

Application of Advanced Master Curve Approaches to the EURO Fracture Toughness Data Set

Convention Electrabel/Tractebel-SCK CEN 2006
Task 1.1.5a

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Abstract

The so-called EURO data set is the largest set ever assembled, consisting of fracture toughness results obtained in the ductile-to-brittle transition region. It was the outcome of a large EU-sponsored project which involved ten European laboratories in the second half of the 90's. Several post-project investigations have identified one of the blocks from which specimens were extracted (block SX9) as macroscopically inhomogeneous and significantly tougher than the remaining blocks.

In this study, the variability of block SX9 has been investigated using the conventional Master Curve (MC) methodology and some recent MC extensions, namely the SINTAP lower tail, the single point estimation, the bi-modal Master Curve and the multi-modal Master Curve. The basic MC method is intended for macroscopically homogeneous ferritic steels only, and the alternative approaches have been developed for the investigation of inhomogeneous materials. Therefore, these methods can be used to study the behaviour of block SX9 within the EURO data set.

It has been found that the bi-modal and multi-modal MC approaches are quite effective in detecting the "anomaly" represented by block SX9, but only when analyses are performed on data sets of comparable size.

Keywords

EURO data set, ductile-to-brittle transition region, macroscopic inhomogeneity, Master Curve extensions, SINTAP lower tail, single point estimation, bi-modal Master Curve, multi-modal Master Curve.

Table of Contents

Abstract	1
Keywords	1
1 Introduction	3
2 Alternative Master Curve approaches	4
2.1 SINTAP Lower Tail (SLT)	4
2.2 Single Point Estimation (SPE)	4
2.3 Bi-Modal Master Curve (BMMC)	4
2.4 Multi-Modal Master Curve (MMMC)	6
3 Material and characteristics of the EURO data set	6
4 Analyses performed.....	8
4.1 Complete EURO data set	8
4.2 Block SX9	9
4.3 Restricted data set: tests performed at -60 °C	11
4.4 Comparison between blocks SX9 and SX12.....	12
5 Conclusions	14
Acknowledgement.....	14
References	14
ANNEX 1 - Master Curve analyses performed on the complete EURO data set (including block SX9)	
ANNEX 2 - Master Curve analyses performed on the complete EURO data set (excluding block SX9)	
ANNEX 3 - Master Curve analyses performed on block SX9	
ANNEX 4 - Master Curve analyses performed on tests performed at -60 °C (including block SX9)	
ANNEX 5 - Master Curve analyses performed on tests performed at -60 °C (excluding block SX9)	
ANNEX 6 - Master Curve analyses performed on blocks SX9 and SX12	

1 Introduction

The so-called EURO fracture toughness data set is definitely the largest and most comprehensive set of fracture toughness data obtained in the ductile-to-brittle transition region on a typical reactor pressure vessel steel (DIN 22NiMoCr37).

It was generated during the second half of the 90's, when ten European laboratories took part in a EU-sponsored project called "Fracture Toughness of Steel in the Ductile-to-Brittle Transition Regime" [1]. Within the project, more than 700 Compact Tension specimens of different thickness (0.5T, 1T, 2T, 4T) were tested at different temperatures in order to produce a sufficiently large data set to be used for the validation of various statistical methods, *in primis* the Master Curve methodology, which in the mid-90's was not yet standardized by ASTM (the first edition of E1921 came out in 1997).

The development and the statistical analysis of the EURO data set was the subject of several publications [1-5]. Besides the straightforward Master Curve analysis [4], other approaches were used [1], such as the analysis of data at the onset of ductile tearing (Neale), a lower bound fracture toughness procedure (Heerens, Pfuff, Hellmann and Zerbst) and modelling by statistical analysis for the quantification of the probability of cleavage fracture (Moskovic). Moreover, Wallin [5] examined the data set for possible inhomogeneities using two of the advanced Master Curve approaches considered in this work (the bi-modal and the multi-modal Master Curve).

Although the material had been found to be "homogeneous" during preliminary investigations, the examination of test results showed that at -60 °C the expected size effect was not observed: 2TC(T) specimens exhibited a clearly higher toughness and larger scatter than the smaller 0.5TC(T) and 1TC(T) specimens. To investigate this discrepancy, an additional set of 0.5TC(T) specimens was machined from the broken 2TC(T) samples and tested at -60 °C. The results confirmed the existence of a macroscopic material variability for block SX9, from which the original 2TC(T) specimens were extracted. A clear inhomogeneity problem for this block was confirmed by Wallin's analyses [5], while for other neighbouring blocks (SX8, SX10) only a moderate inhomogeneity was observed.

In this work, attention will be focused on block SX9, as compared to the remaining data set which will be assumed to be homogeneous. The following Master Curve approaches will be used:

- the conventional Master Curve (MC) analysis in accordance with ASTM E1921-05 (which is only applicable to homogeneous data sets);
- the SINTAP Lower Tail (SLT) procedure;
- the Single Point Estimation (SPE) procedure;
- the Bi-Modal Master Curve (BMMC);
- the Multi-Modal Master Curve (MMMC).

More details on the last four approaches are provided in the next section. For all the methods considered, the objective will be assessing their reliability in recognizing the "anomaly" represented by block SX9 with respect to the overall data population.

After individually examining block SX9 for possible influences of specimen size (2TC(T) vs 0.5TC(T)) or testing laboratory (GKSS vs THA), the whole EURO data set will be considered, both including and excluding data from SX9. Subsequently, in order to have more "comparable" numbers, the same analyses will be performed on the tests performed at -60 °C (all specimens from SX9 were tested at -60 °C). Finally, a "one-to-one" comparison will be presented between blocks SX9 and SX12, with the latter taken as representative of the "average" behaviour of the EURO material.

2 Alternative Master Curve approaches

All the methodologies addressed in this section are described in more detail in [6]. A recent application of two of them (SLT and MMMC) to VVER-440 RPV steels can be found in [7].

2.1 SINTAP Lower Tail (SLT)

The structural integrity assessment procedure SINTAP [8] contains a lower tail modification of the MC analysis [9]. This allows conservative lower bound-type fracture toughness estimates, which are then governed by the toughness of the more brittle constituent. However, the method does not provide information about the tougher material and a probabilistic description of the complete material is not possible.

The SLT procedure guides the user to an estimate of the reference temperature which describes the population having the lowest toughness. It consists of three steps.

Step 1 is a standard estimation of the median fracture toughness in accordance with ASTM E1921-05.

Step 2 performs a lower tail estimation by censoring all K_{Jc} values above the 50% failure probability, $K_{Jc(\text{med})}$, and determining the corresponding reference temperature $T_{o,i}$. The process is iterated until a constant value of T_o (or K_o) is reached.

Step 3, which performs a minimum value estimation, is only required for small data sets (less than 10 values). It allows calculating the maximum value of T_o , $T_{o(\text{max})}$, using all non-censored data. If $T_{o(\text{max})} - 8\text{ °C} > T_{o(\text{step } 2)}$, there is indication that the data is inhomogeneous and $T_{o(\text{max})}$ should be taken as the representative value of T_o .

2.2 Single Point Estimation (SPE)

This simple method provides a quick and rather crude engineering assessment in cases where the inhomogeneity is so large that it becomes a random variable.

After size adjustment, all non-censored values are used to derive individual estimates of T_o , which are then averaged over the number of valid (non-censored) data to obtain the single point value $T_{o,SP}$. This includes a 4 °C bias correction to account for the non-symmetry of the Master Curve distribution.

The standard deviation for T_o can be calculated through a simple formula which accounts for the average inherent scatter of the MC distribution, taken conservatively as 21 °C. No specific criterion is indicated for identifying a data set as inhomogeneous.

2.3 Bi-Modal Master Curve (BMMC)

When the data population of a material consists of two combined MC distributions (as in the case of a heat affected zone), the total cumulative probability can be expressed as a bimodal distribution and two characteristic toughness values (K_{o1} and K_{o2}) can be defined. In contrast to the standard MC analysis, the bimodal distribution contains three parameters (the two characteristic toughness values and the probability p_a of belonging to distribution a ; the probability p_b of belonging to distribution b is obviously given by $1-p_a$). In order to be able to handle randomly censored multi-temperature data sets, the estimation must be based on the maximum likelihood procedure.

The minimum number of data points that can be handled by the BBMC is around 12-15, but preferably the size should be in excess of 20. A simple criterion to judge the likelihood that the data set represents an inhomogeneous material is:

$$|T_{o1} - T_{o2}| > 2\sqrt{\sigma_{T_{o1},E1921}^2 + \sigma_{T_{o2},E1921}^2} \quad (1)$$

where T_{o1} , T_{o2} are the reference temperatures of the two populations and $\sigma_{T_{o1}}$, $\sigma_{T_{o2}}$ their respective standard deviations as per ASTM E1921-05.

Eq. (1) can be considered accurate enough only for small data sets, where the standard deviation calculated according to ASTM E1921 ($\sigma = \beta/r$) primarily depends on the number of valid data r , and reasonable margins of conservatism exist with respect to the effective standard deviation as demonstrated by Monte Carlo calculations in [10]. Based on the E1921 calculation formula, however, for $r \rightarrow \infty$ (i.e. for very large data sets) the standard deviation would tend to zero, thus neglecting all experimental uncertainties related to the measurement of temperature, force, displacement, specimen dimensions and crack size, as well as other factors (specimen alignment, lab-to-lab variability in the case of round-robin exercises, etc).

Since in this study relatively large data sets are investigated, eq. (1) will be effectively replaced by the following criterion:

$$|T_{o1} - T_{o2}| > 2\sqrt{\sigma_{T_{o1},E1921}^2 + \sigma_{T_{o2},E1921}^2 + \sigma_{\text{exp},1}^2 + \sigma_{\text{exp},2}^2} \quad (2)$$

where $\sigma_{\text{exp},1}$ and $\sigma_{\text{exp},2}$ are the contributions to the overall standard deviation which are related to the experimental uncertainty and are independent from the size of the data sets. Based on our engineering judgement, we will subjectively assume $\sigma_{\text{exp}} = 3$ °C.

In order to judge the reliability of the statement "homogeneous/non-homogeneous" provided by the BBMC analysis, we will also evaluate the two members of eq. (2), and based on their ratio (R_σ) we will establish the "degree of non-homogeneity" of each data set according to the following criteria:

$$\text{If } \frac{|T_{o1} - T_{o2}|}{2\sqrt{\sigma_{T_{o1}}^2 + \sigma_{T_{o2}}^2 + \sigma_{\text{exp},1}^2 + \sigma_{\text{exp},2}^2}} \leq 1 \rightarrow \text{no indication of non-homogeneity}$$

$$\text{If } 1 < \frac{|T_{o1} - T_{o2}|}{2\sqrt{\sigma_{T_{o1}}^2 + \sigma_{T_{o2}}^2 + \sigma_{\text{exp},1}^2 + \sigma_{\text{exp},2}^2}} \leq 1.5 \rightarrow \text{slight degree of non-homogeneity}$$

$$\text{If } 1.5 < \frac{|T_{o1} - T_{o2}|}{2\sqrt{\sigma_{T_{o1}}^2 + \sigma_{T_{o2}}^2 + \sigma_{\text{exp},1}^2 + \sigma_{\text{exp},2}^2}} \leq 2 \rightarrow \text{significant degree of non-homogeneity}$$

$$\text{If } \frac{|T_{o1} - T_{o2}|}{2\sqrt{\sigma_{T_{o1}}^2 + \sigma_{T_{o2}}^2 + \sigma_{\text{exp},1}^2 + \sigma_{\text{exp},2}^2}} > 2 \rightarrow \text{high degree of non-homogeneity}$$

2.4 Multi-Modal Master Curve (MMMC)

Based on the maximum likelihood (MML) principle and derived from a proposal by M. Scibetta [11], this method was developed for the analysis of data sets consisting of multiple populations, each characterized by a random variable T_o that is assumed to follow a Gaussian distribution. It is especially suited to data sets including several heats of a single material or inherently macroscopically inhomogeneous materials. The minimum size of the data set for a reliable analysis is around 20.

A simple criterion to judge the likelihood that the data represent an inhomogeneous material is given by:

$$\sigma_{T_o,MMMC} > 2\sigma_{T_o,E1921} \quad (3)$$

i.e. the steel is likely to be inhomogeneous if the standard deviation from the MML estimate ($\sigma_{T_o,MMMC}$) is bigger than twice the theoretical uncertainty for a homogeneous steel ($\sigma_{T_o,E1921}$).

Based on the same arguments already detailed in §2.3, we will replace eq. (3) with:

$$\sigma_{T_o,MMMC} > 2\sqrt{\sigma_{T_o,E1921}^2 + \sigma_{T_o,exp}^2} \quad (4)$$

where $\sigma_{T_o,exp}$ represents the contributions of the experimental measurement uncertainties. Similar to the BMCC method, the ratio between the two members of eq. (4), R_σ , will be used as an indicator of the "degree of non-homogeneity" according to the same criteria as above.

The BMCC and MMMC methods are both implemented as a web-based application (<http://www.sckcen.be/reactorsafety/rmr/mechanicaltesting/mastercurve/>), developed by M. Scibetta with the assistance of Infoplan at SCK•CEN; this application has been used for the analyses performed in this study.

3 Material and characteristics of the EURO data set

The material used to build the EURO data set was a large forged, quenched and tempered ring segment of RPV steel DIN 22NiMoCr37, similar to A508 Cl.3, supplied by Siemens to the project coordinator, GKSS (Geesthacht, Germany). The chemical composition of the material is given in Table 1.

Table 1 - Chemical composition of 22NiMoCr37 (weight %).

C	Si	P	S	Cr	Mn	Ni	Cu	Mo
0.21	0.24	0.003	0.004	0.003	0.82	0.79	0.049	0.56

The cutting scheme of the various blocks extracted from the steel segment is shown in Figure 1. All samples were prepared so that the crack front was located in the region 1/4T-1/2T, which had been found to be "homogeneous" in the preliminary investigations conducted by GKSS [1].

The experimental work was shared between ten different laboratories belonging to six European countries. The test matrix included tests performed at eight different temperatures from -154 °C to 20 °C, covering the whole range between lower and upper shelf. Fracture toughness

specimens were standard C(T) with thickness ranging from 0.5T (12.5 mm) to 4T (100 mm) and initial crack size to width ratio $0.52 \leq a_0/W \leq 0.6$. All specimens were plain sided, except for a set of 20% side-grooved 1TC(T) samples tested at -20°C .

The overall data set consists of 734 K_{Jc} test results, for which nominal values of specimen width and thickness as well as measured values of initial crack size and ductile crack extension are available from a database distributed by GKSS to the participants after the conclusion of the project.

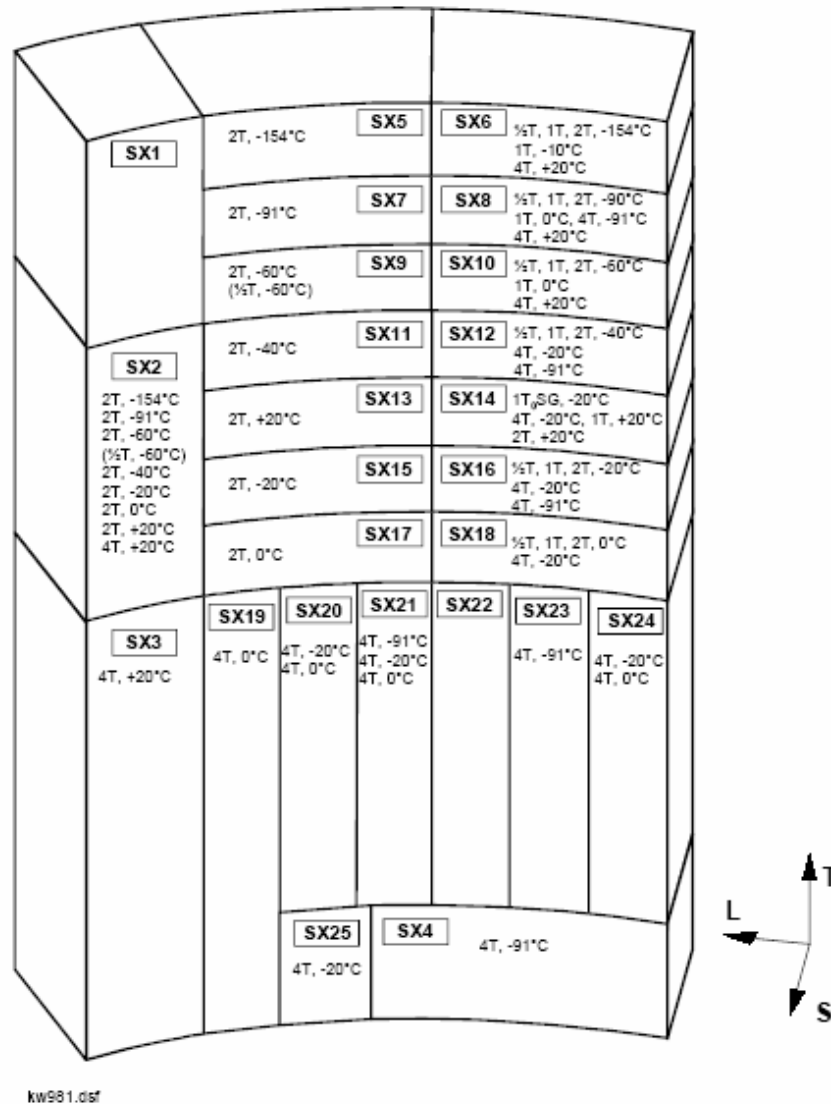


Figure 1 - Cutting scheme of the 22NiMoCr37 ring segment.

4 Analyses performed

4.1 Complete EURO data set

The results of the analyses performed on the overall data set (including the "suspicious" SX9 block) are summarized in Table 2; complete details are provided in Annex 1 (complete data set including SX9) and Annex 2 (complete data set excluding SX9).

Table 2 - Master Curve analyses performed on the complete EURO fracture toughness data set (N = number of specimens tested; r = number of valid data).

Dataset	N	ASTM E1921-05			SLT			SPE		
		T_o (°C)	σ_{T_o} (°C)	r	T_o (°C)	σ_{T_o} (°C)	r	T_o (°C)	σ_{T_o} (°C)	r
All tests	734	-91.3	1.1	278	-96.1	0.7	616	-87.3	N/A	278
All tests except SX9	698	-86.4	1.0	316	-90.8	0.8	547	-85.3	N/A	316
Only block SX9	36	-107.3	3.3	30	-99.5	4.4	17	-102.3	5.1	30.0

Dataset	N	BMMC						MMMC				
		r	$T_{o,A}$ (°C)	$\sigma_{T_{o,A}}$ (°C)	P_a	$T_{o,B}$ (°C)	$\sigma_{T_{o,B}}$ (°C)	LIKELY NON HOM.	T_o (°C)	σ_{T_o} (°C)	r	LIKELY NON HOM.
All tests	734	449	-81.6	1.0	0.91	-110.4	7.3	TRUE	-83.0	11.4	518	TRUE
All tests except SX9	698	419	-79.5	1.1	0.88	-99.6	3.5	TRUE	-85.0	6.4	316	TRUE
Only block SX9	36	30	-93.3	5.4	0.51	-115.1	5.3	TRUE	-104.0	10.8	30	TRUE

Dataset	N	BMMC		MMMC	
		R_σ	Degree of non-homogeneity	R_σ	Degree of non-homogeneity
All tests	734	1.52	SIGNIFICANT	1.78	SIGNIFICANT
All tests except SX9	698	1.43	SLIGHT	1.01	SLIGHT
Only block SX9	36	1.13	SLIGHT	1.21	SLIGHT

The conventional MC analysis of the complete EURO data set (734 tests, 278 valid data) yields $T_o = -91.3$ °C with a standard deviation $\sigma_{T_o} = 1.1$ °C. If measurement uncertainties are taken into account as previously described, the standard deviation becomes $\sigma_{T_o,all} = 3.2$ °C

If data from block SX9 are excluded, the reference temperature becomes $T_o = -86.4$ °C associated to the same overall standard deviation. The difference $\Delta T_o = 4.9$ °C is small enough to render the two temperatures statistically not different at the 95% confidence level (i.e. considering $\pm 2\sigma$ intervals).

A similar increase of T_o is observed when applying the SLT approach (from -96.1 °C to -90.8 after excluding SX9). The variation is only 2 °C for the SPE method (-87.3 °C and -85.3 °C respectively).

Since test results from SX9 represent only less than 5% of the entire EURO data set, the applicability of the BMMC and MMMC analyses might be questioned. Indeed, the data set is judged to be likely inhomogeneous before and after excluding SX9. Moreover, the value of p_a returned by BMMC for the complete data (0.91) set is reasonably close to the fraction of data points not coming from SX9 (0.95).

It is interesting to note that the reference temperatures calculated on the abridged EURO data set (i.e. excluding SX9) using MC, SLT, SPE and MMMC are within 6 °C, while more scatter is observed (13 °C) for the complete data set. This indicates that excluding SX9 results significantly improves the homogeneity of the data set; this is confirmed by the value of R_σ for the MMMC analysis when SX9 results are excluded, which is very close to the threshold of homogeneity (1.01).

4.2 Block SX9

From block SX9, GKSS extracted 24 2TC(T) specimens which were all tested at $-60\text{ }^{\circ}\text{C}$ partly by GKSS and partly by THA (Technische Hochschule Aachen). As previously mentioned, 12 additional 0.5TC(T) samples were subsequently machined from the broken 2TC(T) and tested at the same temperature, all by GKSS. The SX9 data set therefore includes 36 data points.

The results of the analyses performed on block SX9 are summarized in Table 3; details are provided in Annex 3.

Table 3 - Master Curve analyses performed on block SX9.

Dataset	N	ASTM E1921-05			BMMC							MMMC			
		T_o ($^{\circ}\text{C}$)	σ_{T_o} ($^{\circ}\text{C}$)	r	r	$T_{o,A}$ ($^{\circ}\text{C}$)	$\sigma_{T_{o,A}}$ ($^{\circ}\text{C}$)	p_a	$T_{o,B}$ ($^{\circ}\text{C}$)	$\sigma_{T_{o,B}}$ ($^{\circ}\text{C}$)	LIKELY NON HOM.	T_o ($^{\circ}\text{C}$)	σ_{T_o} ($^{\circ}\text{C}$)	r	LIKELY NON HOM.
All tests	36	-107.3	3.3	30	30	-93.3	5.4	0.51	-115.1	5.3	TRUE	-104.0	10.8	30	TRUE
Only 1/2TC(T)	12	-95.1	7.3	6	ANALYSIS DOES NOT CONVERGE										
Only 2TC(T)	20	-109.4	4.0	20	20	-98.8	6.5	0.64	-118.6	7.5	FALSE	-106.3	9.3	20	FALSE
Only GKSS tests	16	-101.9	5.7	10	10	-71.9	13.7	0.27	-108.9	8.6	TRUE	-100.2	15.3	10	TRUE
Only THA tests	20	-109.4	4.0	20	20	-108.5	6.5	0.64	-128.1	7.5	FALSE	-115.9	9.2	20	FALSE

Dataset	N	BMMC		MMMC	
		R_{σ}	Degree of non-homogeneity	R_{σ}	Degree of non-homogeneity
All tests	36	1.13	SLIGHT	1.21	SLIGHT
Only 1/2TC(T)	12	-	-	1.43	SLIGHT
Only 2TC(T)	20	0.85	NO INDICATION	0.93	NO INDICATION
Only GKSS tests	16	1.07	SLIGHT	1.19	SLIGHT
Only THA tests	20	0.85	NO INDICATION	0.92	NO INDICATION

The conventional Master Curve analysis yields $T_o = -107.3\text{ }^{\circ}\text{C}$ with a standard deviation of $3.3\text{ }^{\circ}\text{C}$ ($4.5\text{ }^{\circ}\text{C}$ accounting for experimental uncertainties) and 30 valid data.

The data set is judged to be "likely not homogeneous" by both BMMC and MMMC; the bi-modal analysis splits the data set approximately in half ($p_a = 0.51$).

If data are partitioned according to specimen size (Figure 2) or testing laboratory (Figure 3), no obvious influence of either variable can be observed. Nevertheless, individual MC, BMMC and MMMC analyses have been performed separately on the 0.5TC(T) and 2TC(T) data sets and on the results provided by GKSS and THA.

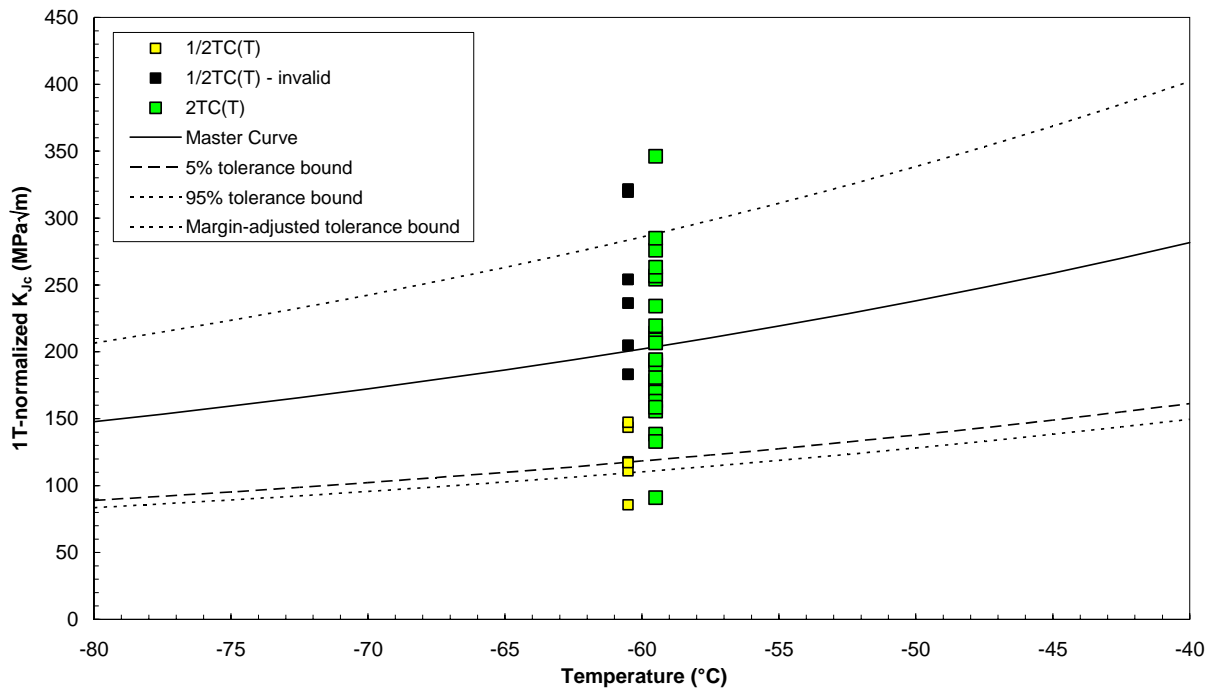


Figure 2 - Test results from block SX9 separated on account of specimen size.

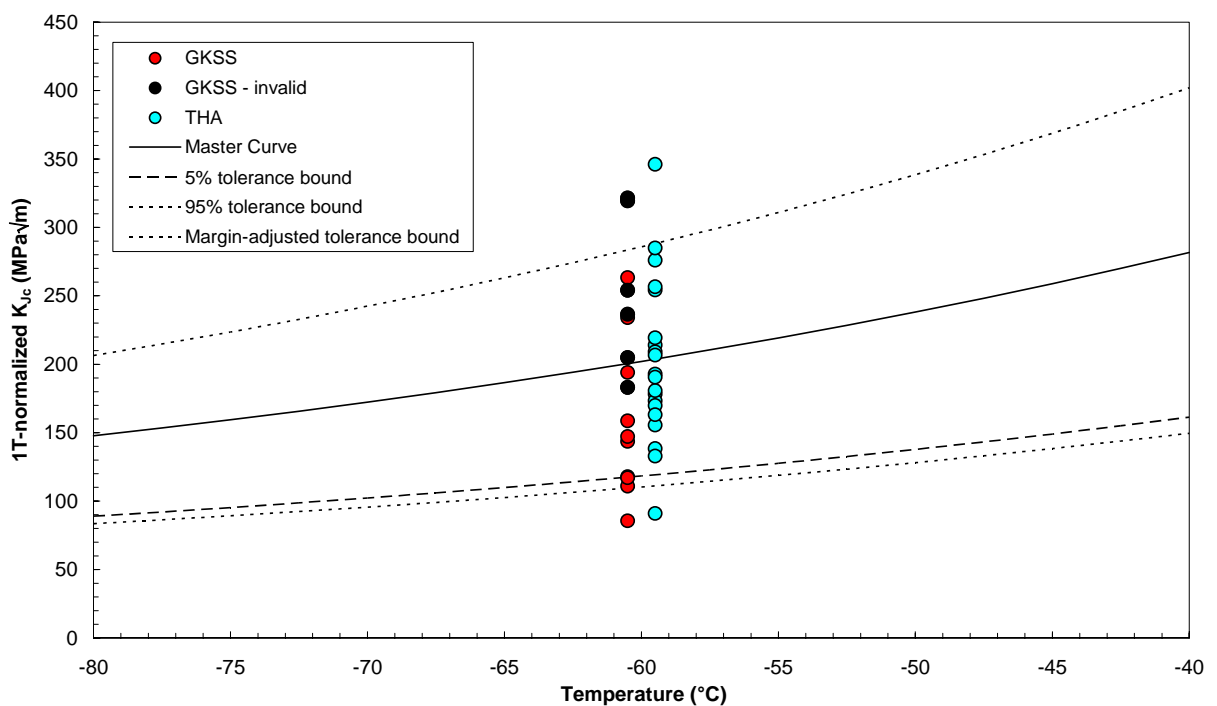


Figure 3 - Test results from block SX9 separated on account of testing laboratory.

The value of T_0 for 0.5TC(T) is significantly higher than for 2TC(T) (-95.1 °C versus -109.4 °C); however, for the former data set half of the results are censored and only 6 valid data are available. BMMC is unable to guarantee that the 2TC(T) data set contains two populations, while for the 0.5TC(T) set the number of valid data is too low and the analysis does not

converge. The MMMC analysis does not provide indications of non homogeneity for the 2TC(T) data set.

Concerning the two testing labs, their respective reference temperatures are rather close (-101.9 °C for GKSS and -109.4 °C for THA). The BMCC analysis identifies two populations for GKSS but not for THA; the latter data set cannot be identified as non-homogeneous based on the MMMC analysis. Note that the GKSS set only contains 10 valid data.

In summary, the advanced Master Curve approaches are unable to detect an influence of specimen size or testing lab on the results measured from block SX9. Moreover, it is observed that block SX9, which is suspected to be different from the overall population, is also slightly non-homogeneous in itself.

4.3 Restricted data set: tests performed at -60 °C

In order to work with more "comparable" numbers and more importantly to eliminate the effect of test temperature and Master Curve shape, a restricted subset of fracture toughness results has been extracted from the complete data set, namely the tests performed at -60 °C (which include all specimens from the SX9 block).

The subset consists of 126 data from 0.5TC(T), 1TC(T) and 2TC(T) specimens; approximately 1/3 (29%) are from block SX9.

The results of the analyses performed are summarized in Table 4, which for the reader's convenience also includes the results of block SX9; full details are provided in Annex 4 (SX9 included) and Annex 5 (SX9 excluded).

Table 4 - Master Curve analyses on the tests performed at -60 °C.

Dataset	N	ASTM E1921-05			SLT			SPE		
		T _o (°C)	σ _{To} (°C)	r	T _o (°C)	σ _{To} (°C)	r	T _o (°C)	σ _{To} (°C)	r
All tests at -60 °C	126	-94.2	1.7	113	-97.1	1.9	93	-87.2	N/A	113
All tests except SX9	90	-82.4	2.0	83	-82.0	2.7	45	-82.1	N/A	83
Only block SX9	36	-107.3	3.3	30	-99.5	4.4	17	-102.3	5.1	30

Dataset	N	BMCC							MMMC			
		r	T _{o,A} (°C)	σ _{To,A} (°C)	P _a	T _{o,B} (°C)	σ _{To,B} (°C)	LIKELY NON HOM.	T _o (°C)	σ _{To} (°C)	r	LIKELY NON HOM.
All tests at -60 °C	126	113	-83.3	2.2	0.81	-114.2	5.8	TRUE	-88.2	13.5	113	TRUE
All tests except SX9	90	83	-72.1	8.2	0.10	-83.3	1.9	FALSE	-82.4	1.1	83	FALSE
Only block SX9	36	30	-93.3	5.4	0.51	-115.1	5.3	TRUE	-104.0	10.8	30	TRUE

Dataset	N	BMCC		MMMC	
		R _σ	Degree of non-homogeneity	R _σ	Degree of non-homogeneity
All tests at -60 °C	126	1.79	SIGNIFICANT	1.96	SIGNIFICANT
All tests except SX9	90	0.54	NO INDICATION	0.15	NO INDICATION
Only block SX9	36	1.13	SLIGHT	1.21	SLIGHT

Following the conventional MC analysis, a reference temperature of -94.2 °C is calculated for the -60 °C data set (113 valid data, σ_{To} = 1.7 °C, σ_{To,all} = 3.4 °C). After excluding SX9 specimens, T_o increases by almost 12 °C to -82.4 °C (σ_{To} = 2.0 °C, σ_{To,all} = 3.6 °C).

The increase of T_o caused by the removal of SX9 data is even more pronounced for the SLT analysis (15.1 °C), while the variation is smaller for the SPE approach (5.1 °C).

In this case, the outcome of the BMCC and MMMC analyses is quite significant:

- when all tests are accounted for, both methods indicate that the data set is likely not homogeneous; furthermore, BMCC reports the probability of belonging to population A as 0.81 (the share of non-SX9 tests in the set is 71%);
- once test results from SX9 samples are removed, the criteria expressed by eqs.(1) and (2) are not fulfilled and the analyses are "unable to guarantee that the data contain two populations" (BMCC) or "unable to guarantee that the material is randomly heterogeneous" (MMMC); in both cases, the ratio R_{σ} is significantly lower than 1 (0.54 and 0.15 respectively).

Moreover, we observe that the reference temperatures measured by MC, SLT, SPE and MMMC for the non-SX9 subset are all within 0.3 °C and that MC and MMMC provide exactly the same T_0 (-82.4 °C), thus confirming that the subset is highly homogeneous.

4.4 Comparison between blocks SX9 and SX12

As a final assessment of the variability of block SX9 with respect to the "mean" fracture behaviour of the 22NiMoCr37 forged ring, we decided to select another block which might be considered representative of such "mean" behaviour. According to the analyses performed by Wallin in [5], the block which best represents the characteristics of the material is SX12 (Figure 4).

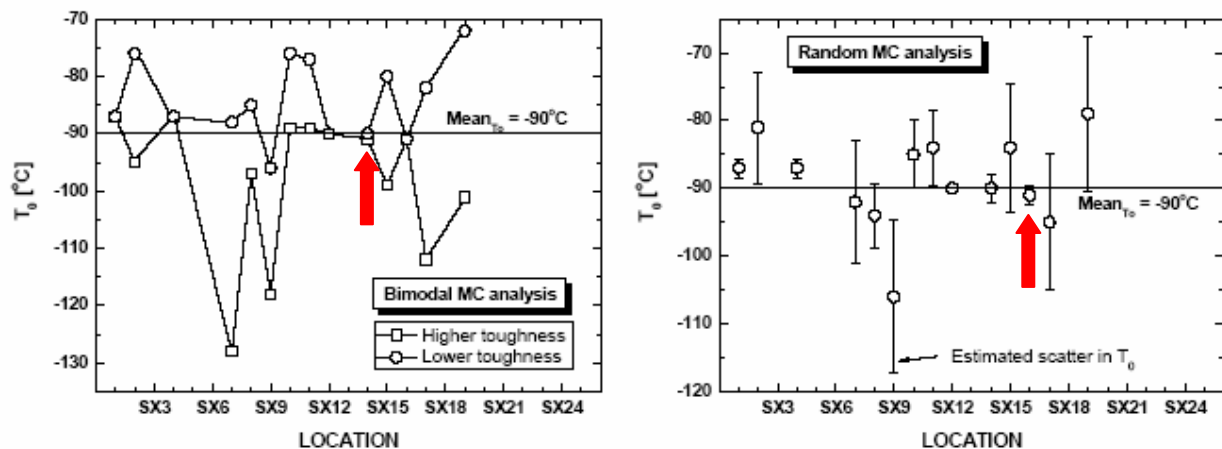


Figure 4 - Inhomogeneity analyses performed by Wallin [5] on the EURO data set. Block SX12 is indicated by the red arrows.

From block SX12, 0.5TC(T), 1TC(T), 2TC(T) and 4TC(T) specimens were extracted; they were tested at -91, -40 and -20 °C (Figure 1). In total, the SX12 data set consists of 68 tests.

In this case, only MC, BMCC and MMMC analysis were performed. The results are summarized in Table 5; details are provided in Annex 6.

Table 5 - Master Curve analyses performed on blocks SX9 and SX12.

Dataset	N	ASTM E1921-05			BMCC							MMMC			
		T_0 (°C)	σ_{T_0} (°C)	r	r	$T_{0,A}$ (°C)	$\sigma_{T_{0,A}}$ (°C)	P_a	$T_{0,B}$ (°C)	$\sigma_{T_{0,B}}$ (°C)	LIKELY NON HOM.	T_0 (°C)	σ_{T_0} (°C)	r	LIKELY NON HOM.
SX9+SX12	104	-98.8	2.1	74	73	-89.2	2.5	0.78	-115.8	160.0	FALSE	-95.0	11.8	73	TRUE
Block SX9	36	-107.3	3.3	30	30	-93.3	5.4	0.51	-115.1	5.3	TRUE	-104.0	10.8	30	TRUE
Block SX12	68	-87.6	2.7	43	43	-87.6	2.7	1.00	-88.2	160.0	FALSE	-87.6	0.0	43	FALSE

Dataset	N	BMMC		MMM	
		R_σ	Degree of non-homogeneity	R_σ	Degree of non-homogeneity
SX9+SX12	104	0.08	NO INDICATION	1.61	SIGNIFICANT
Block SX9	36	1.13	SLIGHT	1.21	SLIGHT
Block SX12	68	0.00	NO INDICATION	0.00	NO INDICATION

The conventional MC analysis of the two blocks (SX9+SX12), Figure 5, was performed without accounting for the temperature validity window of the E1921-05 standard ($T_0 \pm 50$ °C). Otherwise, all data from block SX12 (except one) would have been censored and the calculated reference temperature (-107.1 °C) would have practically coincided with that of block SX9 (-107.3 °C). Fortunately, this is not the case with BMMC and MMMC.

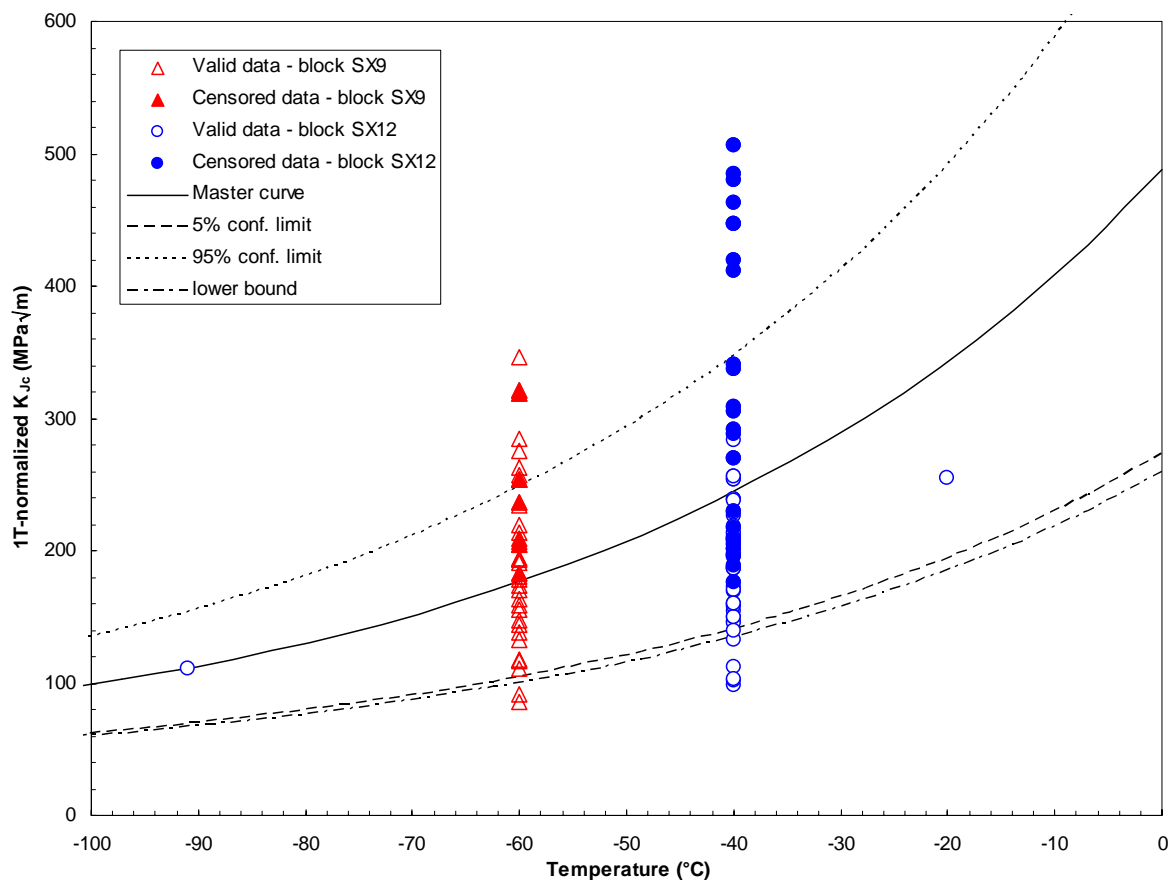


Figure 5 - Master Curve analysis of data from blocks SX9 and SX12.

The reference temperature of block SX12 (-87.6 °C, $\sigma_{T_0,all} = 4.0$ °C) is very close to that of the overall EURO data set after excluding SX9 data (-86.4 °C, $\sigma_{T_0,all} = 4.5$ °C), and statistically different at the 95% confidence level from the reference temperature of block SX9 (-107.3 °C) even considering measurement uncertainties (i.e. using $\sigma_{T_0,all}$).

The bi-modal MC analysis of the combined data set (SX9+SX12) is unable to detect two populations; however, the value obtained for p_a (0.78) is not too far from the percentage of SX12 data (65%) and the values of T_0 for populations A and B (-89.2 °C and -115.8 °C) are fairly similar to those calculated for the individual blocks. Therefore, although strictly speaking eq.(2) is not fulfilled, the BMMC analysis seems to have identified the two blocks as two substantially different materials. Note also that, for the individual block SX12, BMMC yields exactly the

same reference temperature as MC and finds the material remarkably homogeneous ($p_a = 1.0$ and $R_\sigma = 0.00!$).

As far as the MMMC method is concerned, the combined data set is identified as not homogeneous, while the analysis cannot guarantee that the individual block SX12 is randomly inhomogeneous. In other words, adding SX9 data to the SX12 set introduces a significant inhomogeneity which is detected by both the bi-modal and the multi-modal MC analyses, and can be classified as "significant" for the latter method.

5 Conclusions

Alternative Master Curve approaches (SINTAP lower tail, single point estimation, bi-modal Master Curve and multi-modal Master Curve) have been used for the investigation of the largest available fracture toughness data set (the EURO data set). More specifically, the analyses have been aimed at investigating the already established macroscopic inhomogeneity corresponding to one of the blocks extracted from the forged ring section of 22NiMoCr37 used for the EURO project (block SX9).

It has been found that the most advanced methodologies (bi-modal and multi-modal MC) are quite effective in rationalizing the behaviour of the EURO data set in terms of two populations of fracture initiators, one corresponding to the outlier block and the other to the remaining blocks.

However, detecting the intrinsic homogeneity of the SX9 block is more feasible when the contributions of the two populations are numerically "balanced", which is not the case when investigations are performed on the complete data set (734 test results, only 5% coming from SX9). More meaningful results have been obtained by considering the single-temperature -60 °C data set (126 data, 29% from SX9), which allows neglecting any effect of test temperature or Master Curve shape; or by directly comparing SX9 with another block fully representative of the "typical" behaviour of the investigated material.

Acknowledgement

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ANNEX 1

Master Curve analyses performed
on the complete EURO data set
(including block SX9)

**STANDARD TEST METHOD FOR THE DETERMINATION OF REFERENCE TEMPERATURE
T₀ FOR FERRITIC STEELS IN THE TRANSITION RANGE**

[MULTI-TEMPERATURE APPROACH - IN ACCORDANCE WITH ASTM E1921-05]

1. Material characteristics

Material specifications : **EURO toughness data set - Complete dataset**

2. Dimensional and crack growth requirements

Testing lab	T (°C)	a ₀ (mm)	W (mm)	B (mm)	b ₀ (mm)	Δa (mm)	K _{Jc[exp]} (MPa√m)	σ _{ys} (MPa)	E' (GPa)	K _{lim} (MPa√m)	DATA VALID	K _{Jc[calc]} (MPa√m)
GKSS	-154	14.47	25	12.5	10.53	0.00	54.8	674.5	237.6	237.2	YES	54.8
GKSS	-154	14.17	25	12.5	10.83	0.00	49.8	674.5	237.6	240.5	YES	49.8
GKSS	-154	14.15	25	12.5	10.85	0.00	37.8	674.5	237.6	240.8	YES	37.8
GKSS	-154	14.36	25	12.5	10.64	0.00	33.0	674.5	237.6	238.4	YES	33.0
GKSS	-154	14.06	25	12.5	10.94	0.00	38.9	674.5	237.6	241.8	YES	38.9
GKSS	-154	14.11	25	12.5	10.89	0.00	24.2	674.5	237.6	241.2	YES	24.2
GKSS	-154	14.06	25	12.5	10.94	0.00	47.4	674.5	237.6	241.8	YES	47.4
GKSS	-154	14.50	25	12.5	10.50	0.00	46.5	674.5	237.6	236.9	YES	46.5
GKSS	-154	13.79	25	12.5	11.21	0.00	31.4	674.5	237.6	244.7	YES	31.4
GKSS	-154	14.28	25	12.5	10.72	0.00	39.2	674.5	237.6	239.3	YES	39.2
GKSS	-154	14.11	25	12.5	10.89	0.00	24.2	674.5	237.6	241.2	YES	24.2
SIEMENS	-154	13.17	25	12.5	11.83	0.00	33.0	674.5	237.6	251.4	YES	33.0
SIEMENS	-154	13.07	25	12.5	11.93	0.00	41.0	674.5	237.6	252.5	YES	41.0
SIEMENS	-154	13.15	25	12.5	11.85	0.00	31.7	674.5	237.6	251.6	YES	31.7
SIEMENS	-154	13.11	25	12.5	11.89	0.00	35.2	674.5	237.6	252.0	YES	35.2
SIEMENS	-154	13.14	25	12.5	11.86	0.00	44.4	674.5	237.6	251.7	YES	44.4
SIEMENS	-154	13.32	25	12.5	11.68	0.00	41.5	674.5	237.6	249.8	YES	41.5
SIEMENS	-154	13.17	25	12.5	11.83	0.00	32.7	674.5	237.6	251.4	YES	32.7
SIEMENS	-154	13.19	25	12.5	11.81	0.00	34.3	674.5	237.6	251.2	YES	34.3
SIEMENS	-154	13.21	25	12.5	11.79	0.00	36.7	674.5	237.6	251.0	YES	36.7
SIEMENS	-154	13.30	25	12.5	11.70	0.00	39.7	674.5	237.6	250.0	YES	39.7
SIEMENS	-154	13.24	25	12.5	11.76	0.00	46.1	674.5	237.6	250.7	YES	46.1
SIEMENS	-154	13.23	25	12.5	11.77	0.00	34.6	674.5	237.6	250.8	YES	34.6
SIEMENS	-154	13.21	25	12.5	11.79	0.00	35.8	674.5	237.6	251.0	YES	35.8
SIEMENS	-154	13.31	25	12.5	11.69	0.00	29.3	674.5	237.6	249.9	YES	29.3
SIEMENS	-154	13.33	25	12.5	11.67	0.00	28.6	674.5	237.6	249.7	YES	28.6
SIEMENS	-154	13.21	25	12.5	11.79	0.00	38.6	674.5	237.6	251.0	YES	38.6
SIEMENS	-154	13.32	25	12.5	11.68	0.00	44.4	674.5	237.6	249.8	YES	44.4
SIEMENS	-154	13.18	25	12.5	11.82	0.00	48.9	674.5	237.6	251.3	YES	48.9
SIEMENS	-154	13.27	25	12.5	11.73	0.00	38.9	674.5	237.6	250.3	YES	38.9
SIEMENS	-154	13.17	25	12.5	11.83	0.00	36.7	674.5	237.6	251.4	YES	36.7
SIEMENS	-154	13.53	25	12.5	11.47	0.00	31.7	674.5	237.6	247.6	YES	31.7
GKSS	-154	28.21	50	25.0	21.79	0.00	41.5	674.5	237.6	341.2	YES	41.5
GKSS	-154	27.98	50	25.0	22.02	0.00	42.2	674.5	237.6	343.0	YES	42.2
GKSS	-154	27.64	50	25.0	22.36	0.00	50.0	674.5	237.6	345.6	YES	50.0
GKSS	-154	27.73	50	25.0	22.27	0.00	34.0	674.5	237.6	344.9	YES	34.0
GKSS	-154	28.15	50	25.0	21.85	0.00	41.7	674.5	237.6	341.7	YES	41.7
GKSS	-154	27.58	50	25.0	22.42	0.00	46.1	674.5	237.6	346.1	YES	46.1
GKSS	-154	27.98	50	25.0	22.02	0.00	44.2	674.5	237.6	343.0	YES	44.2
GKSS	-154	28.10	50	25.0	21.90	0.00	36.7	674.5	237.6	342.1	YES	36.7
GKSS	-154	27.96	50	25.0	22.04	0.00	29.0	674.5	237.6	343.2	YES	29.0
GKSS	-154	28.17	50	25.0	21.83	0.00	53.0	674.5	237.6	341.5	YES	53.0
GKSS	-154	29.45	50	25.0	20.55	0.00	39.4	674.5	237.6	331.4	YES	39.4
GKSS	-154	27.96	50	25.0	22.04	0.00	29.0	674.5	237.6	343.2	YES	29.0
SIEMENS	-154	26.52	50	25.0	23.48	0.00	34.6	674.5	237.6	354.2	YES	34.6
SIEMENS	-154	26.60	50	25.0	23.40	0.00	33.0	674.5	237.6	353.6	YES	33.0
SIEMENS	-154	26.63	50	25.0	23.37	0.00	38.1	674.5	237.6	353.4	YES	38.1
SIEMENS	-154	26.81	50	25.0	23.19	0.00	28.6	674.5	237.6	352.0	YES	28.6
SIEMENS	-154	26.61	50	25.0	23.39	0.00	28.6	674.5	237.6	353.5	YES	28.6
SIEMENS	-154	26.69	50	25.0	23.31	0.00	38.6	674.5	237.6	352.9	YES	38.6
SIEMENS	-154	26.74	50	25.0	23.26	0.00	36.4	674.5	237.6	352.5	YES	36.4
SIEMENS	-154	26.43	50	25.0	23.57	0.00	33.4	674.5	237.6	354.9	YES	33.4
SIEMENS	-154	26.48	50	25.0	23.52	0.00	36.9	674.5	237.6	354.5	YES	36.9
SIEMENS	-154	26.49	50	25.0	23.51	0.00	31.1	674.5	237.6	354.4	YES	31.1
SIEMENS	-154	26.44	50	25.0	23.56	0.00	34.3	674.5	237.6	354.8	YES	34.3
SIEMENS	-154	26.42	50	25.0	23.58	0.00	30.4	674.5	237.6	354.9	YES	30.4
SIEMENS	-154	26.44	50	25.0	23.56	0.00	49.6	674.5	237.6	354.8	YES	49.6
SIEMENS	-154	26.55	50	25.0	23.45	0.00	41.0	674.5	237.6	354.0	YES	41.0
SIEMENS	-154	26.83	50	25.0	23.17	0.00	34.0	674.5	237.6	351.8	YES	34.0
SIEMENS	-154	27.01	50	25.0	22.99	0.00	30.7	674.5	237.6	350.5	YES	30.7
SIEMENS	-154	26.74	50	25.0	23.26	0.00	41.2	674.5	237.6	352.5	YES	41.2
SIEMENS	-154	26.65	50	25.0	23.35	0.00	26.7	674.5	237.6	353.2	YES	26.7
SIEMENS	-154	26.63	50	25.0	23.37	0.00	35.5	674.5	237.6	353.4	YES	35.5
SIEMENS	-154	26.52	50	25.0	23.48	0.00	33.4	674.5	237.6	354.2	YES	33.4
SIEMENS	-154	26.77	50	25.0	23.23	0.00	36.7	674.5	237.6	352.3	YES	36.7
SIEMENS	-154	26.68	50	25.0	23.32	0.00	32.4	674.5	237.6	353.0	YES	32.4
SIEMENS	-154	26.48	50	25.0	23.52	0.00	45.1	674.5	237.6	354.5	YES	45.1
SIEMENS	-154	26.43	50	25.0	23.57	0.00	33.4	674.5	237.6	354.9	YES	33.4
SIEMENS	-154	26.83	50	25.0	23.17	0.00	34.0	674.5	237.6	351.8	YES	34.0
SIEMENS	-154	27.01	50	25.0	22.99	0.00	30.7	674.5	237.6	350.5	YES	30.7
SIEMENS	-154	26.65	50	25.0	23.35	0.00	26.7	674.5	237.6	353.2	YES	26.7
GKSS	-154	56.79	100	50.0	43.21	0.00	33.7	674.5	237.6	480.5	YES	33.7

GKSS	-154	55.00	100	50.0	45.00	0.00	42.7	674.5	237.6	490.3	YES	42.7
GKSS	-154	55.62	100	50.0	44.38	0.00	37.2	674.5	237.6	486.9	YES	37.2
GKSS	-154	55.81	100	50.0	44.19	0.00	54.4	674.5	237.6	485.9	YES	54.4
GKSS	-154	55.97	100	50.0	44.03	0.00	34.6	674.5	237.6	485.0	YES	34.6
GKSS	-154	55.45	100	50.0	44.55	0.00	44.2	674.5	237.6	487.9	YES	44.2
GKSS	-154	57.86	100	50.0	42.14	0.00	29.7	674.5	237.6	474.5	YES	29.7
GKSS	-154	55.20	100	50.0	44.80	0.00	36.4	674.5	237.6	489.2	YES	36.4
GKSS	-154	55.95	100	50.0	44.05	0.00	36.4	674.5	237.6	485.1	YES	36.4
GKSS	-154	54.42	100	50.0	45.58	0.00	28.2	674.5	237.6	493.5	YES	28.2
GKSS	-154	54.42	100	50.0	45.58	0.00	28.2	674.5	237.6	493.5	YES	28.2
NE	-154	55.67	100	50.0	44.33	0.00	30.0	674.5	237.6	486.7	YES	30.0
NE	-154	56.75	100	50.0	43.25	0.00	36.4	674.5	237.6	480.7	YES	36.4
NE	-154	56.43	100	50.0	43.57	0.00	37.5	674.5	237.6	482.5	YES	37.5
NE	-154	56.35	100	50.0	43.65	0.00	30.0	674.5	237.6	482.9	YES	30.0
NE	-154	56.21	100	50.0	43.79	0.00	30.7	674.5	237.6	483.7	YES	30.7
NE	-154	57.23	100	50.0	42.77	0.00	30.4	674.5	237.6	478.0	YES	30.4
NE	-154	58.12	100	50.0	41.88	0.00	30.7	674.5	237.6	473.0	YES	30.7
NE	-154	56.50	100	50.0	43.50	0.00	31.7	674.5	237.6	482.1	YES	31.7
NE	-154	57.11	100	50.0	42.89	0.00	41.7	674.5	237.6	478.7	YES	41.7
NE	-154	56.45	100	50.0	43.55	0.00	37.2	674.5	237.6	482.4	YES	37.2
NE	-154	56.52	100	50.0	43.48	0.00	34.9	674.5	237.6	482.0	YES	34.9
NE	-154	56.28	100	50.0	43.72	0.00	38.3	674.5	237.6	483.3	YES	38.3
NE	-154	56.35	100	50.0	43.65	0.00	31.4	674.5	237.6	482.9	YES	31.4
NE	-154	56.41	100	50.0	43.59	0.00	33.7	674.5	237.6	482.6	YES	33.7
NE	-154	56.35	100	50.0	43.65	0.00	32.7	674.5	237.6	482.9	YES	32.7
NE	-154	56.36	100	50.0	43.64	0.00	43.0	674.5	237.6	482.9	YES	43.0
NE	-154	56.08	100	50.0	43.92	0.00	32.7	674.5	237.6	484.4	YES	32.7
NE	-154	56.51	100	50.0	43.49	0.00	30.0	674.5	237.6	482.0	YES	30.0
NE	-154	56.47	100	50.0	43.53	0.00	36.9	674.5	237.6	482.3	YES	36.9
NE	-154	56.42	100	50.0	43.58	0.00	33.4	674.5	237.6	482.5	YES	33.4
NE	-154	56.35	100	50.0	43.65	0.00	30.0	674.5	237.6	482.9	YES	30.0
GKSS	-110	14.51	25	12.5	10.49	0.00	98.1	567.6	234.7	215.8	YES	98.1
GKSS	-110	14.34	25	12.5	10.66	0.00	59.0	567.6	234.7	217.6	YES	59.0
GKSS	-110	14.38	25	12.5	10.62	0.00	80.0	567.6	234.7	217.2	YES	80.0
GKSS	-110	14.72	25	12.5	10.28	0.00	57.2	567.6	234.7	213.7	YES	57.2
GKSS	-110	14.64	25	12.5	10.36	0.00	88.3	567.6	234.7	214.5	YES	88.3
GKSS	-110	14.27	25	12.5	10.73	0.00	96.2	567.6	234.7	218.3	YES	96.2
GKSS	-110	14.62	25	12.5	10.38	0.00	81.6	567.6	234.7	214.7	YES	81.6
GKSS	-110	14.30	25	12.5	10.70	0.00	66.9	567.6	234.7	218.0	YES	66.9
GKSS	-110	14.64	25	12.5	10.36	0.00	85.6	567.6	234.7	214.5	YES	85.6
GKSS	-110	14.40	25	12.5	10.60	0.00	86.8	567.6	234.7	217.0	YES	86.8
GKSS	-110	14.44	25	12.5	10.56	0.00	114.2	567.6	234.7	216.6	YES	114.2
GKSS	-110	14.20	25	12.5	10.80	0.00	73.5	567.6	234.7	219.0	YES	73.5
GKSS	-110	13.96	25	12.5	11.04	0.00	92.7	567.6	234.7	221.4	YES	92.7
GKSS	-110	14.10	25	12.5	10.90	0.00	77.5	567.6	234.7	220.0	YES	77.5
GKSS	-110	14.14	25	12.5	10.86	0.00	61.5	567.6	234.7	219.6	YES	61.5
GKSS	-110	14.06	25	12.5	10.94	0.00	51.8	567.6	234.7	220.4	YES	51.8
GKSS	-110	14.23	25	12.5	10.77	0.00	73.6	567.6	234.7	218.7	YES	73.6
GKSS	-110	14.10	25	12.5	10.90	0.00	52.8	567.6	234.7	220.0	YES	52.8
GKSS	-110	14.00	25	12.5	11.00	0.00	41.2	567.6	234.7	221.0	YES	41.2
GKSS	-110	14.20	25	12.5	10.80	0.00	115.3	567.6	234.7	219.0	YES	115.3
GKSS	-110	13.98	25	12.5	11.02	0.00	73.2	567.6	234.7	221.2	YES	73.2
GKSS	-110	13.97	25	12.5	11.03	0.00	74.0	567.6	234.7	221.3	YES	74.0
GKSS	-110	14.45	25	12.5	10.55	0.00	67.5	567.6	234.7	216.5	YES	67.5
GKSS	-110	14.58	25	12.5	10.42	0.00	71.0	567.6	234.7	215.1	YES	71.0
GKSS	-110	14.35	25	12.5	10.65	0.00	53.4	567.6	234.7	217.5	YES	53.4
GKSS	-110	14.55	25	12.5	10.45	0.00	96.5	567.6	234.7	215.4	YES	96.5
GKSS	-110	14.54	25	12.5	10.46	0.00	71.3	567.6	234.7	215.5	YES	71.3
GKSS	-110	14.39	25	12.5	10.61	0.00	71.7	567.6	234.7	217.1	YES	71.7
GKSS	-110	14.54	25	12.5	10.46	0.00	81.7	567.6	234.7	215.5	YES	81.7
GKSS	-110	14.32	25	12.5	10.68	0.00	64.0	567.6	234.7	217.8	YES	64.0
GKSS	-110	14.36	25	12.5	10.64	0.00	74.2	567.6	234.7	217.4	YES	74.2
GKSS	-110	14.30	25	12.5	10.70	0.00	70.4	567.6	234.7	218.0	YES	70.4
GKSS	-110	14.25	25	12.5	10.75	0.00	91.2	567.6	234.7	218.5	YES	91.2
GKSS	-110	14.17	25	12.5	10.83	0.00	72.0	567.6	234.7	219.3	YES	72.0
GKSS	-110	14.46	25	12.5	10.54	0.00	64.8	567.6	234.7	216.3	YES	64.8
GKSS	-110	14.37	25	12.5	10.63	0.00	79.2	567.6	234.7	217.3	YES	79.2
GKSS	-110	14.24	25	12.5	10.76	0.00	52.2	567.6	234.7	218.6	YES	52.2
GKSS	-110	14.22	25	12.5	10.78	0.00	82.9	567.6	234.7	218.8	YES	82.9
GKSS	-110	14.37	25	12.5	10.63	0.00	93.2	567.6	234.7	217.3	YES	93.2
GKSS	-110	14.51	25	12.5	10.49	0.00	75.4	567.6	234.7	215.8	YES	75.4
GKSS	-110	14.26	25	12.5	10.74	0.00	75.0	567.6	234.7	218.4	YES	75.0
GKSS	-110	14.66	25	12.5	10.34	0.00	78.6	567.6	234.7	214.3	YES	78.6
GKSS	-110	14.53	25	12.5	10.47	0.00	94.8	567.6	234.7	215.6	YES	94.8
GKSS	-110	14.33	25	12.5	10.67	0.00	98.1	567.6	234.7	217.7	YES	98.1
GKSS	-110	14.29	25	12.5	10.71	0.00	98.5	567.6	234.7	218.1	YES	98.5
GKSS	-110	14.56	25	12.5	10.44	0.00	104.9	567.6	234.7	215.3	YES	104.9
GKSS	-110	14.35	25	12.5	10.65	0.00	69.9	567.6	234.7	217.5	YES	69.9
GKSS	-110	14.30	25	12.5	10.70	0.00	81.6	567.6	234.7	218.0	YES	81.6
GKSS	-110	14.35	25	12.5	10.65	0.00	55.2	567.6	234.7	217.5	YES	55.2
GKSS	-110	14.35	25	12.5	10.65	0.00	105.6	567.6	234.7	217.5	YES	105.6
GKSS	-110	14.36	25	12.5	10.64	0.00	101.5	567.6	234.7	217.4	YES	101.5
GKSS	-110	14.41	25	12.5	10.59	0.00	73.7	567.6	234.7	216.9	YES	73.7
GKSS	-110	14.39	25	12.5	10.61	0.00	97.5	567.6	234.7	217.1	YES	97.5
GKSS	-110	14.48	25	12.5	10.52	0.00	75.9	567.6	234.7	216.1	YES	75.9
GKSS	-110	14.37	25	12.5	10.63	0.00	48.3	567.6	234.7	217.3	YES	48.3
GKSS	-91	14.41	25	12.5	10.59	0.00	127.0	538.9	233.5	210.8	YES	127.0

GKSS	-91	14.39	25	12.5	10.61	0.00	121.8	538.9	233.5	211.0	YES	121.8
GKSS	-91	14.29	25	12.5	10.71	0.00	70.5	538.9	233.5	211.9	YES	70.5
GKSS	-91	14.41	25	12.5	10.59	0.00	94.2	538.9	233.5	210.8	YES	94.2
GKSS	-91	14.17	25	12.5	10.83	0.00	127.3	538.9	233.5	213.1	YES	127.3
GKSS	-91	14.11	25	12.5	10.89	0.00	119.9	538.9	233.5	213.7	YES	119.9
GKSS	-91	14.19	25	12.5	10.81	0.00	104.5	538.9	233.5	212.9	YES	104.5
GKSS	-91	14.16	25	12.5	10.84	0.00	78.6	538.9	233.5	213.2	YES	78.6
GKSS	-91	14.06	25	12.5	10.94	0.00	98.6	538.9	233.5	214.2	YES	98.6
GKSS	-91	14.24	25	12.5	10.76	0.00	161.6	538.9	233.5	212.4	YES	161.6
THA	-91	13.95	25	12.5	11.05	0.00	91.3	538.9	233.5	215.3	YES	91.3
THA	-91	14.15	25	12.5	10.85	0.00	115.3	538.9	233.5	213.3	YES	115.3
THA	-91	13.96	25	12.5	11.04	0.02	122.4	538.9	233.5	215.2	YES	122.4
THA	-91	14.33	25	12.5	10.67	0.02	126.3	538.9	233.5	211.5	YES	126.3
THA	-91	14.49	25	12.5	10.51	0.00	108.3	538.9	233.5	210.0	YES	108.3
THA	-91	14.28	25	12.5	10.72	0.00	66.9	538.9	233.5	212.0	YES	66.9
THA	-91	14.29	25	12.5	10.71	0.02	126.7	538.9	233.5	211.9	YES	126.7
THA	-91	14.18	25	12.5	10.82	0.00	69.6	538.9	233.5	213.0	YES	69.6
THA	-91	14.52	25	12.5	10.48	0.00	121.4	538.9	233.5	209.7	YES	121.4
THA	-91	14.29	25	12.5	10.71	0.00	90.0	538.9	233.5	211.9	YES	90.0
THA	-91	13.90	25	12.5	11.10	0.05	153.9	538.9	233.5	215.8	YES	153.9
THA	-91	14.21	25	12.5	10.79	0.00	64.6	538.9	233.5	212.7	YES	64.6
THA	-91	14.52	25	12.5	10.48	0.01	127.2	538.9	233.5	209.7	YES	127.2
THA	-91	14.12	25	12.5	10.88	0.00	99.7	538.9	233.5	213.6	YES	99.7
THA	-91	14.38	25	12.5	10.62	0.00	101.3	538.9	233.5	211.1	YES	101.3
THA	-91	14.34	25	12.5	10.66	0.00	140.4	538.9	233.5	211.4	YES	140.4
THA	-91	14.25	25	12.5	10.75	0.00	78.2	538.9	233.5	212.3	YES	78.2
THA	-91	14.26	25	12.5	10.74	0.00	109.0	538.9	233.5	212.2	YES	109.0
THA	-91	14.44	25	12.5	10.56	0.00	103.9	538.9	233.5	210.5	YES	103.9
THA	-91	14.33	25	12.5	10.67	0.04	126.8	538.9	233.5	211.5	YES	126.8
THA	-91	14.33	25	12.5	10.67	0.00	111.7	538.9	233.5	211.5	YES	111.7
GKSS	-91	28.43	50	25.0	21.57	0.00	68.6	538.9	233.5	300.8	YES	68.6
GKSS	-91	28.35	50	25.0	21.65	0.00	81.6	538.9	233.5	301.3	YES	81.6
GKSS	-91	27.33	50	25.0	22.67	0.00	55.9	538.9	233.5	308.4	YES	55.9
GKSS	-91	28.38	50	25.0	21.62	0.00	98.8	538.9	233.5	301.1	YES	98.8
GKSS	-91	27.88	50	25.0	22.12	0.00	71.9	538.9	233.5	304.6	YES	71.9
GKSS	-91	28.18	50	25.0	21.82	0.00	111.0	538.9	233.5	302.5	YES	111.0
GKSS	-91	28.41	50	25.0	21.59	0.00	93.5	538.9	233.5	300.9	YES	93.5
GKSS	-91	28.19	50	25.0	21.81	0.00	79.9	538.9	233.5	302.4	YES	79.9
GKSS	-91	28.27	50	25.0	21.73	0.00	98.4	538.9	233.5	301.9	YES	98.4
GKSS	-91	28.06	50	25.0	21.94	0.00	101.1	538.9	233.5	303.3	YES	101.1
TWI	-91	27.61	50	25.0	22.39	0.00	79.6	538.9	233.5	306.4	YES	79.6
TWI	-91	27.70	50	25.0	22.30	0.00	99.7	538.9	233.5	305.8	YES	99.7
TWI	-91	27.47	50	25.0	22.53	0.00	108.1	538.9	233.5	307.4	YES	108.1
TWI	-91	27.73	50	25.0	22.27	0.00	93.4	538.9	233.5	305.6	YES	93.4
TWI	-91	27.70	50	25.0	22.30	0.00	62.0	538.9	233.5	305.8	YES	62.0
TWI	-91	27.74	50	25.0	22.26	0.00	107.1	538.9	233.5	305.6	YES	107.1
TWI	-91	27.78	50	25.0	22.22	0.06	145.3	538.9	233.5	305.3	YES	145.3
TWI	-91	27.49	50	25.0	22.51	0.00	76.3	538.9	233.5	307.3	YES	76.3
TWI	-91	27.64	50	25.0	22.36	0.00	126.5	538.9	233.5	306.2	YES	126.5
TWI	-91	27.91	50	25.0	22.09	0.04	126.1	538.9	233.5	304.4	YES	126.1
TWI	-91	27.27	50	25.0	22.73	0.05	128.5	538.9	233.5	308.8	YES	128.5
TWI	-91	27.73	50	25.0	22.27	0.00	111.4	538.9	233.5	305.6	YES	111.4
TWI	-91	27.49	50	25.0	22.51	0.00	130.4	538.9	233.5	307.3	YES	130.4
TWI	-91	27.60	50	25.0	22.40	0.00	134.8	538.9	233.5	306.5	YES	134.8
TWI	-91	27.87	50	25.0	22.13	0.00	157.3	538.9	233.5	304.7	YES	157.3
TWI	-91	27.31	50	25.0	22.69	0.00	105.2	538.9	233.5	308.5	YES	105.2
TWI	-91	27.61	50	25.0	22.39	0.00	109.8	538.9	233.5	306.4	YES	109.8
TWI	-91	26.01	50	25.0	23.99	0.00	84.9	538.9	233.5	317.2	YES	84.9
TWI	-91	27.94	50	25.0	22.06	0.00	62.8	538.9	233.5	304.2	YES	62.8
TWI	-91	28.64	50	25.0	21.36	0.00	97.5	538.9	233.5	299.3	YES	97.5
TWI	-91	27.37	50	25.0	22.63	0.00	80.2	538.9	233.5	308.1	YES	80.2
TWI	-91	27.52	50	25.0	22.48	0.05	134.4	538.9	233.5	307.1	YES	134.4
TWI	-91	27.60	50	25.0	22.40	0.00	65.1	538.9	233.5	306.5	YES	65.1
TWI	-91	27.47	50	25.0	22.53	0.00	118.6	538.9	233.5	307.4	YES	118.6
GKSS	-91	56.39	100	50.0	43.61	0.00	67.3	538.9	233.5	427.7	YES	67.3
GKSS	-91	55.98	100	50.0	44.02	0.00	162.9	538.9	233.5	429.7	YES	162.9
GKSS	-91	55.90	100	50.0	44.10	0.00	100.0	538.9	233.5	430.1	YES	100.0
GKSS	-91	56.12	100	50.0	43.88	0.00	91.2	538.9	233.5	429.0	YES	91.2
GKSS	-91	55.74	100	50.0	44.26	0.00	106.2	538.9	233.5	430.9	YES	106.2
GKSS	-91	55.74	100	50.0	44.26	0.00	83.2	538.9	233.5	430.9	YES	83.2
GKSS	-91	56.46	100	50.0	43.54	0.00	91.8	538.9	233.5	427.3	YES	91.8
GKSS	-91	55.78	100	50.0	44.22	0.00	94.7	538.9	233.5	430.7	YES	94.7
GKSS	-91	55.68	100	50.0	44.32	0.00	92.9	538.9	233.5	431.1	YES	92.9
GKSS	-91	55.29	100	50.0	44.71	0.00	69.9	538.9	233.5	433.0	YES	69.9
NE	-91	56.42	100	50.0	43.58	0.00	93.1	538.9	233.5	427.5	YES	93.1
NE	-91	56.77	100	50.0	43.23	0.00	97.9	538.9	233.5	425.8	YES	97.9
NE	-91	56.26	100	50.0	43.74	0.00	73.7	538.9	233.5	428.3	YES	73.7
NE	-91	56.26	100	50.0	43.74	0.00	82.0	538.9	233.5	428.3	YES	82.0
NE	-91	56.31	100	50.0	43.69	0.00	76.3	538.9	233.5	428.1	YES	76.3
NE	-91	56.42	100	50.0	43.58	0.00	93.1	538.9	233.5	427.5	YES	93.1
NE	-91	56.39	100	50.0	43.61	0.00	83.7	538.9	233.5	427.7	YES	83.7
NE	-91	56.41	100	50.0	43.59	0.00	82.1	538.9	233.5	427.6	YES	82.1
NE	-91	56.38	100	50.0	43.62	0.00	86.8	538.9	233.5	427.7	YES	86.8
NE	-91	56.30	100	50.0	43.70	0.00	86.7	538.9	233.5	428.1	YES	86.7
NE	-91	56.35	100	50.0	43.65	0.00	92.3	538.9	233.5	427.9	YES	92.3
NE	-91	56.74	100	50.0	43.26	0.00	83.1	538.9	233.5	426.0	YES	83.1
NE	-91	56.42	100	50.0	43.58	0.00	88.9	538.9	233.5	427.5	YES	88.9

NE	-91	56.36	100	50.0	43.64	0.00	64.3	538.9	233.5	427.8	YES	64.3
NE	-91	56.48	100	50.0	43.52	0.00	101.6	538.9	233.5	427.2	YES	101.6
NE	-91	56.41	100	50.0	43.59	0.00	94.2	538.9	233.5	427.6	YES	94.2
NE	-91	56.34	100	50.0	43.66	0.00	78.7	538.9	233.5	427.9	YES	78.7
NE	-91	56.55	100	50.0	43.45	0.00	73.0	538.9	233.5	426.9	YES	73.0
NE	-91	56.51	100	50.0	43.49	0.00	64.2	538.9	233.5	427.1	YES	64.2
NE	-91	56.49	100	50.0	43.51	0.00	98.9	538.9	233.5	427.2	YES	98.9
GKSS	-91	112.50	200	100.0	87.50	0.00	103.2	538.9	233.5	605.8	YES	103.2
GKSS	-91	111.92	200	100.0	88.08	0.00	84.4	538.9	233.5	607.8	YES	84.4
GKSS	-91	110.92	200	100.0	89.08	0.00	97.0	538.9	233.5	611.2	YES	97.0
GKSS	-91	112.15	200	100.0	87.85	0.00	92.7	538.9	233.5	607.0	YES	92.7
GKSS	-91	112.48	200	100.0	87.52	0.00	96.8	538.9	233.5	605.9	YES	96.8
NE	-91	111.78	200	100.0	88.22	0.00	73.6	538.9	233.5	608.3	YES	73.6
NE	-91	112.90	200	100.0	87.10	0.00	73.0	538.9	233.5	604.4	YES	73.0
NE	-91	111.41	200	100.0	88.59	0.00	73.3	538.9	233.5	609.6	YES	73.3
NE	-91	111.95	200	100.0	88.05	0.00	53.8	538.9	233.5	607.7	YES	53.8
NE	-91	112.66	200	100.0	87.34	0.00	69.5	538.9	233.5	605.2	YES	69.5
NE	-91	115.23	200	100.0	84.77	0.00	65.5	538.9	233.5	596.3	YES	65.5
NE	-91	111.72	200	100.0	88.28	0.00	79.6	538.9	233.5	608.5	YES	79.6
NE	-91	112.52	200	100.0	87.48	0.00	69.8	538.9	233.5	605.7	YES	69.8
NE	-91	113.20	200	100.0	86.80	0.00	90.3	538.9	233.5	603.4	YES	90.3
NE	-91	109.16	200	100.0	90.84	0.00	88.0	538.9	233.5	617.3	YES	88.0
GKSS	-60	14.19	25	12.5	10.81	0.05	234.1	506.4	231.4	205.5	NO	205.5
GKSS	-60	14.16	25	12.5	10.84	0.00	114.4	506.4	231.4	205.8	YES	114.4
GKSS	-60	14.31	25	12.5	10.69	0.00	130.7	506.4	231.4	204.4	YES	130.7
GKSS	-60	14.13	25	12.5	10.87	0.00	106.7	506.4	231.4	206.1	YES	106.7
GKSS	-60	14.08	25	12.5	10.92	0.00	161.0	506.4	231.4	206.5	YES	161.0
GKSS	-60	13.58	25	12.5	11.42	0.00	200.7	506.4	231.4	211.2	YES	200.7
GKSS	-60	14.26	25	12.5	10.74	0.00	125.2	506.4	231.4	204.8	YES	125.2
GKSS	-60	14.19	25	12.5	10.81	0.00	145.1	506.4	231.4	205.5	YES	145.1
GKSS	-60	14.00	25	12.5	11.00	0.00	91.9	506.4	231.4	207.3	YES	91.9
GKSS	-60	13.94	25	12.5	11.06	0.00	128.1	506.4	231.4	207.9	YES	128.1
GKSS	-60	14.59	25	12.5	10.41	0.00	164.4	506.4	231.4	201.7	YES	164.4
GKSS	-60	14.53	25	12.5	10.47	0.00	192.2	506.4	231.4	202.2	YES	192.2
GKSS	-60	14.76	25	12.5	10.24	0.00	166.3	506.4	231.4	200.0	YES	166.3
GKSS	-60	14.48	25	12.5	10.52	0.00	177.7	506.4	231.4	202.7	YES	177.7
GKSS	-60	14.61	25	12.5	10.39	0.00	167.6	506.4	231.4	201.5	YES	167.6
GKSS	-60	14.41	25	12.5	10.59	0.00	128.6	506.4	231.4	203.4	YES	128.6
GKSS	-60	14.45	25	12.5	10.55	0.70	377.4	506.4	231.4	203.0	NO	203.0
GKSS	-60	14.37	25	12.5	10.63	0.00	98.4	506.4	231.4	203.8	YES	98.4
GKSS	-60	14.42	25	12.5	10.58	0.29	278.4	506.4	231.4	203.3	NO	203.3
GKSS	-60	14.49	25	12.5	10.51	0.18	240.7	506.4	231.4	202.6	NO	202.6
GKSS	-60	14.59	25	12.5	10.41	0.75	380.0	506.4	231.4	201.7	NO	201.7
GKSS	-60	14.04	25	12.5	10.96	0.00	171.9	506.4	231.4	206.9	YES	171.9
GKSS	-60	14.49	25	12.5	10.51	0.00	136.8	506.4	231.4	202.6	YES	136.8
GKSS	-60	14.80	25	12.5	10.20	0.00	135.8	506.4	231.4	199.6	YES	135.8
GKSS	-60	14.68	25	12.5	10.32	0.13	214.7	506.4	231.4	200.8	NO	200.8
GKSS	-60	14.47	25	12.5	10.53	0.41	299.5	506.4	231.4	202.8	NO	202.8
GKSS	-60	14.55	25	12.5	10.45	0.00	203.7	506.4	231.4	202.0	NO	202.0
GKSS	-60	14.46	25	12.5	10.54	0.00	116.0	506.4	231.4	202.9	YES	116.0
GKSS	-60	14.55	25	12.5	10.45	0.11	221.9	506.4	231.4	202.0	NO	202.0
GKSS	-60	14.77	25	12.5	10.23	0.00	167.6	506.4	231.4	199.9	YES	167.6
GKSS	-60	14.35	25	12.5	10.65	0.00	89.8	506.4	231.4	204.0	YES	89.8
GKSS	-60	14.56	25	12.5	10.44	0.00	156.3	506.4	231.4	201.9	YES	156.3
GKSS	-60	14.49	25	12.5	10.51	0.00	186.8	506.4	231.4	202.6	YES	186.8
GKSS	-60	14.43	25	12.5	10.57	0.00	213.5	506.4	231.4	203.2	NO	203.2
GKSS	-60	14.39	25	12.5	10.61	0.00	164.6	506.4	231.4	203.6	YES	164.6
GKSS	-60	14.49	25	12.5	10.51	0.28	280.1	506.4	231.4	202.6	NO	202.6
GKSS	-60	14.43	25	12.5	10.57	0.00	185.9	506.4	231.4	203.2	YES	185.9
GKSS	-60	14.85	25	12.5	10.15	0.00	127.7	506.4	231.4	199.1	YES	127.7
GKSS	-60	14.64	25	12.5	10.36	0.00	205.0	506.4	231.4	201.2	NO	201.2
GKSS	-60	14.25	25	12.5	10.75	0.00	115.6	506.4	231.4	204.9	YES	115.6
GKSS	-60	14.44	25	12.5	10.56	0.00	107.5	506.4	231.4	203.1	YES	107.5
SIEMENS	-60	13.24	25	12.5	11.76	0.00	164.6	506.4	231.4	214.3	YES	164.6
SIEMENS	-60	13.29	25	12.5	11.71	0.00	172.0	506.4	231.4	213.9	YES	172.0
SIEMENS	-60	13.24	25	12.5	11.76	0.00	108.5	506.4	231.4	214.3	YES	108.5
SIEMENS	-60	13.28	25	12.5	11.72	0.00	119.0	506.4	231.4	214.0	YES	119.0
SIEMENS	-60	13.26	25	12.5	11.74	0.00	153.5	506.4	231.4	214.2	YES	153.5
SIEMENS	-60	13.22	25	12.5	11.78	0.00	158.9	506.4	231.4	214.5	YES	158.9
SIEMENS	-60	13.27	25	12.5	11.73	0.00	137.5	506.4	231.4	214.1	YES	137.5
SIEMENS	-60	13.18	25	12.5	11.82	0.00	119.5	506.4	231.4	214.9	YES	119.5
SIEMENS	-60	13.18	25	12.5	11.82	0.00	130.7	506.4	231.4	214.9	YES	130.7
SIEMENS	-60	13.24	25	12.5	11.76	0.00	172.6	506.4	231.4	214.3	YES	172.6
SIEMENS	-60	13.24	25	12.5	11.76	0.00	84.5	506.4	231.4	214.3	YES	84.5
SIEMENS	-60	13.34	25	12.5	11.66	0.00	244.6	506.4	231.4	213.4	NO	213.4
SIEMENS	-60	13.20	25	12.5	11.80	0.00	120.4	506.4	231.4	214.7	YES	120.4
SIEMENS	-60	13.31	25	12.5	11.69	0.00	104.5	506.4	231.4	213.7	YES	104.5
SIEMENS	-60	13.23	25	12.5	11.77	0.00	163.6	506.4	231.4	214.4	YES	163.6
SIEMENS	-60	13.28	25	12.5	11.72	0.00	201.4	506.4	231.4	214.0	YES	201.4
SIEMENS	-60	13.20	25	12.5	11.80	0.00	137.8	506.4	231.4	214.7	YES	137.8
SIEMENS	-60	13.19	25	12.5	11.81	0.00	173.0	506.4	231.4	214.8	YES	173.0
SIEMENS	-60	13.22	25	12.5	11.78	0.00	99.2	506.4	231.4	214.5	YES	99.2
SIEMENS	-60	13.22	25	12.5	11.78	0.00	173.4	506.4	231.4	214.5	YES	173.4
SIEMENS	-60	13.29	25	12.5	11.71	0.00	131.5	506.4	231.4	213.9	YES	131.5
GKSS	-60	28.06	50	25.0	21.94	0.00	186.0	506.4	231.4	292.8	YES	186.0
GKSS	-60	27.75	50	25.0	22.25	0.00	151.8	506.4	231.4	294.8	YES	151.8
GKSS	-60	27.62	50	25.0	22.38	0.00	111.7	506.4	231.4	295.7	YES	111.7

VTT	0	28.77	50	25.0	21.23	4.44	718.7	473.3	227.5	276.0	NO	276.0
VTT	0	28.36	50	25.0	21.64	5.09	717.1	473.3	227.5	278.7	NO	278.7
VTT	0	28.46	50	25.0	21.54	4.36	721.2	473.3	227.5	278.0	NO	278.0
VTT	0	28.30	50	25.0	21.70	4.87	725.3	473.3	227.5	279.1	NO	279.1
VTT	0	28.38	50	25.0	21.62	4.47	727.9	473.3	227.5	278.6	NO	278.6
VTT	0	28.25	50	25.0	21.75	4.75	727.0	473.3	227.5	279.4	NO	279.4
VTT	0	28.75	50	25.0	21.25	4.36	718.5	473.3	227.5	276.2	NO	276.2
GKSS	0	56.36	100	50.0	43.64	0.10	191.3	473.3	227.5	395.8	YES	191.3
GKSS	0	57.61	100	50.0	42.39	0.28	269.2	473.3	227.5	390.1	YES	269.2
GKSS	0	56.51	100	50.0	43.49	0.38	281.2	473.3	227.5	395.1	YES	281.2
GKSS	0	56.08	100	50.0	43.92	0.29	242.5	473.3	227.5	397.0	YES	242.5
GKSS	0	56.31	100	50.0	43.69	0.53	318.3	473.3	227.5	396.0	YES	318.3
GKSS	0	56.44	100	50.0	43.56	1.33	476.2	473.3	227.5	395.4	NO	395.4
GKSS	0	56.20	100	50.0	43.80	1.65	511.7	473.3	227.5	396.5	NO	396.5
GKSS	0	56.54	100	50.0	43.46	2.74	621.3	473.3	227.5	394.9	NO	394.9
GKSS	0	56.25	100	50.0	43.75	1.85	531.3	473.3	227.5	396.3	NO	396.3
GKSS	0	56.04	100	50.0	43.96	0.30	266.6	473.3	227.5	397.2	YES	266.6
GKSS	0	56.49	100	50.0	43.51	2.50	599.3	473.3	227.5	395.2	NO	395.2
GKSS	0	56.42	100	50.0	43.58	0.78	362.9	473.3	227.5	395.5	YES	362.9
GKSS	0	56.67	100	50.0	43.33	0.60	331.8	473.3	227.5	394.4	YES	331.8
GKSS	0	56.76	100	50.0	43.24	0.18	227.1	473.3	227.5	393.9	YES	227.1
GKSS	0	56.21	100	50.0	43.79	0.54	309.5	473.3	227.5	396.4	YES	309.5
GKSS	0	56.43	100	50.0	43.57	3.05	628.6	473.3	227.5	395.4	NO	395.4
GKSS	0	56.65	100	50.0	43.35	0.00	210.9	473.3	227.5	394.4	YES	210.9
GKSS	0	56.54	100	50.0	43.46	0.90	410.7	473.3	227.5	394.9	NO	394.9
GKSS	0	56.40	100	50.0	43.60	0.00	211.4	473.3	227.5	395.6	YES	211.4
GKSS	0	56.78	100	50.0	43.22	5.09	778.3	473.3	227.5	393.9	NO	393.9
GKSS	0	56.75	100	50.0	43.25	0.00	263.4	473.3	227.5	394.0	YES	263.4
GKSS	0	56.91	100	50.0	43.09	3.73	682.2	473.3	227.5	393.3	NO	393.3
GKSS	0	56.43	100	50.0	43.57	0.83	386.7	473.3	227.5	395.4	YES	386.7
GKSS	0	57.03	100	50.0	42.97	0.78	376.2	473.3	227.5	392.7	YES	376.2
GKSS	0	56.65	100	50.0	43.35	3.05	642.5	473.3	227.5	394.4	NO	394.4
GKSS	0	56.41	100	50.0	43.59	0.37	306.7	473.3	227.5	395.5	YES	306.7
GKSS	0	56.57	100	50.0	43.43	4.84	758.4	473.3	227.5	394.8	NO	394.8
GKSS	0	56.78	100	50.0	43.22	5.61	797.9	473.3	227.5	393.9	NO	393.9
GKSS	0	56.31	100	50.0	43.69	0.00	246.4	473.3	227.5	396.0	YES	246.4
GKSS	0	56.60	100	50.0	43.40	0.43	320.1	473.3	227.5	394.7	YES	320.1
CISE	0	111.79	200	100.0	88.21	0.22	233.3	473.3	227.5	562.7	YES	233.3
CISE	0	112.47	200	100.0	87.53	0.22	238.2	473.3	227.5	560.5	YES	238.2
CISE	0	112.08	200	100.0	87.92	0.21	208.3	473.3	227.5	561.7	YES	208.3
CISE	0	112.01	200	100.0	87.99	1.01	421.7	473.3	227.5	562.0	YES	421.7
CISE	0	112.75	200	100.0	87.25	0.14	226.7	473.3	227.5	559.6	YES	226.7
CISE	0	112.32	200	100.0	87.68	0.29	267.0	473.3	227.5	561.0	YES	267.0
CISE	0	111.95	200	100.0	88.05	0.00	163.0	473.3	227.5	562.2	YES	163.0
CISE	0	112.11	200	100.0	87.89	0.07	165.8	473.3	227.5	561.6	YES	165.8
CISE	0	111.68	200	100.0	88.32	0.36	285.9	473.3	227.5	563.0	YES	285.9
CISE	0	112.71	200	100.0	87.29	0.68	342.0	473.3	227.5	559.7	YES	342.0
GKSS	0	113.15	200	100.0	86.85	0.48	314.9	473.3	227.5	558.3	YES	314.9
GKSS	0	113.65	200	100.0	86.35	0.41	307.6	473.3	227.5	556.7	YES	307.6
GKSS	0	111.81	200	100.0	88.19	0.81	383.0	473.3	227.5	562.6	YES	383.0
GKSS	0	113.63	200	100.0	86.37	0.57	332.6	473.3	227.5	556.8	YES	332.6
GKSS	0	112.54	200	100.0	87.46	0.00	223.6	473.3	227.5	560.3	YES	223.6
GKSS	0	111.92	200	100.0	88.08	1.16	442.2	473.3	227.5	562.2	YES	442.2

3. Application of the multi-temperature approach for the calculation of the reference temperature

T limits

Specimen code	T (°C)	$K_{Jc[calc]}$ (MPa√m)	$K_{Jc(1T)}$ (MPa√m)	δ_i	n_i	1° member	2° member
GKSS	-154	54.8	49.1	0	0.000	0.0000	0.0000
GKSS	-154	49.8	44.9	0	0.000	0.0000	0.0000
GKSS	-154	37.8	34.9	0	0.000	0.0000	0.0000
GKSS	-154	33.0	30.9	0	0.000	0.0000	0.0000
GKSS	-154	38.9	35.8	0	0.000	0.0000	0.0000
GKSS	-154	24.2	23.6	0	0.000	0.0000	0.0000
GKSS	-154	47.4	43.0	0	0.000	0.0000	0.0000
GKSS	-154	46.5	42.2	0	0.000	0.0000	0.0000
GKSS	-154	31.4	29.6	0	0.000	0.0000	0.0000
GKSS	-154	39.2	36.0	0	0.000	0.0000	0.0000
GKSS	-154	24.2	23.6	0	0.000	0.0000	0.0000
SIEMENS	-154	33.0	30.9	0	0.000	0.0000	0.0000
SIEMENS	-154	41.0	37.6	0	0.000	0.0000	0.0000
SIEMENS	-154	31.7	29.8	0	0.000	0.0000	0.0000
SIEMENS	-154	35.2	32.7	0	0.000	0.0000	0.0000
SIEMENS	-154	44.4	40.5	0	0.000	0.0000	0.0000
SIEMENS	-154	41.5	38.0	0	0.000	0.0000	0.0000
SIEMENS	-154	32.7	30.7	0	0.000	0.0000	0.0000
SIEMENS	-154	34.3	32.0	0	0.000	0.0000	0.0000
SIEMENS	-154	36.7	34.0	0	0.000	0.0000	0.0000
SIEMENS	-154	39.7	36.5	0	0.000	0.0000	0.0000
SIEMENS	-154	46.1	41.8	0	0.000	0.0000	0.0000
SIEMENS	-154	34.6	32.2	0	0.000	0.0000	0.0000
SIEMENS	-154	35.8	33.2	0	0.000	0.0000	0.0000
SIEMENS	-154	29.3	27.8	0	0.000	0.0000	0.0000
SIEMENS	-154	28.6	27.2	0	0.000	0.0000	0.0000

USE LIMITS : YES

-141
-41

Sum of 1° member: 3.205

Sum of 2° member: 3.205

Difference: 0.000

$T_o = -91.3$ °C
(valid per ASTM E1921)

$\sum n_i = 45.02$

N = 734
r = 278

$K_{min} = 20$ MPa√m

$K_{o,eq} = 130.5$ MPa√m

$K_{med,eq} = 120.9$ MPa√m

SIEMENS	-154	38.6	35.6	0	0.000	0.0000	0.0000
SIEMENS	-154	44.4	40.5	0	0.000	0.0000	0.0000
SIEMENS	-154	48.9	44.2	0	0.000	0.0000	0.0000
SIEMENS	-154	38.9	35.8	0	0.000	0.0000	0.0000
SIEMENS	-154	36.7	34.0	0	0.000	0.0000	0.0000
SIEMENS	-154	31.7	29.8	0	0.000	0.0000	0.0000
GKSS	-154	41.5	41.4	0	0.000	0.0000	0.0000
GKSS	-154	42.2	42.2	0	0.000	0.0000	0.0000
GKSS	-154	50.0	49.9	0	0.000	0.0000	0.0000
GKSS	-154	34.0	33.9	0	0.000	0.0000	0.0000
GKSS	-154	41.7	41.7	0	0.000	0.0000	0.0000
GKSS	-154	46.1	46.0	0	0.000	0.0000	0.0000
GKSS	-154	44.2	44.1	0	0.000	0.0000	0.0000
GKSS	-154	36.7	36.6	0	0.000	0.0000	0.0000
GKSS	-154	29.0	28.9	0	0.000	0.0000	0.0000
GKSS	-154	53.0	52.9	0	0.000	0.0000	0.0000
GKSS	-154	39.4	39.3	0	0.000	0.0000	0.0000
GKSS	-154	29.0	28.9	0	0.000	0.0000	0.0000
SIEMENS	-154	34.6	34.5	0	0.000	0.0000	0.0000
SIEMENS	-154	33.0	33.0	0	0.000	0.0000	0.0000
SIEMENS	-154	38.1	38.0	0	0.000	0.0000	0.0000
SIEMENS	-154	28.6	28.6	0	0.000	0.0000	0.0000
SIEMENS	-154	28.6	28.6	0	0.000	0.0000	0.0000
SIEMENS	-154	38.6	38.5	0	0.000	0.0000	0.0000
SIEMENS	-154	36.4	36.3	0	0.000	0.0000	0.0000
SIEMENS	-154	33.4	33.3	0	0.000	0.0000	0.0000
SIEMENS	-154	36.9	36.9	0	0.000	0.0000	0.0000
SIEMENS	-154	31.1	31.0	0	0.000	0.0000	0.0000
SIEMENS	-154	34.3	34.2	0	0.000	0.0000	0.0000
SIEMENS	-154	30.4	30.4	0	0.000	0.0000	0.0000
SIEMENS	-154	49.6	49.5	0	0.000	0.0000	0.0000
SIEMENS	-154	41.0	40.9	0	0.000	0.0000	0.0000
SIEMENS	-154	34.0	33.9	0	0.000	0.0000	0.0000
SIEMENS	-154	30.7	30.7	0	0.000	0.0000	0.0000
SIEMENS	-154	41.2	41.2	0	0.000	0.0000	0.0000
SIEMENS	-154	26.7	26.7	0	0.000	0.0000	0.0000
SIEMENS	-154	35.5	35.4	0	0.000	0.0000	0.0000
SIEMENS	-154	33.4	33.3	0	0.000	0.0000	0.0000
SIEMENS	-154	36.7	36.6	0	0.000	0.0000	0.0000
SIEMENS	-154	32.4	32.4	0	0.000	0.0000	0.0000
SIEMENS	-154	45.1	45.0	0	0.000	0.0000	0.0000
SIEMENS	-154	33.4	33.3	0	0.000	0.0000	0.0000
SIEMENS	-154	34.0	33.9	0	0.000	0.0000	0.0000
SIEMENS	-154	30.7	30.7	0	0.000	0.0000	0.0000
SIEMENS	-154	26.7	26.7	0	0.000	0.0000	0.0000
GKSS	-154	33.7	36.2	0	0.000	0.0000	0.0000
GKSS	-154	42.7	46.9	0	0.000	0.0000	0.0000
GKSS	-154	37.2	40.4	0	0.000	0.0000	0.0000
GKSS	-154	54.4	60.8	0	0.000	0.0000	0.0000
GKSS	-154	34.6	37.3	0	0.000	0.0000	0.0000
GKSS	-154	44.2	48.7	0	0.000	0.0000	0.0000
GKSS	-154	29.7	31.5	0	0.000	0.0000	0.0000
GKSS	-154	36.4	39.4	0	0.000	0.0000	0.0000
GKSS	-154	36.4	39.4	0	0.000	0.0000	0.0000
GKSS	-154	28.2	29.8	0	0.000	0.0000	0.0000
GKSS	-154	28.2	29.8	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
NE	-154	36.4	39.4	0	0.000	0.0000	0.0000
NE	-154	37.5	40.7	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
NE	-154	30.7	32.7	0	0.000	0.0000	0.0000
NE	-154	30.4	32.3	0	0.000	0.0000	0.0000
NE	-154	30.7	32.7	0	0.000	0.0000	0.0000
NE	-154	31.7	33.9	0	0.000	0.0000	0.0000
NE	-154	41.7	45.8	0	0.000	0.0000	0.0000
NE	-154	37.2	40.4	0	0.000	0.0000	0.0000
NE	-154	34.9	37.6	0	0.000	0.0000	0.0000
NE	-154	38.3	41.7	0	0.000	0.0000	0.0000
NE	-154	31.4	33.5	0	0.000	0.0000	0.0000
NE	-154	33.7	36.2	0	0.000	0.0000	0.0000
NE	-154	32.7	35.1	0	0.000	0.0000	0.0000
NE	-154	43.0	47.2	0	0.000	0.0000	0.0000
NE	-154	32.7	35.1	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
NE	-154	36.9	40.1	0	0.000	0.0000	0.0000
NE	-154	33.4	35.8	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
GKSS	-110	98.1	85.4	1	0.143	0.0108	0.0110
GKSS	-110	59.0	52.7	1	0.143	0.0108	0.0007
GKSS	-110	80.0	70.3	1	0.143	0.0108	0.0039
GKSS	-110	57.2	51.2	1	0.143	0.0108	0.0006
GKSS	-110	88.3	77.2	1	0.143	0.0108	0.0065
GKSS	-110	96.2	83.9	1	0.143	0.0108	0.0100
GKSS	-110	81.6	71.6	1	0.143	0.0108	0.0043
GKSS	-110	66.9	59.3	1	0.143	0.0108	0.0014
GKSS	-110	85.6	75.0	1	0.143	0.0108	0.0055
GKSS	-110	86.8	76.0	1	0.143	0.0108	0.0059

GKSS	-110	114.2	98.9	1	0.143	0.0108	0.0234
GKSS	-110	73.5	64.8	1	0.143	0.0108	0.0024
GKSS	-110	92.7	80.9	1	0.143	0.0108	0.0083
GKSS	-110	77.5	68.2	1	0.143	0.0108	0.0033
GKSS	-110	61.5	54.7	1	0.143	0.0108	0.0009
GKSS	-110	51.8	46.7	1	0.143	0.0108	0.0003
GKSS	-110	73.6	64.9	1	0.143	0.0108	0.0025
GKSS	-110	52.8	47.5	1	0.143	0.0108	0.0003
GKSS	-110	41.2	37.8	1	0.143	0.0108	0.0001
GKSS	-110	115.3	99.8	1	0.143	0.0108	0.0245
GKSS	-110	73.2	64.5	1	0.143	0.0108	0.0024
GKSS	-110	74.0	65.3	1	0.143	0.0108	0.0025
GKSS	-110	67.5	59.8	1	0.143	0.0108	0.0015
GKSS	-110	71.0	62.7	1	0.143	0.0108	0.0020
GKSS	-110	53.4	48.0	1	0.143	0.0108	0.0004
GKSS	-110	96.5	84.0	1	0.143	0.0108	0.0102
GKSS	-110	71.3	63.0	1	0.143	0.0108	0.0021
GKSS	-110	71.7	63.3	1	0.143	0.0108	0.0021
GKSS	-110	81.7	71.7	1	0.143	0.0108	0.0043
GKSS	-110	64.0	56.8	1	0.143	0.0108	0.0011
GKSS	-110	74.2	65.4	1	0.143	0.0108	0.0026
GKSS	-110	70.4	62.2	1	0.143	0.0108	0.0019
GKSS	-110	91.2	79.6	1	0.143	0.0108	0.0076
GKSS	-110	72.0	63.6	1	0.143	0.0108	0.0022
GKSS	-110	64.8	57.5	1	0.143	0.0108	0.0012
GKSS	-110	79.2	69.6	1	0.143	0.0108	0.0037
GKSS	-110	52.2	47.0	1	0.143	0.0108	0.0003
GKSS	-110	82.9	72.7	1	0.143	0.0108	0.0046
GKSS	-110	93.2	81.3	1	0.143	0.0108	0.0086
GKSS	-110	75.4	66.4	1	0.143	0.0108	0.0028
GKSS	-110	75.0	66.1	1	0.143	0.0108	0.0027
GKSS	-110	78.6	69.1	1	0.143	0.0108	0.0035
GKSS	-110	94.8	82.7	1	0.143	0.0108	0.0093
GKSS	-110	98.1	85.4	1	0.143	0.0108	0.0110
GKSS	-110	98.5	85.7	1	0.143	0.0108	0.0113
GKSS	-110	104.9	91.1	1	0.143	0.0108	0.0155
GKSS	-110	69.9	61.8	1	0.143	0.0108	0.0019
GKSS	-110	81.6	71.6	1	0.143	0.0108	0.0043
GKSS	-110	55.2	49.5	1	0.143	0.0108	0.0005
GKSS	-110	105.6	91.7	1	0.143	0.0108	0.0160
GKSS	-110	101.5	88.3	1	0.143	0.0108	0.0131
GKSS	-110	73.7	65.0	1	0.143	0.0108	0.0025
GKSS	-110	97.5	84.9	1	0.143	0.0108	0.0107
GKSS	-110	75.9	66.8	1	0.143	0.0108	0.0029
GKSS	-110	48.3	43.7	1	0.143	0.0108	0.0002
GKSS	-91	127.0	109.6	1	0.167	0.0114	0.0120
GKSS	-91	121.8	105.2	1	0.167	0.0114	0.0098
GKSS	-91	70.5	62.3	1	0.167	0.0114	0.0006
GKSS	-91	94.2	82.2	1	0.167	0.0114	0.0028
GKSS	-91	127.3	109.9	1	0.167	0.0114	0.0121
GKSS	-91	119.9	103.7	1	0.167	0.0114	0.0091
GKSS	-91	104.5	90.8	1	0.167	0.0114	0.0047
GKSS	-91	78.6	69.1	1	0.167	0.0114	0.0011
GKSS	-91	98.6	85.8	1	0.167	0.0114	0.0035
GKSS	-91	161.6	138.6	1	0.167	0.0114	0.0367
THA	-91	91.3	79.7	1	0.167	0.0114	0.0024
THA	-91	115.3	99.8	1	0.167	0.0114	0.0075
THA	-91	122.4	105.8	1	0.167	0.0114	0.0101
THA	-91	126.3	109.1	1	0.167	0.0114	0.0117
THA	-91	108.3	94.0	1	0.167	0.0114	0.0056
THA	-91	66.9	59.3	1	0.167	0.0114	0.0004
THA	-91	126.7	109.4	1	0.167	0.0114	0.0119
THA	-91	69.6	61.6	1	0.167	0.0114	0.0006
THA	-91	121.4	104.9	1	0.167	0.0114	0.0097
THA	-91	90.0	78.7	1	0.167	0.0114	0.0022
THA	-91	153.9	132.2	1	0.167	0.0114	0.0294
THA	-91	64.6	57.4	1	0.167	0.0114	0.0004
THA	-91	127.2	109.8	1	0.167	0.0114	0.0120
THA	-91	99.7	86.7	1	0.167	0.0114	0.0037
THA	-91	101.3	88.1	1	0.167	0.0114	0.0040
THA	-91	140.4	120.9	1	0.167	0.0114	0.0192
THA	-91	78.2	68.7	1	0.167	0.0114	0.0010
THA	-91	109.0	94.6	1	0.167	0.0114	0.0057
THA	-91	103.9	90.3	1	0.167	0.0114	0.0045
THA	-91	126.8	109.5	1	0.167	0.0114	0.0119
THA	-91	111.7	96.8	1	0.167	0.0114	0.0065
GKSS	-91	68.6	68.4	1	0.167	0.0114	0.0010
GKSS	-91	81.6	81.3	1	0.167	0.0114	0.0026
GKSS	-91	55.9	55.8	1	0.167	0.0114	0.0003
GKSS	-91	98.8	98.5	1	0.167	0.0114	0.0070
GKSS	-91	71.9	71.7	1	0.167	0.0114	0.0013
GKSS	-91	111.0	110.7	1	0.167	0.0114	0.0125
GKSS	-91	93.5	93.2	1	0.167	0.0114	0.0053
GKSS	-91	79.9	79.7	1	0.167	0.0114	0.0024
GKSS	-91	98.4	98.1	1	0.167	0.0114	0.0069
GKSS	-91	101.1	100.8	1	0.167	0.0114	0.0079
TWI	-91	79.6	79.4	1	0.167	0.0114	0.0023

TWI	-91	99.7	99.3	1	0.167	0.0114	0.0074
TWI	-91	108.1	107.7	1	0.167	0.0114	0.0110
TWI	-91	93.4	93.1	1	0.167	0.0114	0.0053
TWI	-91	62.0	61.8	1	0.167	0.0114	0.0006
TWI	-91	107.1	106.7	1	0.167	0.0114	0.0105
TWI	-91	145.3	144.8	1	0.167	0.0114	0.0450
TWI	-91	76.3	76.0	1	0.167	0.0114	0.0018
TWI	-91	126.5	126.1	1	0.167	0.0114	0.0235
TWI	-91	126.1	125.7	1	0.167	0.0114	0.0231
TWI	-91	128.5	128.0	1	0.167	0.0114	0.0253
TWI	-91	111.4	111.0	1	0.167	0.0114	0.0127
TWI	-91	130.4	130.0	1	0.167	0.0114	0.0272
TWI	-91	134.8	134.3	1	0.167	0.0114	0.0317
TWI	-91	157.3	156.7	1	0.167	0.0114	0.0649
TWI	-91	105.2	104.9	1	0.167	0.0114	0.0096
TWI	-91	109.8	109.4	1	0.167	0.0114	0.0119
TWI	-91	84.9	84.6	1	0.167	0.0114	0.0032
TWI	-91	62.8	62.7	1	0.167	0.0114	0.0006
TWI	-91	97.5	97.2	1	0.167	0.0114	0.0066
TWI	-91	80.2	79.9	1	0.167	0.0114	0.0024
TWI	-91	134.4	133.9	1	0.167	0.0114	0.0313
TWI	-91	65.1	65.0	1	0.167	0.0114	0.0008
TWI	-91	118.6	118.2	1	0.167	0.0114	0.0173
GKSS	-91	67.3	76.1	1	0.167	0.0114	0.0018
GKSS	-91	162.9	189.3	1	0.167	0.0114	0.1524
GKSS	-91	100.0	114.7	1	0.167	0.0114	0.0149
GKSS	-91	91.2	104.3	1	0.167	0.0114	0.0094
GKSS	-91	106.2	122.1	1	0.167	0.0114	0.0202
GKSS	-91	83.2	94.9	1	0.167	0.0114	0.0058
GKSS	-91	91.8	105.0	1	0.167	0.0114	0.0097
GKSS	-91	94.7	108.5	1	0.167	0.0114	0.0114
GKSS	-91	92.9	106.4	1	0.167	0.0114	0.0103
GKSS	-91	69.9	79.2	1	0.167	0.0114	0.0023
NE	-91	93.1	106.6	1	0.167	0.0114	0.0104
NE	-91	97.9	112.2	1	0.167	0.0114	0.0134
NE	-91	73.7	83.7	1	0.167	0.0114	0.0030
NE	-91	82.0	93.4	1	0.167	0.0114	0.0054
NE	-91	76.3	86.7	1	0.167	0.0114	0.0037
NE	-91	93.1	106.6	1	0.167	0.0114	0.0104
NE	-91	83.7	95.5	1	0.167	0.0114	0.0060
NE	-91	82.1	93.6	1	0.167	0.0114	0.0054
NE	-91	86.8	99.2	1	0.167	0.0114	0.0073
NE	-91	86.7	99.0	1	0.167	0.0114	0.0072
NE	-91	92.3	105.7	1	0.167	0.0114	0.0100
NE	-91	83.1	94.8	1	0.167	0.0114	0.0058
NE	-91	88.9	101.6	1	0.167	0.0114	0.0082
NE	-91	64.3	72.5	1	0.167	0.0114	0.0014
NE	-91	101.6	116.7	1	0.167	0.0114	0.0162
NE	-91	94.2	107.9	1	0.167	0.0114	0.0111
NE	-91	78.7	89.5	1	0.167	0.0114	0.0043
NE	-91	73.0	82.8	1	0.167	0.0114	0.0029
NE	-91	64.2	72.3	1	0.167	0.0114	0.0014
NE	-91	98.9	113.5	1	0.167	0.0114	0.0142
GKSS	-91	103.2	137.2	1	0.167	0.0114	0.0350
GKSS	-91	84.4	110.7	1	0.167	0.0114	0.0125
GKSS	-91	97.0	128.5	1	0.167	0.0114	0.0257
GKSS	-91	92.7	122.4	1	0.167	0.0114	0.0204
GKSS	-91	96.8	128.2	1	0.167	0.0114	0.0254
NE	-91	73.6	95.5	1	0.167	0.0114	0.0060
NE	-91	73.0	94.7	1	0.167	0.0114	0.0058
NE	-91	73.3	95.1	1	0.167	0.0114	0.0059
NE	-91	53.8	67.7	1	0.167	0.0114	0.0010
NE	-91	69.5	89.7	1	0.167	0.0114	0.0044
NE	-91	65.5	84.0	1	0.167	0.0114	0.0031
NE	-91	79.6	104.0	1	0.167	0.0114	0.0092
NE	-91	69.8	90.1	1	0.167	0.0114	0.0045
NE	-91	90.3	119.0	1	0.167	0.0114	0.0178
NE	-91	88.0	115.8	1	0.167	0.0114	0.0156
GKSS	-60	205.5	175.4	0	0.000	0.0000	0.0136
GKSS	-60	114.4	99.1	1	0.167	0.0120	0.0009
GKSS	-60	130.7	112.7	1	0.167	0.0120	0.0017
GKSS	-60	106.7	92.6	1	0.167	0.0120	0.0006
GKSS	-60	161.0	138.1	1	0.167	0.0120	0.0045
GKSS	-60	200.7	171.3	1	0.167	0.0120	0.0123
GKSS	-60	125.2	108.1	1	0.167	0.0120	0.0014
GKSS	-60	145.1	124.8	1	0.167	0.0120	0.0028
GKSS	-60	91.9	80.2	1	0.167	0.0120	0.0003
GKSS	-60	128.1	110.6	1	0.167	0.0120	0.0016
GKSS	-60	164.4	140.9	1	0.167	0.0120	0.0050
GKSS	-60	192.2	164.3	1	0.167	0.0120	0.0101
GKSS	-60	166.3	142.5	1	0.167	0.0120	0.0053
GKSS	-60	177.7	152.1	1	0.167	0.0120	0.0071
GKSS	-60	167.6	143.6	1	0.167	0.0120	0.0055
GKSS	-60	128.6	110.9	1	0.167	0.0120	0.0016
GKSS	-60	203.0	173.3	0	0.000	0.0000	0.0129
GKSS	-60	98.4	85.7	1	0.167	0.0120	0.0004
GKSS	-60	203.3	173.5	0	0.000	0.0000	0.0130

GKSS	-60	202.6	173.0	0	0.000	0.0000	0.0128
GKSS	-60	201.7	172.1	0	0.000	0.0000	0.0125
GKSS	-60	171.9	147.2	1	0.167	0.0120	0.0061
GKSS	-60	136.8	117.8	1	0.167	0.0120	0.0021
GKSS	-60	135.8	117.0	1	0.167	0.0120	0.0021
GKSS	-60	200.8	171.4	0	0.000	0.0000	0.0123
GKSS	-60	202.8	173.1	0	0.000	0.0000	0.0129
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0126
GKSS	-60	116.0	100.4	1	0.167	0.0120	0.0010
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0126
GKSS	-60	167.6	143.6	1	0.167	0.0120	0.0055
GKSS	-60	89.8	78.5	1	0.167	0.0120	0.0003
GKSS	-60	156.3	134.1	1	0.167	0.0120	0.0040
GKSS	-60	186.8	159.7	1	0.167	0.0120	0.0089
GKSS	-60	203.2	173.4	0	0.000	0.0000	0.0130
GKSS	-60	164.6	141.1	1	0.167	0.0120	0.0050
GKSS	-60	202.6	173.0	0	0.000	0.0000	0.0128
GKSS	-60	185.9	159.0	1	0.167	0.0120	0.0087
GKSS	-60	127.7	110.2	1	0.167	0.0120	0.0016
GKSS	-60	201.2	171.7	0	0.000	0.0000	0.0124
GKSS	-60	115.6	100.0	1	0.167	0.0120	0.0010
GKSS	-60	107.5	93.3	1	0.167	0.0120	0.0007
SIEMENS	-60	164.6	141.1	1	0.167	0.0120	0.0050
SIEMENS	-60	172.0	147.3	1	0.167	0.0120	0.0061
SIEMENS	-60	108.5	94.2	1	0.167	0.0120	0.0007
SIEMENS	-60	119.0	102.9	1	0.167	0.0120	0.0011
SIEMENS	-60	153.5	131.8	1	0.167	0.0120	0.0037
SIEMENS	-60	158.9	136.4	1	0.167	0.0120	0.0043
SIEMENS	-60	137.5	118.4	1	0.167	0.0120	0.0022
SIEMENS	-60	119.5	103.3	1	0.167	0.0120	0.0011
SIEMENS	-60	130.7	112.8	1	0.167	0.0120	0.0017
SIEMENS	-60	172.6	147.8	1	0.167	0.0120	0.0062
SIEMENS	-60	84.5	74.0	1	0.167	0.0120	0.0002
SIEMENS	-60	213.4	182.0	0	0.000	0.0000	0.0161
SIEMENS	-60	120.4	104.1	1	0.167	0.0120	0.0012
SIEMENS	-60	104.5	90.8	1	0.167	0.0120	0.0006
SIEMENS	-60	163.6	140.2	1	0.167	0.0120	0.0049
SIEMENS	-60	201.4	172.0	1	0.167	0.0120	0.0125
SIEMENS	-60	137.8	118.7	1	0.167	0.0120	0.0022
SIEMENS	-60	173.0	148.1	1	0.167	0.0120	0.0063
SIEMENS	-60	99.2	86.4	1	0.167	0.0120	0.0005
SIEMENS	-60	173.4	148.4	1	0.167	0.0120	0.0064
SIEMENS	-60	131.5	113.4	1	0.167	0.0120	0.0018
GKSS	-60	186.0	185.3	1	0.167	0.0120	0.0175
GKSS	-60	151.8	151.3	1	0.167	0.0120	0.0069
GKSS	-60	111.7	111.3	1	0.167	0.0120	0.0016
GKSS	-60	143.9	143.4	1	0.167	0.0120	0.0054
GKSS	-60	105.4	105.1	1	0.167	0.0120	0.0012
GKSS	-60	154.0	153.4	1	0.167	0.0120	0.0074
GKSS	-60	176.2	175.6	1	0.167	0.0120	0.0137
GKSS	-60	131.9	131.5	1	0.167	0.0120	0.0036
GKSS	-60	203.9	203.2	1	0.167	0.0120	0.0263
GKSS	-60	142.7	142.2	1	0.167	0.0120	0.0052
TWI	-60	134.5	134.0	1	0.167	0.0120	0.0040
TWI	-60	130.1	129.7	1	0.167	0.0120	0.0034
TWI	-60	142.6	142.1	1	0.167	0.0120	0.0052
TWI	-60	119.7	119.3	1	0.167	0.0120	0.0023
TWI	-60	141.3	140.8	1	0.167	0.0120	0.0050
TWI	-60	175.9	175.3	1	0.167	0.0120	0.0136
TWI	-60	119.6	119.2	1	0.167	0.0120	0.0023
TWI	-60	102.4	102.0	1	0.167	0.0120	0.0011
TWI	-60	99.0	98.7	1	0.167	0.0120	0.0009
TWI	-60	115.1	114.7	1	0.167	0.0120	0.0019
TWI	-60	172.9	172.3	1	0.167	0.0120	0.0126
TWI	-60	120.5	120.2	1	0.167	0.0120	0.0024
TWI	-60	165.2	164.6	1	0.167	0.0120	0.0102
TWI	-60	125.6	125.2	1	0.167	0.0120	0.0029
TWI	-60	126.7	126.3	1	0.167	0.0120	0.0030
TWI	-60	100.4	100.1	1	0.167	0.0120	0.0010
TWI	-60	131.1	130.7	1	0.167	0.0120	0.0035
TWI	-60	185.1	184.5	1	0.167	0.0120	0.0171
TWI	-60	163.6	163.0	1	0.167	0.0120	0.0098
TWI	-60	126.5	126.1	1	0.167	0.0120	0.0030
TWI	-60	164.7	164.1	1	0.167	0.0120	0.0101
TWI	-60	192.7	192.0	1	0.167	0.0120	0.0205
TWI	-60	134.5	134.1	1	0.167	0.0120	0.0040
TWI	-60	140.8	140.3	1	0.167	0.0120	0.0049
GKSS	-60	295.3	346.1	1	0.167	0.0120	0.2645
GKSS	-60	217.7	254.2	1	0.167	0.0120	0.0703
GKSS	-60	219.8	256.6	1	0.167	0.0120	0.0733
GKSS	-60	165.9	192.8	1	0.167	0.0120	0.0209
GKSS	-60	109.9	126.5	1	0.167	0.0120	0.0030
GKSS	-60	131.9	152.5	1	0.167	0.0120	0.0072
GKSS	-60	136.2	157.6	1	0.167	0.0120	0.0084
GKSS	-60	154.0	178.8	1	0.167	0.0120	0.0149
GKSS	-60	115.9	133.6	1	0.167	0.0120	0.0039
GKSS	-60	150.4	174.4	1	0.167	0.0120	0.0133

THA	-60	153.6	178.2	1	0.167	0.0120	0.0146
THA	-60	183.8	214.0	1	0.167	0.0120	0.0331
THA	-60	236.1	275.9	1	0.167	0.0120	0.1003
THA	-60	149.4	173.3	1	0.167	0.0120	0.0129
THA	-60	179.5	209.0	1	0.167	0.0120	0.0298
THA	-60	177.6	206.7	1	0.167	0.0120	0.0284
THA	-60	188.3	219.4	1	0.167	0.0120	0.0370
THA	-60	134.5	155.6	1	0.167	0.0120	0.0079
THA	-60	243.6	284.9	1	0.167	0.0120	0.1151
THA	-60	155.7	180.8	1	0.167	0.0120	0.0156
THA	-60	164.0	190.6	1	0.167	0.0120	0.0198
THA	-60	146.5	169.8	1	0.167	0.0120	0.0118
THA	-60	119.9	138.4	1	0.167	0.0120	0.0046
THA	-60	79.9	91.0	1	0.167	0.0120	0.0006
THA	-60	140.9	163.2	1	0.167	0.0120	0.0098
THA	-60	115.3	132.9	1	0.167	0.0120	0.0038
THA	-60	137.0	158.6	1	0.167	0.0120	0.0086
THA	-60	166.9	194.0	1	0.167	0.0120	0.0215
THA	-60	225.4	263.3	1	0.167	0.0120	0.0819
THA	-60	200.7	234.1	1	0.167	0.0120	0.0491
BAM	-40	171.0	146.5	0	0.000	0.0000	0.0000
BAM	-40	206.2	176.0	0	0.000	0.0000	0.0000
BAM	-40	169.4	145.1	0	0.000	0.0000	0.0000
BAM	-40	203.6	173.7	0	0.000	0.0000	0.0000
BAM	-40	202.5	172.9	0	0.000	0.0000	0.0000
BAM	-40	207.2	176.8	0	0.000	0.0000	0.0000
BAM	-40	205.9	175.7	0	0.000	0.0000	0.0000
BAM	-40	206.5	176.2	0	0.000	0.0000	0.0000
BAM	-40	207.3	176.9	0	0.000	0.0000	0.0000
BAM	-40	205.1	175.1	0	0.000	0.0000	0.0000
BAM	-40	202.8	173.1	0	0.000	0.0000	0.0000
BAM	-40	204.9	174.8	0	0.000	0.0000	0.0000
BAM	-40	205.2	175.1	0	0.000	0.0000	0.0000
BAM	-40	113.7	98.5	0	0.000	0.0000	0.0000
BAM	-40	204.8	174.8	0	0.000	0.0000	0.0000
BAM	-40	154.2	132.4	0	0.000	0.0000	0.0000
BAM	-40	206.2	176.0	0	0.000	0.0000	0.0000
BAM	-40	204.2	174.3	0	0.000	0.0000	0.0000
BAM	-40	207.3	176.9	0	0.000	0.0000	0.0000
BAM	-40	202.5	172.8	0	0.000	0.0000	0.0000
GKSS	-40	180.6	154.6	0	0.000	0.0000	0.0000
GKSS	-40	203.5	173.7	0	0.000	0.0000	0.0000
GKSS	-40	198.2	169.3	0	0.000	0.0000	0.0000
GKSS	-40	199.6	170.5	0	0.000	0.0000	0.0000
GKSS	-40	186.4	159.4	0	0.000	0.0000	0.0000
GKSS	-40	199.4	170.3	0	0.000	0.0000	0.0000
GKSS	-40	204.4	174.4	0	0.000	0.0000	0.0000
GKSS	-40	202.4	172.7	0	0.000	0.0000	0.0000
GKSS	-40	203.2	173.4	0	0.000	0.0000	0.0000
GKSS	-40	200.9	171.5	0	0.000	0.0000	0.0000
BAM	-40	187.3	186.6	0	0.000	0.0000	0.0000
BAM	-40	101.5	101.2	0	0.000	0.0000	0.0000
BAM	-40	140.3	139.9	0	0.000	0.0000	0.0000
BAM	-40	150.2	149.7	0	0.000	0.0000	0.0000
BAM	-40	187.3	186.6	0	0.000	0.0000	0.0000
BAM	-40	211.4	210.6	0	0.000	0.0000	0.0000
BAM	-40	160.5	160.0	0	0.000	0.0000	0.0000
BAM	-40	214.6	213.8	0	0.000	0.0000	0.0000
BAM	-40	188.3	187.7	0	0.000	0.0000	0.0000
BAM	-40	239.3	238.4	0	0.000	0.0000	0.0000
BAM	-40	112.8	112.4	0	0.000	0.0000	0.0000
BAM	-40	239.0	238.1	0	0.000	0.0000	0.0000
BAM	-40	284.9	283.9	0	0.000	0.0000	0.0000
BAM	-40	254.7	253.7	0	0.000	0.0000	0.0000
BAM	-40	270.9	269.9	0	0.000	0.0000	0.0000
BAM	-40	187.0	186.3	0	0.000	0.0000	0.0000
BAM	-40	170.1	169.5	0	0.000	0.0000	0.0000
BAM	-40	256.4	255.5	0	0.000	0.0000	0.0000
BAM	-40	171.4	170.8	0	0.000	0.0000	0.0000
BAM	-40	103.1	102.8	0	0.000	0.0000	0.0000
BAM	-40	230.0	229.1	0	0.000	0.0000	0.0000
BAM	-40	210.0	209.2	0	0.000	0.0000	0.0000
GKSS	-40	198.2	197.5	0	0.000	0.0000	0.0000
GKSS	-40	150.2	149.7	0	0.000	0.0000	0.0000
GKSS	-40	226.8	226.0	0	0.000	0.0000	0.0000
GKSS	-40	158.1	157.5	0	0.000	0.0000	0.0000
GKSS	-40	256.4	255.5	0	0.000	0.0000	0.0000
GKSS	-40	207.6	206.9	0	0.000	0.0000	0.0000
GKSS	-40	213.5	212.8	0	0.000	0.0000	0.0000
GKSS	-40	254.6	253.7	0	0.000	0.0000	0.0000
GKSS	-40	240.0	239.1	0	0.000	0.0000	0.0000
GKSS	-40	279.0	278.0	0	0.000	0.0000	0.0000
GKSS	-40	125.9	145.5	0	0.000	0.0000	0.0000
GKSS	-40	128.9	149.0	0	0.000	0.0000	0.0000
GKSS	-40	198.5	231.5	0	0.000	0.0000	0.0000
GKSS	-40	212.0	247.5	0	0.000	0.0000	0.0000
GKSS	-40	138.6	160.5	0	0.000	0.0000	0.0000

GKSS	-40	187.7	218.7	0	0.000	0.0000	0.0000
GKSS	-40	173.0	201.2	0	0.000	0.0000	0.0000
GKSS	-40	179.5	208.9	0	0.000	0.0000	0.0000
GKSS	-40	152.6	177.1	0	0.000	0.0000	0.0000
GKSS	-40	153.6	178.3	0	0.000	0.0000	0.0000
THA	-40	144.6	167.6	0	0.000	0.0000	0.0000
THA	-40	150.7	174.9	0	0.000	0.0000	0.0000
THA	-40	139.1	161.0	0	0.000	0.0000	0.0000
THA	-40	183.6	213.8	0	0.000	0.0000	0.0000
THA	-40	142.0	164.5	0	0.000	0.0000	0.0000
THA	-40	187.2	218.0	0	0.000	0.0000	0.0000
THA	-40	172.2	200.3	0	0.000	0.0000	0.0000
THA	-40	198.0	230.8	0	0.000	0.0000	0.0000
THA	-40	130.4	150.8	0	0.000	0.0000	0.0000
THA	-40	141.7	164.1	0	0.000	0.0000	0.0000
THA	-40	134.5	155.6	0	0.000	0.0000	0.0000
THA	-40	115.5	133.1	0	0.000	0.0000	0.0000
THA	-40	91.7	104.9	0	0.000	0.0000	0.0000
THA	-40	141.1	163.4	0	0.000	0.0000	0.0000
THA	-40	239.1	279.6	0	0.000	0.0000	0.0000
THA	-40	243.4	284.7	0	0.000	0.0000	0.0000
THA	-40	191.9	223.6	0	0.000	0.0000	0.0000
THA	-40	146.8	170.2	0	0.000	0.0000	0.0000
THA	-40	161.4	187.5	0	0.000	0.0000	0.0000
THA	-40	142.3	164.8	0	0.000	0.0000	0.0000
CISE	-20	128.7	111.1	0	0.000	0.0000	0.0000
CISE	-20	146.9	126.3	0	0.000	0.0000	0.0000
CISE	-20	204.3	174.4	0	0.000	0.0000	0.0000
CISE	-20	198.3	169.3	0	0.000	0.0000	0.0000
CISE	-20	195.0	166.6	0	0.000	0.0000	0.0000
CISE	-20	197.8	168.9	0	0.000	0.0000	0.0000
CISE	-20	195.6	167.1	0	0.000	0.0000	0.0000
CISE	-20	196.2	167.6	0	0.000	0.0000	0.0000
CISE	-20	194.0	165.7	0	0.000	0.0000	0.0000
CISE	-20	198.3	169.3	0	0.000	0.0000	0.0000
CISE	-20	201.2	171.8	0	0.000	0.0000	0.0000
CISE	-20	200.9	171.5	0	0.000	0.0000	0.0000
CISE	-20	195.6	167.1	0	0.000	0.0000	0.0000
CISE	-20	197.6	168.8	0	0.000	0.0000	0.0000
CISE	-20	201.9	172.4	0	0.000	0.0000	0.0000
CISE	-20	202.5	172.8	0	0.000	0.0000	0.0000
CISE	-20	198.1	169.2	0	0.000	0.0000	0.0000
CISE	-20	198.1	169.2	0	0.000	0.0000	0.0000
CISE	-20	200.7	171.3	0	0.000	0.0000	0.0000
CISE	-20	199.8	170.6	0	0.000	0.0000	0.0000
CISE	-20	201.5	172.0	0	0.000	0.0000	0.0000
GKSS	-20	200.6	171.2	0	0.000	0.0000	0.0000
GKSS	-20	200.6	171.2	0	0.000	0.0000	0.0000
GKSS	-20	199.8	170.6	0	0.000	0.0000	0.0000
GKSS	-20	198.2	169.2	0	0.000	0.0000	0.0000
GKSS	-20	199.3	170.2	0	0.000	0.0000	0.0000
GKSS	-20	196.6	167.9	0	0.000	0.0000	0.0000
GKSS	-20	198.6	169.6	0	0.000	0.0000	0.0000
GKSS	-20	200.7	171.3	0	0.000	0.0000	0.0000
GKSS	-20	195.0	166.6	0	0.000	0.0000	0.0000
GKSS	-20	198.6	169.6	0	0.000	0.0000	0.0000
GKSS	-20	202.5	201.7	0	0.000	0.0000	0.0000
GKSS	-20	194.7	194.1	0	0.000	0.0000	0.0000
GKSS	-20	262.8	261.8	0	0.000	0.0000	0.0000
GKSS	-20	187.9	187.2	0	0.000	0.0000	0.0000
GKSS	-20	275.8	274.8	0	0.000	0.0000	0.0000
GKSS	-20	261.8	260.9	0	0.000	0.0000	0.0000
GKSS	-20	283.2	282.2	0	0.000	0.0000	0.0000
GKSS	-20	283.1	282.0	0	0.000	0.0000	0.0000
GKSS	-20	284.0	283.0	0	0.000	0.0000	0.0000
GKSS	-20	284.2	283.1	0	0.000	0.0000	0.0000
VTT	-20	284.0	282.9	0	0.000	0.0000	0.0000
VTT	-20	231.9	231.0	0	0.000	0.0000	0.0000
VTT	-20	279.4	278.3	0	0.000	0.0000	0.0000
VTT	-20	280.3	279.2	0	0.000	0.0000	0.0000
VTT	-20	279.4	278.3	0	0.000	0.0000	0.0000
VTT	-20	278.6	277.5	0	0.000	0.0000	0.0000
VTT	-20	281.9	280.9	0	0.000	0.0000	0.0000
VTT	-20	279.4	278.3	0	0.000	0.0000	0.0000
VTT	-20	282.5	281.4	0	0.000	0.0000	0.0000
VTT	-20	247.2	246.3	0	0.000	0.0000	0.0000
VTT	-20	233.2	232.4	0	0.000	0.0000	0.0000
VTT	-20	283.2	282.2	0	0.000	0.0000	0.0000
VTT	-20	288.9	287.8	0	0.000	0.0000	0.0000
VTT	-20	263.2	262.3	0	0.000	0.0000	0.0000
VTT	-20	184.4	183.8	0	0.000	0.0000	0.0000
VTT	-20	283.7	282.7	0	0.000	0.0000	0.0000
VTT	-20	280.8	279.8	0	0.000	0.0000	0.0000
VTT	-20	280.9	279.8	0	0.000	0.0000	0.0000
VTT	-20	280.9	279.8	0	0.000	0.0000	0.0000
VTT	-20	170.9	170.3	0	0.000	0.0000	0.0000
VTT	-20	282.9	281.9	0	0.000	0.0000	0.0000

VTT	-20	275.7	274.6	0	0.000	0.0000	0.0000
VTT	-20	228.2	227.4	0	0.000	0.0000	0.0000
VTT	-20	282.0	281.0	0	0.000	0.0000	0.0000
VTT	-20	280.9	279.8	0	0.000	0.0000	0.0000
VTT	-20	281.8	280.7	0	0.000	0.0000	0.0000
VTT	-20	281.4	280.4	0	0.000	0.0000	0.0000
VTT	-20	227.3	226.5	0	0.000	0.0000	0.0000
VTT	-20	201.3	200.6	0	0.000	0.0000	0.0000
VTT	-20	212.5	211.7	0	0.000	0.0000	0.0000
VTT	-20	256.5	255.5	0	0.000	0.0000	0.0000
VTT	-20	284.8	283.8	0	0.000	0.0000	0.0000
VTT	-20	282.3	281.3	0	0.000	0.0000	0.0000
VTT	-20	269.6	268.6	0	0.000	0.0000	0.0000
VTT	-20	184.4	183.8	0	0.000	0.0000	0.0000
VTT	-20	241.6	240.7	0	0.000	0.0000	0.0000
VTT	-20	146.4	145.9	0	0.000	0.0000	0.0000
VTT	-20	280.0	279.0	0	0.000	0.0000	0.0000
VTT	-20	156.7	156.2	0	0.000	0.0000	0.0000
VTT	-20	277.0	276.0	0	0.000	0.0000	0.0000
CISE	-20	167.4	194.6	0	0.000	0.0000	0.0000
CISE	-20	153.5	178.1	0	0.000	0.0000	0.0000
CISE	-20	211.2	246.5	0	0.000	0.0000	0.0000
CISE	-20	220.3	257.3	0	0.000	0.0000	0.0000
CISE	-20	227.9	266.2	0	0.000	0.0000	0.0000
CISE	-20	211.1	246.4	0	0.000	0.0000	0.0000
CISE	-20	217.1	253.4	0	0.000	0.0000	0.0000
CISE	-20	145.3	168.5	0	0.000	0.0000	0.0000
CISE	-20	161.2	187.2	0	0.000	0.0000	0.0000
CISE	-20	131.9	152.5	0	0.000	0.0000	0.0000
CISE	-20	216.4	252.6	0	0.000	0.0000	0.0000
CISE	-20	125.0	144.4	0	0.000	0.0000	0.0000
CISE	-20	378.7	444.9	0	0.000	0.0000	0.0000
CISE	-20	246.1	287.9	0	0.000	0.0000	0.0000
CISE	-20	250.9	293.5	0	0.000	0.0000	0.0000
CISE	-20	251.5	294.3	0	0.000	0.0000	0.0000
CISE	-20	284.0	332.7	0	0.000	0.0000	0.0000
CISE	-20	261.1	305.6	0	0.000	0.0000	0.0000
CISE	-20	351.6	412.8	0	0.000	0.0000	0.0000
CISE	-20	258.5	302.5	0	0.000	0.0000	0.0000
GKSS	-20	201.3	234.8	0	0.000	0.0000	0.0000
GKSS	-20	110.9	127.7	0	0.000	0.0000	0.0000
GKSS	-20	197.7	230.5	0	0.000	0.0000	0.0000
GKSS	-20	198.9	231.9	0	0.000	0.0000	0.0000
GKSS	-20	200.6	234.0	0	0.000	0.0000	0.0000
GKSS	-20	165.7	192.6	0	0.000	0.0000	0.0000
GKSS	-20	280.1	328.0	0	0.000	0.0000	0.0000
GKSS	-20	279.5	327.3	0	0.000	0.0000	0.0000
GKSS	-20	257.6	301.4	0	0.000	0.0000	0.0000
GKSS	-20	265.2	310.4	0	0.000	0.0000	0.0000
GKSS	-20	156.7	212.6	0	0.000	0.0000	0.0000
GKSS	-20	221.7	304.1	0	0.000	0.0000	0.0000
GKSS	-20	193.9	264.9	0	0.000	0.0000	0.0000
GKSS	-20	191.7	261.9	0	0.000	0.0000	0.0000
GKSS	-20	184.4	251.6	0	0.000	0.0000	0.0000
NE	-20	186.7	254.8	0	0.000	0.0000	0.0000
NE	-20	184.4	251.6	0	0.000	0.0000	0.0000
NE	-20	193.9	264.9	0	0.000	0.0000	0.0000
NE	-20	204.4	279.8	0	0.000	0.0000	0.0000
NE	-20	224.0	307.4	0	0.000	0.0000	0.0000
NE	-20	153.4	207.9	0	0.000	0.0000	0.0000
NE	-20	222.6	305.4	0	0.000	0.0000	0.0000
NE	-20	162.0	220.0	0	0.000	0.0000	0.0000
NE	-20	187.8	256.4	0	0.000	0.0000	0.0000
NE	-20	198.2	271.0	0	0.000	0.0000	0.0000
SCK-CEN	-10	280.0	279.0	0	0.000	0.0000	0.0000
SCK-CEN	-10	281.2	280.2	0	0.000	0.0000	0.0000
SCK-CEN	-10	282.6	281.5	0	0.000	0.0000	0.0000
SCK-CEN	-10	284.0	282.9	0	0.000	0.0000	0.0000
SCK-CEN	-10	280.9	279.9	0	0.000	0.0000	0.0000
GKSS	0	196.8	168.1	0	0.000	0.0000	0.0000
GKSS	0	193.7	165.5	0	0.000	0.0000	0.0000
GKSS	0	192.9	164.8	0	0.000	0.0000	0.0000
GKSS	0	196.7	168.0	0	0.000	0.0000	0.0000
GKSS	0	196.1	167.5	0	0.000	0.0000	0.0000
GKSS	0	194.7	166.3	0	0.000	0.0000	0.0000
GKSS	0	196.3	167.7	0	0.000	0.0000	0.0000
GKSS	0	195.9	167.3	0	0.000	0.0000	0.0000
GKSS	0	195.2	166.8	0	0.000	0.0000	0.0000
GKSS	0	193.3	165.1	0	0.000	0.0000	0.0000
SCK-CEN	0	198.4	169.4	0	0.000	0.0000	0.0000
SCK-CEN	0	199.1	170.0	0	0.000	0.0000	0.0000
SCK-CEN	0	198.2	169.2	0	0.000	0.0000	0.0000
SCK-CEN	0	197.6	168.8	0	0.000	0.0000	0.0000
SCK-CEN	0	201.2	171.8	0	0.000	0.0000	0.0000
SCK-CEN	0	200.0	170.8	0	0.000	0.0000	0.0000
SCK-CEN	0	197.4	168.6	0	0.000	0.0000	0.0000
SCK-CEN	0	199.6	170.4	0	0.000	0.0000	0.0000

SCK-CEN	0	203.4	173.6	0	0.000	0.0000	0.0000
SCK-CEN	0	199.2	170.1	0	0.000	0.0000	0.0000
SCK-CEN	0	200.5	171.2	0	0.000	0.0000	0.0000
SCK-CEN	0	202.4	172.7	0	0.000	0.0000	0.0000
SCK-CEN	0	197.2	168.4	0	0.000	0.0000	0.0000
SCK-CEN	0	205.8	175.6	0	0.000	0.0000	0.0000
SCK-CEN	0	205.5	175.4	0	0.000	0.0000	0.0000
SCK-CEN	0	202.4	172.7	0	0.000	0.0000	0.0000
SCK-CEN	0	203.4	173.6	0	0.000	0.0000	0.0000
SCK-CEN	0	205.2	175.1	0	0.000	0.0000	0.0000
SCK-CEN	0	202.3	172.7	0	0.000	0.0000	0.0000
SCK-CEN	0	201.6	172.1	0	0.000	0.0000	0.0000
GKSS	0	282.4	281.4	0	0.000	0.0000	0.0000
GKSS	0	283.7	282.7	0	0.000	0.0000	0.0000
GKSS	0	284.9	283.9	0	0.000	0.0000	0.0000
GKSS	0	282.8	281.8	0	0.000	0.0000	0.0000
GKSS	0	284.4	283.4	0	0.000	0.0000	0.0000
GKSS	0	284.9	283.8	0	0.000	0.0000	0.0000
GKSS	0	279.6	278.6	0	0.000	0.0000	0.0000
GKSS	0	283.9	282.8	0	0.000	0.0000	0.0000
GKSS	0	285.7	284.7	0	0.000	0.0000	0.0000
GKSS	0	283.0	281.9	0	0.000	0.0000	0.0000
SCK-CEN	0	277.0	276.0	0	0.000	0.0000	0.0000
SCK-CEN	0	276.7	275.7	0	0.000	0.0000	0.0000
SCK-CEN	0	276.9	275.9	0	0.000	0.0000	0.0000
SCK-CEN	0	277.9	276.8	0	0.000	0.0000	0.0000
SCK-CEN	0	276.9	275.9	0	0.000	0.0000	0.0000
SCK-CEN	0	278.2	277.2	0	0.000	0.0000	0.0000
SCK-CEN	0	278.0	277.0	0	0.000	0.0000	0.0000
SCK-CEN	0	275.9	274.9	0	0.000	0.0000	0.0000
SCK-CEN	0	277.6	276.6	0	0.000	0.0000	0.0000
SCK-CEN	0	278.2	277.2	0	0.000	0.0000	0.0000
SCK-CEN	0	277.3	276.3	0	0.000	0.0000	0.0000
VTT	0	280.3	279.3	0	0.000	0.0000	0.0000
VTT	0	275.5	274.5	0	0.000	0.0000	0.0000
VTT	0	280.3	279.3	0	0.000	0.0000	0.0000
VTT	0	275.2	274.2	0	0.000	0.0000	0.0000
VTT	0	278.0	277.0	0	0.000	0.0000	0.0000
VTT	0	278.5	277.5	0	0.000	0.0000	0.0000
VTT	0	279.7	278.6	0	0.000	0.0000	0.0000
VTT	0	267.2	266.2	0	0.000	0.0000	0.0000
VTT	0	279.8	278.8	0	0.000	0.0000	0.0000
VTT	0	278.6	277.6	0	0.000	0.0000	0.0000
VTT	0	278.3	277.3	0	0.000	0.0000	0.0000
VTT	0	280.0	278.9	0	0.000	0.0000	0.0000
VTT	0	274.3	273.3	0	0.000	0.0000	0.0000
VTT	0	276.0	275.0	0	0.000	0.0000	0.0000
VTT	0	278.7	277.7	0	0.000	0.0000	0.0000
VTT	0	278.0	277.0	0	0.000	0.0000	0.0000
VTT	0	279.1	278.0	0	0.000	0.0000	0.0000
VTT	0	278.6	277.5	0	0.000	0.0000	0.0000
VTT	0	279.4	278.4	0	0.000	0.0000	0.0000
VTT	0	276.2	275.2	0	0.000	0.0000	0.0000
GKSS	0	191.3	222.9	0	0.000	0.0000	0.0000
GKSS	0	269.2	315.2	0	0.000	0.0000	0.0000
GKSS	0	281.2	329.4	0	0.000	0.0000	0.0000
GKSS	0	242.5	283.5	0	0.000	0.0000	0.0000
GKSS	0	318.3	373.3	0	0.000	0.0000	0.0000
GKSS	0	395.4	464.7	0	0.000	0.0000	0.0000
GKSS	0	396.5	465.9	0	0.000	0.0000	0.0000
GKSS	0	394.9	464.1	0	0.000	0.0000	0.0000
GKSS	0	396.3	465.7	0	0.000	0.0000	0.0000
GKSS	0	266.6	312.1	0	0.000	0.0000	0.0000
GKSS	0	395.2	464.4	0	0.000	0.0000	0.0000
GKSS	0	362.9	426.1	0	0.000	0.0000	0.0000
GKSS	0	331.8	389.3	0	0.000	0.0000	0.0000
GKSS	0	227.1	265.3	0	0.000	0.0000	0.0000
GKSS	0	309.5	362.9	0	0.000	0.0000	0.0000
GKSS	0	395.4	464.7	0	0.000	0.0000	0.0000
GKSS	0	210.9	246.1	0	0.000	0.0000	0.0000
GKSS	0	394.9	464.1	0	0.000	0.0000	0.0000
GKSS	0	211.4	246.7	0	0.000	0.0000	0.0000
GKSS	0	393.9	462.8	0	0.000	0.0000	0.0000
GKSS	0	263.4	308.3	0	0.000	0.0000	0.0000
GKSS	0	393.3	462.1	0	0.000	0.0000	0.0000
GKSS	0	386.7	454.3	0	0.000	0.0000	0.0000
GKSS	0	376.2	441.9	0	0.000	0.0000	0.0000
GKSS	0	394.4	463.5	0	0.000	0.0000	0.0000
GKSS	0	306.7	359.6	0	0.000	0.0000	0.0000
GKSS	0	394.8	464.0	0	0.000	0.0000	0.0000
GKSS	0	393.9	462.8	0	0.000	0.0000	0.0000
GKSS	0	246.4	288.2	0	0.000	0.0000	0.0000
GKSS	0	320.1	375.4	0	0.000	0.0000	0.0000
CISE	0	233.3	320.4	0	0.000	0.0000	0.0000
CISE	0	238.2	327.4	0	0.000	0.0000	0.0000
CISE	0	208.3	285.2	0	0.000	0.0000	0.0000
CISE	0	421.7	585.8	0	0.000	0.0000	0.0000

CISE	0	226.7	311.2	0	0.000	0.0000	0.0000
CISE	0	267.0	367.9	0	0.000	0.0000	0.0000
CISE	0	163.0	221.4	0	0.000	0.0000	0.0000
CISE	0	165.8	225.4	0	0.000	0.0000	0.0000
CISE	0	285.9	394.6	0	0.000	0.0000	0.0000
CISE	0	342.0	473.5	0	0.000	0.0000	0.0000
GKSS	0	314.9	435.4	0	0.000	0.0000	0.0000
GKSS	0	307.6	425.1	0	0.000	0.0000	0.0000
GKSS	0	383.0	531.4	0	0.000	0.0000	0.0000
GKSS	0	332.6	460.4	0	0.000	0.0000	0.0000
GKSS	0	223.6	306.8	0	0.000	0.0000	0.0000
GKSS	0	442.2	614.7	0	0.000	0.0000	0.0000

4. Master curve fit to data

Temperature adj. = 1.6 °C (est.) Stand. dev. on T_0 = 1.1 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-154	54.8	49.1				
-154	49.8	44.9				
-154	37.8	34.9				
-154	33.0	30.9				
-154	38.9	35.8				
-154	24.2	23.6				
-154	47.4	43.0				
-154	46.5	42.2				
-154	31.4	29.6				
-154	39.2	36.0				
-154	24.2	23.6				
-154	33.0	30.9				
-154	41.0	37.6				
-154	31.7	29.8				
-154	35.2	32.7				
-154	44.4	40.5				
-154	41.5	38.0				
-154	32.7	30.7				
-154	34.3	32.0				
-154	36.7	34.0				
-154	39.7	36.5				
-154	46.1	41.8				
-154	34.6	32.2				
-154	35.8	33.2				
-154	29.3	27.8				
-154	28.6	27.2				
-154	38.6	35.6				
-154	44.4	40.5				
-154	48.9	44.2				
-154	38.9	35.8				
-154	36.7	34.0				
-154	31.7	29.8				
-154	41.5	41.4				
-154	42.2	42.2				
-154	50.0	49.9				
-154	34.0	33.9				
-154	41.7	41.7				
-154	46.1	46.0				
-154	44.2	44.1				
-154	36.7	36.6				
-154	29.0	28.9				
-154	53.0	52.9				
-154	39.4	39.3				
-154	29.0	28.9				
-154	34.6	34.5				
-154	33.0	33.0				
-154	38.1	38.0				
-154	28.6	28.6				
-154	28.6	28.6				
-154	38.6	38.5				
-154	36.4	36.3				
-154	33.4	33.3				
-154	36.9	36.9				
-154	31.1	31.0				
-154	34.3	34.2				
-154	30.4	30.4				
-154	49.6	49.5				
-154	41.0	40.9				
-154	34.0	33.9				
-154	30.7	30.7				
-154	41.2	41.2				
-154	26.7	26.7				
-154	35.5	35.4				
-154	33.4	33.3				
-154	36.7	36.6				
-154	32.4	32.4				
-154	45.1	45.0				

-154	33.4	33.3
-154	34.0	33.9
-154	30.7	30.7
-154	26.7	26.7
-154	33.7	36.2
-154	42.7	46.9
-154	37.2	40.4
-154	54.4	60.8
-154	34.6	37.3
-154	44.2	48.7
-154	29.7	31.5
-154	36.4	39.4
-154	36.4	39.4
-154	28.2	29.8
-154	28.2	29.8
-154	30.0	31.9
-154	36.4	39.4
-154	37.5	40.7
-154	30.0	31.9
-154	30.7	32.7
-154	30.4	32.3
-154	30.7	32.7
-154	31.7	33.9
-154	41.7	45.8
-154	37.2	40.4
-154	34.9	37.6
-154	38.3	41.7
-154	31.4	33.5
-154	33.7	36.2
-154	32.7	35.1
-154	43.0	47.2
-154	32.7	35.1
-154	30.0	31.9
-154	36.9	40.1
-154	33.4	35.8
-154	30.0	31.9
-110	98.1	85.4
-110	59.0	52.7
-110	80.0	70.3
-110	57.2	51.2
-110	88.3	77.2
-110	96.2	83.9
-110	81.6	71.6
-110	66.9	59.3
-110	85.6	75.0
-110	86.8	76.0
-110	114.2	98.9
-110	73.5	64.8
-110	92.7	80.9
-110	77.5	68.2
-110	61.5	54.7
-110	51.8	46.7
-110	73.6	64.9
-110	52.8	47.5
-110	41.2	37.8
-110	115.3	99.8
-110	73.2	64.5
-110	74.0	65.3
-110	67.5	59.8
-110	71.0	62.7
-110	53.4	48.0
-110	96.5	84.0
-110	71.3	63.0
-110	71.7	63.3
-110	81.7	71.7
-110	64.0	56.8
-110	74.2	65.4
-110	70.4	62.2
-110	91.2	79.6
-110	72.0	63.6
-110	64.8	57.5
-110	79.2	69.6
-110	52.2	47.0
-110	82.9	72.7
-110	93.2	81.3
-110	75.4	66.4
-110	75.0	66.1
-110	78.6	69.1
-110	94.8	82.7
-110	98.1	85.4
-110	98.5	85.7
-110	104.9	91.1
-110	69.9	61.8
-110	81.6	71.6
-110	55.2	49.5
-110	105.6	91.7
-110	101.5	88.3

-110	73.7	65.0
-110	97.5	84.9
-110	75.9	66.8
-110	48.3	43.7
-91	127.0	109.6
-91	121.8	105.2
-91	70.5	62.3
-91	94.2	82.2
-91	127.3	109.9
-91	119.9	103.7
-91	104.5	90.8
-91	78.6	69.1
-91	98.6	85.8
-91	161.6	138.6
-91	91.3	79.7
-91	115.3	99.8
-91	122.4	105.8
-91	126.3	109.1
-91	108.3	94.0
-91	66.9	59.3
-91	126.7	109.4
-91	69.6	61.6
-91	121.4	104.9
-91	90.0	78.7
-91	153.9	132.2
-91	64.6	57.4
-91	127.2	109.8
-91	99.7	86.7
-91	101.3	88.1
-91	140.4	120.9
-91	78.2	68.7
-91	109.0	94.6
-91	103.9	90.3
-91	126.8	109.5
-91	111.7	96.8
-91	68.6	68.4
-91	81.6	81.3
-91	55.9	55.8
-91	98.8	98.5
-91	71.9	71.7
-91	111.0	110.7
-91	93.5	93.2
-91	79.9	79.7
-91	98.4	98.1
-91	101.1	100.8
-91	79.6	79.4
-91	99.7	99.3
-91	108.1	107.7
-91	93.4	93.1
-91	62.0	61.8
-91	107.1	106.7
-91	145.3	144.8
-91	76.3	76.0
-91	126.5	126.1
-91	126.1	125.7
-91	128.5	128.0
-91	111.4	111.0
-91	130.4	130.0
-91	134.8	134.3
-91	157.3	156.7
-91	105.2	104.9
-91	109.8	109.4
-91	84.9	84.6
-91	62.8	62.7
-91	97.5	97.2
-91	80.2	79.9
-91	134.4	133.9
-91	65.1	65.0
-91	118.6	118.2
-91	67.3	76.1
-91	162.9	189.3
-91	100.0	114.7
-91	91.2	104.3
-91	106.2	122.1
-91	83.2	94.9
-91	91.8	105.0
-91	94.7	108.5
-91	92.9	106.4
-91	69.9	79.2
-91	93.1	106.6
-91	97.9	112.2
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-91	76.3	86.7
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-91	83.7	95.5
-91	82.1	93.6

-91	86.8	99.2
-91	86.7	99.0
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-91	83.1	94.8
-91	88.9	101.6
-91	64.3	72.5
-91	101.6	116.7
-91	94.2	107.9
-91	78.7	89.5
-91	73.0	82.8
-91	64.2	72.3
-91	98.9	113.5
-91	103.2	137.2
-91	84.4	110.7
-91	97.0	128.5
-91	92.7	122.4
-91	96.8	128.2
-91	73.6	95.5
-91	73.0	94.7
-91	73.3	95.1
-91	53.8	67.7
-91	69.5	89.7
-91	65.5	84.0
-91	79.6	104.0
-91	69.8	90.1
-91	90.3	119.0
-91	88.0	115.8
-60	234.1	199.3
-60	114.4	99.1
-60	130.7	112.7
-60	106.7	92.6
-60	161.0	138.1
-60	200.7	171.3
-60	125.2	108.1
-60	145.1	124.8
-60	91.9	80.2
-60	128.1	110.6
-60	164.4	140.9
-60	192.2	164.3
-60	166.3	142.5
-60	177.7	152.1
-60	167.6	143.6
-60	128.6	110.9
-60	377.4	319.3
-60	98.4	85.7
-60	278.4	236.4
-60	240.7	204.9
-60	380.0	321.5
-60	171.9	147.2
-60	136.8	117.8
-60	135.8	117.0
-60	214.7	183.1
-60	299.5	254.1
-60	203.7	173.9
-60	116.0	100.4
-60	221.9	189.1
-60	167.6	143.6
-60	89.8	78.5
-60	156.3	134.1
-60	186.8	159.7
-60	213.5	182.1
-60	164.6	141.1
-60	280.1	237.9
-60	185.9	159.0
-60	127.7	110.2
-60	205.0	175.0
-60	115.6	100.0
-60	107.5	93.3
-60	164.6	141.1
-60	172.0	147.3
-60	108.5	94.2
-60	119.0	102.9
-60	153.5	131.8
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-60	120.4	104.1
-60	104.5	90.8
-60	163.6	140.2
-60	201.4	172.0
-60	137.8	118.7
-60	173.0	148.1
-60	99.2	86.4

-60	173.4	148.4
-60	131.5	113.4
-60	186.0	185.3
-60	151.8	151.3
-60	111.7	111.3
-60	143.9	143.4
-60	105.4	105.1
-60	154.0	153.4
-60	176.2	175.6
-60	131.9	131.5
-60	203.9	203.2
-60	142.7	142.2
-60	134.5	134.0
-60	130.1	129.7
-60	142.6	142.1
-60	119.7	119.3
-60	141.3	140.8
-60	175.9	175.3
-60	119.6	119.2
-60	102.4	102.0
-60	99.0	98.7
-60	115.1	114.7
-60	172.9	172.3
-60	120.5	120.2
-60	165.2	164.6
-60	125.6	125.2
-60	126.7	126.3
-60	100.4	100.1
-60	131.1	130.7
-60	185.1	184.5
-60	163.6	163.0
-60	126.5	126.1
-60	164.7	164.1
-60	192.7	192.0
-60	134.5	134.1
-60	140.8	140.3
-60	295.3	346.1
-60	217.7	254.2
-60	219.8	256.6
-60	165.9	192.8
-60	109.9	126.5
-60	131.9	152.5
-60	136.2	157.6
-60	154.0	178.8
-60	115.9	133.6
-60	150.4	174.4
-60	153.6	178.2
-60	183.8	214.0
-60	236.1	275.9
-60	149.4	173.3
-60	179.5	209.0
-60	177.6	206.7
-60	188.3	219.4
-60	134.5	155.6
-60	243.6	284.9
-60	155.7	180.8
-60	164.0	190.6
-60	146.5	169.8
-60	119.9	138.4
-60	79.9	91.0
-60	140.9	163.2
-60	115.3	132.9
-60	137.0	158.6
-60	166.9	194.0
-60	225.4	263.3
-60	200.7	234.1
-40	171.0	146.5
-40	569.4	480.2
-40	169.4	145.1
-40	548.7	462.8
-40	529.9	447.1
-40	318.5	270.1
-40	574.8	484.7
-40	360.8	305.4
-40	343.8	291.2
-40	235.8	200.8
-40	529.9	447.1
-40	496.5	419.1
-40	600.0	505.8
-40	113.7	98.5
-40	229.6	195.5
-40	154.2	132.4
-40	221.3	188.6
-40	486.7	410.9
-40	243.8	207.4
-40	202.5	172.8
-40	180.6	154.6

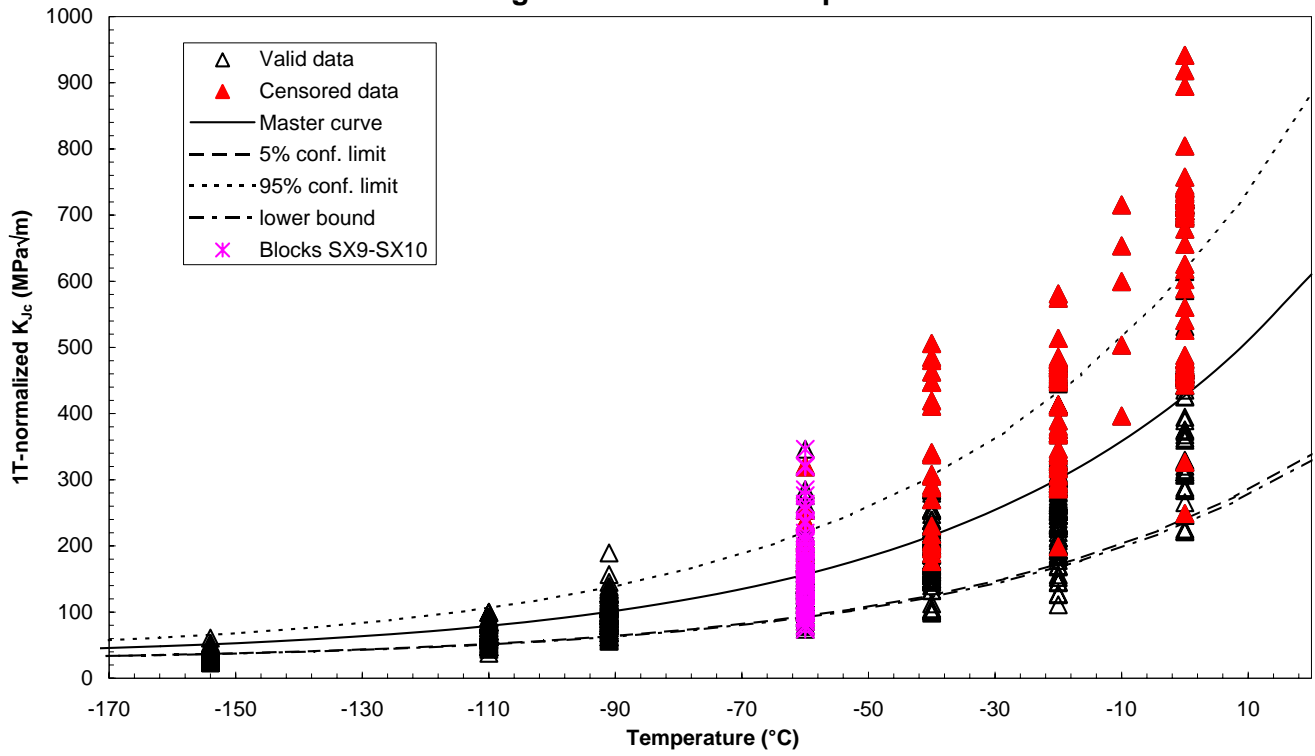
-40	206.7	176.4
-40	240.7	204.9
-40	270.8	230.1
-40	186.4	159.4
-40	255.8	217.5
-40	231.2	196.9
-40	339.4	287.5
-40	403.1	340.9
-40	399.2	337.6
-40	187.3	186.6
-40	101.5	101.2
-40	140.3	139.9
-40	150.2	149.7
-40	187.3	186.6
-40	211.4	210.6
-40	160.5	160.0
-40	214.6	213.8
-40	188.3	187.7
-40	239.3	238.4
-40	112.8	112.4
-40	239.0	238.1
-40	284.9	283.9
-40	254.7	253.7
-40	270.9	269.9
-40	187.0	186.3
-40	170.1	169.5
-40	256.4	255.5
-40	171.4	170.8
-40	103.1	102.8
-40	230.0	229.1
-40	210.0	209.2
-40	198.2	197.5
-40	150.2	149.7
-40	226.8	226.0
-40	158.1	157.5
-40	256.4	255.5
-40	207.6	206.9
-40	213.5	212.8
-40	254.6	253.7
-40	240.0	239.1
-40	309.2	308.0
-40	125.9	145.5
-40	128.9	149.0
-40	198.5	231.5
-40	212.0	247.5
-40	138.6	160.5
-40	187.7	218.7
-40	173.0	201.2
-40	179.5	208.9
-40	152.6	177.1
-40	153.6	178.3
-40	144.6	167.6
-40	150.7	174.9
-40	139.1	161.0
-40	183.6	213.8
-40	142.0	164.5
-40	187.2	218.0
-40	172.2	200.3
-40	198.0	230.8
-40	130.4	150.8
-40	141.7	164.1
-40	134.5	155.6
-40	115.5	133.1
-40	91.7	104.9
-40	141.1	163.4
-40	239.1	279.6
-40	243.4	284.7
-40	191.9	223.6
-40	146.8	170.2
-40	161.4	187.5
-40	142.3	164.8
-20	128.7	111.1
-20	146.9	126.3
-20	402.8	340.6
-20	409.4	346.2
-20	530.5	447.6
-20	532.2	449.0
-20	534.6	451.0
-20	536.1	452.3
-20	536.1	452.3
-20	536.6	452.7
-20	538.6	454.3
-20	540.5	455.9
-20	543.8	458.7
-20	549.2	463.2
-20	553.7	467.0
-20	556.1	469.0

-20	556.3	469.2
-20	560.6	472.8
-20	565.8	477.2
-20	570.1	480.8
-20	571.1	481.6
-20	233.1	198.5
-20	389.8	329.8
-20	487.9	411.9
-20	438.3	370.4
-20	571.4	481.8
-20	560.7	472.9
-20	561.1	473.2
-20	575.1	484.9
-20	557.5	470.2
-20	572.5	482.7
-20	202.5	201.7
-20	194.7	194.1
-20	262.8	261.8
-20	187.9	187.2
-20	275.8	274.8
-20	261.8	260.9
-20	371.0	369.7
-20	369.1	367.7
-20	462.1	460.4
-20	319.7	318.5
-20	583.1	580.9
-20	231.9	231.0
-20	382.0	380.6
-20	295.9	294.8
-20	576.4	574.2
-20	411.7	410.1
-20	306.4	305.2
-20	324.7	323.5
-20	282.5	281.4
-20	247.2	246.3
-20	233.2	232.4
-20	317.5	316.3
-20	515.6	513.7
-20	263.2	262.3
-20	184.4	183.8
-20	286.9	285.9
-20	341.4	340.1
-20	415.0	413.4
-20	327.9	326.7
-20	170.9	170.3
-20	308.8	307.6
-20	376.5	375.1
-20	228.2	227.4
-20	371.7	370.3
-20	291.6	290.6
-20	337.7	336.4
-20	390.5	389.0
-20	227.3	226.5
-20	201.3	200.6
-20	212.5	211.7
-20	288.4	287.3
-20	479.1	477.3
-20	377.9	376.5
-20	269.6	268.6
-20	184.4	183.8
-20	241.6	240.7
-20	146.4	145.9
-20	299.4	298.3
-20	156.7	156.2
-20	295.6	294.5
-20	167.4	164.6
-20	153.5	178.1
-20	211.2	246.5
-20	220.3	257.3
-20	227.9	266.2
-20	211.1	246.4
-20	217.1	253.4
-20	145.3	168.5
-20	161.2	187.2
-20	131.9	152.5
-20	216.4	252.6
-20	125.0	144.4
-20	378.7	444.9
-20	246.1	287.9
-20	250.9	293.5
-20	251.5	294.3
-20	284.0	332.7
-20	261.1	305.6
-20	351.6	412.8
-20	258.5	302.5
-20	201.3	234.8
-20	110.9	127.7

-20	197.7	230.5
-20	198.9	231.9
-20	200.6	234.0
-20	165.7	192.6
-20	280.1	328.0
-20	279.5	327.3
-20	257.6	301.4
-20	265.2	310.4
-20	156.7	212.6
-20	221.7	304.1
-20	193.9	264.9
-20	191.7	261.9
-20	184.4	251.6
-20	186.7	254.8
-20	184.4	251.6
-20	193.9	264.9
-20	204.4	279.8
-20	224.0	307.4
-20	153.4	207.9
-20	222.6	305.4
-20	162.0	220.0
-20	187.8	256.4
-20	198.2	271.0
-10	656.0	653.4
-10	397.8	396.3
-10	718.1	715.3
-10	601.6	599.3
-10	505.3	503.4
0	541.9	457.1
0	547.0	461.4
0	538.7	454.4
0	540.0	455.5
0	544.8	459.6
0	534.8	451.2
0	557.2	469.9
0	545.0	459.7
0	546.1	460.6
0	549.2	463.2
0	565.1	476.5
0	571.6	482.0
0	553.4	466.8
0	293.2	248.8
0	544.1	459.0
0	552.2	465.7
0	558.0	470.6
0	553.5	466.8
0	557.6	470.3
0	552.4	466.0
0	555.6	468.6
0	558.2	470.8
0	550.6	464.4
0	560.8	473.0
0	569.6	480.4
0	552.5	466.0
0	578.5	487.7
0	556.0	468.9
0	543.8	458.7
0	556.3	469.2
0	327.6	326.4
0	681.4	678.8
0	700.8	698.2
0	698.2	695.5
0	708.4	705.7
0	701.5	698.8
0	724.9	722.1
0	717.4	714.6
0	705.8	703.0
0	709.5	706.8
0	716.7	714.0
0	714.1	711.3
0	658.5	656.0
0	747.5	744.6
0	709.0	706.2
0	719.2	716.4
0	444.5	442.8
0	699.8	697.1
0	704.0	701.3
0	729.5	726.7
0	714.0	711.3
0	725.6	722.8
0	730.2	727.4
0	737.8	734.9
0	590.7	588.4
0	730.3	727.5
0	741.8	738.9
0	744.2	741.3
0	527.7	525.7

0	620.4	618.0				
0	727.0	724.2				
0	730.3	727.5				
0	542.6	540.5				
0	726.7	723.9				
0	718.7	716.0				
0	717.1	714.4				
0	721.2	718.5				
0	725.3	722.5				
0	727.9	725.1				
0	727.0	724.2				
0	718.5	715.7				
0	191.3	222.9				
0	269.2	315.2				
0	281.2	329.4				
0	242.5	283.5				
0	318.3	373.3				
0	476.2	560.4				
0	511.7	602.5				
0	621.3	732.2				
0	531.3	625.6				
0	266.6	312.1				
0	599.3	706.2				
0	362.9	426.1				
0	331.8	389.3				
0	227.1	265.3				
0	309.5	362.9				
0	628.6	740.9				
0	210.9	246.1				
0	410.7	482.8				
0	211.4	246.7				
0	778.3	918.2				
0	263.4	308.3				
0	682.2	804.4				
0	386.7	454.3				
0	376.2	441.9				
0	642.5	757.3				
0	306.7	359.6				
0	758.4	894.6				
0	797.9	941.4				
0	246.4	288.2				
0	320.1	375.4				
0	233.3	320.4				
0	238.2	327.4				
0	208.3	285.2				
0	421.7	585.8				
0	226.7	311.2				
0	267.0	367.9				
0	163.0	221.4				
0	165.8	225.4				
0	285.9	394.6				
0	342.0	473.5				
0	314.9	435.4				
0	307.6	425.1				
0	383.0	531.4				
0	332.6	460.4				
0	223.6	306.8				
0	442.2	614.7				
-174			44.6	33.3	55.8	33.0
-161.875			48.3	35.3	61.3	35.0
-149.75			53.1	37.9	68.3	37.5
-137.625			59.0	41.1	77.0	40.6
-125.5			66.6	45.1	88.0	44.6
-113.375			76.0	50.3	101.8	49.5
-101.25			88.0	56.7	119.2	55.8
-89.125			103.0	64.8	141.2	63.7
-77			121.9	75.0	168.8	73.6
-64.875			145.7	87.9	203.5	86.1
-52.75			175.7	104.1	247.3	101.8
-40.625			213.4	124.5	302.4	121.6
-28.5			261.0	150.1	371.8	146.5
-16.375			320.8	182.4	459.1	177.9
-4.25			396.1	223.1	569.1	217.3
7.875			491.0	274.3	707.6	267.1
20			610.4	338.8	882.0	329.7

Master Curve with tolerance bounds EURO toughness dataset - Complete dataset



GKSS	-154	41.7	41.7	0	0.000	0.0000	0.0000
GKSS	-154	46.1	46.0	0	0.000	0.0000	0.0000
GKSS	-154	44.2	44.1	0	0.000	0.0000	0.0000
GKSS	-154	36.7	36.6	0	0.000	0.0000	0.0000
GKSS	-154	29.0	28.9	0	0.000	0.0000	0.0000
GKSS	-154	53.0	52.9	0	0.000	0.0000	0.0000
GKSS	-154	39.4	39.3	0	0.000	0.0000	0.0000
GKSS	-154	29.0	28.9	0	0.000	0.0000	0.0000
SIEMENS	-154	34.6	34.5	0	0.000	0.0000	0.0000
SIEMENS	-154	33.0	33.0	0	0.000	0.0000	0.0000
SIEMENS	-154	38.1	38.0	0	0.000	0.0000	0.0000
SIEMENS	-154	28.6	28.6	0	0.000	0.0000	0.0000
SIEMENS	-154	28.6	28.6	0	0.000	0.0000	0.0000
SIEMENS	-154	38.6	38.5	0	0.000	0.0000	0.0000
SIEMENS	-154	36.4	36.3	0	0.000	0.0000	0.0000
SIEMENS	-154	33.4	33.3	0	0.000	0.0000	0.0000
SIEMENS	-154	36.9	36.9	0	0.000	0.0000	0.0000
SIEMENS	-154	31.1	31.0	0	0.000	0.0000	0.0000
SIEMENS	-154	34.3	34.2	0	0.000	0.0000	0.0000
SIEMENS	-154	30.4	30.4	0	0.000	0.0000	0.0000
SIEMENS	-154	49.6	49.5	0	0.000	0.0000	0.0000
SIEMENS	-154	41.0	40.9	0	0.000	0.0000	0.0000
SIEMENS	-154	34.0	33.9	0	0.000	0.0000	0.0000
SIEMENS	-154	30.7	30.7	0	0.000	0.0000	0.0000
SIEMENS	-154	41.2	41.2	0	0.000	0.0000	0.0000
SIEMENS	-154	26.7	26.7	0	0.000	0.0000	0.0000
SIEMENS	-154	35.5	35.4	0	0.000	0.0000	0.0000
SIEMENS	-154	33.4	33.3	0	0.000	0.0000	0.0000
SIEMENS	-154	36.7	36.6	0	0.000	0.0000	0.0000
SIEMENS	-154	32.4	32.4	0	0.000	0.0000	0.0000
SIEMENS	-154	45.1	45.0	0	0.000	0.0000	0.0000
SIEMENS	-154	33.4	33.3	0	0.000	0.0000	0.0000
SIEMENS	-154	34.0	33.9	0	0.000	0.0000	0.0000
SIEMENS	-154	30.7	30.7	0	0.000	0.0000	0.0000
SIEMENS	-154	26.7	26.7	0	0.000	0.0000	0.0000
GKSS	-154	33.7	36.2	0	0.000	0.0000	0.0000
GKSS	-154	42.7	46.9	0	0.000	0.0000	0.0000
GKSS	-154	37.2	40.4	0	0.000	0.0000	0.0000
GKSS	-154	54.4	60.8	0	0.000	0.0000	0.0000
GKSS	-154	34.6	37.3	0	0.000	0.0000	0.0000
GKSS	-154	44.2	48.7	0	0.000	0.0000	0.0000
GKSS	-154	29.7	31.5	0	0.000	0.0000	0.0000
GKSS	-154	36.4	39.4	0	0.000	0.0000	0.0000
GKSS	-154	36.4	39.4	0	0.000	0.0000	0.0000
GKSS	-154	28.2	29.8	0	0.000	0.0000	0.0000
GKSS	-154	28.2	29.8	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
NE	-154	36.4	39.4	0	0.000	0.0000	0.0000
NE	-154	37.5	40.7	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
NE	-154	30.7	32.7	0	0.000	0.0000	0.0000
NE	-154	30.4	32.3	0	0.000	0.0000	0.0000
NE	-154	30.7	32.7	0	0.000	0.0000	0.0000
NE	-154	31.7	33.9	0	0.000	0.0000	0.0000
NE	-154	41.7	45.8	0	0.000	0.0000	0.0000
NE	-154	37.2	40.4	0	0.000	0.0000	0.0000
NE	-154	34.9	37.6	0	0.000	0.0000	0.0000
NE	-154	38.3	41.7	0	0.000	0.0000	0.0000
NE	-154	31.4	33.5	0	0.000	0.0000	0.0000
NE	-154	33.7	36.2	0	0.000	0.0000	0.0000
NE	-154	32.7	35.1	0	0.000	0.0000	0.0000
NE	-154	43.0	47.2	0	0.000	0.0000	0.0000
NE	-154	32.7	35.1	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
NE	-154	36.9	40.1	0	0.000	0.0000	0.0000
NE	-154	33.4	35.8	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
GKSS	-110	98.1	85.4	1	0.143	0.0108	0.0110
GKSS	-110	59.0	52.7	1	0.143	0.0108	0.0007
GKSS	-110	80.0	70.3	1	0.143	0.0108	0.0039
GKSS	-110	57.2	51.2	1	0.143	0.0108	0.0006
GKSS	-110	88.3	77.2	1	0.143	0.0108	0.0065
GKSS	-110	96.2	83.9	1	0.143	0.0108	0.0100
GKSS	-110	81.6	71.6	1	0.143	0.0108	0.0043
GKSS	-110	66.9	59.3	1	0.143	0.0108	0.0014
GKSS	-110	85.6	75.0	1	0.143	0.0108	0.0055
GKSS	-110	86.8	76.0	1	0.143	0.0108	0.0059
GKSS	-110	114.2	98.9	1	0.143	0.0108	0.0234
GKSS	-110	73.5	64.8	1	0.143	0.0108	0.0024
GKSS	-110	92.7	80.9	1	0.143	0.0108	0.0083
GKSS	-110	77.5	68.2	1	0.143	0.0108	0.0033
GKSS	-110	61.5	54.7	1	0.143	0.0108	0.0009
GKSS	-110	51.8	46.7	1	0.143	0.0108	0.0003
GKSS	-110	73.6	64.9	1	0.143	0.0108	0.0025
GKSS	-110	52.8	47.5	1	0.143	0.0108	0.0003
GKSS	-110	41.2	37.8	1	0.143	0.0108	0.0001
GKSS	-110	115.3	99.8	1	0.143	0.0108	0.0245
GKSS	-110	73.2	64.5	1	0.143	0.0108	0.0024

GKSS	-110	74.0	65.3	1	0.143	0.0108	0.0025
GKSS	-110	67.5	59.8	1	0.143	0.0108	0.0015
GKSS	-110	71.0	62.7	1	0.143	0.0108	0.0020
GKSS	-110	53.4	48.0	1	0.143	0.0108	0.0004
GKSS	-110	96.5	84.0	1	0.143	0.0108	0.0102
GKSS	-110	71.3	63.0	1	0.143	0.0108	0.0021
GKSS	-110	71.7	63.3	1	0.143	0.0108	0.0021
GKSS	-110	81.7	71.7	1	0.143	0.0108	0.0043
GKSS	-110	64.0	56.8	1	0.143	0.0108	0.0011
GKSS	-110	74.2	65.4	1	0.143	0.0108	0.0026
GKSS	-110	70.4	62.2	1	0.143	0.0108	0.0019
GKSS	-110	91.2	79.6	1	0.143	0.0108	0.0076
GKSS	-110	72.0	63.6	1	0.143	0.0108	0.0022
GKSS	-110	64.8	57.5	1	0.143	0.0108	0.0012
GKSS	-110	79.2	69.6	1	0.143	0.0108	0.0037
GKSS	-110	52.2	47.0	1	0.143	0.0108	0.0003
GKSS	-110	82.9	72.7	1	0.143	0.0108	0.0046
GKSS	-110	93.2	81.3	1	0.143	0.0108	0.0086
GKSS	-110	75.4	66.4	1	0.143	0.0108	0.0028
GKSS	-110	75.0	66.1	1	0.143	0.0108	0.0027
GKSS	-110	78.6	69.1	1	0.143	0.0108	0.0035
GKSS	-110	94.8	82.7	1	0.143	0.0108	0.0093
GKSS	-110	98.1	85.4	1	0.143	0.0108	0.0110
GKSS	-110	98.5	85.7	1	0.143	0.0108	0.0113
GKSS	-110	104.9	91.1	1	0.143	0.0108	0.0155
GKSS	-110	69.9	61.8	1	0.143	0.0108	0.0019
GKSS	-110	81.6	71.6	1	0.143	0.0108	0.0043
GKSS	-110	55.2	49.5	1	0.143	0.0108	0.0005
GKSS	-110	105.6	91.7	1	0.143	0.0108	0.0160
GKSS	-110	101.5	88.3	1	0.143	0.0108	0.0131
GKSS	-110	73.7	65.0	1	0.143	0.0108	0.0025
GKSS	-110	97.5	84.9	1	0.143	0.0108	0.0107
GKSS	-110	75.9	66.8	1	0.143	0.0108	0.0029
GKSS	-110	48.3	43.7	1	0.143	0.0108	0.0002
GKSS	-91	127.0	109.6	1	0.167	0.0114	0.0120
GKSS	-91	121.8	105.2	1	0.167	0.0114	0.0098
GKSS	-91	70.5	62.3	1	0.167	0.0114	0.0006
GKSS	-91	94.2	82.2	1	0.167	0.0114	0.0028
GKSS	-91	127.3	109.9	1	0.167	0.0114	0.0121
GKSS	-91	119.9	103.7	1	0.167	0.0114	0.0091
GKSS	-91	104.5	90.8	1	0.167	0.0114	0.0047
GKSS	-91	78.6	69.1	1	0.167	0.0114	0.0011
GKSS	-91	98.6	85.8	1	0.167	0.0114	0.0035
GKSS	-91	161.6	138.6	1	0.167	0.0114	0.0367
THA	-91	91.3	79.7	1	0.167	0.0114	0.0024
THA	-91	115.3	99.8	1	0.167	0.0114	0.0075
THA	-91	122.4	105.8	1	0.167	0.0114	0.0101
THA	-91	126.3	109.1	1	0.167	0.0114	0.0117
THA	-91	108.3	94.0	1	0.167	0.0114	0.0056
THA	-91	66.9	59.3	1	0.167	0.0114	0.0004
THA	-91	126.7	109.4	1	0.167	0.0114	0.0119
THA	-91	69.6	61.6	1	0.167	0.0114	0.0006
THA	-91	121.4	104.9	1	0.167	0.0114	0.0097
THA	-91	90.0	78.7	1	0.167	0.0114	0.0022
THA	-91	153.9	132.2	1	0.167	0.0114	0.0294
THA	-91	64.6	57.4	1	0.167	0.0114	0.0004
THA	-91	127.2	109.8	1	0.167	0.0114	0.0120
THA	-91	99.7	86.7	1	0.167	0.0114	0.0037
THA	-91	101.3	88.1	1	0.167	0.0114	0.0040
THA	-91	140.4	120.9	1	0.167	0.0114	0.0192
THA	-91	78.2	68.7	1	0.167	0.0114	0.0010
THA	-91	109.0	94.6	1	0.167	0.0114	0.0057
THA	-91	103.9	90.3	1	0.167	0.0114	0.0045
THA	-91	126.8	109.5	1	0.167	0.0114	0.0119
THA	-91	111.7	96.8	1	0.167	0.0114	0.0065
GKSS	-91	68.6	68.4	1	0.167	0.0114	0.0010
GKSS	-91	81.6	81.3	1	0.167	0.0114	0.0026
GKSS	-91	55.9	55.8	1	0.167	0.0114	0.0003
GKSS	-91	98.8	98.5	1	0.167	0.0114	0.0070
GKSS	-91	71.9	71.7	1	0.167	0.0114	0.0013
GKSS	-91	111.0	110.7	1	0.167	0.0114	0.0125
GKSS	-91	93.5	93.2	1	0.167	0.0114	0.0053
GKSS	-91	79.9	79.7	1	0.167	0.0114	0.0024
GKSS	-91	98.4	98.1	1	0.167	0.0114	0.0069
GKSS	-91	101.1	100.8	1	0.167	0.0114	0.0079
TWI	-91	79.6	79.4	1	0.167	0.0114	0.0023
TWI	-91	99.7	99.3	1	0.167	0.0114	0.0074
TWI	-91	108.1	107.7	1	0.167	0.0114	0.0110
TWI	-91	93.4	93.1	1	0.167	0.0114	0.0053
TWI	-91	62.0	61.8	1	0.167	0.0114	0.0006
TWI	-91	107.1	106.7	1	0.167	0.0114	0.0105
TWI	-91	145.3	144.8	1	0.167	0.0114	0.0450
TWI	-91	76.3	76.0	1	0.167	0.0114	0.0018
TWI	-91	126.5	126.1	1	0.167	0.0114	0.0235
TWI	-91	126.1	125.7	1	0.167	0.0114	0.0231
TWI	-91	128.5	128.0	1	0.167	0.0114	0.0253
TWI	-91	111.4	111.0	1	0.167	0.0114	0.0127
TWI	-91	130.4	130.0	1	0.167	0.0114	0.0272

TWI	-91	134.8	134.3	1	0.167	0.0114	0.0317
TWI	-91	157.3	156.7	1	0.167	0.0114	0.0649
TWI	-91	105.2	104.9	1	0.167	0.0114	0.0096
TWI	-91	109.8	109.4	1	0.167	0.0114	0.0119
TWI	-91	84.9	84.6	1	0.167	0.0114	0.0032
TWI	-91	62.8	62.7	1	0.167	0.0114	0.0006
TWI	-91	97.5	97.2	1	0.167	0.0114	0.0066
TWI	-91	80.2	79.9	1	0.167	0.0114	0.0024
TWI	-91	134.4	133.9	1	0.167	0.0114	0.0313
TWI	-91	65.1	65.0	1	0.167	0.0114	0.0008
TWI	-91	118.6	118.2	1	0.167	0.0114	0.0173
GKSS	-91	67.3	76.1	1	0.167	0.0114	0.0018
GKSS	-91	162.9	189.3	1	0.167	0.0114	0.1524
GKSS	-91	100.0	114.7	1	0.167	0.0114	0.0149
GKSS	-91	91.2	104.3	1	0.167	0.0114	0.0094
GKSS	-91	106.2	122.1	1	0.167	0.0114	0.0202
GKSS	-91	83.2	94.9	1	0.167	0.0114	0.0058
GKSS	-91	91.8	105.0	1	0.167	0.0114	0.0097
GKSS	-91	94.7	108.5	1	0.167	0.0114	0.0114
GKSS	-91	92.9	106.4	1	0.167	0.0114	0.0103
GKSS	-91	69.9	79.2	1	0.167	0.0114	0.0023
NE	-91	93.1	106.6	1	0.167	0.0114	0.0104
NE	-91	97.9	112.2	1	0.167	0.0114	0.0134
NE	-91	73.7	83.7	1	0.167	0.0114	0.0030
NE	-91	82.0	93.4	1	0.167	0.0114	0.0054
NE	-91	76.3	86.7	1	0.167	0.0114	0.0037
NE	-91	93.1	106.6	1	0.167	0.0114	0.0104
NE	-91	83.7	95.5	1	0.167	0.0114	0.0060
NE	-91	82.1	93.6	1	0.167	0.0114	0.0054
NE	-91	86.8	99.2	1	0.167	0.0114	0.0073
NE	-91	86.7	99.0	1	0.167	0.0114	0.0072
NE	-91	92.3	105.7	1	0.167	0.0114	0.0100
NE	-91	83.1	94.8	1	0.167	0.0114	0.0058
NE	-91	88.9	101.6	1	0.167	0.0114	0.0082
NE	-91	64.3	72.5	1	0.167	0.0114	0.0014
NE	-91	101.6	116.7	1	0.167	0.0114	0.0162
NE	-91	94.2	107.9	1	0.167	0.0114	0.0111
NE	-91	78.7	89.5	1	0.167	0.0114	0.0043
NE	-91	73.0	82.8	1	0.167	0.0114	0.0029
NE	-91	64.2	72.3	1	0.167	0.0114	0.0014
NE	-91	98.9	113.5	1	0.167	0.0114	0.0142
GKSS	-91	103.2	137.2	1	0.167	0.0114	0.0350
GKSS	-91	84.4	110.7	1	0.167	0.0114	0.0125
GKSS	-91	97.0	128.5	1	0.167	0.0114	0.0257
GKSS	-91	92.7	122.4	1	0.167	0.0114	0.0204
GKSS	-91	96.8	128.2	1	0.167	0.0114	0.0254
NE	-91	73.6	95.5	1	0.167	0.0114	0.0060
NE	-91	73.0	94.7	1	0.167	0.0114	0.0058
NE	-91	73.3	95.1	1	0.167	0.0114	0.0059
NE	-91	53.8	67.7	1	0.167	0.0114	0.0010
NE	-91	69.5	89.7	1	0.167	0.0114	0.0044
NE	-91	65.5	84.0	1	0.167	0.0114	0.0031
NE	-91	79.6	104.0	1	0.167	0.0114	0.0092
NE	-91	69.8	90.1	1	0.167	0.0114	0.0045
NE	-91	90.3	119.0	1	0.167	0.0114	0.0178
NE	-91	88.0	115.8	1	0.167	0.0114	0.0156
GKSS	-60	205.5	175.4	0	0.000	0.0000	0.0136
GKSS	-60	114.4	99.1	1	0.167	0.0120	0.0009
GKSS	-60	130.7	112.7	1	0.167	0.0120	0.0017
GKSS	-60	106.7	92.6	1	0.167	0.0120	0.0006
GKSS	-60	161.0	138.1	1	0.167	0.0120	0.0045
GKSS	-60	200.7	171.3	1	0.167	0.0120	0.0123
GKSS	-60	125.2	108.1	1	0.167	0.0120	0.0014
GKSS	-60	145.1	124.8	1	0.167	0.0120	0.0028
GKSS	-60	91.9	80.2	1	0.167	0.0120	0.0003
GKSS	-60	128.1	110.6	1	0.167	0.0120	0.0016
GKSS	-60	164.4	140.9	1	0.167	0.0120	0.0050
GKSS	-60	192.2	164.3	1	0.167	0.0120	0.0101
GKSS	-60	166.3	142.5	1	0.167	0.0120	0.0053
GKSS	-60	177.7	152.1	1	0.167	0.0120	0.0071
GKSS	-60	167.6	143.6	1	0.167	0.0120	0.0055
GKSS	-60	128.6	110.9	1	0.167	0.0120	0.0016
GKSS	-60	203.0	173.3	0	0.000	0.0000	0.0129
GKSS	-60	98.4	85.7	1	0.167	0.0120	0.0004
GKSS	-60	203.3	173.5	0	0.000	0.0000	0.0130
GKSS	-60	202.6	173.0	0	0.000	0.0000	0.0128
GKSS	-60	201.7	172.1	0	0.000	0.0000	0.0125
GKSS	-60	171.9	147.2	1	0.167	0.0120	0.0061
GKSS	-60	136.8	117.8	1	0.167	0.0120	0.0021
GKSS	-60	135.8	117.0	1	0.167	0.0120	0.0021
GKSS	-60	200.8	171.4	0	0.000	0.0000	0.0123
GKSS	-60	202.8	173.1	0	0.000	0.0000	0.0129
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0126
GKSS	-60	116.0	100.4	1	0.167	0.0120	0.0010
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0126
GKSS	-60	167.6	143.6	1	0.167	0.0120	0.0055
GKSS	-60	89.8	78.5	1	0.167	0.0120	0.0003
GKSS	-60	156.3	134.1	1	0.167	0.0120	0.0040

GKSS	-60	186.8	159.7	1	0.167	0.0120	0.0089
GKSS	-60	203.2	173.4	0	0.000	0.0000	0.0130
GKSS	-60	164.6	141.1	1	0.167	0.0120	0.0050
GKSS	-60	202.6	173.0	0	0.000	0.0000	0.0128
GKSS	-60	185.9	159.0	1	0.167	0.0120	0.0087
GKSS	-60	127.7	110.2	1	0.167	0.0120	0.0016
GKSS	-60	201.2	171.7	0	0.000	0.0000	0.0124
GKSS	-60	115.6	100.0	1	0.167	0.0120	0.0010
GKSS	-60	107.5	93.3	1	0.167	0.0120	0.0007
SIEMENS	-60	164.6	141.1	1	0.167	0.0120	0.0050
SIEMENS	-60	172.0	147.3	1	0.167	0.0120	0.0061
SIEMENS	-60	108.5	94.2	1	0.167	0.0120	0.0007
SIEMENS	-60	119.0	102.9	1	0.167	0.0120	0.0011
SIEMENS	-60	153.5	131.8	1	0.167	0.0120	0.0037
SIEMENS	-60	158.9	136.4	1	0.167	0.0120	0.0043
SIEMENS	-60	137.5	118.4	1	0.167	0.0120	0.0022
SIEMENS	-60	119.5	103.3	1	0.167	0.0120	0.0011
SIEMENS	-60	130.7	112.8	1	0.167	0.0120	0.0017
SIEMENS	-60	172.6	147.8	1	0.167	0.0120	0.0062
SIEMENS	-60	84.5	74.0	1	0.167	0.0120	0.0002
SIEMENS	-60	213.4	182.0	0	0.000	0.0000	0.0161
SIEMENS	-60	120.4	104.1	1	0.167	0.0120	0.0012
SIEMENS	-60	104.5	90.8	1	0.167	0.0120	0.0006
SIEMENS	-60	163.6	140.2	1	0.167	0.0120	0.0049
SIEMENS	-60	201.4	172.0	1	0.167	0.0120	0.0125
SIEMENS	-60	137.8	118.7	1	0.167	0.0120	0.0022
SIEMENS	-60	173.0	148.1	1	0.167	0.0120	0.0063
SIEMENS	-60	99.2	86.4	1	0.167	0.0120	0.0005
SIEMENS	-60	173.4	148.4	1	0.167	0.0120	0.0064
SIEMENS	-60	131.5	113.4	1	0.167	0.0120	0.0018
GKSS	-60	186.0	185.3	1	0.167	0.0120	0.0175
GKSS	-60	151.8	151.3	1	0.167	0.0120	0.0069
GKSS	-60	111.7	111.3	1	0.167	0.0120	0.0016
GKSS	-60	143.9	143.4	1	0.167	0.0120	0.0054
GKSS	-60	105.4	105.1	1	0.167	0.0120	0.0012
GKSS	-60	154.0	153.4	1	0.167	0.0120	0.0074
GKSS	-60	176.2	175.6	1	0.167	0.0120	0.0137
GKSS	-60	131.9	131.5	1	0.167	0.0120	0.0036
GKSS	-60	203.9	203.2	1	0.167	0.0120	0.0263
GKSS	-60	142.7	142.2	1	0.167	0.0120	0.0052
TWI	-60	134.5	134.0	1	0.167	0.0120	0.0040
TWI	-60	130.1	129.7	1	0.167	0.0120	0.0034
TWI	-60	142.6	142.1	1	0.167	0.0120	0.0052
TWI	-60	119.7	119.3	1	0.167	0.0120	0.0023
TWI	-60	141.3	140.8	1	0.167	0.0120	0.0050
TWI	-60	175.9	175.3	1	0.167	0.0120	0.0136
TWI	-60	119.6	119.2	1	0.167	0.0120	0.0023
TWI	-60	102.4	102.0	1	0.167	0.0120	0.0011
TWI	-60	99.0	98.7	1	0.167	0.0120	0.0009
TWI	-60	115.1	114.7	1	0.167	0.0120	0.0019
TWI	-60	172.9	172.3	1	0.167	0.0120	0.0126
TWI	-60	120.5	120.2	1	0.167	0.0120	0.0024
TWI	-60	165.2	164.6	1	0.167	0.0120	0.0102
TWI	-60	125.6	125.2	1	0.167	0.0120	0.0029
TWI	-60	126.7	126.3	1	0.167	0.0120	0.0030
TWI	-60	100.4	100.1	1	0.167	0.0120	0.0010
TWI	-60	131.1	130.7	1	0.167	0.0120	0.0035
TWI	-60	185.1	184.5	1	0.167	0.0120	0.0171
TWI	-60	163.6	163.0	1	0.167	0.0120	0.0098
TWI	-60	126.5	126.1	1	0.167	0.0120	0.0030
TWI	-60	164.7	164.1	1	0.167	0.0120	0.0101
TWI	-60	192.7	192.0	1	0.167	0.0120	0.0205
TWI	-60	134.5	134.1	1	0.167	0.0120	0.0040
TWI	-60	140.8	140.3	1	0.167	0.0120	0.0049
GKSS	-60	295.3	346.1	1	0.167	0.0120	0.2645
GKSS	-60	217.7	254.2	1	0.167	0.0120	0.0703
GKSS	-60	219.8	256.6	1	0.167	0.0120	0.0733
GKSS	-60	165.9	192.8	1	0.167	0.0120	0.0209
GKSS	-60	109.9	126.5	1	0.167	0.0120	0.0030
GKSS	-60	131.9	152.5	1	0.167	0.0120	0.0072
GKSS	-60	136.2	157.6	1	0.167	0.0120	0.0084
GKSS	-60	154.0	178.8	1	0.167	0.0120	0.0149
GKSS	-60	115.9	133.6	1	0.167	0.0120	0.0039
GKSS	-60	150.4	174.4	1	0.167	0.0120	0.0133
THA	-60	153.6	178.2	1	0.167	0.0120	0.0146
THA	-60	183.8	214.0	1	0.167	0.0120	0.0331
THA	-60	236.1	275.9	1	0.167	0.0120	0.1003
THA	-60	149.4	173.3	1	0.167	0.0120	0.0129
THA	-60	179.5	209.0	1	0.167	0.0120	0.0298
THA	-60	177.6	206.7	1	0.167	0.0120	0.0284
THA	-60	188.3	219.4	1	0.167	0.0120	0.0370
THA	-60	134.5	155.6	1	0.167	0.0120	0.0079
THA	-60	243.6	284.9	1	0.167	0.0120	0.1151
THA	-60	155.7	180.8	1	0.167	0.0120	0.0156
THA	-60	164.0	190.6	1	0.167	0.0120	0.0198
THA	-60	146.5	169.8	1	0.167	0.0120	0.0118
THA	-60	119.9	138.4	1	0.167	0.0120	0.0046
THA	-60	79.9	91.0	1	0.167	0.0120	0.0006

THA	-60	140.9	163.2	1	0.167	0.0120	0.0098
THA	-60	115.3	132.9	1	0.167	0.0120	0.0038
THA	-60	137.0	158.6	1	0.167	0.0120	0.0086
THA	-60	166.9	194.0	1	0.167	0.0120	0.0215
THA	-60	225.4	263.3	1	0.167	0.0120	0.0819
THA	-60	200.7	234.1	1	0.167	0.0120	0.0491
BAM	-40	171.0	146.5	0	0.000	0.0000	0.0000
BAM	-40	206.2	176.0	0	0.000	0.0000	0.0000
BAM	-40	169.4	145.1	0	0.000	0.0000	0.0000
BAM	-40	203.6	173.7	0	0.000	0.0000	0.0000
BAM	-40	202.5	172.9	0	0.000	0.0000	0.0000
BAM	-40	207.2	176.8	0	0.000	0.0000	0.0000
BAM	-40	205.9	175.7	0	0.000	0.0000	0.0000
BAM	-40	206.5	176.2	0	0.000	0.0000	0.0000
BAM	-40	207.3	176.9	0	0.000	0.0000	0.0000
BAM	-40	205.1	175.1	0	0.000	0.0000	0.0000
BAM	-40	202.8	173.1	0	0.000	0.0000	0.0000
BAM	-40	204.9	174.8	0	0.000	0.0000	0.0000
BAM	-40	205.2	175.1	0	0.000	0.0000	0.0000
BAM	-40	113.7	98.5	0	0.000	0.0000	0.0000
BAM	-40	204.8	174.8	0	0.000	0.0000	0.0000
BAM	-40	154.2	132.4	0	0.000	0.0000	0.0000
BAM	-40	206.2	176.0	0	0.000	0.0000	0.0000
BAM	-40	204.2	174.3	0	0.000	0.0000	0.0000
BAM	-40	207.3	176.9	0	0.000	0.0000	0.0000
BAM	-40	202.5	172.8	0	0.000	0.0000	0.0000
GKSS	-40	180.6	154.6	0	0.000	0.0000	0.0000
GKSS	-40	203.5	173.7	0	0.000	0.0000	0.0000
GKSS	-40	198.2	169.3	0	0.000	0.0000	0.0000
GKSS	-40	199.6	170.5	0	0.000	0.0000	0.0000
GKSS	-40	186.4	159.4	0	0.000	0.0000	0.0000
GKSS	-40	199.4	170.3	0	0.000	0.0000	0.0000
GKSS	-40	204.4	174.4	0	0.000	0.0000	0.0000
GKSS	-40	202.4	172.7	0	0.000	0.0000	0.0000
GKSS	-40	203.2	173.4	0	0.000	0.0000	0.0000
GKSS	-40	200.9	171.5	0	0.000	0.0000	0.0000
BAM	-40	187.3	186.6	0	0.000	0.0000	0.0000
BAM	-40	101.5	101.2	0	0.000	0.0000	0.0000
BAM	-40	140.3	139.9	0	0.000	0.0000	0.0000
BAM	-40	150.2	149.7	0	0.000	0.0000	0.0000
BAM	-40	187.3	186.6	0	0.000	0.0000	0.0000
BAM	-40	211.4	210.6	0	0.000	0.0000	0.0000
BAM	-40	160.5	160.0	0	0.000	0.0000	0.0000
BAM	-40	214.6	213.8	0	0.000	0.0000	0.0000
BAM	-40	188.3	187.7	0	0.000	0.0000	0.0000
BAM	-40	239.3	238.4	0	0.000	0.0000	0.0000
BAM	-40	112.8	112.4	0	0.000	0.0000	0.0000
BAM	-40	239.0	238.1	0	0.000	0.0000	0.0000
BAM	-40	284.9	283.9	0	0.000	0.0000	0.0000
BAM	-40	254.7	253.7	0	0.000	0.0000	0.0000
BAM	-40	270.9	269.9	0	0.000	0.0000	0.0000
BAM	-40	187.0	186.3	0	0.000	0.0000	0.0000
BAM	-40	170.1	169.5	0	0.000	0.0000	0.0000
BAM	-40	256.4	255.5	0	0.000	0.0000	0.0000
BAM	-40	171.4	170.8	0	0.000	0.0000	0.0000
BAM	-40	103.1	102.8	0	0.000	0.0000	0.0000
BAM	-40	230.0	229.1	0	0.000	0.0000	0.0000
BAM	-40	210.0	209.2	0	0.000	0.0000	0.0000
GKSS	-40	198.2	197.5	0	0.000	0.0000	0.0000
GKSS	-40	150.2	149.7	0	0.000	0.0000	0.0000
GKSS	-40	226.8	226.0	0	0.000	0.0000	0.0000
GKSS	-40	158.1	157.5	0	0.000	0.0000	0.0000
GKSS	-40	256.4	255.5	0	0.000	0.0000	0.0000
GKSS	-40	207.6	206.9	0	0.000	0.0000	0.0000
GKSS	-40	213.5	212.8	0	0.000	0.0000	0.0000
GKSS	-40	254.6	253.7	0	0.000	0.0000	0.0000
GKSS	-40	240.0	239.1	0	0.000	0.0000	0.0000
GKSS	-40	279.0	278.0	0	0.000	0.0000	0.0000
GKSS	-40	125.9	145.5	0	0.000	0.0000	0.0000
GKSS	-40	128.9	149.0	0	0.000	0.0000	0.0000
GKSS	-40	198.5	231.5	0	0.000	0.0000	0.0000
GKSS	-40	212.0	247.5	0	0.000	0.0000	0.0000
GKSS	-40	138.6	160.5	0	0.000	0.0000	0.0000
GKSS	-40	187.7	218.7	0	0.000	0.0000	0.0000
GKSS	-40	173.0	201.2	0	0.000	0.0000	0.0000
GKSS	-40	179.5	208.9	0	0.000	0.0000	0.0000
GKSS	-40	152.6	177.1	0	0.000	0.0000	0.0000
GKSS	-40	153.6	178.3	0	0.000	0.0000	0.0000
THA	-40	144.6	167.6	0	0.000	0.0000	0.0000
THA	-40	150.7	174.9	0	0.000	0.0000	0.0000
THA	-40	139.1	161.0	0	0.000	0.0000	0.0000
THA	-40	183.6	213.8	0	0.000	0.0000	0.0000
THA	-40	142.0	164.5	0	0.000	0.0000	0.0000
THA	-40	187.2	218.0	0	0.000	0.0000	0.0000
THA	-40	172.2	200.3	0	0.000	0.0000	0.0000
THA	-40	198.0	230.8	0	0.000	0.0000	0.0000
THA	-40	130.4	150.8	0	0.000	0.0000	0.0000
THA	-40	141.7	164.1	0	0.000	0.0000	0.0000

THA	-40	134.5	155.6	0	0.000	0.0000	0.0000
THA	-40	115.5	133.1	0	0.000	0.0000	0.0000
THA	-40	91.7	104.9	0	0.000	0.0000	0.0000
THA	-40	141.1	163.4	0	0.000	0.0000	0.0000
THA	-40	239.1	279.6	0	0.000	0.0000	0.0000
THA	-40	243.4	284.7	0	0.000	0.0000	0.0000
THA	-40	191.9	223.6	0	0.000	0.0000	0.0000
THA	-40	146.8	170.2	0	0.000	0.0000	0.0000
THA	-40	161.4	187.5	0	0.000	0.0000	0.0000
THA	-40	142.3	164.8	0	0.000	0.0000	0.0000
CISE	-20	128.7	111.1	0	0.000	0.0000	0.0000
CISE	-20	146.9	126.3	0	0.000	0.0000	0.0000
CISE	-20	204.3	174.4	0	0.000	0.0000	0.0000
CISE	-20	198.3	169.3	0	0.000	0.0000	0.0000
CISE	-20	195.0	166.6	0	0.000	0.0000	0.0000
CISE	-20	197.8	168.9	0	0.000	0.0000	0.0000
CISE	-20	195.6	167.1	0	0.000	0.0000	0.0000
CISE	-20	196.2	167.6	0	0.000	0.0000	0.0000
CISE	-20	194.0	165.7	0	0.000	0.0000	0.0000
CISE	-20	198.3	169.3	0	0.000	0.0000	0.0000
CISE	-20	201.2	171.8	0	0.000	0.0000	0.0000
CISE	-20	200.9	171.5	0	0.000	0.0000	0.0000
CISE	-20	195.6	167.1	0	0.000	0.0000	0.0000
CISE	-20	197.6	168.8	0	0.000	0.0000	0.0000
CISE	-20	201.9	172.4	0	0.000	0.0000	0.0000
CISE	-20	202.5	172.8	0	0.000	0.0000	0.0000
CISE	-20	198.1	169.2	0	0.000	0.0000	0.0000
CISE	-20	198.1	169.2	0	0.000	0.0000	0.0000
CISE	-20	200.7	171.3	0	0.000	0.0000	0.0000
CISE	-20	199.8	170.6	0	0.000	0.0000	0.0000
CISE	-20	201.5	172.0	0	0.000	0.0000	0.0000
GKSS	-20	200.6	171.2	0	0.000	0.0000	0.0000
GKSS	-20	200.6	171.2	0	0.000	0.0000	0.0000
GKSS	-20	199.8	170.6	0	0.000	0.0000	0.0000
GKSS	-20	198.2	169.2	0	0.000	0.0000	0.0000
GKSS	-20	199.3	170.2	0	0.000	0.0000	0.0000
GKSS	-20	196.6	167.9	0	0.000	0.0000	0.0000
GKSS	-20	198.6	169.6	0	0.000	0.0000	0.0000
GKSS	-20	200.7	171.3	0	0.000	0.0000	0.0000
GKSS	-20	195.0	166.6	0	0.000	0.0000	0.0000
GKSS	-20	198.6	169.6	0	0.000	0.0000	0.0000
GKSS	-20	202.5	201.7	0	0.000	0.0000	0.0000
GKSS	-20	194.7	194.1	0	0.000	0.0000	0.0000
GKSS	-20	262.8	261.8	0	0.000	0.0000	0.0000
GKSS	-20	187.9	187.2	0	0.000	0.0000	0.0000
GKSS	-20	275.8	274.8	0	0.000	0.0000	0.0000
GKSS	-20	261.8	260.9	0	0.000	0.0000	0.0000
GKSS	-20	283.2	282.2	0	0.000	0.0000	0.0000
GKSS	-20	283.1	282.0	0	0.000	0.0000	0.0000
GKSS	-20	284.0	283.0	0	0.000	0.0000	0.0000
GKSS	-20	284.2	283.1	0	0.000	0.0000	0.0000
VTT	-20	284.0	282.9	0	0.000	0.0000	0.0000
VTT	-20	231.9	231.0	0	0.000	0.0000	0.0000
VTT	-20	279.4	278.3	0	0.000	0.0000	0.0000
VTT	-20	280.3	279.2	0	0.000	0.0000	0.0000
VTT	-20	279.4	278.3	0	0.000	0.0000	0.0000
VTT	-20	278.6	277.5	0	0.000	0.0000	0.0000
VTT	-20	281.9	280.9	0	0.000	0.0000	0.0000
VTT	-20	279.4	278.3	0	0.000	0.0000	0.0000
VTT	-20	282.5	281.4	0	0.000	0.0000	0.0000
VTT	-20	247.2	246.3	0	0.000	0.0000	0.0000
VTT	-20	233.2	232.4	0	0.000	0.0000	0.0000
VTT	-20	283.2	282.2	0	0.000	0.0000	0.0000
VTT	-20	288.9	287.8	0	0.000	0.0000	0.0000
VTT	-20	263.2	262.3	0	0.000	0.0000	0.0000
VTT	-20	184.4	183.8	0	0.000	0.0000	0.0000
VTT	-20	283.7	282.7	0	0.000	0.0000	0.0000
VTT	-20	280.8	279.8	0	0.000	0.0000	0.0000
VTT	-20	280.9	279.8	0	0.000	0.0000	0.0000
VTT	-20	280.9	279.8	0	0.000	0.0000	0.0000
VTT	-20	170.9	170.3	0	0.000	0.0000	0.0000
VTT	-20	282.9	281.9	0	0.000	0.0000	0.0000
VTT	-20	275.7	274.6	0	0.000	0.0000	0.0000
VTT	-20	228.2	227.4	0	0.000	0.0000	0.0000
VTT	-20	282.0	281.0	0	0.000	0.0000	0.0000
VTT	-20	280.9	279.8	0	0.000	0.0000	0.0000
VTT	-20	281.8	280.7	0	0.000	0.0000	0.0000
VTT	-20	281.4	280.4	0	0.000	0.0000	0.0000
VTT	-20	227.3	226.5	0	0.000	0.0000	0.0000
VTT	-20	201.3	200.6	0	0.000	0.0000	0.0000
VTT	-20	212.5	211.7	0	0.000	0.0000	0.0000
VTT	-20	256.5	255.5	0	0.000	0.0000	0.0000
VTT	-20	284.8	283.8	0	0.000	0.0000	0.0000
VTT	-20	282.3	281.3	0	0.000	0.0000	0.0000
VTT	-20	269.6	268.6	0	0.000	0.0000	0.0000
VTT	-20	184.4	183.8	0	0.000	0.0000	0.0000
VTT	-20	241.6	240.7	0	0.000	0.0000	0.0000
VTT	-20	146.4	145.9	0	0.000	0.0000	0.0000

VTT	-20	280.0	279.0	0	0.000	0.0000	0.0000
VTT	-20	156.7	156.2	0	0.000	0.0000	0.0000
VTT	-20	277.0	276.0	0	0.000	0.0000	0.0000
CISE	-20	167.4	194.6	0	0.000	0.0000	0.0000
CISE	-20	153.5	178.1	0	0.000	0.0000	0.0000
CISE	-20	211.2	246.5	0	0.000	0.0000	0.0000
CISE	-20	220.3	257.3	0	0.000	0.0000	0.0000
CISE	-20	227.9	266.2	0	0.000	0.0000	0.0000
CISE	-20	211.1	246.4	0	0.000	0.0000	0.0000
CISE	-20	217.1	253.4	0	0.000	0.0000	0.0000
CISE	-20	145.3	168.5	0	0.000	0.0000	0.0000
CISE	-20	161.2	187.2	0	0.000	0.0000	0.0000
CISE	-20	131.9	152.5	0	0.000	0.0000	0.0000
CISE	-20	216.4	252.6	0	0.000	0.0000	0.0000
CISE	-20	125.0	144.4	0	0.000	0.0000	0.0000
CISE	-20	378.7	444.9	0	0.000	0.0000	0.0000
CISE	-20	246.1	287.9	0	0.000	0.0000	0.0000
CISE	-20	250.9	293.5	0	0.000	0.0000	0.0000
CISE	-20	251.5	294.3	0	0.000	0.0000	0.0000
CISE	-20	284.0	332.7	0	0.000	0.0000	0.0000
CISE	-20	261.1	305.6	0	0.000	0.0000	0.0000
CISE	-20	351.6	412.8	0	0.000	0.0000	0.0000
CISE	-20	258.5	302.5	0	0.000	0.0000	0.0000
GKSS	-20	201.3	234.8	0	0.000	0.0000	0.0000
GKSS	-20	110.9	127.7	0	0.000	0.0000	0.0000
GKSS	-20	197.7	230.5	0	0.000	0.0000	0.0000
GKSS	-20	198.9	231.9	0	0.000	0.0000	0.0000
GKSS	-20	200.6	234.0	0	0.000	0.0000	0.0000
GKSS	-20	165.7	192.6	0	0.000	0.0000	0.0000
GKSS	-20	280.1	328.0	0	0.000	0.0000	0.0000
GKSS	-20	279.5	327.3	0	0.000	0.0000	0.0000
GKSS	-20	257.6	301.4	0	0.000	0.0000	0.0000
GKSS	-20	265.2	310.4	0	0.000	0.0000	0.0000
GKSS	-20	156.7	212.6	0	0.000	0.0000	0.0000
GKSS	-20	221.7	304.1	0	0.000	0.0000	0.0000
GKSS	-20	193.9	264.9	0	0.000	0.0000	0.0000
GKSS	-20	191.7	261.9	0	0.000	0.0000	0.0000
GKSS	-20	184.4	251.6	0	0.000	0.0000	0.0000
NE	-20	186.7	254.8	0	0.000	0.0000	0.0000
NE	-20	184.4	251.6	0	0.000	0.0000	0.0000
NE	-20	193.9	264.9	0	0.000	0.0000	0.0000
NE	-20	204.4	279.8	0	0.000	0.0000	0.0000
NE	-20	224.0	307.4	0	0.000	0.0000	0.0000
NE	-20	153.4	207.9	0	0.000	0.0000	0.0000
NE	-20	222.6	305.4	0	0.000	0.0000	0.0000
NE	-20	162.0	220.0	0	0.000	0.0000	0.0000
NE	-20	187.8	256.4	0	0.000	0.0000	0.0000
NE	-20	198.2	271.0	0	0.000	0.0000	0.0000
SCK-CEN	-10	280.0	279.0	0	0.000	0.0000	0.0000
SCK-CEN	-10	281.2	280.2	0	0.000	0.0000	0.0000
SCK-CEN	-10	282.6	281.5	0	0.000	0.0000	0.0000
SCK-CEN	-10	284.0	282.9	0	0.000	0.0000	0.0000
SCK-CEN	-10	280.9	279.9	0	0.000	0.0000	0.0000
GKSS	0	196.8	168.1	0	0.000	0.0000	0.0000
GKSS	0	193.7	165.5	0	0.000	0.0000	0.0000
GKSS	0	192.9	164.8	0	0.000	0.0000	0.0000
GKSS	0	196.7	168.0	0	0.000	0.0000	0.0000
GKSS	0	196.1	167.5	0	0.000	0.0000	0.0000
GKSS	0	194.7	166.3	0	0.000	0.0000	0.0000
GKSS	0	196.3	167.7	0	0.000	0.0000	0.0000
GKSS	0	195.9	167.3	0	0.000	0.0000	0.0000
GKSS	0	195.2	166.8	0	0.000	0.0000	0.0000
GKSS	0	193.3	165.1	0	0.000	0.0000	0.0000
SCK-CEN	0	198.4	169.4	0	0.000	0.0000	0.0000
SCK-CEN	0	199.1	170.0	0	0.000	0.0000	0.0000
SCK-CEN	0	198.2	169.2	0	0.000	0.0000	0.0000
SCK-CEN	0	197.6	168.8	0	0.000	0.0000	0.0000
SCK-CEN	0	201.2	171.8	0	0.000	0.0000	0.0000
SCK-CEN	0	200.0	170.8	0	0.000	0.0000	0.0000
SCK-CEN	0	197.4	168.6	0	0.000	0.0000	0.0000
SCK-CEN	0	199.6	170.4	0	0.000	0.0000	0.0000
SCK-CEN	0	203.4	173.6	0	0.000	0.0000	0.0000
SCK-CEN	0	199.2	170.1	0	0.000	0.0000	0.0000
SCK-CEN	0	200.5	171.2	0	0.000	0.0000	0.0000
SCK-CEN	0	202.4	172.7	0	0.000	0.0000	0.0000
SCK-CEN	0	197.2	168.4	0	0.000	0.0000	0.0000
SCK-CEN	0	205.8	175.6	0	0.000	0.0000	0.0000
SCK-CEN	0	205.5	175.4	0	0.000	0.0000	0.0000
SCK-CEN	0	202.4	172.7	0	0.000	0.0000	0.0000
SCK-CEN	0	203.4	173.6	0	0.000	0.0000	0.0000
SCK-CEN	0	205.2	175.1	0	0.000	0.0000	0.0000
SCK-CEN	0	202.3	172.7	0	0.000	0.0000	0.0000
SCK-CEN	0	201.6	172.1	0	0.000	0.0000	0.0000
GKSS	0	282.4	281.4	0	0.000	0.0000	0.0000
GKSS	0	283.7	282.7	0	0.000	0.0000	0.0000
GKSS	0	284.9	283.9	0	0.000	0.0000	0.0000
GKSS	0	282.8	281.8	0	0.000	0.0000	0.0000
GKSS	0	284.4	283.4	0	0.000	0.0000	0.0000

GKSS	0	284.9	283.8	0	0.000	0.0000	0.0000
GKSS	0	279.6	278.6	0	0.000	0.0000	0.0000
GKSS	0	283.9	282.8	0	0.000	0.0000	0.0000
GKSS	0	285.7	284.7	0	0.000	0.0000	0.0000
GKSS	0	283.0	281.9	0	0.000	0.0000	0.0000
SCK-CEN	0	277.0	276.0	0	0.000	0.0000	0.0000
SCK-CEN	0	276.7	275.7	0	0.000	0.0000	0.0000
SCK-CEN	0	276.9	275.9	0	0.000	0.0000	0.0000
SCK-CEN	0	277.9	276.8	0	0.000	0.0000	0.0000
SCK-CEN	0	276.9	275.9	0	0.000	0.0000	0.0000
SCK-CEN	0	278.2	277.2	0	0.000	0.0000	0.0000
SCK-CEN	0	278.0	277.0	0	0.000	0.0000	0.0000
SCK-CEN	0	275.9	274.9	0	0.000	0.0000	0.0000
SCK-CEN	0	277.6	276.6	0	0.000	0.0000	0.0000
SCK-CEN	0	278.2	277.2	0	0.000	0.0000	0.0000
SCK-CEN	0	277.3	276.3	0	0.000	0.0000	0.0000
VTT	0	280.3	279.3	0	0.000	0.0000	0.0000
VTT	0	275.5	274.5	0	0.000	0.0000	0.0000
VTT	0	280.3	279.3	0	0.000	0.0000	0.0000
VTT	0	275.2	274.2	0	0.000	0.0000	0.0000
VTT	0	278.0	277.0	0	0.000	0.0000	0.0000
VTT	0	278.5	277.5	0	0.000	0.0000	0.0000
VTT	0	279.7	278.6	0	0.000	0.0000	0.0000
VTT	0	267.2	266.2	0	0.000	0.0000	0.0000
VTT	0	279.8	278.8	0	0.000	0.0000	0.0000
VTT	0	278.6	277.6	0	0.000	0.0000	0.0000
VTT	0	278.3	277.3	0	0.000	0.0000	0.0000
VTT	0	280.0	278.9	0	0.000	0.0000	0.0000
VTT	0	274.3	273.3	0	0.000	0.0000	0.0000
VTT	0	276.0	275.0	0	0.000	0.0000	0.0000
VTT	0	278.7	277.7	0	0.000	0.0000	0.0000
VTT	0	278.0	277.0	0	0.000	0.0000	0.0000
VTT	0	279.1	278.0	0	0.000	0.0000	0.0000
VTT	0	278.6	277.5	0	0.000	0.0000	0.0000
VTT	0	279.4	278.4	0	0.000	0.0000	0.0000
VTT	0	276.2	275.2	0	0.000	0.0000	0.0000
GKSS	0	191.3	222.9	0	0.000	0.0000	0.0000
GKSS	0	269.2	315.2	0	0.000	0.0000	0.0000
GKSS	0	281.2	329.4	0	0.000	0.0000	0.0000
GKSS	0	242.5	283.5	0	0.000	0.0000	0.0000
GKSS	0	318.3	373.3	0	0.000	0.0000	0.0000
GKSS	0	395.4	464.7	0	0.000	0.0000	0.0000
GKSS	0	396.5	465.9	0	0.000	0.0000	0.0000
GKSS	0	394.9	464.1	0	0.000	0.0000	0.0000
GKSS	0	396.3	465.7	0	0.000	0.0000	0.0000
GKSS	0	266.6	312.1	0	0.000	0.0000	0.0000
GKSS	0	395.2	464.4	0	0.000	0.0000	0.0000
GKSS	0	362.9	426.1	0	0.000	0.0000	0.0000
GKSS	0	331.8	389.3	0	0.000	0.0000	0.0000
GKSS	0	227.1	265.3	0	0.000	0.0000	0.0000
GKSS	0	309.5	362.9	0	0.000	0.0000	0.0000
GKSS	0	395.4	464.7	0	0.000	0.0000	0.0000
GKSS	0	210.9	246.1	0	0.000	0.0000	0.0000
GKSS	0	394.9	464.1	0	0.000	0.0000	0.0000
GKSS	0	211.4	246.7	0	0.000	0.0000	0.0000
GKSS	0	393.9	462.8	0	0.000	0.0000	0.0000
GKSS	0	263.4	308.3	0	0.000	0.0000	0.0000
GKSS	0	393.3	462.1	0	0.000	0.0000	0.0000
GKSS	0	386.7	454.3	0	0.000	0.0000	0.0000
GKSS	0	376.2	441.9	0	0.000	0.0000	0.0000
GKSS	0	394.4	463.5	0	0.000	0.0000	0.0000
GKSS	0	306.7	359.6	0	0.000	0.0000	0.0000
GKSS	0	394.8	464.0	0	0.000	0.0000	0.0000
GKSS	0	393.9	462.8	0	0.000	0.0000	0.0000
GKSS	0	246.4	288.2	0	0.000	0.0000	0.0000
GKSS	0	320.1	375.4	0	0.000	0.0000	0.0000
CISE	0	233.3	320.4	0	0.000	0.0000	0.0000
CISE	0	238.2	327.4	0	0.000	0.0000	0.0000
CISE	0	208.3	285.2	0	0.000	0.0000	0.0000
CISE	0	421.7	585.8	0	0.000	0.0000	0.0000
CISE	0	226.7	311.2	0	0.000	0.0000	0.0000
CISE	0	267.0	367.9	0	0.000	0.0000	0.0000
CISE	0	163.0	221.4	0	0.000	0.0000	0.0000
CISE	0	165.8	225.4	0	0.000	0.0000	0.0000
CISE	0	285.9	394.6	0	0.000	0.0000	0.0000
CISE	0	342.0	473.5	0	0.000	0.0000	0.0000
GKSS	0	314.9	435.4	0	0.000	0.0000	0.0000
GKSS	0	307.6	425.1	0	0.000	0.0000	0.0000
GKSS	0	383.0	531.4	0	0.000	0.0000	0.0000
GKSS	0	332.6	460.4	0	0.000	0.0000	0.0000
GKSS	0	223.6	306.8	0	0.000	0.0000	0.0000
GKSS	0	442.2	614.7	0	0.000	0.0000	0.0000

4. Master curve fit to data

Temperature adj. = 1.6 °C (est.) Stand. dev. on T_0 = 1.1 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-154	54.8	49.1				
-154	49.8	44.9				
-154	37.8	34.9				
-154	33.0	30.9				
-154	38.9	35.8				
-154	24.2	23.6				
-154	47.4	43.0				
-154	46.5	42.2				
-154	31.4	29.6				
-154	39.2	36.0				
-154	24.2	23.6				
-154	33.0	30.9				
-154	41.0	37.6				
-154	31.7	29.8				
-154	35.2	32.7				
-154	44.4	40.5				
-154	41.5	38.0				
-154	32.7	30.7				
-154	34.3	32.0				
-154	36.7	34.0				
-154	39.7	36.5				
-154	46.1	41.8				
-154	34.6	32.2				
-154	35.8	33.2				
-154	29.3	27.8				
-154	28.6	27.2				
-154	38.6	35.6				
-154	44.4	40.5				
-154	48.9	44.2				
-154	38.9	35.8				
-154	36.7	34.0				
-154	31.7	29.8				
-154	41.5	41.4				
-154	42.2	42.2				
-154	50.0	49.9				
-154	34.0	33.9				
-154	41.7	41.7				
-154	46.1	46.0				
-154	44.2	44.1				
-154	36.7	36.6				
-154	29.0	28.9				
-154	53.0	52.9				
-154	39.4	39.3				
-154	29.0	28.9				
-154	34.6	34.5				
-154	33.0	33.0				
-154	38.1	38.0				
-154	28.6	28.6				
-154	28.6	28.6				
-154	38.6	38.5				
-154	36.4	36.3				
-154	33.4	33.3				
-154	36.9	36.9				
-154	31.1	31.0				
-154	34.3	34.2				
-154	30.4	30.4				
-154	49.6	49.5				
-154	41.0	40.9				
-154	34.0	33.9				
-154	30.7	30.7				
-154	41.2	41.2				
-154	26.7	26.7				
-154	35.5	35.4				
-154	33.4	33.3				
-154	36.7	36.6				
-154	32.4	32.4				
-154	45.1	45.0				
-154	33.4	33.3				
-154	34.0	33.9				
-154	30.7	30.7				
-154	26.7	26.7				
-154	33.7	36.2				
-154	42.7	46.9				
-154	37.2	40.4				
-154	54.4	60.8				
-154	34.6	37.3				
-154	44.2	48.7				
-154	29.7	31.5				
-154	36.4	39.4				
-154	36.4	39.4				
-154	28.2	29.8				
-154	28.2	29.8				

-154	30.0	31.9
-154	36.4	39.4
-154	37.5	40.7
-154	30.0	31.9
-154	30.7	32.7
-154	30.4	32.3
-154	30.7	32.7
-154	31.7	33.9
-154	41.7	45.8
-154	37.2	40.4
-154	34.9	37.6
-154	38.3	41.7
-154	31.4	33.5
-154	33.7	36.2
-154	32.7	35.1
-154	43.0	47.2
-154	32.7	35.1
-154	30.0	31.9
-154	36.9	40.1
-154	33.4	35.8
-154	30.0	31.9
-110	98.1	85.4
-110	59.0	52.7
-110	80.0	70.3
-110	57.2	51.2
-110	88.3	77.2
-110	96.2	83.9
-110	81.6	71.6
-110	66.9	59.3
-110	85.6	75.0
-110	86.8	76.0
-110	114.2	98.9
-110	73.5	64.8
-110	92.7	80.9
-110	77.5	68.2
-110	61.5	54.7
-110	51.8	46.7
-110	73.6	64.9
-110	52.8	47.5
-110	41.2	37.8
-110	115.3	99.8
-110	73.2	64.5
-110	74.0	65.3
-110	67.5	59.8
-110	71.0	62.7
-110	53.4	48.0
-110	96.5	84.0
-110	71.3	63.0
-110	71.7	63.3
-110	81.7	71.7
-110	64.0	56.8
-110	74.2	65.4
-110	70.4	62.2
-110	91.2	79.6
-110	72.0	63.6
-110	64.8	57.5
-110	79.2	69.6
-110	52.2	47.0
-110	82.9	72.7
-110	93.2	81.3
-110	75.4	66.4
-110	75.0	66.1
-110	78.6	69.1
-110	94.8	82.7
-110	98.1	85.4
-110	98.5	85.7
-110	104.9	91.1
-110	69.9	61.8
-110	81.6	71.6
-110	55.2	49.5
-110	105.6	91.7
-110	101.5	88.3
-110	73.7	65.0
-110	97.5	84.9
-110	75.9	66.8
-110	48.3	43.7
-91	127.0	109.6
-91	121.8	105.2
-91	70.5	62.3
-91	94.2	82.2
-91	127.3	109.9
-91	119.9	103.7
-91	104.5	90.8
-91	78.6	69.1
-91	98.6	85.8
-91	161.6	138.6
-91	91.3	79.7
-91	115.3	99.8

-91	122.4	105.8
-91	126.3	109.1
-91	108.3	94.0
-91	66.9	59.3
-91	126.7	109.4
-91	69.6	61.6
-91	121.4	104.9
-91	90.0	78.7
-91	153.9	132.2
-91	64.6	57.4
-91	127.2	109.8
-91	99.7	86.7
-91	101.3	88.1
-91	140.4	120.9
-91	78.2	68.7
-91	109.0	94.6
-91	103.9	90.3
-91	126.8	109.5
-91	111.7	96.8
-91	68.6	68.4
-91	81.6	81.3
-91	55.9	55.8
-91	98.8	98.5
-91	71.9	71.7
-91	111.0	110.7
-91	93.5	93.2
-91	79.9	79.7
-91	98.4	98.1
-91	101.1	100.8
-91	79.6	79.4
-91	99.7	99.3
-91	108.1	107.7
-91	93.4	93.1
-91	62.0	61.8
-91	107.1	106.7
-91	145.3	144.8
-91	76.3	76.0
-91	126.5	126.1
-91	126.1	125.7
-91	128.5	128.0
-91	111.4	111.0
-91	130.4	130.0
-91	134.8	134.3
-91	157.3	156.7
-91	105.2	104.9
-91	109.8	109.4
-91	84.9	84.6
-91	62.8	62.7
-91	97.5	97.2
-91	80.2	79.9
-91	134.4	133.9
-91	65.1	65.0
-91	118.6	118.2
-91	67.3	76.1
-91	162.9	189.3
-91	100.0	114.7
-91	91.2	104.3
-91	106.2	122.1
-91	83.2	94.9
-91	91.8	105.0
-91	94.7	108.5
-91	92.9	106.4
-91	69.9	79.2
-91	93.1	106.6
-91	97.9	112.2
-91	73.7	83.7
-91	82.0	93.4
-91	76.3	86.7
-91	93.1	106.6
-91	83.7	95.5
-91	82.1	93.6
-91	86.8	99.2
-91	86.7	99.0
-91	92.3	105.7
-91	83.1	94.8
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-60	234.1	199.3
-60	114.4	99.1
-60	130.7	112.7
-60	106.7	92.6
-60	161.0	138.1
-60	200.7	171.3
-60	125.2	108.1
-60	145.1	124.8
-60	91.9	80.2
-60	128.1	110.6
-60	164.4	140.9
-60	192.2	164.3
-60	166.3	142.5
-60	177.7	152.1
-60	167.6	143.6
-60	128.6	110.9
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-60	98.4	85.7
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-60	240.7	204.9
-60	380.0	321.5
-60	171.9	147.2
-60	136.8	117.8
-60	135.8	117.0
-60	214.7	183.1
-60	299.5	254.1
-60	203.7	173.9
-60	116.0	100.4
-60	221.9	189.1
-60	167.6	143.6
-60	89.8	78.5
-60	156.3	134.1
-60	186.8	159.7
-60	213.5	182.1
-60	164.6	141.1
-60	280.1	237.9
-60	185.9	159.0
-60	127.7	110.2
-60	205.0	175.0
-60	115.6	100.0
-60	107.5	93.3
-60	164.6	141.1
-60	172.0	147.3
-60	108.5	94.2
-60	119.0	102.9
-60	153.5	131.8
-60	158.9	136.4
-60	137.5	118.4
-60	119.5	103.3
-60	130.7	112.8
-60	172.6	147.8
-60	84.5	74.0
-60	244.6	208.1
-60	120.4	104.1
-60	104.5	90.8
-60	163.6	140.2
-60	201.4	172.0
-60	137.8	118.7
-60	173.0	148.1
-60	99.2	86.4
-60	173.4	148.4
-60	131.5	113.4
-60	186.0	185.3
-60	151.8	151.3
-60	111.7	111.3
-60	143.9	143.4
-60	105.4	105.1
-60	154.0	153.4
-60	176.2	175.6
-60	131.9	131.5
-60	203.9	203.2
-60	142.7	142.2
-60	134.5	134.0
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-60	119.7	119.3
-60	141.3	140.8
-60	175.9	175.3

-60	119.6	119.2
-60	102.4	102.0
-60	99.0	98.7
-60	115.1	114.7
-60	172.9	172.3
-60	120.5	120.2
-60	165.2	164.6
-60	125.6	125.2
-60	126.7	126.3
-60	100.4	100.1
-60	131.1	130.7
-60	185.1	184.5
-60	163.6	163.0
-60	126.5	126.1
-60	164.7	164.1
-60	192.7	192.0
-60	134.5	134.1
-60	140.8	140.3
-60	295.3	346.1
-60	217.7	254.2
-60	219.8	256.6
-60	165.9	192.8
-60	109.9	126.5
-60	131.9	152.5
-60	136.2	157.6
-60	154.0	178.8
-60	115.9	133.6
-60	150.4	174.4
-60	153.6	178.2
-60	183.8	214.0
-60	236.1	275.9
-60	149.4	173.3
-60	179.5	209.0
-60	177.6	206.7
-60	188.3	219.4
-60	134.5	155.6
-60	243.6	284.9
-60	155.7	180.8
-60	164.0	190.6
-60	146.5	169.8
-60	119.9	138.4
-60	79.9	91.0
-60	140.9	163.2
-60	115.3	132.9
-60	137.0	158.6
-60	166.9	194.0
-60	225.4	263.3
-60	200.7	234.1
-40	171.0	146.5
-40	569.4	480.2
-40	169.4	145.1
-40	548.7	462.8
-40	529.9	447.1
-40	318.5	270.1
-40	574.8	484.7
-40	360.8	305.4
-40	343.8	291.2
-40	235.8	200.8
-40	529.9	447.1
-40	496.5	419.1
-40	600.0	505.8
-40	113.7	98.5
-40	229.6	195.5
-40	154.2	132.4
-40	221.3	188.6
-40	486.7	410.9
-40	243.8	207.4
-40	202.5	172.8
-40	180.6	154.6
-40	206.7	176.4
-40	240.7	204.9
-40	270.8	230.1
-40	186.4	159.4
-40	255.8	217.5
-40	231.2	196.9
-40	339.4	287.5
-40	403.1	340.9
-40	399.2	337.6
-40	187.3	186.6
-40	101.5	101.2
-40	140.3	139.9
-40	150.2	149.7
-40	187.3	186.6
-40	211.4	210.6
-40	160.5	160.0
-40	214.6	213.8
-40	188.3	187.7
-40	239.3	238.4

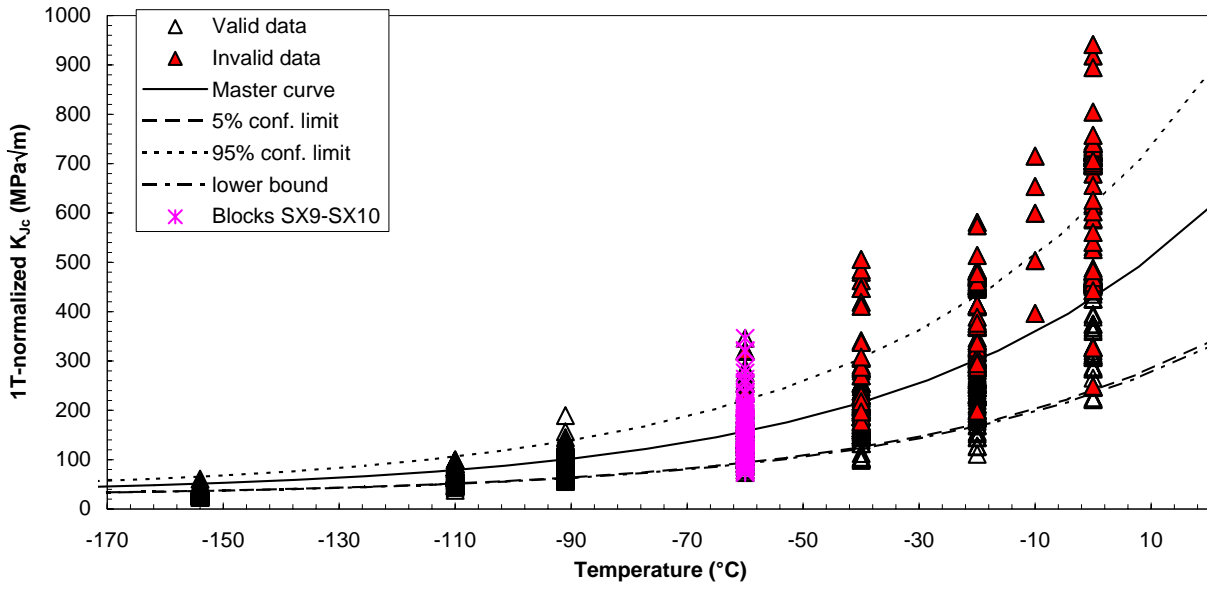
-40	112.8	112.4
-40	239.0	238.1
-40	284.9	283.9
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-40	170.1	169.5
-40	256.4	255.5
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-40	103.1	102.8
-40	230.0	229.1
-40	210.0	209.2
-40	198.2	197.5
-40	150.2	149.7
-40	226.8	226.0
-40	158.1	157.5
-40	256.4	255.5
-40	207.6	206.9
-40	213.5	212.8
-40	254.6	253.7
-40	240.0	239.1
-40	309.2	308.0
-40	125.9	145.5
-40	128.9	149.0
-40	198.5	231.5
-40	212.0	247.5
-40	138.6	160.5
-40	187.7	218.7
-40	173.0	201.2
-40	179.5	208.9
-40	152.6	177.1
-40	153.6	178.3
-40	144.6	167.6
-40	150.7	174.9
-40	139.1	161.0
-40	183.6	213.8
-40	142.0	164.5
-40	187.2	218.0
-40	172.2	200.3
-40	198.0	230.8
-40	130.4	150.8
-40	141.7	164.1
-40	134.5	155.6
-40	115.5	133.1
-40	91.7	104.9
-40	141.1	163.4
-40	239.1	279.6
-40	243.4	284.7
-40	191.9	223.6
-40	146.8	170.2
-40	161.4	187.5
-40	142.3	164.8
-20	128.7	111.1
-20	146.9	126.3
-20	402.8	340.6
-20	409.4	346.2
-20	530.5	447.6
-20	532.2	449.0
-20	534.6	451.0
-20	536.1	452.3
-20	536.1	452.3
-20	536.6	452.7
-20	538.6	454.3
-20	540.5	455.9
-20	543.8	458.7
-20	549.2	463.2
-20	553.7	467.0
-20	556.1	469.0
-20	556.3	469.2
-20	560.6	472.8
-20	565.8	477.2
-20	570.1	480.8
-20	571.1	481.6
-20	233.1	198.5
-20	389.8	329.8
-20	487.9	411.9
-20	438.3	370.4
-20	571.4	481.8
-20	560.7	472.9
-20	561.1	473.2
-20	575.1	484.9
-20	557.5	470.2
-20	572.5	482.7
-20	202.5	201.7
-20	194.7	194.1
-20	262.8	261.8
-20	187.9	187.2
-20	275.8	274.8

-20	261.8	260.9
-20	371.0	369.7
-20	369.1	367.7
-20	462.1	460.4
-20	319.7	318.5
-20	583.1	580.9
-20	231.9	231.0
-20	382.0	380.6
-20	295.9	294.8
-20	576.4	574.2
-20	411.7	410.1
-20	306.4	305.2
-20	324.7	323.5
-20	282.5	281.4
-20	247.2	246.3
-20	233.2	232.4
-20	317.5	316.3
-20	515.6	513.7
-20	263.2	262.3
-20	184.4	183.8
-20	286.9	285.9
-20	341.4	340.1
-20	415.0	413.4
-20	327.9	326.7
-20	170.9	170.3
-20	308.8	307.6
-20	376.5	375.1
-20	228.2	227.4
-20	371.7	370.3
-20	291.6	290.6
-20	337.7	336.4
-20	390.5	389.0
-20	227.3	226.5
-20	201.3	200.6
-20	212.5	211.7
-20	288.4	287.3
-20	479.1	477.3
-20	377.9	376.5
-20	269.6	268.6
-20	184.4	183.8
-20	241.6	240.7
-20	146.4	145.9
-20	299.4	298.3
-20	156.7	156.2
-20	295.6	294.5
-20	167.4	194.6
-20	153.5	178.1
-20	211.2	246.5
-20	220.3	257.3
-20	227.9	266.2
-20	211.1	246.4
-20	217.1	253.4
-20	145.3	168.5
-20	161.2	187.2
-20	131.9	152.5
-20	216.4	252.6
-20	125.0	144.4
-20	378.7	444.9
-20	246.1	287.9
-20	250.9	293.5
-20	251.5	294.3
-20	284.0	332.7
-20	261.1	305.6
-20	351.6	412.8
-20	258.5	302.5
-20	201.3	234.8
-20	110.9	127.7
-20	197.7	230.5
-20	198.9	231.9
-20	200.6	234.0
-20	165.7	192.6
-20	280.1	328.0
-20	279.5	327.3
-20	257.6	301.4
-20	265.2	310.4
-20	156.7	212.6
-20	221.7	304.1
-20	193.9	264.9
-20	191.7	261.9
-20	184.4	251.6
-20	186.7	254.8
-20	184.4	251.6
-20	193.9	264.9
-20	204.4	279.8
-20	224.0	307.4
-20	153.4	207.9
-20	222.6	305.4
-20	162.0	220.0

-20	187.8	256.4
-20	198.2	271.0
-10	656.0	653.4
-10	397.8	396.3
-10	718.1	715.3
-10	601.6	599.3
-10	505.3	503.4
0	541.9	457.1
0	547.0	461.4
0	538.7	454.4
0	540.0	455.5
0	544.8	459.6
0	534.8	451.2
0	557.2	469.9
0	545.0	459.7
0	546.1	460.6
0	549.2	463.2
0	565.1	476.5
0	571.6	482.0
0	553.4	466.8
0	293.2	248.8
0	544.1	459.0
0	552.2	465.7
0	558.0	470.6
0	553.5	466.8
0	557.6	470.3
0	552.4	466.0
0	555.6	468.6
0	558.2	470.8
0	550.6	464.4
0	560.8	473.0
0	569.6	480.4
0	552.5	466.0
0	578.5	487.7
0	556.0	468.9
0	543.8	458.7
0	556.3	469.2
0	327.6	326.4
0	681.4	678.8
0	700.8	698.2
0	698.2	695.5
0	708.4	705.7
0	701.5	698.8
0	724.9	722.1
0	717.4	714.6
0	705.8	703.0
0	709.5	706.8
0	716.7	714.0
0	714.1	711.3
0	658.5	656.0
0	747.5	744.6
0	709.0	706.2
0	719.2	716.4
0	444.5	442.8
0	699.8	697.1
0	704.0	701.3
0	729.5	726.7
0	714.0	711.3
0	725.6	722.8
0	730.2	727.4
0	737.8	734.9
0	590.7	588.4
0	730.3	727.5
0	741.8	738.9
0	744.2	741.3
0	527.7	525.7
0	620.4	618.0
0	727.0	724.2
0	730.3	727.5
0	542.6	540.5
0	726.7	723.9
0	718.7	716.0
0	717.1	714.4
0	721.2	718.5
0	725.3	722.5
0	727.9	725.1
0	727.0	724.2
0	718.5	715.7
0	191.3	222.9
0	269.2	315.2
0	281.2	329.4
0	242.5	283.5
0	318.3	373.3
0	476.2	560.4
0	511.7	602.5
0	621.3	732.2
0	531.3	625.6
0	266.6	312.1

0	599.3	706.2			
0	362.9	426.1			
0	331.8	389.3			
0	227.1	265.3			
0	309.5	362.9			
0	628.6	740.9			
0	210.9	246.1			
0	410.7	482.8			
0	211.4	246.7			
0	778.3	918.2			
0	263.4	308.3			
0	682.2	804.4			
0	386.7	454.3			
0	376.2	441.9			
0	642.5	757.3			
0	306.7	359.6			
0	758.4	894.6			
0	797.9	941.4			
0	246.4	288.2			
0	320.1	375.4			
0	233.3	320.4			
0	238.2	327.4			
0	208.3	285.2			
0	421.7	585.8			
0	226.7	311.2			
0	267.0	367.9			
0	163.0	221.4			
0	165.8	225.4			
0	285.9	394.6			
0	342.0	473.5			
0	314.9	435.4			
0	307.6	425.1			
0	383.0	531.4			
0	332.6	460.4			
0	223.6	306.8			
0	442.2	614.7			
-174		44.6	33.3	55.8	33.0
-161.875		48.3	35.3	61.3	35.0
-149.75		53.1	37.9	68.3	37.5
-137.625		59.0	41.1	77.0	40.6
-125.5		66.6	45.1	88.0	44.6
-113.375		76.0	50.3	101.8	49.5
-101.25		88.0	56.7	119.2	55.8
-89.125		103.0	64.8	141.2	63.7
-77		121.9	75.0	168.8	73.6
-64.875		145.7	87.9	203.5	86.1
-52.75		175.7	104.1	247.3	101.8
-40.625		213.4	124.5	302.4	121.6
-28.5		261.0	150.1	371.8	146.5
-16.375		320.8	182.4	459.1	177.9
-4.25		396.1	223.1	569.1	217.3
7.875		491.0	274.3	707.6	267.1
20		610.4	338.8	882.0	329.7

MASTER CURVE FOR 1TCT WITH CONFIDENCE LIMITS (E1921-05 analysis)
EURO toughness dataset - Complete dataset



SINTAP - Structural Integrity Assessment Procedures for European Industry
Lower Tail Analysis Procedure

Step 2: Lower MMT Tail Estimation

1. Data censoring

<i>Specimen code</i>	<i>T (°C)</i>	<i>K_{Jc[exp]} (MPa √m)</i>	<i>K_{Jc-1T} (MPa √m)</i>	<i>K_{CENS} (MPa √m)</i>	<i>δ_i</i>	<i>K_{analysis} (MPa √m)</i>
GKSS	-154	54.8	49.1	53.3	1	49.1
GKSS	-154	49.8	44.9	53.3	1	44.9
GKSS	-154	37.8	34.9	53.3	1	34.9
GKSS	-154	33.0	30.9	53.3	1	30.9
GKSS	-154	38.9	35.8	53.3	1	35.8
GKSS	-154	24.2	23.6	53.3	1	23.6
GKSS	-154	47.4	43.0	53.3	1	43.0
GKSS	-154	46.5	42.2	53.3	1	42.2
GKSS	-154	31.4	29.6	53.3	1	29.6
GKSS	-154	39.2	36.0	53.3	1	36.0
GKSS	-154	24.2	23.6	53.3	1	23.6
SIEMENS	-154	33.0	30.9	53.3	1	30.9
SIEMENS	-154	41.0	37.6	53.3	1	37.6
SIEMENS	-154	31.7	29.8	53.3	1	29.8
SIEMENS	-154	35.2	32.7	53.3	1	32.7
SIEMENS	-154	44.4	40.5	53.3	1	40.5
SIEMENS	-154	41.5	38.0	53.3	1	38.0
SIEMENS	-154	32.7	30.7	53.3	1	30.7
SIEMENS	-154	34.3	32.0	53.3	1	32.0
SIEMENS	-154	36.7	34.0	53.3	1	34.0
SIEMENS	-154	39.7	36.5	53.3	1	36.5
SIEMENS	-154	46.1	41.8	53.3	1	41.8
SIEMENS	-154	34.6	32.2	53.3	1	32.2
SIEMENS	-154	35.8	33.2	53.3	1	33.2
SIEMENS	-154	29.3	27.8	53.3	1	27.8
SIEMENS	-154	28.6	27.2	53.3	1	27.2
SIEMENS	-154	38.6	35.6	53.3	1	35.6
SIEMENS	-154	44.4	40.5	53.3	1	40.5
SIEMENS	-154	48.9	44.2	53.3	1	44.2
SIEMENS	-154	38.9	35.8	53.3	1	35.8
SIEMENS	-154	36.7	34.0	53.3	1	34.0
SIEMENS	-154	31.7	29.8	53.3	1	29.8
GKSS	-154	41.5	41.4	53.3	1	41.4
GKSS	-154	42.2	42.2	53.3	1	42.2
GKSS	-154	50.0	49.9	53.3	1	49.9
GKSS	-154	34.0	33.9	53.3	1	33.9
GKSS	-154	41.7	41.7	53.3	1	41.7
GKSS	-154	46.1	46.0	53.3	1	46.0
GKSS	-154	44.2	44.1	53.3	1	44.1
GKSS	-154	36.7	36.6	53.3	1	36.6
GKSS	-154	29.0	28.9	53.3	1	28.9
GKSS	-154	53.0	52.9	53.3	1	52.9
GKSS	-154	39.4	39.3	53.3	1	39.3
GKSS	-154	29.0	28.9	53.3	1	28.9
SIEMENS	-154	34.6	34.5	53.3	1	34.5
SIEMENS	-154	33.0	33.0	53.3	1	33.0
SIEMENS	-154	38.1	38.0	53.3	1	38.0
SIEMENS	-154	28.6	28.6	53.3	1	28.6
SIEMENS	-154	28.6	28.6	53.3	1	28.6
SIEMENS	-154	38.6	38.5	53.3	1	38.5
SIEMENS	-154	36.4	36.3	53.3	1	36.3
SIEMENS	-154	33.4	33.3	53.3	1	33.3
SIEMENS	-154	36.9	36.9	53.3	1	36.9
SIEMENS	-154	31.1	31.0	53.3	1	31.0
SIEMENS	-154	34.3	34.2	53.3	1	34.2
SIEMENS	-154	30.4	30.4	53.3	1	30.4
SIEMENS	-154	49.6	49.5	53.3	1	49.5
SIEMENS	-154	41.0	40.9	53.3	1	40.9
SIEMENS	-154	34.0	33.9	53.3	1	33.9
SIEMENS	-154	30.7	30.7	53.3	1	30.7
SIEMENS	-154	41.2	41.2	53.3	1	41.2
SIEMENS	-154	26.7	26.7	53.3	1	26.7
SIEMENS	-154	35.5	35.4	53.3	1	35.4
SIEMENS	-154	33.4	33.3	53.3	1	33.3
SIEMENS	-154	36.7	36.6	53.3	1	36.6
SIEMENS	-154	32.4	32.4	53.3	1	32.4
SIEMENS	-154	45.1	45.0	53.3	1	45.0
SIEMENS	-154	33.4	33.3	53.3	1	33.3
SIEMENS	-154	34.0	33.9	53.3	1	33.9
SIEMENS	-154	30.7	30.7	53.3	1	30.7
SIEMENS	-154	26.7	26.7	53.3	1	26.7
GKSS	-154	33.7	36.2	53.3	1	36.2
GKSS	-154	42.7	46.9	53.3	1	46.9
GKSS	-154	37.2	40.4	53.3	1	40.4
GKSS	-154	54.4	60.8	53.3	0	53.3
GKSS	-154	34.6	37.3	53.3	1	37.3
GKSS	-154	44.2	48.7	53.3	1	48.7

Benchmark T₀ = -96.1 °C

GKSS	-154	29.7	31.5	53.3	1	31.5
GKSS	-154	36.4	39.4	53.3	1	39.4
GKSS	-154	36.4	39.4	53.3	1	39.4
GKSS	-154	28.2	29.8	53.3	1	29.8
GKSS	-154	28.2	29.8	53.3	1	29.8
NE	-154	30.0	31.9	53.3	1	31.9
NE	-154	36.4	39.4	53.3	1	39.4
NE	-154	37.5	40.7	53.3	1	40.7
NE	-154	30.0	31.9	53.3	1	31.9
NE	-154	30.7	32.7	53.3	1	32.7
NE	-154	30.4	32.3	53.3	1	32.3
NE	-154	30.7	32.7	53.3	1	32.7
NE	-154	31.7	33.9	53.3	1	33.9
NE	-154	41.7	45.8	53.3	1	45.8
NE	-154	37.2	40.4	53.3	1	40.4
NE	-154	34.9	37.6	53.3	1	37.6
NE	-154	38.3	41.7	53.3	1	41.7
NE	-154	31.4	33.5	53.3	1	33.5
NE	-154	33.7	36.2	53.3	1	36.2
NE	-154	32.7	35.1	53.3	1	35.1
NE	-154	43.0	47.2	53.3	1	47.2
NE	-154	32.7	35.1	53.3	1	35.1
NE	-154	30.0	31.9	53.3	1	31.9
NE	-154	36.9	40.1	53.3	1	40.1
NE	-154	33.4	35.8	53.3	1	35.8
NE	-154	30.0	31.9	53.3	1	31.9
GKSS	-110	98.1	85.4	83.7	0	83.7
GKSS	-110	59.0	52.7	83.7	1	52.7
GKSS	-110	80.0	70.3	83.7	1	70.3
GKSS	-110	57.2	51.2	83.7	1	51.2
GKSS	-110	88.3	77.2	83.7	1	77.2
GKSS	-110	96.2	83.9	83.7	0	83.7
GKSS	-110	81.6	71.6	83.7	1	71.6
GKSS	-110	66.9	59.3	83.7	1	59.3
GKSS	-110	85.6	75.0	83.7	1	75.0
GKSS	-110	86.8	76.0	83.7	1	76.0
GKSS	-110	114.2	98.9	83.7	0	83.7
GKSS	-110	73.5	64.8	83.7	1	64.8
GKSS	-110	92.7	80.9	83.7	1	80.9
GKSS	-110	77.5	68.2	83.7	1	68.2
GKSS	-110	61.5	54.7	83.7	1	54.7
GKSS	-110	51.8	46.7	83.7	1	46.7
GKSS	-110	73.6	64.9	83.7	1	64.9
GKSS	-110	52.8	47.5	83.7	1	47.5
GKSS	-110	41.2	37.8	83.7	1	37.8
GKSS	-110	115.3	99.8	83.7	0	83.7
GKSS	-110	73.2	64.5	83.7	1	64.5
GKSS	-110	74.0	65.3	83.7	1	65.3
GKSS	-110	67.5	59.8	83.7	1	59.8
GKSS	-110	71.0	62.7	83.7	1	62.7
GKSS	-110	53.4	48.0	83.7	1	48.0
GKSS	-110	96.5	84.0	83.7	0	83.7
GKSS	-110	71.3	63.0	83.7	1	63.0
GKSS	-110	71.7	63.3	83.7	1	63.3
GKSS	-110	81.7	71.7	83.7	1	71.7
GKSS	-110	64.0	56.8	83.7	1	56.8
GKSS	-110	74.2	65.4	83.7	1	65.4
GKSS	-110	70.4	62.2	83.7	1	62.2
GKSS	-110	91.2	79.6	83.7	1	79.6
GKSS	-110	72.0	63.6	83.7	1	63.6
GKSS	-110	64.8	57.5	83.7	1	57.5
GKSS	-110	79.2	69.6	83.7	1	69.6
GKSS	-110	52.2	47.0	83.7	1	47.0
GKSS	-110	82.9	72.7	83.7	1	72.7
GKSS	-110	93.2	81.3	83.7	1	81.3
GKSS	-110	75.4	66.4	83.7	1	66.4
GKSS	-110	75.0	66.1	83.7	1	66.1
GKSS	-110	78.6	69.1	83.7	1	69.1
GKSS	-110	94.8	82.7	83.7	1	82.7
GKSS	-110	98.1	85.4	83.7	0	83.7
GKSS	-110	98.5	85.7	83.7	0	83.7
GKSS	-110	104.9	91.1	83.7	0	83.7
GKSS	-110	69.9	61.8	83.7	1	61.8
GKSS	-110	81.6	71.6	83.7	1	71.6
GKSS	-110	55.2	49.5	83.7	1	49.5
GKSS	-110	105.6	91.7	83.7	0	83.7
GKSS	-110	101.5	88.3	83.7	0	83.7
GKSS	-110	73.7	65.0	83.7	1	65.0
GKSS	-110	97.5	84.9	83.7	0	83.7
GKSS	-110	75.9	66.8	83.7	1	66.8
GKSS	-110	48.3	43.7	83.7	1	43.7
GKSS	-91	127.0	109.6	107.1	0	107.1
GKSS	-91	121.8	105.2	107.1	1	105.2
GKSS	-91	70.5	62.3	107.1	1	62.3
GKSS	-91	94.2	82.2	107.1	1	82.2
GKSS	-91	127.3	109.9	107.1	0	107.1
GKSS	-91	119.9	103.7	107.1	1	103.7
GKSS	-91	104.5	90.8	107.1	1	90.8

GKSS	-91	78.6	69.1	107.1	1	69.1
GKSS	-91	98.6	85.8	107.1	1	85.8
GKSS	-91	161.6	138.6	107.1	0	107.1
THA	-91	91.3	79.7	107.1	1	79.7
THA	-91	115.3	99.8	107.1	1	99.8
THA	-91	122.4	105.8	107.1	1	105.8
THA	-91	126.3	109.1	107.1	0	107.1
THA	-91	108.3	94.0	107.1	1	94.0
THA	-91	66.9	59.3	107.1	1	59.3
THA	-91	126.7	109.4	107.1	0	107.1
THA	-91	69.6	61.6	107.1	1	61.6
THA	-91	121.4	104.9	107.1	1	104.9
THA	-91	90.0	78.7	107.1	1	78.7
THA	-91	153.9	132.2	107.1	0	107.1
THA	-91	64.6	57.4	107.1	1	57.4
THA	-91	127.2	109.8	107.1	0	107.1
THA	-91	99.7	86.7	107.1	1	86.7
THA	-91	101.3	88.1	107.1	1	88.1
THA	-91	140.4	120.9	107.1	0	107.1
THA	-91	78.2	68.7	107.1	1	68.7
THA	-91	109.0	94.6	107.1	1	94.6
THA	-91	103.9	90.3	107.1	1	90.3
THA	-91	126.8	109.5	107.1	0	107.1
THA	-91	111.7	96.8	107.1	1	96.8
GKSS	-91	68.6	68.4	107.1	1	68.4
GKSS	-91	81.6	81.3	107.1	1	81.3
GKSS	-91	55.9	55.8	107.1	1	55.8
GKSS	-91	98.8	98.5	107.1	1	98.5
GKSS	-91	71.9	71.7	107.1	1	71.7
GKSS	-91	111.0	110.7	107.1	0	107.1
GKSS	-91	93.5	93.2	107.1	1	93.2
GKSS	-91	79.9	79.7	107.1	1	79.7
GKSS	-91	98.4	98.1	107.1	1	98.1
GKSS	-91	101.1	100.8	107.1	1	100.8
TWI	-91	79.6	79.4	107.1	1	79.4
TWI	-91	99.7	99.3	107.1	1	99.3
TWI	-91	108.1	107.7	107.1	0	107.1
TWI	-91	93.4	93.1	107.1	1	93.1
TWI	-91	62.0	61.8	107.1	1	61.8
TWI	-91	107.1	106.7	107.1	1	106.7
TWI	-91	145.3	144.8	107.1	0	107.1
TWI	-91	76.3	76.0	107.1	1	76.0
TWI	-91	126.5	126.1	107.1	0	107.1
TWI	-91	126.1	125.7	107.1	0	107.1
TWI	-91	128.5	128.0	107.1	0	107.1
TWI	-91	111.4	111.0	107.1	0	107.1
TWI	-91	130.4	130.0	107.1	0	107.1
TWI	-91	134.8	134.3	107.1	0	107.1
TWI	-91	157.3	156.7	107.1	0	107.1
TWI	-91	105.2	104.9	107.1	1	104.9
TWI	-91	109.8	109.4	107.1	0	107.1
TWI	-91	84.9	84.6	107.1	1	84.6
TWI	-91	62.8	62.7	107.1	1	62.7
TWI	-91	97.5	97.2	107.1	1	97.2
TWI	-91	80.2	79.9	107.1	1	79.9
TWI	-91	134.4	133.9	107.1	0	107.1
TWI	-91	65.1	65.0	107.1	1	65.0
TWI	-91	118.6	118.2	107.1	0	107.1
GKSS	-91	67.3	76.1	107.1	1	76.1
GKSS	-91	162.9	189.3	107.1	0	107.1
GKSS	-91	100.0	114.7	107.1	0	107.1
GKSS	-91	91.2	104.3	107.1	1	104.3
GKSS	-91	106.2	122.1	107.1	0	107.1
GKSS	-91	83.2	94.9	107.1	1	94.9
GKSS	-91	91.8	105.0	107.1	1	105.0
GKSS	-91	94.7	108.5	107.1	0	107.1
GKSS	-91	92.9	106.4	107.1	1	106.4
GKSS	-91	69.9	79.2	107.1	1	79.2
NE	-91	93.1	106.6	107.1	1	106.6
NE	-91	97.9	112.2	107.1	0	107.1
NE	-91	73.7	83.7	107.1	1	83.7
NE	-91	82.0	93.4	107.1	1	93.4
NE	-91	76.3	86.7	107.1	1	86.7
NE	-91	93.1	106.6	107.1	1	106.6
NE	-91	83.7	95.5	107.1	1	95.5
NE	-91	82.1	93.6	107.1	1	93.6
NE	-91	86.8	99.2	107.1	1	99.2
NE	-91	86.7	99.0	107.1	1	99.0
NE	-91	92.3	105.7	107.1	1	105.7
NE	-91	83.1	94.8	107.1	1	94.8
NE	-91	88.9	101.6	107.1	1	101.6
NE	-91	64.3	72.5	107.1	1	72.5
NE	-91	101.6	116.7	107.1	0	107.1
NE	-91	94.2	107.9	107.1	0	107.1
NE	-91	78.7	89.5	107.1	1	89.5
NE	-91	73.0	82.8	107.1	1	82.8
NE	-91	64.2	72.3	107.1	1	72.3
NE	-91	98.9	113.5	107.1	0	107.1

GKSS	-91	103.2	137.2	107.1	0	107.1
GKSS	-91	84.4	110.7	107.1	0	107.1
GKSS	-91	97.0	128.5	107.1	0	107.1
GKSS	-91	92.7	122.4	107.1	0	107.1
GKSS	-91	96.8	128.2	107.1	0	107.1
NE	-91	73.6	95.5	107.1	1	95.5
NE	-91	73.0	94.7	107.1	1	94.7
NE	-91	73.3	95.1	107.1	1	95.1
NE	-91	53.8	67.7	107.1	1	67.7
NE	-91	69.5	89.7	107.1	1	89.7
NE	-91	65.5	84.0	107.1	1	84.0
NE	-91	79.6	104.0	107.1	1	104.0
NE	-91	69.8	90.1	107.1	1	90.1
NE	-91	90.3	119.0	107.1	0	107.1
NE	-91	88.0	115.8	107.1	0	107.1
GKSS	-60	205.5	175.4	168.9	0	168.9
GKSS	-60	114.4	99.1	168.9	1	99.1
GKSS	-60	130.7	112.7	168.9	1	112.7
GKSS	-60	106.7	92.6	168.9	1	92.6
GKSS	-60	161.0	138.1	168.9	1	138.1
GKSS	-60	200.7	171.3	168.9	0	168.9
GKSS	-60	125.2	108.1	168.9	1	108.1
GKSS	-60	145.1	124.8	168.9	1	124.8
GKSS	-60	91.9	80.2	168.9	1	80.2
GKSS	-60	128.1	110.6	168.9	1	110.6
GKSS	-60	164.4	140.9	168.9	1	140.9
GKSS	-60	192.2	164.3	168.9	1	164.3
GKSS	-60	166.3	142.5	168.9	1	142.5
GKSS	-60	177.7	152.1	168.9	1	152.1
GKSS	-60	167.6	143.6	168.9	1	143.6
GKSS	-60	128.6	110.9	168.9	1	110.9
GKSS	-60	203.0	173.3	168.9	0	168.9
GKSS	-60	98.4	85.7	168.9	1	85.7
GKSS	-60	203.3	173.5	168.9	0	168.9
GKSS	-60	202.6	173.0	168.9	0	168.9
GKSS	-60	201.7	172.1	168.9	0	168.9
GKSS	-60	171.9	147.2	168.9	1	147.2
GKSS	-60	136.8	117.8	168.9	1	117.8
GKSS	-60	135.8	117.0	168.9	1	117.0
GKSS	-60	200.8	171.4	168.9	0	168.9
GKSS	-60	202.8	173.1	168.9	0	168.9
GKSS	-60	202.0	172.5	168.9	0	168.9
GKSS	-60	116.0	100.4	168.9	1	100.4
GKSS	-60	202.0	172.5	168.9	0	168.9
GKSS	-60	167.6	143.6	168.9	1	143.6
GKSS	-60	89.8	78.5	168.9	1	78.5
GKSS	-60	156.3	134.1	168.9	1	134.1
GKSS	-60	186.8	159.7	168.9	1	159.7
GKSS	-60	203.2	173.4	168.9	0	168.9
GKSS	-60	164.6	141.1	168.9	1	141.1
GKSS	-60	202.6	173.0	168.9	0	168.9
GKSS	-60	185.9	159.0	168.9	1	159.0
GKSS	-60	127.7	110.2	168.9	1	110.2
GKSS	-60	201.2	171.7	168.9	0	168.9
GKSS	-60	115.6	100.0	168.9	1	100.0
GKSS	-60	107.5	93.3	168.9	1	93.3
SIEMENS	-60	164.6	141.1	168.9	1	141.1
SIEMENS	-60	172.0	147.3	168.9	1	147.3
SIEMENS	-60	108.5	94.2	168.9	1	94.2
SIEMENS	-60	119.0	102.9	168.9	1	102.9
SIEMENS	-60	153.5	131.8	168.9	1	131.8
SIEMENS	-60	158.9	136.4	168.9	1	136.4
SIEMENS	-60	137.5	118.4	168.9	1	118.4
SIEMENS	-60	119.5	103.3	168.9	1	103.3
SIEMENS	-60	130.7	112.8	168.9	1	112.8
SIEMENS	-60	172.6	147.8	168.9	1	147.8
SIEMENS	-60	84.5	74.0	168.9	1	74.0
SIEMENS	-60	213.4	182.0	168.9	0	168.9
SIEMENS	-60	120.4	104.1	168.9	1	104.1
SIEMENS	-60	104.5	90.8	168.9	1	90.8
SIEMENS	-60	163.6	140.2	168.9	1	140.2
SIEMENS	-60	201.4	172.0	168.9	0	168.9
SIEMENS	-60	137.8	118.7	168.9	1	118.7
SIEMENS	-60	173.0	148.1	168.9	1	148.1
SIEMENS	-60	99.2	86.4	168.9	1	86.4
SIEMENS	-60	173.4	148.4	168.9	1	148.4
SIEMENS	-60	131.5	113.4	168.9	1	113.4
GKSS	-60	186.0	185.3	168.9	0	168.9
GKSS	-60	151.8	151.3	168.9	1	151.3
GKSS	-60	111.7	111.3	168.9	1	111.3
GKSS	-60	143.9	143.4	168.9	1	143.4
GKSS	-60	105.4	105.1	168.9	1	105.1
GKSS	-60	154.0	153.4	168.9	1	153.4
GKSS	-60	176.2	175.6	168.9	0	168.9
GKSS	-60	131.9	131.5	168.9	1	131.5
GKSS	-60	203.9	203.2	168.9	0	168.9
GKSS	-60	142.7	142.2	168.9	1	142.2
TWI	-60	134.5	134.0	168.9	1	134.0

TWI	-60	130.1	129.7	168.9	1	129.7
TWI	-60	142.6	142.1	168.9	1	142.1
TWI	-60	119.7	119.3	168.9	1	119.3
TWI	-60	141.3	140.8	168.9	1	140.8
TWI	-60	175.9	175.3	168.9	0	168.9
TWI	-60	119.6	119.2	168.9	1	119.2
TWI	-60	102.4	102.0	168.9	1	102.0
TWI	-60	99.0	98.7	168.9	1	98.7
TWI	-60	115.1	114.7	168.9	1	114.7
TWI	-60	172.9	172.3	168.9	0	168.9
TWI	-60	120.5	120.2	168.9	1	120.2
TWI	-60	165.2	164.6	168.9	1	164.6
TWI	-60	125.6	125.2	168.9	1	125.2
TWI	-60	126.7	126.3	168.9	1	126.3
TWI	-60	100.4	100.1	168.9	1	100.1
TWI	-60	131.1	130.7	168.9	1	130.7
TWI	-60	185.1	184.5	168.9	0	168.9
TWI	-60	163.6	163.0	168.9	1	163.0
TWI	-60	126.5	126.1	168.9	1	126.1
TWI	-60	164.7	164.1	168.9	1	164.1
TWI	-60	192.7	192.0	168.9	0	168.9
TWI	-60	134.5	134.1	168.9	1	134.1
TWI	-60	140.8	140.3	168.9	1	140.3
GKSS	-60	295.3	346.1	168.9	0	168.9
GKSS	-60	217.7	254.2	168.9	0	168.9
GKSS	-60	219.8	256.6	168.9	0	168.9
GKSS	-60	165.9	192.8	168.9	0	168.9
GKSS	-60	109.9	126.5	168.9	1	126.5
GKSS	-60	131.9	152.5	168.9	1	152.5
GKSS	-60	136.2	157.6	168.9	1	157.6
GKSS	-60	154.0	178.8	168.9	0	168.9
GKSS	-60	115.9	133.6	168.9	1	133.6
GKSS	-60	150.4	174.4	168.9	0	168.9
THA	-60	153.6	178.2	168.9	0	168.9
THA	-60	183.8	214.0	168.9	0	168.9
THA	-60	236.1	275.9	168.9	0	168.9
THA	-60	149.4	173.3	168.9	0	168.9
THA	-60	179.5	209.0	168.9	0	168.9
THA	-60	177.6	206.7	168.9	0	168.9
THA	-60	188.3	219.4	168.9	0	168.9
THA	-60	134.5	155.6	168.9	1	155.6
THA	-60	243.6	284.9	168.9	0	168.9
THA	-60	155.7	180.8	168.9	0	168.9
THA	-60	164.0	190.6	168.9	0	168.9
THA	-60	146.5	169.8	168.9	0	168.9
THA	-60	119.9	138.4	168.9	1	138.4
THA	-60	79.9	91.0	168.9	1	91.0
THA	-60	140.9	163.2	168.9	1	163.2
THA	-60	115.3	132.9	168.9	1	132.9
THA	-60	137.0	158.6	168.9	1	158.6
THA	-60	166.9	194.0	168.9	0	168.9
THA	-60	225.4	263.3	168.9	0	168.9
THA	-60	200.7	234.1	168.9	0	168.9
BAM	-40	171.0	146.5	233.1	1	146.5
BAM	-40	206.2	176.0	233.1	1	176.0
BAM	-40	169.4	145.1	233.1	1	145.1
BAM	-40	203.6	173.7	233.1	1	173.7
BAM	-40	202.5	172.9	233.1	1	172.9
BAM	-40	207.2	176.8	233.1	1	176.8
BAM	-40	205.9	175.7	233.1	1	175.7
BAM	-40	206.5	176.2	233.1	1	176.2
BAM	-40	207.3	176.9	233.1	1	176.9
BAM	-40	205.1	175.1	233.1	1	175.1
BAM	-40	202.8	173.1	233.1	1	173.1
BAM	-40	204.9	174.8	233.1	1	174.8
BAM	-40	205.2	175.1	233.1	1	175.1
BAM	-40	113.7	98.5	233.1	1	98.5
BAM	-40	204.8	174.8	233.1	1	174.8
BAM	-40	154.2	132.4	233.1	1	132.4
BAM	-40	206.2	176.0	233.1	1	176.0
BAM	-40	204.2	174.3	233.1	1	174.3
BAM	-40	207.3	176.9	233.1	1	176.9
BAM	-40	202.5	172.8	233.1	1	172.8
GKSS	-40	180.6	154.6	233.1	1	154.6
GKSS	-40	203.5	173.7	233.1	1	173.7
GKSS	-40	198.2	169.3	233.1	1	169.3
GKSS	-40	199.6	170.5	233.1	1	170.5
GKSS	-40	186.4	159.4	233.1	1	159.4
GKSS	-40	199.4	170.3	233.1	1	170.3
GKSS	-40	204.4	174.4	233.1	1	174.4
GKSS	-40	202.4	172.7	233.1	1	172.7
GKSS	-40	203.2	173.4	233.1	1	173.4
GKSS	-40	200.9	171.5	233.1	1	171.5
BAM	-40	187.3	186.6	233.1	1	186.6
BAM	-40	101.5	101.2	233.1	1	101.2
BAM	-40	140.3	139.9	233.1	1	139.9
BAM	-40	150.2	149.7	233.1	1	149.7
BAM	-40	187.3	186.6	233.1	1	186.6

BAM	-40	211.4	210.6	233.1	1	210.6
BAM	-40	160.5	160.0	233.1	1	160.0
BAM	-40	214.6	213.8	233.1	1	213.8
BAM	-40	188.3	187.7	233.1	1	187.7
BAM	-40	239.3	238.4	233.1	0	233.1
BAM	-40	112.8	112.4	233.1	1	112.4
BAM	-40	239.0	238.1	233.1	0	233.1
BAM	-40	284.9	283.9	233.1	0	233.1
BAM	-40	254.7	253.7	233.1	0	233.1
BAM	-40	270.9	269.9	233.1	0	233.1
BAM	-40	187.0	186.3	233.1	1	186.3
BAM	-40	170.1	169.5	233.1	1	169.5
BAM	-40	256.4	255.5	233.1	0	233.1
BAM	-40	171.4	170.8	233.1	1	170.8
BAM	-40	103.1	102.8	233.1	1	102.8
BAM	-40	230.0	229.1	233.1	1	229.1
BAM	-40	210.0	209.2	233.1	1	209.2
GKSS	-40	198.2	197.5	233.1	1	197.5
GKSS	-40	150.2	149.7	233.1	1	149.7
GKSS	-40	226.8	226.0	233.1	1	226.0
GKSS	-40	158.1	157.5	233.1	1	157.5
GKSS	-40	256.4	255.5	233.1	0	233.1
GKSS	-40	207.6	206.9	233.1	1	206.9
GKSS	-40	213.5	212.8	233.1	1	212.8
GKSS	-40	254.6	253.7	233.1	0	233.1
GKSS	-40	240.0	239.1	233.1	0	233.1
GKSS	-40	279.0	278.0	233.1	0	233.1
GKSS	-40	125.9	145.5	233.1	1	145.5
GKSS	-40	128.9	149.0	233.1	1	149.0
GKSS	-40	198.5	231.5	233.1	1	231.5
GKSS	-40	212.0	247.5	233.1	0	233.1
GKSS	-40	138.6	160.5	233.1	1	160.5
GKSS	-40	187.7	218.7	233.1	1	218.7
GKSS	-40	173.0	201.2	233.1	1	201.2
GKSS	-40	179.5	208.9	233.1	1	208.9
GKSS	-40	152.6	177.1	233.1	1	177.1
GKSS	-40	153.6	178.3	233.1	1	178.3
THA	-40	144.6	167.6	233.1	1	167.6
THA	-40	150.7	174.9	233.1	1	174.9
THA	-40	139.1	161.0	233.1	1	161.0
THA	-40	183.6	213.8	233.1	1	213.8
THA	-40	142.0	164.5	233.1	1	164.5
THA	-40	187.2	218.0	233.1	1	218.0
THA	-40	172.2	200.3	233.1	1	200.3
THA	-40	198.0	230.8	233.1	1	230.8
THA	-40	130.4	150.8	233.1	1	150.8
THA	-40	141.7	164.1	233.1	1	164.1
THA	-40	134.5	155.6	233.1	1	155.6
THA	-40	115.5	133.1	233.1	1	133.1
THA	-40	91.7	104.9	233.1	1	104.9
THA	-40	141.1	163.4	233.1	1	163.4
THA	-40	239.1	279.6	233.1	0	233.1
THA	-40	243.4	284.7	233.1	0	233.1
THA	-40	191.9	223.6	233.1	1	223.6
THA	-40	146.8	170.2	233.1	1	170.2
THA	-40	161.4	187.5	233.1	1	187.5
THA	-40	142.3	164.8	233.1	1	164.8
CISE	-20	128.7	111.1	326.9	1	111.1
CISE	-20	146.9	126.3	326.9	1	126.3
CISE	-20	204.3	174.4	326.9	1	174.4
CISE	-20	198.3	169.3	326.9	1	169.3
CISE	-20	195.0	166.6	326.9	1	166.6
CISE	-20	197.8	168.9	326.9	1	168.9
CISE	-20	195.6	167.1	326.9	1	167.1
CISE	-20	196.2	167.6	326.9	1	167.6
CISE	-20	194.0	165.7	326.9	1	165.7
CISE	-20	198.3	169.3	326.9	1	169.3
CISE	-20	201.2	171.8	326.9	1	171.8
CISE	-20	200.9	171.5	326.9	1	171.5
CISE	-20	195.6	167.1	326.9	1	167.1
CISE	-20	197.6	168.8	326.9	1	168.8
CISE	-20	201.9	172.4	326.9	1	172.4
CISE	-20	202.5	172.8	326.9	1	172.8
CISE	-20	198.1	169.2	326.9	1	169.2
CISE	-20	198.1	169.2	326.9	1	169.2
CISE	-20	200.7	171.3	326.9	1	171.3
CISE	-20	199.8	170.6	326.9	1	170.6
CISE	-20	201.5	172.0	326.9	1	172.0
GKSS	-20	200.6	171.2	326.9	1	171.2
GKSS	-20	200.6	171.2	326.9	1	171.2
GKSS	-20	199.8	170.6	326.9	1	170.6
GKSS	-20	198.2	169.2	326.9	1	169.2
GKSS	-20	199.3	170.2	326.9	1	170.2
GKSS	-20	196.6	167.9	326.9	1	167.9
GKSS	-20	198.6	169.6	326.9	1	169.6
GKSS	-20	200.7	171.3	326.9	1	171.3
GKSS	-20	195.0	166.6	326.9	1	166.6
GKSS	-20	198.6	169.6	326.9	1	169.6

GKSS	-20	202.5	201.7	326.9	1	201.7
GKSS	-20	194.7	194.1	326.9	1	194.1
GKSS	-20	262.8	261.8	326.9	1	261.8
GKSS	-20	187.9	187.2	326.9	1	187.2
GKSS	-20	275.8	274.8	326.9	1	274.8
GKSS	-20	261.8	260.9	326.9	1	260.9
GKSS	-20	283.2	282.2	326.9	1	282.2
GKSS	-20	283.1	282.0	326.9	1	282.0
GKSS	-20	284.0	283.0	326.9	1	283.0
GKSS	-20	284.2	283.1	326.9	1	283.1
VTT	-20	284.0	282.9	326.9	1	282.9
VTT	-20	231.9	231.0	326.9	1	231.0
VTT	-20	279.4	278.3	326.9	1	278.3
VTT	-20	280.3	279.2	326.9	1	279.2
VTT	-20	279.4	278.3	326.9	1	278.3
VTT	-20	278.6	277.5	326.9	1	277.5
VTT	-20	281.9	280.9	326.9	1	280.9
VTT	-20	279.4	278.3	326.9	1	278.3
VTT	-20	282.5	281.4	326.9	1	281.4
VTT	-20	247.2	246.3	326.9	1	246.3
VTT	-20	233.2	232.4	326.9	1	232.4
VTT	-20	283.2	282.2	326.9	1	282.2
VTT	-20	288.9	287.8	326.9	1	287.8
VTT	-20	263.2	262.3	326.9	1	262.3
VTT	-20	184.4	183.8	326.9	1	183.8
VTT	-20	283.7	282.7	326.9	1	282.7
VTT	-20	280.8	279.8	326.9	1	279.8
VTT	-20	280.9	279.8	326.9	1	279.8
VTT	-20	280.9	279.8	326.9	1	279.8
VTT	-20	170.9	170.3	326.9	1	170.3
VTT	-20	282.9	281.9	326.9	1	281.9
VTT	-20	275.7	274.6	326.9	1	274.6
VTT	-20	228.2	227.4	326.9	1	227.4
VTT	-20	282.0	281.0	326.9	1	281.0
VTT	-20	280.9	279.8	326.9	1	279.8
VTT	-20	281.8	280.7	326.9	1	280.7
VTT	-20	281.4	280.4	326.9	1	280.4
VTT	-20	227.3	226.5	326.9	1	226.5
VTT	-20	201.3	200.6	326.9	1	200.6
VTT	-20	212.5	211.7	326.9	1	211.7
VTT	-20	256.5	255.5	326.9	1	255.5
VTT	-20	284.8	283.8	326.9	1	283.8
VTT	-20	282.3	281.3	326.9	1	281.3
VTT	-20	269.6	268.6	326.9	1	268.6
VTT	-20	184.4	183.8	326.9	1	183.8
VTT	-20	241.6	240.7	326.9	1	240.7
VTT	-20	146.4	145.9	326.9	1	145.9
VTT	-20	280.0	279.0	326.9	1	279.0
VTT	-20	156.7	156.2	326.9	1	156.2
VTT	-20	277.0	276.0	326.9	1	276.0
CISE	-20	167.4	194.6	326.9	1	194.6
CISE	-20	153.5	178.1	326.9	1	178.1
CISE	-20	211.2	246.5	326.9	1	246.5
CISE	-20	220.3	257.3	326.9	1	257.3
CISE	-20	227.9	266.2	326.9	1	266.2
CISE	-20	211.1	246.4	326.9	1	246.4
CISE	-20	217.1	253.4	326.9	1	253.4
CISE	-20	145.3	168.5	326.9	1	168.5
CISE	-20	161.2	187.2	326.9	1	187.2
CISE	-20	131.9	152.5	326.9	1	152.5
CISE	-20	216.4	252.6	326.9	1	252.6
CISE	-20	125.0	144.4	326.9	1	144.4
CISE	-20	378.7	444.9	326.9	0	326.9
CISE	-20	246.1	287.9	326.9	1	287.9
CISE	-20	250.9	293.5	326.9	1	293.5
CISE	-20	251.5	294.3	326.9	1	294.3
CISE	-20	284.0	332.7	326.9	0	326.9
CISE	-20	261.1	305.6	326.9	1	305.6
CISE	-20	351.6	412.8	326.9	0	326.9
CISE	-20	258.5	302.5	326.9	1	302.5
GKSS	-20	201.3	234.8	326.9	1	234.8
GKSS	-20	110.9	127.7	326.9	1	127.7
GKSS	-20	197.7	230.5	326.9	1	230.5
GKSS	-20	198.9	231.9	326.9	1	231.9
GKSS	-20	200.6	234.0	326.9	1	234.0
GKSS	-20	165.7	192.6	326.9	1	192.6
GKSS	-20	280.1	328.0	326.9	0	326.9
GKSS	-20	279.5	327.3	326.9	0	326.9
GKSS	-20	257.6	301.4	326.9	1	301.4
GKSS	-20	265.2	310.4	326.9	1	310.4
GKSS	-20	156.7	212.6	326.9	1	212.6
GKSS	-20	221.7	304.1	326.9	1	304.1
GKSS	-20	193.9	264.9	326.9	1	264.9
GKSS	-20	191.7	261.9	326.9	1	261.9
GKSS	-20	184.4	251.6	326.9	1	251.6
NE	-20	186.7	254.8	326.9	1	254.8
NE	-20	184.4	251.6	326.9	1	251.6
NE	-20	193.9	264.9	326.9	1	264.9

NE	-20	204.4	279.8	326.9	1	279.8
NE	-20	224.0	307.4	326.9	1	307.4
NE	-20	153.4	207.9	326.9	1	207.9
NE	-20	222.6	305.4	326.9	1	305.4
NE	-20	162.0	220.0	326.9	1	220.0
NE	-20	187.8	256.4	326.9	1	256.4
NE	-20	198.2	271.0	326.9	1	271.0
SCK-CEN	-10	280.0	279.0	389.1	1	279.0
SCK-CEN	-10	281.2	280.2	389.1	1	280.2
SCK-CEN	-10	282.6	281.5	389.1	1	281.5
SCK-CEN	-10	284.0	282.9	389.1	1	282.9
SCK-CEN	-10	280.9	279.9	389.1	1	279.9
GKSS	0	196.8	168.1	464.2	1	168.1
GKSS	0	193.7	165.5	464.2	1	165.5
GKSS	0	192.9	164.8	464.2	1	164.8
GKSS	0	196.7	168.0	464.2	1	168.0
GKSS	0	196.1	167.5	464.2	1	167.5
GKSS	0	194.7	166.3	464.2	1	166.3
GKSS	0	196.3	167.7	464.2	1	167.7
GKSS	0	195.9	167.3	464.2	1	167.3
GKSS	0	195.2	166.8	464.2	1	166.8
GKSS	0	193.3	165.1	464.2	1	165.1
SCK-CEN	0	198.4	169.4	464.2	1	169.4
SCK-CEN	0	199.1	170.0	464.2	1	170.0
SCK-CEN	0	198.2	169.2	464.2	1	169.2
SCK-CEN	0	197.6	168.8	464.2	1	168.8
SCK-CEN	0	201.2	171.8	464.2	1	171.8
SCK-CEN	0	200.0	170.8	464.2	1	170.8
SCK-CEN	0	197.4	168.6	464.2	1	168.6
SCK-CEN	0	199.6	170.4	464.2	1	170.4
SCK-CEN	0	203.4	173.6	464.2	1	173.6
SCK-CEN	0	199.2	170.1	464.2	1	170.1
SCK-CEN	0	200.5	171.2	464.2	1	171.2
SCK-CEN	0	202.4	172.7	464.2	1	172.7
SCK-CEN	0	197.2	168.4	464.2	1	168.4
SCK-CEN	0	205.8	175.6	464.2	1	175.6
SCK-CEN	0	205.5	175.4	464.2	1	175.4
SCK-CEN	0	202.4	172.7	464.2	1	172.7
SCK-CEN	0	203.4	173.6	464.2	1	173.6
SCK-CEN	0	205.2	175.1	464.2	1	175.1
SCK-CEN	0	202.3	172.7	464.2	1	172.7
SCK-CEN	0	201.6	172.1	464.2	1	172.1
GKSS	0	282.4	281.4	464.2	1	281.4
GKSS	0	283.7	282.7	464.2	1	282.7
GKSS	0	284.9	283.9	464.2	1	283.9
GKSS	0	282.8	281.8	464.2	1	281.8
GKSS	0	284.4	283.4	464.2	1	283.4
GKSS	0	284.9	283.8	464.2	1	283.8
GKSS	0	279.6	278.6	464.2	1	278.6
GKSS	0	283.9	282.8	464.2	1	282.8
GKSS	0	285.7	284.7	464.2	1	284.7
GKSS	0	283.0	281.9	464.2	1	281.9
SCK-CEN	0	277.0	276.0	464.2	1	276.0
SCK-CEN	0	276.7	275.7	464.2	1	275.7
SCK-CEN	0	276.9	275.9	464.2	1	275.9
SCK-CEN	0	277.9	276.8	464.2	1	276.8
SCK-CEN	0	276.9	275.9	464.2	1	275.9
SCK-CEN	0	278.2	277.2	464.2	1	277.2
SCK-CEN	0	278.0	277.0	464.2	1	277.0
SCK-CEN	0	275.9	274.9	464.2	1	274.9
SCK-CEN	0	277.6	276.6	464.2	1	276.6
SCK-CEN	0	278.2	277.2	464.2	1	277.2
SCK-CEN	0	277.3	276.3	464.2	1	276.3
VTT	0	280.3	279.3	464.2	1	279.3
VTT	0	275.5	274.5	464.2	1	274.5
VTT	0	280.3	279.3	464.2	1	279.3
VTT	0	275.2	274.2	464.2	1	274.2
VTT	0	278.0	277.0	464.2	1	277.0
VTT	0	278.5	277.5	464.2	1	277.5
VTT	0	279.7	278.6	464.2	1	278.6
VTT	0	267.2	266.2	464.2	1	266.2
VTT	0	279.8	278.8	464.2	1	278.8
VTT	0	278.6	277.6	464.2	1	277.6
VTT	0	278.3	277.3	464.2	1	277.3
VTT	0	280.0	278.9	464.2	1	278.9
VTT	0	274.3	273.3	464.2	1	273.3
VTT	0	276.0	275.0	464.2	1	275.0
VTT	0	278.7	277.7	464.2	1	277.7
VTT	0	278.0	277.0	464.2	1	277.0
VTT	0	279.1	278.0	464.2	1	278.0
VTT	0	278.6	277.5	464.2	1	277.5
VTT	0	279.4	278.4	464.2	1	278.4
VTT	0	276.2	275.2	464.2	1	275.2
GKSS	0	191.3	222.9	464.2	1	222.9
GKSS	0	269.2	315.2	464.2	1	315.2
GKSS	0	281.2	329.4	464.2	1	329.4
GKSS	0	242.5	283.5	464.2	1	283.5
GKSS	0	318.3	373.3	464.2	1	373.3

GKSS	0	395.4	464.7	464.2	0	464.2
GKSS	0	396.5	465.9	464.2	0	464.2
GKSS	0	394.9	464.1	464.2	1	464.1
GKSS	0	396.3	465.7	464.2	0	464.2
GKSS	0	266.6	312.1	464.2	1	312.1
GKSS	0	395.2	464.4	464.2	0	464.2
GKSS	0	362.9	426.1	464.2	1	426.1
GKSS	0	331.8	389.3	464.2	1	389.3
GKSS	0	227.1	265.3	464.2	1	265.3
GKSS	0	309.5	362.9	464.2	1	362.9
GKSS	0	395.4	464.7	464.2	0	464.2
GKSS	0	210.9	246.1	464.2	1	246.1
GKSS	0	394.9	464.1	464.2	1	464.1
GKSS	0	211.4	246.7	464.2	1	246.7
GKSS	0	393.9	462.8	464.2	1	462.8
GKSS	0	263.4	308.3	464.2	1	308.3
GKSS	0	393.3	462.1	464.2	1	462.1
GKSS	0	386.7	454.3	464.2	1	454.3
GKSS	0	376.2	441.9	464.2	1	441.9
GKSS	0	394.4	463.5	464.2	1	463.5
GKSS	0	306.7	359.6	464.2	1	359.6
GKSS	0	394.8	464.0	464.2	1	464.0
GKSS	0	393.9	462.8	464.2	1	462.8
GKSS	0	246.4	288.2	464.2	1	288.2
GKSS	0	320.1	375.4	464.2	1	375.4
CISE	0	233.3	320.4	464.2	1	320.4
CISE	0	238.2	327.4	464.2	1	327.4
CISE	0	208.3	285.2	464.2	1	285.2
CISE	0	421.7	585.8	464.2	0	464.2
CISE	0	226.7	311.2	464.2	1	311.2
CISE	0	267.0	367.9	464.2	1	367.9
CISE	0	163.0	221.4	464.2	1	221.4
CISE	0	165.8	225.4	464.2	1	225.4
CISE	0	285.9	394.6	464.2	1	394.6
CISE	0	342.0	473.5	464.2	0	464.2
GKSS	0	314.9	435.4	464.2	1	435.4
GKSS	0	307.6	425.1	464.2	1	425.1
GKSS	0	383.0	531.4	464.2	0	464.2
GKSS	0	332.6	460.4	464.2	1	460.4
GKSS	0	223.6	306.8	464.2	1	306.8
GKSS	0	442.2	614.7	464.2	0	464.2

2. Analysis of the censored data and obtainment of a new estimate of T_o

Specimen code	T (°C)	$K_{Jc[exp]}$ (MPa√m)	K_{Jc-T} (MPa√m)	$K_{analysis}$ (MPa√m)	δ_i	1° member	2° member
GKSS	-154	54.8	49.1	49.1	1	0.0000	0.0000
GKSS	-154	49.8	44.9	44.9	1	0.0000	0.0000
GKSS	-154	37.8	34.9	34.9	1	0.0000	0.0000
GKSS	-154	33.0	30.9	30.9	1	0.0000	0.0000
GKSS	-154	38.9	35.8	35.8	1	0.0000	0.0000
GKSS	-154	24.2	23.6	23.6	1	0.0000	0.0000
GKSS	-154	47.4	43.0	43.0	1	0.0000	0.0000
GKSS	-154	46.5	42.2	42.2	1	0.0000	0.0000
GKSS	-154	31.4	29.6	29.6	1	0.0000	0.0000
GKSS	-154	39.2	36.0	36.0	1	0.0000	0.0000
GKSS	-154	24.2	23.6	23.6	1	0.0000	0.0000
SIEMENS	-154	33.0	30.9	30.9	1	0.0000	0.0000
SIEMENS	-154	41.0	37.6	37.6	1	0.0000	0.0000
SIEMENS	-154	31.7	29.8	29.8	1	0.0000	0.0000
SIEMENS	-154	35.2	32.7	32.7	1	0.0000	0.0000
SIEMENS	-154	44.4	40.5	40.5	1	0.0000	0.0000
SIEMENS	-154	41.5	38.0	38.0	1	0.0000	0.0000
SIEMENS	-154	32.7	30.7	30.7	1	0.0000	0.0000
SIEMENS	-154	34.3	32.0	32.0	1	0.0000	0.0000
SIEMENS	-154	36.7	34.0	34.0	1	0.0000	0.0000
SIEMENS	-154	39.7	36.5	36.5	1	0.0000	0.0000
SIEMENS	-154	46.1	41.8	41.8	1	0.0000	0.0000
SIEMENS	-154	34.6	32.2	32.2	1	0.0000	0.0000
SIEMENS	-154	35.8	33.2	33.2	1	0.0000	0.0000
SIEMENS	-154	29.3	27.8	27.8	1	0.0000	0.0000
SIEMENS	-154	28.6	27.2	27.2	1	0.0000	0.0000
SIEMENS	-154	38.6	35.6	35.6	1	0.0000	0.0000
SIEMENS	-154	44.4	40.5	40.5	1	0.0000	0.0000
SIEMENS	-154	48.9	44.2	44.2	1	0.0000	0.0000
SIEMENS	-154	38.9	35.8	35.8	1	0.0000	0.0000
SIEMENS	-154	36.7	34.0	34.0	1	0.0000	0.0000
SIEMENS	-154	31.7	29.8	29.8	1	0.0000	0.0000
GKSS	-154	41.5	41.4	41.4	1	0.0000	0.0000
GKSS	-154	42.2	42.2	42.2	1	0.0000	0.0000
GKSS	-154	50.0	49.9	49.9	1	0.0000	0.0000
GKSS	-154	34.0	33.9	33.9	1	0.0000	0.0000
GKSS	-154	41.7	41.7	41.7	1	0.0000	0.0000
GKSS	-154	46.1	46.0	46.0	1	0.0000	0.0000
GKSS	-154	44.2	44.1	44.1	1	0.0000	0.0000

USE LIMITS : YES T limits
-141
-41

Sum of 1° member: 2.338

Sum of 2° member: 2.338

Difference: 0.000

$T_o = -96.1$ °C

Use new estimate as benchmark

N = 734

r = 616

$K_{min} = 20$ MPa√m

$K_{o,eq} = 130.5$ MPa√m

$K_{med,eq} = 120.9$ MPa√m

GKSS	-154	36.7	36.6	36.6	1	0.0000	0.0000
GKSS	-154	29.0	28.9	28.9	1	0.0000	0.0000
GKSS	-154	53.0	52.9	52.9	1	0.0000	0.0000
GKSS	-154	39.4	39.3	39.3	1	0.0000	0.0000
GKSS	-154	29.0	28.9	28.9	1	0.0000	0.0000
SIEMENS	-154	34.6	34.5	34.5	1	0.0000	0.0000
SIEMENS	-154	33.0	33.0	33.0	1	0.0000	0.0000
SIEMENS	-154	38.1	38.0	38.0	1	0.0000	0.0000
SIEMENS	-154	28.6	28.6	28.6	1	0.0000	0.0000
SIEMENS	-154	28.6	28.6	28.6	1	0.0000	0.0000
SIEMENS	-154	38.6	38.5	38.5	1	0.0000	0.0000
SIEMENS	-154	36.4	36.3	36.3	1	0.0000	0.0000
SIEMENS	-154	33.4	33.3	33.3	1	0.0000	0.0000
SIEMENS	-154	36.9	36.9	36.9	1	0.0000	0.0000
SIEMENS	-154	31.1	31.0	31.0	1	0.0000	0.0000
SIEMENS	-154	34.3	34.2	34.2	1	0.0000	0.0000
SIEMENS	-154	30.4	30.4	30.4	1	0.0000	0.0000
SIEMENS	-154	49.6	49.5	49.5	1	0.0000	0.0000
SIEMENS	-154	41.0	40.9	40.9	1	0.0000	0.0000
SIEMENS	-154	34.0	33.9	33.9	1	0.0000	0.0000
SIEMENS	-154	30.7	30.7	30.7	1	0.0000	0.0000
SIEMENS	-154	41.2	41.2	41.2	1	0.0000	0.0000
SIEMENS	-154	26.7	26.7	26.7	1	0.0000	0.0000
SIEMENS	-154	35.5	35.4	35.4	1	0.0000	0.0000
SIEMENS	-154	33.4	33.3	33.3	1	0.0000	0.0000
SIEMENS	-154	36.7	36.6	36.6	1	0.0000	0.0000
SIEMENS	-154	32.4	32.4	32.4	1	0.0000	0.0000
SIEMENS	-154	45.1	45.0	45.0	1	0.0000	0.0000
SIEMENS	-154	33.4	33.3	33.3	1	0.0000	0.0000
SIEMENS	-154	34.0	33.9	33.9	1	0.0000	0.0000
SIEMENS	-154	30.7	30.7	30.7	1	0.0000	0.0000
SIEMENS	-154	26.7	26.7	26.7	1	0.0000	0.0000
GKSS	-154	33.7	36.2	36.2	1	0.0000	0.0000
GKSS	-154	42.7	46.9	46.9	1	0.0000	0.0000
GKSS	-154	37.2	40.4	40.4	1	0.0000	0.0000
GKSS	-154	54.4	60.8	53.3	0	0.0000	0.0000
GKSS	-154	34.6	37.3	37.3	1	0.0000	0.0000
GKSS	-154	44.2	48.7	48.7	1	0.0000	0.0000
GKSS	-154	29.7	31.5	31.5	1	0.0000	0.0000
GKSS	-154	36.4	39.4	39.4	1	0.0000	0.0000
GKSS	-154	36.4	39.4	39.4	1	0.0000	0.0000
GKSS	-154	28.2	29.8	29.8	1	0.0000	0.0000
GKSS	-154	28.2	29.8	29.8	1	0.0000	0.0000
NE	-154	30.0	31.9	31.9	1	0.0000	0.0000
NE	-154	36.4	39.4	39.4	1	0.0000	0.0000
NE	-154	37.5	40.7	40.7	1	0.0000	0.0000
NE	-154	30.0	31.9	31.9	1	0.0000	0.0000
NE	-154	30.7	32.7	32.7	1	0.0000	0.0000
NE	-154	30.4	32.3	32.3	1	0.0000	0.0000
NE	-154	30.7	32.7	32.7	1	0.0000	0.0000
NE	-154	31.7	33.9	33.9	1	0.0000	0.0000
NE	-154	41.7	45.8	45.8	1	0.0000	0.0000
NE	-154	37.2	40.4	40.4	1	0.0000	0.0000
NE	-154	34.9	37.6	37.6	1	0.0000	0.0000
NE	-154	38.3	41.7	41.7	1	0.0000	0.0000
NE	-154	31.4	33.5	33.5	1	0.0000	0.0000
NE	-154	33.7	36.2	36.2	1	0.0000	0.0000
NE	-154	32.7	35.1	35.1	1	0.0000	0.0000
NE	-154	43.0	47.2	47.2	1	0.0000	0.0000
NE	-154	32.7	35.1	35.1	1	0.0000	0.0000
NE	-154	30.0	31.9	31.9	1	0.0000	0.0000
NE	-154	36.9	40.1	40.1	1	0.0000	0.0000
NE	-154	33.4	35.8	35.8	1	0.0000	0.0000
NE	-154	30.0	31.9	31.9	1	0.0000	0.0000
GKSS	-110	98.1	85.4	83.7	0	0.0000	0.0083
GKSS	-110	59.0	52.7	52.7	1	0.0109	0.0005
GKSS	-110	80.0	70.3	70.3	1	0.0109	0.0029
GKSS	-110	57.2	51.2	51.2	1	0.0109	0.0004
GKSS	-110	88.3	77.2	77.2	1	0.0109	0.0049
GKSS	-110	96.2	83.9	83.7	0	0.0000	0.0075
GKSS	-110	81.6	71.6	71.6	1	0.0109	0.0032
GKSS	-110	66.9	59.3	59.3	1	0.0109	0.0011
GKSS	-110	85.6	75.0	75.0	1	0.0109	0.0041
GKSS	-110	86.8	76.0	76.0	1	0.0109	0.0045
GKSS	-110	114.2	98.9	83.7	0	0.0000	0.0176
GKSS	-110	73.5	64.8	64.8	1	0.0109	0.0018
GKSS	-110	92.7	80.9	80.9	1	0.0109	0.0062
GKSS	-110	77.5	68.2	68.2	1	0.0109	0.0024
GKSS	-110	61.5	54.7	54.7	1	0.0109	0.0007
GKSS	-110	51.8	46.7	46.7	1	0.0109	0.0002
GKSS	-110	73.6	64.9	64.9	1	0.0109	0.0018
GKSS	-110	52.8	47.5	47.5	1	0.0109	0.0003
GKSS	-110	41.2	37.8	37.8	1	0.0109	0.0000
GKSS	-110	115.3	99.8	83.7	0	0.0000	0.0184
GKSS	-110	73.2	64.5	64.5	1	0.0109	0.0018
GKSS	-110	74.0	65.3	65.3	1	0.0109	0.0019
GKSS	-110	67.5	59.8	59.8	1	0.0109	0.0011
GKSS	-110	71.0	62.7	62.7	1	0.0109	0.0015

GKSS	-110	53.4	48.0	48.0	1	0.0109	0.0003
GKSS	-110	96.5	84.0	83.7	0	0.0000	0.0076
GKSS	-110	71.3	63.0	63.0	1	0.0109	0.0015
GKSS	-110	71.7	63.3	63.3	1	0.0109	0.0016
GKSS	-110	81.7	71.7	71.7	1	0.0109	0.0032
GKSS	-110	64.0	56.8	56.8	1	0.0109	0.0008
GKSS	-110	74.2	65.4	65.4	1	0.0109	0.0019
GKSS	-110	70.4	62.2	62.2	1	0.0109	0.0014
GKSS	-110	91.2	79.6	79.6	1	0.0109	0.0057
GKSS	-110	72.0	63.6	63.6	1	0.0109	0.0016
GKSS	-110	64.8	57.5	57.5	1	0.0109	0.0009
GKSS	-110	79.2	69.6	69.6	1	0.0109	0.0028
GKSS	-110	52.2	47.0	47.0	1	0.0109	0.0002
GKSS	-110	82.9	72.7	72.7	1	0.0109	0.0035
GKSS	-110	93.2	81.3	81.3	1	0.0109	0.0064
GKSS	-110	75.4	66.4	66.4	1	0.0109	0.0021
GKSS	-110	75.0	66.1	66.1	1	0.0109	0.0020
GKSS	-110	78.6	69.1	69.1	1	0.0109	0.0026
GKSS	-110	94.8	82.7	82.7	1	0.0109	0.0070
GKSS	-110	98.1	85.4	83.7	0	0.0000	0.0083
GKSS	-110	98.5	85.7	83.7	0	0.0000	0.0085
GKSS	-110	104.9	91.1	83.7	0	0.0000	0.0116
GKSS	-110	69.9	61.8	61.8	1	0.0109	0.0014
GKSS	-110	81.6	71.6	71.6	1	0.0109	0.0032
GKSS	-110	55.2	49.5	49.5	1	0.0109	0.0003
GKSS	-110	105.6	91.7	83.7	0	0.0000	0.0120
GKSS	-110	101.5	88.3	83.7	0	0.0000	0.0099
GKSS	-110	73.7	65.0	65.0	1	0.0109	0.0019
GKSS	-110	97.5	84.9	83.7	0	0.0000	0.0081
GKSS	-110	75.9	66.8	66.8	1	0.0109	0.0022
GKSS	-110	48.3	43.7	43.7	1	0.0109	0.0001
GKSS	-91	127.0	109.6	107.1	0	0.0000	0.0088
GKSS	-91	121.8	105.2	105.2	1	0.0115	0.0072
GKSS	-91	70.5	62.3	62.3	1	0.0115	0.0004
GKSS	-91	94.2	82.2	82.2	1	0.0115	0.0020
GKSS	-91	127.3	109.9	107.1	0	0.0000	0.0089
GKSS	-91	119.9	103.7	103.7	1	0.0115	0.0067
GKSS	-91	104.5	90.8	90.8	1	0.0115	0.0034
GKSS	-91	78.6	69.1	69.1	1	0.0115	0.0008
GKSS	-91	98.6	85.8	85.8	1	0.0115	0.0026
GKSS	-91	161.6	138.6	107.1	0	0.0000	0.0270
THA	-91	91.3	79.7	79.7	1	0.0115	0.0017
THA	-91	115.3	99.8	99.8	1	0.0115	0.0055
THA	-91	122.4	105.8	105.8	1	0.0115	0.0074
THA	-91	126.3	109.1	107.1	0	0.0000	0.0086
THA	-91	108.3	94.0	94.0	1	0.0115	0.0041
THA	-91	66.9	59.3	59.3	1	0.0115	0.0003
THA	-91	126.7	109.4	107.1	0	0.0000	0.0087
THA	-91	69.6	61.6	61.6	1	0.0115	0.0004
THA	-91	121.4	104.9	104.9	1	0.0115	0.0071
THA	-91	90.0	78.7	78.7	1	0.0115	0.0016
THA	-91	153.9	132.2	107.1	0	0.0000	0.0216
THA	-91	64.6	57.4	57.4	1	0.0115	0.0003
THA	-91	127.2	109.8	107.1	0	0.0000	0.0089
THA	-91	99.7	86.7	86.7	1	0.0115	0.0027
THA	-91	101.3	88.1	88.1	1	0.0115	0.0029
THA	-91	140.4	120.9	107.1	0	0.0000	0.0142
THA	-91	78.2	68.7	68.7	1	0.0115	0.0008
THA	-91	109.0	94.6	94.6	1	0.0115	0.0042
THA	-91	103.9	90.3	90.3	1	0.0115	0.0033
THA	-91	126.8	109.5	107.1	0	0.0000	0.0088
THA	-91	111.7	96.8	96.8	1	0.0115	0.0048
GKSS	-91	68.6	68.4	68.4	1	0.0115	0.0007
GKSS	-91	81.6	81.3	81.3	1	0.0115	0.0019
GKSS	-91	55.9	55.8	55.8	1	0.0115	0.0002
GKSS	-91	98.8	98.5	98.5	1	0.0115	0.0052
GKSS	-91	71.9	71.7	71.7	1	0.0115	0.0010
GKSS	-91	111.0	110.7	107.1	0	0.0000	0.0092
GKSS	-91	93.5	93.2	93.2	1	0.0115	0.0039
GKSS	-91	79.9	79.7	79.7	1	0.0115	0.0017
GKSS	-91	98.4	98.1	98.1	1	0.0115	0.0051
GKSS	-91	101.1	100.8	100.8	1	0.0115	0.0058
TWI	-91	79.6	79.4	79.4	1	0.0115	0.0017
TWI	-91	99.7	99.3	99.3	1	0.0115	0.0054
TWI	-91	108.1	107.7	107.1	0	0.0000	0.0081
TWI	-91	93.4	93.1	93.1	1	0.0115	0.0039
TWI	-91	62.0	61.8	61.8	1	0.0115	0.0004
TWI	-91	107.1	106.7	106.7	1	0.0115	0.0077
TWI	-91	145.3	144.8	107.1	0	0.0000	0.0331
TWI	-91	76.3	76.0	76.0	1	0.0115	0.0013
TWI	-91	126.5	126.1	107.1	0	0.0000	0.0173
TWI	-91	126.1	125.7	107.1	0	0.0000	0.0170
TWI	-91	128.5	128.0	107.1	0	0.0000	0.0186
TWI	-91	111.4	111.0	107.1	0	0.0000	0.0094
TWI	-91	130.4	130.0	107.1	0	0.0000	0.0200
TWI	-91	134.8	134.3	107.1	0	0.0000	0.0234
TWI	-91	157.3	156.7	107.1	0	0.0000	0.0478
TWI	-91	105.2	104.9	104.9	1	0.0115	0.0071

TWI	-91	109.8	109.4	107.1	0	0.0000	0.0087
TWI	-91	84.9	84.6	84.6	1	0.0115	0.0024
TWI	-91	62.8	62.7	62.7	1	0.0115	0.0005
TWI	-91	97.5	97.2	97.2	1	0.0115	0.0049
TWI	-91	80.2	79.9	79.9	1	0.0115	0.0018
TWI	-91	134.4	133.9	107.1	0	0.0000	0.0230
TWI	-91	65.1	65.0	65.0	1	0.0115	0.0006
TWI	-91	118.6	118.2	107.1	0	0.0000	0.0127
GKSS	-91	67.3	76.1	76.1	1	0.0115	0.0014
GKSS	-91	162.9	189.3	107.1	0	0.0000	0.1123
GKSS	-91	100.0	114.7	107.1	0	0.0000	0.0110
GKSS	-91	91.2	104.3	104.3	1	0.0115	0.0069
GKSS	-91	106.2	122.1	107.1	0	0.0000	0.0149
GKSS	-91	83.2	94.9	94.9	1	0.0115	0.0043
GKSS	-91	91.8	105.0	105.0	1	0.0115	0.0071
GKSS	-91	94.7	108.5	107.1	0	0.0000	0.0084
GKSS	-91	92.9	106.4	106.4	1	0.0115	0.0076
GKSS	-91	69.9	79.2	79.2	1	0.0115	0.0017
NE	-91	93.1	106.6	106.6	1	0.0115	0.0077
NE	-91	97.9	112.2	107.1	0	0.0000	0.0099
NE	-91	73.7	83.7	83.7	1	0.0115	0.0022
NE	-91	82.0	93.4	93.4	1	0.0115	0.0040
NE	-91	76.3	86.7	86.7	1	0.0115	0.0027
NE	-91	93.1	106.6	106.6	1	0.0115	0.0077
NE	-91	83.7	95.5	95.5	1	0.0115	0.0044
NE	-91	82.1	93.6	93.6	1	0.0115	0.0040
NE	-91	86.8	99.2	99.2	1	0.0115	0.0054
NE	-91	86.7	99.0	99.0	1	0.0115	0.0053
NE	-91	92.3	105.7	105.7	1	0.0115	0.0074
NE	-91	83.1	94.8	94.8	1	0.0115	0.0043
NE	-91	88.9	101.6	101.6	1	0.0115	0.0061
NE	-91	64.3	72.5	72.5	1	0.0115	0.0010
NE	-91	101.6	116.7	107.1	0	0.0000	0.0120
NE	-91	94.2	107.9	107.1	0	0.0000	0.0082
NE	-91	78.7	89.5	89.5	1	0.0115	0.0032
NE	-91	73.0	82.8	82.8	1	0.0115	0.0021
NE	-91	64.2	72.3	72.3	1	0.0115	0.0010
NE	-91	98.9	113.5	107.1	0	0.0000	0.0104
GKSS	-91	103.2	137.2	107.1	0	0.0000	0.0258
GKSS	-91	84.4	110.7	107.1	0	0.0000	0.0092
GKSS	-91	97.0	128.5	107.1	0	0.0000	0.0189
GKSS	-91	92.7	122.4	107.1	0	0.0000	0.0150
GKSS	-91	96.8	128.2	107.1	0	0.0000	0.0187
NE	-91	73.6	95.5	95.5	1	0.0115	0.0044
NE	-91	73.0	94.7	94.7	1	0.0115	0.0043
NE	-91	73.3	95.1	95.1	1	0.0115	0.0044
NE	-91	53.8	67.7	67.7	1	0.0115	0.0007
NE	-91	69.5	89.7	89.7	1	0.0115	0.0032
NE	-91	65.5	84.0	84.0	1	0.0115	0.0023
NE	-91	79.6	104.0	104.0	1	0.0115	0.0068
NE	-91	69.8	90.1	90.1	1	0.0115	0.0033
NE	-91	90.3	119.0	107.1	0	0.0000	0.0131
NE	-91	88.0	115.8	107.1	0	0.0000	0.0115
GKSS	-60	205.5	175.4	168.9	0	0.0000	0.0098
GKSS	-60	114.4	99.1	99.1	1	0.0121	0.0007
GKSS	-60	130.7	112.7	112.7	1	0.0121	0.0012
GKSS	-60	106.7	92.6	92.6	1	0.0121	0.0005
GKSS	-60	161.0	138.1	138.1	1	0.0121	0.0033
GKSS	-60	200.7	171.3	168.9	0	0.0000	0.0088
GKSS	-60	125.2	108.1	108.1	1	0.0121	0.0010
GKSS	-60	145.1	124.8	124.8	1	0.0121	0.0020
GKSS	-60	91.9	80.2	80.2	1	0.0121	0.0002
GKSS	-60	128.1	110.6	110.6	1	0.0121	0.0011
GKSS	-60	164.4	140.9	140.9	1	0.0121	0.0036
GKSS	-60	192.2	164.3	164.3	1	0.0121	0.0073
GKSS	-60	166.3	142.5	142.5	1	0.0121	0.0038
GKSS	-60	177.7	152.1	152.1	1	0.0121	0.0051
GKSS	-60	167.6	143.6	143.6	1	0.0121	0.0039
GKSS	-60	128.6	110.9	110.9	1	0.0121	0.0012
GKSS	-60	203.0	173.3	168.9	0	0.0000	0.0093
GKSS	-60	98.4	85.7	85.7	1	0.0121	0.0003
GKSS	-60	203.3	173.5	168.9	0	0.0000	0.0094
GKSS	-60	202.6	173.0	168.9	0	0.0000	0.0092
GKSS	-60	201.7	172.1	168.9	0	0.0000	0.0090
GKSS	-60	171.9	147.2	147.2	1	0.0121	0.0044
GKSS	-60	136.8	117.8	117.8	1	0.0121	0.0015
GKSS	-60	135.8	117.0	117.0	1	0.0121	0.0015
GKSS	-60	200.8	171.4	168.9	0	0.0000	0.0089
GKSS	-60	202.8	173.1	168.9	0	0.0000	0.0093
GKSS	-60	202.0	172.5	168.9	0	0.0000	0.0091
GKSS	-60	116.0	100.4	100.4	1	0.0121	0.0007
GKSS	-60	202.0	172.5	168.9	0	0.0000	0.0091
GKSS	-60	167.6	143.6	143.6	1	0.0121	0.0039
GKSS	-60	89.8	78.5	78.5	1	0.0121	0.0002
GKSS	-60	156.3	134.1	134.1	1	0.0121	0.0029
GKSS	-60	186.8	159.7	159.7	1	0.0121	0.0064
GKSS	-60	203.2	173.4	168.9	0	0.0000	0.0093
GKSS	-60	164.6	141.1	141.1	1	0.0121	0.0036

GKSS	-60	202.6	173.0	168.9	0	0.0000	0.0092
GKSS	-60	185.9	159.0	159.0	1	0.0121	0.0063
GKSS	-60	127.7	110.2	110.2	1	0.0121	0.0011
GKSS	-60	201.2	171.7	168.9	0	0.0000	0.0089
GKSS	-60	115.6	100.0	100.0	1	0.0121	0.0007
GKSS	-60	107.5	93.3	93.3	1	0.0121	0.0005
SIEMENS	-60	164.6	141.1	141.1	1	0.0121	0.0036
SIEMENS	-60	172.0	147.3	147.3	1	0.0121	0.0044
SIEMENS	-60	108.5	94.2	94.2	1	0.0121	0.0005
SIEMENS	-60	119.0	102.9	102.9	1	0.0121	0.0008
SIEMENS	-60	153.5	131.8	131.8	1	0.0121	0.0026
SIEMENS	-60	158.9	136.4	136.4	1	0.0121	0.0031
SIEMENS	-60	137.5	118.4	118.4	1	0.0121	0.0016
SIEMENS	-60	119.5	103.3	103.3	1	0.0121	0.0008
SIEMENS	-60	130.7	112.8	112.8	1	0.0121	0.0012
SIEMENS	-60	172.6	147.8	147.8	1	0.0121	0.0045
SIEMENS	-60	84.5	74.0	74.0	1	0.0121	0.0001
SIEMENS	-60	213.4	182.0	168.9	0	0.0000	0.0116
SIEMENS	-60	120.4	104.1	104.1	1	0.0121	0.0008
SIEMENS	-60	104.5	90.8	90.8	1	0.0121	0.0004
SIEMENS	-60	163.6	140.2	140.2	1	0.0121	0.0035
SIEMENS	-60	201.4	172.0	168.9	0	0.0000	0.0090
SIEMENS	-60	137.8	118.7	118.7	1	0.0121	0.0016
SIEMENS	-60	173.0	148.1	148.1	1	0.0121	0.0045
SIEMENS	-60	99.2	86.4	86.4	1	0.0121	0.0003
SIEMENS	-60	173.4	148.4	148.4	1	0.0121	0.0046
SIEMENS	-60	131.5	113.4	113.4	1	0.0121	0.0013
GKSS	-60	186.0	185.3	168.9	0	0.0000	0.0126
GKSS	-60	151.8	151.3	151.3	1	0.0121	0.0050
GKSS	-60	111.7	111.3	111.3	1	0.0121	0.0012
GKSS	-60	143.9	143.4	143.4	1	0.0121	0.0039
GKSS	-60	105.4	105.1	105.1	1	0.0121	0.0009
GKSS	-60	154.0	153.4	153.4	1	0.0121	0.0053
GKSS	-60	176.2	175.6	168.9	0	0.0000	0.0099
GKSS	-60	131.9	131.5	131.5	1	0.0121	0.0026
GKSS	-60	203.9	203.2	168.9	0	0.0000	0.0190
GKSS	-60	142.7	142.2	142.2	1	0.0121	0.0038
TWI	-60	134.5	134.0	134.0	1	0.0121	0.0028
TWI	-60	130.1	129.7	129.7	1	0.0121	0.0024
TWI	-60	142.6	142.1	142.1	1	0.0121	0.0037
TWI	-60	119.7	119.3	119.3	1	0.0121	0.0016
TWI	-60	141.3	140.8	140.8	1	0.0121	0.0036
TWI	-60	175.9	175.3	168.9	0	0.0000	0.0098
TWI	-60	119.6	119.2	119.2	1	0.0121	0.0016
TWI	-60	102.4	102.0	102.0	1	0.0121	0.0008
TWI	-60	99.0	98.7	98.7	1	0.0121	0.0006
TWI	-60	115.1	114.7	114.7	1	0.0121	0.0014
TWI	-60	172.9	172.3	168.9	0	0.0000	0.0091
TWI	-60	120.5	120.2	120.2	1	0.0121	0.0017
TWI	-60	165.2	164.6	164.6	1	0.0121	0.0074
TWI	-60	125.6	125.2	125.2	1	0.0121	0.0021
TWI	-60	126.7	126.3	126.3	1	0.0121	0.0022
TWI	-60	100.4	100.1	100.1	1	0.0121	0.0007
TWI	-60	131.1	130.7	130.7	1	0.0121	0.0025
TWI	-60	185.1	184.5	168.9	0	0.0000	0.0123
TWI	-60	163.6	163.0	163.0	1	0.0121	0.0070
TWI	-60	126.5	126.1	126.1	1	0.0121	0.0021
TWI	-60	164.7	164.1	164.1	1	0.0121	0.0073
TWI	-60	192.7	192.0	168.9	0	0.0000	0.0147
TWI	-60	134.5	134.1	134.1	1	0.0121	0.0029
TWI	-60	140.8	140.3	140.3	1	0.0121	0.0035
GKSS	-60	295.3	346.1	168.9	0	0.0000	0.1906
GKSS	-60	217.7	254.2	168.9	0	0.0000	0.0507
GKSS	-60	219.8	256.6	168.9	0	0.0000	0.0528
GKSS	-60	165.9	192.8	168.9	0	0.0000	0.0150
GKSS	-60	109.9	126.5	126.5	1	0.0121	0.0022
GKSS	-60	131.9	152.5	152.5	1	0.0121	0.0052
GKSS	-60	136.2	157.6	157.6	1	0.0121	0.0060
GKSS	-60	154.0	178.8	168.9	0	0.0000	0.0107
GKSS	-60	115.9	133.6	133.6	1	0.0121	0.0028
GKSS	-60	150.4	174.4	168.9	0	0.0000	0.0096
THA	-60	153.6	178.2	168.9	0	0.0000	0.0106
THA	-60	183.8	214.0	168.9	0	0.0000	0.0239
THA	-60	236.1	275.9	168.9	0	0.0000	0.0723
THA	-60	149.4	173.3	168.9	0	0.0000	0.0093
THA	-60	179.5	209.0	168.9	0	0.0000	0.0215
THA	-60	177.6	206.7	168.9	0	0.0000	0.0205
THA	-60	188.3	219.4	168.9	0	0.0000	0.0266
THA	-60	134.5	155.6	155.6	1	0.0121	0.0057
THA	-60	243.6	284.9	168.9	0	0.0000	0.0829
THA	-60	155.7	180.8	168.9	0	0.0000	0.0113
THA	-60	164.0	190.6	168.9	0	0.0000	0.0143
THA	-60	146.5	169.8	168.9	0	0.0000	0.0085
THA	-60	119.9	138.4	138.4	1	0.0121	0.0033
THA	-60	79.9	91.0	91.0	1	0.0121	0.0004
THA	-60	140.9	163.2	163.2	1	0.0121	0.0071
THA	-60	115.3	132.9	132.9	1	0.0121	0.0027
THA	-60	137.0	158.6	158.6	1	0.0121	0.0062

THA	-60	166.9	194.0	168.9	0	0.0000	0.0155
THA	-60	225.4	263.3	168.9	0	0.0000	0.0590
THA	-60	200.7	234.1	168.9	0	0.0000	0.0354
BAM	-40	171.0	146.5	146.5	1	0.0000	0.0000
BAM	-40	206.2	176.0	176.0	1	0.0000	0.0000
BAM	-40	169.4	145.1	145.1	1	0.0000	0.0000
BAM	-40	203.6	173.7	173.7	1	0.0000	0.0000
BAM	-40	202.5	172.9	172.9	1	0.0000	0.0000
BAM	-40	207.2	176.8	176.8	1	0.0000	0.0000
BAM	-40	205.9	175.7	175.7	1	0.0000	0.0000
BAM	-40	206.5	176.2	176.2	1	0.0000	0.0000
BAM	-40	207.3	176.9	176.9	1	0.0000	0.0000
BAM	-40	205.1	175.1	175.1	1	0.0000	0.0000
BAM	-40	202.8	173.1	173.1	1	0.0000	0.0000
BAM	-40	204.9	174.8	174.8	1	0.0000	0.0000
BAM	-40	205.2	175.1	175.1	1	0.0000	0.0000
BAM	-40	113.7	98.5	98.5	1	0.0000	0.0000
BAM	-40	204.8	174.8	174.8	1	0.0000	0.0000
BAM	-40	154.2	132.4	132.4	1	0.0000	0.0000
BAM	-40	206.2	176.0	176.0	1	0.0000	0.0000
BAM	-40	204.2	174.3	174.3	1	0.0000	0.0000
BAM	-40	207.3	176.9	176.9	1	0.0000	0.0000
BAM	-40	202.5	172.8	172.8	1	0.0000	0.0000
GKSS	-40	180.6	154.6	154.6	1	0.0000	0.0000
GKSS	-40	203.5	173.7	173.7	1	0.0000	0.0000
GKSS	-40	198.2	169.3	169.3	1	0.0000	0.0000
GKSS	-40	199.6	170.5	170.5	1	0.0000	0.0000
GKSS	-40	186.4	159.4	159.4	1	0.0000	0.0000
GKSS	-40	199.4	170.3	170.3	1	0.0000	0.0000
GKSS	-40	204.4	174.4	174.4	1	0.0000	0.0000
GKSS	-40	202.4	172.7	172.7	1	0.0000	0.0000
GKSS	-40	203.2	173.4	173.4	1	0.0000	0.0000
GKSS	-40	200.9	171.5	171.5	1	0.0000	0.0000
BAM	-40	187.3	186.6	186.6	1	0.0000	0.0000
BAM	-40	101.5	101.2	101.2	1	0.0000	0.0000
BAM	-40	140.3	139.9	139.9	1	0.0000	0.0000
BAM	-40	150.2	149.7	149.7	1	0.0000	0.0000
BAM	-40	187.3	186.6	186.6	1	0.0000	0.0000
BAM	-40	211.4	210.6	210.6	1	0.0000	0.0000
BAM	-40	160.5	160.0	160.0	1	0.0000	0.0000
BAM	-40	214.6	213.8	213.8	1	0.0000	0.0000
BAM	-40	188.3	187.7	187.7	1	0.0000	0.0000
BAM	-40	239.3	238.4	233.1	0	0.0000	0.0000
BAM	-40	112.8	112.4	112.4	1	0.0000	0.0000
BAM	-40	239.0	238.1	233.1	0	0.0000	0.0000
BAM	-40	284.9	283.9	233.1	0	0.0000	0.0000
BAM	-40	254.7	253.7	233.1	0	0.0000	0.0000
BAM	-40	270.9	269.9	233.1	0	0.0000	0.0000
BAM	-40	187.0	186.3	186.3	1	0.0000	0.0000
BAM	-40	170.1	169.5	169.5	1	0.0000	0.0000
BAM	-40	256.4	255.5	233.1	0	0.0000	0.0000
BAM	-40	171.4	170.8	170.8	1	0.0000	0.0000
BAM	-40	103.1	102.8	102.8	1	0.0000	0.0000
BAM	-40	230.0	229.1	229.1	1	0.0000	0.0000
BAM	-40	210.0	209.2	209.2	1	0.0000	0.0000
GKSS	-40	198.2	197.5	197.5	1	0.0000	0.0000
GKSS	-40	150.2	149.7	149.7	1	0.0000	0.0000
GKSS	-40	226.8	226.0	226.0	1	0.0000	0.0000
GKSS	-40	158.1	157.5	157.5	1	0.0000	0.0000
GKSS	-40	256.4	255.5	233.1	0	0.0000	0.0000
GKSS	-40	207.6	206.9	206.9	1	0.0000	0.0000
GKSS	-40	213.5	212.8	212.8	1	0.0000	0.0000
GKSS	-40	254.6	253.7	233.1	0	0.0000	0.0000
GKSS	-40	240.0	239.1	233.1	0	0.0000	0.0000
GKSS	-40	279.0	278.0	233.1	0	0.0000	0.0000
GKSS	-40	125.9	145.5	145.5	1	0.0000	0.0000
GKSS	-40	128.9	149.0	149.0	1	0.0000	0.0000
GKSS	-40	198.5	231.5	231.5	1	0.0000	0.0000
GKSS	-40	212.0	247.5	233.1	0	0.0000	0.0000
GKSS	-40	138.6	160.5	160.5	1	0.0000	0.0000
GKSS	-40	187.7	218.7	218.7	1	0.0000	0.0000
GKSS	-40	173.0	201.2	201.2	1	0.0000	0.0000
GKSS	-40	179.5	208.9	208.9	1	0.0000	0.0000
GKSS	-40	152.6	177.1	177.1	1	0.0000	0.0000
GKSS	-40	153.6	178.3	178.3	1	0.0000	0.0000
THA	-40	144.6	167.6	167.6	1	0.0000	0.0000
THA	-40	150.7	174.9	174.9	1	0.0000	0.0000
THA	-40	139.1	161.0	161.0	1	0.0000	0.0000
THA	-40	183.6	213.8	213.8	1	0.0000	0.0000
THA	-40	142.0	164.5	164.5	1	0.0000	0.0000
THA	-40	187.2	218.0	218.0	1	0.0000	0.0000
THA	-40	172.2	200.3	200.3	1	0.0000	0.0000
THA	-40	198.0	230.8	230.8	1	0.0000	0.0000
THA	-40	130.4	150.8	150.8	1	0.0000	0.0000
THA	-40	141.7	164.1	164.1	1	0.0000	0.0000
THA	-40	134.5	155.6	155.6	1	0.0000	0.0000
THA	-40	115.5	133.1	133.1	1	0.0000	0.0000
THA	-40	91.7	104.9	104.9	1	0.0000	0.0000

THA	-40	141.1	163.4	163.4	1	0.0000	0.0000
THA	-40	239.1	279.6	233.1	0	0.0000	0.0000
THA	-40	243.4	284.7	233.1	0	0.0000	0.0000
THA	-40	191.9	223.6	223.6	1	0.0000	0.0000
THA	-40	146.8	170.2	170.2	1	0.0000	0.0000
THA	-40	161.4	187.5	187.5	1	0.0000	0.0000
THA	-40	142.3	164.8	164.8	1	0.0000	0.0000
CISE	-20	128.7	111.1	111.1	1	0.0000	0.0000
CISE	-20	146.9	126.3	126.3	1	0.0000	0.0000
CISE	-20	204.3	174.4	174.4	1	0.0000	0.0000
CISE	-20	198.3	169.3	169.3	1	0.0000	0.0000
CISE	-20	195.0	166.6	166.6	1	0.0000	0.0000
CISE	-20	197.8	168.9	168.9	1	0.0000	0.0000
CISE	-20	195.6	167.1	167.1	1	0.0000	0.0000
CISE	-20	196.2	167.6	167.6	1	0.0000	0.0000
CISE	-20	194.0	165.7	165.7	1	0.0000	0.0000
CISE	-20	198.3	169.3	169.3	1	0.0000	0.0000
CISE	-20	201.2	171.8	171.8	1	0.0000	0.0000
CISE	-20	200.9	171.5	171.5	1	0.0000	0.0000
CISE	-20	195.6	167.1	167.1	1	0.0000	0.0000
CISE	-20	197.6	168.8	168.8	1	0.0000	0.0000
CISE	-20	201.9	172.4	172.4	1	0.0000	0.0000
CISE	-20	202.5	172.8	172.8	1	0.0000	0.0000
CISE	-20	198.1	169.2	169.2	1	0.0000	0.0000
CISE	-20	198.1	169.2	169.2	1	0.0000	0.0000
CISE	-20	200.7	171.3	171.3	1	0.0000	0.0000
CISE	-20	199.8	170.6	170.6	1	0.0000	0.0000
CISE	-20	201.5	172.0	172.0	1	0.0000	0.0000
GKSS	-20	200.6	171.2	171.2	1	0.0000	0.0000
GKSS	-20	200.6	171.2	171.2	1	0.0000	0.0000
GKSS	-20	199.8	170.6	170.6	1	0.0000	0.0000
GKSS	-20	198.2	169.2	169.2	1	0.0000	0.0000
GKSS	-20	199.3	170.2	170.2	1	0.0000	0.0000
GKSS	-20	196.6	167.9	167.9	1	0.0000	0.0000
GKSS	-20	198.6	169.6	169.6	1	0.0000	0.0000
GKSS	-20	200.7	171.3	171.3	1	0.0000	0.0000
GKSS	-20	195.0	166.6	166.6	1	0.0000	0.0000
GKSS	-20	198.6	169.6	169.6	1	0.0000	0.0000
GKSS	-20	202.5	201.7	201.7	1	0.0000	0.0000
GKSS	-20	194.7	194.1	194.1	1	0.0000	0.0000
GKSS	-20	262.8	261.8	261.8	1	0.0000	0.0000
GKSS	-20	187.9	187.2	187.2	1	0.0000	0.0000
GKSS	-20	275.8	274.8	274.8	1	0.0000	0.0000
GKSS	-20	261.8	260.9	260.9	1	0.0000	0.0000
GKSS	-20	283.2	282.2	282.2	1	0.0000	0.0000
GKSS	-20	283.1	282.0	282.0	1	0.0000	0.0000
GKSS	-20	284.0	283.0	283.0	1	0.0000	0.0000
GKSS	-20	284.2	283.1	283.1	1	0.0000	0.0000
VTT	-20	284.0	282.9	282.9	1	0.0000	0.0000
VTT	-20	231.9	231.0	231.0	1	0.0000	0.0000
VTT	-20	279.4	278.3	278.3	1	0.0000	0.0000
VTT	-20	280.3	279.2	279.2	1	0.0000	0.0000
VTT	-20	279.4	278.3	278.3	1	0.0000	0.0000
VTT	-20	278.6	277.5	277.5	1	0.0000	0.0000
VTT	-20	281.9	280.9	280.9	1	0.0000	0.0000
VTT	-20	279.4	278.3	278.3	1	0.0000	0.0000
VTT	-20	282.5	281.4	281.4	1	0.0000	0.0000
VTT	-20	247.2	246.3	246.3	1	0.0000	0.0000
VTT	-20	233.2	232.4	232.4	1	0.0000	0.0000
VTT	-20	283.2	282.2	282.2	1	0.0000	0.0000
VTT	-20	288.9	287.8	287.8	1	0.0000	0.0000
VTT	-20	263.2	262.3	262.3	1	0.0000	0.0000
VTT	-20	184.4	183.8	183.8	1	0.0000	0.0000
VTT	-20	283.7	282.7	282.7	1	0.0000	0.0000
VTT	-20	280.8	279.8	279.8	1	0.0000	0.0000
VTT	-20	280.9	279.8	279.8	1	0.0000	0.0000
VTT	-20	280.9	279.8	279.8	1	0.0000	0.0000
VTT	-20	170.9	170.3	170.3	1	0.0000	0.0000
VTT	-20	282.9	281.9	281.9	1	0.0000	0.0000
VTT	-20	275.7	274.6	274.6	1	0.0000	0.0000
VTT	-20	228.2	227.4	227.4	1	0.0000	0.0000
VTT	-20	282.0	281.0	281.0	1	0.0000	0.0000
VTT	-20	280.9	279.8	279.8	1	0.0000	0.0000
VTT	-20	281.8	280.7	280.7	1	0.0000	0.0000
VTT	-20	281.4	280.4	280.4	1	0.0000	0.0000
VTT	-20	227.3	226.5	226.5	1	0.0000	0.0000
VTT	-20	201.3	200.6	200.6	1	0.0000	0.0000
VTT	-20	212.5	211.7	211.7	1	0.0000	0.0000
VTT	-20	256.5	255.5	255.5	1	0.0000	0.0000
VTT	-20	284.8	283.8	283.8	1	0.0000	0.0000
VTT	-20	282.3	281.3	281.3	1	0.0000	0.0000
VTT	-20	269.6	268.6	268.6	1	0.0000	0.0000
VTT	-20	184.4	183.8	183.8	1	0.0000	0.0000
VTT	-20	241.6	240.7	240.7	1	0.0000	0.0000
VTT	-20	146.4	145.9	145.9	1	0.0000	0.0000
VTT	-20	280.0	279.0	279.0	1	0.0000	0.0000
VTT	-20	156.7	156.2	156.2	1	0.0000	0.0000
VTT	-20	277.0	276.0	276.0	1	0.0000	0.0000

3. Revised Master Curve fit to data

Temperature adj. = 1.0 °C (est.) Stand. dev. on T_0 = 0.7 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-154	54.8	49.1				
-154	49.8	44.9				
-154	37.8	34.9				
-154	33.0	30.9				
-154	38.9	35.8				
-154	24.2	23.6				
-154	47.4	43.0				
-154	46.5	42.2				
-154	31.4	29.6				
-154	39.2	36.0				
-154	24.2	23.6				
-154	33.0	30.9				
-154	41.0	37.6				
-154	31.7	29.8				
-154	35.2	32.7				
-154	44.4	40.5				
-154	41.5	38.0				
-154	32.7	30.7				
-154	34.3	32.0				
-154	36.7	34.0				
-154	39.7	36.5				
-154	46.1	41.8				
-154	34.6	32.2				
-154	35.8	33.2				
-154	29.3	27.8				
-154	28.6	27.2				
-154	38.6	35.6				
-154	44.4	40.5				
-154	48.9	44.2				
-154	38.9	35.8				
-154	36.7	34.0				
-154	31.7	29.8				
-154	41.5	41.4				
-154	42.2	42.2				
-154	50.0	49.9				
-154	34.0	33.9				
-154	41.7	41.7				
-154	46.1	46.0				
-154	44.2	44.1				
-154	36.7	36.6				
-154	29.0	28.9				
-154	53.0	52.9				
-154	39.4	39.3				
-154	29.0	28.9				
-154	34.6	34.5				
-154	33.0	33.0				
-154	38.1	38.0				
-154	28.6	28.6				
-154	28.6	28.6				
-154	38.6	38.5				
-154	36.4	36.3				
-154	33.4	33.3				
-154	36.9	36.9				
-154	31.1	31.0				
-154	34.3	34.2				
-154	30.4	30.4				
-154	49.6	49.5				
-154	41.0	40.9				
-154	34.0	33.9				
-154	30.7	30.7				
-154	41.2	41.2				
-154	26.7	26.7				
-154	35.5	35.4				
-154	33.4	33.3				
-154	36.7	36.6				
-154	32.4	32.4				
-154	45.1	45.0				
-154	33.4	33.3				
-154	34.0	33.9				
-154	30.7	30.7				
-154	26.7	26.7				
-154	33.7	36.2				
-154	42.7	46.9				
-154	37.2	40.4				
-154	54.4	60.8				
-154	34.6	37.3				
-154	44.2	48.7				
-154	29.7	31.5				
-154	36.4	39.4				
-154	36.4	39.4				
-154	28.2	29.8				

-154	28.2	29.8
-154	30.0	31.9
-154	36.4	39.4
-154	37.5	40.7
-154	30.0	31.9
-154	30.7	32.7
-154	30.4	32.3
-154	30.7	32.7
-154	31.7	33.9
-154	41.7	45.8
-154	37.2	40.4
-154	34.9	37.6
-154	38.3	41.7
-154	31.4	33.5
-154	33.7	36.2
-154	32.7	35.1
-154	43.0	47.2
-154	32.7	35.1
-154	30.0	31.9
-154	36.9	40.1
-154	33.4	35.8
-154	30.0	31.9
-110	98.1	85.4
-110	59.0	52.7
-110	80.0	70.3
-110	57.2	51.2
-110	88.3	77.2
-110	96.2	83.9
-110	81.6	71.6
-110	66.9	59.3
-110	85.6	75.0
-110	86.8	76.0
-110	114.2	98.9
-110	73.5	64.8
-110	92.7	80.9
-110	77.5	68.2
-110	61.5	54.7
-110	51.8	46.7
-110	73.6	64.9
-110	52.8	47.5
-110	41.2	37.8
-110	115.3	99.8
-110	73.2	64.5
-110	74.0	65.3
-110	67.5	59.8
-110	71.0	62.7
-110	53.4	48.0
-110	96.5	84.0
-110	71.3	63.0
-110	71.7	63.3
-110	81.7	71.7
-110	64.0	56.8
-110	74.2	65.4
-110	70.4	62.2
-110	91.2	79.6
-110	72.0	63.6
-110	64.8	57.5
-110	79.2	69.6
-110	52.2	47.0
-110	82.9	72.7
-110	93.2	81.3
-110	75.4	66.4
-110	75.0	66.1
-110	78.6	69.1
-110	94.8	82.7
-110	98.1	85.4
-110	98.5	85.7
-110	104.9	91.1
-110	69.9	61.8
-110	81.6	71.6
-110	55.2	49.5
-110	105.6	91.7
-110	101.5	88.3
-110	73.7	65.0
-110	97.5	84.9
-110	75.9	66.8
-110	48.3	43.7
-91	127.0	109.6
-91	121.8	105.2
-91	70.5	62.3
-91	94.2	82.2
-91	127.3	109.9
-91	119.9	103.7
-91	104.5	90.8
-91	78.6	69.1
-91	98.6	85.8
-91	161.6	138.6
-91	91.3	79.7

-91	115.3	99.8
-91	122.4	105.8
-91	126.3	109.1
-91	108.3	94.0
-91	66.9	59.3
-91	126.7	109.4
-91	69.6	61.6
-91	121.4	104.9
-91	90.0	78.7
-91	153.9	132.2
-91	64.6	57.4
-91	127.2	109.8
-91	99.7	86.7
-91	101.3	88.1
-91	140.4	120.9
-91	78.2	68.7
-91	109.0	94.6
-91	103.9	90.3
-91	126.8	109.5
-91	111.7	96.8
-91	68.6	68.4
-91	81.6	81.3
-91	55.9	55.8
-91	98.8	98.5
-91	71.9	71.7
-91	111.0	110.7
-91	93.5	93.2
-91	79.9	79.7
-91	98.4	98.1
-91	101.1	100.8
-91	79.6	79.4
-91	99.7	99.3
-91	108.1	107.7
-91	93.4	93.1
-91	62.0	61.8
-91	107.1	106.7
-91	145.3	144.8
-91	76.3	76.0
-91	126.5	126.1
-91	126.1	125.7
-91	128.5	128.0
-91	111.4	111.0
-91	130.4	130.0
-91	134.8	134.3
-91	157.3	156.7
-91	105.2	104.9
-91	109.8	109.4
-91	84.9	84.6
-91	62.8	62.7
-91	97.5	97.2
-91	80.2	79.9
-91	134.4	133.9
-91	65.1	65.0
-91	118.6	118.2
-91	67.3	76.1
-91	162.9	189.3
-91	100.0	114.7
-91	91.2	104.3
-91	106.2	122.1
-91	83.2	94.9
-91	91.8	105.0
-91	94.7	108.5
-91	92.9	106.4
-91	69.9	79.2
-91	93.1	106.6
-91	97.9	112.2
-91	73.7	83.7
-91	82.0	93.4
-91	76.3	86.7
-91	93.1	106.6
-91	83.7	95.5
-91	82.1	93.6
-91	86.8	99.2
-91	86.7	99.0
-91	92.3	105.7
-91	83.1	94.8
-91	88.9	101.6
-91	64.3	72.5
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-91	98.9	113.5
-91	103.2	137.2
-91	84.4	110.7
-91	97.0	128.5
-91	92.7	122.4

-91	96.8	128.2
-91	73.6	95.5
-91	73.0	94.7
-91	73.3	95.1
-91	53.8	67.7
-91	69.5	89.7
-91	65.5	84.0
-91	79.6	104.0
-91	69.8	90.1
-91	90.3	119.0
-91	88.0	115.8
-60	234.1	199.3
-60	114.4	99.1
-60	130.7	112.7
-60	106.7	92.6
-60	161.0	138.1
-60	200.7	171.3
-60	125.2	108.1
-60	145.1	124.8
-60	91.9	80.2
-60	128.1	110.6
-60	164.4	140.9
-60	192.2	164.3
-60	166.3	142.5
-60	177.7	152.1
-60	167.6	143.6
-60	128.6	110.9
-60	377.4	319.3
-60	98.4	85.7
-60	278.4	236.4
-60	240.7	204.9
-60	380.0	321.5
-60	171.9	147.2
-60	136.8	117.8
-60	135.8	117.0
-60	214.7	183.1
-60	299.5	254.1
-60	203.7	173.9
-60	116.0	100.4
-60	221.9	189.1
-60	167.6	143.6
-60	89.8	78.5
-60	156.3	134.1
-60	186.8	159.7
-60	213.5	182.1
-60	164.6	141.1
-60	280.1	237.9
-60	185.9	159.0
-60	127.7	110.2
-60	205.0	175.0
-60	115.6	100.0
-60	107.5	93.3
-60	164.6	141.1
-60	172.0	147.3
-60	108.5	94.2
-60	119.0	102.9
-60	153.5	131.8
-60	158.9	136.4
-60	137.5	118.4
-60	119.5	103.3
-60	130.7	112.8
-60	172.6	147.8
-60	84.5	74.0
-60	244.6	208.1
-60	120.4	104.1
-60	104.5	90.8
-60	163.6	140.2
-60	201.4	172.0
-60	137.8	118.7
-60	173.0	148.1
-60	99.2	86.4
-60	173.4	148.4
-60	131.5	113.4
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-60	151.8	151.3
-60	111.7	111.3
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-60	105.4	105.1
-60	154.0	153.4
-60	176.2	175.6
-60	131.9	131.5
-60	203.9	203.2
-60	142.7	142.2
-60	134.5	134.0
-60	130.1	129.7
-60	142.6	142.1
-60	119.7	119.3
-60	141.3	140.8

-60	175.9	175.3
-60	119.6	119.2
-60	102.4	102.0
-60	99.0	98.7
-60	115.1	114.7
-60	172.9	172.3
-60	120.5	120.2
-60	165.2	164.6
-60	125.6	125.2
-60	126.7	126.3
-60	100.4	100.1
-60	131.1	130.7
-60	185.1	184.5
-60	163.6	163.0
-60	126.5	126.1
-60	164.7	164.1
-60	192.7	192.0
-60	134.5	134.1
-60	140.8	140.3
-60	295.3	346.1
-60	217.7	254.2
-60	219.8	256.6
-60	165.9	192.8
-60	109.9	126.5
-60	131.9	152.5
-60	136.2	157.6
-60	154.0	178.8
-60	115.9	133.6
-60	150.4	174.4
-60	153.6	178.2
-60	183.8	214.0
-60	236.1	275.9
-60	149.4	173.3
-60	179.5	209.0
-60	177.6	206.7
-60	188.3	219.4
-60	134.5	155.6
-60	243.6	284.9
-60	155.7	180.8
-60	164.0	190.6
-60	146.5	169.8
-60	119.9	138.4
-60	79.9	91.0
-60	140.9	163.2
-60	115.3	132.9
-60	137.0	158.6
-60	166.9	194.0
-60	225.4	263.3
-60	200.7	234.1
-40	171.0	146.5
-40	569.4	480.2
-40	169.4	145.1
-40	548.7	462.8
-40	529.9	447.1
-40	318.5	270.1
-40	574.8	484.7
-40	360.8	305.4
-40	343.8	291.2
-40	235.8	200.8
-40	529.9	447.1
-40	496.5	419.1
-40	600.0	505.8
-40	113.7	98.5
-40	229.6	195.5
-40	154.2	132.4
-40	221.3	188.6
-40	486.7	410.9
-40	243.8	207.4
-40	202.5	172.8
-40	180.6	154.6
-40	206.7	176.4
-40	240.7	204.9
-40	270.8	230.1
-40	186.4	159.4
-40	255.8	217.5
-40	231.2	196.9
-40	339.4	287.5
-40	403.1	340.9
-40	399.2	337.6
-40	187.3	186.6
-40	101.5	101.2
-40	140.3	139.9
-40	150.2	149.7
-40	187.3	186.6
-40	211.4	210.6
-40	160.5	160.0
-40	214.6	213.8
-40	188.3	187.7

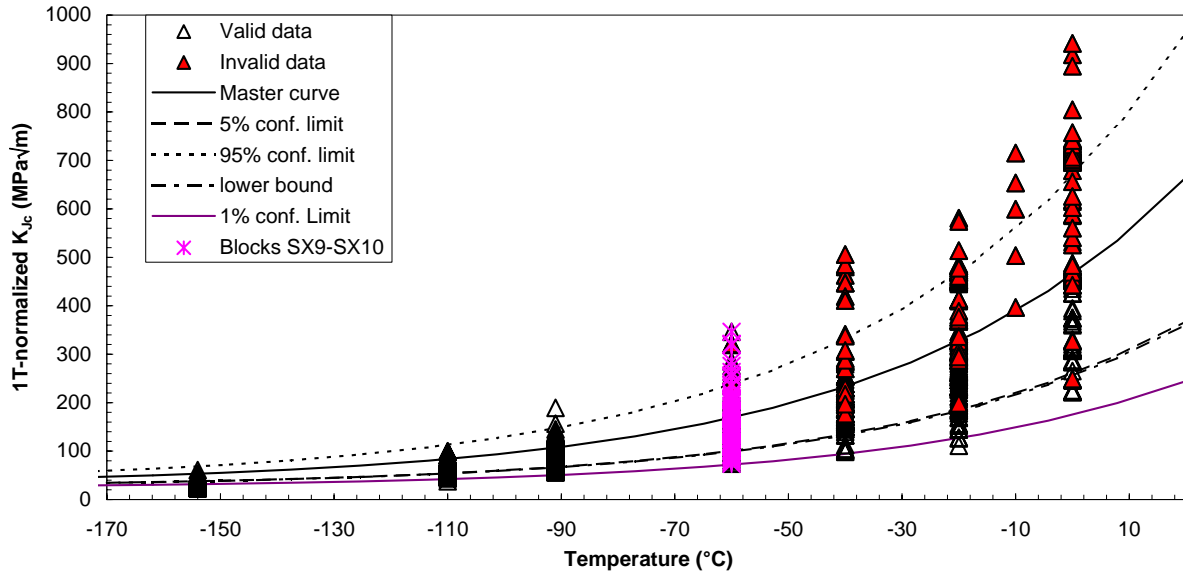
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-40	171.4	170.8
-40	103.1	102.8
-40	230.0	229.1
-40	210.0	209.2
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-40	150.2	149.7
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-40	207.6	206.9
-40	213.5	212.8
-40	254.6	253.7
-40	240.0	239.1
-40	309.2	308.0
-40	125.9	145.5
-40	128.9	149.0
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-40	212.0	247.5
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-40	152.6	177.1
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-40	144.6	167.6
-40	150.7	174.9
-40	139.1	161.0
-40	183.6	213.8
-40	142.0	164.5
-40	187.2	218.0
-40	172.2	200.3
-40	198.0	230.8
-40	130.4	150.8
-40	141.7	164.1
-40	134.5	155.6
-40	115.5	133.1
-40	91.7	104.9
-40	141.1	163.4
-40	239.1	279.6
-40	243.4	284.7
-40	191.9	223.6
-40	146.8	170.2
-40	161.4	187.5
-40	142.3	164.8
-20	128.7	111.1
-20	146.9	126.3
-20	402.8	340.6
-20	409.4	346.2
-20	530.5	447.6
-20	532.2	449.0
-20	534.6	451.0
-20	536.1	452.3
-20	536.1	452.3
-20	536.6	452.7
-20	538.6	454.3
-20	540.5	455.9
-20	543.8	458.7
-20	549.2	463.2
-20	553.7	467.0
-20	556.1	469.0
-20	556.3	469.2
-20	560.6	472.8
-20	565.8	477.2
-20	570.1	480.8
-20	571.1	481.6
-20	233.1	198.5
-20	389.8	329.8
-20	487.9	411.9
-20	438.3	370.4
-20	571.4	481.8
-20	560.7	472.9
-20	561.1	473.2
-20	575.1	484.9
-20	557.5	470.2
-20	572.5	482.7
-20	202.5	201.7
-20	194.7	194.1
-20	262.8	261.8
-20	187.9	187.2

-20	275.8	274.8
-20	261.8	260.9
-20	371.0	369.7
-20	369.1	367.7
-20	462.1	460.4
-20	319.7	318.5
-20	583.1	580.9
-20	231.9	231.0
-20	382.0	380.6
-20	295.9	294.8
-20	576.4	574.2
-20	411.7	410.1
-20	306.4	305.2
-20	324.7	323.5
-20	282.5	281.4
-20	247.2	246.3
-20	233.2	232.4
-20	317.5	316.3
-20	515.6	513.7
-20	263.2	262.3
-20	184.4	183.8
-20	286.9	285.9
-20	341.4	340.1
-20	415.0	413.4
-20	327.9	326.7
-20	170.9	170.3
-20	308.8	307.6
-20	376.5	375.1
-20	228.2	227.4
-20	371.7	370.3
-20	291.6	290.6
-20	337.7	336.4
-20	390.5	389.0
-20	227.3	226.5
-20	201.3	200.6
-20	212.5	211.7
-20	288.4	287.3
-20	479.1	477.3
-20	377.9	376.5
-20	269.6	268.6
-20	184.4	183.8
-20	241.6	240.7
-20	146.4	145.9
-20	299.4	298.3
-20	156.7	156.2
-20	295.6	294.5
-20	167.4	194.6
-20	153.5	178.1
-20	211.2	246.5
-20	220.3	257.3
-20	227.9	266.2
-20	211.1	246.4
-20	217.1	253.4
-20	145.3	168.5
-20	161.2	187.2
-20	131.9	152.5
-20	216.4	252.6
-20	125.0	144.4
-20	378.7	444.9
-20	246.1	287.9
-20	250.9	293.5
-20	251.5	294.3
-20	284.0	332.7
-20	261.1	305.6
-20	351.6	412.8
-20	258.5	302.5
-20	201.3	234.8
-20	110.9	127.7
-20	197.7	230.5
-20	198.9	231.9
-20	200.6	234.0
-20	165.7	192.6
-20	280.1	328.0
-20	279.5	327.3
-20	257.6	301.4
-20	265.2	310.4
-20	156.7	212.6
-20	221.7	304.1
-20	193.9	264.9
-20	191.7	261.9
-20	184.4	251.6
-20	186.7	254.8
-20	184.4	251.6
-20	193.9	264.9
-20	204.4	279.8
-20	224.0	307.4
-20	153.4	207.9
-20	222.6	305.4

-20	162.0	220.0
-20	187.8	256.4
-20	198.2	271.0
-10	656.0	653.4
-10	397.8	396.3
-10	718.1	715.3
-10	601.6	599.3
-10	505.3	503.4
0	541.9	457.1
0	547.0	461.4
0	538.7	454.4
0	540.0	455.5
0	544.8	459.6
0	534.8	451.2
0	557.2	469.9
0	545.0	459.7
0	546.1	460.6
0	549.2	463.2
0	565.1	476.5
0	571.6	482.0
0	553.4	466.8
0	293.2	248.8
0	544.1	459.0
0	552.2	465.7
0	558.0	470.6
0	553.5	466.8
0	557.6	470.3
0	552.4	466.0
0	555.6	468.6
0	558.2	470.8
0	550.6	464.4
0	560.8	473.0
0	569.6	480.4
0	552.5	466.0
0	578.5	487.7
0	556.0	468.9
0	543.8	458.7
0	556.3	469.2
0	327.6	326.4
0	681.4	678.8
0	700.8	698.2
0	698.2	695.5
0	708.4	705.7
0	701.5	698.8
0	724.9	722.1
0	717.4	714.6
0	705.8	703.0
0	709.5	706.8
0	716.7	714.0
0	714.1	711.3
0	658.5	656.0
0	747.5	744.6
0	709.0	706.2
0	719.2	716.4
0	444.5	442.8
0	699.8	697.1
0	704.0	701.3
0	729.5	726.7
0	714.0	711.3
0	725.6	722.8
0	730.2	727.4
0	737.8	734.9
0	590.7	588.4
0	730.3	727.5
0	741.8	738.9
0	744.2	741.3
0	527.7	525.7
0	620.4	618.0
0	727.0	724.2
0	730.3	727.5
0	542.6	540.5
0	726.7	723.9
0	718.7	716.0
0	717.1	714.4
0	721.2	718.5
0	725.3	722.5
0	727.9	725.1
0	727.0	724.2
0	718.5	715.7
0	191.3	222.9
0	269.2	315.2
0	281.2	329.4
0	242.5	283.5
0	318.3	373.3
0	476.2	560.4
0	511.7	602.5
0	621.3	732.2
0	531.3	625.6

0	266.6	312.1				
0	599.3	706.2				
0	362.9	426.1				
0	331.8	389.3				
0	227.1	265.3				
0	309.5	362.9				
0	628.6	740.9				
0	210.9	246.1				
0	410.7	482.8				
0	211.4	246.7				
0	778.3	918.2				
0	263.4	308.3				
0	682.2	804.4				
0	386.7	454.3				
0	376.2	441.9				
0	642.5	757.3				
0	306.7	359.6				
0	758.4	894.6				
0	797.9	941.4				
0	246.4	288.2				
0	320.1	375.4				
0	233.3	320.4				
0	238.2	327.4				
0	208.3	285.2				
0	421.7	585.8				
0	226.7	311.2				
0	267.0	367.9				
0	163.0	221.4				
0	165.8	225.4				
0	285.9	394.6				
0	342.0	473.5				
0	314.9	435.4				
0	307.6	425.1				
0	383.0	531.4				
0	332.6	460.4				
0	223.6	306.8				
0	442.2	614.7				
-174			45.9	34.0	57.8	33.8
-161.875			50.0	36.2	63.9	36.0
-149.75			55.2	39.0	71.4	38.8
-137.625			61.8	42.6	81.0	42.2
-125.5			70.0	47.0	93.0	46.6
-113.375			80.4	52.6	108.1	52.1
-101.25			93.4	59.6	127.2	59.0
-89.125			109.8	68.5	151.2	67.7
-77			130.5	79.7	181.4	78.6
-64.875			156.6	93.8	219.4	92.4
-52.75			189.4	111.5	267.3	109.8
-40.625			230.7	133.8	327.6	131.6
-28.5			282.6	161.8	403.5	159.1
-16.375			348.1	197.2	499.0	193.8
-4.25			430.5	241.7	619.3	237.4
7.875			534.3	297.7	770.8	292.4
20			664.9	368.2	961.6	361.5

MASTER CURVE WITH CONFIDENCE LIMITS - SINTAP lower tail analysis
EURO toughness dataset - Complete dataset



SINTAP - Structural Integrity Assessment Procedures for European Industry
Lower Tail Analysis Procedure

Step 3: Minimum value estimation

1. Calculation of the maximum value of T_o (based on a single data point) and establishment of T_o for the data set

Specimen code	T (°C)	$K_{Jc[exp]}$ (MPa√m)	K_{Jc-1T} (MPa√m)	K_{CENS} (MPa√m)	δ_i	$T_{o(i)}$ (°C)
GKSS	-154	54.8	49.1	53.3	1	-219.9
GKSS	-154	49.8	44.9	53.3	1	-215.0
GKSS	-154	37.8	34.9	53.3	1	-201.0
GKSS	-154	33.0	30.9	53.3	1	-194.2
GKSS	-154	38.9	35.8	53.3	1	-202.4
GKSS	-154	24.2	23.6	53.3	1	-178.8
GKSS	-154	47.4	43.0	53.3	1	-212.5
GKSS	-154	46.5	42.2	53.3	1	-211.5
GKSS	-154	31.4	29.6	53.3	1	-191.7
GKSS	-154	39.2	36.0	53.3	1	-202.8
GKSS	-154	24.2	23.6	53.3	1	-178.8
SIEMENS	-154	33.0	30.9	53.3	1	-194.2
SIEMENS	-154	41.0	37.6	53.3	1	-205.1
SIEMENS	-154	31.7	29.8	53.3	1	-192.2
SIEMENS	-154	35.2	32.7	53.3	1	-197.4
SIEMENS	-154	44.4	40.5	53.3	1	-209.2
SIEMENS	-154	41.5	38.0	53.3	1	-205.7
SIEMENS	-154	32.7	30.7	53.3	1	-193.8
SIEMENS	-154	34.3	32.0	53.3	1	-196.1
SIEMENS	-154	36.7	34.0	53.3	1	-199.5
SIEMENS	-154	39.7	36.5	53.3	1	-203.5
SIEMENS	-154	46.1	41.8	53.3	1	-211.0
SIEMENS	-154	34.6	32.2	53.3	1	-196.6
SIEMENS	-154	35.8	33.2	53.3	1	-198.3
SIEMENS	-154	29.3	27.8	53.3	1	-188.3
SIEMENS	-154	28.6	27.2	53.3	1	-187.0
SIEMENS	-154	38.6	35.6	53.3	1	-202.1
SIEMENS	-154	44.4	40.5	53.3	1	-209.2
SIEMENS	-154	48.9	44.2	53.3	1	-214.1
SIEMENS	-154	38.9	35.8	53.3	1	-202.4
SIEMENS	-154	36.7	34.0	53.3	1	-199.5
SIEMENS	-154	31.7	29.8	53.3	1	-192.2
GKSS	-154	41.5	41.4	53.3	1	-210.5
GKSS	-154	42.2	42.2	53.3	1	-211.5
GKSS	-154	50.0	49.9	53.3	1	-220.7
GKSS	-154	34.0	33.9	53.3	1	-199.4
GKSS	-154	41.7	41.7	53.3	1	-210.8
GKSS	-154	46.1	46.0	53.3	1	-216.2
GKSS	-154	44.2	44.1	53.3	1	-214.0
GKSS	-154	36.7	36.6	53.3	1	-203.6
GKSS	-154	29.0	28.9	53.3	1	-190.5
GKSS	-154	53.0	52.9	53.3	1	-223.9
GKSS	-154	39.4	39.3	53.3	1	-207.7
GKSS	-154	29.0	28.9	53.3	1	-190.5
SIEMENS	-154	34.6	34.5	53.3	1	-200.4
SIEMENS	-154	33.0	33.0	53.3	1	-197.9
SIEMENS	-154	38.1	38.0	53.3	1	-205.7
SIEMENS	-154	28.6	28.6	53.3	1	-189.8
SIEMENS	-154	28.6	28.6	53.3	1	-189.8
SIEMENS	-154	38.6	38.5	53.3	1	-206.5
SIEMENS	-154	36.4	36.3	53.3	1	-203.2
SIEMENS	-154	33.4	33.3	53.3	1	-198.4
SIEMENS	-154	36.9	36.9	53.3	1	-204.1
SIEMENS	-154	31.1	31.0	53.3	1	-194.4
SIEMENS	-154	34.3	34.2	53.3	1	-199.9
SIEMENS	-154	30.4	30.4	53.3	1	-193.2
SIEMENS	-154	49.6	49.5	53.3	1	-220.2
SIEMENS	-154	41.0	40.9	53.3	1	-209.8
SIEMENS	-154	34.0	33.9	53.3	1	-199.4
SIEMENS	-154	30.7	30.7	53.3	1	-193.8
SIEMENS	-154	41.2	41.2	53.3	1	-210.2
SIEMENS	-154	26.7	26.7	53.3	1	-185.9
SIEMENS	-154	35.5	35.4	53.3	1	-201.9
SIEMENS	-154	33.4	33.3	53.3	1	-198.4
SIEMENS	-154	36.7	36.6	53.3	1	-203.6
SIEMENS	-154	32.4	32.4	53.3	1	-196.8
SIEMENS	-154	45.1	45.0	53.3	1	-215.1
SIEMENS	-154	33.4	33.3	53.3	1	-198.4
SIEMENS	-154	34.0	33.9	53.3	1	-199.4
SIEMENS	-154	30.7	30.7	53.3	1	-193.8
SIEMENS	-154	26.7	26.7	53.3	1	-185.9
GKSS	-154	33.7	36.2	53.3	1	-203.0
GKSS	-154	42.7	46.9	53.3	1	-217.4

Max value $T_{o(max)} = -130$ °C

$T_{o(max)} - 8$ °C > $T_{o(step 2)}$: **NO**
→ DATA IS HOMOGENEOUS

T_o for the data set: $T_o = -96.1$ °C

GKSS	-154	37.2	40.4	53.3	1	-209.1
GKSS	-154	54.4	60.8	53.3	0	-
GKSS	-154	34.6	37.3	53.3	1	-204.7
GKSS	-154	44.2	48.7	53.3	1	-219.4
GKSS	-154	29.7	31.5	53.3	1	-195.3
GKSS	-154	36.4	39.4	53.3	1	-207.7
GKSS	-154	36.4	39.4	53.3	1	-207.7
GKSS	-154	28.2	29.8	53.3	1	-192.1
GKSS	-154	28.2	29.8	53.3	1	-192.1
NE	-154	30.0	31.9	53.3	1	-196.0
NE	-154	36.4	39.4	53.3	1	-207.7
NE	-154	37.5	40.7	53.3	1	-209.6
NE	-154	30.0	31.9	53.3	1	-196.0
NE	-154	30.7	32.7	53.3	1	-197.4
NE	-154	30.4	32.3	53.3	1	-196.7
NE	-154	30.7	32.7	53.3	1	-197.4
NE	-154	31.7	33.9	53.3	1	-199.4
NE	-154	41.7	45.8	53.3	1	-216.0
NE	-154	37.2	40.4	53.3	1	-209.1
NE	-154	34.9	37.6	53.3	1	-205.2
NE	-154	38.3	41.7	53.3	1	-210.9
NE	-154	31.4	33.5	53.3	1	-198.8
NE	-154	33.7	36.2	53.3	1	-203.0
NE	-154	32.7	35.1	53.3	1	-201.3
NE	-154	43.0	47.2	53.3	1	-217.7
NE	-154	32.7	35.1	53.3	1	-201.3
NE	-154	30.0	31.9	53.3	1	-196.0
NE	-154	36.9	40.1	53.3	1	-208.7
NE	-154	33.4	35.8	53.3	1	-202.5
NE	-154	30.0	31.9	53.3	1	-196.0
GKSS	-110	98.1	85.4	83.7	0	-
GKSS	-110	59.0	52.7	83.7	1	-179.7
GKSS	-110	80.0	70.3	83.7	1	-195.4
GKSS	-110	57.2	51.2	83.7	1	-178.1
GKSS	-110	88.3	77.2	83.7	1	-200.4
GKSS	-110	96.2	83.9	83.7	0	-
GKSS	-110	81.6	71.6	83.7	1	-196.4
GKSS	-110	66.9	59.3	83.7	1	-186.1
GKSS	-110	85.6	75.0	83.7	1	-198.9
GKSS	-110	86.8	76.0	83.7	1	-199.6
GKSS	-110	114.2	98.9	83.7	0	-
GKSS	-110	73.5	64.8	83.7	1	-191.0
GKSS	-110	92.7	80.9	83.7	1	-203.0
GKSS	-110	77.5	68.2	83.7	1	-193.7
GKSS	-110	61.5	54.7	83.7	1	-181.8
GKSS	-110	51.8	46.7	83.7	1	-173.1
GKSS	-110	73.6	64.9	83.7	1	-191.1
GKSS	-110	52.8	47.5	83.7	1	-174.1
GKSS	-110	41.2	37.8	83.7	1	-161.4
GKSS	-110	115.3	99.8	83.7	0	-
GKSS	-110	73.2	64.5	83.7	1	-190.8
GKSS	-110	74.0	65.3	83.7	1	-191.4
GKSS	-110	67.5	59.8	83.7	1	-186.6
GKSS	-110	71.0	62.7	83.7	1	-189.2
GKSS	-110	53.4	48.0	83.7	1	-174.6
GKSS	-110	96.5	84.0	83.7	0	-
GKSS	-110	71.3	63.0	83.7	1	-189.4
GKSS	-110	71.7	63.3	83.7	1	-189.7
GKSS	-110	81.7	71.7	83.7	1	-196.5
GKSS	-110	64.0	56.8	83.7	1	-183.9
GKSS	-110	74.2	65.4	83.7	1	-191.5
GKSS	-110	70.4	62.2	83.7	1	-188.8
GKSS	-110	91.2	79.6	83.7	1	-202.1
GKSS	-110	72.0	63.6	83.7	1	-189.9
GKSS	-110	64.8	57.5	83.7	1	-184.5
GKSS	-110	79.2	69.6	83.7	1	-194.9
GKSS	-110	52.2	47.0	83.7	1	-173.5
GKSS	-110	82.9	72.7	83.7	1	-197.2
GKSS	-110	93.2	81.3	83.7	1	-203.3
GKSS	-110	75.4	66.4	83.7	1	-192.3
GKSS	-110	75.0	66.1	83.7	1	-192.0
GKSS	-110	78.6	69.1	83.7	1	-194.4
GKSS	-110	94.8	82.7	83.7	1	-204.1
GKSS	-110	98.1	85.4	83.7	0	-
GKSS	-110	98.5	85.7	83.7	0	-
GKSS	-110	104.9	91.1	83.7	0	-
GKSS	-110	69.9	61.8	83.7	1	-188.4
GKSS	-110	81.6	71.6	83.7	1	-196.4
GKSS	-110	55.2	49.5	83.7	1	-176.3
GKSS	-110	105.6	91.7	83.7	0	-
GKSS	-110	101.5	88.3	83.7	0	-
GKSS	-110	73.7	65.0	83.7	1	-191.2
GKSS	-110	97.5	84.9	83.7	0	-
GKSS	-110	75.9	66.8	83.7	1	-192.6
GKSS	-110	48.3	43.7	83.7	1	-169.4

GKSS	-91	127.0	109.6	107.1	0	-
GKSS	-91	121.8	105.2	107.1	1	-198.1
GKSS	-91	70.5	62.3	107.1	1	-169.9
GKSS	-91	94.2	82.2	107.1	1	-184.8
GKSS	-91	127.3	109.9	107.1	0	-
GKSS	-91	119.9	103.7	107.1	1	-197.3
GKSS	-91	104.5	90.8	107.1	1	-190.2
GKSS	-91	78.6	69.1	107.1	1	-175.4
GKSS	-91	98.6	85.8	107.1	1	-187.2
GKSS	-91	161.6	138.6	107.1	0	-
THA	-91	91.3	79.7	107.1	1	-183.2
THA	-91	115.3	99.8	107.1	1	-195.3
THA	-91	122.4	105.8	107.1	1	-198.4
THA	-91	126.3	109.1	107.1	0	-
THA	-91	108.3	94.0	107.1	1	-192.1
THA	-91	66.9	59.3	107.1	1	-167.1
THA	-91	126.7	109.4	107.1	0	-
THA	-91	69.6	61.6	107.1	1	-169.2
THA	-91	121.4	104.9	107.1	1	-198.0
THA	-91	90.0	78.7	107.1	1	-182.5
THA	-91	153.9	132.2	107.1	0	-
THA	-91	64.6	57.4	107.1	1	-165.4
THA	-91	127.2	109.8	107.1	0	-
THA	-91	99.7	86.7	107.1	1	-187.7
THA	-91	101.3	88.1	107.1	1	-188.6
THA	-91	140.4	120.9	107.1	0	-
THA	-91	78.2	68.7	107.1	1	-175.2
THA	-91	109.0	94.6	107.1	1	-192.4
THA	-91	103.9	90.3	107.1	1	-189.9
THA	-91	126.8	109.5	107.1	0	-
THA	-91	111.7	96.8	107.1	1	-193.6
GKSS	-91	68.6	68.4	107.1	1	-174.9
GKSS	-91	81.6	81.3	107.1	1	-184.3
GKSS	-91	55.9	55.8	107.1	1	-163.8
GKSS	-91	98.8	98.5	107.1	1	-194.6
GKSS	-91	71.9	71.7	107.1	1	-177.4
GKSS	-91	111.0	110.7	107.1	0	-
GKSS	-91	93.5	93.2	107.1	1	-191.6
GKSS	-91	79.9	79.7	107.1	1	-183.1
GKSS	-91	98.4	98.1	107.1	1	-194.3
GKSS	-91	101.1	100.8	107.1	1	-195.8
TWI	-91	79.6	79.4	107.1	1	-183.0
TWI	-91	99.7	99.3	107.1	1	-195.0
TWI	-91	108.1	107.7	107.1	0	-
TWI	-91	93.4	93.1	107.1	1	-191.5
TWI	-91	62.0	61.8	107.1	1	-169.4
TWI	-91	107.1	106.7	107.1	1	-198.9
TWI	-91	145.3	144.8	107.1	0	-
TWI	-91	76.3	76.0	107.1	1	-180.6
TWI	-91	126.5	126.1	107.1	0	-
TWI	-91	126.1	125.7	107.1	0	-
TWI	-91	128.5	128.0	107.1	0	-
TWI	-91	111.4	111.0	107.1	0	-
TWI	-91	130.4	130.0	107.1	0	-
TWI	-91	134.8	134.3	107.1	0	-
TWI	-91	157.3	156.7	107.1	0	-
TWI	-91	105.2	104.9	107.1	1	-197.9
TWI	-91	109.8	109.4	107.1	0	-
TWI	-91	84.9	84.6	107.1	1	-186.4
TWI	-91	62.8	62.7	107.1	1	-170.2
TWI	-91	97.5	97.2	107.1	1	-193.9
TWI	-91	80.2	79.9	107.1	1	-183.3
TWI	-91	134.4	133.9	107.1	0	-
TWI	-91	65.1	65.0	107.1	1	-172.1
TWI	-91	118.6	118.2	107.1	0	-
GKSS	-91	67.3	76.1	107.1	1	-180.7
GKSS	-91	162.9	189.3	107.1	0	-
GKSS	-91	100.0	114.7	107.1	0	-
GKSS	-91	91.2	104.3	107.1	1	-197.6
GKSS	-91	106.2	122.1	107.1	0	-
GKSS	-91	83.2	94.9	107.1	1	-192.6
GKSS	-91	91.8	105.0	107.1	1	-198.0
GKSS	-91	94.7	108.5	107.1	0	-
GKSS	-91	92.9	106.4	107.1	1	-198.7
GKSS	-91	69.9	79.2	107.1	1	-182.8
NE	-91	93.1	106.6	107.1	1	-198.8
NE	-91	97.9	112.2	107.1	0	-
NE	-91	73.7	83.7	107.1	1	-185.8
NE	-91	82.0	93.4	107.1	1	-191.7
NE	-91	76.3	86.7	107.1	1	-187.7
NE	-91	93.1	106.6	107.1	1	-198.8
NE	-91	83.7	95.5	107.1	1	-192.9
NE	-91	82.1	93.6	107.1	1	-191.8
NE	-91	86.8	99.2	107.1	1	-194.9
NE	-91	86.7	99.0	107.1	1	-194.8

NE	-91	92.3	105.7	107.1	1	-198.3
NE	-91	83.1	94.8	107.1	1	-192.5
NE	-91	88.9	101.6	107.1	1	-196.2
NE	-91	64.3	72.5	107.1	1	-178.1
NE	-91	101.6	116.7	107.1	0	-
NE	-91	94.2	107.9	107.1	0	-
NE	-91	78.7	89.5	107.1	1	-189.4
NE	-91	73.0	82.8	107.1	1	-185.2
NE	-91	64.2	72.3	107.1	1	-177.9
NE	-91	98.9	113.5	107.1	0	-
GKSS	-91	103.2	137.2	107.1	0	-
GKSS	-91	84.4	110.7	107.1	0	-
GKSS	-91	97.0	128.5	107.1	0	-
GKSS	-91	92.7	122.4	107.1	0	-
GKSS	-91	96.8	128.2	107.1	0	-
NE	-91	73.6	95.5	107.1	1	-192.9
NE	-91	73.0	94.7	107.1	1	-192.5
NE	-91	73.3	95.1	107.1	1	-192.7
NE	-91	53.8	67.7	107.1	1	-174.3
NE	-91	69.5	89.7	107.1	1	-189.6
NE	-91	65.5	84.0	107.1	1	-186.0
NE	-91	79.6	104.0	107.1	1	-197.5
NE	-91	69.8	90.1	107.1	1	-189.8
NE	-91	90.3	119.0	107.1	0	-
NE	-91	88.0	115.8	107.1	0	-
GKSS	-60	205.5	175.4	168.9	0	-
GKSS	-60	114.4	99.1	168.9	1	-163.9
GKSS	-60	130.7	112.7	168.9	1	-170.8
GKSS	-60	106.7	92.6	168.9	1	-160.3
GKSS	-60	161.0	138.1	168.9	1	-181.6
GKSS	-60	200.7	171.3	168.9	0	-
GKSS	-60	125.2	108.1	168.9	1	-168.5
GKSS	-60	145.1	124.8	168.9	1	-176.2
GKSS	-60	91.9	80.2	168.9	1	-152.5
GKSS	-60	128.1	110.6	168.9	1	-169.8
GKSS	-60	164.4	140.9	168.9	1	-182.7
GKSS	-60	192.2	164.3	168.9	1	-190.9
GKSS	-60	166.3	142.5	168.9	1	-183.3
GKSS	-60	177.7	152.1	168.9	1	-186.8
GKSS	-60	167.6	143.6	168.9	1	-183.7
GKSS	-60	128.6	110.9	168.9	1	-169.9
GKSS	-60	203.0	173.3	168.9	0	-
GKSS	-60	98.4	85.7	168.9	1	-156.1
GKSS	-60	203.3	173.5	168.9	0	-
GKSS	-60	202.6	173.0	168.9	0	-
GKSS	-60	201.7	172.1	168.9	0	-
GKSS	-60	171.9	147.2	168.9	1	-185.1
GKSS	-60	136.8	117.8	168.9	1	-173.2
GKSS	-60	135.8	117.0	168.9	1	-172.8
GKSS	-60	200.8	171.4	168.9	0	-
GKSS	-60	202.8	173.1	168.9	0	-
GKSS	-60	202.0	172.5	168.9	0	-
GKSS	-60	116.0	100.4	168.9	1	-164.6
GKSS	-60	202.0	172.5	168.9	0	-
GKSS	-60	167.6	143.6	168.9	1	-183.7
GKSS	-60	89.8	78.5	168.9	1	-151.3
GKSS	-60	156.3	134.1	168.9	1	-180.1
GKSS	-60	186.8	159.7	168.9	1	-189.4
GKSS	-60	203.2	173.4	168.9	0	-
GKSS	-60	164.6	141.1	168.9	1	-182.8
GKSS	-60	202.6	173.0	168.9	0	-
GKSS	-60	185.9	159.0	168.9	1	-189.2
GKSS	-60	127.7	110.2	168.9	1	-169.6
GKSS	-60	201.2	171.7	168.9	0	-
GKSS	-60	115.6	100.0	168.9	1	-164.4
GKSS	-60	107.5	93.3	168.9	1	-160.6
SIEMENS	-60	164.6	141.1	168.9	1	-182.8
SIEMENS	-60	172.0	147.3	168.9	1	-185.1
SIEMENS	-60	108.5	94.2	168.9	1	-161.1
SIEMENS	-60	119.0	102.9	168.9	1	-165.9
SIEMENS	-60	153.5	131.8	168.9	1	-179.2
SIEMENS	-60	158.9	136.4	168.9	1	-181.0
SIEMENS	-60	137.5	118.4	168.9	1	-173.4
SIEMENS	-60	119.5	103.3	168.9	1	-166.1
SIEMENS	-60	130.7	112.8	168.9	1	-170.8
SIEMENS	-60	172.6	147.8	168.9	1	-185.3
SIEMENS	-60	84.5	74.0	168.9	1	-148.2
SIEMENS	-60	213.4	182.0	168.9	0	-
SIEMENS	-60	120.4	104.1	168.9	1	-166.5
SIEMENS	-60	104.5	90.8	168.9	1	-159.2
SIEMENS	-60	163.6	140.2	168.9	1	-182.5
SIEMENS	-60	201.4	172.0	168.9	0	-
SIEMENS	-60	137.8	118.7	168.9	1	-173.5
SIEMENS	-60	173.0	148.1	168.9	1	-185.4
SIEMENS	-60	99.2	86.4	168.9	1	-156.5

SIEMENS	-60	173.4	148.4	168.9	1	-185.5
SIEMENS	-60	131.5	113.4	168.9	1	-171.1
GKSS	-60	186.0	185.3	168.9	0	-
GKSS	-60	151.8	151.3	168.9	1	-186.5
GKSS	-60	111.7	111.3	168.9	1	-170.1
GKSS	-60	143.9	143.4	168.9	1	-183.7
GKSS	-60	105.4	105.1	168.9	1	-167.0
GKSS	-60	154.0	153.4	168.9	1	-187.3
GKSS	-60	176.2	175.6	168.9	0	-
GKSS	-60	131.9	131.5	168.9	1	-179.0
GKSS	-60	203.9	203.2	168.9	0	-
GKSS	-60	142.7	142.2	168.9	1	-183.2
TWI	-60	134.5	134.0	168.9	1	-180.0
TWI	-60	130.1	129.7	168.9	1	-178.3
TWI	-60	142.6	142.1	168.9	1	-183.2
TWI	-60	119.7	119.3	168.9	1	-173.8
TWI	-60	141.3	140.8	168.9	1	-182.7
TWI	-60	175.9	175.3	168.9	0	-
TWI	-60	119.6	119.2	168.9	1	-173.8
TWI	-60	102.4	102.0	168.9	1	-165.5
TWI	-60	99.0	98.7	168.9	1	-163.7
TWI	-60	115.1	114.7	168.9	1	-171.7
TWI	-60	172.9	172.3	168.9	0	-
TWI	-60	120.5	120.2	168.9	1	-174.2
TWI	-60	165.2	164.6	168.9	1	-191.0
TWI	-60	125.6	125.2	168.9	1	-176.4
TWI	-60	126.7	126.3	168.9	1	-176.9
TWI	-60	100.4	100.1	168.9	1	-164.4
TWI	-60	131.1	130.7	168.9	1	-178.7
TWI	-60	185.1	184.5	168.9	0	-
TWI	-60	163.6	163.0	168.9	1	-190.5
TWI	-60	126.5	126.1	168.9	1	-176.8
TWI	-60	164.7	164.1	168.9	1	-190.8
TWI	-60	192.7	192.0	168.9	0	-
TWI	-60	134.5	134.1	168.9	1	-180.1
TWI	-60	140.8	140.3	168.9	1	-182.5
GKSS	-60	295.3	346.1	168.9	0	-
GKSS	-60	217.7	254.2	168.9	0	-
GKSS	-60	219.8	256.6	168.9	0	-
GKSS	-60	165.9	192.8	168.9	0	-
GKSS	-60	109.9	126.5	168.9	1	-177.0
GKSS	-60	131.9	152.5	168.9	1	-186.9
GKSS	-60	136.2	157.6	168.9	1	-188.7
GKSS	-60	154.0	178.8	168.9	0	-
GKSS	-60	115.9	133.6	168.9	1	-179.9
GKSS	-60	150.4	174.4	168.9	0	-
THA	-60	153.6	178.2	168.9	0	-
THA	-60	183.8	214.0	168.9	0	-
THA	-60	236.1	275.9	168.9	0	-
THA	-60	149.4	173.3	168.9	0	-
THA	-60	179.5	209.0	168.9	0	-
THA	-60	177.6	206.7	168.9	0	-
THA	-60	188.3	219.4	168.9	0	-
THA	-60	134.5	155.6	168.9	1	-188.0
THA	-60	243.6	284.9	168.9	0	-
THA	-60	155.7	180.8	168.9	0	-
THA	-60	164.0	190.6	168.9	0	-
THA	-60	146.5	169.8	168.9	0	-
THA	-60	119.9	138.4	168.9	1	-181.8
THA	-60	79.9	91.0	168.9	1	-159.3
THA	-60	140.9	163.2	168.9	1	-190.5
THA	-60	115.3	132.9	168.9	1	-179.6
THA	-60	137.0	158.6	168.9	1	-189.0
THA	-60	166.9	194.0	168.9	0	-
THA	-60	225.4	263.3	168.9	0	-
THA	-60	200.7	234.1	168.9	0	-
BAM	-40	171.0	146.5	233.1	1	-164.8
BAM	-40	206.2	176.0	233.1	1	-174.6
BAM	-40	169.4	145.1	233.1	1	-164.3
BAM	-40	203.6	173.7	233.1	1	-173.9
BAM	-40	202.5	172.9	233.1	1	-173.6
BAM	-40	207.2	176.8	233.1	1	-174.8
BAM	-40	205.9	175.7	233.1	1	-174.5
BAM	-40	206.5	176.2	233.1	1	-174.6
BAM	-40	207.3	176.9	233.1	1	-174.8
BAM	-40	205.1	175.1	233.1	1	-174.3
BAM	-40	202.8	173.1	233.1	1	-173.7
BAM	-40	204.9	174.8	233.1	1	-174.2
BAM	-40	205.2	175.1	233.1	1	-174.3
BAM	-40	113.7	98.5	233.1	1	-143.6
BAM	-40	204.8	174.8	233.1	1	-174.2
BAM	-40	154.2	132.4	233.1	1	-159.4
BAM	-40	206.2	176.0	233.1	1	-174.6
BAM	-40	204.2	174.3	233.1	1	-174.1
BAM	-40	207.3	176.9	233.1	1	-174.8

BAM	-40	202.5	172.8	233.1	1	-173.6
GKSS	-40	180.6	154.6	233.1	1	-167.7
GKSS	-40	203.5	173.7	233.1	1	-173.9
GKSS	-40	198.2	169.3	233.1	1	-172.5
GKSS	-40	199.6	170.5	233.1	1	-172.9
GKSS	-40	186.4	159.4	233.1	1	-169.3
GKSS	-40	199.4	170.3	233.1	1	-172.8
GKSS	-40	204.4	174.4	233.1	1	-174.1
GKSS	-40	202.4	172.7	233.1	1	-173.6
GKSS	-40	203.2	173.4	233.1	1	-173.8
GKSS	-40	200.9	171.5	233.1	1	-173.2
BAM	-40	187.3	186.6	233.1	1	-177.7
BAM	-40	101.5	101.2	233.1	1	-145.0
BAM	-40	140.3	139.9	233.1	1	-162.3
BAM	-40	150.2	149.7	233.1	1	-165.9
BAM	-40	187.3	186.6	233.1	1	-177.7
BAM	-40	211.4	210.6	233.1	1	-184.1
BAM	-40	160.5	160.0	233.1	1	-169.5
BAM	-40	214.6	213.8	233.1	1	-184.9
BAM	-40	188.3	187.7	233.1	1	-178.0
BAM	-40	239.3	238.4	233.1	0	-
BAM	-40	112.8	112.4	233.1	1	-150.7
BAM	-40	239.0	238.1	233.1	0	-
BAM	-40	284.9	283.9	233.1	0	-
BAM	-40	254.7	253.7	233.1	0	-
BAM	-40	270.9	269.9	233.1	0	-
BAM	-40	187.0	186.3	233.1	1	-177.6
BAM	-40	170.1	169.5	233.1	1	-172.6
BAM	-40	256.4	255.5	233.1	0	-
BAM	-40	171.4	170.8	233.1	1	-173.0
BAM	-40	103.1	102.8	233.1	1	-145.8
BAM	-40	230.0	229.1	233.1	1	-188.6
BAM	-40	210.0	209.2	233.1	1	-183.8
GKSS	-40	198.2	197.5	233.1	1	-180.7
GKSS	-40	150.2	149.7	233.1	1	-166.0
GKSS	-40	226.8	226.0	233.1	1	-187.9
GKSS	-40	158.1	157.5	233.1	1	-168.7
GKSS	-40	256.4	255.5	233.1	0	-
GKSS	-40	207.6	206.9	233.1	1	-183.2
GKSS	-40	213.5	212.8	233.1	1	-184.7
GKSS	-40	254.6	253.7	233.1	0	-
GKSS	-40	240.0	239.1	233.1	0	-
GKSS	-40	279.0	278.0	233.1	0	-
GKSS	-40	125.9	145.5	233.1	1	-164.4
GKSS	-40	128.9	149.0	233.1	1	-165.7
GKSS	-40	198.5	231.5	233.1	1	-189.1
GKSS	-40	212.0	247.5	233.1	0	-
GKSS	-40	138.6	160.5	233.1	1	-169.7
GKSS	-40	187.7	218.7	233.1	1	-186.1
GKSS	-40	173.0	201.2	233.1	1	-181.7
GKSS	-40	179.5	208.9	233.1	1	-183.7
GKSS	-40	152.6	177.1	233.1	1	-174.9
GKSS	-40	153.6	178.3	233.1	1	-175.3
THA	-40	144.6	167.6	233.1	1	-172.0
THA	-40	150.7	174.9	233.1	1	-174.2
THA	-40	139.1	161.0	233.1	1	-169.8
THA	-40	183.6	213.8	233.1	1	-184.9
THA	-40	142.0	164.5	233.1	1	-171.0
THA	-40	187.2	218.0	233.1	1	-186.0
THA	-40	172.2	200.3	233.1	1	-181.4
THA	-40	198.0	230.8	233.1	1	-189.0
THA	-40	130.4	150.8	233.1	1	-166.3
THA	-40	141.7	164.1	233.1	1	-170.9
THA	-40	134.5	155.6	233.1	1	-168.0
THA	-40	115.5	133.1	233.1	1	-159.7
THA	-40	91.7	104.9	233.1	1	-146.9
THA	-40	141.1	163.4	233.1	1	-170.6
THA	-40	239.1	279.6	233.1	0	-
THA	-40	243.4	284.7	233.1	0	-
THA	-40	191.9	223.6	233.1	1	-187.3
THA	-40	146.8	170.2	233.1	1	-172.8
THA	-40	161.4	187.5	233.1	1	-177.9
THA	-40	142.3	164.8	233.1	1	-171.1
CISE	-20	128.7	111.1	326.9	1	-130.0
CISE	-20	146.9	126.3	326.9	1	-136.9
CISE	-20	204.3	174.4	326.9	1	-154.1
CISE	-20	198.3	169.3	326.9	1	-152.5
CISE	-20	195.0	166.6	326.9	1	-151.6
CISE	-20	197.8	168.9	326.9	1	-152.4
CISE	-20	195.6	167.1	326.9	1	-151.8
CISE	-20	196.2	167.6	326.9	1	-152.0
CISE	-20	194.0	165.7	326.9	1	-151.4
CISE	-20	198.3	169.3	326.9	1	-152.5
CISE	-20	201.2	171.8	326.9	1	-153.3
CISE	-20	200.9	171.5	326.9	1	-153.2

CISE	-20	195.6	167.1	326.9	1	-151.8
CISE	-20	197.6	168.8	326.9	1	-152.3
CISE	-20	201.9	172.4	326.9	1	-153.5
CISE	-20	202.5	172.8	326.9	1	-153.6
CISE	-20	198.1	169.2	326.9	1	-152.5
CISE	-20	198.1	169.2	326.9	1	-152.5
CISE	-20	200.7	171.3	326.9	1	-153.1
CISE	-20	199.8	170.6	326.9	1	-152.9
CISE	-20	201.5	172.0	326.9	1	-153.4
GKSS	-20	200.6	171.2	326.9	1	-153.1
GKSS	-20	200.6	171.2	326.9	1	-153.1
GKSS	-20	199.8	170.6	326.9	1	-152.9
GKSS	-20	198.2	169.2	326.9	1	-152.5
GKSS	-20	199.3	170.2	326.9	1	-152.8
GKSS	-20	196.6	167.9	326.9	1	-152.1
GKSS	-20	198.6	169.6	326.9	1	-152.6
GKSS	-20	200.7	171.3	326.9	1	-153.1
GKSS	-20	195.0	166.6	326.9	1	-151.6
GKSS	-20	198.6	169.6	326.9	1	-152.6
GKSS	-20	202.5	201.7	326.9	1	-161.8
GKSS	-20	194.7	194.1	326.9	1	-159.8
GKSS	-20	262.8	261.8	326.9	1	-175.7
GKSS	-20	187.9	187.2	326.9	1	-157.9
GKSS	-20	275.8	274.8	326.9	1	-178.2
GKSS	-20	261.8	260.9	326.9	1	-175.5
GKSS	-20	283.2	282.2	326.9	1	-179.6
GKSS	-20	283.1	282.0	326.9	1	-179.6
GKSS	-20	284.0	283.0	326.9	1	-179.8
GKSS	-20	284.2	283.1	326.9	1	-179.8
VTT	-20	284.0	282.9	326.9	1	-179.8
VTT	-20	231.9	231.0	326.9	1	-169.0
VTT	-20	279.4	278.3	326.9	1	-178.9
VTT	-20	280.3	279.2	326.9	1	-179.1
VTT	-20	279.4	278.3	326.9	1	-178.9
VTT	-20	278.6	277.5	326.9	1	-178.8
VTT	-20	281.9	280.9	326.9	1	-179.4
VTT	-20	279.4	278.3	326.9	1	-178.9
VTT	-20	282.5	281.4	326.9	1	-179.5
VTT	-20	247.2	246.3	326.9	1	-172.4
VTT	-20	233.2	232.4	326.9	1	-169.3
VTT	-20	283.2	282.2	326.9	1	-179.6
VTT	-20	288.9	287.8	326.9	1	-180.7
VTT	-20	263.2	262.3	326.9	1	-175.8
VTT	-20	184.4	183.8	326.9	1	-156.9
VTT	-20	283.7	282.7	326.9	1	-179.7
VTT	-20	280.8	279.8	326.9	1	-179.2
VTT	-20	280.9	279.8	326.9	1	-179.2
VTT	-20	280.9	279.8	326.9	1	-179.2
VTT	-20	170.9	170.3	326.9	1	-152.8
VTT	-20	282.9	281.9	326.9	1	-179.6
VTT	-20	275.7	274.6	326.9	1	-178.2
VTT	-20	228.2	227.4	326.9	1	-168.2
VTT	-20	282.0	281.0	326.9	1	-179.4
VTT	-20	280.9	279.8	326.9	1	-179.2
VTT	-20	281.8	280.7	326.9	1	-179.4
VTT	-20	281.4	280.4	326.9	1	-179.3
VTT	-20	227.3	226.5	326.9	1	-168.0
VTT	-20	201.3	200.6	326.9	1	-161.5
VTT	-20	212.5	211.7	326.9	1	-164.4
VTT	-20	256.5	255.5	326.9	1	-174.4
VTT	-20	284.8	283.8	326.9	1	-179.9
VTT	-20	282.3	281.3	326.9	1	-179.5
VTT	-20	269.6	268.6	326.9	1	-177.0
VTT	-20	184.4	183.8	326.9	1	-156.9
VTT	-20	241.6	240.7	326.9	1	-171.2
VTT	-20	146.4	145.9	326.9	1	-144.6
VTT	-20	280.0	279.0	326.9	1	-179.0
VTT	-20	156.7	156.2	326.9	1	-148.2
VTT	-20	277.0	276.0	326.9	1	-178.5
CISE	-20	167.4	194.6	326.9	1	-159.9
CISE	-20	153.5	178.1	326.9	1	-155.2
CISE	-20	211.2	246.5	326.9	1	-172.5
CISE	-20	220.3	257.3	326.9	1	-174.7
CISE	-20	227.9	266.2	326.9	1	-176.6
CISE	-20	211.1	246.4	326.9	1	-172.5
CISE	-20	217.1	253.4	326.9	1	-173.9
CISE	-20	145.3	168.5	326.9	1	-152.2
CISE	-20	161.2	187.2	326.9	1	-157.9
CISE	-20	131.9	152.5	326.9	1	-146.9
CISE	-20	216.4	252.6	326.9	1	-173.8
CISE	-20	125.0	144.4	326.9	1	-144.0
CISE	-20	378.7	444.9	326.9	0	-
CISE	-20	246.1	287.9	326.9	1	-180.7
CISE	-20	250.9	293.5	326.9	1	-181.7
CISE	-20	251.5	294.3	326.9	1	-181.9

CISE	-20	284.0	332.7	326.9	0	-
CISE	-20	261.1	305.6	326.9	1	-183.9
CISE	-20	351.6	412.8	326.9	0	-
CISE	-20	258.5	302.5	326.9	1	-183.3
GKSS	-20	201.3	234.8	326.9	1	-169.9
GKSS	-20	110.9	127.7	326.9	1	-137.5
GKSS	-20	197.7	230.5	326.9	1	-168.9
GKSS	-20	198.9	231.9	326.9	1	-169.2
GKSS	-20	200.6	234.0	326.9	1	-169.7
GKSS	-20	165.7	192.6	326.9	1	-159.4
GKSS	-20	280.1	328.0	326.9	0	-
GKSS	-20	279.5	327.3	326.9	0	-
GKSS	-20	257.6	301.4	326.9	1	-183.1
GKSS	-20	265.2	310.4	326.9	1	-184.7
GKSS	-20	156.7	212.6	326.9	1	-164.6
GKSS	-20	221.7	304.1	326.9	1	-183.6
GKSS	-20	193.9	264.9	326.9	1	-176.3
GKSS	-20	191.7	261.9	326.9	1	-175.7
GKSS	-20	184.4	251.6	326.9	1	-173.6
NE	-20	186.7	254.8	326.9	1	-174.2
NE	-20	184.4	251.6	326.9	1	-173.6
NE	-20	193.9	264.9	326.9	1	-176.3
NE	-20	204.4	279.8	326.9	1	-179.2
NE	-20	224.0	307.4	326.9	1	-184.2
NE	-20	153.4	207.9	326.9	1	-163.4
NE	-20	222.6	305.4	326.9	1	-183.8
NE	-20	162.0	220.0	326.9	1	-166.4
NE	-20	187.8	256.4	326.9	1	-174.6
NE	-20	198.2	271.0	326.9	1	-177.5
SCK-CEN	-10	280.0	279.0	389.1	1	-169.0
SCK-CEN	-10	281.2	280.2	389.1	1	-169.3
SCK-CEN	-10	282.6	281.5	389.1	1	-169.5
SCK-CEN	-10	284.0	282.9	389.1	1	-169.8
SCK-CEN	-10	280.9	279.9	389.1	1	-169.2
GKSS	0	196.8	168.1	464.2	1	-132.1
GKSS	0	193.7	165.5	464.2	1	-131.3
GKSS	0	192.9	164.8	464.2	1	-131.1
GKSS	0	196.7	168.0	464.2	1	-132.1
GKSS	0	196.1	167.5	464.2	1	-131.9
GKSS	0	194.7	166.3	464.2	1	-131.6
GKSS	0	196.3	167.7	464.2	1	-132.0
GKSS	0	195.9	167.3	464.2	1	-131.9
GKSS	0	195.2	166.8	464.2	1	-131.7
GKSS	0	193.3	165.1	464.2	1	-131.2
SCK-CEN	0	198.4	169.4	464.2	1	-132.6
SCK-CEN	0	199.1	170.0	464.2	1	-132.7
SCK-CEN	0	198.2	169.2	464.2	1	-132.5
SCK-CEN	0	197.6	168.8	464.2	1	-132.3
SCK-CEN	0	201.2	171.8	464.2	1	-133.3
SCK-CEN	0	200.0	170.8	464.2	1	-133.0
SCK-CEN	0	197.4	168.6	464.2	1	-132.3
SCK-CEN	0	199.6	170.4	464.2	1	-132.9
SCK-CEN	0	203.4	173.6	464.2	1	-133.9
SCK-CEN	0	199.2	170.1	464.2	1	-132.8
SCK-CEN	0	200.5	171.2	464.2	1	-133.1
SCK-CEN	0	202.4	172.7	464.2	1	-133.6
SCK-CEN	0	197.2	168.4	464.2	1	-132.2
SCK-CEN	0	205.8	175.6	464.2	1	-134.5
SCK-CEN	0	205.5	175.4	464.2	1	-134.4
SCK-CEN	0	202.4	172.7	464.2	1	-133.6
SCK-CEN	0	203.4	173.6	464.2	1	-133.9
SCK-CEN	0	205.2	175.1	464.2	1	-134.3
SCK-CEN	0	202.3	172.7	464.2	1	-133.6
SCK-CEN	0	201.6	172.1	464.2	1	-133.4
GKSS	0	282.4	281.4	464.2	1	-159.5
GKSS	0	283.7	282.7	464.2	1	-159.7
GKSS	0	284.9	283.9	464.2	1	-160.0
GKSS	0	282.8	281.8	464.2	1	-159.6
GKSS	0	284.4	283.4	464.2	1	-159.9
GKSS	0	284.9	283.8	464.2	1	-159.9
GKSS	0	279.6	278.6	464.2	1	-159.0
GKSS	0	283.9	282.8	464.2	1	-159.8
GKSS	0	285.7	284.7	464.2	1	-160.1
GKSS	0	283.0	281.9	464.2	1	-159.6
SCK-CEN	0	277.0	276.0	464.2	1	-158.5
SCK-CEN	0	276.7	275.7	464.2	1	-158.4
SCK-CEN	0	276.9	275.9	464.2	1	-158.5
SCK-CEN	0	277.9	276.8	464.2	1	-158.6
SCK-CEN	0	276.9	275.9	464.2	1	-158.5
SCK-CEN	0	278.2	277.2	464.2	1	-158.7
SCK-CEN	0	278.0	277.0	464.2	1	-158.7
SCK-CEN	0	275.9	274.9	464.2	1	-158.3
SCK-CEN	0	277.6	276.6	464.2	1	-158.6
SCK-CEN	0	278.2	277.2	464.2	1	-158.7
SCK-CEN	0	277.3	276.3	464.2	1	-158.5

VTT	0	280.3	279.3	464.2	1	-159.1
VTT	0	275.5	274.5	464.2	1	-158.2
VTT	0	280.3	279.3	464.2	1	-159.1
VTT	0	275.2	274.2	464.2	1	-158.1
VTT	0	278.0	277.0	464.2	1	-158.7
VTT	0	278.5	277.5	464.2	1	-158.7
VTT	0	279.7	278.6	464.2	1	-159.0
VTT	0	267.2	266.2	464.2	1	-156.5
VTT	0	279.8	278.8	464.2	1	-159.0
VTT	0	278.6	277.6	464.2	1	-158.8
VTT	0	278.3	277.3	464.2	1	-158.7
VTT	0	280.0	278.9	464.2	1	-159.0
VTT	0	274.3	273.3	464.2	1	-157.9
VTT	0	276.0	275.0	464.2	1	-158.3
VTT	0	278.7	277.7	464.2	1	-158.8
VTT	0	278.0	277.0	464.2	1	-158.7
VTT	0	279.1	278.0	464.2	1	-158.9
VTT	0	278.6	277.5	464.2	1	-158.8
VTT	0	279.4	278.4	464.2	1	-158.9
VTT	0	276.2	275.2	464.2	1	-158.3
GKSS	0	191.3	222.9	464.2	1	-147.1
GKSS	0	269.2	315.2	464.2	1	-165.5
GKSS	0	281.2	329.4	464.2	1	-167.8
GKSS	0	242.5	283.5	464.2	1	-159.9
GKSS	0	318.3	373.3	464.2	1	-174.5
GKSS	0	395.4	464.7	464.2	0	-
GKSS	0	396.5	465.9	464.2	0	-
GKSS	0	394.9	464.1	464.2	1	-186.0
GKSS	0	396.3	465.7	464.2	0	-
GKSS	0	266.6	312.1	464.2	1	-165.0
GKSS	0	395.2	464.4	464.2	0	-
GKSS	0	362.9	426.1	464.2	1	-181.5
GKSS	0	331.8	389.3	464.2	1	-176.7
GKSS	0	227.1	265.3	464.2	1	-156.4
GKSS	0	309.5	362.9	464.2	1	-173.0
GKSS	0	395.4	464.7	464.2	0	-
GKSS	0	210.9	246.1	464.2	1	-152.4
GKSS	0	394.9	464.1	464.2	1	-186.0
GKSS	0	211.4	246.7	464.2	1	-152.5
GKSS	0	393.9	462.8	464.2	1	-185.8
GKSS	0	263.4	308.3	464.2	1	-164.3
GKSS	0	393.3	462.1	464.2	1	-185.7
GKSS	0	386.7	454.3	464.2	1	-184.8
GKSS	0	376.2	441.9	464.2	1	-183.4
GKSS	0	394.4	463.5	464.2	1	-185.9
GKSS	0	306.7	359.6	464.2	1	-172.5
GKSS	0	394.8	464.0	464.2	1	-186.0
GKSS	0	393.9	462.8	464.2	1	-185.8
GKSS	0	246.4	288.2	464.2	1	-160.8
GKSS	0	320.1	375.4	464.2	1	-174.8
CISE	0	233.3	320.4	464.2	1	-166.4
CISE	0	238.2	327.4	464.2	1	-167.5
CISE	0	208.3	285.2	464.2	1	-160.2
CISE	0	421.7	585.8	464.2	0	-
CISE	0	226.7	311.2	464.2	1	-164.8
CISE	0	267.0	367.9	464.2	1	-173.7
CISE	0	163.0	221.4	464.2	1	-146.8
CISE	0	165.8	225.4	464.2	1	-147.7
CISE	0	285.9	394.6	464.2	1	-177.4
CISE	0	342.0	473.5	464.2	0	-
GKSS	0	314.9	435.4	464.2	1	-182.6
GKSS	0	307.6	425.1	464.2	1	-181.3
GKSS	0	383.0	531.4	464.2	0	-
GKSS	0	332.6	460.4	464.2	1	-185.5
GKSS	0	223.6	306.8	464.2	1	-164.1
GKSS	0	442.2	614.7	464.2	0	-

2. Final Master Curve fit to data

Temperature adj. = 1.0 °C (est.) Stand. dev. on T_0 = 0.7 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-154	54.8	49.1				
-154	49.8	44.9				
-154	37.8	34.9				
-154	33.0	30.9				
-154	38.9	35.8				
-154	24.2	23.6				
-154	47.4	43.0				
-154	46.5	42.2				

-154	31.4	29.6
-154	39.2	36.0
-154	24.2	23.6
-154	33.0	30.9
-154	41.0	37.6
-154	31.7	29.8
-154	35.2	32.7
-154	44.4	40.5
-154	41.5	38.0
-154	32.7	30.7
-154	34.3	32.0
-154	36.7	34.0
-154	39.7	36.5
-154	46.1	41.8
-154	34.6	32.2
-154	35.8	33.2
-154	29.3	27.8
-154	28.6	27.2
-154	38.6	35.6
-154	44.4	40.5
-154	48.9	44.2
-154	38.9	35.8
-154	36.7	34.0
-154	31.7	29.8
-154	41.5	41.4
-154	42.2	42.2
-154	50.0	49.9
-154	34.0	33.9
-154	41.7	41.7
-154	46.1	46.0
-154	44.2	44.1
-154	36.7	36.6
-154	29.0	28.9
-154	53.0	52.9
-154	39.4	39.3
-154	29.0	28.9
-154	34.6	34.5
-154	33.0	33.0
-154	38.1	38.0
-154	28.6	28.6
-154	28.6	28.6
-154	38.6	38.5
-154	36.4	36.3
-154	33.4	33.3
-154	36.9	36.9
-154	31.1	31.0
-154	34.3	34.2
-154	30.4	30.4
-154	49.6	49.5
-154	41.0	40.9
-154	34.0	33.9
-154	30.7	30.7
-154	41.2	41.2
-154	26.7	26.7
-154	35.5	35.4
-154	33.4	33.3
-154	36.7	36.6
-154	32.4	32.4
-154	45.1	45.0
-154	33.4	33.3
-154	34.0	33.9
-154	30.7	30.7
-154	26.7	26.7
-154	33.7	36.2
-154	42.7	46.9
-154	37.2	40.4
-154	54.4	60.8
-154	34.6	37.3
-154	44.2	48.7
-154	29.7	31.5
-154	36.4	39.4
-154	36.4	39.4

-154	28.2	29.8
-154	28.2	29.8
-154	30.0	31.9
-154	36.4	39.4
-154	37.5	40.7
-154	30.0	31.9
-154	30.7	32.7
-154	30.4	32.3
-154	30.7	32.7
-154	31.7	33.9
-154	41.7	45.8
-154	37.2	40.4
-154	34.9	37.6
-154	38.3	41.7
-154	31.4	33.5
-154	33.7	36.2
-154	32.7	35.1
-154	43.0	47.2
-154	32.7	35.1
-154	30.0	31.9
-154	36.9	40.1
-154	33.4	35.8
-154	30.0	31.9
-110	98.1	85.4
-110	59.0	52.7
-110	80.0	70.3
-110	57.2	51.2
-110	88.3	77.2
-110	96.2	83.9
-110	81.6	71.6
-110	66.9	59.3
-110	85.6	75.0
-110	86.8	76.0
-110	114.2	98.9
-110	73.5	64.8
-110	92.7	80.9
-110	77.5	68.2
-110	61.5	54.7
-110	51.8	46.7
-110	73.6	64.9
-110	52.8	47.5
-110	41.2	37.8
-110	115.3	99.8
-110	73.2	64.5
-110	74.0	65.3
-110	67.5	59.8
-110	71.0	62.7
-110	53.4	48.0
-110	96.5	84.0
-110	71.3	63.0
-110	71.7	63.3
-110	81.7	71.7
-110	64.0	56.8
-110	74.2	65.4
-110	70.4	62.2
-110	91.2	79.6
-110	72.0	63.6
-110	64.8	57.5
-110	79.2	69.6
-110	52.2	47.0
-110	82.9	72.7
-110	93.2	81.3
-110	75.4	66.4
-110	75.0	66.1
-110	78.6	69.1
-110	94.8	82.7
-110	98.1	85.4
-110	98.5	85.7
-110	104.9	91.1
-110	69.9	61.8
-110	81.6	71.6
-110	55.2	49.5

-110	105.6	91.7
-110	101.5	88.3
-110	73.7	65.0
-110	97.5	84.9
-110	75.9	66.8
-110	48.3	43.7
-91	127.0	109.6
-91	121.8	105.2
-91	70.5	62.3
-91	94.2	82.2
-91	127.3	109.9
-91	119.9	103.7
-91	104.5	90.8
-91	78.6	69.1
-91	98.6	85.8
-91	161.6	138.6
-91	91.3	79.7
-91	115.3	99.8
-91	122.4	105.8
-91	126.3	109.1
-91	108.3	94.0
-91	66.9	59.3
-91	126.7	109.4
-91	69.6	61.6
-91	121.4	104.9
-91	90.0	78.7
-91	153.9	132.2
-91	64.6	57.4
-91	127.2	109.8
-91	99.7	86.7
-91	101.3	88.1
-91	140.4	120.9
-91	78.2	68.7
-91	109.0	94.6
-91	103.9	90.3
-91	126.8	109.5
-91	111.7	96.8
-91	68.6	68.4
-91	81.6	81.3
-91	55.9	55.8
-91	98.8	98.5
-91	71.9	71.7
-91	111.0	110.7
-91	93.5	93.2
-91	79.9	79.7
-91	98.4	98.1
-91	101.1	100.8
-91	79.6	79.4
-91	99.7	99.3
-91	108.1	107.7
-91	93.4	93.1
-91	62.0	61.8
-91	107.1	106.7
-91	145.3	144.8
-91	76.3	76.0
-91	126.5	126.1
-91	126.1	125.7
-91	128.5	128.0
-91	111.4	111.0
-91	130.4	130.0
-91	134.8	134.3
-91	157.3	156.7
-91	105.2	104.9
-91	109.8	109.4
-91	84.9	84.6
-91	62.8	62.7
-91	97.5	97.2
-91	80.2	79.9
-91	134.4	133.9
-91	65.1	65.0
-91	118.6	118.2
-91	67.3	76.1

-91	162.9	189.3
-91	100.0	114.7
-91	91.2	104.3
-91	106.2	122.1
-91	83.2	94.9
-91	91.8	105.0
-91	94.7	108.5
-91	92.9	106.4
-91	69.9	79.2
-91	93.1	106.6
-91	97.9	112.2
-91	73.7	83.7
-91	82.0	93.4
-91	76.3	86.7
-91	93.1	106.6
-91	83.7	95.5
-91	82.1	93.6
-91	86.8	99.2
-91	86.7	99.0
-91	92.3	105.7
-91	83.1	94.8
-91	88.9	101.6
-91	64.3	72.5
-91	101.6	116.7
-91	94.2	107.9
-91	78.7	89.5
-91	73.0	82.8
-91	64.2	72.3
-91	98.9	113.5
-91	103.2	137.2
-91	84.4	110.7
-91	97.0	128.5
-91	92.7	122.4
-91	96.8	128.2
-91	73.6	95.5
-91	73.0	94.7
-91	73.3	95.1
-91	53.8	67.7
-91	69.5	89.7
-91	65.5	84.0
-91	79.6	104.0
-91	69.8	90.1
-91	90.3	119.0
-91	88.0	115.8
-60	234.1	199.3
-60	114.4	99.1
-60	130.7	112.7
-60	106.7	92.6
-60	161.0	138.1
-60	200.7	171.3
-60	125.2	108.1
-60	145.1	124.8
-60	91.9	80.2
-60	128.1	110.6
-60	164.4	140.9
-60	192.2	164.3
-60	166.3	142.5
-60	177.7	152.1
-60	167.6	143.6
-60	128.6	110.9
-60	377.4	319.3
-60	98.4	85.7
-60	278.4	236.4
-60	240.7	204.9
-60	380.0	321.5
-60	171.9	147.2
-60	136.8	117.8
-60	135.8	117.0
-60	214.7	183.1
-60	299.5	254.1
-60	203.7	173.9
-60	116.0	100.4

-60	221.9	189.1
-60	167.6	143.6
-60	89.8	78.5
-60	156.3	134.1
-60	186.8	159.7
-60	213.5	182.1
-60	164.6	141.1
-60	280.1	237.9
-60	185.9	159.0
-60	127.7	110.2
-60	205.0	175.0
-60	115.6	100.0
-60	107.5	93.3
-60	164.6	141.1
-60	172.0	147.3
-60	108.5	94.2
-60	119.0	102.9
-60	153.5	131.8
-60	158.9	136.4
-60	137.5	118.4
-60	119.5	103.3
-60	130.7	112.8
-60	172.6	147.8
-60	84.5	74.0
-60	244.6	208.1
-60	120.4	104.1
-60	104.5	90.8
-60	163.6	140.2
-60	201.4	172.0
-60	137.8	118.7
-60	173.0	148.1
-60	99.2	86.4
-60	173.4	148.4
-60	131.5	113.4
-60	186.0	185.3
-60	151.8	151.3
-60	111.7	111.3
-60	143.9	143.4
-60	105.4	105.1
-60	154.0	153.4
-60	176.2	175.6
-60	131.9	131.5
-60	203.9	203.2
-60	142.7	142.2
-60	134.5	134.0
-60	130.1	129.7
-60	142.6	142.1
-60	119.7	119.3
-60	141.3	140.8
-60	175.9	175.3
-60	119.6	119.2
-60	102.4	102.0
-60	99.0	98.7
-60	115.1	114.7
-60	172.9	172.3
-60	120.5	120.2
-60	165.2	164.6
-60	125.6	125.2
-60	126.7	126.3
-60	100.4	100.1
-60	131.1	130.7
-60	185.1	184.5
-60	163.6	163.0
-60	126.5	126.1
-60	164.7	164.1
-60	192.7	192.0
-60	134.5	134.1
-60	140.8	140.3
-60	295.3	346.1
-60	217.7	254.2
-60	219.8	256.6
-60	165.9	192.8

-60	109.9	126.5
-60	131.9	152.5
-60	136.2	157.6
-60	154.0	178.8
-60	115.9	133.6
-60	150.4	174.4
-60	153.6	178.2
-60	183.8	214.0
-60	236.1	275.9
-60	149.4	173.3
-60	179.5	209.0
-60	177.6	206.7
-60	188.3	219.4
-60	134.5	155.6
-60	243.6	284.9
-60	155.7	180.8
-60	164.0	190.6
-60	146.5	169.8
-60	119.9	138.4
-60	79.9	91.0
-60	140.9	163.2
-60	115.3	132.9
-60	137.0	158.6
-60	166.9	194.0
-60	225.4	263.3
-60	200.7	234.1
-40	171.0	146.5
-40	569.4	480.2
-40	169.4	145.1
-40	548.7	462.8
-40	529.9	447.1
-40	318.5	270.1
-40	574.8	484.7
-40	360.8	305.4
-40	343.8	291.2
-40	235.8	200.8
-40	529.9	447.1
-40	496.5	419.1
-40	600.0	505.8
-40	113.7	98.5
-40	229.6	195.5
-40	154.2	132.4
-40	221.3	188.6
-40	486.7	410.9
-40	243.8	207.4
-40	202.5	172.8
-40	180.6	154.6
-40	206.7	176.4
-40	240.7	204.9
-40	270.8	230.1
-40	186.4	159.4
-40	255.8	217.5
-40	231.2	196.9
-40	339.4	287.5
-40	403.1	340.9
-40	399.2	337.6
-40	187.3	186.6
-40	101.5	101.2
-40	140.3	139.9
-40	150.2	149.7
-40	187.3	186.6
-40	211.4	210.6
-40	160.5	160.0
-40	214.6	213.8
-40	188.3	187.7
-40	239.3	238.4
-40	112.8	112.4
-40	239.0	238.1
-40	284.9	283.9
-40	254.7	253.7
-40	270.9	269.9
-40	187.0	186.3

-40	170.1	169.5
-40	256.4	255.5
-40	171.4	170.8
-40	103.1	102.8
-40	230.0	229.1
-40	210.0	209.2
-40	198.2	197.5
-40	150.2	149.7
-40	226.8	226.0
-40	158.1	157.5
-40	256.4	255.5
-40	207.6	206.9
-40	213.5	212.8
-40	254.6	253.7
-40	240.0	239.1
-40	309.2	308.0
-40	125.9	145.5
-40	128.9	149.0
-40	198.5	231.5
-40	212.0	247.5
-40	138.6	160.5
-40	187.7	218.7
-40	173.0	201.2
-40	179.5	208.9
-40	152.6	177.1
-40	153.6	178.3
-40	144.6	167.6
-40	150.7	174.9
-40	139.1	161.0
-40	183.6	213.8
-40	142.0	164.5
-40	187.2	218.0
-40	172.2	200.3
-40	198.0	230.8
-40	130.4	150.8
-40	141.7	164.1
-40	134.5	155.6
-40	115.5	133.1
-40	91.7	104.9
-40	141.1	163.4
-40	239.1	279.6
-40	243.4	284.7
-40	191.9	223.6
-40	146.8	170.2
-40	161.4	187.5
-40	142.3	164.8
-20	128.7	111.1
-20	146.9	126.3
-20	402.8	340.6
-20	409.4	346.2
-20	530.5	447.6
-20	532.2	449.0
-20	534.6	451.0
-20	536.1	452.3
-20	536.1	452.3
-20	536.6	452.7
-20	538.6	454.3
-20	540.5	455.9
-20	543.8	458.7
-20	549.2	463.2
-20	553.7	467.0
-20	556.1	469.0
-20	556.3	469.2
-20	560.6	472.8
-20	565.8	477.2
-20	570.1	480.8
-20	571.1	481.6
-20	233.1	198.5
-20	389.8	329.8
-20	487.9	411.9
-20	438.3	370.4
-20	571.4	481.8

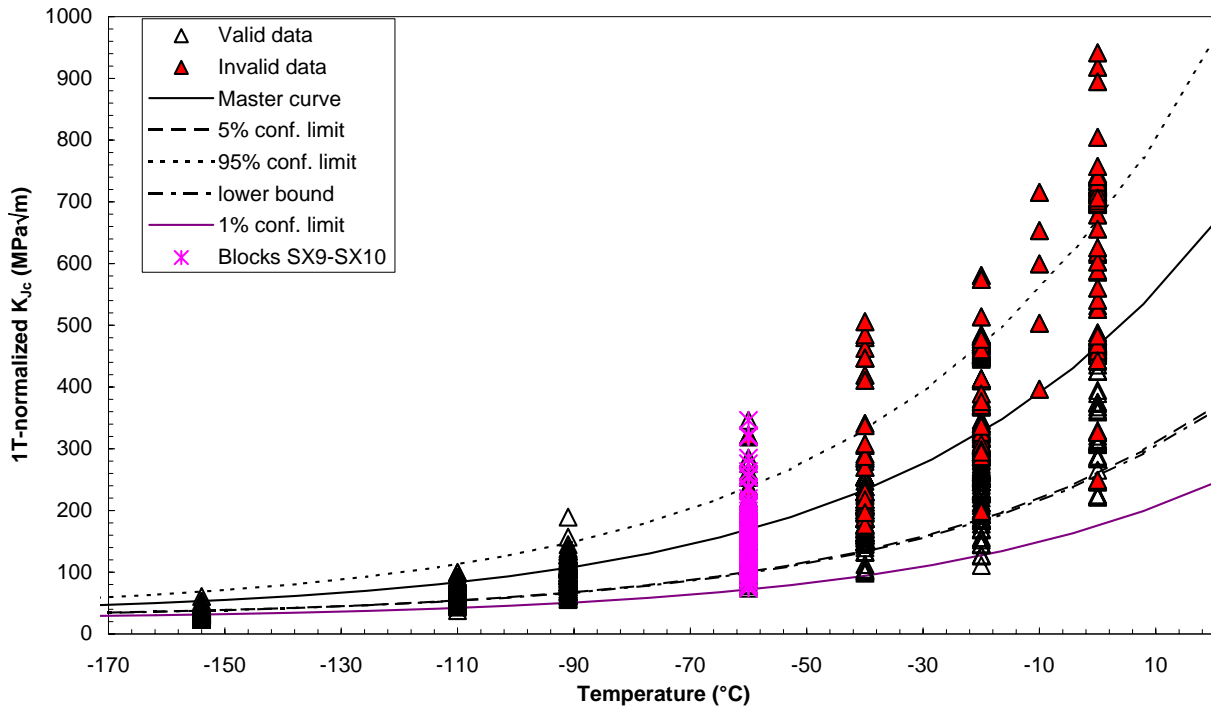
-20	560.7	472.9
-20	561.1	473.2
-20	575.1	484.9
-20	557.5	470.2
-20	572.5	482.7
-20	202.5	201.7
-20	194.7	194.1
-20	262.8	261.8
-20	187.9	187.2
-20	275.8	274.8
-20	261.8	260.9
-20	371.0	369.7
-20	369.1	367.7
-20	462.1	460.4
-20	319.7	318.5
-20	583.1	580.9
-20	231.9	231.0
-20	382.0	380.6
-20	295.9	294.8
-20	576.4	574.2
-20	411.7	410.1
-20	306.4	305.2
-20	324.7	323.5
-20	282.5	281.4
-20	247.2	246.3
-20	233.2	232.4
-20	317.5	316.3
-20	515.6	513.7
-20	263.2	262.3
-20	184.4	183.8
-20	286.9	285.9
-20	341.4	340.1
-20	415.0	413.4
-20	327.9	326.7
-20	170.9	170.3
-20	308.8	307.6
-20	376.5	375.1
-20	228.2	227.4
-20	371.7	370.3
-20	291.6	290.6
-20	337.7	336.4
-20	390.5	389.0
-20	227.3	226.5
-20	201.3	200.6
-20	212.5	211.7
-20	288.4	287.3
-20	479.1	477.3
-20	377.9	376.5
-20	269.6	268.6
-20	184.4	183.8
-20	241.6	240.7
-20	146.4	145.9
-20	299.4	298.3
-20	156.7	156.2
-20	295.6	294.5
-20	167.4	194.6
-20	153.5	178.1
-20	211.2	246.5
-20	220.3	257.3
-20	227.9	266.2
-20	211.1	246.4
-20	217.1	253.4
-20	145.3	168.5
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-20	131.9	152.5
-20	216.4	252.6
-20	125.0	144.4
-20	378.7	444.9
-20	246.1	287.9
-20	250.9	293.5
-20	251.5	294.3
-20	284.0	332.7

-20	261.1	305.6
-20	351.6	412.8
-20	258.5	302.5
-20	201.3	234.8
-20	110.9	127.7
-20	197.7	230.5
-20	198.9	231.9
-20	200.6	234.0
-20	165.7	192.6
-20	280.1	328.0
-20	279.5	327.3
-20	257.6	301.4
-20	265.2	310.4
-20	156.7	212.6
-20	221.7	304.1
-20	193.9	264.9
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-20	184.4	251.6
-20	193.9	264.9
-20	204.4	279.8
-20	224.0	307.4
-20	153.4	207.9
-20	222.6	305.4
-20	162.0	220.0
-20	187.8	256.4
-20	198.2	271.0
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-10	718.1	715.3
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0	557.2	469.9
0	545.0	459.7
0	546.1	460.6
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0	565.1	476.5
0	571.6	482.0
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0	293.2	248.8
0	544.1	459.0
0	552.2	465.7
0	558.0	470.6
0	553.5	466.8
0	557.6	470.3
0	552.4	466.0
0	555.6	468.6
0	558.2	470.8
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0	556.0	468.9
0	543.8	458.7
0	556.3	469.2
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0	698.2	695.5
0	708.4	705.7
0	701.5	698.8
0	724.9	722.1
0	717.4	714.6
0	705.8	703.0

0	709.5	706.8
0	716.7	714.0
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0	709.0	706.2
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0	714.0	711.3
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0	730.2	727.4
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0	744.2	741.3
0	527.7	525.7
0	620.4	618.0
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0	730.3	727.5
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0	726.7	723.9
0	718.7	716.0
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0	727.0	724.2
0	718.5	715.7
0	191.3	222.9
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0	281.2	329.4
0	242.5	283.5
0	318.3	373.3
0	476.2	560.4
0	511.7	602.5
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0	531.3	625.6
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0	599.3	706.2
0	362.9	426.1
0	331.8	389.3
0	227.1	265.3
0	309.5	362.9
0	628.6	740.9
0	210.9	246.1
0	410.7	482.8
0	211.4	246.7
0	778.3	918.2
0	263.4	308.3
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0	386.7	454.3
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0	642.5	757.3
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0	758.4	894.6
0	797.9	941.4
0	246.4	288.2
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0	233.3	320.4
0	238.2	327.4
0	208.3	285.2
0	421.7	585.8
0	226.7	311.2
0	267.0	367.9
0	163.0	221.4
0	165.8	225.4
0	285.9	394.6
0	342.0	473.5

0	314.9	435.4				
0	307.6	425.1				
0	383.0	531.4				
0	332.6	460.4				
0	223.6	306.8				
0	442.2	614.7				
-174			45.9	34.0	57.8	33.8
-161.875			50.0	36.2	63.9	36.0
-149.75			55.2	39.0	71.4	38.8
-137.625			61.8	42.6	81.0	42.2
-125.5			70.0	47.0	93.0	46.6
-113.375			80.4	52.6	108.1	52.1
-101.25			93.4	59.6	127.2	59.0
-89.125			109.8	68.5	151.2	67.7
-77			130.5	79.7	181.4	78.6
-64.875			156.6	93.8	219.4	92.4
-52.75			189.4	111.5	267.3	109.8
-40.625			230.7	133.8	327.6	131.6
-28.5			282.6	161.8	403.5	159.1
-16.375			348.1	197.2	499.0	193.8
-4.25			430.5	241.7	619.3	237.4
7.875			534.3	297.7	770.8	292.4
20			664.9	368.2	961.6	361.5

**MASTER CURVE WITH CONFIDENCE LIMITS - SINTAP lower tail analysis
EURO toughness dataset - Complete dataset**



SIEMENS	-154	28.6	27.2	0	0.000	0.0000	0.0000
SIEMENS	-154	38.6	35.6	0	0.000	0.0000	0.0000
SIEMENS	-154	44.4	40.5	0	0.000	0.0000	0.0000
SIEMENS	-154	48.9	44.2	0	0.000	0.0000	0.0000
SIEMENS	-154	38.9	35.8	0	0.000	0.0000	0.0000
SIEMENS	-154	36.7	34.0	0	0.000	0.0000	0.0000
SIEMENS	-154	31.7	29.8	0	0.000	0.0000	0.0000
GKSS	-154	41.5	41.4	0	0.000	0.0000	0.0000
GKSS	-154	42.2	42.2	0	0.000	0.0000	0.0000
GKSS	-154	50.0	49.9	0	0.000	0.0000	0.0000
GKSS	-154	34.0	33.9	0	0.000	0.0000	0.0000
GKSS	-154	41.7	41.7	0	0.000	0.0000	0.0000
GKSS	-154	46.1	46.0	0	0.000	0.0000	0.0000
GKSS	-154	44.2	44.1	0	0.000	0.0000	0.0000
GKSS	-154	36.7	36.6	0	0.000	0.0000	0.0000
GKSS	-154	29.0	28.9	0	0.000	0.0000	0.0000
GKSS	-154	53.0	52.9	0	0.000	0.0000	0.0000
GKSS	-154	39.4	39.3	0	0.000	0.0000	0.0000
GKSS	-154	29.0	28.9	0	0.000	0.0000	0.0000
SIEMENS	-154	34.6	34.5	0	0.000	0.0000	0.0000
SIEMENS	-154	33.0	33.0	0	0.000	0.0000	0.0000
SIEMENS	-154	38.1	38.0	0	0.000	0.0000	0.0000
SIEMENS	-154	28.6	28.6	0	0.000	0.0000	0.0000
SIEMENS	-154	28.6	28.6	0	0.000	0.0000	0.0000
SIEMENS	-154	38.6	38.5	0	0.000	0.0000	0.0000
SIEMENS	-154	36.4	36.3	0	0.000	0.0000	0.0000
SIEMENS	-154	33.4	33.3	0	0.000	0.0000	0.0000
SIEMENS	-154	36.9	36.9	0	0.000	0.0000	0.0000
SIEMENS	-154	31.1	31.0	0	0.000	0.0000	0.0000
SIEMENS	-154	34.3	34.2	0	0.000	0.0000	0.0000
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SIEMENS	-154	34.0	33.9	0	0.000	0.0000	0.0000
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SIEMENS	-154	26.7	26.7	0	0.000	0.0000	0.0000
GKSS	-154	33.7	36.2	0	0.000	0.0000	0.0000
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NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
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NE	-154	37.5	40.7	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
NE	-154	30.7	32.7	0	0.000	0.0000	0.0000
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NE	-154	31.7	33.9	0	0.000	0.0000	0.0000
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NE	-154	37.2	40.4	0	0.000	0.0000	0.0000
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NE	-154	32.7	35.1	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
NE	-154	36.9	40.1	0	0.000	0.0000	0.0000
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NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
GKSS	-110	98.1	85.4	1	0.143	0.0108	0.0110
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GKSS	-110	57.2	51.2	1	0.143	0.0108	0.0006
GKSS	-110	88.3	77.2	1	0.143	0.0108	0.0065
GKSS	-110	96.2	83.9	1	0.143	0.0108	0.0100
GKSS	-110	81.6	71.6	1	0.143	0.0108	0.0043
GKSS	-110	66.9	59.3	1	0.143	0.0108	0.0014
GKSS	-110	85.6	75.0	1	0.143	0.0108	0.0055

GKSS	-110	86.8	76.0	1	0.143	0.0108	0.0059
GKSS	-110	114.2	98.9	1	0.143	0.0108	0.0234
GKSS	-110	73.5	64.8	1	0.143	0.0108	0.0024
GKSS	-110	92.7	80.9	1	0.143	0.0108	0.0083
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GKSS	-110	61.5	54.7	1	0.143	0.0108	0.0009
GKSS	-110	51.8	46.7	1	0.143	0.0108	0.0003
GKSS	-110	73.6	64.9	1	0.143	0.0108	0.0025
GKSS	-110	52.8	47.5	1	0.143	0.0108	0.0003
GKSS	-110	41.2	37.8	1	0.143	0.0108	0.0001
GKSS	-110	115.3	99.8	1	0.143	0.0108	0.0245
GKSS	-110	73.2	64.5	1	0.143	0.0108	0.0024
GKSS	-110	74.0	65.3	1	0.143	0.0108	0.0025
GKSS	-110	67.5	59.8	1	0.143	0.0108	0.0015
GKSS	-110	71.0	62.7	1	0.143	0.0108	0.0020
GKSS	-110	53.4	48.0	1	0.143	0.0108	0.0004
GKSS	-110	96.5	84.0	1	0.143	0.0108	0.0102
GKSS	-110	71.3	63.0	1	0.143	0.0108	0.0021
GKSS	-110	71.7	63.3	1	0.143	0.0108	0.0021
GKSS	-110	81.7	71.7	1	0.143	0.0108	0.0043
GKSS	-110	64.0	56.8	1	0.143	0.0108	0.0011
GKSS	-110	74.2	65.4	1	0.143	0.0108	0.0026
GKSS	-110	70.4	62.2	1	0.143	0.0108	0.0019
GKSS	-110	91.2	79.6	1	0.143	0.0108	0.0076
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GKSS	-110	64.8	57.5	1	0.143	0.0108	0.0012
GKSS	-110	79.2	69.6	1	0.143	0.0108	0.0037
GKSS	-110	52.2	47.0	1	0.143	0.0108	0.0003
GKSS	-110	82.9	72.7	1	0.143	0.0108	0.0046
GKSS	-110	93.2	81.3	1	0.143	0.0108	0.0086
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GKSS	-110	75.0	66.1	1	0.143	0.0108	0.0027
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GKSS	-110	94.8	82.7	1	0.143	0.0108	0.0093
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GKSS	-110	48.3	43.7	1	0.143	0.0108	0.0002
GKSS	-91	127.0	109.6	1	0.167	0.0114	0.0120
GKSS	-91	121.8	105.2	1	0.167	0.0114	0.0098
GKSS	-91	70.5	62.3	1	0.167	0.0114	0.0006
GKSS	-91	94.2	82.2	1	0.167	0.0114	0.0028
GKSS	-91	127.3	109.9	1	0.167	0.0114	0.0121
GKSS	-91	119.9	103.7	1	0.167	0.0114	0.0091
GKSS	-91	104.5	90.8	1	0.167	0.0114	0.0047
GKSS	-91	78.6	69.1	1	0.167	0.0114	0.0011
GKSS	-91	98.6	85.8	1	0.167	0.0114	0.0035
GKSS	-91	161.6	138.6	1	0.167	0.0114	0.0367
THA	-91	91.3	79.7	1	0.167	0.0114	0.0024
THA	-91	115.3	99.8	1	0.167	0.0114	0.0075
THA	-91	122.4	105.8	1	0.167	0.0114	0.0101
THA	-91	126.3	109.1	1	0.167	0.0114	0.0117
THA	-91	108.3	94.0	1	0.167	0.0114	0.0056
THA	-91	66.9	59.3	1	0.167	0.0114	0.0004
THA	-91	126.7	109.4	1	0.167	0.0114	0.0119
THA	-91	69.6	61.6	1	0.167	0.0114	0.0006
THA	-91	121.4	104.9	1	0.167	0.0114	0.0097
THA	-91	90.0	78.7	1	0.167	0.0114	0.0022
THA	-91	153.9	132.2	1	0.167	0.0114	0.0294
THA	-91	64.6	57.4	1	0.167	0.0114	0.0004
THA	-91	127.2	109.8	1	0.167	0.0114	0.0120
THA	-91	99.7	86.7	1	0.167	0.0114	0.0037
THA	-91	101.3	88.1	1	0.167	0.0114	0.0040
THA	-91	140.4	120.9	1	0.167	0.0114	0.0192
THA	-91	78.2	68.7	1	0.167	0.0114	0.0010
THA	-91	109.0	94.6	1	0.167	0.0114	0.0057
THA	-91	103.9	90.3	1	0.167	0.0114	0.0045
THA	-91	126.8	109.5	1	0.167	0.0114	0.0119
THA	-91	111.7	96.8	1	0.167	0.0114	0.0065
GKSS	-91	68.6	68.4	1	0.167	0.0114	0.0010
GKSS	-91	81.6	81.3	1	0.167	0.0114	0.0026
GKSS	-91	55.9	55.8	1	0.167	0.0114	0.0003
GKSS	-91	98.8	98.5	1	0.167	0.0114	0.0070
GKSS	-91	71.9	71.7	1	0.167	0.0114	0.0013
GKSS	-91	111.0	110.7	1	0.167	0.0114	0.0125
GKSS	-91	93.5	93.2	1	0.167	0.0114	0.0053
GKSS	-91	79.9	79.7	1	0.167	0.0114	0.0024
GKSS	-91	98.4	98.1	1	0.167	0.0114	0.0069
GKSS	-91	101.1	100.8	1	0.167	0.0114	0.0079

TWI	-91	79.6	79.4	1	0.167	0.0114	0.0023
TWI	-91	99.7	99.3	1	0.167	0.0114	0.0074
TWI	-91	108.1	107.7	1	0.167	0.0114	0.0110
TWI	-91	93.4	93.1	1	0.167	0.0114	0.0053
TWI	-91	62.0	61.8	1	0.167	0.0114	0.0006
TWI	-91	107.1	106.7	1	0.167	0.0114	0.0105
TWI	-91	145.3	144.8	1	0.167	0.0114	0.0450
TWI	-91	76.3	76.0	1	0.167	0.0114	0.0018
TWI	-91	126.5	126.1	1	0.167	0.0114	0.0235
TWI	-91	126.1	125.7	1	0.167	0.0114	0.0231
TWI	-91	128.5	128.0	1	0.167	0.0114	0.0253
TWI	-91	111.4	111.0	1	0.167	0.0114	0.0127
TWI	-91	130.4	130.0	1	0.167	0.0114	0.0272
TWI	-91	134.8	134.3	1	0.167	0.0114	0.0317
TWI	-91	157.3	156.7	1	0.167	0.0114	0.0649
TWI	-91	105.2	104.9	1	0.167	0.0114	0.0096
TWI	-91	109.8	109.4	1	0.167	0.0114	0.0119
TWI	-91	84.9	84.6	1	0.167	0.0114	0.0032
TWI	-91	62.8	62.7	1	0.167	0.0114	0.0006
TWI	-91	97.5	97.2	1	0.167	0.0114	0.0066
TWI	-91	80.2	79.9	1	0.167	0.0114	0.0024
TWI	-91	134.4	133.9	1	0.167	0.0114	0.0313
TWI	-91	65.1	65.0	1	0.167	0.0114	0.0008
TWI	-91	118.6	118.2	1	0.167	0.0114	0.0173
GKSS	-91	67.3	76.1	1	0.167	0.0114	0.0018
GKSS	-91	162.9	189.3	1	0.167	0.0114	0.1524
GKSS	-91	100.0	114.7	1	0.167	0.0114	0.0149
GKSS	-91	91.2	104.3	1	0.167	0.0114	0.0094
GKSS	-91	106.2	122.1	1	0.167	0.0114	0.0202
GKSS	-91	83.2	94.9	1	0.167	0.0114	0.0058
GKSS	-91	91.8	105.0	1	0.167	0.0114	0.0097
GKSS	-91	94.7	108.5	1	0.167	0.0114	0.0114
GKSS	-91	92.9	106.4	1	0.167	0.0114	0.0103
GKSS	-91	69.9	79.2	1	0.167	0.0114	0.0023
NE	-91	93.1	106.6	1	0.167	0.0114	0.0104
NE	-91	97.9	112.2	1	0.167	0.0114	0.0134
NE	-91	73.7	83.7	1	0.167	0.0114	0.0030
NE	-91	82.0	93.4	1	0.167	0.0114	0.0054
NE	-91	76.3	86.7	1	0.167	0.0114	0.0037
NE	-91	93.1	106.6	1	0.167	0.0114	0.0104
NE	-91	83.7	95.5	1	0.167	0.0114	0.0060
NE	-91	82.1	93.6	1	0.167	0.0114	0.0054
NE	-91	86.8	99.2	1	0.167	0.0114	0.0073
NE	-91	86.7	99.0	1	0.167	0.0114	0.0072
NE	-91	92.3	105.7	1	0.167	0.0114	0.0100
NE	-91	83.1	94.8	1	0.167	0.0114	0.0058
NE	-91	88.9	101.6	1	0.167	0.0114	0.0082
NE	-91	64.3	72.5	1	0.167	0.0114	0.0014
NE	-91	101.6	116.7	1	0.167	0.0114	0.0162
NE	-91	94.2	107.9	1	0.167	0.0114	0.0111
NE	-91	78.7	89.5	1	0.167	0.0114	0.0043
NE	-91	73.0	82.8	1	0.167	0.0114	0.0029
NE	-91	64.2	72.3	1	0.167	0.0114	0.0014
NE	-91	98.9	113.5	1	0.167	0.0114	0.0142
GKSS	-91	103.2	137.2	1	0.167	0.0114	0.0350
GKSS	-91	84.4	110.7	1	0.167	0.0114	0.0125
GKSS	-91	97.0	128.5	1	0.167	0.0114	0.0257
GKSS	-91	92.7	122.4	1	0.167	0.0114	0.0204
GKSS	-91	96.8	128.2	1	0.167	0.0114	0.0254
NE	-91	73.6	95.5	1	0.167	0.0114	0.0060
NE	-91	73.0	94.7	1	0.167	0.0114	0.0058
NE	-91	73.3	95.1	1	0.167	0.0114	0.0059
NE	-91	53.8	67.7	1	0.167	0.0114	0.0010
NE	-91	69.5	89.7	1	0.167	0.0114	0.0044
NE	-91	65.5	84.0	1	0.167	0.0114	0.0031
NE	-91	79.6	104.0	1	0.167	0.0114	0.0092
NE	-91	69.8	90.1	1	0.167	0.0114	0.0045
NE	-91	90.3	119.0	1	0.167	0.0114	0.0178
NE	-91	88.0	115.8	1	0.167	0.0114	0.0156
GKSS	-60	205.5	175.4	0	0.000	0.0000	0.0136
GKSS	-60	114.4	99.1	1	0.167	0.0120	0.0009
GKSS	-60	130.7	112.7	1	0.167	0.0120	0.0017
GKSS	-60	106.7	92.6	1	0.167	0.0120	0.0006
GKSS	-60	161.0	138.1	1	0.167	0.0120	0.0045
GKSS	-60	200.7	171.3	1	0.167	0.0120	0.0123
GKSS	-60	125.2	108.1	1	0.167	0.0120	0.0014
GKSS	-60	145.1	124.8	1	0.167	0.0120	0.0028
GKSS	-60	91.9	80.2	1	0.167	0.0120	0.0003
GKSS	-60	128.1	110.6	1	0.167	0.0120	0.0016
GKSS	-60	164.4	140.9	1	0.167	0.0120	0.0050
GKSS	-60	192.2	164.3	1	0.167	0.0120	0.0101
GKSS	-60	166.3	142.5	1	0.167	0.0120	0.0053
GKSS	-60	177.7	152.1	1	0.167	0.0120	0.0071
GKSS	-60	167.6	143.6	1	0.167	0.0120	0.0055
GKSS	-60	128.6	110.9	1	0.167	0.0120	0.0016
GKSS	-60	203.0	173.3	0	0.000	0.0000	0.0129
GKSS	-60	98.4	85.7	1	0.167	0.0120	0.0004

GKSS	-60	203.3	173.5	0	0.000	0.0000	0.0130
GKSS	-60	202.6	173.0	0	0.000	0.0000	0.0128
GKSS	-60	201.7	172.1	0	0.000	0.0000	0.0125
GKSS	-60	171.9	147.2	1	0.167	0.0120	0.0061
GKSS	-60	136.8	117.8	1	0.167	0.0120	0.0021
GKSS	-60	135.8	117.0	1	0.167	0.0120	0.0021
GKSS	-60	200.8	171.4	0	0.000	0.0000	0.0123
GKSS	-60	202.8	173.1	0	0.000	0.0000	0.0129
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0126
GKSS	-60	116.0	100.4	1	0.167	0.0120	0.0010
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0126
GKSS	-60	167.6	143.6	1	0.167	0.0120	0.0055
GKSS	-60	89.8	78.5	1	0.167	0.0120	0.0003
GKSS	-60	156.3	134.1	1	0.167	0.0120	0.0040
GKSS	-60	186.8	159.7	1	0.167	0.0120	0.0089
GKSS	-60	203.2	173.4	0	0.000	0.0000	0.0130
GKSS	-60	164.6	141.1	1	0.167	0.0120	0.0050
GKSS	-60	202.6	173.0	0	0.000	0.0000	0.0128
GKSS	-60	185.9	159.0	1	0.167	0.0120	0.0087
GKSS	-60	127.7	110.2	1	0.167	0.0120	0.0016
GKSS	-60	201.2	171.7	0	0.000	0.0000	0.0124
GKSS	-60	115.6	100.0	1	0.167	0.0120	0.0010
GKSS	-60	107.5	93.3	1	0.167	0.0120	0.0007
SIEMENS	-60	164.6	141.1	1	0.167	0.0120	0.0050
SIEMENS	-60	172.0	147.3	1	0.167	0.0120	0.0061
SIEMENS	-60	108.5	94.2	1	0.167	0.0120	0.0007
SIEMENS	-60	119.0	102.9	1	0.167	0.0120	0.0011
SIEMENS	-60	153.5	131.8	1	0.167	0.0120	0.0037
SIEMENS	-60	158.9	136.4	1	0.167	0.0120	0.0043
SIEMENS	-60	137.5	118.4	1	0.167	0.0120	0.0022
SIEMENS	-60	119.5	103.3	1	0.167	0.0120	0.0011
SIEMENS	-60	130.7	112.8	1	0.167	0.0120	0.0017
SIEMENS	-60	172.6	147.8	1	0.167	0.0120	0.0062
SIEMENS	-60	84.5	74.0	1	0.167	0.0120	0.0002
SIEMENS	-60	213.4	182.0	0	0.000	0.0000	0.0161
SIEMENS	-60	120.4	104.1	1	0.167	0.0120	0.0012
SIEMENS	-60	104.5	90.8	1	0.167	0.0120	0.0006
SIEMENS	-60	163.6	140.2	1	0.167	0.0120	0.0049
SIEMENS	-60	201.4	172.0	1	0.167	0.0120	0.0125
SIEMENS	-60	137.8	118.7	1	0.167	0.0120	0.0022
SIEMENS	-60	173.0	148.1	1	0.167	0.0120	0.0063
SIEMENS	-60	99.2	86.4	1	0.167	0.0120	0.0005
SIEMENS	-60	173.4	148.4	1	0.167	0.0120	0.0064
SIEMENS	-60	131.5	113.4	1	0.167	0.0120	0.0018
GKSS	-60	186.0	185.3	1	0.167	0.0120	0.0175
GKSS	-60	151.8	151.3	1	0.167	0.0120	0.0069
GKSS	-60	111.7	111.3	1	0.167	0.0120	0.0016
GKSS	-60	143.9	143.4	1	0.167	0.0120	0.0054
GKSS	-60	105.4	105.1	1	0.167	0.0120	0.0012
GKSS	-60	154.0	153.4	1	0.167	0.0120	0.0074
GKSS	-60	176.2	175.6	1	0.167	0.0120	0.0137
GKSS	-60	131.9	131.5	1	0.167	0.0120	0.0036
GKSS	-60	203.9	203.2	1	0.167	0.0120	0.0263
GKSS	-60	142.7	142.2	1	0.167	0.0120	0.0052
TWI	-60	134.5	134.0	1	0.167	0.0120	0.0040
TWI	-60	130.1	129.7	1	0.167	0.0120	0.0034
TWI	-60	142.6	142.1	1	0.167	0.0120	0.0052
TWI	-60	119.7	119.3	1	0.167	0.0120	0.0023
TWI	-60	141.3	140.8	1	0.167	0.0120	0.0050
TWI	-60	175.9	175.3	1	0.167	0.0120	0.0136
TWI	-60	119.6	119.2	1	0.167	0.0120	0.0023
TWI	-60	102.4	102.0	1	0.167	0.0120	0.0011
TWI	-60	99.0	98.7	1	0.167	0.0120	0.0009
TWI	-60	115.1	114.7	1	0.167	0.0120	0.0019
TWI	-60	172.9	172.3	1	0.167	0.0120	0.0126
TWI	-60	120.5	120.2	1	0.167	0.0120	0.0024
TWI	-60	165.2	164.6	1	0.167	0.0120	0.0102
TWI	-60	125.6	125.2	1	0.167	0.0120	0.0029
TWI	-60	126.7	126.3	1	0.167	0.0120	0.0030
TWI	-60	100.4	100.1	1	0.167	0.0120	0.0010
TWI	-60	131.1	130.7	1	0.167	0.0120	0.0035
TWI	-60	185.1	184.5	1	0.167	0.0120	0.0171
TWI	-60	163.6	163.0	1	0.167	0.0120	0.0098
TWI	-60	126.5	126.1	1	0.167	0.0120	0.0030
TWI	-60	164.7	164.1	1	0.167	0.0120	0.0101
TWI	-60	192.7	192.0	1	0.167	0.0120	0.0205
TWI	-60	134.5	134.1	1	0.167	0.0120	0.0040
TWI	-60	140.8	140.3	1	0.167	0.0120	0.0049
GKSS	-60	295.3	346.1	1	0.167	0.0120	0.2645
GKSS	-60	217.7	254.2	1	0.167	0.0120	0.0703
GKSS	-60	219.8	256.6	1	0.167	0.0120	0.0733
GKSS	-60	165.9	192.8	1	0.167	0.0120	0.0209
GKSS	-60	109.9	126.5	1	0.167	0.0120	0.0030
GKSS	-60	131.9	152.5	1	0.167	0.0120	0.0072
GKSS	-60	136.2	157.6	1	0.167	0.0120	0.0084
GKSS	-60	154.0	178.8	1	0.167	0.0120	0.0149
GKSS	-60	115.9	133.6	1	0.167	0.0120	0.0039

GKSS	-60	150.4	174.4	1	0.167	0.0120	0.0133
THA	-60	153.6	178.2	1	0.167	0.0120	0.0146
THA	-60	183.8	214.0	1	0.167	0.0120	0.0331
THA	-60	236.1	275.9	1	0.167	0.0120	0.1003
THA	-60	149.4	173.3	1	0.167	0.0120	0.0129
THA	-60	179.5	209.0	1	0.167	0.0120	0.0298
THA	-60	177.6	206.7	1	0.167	0.0120	0.0284
THA	-60	188.3	219.4	1	0.167	0.0120	0.0370
THA	-60	134.5	155.6	1	0.167	0.0120	0.0079
THA	-60	243.6	284.9	1	0.167	0.0120	0.1151
THA	-60	155.7	180.8	1	0.167	0.0120	0.0156
THA	-60	164.0	190.6	1	0.167	0.0120	0.0198
THA	-60	146.5	169.8	1	0.167	0.0120	0.0118
THA	-60	119.9	138.4	1	0.167	0.0120	0.0046
THA	-60	79.9	91.0	1	0.167	0.0120	0.0006
THA	-60	140.9	163.2	1	0.167	0.0120	0.0098
THA	-60	115.3	132.9	1	0.167	0.0120	0.0038
THA	-60	137.0	158.6	1	0.167	0.0120	0.0086
THA	-60	166.9	194.0	1	0.167	0.0120	0.0215
THA	-60	225.4	263.3	1	0.167	0.0120	0.0819
THA	-60	200.7	234.1	1	0.167	0.0120	0.0491
BAM	-40	171.0	146.5	0	0.000	0.0000	0.0000
BAM	-40	206.2	176.0	0	0.000	0.0000	0.0000
BAM	-40	169.4	145.1	0	0.000	0.0000	0.0000
BAM	-40	203.6	173.7	0	0.000	0.0000	0.0000
BAM	-40	202.5	172.9	0	0.000	0.0000	0.0000
BAM	-40	207.2	176.8	0	0.000	0.0000	0.0000
BAM	-40	205.9	175.7	0	0.000	0.0000	0.0000
BAM	-40	206.5	176.2	0	0.000	0.0000	0.0000
BAM	-40	207.3	176.9	0	0.000	0.0000	0.0000
BAM	-40	205.1	175.1	0	0.000	0.0000	0.0000
BAM	-40	202.8	173.1	0	0.000	0.0000	0.0000
BAM	-40	204.9	174.8	0	0.000	0.0000	0.0000
BAM	-40	205.2	175.1	0	0.000	0.0000	0.0000
BAM	-40	113.7	98.5	0	0.000	0.0000	0.0000
BAM	-40	204.8	174.8	0	0.000	0.0000	0.0000
BAM	-40	154.2	132.4	0	0.000	0.0000	0.0000
BAM	-40	206.2	176.0	0	0.000	0.0000	0.0000
BAM	-40	204.2	174.3	0	0.000	0.0000	0.0000
BAM	-40	207.3	176.9	0	0.000	0.0000	0.0000
BAM	-40	202.5	172.8	0	0.000	0.0000	0.0000
GKSS	-40	180.6	154.6	0	0.000	0.0000	0.0000
GKSS	-40	203.5	173.7	0	0.000	0.0000	0.0000
GKSS	-40	198.2	169.3	0	0.000	0.0000	0.0000
GKSS	-40	199.6	170.5	0	0.000	0.0000	0.0000
GKSS	-40	186.4	159.4	0	0.000	0.0000	0.0000
GKSS	-40	199.4	170.3	0	0.000	0.0000	0.0000
GKSS	-40	204.4	174.4	0	0.000	0.0000	0.0000
GKSS	-40	202.4	172.7	0	0.000	0.0000	0.0000
GKSS	-40	203.2	173.4	0	0.000	0.0000	0.0000
GKSS	-40	200.9	171.5	0	0.000	0.0000	0.0000
BAM	-40	187.3	186.6	0	0.000	0.0000	0.0000
BAM	-40	101.5	101.2	0	0.000	0.0000	0.0000
BAM	-40	140.3	139.9	0	0.000	0.0000	0.0000
BAM	-40	150.2	149.7	0	0.000	0.0000	0.0000
BAM	-40	187.3	186.6	0	0.000	0.0000	0.0000
BAM	-40	211.4	210.6	0	0.000	0.0000	0.0000
BAM	-40	160.5	160.0	0	0.000	0.0000	0.0000
BAM	-40	214.6	213.8	0	0.000	0.0000	0.0000
BAM	-40	188.3	187.7	0	0.000	0.0000	0.0000
BAM	-40	239.3	238.4	0	0.000	0.0000	0.0000
BAM	-40	112.8	112.4	0	0.000	0.0000	0.0000
BAM	-40	239.0	238.1	0	0.000	0.0000	0.0000
BAM	-40	284.9	283.9	0	0.000	0.0000	0.0000
BAM	-40	254.7	253.7	0	0.000	0.0000	0.0000
BAM	-40	270.9	269.9	0	0.000	0.0000	0.0000
BAM	-40	187.0	186.3	0	0.000	0.0000	0.0000
BAM	-40	170.1	169.5	0	0.000	0.0000	0.0000
BAM	-40	256.4	255.5	0	0.000	0.0000	0.0000
BAM	-40	171.4	170.8	0	0.000	0.0000	0.0000
BAM	-40	103.1	102.8	0	0.000	0.0000	0.0000
BAM	-40	230.0	229.1	0	0.000	0.0000	0.0000
BAM	-40	210.0	209.2	0	0.000	0.0000	0.0000
GKSS	-40	198.2	197.5	0	0.000	0.0000	0.0000
GKSS	-40	150.2	149.7	0	0.000	0.0000	0.0000
GKSS	-40	226.8	226.0	0	0.000	0.0000	0.0000
GKSS	-40	158.1	157.5	0	0.000	0.0000	0.0000
GKSS	-40	256.4	255.5	0	0.000	0.0000	0.0000
GKSS	-40	207.6	206.9	0	0.000	0.0000	0.0000
GKSS	-40	213.5	212.8	0	0.000	0.0000	0.0000
GKSS	-40	254.6	253.7	0	0.000	0.0000	0.0000
GKSS	-40	240.0	239.1	0	0.000	0.0000	0.0000
GKSS	-40	279.0	278.0	0	0.000	0.0000	0.0000
GKSS	-40	125.9	145.5	0	0.000	0.0000	0.0000
GKSS	-40	128.9	149.0	0	0.000	0.0000	0.0000
GKSS	-40	198.5	231.5	0	0.000	0.0000	0.0000
GKSS	-40	212.0	247.5	0	0.000	0.0000	0.0000

GKSS	-40	138.6	160.5	0	0.000	0.0000	0.0000
GKSS	-40	187.7	218.7	0	0.000	0.0000	0.0000
GKSS	-40	173.0	201.2	0	0.000	0.0000	0.0000
GKSS	-40	179.5	208.9	0	0.000	0.0000	0.0000
GKSS	-40	152.6	177.1	0	0.000	0.0000	0.0000
GKSS	-40	153.6	178.3	0	0.000	0.0000	0.0000
THA	-40	144.6	167.6	0	0.000	0.0000	0.0000
THA	-40	150.7	174.9	0	0.000	0.0000	0.0000
THA	-40	139.1	161.0	0	0.000	0.0000	0.0000
THA	-40	183.6	213.8	0	0.000	0.0000	0.0000
THA	-40	142.0	164.5	0	0.000	0.0000	0.0000
THA	-40	187.2	218.0	0	0.000	0.0000	0.0000
THA	-40	172.2	200.3	0	0.000	0.0000	0.0000
THA	-40	198.0	230.8	0	0.000	0.0000	0.0000
THA	-40	130.4	150.8	0	0.000	0.0000	0.0000
THA	-40	141.7	164.1	0	0.000	0.0000	0.0000
THA	-40	134.5	155.6	0	0.000	0.0000	0.0000
THA	-40	115.5	133.1	0	0.000	0.0000	0.0000
THA	-40	91.7	104.9	0	0.000	0.0000	0.0000
THA	-40	141.1	163.4	0	0.000	0.0000	0.0000
THA	-40	239.1	279.6	0	0.000	0.0000	0.0000
THA	-40	243.4	284.7	0	0.000	0.0000	0.0000
THA	-40	191.9	223.6	0	0.000	0.0000	0.0000
THA	-40	146.8	170.2	0	0.000	0.0000	0.0000
THA	-40	161.4	187.5	0	0.000	0.0000	0.0000
THA	-40	142.3	164.8	0	0.000	0.0000	0.0000
CISE	-20	128.7	111.1	0	0.000	0.0000	0.0000
CISE	-20	146.9	126.3	0	0.000	0.0000	0.0000
CISE	-20	204.3	174.4	0	0.000	0.0000	0.0000
CISE	-20	198.3	169.3	0	0.000	0.0000	0.0000
CISE	-20	195.0	166.6	0	0.000	0.0000	0.0000
CISE	-20	197.8	168.9	0	0.000	0.0000	0.0000
CISE	-20	195.6	167.1	0	0.000	0.0000	0.0000
CISE	-20	196.2	167.6	0	0.000	0.0000	0.0000
CISE	-20	194.0	165.7	0	0.000	0.0000	0.0000
CISE	-20	198.3	169.3	0	0.000	0.0000	0.0000
CISE	-20	201.2	171.8	0	0.000	0.0000	0.0000
CISE	-20	200.9	171.5	0	0.000	0.0000	0.0000
CISE	-20	195.6	167.1	0	0.000	0.0000	0.0000
CISE	-20	197.6	168.8	0	0.000	0.0000	0.0000
CISE	-20	201.9	172.4	0	0.000	0.0000	0.0000
CISE	-20	202.5	172.8	0	0.000	0.0000	0.0000
CISE	-20	198.1	169.2	0	0.000	0.0000	0.0000
CISE	-20	198.1	169.2	0	0.000	0.0000	0.0000
CISE	-20	200.7	171.3	0	0.000	0.0000	0.0000
CISE	-20	199.8	170.6	0	0.000	0.0000	0.0000
CISE	-20	201.5	172.0	0	0.000	0.0000	0.0000
GKSS	-20	200.6	171.2	0	0.000	0.0000	0.0000
GKSS	-20	200.6	171.2	0	0.000	0.0000	0.0000
GKSS	-20	199.8	170.6	0	0.000	0.0000	0.0000
GKSS	-20	198.2	169.2	0	0.000	0.0000	0.0000
GKSS	-20	199.3	170.2	0	0.000	0.0000	0.0000
GKSS	-20	196.6	167.9	0	0.000	0.0000	0.0000
GKSS	-20	198.6	169.6	0	0.000	0.0000	0.0000
GKSS	-20	200.7	171.3	0	0.000	0.0000	0.0000
GKSS	-20	195.0	166.6	0	0.000	0.0000	0.0000
GKSS	-20	198.6	169.6	0	0.000	0.0000	0.0000
GKSS	-20	202.5	201.7	0	0.000	0.0000	0.0000
GKSS	-20	194.7	194.1	0	0.000	0.0000	0.0000
GKSS	-20	262.8	261.8	0	0.000	0.0000	0.0000
GKSS	-20	187.9	187.2	0	0.000	0.0000	0.0000
GKSS	-20	275.8	274.8	0	0.000	0.0000	0.0000
GKSS	-20	261.8	260.9	0	0.000	0.0000	0.0000
GKSS	-20	283.2	282.2	0	0.000	0.0000	0.0000
GKSS	-20	283.1	282.0	0	0.000	0.0000	0.0000
GKSS	-20	284.0	283.0	0	0.000	0.0000	0.0000
GKSS	-20	284.2	283.1	0	0.000	0.0000	0.0000
VTT	-20	284.0	282.9	0	0.000	0.0000	0.0000
VTT	-20	231.9	231.0	0	0.000	0.0000	0.0000
VTT	-20	279.4	278.3	0	0.000	0.0000	0.0000
VTT	-20	280.3	279.2	0	0.000	0.0000	0.0000
VTT	-20	279.4	278.3	0	0.000	0.0000	0.0000
VTT	-20	278.6	277.5	0	0.000	0.0000	0.0000
VTT	-20	281.9	280.9	0	0.000	0.0000	0.0000
VTT	-20	279.4	278.3	0	0.000	0.0000	0.0000
VTT	-20	282.5	281.4	0	0.000	0.0000	0.0000
VTT	-20	247.2	246.3	0	0.000	0.0000	0.0000
VTT	-20	233.2	232.4	0	0.000	0.0000	0.0000
VTT	-20	283.2	282.2	0	0.000	0.0000	0.0000
VTT	-20	288.9	287.8	0	0.000	0.0000	0.0000
VTT	-20	263.2	262.3	0	0.000	0.0000	0.0000
VTT	-20	184.4	183.8	0	0.000	0.0000	0.0000
VTT	-20	283.7	282.7	0	0.000	0.0000	0.0000
VTT	-20	280.8	279.8	0	0.000	0.0000	0.0000
VTT	-20	280.9	279.8	0	0.000	0.0000	0.0000
VTT	-20	280.9	279.8	0	0.000	0.0000	0.0000
VTT	-20	170.9	170.3	0	0.000	0.0000	0.0000

VTT	-20	282.9	281.9	0	0.000	0.0000	0.0000
VTT	-20	275.7	274.6	0	0.000	0.0000	0.0000
VTT	-20	228.2	227.4	0	0.000	0.0000	0.0000
VTT	-20	282.0	281.0	0	0.000	0.0000	0.0000
VTT	-20	280.9	279.8	0	0.000	0.0000	0.0000
VTT	-20	281.8	280.7	0	0.000	0.0000	0.0000
VTT	-20	281.4	280.4	0	0.000	0.0000	0.0000
VTT	-20	227.3	226.5	0	0.000	0.0000	0.0000
VTT	-20	201.3	200.6	0	0.000	0.0000	0.0000
VTT	-20	212.5	211.7	0	0.000	0.0000	0.0000
VTT	-20	256.5	255.5	0	0.000	0.0000	0.0000
VTT	-20	284.8	283.8	0	0.000	0.0000	0.0000
VTT	-20	282.3	281.3	0	0.000	0.0000	0.0000
VTT	-20	269.6	268.6	0	0.000	0.0000	0.0000
VTT	-20	184.4	183.8	0	0.000	0.0000	0.0000
VTT	-20	241.6	240.7	0	0.000	0.0000	0.0000
VTT	-20	146.4	145.9	0	0.000	0.0000	0.0000
VTT	-20	280.0	279.0	0	0.000	0.0000	0.0000
VTT	-20	156.7	156.2	0	0.000	0.0000	0.0000
VTT	-20	277.0	276.0	0	0.000	0.0000	0.0000
CISE	-20	167.4	194.6	0	0.000	0.0000	0.0000
CISE	-20	153.5	178.1	0	0.000	0.0000	0.0000
CISE	-20	211.2	246.5	0	0.000	0.0000	0.0000
CISE	-20	220.3	257.3	0	0.000	0.0000	0.0000
CISE	-20	227.9	266.2	0	0.000	0.0000	0.0000
CISE	-20	211.1	246.4	0	0.000	0.0000	0.0000
CISE	-20	217.1	253.4	0	0.000	0.0000	0.0000
CISE	-20	145.3	168.5	0	0.000	0.0000	0.0000
CISE	-20	161.2	187.2	0	0.000	0.0000	0.0000
CISE	-20	131.9	152.5	0	0.000	0.0000	0.0000
CISE	-20	216.4	252.6	0	0.000	0.0000	0.0000
CISE	-20	125.0	144.4	0	0.000	0.0000	0.0000
CISE	-20	378.7	444.9	0	0.000	0.0000	0.0000
CISE	-20	246.1	287.9	0	0.000	0.0000	0.0000
CISE	-20	250.9	293.5	0	0.000	0.0000	0.0000
CISE	-20	251.5	294.3	0	0.000	0.0000	0.0000
CISE	-20	284.0	332.7	0	0.000	0.0000	0.0000
CISE	-20	261.1	305.6	0	0.000	0.0000	0.0000
CISE	-20	351.6	412.8	0	0.000	0.0000	0.0000
CISE	-20	258.5	302.5	0	0.000	0.0000	0.0000
GKSS	-20	201.3	234.8	0	0.000	0.0000	0.0000
GKSS	-20	110.9	127.7	0	0.000	0.0000	0.0000
GKSS	-20	197.7	230.5	0	0.000	0.0000	0.0000
GKSS	-20	198.9	231.9	0	0.000	0.0000	0.0000
GKSS	-20	200.6	234.0	0	0.000	0.0000	0.0000
GKSS	-20	165.7	192.6	0	0.000	0.0000	0.0000
GKSS	-20	280.1	328.0	0	0.000	0.0000	0.0000
GKSS	-20	279.5	327.3	0	0.000	0.0000	0.0000
GKSS	-20	257.6	301.4	0	0.000	0.0000	0.0000
GKSS	-20	265.2	310.4	0	0.000	0.0000	0.0000
GKSS	-20	156.7	212.6	0	0.000	0.0000	0.0000
GKSS	-20	221.7	304.1	0	0.000	0.0000	0.0000
GKSS	-20	193.9	264.9	0	0.000	0.0000	0.0000
GKSS	-20	191.7	261.9	0	0.000	0.0000	0.0000
GKSS	-20	184.4	251.6	0	0.000	0.0000	0.0000
NE	-20	186.7	254.8	0	0.000	0.0000	0.0000
NE	-20	184.4	251.6	0	0.000	0.0000	0.0000
NE	-20	193.9	264.9	0	0.000	0.0000	0.0000
NE	-20	204.4	279.8	0	0.000	0.0000	0.0000
NE	-20	224.0	307.4	0	0.000	0.0000	0.0000
NE	-20	153.4	207.9	0	0.000	0.0000	0.0000
NE	-20	222.6	305.4	0	0.000	0.0000	0.0000
NE	-20	162.0	220.0	0	0.000	0.0000	0.0000
NE	-20	187.8	256.4	0	0.000	0.0000	0.0000
NE	-20	198.2	271.0	0	0.000	0.0000	0.0000
SCK-CEN	-10	280.0	279.0	0	0.000	0.0000	0.0000
SCK-CEN	-10	281.2	280.2	0	0.000	0.0000	0.0000
SCK-CEN	-10	282.6	281.5	0	0.000	0.0000	0.0000
SCK-CEN	-10	284.0	282.9	0	0.000	0.0000	0.0000
SCK-CEN	-10	280.9	279.9	0	0.000	0.0000	0.0000
GKSS	0	196.8	168.1	0	0.000	0.0000	0.0000
GKSS	0	193.7	165.5	0	0.000	0.0000	0.0000
GKSS	0	192.9	164.8	0	0.000	0.0000	0.0000
GKSS	0	196.7	168.0	0	0.000	0.0000	0.0000
GKSS	0	196.1	167.5	0	0.000	0.0000	0.0000
GKSS	0	194.7	166.3	0	0.000	0.0000	0.0000
GKSS	0	196.3	167.7	0	0.000	0.0000	0.0000
GKSS	0	195.9	167.3	0	0.000	0.0000	0.0000
GKSS	0	195.2	166.8	0	0.000	0.0000	0.0000
GKSS	0	193.3	165.1	0	0.000	0.0000	0.0000
SCK-CEN	0	198.4	169.4	0	0.000	0.0000	0.0000
SCK-CEN	0	199.1	170.0	0	0.000	0.0000	0.0000
SCK-CEN	0	198.2	169.2	0	0.000	0.0000	0.0000
SCK-CEN	0	197.6	168.8	0	0.000	0.0000	0.0000
SCK-CEN	0	201.2	171.8	0	0.000	0.0000	0.0000
SCK-CEN	0	200.0	170.8	0	0.000	0.0000	0.0000
SCK-CEN	0	197.4	168.6	0	0.000	0.0000	0.0000

SCK-CEN	0	199.6	170.4	0	0.000	0.0000	0.0000
SCK-CEN	0	203.4	173.6	0	0.000	0.0000	0.0000
SCK-CEN	0	199.2	170.1	0	0.000	0.0000	0.0000
SCK-CEN	0	200.5	171.2	0	0.000	0.0000	0.0000
SCK-CEN	0	202.4	172.7	0	0.000	0.0000	0.0000
SCK-CEN	0	197.2	168.4	0	0.000	0.0000	0.0000
SCK-CEN	0	205.8	175.6	0	0.000	0.0000	0.0000
SCK-CEN	0	205.5	175.4	0	0.000	0.0000	0.0000
SCK-CEN	0	202.4	172.7	0	0.000	0.0000	0.0000
SCK-CEN	0	203.4	173.6	0	0.000	0.0000	0.0000
SCK-CEN	0	205.2	175.1	0	0.000	0.0000	0.0000
SCK-CEN	0	202.3	172.7	0	0.000	0.0000	0.0000
SCK-CEN	0	201.6	172.1	0	0.000	0.0000	0.0000
GKSS	0	282.4	281.4	0	0.000	0.0000	0.0000
GKSS	0	283.7	282.7	0	0.000	0.0000	0.0000
GKSS	0	284.9	283.9	0	0.000	0.0000	0.0000
GKSS	0	282.8	281.8	0	0.000	0.0000	0.0000
GKSS	0	284.4	283.4	0	0.000	0.0000	0.0000
GKSS	0	284.9	283.8	0	0.000	0.0000	0.0000
GKSS	0	279.6	278.6	0	0.000	0.0000	0.0000
GKSS	0	283.9	282.8	0	0.000	0.0000	0.0000
GKSS	0	285.7	284.7	0	0.000	0.0000	0.0000
GKSS	0	283.0	281.9	0	0.000	0.0000	0.0000
SCK-CEN	0	277.0	276.0	0	0.000	0.0000	0.0000
SCK-CEN	0	276.7	275.7	0	0.000	0.0000	0.0000
SCK-CEN	0	276.9	275.9	0	0.000	0.0000	0.0000
SCK-CEN	0	277.9	276.8	0	0.000	0.0000	0.0000
SCK-CEN	0	276.9	275.9	0	0.000	0.0000	0.0000
SCK-CEN	0	278.2	277.2	0	0.000	0.0000	0.0000
SCK-CEN	0	278.0	277.0	0	0.000	0.0000	0.0000
SCK-CEN	0	275.9	274.9	0	0.000	0.0000	0.0000
SCK-CEN	0	277.6	276.6	0	0.000	0.0000	0.0000
SCK-CEN	0	278.2	277.2	0	0.000	0.0000	0.0000
SCK-CEN	0	277.3	276.3	0	0.000	0.0000	0.0000
VTT	0	280.3	279.3	0	0.000	0.0000	0.0000
VTT	0	275.5	274.5	0	0.000	0.0000	0.0000
VTT	0	280.3	279.3	0	0.000	0.0000	0.0000
VTT	0	275.2	274.2	0	0.000	0.0000	0.0000
VTT	0	278.0	277.0	0	0.000	0.0000	0.0000
VTT	0	278.5	277.5	0	0.000	0.0000	0.0000
VTT	0	279.7	278.6	0	0.000	0.0000	0.0000
VTT	0	267.2	266.2	0	0.000	0.0000	0.0000
VTT	0	279.8	278.8	0	0.000	0.0000	0.0000
VTT	0	278.6	277.6	0	0.000	0.0000	0.0000
VTT	0	278.3	277.3	0	0.000	0.0000	0.0000
VTT	0	280.0	278.9	0	0.000	0.0000	0.0000
VTT	0	274.3	273.3	0	0.000	0.0000	0.0000
VTT	0	276.0	275.0	0	0.000	0.0000	0.0000
VTT	0	278.7	277.7	0	0.000	0.0000	0.0000
VTT	0	278.0	277.0	0	0.000	0.0000	0.0000
VTT	0	279.1	278.0	0	0.000	0.0000	0.0000
VTT	0	278.6	277.5	0	0.000	0.0000	0.0000
VTT	0	279.4	278.4	0	0.000	0.0000	0.0000
VTT	0	276.2	275.2	0	0.000	0.0000	0.0000
GKSS	0	191.3	222.9	0	0.000	0.0000	0.0000
GKSS	0	269.2	315.2	0	0.000	0.0000	0.0000
GKSS	0	281.2	329.4	0	0.000	0.0000	0.0000
GKSS	0	242.5	283.5	0	0.000	0.0000	0.0000
GKSS	0	318.3	373.3	0	0.000	0.0000	0.0000
GKSS	0	395.4	464.7	0	0.000	0.0000	0.0000
GKSS	0	396.5	465.9	0	0.000	0.0000	0.0000
GKSS	0	394.9	464.1	0	0.000	0.0000	0.0000
GKSS	0	396.3	465.7	0	0.000	0.0000	0.0000
GKSS	0	266.6	312.1	0	0.000	0.0000	0.0000
GKSS	0	395.2	464.4	0	0.000	0.0000	0.0000
GKSS	0	362.9	426.1	0	0.000	0.0000	0.0000
GKSS	0	331.8	389.3	0	0.000	0.0000	0.0000
GKSS	0	227.1	265.3	0	0.000	0.0000	0.0000
GKSS	0	309.5	362.9	0	0.000	0.0000	0.0000
GKSS	0	395.4	464.7	0	0.000	0.0000	0.0000
GKSS	0	210.9	246.1	0	0.000	0.0000	0.0000
GKSS	0	394.9	464.1	0	0.000	0.0000	0.0000
GKSS	0	211.4	246.7	0	0.000	0.0000	0.0000
GKSS	0	393.9	462.8	0	0.000	0.0000	0.0000
GKSS	0	263.4	308.3	0	0.000	0.0000	0.0000
GKSS	0	393.3	462.1	0	0.000	0.0000	0.0000
GKSS	0	386.7	454.3	0	0.000	0.0000	0.0000
GKSS	0	376.2	441.9	0	0.000	0.0000	0.0000
GKSS	0	394.4	463.5	0	0.000	0.0000	0.0000
GKSS	0	306.7	359.6	0	0.000	0.0000	0.0000
GKSS	0	394.8	464.0	0	0.000	0.0000	0.0000
GKSS	0	393.9	462.8	0	0.000	0.0000	0.0000
GKSS	0	246.4	288.2	0	0.000	0.0000	0.0000
GKSS	0	320.1	375.4	0	0.000	0.0000	0.0000
CISE	0	233.3	320.4	0	0.000	0.0000	0.0000
CISE	0	238.2	327.4	0	0.000	0.0000	0.0000
CISE	0	208.3	285.2	0	0.000	0.0000	0.0000

CISE	0	421.7	585.8	0	0.000	0.0000	0.0000
CISE	0	226.7	311.2	0	0.000	0.0000	0.0000
CISE	0	267.0	367.9	0	0.000	0.0000	0.0000
CISE	0	163.0	221.4	0	0.000	0.0000	0.0000
CISE	0	165.8	225.4	0	0.000	0.0000	0.0000
CISE	0	285.9	394.6	0	0.000	0.0000	0.0000
CISE	0	342.0	473.5	0	0.000	0.0000	0.0000
GKSS	0	314.9	435.4	0	0.000	0.0000	0.0000
GKSS	0	307.6	425.1	0	0.000	0.0000	0.0000
GKSS	0	383.0	531.4	0	0.000	0.0000	0.0000
GKSS	0	332.6	460.4	0	0.000	0.0000	0.0000
GKSS	0	223.6	306.8	0	0.000	0.0000	0.0000
GKSS	0	442.2	614.7	0	0.000	0.0000	0.0000

4. Master curve fit to data

Temperature adj. = 1.6 °C (est.) Stand. dev. on T_0 = 1.1 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-154	54.8	49.3				
-154	49.8	45.0				
-154	37.8	35.0				
-154	33.0	31.0				
-154	38.9	35.9				
-154	24.2	23.6				
-154	47.4	43.0				
-154	46.5	42.3				
-154	31.4	29.6				
-154	39.2	36.1				
-154	24.2	23.6				
-154	33.0	31.0				
-154	41.0	37.6				
-154	31.7	29.9				
-154	35.2	32.8				
-154	44.4	40.5				
-154	41.5	38.1				
-154	32.7	30.7				
-154	34.3	32.0				
-154	36.7	34.0				
-154	39.7	36.6				
-154	46.1	41.9				
-154	34.6	32.3				
-154	35.8	33.3				
-154	29.3	27.9				
-154	28.6	27.2				
-154	38.6	35.7				
-154	44.4	40.5				
-154	48.9	44.3				
-154	38.9	35.9				
-154	36.7	34.0				
-154	31.7	29.9				
-154	41.5	41.5				
-154	42.2	42.2				
-154	50.0	50.0				
-154	34.0	34.0				
-154	41.7	41.7				
-154	46.1	46.1				
-154	44.2	44.2				
-154	36.7	36.7				
-154	29.0	29.0				
-154	53.0	53.0				
-154	39.4	39.4				
-154	29.0	29.0				
-154	34.6	34.6				
-154	33.0	33.0				
-154	38.1	38.1				
-154	28.6	28.6				
-154	28.6	28.6				
-154	38.6	38.6				
-154	36.4	36.4				
-154	33.4	33.4				
-154	36.9	36.9				
-154	31.1	31.1				
-154	34.3	34.3				
-154	30.4	30.4				
-154	49.6	49.6				
-154	41.0	41.0				
-154	34.0	34.0				
-154	30.7	30.7				
-154	41.2	41.2				
-154	26.7	26.7				
-154	35.5	35.5				
-154	33.4	33.4				
-154	36.7	36.7				
-154	32.4	32.4				
-154	45.1	45.1				
-154	33.4	33.4				
-154	34.0	34.0				
-154	30.7	30.7				
-154	26.7	26.7				
-154	33.7	36.3				
-154	42.7	47.0				
-154	37.2	40.5				
-154	54.4	60.9				
-154	34.6	37.4				
-154	44.2	48.8				
-154	29.7	31.5				
-154	36.4	39.5				
-154	36.4	39.5				

-154	28.2	29.8
-154	28.2	29.8
-154	30.0	32.0
-154	36.4	39.5
-154	37.5	40.8
-154	30.0	32.0
-154	30.7	32.8
-154	30.4	32.4
-154	30.7	32.8
-154	31.7	34.0
-154	41.7	45.9
-154	37.2	40.5
-154	34.9	37.7
-154	38.3	41.8
-154	31.4	33.6
-154	33.7	36.3
-154	32.7	35.1
-154	43.0	47.3
-154	32.7	35.1
-154	30.0	32.0
-154	36.9	40.2
-154	33.4	35.9
-154	30.0	32.0
-110	98.1	85.6
-110	59.0	52.8
-110	80.0	70.5
-110	57.2	51.3
-110	88.3	77.4
-110	96.2	84.1
-110	81.6	71.8
-110	66.9	59.4
-110	85.6	75.2
-110	86.8	76.2
-110	114.2	99.2
-110	73.5	65.0
-110	92.7	81.1
-110	77.5	68.4
-110	61.5	54.9
-110	51.8	46.8
-110	73.6	65.1
-110	52.8	47.6
-110	41.2	37.9
-110	115.3	100.1
-110	73.2	64.7
-110	74.0	65.4
-110	67.5	59.9
-110	71.0	62.9
-110	53.4	48.1
-110	96.5	84.3
-110	71.3	63.1
-110	71.7	63.5
-110	81.7	71.9
-110	64.0	57.0
-110	74.2	65.6
-110	70.4	62.4
-110	91.2	79.9
-110	72.0	63.7
-110	64.8	57.7
-110	79.2	69.8
-110	52.2	47.1
-110	82.9	72.9
-110	93.2	81.6
-110	75.4	66.6
-110	75.0	66.3
-110	78.6	69.3
-110	94.8	82.9
-110	98.1	85.6
-110	98.5	86.0
-110	104.9	91.4
-110	69.9	62.0
-110	81.6	71.8
-110	55.2	49.6
-110	105.6	92.0
-110	101.5	88.6
-110	73.7	65.2
-110	97.5	85.2
-110	75.9	67.0
-110	48.3	43.8
-91	127.0	110.0
-91	121.8	105.6
-91	70.5	62.5
-91	94.2	82.4
-91	127.3	110.3
-91	119.9	104.0
-91	104.5	91.1
-91	78.6	69.3
-91	98.6	86.1

-91	161.6	139.0
-91	91.3	80.0
-91	115.3	100.1
-91	122.4	106.1
-91	126.3	109.4
-91	108.3	94.3
-91	66.9	59.4
-91	126.7	109.8
-91	69.6	61.7
-91	121.4	105.3
-91	90.0	78.9
-91	153.9	132.6
-91	64.6	57.5
-91	127.2	110.1
-91	99.7	87.0
-91	101.3	88.4
-91	140.4	121.3
-91	78.2	68.9
-91	109.0	94.9
-91	103.9	90.5
-91	126.8	109.8
-91	111.7	97.1
-91	68.6	68.6
-91	81.6	81.6
-91	55.9	55.9
-91	98.8	98.8
-91	71.9	71.9
-91	111.0	111.0
-91	93.5	93.5
-91	79.9	79.9
-91	98.4	98.4
-91	101.1	101.1
-91	79.6	79.6
-91	99.7	99.7
-91	108.1	108.1
-91	93.4	93.4
-91	62.0	62.0
-91	107.1	107.1
-91	145.3	145.3
-91	76.3	76.3
-91	126.5	126.5
-91	126.1	126.1
-91	128.5	128.5
-91	111.4	111.4
-91	130.4	130.4
-91	134.8	134.8
-91	157.3	157.3
-91	105.2	105.2
-91	109.8	109.8
-91	84.9	84.9
-91	62.8	62.8
-91	97.5	97.5
-91	80.2	80.2
-91	134.4	134.4
-91	65.1	65.1
-91	118.6	118.6
-91	67.3	76.3
-91	162.9	190.0
-91	100.0	115.1
-91	91.2	104.7
-91	106.2	122.5
-91	83.2	95.2
-91	91.8	105.3
-91	94.7	108.8
-91	92.9	106.7
-91	69.9	79.4
-91	93.1	107.0
-91	97.9	112.6
-91	73.7	83.9
-91	82.0	93.7
-91	76.3	86.9
-91	93.1	107.0
-91	83.7	95.8
-91	82.1	93.9
-91	86.8	99.5
-91	86.7	99.3
-91	92.3	106.0
-91	83.1	95.1
-91	88.9	101.9
-91	64.3	72.7
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-91	94.2	108.3
-91	78.7	89.8
-91	73.0	83.1
-91	64.2	72.5
-91	98.9	113.9
-91	103.2	137.6

-91	84.4	111.0
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-91	73.0	95.0
-91	73.3	95.4
-91	53.8	67.8
-91	69.5	90.0
-91	65.5	84.3
-91	79.6	104.3
-91	69.8	90.4
-91	90.3	119.4
-91	88.0	116.2
-60	234.1	200.0
-60	114.4	99.4
-60	130.7	113.1
-60	106.7	92.9
-60	161.0	138.5
-60	200.7	171.9
-60	125.2	108.4
-60	145.1	125.2
-60	91.9	80.4
-60	128.1	110.9
-60	164.4	141.4
-60	192.2	164.8
-60	166.3	143.0
-60	177.7	152.6
-60	167.6	144.1
-60	128.6	111.3
-60	377.4	320.5
-60	98.4	85.9
-60	278.4	237.3
-60	240.7	205.6
-60	380.0	322.7
-60	171.9	147.7
-60	136.8	118.2
-60	135.8	117.4
-60	214.7	183.7
-60	299.5	255.0
-60	203.7	174.5
-60	116.0	100.7
-60	221.9	189.8
-60	167.6	144.1
-60	89.8	78.7
-60	156.3	134.6
-60	186.8	160.2
-60	213.5	182.7
-60	164.6	141.6
-60	280.1	238.7
-60	185.9	159.5
-60	127.7	110.6
-60	205.0	175.6
-60	115.6	100.4
-60	107.5	93.6
-60	164.6	141.6
-60	172.0	147.8
-60	108.5	94.5
-60	119.0	103.2
-60	153.5	132.3
-60	158.9	136.8
-60	137.5	118.8
-60	119.5	103.7
-60	130.7	113.1
-60	172.6	148.3
-60	84.5	74.2
-60	244.6	208.9
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-60	163.6	140.7
-60	201.4	172.6
-60	137.8	119.0
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-60	99.2	86.6
-60	173.4	149.0
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-60	186.0	186.0
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-60	111.7	111.7
-60	143.9	143.9
-60	105.4	105.4
-60	154.0	154.0
-60	176.2	176.2
-60	131.9	131.9
-60	203.9	203.9
-60	142.7	142.7
-60	134.5	134.5

-60	130.1	130.1
-60	142.6	142.6
-60	119.7	119.7
-60	141.3	141.3
-60	175.9	175.9
-60	119.6	119.6
-60	102.4	102.4
-60	99.0	99.0
-60	115.1	115.1
-60	172.9	172.9
-60	120.5	120.5
-60	165.2	165.2
-60	125.6	125.6
-60	126.7	126.7
-60	100.4	100.4
-60	131.1	131.1
-60	185.1	185.1
-60	163.6	163.6
-60	126.5	126.5
-60	164.7	164.7
-60	192.7	192.7
-60	134.5	134.5
-60	140.8	140.8
-60	295.3	347.4
-60	217.7	255.1
-60	219.8	257.6
-60	165.9	193.5
-60	109.9	126.9
-60	131.9	153.0
-60	136.2	158.2
-60	154.0	179.4
-60	115.9	134.1
-60	150.4	175.1
-60	153.6	178.8
-60	183.8	214.7
-60	236.1	277.0
-60	149.4	173.9
-60	179.5	209.7
-60	177.6	207.4
-60	188.3	220.2
-60	134.5	156.1
-60	243.6	285.9
-60	155.7	181.4
-60	164.0	191.3
-60	146.5	170.4
-60	119.9	138.8
-60	79.9	91.2
-60	140.9	163.7
-60	115.3	133.3
-60	137.0	159.2
-60	166.9	194.7
-60	225.4	264.2
-60	200.7	234.9
-40	171.0	147.0
-40	569.4	482.0
-40	169.4	145.6
-40	548.7	464.6
-40	529.9	448.8
-40	318.5	271.0
-40	574.8	486.5
-40	360.8	306.6
-40	343.8	292.3
-40	235.8	201.5
-40	529.9	448.8
-40	496.5	420.7
-40	600.0	507.7
-40	113.7	98.8
-40	229.6	196.2
-40	154.2	132.8
-40	221.3	189.3
-40	486.7	412.4
-40	243.8	208.2
-40	202.5	173.4
-40	180.6	155.1
-40	206.7	177.0
-40	240.7	205.6
-40	270.8	230.9
-40	186.4	159.9
-40	255.8	218.3
-40	231.2	197.6
-40	339.4	288.6
-40	403.1	342.2
-40	399.2	338.8
-40	187.3	187.3
-40	101.5	101.5
-40	140.3	140.3
-40	150.2	150.2

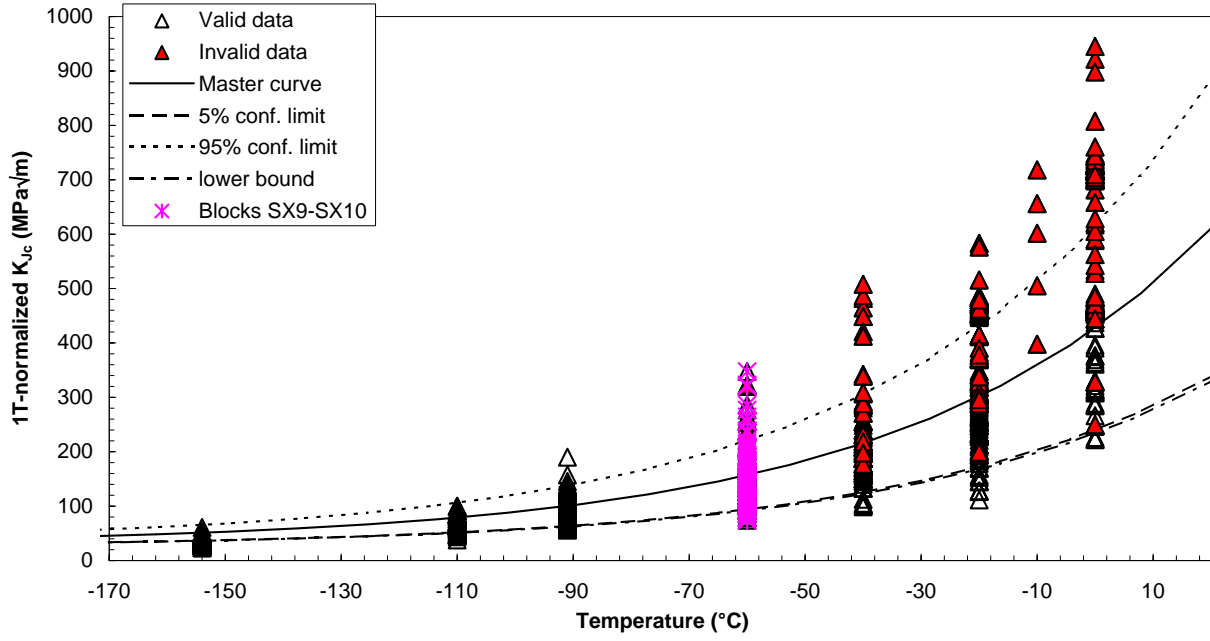
-40	187.3	187.3
-40	211.4	211.4
-40	160.5	160.5
-40	214.6	214.6
-40	188.3	188.3
-40	239.3	239.3
-40	112.8	112.8
-40	239.0	239.0
-40	284.9	284.9
-40	254.7	254.7
-40	270.9	270.9
-40	187.0	187.0
-40	170.1	170.1
-40	256.4	256.4
-40	171.4	171.4
-40	103.1	103.1
-40	230.0	230.0
-40	210.0	210.0
-40	198.2	198.2
-40	150.2	150.2
-40	226.8	226.8
-40	158.1	158.1
-40	256.4	256.4
-40	207.6	207.6
-40	213.5	213.5
-40	254.6	254.6
-40	240.0	240.0
-40	309.2	309.2
-40	125.9	146.0
-40	128.9	149.5
-40	198.5	232.3
-40	212.0	248.4
-40	138.6	161.1
-40	187.7	219.5
-40	173.0	201.9
-40	179.5	209.7
-40	152.6	177.7
-40	153.6	178.9
-40	144.6	168.2
-40	150.7	175.5
-40	139.1	161.6
-40	183.6	214.5
-40	142.0	165.1
-40	187.2	218.8
-40	172.2	201.0
-40	198.0	231.7
-40	130.4	151.3
-40	141.7	164.7
-40	134.5	156.1
-40	115.5	133.5
-40	91.7	105.2
-40	141.1	164.0
-40	239.1	280.6
-40	243.4	285.7
-40	191.9	224.5
-40	146.8	170.8
-40	161.4	188.1
-40	142.3	165.4
-20	128.7	111.4
-20	146.9	126.7
-20	402.8	341.9
-20	409.4	347.5
-20	530.5	449.3
-20	532.2	450.7
-20	534.6	452.8
-20	536.1	454.0
-20	536.1	454.0
-20	536.6	454.4
-20	538.6	456.1
-20	540.5	457.7
-20	543.8	460.5
-20	549.2	465.0
-20	553.7	468.8
-20	556.1	470.8
-20	556.3	471.0
-20	560.6	474.6
-20	565.8	479.0
-20	570.1	482.6
-20	571.1	483.4
-20	233.1	199.2
-20	389.8	331.0
-20	487.9	413.5
-20	438.3	371.8
-20	571.4	483.6
-20	560.7	474.7
-20	561.1	475.0
-20	575.1	486.8

-20	557.5	472.0
-20	572.5	484.6
-20	202.5	202.5
-20	194.7	194.7
-20	262.8	262.8
-20	187.9	187.9
-20	275.8	275.8
-20	261.8	261.8
-20	371.0	371.0
-20	369.1	369.1
-20	462.1	462.1
-20	319.7	319.7
-20	583.1	583.1
-20	231.9	231.9
-20	382.0	382.0
-20	295.9	295.9
-20	576.4	576.4
-20	411.7	411.7
-20	306.4	306.4
-20	324.7	324.7
-20	282.5	282.5
-20	247.2	247.2
-20	233.2	233.2
-20	317.5	317.5
-20	515.6	515.6
-20	263.2	263.2
-20	184.4	184.4
-20	286.9	286.9
-20	341.4	341.4
-20	415.0	415.0
-20	327.9	327.9
-20	170.9	170.9
-20	308.8	308.8
-20	376.5	376.5
-20	228.2	228.2
-20	371.7	371.7
-20	291.6	291.6
-20	337.7	337.7
-20	390.5	390.5
-20	227.3	227.3
-20	201.3	201.3
-20	212.5	212.5
-20	288.4	288.4
-20	479.1	479.1
-20	377.9	377.9
-20	269.6	269.6
-20	184.4	184.4
-20	241.6	241.6
-20	146.4	146.4
-20	299.4	299.4
-20	156.7	156.7
-20	295.6	295.6
-20	167.4	195.3
-20	153.5	178.8
-20	211.2	247.4
-20	220.3	258.3
-20	227.9	267.2
-20	211.1	247.3
-20	217.1	254.4
-20	145.3	169.1
-20	161.2	187.9
-20	131.9	153.0
-20	216.4	253.6
-20	125.0	144.9
-20	378.7	446.6
-20	246.1	288.9
-20	250.9	294.6
-20	251.5	295.4
-20	284.0	334.0
-20	261.1	306.7
-20	351.6	414.3
-20	258.5	303.6
-20	201.3	235.6
-20	110.9	128.1
-20	197.7	231.3
-20	198.9	232.8
-20	200.6	234.8
-20	165.7	193.3
-20	280.1	329.3
-20	279.5	328.6
-20	257.6	302.5
-20	265.2	311.6
-20	156.7	213.4
-20	221.7	305.2
-20	193.9	265.9
-20	191.7	262.8
-20	184.4	252.6

-20	186.7	255.8
-20	184.4	252.6
-20	193.9	265.9
-20	204.4	280.8
-20	224.0	308.5
-20	153.4	208.6
-20	222.6	306.5
-20	162.0	220.8
-20	187.8	257.3
-20	198.2	272.0
-10	656.0	656.0
-10	397.8	397.8
-10	718.1	718.1
-10	601.6	601.6
-10	505.3	505.3
0	541.9	458.9
0	547.0	463.1
0	538.7	456.2
0	540.0	457.3
0	544.8	461.3
0	534.8	452.9
0	557.2	471.7
0	545.0	461.5
0	546.1	462.4
0	549.2	465.0
0	565.1	478.4
0	571.6	483.8
0	553.4	468.6
0	293.2	249.7
0	544.1	460.7
0	552.2	467.5
0	558.0	472.4
0	553.5	468.6
0	557.6	472.1
0	552.4	467.7
0	555.6	470.4
0	558.2	472.6
0	550.6	466.2
0	560.8	474.8
0	569.6	482.2
0	552.5	467.8
0	578.5	489.6
0	556.0	470.7
0	543.8	460.5
0	556.3	471.0
0	327.6	327.6
0	681.4	681.4
0	700.8	700.8
0	698.2	698.2
0	708.4	708.4
0	701.5	701.5
0	724.9	724.9
0	717.4	717.4
0	705.8	705.8
0	709.5	709.5
0	716.7	716.7
0	714.1	714.1
0	658.5	658.5
0	747.5	747.5
0	709.0	709.0
0	719.2	719.2
0	444.5	444.5
0	699.8	699.8
0	704.0	704.0
0	729.5	729.5
0	714.0	714.0
0	725.6	725.6
0	730.2	730.2
0	737.8	737.8
0	590.7	590.7
0	730.3	730.3
0	741.8	741.8
0	744.2	744.2
0	527.7	527.7
0	620.4	620.4
0	727.0	727.0
0	730.3	730.3
0	542.6	542.6
0	726.7	726.7
0	718.7	718.7
0	717.1	717.1
0	721.2	721.2
0	725.3	725.3
0	727.9	727.9
0	727.0	727.0
0	718.5	718.5
0	191.3	223.7

0	269.2	316.4				
0	281.2	330.6				
0	242.5	284.6				
0	318.3	374.7				
0	476.2	562.5				
0	511.7	604.8				
0	621.3	735.0				
0	531.3	628.0				
0	266.6	313.3				
0	599.3	709.0				
0	362.9	427.7				
0	331.8	390.8				
0	227.1	266.2				
0	309.5	364.2				
0	628.6	743.7				
0	210.9	247.0				
0	410.7	484.7				
0	211.4	247.6				
0	778.3	921.7				
0	263.4	309.5				
0	682.2	807.5				
0	386.7	456.1				
0	376.2	443.6				
0	642.5	760.3				
0	306.7	361.0				
0	758.4	898.1				
0	797.9	945.1				
0	246.4	289.2				
0	320.1	376.8				
0	233.3	321.6				
0	238.2	328.6				
0	208.3	286.3				
0	421.7	588.1				
0	226.7	312.4				
0	267.0	369.3				
0	163.0	222.2				
0	165.8	226.2				
0	285.9	396.1				
0	342.0	475.3				
0	314.9	437.1				
0	307.6	426.7				
0	383.0	533.4				
0	332.6	462.1				
0	223.6	307.9				
0	442.2	617.1				
-174			44.6	33.3	55.8	33.0
-161.875			48.3	35.3	61.3	35.0
-149.75			53.1	37.9	68.3	37.5
-137.625			59.0	41.1	77.0	40.6
-125.5			66.6	45.1	88.0	44.6
-113.375			76.0	50.3	101.8	49.5
-101.25			88.0	56.7	119.2	55.8
-89.125			103.0	64.8	141.2	63.7
-77			121.9	75.0	168.8	73.6
-64.875			145.7	87.9	203.5	86.1
-52.75			175.7	104.1	247.3	101.8
-40.625			213.4	124.5	302.4	121.6
-28.5			261.0	150.1	371.8	146.5
-16.375			320.8	182.4	459.1	177.9
-4.25			396.1	223.1	569.1	217.3
7.875			491.0	274.3	707.6	267.1
20			610.4	338.8	882.0	329.7

MASTER CURVE FOR 1TCT WITH CONFIDENCE LIMITS (E1921-05 analysis)
EURO toughness dataset - Complete dataset



MASTER CURVE ANALYSIS OF RANDOM INHOMOGENEITIES

Single Point Estimation Method

Step 2: Single point estimation

1. Calculation of the maximum value of T_o (based on a single data point) and establishment of T_o for the data set

Specimen code	T (°C)	$K_{Jc[exp]}$ (MPa√m)	K_{Jc-1T} (MPa√m)	$K_{analysis}$ (MPa√m)	δ_i	$T_{o(i)}$ (°C)
GKSS	-154	54.8	49.1	49.1	0	-
GKSS	-154	49.8	44.9	49.8	0	-
GKSS	-154	37.8	34.9	37.8	0	-
GKSS	-154	33.0	30.9	33.0	0	-
GKSS	-154	38.9	35.8	38.9	0	-
GKSS	-154	24.2	23.6	24.2	(*)	-
GKSS	-154	47.4	43.0	47.4	0	-
GKSS	-154	46.5	42.2	46.5	0	-
GKSS	-154	31.4	29.6	31.4	(*)	-
GKSS	-154	39.2	36.0	39.2	0	-
GKSS	-154	24.2	23.6	24.2	(*)	-
SIEMENS	-154	33.0	30.9	33.0	0	-
SIEMENS	-154	41.0	37.6	41.0	0	-
SIEMENS	-154	31.7	29.8	31.7	(*)	-
SIEMENS	-154	35.2	32.7	35.2	0	-
SIEMENS	-154	44.4	40.5	44.4	0	-
SIEMENS	-154	41.5	38.0	41.5	0	-
SIEMENS	-154	32.7	30.7	32.7	0	-
SIEMENS	-154	34.3	32.0	34.3	0	-
SIEMENS	-154	36.7	34.0	36.7	0	-
SIEMENS	-154	39.7	36.5	39.7	0	-
SIEMENS	-154	46.1	41.8	46.1	0	-
SIEMENS	-154	34.6	32.2	34.6	0	-
SIEMENS	-154	35.8	33.2	35.8	0	-
SIEMENS	-154	29.3	27.8	29.3	(*)	-
SIEMENS	-154	28.6	27.2	28.6	(*)	-
SIEMENS	-154	38.6	35.6	38.6	0	-
SIEMENS	-154	44.4	40.5	44.4	0	-
SIEMENS	-154	48.9	44.2	48.9	0	-
SIEMENS	-154	38.9	35.8	38.9	0	-
SIEMENS	-154	36.7	34.0	36.7	0	-
SIEMENS	-154	31.7	29.8	31.7	(*)	-
GKSS	-154	41.5	41.4	41.5	0	-
GKSS	-154	42.2	42.2	42.2	0	-
GKSS	-154	50.0	49.9	50.0	0	-
GKSS	-154	34.0	33.9	34.0	0	-
GKSS	-154	41.7	41.7	41.7	0	-
GKSS	-154	46.1	46.0	46.1	0	-
GKSS	-154	44.2	44.1	44.2	0	-
GKSS	-154	36.7	36.6	36.7	0	-
GKSS	-154	29.0	28.9	29.0	(*)	-
GKSS	-154	53.0	52.9	53.0	0	-
GKSS	-154	39.4	39.3	39.4	0	-
GKSS	-154	29.0	28.9	29.0	(*)	-
SIEMENS	-154	34.6	34.5	34.6	0	-
SIEMENS	-154	33.0	33.0	33.0	0	-
SIEMENS	-154	38.1	38.0	38.1	0	-
SIEMENS	-154	28.6	28.6	28.6	(*)	-
SIEMENS	-154	28.6	28.6	28.6	(*)	-
SIEMENS	-154	38.6	38.5	38.6	0	-
SIEMENS	-154	36.4	36.3	36.4	0	-
SIEMENS	-154	33.4	33.3	33.4	0	-
SIEMENS	-154	36.9	36.9	36.9	0	-
SIEMENS	-154	31.1	31.0	31.1	0	-
SIEMENS	-154	34.3	34.2	34.3	0	-
SIEMENS	-154	30.4	30.4	30.4	0	-
SIEMENS	-154	49.6	49.5	49.6	0	-
SIEMENS	-154	41.0	40.9	41.0	0	-
SIEMENS	-154	34.0	33.9	34.0	0	-
SIEMENS	-154	30.7	30.7	30.7	0	-
SIEMENS	-154	41.2	41.2	41.2	0	-
SIEMENS	-154	26.7	26.7	26.7	(*)	-
SIEMENS	-154	35.5	35.4	35.5	0	-
SIEMENS	-154	33.4	33.3	33.4	0	-
SIEMENS	-154	36.7	36.6	36.7	0	-
SIEMENS	-154	32.4	32.4	32.4	0	-
SIEMENS	-154	45.1	45.0	45.1	0	-
SIEMENS	-154	33.4	33.3	33.4	0	-
SIEMENS	-154	34.0	33.9	34.0	0	-
SIEMENS	-154	30.7	30.7	30.7	0	-
SIEMENS	-154	26.7	26.7	26.7	(*)	-

$$T_{o(SP)} = -87.3 \text{ } ^\circ\text{C}$$

$$\sigma_{T_o(SP)} = 0 \text{ } ^\circ\text{C}$$

(*) $K_{Jc-1T} < 30 \text{ MPa}\sqrt{\text{m}}$

GKSS	-154	33.7	36.2	33.7	0	-
GKSS	-154	42.7	46.9	42.7	0	-
GKSS	-154	37.2	40.4	37.2	0	-
GKSS	-154	54.4	60.8	54.4	0	-
GKSS	-154	34.6	37.3	34.6	0	-
GKSS	-154	44.2	48.7	44.2	0	-
GKSS	-154	29.7	31.5	29.7	0	-
GKSS	-154	36.4	39.4	36.4	0	-
GKSS	-154	36.4	39.4	36.4	0	-
GKSS	-154	28.2	29.8	28.2	(*)	-
GKSS	-154	28.2	29.8	28.2	(*)	-
NE	-154	30.0	31.9	30.0	0	-
NE	-154	36.4	39.4	36.4	0	-
NE	-154	37.5	40.7	37.5	0	-
NE	-154	30.0	31.9	30.0	0	-
NE	-154	30.7	32.7	30.7	0	-
NE	-154	30.4	32.3	30.4	0	-
NE	-154	30.7	32.7	30.7	0	-
NE	-154	31.7	33.9	31.7	0	-
NE	-154	41.7	45.8	41.7	0	-
NE	-154	37.2	40.4	37.2	0	-
NE	-154	34.9	37.6	34.9	0	-
NE	-154	38.3	41.7	38.3	0	-
NE	-154	31.4	33.5	31.4	0	-
NE	-154	33.7	36.2	33.7	0	-
NE	-154	32.7	35.1	32.7	0	-
NE	-154	43.0	47.2	43.0	0	-
NE	-154	32.7	35.1	32.7	0	-
NE	-154	30.0	31.9	30.0	0	-
NE	-154	36.9	40.1	36.9	0	-
NE	-154	33.4	35.8	33.4	0	-
NE	-154	30.0	31.9	30.0	0	-
GKSS	-110	98.1	85.4	98.1	1	-98
GKSS	-110	59.0	52.7	59.0	1	-51
GKSS	-110	80.0	70.3	80.0	1	-81
GKSS	-110	57.2	51.2	57.2	1	-47
GKSS	-110	88.3	77.2	88.3	1	-89
GKSS	-110	96.2	83.9	96.2	1	-96
GKSS	-110	81.6	71.6	81.6	1	-83
GKSS	-110	66.9	59.3	66.9	1	-64
GKSS	-110	85.6	75.0	85.6	1	-87
GKSS	-110	86.8	76.0	86.8	1	-88
GKSS	-110	114.2	98.9	114.2	1	-109
GKSS	-110	73.5	64.8	73.5	1	-73
GKSS	-110	92.7	80.9	92.7	1	-93
GKSS	-110	77.5	68.2	77.5	1	-78
GKSS	-110	61.5	54.7	61.5	1	-55
GKSS	-110	51.8	46.7	51.8	1	-34
GKSS	-110	73.6	64.9	73.6	1	-73
GKSS	-110	52.8	47.5	52.8	1	-37
GKSS	-110	41.2	37.8	41.2	1	6
GKSS	-110	115.3	99.8	115.3	1	-110
GKSS	-110	73.2	64.5	73.2	1	-73
GKSS	-110	74.0	65.3	74.0	1	-74
GKSS	-110	67.5	59.8	67.5	1	-65
GKSS	-110	71.0	62.7	71.0	1	-70
GKSS	-110	53.4	48.0	53.4	1	-39
GKSS	-110	96.5	84.0	96.5	1	-96
GKSS	-110	71.3	63.0	71.3	1	-70
GKSS	-110	71.7	63.3	71.7	1	-71
GKSS	-110	81.7	71.7	81.7	1	-83
GKSS	-110	64.0	56.8	64.0	1	-60
GKSS	-110	74.2	65.4	74.2	1	-74
GKSS	-110	70.4	62.2	70.4	1	-69
GKSS	-110	91.2	79.6	91.2	1	-92
GKSS	-110	72.0	63.6	72.0	1	-71
GKSS	-110	64.8	57.5	64.8	1	-61
GKSS	-110	79.2	69.6	79.2	1	-80
GKSS	-110	52.2	47.0	52.2	1	-36
GKSS	-110	82.9	72.7	82.9	1	-84
GKSS	-110	93.2	81.3	93.2	1	-94
GKSS	-110	75.4	66.4	75.4	1	-76
GKSS	-110	75.0	66.1	75.0	1	-75
GKSS	-110	78.6	69.1	78.6	1	-79
GKSS	-110	94.8	82.7	94.8	1	-95
GKSS	-110	98.1	85.4	98.1	1	-98
GKSS	-110	98.5	85.7	98.5	1	-98
GKSS	-110	104.9	91.1	104.9	1	-103
GKSS	-110	69.9	61.8	69.9	1	-69
GKSS	-110	81.6	71.6	81.6	1	-83
GKSS	-110	55.2	49.5	55.2	1	-43
GKSS	-110	105.6	91.7	105.6	1	-103
GKSS	-110	101.5	88.3	101.5	1	-100
GKSS	-110	73.7	65.0	73.7	1	-74
GKSS	-110	97.5	84.9	97.5	1	-97

GKSS	-110	75.9	66.8	75.9	1	-76
GKSS	-110	48.3	43.7	48.3	1	-24
GKSS	-91	127.0	109.6	127.0	1	-98
GKSS	-91	121.8	105.2	121.8	1	-95
GKSS	-91	70.5	62.3	70.5	1	-50
GKSS	-91	94.2	82.2	94.2	1	-76
GKSS	-91	127.3	109.9	127.3	1	-98
GKSS	-91	119.9	103.7	119.9	1	-94
GKSS	-91	104.5	90.8	104.5	1	-84
GKSS	-91	78.6	69.1	78.6	1	-60
GKSS	-91	98.6	85.8	98.6	1	-79
GKSS	-91	161.6	138.6	161.6	1	-114
THA	-91	91.3	79.7	91.3	1	-73
THA	-91	115.3	99.8	115.3	1	-91
THA	-91	122.4	105.8	122.4	1	-95
THA	-91	126.3	109.1	126.3	1	-97
THA	-91	108.3	94.0	108.3	1	-86
THA	-91	66.9	59.3	66.9	1	-45
THA	-91	126.7	109.4	126.7	1	-98
THA	-91	69.6	61.6	69.6	1	-49
THA	-91	121.4	104.9	121.4	1	-95
THA	-91	90.0	78.7	90.0	1	-72
THA	-91	153.9	132.2	153.9	1	-111
THA	-91	64.6	57.4	64.6	1	-42
THA	-91	127.2	109.8	127.2	1	-98
THA	-91	99.7	86.7	99.7	1	-80
THA	-91	101.3	88.1	101.3	1	-81
THA	-91	140.4	120.9	140.4	1	-105
THA	-91	78.2	68.7	78.2	1	-60
THA	-91	109.0	94.6	109.0	1	-87
THA	-91	103.9	90.3	103.9	1	-83
THA	-91	126.8	109.5	126.8	1	-98
THA	-91	111.7	96.8	111.7	1	-89
GKSS	-91	68.6	68.4	68.6	1	-59
GKSS	-91	81.6	81.3	81.6	1	-75
GKSS	-91	55.9	55.8	55.9	1	-38
GKSS	-91	98.8	98.5	98.8	1	-90
GKSS	-91	71.9	71.7	71.9	1	-64
GKSS	-91	111.0	110.7	111.0	1	-98
GKSS	-91	93.5	93.2	93.5	1	-86
GKSS	-91	79.9	79.7	79.9	1	-73
GKSS	-91	98.4	98.1	98.4	1	-90
GKSS	-91	101.1	100.8	101.1	1	-92
TWI	-91	79.6	79.4	79.6	1	-73
TWI	-91	99.7	99.3	99.7	1	-91
TWI	-91	108.1	107.7	108.1	1	-96
TWI	-91	93.4	93.1	93.4	1	-86
TWI	-91	62.0	61.8	62.0	1	-50
TWI	-91	107.1	106.7	107.1	1	-96
TWI	-91	145.3	144.8	145.3	1	-117
TWI	-91	76.3	76.0	76.3	1	-69
TWI	-91	126.5	126.1	126.5	1	-108
TWI	-91	126.1	125.7	126.1	1	-107
TWI	-91	128.5	128.0	128.5	1	-109
TWI	-91	111.4	111.0	111.4	1	-99
TWI	-91	130.4	130.0	130.4	1	-110
TWI	-91	134.8	134.3	134.8	1	-112
TWI	-91	157.3	156.7	157.3	1	-122
TWI	-91	105.2	104.9	105.2	1	-95
TWI	-91	109.8	109.4	109.8	1	-98
TWI	-91	84.9	84.6	84.9	1	-78
TWI	-91	62.8	62.7	62.8	1	-51
TWI	-91	97.5	97.2	97.5	1	-89
TWI	-91	80.2	79.9	80.2	1	-73
TWI	-91	134.4	133.9	134.4	1	-112
TWI	-91	65.1	65.0	65.1	1	-54
TWI	-91	118.6	118.2	118.6	1	-103
GKSS	-91	67.3	76.1	67.3	1	-69
GKSS	-91	162.9	189.3	162.9	1	-134
GKSS	-91	100.0	114.7	100.0	1	-101
GKSS	-91	91.2	104.3	91.2	1	-94
GKSS	-91	106.2	122.1	106.2	1	-105
GKSS	-91	83.2	94.9	83.2	1	-87
GKSS	-91	91.8	105.0	91.8	1	-95
GKSS	-91	94.7	108.5	94.7	1	-97
GKSS	-91	92.9	106.4	92.9	1	-96
GKSS	-91	69.9	79.2	69.9	1	-72
NE	-91	93.1	106.6	93.1	1	-96
NE	-91	97.9	112.2	97.9	1	-99
NE	-91	73.7	83.7	73.7	1	-77
NE	-91	82.0	93.4	82.0	1	-86
NE	-91	76.3	86.7	76.3	1	-80
NE	-91	93.1	106.6	93.1	1	-96
NE	-91	83.7	95.5	83.7	1	-88
NE	-91	82.1	93.6	82.1	1	-86

NE	-91	86.8	99.2	86.8	1	-90
NE	-91	86.7	99.0	86.7	1	-90
NE	-91	92.3	105.7	92.3	1	-95
NE	-91	83.1	94.8	83.1	1	-87
NE	-91	88.9	101.6	88.9	1	-92
NE	-91	64.3	72.5	64.3	1	-65
NE	-91	101.6	116.7	101.6	1	-102
NE	-91	94.2	107.9	94.2	1	-97
NE	-91	78.7	89.5	78.7	1	-82
NE	-91	73.0	82.8	73.0	1	-76
NE	-91	64.2	72.3	64.2	1	-64
NE	-91	98.9	113.5	98.9	1	-100
GKSS	-91	103.2	137.2	103.2	1	-113
GKSS	-91	84.4	110.7	84.4	1	-98
GKSS	-91	97.0	128.5	97.0	1	-109
GKSS	-91	92.7	122.4	92.7	1	-106
GKSS	-91	96.8	128.2	96.8	1	-109
NE	-91	73.6	95.5	73.6	1	-88
NE	-91	73.0	94.7	73.0	1	-87
NE	-91	73.3	95.1	73.3	1	-87
NE	-91	53.8	67.7	53.8	1	-58
NE	-91	69.5	89.7	69.5	1	-83
NE	-91	65.5	84.0	65.5	1	-77
NE	-91	79.6	104.0	79.6	1	-94
NE	-91	69.8	90.1	69.8	1	-83
NE	-91	90.3	119.0	90.3	1	-104
NE	-91	88.0	115.8	88.0	1	-102
GKSS	-60	234.1	199.3	205.5	0	-
GKSS	-60	114.4	99.1	114.4	1	-59
GKSS	-60	130.7	112.7	130.7	1	-69
GKSS	-60	106.7	92.6	106.7	1	-54
GKSS	-60	161.0	138.1	161.0	1	-83
GKSS	-60	200.7	171.3	200.7	1	-97
GKSS	-60	125.2	108.1	125.2	1	-66
GKSS	-60	145.1	124.8	145.1	1	-76
GKSS	-60	91.9	80.2	91.9	1	-43
GKSS	-60	128.1	110.6	128.1	1	-67
GKSS	-60	164.4	140.9	164.4	1	-84
GKSS	-60	192.2	164.3	192.2	1	-94
GKSS	-60	166.3	142.5	166.3	1	-85
GKSS	-60	177.7	152.1	177.7	1	-89
GKSS	-60	167.6	143.6	167.6	1	-85
GKSS	-60	128.6	110.9	128.6	1	-68
GKSS	-60	377.4	319.3	203.0	0	-
GKSS	-60	98.4	85.7	98.4	1	-48
GKSS	-60	278.4	236.4	203.3	0	-
GKSS	-60	240.7	204.9	202.6	0	-
GKSS	-60	380.0	321.5	201.7	0	-
GKSS	-60	171.9	147.2	171.9	1	-87
GKSS	-60	136.8	117.8	136.8	1	-72
GKSS	-60	135.8	117.0	135.8	1	-71
GKSS	-60	214.7	183.1	200.8	0	-
GKSS	-60	299.5	254.1	202.8	0	-
GKSS	-60	203.7	173.9	202.0	0	-
GKSS	-60	116.0	100.4	116.0	1	-60
GKSS	-60	221.9	189.1	202.0	0	-
GKSS	-60	167.6	143.6	167.6	1	-85
GKSS	-60	89.8	78.5	89.8	1	-41
GKSS	-60	156.3	134.1	156.3	1	-81
GKSS	-60	186.8	159.7	186.8	1	-92
GKSS	-60	213.5	182.1	203.2	0	-
GKSS	-60	164.6	141.1	164.6	1	-84
GKSS	-60	280.1	237.9	202.6	0	-
GKSS	-60	185.9	159.0	185.9	1	-92
GKSS	-60	127.7	110.2	127.7	1	-67
GKSS	-60	205.0	175.0	201.2	0	-
GKSS	-60	115.6	100.0	115.6	1	-60
GKSS	-60	107.5	93.3	107.5	1	-55
SIEMENS	-60	164.6	141.1	164.6	1	-84
SIEMENS	-60	172.0	147.3	172.0	1	-87
SIEMENS	-60	108.5	94.2	108.5	1	-55
SIEMENS	-60	119.0	102.9	119.0	1	-62
SIEMENS	-60	153.5	131.8	153.5	1	-80
SIEMENS	-60	158.9	136.4	158.9	1	-82
SIEMENS	-60	137.5	118.4	137.5	1	-72
SIEMENS	-60	119.5	103.3	119.5	1	-62
SIEMENS	-60	130.7	112.8	130.7	1	-69
SIEMENS	-60	172.6	147.8	172.6	1	-87
SIEMENS	-60	84.5	74.0	84.5	1	-36
SIEMENS	-60	244.6	208.1	213.4	0	-
SIEMENS	-60	120.4	104.1	120.4	1	-63
SIEMENS	-60	104.5	90.8	104.5	1	-53
SIEMENS	-60	163.6	140.2	163.6	1	-84
SIEMENS	-60	201.4	172.0	201.4	1	-97
SIEMENS	-60	137.8	118.7	137.8	1	-72

SIEMENS	-60	173.0	148.1	173.0	1	-88
SIEMENS	-60	99.2	86.4	99.2	1	-49
SIEMENS	-60	173.4	148.4	173.4	1	-88
SIEMENS	-60	131.5	113.4	131.5	1	-69
GKSS	-60	186.0	185.3	186.0	1	-102
GKSS	-60	151.8	151.3	151.8	1	-89
GKSS	-60	111.7	111.3	111.7	1	-68
GKSS	-60	143.9	143.4	143.9	1	-85
GKSS	-60	105.4	105.1	105.4	1	-64
GKSS	-60	154.0	153.4	154.0	1	-90
GKSS	-60	176.2	175.6	176.2	1	-99
GKSS	-60	131.9	131.5	131.9	1	-80
GKSS	-60	203.9	203.2	203.9	1	-108
GKSS	-60	142.7	142.2	142.7	1	-85
TWI	-60	134.5	134.0	134.5	1	-81
TWI	-60	130.1	129.7	130.1	1	-79
TWI	-60	142.6	142.1	142.6	1	-85
TWI	-60	119.7	119.3	119.7	1	-73
TWI	-60	141.3	140.8	141.3	1	-84
TWI	-60	175.9	175.3	175.9	1	-98
TWI	-60	119.6	119.2	119.6	1	-73
TWI	-60	102.4	102.0	102.4	1	-62
TWI	-60	99.0	98.7	99.0	1	-59
TWI	-60	115.1	114.7	115.1	1	-70
TWI	-60	172.9	172.3	172.9	1	-97
TWI	-60	120.5	120.2	120.5	1	-73
TWI	-60	165.2	164.6	165.2	1	-94
TWI	-60	125.6	125.2	125.6	1	-76
TWI	-60	126.7	126.3	126.7	1	-77
TWI	-60	100.4	100.1	100.4	1	-60
TWI	-60	131.1	130.7	131.1	1	-79
TWI	-60	185.1	184.5	185.1	1	-102
TWI	-60	163.6	163.0	163.6	1	-94
TWI	-60	126.5	126.1	126.5	1	-77
TWI	-60	164.7	164.1	164.7	1	-94
TWI	-60	192.7	192.0	192.7	1	-104
TWI	-60	134.5	134.1	134.5	1	-81
TWI	-60	140.8	140.3	140.8	1	-84
GKSS	-60	295.3	346.1	295.3	1	-139
GKSS	-60	217.7	254.2	217.7	1	-121
GKSS	-60	219.8	256.6	219.8	1	-122
GKSS	-60	165.9	192.8	165.9	1	-104
GKSS	-60	109.9	126.5	109.9	1	-77
GKSS	-60	131.9	152.5	131.9	1	-89
GKSS	-60	136.2	157.6	136.2	1	-92
GKSS	-60	154.0	178.8	154.0	1	-100
GKSS	-60	115.9	133.6	115.9	1	-81
GKSS	-60	150.4	174.4	150.4	1	-98
THA	-60	153.6	178.2	153.6	1	-99
THA	-60	183.8	214.0	183.8	1	-111
THA	-60	236.1	275.9	236.1	1	-126
THA	-60	149.4	173.3	149.4	1	-98
THA	-60	179.5	209.0	179.5	1	-109
THA	-60	177.6	206.7	177.6	1	-109
THA	-60	188.3	219.4	188.3	1	-112
THA	-60	134.5	155.6	134.5	1	-91
THA	-60	243.6	284.9	243.6	1	-128
THA	-60	155.7	180.8	155.7	1	-100
THA	-60	164.0	190.6	164.0	1	-104
THA	-60	146.5	169.8	146.5	1	-96
THA	-60	119.9	138.4	119.9	1	-83
THA	-60	79.9	91.0	79.9	1	-53
THA	-60	140.9	163.2	140.9	1	-94
THA	-60	115.3	132.9	115.3	1	-80
THA	-60	137.0	158.6	137.0	1	-92
THA	-60	166.9	194.0	166.9	1	-105
THA	-60	225.4	263.3	225.4	1	-123
THA	-60	200.7	234.1	200.7	1	-116
BAM	-40	171.0	146.5	171.0	0	-
BAM	-40	569.4	480.2	206.2	0	-
BAM	-40	169.4	145.1	169.4	0	-
BAM	-40	548.7	462.8	203.6	0	-
BAM	-40	529.9	447.1	202.5	0	-
BAM	-40	318.5	270.1	207.2	0	-
BAM	-40	574.8	484.7	205.9	0	-
BAM	-40	360.8	305.4	206.5	0	-
BAM	-40	343.8	291.2	207.3	0	-
BAM	-40	235.8	200.8	205.1	0	-
BAM	-40	529.9	447.1	202.8	0	-
BAM	-40	496.5	419.1	204.9	0	-
BAM	-40	600.0	505.8	205.2	0	-
BAM	-40	113.7	98.5	113.7	0	-
BAM	-40	229.6	195.5	204.8	0	-
BAM	-40	154.2	132.4	154.2	0	-
BAM	-40	221.3	188.6	206.2	0	-

BAM	-40	486.7	410.9	204.2	0	-
BAM	-40	243.8	207.4	207.3	0	-
BAM	-40	202.5	172.8	202.5	0	-
GKSS	-40	180.6	154.6	180.6	0	-
GKSS	-40	206.7	176.4	203.5	0	-
GKSS	-40	240.7	204.9	198.2	0	-
GKSS	-40	270.8	230.1	199.6	0	-
GKSS	-40	186.4	159.4	186.4	0	-
GKSS	-40	255.8	217.5	199.4	0	-
GKSS	-40	231.2	196.9	204.4	0	-
GKSS	-40	339.4	287.5	202.4	0	-
GKSS	-40	403.1	340.9	203.2	0	-
GKSS	-40	399.2	337.6	200.9	0	-
BAM	-40	187.3	186.6	187.3	0	-
BAM	-40	101.5	101.2	101.5	0	-
BAM	-40	140.3	139.9	140.3	0	-
BAM	-40	150.2	149.7	150.2	0	-
BAM	-40	187.3	186.6	187.3	0	-
BAM	-40	211.4	210.6	211.4	0	-
BAM	-40	160.5	160.0	160.5	0	-
BAM	-40	214.6	213.8	214.6	0	-
BAM	-40	188.3	187.7	188.3	0	-
BAM	-40	239.3	238.4	239.3	0	-
BAM	-40	112.8	112.4	112.8	0	-
BAM	-40	239.0	238.1	239.0	0	-
BAM	-40	284.9	283.9	284.9	0	-
BAM	-40	254.7	253.7	254.7	0	-
BAM	-40	270.9	269.9	270.9	0	-
BAM	-40	187.0	186.3	187.0	0	-
BAM	-40	170.1	169.5	170.1	0	-
BAM	-40	256.4	255.5	256.4	0	-
BAM	-40	171.4	170.8	171.4	0	-
BAM	-40	103.1	102.8	103.1	0	-
BAM	-40	230.0	229.1	230.0	0	-
BAM	-40	210.0	209.2	210.0	0	-
GKSS	-40	198.2	197.5	198.2	0	-
GKSS	-40	150.2	149.7	150.2	0	-
GKSS	-40	226.8	226.0	226.8	0	-
GKSS	-40	158.1	157.5	158.1	0	-
GKSS	-40	256.4	255.5	256.4	0	-
GKSS	-40	207.6	206.9	207.6	0	-
GKSS	-40	213.5	212.8	213.5	0	-
GKSS	-40	254.6	253.7	254.6	0	-
GKSS	-40	240.0	239.1	240.0	0	-
GKSS	-40	309.2	308.0	279.0	0	-
GKSS	-40	125.9	145.5	125.9	0	-
GKSS	-40	128.9	149.0	128.9	0	-
GKSS	-40	198.5	231.5	198.5	0	-
GKSS	-40	212.0	247.5	212.0	0	-
GKSS	-40	138.6	160.5	138.6	0	-
GKSS	-40	187.7	218.7	187.7	0	-
GKSS	-40	173.0	201.2	173.0	0	-
GKSS	-40	179.5	208.9	179.5	0	-
GKSS	-40	152.6	177.1	152.6	0	-
GKSS	-40	153.6	178.3	153.6	0	-
THA	-40	144.6	167.6	144.6	0	-
THA	-40	150.7	174.9	150.7	0	-
THA	-40	139.1	161.0	139.1	0	-
THA	-40	183.6	213.8	183.6	0	-
THA	-40	142.0	164.5	142.0	0	-
THA	-40	187.2	218.0	187.2	0	-
THA	-40	172.2	200.3	172.2	0	-
THA	-40	198.0	230.8	198.0	0	-
THA	-40	130.4	150.8	130.4	0	-
THA	-40	141.7	164.1	141.7	0	-
THA	-40	134.5	155.6	134.5	0	-
THA	-40	115.5	133.1	115.5	0	-
THA	-40	91.7	104.9	91.7	0	-
THA	-40	141.1	163.4	141.1	0	-
THA	-40	239.1	279.6	239.1	0	-
THA	-40	243.4	284.7	243.4	0	-
THA	-40	191.9	223.6	191.9	0	-
THA	-40	146.8	170.2	146.8	0	-
THA	-40	161.4	187.5	161.4	0	-
THA	-40	142.3	164.8	142.3	0	-
CISE	-20	128.7	111.1	128.7	0	-
CISE	-20	146.9	126.3	146.9	0	-
CISE	-20	402.8	340.6	204.3	0	-
CISE	-20	409.4	346.2	198.3	0	-
CISE	-20	530.5	447.6	195.0	0	-
CISE	-20	532.2	449.0	197.8	0	-
CISE	-20	534.6	451.0	195.6	0	-
CISE	-20	536.1	452.3	196.2	0	-
CISE	-20	536.1	452.3	194.0	0	-
CISE	-20	536.6	452.7	198.3	0	-

CISE	-20	538.6	454.3	201.2	0	-
CISE	-20	540.5	455.9	200.9	0	-
CISE	-20	543.8	458.7	195.6	0	-
CISE	-20	549.2	463.2	197.6	0	-
CISE	-20	553.7	467.0	201.9	0	-
CISE	-20	556.1	469.0	202.5	0	-
CISE	-20	556.3	469.2	198.1	0	-
CISE	-20	560.6	472.8	198.1	0	-
CISE	-20	565.8	477.2	200.7	0	-
CISE	-20	570.1	480.8	199.8	0	-
CISE	-20	571.1	481.6	201.5	0	-
GKSS	-20	233.1	198.5	200.6	0	-
GKSS	-20	389.8	329.8	200.6	0	-
GKSS	-20	487.9	411.9	199.8	0	-
GKSS	-20	438.3	370.4	198.2	0	-
GKSS	-20	571.4	481.8	199.3	0	-
GKSS	-20	560.7	472.9	196.6	0	-
GKSS	-20	561.1	473.2	198.6	0	-
GKSS	-20	575.1	484.9	200.7	0	-
GKSS	-20	557.5	470.2	195.0	0	-
GKSS	-20	572.5	482.7	198.6	0	-
GKSS	-20	202.5	201.7	202.5	0	-
GKSS	-20	194.7	194.1	194.7	0	-
GKSS	-20	262.8	261.8	262.8	0	-
GKSS	-20	187.9	187.2	187.9	0	-
GKSS	-20	275.8	274.8	275.8	0	-
GKSS	-20	261.8	260.9	261.8	0	-
GKSS	-20	371.0	369.7	283.2	0	-
GKSS	-20	369.1	367.7	283.1	0	-
GKSS	-20	462.1	460.4	284.0	0	-
GKSS	-20	319.7	318.5	284.2	0	-
VTT	-20	583.1	580.9	284.0	0	-
VTT	-20	231.9	231.0	231.9	0	-
VTT	-20	382.0	380.6	279.4	0	-
VTT	-20	295.9	294.8	280.3	0	-
VTT	-20	576.4	574.2	279.4	0	-
VTT	-20	411.7	410.1	278.6	0	-
VTT	-20	306.4	305.2	281.9	0	-
VTT	-20	324.7	323.5	279.4	0	-
VTT	-20	282.5	281.4	282.5	0	-
VTT	-20	247.2	246.3	247.2	0	-
VTT	-20	233.2	232.4	233.2	0	-
VTT	-20	317.5	316.3	283.2	0	-
VTT	-20	515.6	513.7	288.9	0	-
VTT	-20	263.2	262.3	263.2	0	-
VTT	-20	184.4	183.8	184.4	0	-
VTT	-20	286.9	285.9	283.7	0	-
VTT	-20	341.4	340.1	280.8	0	-
VTT	-20	415.0	413.4	280.9	0	-
VTT	-20	327.9	326.7	280.9	0	-
VTT	-20	170.9	170.3	170.9	0	-
VTT	-20	308.8	307.6	282.9	0	-
VTT	-20	376.5	375.1	275.7	0	-
VTT	-20	228.2	227.4	228.2	0	-
VTT	-20	371.7	370.3	282.0	0	-
VTT	-20	291.6	290.6	280.9	0	-
VTT	-20	337.7	336.4	281.8	0	-
VTT	-20	390.5	389.0	281.4	0	-
VTT	-20	227.3	226.5	227.3	0	-
VTT	-20	201.3	200.6	201.3	0	-
VTT	-20	212.5	211.7	212.5	0	-
VTT	-20	288.4	287.3	256.5	0	-
VTT	-20	479.1	477.3	284.8	0	-
VTT	-20	377.9	376.5	282.3	0	-
VTT	-20	269.6	268.6	269.6	0	-
VTT	-20	184.4	183.8	184.4	0	-
VTT	-20	241.6	240.7	241.6	0	-
VTT	-20	146.4	145.9	146.4	0	-
VTT	-20	299.4	298.3	280.0	0	-
VTT	-20	156.7	156.2	156.7	0	-
VTT	-20	295.6	294.5	277.0	0	-
CISE	-20	167.4	194.6	167.4	0	-
CISE	-20	153.5	178.1	153.5	0	-
CISE	-20	211.2	246.5	211.2	0	-
CISE	-20	220.3	257.3	220.3	0	-
CISE	-20	227.9	266.2	227.9	0	-
CISE	-20	211.1	246.4	211.1	0	-
CISE	-20	217.1	253.4	217.1	0	-
CISE	-20	145.3	168.5	145.3	0	-
CISE	-20	161.2	187.2	161.2	0	-
CISE	-20	131.9	152.5	131.9	0	-
CISE	-20	216.4	252.6	216.4	0	-
CISE	-20	125.0	144.4	125.0	0	-
CISE	-20	378.7	444.9	378.7	0	-
CISE	-20	246.1	287.9	246.1	0	-

CISE	-20	250.9	293.5	250.9	0	-
CISE	-20	251.5	294.3	251.5	0	-
CISE	-20	284.0	332.7	284.0	0	-
CISE	-20	261.1	305.6	261.1	0	-
CISE	-20	351.6	412.8	351.6	0	-
CISE	-20	258.5	302.5	258.5	0	-
GKSS	-20	201.3	234.8	201.3	0	-
GKSS	-20	110.9	127.7	110.9	0	-
GKSS	-20	197.7	230.5	197.7	0	-
GKSS	-20	198.9	231.9	198.9	0	-
GKSS	-20	200.6	234.0	200.6	0	-
GKSS	-20	165.7	192.6	165.7	0	-
GKSS	-20	280.1	328.0	280.1	0	-
GKSS	-20	279.5	327.3	279.5	0	-
GKSS	-20	257.6	301.4	257.6	0	-
GKSS	-20	265.2	310.4	265.2	0	-
GKSS	-20	156.7	212.6	156.7	0	-
GKSS	-20	221.7	304.1	221.7	0	-
GKSS	-20	193.9	264.9	193.9	0	-
GKSS	-20	191.7	261.9	191.7	0	-
GKSS	-20	184.4	251.6	184.4	0	-
NE	-20	186.7	254.8	186.7	0	-
NE	-20	184.4	251.6	184.4	0	-
NE	-20	193.9	264.9	193.9	0	-
NE	-20	204.4	279.8	204.4	0	-
NE	-20	224.0	307.4	224.0	0	-
NE	-20	153.4	207.9	153.4	0	-
NE	-20	222.6	305.4	222.6	0	-
NE	-20	162.0	220.0	162.0	0	-
NE	-20	187.8	256.4	187.8	0	-
NE	-20	198.2	271.0	198.2	0	-
SCK-CEN	-10	656.0	653.4	280.0	0	-
SCK-CEN	-10	397.8	396.3	281.2	0	-
SCK-CEN	-10	718.1	715.3	282.6	0	-
SCK-CEN	-10	601.6	599.3	284.0	0	-
SCK-CEN	-10	505.3	503.4	280.9	0	-
GKSS	0	541.9	457.1	196.8	0	-
GKSS	0	547.0	461.4	193.7	0	-
GKSS	0	538.7	454.4	192.9	0	-
GKSS	0	540.0	455.5	196.7	0	-
GKSS	0	544.8	459.6	196.1	0	-
GKSS	0	534.8	451.2	194.7	0	-
GKSS	0	557.2	469.9	196.3	0	-
GKSS	0	545.0	459.7	195.9	0	-
GKSS	0	546.1	460.6	195.2	0	-
GKSS	0	549.2	463.2	193.3	0	-
SCK-CEN	0	565.1	476.5	198.4	0	-
SCK-CEN	0	571.6	482.0	199.1	0	-
SCK-CEN	0	553.4	466.8	198.2	0	-
SCK-CEN	0	293.2	248.8	197.6	0	-
SCK-CEN	0	544.1	459.0	201.2	0	-
SCK-CEN	0	552.2	465.7	200.0	0	-
SCK-CEN	0	558.0	470.6	197.4	0	-
SCK-CEN	0	553.5	466.8	199.6	0	-
SCK-CEN	0	557.6	470.3	203.4	0	-
SCK-CEN	0	552.4	466.0	199.2	0	-
SCK-CEN	0	555.6	468.6	200.5	0	-
SCK-CEN	0	558.2	470.8	202.4	0	-
SCK-CEN	0	550.6	464.4	197.2	0	-
SCK-CEN	0	560.8	473.0	205.8	0	-
SCK-CEN	0	569.6	480.4	205.5	0	-
SCK-CEN	0	552.5	466.0	202.4	0	-
SCK-CEN	0	578.5	487.7	203.4	0	-
SCK-CEN	0	556.0	468.9	205.2	0	-
SCK-CEN	0	543.8	458.7	202.3	0	-
SCK-CEN	0	556.3	469.2	201.6	0	-
GKSS	0	327.6	326.4	282.4	0	-
GKSS	0	681.4	678.8	283.7	0	-
GKSS	0	700.8	698.2	284.9	0	-
GKSS	0	698.2	695.5	282.8	0	-
GKSS	0	708.4	705.7	284.4	0	-
GKSS	0	701.5	698.8	284.9	0	-
GKSS	0	724.9	722.1	279.6	0	-
GKSS	0	717.4	714.6	283.9	0	-
GKSS	0	705.8	703.0	285.7	0	-
GKSS	0	709.5	706.8	283.0	0	-
SCK-CEN	0	716.7	714.0	277.0	0	-
SCK-CEN	0	714.1	711.3	276.7	0	-
SCK-CEN	0	658.5	656.0	276.9	0	-
SCK-CEN	0	747.5	744.6	277.9	0	-
SCK-CEN	0	709.0	706.2	276.9	0	-
SCK-CEN	0	719.2	716.4	278.2	0	-
SCK-CEN	0	444.5	442.8	278.0	0	-
SCK-CEN	0	699.8	697.1	275.9	0	-
SCK-CEN	0	704.0	701.3	277.6	0	-

SCK-CEN	0	729.5	726.7	278.2	0	-
SCK-CEN	0	714.0	711.3	277.3	0	-
VTT	0	725.6	722.8	280.3	0	-
VTT	0	730.2	727.4	275.5	0	-
VTT	0	737.8	734.9	280.3	0	-
VTT	0	590.7	588.4	275.2	0	-
VTT	0	730.3	727.5	278.0	0	-
VTT	0	741.8	738.9	278.5	0	-
VTT	0	744.2	741.3	279.7	0	-
VTT	0	527.7	525.7	267.2	0	-
VTT	0	620.4	618.0	279.8	0	-
VTT	0	727.0	724.2	278.6	0	-
VTT	0	730.3	727.5	278.3	0	-
VTT	0	542.6	540.5	280.0	0	-
VTT	0	726.7	723.9	274.3	0	-
VTT	0	718.7	716.0	276.0	0	-
VTT	0	717.1	714.4	278.7	0	-
VTT	0	721.2	718.5	278.0	0	-
VTT	0	725.3	722.5	279.1	0	-
VTT	0	727.9	725.1	278.6	0	-
VTT	0	727.0	724.2	279.4	0	-
VTT	0	718.5	715.7	276.2	0	-
GKSS	0	191.3	222.9	191.3	0	-
GKSS	0	269.2	315.2	269.2	0	-
GKSS	0	281.2	329.4	281.2	0	-
GKSS	0	242.5	283.5	242.5	0	-
GKSS	0	318.3	373.3	318.3	0	-
GKSS	0	476.2	560.4	395.4	0	-
GKSS	0	511.7	602.5	396.5	0	-
GKSS	0	621.3	732.2	394.9	0	-
GKSS	0	531.3	625.6	396.3	0	-
GKSS	0	266.6	312.1	266.6	0	-
GKSS	0	599.3	706.2	395.2	0	-
GKSS	0	362.9	426.1	362.9	0	-
GKSS	0	331.8	389.3	331.8	0	-
GKSS	0	227.1	265.3	227.1	0	-
GKSS	0	309.5	362.9	309.5	0	-
GKSS	0	628.6	740.9	395.4	0	-
GKSS	0	210.9	246.1	210.9	0	-
GKSS	0	410.7	482.8	394.9	0	-
GKSS	0	211.4	246.7	211.4	0	-
GKSS	0	778.3	918.2	393.9	0	-
GKSS	0	263.4	308.3	263.4	0	-
GKSS	0	682.2	804.4	393.3	0	-
GKSS	0	386.7	454.3	386.7	0	-
GKSS	0	376.2	441.9	376.2	0	-
GKSS	0	642.5	757.3	394.4	0	-
GKSS	0	306.7	359.6	306.7	0	-
GKSS	0	758.4	894.6	394.8	0	-
GKSS	0	797.9	941.4	393.9	0	-
GKSS	0	246.4	288.2	246.4	0	-
GKSS	0	320.1	375.4	320.1	0	-
CISE	0	233.3	320.4	233.3	0	-
CISE	0	238.2	327.4	238.2	0	-
CISE	0	208.3	285.2	208.3	0	-
CISE	0	421.7	585.8	421.7	0	-
CISE	0	226.7	311.2	226.7	0	-
CISE	0	267.0	367.9	267.0	0	-
CISE	0	163.0	221.4	163.0	0	-
CISE	0	165.8	225.4	165.8	0	-
CISE	0	285.9	394.6	285.9	0	-
CISE	0	342.0	473.5	342.0	0	-
GKSS	0	314.9	435.4	314.9	0	-
GKSS	0	307.6	425.1	307.6	0	-
GKSS	0	383.0	531.4	383.0	0	-
GKSS	0	332.6	460.4	332.6	0	-
GKSS	0	223.6	306.8	223.6	0	-
GKSS	0	442.2	614.7	442.2	0	-

2. Revised Master Curve fit to data

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-154	54.8	49.3				
-154	49.8	45.0				
-154	37.8	35.0				
-154	33.0	31.0				
-154	38.9	35.9				
-154	24.2	23.6				

-154	47.4	43.0
-154	46.5	42.3
-154	31.4	29.6
-154	39.2	36.1
-154	24.2	23.6
-154	33.0	31.0
-154	41.0	37.6
-154	31.7	29.9
-154	35.2	32.8
-154	44.4	40.5
-154	41.5	38.1
-154	32.7	30.7
-154	34.3	32.0
-154	36.7	34.0
-154	39.7	36.6
-154	46.1	41.9
-154	34.6	32.3
-154	35.8	33.3
-154	29.3	27.9
-154	28.6	27.2
-154	38.6	35.7
-154	44.4	40.5
-154	48.9	44.3
-154	38.9	35.9
-154	36.7	34.0
0	442.2	617.1
-154	41.5	41.5
-154	42.2	42.2
-154	50.0	50.0
-154	34.0	34.0
-154	41.7	41.7
-154	46.1	46.1
-154	44.2	44.2
-154	36.7	36.7
-154	29.0	29.0
-154	53.0	53.0
-154	39.4	39.4
-154	29.0	29.0
-154	34.6	34.6
-154	33.0	33.0
-154	38.1	38.1
-154	28.6	28.6
-154	28.6	28.6
-154	38.6	38.6
-154	36.4	36.4
-154	33.4	33.4
-154	36.9	36.9
-154	31.1	31.1
-154	34.3	34.3
-154	30.4	30.4
-154	49.6	49.6
-154	41.0	41.0
-154	34.0	34.0
-154	30.7	30.7
-154	41.2	41.2
-154	26.7	26.7
-154	35.5	35.5
-154	33.4	33.4
-154	36.7	36.7
-154	32.4	32.4
-154	45.1	45.1
-154	33.4	33.4
-154	34.0	34.0
-154	30.7	30.7
-154	26.7	26.7
-154	33.7	36.3
-154	42.7	47.0
-154	37.2	40.5
-154	54.4	60.9
-154	34.6	37.4
-154	44.2	48.8

-154	29.7	31.5
-154	36.4	39.5
-154	36.4	39.5
-154	28.2	29.8
-154	28.2	29.8
-154	30.0	32.0
-154	36.4	39.5
-154	37.5	40.8
-154	30.0	32.0
-154	30.7	32.8
-154	30.4	32.4
-154	30.7	32.8
-154	31.7	34.0
-154	41.7	45.9
-154	37.2	40.5
-154	34.9	37.7
-154	38.3	41.8
-154	31.4	33.6
-154	33.7	36.3
-154	32.7	35.1
-154	43.0	47.3
-154	32.7	35.1
-154	30.0	32.0
-154	36.9	40.2
-154	33.4	35.9
-154	30.0	32.0
-110	98.1	85.6
-110	59.0	52.8
-110	80.0	70.5
-110	57.2	51.3
-110	88.3	77.4
-110	96.2	84.1
-110	81.6	71.8
-110	66.9	59.4
-110	85.6	75.2
-110	86.8	76.2
-110	114.2	99.2
-110	73.5	65.0
-110	92.7	81.1
-110	77.5	68.4
-110	61.5	54.9
-110	51.8	46.8
-110	73.6	65.1
-110	52.8	47.6
-110	41.2	37.9
-110	115.3	100.1
-110	73.2	64.7
-110	74.0	65.4
-110	67.5	59.9
-110	71.0	62.9
-110	53.4	48.1
-110	96.5	84.3
-110	71.3	63.1
-110	71.7	63.5
-110	81.7	71.9
-110	64.0	57.0
-110	74.2	65.6
-110	70.4	62.4
-110	91.2	79.9
-110	72.0	63.7
-110	64.8	57.7
-110	79.2	69.8
-110	52.2	47.1
-110	82.9	72.9
-110	93.2	81.6
-110	75.4	66.6
-110	75.0	66.3
-110	78.6	69.3
-110	94.8	82.9
-110	98.1	85.6
-110	98.5	86.0

-110	104.9	91.4
-110	69.9	62.0
-110	81.6	71.8
-110	55.2	49.6
-110	105.6	92.0
-110	101.5	88.6
-110	73.7	65.2
-110	97.5	85.2
-110	75.9	67.0
-110	48.3	43.8
-91	127.0	110.0
-91	121.8	105.6
-91	70.5	62.5
-91	94.2	82.4
-91	127.3	110.3
-91	119.9	104.0
-91	104.5	91.1
-91	78.6	69.3
-91	98.6	86.1
-91	161.6	139.0
-91	91.3	80.0
-91	115.3	100.1
-91	122.4	106.1
-91	126.3	109.4
-91	108.3	94.3
-91	66.9	59.4
-91	126.7	109.8
-91	69.6	61.7
-91	121.4	105.3
-91	90.0	78.9
-91	153.9	132.6
-91	64.6	57.5
-91	127.2	110.1
-91	99.7	87.0
-91	101.3	88.4
-91	140.4	121.3
-91	78.2	68.9
-91	109.0	94.9
-91	103.9	90.5
-91	126.8	109.8
-91	111.7	97.1
-91	68.6	68.6
-91	81.6	81.6
-91	55.9	55.9
-91	98.8	98.8
-91	71.9	71.9
-91	111.0	111.0
-91	93.5	93.5
-91	79.9	79.9
-91	98.4	98.4
-91	101.1	101.1
-91	79.6	79.6
-91	99.7	99.7
-91	108.1	108.1
-91	93.4	93.4
-91	62.0	62.0
-91	107.1	107.1
-91	145.3	145.3
-91	76.3	76.3
-91	126.5	126.5
-91	126.1	126.1
-91	128.5	128.5
-91	111.4	111.4
-91	130.4	130.4
-91	134.8	134.8
-91	157.3	157.3
-91	105.2	105.2
-91	109.8	109.8
-91	84.9	84.9
-91	62.8	62.8
-91	97.5	97.5

-91	80.2	80.2
-91	134.4	134.4
-91	65.1	65.1
-91	118.6	118.6
-91	67.3	76.3
-91	162.9	190.0
-91	100.0	115.1
-91	91.2	104.7
-91	106.2	122.5
-91	83.2	95.2
-91	91.8	105.3
-91	94.7	108.8
-91	92.9	106.7
-91	69.9	79.4
-91	93.1	107.0
-91	97.9	112.6
-91	73.7	83.9
-91	82.0	93.7
-91	76.3	86.9
-91	93.1	107.0
-91	83.7	95.8
-91	82.1	93.9
-91	86.8	99.5
-91	86.7	99.3
-91	92.3	106.0
-91	83.1	95.1
-91	88.9	101.9
-91	64.3	72.7
-91	101.6	117.1
-91	94.2	108.3
-91	78.7	89.8
-91	73.0	83.1
-91	64.2	72.5
-91	98.9	113.9
-91	103.2	137.6
-91	84.4	111.0
-91	97.0	128.9
-91	92.7	122.8
-91	96.8	128.6
-91	73.6	95.8
-91	73.0	95.0
-91	73.3	95.4
-91	53.8	67.8
-91	69.5	90.0
-91	65.5	84.3
-91	79.6	104.3
-91	69.8	90.4
-91	90.3	119.4
-91	88.0	116.2
-60	234.1	200.0
-60	114.4	99.4
-60	130.7	113.1
-60	106.7	92.9
-60	161.0	138.5
-60	200.7	171.9
-60	125.2	108.4
-60	145.1	125.2
-60	91.9	80.4
-60	128.1	110.9
-60	164.4	141.4
-60	192.2	164.8
-60	166.3	143.0
-60	177.7	152.6
-60	167.6	144.1
-60	128.6	111.3
-60	377.4	320.5
-60	98.4	85.9
-60	278.4	237.3
-60	240.7	205.6
-60	380.0	322.7
-60	171.9	147.7

-60	136.8	118.2
-60	135.8	117.4
-60	214.7	183.7
-60	299.5	255.0
-60	203.7	174.5
-60	116.0	100.7
-60	221.9	189.8
-60	167.6	144.1
-60	89.8	78.7
-60	156.3	134.6
-60	186.8	160.2
-60	213.5	182.7
-60	164.6	141.6
-60	280.1	238.7
-60	185.9	159.5
-60	127.7	110.6
-60	205.0	175.6
-60	115.6	100.4
-60	107.5	93.6
-60	164.6	141.6
-60	172.0	147.8
-60	108.5	94.5
-60	119.0	103.2
-60	153.5	132.3
-60	158.9	136.8
-60	137.5	118.8
-60	119.5	103.7
-60	130.7	113.1
-60	172.6	148.3
-60	84.5	74.2
-60	244.6	208.9
-60	120.4	104.4
-60	104.5	91.1
-60	163.6	140.7
-60	201.4	172.6
-60	137.8	119.0
-60	173.0	148.6
-60	99.2	86.6
-60	173.4	149.0
-60	131.5	113.7
-60	186.0	186.0
-60	151.8	151.8
-60	111.7	111.7
-60	143.9	143.9
-60	105.4	105.4
-60	154.0	154.0
-60	176.2	176.2
-60	131.9	131.9
-60	203.9	203.9
-60	142.7	142.7
-60	134.5	134.5
-60	130.1	130.1
-60	142.6	142.6
-60	119.7	119.7
-60	141.3	141.3
-60	175.9	175.9
-60	119.6	119.6
-60	102.4	102.4
-60	99.0	99.0
-60	115.1	115.1
-60	172.9	172.9
-60	120.5	120.5
-60	165.2	165.2
-60	125.6	125.6
-60	126.7	126.7
-60	100.4	100.4
-60	131.1	131.1
-60	185.1	185.1
-60	163.6	163.6
-60	126.5	126.5
-60	164.7	164.7

-60	192.7	192.7
-60	134.5	134.5
-60	140.8	140.8
-60	295.3	347.4
-60	217.7	255.1
-60	219.8	257.6
-60	165.9	193.5
-60	109.9	126.9
-60	131.9	153.0
-60	136.2	158.2
-60	154.0	179.4
-60	115.9	134.1
-60	150.4	175.1
-60	153.6	178.8
-60	183.8	214.7
-60	236.1	277.0
-60	149.4	173.9
-60	179.5	209.7
-60	177.6	207.4
-60	188.3	220.2
-60	134.5	156.1
-60	243.6	285.9
-60	155.7	181.4
-60	164.0	191.3
-60	146.5	170.4
-60	119.9	138.8
-60	79.9	91.2
-60	140.9	163.7
-60	115.3	133.3
-60	137.0	159.2
-60	166.9	194.7
-60	225.4	264.2
-60	200.7	234.9
-40	171.0	147.0
-40	569.4	482.0
-40	169.4	145.6
-40	548.7	464.6
-40	529.9	448.8
-40	318.5	271.0
-40	574.8	486.5
-40	360.8	306.6
-40	343.8	292.3
-40	235.8	201.5
-40	529.9	448.8
-40	496.5	420.7
-40	600.0	507.7
-40	113.7	98.8
-40	229.6	196.2
-40	154.2	132.8
-40	221.3	189.3
-40	486.7	412.4
-40	243.8	208.2
-40	202.5	173.4
-40	180.6	155.1
-40	206.7	177.0
-40	240.7	205.6
-40	270.8	230.9
-40	186.4	159.9
-40	255.8	218.3
-40	231.2	197.6
-40	339.4	288.6
-40	403.1	342.2
-40	399.2	338.8
-40	187.3	187.3
-40	101.5	101.5
-40	140.3	140.3
-40	150.2	150.2
-40	187.3	187.3
-40	211.4	211.4
-40	160.5	160.5
-40	214.6	214.6

-40	188.3	188.3
-40	239.3	239.3
-40	112.8	112.8
-40	239.0	239.0
-40	284.9	284.9
-40	254.7	254.7
-40	270.9	270.9
-40	187.0	187.0
-40	170.1	170.1
-40	256.4	256.4
-40	171.4	171.4
-40	103.1	103.1
-40	230.0	230.0
-40	210.0	210.0
-40	198.2	198.2
-40	150.2	150.2
-40	226.8	226.8
-40	158.1	158.1
-40	256.4	256.4
-40	207.6	207.6
-40	213.5	213.5
-40	254.6	254.6
-40	240.0	240.0
-40	309.2	309.2
-40	125.9	146.0
-40	128.9	149.5
-40	198.5	232.3
-40	212.0	248.4
-40	138.6	161.1
-40	187.7	219.5
-40	173.0	201.9
-40	179.5	209.7
-40	152.6	177.7
-40	153.6	178.9
-40	144.6	168.2
-40	150.7	175.5
-40	139.1	161.6
-40	183.6	214.5
-40	142.0	165.1
-40	187.2	218.8
-40	172.2	201.0
-40	198.0	231.7
-40	130.4	151.3
-40	141.7	164.7
-40	134.5	156.1
-40	115.5	133.5
-40	91.7	105.2
-40	141.1	164.0
-40	239.1	280.6
-40	243.4	285.7
-40	191.9	224.5
-40	146.8	170.8
-40	161.4	188.1
-40	142.3	165.4
-20	128.7	111.4
-20	146.9	126.7
-20	402.8	341.9
-20	409.4	347.5
-20	530.5	449.3
-20	532.2	450.7
-20	534.6	452.8
-20	536.1	454.0
-20	536.1	454.0
-20	536.6	454.4
-20	538.6	456.1
-20	540.5	457.7
-20	543.8	460.5
-20	549.2	465.0
-20	553.7	468.8
-20	556.1	470.8
-20	556.3	471.0

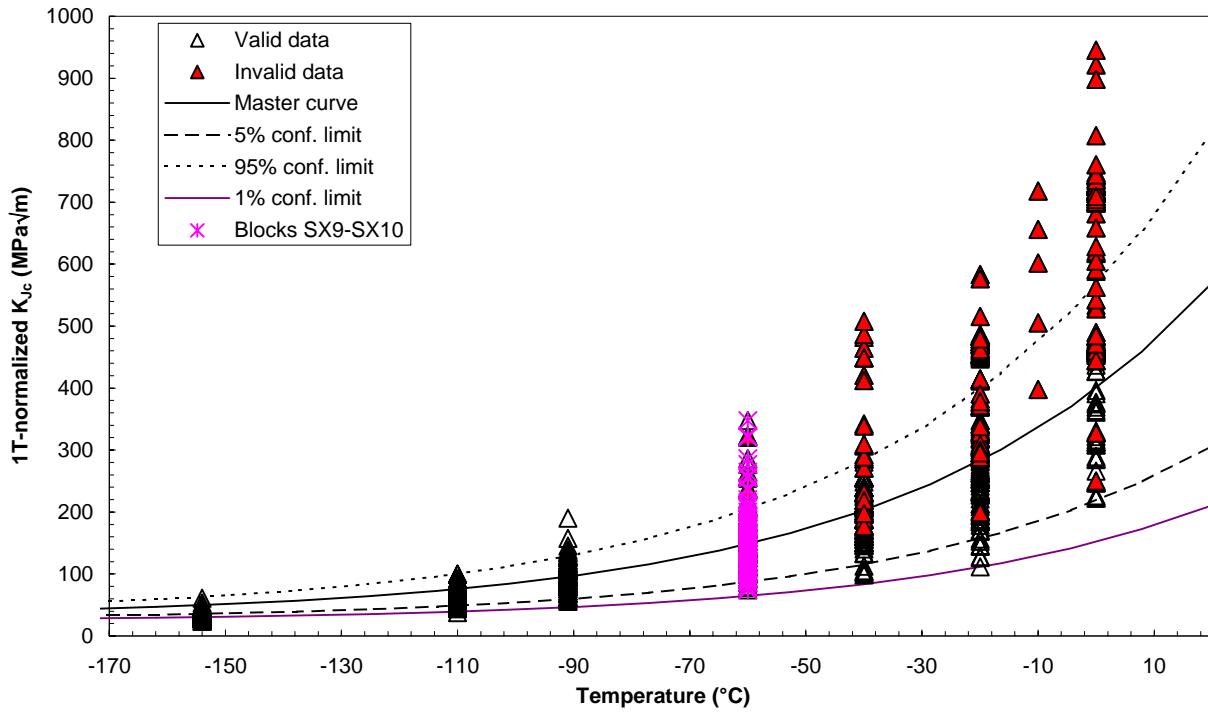
-20	560.6	474.6
-20	565.8	479.0
-20	570.1	482.6
-20	571.1	483.4
-20	233.1	199.2
-20	389.8	331.0
-20	487.9	413.5
-20	438.3	371.8
-20	571.4	483.6
-20	560.7	474.7
-20	561.1	475.0
-20	575.1	486.8
-20	557.5	472.0
-20	572.5	484.6
-20	202.5	202.5
-20	194.7	194.7
-20	262.8	262.8
-20	187.9	187.9
-20	275.8	275.8
-20	261.8	261.8
-20	371.0	371.0
-20	369.1	369.1
-20	462.1	462.1
-20	319.7	319.7
-20	583.1	583.1
-20	231.9	231.9
-20	382.0	382.0
-20	295.9	295.9
-20	576.4	576.4
-20	411.7	411.7
-20	306.4	306.4
-20	324.7	324.7
-20	282.5	282.5
-20	247.2	247.2
-20	233.2	233.2
-20	317.5	317.5
-20	515.6	515.6
-20	263.2	263.2
-20	184.4	184.4
-20	286.9	286.9
-20	341.4	341.4
-20	415.0	415.0
-20	327.9	327.9
-20	170.9	170.9
-20	308.8	308.8
-20	376.5	376.5
-20	228.2	228.2
-20	371.7	371.7
-20	291.6	291.6
-20	337.7	337.7
-20	390.5	390.5
-20	227.3	227.3
-20	201.3	201.3
-20	212.5	212.5
-20	288.4	288.4
-20	479.1	479.1
-20	377.9	377.9
-20	269.6	269.6
-20	184.4	184.4
-20	241.6	241.6
-20	146.4	146.4
-20	299.4	299.4
-20	156.7	156.7
-20	295.6	295.6
-20	167.4	195.3
-20	153.5	178.8
-20	211.2	247.4
-20	220.3	258.3
-20	227.9	267.2
-20	211.1	247.3
-20	217.1	254.4

-20	145.3	169.1
-20	161.2	187.9
-20	131.9	153.0
-20	216.4	253.6
-20	125.0	144.9
-20	378.7	446.6
-20	246.1	288.9
-20	250.9	294.6
-20	251.5	295.4
-20	284.0	334.0
-20	261.1	306.7
-20	351.6	414.3
-20	258.5	303.6
-20	201.3	235.6
-20	110.9	128.1
-20	197.7	231.3
-20	198.9	232.8
-20	200.6	234.8
-20	165.7	193.3
-20	280.1	329.3
-20	279.5	328.6
-20	257.6	302.5
-20	265.2	311.6
-20	156.7	213.4
-20	221.7	305.2
-20	193.9	265.9
-20	191.7	262.8
-20	184.4	252.6
-20	186.7	255.8
-20	184.4	252.6
-20	193.9	265.9
-20	204.4	280.8
-20	224.0	308.5
-20	153.4	208.6
-20	222.6	306.5
-20	162.0	220.8
-20	187.8	257.3
-20	198.2	272.0
-10	656.0	656.0
-10	397.8	397.8
-10	718.1	718.1
-10	601.6	601.6
-10	505.3	505.3
0	541.9	458.9
0	547.0	463.1
0	538.7	456.2
0	540.0	457.3
0	544.8	461.3
0	534.8	452.9
0	557.2	471.7
0	545.0	461.5
0	546.1	462.4
0	549.2	465.0
0	565.1	478.4
0	571.6	483.8
0	553.4	468.6
0	293.2	249.7
0	544.1	460.7
0	552.2	467.5
0	558.0	472.4
0	553.5	468.6
0	557.6	472.1
0	552.4	467.7
0	555.6	470.4
0	558.2	472.6
0	550.6	466.2
0	560.8	474.8
0	569.6	482.2
0	552.5	467.8
0	578.5	489.6
0	556.0	470.7

0	543.8	460.5
0	556.3	471.0
0	327.6	327.6
0	681.4	681.4
0	700.8	700.8
0	698.2	698.2
0	708.4	708.4
0	701.5	701.5
0	724.9	724.9
0	717.4	717.4
0	705.8	705.8
0	709.5	709.5
0	716.7	716.7
0	714.1	714.1
0	658.5	658.5
0	747.5	747.5
0	709.0	709.0
0	719.2	719.2
0	444.5	444.5
0	699.8	699.8
0	704.0	704.0
0	729.5	729.5
0	714.0	714.0
0	725.6	725.6
0	730.2	730.2
0	737.8	737.8
0	590.7	590.7
0	730.3	730.3
0	741.8	741.8
0	744.2	744.2
0	527.7	527.7
0	620.4	620.4
0	727.0	727.0
0	730.3	730.3
0	542.6	542.6
0	726.7	726.7
0	718.7	718.7
0	717.1	717.1
0	721.2	721.2
0	725.3	725.3
0	727.9	727.9
0	727.0	727.0
0	718.5	718.5
0	191.3	223.7
0	269.2	316.4
0	281.2	330.6
0	242.5	284.6
0	318.3	374.7
0	476.2	562.5
0	511.7	604.8
0	621.3	735.0
0	531.3	628.0
0	266.6	313.3
0	599.3	709.0
0	362.9	427.7
0	331.8	390.8
0	227.1	266.2
0	309.5	364.2
0	628.6	743.7
0	210.9	247.0
0	410.7	484.7
0	211.4	247.6
0	778.3	921.7
0	263.4	309.5
0	682.2	807.5
0	386.7	456.1
0	376.2	443.6
0	642.5	760.3
0	306.7	361.0
0	758.4	898.1
0	797.9	945.1

0	246.4	289.2				
0	320.1	376.8				
0	233.3	321.6				
0	238.2	328.6				
0	208.3	286.3				
0	421.7	588.1				
0	226.7	312.4				
0	267.0	369.3				
0	163.0	222.2				
0	165.8	226.2				
0	285.9	396.1				
0	342.0	475.3				
0	314.9	437.1				
0	307.6	426.7				
0	383.0	533.4				
0	332.6	462.1				
0	223.6	307.9				
0	442.2	617.1				
-174			43.6	32.3	54.0	28.2
-161.875			47.1	34.1	59.0	29.4
-149.75			51.5	36.4	65.4	30.9
-137.625			57.1	39.3	73.4	32.9
-125.5			64.1	43.0	83.5	35.3
-113.375			72.9	47.6	96.2	38.3
-101.25			84.0	53.4	112.2	42.2
-89.125			97.9	60.6	132.4	47.0
-77			115.5	69.8	157.7	53.1
-64.875			137.7	81.4	189.7	60.8
-52.75			165.6	95.9	229.9	70.5
-40.625			200.7	114.2	280.5	82.7
-28.5			244.9	137.3	344.2	98.0
-16.375			300.5	166.3	424.5	117.3
-4.25			370.6	202.9	525.5	141.7
7.875			458.8	248.9	652.7	172.3
20			569.9	306.8	812.9	210.8

MASTER CURVE WITH CONFIDENCE LIMITS - Single Point Estimation Method
EURO toughness dataset - Complete dataset



Calculation name: EURO toughness curve - Complete dataset			
Data set length:	734	Submitted on:	2006-Nov-13 12:20:46
Data set limit:	max. allowed	Calculation time:	28.594 seconds

Master Curve results (Version 1.1.3.0)

1. Master Curve analysis of homogeneous material (ASTM E1921-05)

Reference temperature T_0 (°C)	-91.3
One standard deviation on T_0 (°C)	1.1
$K_{Jc,1T,med.,eq}$ (MPaVm)	119.2
Left temperature window (°C)	-141.3
Right temperature window (°C)	-41.3
Number of data	734
Number of data outside the temperature window	443
Number of valid data, r	278
Sum of n_i	45.02
Sum of \ln of probability density	-1361.22

Minimum number of specimen satisfied

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-141.3	32.9	39.4	57.2	73.6	79.7
-134.2	34.3	41.5	61.2	79.3	86.1
-127.0	35.9	43.8	65.7	85.9	93.3
-119.9	37.6	46.5	70.9	93.3	101.7
-112.8	39.7	49.6	76.8	101.9	111.2
-105.6	42.1	53.2	83.6	111.7	122.1
-98.5	44.8	57.2	91.4	122.9	134.6
-91.3	47.9	61.9	100.3	135.8	148.9
-84.2	51.4	67.2	110.5	150.5	165.3
-77.0	55.5	73.3	122.2	167.4	184.1
-69.9	60.1	80.3	135.6	186.7	205.6
-62.8	65.4	88.3	150.9	208.8	230.2
-55.6	71.5	97.5	168.5	234.1	258.4
-48.5	78.5	108.0	188.6	263.2	290.8
-41.3	86.5	120.0	211.7	296.4	327.8

2. Bi-modal Master Curve analysis for data set suspected to contains two populations

Reference temperature population A, T_a	-81.6 °C
One standard deviation on T_a	1.0 °C
Reference temperature population B, T_b	-110.4 °C
One standard deviation on T_b	7.3 °C
Likelihood to be from population A, p_a	0.91
One standard deviation on p_a	0.0
Left temperature window (°C)	-160.4
Right temperature window(°C)	-31.6
Number of data	734
Number of data outside the temperature window	248
Number of valid data, r	449
Sum of \ln of probability density	-2158.07

This dataset is likely not homogeneous

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-160.4	29.1	33.7	46.4	60.2	69.7
-151.2	30.2	35.3	49.5	65.2	76.6
-142.0	31.4	37.2	53.2	71.2	84.8
-132.8	32.9	39.5	57.6	78.3	94.7
-123.6	34.7	42.2	62.8	86.9	106.4
-114.4	36.9	45.4	69.0	97.1	120.3
-105.2	39.4	49.2	76.4	109.2	136.9
-96.0	42.5	53.8	85.3	123.7	156.7
-86.8	46.1	59.2	95.8	141.0	180.2
-77.6	50.4	65.7	108.3	161.6	208.3
-68.4	55.5	73.4	123.2	186.1	241.6
-59.2	61.6	82.6	141.0	215.4	281.4
-50.0	68.9	93.6	162.1	250.2	328.8
-40.8	77.6	106.6	187.3	291.8	385.3
-31.6	87.9	122.1	217.3	341.3	452.5

3. Master Curve analysis for data set suspected to be randomly inhomogeneous

Mean reference temperature, T	-83.0 °C
One standard deviation on the mean T	11.4 °C
Left temperature window(°C)	-155.9
Right temperature window(°C)	-10.1
Number of data	734
Number of data outside the temperature window	122
Number of valid data, r	518
Sum of ln of probability density	-2571.25

This dataset is likely not homogeneous

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-155.9	29.3	34.0	47.5	63.0	70.4
-145.5	30.5	35.9	51.3	69.4	78.2
-135.1	32.0	38.1	55.9	77.2	87.8
-124.6	33.9	40.9	61.5	86.7	99.4
-114.2	36.1	44.2	68.3	98.4	113.6
-103.8	38.8	48.3	76.7	112.6	130.9
-93.4	42.1	53.3	86.9	129.9	152.0
-83.0	46.1	59.3	99.2	151.0	177.7
-72.6	50.9	66.7	114.3	176.7	209.1
-62.2	56.9	75.6	132.7	208.1	247.3
-51.8	64.1	86.5	155.1	246.3	293.9
-41.4	72.9	99.8	182.4	292.8	350.6
-31.0	83.6	116.1	215.7	349.6	419.8
-20.5	96.7	135.8	256.3	418.8	504.2
-10.1	112.6	159.9	305.7	503.1	607.0

ANNEX 2

Master Curve analyses performed
on the complete EURO data set
(excluding block SX9)

**STANDARD TEST METHOD FOR THE DETERMINATION OF REFERENCE TEMPERATURE
T₀ FOR FERRITIC STEELS IN THE TRANSITION RANGE**

[MULTI-TEMPERATURE APPROACH - IN ACCORDANCE WITH ASTM E1921-05]

1. Material characteristics

Material specifications : **EURO toughness data set - Complete dataset including SX9**

2. Dimensional and crack growth requirements

Testing lab	T (°C)	a ₀ (mm)	W (mm)	B (mm)	b ₀ (mm)	Δa (mm)	K _{Jc[exp]} (MPa√m)	σ _{ys} (MPa)	E' (GPa)	K _{lim} (MPa√m)	DATA VALID	K _{Jc[calc]} (MPa√m)
GKSS	-154	14.47	25	12.5	10.53	0.00	54.8	674.5	237.6	237.2	YES	54.8
GKSS	-154	14.17	25	12.5	10.83	0.00	49.8	674.5	237.6	240.5	YES	49.8
GKSS	-154	14.15	25	12.5	10.85	0.00	37.8	674.5	237.6	240.8	YES	37.8
GKSS	-154	14.36	25	12.5	10.64	0.00	33.0	674.5	237.6	238.4	YES	33.0
GKSS	-154	14.06	25	12.5	10.94	0.00	38.9	674.5	237.6	241.8	YES	38.9
GKSS	-154	14.11	25	12.5	10.89	0.00	24.2	674.5	237.6	241.2	YES	24.2
GKSS	-154	14.06	25	12.5	10.94	0.00	47.4	674.5	237.6	241.8	YES	47.4
GKSS	-154	14.50	25	12.5	10.50	0.00	46.5	674.5	237.6	236.9	YES	46.5
GKSS	-154	13.79	25	12.5	11.21	0.00	31.4	674.5	237.6	244.7	YES	31.4
GKSS	-154	14.28	25	12.5	10.72	0.00	39.2	674.5	237.6	239.3	YES	39.2
GKSS	-154	14.11	25	12.5	10.89	0.00	24.2	674.5	237.6	241.2	YES	24.2
SIEMENS	-154	13.17	25	12.5	11.83	0.00	33.0	674.5	237.6	251.4	YES	33.0
SIEMENS	-154	13.07	25	12.5	11.93	0.00	41.0	674.5	237.6	252.5	YES	41.0
SIEMENS	-154	13.15	25	12.5	11.85	0.00	31.7	674.5	237.6	251.6	YES	31.7
SIEMENS	-154	13.11	25	12.5	11.89	0.00	35.2	674.5	237.6	252.0	YES	35.2
SIEMENS	-154	13.14	25	12.5	11.86	0.00	44.4	674.5	237.6	251.7	YES	44.4
SIEMENS	-154	13.32	25	12.5	11.68	0.00	41.5	674.5	237.6	249.8	YES	41.5
SIEMENS	-154	13.17	25	12.5	11.83	0.00	32.7	674.5	237.6	251.4	YES	32.7
SIEMENS	-154	13.19	25	12.5	11.81	0.00	34.3	674.5	237.6	251.2	YES	34.3
SIEMENS	-154	13.21	25	12.5	11.79	0.00	36.7	674.5	237.6	251.0	YES	36.7
SIEMENS	-154	13.30	25	12.5	11.70	0.00	39.7	674.5	237.6	250.0	YES	39.7
SIEMENS	-154	13.24	25	12.5	11.76	0.00	46.1	674.5	237.6	250.7	YES	46.1
SIEMENS	-154	13.23	25	12.5	11.77	0.00	34.6	674.5	237.6	250.8	YES	34.6
SIEMENS	-154	13.21	25	12.5	11.79	0.00	35.8	674.5	237.6	251.0	YES	35.8
SIEMENS	-154	13.31	25	12.5	11.69	0.00	29.3	674.5	237.6	249.9	YES	29.3
SIEMENS	-154	13.33	25	12.5	11.67	0.00	28.6	674.5	237.6	249.7	YES	28.6
SIEMENS	-154	13.21	25	12.5	11.79	0.00	38.6	674.5	237.6	251.0	YES	38.6
SIEMENS	-154	13.32	25	12.5	11.68	0.00	44.4	674.5	237.6	249.8	YES	44.4
SIEMENS	-154	13.18	25	12.5	11.82	0.00	48.9	674.5	237.6	251.3	YES	48.9
SIEMENS	-154	13.27	25	12.5	11.73	0.00	38.9	674.5	237.6	250.3	YES	38.9
SIEMENS	-154	13.17	25	12.5	11.83	0.00	36.7	674.5	237.6	251.4	YES	36.7
SIEMENS	-154	13.53	25	12.5	11.47	0.00	31.7	674.5	237.6	247.6	YES	31.7
GKSS	-154	28.21	50	25.0	21.79	0.00	41.5	674.5	237.6	341.2	YES	41.5
GKSS	-154	27.98	50	25.0	22.02	0.00	42.2	674.5	237.6	343.0	YES	42.2
GKSS	-154	27.64	50	25.0	22.36	0.00	50.0	674.5	237.6	345.6	YES	50.0
GKSS	-154	27.73	50	25.0	22.27	0.00	34.0	674.5	237.6	344.9	YES	34.0
GKSS	-154	28.15	50	25.0	21.85	0.00	41.7	674.5	237.6	341.7	YES	41.7
GKSS	-154	27.58	50	25.0	22.42	0.00	46.1	674.5	237.6	346.1	YES	46.1
GKSS	-154	27.98	50	25.0	22.02	0.00	44.2	674.5	237.6	343.0	YES	44.2
GKSS	-154	28.10	50	25.0	21.90	0.00	36.7	674.5	237.6	342.1	YES	36.7
GKSS	-154	27.96	50	25.0	22.04	0.00	29.0	674.5	237.6	343.2	YES	29.0
GKSS	-154	28.17	50	25.0	21.83	0.00	53.0	674.5	237.6	341.5	YES	53.0
GKSS	-154	29.45	50	25.0	20.55	0.00	39.4	674.5	237.6	331.4	YES	39.4
GKSS	-154	27.96	50	25.0	22.04	0.00	29.0	674.5	237.6	343.2	YES	29.0
SIEMENS	-154	26.52	50	25.0	23.48	0.00	34.6	674.5	237.6	354.2	YES	34.6
SIEMENS	-154	26.60	50	25.0	23.40	0.00	33.0	674.5	237.6	353.6	YES	33.0
SIEMENS	-154	26.63	50	25.0	23.37	0.00	38.1	674.5	237.6	353.4	YES	38.1
SIEMENS	-154	26.81	50	25.0	23.19	0.00	28.6	674.5	237.6	352.0	YES	28.6
SIEMENS	-154	26.61	50	25.0	23.39	0.00	28.6	674.5	237.6	353.5	YES	28.6
SIEMENS	-154	26.69	50	25.0	23.31	0.00	38.6	674.5	237.6	352.9	YES	38.6
SIEMENS	-154	26.74	50	25.0	23.26	0.00	36.4	674.5	237.6	352.5	YES	36.4
SIEMENS	-154	26.43	50	25.0	23.57	0.00	33.4	674.5	237.6	354.9	YES	33.4
SIEMENS	-154	26.48	50	25.0	23.52	0.00	36.9	674.5	237.6	354.5	YES	36.9
SIEMENS	-154	26.49	50	25.0	23.51	0.00	31.1	674.5	237.6	354.4	YES	31.1
SIEMENS	-154	26.44	50	25.0	23.56	0.00	34.3	674.5	237.6	354.8	YES	34.3
SIEMENS	-154	26.42	50	25.0	23.58	0.00	30.4	674.5	237.6	354.9	YES	30.4
SIEMENS	-154	26.44	50	25.0	23.56	0.00	49.6	674.5	237.6	354.8	YES	49.6
SIEMENS	-154	26.55	50	25.0	23.45	0.00	41.0	674.5	237.6	354.0	YES	41.0
SIEMENS	-154	26.83	50	25.0	23.17	0.00	34.0	674.5	237.6	351.8	YES	34.0
SIEMENS	-154	27.01	50	25.0	22.99	0.00	30.7	674.5	237.6	350.5	YES	30.7
SIEMENS	-154	26.74	50	25.0	23.26	0.00	41.2	674.5	237.6	352.5	YES	41.2
SIEMENS	-154	26.65	50	25.0	23.35	0.00	26.7	674.5	237.6	353.2	YES	26.7
SIEMENS	-154	26.63	50	25.0	23.37	0.00	35.5	674.5	237.6	353.4	YES	35.5
SIEMENS	-154	26.52	50	25.0	23.48	0.00	33.4	674.5	237.6	354.2	YES	33.4
SIEMENS	-154	26.77	50	25.0	23.23	0.00	36.7	674.5	237.6	352.3	YES	36.7
SIEMENS	-154	26.68	50	25.0	23.32	0.00	32.4	674.5	237.6	353.0	YES	32.4
SIEMENS	-154	26.48	50	25.0	23.52	0.00	45.1	674.5	237.6	354.5	YES	45.1
SIEMENS	-154	26.43	50	25.0	23.57	0.00	33.4	674.5	237.6	354.9	YES	33.4
SIEMENS	-154	26.83	50	25.0	23.17	0.00	34.0	674.5	237.6	351.8	YES	34.0
SIEMENS	-154	27.01	50	25.0	22.99	0.00	30.7	674.5	237.6	350.5	YES	30.7
SIEMENS	-154	26.65	50	25.0	23.35	0.00	26.7	674.5	237.6	353.2	YES	26.7
GKSS	-154	56.79	100	50.0	43.21	0.00	33.7	674.5	237.6	480.5	YES	33.7

GKSS	-154	55.00	100	50.0	45.00	0.00	42.7	674.5	237.6	490.3	YES	42.7
GKSS	-154	55.62	100	50.0	44.38	0.00	37.2	674.5	237.6	486.9	YES	37.2
GKSS	-154	55.81	100	50.0	44.19	0.00	54.4	674.5	237.6	485.9	YES	54.4
GKSS	-154	55.97	100	50.0	44.03	0.00	34.6	674.5	237.6	485.0	YES	34.6
GKSS	-154	55.45	100	50.0	44.55	0.00	44.2	674.5	237.6	487.9	YES	44.2
GKSS	-154	57.86	100	50.0	42.14	0.00	29.7	674.5	237.6	474.5	YES	29.7
GKSS	-154	55.20	100	50.0	44.80	0.00	36.4	674.5	237.6	489.2	YES	36.4
GKSS	-154	55.95	100	50.0	44.05	0.00	36.4	674.5	237.6	485.1	YES	36.4
GKSS	-154	54.42	100	50.0	45.58	0.00	28.2	674.5	237.6	493.5	YES	28.2
GKSS	-154	54.42	100	50.0	45.58	0.00	28.2	674.5	237.6	493.5	YES	28.2
NE	-154	55.67	100	50.0	44.33	0.00	30.0	674.5	237.6	486.7	YES	30.0
NE	-154	56.75	100	50.0	43.25	0.00	36.4	674.5	237.6	480.7	YES	36.4
NE	-154	56.43	100	50.0	43.57	0.00	37.5	674.5	237.6	482.5	YES	37.5
NE	-154	56.35	100	50.0	43.65	0.00	30.0	674.5	237.6	482.9	YES	30.0
NE	-154	56.21	100	50.0	43.79	0.00	30.7	674.5	237.6	483.7	YES	30.7
NE	-154	57.23	100	50.0	42.77	0.00	30.4	674.5	237.6	478.0	YES	30.4
NE	-154	58.12	100	50.0	41.88	0.00	30.7	674.5	237.6	473.0	YES	30.7
NE	-154	56.50	100	50.0	43.50	0.00	31.7	674.5	237.6	482.1	YES	31.7
NE	-154	57.11	100	50.0	42.89	0.00	41.7	674.5	237.6	478.7	YES	41.7
NE	-154	56.45	100	50.0	43.55	0.00	37.2	674.5	237.6	482.4	YES	37.2
NE	-154	56.52	100	50.0	43.48	0.00	34.9	674.5	237.6	482.0	YES	34.9
NE	-154	56.28	100	50.0	43.72	0.00	38.3	674.5	237.6	483.3	YES	38.3
NE	-154	56.35	100	50.0	43.65	0.00	31.4	674.5	237.6	482.9	YES	31.4
NE	-154	56.41	100	50.0	43.59	0.00	33.7	674.5	237.6	482.6	YES	33.7
NE	-154	56.35	100	50.0	43.65	0.00	32.7	674.5	237.6	482.9	YES	32.7
NE	-154	56.36	100	50.0	43.64	0.00	43.0	674.5	237.6	482.9	YES	43.0
NE	-154	56.08	100	50.0	43.92	0.00	32.7	674.5	237.6	484.4	YES	32.7
NE	-154	56.51	100	50.0	43.49	0.00	30.0	674.5	237.6	482.0	YES	30.0
NE	-154	56.47	100	50.0	43.53	0.00	36.9	674.5	237.6	482.3	YES	36.9
NE	-154	56.42	100	50.0	43.58	0.00	33.4	674.5	237.6	482.5	YES	33.4
NE	-154	56.35	100	50.0	43.65	0.00	30.0	674.5	237.6	482.9	YES	30.0
GKSS	-110	14.51	25	12.5	10.49	0.00	98.1	567.6	234.7	215.8	YES	98.1
GKSS	-110	14.34	25	12.5	10.66	0.00	59.0	567.6	234.7	217.6	YES	59.0
GKSS	-110	14.38	25	12.5	10.62	0.00	80.0	567.6	234.7	217.2	YES	80.0
GKSS	-110	14.72	25	12.5	10.28	0.00	57.2	567.6	234.7	213.7	YES	57.2
GKSS	-110	14.64	25	12.5	10.36	0.00	88.3	567.6	234.7	214.5	YES	88.3
GKSS	-110	14.27	25	12.5	10.73	0.00	96.2	567.6	234.7	218.3	YES	96.2
GKSS	-110	14.62	25	12.5	10.38	0.00	81.6	567.6	234.7	214.7	YES	81.6
GKSS	-110	14.30	25	12.5	10.70	0.00	66.9	567.6	234.7	218.0	YES	66.9
GKSS	-110	14.64	25	12.5	10.36	0.00	85.6	567.6	234.7	214.5	YES	85.6
GKSS	-110	14.40	25	12.5	10.60	0.00	86.8	567.6	234.7	217.0	YES	86.8
GKSS	-110	14.44	25	12.5	10.56	0.00	114.2	567.6	234.7	216.6	YES	114.2
GKSS	-110	14.20	25	12.5	10.80	0.00	73.5	567.6	234.7	219.0	YES	73.5
GKSS	-110	13.96	25	12.5	11.04	0.00	92.7	567.6	234.7	221.4	YES	92.7
GKSS	-110	14.10	25	12.5	10.90	0.00	77.5	567.6	234.7	220.0	YES	77.5
GKSS	-110	14.14	25	12.5	10.86	0.00	61.5	567.6	234.7	219.6	YES	61.5
GKSS	-110	14.06	25	12.5	10.94	0.00	51.8	567.6	234.7	220.4	YES	51.8
GKSS	-110	14.23	25	12.5	10.77	0.00	73.6	567.6	234.7	218.7	YES	73.6
GKSS	-110	14.10	25	12.5	10.90	0.00	52.8	567.6	234.7	220.0	YES	52.8
GKSS	-110	14.00	25	12.5	11.00	0.00	41.2	567.6	234.7	221.0	YES	41.2
GKSS	-110	14.20	25	12.5	10.80	0.00	115.3	567.6	234.7	219.0	YES	115.3
GKSS	-110	13.98	25	12.5	11.02	0.00	73.2	567.6	234.7	221.2	YES	73.2
GKSS	-110	13.97	25	12.5	11.03	0.00	74.0	567.6	234.7	221.3	YES	74.0
GKSS	-110	14.45	25	12.5	10.55	0.00	67.5	567.6	234.7	216.5	YES	67.5
GKSS	-110	14.58	25	12.5	10.42	0.00	71.0	567.6	234.7	215.1	YES	71.0
GKSS	-110	14.35	25	12.5	10.65	0.00	53.4	567.6	234.7	217.5	YES	53.4
GKSS	-110	14.55	25	12.5	10.45	0.00	96.5	567.6	234.7	215.4	YES	96.5
GKSS	-110	14.54	25	12.5	10.46	0.00	71.3	567.6	234.7	215.5	YES	71.3
GKSS	-110	14.39	25	12.5	10.61	0.00	71.7	567.6	234.7	217.1	YES	71.7
GKSS	-110	14.54	25	12.5	10.46	0.00	81.7	567.6	234.7	215.5	YES	81.7
GKSS	-110	14.32	25	12.5	10.68	0.00	64.0	567.6	234.7	217.8	YES	64.0
GKSS	-110	14.36	25	12.5	10.64	0.00	74.2	567.6	234.7	217.4	YES	74.2
GKSS	-110	14.30	25	12.5	10.70	0.00	70.4	567.6	234.7	218.0	YES	70.4
GKSS	-110	14.25	25	12.5	10.75	0.00	91.2	567.6	234.7	218.5	YES	91.2
GKSS	-110	14.17	25	12.5	10.83	0.00	72.0	567.6	234.7	219.3	YES	72.0
GKSS	-110	14.46	25	12.5	10.54	0.00	64.8	567.6	234.7	216.3	YES	64.8
GKSS	-110	14.37	25	12.5	10.63	0.00	79.2	567.6	234.7	217.3	YES	79.2
GKSS	-110	14.24	25	12.5	10.76	0.00	52.2	567.6	234.7	218.6	YES	52.2
GKSS	-110	14.22	25	12.5	10.78	0.00	82.9	567.6	234.7	218.8	YES	82.9
GKSS	-110	14.37	25	12.5	10.63	0.00	93.2	567.6	234.7	217.3	YES	93.2
GKSS	-110	14.51	25	12.5	10.49	0.00	75.4	567.6	234.7	215.8	YES	75.4
GKSS	-110	14.26	25	12.5	10.74	0.00	75.0	567.6	234.7	218.4	YES	75.0
GKSS	-110	14.66	25	12.5	10.34	0.00	78.6	567.6	234.7	214.3	YES	78.6
GKSS	-110	14.53	25	12.5	10.47	0.00	94.8	567.6	234.7	215.6	YES	94.8
GKSS	-110	14.33	25	12.5	10.67	0.00	98.1	567.6	234.7	217.7	YES	98.1
GKSS	-110	14.29	25	12.5	10.71	0.00	98.5	567.6	234.7	218.1	YES	98.5
GKSS	-110	14.56	25	12.5	10.44	0.00	104.9	567.6	234.7	215.3	YES	104.9
GKSS	-110	14.35	25	12.5	10.65	0.00	69.9	567.6	234.7	217.5	YES	69.9
GKSS	-110	14.30	25	12.5	10.70	0.00	81.6	567.6	234.7	218.0	YES	81.6
GKSS	-110	14.35	25	12.5	10.65	0.00	55.2	567.6	234.7	217.5	YES	55.2
GKSS	-110	14.35	25	12.5	10.65	0.00	105.6	567.6	234.7	217.5	YES	105.6
GKSS	-110	14.36	25	12.5	10.64	0.00	101.5	567.6	234.7	217.4	YES	101.5
GKSS	-110	14.41	25	12.5	10.59	0.00	73.7	567.6	234.7	216.9	YES	73.7
GKSS	-110	14.39	25	12.5	10.61	0.00	97.5	567.6	234.7	217.1	YES	97.5
GKSS	-110	14.48	25	12.5	10.52	0.00	75.9	567.6	234.7	216.1	YES	75.9
GKSS	-110	14.37	25	12.5	10.63	0.00	48.3	567.6	234.7	217.3	YES	48.3
GKSS	-91	14.41	25	12.5	10.59	0.00	127.0	538.9	233.5	210.8	YES	127.0

GKSS	-91	14.39	25	12.5	10.61	0.00	121.8	538.9	233.5	211.0	YES	121.8
GKSS	-91	14.29	25	12.5	10.71	0.00	70.5	538.9	233.5	211.9	YES	70.5
GKSS	-91	14.41	25	12.5	10.59	0.00	94.2	538.9	233.5	210.8	YES	94.2
GKSS	-91	14.17	25	12.5	10.83	0.00	127.3	538.9	233.5	213.1	YES	127.3
GKSS	-91	14.11	25	12.5	10.89	0.00	119.9	538.9	233.5	213.7	YES	119.9
GKSS	-91	14.19	25	12.5	10.81	0.00	104.5	538.9	233.5	212.9	YES	104.5
GKSS	-91	14.16	25	12.5	10.84	0.00	78.6	538.9	233.5	213.2	YES	78.6
GKSS	-91	14.06	25	12.5	10.94	0.00	98.6	538.9	233.5	214.2	YES	98.6
GKSS	-91	14.24	25	12.5	10.76	0.00	161.6	538.9	233.5	212.4	YES	161.6
THA	-91	13.95	25	12.5	11.05	0.00	91.3	538.9	233.5	215.3	YES	91.3
THA	-91	14.15	25	12.5	10.85	0.00	115.3	538.9	233.5	213.3	YES	115.3
THA	-91	13.96	25	12.5	11.04	0.02	122.4	538.9	233.5	215.2	YES	122.4
THA	-91	14.33	25	12.5	10.67	0.02	126.3	538.9	233.5	211.5	YES	126.3
THA	-91	14.49	25	12.5	10.51	0.00	108.3	538.9	233.5	210.0	YES	108.3
THA	-91	14.28	25	12.5	10.72	0.00	66.9	538.9	233.5	212.0	YES	66.9
THA	-91	14.29	25	12.5	10.71	0.02	126.7	538.9	233.5	211.9	YES	126.7
THA	-91	14.18	25	12.5	10.82	0.00	69.6	538.9	233.5	213.0	YES	69.6
THA	-91	14.52	25	12.5	10.48	0.00	121.4	538.9	233.5	209.7	YES	121.4
THA	-91	14.29	25	12.5	10.71	0.00	90.0	538.9	233.5	211.9	YES	90.0
THA	-91	13.90	25	12.5	11.10	0.05	153.9	538.9	233.5	215.8	YES	153.9
THA	-91	14.21	25	12.5	10.79	0.00	64.6	538.9	233.5	212.7	YES	64.6
THA	-91	14.52	25	12.5	10.48	0.01	127.2	538.9	233.5	209.7	YES	127.2
THA	-91	14.12	25	12.5	10.88	0.00	99.7	538.9	233.5	213.6	YES	99.7
THA	-91	14.38	25	12.5	10.62	0.00	101.3	538.9	233.5	211.1	YES	101.3
THA	-91	14.34	25	12.5	10.66	0.00	140.4	538.9	233.5	211.4	YES	140.4
THA	-91	14.25	25	12.5	10.75	0.00	78.2	538.9	233.5	212.3	YES	78.2
THA	-91	14.26	25	12.5	10.74	0.00	109.0	538.9	233.5	212.2	YES	109.0
THA	-91	14.44	25	12.5	10.56	0.00	103.9	538.9	233.5	210.5	YES	103.9
THA	-91	14.33	25	12.5	10.67	0.04	126.8	538.9	233.5	211.5	YES	126.8
THA	-91	14.33	25	12.5	10.67	0.00	111.7	538.9	233.5	211.5	YES	111.7
GKSS	-91	28.43	50	25.0	21.57	0.00	68.6	538.9	233.5	300.8	YES	68.6
GKSS	-91	28.35	50	25.0	21.65	0.00	81.6	538.9	233.5	301.3	YES	81.6
GKSS	-91	27.33	50	25.0	22.67	0.00	55.9	538.9	233.5	308.4	YES	55.9
GKSS	-91	28.38	50	25.0	21.62	0.00	98.8	538.9	233.5	301.1	YES	98.8
GKSS	-91	27.88	50	25.0	22.12	0.00	71.9	538.9	233.5	304.6	YES	71.9
GKSS	-91	28.18	50	25.0	21.82	0.00	111.0	538.9	233.5	302.5	YES	111.0
GKSS	-91	28.41	50	25.0	21.59	0.00	93.5	538.9	233.5	300.9	YES	93.5
GKSS	-91	28.19	50	25.0	21.81	0.00	79.9	538.9	233.5	302.4	YES	79.9
GKSS	-91	28.27	50	25.0	21.73	0.00	98.4	538.9	233.5	301.9	YES	98.4
GKSS	-91	28.06	50	25.0	21.94	0.00	101.1	538.9	233.5	303.3	YES	101.1
TWI	-91	27.61	50	25.0	22.39	0.00	79.6	538.9	233.5	306.4	YES	79.6
TWI	-91	27.70	50	25.0	22.30	0.00	99.7	538.9	233.5	305.8	YES	99.7
TWI	-91	27.47	50	25.0	22.53	0.00	108.1	538.9	233.5	307.4	YES	108.1
TWI	-91	27.73	50	25.0	22.27	0.00	93.4	538.9	233.5	305.6	YES	93.4
TWI	-91	27.70	50	25.0	22.30	0.00	62.0	538.9	233.5	305.8	YES	62.0
TWI	-91	27.74	50	25.0	22.26	0.00	107.1	538.9	233.5	305.6	YES	107.1
TWI	-91	27.78	50	25.0	22.22	0.06	145.3	538.9	233.5	305.3	YES	145.3
TWI	-91	27.49	50	25.0	22.51	0.00	76.3	538.9	233.5	307.3	YES	76.3
TWI	-91	27.64	50	25.0	22.36	0.00	126.5	538.9	233.5	306.2	YES	126.5
TWI	-91	27.91	50	25.0	22.09	0.04	126.1	538.9	233.5	304.4	YES	126.1
TWI	-91	27.27	50	25.0	22.73	0.05	128.5	538.9	233.5	308.8	YES	128.5
TWI	-91	27.73	50	25.0	22.27	0.00	111.4	538.9	233.5	305.6	YES	111.4
TWI	-91	27.49	50	25.0	22.51	0.00	130.4	538.9	233.5	307.3	YES	130.4
TWI	-91	27.60	50	25.0	22.40	0.00	134.8	538.9	233.5	306.5	YES	134.8
TWI	-91	27.87	50	25.0	22.13	0.00	157.3	538.9	233.5	304.7	YES	157.3
TWI	-91	27.31	50	25.0	22.69	0.00	105.2	538.9	233.5	308.5	YES	105.2
TWI	-91	27.61	50	25.0	22.39	0.00	109.8	538.9	233.5	306.4	YES	109.8
TWI	-91	26.01	50	25.0	23.99	0.00	84.9	538.9	233.5	317.2	YES	84.9
TWI	-91	27.94	50	25.0	22.06	0.00	62.8	538.9	233.5	304.2	YES	62.8
TWI	-91	28.64	50	25.0	21.36	0.00	97.5	538.9	233.5	299.3	YES	97.5
TWI	-91	27.37	50	25.0	22.63	0.00	80.2	538.9	233.5	308.1	YES	80.2
TWI	-91	27.52	50	25.0	22.48	0.05	134.4	538.9	233.5	307.1	YES	134.4
TWI	-91	27.60	50	25.0	22.40	0.00	65.1	538.9	233.5	306.5	YES	65.1
TWI	-91	27.47	50	25.0	22.53	0.00	118.6	538.9	233.5	307.4	YES	118.6
GKSS	-91	56.39	100	50.0	43.61	0.00	67.3	538.9	233.5	427.7	YES	67.3
GKSS	-91	55.98	100	50.0	44.02	0.00	162.9	538.9	233.5	429.7	YES	162.9
GKSS	-91	55.90	100	50.0	44.10	0.00	100.0	538.9	233.5	430.1	YES	100.0
GKSS	-91	56.12	100	50.0	43.88	0.00	91.2	538.9	233.5	429.0	YES	91.2
GKSS	-91	55.74	100	50.0	44.26	0.00	106.2	538.9	233.5	430.9	YES	106.2
GKSS	-91	55.74	100	50.0	44.26	0.00	83.2	538.9	233.5	430.9	YES	83.2
GKSS	-91	56.46	100	50.0	43.54	0.00	91.8	538.9	233.5	427.3	YES	91.8
GKSS	-91	55.78	100	50.0	44.22	0.00	94.7	538.9	233.5	430.7	YES	94.7
GKSS	-91	55.68	100	50.0	44.32	0.00	92.9	538.9	233.5	431.1	YES	92.9
GKSS	-91	55.29	100	50.0	44.71	0.00	69.9	538.9	233.5	433.0	YES	69.9
NE	-91	56.42	100	50.0	43.58	0.00	93.1	538.9	233.5	427.5	YES	93.1
NE	-91	56.77	100	50.0	43.23	0.00	97.9	538.9	233.5	425.8	YES	97.9
NE	-91	56.26	100	50.0	43.74	0.00	73.7	538.9	233.5	428.3	YES	73.7
NE	-91	56.26	100	50.0	43.74	0.00	82.0	538.9	233.5	428.3	YES	82.0
NE	-91	56.31	100	50.0	43.69	0.00	76.3	538.9	233.5	428.1	YES	76.3
NE	-91	56.42	100	50.0	43.58	0.00	93.1	538.9	233.5	427.5	YES	93.1
NE	-91	56.39	100	50.0	43.61	0.00	83.7	538.9	233.5	427.7	YES	83.7
NE	-91	56.41	100	50.0	43.59	0.00	82.1	538.9	233.5	427.6	YES	82.1
NE	-91	56.38	100	50.0	43.62	0.00	86.8	538.9	233.5	427.7	YES	86.8
NE	-91	56.30	100	50.0	43.70	0.00	86.7	538.9	233.5	428.1	YES	86.7
NE	-91	56.35	100	50.0	43.65	0.00	92.3	538.9	233.5	427.9	YES	92.3
NE	-91	56.74	100	50.0	43.26	0.00	83.1	538.9	233.5	426.0	YES	83.1
NE	-91	56.42	100	50.0	43.58	0.00	88.9	538.9	233.5	427.5	YES	88.9

NE	-91	56.36	100	50.0	43.64	0.00	64.3	538.9	233.5	427.8	YES	64.3
NE	-91	56.48	100	50.0	43.52	0.00	101.6	538.9	233.5	427.2	YES	101.6
NE	-91	56.41	100	50.0	43.59	0.00	94.2	538.9	233.5	427.6	YES	94.2
NE	-91	56.34	100	50.0	43.66	0.00	78.7	538.9	233.5	427.9	YES	78.7
NE	-91	56.55	100	50.0	43.45	0.00	73.0	538.9	233.5	426.9	YES	73.0
NE	-91	56.51	100	50.0	43.49	0.00	64.2	538.9	233.5	427.1	YES	64.2
NE	-91	56.49	100	50.0	43.51	0.00	98.9	538.9	233.5	427.2	YES	98.9
GKSS	-91	112.50	200	100.0	87.50	0.00	103.2	538.9	233.5	605.8	YES	103.2
GKSS	-91	111.92	200	100.0	88.08	0.00	84.4	538.9	233.5	607.8	YES	84.4
GKSS	-91	110.92	200	100.0	89.08	0.00	97.0	538.9	233.5	611.2	YES	97.0
GKSS	-91	112.15	200	100.0	87.85	0.00	92.7	538.9	233.5	607.0	YES	92.7
GKSS	-91	112.48	200	100.0	87.52	0.00	96.8	538.9	233.5	605.9	YES	96.8
NE	-91	111.78	200	100.0	88.22	0.00	73.6	538.9	233.5	608.3	YES	73.6
NE	-91	112.90	200	100.0	87.10	0.00	73.0	538.9	233.5	604.4	YES	73.0
NE	-91	111.41	200	100.0	88.59	0.00	73.3	538.9	233.5	609.6	YES	73.3
NE	-91	111.95	200	100.0	88.05	0.00	53.8	538.9	233.5	607.7	YES	53.8
NE	-91	112.66	200	100.0	87.34	0.00	69.5	538.9	233.5	605.2	YES	69.5
NE	-91	115.23	200	100.0	84.77	0.00	65.5	538.9	233.5	596.3	YES	65.5
NE	-91	111.72	200	100.0	88.28	0.00	79.6	538.9	233.5	608.5	YES	79.6
NE	-91	112.52	200	100.0	87.48	0.00	69.8	538.9	233.5	605.7	YES	69.8
NE	-91	113.20	200	100.0	86.80	0.00	90.3	538.9	233.5	603.4	YES	90.3
NE	-91	109.16	200	100.0	90.84	0.00	88.0	538.9	233.5	617.3	YES	88.0
GKSS	-60	14.19	25	12.5	10.81	0.05	234.1	506.4	231.4	205.5	NO	205.5
GKSS	-60	14.16	25	12.5	10.84	0.00	114.4	506.4	231.4	205.8	YES	114.4
GKSS	-60	14.31	25	12.5	10.69	0.00	130.7	506.4	231.4	204.4	YES	130.7
GKSS	-60	14.13	25	12.5	10.87	0.00	106.7	506.4	231.4	206.1	YES	106.7
GKSS	-60	14.08	25	12.5	10.92	0.00	161.0	506.4	231.4	206.5	YES	161.0
GKSS	-60	13.58	25	12.5	11.42	0.00	200.7	506.4	231.4	211.2	YES	200.7
GKSS	-60	14.26	25	12.5	10.74	0.00	125.2	506.4	231.4	204.8	YES	125.2
GKSS	-60	14.19	25	12.5	10.81	0.00	145.1	506.4	231.4	205.5	YES	145.1
GKSS	-60	14.00	25	12.5	11.00	0.00	91.9	506.4	231.4	207.3	YES	91.9
GKSS	-60	13.94	25	12.5	11.06	0.00	128.1	506.4	231.4	207.9	YES	128.1
GKSS	-60	14.59	25	12.5	10.41	0.00	164.4	506.4	231.4	201.7	YES	164.4
GKSS	-60	14.53	25	12.5	10.47	0.00	192.2	506.4	231.4	202.2	YES	192.2
GKSS	-60	14.76	25	12.5	10.24	0.00	166.3	506.4	231.4	200.0	YES	166.3
GKSS	-60	14.48	25	12.5	10.52	0.00	177.7	506.4	231.4	202.7	YES	177.7
GKSS	-60	14.55	25	12.5	10.45	0.00	203.7	506.4	231.4	202.0	NO	202.0
GKSS	-60	14.46	25	12.5	10.54	0.00	116.0	506.4	231.4	202.9	YES	116.0
GKSS	-60	14.55	25	12.5	10.45	0.11	221.9	506.4	231.4	202.0	NO	202.0
GKSS	-60	14.77	25	12.5	10.23	0.00	167.6	506.4	231.4	199.9	YES	167.6
GKSS	-60	14.35	25	12.5	10.65	0.00	89.8	506.4	231.4	204.0	YES	89.8
GKSS	-60	14.56	25	12.5	10.44	0.00	156.3	506.4	231.4	201.9	YES	156.3
GKSS	-60	14.49	25	12.5	10.51	0.00	186.8	506.4	231.4	202.6	YES	186.8
GKSS	-60	14.43	25	12.5	10.57	0.00	213.5	506.4	231.4	203.2	NO	203.2
GKSS	-60	14.39	25	12.5	10.61	0.00	164.6	506.4	231.4	203.6	YES	164.6
GKSS	-60	14.49	25	12.5	10.51	0.28	280.1	506.4	231.4	202.6	NO	202.6
GKSS	-60	14.43	25	12.5	10.57	0.00	185.9	506.4	231.4	203.2	YES	185.9
GKSS	-60	14.85	25	12.5	10.15	0.00	127.7	506.4	231.4	199.1	YES	127.7
GKSS	-60	14.64	25	12.5	10.36	0.00	205.0	506.4	231.4	201.2	NO	201.2
GKSS	-60	14.25	25	12.5	10.75	0.00	115.6	506.4	231.4	204.9	YES	115.6
GKSS	-60	14.44	25	12.5	10.56	0.00	107.5	506.4	231.4	203.1	YES	107.5
SIEMENS	-60	13.24	25	12.5	11.76	0.00	164.6	506.4	231.4	214.3	YES	164.6
SIEMENS	-60	13.29	25	12.5	11.71	0.00	172.0	506.4	231.4	213.9	YES	172.0
SIEMENS	-60	13.24	25	12.5	11.76	0.00	108.5	506.4	231.4	214.3	YES	108.5
SIEMENS	-60	13.28	25	12.5	11.72	0.00	119.0	506.4	231.4	214.0	YES	119.0
SIEMENS	-60	13.26	25	12.5	11.74	0.00	153.5	506.4	231.4	214.2	YES	153.5
SIEMENS	-60	13.22	25	12.5	11.78	0.00	158.9	506.4	231.4	214.5	YES	158.9
SIEMENS	-60	13.27	25	12.5	11.73	0.00	137.5	506.4	231.4	214.1	YES	137.5
SIEMENS	-60	13.18	25	12.5	11.82	0.00	119.5	506.4	231.4	214.9	YES	119.5
SIEMENS	-60	13.18	25	12.5	11.82	0.00	130.7	506.4	231.4	214.9	YES	130.7
SIEMENS	-60	13.24	25	12.5	11.76	0.00	172.6	506.4	231.4	214.3	YES	172.6
SIEMENS	-60	13.24	25	12.5	11.76	0.00	84.5	506.4	231.4	214.3	YES	84.5
SIEMENS	-60	13.34	25	12.5	11.66	0.00	244.6	506.4	231.4	213.4	NO	213.4
SIEMENS	-60	13.20	25	12.5	11.80	0.00	120.4	506.4	231.4	214.7	YES	120.4
SIEMENS	-60	13.31	25	12.5	11.69	0.00	104.5	506.4	231.4	213.7	YES	104.5
SIEMENS	-60	13.23	25	12.5	11.77	0.00	163.6	506.4	231.4	214.4	YES	163.6
SIEMENS	-60	13.28	25	12.5	11.72	0.00	201.4	506.4	231.4	214.0	YES	201.4
SIEMENS	-60	13.20	25	12.5	11.80	0.00	137.8	506.4	231.4	214.7	YES	137.8
SIEMENS	-60	13.19	25	12.5	11.81	0.00	173.0	506.4	231.4	214.8	YES	173.0
SIEMENS	-60	13.22	25	12.5	11.78	0.00	99.2	506.4	231.4	214.5	YES	99.2
SIEMENS	-60	13.22	25	12.5	11.78	0.00	173.4	506.4	231.4	214.5	YES	173.4
SIEMENS	-60	13.29	25	12.5	11.71	0.00	131.5	506.4	231.4	213.9	YES	131.5
GKSS	-60	28.06	50	25.0	21.94	0.00	186.0	506.4	231.4	292.8	YES	186.0
GKSS	-60	27.75	50	25.0	22.25	0.00	151.8	506.4	231.4	294.8	YES	151.8
GKSS	-60	27.62	50	25.0	22.38	0.00	111.7	506.4	231.4	295.7	YES	111.7
GKSS	-60	27.65	50	25.0	22.35	0.00	143.9	506.4	231.4	295.5	YES	143.9
GKSS	-60	27.71	50	25.0	22.29	0.00	105.4	506.4	231.4	295.1	YES	105.4
GKSS	-60	28.01	50	25.0	21.99	0.00	154.0	506.4	231.4	293.1	YES	154.0
GKSS	-60	27.97	50	25.0	22.03	0.00	176.2	506.4	231.4	293.4	YES	176.2
GKSS	-60	27.51	50	25.0	22.49	0.00	131.9	506.4	231.4	296.4	YES	131.9
GKSS	-60	27.86	50	25.0	22.14	0.00	203.9	506.4	231.4	294.1	YES	203.9
GKSS	-60	27.51	50	25.0	22.49	0.00	142.7	506.4	231.4	296.4	YES	142.7
TWI	-60	27.42	50	25.0	22.58	0.06	134.5	506.4	231.4	297.0	YES	134.5
TWI	-60	27.43	50	25.0	22.57	0.00	130.1	506.4	231.4	296.9	YES	130.1
TWI	-60	27.62	50	25.0	22.38	0.07	142.6	506.4	231.4	295.7	YES	142.6
TWI	-60	27.47	50	25.0	22.53	0.05	119.7	506.4	231.4	296.7	YES	119.7
TWI	-60	27.49	50	25.0	22.51	0.07	141.3	506.4	231.4	296.5	YES	141.3

TWI	-60	27.95	50	25.0	22.05	0.10	175.9	506.4	231.4	293.5	YES	175.9
TWI	-60	27.62	50	25.0	22.38	0.00	119.6	506.4	231.4	295.7	YES	119.6
TWI	-60	27.65	50	25.0	22.35	0.00	102.4	506.4	231.4	295.5	YES	102.4
TWI	-60	27.68	50	25.0	22.32	0.00	99.0	506.4	231.4	295.3	YES	99.0
TWI	-60	27.82	50	25.0	22.18	0.05	115.1	506.4	231.4	294.4	YES	115.1
TWI	-60	27.98	50	25.0	22.02	0.11	172.9	506.4	231.4	293.3	YES	172.9
TWI	-60	27.72	50	25.0	22.28	0.03	120.5	506.4	231.4	295.0	YES	120.5
TWI	-60	27.48	50	25.0	22.52	0.00	165.2	506.4	231.4	296.6	YES	165.2
TWI	-60	27.54	50	25.0	22.46	0.00	125.6	506.4	231.4	296.2	YES	125.6
TWI	-60	27.88	50	25.0	22.12	0.05	126.7	506.4	231.4	294.0	YES	126.7
TWI	-60	27.79	50	25.0	22.21	0.00	100.4	506.4	231.4	294.6	YES	100.4
TWI	-60	27.56	50	25.0	22.44	0.05	131.1	506.4	231.4	296.1	YES	131.1
TWI	-60	27.58	50	25.0	22.42	0.06	185.1	506.4	231.4	295.9	YES	185.1
TWI	-60	27.59	50	25.0	22.41	0.09	163.6	506.4	231.4	295.9	YES	163.6
TWI	-60	27.68	50	25.0	22.32	0.09	126.5	506.4	231.4	295.3	YES	126.5
TWI	-60	27.65	50	25.0	22.35	0.10	164.7	506.4	231.4	295.5	YES	164.7
TWI	-60	27.73	50	25.0	22.27	0.16	192.7	506.4	231.4	294.9	YES	192.7
TWI	-60	27.65	50	25.0	22.35	0.05	134.5	506.4	231.4	295.5	YES	134.5
TWI	-60	27.86	50	25.0	22.14	0.05	140.8	506.4	231.4	294.1	YES	140.8
GKSS	-60	57.56	100	50.0	42.44	0.00	109.9	506.4	231.4	407.2	YES	109.9
GKSS	-60	56.69	100	50.0	43.31	0.00	131.9	506.4	231.4	411.3	YES	131.9
GKSS	-60	56.69	100	50.0	43.31	0.00	136.2	506.4	231.4	411.3	YES	136.2
GKSS	-60	56.51	100	50.0	43.49	0.00	154.0	506.4	231.4	412.2	YES	154.0
GKSS	-60	56.15	100	50.0	43.85	0.00	115.9	506.4	231.4	413.9	YES	115.9
GKSS	-60	55.96	100	50.0	44.04	0.00	150.4	506.4	231.4	414.8	YES	150.4
BAM	-40	13.63	25	12.5	11.37	0.08	171.0	492.0	230.1	207.1	YES	171.0
BAM	-40	13.73	25	12.5	11.27	2.05	569.4	492.0	230.1	206.2	NO	206.2
BAM	-40	13.78	25	12.5	11.22	0.13	169.4	492.0	230.1	205.8	YES	169.4
BAM	-40	14.02	25	12.5	10.98	1.93	548.7	492.0	230.1	203.6	NO	203.6
BAM	-40	14.13	25	12.5	10.87	1.67	529.9	492.0	230.1	202.5	NO	202.5
BAM	-40	13.62	25	12.5	11.38	0.36	318.5	492.0	230.1	207.2	NO	207.2
BAM	-40	13.77	25	12.5	11.23	2.07	574.8	492.0	230.1	205.9	NO	205.9
BAM	-40	13.70	25	12.5	11.30	0.69	360.8	492.0	230.1	206.5	NO	206.5
BAM	-40	13.61	25	12.5	11.39	0.60	343.8	492.0	230.1	207.3	NO	207.3
BAM	-40	13.85	25	12.5	11.15	0.26	235.8	492.0	230.1	205.1	NO	205.1
BAM	-40	14.10	25	12.5	10.90	1.79	529.9	492.0	230.1	202.8	NO	202.8
BAM	-40	13.88	25	12.5	11.12	1.44	496.5	492.0	230.1	204.9	NO	204.9
BAM	-40	13.84	25	12.5	11.16	2.08	600.0	492.0	230.1	205.2	NO	205.2
BAM	-40	13.91	25	12.5	11.09	0.07	113.7	492.0	230.1	204.6	YES	113.7
BAM	-40	13.89	25	12.5	11.11	0.21	229.6	492.0	230.1	204.8	NO	204.8
BAM	-40	13.99	25	12.5	11.01	0.09	154.2	492.0	230.1	203.8	YES	154.2
BAM	-40	13.73	25	12.5	11.27	0.24	221.3	492.0	230.1	206.2	NO	206.2
BAM	-40	13.95	25	12.5	11.05	1.37	486.7	492.0	230.1	204.2	NO	204.2
BAM	-40	13.61	25	12.5	11.39	0.25	243.8	492.0	230.1	207.3	NO	207.3
BAM	-40	13.74	25	12.5	11.26	0.17	202.5	492.0	230.1	206.1	YES	202.5
GKSS	-40	14.00	25	12.5	11.00	0.00	180.6	492.0	230.1	203.7	YES	180.6
GKSS	-40	14.03	25	12.5	10.97	0.00	206.7	492.0	230.1	203.5	NO	203.5
GKSS	-40	14.59	25	12.5	10.41	0.00	240.7	492.0	230.1	198.2	NO	198.2
GKSS	-40	14.44	25	12.5	10.56	0.00	270.8	492.0	230.1	199.6	NO	199.6
GKSS	-40	14.05	25	12.5	10.95	0.00	186.4	492.0	230.1	203.3	YES	186.4
GKSS	-40	14.46	25	12.5	10.54	0.18	255.8	492.0	230.1	199.4	NO	199.4
GKSS	-40	13.93	25	12.5	11.07	0.12	231.2	492.0	230.1	204.4	NO	204.4
GKSS	-40	14.15	25	12.5	10.85	0.44	339.4	492.0	230.1	202.4	NO	202.4
GKSS	-40	14.06	25	12.5	10.94	0.83	403.1	492.0	230.1	203.2	NO	203.2
GKSS	-40	14.31	25	12.5	10.69	0.83	399.2	492.0	230.1	200.9	NO	200.9
BAM	-40	27.73	50	25.0	22.27	0.09	187.3	492.0	230.1	289.9	YES	187.3
BAM	-40	27.76	50	25.0	22.24	0.05	101.5	492.0	230.1	289.7	YES	101.5
BAM	-40	27.54	50	25.0	22.46	0.06	140.3	492.0	230.1	291.1	YES	140.3
BAM	-40	26.90	50	25.0	23.10	0.08	150.2	492.0	230.1	295.3	YES	150.2
BAM	-40	27.34	50	25.0	22.66	0.09	187.3	492.0	230.1	292.4	YES	187.3
BAM	-40	27.00	50	25.0	23.00	0.18	211.4	492.0	230.1	294.6	YES	211.4
BAM	-40	26.82	50	25.0	23.18	0.12	160.5	492.0	230.1	295.8	YES	160.5
BAM	-40	26.88	50	25.0	23.12	0.11	214.6	492.0	230.1	295.4	YES	214.6
BAM	-40	27.28	50	25.0	22.72	0.15	188.3	492.0	230.1	292.8	YES	188.3
BAM	-40	27.52	50	25.0	22.48	0.23	239.3	492.0	230.1	291.3	YES	239.3
BAM	-40	27.16	50	25.0	22.84	0.05	112.8	492.0	230.1	293.6	YES	112.8
BAM	-40	27.71	50	25.0	22.29	0.23	239.0	492.0	230.1	290.0	YES	239.0
BAM	-40	27.48	50	25.0	22.52	0.38	284.9	492.0	230.1	291.5	YES	284.9
BAM	-40	27.17	50	25.0	22.83	0.31	254.7	492.0	230.1	293.5	YES	254.7
BAM	-40	27.33	50	25.0	22.67	0.23	270.9	492.0	230.1	292.5	YES	270.9
BAM	-40	27.39	50	25.0	22.61	0.14	187.0	492.0	230.1	292.1	YES	187.0
BAM	-40	27.53	50	25.0	22.47	0.13	170.1	492.0	230.1	291.2	YES	170.1
BAM	-40	26.83	50	25.0	23.17	0.25	256.4	492.0	230.1	295.7	YES	256.4
BAM	-40	27.51	50	25.0	22.49	0.11	171.4	492.0	230.1	291.3	YES	171.4
BAM	-40	26.62	50	25.0	23.38	0.05	103.1	492.0	230.1	297.0	YES	103.1
BAM	-40	28.84	50	25.0	21.16	0.23	230.0	492.0	230.1	282.6	YES	230.0
BAM	-40	26.72	50	25.0	23.28	0.20	210.0	492.0	230.1	296.4	YES	210.0
GKSS	-40	27.99	50	25.0	22.01	0.00	198.2	492.0	230.1	288.2	YES	198.2
GKSS	-40	28.02	50	25.0	21.98	0.00	150.2	492.0	230.1	288.0	YES	150.2
GKSS	-40	28.32	50	25.0	21.68	0.00	226.8	492.0	230.1	286.0	YES	226.8
GKSS	-40	28.13	50	25.0	21.87	0.00	158.1	492.0	230.1	287.3	YES	158.1
GKSS	-40	28.17	50	25.0	21.83	0.00	256.4	492.0	230.1	287.0	YES	256.4
GKSS	-40	28.10	50	25.0	21.90	0.00	207.6	492.0	230.1	287.5	YES	207.6
GKSS	-40	27.84	50	25.0	22.16	0.19	213.5	492.0	230.1	289.2	YES	213.5
GKSS	-40	28.14	50	25.0	21.86	0.25	254.6	492.0	230.1	287.2	YES	254.6
GKSS	-40	28.26	50	25.0	21.74	0.24	240.0	492.0	230.1	286.4	YES	240.0
GKSS	-40	29.37	50	25.0	20.63	0.41	309.2	492.0	230.1	279.0	NO	279.0

GKSS	-40	56.43	100	50.0	43.57	0.00	125.9	492.0	230.1	405.5	YES	125.9
GKSS	-40	56.39	100	50.0	43.61	0.00	128.9	492.0	230.1	405.7	YES	128.9
GKSS	-40	56.29	100	50.0	43.71	0.00	198.5	492.0	230.1	406.2	YES	198.5
GKSS	-40	54.58	100	50.0	45.42	0.00	212.0	492.0	230.1	414.0	YES	212.0
GKSS	-40	56.61	100	50.0	43.39	0.00	138.6	492.0	230.1	404.7	YES	138.6
GKSS	-40	56.75	100	50.0	43.25	0.00	187.7	492.0	230.1	404.0	YES	187.7
GKSS	-40	56.59	100	50.0	43.41	0.00	173.0	492.0	230.1	404.8	YES	173.0
GKSS	-40	56.48	100	50.0	43.52	0.00	179.5	492.0	230.1	405.3	YES	179.5
GKSS	-40	57.40	100	50.0	42.60	0.00	152.6	492.0	230.1	401.0	YES	152.6
GKSS	-40	56.44	100	50.0	43.56	0.00	153.6	492.0	230.1	405.5	YES	153.6
THA	-40	56.27	100	50.0	43.73	0.00	144.6	492.0	230.1	406.2	YES	144.6
THA	-40	56.17	100	50.0	43.83	0.00	150.7	492.0	230.1	406.7	YES	150.7
THA	-40	56.43	100	50.0	43.57	0.00	139.1	492.0	230.1	405.5	YES	139.1
THA	-40	56.26	100	50.0	43.74	0.00	183.6	492.0	230.1	406.3	YES	183.6
THA	-40	56.26	100	50.0	43.74	0.00	142.0	492.0	230.1	406.3	YES	142.0
THA	-40	56.79	100	50.0	43.21	0.16	187.2	492.0	230.1	403.8	YES	187.2
THA	-40	56.58	100	50.0	43.42	0.12	172.2	492.0	230.1	404.8	YES	172.2
THA	-40	56.29	100	50.0	43.71	0.15	198.0	492.0	230.1	406.2	YES	198.0
THA	-40	56.57	100	50.0	43.43	0.00	130.4	492.0	230.1	404.8	YES	130.4
THA	-40	56.56	100	50.0	43.44	0.00	141.7	492.0	230.1	404.9	YES	141.7
THA	-40	56.67	100	50.0	43.33	0.00	134.5	492.0	230.1	404.4	YES	134.5
THA	-40	56.77	100	50.0	43.23	0.00	115.5	492.0	230.1	403.9	YES	115.5
THA	-40	57.53	100	50.0	42.47	0.00	91.7	492.0	230.1	400.4	YES	91.7
THA	-40	56.44	100	50.0	43.56	0.00	141.1	492.0	230.1	405.5	YES	141.1
THA	-40	56.40	100	50.0	43.60	0.21	239.1	492.0	230.1	405.6	YES	239.1
THA	-40	56.45	100	50.0	43.55	0.23	243.4	492.0	230.1	405.4	YES	243.4
THA	-40	56.33	100	50.0	43.67	0.14	191.9	492.0	230.1	406.0	YES	191.9
THA	-40	56.78	100	50.0	43.22	0.00	146.8	492.0	230.1	403.9	YES	146.8
THA	-40	56.42	100	50.0	43.58	0.00	161.4	492.0	230.1	405.5	YES	161.4
THA	-40	56.67	100	50.0	43.33	0.00	142.3	492.0	230.1	404.4	YES	142.3
CISE	-20	14.20	25	12.5	10.80	0.00	128.7	481.3	228.8	199.1	YES	128.7
CISE	-20	13.93	25	12.5	11.07	0.00	146.9	481.3	228.8	201.6	YES	146.9
CISE	-20	13.63	25	12.5	11.37	0.74	402.8	481.3	228.8	204.3	NO	204.3
CISE	-20	14.29	25	12.5	10.71	1.05	409.4	481.3	228.8	198.3	NO	198.3
CISE	-20	14.64	25	12.5	10.36	2.38	530.5	481.3	228.8	195.0	NO	195.0
CISE	-20	14.34	25	12.5	10.66	2.64	532.2	481.3	228.8	197.8	NO	197.8
CISE	-20	14.58	25	12.5	10.42	2.46	534.6	481.3	228.8	195.6	NO	195.6
CISE	-20	14.51	25	12.5	10.49	2.58	536.1	481.3	228.8	196.2	NO	196.2
CISE	-20	14.75	25	12.5	10.25	2.17	536.1	481.3	228.8	194.0	NO	194.0
CISE	-20	14.29	25	12.5	10.71	2.78	536.6	481.3	228.8	198.3	NO	198.3
CISE	-20	13.97	25	12.5	11.03	2.62	538.6	481.3	228.8	201.2	NO	201.2
CISE	-20	14.01	25	12.5	10.99	2.40	540.5	481.3	228.8	200.9	NO	200.9
CISE	-20	14.58	25	12.5	10.42	2.77	543.8	481.3	228.8	195.6	NO	195.6
CISE	-20	14.36	25	12.5	10.64	2.58	549.2	481.3	228.8	197.6	NO	197.6
CISE	-20	13.89	25	12.5	11.11	2.48	553.7	481.3	228.8	201.9	NO	201.9
CISE	-20	13.83	25	12.5	11.17	2.47	556.1	481.3	228.8	202.5	NO	202.5
CISE	-20	14.31	25	12.5	10.69	2.51	556.3	481.3	228.8	198.1	NO	198.1
CISE	-20	14.31	25	12.5	10.69	2.51	560.6	481.3	228.8	198.1	NO	198.1
CISE	-20	14.03	25	12.5	10.97	2.83	565.8	481.3	228.8	200.7	NO	200.7
CISE	-20	14.13	25	12.5	10.87	2.43	570.1	481.3	228.8	199.8	NO	199.8
CISE	-20	13.94	25	12.5	11.06	2.63	571.1	481.3	228.8	201.5	NO	201.5
GKSS	-20	14.04	25	12.5	10.96	0.00	233.1	481.3	228.8	200.6	NO	200.6
GKSS	-20	14.04	25	12.5	10.96	0.74	389.8	481.3	228.8	200.6	NO	200.6
GKSS	-20	14.12	25	12.5	10.88	1.31	487.9	481.3	228.8	199.8	NO	199.8
GKSS	-20	14.30	25	12.5	10.70	1.07	438.3	481.3	228.8	198.2	NO	198.2
GKSS	-20	14.18	25	12.5	10.82	2.76	571.4	481.3	228.8	199.3	NO	199.3
GKSS	-20	14.47	25	12.5	10.53	2.41	560.7	481.3	228.8	196.6	NO	196.6
GKSS	-20	14.25	25	12.5	10.75	2.71	561.1	481.3	228.8	198.6	NO	198.6
GKSS	-20	14.03	25	12.5	10.97	2.83	575.1	481.3	228.8	200.7	NO	200.7
GKSS	-20	14.64	25	12.5	10.36	2.64	557.5	481.3	228.8	195.0	NO	195.0
GKSS	-20	14.26	25	12.5	10.74	2.65	572.5	481.3	228.8	198.6	NO	198.6
GKSS	-20	27.87	50	25.0	22.13	0.00	202.5	481.3	228.8	285.0	YES	202.5
GKSS	-20	28.00	50	25.0	22.00	0.00	194.7	481.3	228.8	284.2	YES	194.7
GKSS	-20	27.61	50	25.0	22.39	0.00	262.8	481.3	228.8	286.7	YES	262.8
GKSS	-20	28.02	50	25.0	21.98	0.00	187.9	481.3	228.8	284.0	YES	187.9
GKSS	-20	28.15	50	25.0	21.85	0.31	275.8	481.3	228.8	283.2	YES	275.8
GKSS	-20	28.12	50	25.0	21.88	0.21	261.8	481.3	228.8	283.4	YES	261.8
GKSS	-20	28.15	50	25.0	21.85	0.68	371.0	481.3	228.8	283.2	NO	283.2
GKSS	-20	28.17	50	25.0	21.83	0.65	369.1	481.3	228.8	283.1	NO	283.1
GKSS	-20	28.02	50	25.0	21.98	1.13	462.1	481.3	228.8	284.0	NO	284.0
GKSS	-20	28.00	50	25.0	22.00	0.47	319.7	481.3	228.8	284.2	NO	284.2
VTT	-20	28.03	50	25.0	21.97	1.80	583.1	481.3	228.8	284.0	NO	284.0
VTT	-20	28.62	50	25.0	21.38	0.18	231.9	481.3	228.8	280.1	YES	231.9
VTT	-20	28.74	50	25.0	21.26	0.77	382.0	481.3	228.8	279.4	NO	279.4
VTT	-20	28.60	50	25.0	21.40	0.35	295.9	481.3	228.8	280.3	NO	280.3
VTT	-20	28.74	50	25.0	21.26	2.14	576.4	481.3	228.8	279.4	NO	279.4
VTT	-20	28.86	50	25.0	21.14	0.89	411.7	481.3	228.8	278.6	NO	278.6
VTT	-20	28.35	50	25.0	21.65	0.30	306.4	481.3	228.8	281.9	NO	281.9
VTT	-20	28.74	50	25.0	21.26	0.46	324.7	481.3	228.8	279.4	NO	279.4
VTT	-20	27.98	50	25.0	22.02	0.31	282.5	481.3	228.8	284.3	YES	282.5
VTT	-20	28.64	50	25.0	21.36	0.23	247.2	481.3	228.8	280.0	YES	247.2
VTT	-20	28.68	50	25.0	21.32	0.16	233.2	481.3	228.8	279.7	YES	233.2
VTT	-20	28.15	50	25.0	21.85	0.47	317.5	481.3	228.8	283.2	NO	283.2
VTT	-20	27.27	50	25.0	22.73	1.54	515.6	481.3	228.8	288.9	NO	288.9
VTT	-20	29.06	50	25.0	20.94	0.26	263.2	481.3	228.8	277.2	YES	263.2
VTT	-20	27.09	50	25.0	22.91	0.05	184.4	481.3	228.8	290.0	YES	184.4
VTT	-20	28.07	50	25.0	21.93	0.38	286.9	481.3	228.8	283.7	NO	283.7

VTT	-20	28.52	50	25.0	21.48	0.62	341.4	481.3	228.8	280.8	NO	280.8
VTT	-20	28.51	50	25.0	21.49	0.79	415.0	481.3	228.8	280.9	NO	280.9
VTT	-20	28.51	50	25.0	21.49	0.44	327.9	481.3	228.8	280.9	NO	280.9
VTT	-20	28.56	50	25.0	21.44	0.06	170.9	481.3	228.8	280.5	YES	170.9
VTT	-20	28.19	50	25.0	21.81	0.46	308.8	481.3	228.8	282.9	NO	282.9
VTT	-20	29.30	50	25.0	20.70	0.64	376.5	481.3	228.8	275.7	NO	275.7
VTT	-20	28.22	50	25.0	21.78	0.16	228.2	481.3	228.8	282.8	YES	228.2
VTT	-20	28.33	50	25.0	21.67	0.81	371.7	481.3	228.8	282.0	NO	282.0
VTT	-20	28.51	50	25.0	21.49	0.37	291.6	481.3	228.8	280.9	NO	280.9
VTT	-20	28.37	50	25.0	21.63	0.50	337.7	481.3	228.8	281.8	NO	281.8
VTT	-20	28.42	50	25.0	21.58	0.82	390.5	481.3	228.8	281.4	NO	281.4
VTT	-20	28.54	50	25.0	21.46	0.12	227.3	481.3	228.8	280.7	YES	227.3
VTT	-20	28.13	50	25.0	21.87	0.13	201.3	481.3	228.8	283.3	YES	201.3
VTT	-20	27.90	50	25.0	22.10	0.15	212.5	481.3	228.8	284.8	YES	212.5
VTT	-20	32.08	50	25.0	17.92	0.36	288.4	481.3	228.8	256.5	NO	256.5
VTT	-20	27.90	50	25.0	22.10	1.62	479.1	481.3	228.8	284.8	NO	284.8
VTT	-20	28.29	50	25.0	21.71	0.95	377.9	481.3	228.8	282.3	NO	282.3
VTT	-20	28.84	50	25.0	21.16	0.35	269.6	481.3	228.8	278.7	YES	269.6
VTT	-20	29.33	50	25.0	20.67	0.09	184.4	481.3	228.8	275.5	YES	184.4
VTT	-20	29.42	50	25.0	20.58	0.25	241.6	481.3	228.8	274.9	YES	241.6
VTT	-20	29.37	50	25.0	20.63	0.00	146.4	481.3	228.8	275.2	YES	146.4
VTT	-20	28.64	50	25.0	21.36	0.41	299.4	481.3	228.8	280.0	NO	280.0
VTT	-20	28.23	50	25.0	21.77	0.00	156.7	481.3	228.8	282.7	YES	156.7
VTT	-20	29.10	50	25.0	20.90	0.34	295.6	481.3	228.8	277.0	NO	277.0
CISE	-20	56.40	100	50.0	43.60	0.00	167.4	481.3	228.8	400.1	YES	167.4
CISE	-20	56.54	100	50.0	43.46	0.00	153.5	481.3	228.8	399.4	YES	153.5
CISE	-20	56.35	100	50.0	43.65	0.12	211.2	481.3	228.8	400.3	YES	211.2
CISE	-20	56.82	100	50.0	43.18	0.00	220.3	481.3	228.8	398.1	YES	220.3
CISE	-20	56.63	100	50.0	43.37	0.18	227.9	481.3	228.8	399.0	YES	227.9
CISE	-20	56.83	100	50.0	43.17	0.00	211.1	481.3	228.8	398.1	YES	211.1
CISE	-20	56.30	100	50.0	43.70	0.00	217.1	481.3	228.8	400.5	YES	217.1
CISE	-20	56.86	100	50.0	43.14	0.00	145.3	481.3	228.8	397.9	YES	145.3
CISE	-20	56.22	100	50.0	43.78	0.00	161.2	481.3	228.8	400.9	YES	161.2
CISE	-20	57.02	100	50.0	42.98	0.00	131.9	481.3	228.8	397.2	YES	131.9
CISE	-20	56.43	100	50.0	43.57	0.15	216.4	481.3	228.8	399.9	YES	216.4
CISE	-20	56.97	100	50.0	43.03	0.00	125.0	481.3	228.8	397.4	YES	125.0
CISE	-20	57.01	100	50.0	42.99	0.76	378.7	481.3	228.8	397.2	YES	378.7
CISE	-20	56.88	100	50.0	43.12	0.25	246.1	481.3	228.8	397.8	YES	246.1
CISE	-20	56.40	100	50.0	43.60	0.21	250.9	481.3	228.8	400.1	YES	250.9
CISE	-20	56.48	100	50.0	43.52	0.27	251.5	481.3	228.8	399.7	YES	251.5
CISE	-20	56.94	100	50.0	43.06	0.37	284.0	481.3	228.8	397.6	YES	284.0
CISE	-20	56.46	100	50.0	43.54	0.23	261.1	481.3	228.8	399.8	YES	261.1
CISE	-20	57.04	100	50.0	42.96	0.45	351.6	481.3	228.8	397.1	YES	351.6
CISE	-20	56.38	100	50.0	43.62	0.32	258.5	481.3	228.8	400.1	YES	258.5
GKSS	-20	56.19	100	50.0	43.81	0.00	201.3	481.3	228.8	401.0	YES	201.3
GKSS	-20	56.01	100	50.0	43.99	0.00	110.9	481.3	228.8	401.8	YES	110.9
GKSS	-20	56.65	100	50.0	43.35	0.00	197.7	481.3	228.8	398.9	YES	197.7
GKSS	-20	56.39	100	50.0	43.61	0.00	198.9	481.3	228.8	400.1	YES	198.9
GKSS	-20	56.30	100	50.0	43.70	0.00	200.6	481.3	228.8	400.5	YES	200.6
GKSS	-20	56.89	100	50.0	43.11	0.00	165.7	481.3	228.8	397.8	YES	165.7
GKSS	-20	56.12	100	50.0	43.88	0.37	280.1	481.3	228.8	401.3	YES	280.1
GKSS	-20	56.29	100	50.0	43.71	0.37	279.5	481.3	228.8	400.6	YES	279.5
GKSS	-20	56.04	100	50.0	43.96	0.29	257.6	481.3	228.8	401.7	YES	257.6
GKSS	-20	57.64	100	50.0	42.36	0.32	265.2	481.3	228.8	394.3	YES	265.2
GKSS	-20	113.67	200	100.0	86.33	0.00	156.7	481.3	228.8	562.9	YES	156.7
GKSS	-20	112.96	200	100.0	87.04	0.00	221.7	481.3	228.8	565.2	YES	221.7
GKSS	-20	112.18	200	100.0	87.82	0.00	193.9	481.3	228.8	567.8	YES	193.9
GKSS	-20	110.04	200	100.0	89.96	0.00	191.7	481.3	228.8	574.6	YES	191.7
GKSS	-20	113.10	200	100.0	86.90	0.00	184.4	481.3	228.8	564.8	YES	184.4
NE	-20	112.21	200	100.0	87.79	0.11	186.7	481.3	228.8	567.7	YES	186.7
NE	-20	112.21	200	100.0	87.79	0.11	184.4	481.3	228.8	567.7	YES	184.4
NE	-20	110.84	200	100.0	89.16	0.11	193.9	481.3	228.8	572.1	YES	193.9
NE	-20	111.83	200	100.0	88.17	0.14	204.4	481.3	228.8	568.9	YES	204.4
NE	-20	111.89	200	100.0	88.11	0.16	224.0	481.3	228.8	568.7	YES	224.0
NE	-20	111.52	200	100.0	88.48	0.09	153.4	481.3	228.8	569.9	YES	153.4
NE	-20	112.52	200	100.0	87.48	0.16	222.6	481.3	228.8	566.7	YES	222.6
NE	-20	112.36	200	100.0	87.64	0.10	162.0	481.3	228.8	567.2	YES	162.0
NE	-20	112.39	200	100.0	87.61	0.11	187.8	481.3	228.8	567.1	YES	187.8
NE	-20	111.64	200	100.0	88.36	0.12	198.2	481.3	228.8	569.5	YES	198.2
SCK-CEN	-10	28.39	50	25.0	21.61	3.23	656.0	477.0	228.1	280.0	NO	280.0
SCK-CEN	-10	28.20	50	25.0	21.80	0.81	397.8	477.0	228.1	281.2	NO	281.2
SCK-CEN	-10	27.99	50	25.0	22.01	4.21	718.1	477.0	228.1	282.6	NO	282.6
SCK-CEN	-10	27.77	50	25.0	22.23	2.68	601.6	477.0	228.1	284.0	NO	284.0
SCK-CEN	-10	28.25	50	25.0	21.75	1.52	505.3	477.0	228.1	280.9	NO	280.9
GKSS	0	14.21	25	12.5	10.79	2.51	541.9	473.3	227.5	196.8	NO	196.8
GKSS	0	14.55	25	12.5	10.45	2.45	547.0	473.3	227.5	193.7	NO	193.7
GKSS	0	14.63	25	12.5	10.37	2.44	538.7	473.3	227.5	192.9	NO	192.9
GKSS	0	14.22	25	12.5	10.78	2.47	540.0	473.3	227.5	196.7	NO	196.7
GKSS	0	14.29	25	12.5	10.71	2.55	544.8	473.3	227.5	196.1	NO	196.1
GKSS	0	14.44	25	12.5	10.56	2.49	534.8	473.3	227.5	194.7	NO	194.7
GKSS	0	14.26	25	12.5	10.74	2.53	557.2	473.3	227.5	196.3	NO	196.3
GKSS	0	14.31	25	12.5	10.69	2.51	545.0	473.3	227.5	195.9	NO	195.9
GKSS	0	14.38	25	12.5	10.62	2.56	546.1	473.3	227.5	195.2	NO	195.2
GKSS	0	14.59	25	12.5	10.41	2.53	549.2	473.3	227.5	193.3	NO	193.3
SCK-CEN	0	14.03	25	12.5	10.97	1.80	565.1	473.3	227.5	198.4	NO	198.4
SCK-CEN	0	13.96	25	12.5	11.04	2.57	571.6	473.3	227.5	199.1	NO	199.1
SCK-CEN	0	14.06	25	12.5	10.94	2.65	553.4	473.3	227.5	198.2	NO	198.2

SCK-CEN	0	14.12	25	12.5	10.88	0.28	293.2	473.3	227.5	197.6	NO	197.6
SCK-CEN	0	13.72	25	12.5	11.28	2.34	544.1	473.3	227.5	201.2	NO	201.2
SCK-CEN	0	13.85	25	12.5	11.15	2.49	552.2	473.3	227.5	200.0	NO	200.0
SCK-CEN	0	14.14	25	12.5	10.86	2.18	558.0	473.3	227.5	197.4	NO	197.4
SCK-CEN	0	13.90	25	12.5	11.10	2.53	553.5	473.3	227.5	199.6	NO	199.6
SCK-CEN	0	13.47	25	12.5	11.53	2.56	557.6	473.3	227.5	203.4	NO	203.4
SCK-CEN	0	13.94	25	12.5	11.06	2.25	552.4	473.3	227.5	199.2	NO	199.2
SCK-CEN	0	13.80	25	12.5	11.20	2.34	555.6	473.3	227.5	200.5	NO	200.5
SCK-CEN	0	13.59	25	12.5	11.41	2.42	558.2	473.3	227.5	202.4	NO	202.4
SCK-CEN	0	14.17	25	12.5	10.83	2.36	550.6	473.3	227.5	197.2	NO	197.2
SCK-CEN	0	13.20	25	12.5	11.80	1.88	560.8	473.3	227.5	205.8	NO	205.8
SCK-CEN	0	13.23	25	12.5	11.77	2.59	569.6	473.3	227.5	205.5	NO	205.5
SCK-CEN	0	13.59	25	12.5	11.41	2.57	552.5	473.3	227.5	202.4	NO	202.4
SCK-CEN	0	13.47	25	12.5	11.53	2.54	578.5	473.3	227.5	203.4	NO	203.4
SCK-CEN	0	13.27	25	12.5	11.73	2.61	556.0	473.3	227.5	205.2	NO	205.2
SCK-CEN	0	13.60	25	12.5	11.40	2.61	543.8	473.3	227.5	202.3	NO	202.3
SCK-CEN	0	13.68	25	12.5	11.32	2.49	556.3	473.3	227.5	201.6	NO	201.6
GKSS	0	27.78	50	25.0	22.22	0.56	327.6	473.3	227.5	282.4	NO	282.4
GKSS	0	27.57	50	25.0	22.43	4.68	681.4	473.3	227.5	283.7	NO	283.7
GKSS	0	27.38	50	25.0	22.62	4.89	700.8	473.3	227.5	284.9	NO	284.9
GKSS	0	27.71	50	25.0	22.29	4.59	698.2	473.3	227.5	282.8	NO	282.8
GKSS	0	27.46	50	25.0	22.54	4.75	708.4	473.3	227.5	284.4	NO	284.4
GKSS	0	27.39	50	25.0	22.61	4.84	701.5	473.3	227.5	284.9	NO	284.9
GKSS	0	28.22	50	25.0	21.78	4.67	724.9	473.3	227.5	279.6	NO	279.6
GKSS	0	27.55	50	25.0	22.45	4.68	717.4	473.3	227.5	283.9	NO	283.9
GKSS	0	27.25	50	25.0	22.75	5.13	705.8	473.3	227.5	285.7	NO	285.7
GKSS	0	27.69	50	25.0	22.31	5.08	709.5	473.3	227.5	283.0	NO	283.0
SCK-CEN	0	28.62	50	25.0	21.38	4.56	716.7	473.3	227.5	277.0	NO	277.0
SCK-CEN	0	28.67	50	25.0	21.33	4.42	714.1	473.3	227.5	276.7	NO	276.7
SCK-CEN	0	28.63	50	25.0	21.37	3.68	658.5	473.3	227.5	276.9	NO	276.9
SCK-CEN	0	28.49	50	25.0	21.51	4.89	747.5	473.3	227.5	277.9	NO	277.9
SCK-CEN	0	28.63	50	25.0	21.37	4.22	709.0	473.3	227.5	276.9	NO	276.9
SCK-CEN	0	28.43	50	25.0	21.57	4.70	719.2	473.3	227.5	278.2	NO	278.2
SCK-CEN	0	28.46	50	25.0	21.54	1.31	444.5	473.3	227.5	278.0	NO	278.0
SCK-CEN	0	28.79	50	25.0	21.21	4.57	699.8	473.3	227.5	275.9	NO	275.9
SCK-CEN	0	28.53	50	25.0	21.47	4.73	704.0	473.3	227.5	277.6	NO	277.6
SCK-CEN	0	28.44	50	25.0	21.56	4.18	729.5	473.3	227.5	278.2	NO	278.2
SCK-CEN	0	28.57	50	25.0	21.43	4.46	714.0	473.3	227.5	277.3	NO	277.3
VTT	0	28.11	50	25.0	21.89	4.85	725.6	473.3	227.5	280.3	NO	280.3
VTT	0	28.85	50	25.0	21.15	4.56	730.2	473.3	227.5	275.5	NO	275.5
VTT	0	28.11	50	25.0	21.89	5.10	737.8	473.3	227.5	280.3	NO	280.3
VTT	0	28.90	50	25.0	21.10	3.05	590.7	473.3	227.5	275.2	NO	275.2
VTT	0	28.46	50	25.0	21.54	4.94	730.3	473.3	227.5	278.0	NO	278.0
VTT	0	28.39	50	25.0	21.61	4.95	741.8	473.3	227.5	278.5	NO	278.5
VTT	0	28.21	50	25.0	21.79	5.01	744.2	473.3	227.5	279.7	NO	279.7
VTT	0	30.11	50	25.0	19.89	2.11	527.7	473.3	227.5	267.2	NO	267.2
VTT	0	28.18	50	25.0	21.82	2.67	620.4	473.3	227.5	279.8	NO	279.8
VTT	0	28.37	50	25.0	21.63	4.54	727.0	473.3	227.5	278.6	NO	278.6
VTT	0	28.42	50	25.0	21.58	4.46	730.3	473.3	227.5	278.3	NO	278.3
VTT	0	28.16	50	25.0	21.84	2.29	542.6	473.3	227.5	280.0	NO	280.0
VTT	0	29.04	50	25.0	20.96	4.78	726.7	473.3	227.5	274.3	NO	274.3
VTT	0	28.77	50	25.0	21.23	4.44	718.7	473.3	227.5	276.0	NO	276.0
VTT	0	28.36	50	25.0	21.64	5.09	717.1	473.3	227.5	278.7	NO	278.7
VTT	0	28.46	50	25.0	21.54	4.36	721.2	473.3	227.5	278.0	NO	278.0
VTT	0	28.30	50	25.0	21.70	4.87	725.3	473.3	227.5	279.1	NO	279.1
VTT	0	28.38	50	25.0	21.62	4.47	727.9	473.3	227.5	278.6	NO	278.6
VTT	0	28.25	50	25.0	21.75	4.75	727.0	473.3	227.5	279.4	NO	279.4
VTT	0	28.75	50	25.0	21.25	4.36	718.5	473.3	227.5	276.2	NO	276.2
GKSS	0	56.36	100	50.0	43.64	0.10	191.3	473.3	227.5	395.8	YES	191.3
GKSS	0	57.61	100	50.0	42.39	0.28	269.2	473.3	227.5	390.1	YES	269.2
GKSS	0	56.51	100	50.0	43.49	0.38	281.2	473.3	227.5	395.1	YES	281.2
GKSS	0	56.08	100	50.0	43.92	0.29	242.5	473.3	227.5	397.0	YES	242.5
GKSS	0	56.31	100	50.0	43.69	0.53	318.3	473.3	227.5	396.0	YES	318.3
GKSS	0	56.44	100	50.0	43.56	1.33	476.2	473.3	227.5	395.4	NO	395.4
GKSS	0	56.20	100	50.0	43.80	1.65	511.7	473.3	227.5	396.5	NO	396.5
GKSS	0	56.54	100	50.0	43.46	2.74	621.3	473.3	227.5	394.9	NO	394.9
GKSS	0	56.25	100	50.0	43.75	1.85	531.3	473.3	227.5	396.3	NO	396.3
GKSS	0	56.04	100	50.0	43.96	0.30	266.6	473.3	227.5	397.2	YES	266.6
GKSS	0	56.49	100	50.0	43.51	2.50	599.3	473.3	227.5	395.2	NO	395.2
GKSS	0	56.42	100	50.0	43.58	0.78	362.9	473.3	227.5	395.5	YES	362.9
GKSS	0	56.67	100	50.0	43.33	0.60	331.8	473.3	227.5	394.4	YES	331.8
GKSS	0	56.76	100	50.0	43.24	0.18	227.1	473.3	227.5	393.9	YES	227.1
GKSS	0	56.21	100	50.0	43.79	0.54	309.5	473.3	227.5	396.4	YES	309.5
GKSS	0	56.43	100	50.0	43.57	3.05	628.6	473.3	227.5	395.4	NO	395.4
GKSS	0	56.65	100	50.0	43.35	0.00	210.9	473.3	227.5	394.4	YES	210.9
GKSS	0	56.54	100	50.0	43.46	0.90	410.7	473.3	227.5	394.9	NO	394.9
GKSS	0	56.40	100	50.0	43.60	0.00	211.4	473.3	227.5	395.6	YES	211.4
GKSS	0	56.78	100	50.0	43.22	5.09	778.3	473.3	227.5	393.9	NO	393.9
GKSS	0	56.75	100	50.0	43.25	0.00	263.4	473.3	227.5	394.0	YES	263.4
GKSS	0	56.91	100	50.0	43.09	3.73	682.2	473.3	227.5	393.3	NO	393.3
GKSS	0	56.43	100	50.0	43.57	0.83	386.7	473.3	227.5	395.4	YES	386.7
GKSS	0	57.03	100	50.0	42.97	0.78	376.2	473.3	227.5	392.7	YES	376.2
GKSS	0	56.65	100	50.0	43.35	3.05	642.5	473.3	227.5	394.4	NO	394.4
GKSS	0	56.41	100	50.0	43.59	0.37	306.7	473.3	227.5	395.5	YES	306.7
GKSS	0	56.57	100	50.0	43.43	4.84	758.4	473.3	227.5	394.8	NO	394.8
GKSS	0	56.78	100	50.0	43.22	5.61	797.9	473.3	227.5	393.9	NO	393.9
GKSS	0	56.31	100	50.0	43.69	0.00	246.4	473.3	227.5	396.0	YES	246.4

GKSS	0	56.60	100	50.0	43.40	0.43	320.1	473.3	227.5	394.7	YES	320.1
CISE	0	111.79	200	100.0	88.21	0.22	233.3	473.3	227.5	562.7	YES	233.3
CISE	0	112.47	200	100.0	87.53	0.22	238.2	473.3	227.5	560.5	YES	238.2
CISE	0	112.08	200	100.0	87.92	0.21	208.3	473.3	227.5	561.7	YES	208.3
CISE	0	112.01	200	100.0	87.99	1.01	421.7	473.3	227.5	562.0	YES	421.7
CISE	0	112.75	200	100.0	87.25	0.14	226.7	473.3	227.5	559.6	YES	226.7
CISE	0	112.32	200	100.0	87.68	0.29	267.0	473.3	227.5	561.0	YES	267.0
CISE	0	111.95	200	100.0	88.05	0.00	163.0	473.3	227.5	562.2	YES	163.0
CISE	0	112.11	200	100.0	87.89	0.07	165.8	473.3	227.5	561.6	YES	165.8
CISE	0	111.68	200	100.0	88.32	0.36	285.9	473.3	227.5	563.0	YES	285.9
CISE	0	112.71	200	100.0	87.29	0.68	342.0	473.3	227.5	559.7	YES	342.0
GKSS	0	113.15	200	100.0	86.85	0.48	314.9	473.3	227.5	558.3	YES	314.9
GKSS	0	113.65	200	100.0	86.35	0.41	307.6	473.3	227.5	556.7	YES	307.6
GKSS	0	111.81	200	100.0	88.19	0.81	383.0	473.3	227.5	562.6	YES	383.0
GKSS	0	113.63	200	100.0	86.37	0.57	332.6	473.3	227.5	556.8	YES	332.6
GKSS	0	112.54	200	100.0	87.46	0.00	223.6	473.3	227.5	560.3	YES	223.6
GKSS	0	111.92	200	100.0	88.08	1.16	442.2	473.3	227.5	562.2	YES	442.2

3. Application of the multi-temperature approach for the calculation of the reference temperature

T limits

Specimen code	T (°C)	$K_{Jc[calc]}$ (MPa√m)	$K_{Jc(1T)}$ (MPa√m)	δ_i	n_i	1° member	2° member
GKSS	-154	54.8	49.1	0	0.000	0.0000	0.0000
GKSS	-154	49.8	44.9	0	0.000	0.0000	0.0000
GKSS	-154	37.8	34.9	0	0.000	0.0000	0.0000
GKSS	-154	33.0	30.9	0	0.000	0.0000	0.0000
GKSS	-154	38.9	35.8	0	0.000	0.0000	0.0000
GKSS	-154	24.2	23.6	0	0.000	0.0000	0.0000
GKSS	-154	47.4	43.0	0	0.000	0.0000	0.0000
GKSS	-154	46.5	42.2	0	0.000	0.0000	0.0000
GKSS	-154	31.4	29.6	0	0.000	0.0000	0.0000
GKSS	-154	39.2	36.0	0	0.000	0.0000	0.0000
GKSS	-154	24.2	23.6	0	0.000	0.0000	0.0000
SIEMENS	-154	33.0	30.9	0	0.000	0.0000	0.0000
SIEMENS	-154	41.0	37.6	0	0.000	0.0000	0.0000
SIEMENS	-154	31.7	29.8	0	0.000	0.0000	0.0000
SIEMENS	-154	35.2	32.7	0	0.000	0.0000	0.0000
SIEMENS	-154	44.4	40.5	0	0.000	0.0000	0.0000
SIEMENS	-154	41.5	38.0	0	0.000	0.0000	0.0000
SIEMENS	-154	32.7	30.7	0	0.000	0.0000	0.0000
SIEMENS	-154	34.3	32.0	0	0.000	0.0000	0.0000
SIEMENS	-154	36.7	34.0	0	0.000	0.0000	0.0000
SIEMENS	-154	39.7	36.5	0	0.000	0.0000	0.0000
SIEMENS	-154	46.1	41.8	0	0.000	0.0000	0.0000
SIEMENS	-154	34.6	32.2	0	0.000	0.0000	0.0000
SIEMENS	-154	35.8	33.2	0	0.000	0.0000	0.0000
SIEMENS	-154	29.3	27.8	0	0.000	0.0000	0.0000
SIEMENS	-154	28.6	27.2	0	0.000	0.0000	0.0000
SIEMENS	-154	38.6	35.6	0	0.000	0.0000	0.0000
SIEMENS	-154	44.4	40.5	0	0.000	0.0000	0.0000
SIEMENS	-154	48.9	44.2	0	0.000	0.0000	0.0000
SIEMENS	-154	38.9	35.8	0	0.000	0.0000	0.0000
SIEMENS	-154	36.7	34.0	0	0.000	0.0000	0.0000
SIEMENS	-154	31.7	29.8	0	0.000	0.0000	0.0000
GKSS	-154	41.5	41.4	0	0.000	0.0000	0.0000
GKSS	-154	42.2	42.2	0	0.000	0.0000	0.0000
GKSS	-154	50.0	49.9	0	0.000	0.0000	0.0000
GKSS	-154	34.0	33.9	0	0.000	0.0000	0.0000
GKSS	-154	41.7	41.7	0	0.000	0.0000	0.0000
GKSS	-154	46.1	46.0	0	0.000	0.0000	0.0000
GKSS	-154	44.2	44.1	0	0.000	0.0000	0.0000
GKSS	-154	36.7	36.6	0	0.000	0.0000	0.0000
GKSS	-154	29.0	28.9	0	0.000	0.0000	0.0000
GKSS	-154	53.0	52.9	0	0.000	0.0000	0.0000
GKSS	-154	39.4	39.3	0	0.000	0.0000	0.0000
GKSS	-154	29.0	28.9	0	0.000	0.0000	0.0000
SIEMENS	-154	34.6	34.5	0	0.000	0.0000	0.0000
SIEMENS	-154	33.0	33.0	0	0.000	0.0000	0.0000
SIEMENS	-154	38.1	38.0	0	0.000	0.0000	0.0000
SIEMENS	-154	28.6	28.6	0	0.000	0.0000	0.0000
SIEMENS	-154	28.6	28.6	0	0.000	0.0000	0.0000
SIEMENS	-154	38.6	38.5	0	0.000	0.0000	0.0000
SIEMENS	-154	36.4	36.3	0	0.000	0.0000	0.0000
SIEMENS	-154	33.4	33.3	0	0.000	0.0000	0.0000
SIEMENS	-154	36.9	36.9	0	0.000	0.0000	0.0000
SIEMENS	-154	31.1	31.0	0	0.000	0.0000	0.0000
SIEMENS	-154	34.3	34.2	0	0.000	0.0000	0.0000
SIEMENS	-154	30.4	30.4	0	0.000	0.0000	0.0000
SIEMENS	-154	49.6	49.5	0	0.000	0.0000	0.0000
SIEMENS	-154	41.0	40.9	0	0.000	0.0000	0.0000
SIEMENS	-154	34.0	33.9	0	0.000	0.0000	0.0000
SIEMENS	-154	30.7	30.7	0	0.000	0.0000	0.0000
SIEMENS	-154	41.2	41.2	0	0.000	0.0000	0.0000
SIEMENS	-154	26.7	26.7	0	0.000	0.0000	0.0000

USE LIMITS : YES

-136
-36

Sum of 1° member: 3.645

Sum of 2° member: 3.645

Difference: 0.000

$T_o = -86.4$ °C
(valid per ASTM E1921)

$\sum_i n_i = 51.36$

N = 698
r = 316

$K_{min} = 20$ MPa√m

$K_{o,eq} = 143.0$ MPa√m

$K_{med,eq} = 132.2$ MPa√m

SIEMENS	-154	35.5	35.4	0	0.000	0.0000	0.0000
SIEMENS	-154	33.4	33.3	0	0.000	0.0000	0.0000
SIEMENS	-154	36.7	36.6	0	0.000	0.0000	0.0000
SIEMENS	-154	32.4	32.4	0	0.000	0.0000	0.0000
SIEMENS	-154	45.1	45.0	0	0.000	0.0000	0.0000
SIEMENS	-154	33.4	33.3	0	0.000	0.0000	0.0000
SIEMENS	-154	34.0	33.9	0	0.000	0.0000	0.0000
SIEMENS	-154	30.7	30.7	0	0.000	0.0000	0.0000
SIEMENS	-154	26.7	26.7	0	0.000	0.0000	0.0000
GKSS	-154	33.7	36.2	0	0.000	0.0000	0.0000
GKSS	-154	42.7	46.9	0	0.000	0.0000	0.0000
GKSS	-154	37.2	40.4	0	0.000	0.0000	0.0000
GKSS	-154	54.4	60.8	0	0.000	0.0000	0.0000
GKSS	-154	34.6	37.3	0	0.000	0.0000	0.0000
GKSS	-154	44.2	48.7	0	0.000	0.0000	0.0000
GKSS	-154	29.7	31.5	0	0.000	0.0000	0.0000
GKSS	-154	36.4	39.4	0	0.000	0.0000	0.0000
GKSS	-154	36.4	39.4	0	0.000	0.0000	0.0000
GKSS	-154	28.2	29.8	0	0.000	0.0000	0.0000
GKSS	-154	28.2	29.8	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
NE	-154	36.4	39.4	0	0.000	0.0000	0.0000
NE	-154	37.5	40.7	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
NE	-154	30.7	32.7	0	0.000	0.0000	0.0000
NE	-154	30.4	32.3	0	0.000	0.0000	0.0000
NE	-154	30.7	32.7	0	0.000	0.0000	0.0000
NE	-154	31.7	33.9	0	0.000	0.0000	0.0000
NE	-154	41.7	45.8	0	0.000	0.0000	0.0000
NE	-154	37.2	40.4	0	0.000	0.0000	0.0000
NE	-154	34.9	37.6	0	0.000	0.0000	0.0000
NE	-154	38.3	41.7	0	0.000	0.0000	0.0000
NE	-154	31.4	33.5	0	0.000	0.0000	0.0000
NE	-154	33.7	36.2	0	0.000	0.0000	0.0000
NE	-154	32.7	35.1	0	0.000	0.0000	0.0000
NE	-154	43.0	47.2	0	0.000	0.0000	0.0000
NE	-154	32.7	35.1	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
NE	-154	36.9	40.1	0	0.000	0.0000	0.0000
NE	-154	33.4	35.8	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
GKSS	-110	98.1	85.4	1	0.143	0.0106	0.0148
GKSS	-110	59.0	52.7	1	0.143	0.0106	0.0009
GKSS	-110	80.0	70.3	1	0.143	0.0106	0.0052
GKSS	-110	57.2	51.2	1	0.143	0.0106	0.0008
GKSS	-110	88.3	77.2	1	0.143	0.0106	0.0087
GKSS	-110	96.2	83.9	1	0.143	0.0106	0.0135
GKSS	-110	81.6	71.6	1	0.143	0.0106	0.0057
GKSS	-110	66.9	59.3	1	0.143	0.0106	0.0019
GKSS	-110	85.6	75.0	1	0.143	0.0106	0.0074
GKSS	-110	86.8	76.0	1	0.143	0.0106	0.0079
GKSS	-110	114.2	98.9	1	0.143	0.0106	0.0314
GKSS	-110	73.5	64.8	1	0.143	0.0106	0.0033
GKSS	-110	92.7	80.9	1	0.143	0.0106	0.0111
GKSS	-110	77.5	68.2	1	0.143	0.0106	0.0044
GKSS	-110	61.5	54.7	1	0.143	0.0106	0.0012
GKSS	-110	51.8	46.7	1	0.143	0.0106	0.0004
GKSS	-110	73.6	64.9	1	0.143	0.0106	0.0033
GKSS	-110	52.8	47.5	1	0.143	0.0106	0.0005
GKSS	-110	41.2	37.8	1	0.143	0.0106	0.0001
GKSS	-110	115.3	99.8	1	0.143	0.0106	0.0329
GKSS	-110	73.2	64.5	1	0.143	0.0106	0.0032
GKSS	-110	74.0	65.3	1	0.143	0.0106	0.0034
GKSS	-110	67.5	59.8	1	0.143	0.0106	0.0020
GKSS	-110	71.0	62.7	1	0.143	0.0106	0.0027
GKSS	-110	53.4	48.0	1	0.143	0.0106	0.0005
GKSS	-110	96.5	84.0	1	0.143	0.0106	0.0136
GKSS	-110	71.3	63.0	1	0.143	0.0106	0.0028
GKSS	-110	71.7	63.3	1	0.143	0.0106	0.0029
GKSS	-110	81.7	71.7	1	0.143	0.0106	0.0058
GKSS	-110	64.0	56.8	1	0.143	0.0106	0.0015
GKSS	-110	74.2	65.4	1	0.143	0.0106	0.0034
GKSS	-110	70.4	62.2	1	0.143	0.0106	0.0026
GKSS	-110	91.2	79.6	1	0.143	0.0106	0.0102
GKSS	-110	72.0	63.6	1	0.143	0.0106	0.0029
GKSS	-110	64.8	57.5	1	0.143	0.0106	0.0016
GKSS	-110	79.2	69.6	1	0.143	0.0106	0.0049
GKSS	-110	52.2	47.0	1	0.143	0.0106	0.0004
GKSS	-110	82.9	72.7	1	0.143	0.0106	0.0062
GKSS	-110	93.2	81.3	1	0.143	0.0106	0.0115
GKSS	-110	75.4	66.4	1	0.143	0.0106	0.0038
GKSS	-110	75.0	66.1	1	0.143	0.0106	0.0037
GKSS	-110	78.6	69.1	1	0.143	0.0106	0.0047
GKSS	-110	94.8	82.7	1	0.143	0.0106	0.0125
GKSS	-110	98.1	85.4	1	0.143	0.0106	0.0148
GKSS	-110	98.5	85.7	1	0.143	0.0106	0.0151
GKSS	-110	104.9	91.1	1	0.143	0.0106	0.0207

GKSS	-110	69.9	61.8	1	0.143	0.0106	0.0025
GKSS	-110	81.6	71.6	1	0.143	0.0106	0.0057
GKSS	-110	55.2	49.5	1	0.143	0.0106	0.0006
GKSS	-110	105.6	91.7	1	0.143	0.0106	0.0214
GKSS	-110	101.5	88.3	1	0.143	0.0106	0.0176
GKSS	-110	73.7	65.0	1	0.143	0.0106	0.0033
GKSS	-110	97.5	84.9	1	0.143	0.0106	0.0144
GKSS	-110	75.9	66.8	1	0.143	0.0106	0.0039
GKSS	-110	48.3	43.7	1	0.143	0.0106	0.0003
GKSS	-91	127.0	109.6	1	0.167	0.0112	0.0164
GKSS	-91	121.8	105.2	1	0.167	0.0112	0.0134
GKSS	-91	70.5	62.3	1	0.167	0.0112	0.0008
GKSS	-91	94.2	82.2	1	0.167	0.0112	0.0038
GKSS	-91	127.3	109.9	1	0.167	0.0112	0.0166
GKSS	-91	119.9	103.7	1	0.167	0.0112	0.0125
GKSS	-91	104.5	90.8	1	0.167	0.0112	0.0064
GKSS	-91	78.6	69.1	1	0.167	0.0112	0.0015
GKSS	-91	98.6	85.8	1	0.167	0.0112	0.0048
GKSS	-91	161.6	138.6	1	0.167	0.0112	0.0502
THA	-91	91.3	79.7	1	0.167	0.0112	0.0032
THA	-91	115.3	99.8	1	0.167	0.0112	0.0103
THA	-91	122.4	105.8	1	0.167	0.0112	0.0138
THA	-91	126.3	109.1	1	0.167	0.0112	0.0160
THA	-91	108.3	94.0	1	0.167	0.0112	0.0076
THA	-91	66.9	59.3	1	0.167	0.0112	0.0006
THA	-91	126.7	109.4	1	0.167	0.0112	0.0162
THA	-91	69.6	61.6	1	0.167	0.0112	0.0008
THA	-91	121.4	104.9	1	0.167	0.0112	0.0132
THA	-91	90.0	78.7	1	0.167	0.0112	0.0030
THA	-91	153.9	132.2	1	0.167	0.0112	0.0402
THA	-91	64.6	57.4	1	0.167	0.0112	0.0005
THA	-91	127.2	109.8	1	0.167	0.0112	0.0165
THA	-91	99.7	86.7	1	0.167	0.0112	0.0050
THA	-91	101.3	88.1	1	0.167	0.0112	0.0055
THA	-91	140.4	120.9	1	0.167	0.0112	0.0263
THA	-91	78.2	68.7	1	0.167	0.0112	0.0014
THA	-91	109.0	94.6	1	0.167	0.0112	0.0079
THA	-91	103.9	90.3	1	0.167	0.0112	0.0062
THA	-91	126.8	109.5	1	0.167	0.0112	0.0163
THA	-91	111.7	96.8	1	0.167	0.0112	0.0088
GKSS	-91	68.6	68.4	1	0.167	0.0112	0.0014
GKSS	-91	81.6	81.3	1	0.167	0.0112	0.0036
GKSS	-91	55.9	55.8	1	0.167	0.0112	0.0004
GKSS	-91	98.8	98.5	1	0.167	0.0112	0.0096
GKSS	-91	71.9	71.7	1	0.167	0.0112	0.0018
GKSS	-91	111.0	110.7	1	0.167	0.0112	0.0172
GKSS	-91	93.5	93.2	1	0.167	0.0112	0.0073
GKSS	-91	79.9	79.7	1	0.167	0.0112	0.0032
GKSS	-91	98.4	98.1	1	0.167	0.0112	0.0094
GKSS	-91	101.1	100.8	1	0.167	0.0112	0.0108
TWI	-91	79.6	79.4	1	0.167	0.0112	0.0032
TWI	-91	99.7	99.3	1	0.167	0.0112	0.0101
TWI	-91	108.1	107.7	1	0.167	0.0112	0.0150
TWI	-91	93.4	93.1	1	0.167	0.0112	0.0072
TWI	-91	62.0	61.8	1	0.167	0.0112	0.0008
TWI	-91	107.1	106.7	1	0.167	0.0112	0.0144
TWI	-91	145.3	144.8	1	0.167	0.0112	0.0616
TWI	-91	76.3	76.0	1	0.167	0.0112	0.0025
TWI	-91	126.5	126.1	1	0.167	0.0112	0.0322
TWI	-91	126.1	125.7	1	0.167	0.0112	0.0317
TWI	-91	128.5	128.0	1	0.167	0.0112	0.0346
TWI	-91	111.4	111.0	1	0.167	0.0112	0.0175
TWI	-91	130.4	130.0	1	0.167	0.0112	0.0372
TWI	-91	134.8	134.3	1	0.167	0.0112	0.0434
TWI	-91	157.3	156.7	1	0.167	0.0112	0.0888
TWI	-91	105.2	104.9	1	0.167	0.0112	0.0132
TWI	-91	109.8	109.4	1	0.167	0.0112	0.0163
TWI	-91	84.9	84.6	1	0.167	0.0112	0.0044
TWI	-91	62.8	62.7	1	0.167	0.0112	0.0008
TWI	-91	97.5	97.2	1	0.167	0.0112	0.0090
TWI	-91	80.2	79.9	1	0.167	0.0112	0.0033
TWI	-91	134.4	133.9	1	0.167	0.0112	0.0428
TWI	-91	65.1	65.0	1	0.167	0.0112	0.0010
TWI	-91	118.6	118.2	1	0.167	0.0112	0.0236
GKSS	-91	67.3	76.1	1	0.167	0.0112	0.0025
GKSS	-91	162.9	189.3	1	0.167	0.0112	0.2087
GKSS	-91	100.0	114.7	1	0.167	0.0112	0.0205
GKSS	-91	91.2	104.3	1	0.167	0.0112	0.0128
GKSS	-91	106.2	122.1	1	0.167	0.0112	0.0276
GKSS	-91	83.2	94.9	1	0.167	0.0112	0.0080
GKSS	-91	91.8	105.0	1	0.167	0.0112	0.0133
GKSS	-91	94.7	108.5	1	0.167	0.0112	0.0156
GKSS	-91	92.9	106.4	1	0.167	0.0112	0.0141
GKSS	-91	69.9	79.2	1	0.167	0.0112	0.0031
NE	-91	93.1	106.6	1	0.167	0.0112	0.0143
NE	-91	97.9	112.2	1	0.167	0.0112	0.0184
NE	-91	73.7	83.7	1	0.167	0.0112	0.0042

NE	-91	82.0	93.4	1	0.167	0.0112	0.0074
NE	-91	76.3	86.7	1	0.167	0.0112	0.0050
NE	-91	93.1	106.6	1	0.167	0.0112	0.0143
NE	-91	83.7	95.5	1	0.167	0.0112	0.0083
NE	-91	82.1	93.6	1	0.167	0.0112	0.0074
NE	-91	86.8	99.2	1	0.167	0.0112	0.0100
NE	-91	86.7	99.0	1	0.167	0.0112	0.0099
NE	-91	92.3	105.7	1	0.167	0.0112	0.0137
NE	-91	83.1	94.8	1	0.167	0.0112	0.0079
NE	-91	88.9	101.6	1	0.167	0.0112	0.0112
NE	-91	64.3	72.5	1	0.167	0.0112	0.0019
NE	-91	101.6	116.7	1	0.167	0.0112	0.0222
NE	-91	94.2	107.9	1	0.167	0.0112	0.0152
NE	-91	78.7	89.5	1	0.167	0.0112	0.0059
NE	-91	73.0	82.8	1	0.167	0.0112	0.0040
NE	-91	64.2	72.3	1	0.167	0.0112	0.0019
NE	-91	98.9	113.5	1	0.167	0.0112	0.0194
GKSS	-91	103.2	137.2	1	0.167	0.0112	0.0479
GKSS	-91	84.4	110.7	1	0.167	0.0112	0.0172
GKSS	-91	97.0	128.5	1	0.167	0.0112	0.0351
GKSS	-91	92.7	122.4	1	0.167	0.0112	0.0279
GKSS	-91	96.8	128.2	1	0.167	0.0112	0.0348
NE	-91	73.6	95.5	1	0.167	0.0112	0.0083
NE	-91	73.0	94.7	1	0.167	0.0112	0.0079
NE	-91	73.3	95.1	1	0.167	0.0112	0.0081
NE	-91	53.8	67.7	1	0.167	0.0112	0.0013
NE	-91	69.5	89.7	1	0.167	0.0112	0.0060
NE	-91	65.5	84.0	1	0.167	0.0112	0.0043
NE	-91	79.6	104.0	1	0.167	0.0112	0.0127
NE	-91	69.8	90.1	1	0.167	0.0112	0.0062
NE	-91	90.3	119.0	1	0.167	0.0112	0.0244
NE	-91	88.0	115.8	1	0.167	0.0112	0.0214
GKSS	-60	205.5	175.4	0	0.000	0.0000	0.0191
GKSS	-60	114.4	99.1	1	0.167	0.0120	0.0013
GKSS	-60	130.7	112.7	1	0.167	0.0120	0.0024
GKSS	-60	106.7	92.6	1	0.167	0.0120	0.0009
GKSS	-60	161.0	138.1	1	0.167	0.0120	0.0064
GKSS	-60	200.7	171.3	1	0.167	0.0120	0.0172
GKSS	-60	125.2	108.1	1	0.167	0.0120	0.0020
GKSS	-60	145.1	124.8	1	0.167	0.0120	0.0040
GKSS	-60	91.9	80.2	1	0.167	0.0120	0.0004
GKSS	-60	128.1	110.6	1	0.167	0.0120	0.0022
GKSS	-60	164.4	140.9	1	0.167	0.0120	0.0070
GKSS	-60	192.2	164.3	1	0.167	0.0120	0.0142
GKSS	-60	166.3	142.5	1	0.167	0.0120	0.0074
GKSS	-60	177.7	152.1	1	0.167	0.0120	0.0100
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0177
GKSS	-60	116.0	100.4	1	0.167	0.0120	0.0014
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0177
GKSS	-60	167.6	143.6	1	0.167	0.0120	0.0077
GKSS	-60	89.8	78.5	1	0.167	0.0120	0.0004
GKSS	-60	156.3	134.1	1	0.167	0.0120	0.0056
GKSS	-60	186.8	159.7	1	0.167	0.0120	0.0125
GKSS	-60	203.2	173.4	0	0.000	0.0000	0.0182
GKSS	-60	164.6	141.1	1	0.167	0.0120	0.0071
GKSS	-60	202.6	173.0	0	0.000	0.0000	0.0180
GKSS	-60	185.9	159.0	1	0.167	0.0120	0.0122
GKSS	-60	127.7	110.2	1	0.167	0.0120	0.0022
GKSS	-60	201.2	171.7	0	0.000	0.0000	0.0174
GKSS	-60	115.6	100.0	1	0.167	0.0120	0.0013
GKSS	-60	107.5	93.3	1	0.167	0.0120	0.0009
SIEMENS	-60	164.6	141.1	1	0.167	0.0120	0.0071
SIEMENS	-60	172.0	147.3	1	0.167	0.0120	0.0086
SIEMENS	-60	108.5	94.2	1	0.167	0.0120	0.0010
SIEMENS	-60	119.0	102.9	1	0.167	0.0120	0.0015
SIEMENS	-60	153.5	131.8	1	0.167	0.0120	0.0051
SIEMENS	-60	158.9	136.4	1	0.167	0.0120	0.0060
SIEMENS	-60	137.5	118.4	1	0.167	0.0120	0.0031
SIEMENS	-60	119.5	103.3	1	0.167	0.0120	0.0016
SIEMENS	-60	130.7	112.8	1	0.167	0.0120	0.0024
SIEMENS	-60	172.6	147.8	1	0.167	0.0120	0.0088
SIEMENS	-60	84.5	74.0	1	0.167	0.0120	0.0003
SIEMENS	-60	213.4	182.0	0	0.000	0.0000	0.0226
SIEMENS	-60	120.4	104.1	1	0.167	0.0120	0.0016
SIEMENS	-60	104.5	90.8	1	0.167	0.0120	0.0008
SIEMENS	-60	163.6	140.2	1	0.167	0.0120	0.0069
SIEMENS	-60	201.4	172.0	1	0.167	0.0120	0.0175
SIEMENS	-60	137.8	118.7	1	0.167	0.0120	0.0031
SIEMENS	-60	173.0	148.1	1	0.167	0.0120	0.0088
SIEMENS	-60	99.2	86.4	1	0.167	0.0120	0.0006
SIEMENS	-60	173.4	148.4	1	0.167	0.0120	0.0089
SIEMENS	-60	131.5	113.4	1	0.167	0.0120	0.0025
GKSS	-60	186.0	185.3	1	0.167	0.0120	0.0245
GKSS	-60	151.8	151.3	1	0.167	0.0120	0.0097
GKSS	-60	111.7	111.3	1	0.167	0.0120	0.0023
GKSS	-60	143.9	143.4	1	0.167	0.0120	0.0076
GKSS	-60	105.4	105.1	1	0.167	0.0120	0.0017

GKSS	-60	154.0	153.4	1	0.167	0.0120	0.0104
GKSS	-60	176.2	175.6	1	0.167	0.0120	0.0192
GKSS	-60	131.9	131.5	1	0.167	0.0120	0.0051
GKSS	-60	203.9	203.2	1	0.167	0.0120	0.0370
GKSS	-60	142.7	142.2	1	0.167	0.0120	0.0073
TWI	-60	134.5	134.0	1	0.167	0.0120	0.0055
TWI	-60	130.1	129.7	1	0.167	0.0120	0.0047
TWI	-60	142.6	142.1	1	0.167	0.0120	0.0073
TWI	-60	119.7	119.3	1	0.167	0.0120	0.0032
TWI	-60	141.3	140.8	1	0.167	0.0120	0.0070
TWI	-60	175.9	175.3	1	0.167	0.0120	0.0191
TWI	-60	119.6	119.2	1	0.167	0.0120	0.0032
TWI	-60	102.4	102.0	1	0.167	0.0120	0.0015
TWI	-60	99.0	98.7	1	0.167	0.0120	0.0013
TWI	-60	115.1	114.7	1	0.167	0.0120	0.0026
TWI	-60	172.9	172.3	1	0.167	0.0120	0.0176
TWI	-60	120.5	120.2	1	0.167	0.0120	0.0033
TWI	-60	165.2	164.6	1	0.167	0.0120	0.0143
TWI	-60	125.6	125.2	1	0.167	0.0120	0.0040
TWI	-60	126.7	126.3	1	0.167	0.0120	0.0042
TWI	-60	100.4	100.1	1	0.167	0.0120	0.0013
TWI	-60	131.1	130.7	1	0.167	0.0120	0.0049
TWI	-60	185.1	184.5	1	0.167	0.0120	0.0240
TWI	-60	163.6	163.0	1	0.167	0.0120	0.0137
TWI	-60	126.5	126.1	1	0.167	0.0120	0.0042
TWI	-60	164.7	164.1	1	0.167	0.0120	0.0141
TWI	-60	192.7	192.0	1	0.167	0.0120	0.0287
TWI	-60	134.5	134.1	1	0.167	0.0120	0.0056
TWI	-60	140.8	140.3	1	0.167	0.0120	0.0069
GKSS	-60	109.9	126.5	1	0.167	0.0120	0.0042
GKSS	-60	131.9	152.5	1	0.167	0.0120	0.0101
GKSS	-60	136.2	157.6	1	0.167	0.0120	0.0118
GKSS	-60	154.0	178.8	1	0.167	0.0120	0.0209
GKSS	-60	115.9	133.6	1	0.167	0.0120	0.0055
GKSS	-60	150.4	174.4	1	0.167	0.0120	0.0187
BAM	-40	171.0	146.5	1	0.167	0.0123	0.0021
BAM	-40	206.2	176.0	0	0.000	0.0000	0.0048
BAM	-40	169.4	145.1	1	0.167	0.0123	0.0020
BAM	-40	203.6	173.7	0	0.000	0.0000	0.0046
BAM	-40	202.5	172.9	0	0.000	0.0000	0.0045
BAM	-40	207.2	176.8	0	0.000	0.0000	0.0049
BAM	-40	205.9	175.7	0	0.000	0.0000	0.0048
BAM	-40	206.5	176.2	0	0.000	0.0000	0.0049
BAM	-40	207.3	176.9	0	0.000	0.0000	0.0049
BAM	-40	205.1	175.1	0	0.000	0.0000	0.0047
BAM	-40	202.8	173.1	0	0.000	0.0000	0.0045
BAM	-40	204.9	174.8	0	0.000	0.0000	0.0047
BAM	-40	205.2	175.1	0	0.000	0.0000	0.0047
BAM	-40	113.7	98.5	1	0.167	0.0123	0.0003
BAM	-40	204.8	174.8	0	0.000	0.0000	0.0047
BAM	-40	154.2	132.4	1	0.167	0.0123	0.0013
BAM	-40	206.2	176.0	0	0.000	0.0000	0.0048
BAM	-40	204.2	174.3	0	0.000	0.0000	0.0046
BAM	-40	207.3	176.9	0	0.000	0.0000	0.0049
BAM	-40	202.5	172.8	1	0.167	0.0123	0.0044
GKSS	-40	180.6	154.6	1	0.167	0.0123	0.0027
GKSS	-40	203.5	173.7	0	0.000	0.0000	0.0045
GKSS	-40	198.2	169.3	0	0.000	0.0000	0.0040
GKSS	-40	199.6	170.5	0	0.000	0.0000	0.0042
GKSS	-40	186.4	159.4	1	0.167	0.0123	0.0031
GKSS	-40	199.4	170.3	0	0.000	0.0000	0.0042
GKSS	-40	204.4	174.4	0	0.000	0.0000	0.0046
GKSS	-40	202.4	172.7	0	0.000	0.0000	0.0044
GKSS	-40	203.2	173.4	0	0.000	0.0000	0.0045
GKSS	-40	200.9	171.5	0	0.000	0.0000	0.0043
BAM	-40	187.3	186.6	1	0.167	0.0123	0.0063
BAM	-40	101.5	101.2	1	0.167	0.0123	0.0004
BAM	-40	140.3	139.9	1	0.167	0.0123	0.0017
BAM	-40	150.2	149.7	1	0.167	0.0123	0.0023
BAM	-40	187.3	186.6	1	0.167	0.0123	0.0063
BAM	-40	211.4	210.6	1	0.167	0.0123	0.0108
BAM	-40	160.5	160.0	1	0.167	0.0123	0.0031
BAM	-40	214.6	213.8	1	0.167	0.0123	0.0115
BAM	-40	188.3	187.7	1	0.167	0.0123	0.0064
BAM	-40	239.3	238.4	1	0.167	0.0123	0.0186
BAM	-40	112.8	112.4	1	0.167	0.0123	0.0006
BAM	-40	239.0	238.1	1	0.167	0.0123	0.0184
BAM	-40	284.9	283.9	1	0.167	0.0123	0.0395
BAM	-40	254.7	253.7	1	0.167	0.0123	0.0243
BAM	-40	270.9	269.9	1	0.167	0.0123	0.0318
BAM	-40	187.0	186.3	1	0.167	0.0123	0.0062
BAM	-40	170.1	169.5	1	0.167	0.0123	0.0041
BAM	-40	256.4	255.5	1	0.167	0.0123	0.0251
BAM	-40	171.4	170.8	1	0.167	0.0123	0.0042
BAM	-40	103.1	102.8	1	0.167	0.0123	0.0004
BAM	-40	230.0	229.1	1	0.167	0.0123	0.0156
BAM	-40	210.0	209.2	1	0.167	0.0123	0.0105

GKSS	-40	198.2	197.5	1	0.167	0.0123	0.0081
GKSS	-40	150.2	149.7	1	0.167	0.0123	0.0023
GKSS	-40	226.8	226.0	1	0.167	0.0123	0.0147
GKSS	-40	158.1	157.5	1	0.167	0.0123	0.0029
GKSS	-40	256.4	255.5	1	0.167	0.0123	0.0251
GKSS	-40	207.6	206.9	1	0.167	0.0123	0.0099
GKSS	-40	213.5	212.8	1	0.167	0.0123	0.0113
GKSS	-40	254.6	253.7	1	0.167	0.0123	0.0243
GKSS	-40	240.0	239.1	1	0.167	0.0123	0.0188
GKSS	-40	279.0	278.0	0	0.000	0.0000	0.0361
GKSS	-40	125.9	145.5	1	0.167	0.0123	0.0020
GKSS	-40	128.9	149.0	1	0.167	0.0123	0.0023
GKSS	-40	198.5	231.5	1	0.167	0.0123	0.0163
GKSS	-40	212.0	247.5	1	0.167	0.0123	0.0218
GKSS	-40	138.6	160.5	1	0.167	0.0123	0.0032
GKSS	-40	187.7	218.7	1	0.167	0.0123	0.0127
GKSS	-40	173.0	201.2	1	0.167	0.0123	0.0088
GKSS	-40	179.5	208.9	1	0.167	0.0123	0.0104
GKSS	-40	152.6	177.1	1	0.167	0.0123	0.0050
GKSS	-40	153.6	178.3	1	0.167	0.0123	0.0051
THA	-40	144.6	167.6	1	0.167	0.0123	0.0039
THA	-40	150.7	174.9	1	0.167	0.0123	0.0047
THA	-40	139.1	161.0	1	0.167	0.0123	0.0032
THA	-40	183.6	213.8	1	0.167	0.0123	0.0115
THA	-40	142.0	164.5	1	0.167	0.0123	0.0036
THA	-40	187.2	218.0	1	0.167	0.0123	0.0125
THA	-40	172.2	200.3	1	0.167	0.0123	0.0086
THA	-40	198.0	230.8	1	0.167	0.0123	0.0161
THA	-40	130.4	150.8	1	0.167	0.0123	0.0024
THA	-40	141.7	164.1	1	0.167	0.0123	0.0035
THA	-40	134.5	155.6	1	0.167	0.0123	0.0028
THA	-40	115.5	133.1	1	0.167	0.0123	0.0013
THA	-40	91.7	104.9	1	0.167	0.0123	0.0004
THA	-40	141.1	163.4	1	0.167	0.0123	0.0035
THA	-40	239.1	279.6	1	0.167	0.0123	0.0370
THA	-40	243.4	284.7	1	0.167	0.0123	0.0400
THA	-40	191.9	223.6	1	0.167	0.0123	0.0140
THA	-40	146.8	170.2	1	0.167	0.0123	0.0041
THA	-40	161.4	187.5	1	0.167	0.0123	0.0064
THA	-40	142.3	164.8	1	0.167	0.0123	0.0036
CISE	-20	128.7	111.1	0	0.000	0.0000	0.0000
CISE	-20	146.9	126.3	0	0.000	0.0000	0.0000
CISE	-20	204.3	174.4	0	0.000	0.0000	0.0000
CISE	-20	198.3	169.3	0	0.000	0.0000	0.0000
CISE	-20	195.0	166.6	0	0.000	0.0000	0.0000
CISE	-20	197.8	168.9	0	0.000	0.0000	0.0000
CISE	-20	195.6	167.1	0	0.000	0.0000	0.0000
CISE	-20	196.2	167.6	0	0.000	0.0000	0.0000
CISE	-20	194.0	165.7	0	0.000	0.0000	0.0000
CISE	-20	198.3	169.3	0	0.000	0.0000	0.0000
CISE	-20	201.2	171.8	0	0.000	0.0000	0.0000
CISE	-20	200.9	171.5	0	0.000	0.0000	0.0000
CISE	-20	195.6	167.1	0	0.000	0.0000	0.0000
CISE	-20	197.6	168.8	0	0.000	0.0000	0.0000
CISE	-20	201.9	172.4	0	0.000	0.0000	0.0000
CISE	-20	202.5	172.8	0	0.000	0.0000	0.0000
CISE	-20	198.1	169.2	0	0.000	0.0000	0.0000
CISE	-20	198.1	169.2	0	0.000	0.0000	0.0000
CISE	-20	200.7	171.3	0	0.000	0.0000	0.0000
CISE	-20	199.8	170.6	0	0.000	0.0000	0.0000
CISE	-20	201.5	172.0	0	0.000	0.0000	0.0000
GKSS	-20	200.6	171.2	0	0.000	0.0000	0.0000
GKSS	-20	200.6	171.2	0	0.000	0.0000	0.0000
GKSS	-20	199.8	170.6	0	0.000	0.0000	0.0000
GKSS	-20	198.2	169.2	0	0.000	0.0000	0.0000
GKSS	-20	199.3	170.2	0	0.000	0.0000	0.0000
GKSS	-20	196.6	167.9	0	0.000	0.0000	0.0000
GKSS	-20	198.6	169.6	0	0.000	0.0000	0.0000
GKSS	-20	200.7	171.3	0	0.000	0.0000	0.0000
GKSS	-20	195.0	166.6	0	0.000	0.0000	0.0000
GKSS	-20	198.6	169.6	0	0.000	0.0000	0.0000
GKSS	-20	202.5	201.7	0	0.000	0.0000	0.0000
GKSS	-20	194.7	194.1	0	0.000	0.0000	0.0000
GKSS	-20	262.8	261.8	0	0.000	0.0000	0.0000
GKSS	-20	187.9	187.2	0	0.000	0.0000	0.0000
GKSS	-20	275.8	274.8	0	0.000	0.0000	0.0000
GKSS	-20	261.8	260.9	0	0.000	0.0000	0.0000
GKSS	-20	283.2	282.2	0	0.000	0.0000	0.0000
GKSS	-20	283.1	282.0	0	0.000	0.0000	0.0000
GKSS	-20	284.0	283.0	0	0.000	0.0000	0.0000
GKSS	-20	284.2	283.1	0	0.000	0.0000	0.0000
VTT	-20	284.0	282.9	0	0.000	0.0000	0.0000
VTT	-20	231.9	231.0	0	0.000	0.0000	0.0000
VTT	-20	279.4	278.3	0	0.000	0.0000	0.0000
VTT	-20	280.3	279.2	0	0.000	0.0000	0.0000
VTT	-20	279.4	278.3	0	0.000	0.0000	0.0000
VTT	-20	278.6	277.5	0	0.000	0.0000	0.0000

VTT	-20	281.9	280.9	0	0.000	0.0000	0.0000
VTT	-20	279.4	278.3	0	0.000	0.0000	0.0000
VTT	-20	282.5	281.4	0	0.000	0.0000	0.0000
VTT	-20	247.2	246.3	0	0.000	0.0000	0.0000
VTT	-20	233.2	232.4	0	0.000	0.0000	0.0000
VTT	-20	283.2	282.2	0	0.000	0.0000	0.0000
VTT	-20	288.9	287.8	0	0.000	0.0000	0.0000
VTT	-20	263.2	262.3	0	0.000	0.0000	0.0000
VTT	-20	184.4	183.8	0	0.000	0.0000	0.0000
VTT	-20	283.7	282.7	0	0.000	0.0000	0.0000
VTT	-20	280.8	279.8	0	0.000	0.0000	0.0000
VTT	-20	280.9	279.8	0	0.000	0.0000	0.0000
VTT	-20	280.9	279.8	0	0.000	0.0000	0.0000
VTT	-20	170.9	170.3	0	0.000	0.0000	0.0000
VTT	-20	282.9	281.9	0	0.000	0.0000	0.0000
VTT	-20	275.7	274.6	0	0.000	0.0000	0.0000
VTT	-20	228.2	227.4	0	0.000	0.0000	0.0000
VTT	-20	282.0	281.0	0	0.000	0.0000	0.0000
VTT	-20	280.9	279.8	0	0.000	0.0000	0.0000
VTT	-20	281.8	280.7	0	0.000	0.0000	0.0000
VTT	-20	281.4	280.4	0	0.000	0.0000	0.0000
VTT	-20	227.3	226.5	0	0.000	0.0000	0.0000
VTT	-20	201.3	200.6	0	0.000	0.0000	0.0000
VTT	-20	212.5	211.7	0	0.000	0.0000	0.0000
VTT	-20	256.5	255.5	0	0.000	0.0000	0.0000
VTT	-20	284.8	283.8	0	0.000	0.0000	0.0000
VTT	-20	282.3	281.3	0	0.000	0.0000	0.0000
VTT	-20	269.6	268.6	0	0.000	0.0000	0.0000
VTT	-20	184.4	183.8	0	0.000	0.0000	0.0000
VTT	-20	241.6	240.7	0	0.000	0.0000	0.0000
VTT	-20	146.4	145.9	0	0.000	0.0000	0.0000
VTT	-20	280.0	279.0	0	0.000	0.0000	0.0000
VTT	-20	156.7	156.2	0	0.000	0.0000	0.0000
VTT	-20	277.0	276.0	0	0.000	0.0000	0.0000
CISE	-20	167.4	194.6	0	0.000	0.0000	0.0000
CISE	-20	153.5	178.1	0	0.000	0.0000	0.0000
CISE	-20	211.2	246.5	0	0.000	0.0000	0.0000
CISE	-20	220.3	257.3	0	0.000	0.0000	0.0000
CISE	-20	227.9	266.2	0	0.000	0.0000	0.0000
CISE	-20	211.1	246.4	0	0.000	0.0000	0.0000
CISE	-20	217.1	253.4	0	0.000	0.0000	0.0000
CISE	-20	145.3	168.5	0	0.000	0.0000	0.0000
CISE	-20	161.2	187.2	0	0.000	0.0000	0.0000
CISE	-20	131.9	152.5	0	0.000	0.0000	0.0000
CISE	-20	216.4	252.6	0	0.000	0.0000	0.0000
CISE	-20	125.0	144.4	0	0.000	0.0000	0.0000
CISE	-20	378.7	444.9	0	0.000	0.0000	0.0000
CISE	-20	246.1	287.9	0	0.000	0.0000	0.0000
CISE	-20	250.9	293.5	0	0.000	0.0000	0.0000
CISE	-20	251.5	294.3	0	0.000	0.0000	0.0000
CISE	-20	284.0	332.7	0	0.000	0.0000	0.0000
CISE	-20	261.1	305.6	0	0.000	0.0000	0.0000
CISE	-20	351.6	412.8	0	0.000	0.0000	0.0000
CISE	-20	258.5	302.5	0	0.000	0.0000	0.0000
GKSS	-20	201.3	234.8	0	0.000	0.0000	0.0000
GKSS	-20	110.9	127.7	0	0.000	0.0000	0.0000
GKSS	-20	197.7	230.5	0	0.000	0.0000	0.0000
GKSS	-20	198.9	231.9	0	0.000	0.0000	0.0000
GKSS	-20	200.6	234.0	0	0.000	0.0000	0.0000
GKSS	-20	165.7	192.6	0	0.000	0.0000	0.0000
GKSS	-20	280.1	328.0	0	0.000	0.0000	0.0000
GKSS	-20	279.5	327.3	0	0.000	0.0000	0.0000
GKSS	-20	257.6	301.4	0	0.000	0.0000	0.0000
GKSS	-20	265.2	310.4	0	0.000	0.0000	0.0000
GKSS	-20	156.7	212.6	0	0.000	0.0000	0.0000
GKSS	-20	221.7	304.1	0	0.000	0.0000	0.0000
GKSS	-20	193.9	264.9	0	0.000	0.0000	0.0000
GKSS	-20	191.7	261.9	0	0.000	0.0000	0.0000
GKSS	-20	184.4	251.6	0	0.000	0.0000	0.0000
NE	-20	186.7	254.8	0	0.000	0.0000	0.0000
NE	-20	184.4	251.6	0	0.000	0.0000	0.0000
NE	-20	193.9	264.9	0	0.000	0.0000	0.0000
NE	-20	204.4	279.8	0	0.000	0.0000	0.0000
NE	-20	224.0	307.4	0	0.000	0.0000	0.0000
NE	-20	153.4	207.9	0	0.000	0.0000	0.0000
NE	-20	222.6	305.4	0	0.000	0.0000	0.0000
NE	-20	162.0	220.0	0	0.000	0.0000	0.0000
NE	-20	187.8	256.4	0	0.000	0.0000	0.0000
NE	-20	198.2	271.0	0	0.000	0.0000	0.0000
SCK-CEN	-10	280.0	279.0	0	0.000	0.0000	0.0000
SCK-CEN	-10	281.2	280.2	0	0.000	0.0000	0.0000
SCK-CEN	-10	282.6	281.5	0	0.000	0.0000	0.0000
SCK-CEN	-10	284.0	282.9	0	0.000	0.0000	0.0000
SCK-CEN	-10	280.9	279.9	0	0.000	0.0000	0.0000
GKSS	0	196.8	168.1	0	0.000	0.0000	0.0000
GKSS	0	193.7	165.5	0	0.000	0.0000	0.0000
GKSS	0	192.9	164.8	0	0.000	0.0000	0.0000

GKSS	0	196.7	168.0	0	0.000	0.0000	0.0000
GKSS	0	196.1	167.5	0	0.000	0.0000	0.0000
GKSS	0	194.7	166.3	0	0.000	0.0000	0.0000
GKSS	0	196.3	167.7	0	0.000	0.0000	0.0000
GKSS	0	195.9	167.3	0	0.000	0.0000	0.0000
GKSS	0	195.2	166.8	0	0.000	0.0000	0.0000
GKSS	0	193.3	165.1	0	0.000	0.0000	0.0000
SCK-CEN	0	198.4	169.4	0	0.000	0.0000	0.0000
SCK-CEN	0	199.1	170.0	0	0.000	0.0000	0.0000
SCK-CEN	0	198.2	169.2	0	0.000	0.0000	0.0000
SCK-CEN	0	197.6	168.8	0	0.000	0.0000	0.0000
SCK-CEN	0	201.2	171.8	0	0.000	0.0000	0.0000
SCK-CEN	0	200.0	170.8	0	0.000	0.0000	0.0000
SCK-CEN	0	197.4	168.6	0	0.000	0.0000	0.0000
SCK-CEN	0	199.6	170.4	0	0.000	0.0000	0.0000
SCK-CEN	0	203.4	173.6	0	0.000	0.0000	0.0000
SCK-CEN	0	199.2	170.1	0	0.000	0.0000	0.0000
SCK-CEN	0	200.5	171.2	0	0.000	0.0000	0.0000
SCK-CEN	0	202.4	172.7	0	0.000	0.0000	0.0000
SCK-CEN	0	197.2	168.4	0	0.000	0.0000	0.0000
SCK-CEN	0	205.8	175.6	0	0.000	0.0000	0.0000
SCK-CEN	0	205.5	175.4	0	0.000	0.0000	0.0000
SCK-CEN	0	202.4	172.7	0	0.000	0.0000	0.0000
SCK-CEN	0	203.4	173.6	0	0.000	0.0000	0.0000
SCK-CEN	0	205.2	175.1	0	0.000	0.0000	0.0000
SCK-CEN	0	202.3	172.7	0	0.000	0.0000	0.0000
SCK-CEN	0	201.6	172.1	0	0.000	0.0000	0.0000
GKSS	0	282.4	281.4	0	0.000	0.0000	0.0000
GKSS	0	283.7	282.7	0	0.000	0.0000	0.0000
GKSS	0	284.9	283.9	0	0.000	0.0000	0.0000
GKSS	0	282.8	281.8	0	0.000	0.0000	0.0000
GKSS	0	284.4	283.4	0	0.000	0.0000	0.0000
GKSS	0	284.9	283.8	0	0.000	0.0000	0.0000
GKSS	0	279.6	278.6	0	0.000	0.0000	0.0000
GKSS	0	283.9	282.8	0	0.000	0.0000	0.0000
GKSS	0	285.7	284.7	0	0.000	0.0000	0.0000
GKSS	0	283.0	281.9	0	0.000	0.0000	0.0000
SCK-CEN	0	277.0	276.0	0	0.000	0.0000	0.0000
SCK-CEN	0	276.7	275.7	0	0.000	0.0000	0.0000
SCK-CEN	0	276.9	275.9	0	0.000	0.0000	0.0000
SCK-CEN	0	277.9	276.8	0	0.000	0.0000	0.0000
SCK-CEN	0	276.9	275.9	0	0.000	0.0000	0.0000
SCK-CEN	0	278.2	277.2	0	0.000	0.0000	0.0000
SCK-CEN	0	278.0	277.0	0	0.000	0.0000	0.0000
SCK-CEN	0	275.9	274.9	0	0.000	0.0000	0.0000
SCK-CEN	0	277.6	276.6	0	0.000	0.0000	0.0000
SCK-CEN	0	278.2	277.2	0	0.000	0.0000	0.0000
SCK-CEN	0	277.3	276.3	0	0.000	0.0000	0.0000
VTT	0	280.3	279.3	0	0.000	0.0000	0.0000
VTT	0	275.5	274.5	0	0.000	0.0000	0.0000
VTT	0	280.3	279.3	0	0.000	0.0000	0.0000
VTT	0	275.2	274.2	0	0.000	0.0000	0.0000
VTT	0	278.0	277.0	0	0.000	0.0000	0.0000
VTT	0	278.5	277.5	0	0.000	0.0000	0.0000
VTT	0	279.7	278.6	0	0.000	0.0000	0.0000
VTT	0	267.2	266.2	0	0.000	0.0000	0.0000
VTT	0	279.8	278.8	0	0.000	0.0000	0.0000
VTT	0	278.6	277.6	0	0.000	0.0000	0.0000
VTT	0	278.3	277.3	0	0.000	0.0000	0.0000
VTT	0	280.0	278.9	0	0.000	0.0000	0.0000
VTT	0	274.3	273.3	0	0.000	0.0000	0.0000
VTT	0	276.0	275.0	0	0.000	0.0000	0.0000
VTT	0	278.7	277.7	0	0.000	0.0000	0.0000
VTT	0	278.0	277.0	0	0.000	0.0000	0.0000
VTT	0	279.1	278.0	0	0.000	0.0000	0.0000
VTT	0	278.6	277.5	0	0.000	0.0000	0.0000
VTT	0	279.4	278.4	0	0.000	0.0000	0.0000
VTT	0	276.2	275.2	0	0.000	0.0000	0.0000
GKSS	0	191.3	222.9	0	0.000	0.0000	0.0000
GKSS	0	269.2	315.2	0	0.000	0.0000	0.0000
GKSS	0	281.2	329.4	0	0.000	0.0000	0.0000
GKSS	0	242.5	283.5	0	0.000	0.0000	0.0000
GKSS	0	318.3	373.3	0	0.000	0.0000	0.0000
GKSS	0	395.4	464.7	0	0.000	0.0000	0.0000
GKSS	0	396.5	465.9	0	0.000	0.0000	0.0000
GKSS	0	394.9	464.1	0	0.000	0.0000	0.0000
GKSS	0	396.3	465.7	0	0.000	0.0000	0.0000
GKSS	0	266.6	312.1	0	0.000	0.0000	0.0000
GKSS	0	395.2	464.4	0	0.000	0.0000	0.0000
GKSS	0	362.9	426.1	0	0.000	0.0000	0.0000
GKSS	0	331.8	389.3	0	0.000	0.0000	0.0000
GKSS	0	227.1	265.3	0	0.000	0.0000	0.0000
GKSS	0	309.5	362.9	0	0.000	0.0000	0.0000
GKSS	0	395.4	464.7	0	0.000	0.0000	0.0000
GKSS	0	210.9	246.1	0	0.000	0.0000	0.0000
GKSS	0	394.9	464.1	0	0.000	0.0000	0.0000
GKSS	0	211.4	246.7	0	0.000	0.0000	0.0000

GKSS	0	393.9	462.8	0	0.000	0.0000	0.0000
GKSS	0	263.4	308.3	0	0.000	0.0000	0.0000
GKSS	0	393.3	462.1	0	0.000	0.0000	0.0000
GKSS	0	386.7	454.3	0	0.000	0.0000	0.0000
GKSS	0	376.2	441.9	0	0.000	0.0000	0.0000
GKSS	0	394.4	463.5	0	0.000	0.0000	0.0000
GKSS	0	306.7	359.6	0	0.000	0.0000	0.0000
GKSS	0	394.8	464.0	0	0.000	0.0000	0.0000
GKSS	0	393.9	462.8	0	0.000	0.0000	0.0000
GKSS	0	246.4	288.2	0	0.000	0.0000	0.0000
GKSS	0	320.1	375.4	0	0.000	0.0000	0.0000
CISE	0	233.3	320.4	0	0.000	0.0000	0.0000
CISE	0	238.2	327.4	0	0.000	0.0000	0.0000
CISE	0	208.3	285.2	0	0.000	0.0000	0.0000
CISE	0	421.7	585.8	0	0.000	0.0000	0.0000
CISE	0	226.7	311.2	0	0.000	0.0000	0.0000
CISE	0	267.0	367.9	0	0.000	0.0000	0.0000
CISE	0	163.0	221.4	0	0.000	0.0000	0.0000
CISE	0	165.8	225.4	0	0.000	0.0000	0.0000
CISE	0	285.9	394.6	0	0.000	0.0000	0.0000
CISE	0	342.0	473.5	0	0.000	0.0000	0.0000
GKSS	0	314.9	435.4	0	0.000	0.0000	0.0000
GKSS	0	307.6	425.1	0	0.000	0.0000	0.0000
GKSS	0	383.0	531.4	0	0.000	0.0000	0.0000
GKSS	0	332.6	460.4	0	0.000	0.0000	0.0000
GKSS	0	223.6	306.8	0	0.000	0.0000	0.0000
GKSS	0	442.2	614.7	0	0.000	0.0000	0.0000

4. Master curve fit to data

Temperature adj. = 1.5 °C (est.) Stand. dev. on T_0 = 1.0 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa√m)	$K_{Jc(1T)}$ (MPa√m)	$K_{MC(1T)}$ (MPa√m)	5% conf. (MPa√m)	95% conf. (MPa√m)	5% L.B. (MPa√m)
-154	54.8	49.1				
-154	49.8	44.9				
-154	37.8	34.9				
-154	33.0	30.9				
-154	38.9	35.8				
-154	24.2	23.6				
-154	47.4	43.0				
-154	46.5	42.2				
-154	31.4	29.6				
-154	39.2	36.0				
-154	24.2	23.6				
-154	33.0	30.9				
-154	41.0	37.6				
-154	31.7	29.8				
-154	35.2	32.7				
-154	44.4	40.5				
-154	41.5	38.0				
-154	32.7	30.7				
-154	34.3	32.0				
-154	36.7	34.0				
-154	39.7	36.5				
-154	46.1	41.8				
-154	34.6	32.2				
-154	35.8	33.2				
-154	29.3	27.8				
-154	28.6	27.2				
-154	38.6	35.6				
-154	44.4	40.5				
-154	48.9	44.2				
-154	38.9	35.8				
-154	36.7	34.0				
-154	31.7	29.8				
-154	41.5	41.4				
-154	42.2	42.2				
-154	50.0	49.9				
-154	34.0	33.9				
-154	41.7	41.7				
-154	46.1	46.0				
-154	44.2	44.1				
-154	36.7	36.6				
-154	29.0	28.9				
-154	53.0	52.9				
-154	39.4	39.3				
-154	29.0	28.9				
-154	34.6	34.5				
-154	33.0	33.0				
-154	38.1	38.0				
-154	28.6	28.6				
-154	28.6	28.6				
-154	38.6	38.5				
-154	36.4	36.3				
-154	33.4	33.3				

-154	36.9	36.9
-154	31.1	31.0
-154	34.3	34.2
-154	30.4	30.4
-154	49.6	49.5
-154	41.0	40.9
-154	34.0	33.9
-154	30.7	30.7
-154	41.2	41.2
-154	26.7	26.7
-154	35.5	35.4
-154	33.4	33.3
-154	36.7	36.6
-154	32.4	32.4
-154	45.1	45.0
-154	33.4	33.3
-154	34.0	33.9
-154	30.7	30.7
-154	26.7	26.7
-154	33.7	36.2
-154	42.7	46.9
-154	37.2	40.4
-154	54.4	60.8
-154	34.6	37.3
-154	44.2	48.7
-154	29.7	31.5
-154	36.4	39.4
-154	36.4	39.4
-154	28.2	29.8
-154	28.2	29.8
-154	30.0	31.9
-154	36.4	39.4
-154	37.5	40.7
-154	30.0	31.9
-154	30.7	32.7
-154	30.4	32.3
-154	30.7	32.7
-154	31.7	33.9
-154	41.7	45.8
-154	37.2	40.4
-154	34.9	37.6
-154	38.3	41.7
-154	31.4	33.5
-154	33.7	36.2
-154	32.7	35.1
-154	43.0	47.2
-154	32.7	35.1
-154	30.0	31.9
-154	36.9	40.1
-154	33.4	35.8
-154	30.0	31.9
-110	98.1	85.4
-110	59.0	52.7
-110	80.0	70.3
-110	57.2	51.2
-110	88.3	77.2
-110	96.2	83.9
-110	81.6	71.6
-110	66.9	59.3
-110	85.6	75.0
-110	86.8	76.0
-110	114.2	98.9
-110	73.5	64.8
-110	92.7	80.9
-110	77.5	68.2
-110	61.5	54.7
-110	51.8	46.7
-110	73.6	64.9
-110	52.8	47.5
-110	41.2	37.8
-110	115.3	99.8
-110	73.2	64.5
-110	74.0	65.3
-110	67.5	59.8
-110	71.0	62.7
-110	53.4	48.0
-110	96.5	84.0
-110	71.3	63.0
-110	71.7	63.3
-110	81.7	71.7
-110	64.0	56.8
-110	74.2	65.4
-110	70.4	62.2
-110	91.2	79.6
-110	72.0	63.6
-110	64.8	57.5
-110	79.2	69.6

-110	52.2	47.0
-110	82.9	72.7
-110	93.2	81.3
-110	75.4	66.4
-110	75.0	66.1
-110	78.6	69.1
-110	94.8	82.7
-110	98.1	85.4
-110	98.5	85.7
-110	104.9	91.1
-110	69.9	61.8
-110	81.6	71.6
-110	55.2	49.5
-110	105.6	91.7
-110	101.5	88.3
-110	73.7	65.0
-110	97.5	84.9
-110	75.9	66.8
-110	48.3	43.7
-91	127.0	109.6
-91	121.8	105.2
-91	70.5	62.3
-91	94.2	82.2
-91	127.3	109.9
-91	119.9	103.7
-91	104.5	90.8
-91	78.6	69.1
-91	98.6	85.8
-91	161.6	138.6
-91	91.3	79.7
-91	115.3	99.8
-91	122.4	105.8
-91	126.3	109.1
-91	108.3	94.0
-91	66.9	59.3
-91	126.7	109.4
-91	69.6	61.6
-91	121.4	104.9
-91	90.0	78.7
-91	153.9	132.2
-91	64.6	57.4
-91	127.2	109.8
-91	99.7	86.7
-91	101.3	88.1
-91	140.4	120.9
-91	78.2	68.7
-91	109.0	94.6
-91	103.9	90.3
-91	126.8	109.5
-91	111.7	96.8
-91	68.6	68.4
-91	81.6	81.3
-91	55.9	55.8
-91	98.8	98.5
-91	71.9	71.7
-91	111.0	110.7
-91	93.5	93.2
-91	79.9	79.7
-91	98.4	98.1
-91	101.1	100.8
-91	79.6	79.4
-91	99.7	99.3
-91	108.1	107.7
-91	93.4	93.1
-91	62.0	61.8
-91	107.1	106.7
-91	145.3	144.8
-91	76.3	76.0
-91	126.5	126.1
-91	126.1	125.7
-91	128.5	128.0
-91	111.4	111.0
-91	130.4	130.0
-91	134.8	134.3
-91	157.3	156.7
-91	105.2	104.9
-91	109.8	109.4
-91	84.9	84.6
-91	62.8	62.7
-91	97.5	97.2
-91	80.2	79.9
-91	134.4	133.9
-91	65.1	65.0
-91	118.6	118.2
-91	67.3	66.1
-91	162.9	189.3
-91	100.0	114.7

-91	91.2	104.3
-91	106.2	122.1
-91	83.2	94.9
-91	91.8	105.0
-91	94.7	108.5
-91	92.9	106.4
-91	69.9	79.2
-91	93.1	106.6
-91	97.9	112.2
-91	73.7	83.7
-91	82.0	93.4
-91	76.3	86.7
-91	93.1	106.6
-91	83.7	95.5
-91	82.1	93.6
-91	86.8	99.2
-91	86.7	99.0
-91	92.3	105.7
-91	83.1	94.8
-91	88.9	101.6
-91	64.3	72.5
-91	101.6	116.7
-91	94.2	107.9
-91	78.7	89.5
-91	73.0	82.8
-91	64.2	72.3
-91	98.9	113.5
-91	103.2	137.2
-91	84.4	110.7
-91	97.0	128.5
-91	92.7	122.4
-91	96.8	128.2
-91	73.6	95.5
-91	73.0	94.7
-91	73.3	95.1
-91	53.8	67.7
-91	69.5	89.7
-91	65.5	84.0
-91	79.6	104.0
-91	69.8	90.1
-91	90.3	119.0
-91	88.0	115.8
-60	234.1	199.3
-60	114.4	99.1
-60	130.7	112.7
-60	106.7	92.6
-60	161.0	138.1
-60	200.7	171.3
-60	125.2	108.1
-60	145.1	124.8
-60	91.9	80.2
-60	128.1	110.6
-60	164.4	140.9
-60	192.2	164.3
-60	166.3	142.5
-60	177.7	152.1
-60	203.7	173.9
-60	116.0	100.4
-60	221.9	189.1
-60	167.6	143.6
-60	89.8	78.5
-60	156.3	134.1
-60	186.8	159.7
-60	213.5	182.1
-60	164.6	141.1
-60	280.1	237.9
-60	185.9	159.0
-60	127.7	110.2
-60	205.0	175.0
-60	115.6	100.0
-60	107.5	93.3
-60	164.6	141.1
-60	172.0	147.3
-60	108.5	94.2
-60	119.0	102.9
-60	153.5	131.8
-60	158.9	136.4
-60	137.5	118.4
-60	119.5	103.3
-60	130.7	112.8
-60	172.6	147.8
-60	84.5	74.0
-60	244.6	208.1
-60	120.4	104.1
-60	104.5	90.8
-60	163.6	140.2
-60	201.4	172.0

-60	137.8	118.7
-60	173.0	148.1
-60	99.2	86.4
-60	173.4	148.4
-60	131.5	113.4
-60	186.0	185.3
-60	151.8	151.3
-60	111.7	111.3
-60	143.9	143.4
-60	105.4	105.1
-60	154.0	153.4
-60	176.2	175.6
-60	131.9	131.5
-60	203.9	203.2
-60	142.7	142.2
-60	134.5	134.0
-60	130.1	129.7
-60	142.6	142.1
-60	119.7	119.3
-60	141.3	140.8
-60	175.9	175.3
-60	119.6	119.2
-60	102.4	102.0
-60	99.0	98.7
-60	115.1	114.7
-60	172.9	172.3
-60	120.5	120.2
-60	165.2	164.6
-60	125.6	125.2
-60	126.7	126.3
-60	100.4	100.1
-60	131.1	130.7
-60	185.1	184.5
-60	163.6	163.0
-60	126.5	126.1
-60	164.7	164.1
-60	192.7	192.0
-60	134.5	134.1
-60	140.8	140.3
-60	109.9	126.5
-60	131.9	152.5
-60	136.2	157.6
-60	154.0	178.8
-60	115.9	133.6
-60	150.4	174.4
-40	171.0	146.5
-40	569.4	480.2
-40	169.4	145.1
-40	548.7	462.8
-40	529.9	447.1
-40	318.5	270.1
-40	574.8	484.7
-40	360.8	305.4
-40	343.8	291.2
-40	235.8	200.8
-40	529.9	447.1
-40	496.5	419.1
-40	600.0	505.8
-40	113.7	98.5
-40	229.6	195.5
-40	154.2	132.4
-40	221.3	188.6
-40	486.7	410.9
-40	243.8	207.4
-40	202.5	172.8
-40	180.6	154.6
-40	206.7	176.4
-40	240.7	204.9
-40	270.8	230.1
-40	186.4	159.4
-40	255.8	217.5
-40	231.2	196.9
-40	339.4	287.5
-40	403.1	340.9
-40	399.2	337.6
-40	187.3	186.6
-40	101.5	101.2
-40	140.3	139.9
-40	150.2	149.7
-40	187.3	186.6
-40	211.4	210.6
-40	160.5	160.0
-40	214.6	213.8
-40	188.3	187.7
-40	239.3	238.4
-40	112.8	112.4
-40	239.0	238.1

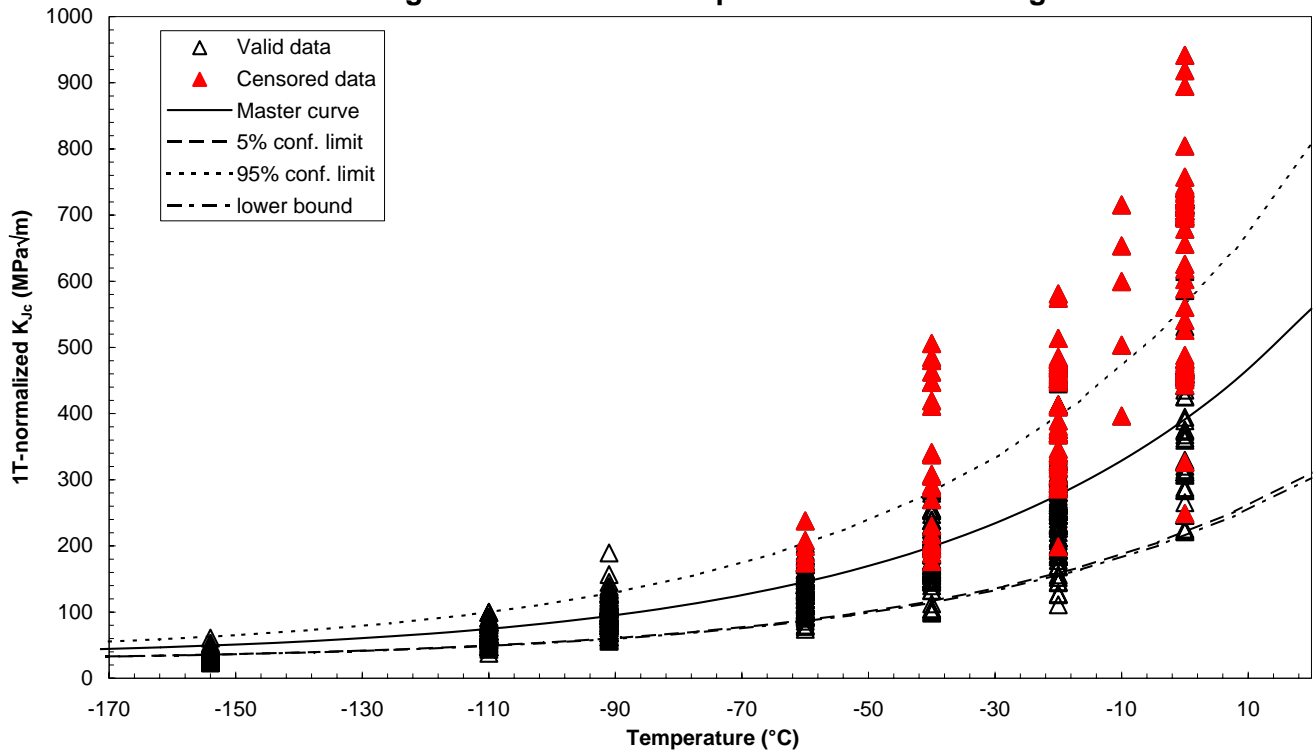
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-40	254.7	253.7
-40	270.9	269.9
-40	187.0	186.3
-40	170.1	169.5
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-40	103.1	102.8
-40	230.0	229.1
-40	210.0	209.2
-40	198.2	197.5
-40	150.2	149.7
-40	226.8	226.0
-40	158.1	157.5
-40	256.4	255.5
-40	207.6	206.9
-40	213.5	212.8
-40	254.6	253.7
-40	240.0	239.1
-40	309.2	308.0
-40	125.9	145.5
-40	128.9	149.0
-40	198.5	231.5
-40	212.0	247.5
-40	138.6	160.5
-40	187.7	218.7
-40	173.0	201.2
-40	179.5	208.9
-40	152.6	177.1
-40	153.6	178.3
-40	144.6	167.6
-40	150.7	174.9
-40	139.1	161.0
-40	183.6	213.8
-40	142.0	164.5
-40	187.2	218.0
-40	172.2	200.3
-40	198.0	230.8
-40	130.4	150.8
-40	141.7	164.1
-40	134.5	155.6
-40	115.5	133.1
-40	91.7	104.9
-40	141.1	163.4
-40	239.1	279.6
-40	243.4	284.7
-40	191.9	223.6
-40	146.8	170.2
-40	161.4	187.5
-40	142.3	164.8
-20	128.7	111.1
-20	146.9	126.3
-20	402.8	340.6
-20	409.4	346.2
-20	530.5	447.6
-20	532.2	449.0
-20	534.6	451.0
-20	536.1	452.3
-20	536.1	452.3
-20	536.6	452.7
-20	538.6	454.3
-20	540.5	455.9
-20	543.8	458.7
-20	549.2	463.2
-20	553.7	467.0
-20	556.1	469.0
-20	556.3	469.2
-20	560.6	472.8
-20	565.8	477.2
-20	570.1	480.8
-20	571.1	481.6
-20	233.1	198.5
-20	389.8	329.8
-20	487.9	411.9
-20	438.3	370.4
-20	571.4	481.8
-20	560.7	472.9
-20	561.1	473.2
-20	575.1	484.9
-20	557.5	470.2
-20	572.5	482.7
-20	202.5	201.7
-20	194.7	194.1
-20	262.8	261.8
-20	187.9	187.2
-20	275.8	274.8
-20	261.8	260.9

-20	371.0	369.7
-20	369.1	367.7
-20	462.1	460.4
-20	319.7	318.5
-20	583.1	580.9
-20	231.9	231.0
-20	382.0	380.6
-20	295.9	294.8
-20	576.4	574.2
-20	411.7	410.1
-20	306.4	305.2
-20	324.7	323.5
-20	282.5	281.4
-20	247.2	246.3
-20	233.2	232.4
-20	317.5	316.3
-20	515.6	513.7
-20	263.2	262.3
-20	184.4	183.8
-20	286.9	285.9
-20	341.4	340.1
-20	415.0	413.4
-20	327.9	326.7
-20	170.9	170.3
-20	308.8	307.6
-20	376.5	375.1
-20	228.2	227.4
-20	371.7	370.3
-20	291.6	290.6
-20	337.7	336.4
-20	390.5	389.0
-20	227.3	226.5
-20	201.3	200.6
-20	212.5	211.7
-20	288.4	287.3
-20	479.1	477.3
-20	377.9	376.5
-20	269.6	268.6
-20	184.4	183.8
-20	241.6	240.7
-20	146.4	145.9
-20	299.4	298.3
-20	156.7	156.2
-20	295.6	294.5
-20	167.4	167.4
-20	153.5	178.1
-20	211.2	246.5
-20	220.3	257.3
-20	227.9	266.2
-20	211.1	246.4
-20	217.1	253.4
-20	145.3	168.5
-20	161.2	187.2
-20	131.9	152.5
-20	216.4	252.6
-20	125.0	144.4
-20	378.7	444.9
-20	246.1	287.9
-20	250.9	293.5
-20	251.5	294.3
-20	284.0	332.7
-20	261.1	305.6
-20	351.6	412.8
-20	258.5	302.5
-20	201.3	234.8
-20	110.9	127.7
-20	197.7	230.5
-20	198.9	231.9
-20	200.6	234.0
-20	165.7	192.6
-20	280.1	328.0
-20	279.5	327.3
-20	257.6	301.4
-20	265.2	310.4
-20	156.7	212.6
-20	221.7	304.1
-20	193.9	264.9
-20	191.7	261.9
-20	184.4	251.6
-20	186.7	254.8
-20	184.4	251.6
-20	193.9	264.9
-20	204.4	279.8
-20	224.0	307.4
-20	153.4	207.9
-20	222.6	305.4
-20	162.0	220.0

-20	187.8	256.4
-20	198.2	271.0
-10	656.0	653.4
-10	397.8	396.3
-10	718.1	715.3
-10	601.6	599.3
-10	505.3	503.4
0	541.9	457.1
0	547.0	461.4
0	538.7	454.4
0	540.0	455.5
0	544.8	459.6
0	534.8	451.2
0	557.2	469.9
0	545.0	459.7
0	546.1	460.6
0	549.2	463.2
0	565.1	476.5
0	571.6	482.0
0	553.4	466.8
0	293.2	248.8
0	544.1	459.0
0	552.2	465.7
0	558.0	470.6
0	553.5	466.8
0	557.6	470.3
0	552.4	466.0
0	555.6	468.6
0	558.2	470.8
0	550.6	464.4
0	560.8	473.0
0	569.6	480.4
0	552.5	466.0
0	578.5	487.7
0	556.0	468.9
0	543.8	458.7
0	556.3	469.2
0	327.6	326.4
0	681.4	678.8
0	700.8	698.2
0	698.2	695.5
0	708.4	705.7
0	701.5	698.8
0	724.9	722.1
0	717.4	714.6
0	705.8	703.0
0	709.5	706.8
0	716.7	714.0
0	714.1	711.3
0	658.5	656.0
0	747.5	744.6
0	709.0	706.2
0	719.2	716.4
0	444.5	442.8
0	699.8	697.1
0	704.0	701.3
0	729.5	726.7
0	714.0	711.3
0	725.6	722.8
0	730.2	727.4
0	737.8	734.9
0	590.7	588.4
0	730.3	727.5
0	741.8	738.9
0	744.2	741.3
0	527.7	525.7
0	620.4	618.0
0	727.0	724.2
0	730.3	727.5
0	542.6	540.5
0	726.7	723.9
0	718.7	716.0
0	717.1	714.4
0	721.2	718.5
0	725.3	722.5
0	727.9	725.1
0	727.0	724.2
0	718.5	715.7
0	191.3	222.9
0	269.2	315.2
0	281.2	329.4
0	242.5	283.5
0	318.3	373.3
0	476.2	560.4
0	511.7	602.5
0	621.3	732.2
0	531.3	625.6

0	266.6	312.1				
0	599.3	706.2				
0	362.9	426.1				
0	331.8	389.3				
0	227.1	265.3				
0	309.5	362.9				
0	628.6	740.9				
0	210.9	246.1				
0	410.7	482.8				
0	211.4	246.7				
0	778.3	918.2				
0	263.4	308.3				
0	682.2	804.4				
0	386.7	454.3				
0	376.2	441.9				
0	642.5	757.3				
0	306.7	359.6				
0	758.4	894.6				
0	797.9	941.4				
0	246.4	288.2				
0	320.1	375.4				
0	233.3	320.4				
0	238.2	327.4				
0	208.3	285.2				
0	421.7	585.8				
0	226.7	311.2				
0	267.0	367.9				
0	163.0	221.4				
0	165.8	225.4				
0	285.9	394.6				
0	342.0	473.5				
0	314.9	435.4				
0	307.6	425.1				
0	383.0	531.4				
0	332.6	460.4				
0	223.6	306.8				
0	442.2	614.7				
-174			43.2	32.6	53.9	32.4
-161.875			46.7	34.4	59.0	34.2
-149.75			51.0	36.7	65.3	36.4
-137.625			56.4	39.7	73.2	39.3
-125.5			63.3	43.4	83.2	42.9
-113.375			71.9	48.0	95.8	47.4
-101.25			82.8	53.9	111.7	53.1
-89.125			96.5	61.3	131.6	60.3
-77			113.7	70.6	156.8	69.4
-64.875			135.4	82.3	188.4	80.7
-52.75			162.7	97.0	228.3	95.1
-40.625			197.0	115.6	278.5	113.1
-28.5			240.3	139.0	341.6	135.9
-16.375			294.8	168.4	421.2	164.5
-4.25			363.4	205.4	521.3	200.5
7.875			449.7	252.1	647.4	245.9
20			558.5	310.8	806.2	303.0

Master Curve with tolerance bounds EURO toughness dataset - Complete dataset excluding SX9



SINTAP - Structural Integrity Assessment Procedures for European Industry
Lower Tail Analysis Procedure

Step 1: Estimate of the median value of fracture toughness (ASTM E1921-05)

1. Material characteristics

Material specifications : **EURO toughness data set - Complete dataset excluding SX9**

2. Dimensional and crack growth requirements

Specimen code	T (°C)	a _o (mm)	W (mm)	B (mm)	b _o (mm)	Δa (mm)	K _{Jc[exp]} (MPa√m)	σ _{ys} (MPa)	E' (GPa)	K _{lim} (MPa√m)	DATA VALID	K _{Jc[calc]} (MPa√m)
GKSS	-154	14.47	25	12.5	10.530	0.00	54.8	674.5	237.6	237.2	YES	54.8
GKSS	-154	14.17	25	12.5	10.830	0.00	49.8	674.5	237.6	240.5	YES	49.8
GKSS	-154	14.15	25	12.5	10.850	0.00	37.8	674.5	237.6	240.8	YES	37.8
GKSS	-154	14.36	25	12.5	10.640	0.00	33.0	674.5	237.6	238.4	YES	33.0
GKSS	-154	14.06	25	12.5	10.940	0.00	38.9	674.5	237.6	241.8	YES	38.9
GKSS	-154	14.11	25	12.5	10.890	0.00	24.2	674.5	237.6	241.2	YES	24.2
GKSS	-154	14.06	25	12.5	10.940	0.00	47.4	674.5	237.6	241.8	YES	47.4
GKSS	-154	14.50	25	12.5	10.500	0.00	46.5	674.5	237.6	236.9	YES	46.5
GKSS	-154	13.79	25	12.5	11.210	0.00	31.4	674.5	237.6	244.7	YES	31.4
GKSS	-154	14.28	25	12.5	10.720	0.00	39.2	674.5	237.6	239.3	YES	39.2
GKSS	-154	14.11	25	12.5	10.890	0.00	24.2	674.5	237.6	241.2	YES	24.2
SIEMENS	-154	13.17	25	12.5	11.830	0.00	33.0	674.5	237.6	251.4	YES	33.0
SIEMENS	-154	13.07	25	12.5	11.930	0.00	41.0	674.5	237.6	252.5	YES	41.0
SIEMENS	-154	13.15	25	12.5	11.850	0.00	31.7	674.5	237.6	251.6	YES	31.7
SIEMENS	-154	13.11	25	12.5	11.890	0.00	35.2	674.5	237.6	252.0	YES	35.2
SIEMENS	-154	13.14	25	12.5	11.860	0.00	44.4	674.5	237.6	251.7	YES	44.4
SIEMENS	-154	13.32	25	12.5	11.680	0.00	41.5	674.5	237.6	249.8	YES	41.5
SIEMENS	-154	13.17	25	12.5	11.830	0.00	32.7	674.5	237.6	251.4	YES	32.7
SIEMENS	-154	13.19	25	12.5	11.810	0.00	34.3	674.5	237.6	251.2	YES	34.3
SIEMENS	-154	13.21	25	12.5	11.790	0.00	36.7	674.5	237.6	251.0	YES	36.7
SIEMENS	-154	13.30	25	12.5	11.700	0.00	39.7	674.5	237.6	250.0	YES	39.7
SIEMENS	-154	13.24	25	12.5	11.760	0.00	46.1	674.5	237.6	250.7	YES	46.1
SIEMENS	-154	13.23	25	12.5	11.770	0.00	34.6	674.5	237.6	250.8	YES	34.6
SIEMENS	-154	13.21	25	12.5	11.790	0.00	35.8	674.5	237.6	251.0	YES	35.8
SIEMENS	-154	13.31	25	12.5	11.690	0.00	29.3	674.5	237.6	249.9	YES	29.3
SIEMENS	-154	13.33	25	12.5	11.670	0.00	28.6	674.5	237.6	249.7	YES	28.6
SIEMENS	-154	13.21	25	12.5	11.790	0.00	38.6	674.5	237.6	251.0	YES	38.6
SIEMENS	-154	13.32	25	12.5	11.680	0.00	44.4	674.5	237.6	249.8	YES	44.4
SIEMENS	-154	13.18	25	12.5	11.820	0.00	48.9	674.5	237.6	251.3	YES	48.9
SIEMENS	-154	13.27	25	12.5	11.730	0.00	38.9	674.5	237.6	250.3	YES	38.9
SIEMENS	-154	13.17	25	12.5	11.830	0.00	36.7	674.5	237.6	251.4	YES	36.7
SIEMENS	-154	13.53	25	12.5	11.470	0.00	31.7	674.5	237.6	247.6	YES	31.7
GKSS	-154	28.21	50	25.0	21.790	0.00	41.5	674.5	237.6	341.2	YES	41.5
GKSS	-154	27.98	50	25.0	22.020	0.00	42.2	674.5	237.6	343.0	YES	42.2
GKSS	-154	27.64	50	25.0	22.360	0.00	50.0	674.5	237.6	345.6	YES	50.0
GKSS	-154	27.73	50	25.0	22.270	0.00	34.0	674.5	237.6	344.9	YES	34.0
GKSS	-154	28.15	50	25.0	21.850	0.00	41.7	674.5	237.6	341.7	YES	41.7
GKSS	-154	27.58	50	25.0	22.420	0.00	46.1	674.5	237.6	346.1	YES	46.1
GKSS	-154	27.98	50	25.0	22.020	0.00	44.2	674.5	237.6	343.0	YES	44.2
GKSS	-154	28.10	50	25.0	21.900	0.00	36.7	674.5	237.6	342.1	YES	36.7
GKSS	-154	27.96	50	25.0	22.040	0.00	29.0	674.5	237.6	343.2	YES	29.0
GKSS	-154	28.17	50	25.0	21.830	0.00	53.0	674.5	237.6	341.5	YES	53.0
GKSS	-154	29.45	50	25.0	20.550	0.00	39.4	674.5	237.6	331.4	YES	39.4
GKSS	-154	27.96	50	25.0	22.040	0.00	29.0	674.5	237.6	343.2	YES	29.0
SIEMENS	-154	26.52	50	25.0	23.480	0.00	34.6	674.5	237.6	354.2	YES	34.6
SIEMENS	-154	26.60	50	25.0	23.400	0.00	33.0	674.5	237.6	353.6	YES	33.0
SIEMENS	-154	26.63	50	25.0	23.370	0.00	38.1	674.5	237.6	353.4	YES	38.1
SIEMENS	-154	26.81	50	25.0	23.190	0.00	28.6	674.5	237.6	352.0	YES	28.6
SIEMENS	-154	26.61	50	25.0	23.390	0.00	28.6	674.5	237.6	353.5	YES	28.6
SIEMENS	-154	26.69	50	25.0	23.310	0.00	38.6	674.5	237.6	352.9	YES	38.6
SIEMENS	-154	26.74	50	25.0	23.260	0.00	36.4	674.5	237.6	352.5	YES	36.4
SIEMENS	-154	26.43	50	25.0	23.570	0.00	33.4	674.5	237.6	354.9	YES	33.4
SIEMENS	-154	26.48	50	25.0	23.520	0.00	36.9	674.5	237.6	354.5	YES	36.9
SIEMENS	-154	26.49	50	25.0	23.510	0.00	31.1	674.5	237.6	354.4	YES	31.1
SIEMENS	-154	26.44	50	25.0	23.560	0.00	34.3	674.5	237.6	354.8	YES	34.3
SIEMENS	-154	26.42	50	25.0	23.580	0.00	30.4	674.5	237.6	354.9	YES	30.4
SIEMENS	-154	26.44	50	25.0	23.560	0.00	49.6	674.5	237.6	354.8	YES	49.6
SIEMENS	-154	26.55	50	25.0	23.450	0.00	41.0	674.5	237.6	354.0	YES	41.0
SIEMENS	-154	26.83	50	25.0	23.170	0.00	34.0	674.5	237.6	351.8	YES	34.0
SIEMENS	-154	27.01	50	25.0	22.990	0.00	30.7	674.5	237.6	350.5	YES	30.7
SIEMENS	-154	26.74	50	25.0	23.260	0.00	41.2	674.5	237.6	352.5	YES	41.2
SIEMENS	-154	26.65	50	25.0	23.350	0.00	26.7	674.5	237.6	353.2	YES	26.7
SIEMENS	-154	26.63	50	25.0	23.370	0.00	35.5	674.5	237.6	353.4	YES	35.5
SIEMENS	-154	26.52	50	25.0	23.480	0.00	33.4	674.5	237.6	354.2	YES	33.4
SIEMENS	-154	26.77	50	25.0	23.230	0.00	36.7	674.5	237.6	352.3	YES	36.7
SIEMENS	-154	26.68	50	25.0	23.320	0.00	32.4	674.5	237.6	353.0	YES	32.4
SIEMENS	-154	26.48	50	25.0	23.520	0.00	45.1	674.5	237.6	354.5	YES	45.1
SIEMENS	-154	26.43	50	25.0	23.570	0.00	33.4	674.5	237.6	354.9	YES	33.4
SIEMENS	-154	26.83	50	25.0	23.170	0.00	34.0	674.5	237.6	351.8	YES	34.0
SIEMENS	-154	27.01	50	25.0	22.990	0.00	30.7	674.5	237.6	350.5	YES	30.7
SIEMENS	-154	26.65	50	25.0	23.350	0.00	26.7	674.5	237.6	353.2	YES	26.7
GKSS	-154	56.79	100	50.0	43.210	0.00	33.7	674.5	237.6	480.5	YES	33.7
GKSS	-154	55.00	100	50.0	45.000	0.00	42.7	674.5	237.6	490.3	YES	42.7
GKSS	-154	55.62	100	50.0	44.380	0.00	37.2	674.5	237.6	486.9	YES	37.2

GKSS	-154	55.81	100	50.0	44.190	0.00	54.4	674.5	237.6	485.9	YES	54.4
GKSS	-154	55.97	100	50.0	44.030	0.00	34.6	674.5	237.6	485.0	YES	34.6
GKSS	-154	55.45	100	50.0	44.550	0.00	44.2	674.5	237.6	487.9	YES	44.2
GKSS	-154	57.86	100	50.0	42.140	0.00	29.7	674.5	237.6	474.5	YES	29.7
GKSS	-154	55.20	100	50.0	44.800	0.00	36.4	674.5	237.6	489.2	YES	36.4
GKSS	-154	55.95	100	50.0	44.050	0.00	36.4	674.5	237.6	485.1	YES	36.4
GKSS	-154	54.42	100	50.0	45.580	0.00	28.2	674.5	237.6	493.5	YES	28.2
GKSS	-154	54.42	100	50.0	45.580	0.00	28.2	674.5	237.6	493.5	YES	28.2
NE	-154	55.67	100	50.0	44.330	0.00	30.0	674.5	237.6	486.7	YES	30.0
NE	-154	56.75	100	50.0	43.250	0.00	36.4	674.5	237.6	480.7	YES	36.4
NE	-154	56.43	100	50.0	43.570	0.00	37.5	674.5	237.6	482.5	YES	37.5
NE	-154	56.35	100	50.0	43.650	0.00	30.0	674.5	237.6	482.9	YES	30.0
NE	-154	56.21	100	50.0	43.790	0.00	30.7	674.5	237.6	483.7	YES	30.7
NE	-154	57.23	100	50.0	42.770	0.00	30.4	674.5	237.6	478.0	YES	30.4
NE	-154	58.12	100	50.0	41.880	0.00	30.7	674.5	237.6	473.0	YES	30.7
NE	-154	56.50	100	50.0	43.500	0.00	31.7	674.5	237.6	482.1	YES	31.7
NE	-154	57.11	100	50.0	42.890	0.00	41.7	674.5	237.6	478.7	YES	41.7
NE	-154	56.45	100	50.0	43.550	0.00	37.2	674.5	237.6	482.4	YES	37.2
NE	-154	56.52	100	50.0	43.480	0.00	34.9	674.5	237.6	482.0	YES	34.9
NE	-154	56.28	100	50.0	43.720	0.00	38.3	674.5	237.6	483.3	YES	38.3
NE	-154	56.35	100	50.0	43.650	0.00	31.4	674.5	237.6	482.9	YES	31.4
NE	-154	56.41	100	50.0	43.590	0.00	33.7	674.5	237.6	482.6	YES	33.7
NE	-154	56.35	100	50.0	43.650	0.00	32.7	674.5	237.6	482.9	YES	32.7
NE	-154	56.36	100	50.0	43.640	0.00	43.0	674.5	237.6	482.9	YES	43.0
NE	-154	56.08	100	50.0	43.920	0.00	32.7	674.5	237.6	484.4	YES	32.7
NE	-154	56.51	100	50.0	43.490	0.00	30.0	674.5	237.6	482.0	YES	30.0
NE	-154	56.47	100	50.0	43.530	0.00	36.9	674.5	237.6	482.3	YES	36.9
NE	-154	56.42	100	50.0	43.580	0.00	33.4	674.5	237.6	482.5	YES	33.4
NE	-154	56.35	100	50.0	43.650	0.00	30.0	674.5	237.6	482.9	YES	30.0
GKSS	-110	14.51	25	12.5	10.490	0.00	98.1	567.6	234.7	215.8	YES	98.1
GKSS	-110	14.34	25	12.5	10.660	0.00	59.0	567.6	234.7	217.6	YES	59.0
GKSS	-110	14.38	25	12.5	10.620	0.00	80.0	567.6	234.7	217.2	YES	80.0
GKSS	-110	14.72	25	12.5	10.280	0.00	57.2	567.6	234.7	213.7	YES	57.2
GKSS	-110	14.64	25	12.5	10.360	0.00	88.3	567.6	234.7	214.5	YES	88.3
GKSS	-110	14.27	25	12.5	10.730	0.00	96.2	567.6	234.7	218.3	YES	96.2
GKSS	-110	14.62	25	12.5	10.380	0.00	81.6	567.6	234.7	214.7	YES	81.6
GKSS	-110	14.30	25	12.5	10.700	0.00	66.9	567.6	234.7	218.0	YES	66.9
GKSS	-110	14.64	25	12.5	10.360	0.00	85.6	567.6	234.7	214.5	YES	85.6
GKSS	-110	14.40	25	12.5	10.600	0.00	86.8	567.6	234.7	217.0	YES	86.8
GKSS	-110	14.44	25	12.5	10.560	0.00	114.2	567.6	234.7	216.6	YES	114.2
GKSS	-110	14.20	25	12.5	10.800	0.00	73.5	567.6	234.7	219.0	YES	73.5
GKSS	-110	13.96	25	12.5	11.040	0.00	92.7	567.6	234.7	221.4	YES	92.7
GKSS	-110	14.10	25	12.5	10.900	0.00	77.5	567.6	234.7	220.0	YES	77.5
GKSS	-110	14.14	25	12.5	10.860	0.00	61.5	567.6	234.7	219.6	YES	61.5
GKSS	-110	14.06	25	12.5	10.940	0.00	51.8	567.6	234.7	220.4	YES	51.8
GKSS	-110	14.23	25	12.5	10.770	0.00	73.6	567.6	234.7	218.7	YES	73.6
GKSS	-110	14.10	25	12.5	10.900	0.00	52.8	567.6	234.7	220.0	YES	52.8
GKSS	-110	14.00	25	12.5	11.000	0.00	41.2	567.6	234.7	221.0	YES	41.2
GKSS	-110	14.20	25	12.5	10.800	0.00	115.3	567.6	234.7	219.0	YES	115.3
GKSS	-110	13.98	25	12.5	11.020	0.00	73.2	567.6	234.7	221.2	YES	73.2
GKSS	-110	13.97	25	12.5	11.030	0.00	74.0	567.6	234.7	221.3	YES	74.0
GKSS	-110	14.45	25	12.5	10.550	0.00	67.5	567.6	234.7	216.5	YES	67.5
GKSS	-110	14.58	25	12.5	10.420	0.00	71.0	567.6	234.7	215.1	YES	71.0
GKSS	-110	14.35	25	12.5	10.650	0.00	53.4	567.6	234.7	217.5	YES	53.4
GKSS	-110	14.55	25	12.5	10.450	0.00	96.5	567.6	234.7	215.4	YES	96.5
GKSS	-110	14.54	25	12.5	10.460	0.00	71.3	567.6	234.7	215.5	YES	71.3
GKSS	-110	14.39	25	12.5	10.610	0.00	71.7	567.6	234.7	217.1	YES	71.7
GKSS	-110	14.54	25	12.5	10.460	0.00	81.7	567.6	234.7	215.5	YES	81.7
GKSS	-110	14.32	25	12.5	10.680	0.00	64.0	567.6	234.7	217.8	YES	64.0
GKSS	-110	14.36	25	12.5	10.640	0.00	74.2	567.6	234.7	217.4	YES	74.2
GKSS	-110	14.30	25	12.5	10.700	0.00	70.4	567.6	234.7	218.0	YES	70.4
GKSS	-110	14.25	25	12.5	10.750	0.00	91.2	567.6	234.7	218.5	YES	91.2
GKSS	-110	14.17	25	12.5	10.830	0.00	72.0	567.6	234.7	219.3	YES	72.0
GKSS	-110	14.46	25	12.5	10.540	0.00	64.8	567.6	234.7	216.3	YES	64.8
GKSS	-110	14.37	25	12.5	10.630	0.00	79.2	567.6	234.7	217.3	YES	79.2
GKSS	-110	14.24	25	12.5	10.760	0.00	52.2	567.6	234.7	218.6	YES	52.2
GKSS	-110	14.22	25	12.5	10.780	0.00	82.9	567.6	234.7	218.8	YES	82.9
GKSS	-110	14.37	25	12.5	10.630	0.00	93.2	567.6	234.7	217.3	YES	93.2
GKSS	-110	14.51	25	12.5	10.490	0.00	75.4	567.6	234.7	215.8	YES	75.4
GKSS	-110	14.26	25	12.5	10.740	0.00	75.0	567.6	234.7	218.4	YES	75.0
GKSS	-110	14.66	25	12.5	10.340	0.00	78.6	567.6	234.7	214.3	YES	78.6
GKSS	-110	14.53	25	12.5	10.470	0.00	94.8	567.6	234.7	215.6	YES	94.8
GKSS	-110	14.33	25	12.5	10.670	0.00	98.1	567.6	234.7	217.7	YES	98.1
GKSS	-110	14.29	25	12.5	10.710	0.00	98.5	567.6	234.7	218.1	YES	98.5
GKSS	-110	14.56	25	12.5	10.440	0.00	104.9	567.6	234.7	215.3	YES	104.9
GKSS	-110	14.35	25	12.5	10.650	0.00	69.9	567.6	234.7	217.5	YES	69.9
GKSS	-110	14.30	25	12.5	10.700	0.00	81.6	567.6	234.7	218.0	YES	81.6
GKSS	-110	14.35	25	12.5	10.650	0.00	55.2	567.6	234.7	217.5	YES	55.2
GKSS	-110	14.35	25	12.5	10.650	0.00	105.6	567.6	234.7	217.5	YES	105.6
GKSS	-110	14.36	25	12.5	10.640	0.00	101.5	567.6	234.7	217.4	YES	101.5
GKSS	-110	14.41	25	12.5	10.590	0.00	73.7	567.6	234.7	216.9	YES	73.7
GKSS	-110	14.39	25	12.5	10.610	0.00	97.5	567.6	234.7	217.1	YES	97.5
GKSS	-110	14.48	25	12.5	10.520	0.00	75.9	567.6	234.7	216.1	YES	75.9
GKSS	-110	14.37	25	12.5	10.630	0.00	48.3	567.6	234.7	217.3	YES	48.3
GKSS	-91	14.41	25	12.5	10.590	0.00	127.0	538.9	233.5	210.8	YES	127.0
GKSS	-91	14.39	25	12.5	10.610	0.00	121.8	538.9	233.5	211.0	YES	121.8
GKSS	-91	14.29	25	12.5	10.710	0.00	70.5	538.9	233.5	211.9	YES	70.5
GKSS	-91	14.41	25	12.5	10.590	0.00	94.2	538.9	233.5	210.8	YES	94.2

GKSS	-91	14.17	25	12.5	10.830	0.00	127.3	538.9	233.5	213.1	YES	127.3
GKSS	-91	14.11	25	12.5	10.890	0.00	119.9	538.9	233.5	213.7	YES	119.9
GKSS	-91	14.19	25	12.5	10.810	0.00	104.5	538.9	233.5	212.9	YES	104.5
GKSS	-91	14.16	25	12.5	10.840	0.00	78.6	538.9	233.5	213.2	YES	78.6
GKSS	-91	14.06	25	12.5	10.940	0.00	98.6	538.9	233.5	214.2	YES	98.6
GKSS	-91	14.24	25	12.5	10.760	0.00	161.6	538.9	233.5	212.4	YES	161.6
THA	-91	13.95	25	12.5	11.050	0.00	91.3	538.9	233.5	215.3	YES	91.3
THA	-91	14.15	25	12.5	10.850	0.00	115.3	538.9	233.5	213.3	YES	115.3
THA	-91	13.96	25	12.5	11.040	0.02	122.4	538.9	233.5	215.2	YES	122.4
THA	-91	14.33	25	12.5	10.670	0.02	126.3	538.9	233.5	211.5	YES	126.3
THA	-91	14.49	25	12.5	10.510	0.00	108.3	538.9	233.5	210.0	YES	108.3
THA	-91	14.28	25	12.5	10.720	0.00	66.9	538.9	233.5	212.0	YES	66.9
THA	-91	14.29	25	12.5	10.710	0.02	126.7	538.9	233.5	211.9	YES	126.7
THA	-91	14.18	25	12.5	10.820	0.00	69.6	538.9	233.5	213.0	YES	69.6
THA	-91	14.52	25	12.5	10.480	0.00	121.4	538.9	233.5	209.7	YES	121.4
THA	-91	14.29	25	12.5	10.710	0.00	90.0	538.9	233.5	211.9	YES	90.0
THA	-91	13.90	25	12.5	11.100	0.05	153.9	538.9	233.5	215.8	YES	153.9
THA	-91	14.21	25	12.5	10.790	0.00	64.6	538.9	233.5	212.7	YES	64.6
THA	-91	14.52	25	12.5	10.480	0.01	127.2	538.9	233.5	209.7	YES	127.2
THA	-91	14.12	25	12.5	10.880	0.00	99.7	538.9	233.5	213.6	YES	99.7
THA	-91	14.38	25	12.5	10.620	0.00	101.3	538.9	233.5	211.1	YES	101.3
THA	-91	14.34	25	12.5	10.660	0.00	140.4	538.9	233.5	211.4	YES	140.4
THA	-91	14.25	25	12.5	10.750	0.00	78.2	538.9	233.5	212.3	YES	78.2
THA	-91	14.26	25	12.5	10.740	0.00	109.0	538.9	233.5	212.2	YES	109.0
THA	-91	14.44	25	12.5	10.560	0.00	103.9	538.9	233.5	210.5	YES	103.9
THA	-91	14.33	25	12.5	10.670	0.04	126.8	538.9	233.5	211.5	YES	126.8
THA	-91	14.33	25	12.5	10.670	0.00	111.7	538.9	233.5	211.5	YES	111.7
GKSS	-91	28.43	50	25.0	21.570	0.00	68.6	538.9	233.5	300.8	YES	68.6
GKSS	-91	28.35	50	25.0	21.650	0.00	81.6	538.9	233.5	301.3	YES	81.6
GKSS	-91	27.33	50	25.0	22.670	0.00	55.9	538.9	233.5	308.4	YES	55.9
GKSS	-91	28.38	50	25.0	21.620	0.00	98.8	538.9	233.5	301.1	YES	98.8
GKSS	-91	27.88	50	25.0	22.120	0.00	71.9	538.9	233.5	304.6	YES	71.9
GKSS	-91	28.18	50	25.0	21.820	0.00	111.0	538.9	233.5	302.5	YES	111.0
GKSS	-91	28.41	50	25.0	21.590	0.00	93.5	538.9	233.5	300.9	YES	93.5
GKSS	-91	28.19	50	25.0	21.810	0.00	79.9	538.9	233.5	302.4	YES	79.9
GKSS	-91	28.27	50	25.0	21.730	0.00	98.4	538.9	233.5	301.9	YES	98.4
GKSS	-91	28.06	50	25.0	21.940	0.00	101.1	538.9	233.5	303.3	YES	101.1
TWI	-91	27.61	50	25.0	22.390	0.00	79.6	538.9	233.5	306.4	YES	79.6
TWI	-91	27.70	50	25.0	22.300	0.00	99.7	538.9	233.5	305.8	YES	99.7
TWI	-91	27.47	50	25.0	22.530	0.00	108.1	538.9	233.5	307.4	YES	108.1
TWI	-91	27.73	50	25.0	22.270	0.00	93.4	538.9	233.5	305.6	YES	93.4
TWI	-91	27.70	50	25.0	22.300	0.00	62.0	538.9	233.5	305.8	YES	62.0
TWI	-91	27.74	50	25.0	22.260	0.00	107.1	538.9	233.5	305.6	YES	107.1
TWI	-91	27.78	50	25.0	22.220	0.06	145.3	538.9	233.5	305.3	YES	145.3
TWI	-91	27.49	50	25.0	22.510	0.00	76.3	538.9	233.5	307.3	YES	76.3
TWI	-91	27.64	50	25.0	22.360	0.00	126.5	538.9	233.5	306.2	YES	126.5
TWI	-91	27.91	50	25.0	22.090	0.04	126.1	538.9	233.5	304.4	YES	126.1
TWI	-91	27.27	50	25.0	22.730	0.05	128.5	538.9	233.5	308.8	YES	128.5
TWI	-91	27.73	50	25.0	22.270	0.00	111.4	538.9	233.5	305.6	YES	111.4
TWI	-91	27.49	50	25.0	22.510	0.00	130.4	538.9	233.5	307.3	YES	130.4
TWI	-91	27.60	50	25.0	22.400	0.00	134.8	538.9	233.5	306.5	YES	134.8
TWI	-91	27.87	50	25.0	22.130	0.00	157.3	538.9	233.5	304.7	YES	157.3
TWI	-91	27.31	50	25.0	22.690	0.00	105.2	538.9	233.5	308.5	YES	105.2
TWI	-91	27.61	50	25.0	22.390	0.00	109.8	538.9	233.5	306.4	YES	109.8
TWI	-91	26.01	50	25.0	23.990	0.00	84.9	538.9	233.5	317.2	YES	84.9
TWI	-91	27.94	50	25.0	22.060	0.00	62.8	538.9	233.5	304.2	YES	62.8
TWI	-91	28.64	50	25.0	21.360	0.00	97.5	538.9	233.5	299.3	YES	97.5
TWI	-91	27.37	50	25.0	22.630	0.00	80.2	538.9	233.5	308.1	YES	80.2
TWI	-91	27.52	50	25.0	22.480	0.05	134.4	538.9	233.5	307.1	YES	134.4
TWI	-91	27.60	50	25.0	22.400	0.00	65.1	538.9	233.5	306.5	YES	65.1
TWI	-91	27.47	50	25.0	22.530	0.00	118.6	538.9	233.5	307.4	YES	118.6
GKSS	-91	56.39	100	50.0	43.610	0.00	67.3	538.9	233.5	427.7	YES	67.3
GKSS	-91	55.98	100	50.0	44.020	0.00	162.9	538.9	233.5	429.7	YES	162.9
GKSS	-91	55.90	100	50.0	44.100	0.00	100.0	538.9	233.5	430.1	YES	100.0
GKSS	-91	56.12	100	50.0	43.880	0.00	91.2	538.9	233.5	429.0	YES	91.2
GKSS	-91	55.74	100	50.0	44.260	0.00	106.2	538.9	233.5	430.9	YES	106.2
GKSS	-91	55.74	100	50.0	44.260	0.00	83.2	538.9	233.5	430.9	YES	83.2
GKSS	-91	56.46	100	50.0	43.540	0.00	91.8	538.9	233.5	427.3	YES	91.8
GKSS	-91	55.78	100	50.0	44.220	0.00	94.7	538.9	233.5	430.7	YES	94.7
GKSS	-91	55.68	100	50.0	44.320	0.00	92.9	538.9	233.5	431.1	YES	92.9
GKSS	-91	55.29	100	50.0	44.710	0.00	69.9	538.9	233.5	433.0	YES	69.9
NE	-91	56.42	100	50.0	43.580	0.00	93.1	538.9	233.5	427.5	YES	93.1
NE	-91	56.77	100	50.0	43.230	0.00	97.9	538.9	233.5	425.8	YES	97.9
NE	-91	56.26	100	50.0	43.740	0.00	73.7	538.9	233.5	428.3	YES	73.7
NE	-91	56.26	100	50.0	43.740	0.00	82.0	538.9	233.5	428.3	YES	82.0
NE	-91	56.31	100	50.0	43.690	0.00	76.3	538.9	233.5	428.1	YES	76.3
NE	-91	56.42	100	50.0	43.580	0.00	93.1	538.9	233.5	427.5	YES	93.1
NE	-91	56.39	100	50.0	43.610	0.00	83.7	538.9	233.5	427.7	YES	83.7
NE	-91	56.41	100	50.0	43.590	0.00	82.1	538.9	233.5	427.6	YES	82.1
NE	-91	56.38	100	50.0	43.620	0.00	86.8	538.9	233.5	427.7	YES	86.8
NE	-91	56.30	100	50.0	43.700	0.00	86.7	538.9	233.5	428.1	YES	86.7
NE	-91	56.35	100	50.0	43.650	0.00	92.3	538.9	233.5	427.9	YES	92.3
NE	-91	56.74	100	50.0	43.260	0.00	83.1	538.9	233.5	426.0	YES	83.1
NE	-91	56.42	100	50.0	43.580	0.00	88.9	538.9	233.5	427.5	YES	88.9
NE	-91	56.36	100	50.0	43.640	0.00	64.3	538.9	233.5	427.8	YES	64.3
NE	-91	56.48	100	50.0	43.520	0.00	101.6	538.9	233.5	427.2	YES	101.6
NE	-91	56.41	100	50.0	43.590	0.00	94.2	538.9	233.5	427.6	YES	94.2
NE	-91	56.34	100	50.0	43.660	0.00	78.7	538.9	233.5	427.9	YES	78.7

NE	-91	56.55	100	50.0	43.450	0.00	73.0	538.9	233.5	426.9	YES	73.0
NE	-91	56.51	100	50.0	43.490	0.00	64.2	538.9	233.5	427.1	YES	64.2
NE	-91	56.49	100	50.0	43.510	0.00	98.9	538.9	233.5	427.2	YES	98.9
GKSS	-91	112.50	200	100.0	87.500	0.00	103.2	538.9	233.5	605.8	YES	103.2
GKSS	-91	111.92	200	100.0	88.080	0.00	84.4	538.9	233.5	607.8	YES	84.4
GKSS	-91	110.92	200	100.0	89.080	0.00	97.0	538.9	233.5	611.2	YES	97.0
GKSS	-91	112.15	200	100.0	87.850	0.00	92.7	538.9	233.5	607.0	YES	92.7
GKSS	-91	112.48	200	100.0	87.520	0.00	96.8	538.9	233.5	605.9	YES	96.8
NE	-91	111.78	200	100.0	88.220	0.00	73.6	538.9	233.5	608.3	YES	73.6
NE	-91	112.90	200	100.0	87.100	0.00	73.0	538.9	233.5	604.4	YES	73.0
NE	-91	111.41	200	100.0	88.590	0.00	73.3	538.9	233.5	609.6	YES	73.3
NE	-91	111.95	200	100.0	88.050	0.00	53.8	538.9	233.5	607.7	YES	53.8
NE	-91	112.66	200	100.0	87.340	0.00	69.5	538.9	233.5	605.2	YES	69.5
NE	-91	115.23	200	100.0	84.770	0.00	65.5	538.9	233.5	605.3	YES	65.5
NE	-91	111.72	200	100.0	88.280	0.00	79.6	538.9	233.5	608.5	YES	79.6
NE	-91	112.52	200	100.0	87.480	0.00	69.8	538.9	233.5	605.7	YES	69.8
NE	-91	113.20	200	100.0	86.800	0.00	90.3	538.9	233.5	603.4	YES	90.3
NE	-91	109.16	200	100.0	90.840	0.00	88.0	538.9	233.5	617.3	YES	88.0
GKSS	-60	14.19	25	12.5	10.810	0.05	234.1	506.4	231.4	205.5	NO	205.5
GKSS	-60	14.16	25	12.5	10.840	0.00	114.4	506.4	231.4	205.8	YES	114.4
GKSS	-60	14.31	25	12.5	10.690	0.00	130.7	506.4	231.4	204.4	YES	130.7
GKSS	-60	14.13	25	12.5	10.870	0.00	106.7	506.4	231.4	206.1	YES	106.7
GKSS	-60	14.08	25	12.5	10.920	0.00	161.0	506.4	231.4	206.5	YES	161.0
GKSS	-60	13.58	25	12.5	11.420	0.00	200.7	506.4	231.4	211.2	YES	200.7
GKSS	-60	14.26	25	12.5	10.740	0.00	125.2	506.4	231.4	204.8	YES	125.2
GKSS	-60	14.19	25	12.5	10.810	0.00	145.1	506.4	231.4	205.5	YES	145.1
GKSS	-60	14.00	25	12.5	11.000	0.00	91.9	506.4	231.4	207.3	YES	91.9
GKSS	-60	13.94	25	12.5	11.060	0.00	128.1	506.4	231.4	207.9	YES	128.1
GKSS	-60	14.59	25	12.5	10.410	0.00	164.4	506.4	231.4	201.7	YES	164.4
GKSS	-60	14.53	25	12.5	10.470	0.00	192.2	506.4	231.4	202.2	YES	192.2
GKSS	-60	14.76	25	12.5	10.240	0.00	166.3	506.4	231.4	200.0	YES	166.3
GKSS	-60	14.48	25	12.5	10.520	0.00	177.7	506.4	231.4	202.7	YES	177.7
GKSS	-60	14.55	25	12.5	10.450	0.00	203.7	506.4	231.4	202.0	NO	202.0
GKSS	-60	14.46	25	12.5	10.540	0.00	116.0	506.4	231.4	202.9	YES	116.0
GKSS	-60	14.55	25	12.5	10.450	0.11	221.9	506.4	231.4	202.0	NO	202.0
GKSS	-60	14.77	25	12.5	10.230	0.00	167.6	506.4	231.4	199.9	YES	167.6
GKSS	-60	14.35	25	12.5	10.650	0.00	89.8	506.4	231.4	204.0	YES	89.8
GKSS	-60	14.56	25	12.5	10.440	0.00	156.3	506.4	231.4	201.9	YES	156.3
GKSS	-60	14.49	25	12.5	10.510	0.00	186.8	506.4	231.4	202.6	YES	186.8
GKSS	-60	14.43	25	12.5	10.570	0.00	213.5	506.4	231.4	203.2	NO	203.2
GKSS	-60	14.39	25	12.5	10.610	0.00	164.6	506.4	231.4	203.6	YES	164.6
GKSS	-60	14.49	25	12.5	10.510	0.28	280.1	506.4	231.4	202.6	NO	202.6
GKSS	-60	14.43	25	12.5	10.570	0.00	185.9	506.4	231.4	203.2	YES	185.9
GKSS	-60	14.85	25	12.5	10.150	0.00	127.7	506.4	231.4	199.1	YES	127.7
GKSS	-60	14.64	25	12.5	10.360	0.00	205.0	506.4	231.4	201.2	NO	201.2
GKSS	-60	14.25	25	12.5	10.750	0.00	115.6	506.4	231.4	204.9	YES	115.6
GKSS	-60	14.44	25	12.5	10.560	0.00	107.5	506.4	231.4	203.1	YES	107.5
SIEMENS	-60	13.24	25	12.5	11.760	0.00	164.6	506.4	231.4	214.3	YES	164.6
SIEMENS	-60	13.29	25	12.5	11.710	0.00	172.0	506.4	231.4	213.9	YES	172.0
SIEMENS	-60	13.24	25	12.5	11.760	0.00	108.5	506.4	231.4	214.3	YES	108.5
SIEMENS	-60	13.28	25	12.5	11.720	0.00	119.0	506.4	231.4	214.0	YES	119.0
SIEMENS	-60	13.26	25	12.5	11.740	0.00	153.5	506.4	231.4	214.2	YES	153.5
SIEMENS	-60	13.22	25	12.5	11.780	0.00	158.9	506.4	231.4	214.5	YES	158.9
SIEMENS	-60	13.27	25	12.5	11.730	0.00	137.5	506.4	231.4	214.1	YES	137.5
SIEMENS	-60	13.18	25	12.5	11.820	0.00	119.5	506.4	231.4	214.9	YES	119.5
SIEMENS	-60	13.18	25	12.5	11.820	0.00	130.7	506.4	231.4	214.9	YES	130.7
SIEMENS	-60	13.24	25	12.5	11.760	0.00	172.6	506.4	231.4	214.3	YES	172.6
SIEMENS	-60	13.24	25	12.5	11.760	0.00	84.5	506.4	231.4	214.3	YES	84.5
SIEMENS	-60	13.34	25	12.5	11.660	0.00	244.6	506.4	231.4	213.4	NO	213.4
SIEMENS	-60	13.20	25	12.5	11.800	0.00	120.4	506.4	231.4	214.7	YES	120.4
SIEMENS	-60	13.31	25	12.5	11.690	0.00	104.5	506.4	231.4	213.7	YES	104.5
SIEMENS	-60	13.23	25	12.5	11.770	0.00	163.6	506.4	231.4	214.4	YES	163.6
SIEMENS	-60	13.28	25	12.5	11.720	0.00	201.4	506.4	231.4	214.0	YES	201.4
SIEMENS	-60	13.20	25	12.5	11.800	0.00	137.8	506.4	231.4	214.7	YES	137.8
SIEMENS	-60	13.19	25	12.5	11.810	0.00	173.0	506.4	231.4	214.8	YES	173.0
SIEMENS	-60	13.22	25	12.5	11.780	0.00	99.2	506.4	231.4	214.5	YES	99.2
SIEMENS	-60	13.22	25	12.5	11.780	0.00	173.4	506.4	231.4	214.5	YES	173.4
SIEMENS	-60	13.29	25	12.5	11.710	0.00	131.5	506.4	231.4	213.9	YES	131.5
GKSS	-60	28.06	50	25.0	21.940	0.00	186.0	506.4	231.4	292.8	YES	186.0
GKSS	-60	27.75	50	25.0	22.250	0.00	151.8	506.4	231.4	294.8	YES	151.8
GKSS	-60	27.62	50	25.0	22.380	0.00	111.7	506.4	231.4	295.7	YES	111.7
GKSS	-60	27.65	50	25.0	22.350	0.00	143.9	506.4	231.4	295.5	YES	143.9
GKSS	-60	27.71	50	25.0	22.290	0.00	105.4	506.4	231.4	295.1	YES	105.4
GKSS	-60	28.01	50	25.0	21.990	0.00	154.0	506.4	231.4	293.1	YES	154.0
GKSS	-60	27.97	50	25.0	22.030	0.00	176.2	506.4	231.4	293.4	YES	176.2
GKSS	-60	27.51	50	25.0	22.490	0.00	131.9	506.4	231.4	296.4	YES	131.9
GKSS	-60	27.86	50	25.0	22.140	0.00	203.9	506.4	231.4	294.1	YES	203.9
GKSS	-60	27.51	50	25.0	22.490	0.00	142.7	506.4	231.4	296.4	YES	142.7
TWI	-60	27.42	50	25.0	22.580	0.06	134.5	506.4	231.4	297.0	YES	134.5
TWI	-60	27.43	50	25.0	22.570	0.00	130.1	506.4	231.4	296.9	YES	130.1
TWI	-60	27.62	50	25.0	22.380	0.07	142.6	506.4	231.4	295.7	YES	142.6
TWI	-60	27.47	50	25.0	22.530	0.05	119.7	506.4	231.4	296.7	YES	119.7
TWI	-60	27.49	50	25.0	22.510	0.07	141.3	506.4	231.4	296.5	YES	141.3
TWI	-60	27.95	50	25.0	22.050	0.10	175.9	506.4	231.4	293.5	YES	175.9
TWI	-60	27.62	50	25.0	22.380	0.00	119.6	506.4	231.4	295.7	YES	119.6
TWI	-60	27.65	50	25.0	22.350	0.00	102.4	506.4	231.4	295.5	YES	102.4
TWI	-60	27.68	50	25.0	22.320	0.00	99.0	506.4	231.4	295.3	YES	99.0
TWI	-60	27.82	50	25.0	22.180	0.05	115.1	506.4	231.4	294.4	YES	115.1

TWI	-60	27.98	50	25.0	22.020	0.11	172.9	506.4	231.4	293.3	YES	172.9
TWI	-60	27.72	50	25.0	22.280	0.03	120.5	506.4	231.4	295.0	YES	120.5
TWI	-60	27.48	50	25.0	22.520	0.00	165.2	506.4	231.4	296.6	YES	165.2
TWI	-60	27.54	50	25.0	22.460	0.00	125.6	506.4	231.4	296.2	YES	125.6
TWI	-60	27.88	50	25.0	22.120	0.05	126.7	506.4	231.4	294.0	YES	126.7
TWI	-60	27.79	50	25.0	22.210	0.00	100.4	506.4	231.4	294.6	YES	100.4
TWI	-60	27.56	50	25.0	22.440	0.05	131.1	506.4	231.4	296.1	YES	131.1
TWI	-60	27.58	50	25.0	22.420	0.06	185.1	506.4	231.4	295.9	YES	185.1
TWI	-60	27.59	50	25.0	22.410	0.09	163.6	506.4	231.4	295.9	YES	163.6
TWI	-60	27.68	50	25.0	22.320	0.09	126.5	506.4	231.4	295.3	YES	126.5
TWI	-60	27.65	50	25.0	22.350	0.10	164.7	506.4	231.4	295.5	YES	164.7
TWI	-60	27.73	50	25.0	22.270	0.16	192.7	506.4	231.4	294.9	YES	192.7
TWI	-60	27.65	50	25.0	22.350	0.05	134.5	506.4	231.4	295.5	YES	134.5
TWI	-60	27.86	50	25.0	22.140	0.05	140.8	506.4	231.4	294.1	YES	140.8
GKSS	-60	57.56	100	50.0	42.440	0.00	109.9	506.4	231.4	407.2	YES	109.9
GKSS	-60	56.69	100	50.0	43.310	0.00	131.9	506.4	231.4	411.3	YES	131.9
GKSS	-60	56.69	100	50.0	43.310	0.00	136.2	506.4	231.4	411.3	YES	136.2
GKSS	-60	56.51	100	50.0	43.490	0.00	154.0	506.4	231.4	412.2	YES	154.0
GKSS	-60	56.15	100	50.0	43.850	0.00	115.9	506.4	231.4	413.9	YES	115.9
GKSS	-60	55.96	100	50.0	44.040	0.00	150.4	506.4	231.4	414.8	YES	150.4
BAM	-40	13.63	25	12.5	11.370	0.08	171.0	492.0	230.1	207.1	YES	171.0
BAM	-40	13.73	25	12.5	11.270	2.05	569.4	492.0	230.1	206.2	NO	206.2
BAM	-40	13.78	25	12.5	11.220	0.13	169.4	492.0	230.1	205.8	YES	169.4
BAM	-40	14.02	25	12.5	10.980	1.93	548.7	492.0	230.1	203.6	NO	203.6
BAM	-40	14.13	25	12.5	10.870	1.67	529.9	492.0	230.1	202.5	NO	202.5
BAM	-40	13.62	25	12.5	11.380	0.36	318.5	492.0	230.1	207.2	NO	207.2
BAM	-40	13.77	25	12.5	11.230	2.07	574.8	492.0	230.1	205.9	NO	205.9
BAM	-40	13.70	25	12.5	11.300	0.69	360.8	492.0	230.1	206.5	NO	206.5
BAM	-40	13.61	25	12.5	11.390	0.60	343.8	492.0	230.1	207.3	NO	207.3
BAM	-40	13.85	25	12.5	11.150	0.26	235.8	492.0	230.1	205.1	NO	205.1
BAM	-40	14.10	25	12.5	10.900	1.79	529.9	492.0	230.1	202.8	NO	202.8
BAM	-40	13.88	25	12.5	11.120	1.44	496.5	492.0	230.1	204.9	NO	204.9
BAM	-40	13.84	25	12.5	11.160	2.08	600.0	492.0	230.1	205.2	NO	205.2
BAM	-40	13.91	25	12.5	11.090	0.07	113.7	492.0	230.1	204.6	YES	113.7
BAM	-40	13.89	25	12.5	11.110	0.21	229.6	492.0	230.1	204.8	NO	204.8
BAM	-40	13.99	25	12.5	11.010	0.09	154.2	492.0	230.1	203.8	YES	154.2
BAM	-40	13.73	25	12.5	11.270	0.24	221.3	492.0	230.1	206.2	NO	206.2
BAM	-40	13.95	25	12.5	11.050	1.37	486.7	492.0	230.1	204.2	NO	204.2
BAM	-40	13.61	25	12.5	11.390	0.25	243.8	492.0	230.1	207.3	NO	207.3
BAM	-40	13.74	25	12.5	11.260	0.17	202.5	492.0	230.1	206.1	YES	202.5
GKSS	-40	14.00	25	12.5	11.000	0.00	180.6	492.0	230.1	203.7	YES	180.6
GKSS	-40	14.03	25	12.5	10.970	0.00	206.7	492.0	230.1	203.5	NO	203.5
GKSS	-40	14.59	25	12.5	10.410	0.00	240.7	492.0	230.1	198.2	NO	198.2
GKSS	-40	14.44	25	12.5	10.560	0.00	270.8	492.0	230.1	199.6	NO	199.6
GKSS	-40	14.05	25	12.5	10.950	0.00	186.4	492.0	230.1	203.3	YES	186.4
GKSS	-40	14.46	25	12.5	10.540	0.18	255.8	492.0	230.1	199.4	NO	199.4
GKSS	-40	13.93	25	12.5	11.070	0.12	231.2	492.0	230.1	204.4	NO	204.4
GKSS	-40	14.15	25	12.5	10.850	0.44	339.4	492.0	230.1	202.4	NO	202.4
GKSS	-40	14.06	25	12.5	10.940	0.83	403.1	492.0	230.1	203.2	NO	203.2
GKSS	-40	14.31	25	12.5	10.690	0.83	399.2	492.0	230.1	200.9	NO	200.9
BAM	-40	27.73	50	25.0	22.270	0.09	187.3	492.0	230.1	289.9	YES	187.3
BAM	-40	27.76	50	25.0	22.240	0.05	101.5	492.0	230.1	289.7	YES	101.5
BAM	-40	27.54	50	25.0	22.460	0.06	140.3	492.0	230.1	291.1	YES	140.3
BAM	-40	26.90	50	25.0	23.100	0.08	150.2	492.0	230.1	295.3	YES	150.2
BAM	-40	27.34	50	25.0	22.660	0.09	187.3	492.0	230.1	292.4	YES	187.3
BAM	-40	27.00	50	25.0	23.000	0.18	211.4	492.0	230.1	294.6	YES	211.4
BAM	-40	26.82	50	25.0	23.180	0.12	160.5	492.0	230.1	295.8	YES	160.5
BAM	-40	26.88	50	25.0	23.120	0.11	214.6	492.0	230.1	295.4	YES	214.6
BAM	-40	27.28	50	25.0	22.720	0.15	188.3	492.0	230.1	292.8	YES	188.3
BAM	-40	27.52	50	25.0	22.480	0.23	239.3	492.0	230.1	291.3	YES	239.3
BAM	-40	27.16	50	25.0	22.840	0.05	112.8	492.0	230.1	293.6	YES	112.8
BAM	-40	27.71	50	25.0	22.290	0.23	239.0	492.0	230.1	290.0	YES	239.0
BAM	-40	27.48	50	25.0	22.520	0.38	284.9	492.0	230.1	291.5	YES	284.9
BAM	-40	27.17	50	25.0	22.830	0.31	254.7	492.0	230.1	293.5	YES	254.7
BAM	-40	27.33	50	25.0	22.670	0.23	270.9	492.0	230.1	292.5	YES	270.9
BAM	-40	27.39	50	25.0	22.610	0.14	187.0	492.0	230.1	292.1	YES	187.0
BAM	-40	27.53	50	25.0	22.470	0.13	170.1	492.0	230.1	291.2	YES	170.1
BAM	-40	26.83	50	25.0	23.170	0.25	256.4	492.0	230.1	295.7	YES	256.4
BAM	-40	27.51	50	25.0	22.490	0.11	171.4	492.0	230.1	291.3	YES	171.4
BAM	-40	26.62	50	25.0	23.380	0.05	103.1	492.0	230.1	297.0	YES	103.1
BAM	-40	28.84	50	25.0	21.160	0.23	230.0	492.0	230.1	282.6	YES	230.0
BAM	-40	26.72	50	25.0	23.280	0.20	210.0	492.0	230.1	296.4	YES	210.0
GKSS	-40	27.99	50	25.0	22.010	0.00	198.2	492.0	230.1	288.2	YES	198.2
GKSS	-40	28.02	50	25.0	21.980	0.00	150.2	492.0	230.1	288.0	YES	150.2
GKSS	-40	28.32	50	25.0	21.680	0.00	226.8	492.0	230.1	286.0	YES	226.8
GKSS	-40	28.13	50	25.0	21.870	0.00	158.1	492.0	230.1	287.3	YES	158.1
GKSS	-40	28.17	50	25.0	21.830	0.00	256.4	492.0	230.1	287.0	YES	256.4
GKSS	-40	28.10	50	25.0	21.900	0.00	207.6	492.0	230.1	287.5	YES	207.6
GKSS	-40	27.84	50	25.0	22.160	0.19	213.5	492.0	230.1	289.2	YES	213.5
GKSS	-40	28.14	50	25.0	21.860	0.25	254.6	492.0	230.1	287.2	YES	254.6
GKSS	-40	28.26	50	25.0	21.740	0.24	240.0	492.0	230.1	286.4	YES	240.0
GKSS	-40	29.37	50	25.0	20.630	0.41	309.2	492.0	230.1	279.0	NO	279.0
GKSS	-40	56.43	100	50.0	43.570	0.00	125.9	492.0	230.1	405.5	YES	125.9
GKSS	-40	56.39	100	50.0	43.610	0.00	128.9	492.0	230.1	405.7	YES	128.9
GKSS	-40	56.29	100	50.0	43.710	0.00	198.5	492.0	230.1	406.2	YES	198.5
GKSS	-40	54.58	100	50.0	45.420	0.00	212.0	492.0	230.1	414.0	YES	212.0
GKSS	-40	56.61	100	50.0	43.390	0.00	138.6	492.0	230.1	404.7	YES	138.6
GKSS	-40	56.75	100	50.0	43.250	0.00	187.7	492.0	230.1	404.0	YES	187.7

GKSS	-40	56.59	100	50.0	43.410	0.00	173.0	492.0	230.1	404.8	YES	173.0
GKSS	-40	56.48	100	50.0	43.520	0.00	179.5	492.0	230.1	405.3	YES	179.5
GKSS	-40	57.40	100	50.0	42.600	0.00	152.6	492.0	230.1	401.0	YES	152.6
GKSS	-40	56.44	100	50.0	43.560	0.00	153.6	492.0	230.1	405.5	YES	153.6
THA	-40	56.27	100	50.0	43.730	0.00	144.6	492.0	230.1	406.2	YES	144.6
THA	-40	56.17	100	50.0	43.830	0.00	150.7	492.0	230.1	406.7	YES	150.7
THA	-40	56.43	100	50.0	43.570	0.00	139.1	492.0	230.1	405.5	YES	139.1
THA	-40	56.26	100	50.0	43.740	0.00	183.6	492.0	230.1	406.3	YES	183.6
THA	-40	56.26	100	50.0	43.740	0.00	142.0	492.0	230.1	406.3	YES	142.0
THA	-40	56.79	100	50.0	43.210	0.16	187.2	492.0	230.1	403.8	YES	187.2
THA	-40	56.58	100	50.0	43.420	0.12	172.2	492.0	230.1	404.8	YES	172.2
THA	-40	56.29	100	50.0	43.710	0.15	198.0	492.0	230.1	406.2	YES	198.0
THA	-40	56.57	100	50.0	43.430	0.00	130.4	492.0	230.1	404.8	YES	130.4
THA	-40	56.56	100	50.0	43.440	0.00	141.7	492.0	230.1	404.9	YES	141.7
THA	-40	56.67	100	50.0	43.330	0.00	134.5	492.0	230.1	404.4	YES	134.5
THA	-40	56.77	100	50.0	43.230	0.00	115.5	492.0	230.1	403.9	YES	115.5
THA	-40	57.53	100	50.0	42.470	0.00	91.7	492.0	230.1	400.4	YES	91.7
THA	-40	56.44	100	50.0	43.560	0.00	141.1	492.0	230.1	405.5	YES	141.1
THA	-40	56.40	100	50.0	43.600	0.21	239.1	492.0	230.1	405.6	YES	239.1
THA	-40	56.45	100	50.0	43.550	0.23	243.4	492.0	230.1	405.4	YES	243.4
THA	-40	56.33	100	50.0	43.670	0.14	191.9	492.0	230.1	406.0	YES	191.9
THA	-40	56.78	100	50.0	43.220	0.00	146.8	492.0	230.1	403.9	YES	146.8
THA	-40	56.42	100	50.0	43.580	0.00	161.4	492.0	230.1	405.5	YES	161.4
THA	-40	56.67	100	50.0	43.330	0.00	142.3	492.0	230.1	404.4	YES	142.3
CISE	-20	14.20	25	12.5	10.800	0.00	128.7	481.3	228.8	199.1	YES	128.7
CISE	-20	13.93	25	12.5	11.070	0.00	146.9	481.3	228.8	201.6	YES	146.9
CISE	-20	13.63	25	12.5	11.370	0.74	402.8	481.3	228.8	204.3	NO	204.3
CISE	-20	14.29	25	12.5	10.710	1.05	409.4	481.3	228.8	198.3	NO	198.3
CISE	-20	14.64	25	12.5	10.360	2.38	530.5	481.3	228.8	195.0	NO	195.0
CISE	-20	14.34	25	12.5	10.660	2.64	532.2	481.3	228.8	197.8	NO	197.8
CISE	-20	14.58	25	12.5	10.420	2.46	534.6	481.3	228.8	195.6	NO	195.6
CISE	-20	14.51	25	12.5	10.490	2.58	536.1	481.3	228.8	196.2	NO	196.2
CISE	-20	14.75	25	12.5	10.250	2.17	536.1	481.3	228.8	194.0	NO	194.0
CISE	-20	14.29	25	12.5	10.710	2.78	536.6	481.3	228.8	198.3	NO	198.3
CISE	-20	13.97	25	12.5	11.030	2.62	538.6	481.3	228.8	201.2	NO	201.2
CISE	-20	14.01	25	12.5	10.990	2.40	540.5	481.3	228.8	200.9	NO	200.9
CISE	-20	14.58	25	12.5	10.420	2.77	543.8	481.3	228.8	195.6	NO	195.6
CISE	-20	14.36	25	12.5	10.640	2.58	549.2	481.3	228.8	197.6	NO	197.6
CISE	-20	13.89	25	12.5	11.110	2.48	553.7	481.3	228.8	201.9	NO	201.9
CISE	-20	13.83	25	12.5	11.170	2.47	556.1	481.3	228.8	202.5	NO	202.5
CISE	-20	14.31	25	12.5	10.690	2.51	556.3	481.3	228.8	198.1	NO	198.1
CISE	-20	14.31	25	12.5	10.690	2.51	560.6	481.3	228.8	198.1	NO	198.1
CISE	-20	14.03	25	12.5	10.970	2.83	565.8	481.3	228.8	200.7	NO	200.7
CISE	-20	14.13	25	12.5	10.870	2.43	570.1	481.3	228.8	199.8	NO	199.8
CISE	-20	13.94	25	12.5	11.060	2.63	571.1	481.3	228.8	201.5	NO	201.5
GKSS	-20	14.04	25	12.5	10.960	0.00	233.1	481.3	228.8	200.6	NO	200.6
GKSS	-20	14.04	25	12.5	10.960	0.74	389.8	481.3	228.8	200.6	NO	200.6
GKSS	-20	14.12	25	12.5	10.880	1.31	487.9	481.3	228.8	199.8	NO	199.8
GKSS	-20	14.30	25	12.5	10.700	1.07	438.3	481.3	228.8	198.2	NO	198.2
GKSS	-20	14.18	25	12.5	10.820	2.76	571.4	481.3	228.8	199.3	NO	199.3
GKSS	-20	14.47	25	12.5	10.530	2.41	560.7	481.3	228.8	196.6	NO	196.6
GKSS	-20	14.25	25	12.5	10.750	2.71	561.1	481.3	228.8	198.6	NO	198.6
GKSS	-20	14.03	25	12.5	10.970	2.83	575.1	481.3	228.8	200.7	NO	200.7
GKSS	-20	14.64	25	12.5	10.360	2.64	557.5	481.3	228.8	195.0	NO	195.0
GKSS	-20	14.26	25	12.5	10.740	2.65	572.5	481.3	228.8	198.6	NO	198.6
GKSS	-20	27.87	50	25.0	22.130	0.00	202.5	481.3	228.8	285.0	YES	202.5
GKSS	-20	28.00	50	25.0	22.000	0.00	194.7	481.3	228.8	284.2	YES	194.7
GKSS	-20	27.61	50	25.0	22.390	0.00	262.8	481.3	228.8	286.7	YES	262.8
GKSS	-20	28.02	50	25.0	21.980	0.00	187.9	481.3	228.8	284.0	YES	187.9
GKSS	-20	28.15	50	25.0	21.850	0.31	275.8	481.3	228.8	283.2	YES	275.8
GKSS	-20	28.12	50	25.0	21.880	0.21	261.8	481.3	228.8	283.4	YES	261.8
GKSS	-20	28.15	50	25.0	21.850	0.68	371.0	481.3	228.8	283.2	NO	283.2
GKSS	-20	28.17	50	25.0	21.830	0.65	369.1	481.3	228.8	283.1	NO	283.1
GKSS	-20	28.02	50	25.0	21.980	1.13	462.1	481.3	228.8	284.0	NO	284.0
GKSS	-20	28.00	50	25.0	22.000	0.47	319.7	481.3	228.8	284.2	NO	284.2
VTT	-20	28.03	50	25.0	21.970	1.80	583.1	481.3	228.8	284.0	NO	284.0
VTT	-20	28.62	50	25.0	21.380	0.18	231.9	481.3	228.8	280.1	YES	231.9
VTT	-20	28.74	50	25.0	21.260	0.77	382.0	481.3	228.8	279.4	NO	279.4
VTT	-20	28.60	50	25.0	21.400	0.35	295.9	481.3	228.8	280.3	NO	280.3
VTT	-20	28.74	50	25.0	21.260	2.14	576.4	481.3	228.8	279.4	NO	279.4
VTT	-20	28.86	50	25.0	21.140	0.89	411.7	481.3	228.8	278.6	NO	278.6
VTT	-20	28.35	50	25.0	21.650	0.30	306.4	481.3	228.8	281.9	NO	281.9
VTT	-20	28.74	50	25.0	21.260	0.46	324.7	481.3	228.8	279.4	NO	279.4
VTT	-20	27.98	50	25.0	22.020	0.31	282.5	481.3	228.8	284.3	YES	282.5
VTT	-20	28.64	50	25.0	21.360	0.23	247.2	481.3	228.8	280.0	YES	247.2
VTT	-20	28.68	50	25.0	21.320	0.16	233.2	481.3	228.8	279.7	YES	233.2
VTT	-20	28.15	50	25.0	21.850	0.47	317.5	481.3	228.8	283.2	NO	283.2
VTT	-20	27.27	50	25.0	22.730	1.54	515.6	481.3	228.8	288.9	NO	288.9
VTT	-20	29.06	50	25.0	20.940	0.26	263.2	481.3	228.8	277.2	YES	263.2
VTT	-20	27.09	50	25.0	22.910	0.05	184.4	481.3	228.8	290.0	YES	184.4
VTT	-20	28.07	50	25.0	21.930	0.38	286.9	481.3	228.8	283.7	NO	283.7
VTT	-20	28.52	50	25.0	21.480	0.62	341.4	481.3	228.8	280.8	NO	280.8
VTT	-20	28.51	50	25.0	21.490	0.79	415.0	481.3	228.8	280.9	NO	280.9
VTT	-20	28.51	50	25.0	21.490	0.44	327.9	481.3	228.8	280.9	NO	280.9
VTT	-20	28.56	50	25.0	21.440	0.06	170.9	481.3	228.8	280.5	YES	170.9
VTT	-20	28.19	50	25.0	21.810	0.46	308.8	481.3	228.8	282.9	NO	282.9
VTT	-20	29.30	50	25.0	20.700	0.64	376.5	481.3	228.8	275.7	NO	275.7
VTT	-20	28.22	50	25.0	21.780	0.16	228.2	481.3	228.8	282.8	YES	228.2

VTT	-20	28.33	50	25.0	21.670	0.81	371.7	481.3	228.8	282.0	NO	282.0
VTT	-20	28.51	50	25.0	21.490	0.37	291.6	481.3	228.8	280.9	NO	280.9
VTT	-20	28.37	50	25.0	21.630	0.50	337.7	481.3	228.8	281.8	NO	281.8
VTT	-20	28.42	50	25.0	21.580	0.82	390.5	481.3	228.8	281.4	NO	281.4
VTT	-20	28.54	50	25.0	21.460	0.12	227.3	481.3	228.8	280.7	YES	227.3
VTT	-20	28.13	50	25.0	21.870	0.13	201.3	481.3	228.8	283.3	YES	201.3
VTT	-20	27.90	50	25.0	22.100	0.15	212.5	481.3	228.8	284.8	YES	212.5
VTT	-20	32.08	50	25.0	17.920	0.36	288.4	481.3	228.8	256.5	NO	256.5
VTT	-20	27.90	50	25.0	22.100	1.62	479.1	481.3	228.8	284.8	NO	284.8
VTT	-20	28.29	50	25.0	21.710	0.95	377.9	481.3	228.8	282.3	NO	282.3
VTT	-20	28.84	50	25.0	21.160	0.35	269.6	481.3	228.8	287.7	YES	269.6
VTT	-20	29.33	50	25.0	20.670	0.09	184.4	481.3	228.8	275.5	YES	184.4
VTT	-20	29.42	50	25.0	20.580	0.25	241.6	481.3	228.8	274.9	YES	241.6
VTT	-20	29.37	50	25.0	20.630	0.00	146.4	481.3	228.8	275.2	YES	146.4
VTT	-20	28.64	50	25.0	21.360	0.41	299.4	481.3	228.8	280.0	NO	280.0
VTT	-20	28.23	50	25.0	21.770	0.00	156.7	481.3	228.8	282.7	YES	156.7
VTT	-20	29.10	50	25.0	20.900	0.34	295.6	481.3	228.8	277.0	NO	277.0
CISE	-20	56.40	100	50.0	43.600	0.00	167.4	481.3	228.8	400.1	YES	167.4
CISE	-20	56.54	100	50.0	43.460	0.00	153.5	481.3	228.8	399.4	YES	153.5
CISE	-20	56.35	100	50.0	43.650	0.12	211.2	481.3	228.8	400.3	YES	211.2
CISE	-20	56.82	100	50.0	43.180	0.00	220.3	481.3	228.8	398.1	YES	220.3
CISE	-20	56.63	100	50.0	43.370	0.18	227.9	481.3	228.8	399.0	YES	227.9
CISE	-20	56.83	100	50.0	43.170	0.00	211.1	481.3	228.8	398.1	YES	211.1
CISE	-20	56.30	100	50.0	43.700	0.00	217.1	481.3	228.8	400.5	YES	217.1
CISE	-20	56.86	100	50.0	43.140	0.00	145.3	481.3	228.8	397.9	YES	145.3
CISE	-20	56.22	100	50.0	43.780	0.00	161.2	481.3	228.8	400.9	YES	161.2
CISE	-20	57.02	100	50.0	42.980	0.00	131.9	481.3	228.8	397.2	YES	131.9
CISE	-20	56.43	100	50.0	43.570	0.15	216.4	481.3	228.8	399.9	YES	216.4
CISE	-20	56.97	100	50.0	43.030	0.00	125.0	481.3	228.8	397.4	YES	125.0
CISE	-20	57.01	100	50.0	42.990	0.76	378.7	481.3	228.8	397.2	YES	378.7
CISE	-20	56.88	100	50.0	43.120	0.25	246.1	481.3	228.8	397.8	YES	246.1
CISE	-20	56.40	100	50.0	43.600	0.21	250.9	481.3	228.8	400.1	YES	250.9
CISE	-20	56.48	100	50.0	43.520	0.27	251.5	481.3	228.8	399.7	YES	251.5
CISE	-20	56.94	100	50.0	43.060	0.37	284.0	481.3	228.8	397.6	YES	284.0
CISE	-20	56.46	100	50.0	43.540	0.23	261.1	481.3	228.8	399.8	YES	261.1
CISE	-20	57.04	100	50.0	42.960	0.45	351.6	481.3	228.8	397.1	YES	351.6
CISE	-20	56.38	100	50.0	43.620	0.32	258.5	481.3	228.8	400.1	YES	258.5
GKSS	-20	56.19	100	50.0	43.810	0.00	201.3	481.3	228.8	401.0	YES	201.3
GKSS	-20	56.01	100	50.0	43.990	0.00	110.9	481.3	228.8	401.8	YES	110.9
GKSS	-20	56.65	100	50.0	43.350	0.00	197.7	481.3	228.8	398.9	YES	197.7
GKSS	-20	56.39	100	50.0	43.610	0.00	198.9	481.3	228.8	400.1	YES	198.9
GKSS	-20	56.30	100	50.0	43.700	0.00	200.6	481.3	228.8	400.5	YES	200.6
GKSS	-20	56.89	100	50.0	43.110	0.00	165.7	481.3	228.8	397.8	YES	165.7
GKSS	-20	56.12	100	50.0	43.880	0.37	280.1	481.3	228.8	401.3	YES	280.1
GKSS	-20	56.29	100	50.0	43.710	0.37	279.5	481.3	228.8	400.6	YES	279.5
GKSS	-20	56.04	100	50.0	43.960	0.29	257.6	481.3	228.8	401.7	YES	257.6
GKSS	-20	57.64	100	50.0	42.360	0.32	265.2	481.3	228.8	394.3	YES	265.2
GKSS	-20	113.67	200	100.0	86.330	0.00	156.7	481.3	228.8	562.9	YES	156.7
GKSS	-20	112.96	200	100.0	87.040	0.00	221.7	481.3	228.8	565.2	YES	221.7
GKSS	-20	112.18	200	100.0	87.820	0.00	193.9	481.3	228.8	567.8	YES	193.9
GKSS	-20	110.04	200	100.0	89.960	0.00	191.7	481.3	228.8	574.6	YES	191.7
GKSS	-20	113.10	200	100.0	86.900	0.00	184.4	481.3	228.8	564.8	YES	184.4
NE	-20	112.21	200	100.0	87.790	0.11	186.7	481.3	228.8	567.7	YES	186.7
NE	-20	112.21	200	100.0	87.790	0.11	184.4	481.3	228.8	567.7	YES	184.4
NE	-20	110.84	200	100.0	89.160	0.11	193.9	481.3	228.8	572.1	YES	193.9
NE	-20	111.83	200	100.0	88.170	0.14	204.4	481.3	228.8	568.9	YES	204.4
NE	-20	111.89	200	100.0	88.110	0.16	224.0	481.3	228.8	568.7	YES	224.0
NE	-20	111.52	200	100.0	88.480	0.09	153.4	481.3	228.8	569.9	YES	153.4
NE	-20	112.52	200	100.0	87.480	0.16	222.6	481.3	228.8	566.7	YES	222.6
NE	-20	112.36	200	100.0	87.640	0.10	162.0	481.3	228.8	567.2	YES	162.0
NE	-20	112.39	200	100.0	87.610	0.11	187.8	481.3	228.8	567.1	YES	187.8
NE	-20	111.64	200	100.0	88.360	0.12	198.2	481.3	228.8	569.5	YES	198.2
SCK-CEN	-10	28.39	50	25.0	21.610	3.23	656.0	477.0	228.1	280.0	NO	280.0
SCK-CEN	-10	28.20	50	25.0	21.800	0.81	397.8	477.0	228.1	281.2	NO	281.2
SCK-CEN	-10	27.99	50	25.0	22.010	4.21	718.1	477.0	228.1	282.6	NO	282.6
SCK-CEN	-10	27.77	50	25.0	22.230	2.68	601.6	477.0	228.1	284.0	NO	284.0
SCK-CEN	-10	28.25	50	25.0	21.750	1.52	505.3	477.0	228.1	280.9	NO	280.9
GKSS	0	14.21	25	12.5	10.790	2.51	541.9	473.3	227.5	196.8	NO	196.8
GKSS	0	14.55	25	12.5	10.450	2.45	547.0	473.3	227.5	193.7	NO	193.7
GKSS	0	14.63	25	12.5	10.370	2.44	538.7	473.3	227.5	192.9	NO	192.9
GKSS	0	14.22	25	12.5	10.780	2.47	540.0	473.3	227.5	196.7	NO	196.7
GKSS	0	14.29	25	12.5	10.710	2.55	544.8	473.3	227.5	196.1	NO	196.1
GKSS	0	14.44	25	12.5	10.560	2.49	534.8	473.3	227.5	194.7	NO	194.7
GKSS	0	14.26	25	12.5	10.740	2.53	557.2	473.3	227.5	196.3	NO	196.3
GKSS	0	14.31	25	12.5	10.690	2.51	545.0	473.3	227.5	195.9	NO	195.9
GKSS	0	14.38	25	12.5	10.620	2.56	546.1	473.3	227.5	195.2	NO	195.2
GKSS	0	14.59	25	12.5	10.410	2.53	549.2	473.3	227.5	193.3	NO	193.3
SCK-CEN	0	14.03	25	12.5	10.970	1.80	565.1	473.3	227.5	198.4	NO	198.4
SCK-CEN	0	13.96	25	12.5	11.040	2.57	571.6	473.3	227.5	199.1	NO	199.1
SCK-CEN	0	14.06	25	12.5	10.940	2.65	553.4	473.3	227.5	198.2	NO	198.2
SCK-CEN	0	14.12	25	12.5	10.880	0.28	293.2	473.3	227.5	197.6	NO	197.6
SCK-CEN	0	13.72	25	12.5	11.280	2.34	544.1	473.3	227.5	201.2	NO	201.2
SCK-CEN	0	13.85	25	12.5	11.150	2.49	552.2	473.3	227.5	200.0	NO	200.0
SCK-CEN	0	14.14	25	12.5	10.860	2.18	558.0	473.3	227.5	197.4	NO	197.4
SCK-CEN	0	13.90	25	12.5	11.100	2.53	553.5	473.3	227.5	199.6	NO	199.6
SCK-CEN	0	13.47	25	12.5	11.530	2.56	557.6	473.3	227.5	203.4	NO	203.4
SCK-CEN	0	13.94	25	12.5	11.060	2.25	552.4	473.3	227.5	199.2	NO	199.2
SCK-CEN	0	13.80	25	12.5	11.200	2.34	555.6	473.3	227.5	200.5	NO	200.5

SCK-CEN	0	13.59	25	12.5	11.410	2.42	558.2	473.3	227.5	202.4	NO	202.4
SCK-CEN	0	14.17	25	12.5	10.830	2.36	550.6	473.3	227.5	197.2	NO	197.2
SCK-CEN	0	13.20	25	12.5	11.800	1.88	560.8	473.3	227.5	205.8	NO	205.8
SCK-CEN	0	13.23	25	12.5	11.770	2.59	569.6	473.3	227.5	205.5	NO	205.5
SCK-CEN	0	13.59	25	12.5	11.410	2.57	552.5	473.3	227.5	202.4	NO	202.4
SCK-CEN	0	13.47	25	12.5	11.530	2.54	578.5	473.3	227.5	203.4	NO	203.4
SCK-CEN	0	13.27	25	12.5	11.730	2.61	556.0	473.3	227.5	205.2	NO	205.2
SCK-CEN	0	13.60	25	12.5	11.400	2.61	543.8	473.3	227.5	202.3	NO	202.3
SCK-CEN	0	13.68	25	12.5	11.320	2.49	556.3	473.3	227.5	201.6	NO	201.6
GKSS	0	27.78	50	25.0	22.220	0.56	327.6	473.3	227.5	282.4	NO	282.4
GKSS	0	27.57	50	25.0	22.430	4.68	681.4	473.3	227.5	283.7	NO	283.7
GKSS	0	27.38	50	25.0	22.620	4.89	700.8	473.3	227.5	284.9	NO	284.9
GKSS	0	27.71	50	25.0	22.290	4.59	698.2	473.3	227.5	282.8	NO	282.8
GKSS	0	27.46	50	25.0	22.540	4.75	708.4	473.3	227.5	284.4	NO	284.4
GKSS	0	27.39	50	25.0	22.610	4.84	701.5	473.3	227.5	284.9	NO	284.9
GKSS	0	28.22	50	25.0	21.780	4.67	724.9	473.3	227.5	279.6	NO	279.6
GKSS	0	27.55	50	25.0	22.450	4.68	717.4	473.3	227.5	283.9	NO	283.9
GKSS	0	27.25	50	25.0	22.750	5.13	705.8	473.3	227.5	285.7	NO	285.7
GKSS	0	27.69	50	25.0	22.310	5.08	709.5	473.3	227.5	283.0	NO	283.0
SCK-CEN	0	28.62	50	25.0	21.380	4.56	716.7	473.3	227.5	277.0	NO	277.0
SCK-CEN	0	28.67	50	25.0	21.330	4.42	714.1	473.3	227.5	276.7	NO	276.7
SCK-CEN	0	28.63	50	25.0	21.370	3.68	658.5	473.3	227.5	276.9	NO	276.9
SCK-CEN	0	28.49	50	25.0	21.510	4.89	747.5	473.3	227.5	277.9	NO	277.9
SCK-CEN	0	28.63	50	25.0	21.370	4.22	709.0	473.3	227.5	276.9	NO	276.9
SCK-CEN	0	28.43	50	25.0	21.570	4.70	719.2	473.3	227.5	278.2	NO	278.2
SCK-CEN	0	28.46	50	25.0	21.540	1.31	444.5	473.3	227.5	278.0	NO	278.0
SCK-CEN	0	28.79	50	25.0	21.210	4.57	699.8	473.3	227.5	275.9	NO	275.9
SCK-CEN	0	28.53	50	25.0	21.470	4.73	704.0	473.3	227.5	277.6	NO	277.6
SCK-CEN	0	28.44	50	25.0	21.560	4.18	729.5	473.3	227.5	278.2	NO	278.2
SCK-CEN	0	28.57	50	25.0	21.430	4.46	714.0	473.3	227.5	277.3	NO	277.3
VTT	0	28.11	50	25.0	21.890	4.85	725.6	473.3	227.5	280.3	NO	280.3
VTT	0	28.85	50	25.0	21.150	4.56	730.2	473.3	227.5	275.5	NO	275.5
VTT	0	28.11	50	25.0	21.890	5.10	737.8	473.3	227.5	280.3	NO	280.3
VTT	0	28.90	50	25.0	21.100	3.05	590.7	473.3	227.5	275.2	NO	275.2
VTT	0	28.46	50	25.0	21.540	4.94	730.3	473.3	227.5	278.0	NO	278.0
VTT	0	28.39	50	25.0	21.610	4.95	741.8	473.3	227.5	278.5	NO	278.5
VTT	0	28.21	50	25.0	21.790	5.01	744.2	473.3	227.5	279.7	NO	279.7
VTT	0	30.11	50	25.0	19.890	2.11	527.7	473.3	227.5	267.2	NO	267.2
VTT	0	28.18	50	25.0	21.820	2.67	620.4	473.3	227.5	279.8	NO	279.8
VTT	0	28.37	50	25.0	21.630	4.54	727.0	473.3	227.5	278.6	NO	278.6
VTT	0	28.42	50	25.0	21.580	4.46	730.3	473.3	227.5	278.3	NO	278.3
VTT	0	28.16	50	25.0	21.840	2.29	542.6	473.3	227.5	280.0	NO	280.0
VTT	0	29.04	50	25.0	20.960	4.78	726.7	473.3	227.5	274.3	NO	274.3
VTT	0	28.77	50	25.0	21.230	4.44	718.7	473.3	227.5	276.0	NO	276.0
VTT	0	28.36	50	25.0	21.640	5.09	717.1	473.3	227.5	278.7	NO	278.7
VTT	0	28.46	50	25.0	21.540	4.36	721.2	473.3	227.5	278.0	NO	278.0
VTT	0	28.30	50	25.0	21.700	4.87	725.3	473.3	227.5	279.1	NO	279.1
VTT	0	28.38	50	25.0	21.620	4.47	727.9	473.3	227.5	278.6	NO	278.6
VTT	0	28.25	50	25.0	21.750	4.75	727.0	473.3	227.5	279.4	NO	279.4
VTT	0	28.75	50	25.0	21.250	4.36	718.5	473.3	227.5	276.2	NO	276.2
GKSS	0	56.36	100	50.0	43.640	0.10	191.3	473.3	227.5	395.8	YES	191.3
GKSS	0	57.61	100	50.0	42.390	0.28	269.2	473.3	227.5	390.1	YES	269.2
GKSS	0	56.51	100	50.0	43.490	0.38	281.2	473.3	227.5	395.1	YES	281.2
GKSS	0	56.08	100	50.0	43.920	0.29	242.5	473.3	227.5	397.0	YES	242.5
GKSS	0	56.31	100	50.0	43.690	0.53	318.3	473.3	227.5	396.0	YES	318.3
GKSS	0	56.44	100	50.0	43.560	1.33	476.2	473.3	227.5	395.4	NO	395.4
GKSS	0	56.20	100	50.0	43.800	1.65	511.7	473.3	227.5	396.5	NO	396.5
GKSS	0	56.54	100	50.0	43.460	2.74	621.3	473.3	227.5	394.9	NO	394.9
GKSS	0	56.25	100	50.0	43.750	1.85	531.3	473.3	227.5	396.3	NO	396.3
GKSS	0	56.04	100	50.0	43.960	0.30	266.6	473.3	227.5	397.2	YES	266.6
GKSS	0	56.49	100	50.0	43.510	2.50	599.3	473.3	227.5	395.2	NO	395.2
GKSS	0	56.42	100	50.0	43.580	0.78	362.9	473.3	227.5	395.5	YES	362.9
GKSS	0	56.67	100	50.0	43.330	0.60	331.8	473.3	227.5	394.4	YES	331.8
GKSS	0	56.76	100	50.0	43.240	0.18	227.1	473.3	227.5	393.9	YES	227.1
GKSS	0	56.21	100	50.0	43.790	0.54	309.5	473.3	227.5	396.4	YES	309.5
GKSS	0	56.43	100	50.0	43.570	3.05	628.6	473.3	227.5	395.4	NO	395.4
GKSS	0	56.65	100	50.0	43.350	0.00	210.9	473.3	227.5	394.4	YES	210.9
GKSS	0	56.54	100	50.0	43.460	0.90	410.7	473.3	227.5	394.9	NO	394.9
GKSS	0	56.40	100	50.0	43.600	0.00	211.4	473.3	227.5	395.6	YES	211.4
GKSS	0	56.78	100	50.0	43.220	5.09	778.3	473.3	227.5	393.9	NO	393.9
GKSS	0	56.75	100	50.0	43.250	0.00	263.4	473.3	227.5	394.0	YES	263.4
GKSS	0	56.91	100	50.0	43.090	3.73	682.2	473.3	227.5	393.3	NO	393.3
GKSS	0	56.43	100	50.0	43.570	0.83	386.7	473.3	227.5	395.4	YES	386.7
GKSS	0	57.03	100	50.0	42.970	0.78	376.2	473.3	227.5	392.7	YES	376.2
GKSS	0	56.65	100	50.0	43.350	3.05	642.5	473.3	227.5	394.4	NO	394.4
GKSS	0	56.41	100	50.0	43.590	0.37	306.7	473.3	227.5	395.5	YES	306.7
GKSS	0	56.57	100	50.0	43.430	4.84	758.4	473.3	227.5	394.8	NO	394.8
GKSS	0	56.78	100	50.0	43.220	5.61	797.9	473.3	227.5	393.9	NO	393.9
GKSS	0	56.31	100	50.0	43.690	0.00	246.4	473.3	227.5	396.0	YES	246.4
GKSS	0	56.60	100	50.0	43.400	0.43	320.1	473.3	227.5	394.7	YES	320.1
CISE	0	111.79	200	100.0	88.210	0.22	233.3	473.3	227.5	562.7	YES	233.3
CISE	0	112.47	200	100.0	87.530	0.22	238.2	473.3	227.5	560.5	YES	238.2
CISE	0	112.08	200	100.0	87.920	0.21	208.3	473.3	227.5	561.7	YES	208.3
CISE	0	112.01	200	100.0	87.990	1.01	421.7	473.3	227.5	562.0	YES	421.7
CISE	0	112.75	200	100.0	87.250	0.14	226.7	473.3	227.5	559.6	YES	226.7
CISE	0	112.32	200	100.0	87.680	0.29	267.0	473.3	227.5	561.0	YES	267.0
CISE	0	111.95	200	100.0	88.050	0.00	163.0	473.3	227.5	562.2	YES	163.0
CISE	0	112.11	200	100.0	87.890	0.07	165.8	473.3	227.5	561.6	YES	165.8

CISE	0	111.68	200	100.0	88.320	0.36	285.9	473.3	227.5	563.0	YES	285.9
CISE	0	112.71	200	100.0	87.290	0.68	342.0	473.3	227.5	559.7	YES	342.0
GKSS	0	113.15	200	100.0	86.850	0.48	314.9	473.3	227.5	558.3	YES	314.9
GKSS	0	113.65	200	100.0	86.350	0.41	307.6	473.3	227.5	556.7	YES	307.6
GKSS	0	111.81	200	100.0	88.190	0.81	383.0	473.3	227.5	562.6	YES	383.0
GKSS	0	113.63	200	100.0	86.370	0.57	332.6	473.3	227.5	556.8	YES	332.6
GKSS	0	112.54	200	100.0	87.460	0.00	223.6	473.3	227.5	560.3	YES	223.6
GKSS	0	111.92	200	100.0	88.080	1.16	442.2	473.3	227.5	562.2	YES	442.2

3. Application of the multi-temperature approach for the calculation of the reference temperature

T limits

Specimen code	T (°C)	$K_{Jc[calc]}$ (MPa√m)	$K_{Jc(1T)}$ (MPa√m)	δ_i	n_i	1° member	2° member
GKSS	-154	54.8	49.1	0	0.000	0.0000	0.0000
GKSS	-154	49.8	44.9	0	0.000	0.0000	0.0000
GKSS	-154	37.8	34.9	0	0.000	0.0000	0.0000
GKSS	-154	33.0	30.9	0	0.000	0.0000	0.0000
GKSS	-154	38.9	35.8	0	0.000	0.0000	0.0000
GKSS	-154	24.2	23.6	0	0.000	0.0000	0.0000
GKSS	-154	47.4	43.0	0	0.000	0.0000	0.0000
GKSS	-154	46.5	42.2	0	0.000	0.0000	0.0000
GKSS	-154	31.4	29.6	0	0.000	0.0000	0.0000
GKSS	-154	39.2	36.0	0	0.000	0.0000	0.0000
GKSS	-154	24.2	23.6	0	0.000	0.0000	0.0000
SIEMENS	-154	33.0	30.9	0	0.000	0.0000	0.0000
SIEMENS	-154	41.0	37.6	0	0.000	0.0000	0.0000
SIEMENS	-154	31.7	29.8	0	0.000	0.0000	0.0000
SIEMENS	-154	35.2	32.7	0	0.000	0.0000	0.0000
SIEMENS	-154	44.4	40.5	0	0.000	0.0000	0.0000
SIEMENS	-154	41.5	38.0	0	0.000	0.0000	0.0000
SIEMENS	-154	32.7	30.7	0	0.000	0.0000	0.0000
SIEMENS	-154	34.3	32.0	0	0.000	0.0000	0.0000
SIEMENS	-154	36.7	34.0	0	0.000	0.0000	0.0000
SIEMENS	-154	39.7	36.5	0	0.000	0.0000	0.0000
SIEMENS	-154	46.1	41.8	0	0.000	0.0000	0.0000
SIEMENS	-154	34.6	32.2	0	0.000	0.0000	0.0000
SIEMENS	-154	35.8	33.2	0	0.000	0.0000	0.0000
SIEMENS	-154	29.3	27.8	0	0.000	0.0000	0.0000
SIEMENS	-154	28.6	27.2	0	0.000	0.0000	0.0000
SIEMENS	-154	38.6	35.6	0	0.000	0.0000	0.0000
SIEMENS	-154	44.4	40.5	0	0.000	0.0000	0.0000
SIEMENS	-154	48.9	44.2	0	0.000	0.0000	0.0000
SIEMENS	-154	38.9	35.8	0	0.000	0.0000	0.0000
SIEMENS	-154	36.7	34.0	0	0.000	0.0000	0.0000
SIEMENS	-154	31.7	29.8	0	0.000	0.0000	0.0000
GKSS	-154	41.5	41.4	0	0.000	0.0000	0.0000
GKSS	-154	42.2	42.2	0	0.000	0.0000	0.0000
GKSS	-154	50.0	49.9	0	0.000	0.0000	0.0000
GKSS	-154	34.0	33.9	0	0.000	0.0000	0.0000
GKSS	-154	41.7	41.7	0	0.000	0.0000	0.0000
GKSS	-154	46.1	46.0	0	0.000	0.0000	0.0000
GKSS	-154	44.2	44.1	0	0.000	0.0000	0.0000
GKSS	-154	36.7	36.6	0	0.000	0.0000	0.0000
GKSS	-154	29.0	28.9	0	0.000	0.0000	0.0000
GKSS	-154	53.0	52.9	0	0.000	0.0000	0.0000
GKSS	-154	39.4	39.3	0	0.000	0.0000	0.0000
GKSS	-154	29.0	28.9	0	0.000	0.0000	0.0000
SIEMENS	-154	34.6	34.5	0	0.000	0.0000	0.0000
SIEMENS	-154	33.0	33.0	0	0.000	0.0000	0.0000
SIEMENS	-154	38.1	38.0	0	0.000	0.0000	0.0000
SIEMENS	-154	28.6	28.6	0	0.000	0.0000	0.0000
SIEMENS	-154	28.6	28.6	0	0.000	0.0000	0.0000
SIEMENS	-154	38.6	38.5	0	0.000	0.0000	0.0000
SIEMENS	-154	36.4	36.3	0	0.000	0.0000	0.0000
SIEMENS	-154	33.4	33.3	0	0.000	0.0000	0.0000
SIEMENS	-154	36.9	36.9	0	0.000	0.0000	0.0000
SIEMENS	-154	31.1	31.0	0	0.000	0.0000	0.0000
SIEMENS	-154	34.3	34.2	0	0.000	0.0000	0.0000
SIEMENS	-154	30.4	30.4	0	0.000	0.0000	0.0000
SIEMENS	-154	49.6	49.5	0	0.000	0.0000	0.0000
SIEMENS	-154	41.0	40.9	0	0.000	0.0000	0.0000
SIEMENS	-154	34.0	33.9	0	0.000	0.0000	0.0000
SIEMENS	-154	30.7	30.7	0	0.000	0.0000	0.0000
SIEMENS	-154	41.2	41.2	0	0.000	0.0000	0.0000
SIEMENS	-154	26.7	26.7	0	0.000	0.0000	0.0000
SIEMENS	-154	35.5	35.4	0	0.000	0.0000	0.0000
SIEMENS	-154	33.4	33.3	0	0.000	0.0000	0.0000
SIEMENS	-154	36.7	36.6	0	0.000	0.0000	0.0000
SIEMENS	-154	32.4	32.4	0	0.000	0.0000	0.0000
SIEMENS	-154	45.1	45.0	0	0.000	0.0000	0.0000
SIEMENS	-154	33.4	33.3	0	0.000	0.0000	0.0000
SIEMENS	-154	34.0	33.9	0	0.000	0.0000	0.0000
SIEMENS	-154	30.7	30.7	0	0.000	0.0000	0.0000
SIEMENS	-154	26.7	26.7	0	0.000	0.0000	0.0000
GKSS	-154	33.7	36.2	0	0.000	0.0000	0.0000

USE LIMITS : YES

-136

-36

Sum of 1° member: 3.645

Sum of 2° member: 3.645

Difference: 0.000

$T_o = -86.4$ °C
(valid per ASTM E1921)

$\sum_i n_i = 51.36$

N = 698
r = 316

$K_{min} = 20$ MPa√m

$K_{o,eq} = 143.0$ MPa√m

$K_{med,eq} = 132.2$ MPa√m

GKSS	-154	42.7	46.9	0	0.000	0.0000	0.0000
GKSS	-154	37.2	40.4	0	0.000	0.0000	0.0000
GKSS	-154	54.4	60.8	0	0.000	0.0000	0.0000
GKSS	-154	34.6	37.3	0	0.000	0.0000	0.0000
GKSS	-154	44.2	48.7	0	0.000	0.0000	0.0000
GKSS	-154	29.7	31.5	0	0.000	0.0000	0.0000
GKSS	-154	36.4	39.4	0	0.000	0.0000	0.0000
GKSS	-154	36.4	39.4	0	0.000	0.0000	0.0000
GKSS	-154	28.2	29.8	0	0.000	0.0000	0.0000
GKSS	-154	28.2	29.8	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
NE	-154	36.4	39.4	0	0.000	0.0000	0.0000
NE	-154	37.5	40.7	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
NE	-154	30.7	32.7	0	0.000	0.0000	0.0000
NE	-154	30.4	32.3	0	0.000	0.0000	0.0000
NE	-154	30.7	32.7	0	0.000	0.0000	0.0000
NE	-154	31.7	33.9	0	0.000	0.0000	0.0000
NE	-154	41.7	45.8	0	0.000	0.0000	0.0000
NE	-154	37.2	40.4	0	0.000	0.0000	0.0000
NE	-154	34.9	37.6	0	0.000	0.0000	0.0000
NE	-154	38.3	41.7	0	0.000	0.0000	0.0000
NE	-154	31.4	33.5	0	0.000	0.0000	0.0000
NE	-154	33.7	36.2	0	0.000	0.0000	0.0000
NE	-154	32.7	35.1	0	0.000	0.0000	0.0000
NE	-154	43.0	47.2	0	0.000	0.0000	0.0000
NE	-154	32.7	35.1	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
NE	-154	36.9	40.1	0	0.000	0.0000	0.0000
NE	-154	33.4	35.8	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
GKSS	-110	98.1	85.4	1	0.143	0.0106	0.0148
GKSS	-110	59.0	52.7	1	0.143	0.0106	0.0009
GKSS	-110	80.0	70.3	1	0.143	0.0106	0.0052
GKSS	-110	57.2	51.2	1	0.143	0.0106	0.0008
GKSS	-110	88.3	77.2	1	0.143	0.0106	0.0087
GKSS	-110	96.2	83.9	1	0.143	0.0106	0.0135
GKSS	-110	81.6	71.6	1	0.143	0.0106	0.0057
GKSS	-110	66.9	59.3	1	0.143	0.0106	0.0019
GKSS	-110	85.6	75.0	1	0.143	0.0106	0.0074
GKSS	-110	86.8	76.0	1	0.143	0.0106	0.0079
GKSS	-110	114.2	98.9	1	0.143	0.0106	0.0314
GKSS	-110	73.5	64.8	1	0.143	0.0106	0.0033
GKSS	-110	92.7	80.9	1	0.143	0.0106	0.0111
GKSS	-110	77.5	68.2	1	0.143	0.0106	0.0044
GKSS	-110	61.5	54.7	1	0.143	0.0106	0.0012
GKSS	-110	51.8	46.7	1	0.143	0.0106	0.0004
GKSS	-110	73.6	64.9	1	0.143	0.0106	0.0033
GKSS	-110	52.8	47.5	1	0.143	0.0106	0.0005
GKSS	-110	41.2	37.8	1	0.143	0.0106	0.0001
GKSS	-110	115.3	99.8	1	0.143	0.0106	0.0329
GKSS	-110	73.2	64.5	1	0.143	0.0106	0.0032
GKSS	-110	74.0	65.3	1	0.143	0.0106	0.0034
GKSS	-110	67.5	59.8	1	0.143	0.0106	0.0020
GKSS	-110	71.0	62.7	1	0.143	0.0106	0.0027
GKSS	-110	53.4	48.0	1	0.143	0.0106	0.0005
GKSS	-110	96.5	84.0	1	0.143	0.0106	0.0136
GKSS	-110	71.3	63.0	1	0.143	0.0106	0.0028
GKSS	-110	71.7	63.3	1	0.143	0.0106	0.0029
GKSS	-110	81.7	71.7	1	0.143	0.0106	0.0058
GKSS	-110	64.0	56.8	1	0.143	0.0106	0.0015
GKSS	-110	74.2	65.4	1	0.143	0.0106	0.0034
GKSS	-110	70.4	62.2	1	0.143	0.0106	0.0026
GKSS	-110	91.2	79.6	1	0.143	0.0106	0.0102
GKSS	-110	72.0	63.6	1	0.143	0.0106	0.0029
GKSS	-110	64.8	57.5	1	0.143	0.0106	0.0016
GKSS	-110	79.2	69.6	1	0.143	0.0106	0.0049
GKSS	-110	52.2	47.0	1	0.143	0.0106	0.0004
GKSS	-110	82.9	72.7	1	0.143	0.0106	0.0062
GKSS	-110	93.2	81.3	1	0.143	0.0106	0.0115
GKSS	-110	75.4	66.4	1	0.143	0.0106	0.0038
GKSS	-110	75.0	66.1	1	0.143	0.0106	0.0037
GKSS	-110	78.6	69.1	1	0.143	0.0106	0.0047
GKSS	-110	94.8	82.7	1	0.143	0.0106	0.0125
GKSS	-110	98.1	85.4	1	0.143	0.0106	0.0148
GKSS	-110	98.5	85.7	1	0.143	0.0106	0.0151
GKSS	-110	104.9	91.1	1	0.143	0.0106	0.0207
GKSS	-110	69.9	61.8	1	0.143	0.0106	0.0025
GKSS	-110	81.6	71.6	1	0.143	0.0106	0.0057
GKSS	-110	55.2	49.5	1	0.143	0.0106	0.0006
GKSS	-110	105.6	91.7	1	0.143	0.0106	0.0214
GKSS	-110	101.5	88.3	1	0.143	0.0106	0.0176
GKSS	-110	73.7	65.0	1	0.143	0.0106	0.0033
GKSS	-110	97.5	84.9	1	0.143	0.0106	0.0144
GKSS	-110	75.9	66.8	1	0.143	0.0106	0.0039
GKSS	-110	48.3	43.7	1	0.143	0.0106	0.0003
GKSS	-91	127.0	109.6	1	0.167	0.0112	0.0164
GKSS	-91	121.8	105.2	1	0.167	0.0112	0.0134

GKSS	-91	70.5	62.3	1	0.167	0.0112	0.0008
GKSS	-91	94.2	82.2	1	0.167	0.0112	0.0038
GKSS	-91	127.3	109.9	1	0.167	0.0112	0.0166
GKSS	-91	119.9	103.7	1	0.167	0.0112	0.0125
GKSS	-91	104.5	90.8	1	0.167	0.0112	0.0064
GKSS	-91	78.6	69.1	1	0.167	0.0112	0.0015
GKSS	-91	98.6	85.8	1	0.167	0.0112	0.0048
GKSS	-91	161.6	138.6	1	0.167	0.0112	0.0502
THA	-91	91.3	79.7	1	0.167	0.0112	0.0032
THA	-91	115.3	99.8	1	0.167	0.0112	0.0103
THA	-91	122.4	105.8	1	0.167	0.0112	0.0138
THA	-91	126.3	109.1	1	0.167	0.0112	0.0160
THA	-91	108.3	94.0	1	0.167	0.0112	0.0076
THA	-91	66.9	59.3	1	0.167	0.0112	0.0006
THA	-91	126.7	109.4	1	0.167	0.0112	0.0162
THA	-91	69.6	61.6	1	0.167	0.0112	0.0008
THA	-91	121.4	104.9	1	0.167	0.0112	0.0132
THA	-91	90.0	78.7	1	0.167	0.0112	0.0030
THA	-91	153.9	132.2	1	0.167	0.0112	0.0402
THA	-91	64.6	57.4	1	0.167	0.0112	0.0005
THA	-91	127.2	109.8	1	0.167	0.0112	0.0165
THA	-91	99.7	86.7	1	0.167	0.0112	0.0050
THA	-91	101.3	88.1	1	0.167	0.0112	0.0055
THA	-91	140.4	120.9	1	0.167	0.0112	0.0263
THA	-91	78.2	68.7	1	0.167	0.0112	0.0014
THA	-91	109.0	94.6	1	0.167	0.0112	0.0079
THA	-91	103.9	90.3	1	0.167	0.0112	0.0062
THA	-91	126.8	109.5	1	0.167	0.0112	0.0163
THA	-91	111.7	96.8	1	0.167	0.0112	0.0088
GKSS	-91	68.6	68.4	1	0.167	0.0112	0.0014
GKSS	-91	81.6	81.3	1	0.167	0.0112	0.0036
GKSS	-91	55.9	55.8	1	0.167	0.0112	0.0004
GKSS	-91	98.8	98.5	1	0.167	0.0112	0.0096
GKSS	-91	71.9	71.7	1	0.167	0.0112	0.0018
GKSS	-91	111.0	110.7	1	0.167	0.0112	0.0172
GKSS	-91	93.5	93.2	1	0.167	0.0112	0.0073
GKSS	-91	79.9	79.7	1	0.167	0.0112	0.0032
GKSS	-91	98.4	98.1	1	0.167	0.0112	0.0094
GKSS	-91	101.1	100.8	1	0.167	0.0112	0.0108
TWI	-91	79.6	79.4	1	0.167	0.0112	0.0032
TWI	-91	99.7	99.3	1	0.167	0.0112	0.0101
TWI	-91	108.1	107.7	1	0.167	0.0112	0.0150
TWI	-91	93.4	93.1	1	0.167	0.0112	0.0072
TWI	-91	62.0	61.8	1	0.167	0.0112	0.0008
TWI	-91	107.1	106.7	1	0.167	0.0112	0.0144
TWI	-91	145.3	144.8	1	0.167	0.0112	0.0616
TWI	-91	76.3	76.0	1	0.167	0.0112	0.0025
TWI	-91	126.5	126.1	1	0.167	0.0112	0.0322
TWI	-91	126.1	125.7	1	0.167	0.0112	0.0317
TWI	-91	128.5	128.0	1	0.167	0.0112	0.0346
TWI	-91	111.4	111.0	1	0.167	0.0112	0.0175
TWI	-91	130.4	130.0	1	0.167	0.0112	0.0372
TWI	-91	134.8	134.3	1	0.167	0.0112	0.0434
TWI	-91	157.3	156.7	1	0.167	0.0112	0.0888
TWI	-91	105.2	104.9	1	0.167	0.0112	0.0132
TWI	-91	109.8	109.4	1	0.167	0.0112	0.0163
TWI	-91	84.9	84.6	1	0.167	0.0112	0.0044
TWI	-91	62.8	62.7	1	0.167	0.0112	0.0008
TWI	-91	97.5	97.2	1	0.167	0.0112	0.0090
TWI	-91	80.2	79.9	1	0.167	0.0112	0.0033
TWI	-91	134.4	133.9	1	0.167	0.0112	0.0428
TWI	-91	65.1	65.0	1	0.167	0.0112	0.0010
TWI	-91	118.6	118.2	1	0.167	0.0112	0.0236
GKSS	-91	67.3	76.1	1	0.167	0.0112	0.0025
GKSS	-91	162.9	189.3	1	0.167	0.0112	0.2087
GKSS	-91	100.0	114.7	1	0.167	0.0112	0.0205
GKSS	-91	91.2	104.3	1	0.167	0.0112	0.0128
GKSS	-91	106.2	122.1	1	0.167	0.0112	0.0276
GKSS	-91	83.2	94.9	1	0.167	0.0112	0.0080
GKSS	-91	91.8	105.0	1	0.167	0.0112	0.0133
GKSS	-91	94.7	108.5	1	0.167	0.0112	0.0156
GKSS	-91	92.9	106.4	1	0.167	0.0112	0.0141
GKSS	-91	69.9	79.2	1	0.167	0.0112	0.0031
NE	-91	93.1	106.6	1	0.167	0.0112	0.0143
NE	-91	97.9	112.2	1	0.167	0.0112	0.0184
NE	-91	73.7	83.7	1	0.167	0.0112	0.0042
NE	-91	82.0	93.4	1	0.167	0.0112	0.0074
NE	-91	76.3	86.7	1	0.167	0.0112	0.0050
NE	-91	93.1	106.6	1	0.167	0.0112	0.0143
NE	-91	83.7	95.5	1	0.167	0.0112	0.0083
NE	-91	82.1	93.6	1	0.167	0.0112	0.0074
NE	-91	86.8	99.2	1	0.167	0.0112	0.0100
NE	-91	86.7	99.0	1	0.167	0.0112	0.0099
NE	-91	92.3	105.7	1	0.167	0.0112	0.0137
NE	-91	83.1	94.8	1	0.167	0.0112	0.0079
NE	-91	88.9	101.6	1	0.167	0.0112	0.0112
NE	-91	64.3	72.5	1	0.167	0.0112	0.0019
NE	-91	101.6	116.7	1	0.167	0.0112	0.0222

NE	-91	94.2	107.9	1	0.167	0.0112	0.0152
NE	-91	78.7	89.5	1	0.167	0.0112	0.0059
NE	-91	73.0	82.8	1	0.167	0.0112	0.0040
NE	-91	64.2	72.3	1	0.167	0.0112	0.0019
NE	-91	98.9	113.5	1	0.167	0.0112	0.0194
GKSS	-91	103.2	137.2	1	0.167	0.0112	0.0479
GKSS	-91	84.4	110.7	1	0.167	0.0112	0.0172
GKSS	-91	97.0	128.5	1	0.167	0.0112	0.0351
GKSS	-91	92.7	122.4	1	0.167	0.0112	0.0279
GKSS	-91	96.8	128.2	1	0.167	0.0112	0.0348
NE	-91	73.6	95.5	1	0.167	0.0112	0.0083
NE	-91	73.0	94.7	1	0.167	0.0112	0.0079
NE	-91	73.3	95.1	1	0.167	0.0112	0.0081
NE	-91	53.8	67.7	1	0.167	0.0112	0.0013
NE	-91	69.5	89.7	1	0.167	0.0112	0.0060
NE	-91	65.5	84.0	1	0.167	0.0112	0.0043
NE	-91	79.6	104.0	1	0.167	0.0112	0.0127
NE	-91	69.8	90.1	1	0.167	0.0112	0.0062
NE	-91	90.3	119.0	1	0.167	0.0112	0.0244
NE	-91	88.0	115.8	1	0.167	0.0112	0.0214
GKSS	-60	205.5	175.4	0	0.000	0.0000	0.0191
GKSS	-60	114.4	99.1	1	0.167	0.0120	0.0013
GKSS	-60	130.7	112.7	1	0.167	0.0120	0.0024
GKSS	-60	106.7	92.6	1	0.167	0.0120	0.0009
GKSS	-60	161.0	138.1	1	0.167	0.0120	0.0064
GKSS	-60	200.7	171.3	1	0.167	0.0120	0.0172
GKSS	-60	125.2	108.1	1	0.167	0.0120	0.0020
GKSS	-60	145.1	124.8	1	0.167	0.0120	0.0040
GKSS	-60	91.9	80.2	1	0.167	0.0120	0.0004
GKSS	-60	128.1	110.6	1	0.167	0.0120	0.0022
GKSS	-60	164.4	140.9	1	0.167	0.0120	0.0070
GKSS	-60	192.2	164.3	1	0.167	0.0120	0.0142
GKSS	-60	166.3	142.5	1	0.167	0.0120	0.0074
GKSS	-60	177.7	152.1	1	0.167	0.0120	0.0100
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0177
GKSS	-60	116.0	100.4	1	0.167	0.0120	0.0014
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0177
GKSS	-60	167.6	143.6	1	0.167	0.0120	0.0077
GKSS	-60	89.8	78.5	1	0.167	0.0120	0.0004
GKSS	-60	156.3	134.1	1	0.167	0.0120	0.0056
GKSS	-60	186.8	159.7	1	0.167	0.0120	0.0125
GKSS	-60	203.2	173.4	0	0.000	0.0000	0.0182
GKSS	-60	164.6	141.1	1	0.167	0.0120	0.0071
GKSS	-60	202.6	173.0	0	0.000	0.0000	0.0180
GKSS	-60	185.9	159.0	1	0.167	0.0120	0.0122
GKSS	-60	127.7	110.2	1	0.167	0.0120	0.0022
GKSS	-60	201.2	171.7	0	0.000	0.0000	0.0174
GKSS	-60	115.6	100.0	1	0.167	0.0120	0.0013
GKSS	-60	107.5	93.3	1	0.167	0.0120	0.0009
SIEMENS	-60	164.6	141.1	1	0.167	0.0120	0.0071
SIEMENS	-60	172.0	147.3	1	0.167	0.0120	0.0086
SIEMENS	-60	108.5	94.2	1	0.167	0.0120	0.0010
SIEMENS	-60	119.0	102.9	1	0.167	0.0120	0.0015
SIEMENS	-60	153.5	131.8	1	0.167	0.0120	0.0051
SIEMENS	-60	158.9	136.4	1	0.167	0.0120	0.0060
SIEMENS	-60	137.5	118.4	1	0.167	0.0120	0.0031
SIEMENS	-60	119.5	103.3	1	0.167	0.0120	0.0016
SIEMENS	-60	130.7	112.8	1	0.167	0.0120	0.0024
SIEMENS	-60	172.6	147.8	1	0.167	0.0120	0.0088
SIEMENS	-60	84.5	74.0	1	0.167	0.0120	0.0003
SIEMENS	-60	213.4	182.0	0	0.000	0.0000	0.0226
SIEMENS	-60	120.4	104.1	1	0.167	0.0120	0.0016
SIEMENS	-60	104.5	90.8	1	0.167	0.0120	0.0008
SIEMENS	-60	163.6	140.2	1	0.167	0.0120	0.0069
SIEMENS	-60	201.4	172.0	1	0.167	0.0120	0.0175
SIEMENS	-60	137.8	118.7	1	0.167	0.0120	0.0031
SIEMENS	-60	173.0	148.1	1	0.167	0.0120	0.0088
SIEMENS	-60	99.2	86.4	1	0.167	0.0120	0.0006
SIEMENS	-60	173.4	148.4	1	0.167	0.0120	0.0089
SIEMENS	-60	131.5	113.4	1	0.167	0.0120	0.0025
GKSS	-60	186.0	185.3	1	0.167	0.0120	0.0245
GKSS	-60	151.8	151.3	1	0.167	0.0120	0.0097
GKSS	-60	111.7	111.3	1	0.167	0.0120	0.0023
GKSS	-60	143.9	143.4	1	0.167	0.0120	0.0076
GKSS	-60	105.4	105.1	1	0.167	0.0120	0.0017
GKSS	-60	154.0	153.4	1	0.167	0.0120	0.0104
GKSS	-60	176.2	175.6	1	0.167	0.0120	0.0192
GKSS	-60	131.9	131.5	1	0.167	0.0120	0.0051
GKSS	-60	203.9	203.2	1	0.167	0.0120	0.0370
GKSS	-60	142.7	142.2	1	0.167	0.0120	0.0073
TWI	-60	134.5	134.0	1	0.167	0.0120	0.0055
TWI	-60	130.1	129.7	1	0.167	0.0120	0.0047
TWI	-60	142.6	142.1	1	0.167	0.0120	0.0073
TWI	-60	119.7	119.3	1	0.167	0.0120	0.0032
TWI	-60	141.3	140.8	1	0.167	0.0120	0.0070
TWI	-60	175.9	175.3	1	0.167	0.0120	0.0191
TWI	-60	119.6	119.2	1	0.167	0.0120	0.0032
TWI	-60	102.4	102.0	1	0.167	0.0120	0.0015

TWI	-60	99.0	98.7	1	0.167	0.0120	0.0013
TWI	-60	115.1	114.7	1	0.167	0.0120	0.0026
TWI	-60	172.9	172.3	1	0.167	0.0120	0.0176
TWI	-60	120.5	120.2	1	0.167	0.0120	0.0033
TWI	-60	165.2	164.6	1	0.167	0.0120	0.0143
TWI	-60	125.6	125.2	1	0.167	0.0120	0.0040
TWI	-60	126.7	126.3	1	0.167	0.0120	0.0042
TWI	-60	100.4	100.1	1	0.167	0.0120	0.0013
TWI	-60	131.1	130.7	1	0.167	0.0120	0.0049
TWI	-60	185.1	184.5	1	0.167	0.0120	0.0240
TWI	-60	163.6	163.0	1	0.167	0.0120	0.0137
TWI	-60	126.5	126.1	1	0.167	0.0120	0.0042
TWI	-60	164.7	164.1	1	0.167	0.0120	0.0141
TWI	-60	192.7	192.0	1	0.167	0.0120	0.0287
TWI	-60	134.5	134.1	1	0.167	0.0120	0.0056
TWI	-60	140.8	140.3	1	0.167	0.0120	0.0069
GKSS	-60	109.9	126.5	1	0.167	0.0120	0.0042
GKSS	-60	131.9	152.5	1	0.167	0.0120	0.0101
GKSS	-60	136.2	157.6	1	0.167	0.0120	0.0118
GKSS	-60	154.0	178.8	1	0.167	0.0120	0.0209
GKSS	-60	115.9	133.6	1	0.167	0.0120	0.0055
GKSS	-60	150.4	174.4	1	0.167	0.0120	0.0187
BAM	-40	171.0	146.5	1	0.167	0.0123	0.0021
BAM	-40	206.2	176.0	0	0.000	0.0000	0.0048
BAM	-40	169.4	145.1	1	0.167	0.0123	0.0020
BAM	-40	203.6	173.7	0	0.000	0.0000	0.0046
BAM	-40	202.5	172.9	0	0.000	0.0000	0.0045
BAM	-40	207.2	176.8	0	0.000	0.0000	0.0049
BAM	-40	205.9	175.7	0	0.000	0.0000	0.0048
BAM	-40	206.5	176.2	0	0.000	0.0000	0.0049
BAM	-40	207.3	176.9	0	0.000	0.0000	0.0049
BAM	-40	205.1	175.1	0	0.000	0.0000	0.0047
BAM	-40	202.8	173.1	0	0.000	0.0000	0.0045
BAM	-40	204.9	174.8	0	0.000	0.0000	0.0047
BAM	-40	205.2	175.1	0	0.000	0.0000	0.0047
BAM	-40	113.7	98.5	1	0.167	0.0123	0.0003
BAM	-40	204.8	174.8	0	0.000	0.0000	0.0047
BAM	-40	154.2	132.4	1	0.167	0.0123	0.0013
BAM	-40	206.2	176.0	0	0.000	0.0000	0.0048
BAM	-40	204.2	174.3	0	0.000	0.0000	0.0046
BAM	-40	207.3	176.9	0	0.000	0.0000	0.0049
BAM	-40	202.5	172.8	1	0.167	0.0123	0.0044
GKSS	-40	180.6	154.6	1	0.167	0.0123	0.0027
GKSS	-40	203.5	173.7	0	0.000	0.0000	0.0045
GKSS	-40	198.2	169.3	0	0.000	0.0000	0.0040
GKSS	-40	199.6	170.5	0	0.000	0.0000	0.0042
GKSS	-40	186.4	159.4	1	0.167	0.0123	0.0031
GKSS	-40	199.4	170.3	0	0.000	0.0000	0.0042
GKSS	-40	204.4	174.4	0	0.000	0.0000	0.0046
GKSS	-40	202.4	172.7	0	0.000	0.0000	0.0044
GKSS	-40	203.2	173.4	0	0.000	0.0000	0.0045
GKSS	-40	200.9	171.5	0	0.000	0.0000	0.0043
BAM	-40	187.3	186.6	1	0.167	0.0123	0.0063
BAM	-40	101.5	101.2	1	0.167	0.0123	0.0004
BAM	-40	140.3	139.9	1	0.167	0.0123	0.0017
BAM	-40	150.2	149.7	1	0.167	0.0123	0.0023
BAM	-40	187.3	186.6	1	0.167	0.0123	0.0063
BAM	-40	211.4	210.6	1	0.167	0.0123	0.0108
BAM	-40	160.5	160.0	1	0.167	0.0123	0.0031
BAM	-40	214.6	213.8	1	0.167	0.0123	0.0115
BAM	-40	188.3	187.7	1	0.167	0.0123	0.0064
BAM	-40	239.3	238.4	1	0.167	0.0123	0.0186
BAM	-40	112.8	112.4	1	0.167	0.0123	0.0006
BAM	-40	239.0	238.1	1	0.167	0.0123	0.0184
BAM	-40	284.9	283.9	1	0.167	0.0123	0.0395
BAM	-40	254.7	253.7	1	0.167	0.0123	0.0243
BAM	-40	270.9	269.9	1	0.167	0.0123	0.0318
BAM	-40	187.0	186.3	1	0.167	0.0123	0.0062
BAM	-40	170.1	169.5	1	0.167	0.0123	0.0041
BAM	-40	256.4	255.5	1	0.167	0.0123	0.0251
BAM	-40	171.4	170.8	1	0.167	0.0123	0.0042
BAM	-40	103.1	102.8	1	0.167	0.0123	0.0004
BAM	-40	230.0	229.1	1	0.167	0.0123	0.0156
BAM	-40	210.0	209.2	1	0.167	0.0123	0.0105
GKSS	-40	198.2	197.5	1	0.167	0.0123	0.0081
GKSS	-40	150.2	149.7	1	0.167	0.0123	0.0023
GKSS	-40	226.8	226.0	1	0.167	0.0123	0.0147
GKSS	-40	158.1	157.5	1	0.167	0.0123	0.0029
GKSS	-40	256.4	255.5	1	0.167	0.0123	0.0251
GKSS	-40	207.6	206.9	1	0.167	0.0123	0.0099
GKSS	-40	213.5	212.8	1	0.167	0.0123	0.0113
GKSS	-40	254.6	253.7	1	0.167	0.0123	0.0243
GKSS	-40	240.0	239.1	1	0.167	0.0123	0.0188
GKSS	-40	279.0	278.0	0	0.000	0.0000	0.0361
GKSS	-40	125.9	145.5	1	0.167	0.0123	0.0020
GKSS	-40	128.9	149.0	1	0.167	0.0123	0.0023
GKSS	-40	198.5	231.5	1	0.167	0.0123	0.0163
GKSS	-40	212.0	247.5	1	0.167	0.0123	0.0218

GKSS	-40	138.6	160.5	1	0.167	0.0123	0.0032
GKSS	-40	187.7	218.7	1	0.167	0.0123	0.0127
GKSS	-40	173.0	201.2	1	0.167	0.0123	0.0088
GKSS	-40	179.5	208.9	1	0.167	0.0123	0.0104
GKSS	-40	152.6	177.1	1	0.167	0.0123	0.0050
GKSS	-40	153.6	178.3	1	0.167	0.0123	0.0051
THA	-40	144.6	167.6	1	0.167	0.0123	0.0039
THA	-40	150.7	174.9	1	0.167	0.0123	0.0047
THA	-40	139.1	161.0	1	0.167	0.0123	0.0032
THA	-40	183.6	213.8	1	0.167	0.0123	0.0115
THA	-40	142.0	164.5	1	0.167	0.0123	0.0036
THA	-40	187.2	218.0	1	0.167	0.0123	0.0125
THA	-40	172.2	200.3	1	0.167	0.0123	0.0086
THA	-40	198.0	230.8	1	0.167	0.0123	0.0161
THA	-40	130.4	150.8	1	0.167	0.0123	0.0024
THA	-40	141.7	164.1	1	0.167	0.0123	0.0035
THA	-40	134.5	155.6	1	0.167	0.0123	0.0028
THA	-40	115.5	133.1	1	0.167	0.0123	0.0013
THA	-40	91.7	104.9	1	0.167	0.0123	0.0004
THA	-40	141.1	163.4	1	0.167	0.0123	0.0035
THA	-40	239.1	279.6	1	0.167	0.0123	0.0370
THA	-40	243.4	284.7	1	0.167	0.0123	0.0400
THA	-40	191.9	223.6	1	0.167	0.0123	0.0140
THA	-40	146.8	170.2	1	0.167	0.0123	0.0041
THA	-40	161.4	187.5	1	0.167	0.0123	0.0064
THA	-40	142.3	164.8	1	0.167	0.0123	0.0036
CISE	-20	128.7	111.1	0	0.000	0.0000	0.0000
CISE	-20	146.9	126.3	0	0.000	0.0000	0.0000
CISE	-20	204.3	174.4	0	0.000	0.0000	0.0000
CISE	-20	198.3	169.3	0	0.000	0.0000	0.0000
CISE	-20	195.0	166.6	0	0.000	0.0000	0.0000
CISE	-20	197.8	168.9	0	0.000	0.0000	0.0000
CISE	-20	195.6	167.1	0	0.000	0.0000	0.0000
CISE	-20	196.2	167.6	0	0.000	0.0000	0.0000
CISE	-20	194.0	165.7	0	0.000	0.0000	0.0000
CISE	-20	198.3	169.3	0	0.000	0.0000	0.0000
CISE	-20	201.2	171.8	0	0.000	0.0000	0.0000
CISE	-20	200.9	171.5	0	0.000	0.0000	0.0000
CISE	-20	195.6	167.1	0	0.000	0.0000	0.0000
CISE	-20	197.6	168.8	0	0.000	0.0000	0.0000
CISE	-20	201.9	172.4	0	0.000	0.0000	0.0000
CISE	-20	202.5	172.8	0	0.000	0.0000	0.0000
CISE	-20	198.1	169.2	0	0.000	0.0000	0.0000
CISE	-20	198.1	169.2	0	0.000	0.0000	0.0000
CISE	-20	200.7	171.3	0	0.000	0.0000	0.0000
CISE	-20	199.8	170.6	0	0.000	0.0000	0.0000
CISE	-20	201.5	172.0	0	0.000	0.0000	0.0000
GKSS	-20	200.6	171.2	0	0.000	0.0000	0.0000
GKSS	-20	200.6	171.2	0	0.000	0.0000	0.0000
GKSS	-20	199.8	170.6	0	0.000	0.0000	0.0000
GKSS	-20	198.2	169.2	0	0.000	0.0000	0.0000
GKSS	-20	199.3	170.2	0	0.000	0.0000	0.0000
GKSS	-20	196.6	167.9	0	0.000	0.0000	0.0000
GKSS	-20	198.6	169.6	0	0.000	0.0000	0.0000
GKSS	-20	200.7	171.3	0	0.000	0.0000	0.0000
GKSS	-20	195.0	166.6	0	0.000	0.0000	0.0000
GKSS	-20	198.6	169.6	0	0.000	0.0000	0.0000
GKSS	-20	202.5	201.7	0	0.000	0.0000	0.0000
GKSS	-20	194.7	194.1	0	0.000	0.0000	0.0000
GKSS	-20	262.8	261.8	0	0.000	0.0000	0.0000
GKSS	-20	187.9	187.2	0	0.000	0.0000	0.0000
GKSS	-20	275.8	274.8	0	0.000	0.0000	0.0000
GKSS	-20	261.8	260.9	0	0.000	0.0000	0.0000
GKSS	-20	283.2	282.2	0	0.000	0.0000	0.0000
GKSS	-20	283.1	282.0	0	0.000	0.0000	0.0000
GKSS	-20	284.0	283.0	0	0.000	0.0000	0.0000
GKSS	-20	284.2	283.1	0	0.000	0.0000	0.0000
VTT	-20	284.0	282.9	0	0.000	0.0000	0.0000
VTT	-20	231.9	231.0	0	0.000	0.0000	0.0000
VTT	-20	279.4	278.3	0	0.000	0.0000	0.0000
VTT	-20	280.3	279.2	0	0.000	0.0000	0.0000
VTT	-20	279.4	278.3	0	0.000	0.0000	0.0000
VTT	-20	278.6	277.5	0	0.000	0.0000	0.0000
VTT	-20	281.9	280.9	0	0.000	0.0000	0.0000
VTT	-20	279.4	278.3	0	0.000	0.0000	0.0000
VTT	-20	282.5	281.4	0	0.000	0.0000	0.0000
VTT	-20	247.2	246.3	0	0.000	0.0000	0.0000
VTT	-20	233.2	232.4	0	0.000	0.0000	0.0000
VTT	-20	283.2	282.2	0	0.000	0.0000	0.0000
VTT	-20	288.9	287.8	0	0.000	0.0000	0.0000
VTT	-20	263.2	262.3	0	0.000	0.0000	0.0000
VTT	-20	184.4	183.8	0	0.000	0.0000	0.0000
VTT	-20	283.7	282.7	0	0.000	0.0000	0.0000
VTT	-20	280.8	279.8	0	0.000	0.0000	0.0000
VTT	-20	280.9	279.8	0	0.000	0.0000	0.0000
VTT	-20	280.9	279.8	0	0.000	0.0000	0.0000
VTT	-20	170.9	170.3	0	0.000	0.0000	0.0000
VTT	-20	282.9	281.9	0	0.000	0.0000	0.0000

VTT	-20	275.7	274.6	0	0.000	0.0000	0.0000
VTT	-20	228.2	227.4	0	0.000	0.0000	0.0000
VTT	-20	282.0	281.0	0	0.000	0.0000	0.0000
VTT	-20	280.9	279.8	0	0.000	0.0000	0.0000
VTT	-20	281.8	280.7	0	0.000	0.0000	0.0000
VTT	-20	281.4	280.4	0	0.000	0.0000	0.0000
VTT	-20	227.3	226.5	0	0.000	0.0000	0.0000
VTT	-20	201.3	200.6	0	0.000	0.0000	0.0000
VTT	-20	212.5	211.7	0	0.000	0.0000	0.0000
VTT	-20	256.5	255.5	0	0.000	0.0000	0.0000
VTT	-20	284.8	283.8	0	0.000	0.0000	0.0000
VTT	-20	282.3	281.3	0	0.000	0.0000	0.0000
VTT	-20	269.6	268.6	0	0.000	0.0000	0.0000
VTT	-20	184.4	183.8	0	0.000	0.0000	0.0000
VTT	-20	241.6	240.7	0	0.000	0.0000	0.0000
VTT	-20	146.4	145.9	0	0.000	0.0000	0.0000
VTT	-20	280.0	279.0	0	0.000	0.0000	0.0000
VTT	-20	156.7	156.2	0	0.000	0.0000	0.0000
VTT	-20	277.0	276.0	0	0.000	0.0000	0.0000
CISE	-20	167.4	194.6	0	0.000	0.0000	0.0000
CISE	-20	153.5	178.1	0	0.000	0.0000	0.0000
CISE	-20	211.2	246.5	0	0.000	0.0000	0.0000
CISE	-20	220.3	257.3	0	0.000	0.0000	0.0000
CISE	-20	227.9	266.2	0	0.000	0.0000	0.0000
CISE	-20	211.1	246.4	0	0.000	0.0000	0.0000
CISE	-20	217.1	253.4	0	0.000	0.0000	0.0000
CISE	-20	145.3	168.5	0	0.000	0.0000	0.0000
CISE	-20	161.2	187.2	0	0.000	0.0000	0.0000
CISE	-20	131.9	152.5	0	0.000	0.0000	0.0000
CISE	-20	216.4	252.6	0	0.000	0.0000	0.0000
CISE	-20	125.0	144.4	0	0.000	0.0000	0.0000
CISE	-20	378.7	444.9	0	0.000	0.0000	0.0000
CISE	-20	246.1	287.9	0	0.000	0.0000	0.0000
CISE	-20	250.9	293.5	0	0.000	0.0000	0.0000
CISE	-20	251.5	294.3	0	0.000	0.0000	0.0000
CISE	-20	284.0	332.7	0	0.000	0.0000	0.0000
CISE	-20	261.1	305.6	0	0.000	0.0000	0.0000
CISE	-20	351.6	412.8	0	0.000	0.0000	0.0000
CISE	-20	258.5	302.5	0	0.000	0.0000	0.0000
GKSS	-20	201.3	234.8	0	0.000	0.0000	0.0000
GKSS	-20	110.9	127.7	0	0.000	0.0000	0.0000
GKSS	-20	197.7	230.5	0	0.000	0.0000	0.0000
GKSS	-20	198.9	231.9	0	0.000	0.0000	0.0000
GKSS	-20	200.6	234.0	0	0.000	0.0000	0.0000
GKSS	-20	165.7	192.6	0	0.000	0.0000	0.0000
GKSS	-20	280.1	328.0	0	0.000	0.0000	0.0000
GKSS	-20	279.5	327.3	0	0.000	0.0000	0.0000
GKSS	-20	257.6	301.4	0	0.000	0.0000	0.0000
GKSS	-20	265.2	310.4	0	0.000	0.0000	0.0000
GKSS	-20	156.7	212.6	0	0.000	0.0000	0.0000
GKSS	-20	221.7	304.1	0	0.000	0.0000	0.0000
GKSS	-20	193.9	264.9	0	0.000	0.0000	0.0000
GKSS	-20	191.7	261.9	0	0.000	0.0000	0.0000
GKSS	-20	184.4	251.6	0	0.000	0.0000	0.0000
NE	-20	186.7	254.8	0	0.000	0.0000	0.0000
NE	-20	184.4	251.6	0	0.000	0.0000	0.0000
NE	-20	193.9	264.9	0	0.000	0.0000	0.0000
NE	-20	204.4	279.8	0	0.000	0.0000	0.0000
NE	-20	224.0	307.4	0	0.000	0.0000	0.0000
NE	-20	153.4	207.9	0	0.000	0.0000	0.0000
NE	-20	222.6	305.4	0	0.000	0.0000	0.0000
NE	-20	162.0	220.0	0	0.000	0.0000	0.0000
NE	-20	187.8	256.4	0	0.000	0.0000	0.0000
NE	-20	198.2	271.0	0	0.000	0.0000	0.0000
SCK-CEN	-10	280.0	279.0	0	0.000	0.0000	0.0000
SCK-CEN	-10	281.2	280.2	0	0.000	0.0000	0.0000
SCK-CEN	-10	282.6	281.5	0	0.000	0.0000	0.0000
SCK-CEN	-10	284.0	282.9	0	0.000	0.0000	0.0000
SCK-CEN	-10	280.9	279.9	0	0.000	0.0000	0.0000
GKSS	0	196.8	168.1	0	0.000	0.0000	0.0000
GKSS	0	193.7	165.5	0	0.000	0.0000	0.0000
GKSS	0	192.9	164.8	0	0.000	0.0000	0.0000
GKSS	0	196.7	168.0	0	0.000	0.0000	0.0000
GKSS	0	196.1	167.5	0	0.000	0.0000	0.0000
GKSS	0	194.7	166.3	0	0.000	0.0000	0.0000
GKSS	0	196.3	167.7	0	0.000	0.0000	0.0000
GKSS	0	195.9	167.3	0	0.000	0.0000	0.0000
GKSS	0	195.2	166.8	0	0.000	0.0000	0.0000
GKSS	0	193.3	165.1	0	0.000	0.0000	0.0000
SCK-CEN	0	198.4	169.4	0	0.000	0.0000	0.0000
SCK-CEN	0	199.1	170.0	0	0.000	0.0000	0.0000
SCK-CEN	0	198.2	169.2	0	0.000	0.0000	0.0000
SCK-CEN	0	197.6	168.8	0	0.000	0.0000	0.0000
SCK-CEN	0	201.2	171.8	0	0.000	0.0000	0.0000
SCK-CEN	0	200.0	170.8	0	0.000	0.0000	0.0000
SCK-CEN	0	197.4	168.6	0	0.000	0.0000	0.0000
SCK-CEN	0	199.6	170.4	0	0.000	0.0000	0.0000
SCK-CEN	0	203.4	173.6	0	0.000	0.0000	0.0000

SCK-CEN	0	199.2	170.1	0	0.000	0.0000	0.0000
SCK-CEN	0	200.5	171.2	0	0.000	0.0000	0.0000
SCK-CEN	0	202.4	172.7	0	0.000	0.0000	0.0000
SCK-CEN	0	197.2	168.4	0	0.000	0.0000	0.0000
SCK-CEN	0	205.8	175.6	0	0.000	0.0000	0.0000
SCK-CEN	0	205.5	175.4	0	0.000	0.0000	0.0000
SCK-CEN	0	202.4	172.7	0	0.000	0.0000	0.0000
SCK-CEN	0	203.4	173.6	0	0.000	0.0000	0.0000
SCK-CEN	0	205.2	175.1	0	0.000	0.0000	0.0000
SCK-CEN	0	202.3	172.7	0	0.000	0.0000	0.0000
SCK-CEN	0	201.6	172.1	0	0.000	0.0000	0.0000
GKSS	0	282.4	281.4	0	0.000	0.0000	0.0000
GKSS	0	283.7	282.7	0	0.000	0.0000	0.0000
GKSS	0	284.9	283.9	0	0.000	0.0000	0.0000
GKSS	0	282.8	281.8	0	0.000	0.0000	0.0000
GKSS	0	284.4	283.4	0	0.000	0.0000	0.0000
GKSS	0	284.9	283.8	0	0.000	0.0000	0.0000
GKSS	0	279.6	278.6	0	0.000	0.0000	0.0000
GKSS	0	283.9	282.8	0	0.000	0.0000	0.0000
GKSS	0	285.7	284.7	0	0.000	0.0000	0.0000
GKSS	0	283.0	281.9	0	0.000	0.0000	0.0000
SCK-CEN	0	277.0	276.0	0	0.000	0.0000	0.0000
SCK-CEN	0	276.7	275.7	0	0.000	0.0000	0.0000
SCK-CEN	0	276.9	275.9	0	0.000	0.0000	0.0000
SCK-CEN	0	277.9	276.8	0	0.000	0.0000	0.0000
SCK-CEN	0	276.9	275.9	0	0.000	0.0000	0.0000
SCK-CEN	0	278.2	277.2	0	0.000	0.0000	0.0000
SCK-CEN	0	278.0	277.0	0	0.000	0.0000	0.0000
SCK-CEN	0	275.9	274.9	0	0.000	0.0000	0.0000
SCK-CEN	0	277.6	276.6	0	0.000	0.0000	0.0000
SCK-CEN	0	278.2	277.2	0	0.000	0.0000	0.0000
SCK-CEN	0	277.3	276.3	0	0.000	0.0000	0.0000
VTT	0	280.3	279.3	0	0.000	0.0000	0.0000
VTT	0	275.5	274.5	0	0.000	0.0000	0.0000
VTT	0	280.3	279.3	0	0.000	0.0000	0.0000
VTT	0	275.2	274.2	0	0.000	0.0000	0.0000
VTT	0	278.0	277.0	0	0.000	0.0000	0.0000
VTT	0	278.5	277.5	0	0.000	0.0000	0.0000
VTT	0	279.7	278.6	0	0.000	0.0000	0.0000
VTT	0	267.2	266.2	0	0.000	0.0000	0.0000
VTT	0	279.8	278.8	0	0.000	0.0000	0.0000
VTT	0	278.6	277.6	0	0.000	0.0000	0.0000
VTT	0	278.3	277.3	0	0.000	0.0000	0.0000
VTT	0	280.0	278.9	0	0.000	0.0000	0.0000
VTT	0	274.3	273.3	0	0.000	0.0000	0.0000
VTT	0	276.0	275.0	0	0.000	0.0000	0.0000
VTT	0	278.7	277.7	0	0.000	0.0000	0.0000
VTT	0	278.0	277.0	0	0.000	0.0000	0.0000
VTT	0	279.1	278.0	0	0.000	0.0000	0.0000
VTT	0	278.6	277.5	0	0.000	0.0000	0.0000
VTT	0	279.4	278.4	0	0.000	0.0000	0.0000
VTT	0	276.2	275.2	0	0.000	0.0000	0.0000
GKSS	0	191.3	222.9	0	0.000	0.0000	0.0000
GKSS	0	269.2	315.2	0	0.000	0.0000	0.0000
GKSS	0	281.2	329.4	0	0.000	0.0000	0.0000
GKSS	0	242.5	283.5	0	0.000	0.0000	0.0000
GKSS	0	318.3	373.3	0	0.000	0.0000	0.0000
GKSS	0	395.4	464.7	0	0.000	0.0000	0.0000
GKSS	0	396.5	465.9	0	0.000	0.0000	0.0000
GKSS	0	394.9	464.1	0	0.000	0.0000	0.0000
GKSS	0	396.3	465.7	0	0.000	0.0000	0.0000
GKSS	0	266.6	312.1	0	0.000	0.0000	0.0000
GKSS	0	395.2	464.4	0	0.000	0.0000	0.0000
GKSS	0	362.9	426.1	0	0.000	0.0000	0.0000
GKSS	0	331.8	389.3	0	0.000	0.0000	0.0000
GKSS	0	227.1	265.3	0	0.000	0.0000	0.0000
GKSS	0	309.5	362.9	0	0.000	0.0000	0.0000
GKSS	0	395.4	464.7	0	0.000	0.0000	0.0000
GKSS	0	210.9	246.1	0	0.000	0.0000	0.0000
GKSS	0	394.9	464.1	0	0.000	0.0000	0.0000
GKSS	0	211.4	246.7	0	0.000	0.0000	0.0000
GKSS	0	393.9	462.8	0	0.000	0.0000	0.0000
GKSS	0	263.4	308.3	0	0.000	0.0000	0.0000
GKSS	0	393.3	462.1	0	0.000	0.0000	0.0000
GKSS	0	386.7	454.3	0	0.000	0.0000	0.0000
GKSS	0	376.2	441.9	0	0.000	0.0000	0.0000
GKSS	0	394.4	463.5	0	0.000	0.0000	0.0000
GKSS	0	306.7	359.6	0	0.000	0.0000	0.0000
GKSS	0	394.8	464.0	0	0.000	0.0000	0.0000
GKSS	0	393.9	462.8	0	0.000	0.0000	0.0000
GKSS	0	246.4	288.2	0	0.000	0.0000	0.0000
GKSS	0	320.1	375.4	0	0.000	0.0000	0.0000
CISE	0	233.3	320.4	0	0.000	0.0000	0.0000
CISE	0	238.2	327.4	0	0.000	0.0000	0.0000
CISE	0	208.3	285.2	0	0.000	0.0000	0.0000
CISE	0	421.7	585.8	0	0.000	0.0000	0.0000
CISE	0	226.7	311.2	0	0.000	0.0000	0.0000
CISE	0	267.0	367.9	0	0.000	0.0000	0.0000

CISE	0	163.0	221.4	0	0.000	0.0000	0.0000
CISE	0	165.8	225.4	0	0.000	0.0000	0.0000
CISE	0	285.9	394.6	0	0.000	0.0000	0.0000
CISE	0	342.0	473.5	0	0.000	0.0000	0.0000
GKSS	0	314.9	435.4	0	0.000	0.0000	0.0000
GKSS	0	307.6	425.1	0	0.000	0.0000	0.0000
GKSS	0	383.0	531.4	0	0.000	0.0000	0.0000
GKSS	0	332.6	460.4	0	0.000	0.0000	0.0000
GKSS	0	223.6	306.8	0	0.000	0.0000	0.0000
GKSS	0	442.2	614.7	0	0.000	0.0000	0.0000

4. Master curve fit to data

Temperature adj. = 1.5 °C (est.) Stand. dev. on T_0 = 1.0 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-154	54.8	49.1				
-154	49.8	44.9				
-154	37.8	34.9				
-154	33.0	30.9				
-154	38.9	35.8				
-154	24.2	23.6				
-154	47.4	43.0				
-154	46.5	42.2				
-154	31.4	29.6				
-154	39.2	36.0				
-154	24.2	23.6				
-154	33.0	30.9				
-154	41.0	37.6				
-154	31.7	29.8				
-154	35.2	32.7				
-154	44.4	40.5				
-154	41.5	38.0				
-154	32.7	30.7				
-154	34.3	32.0				
-154	36.7	34.0				
-154	39.7	36.5				
-154	46.1	41.8				
-154	34.6	32.2				
-154	35.8	33.2				
-154	29.3	27.8				
-154	28.6	27.2				
-154	38.6	35.6				
-154	44.4	40.5				
-154	48.9	44.2				
-154	38.9	35.8				
-154	36.7	34.0				
-154	31.7	29.8				
-154	41.5	41.4				
-154	42.2	42.2				
-154	50.0	49.9				
-154	34.0	33.9				
-154	41.7	41.7				
-154	46.1	46.0				
-154	44.2	44.1				
-154	36.7	36.6				
-154	29.0	28.9				
-154	53.0	52.9				
-154	39.4	39.3				
-154	29.0	28.9				
-154	34.6	34.5				
-154	33.0	33.0				
-154	38.1	38.0				
-154	28.6	28.6				
-154	28.6	28.6				
-154	38.6	38.5				
-154	36.4	36.3				
-154	33.4	33.3				
-154	36.9	36.9				
-154	31.1	31.0				
-154	34.3	34.2				
-154	30.4	30.4				
-154	49.6	49.5				
-154	41.0	40.9				
-154	34.0	33.9				
-154	30.7	30.7				
-154	41.2	41.2				
-154	26.7	26.7				
-154	35.5	35.4				
-154	33.4	33.3				
-154	36.7	36.6				
-154	32.4	32.4				
-154	45.1	45.0				
-154	33.4	33.3				
-154	34.0	33.9				
-154	30.7	30.7				
-154	26.7	26.7				

-154	33.7	36.2
-154	42.7	46.9
-154	37.2	40.4
-154	54.4	60.8
-154	34.6	37.3
-154	44.2	48.7
-154	29.7	31.5
-154	36.4	39.4
-154	36.4	39.4
-154	28.2	29.8
-154	28.2	29.8
-154	30.0	31.9
-154	36.4	39.4
-154	37.5	40.7
-154	30.0	31.9
-154	30.7	32.7
-154	30.4	32.3
-154	30.7	32.7
-154	31.7	33.9
-154	41.7	45.8
-154	37.2	40.4
-154	34.9	37.6
-154	38.3	41.7
-154	31.4	33.5
-154	33.7	36.2
-154	32.7	35.1
-154	43.0	47.2
-154	32.7	35.1
-154	30.0	31.9
-154	36.9	40.1
-154	33.4	35.8
-154	30.0	31.9
-110	98.1	85.4
-110	59.0	52.7
-110	80.0	70.3
-110	57.2	51.2
-110	88.3	77.2
-110	96.2	83.9
-110	81.6	71.6
-110	66.9	59.3
-110	85.6	75.0
-110	86.8	76.0
-110	114.2	98.9
-110	73.5	64.8
-110	92.7	80.9
-110	77.5	68.2
-110	61.5	54.7
-110	51.8	46.7
-110	73.6	64.9
-110	52.8	47.5
-110	41.2	37.8
-110	115.3	99.8
-110	73.2	64.5
-110	74.0	65.3
-110	67.5	59.8
-110	71.0	62.7
-110	53.4	48.0
-110	96.5	84.0
-110	71.3	63.0
-110	71.7	63.3
-110	81.7	71.7
-110	64.0	56.8
-110	74.2	65.4
-110	70.4	62.2
-110	91.2	79.6
-110	72.0	63.6
-110	64.8	57.5
-110	79.2	69.6
-110	52.2	47.0
-110	82.9	72.7
-110	93.2	81.3
-110	75.4	66.4
-110	75.0	66.1
-110	78.6	69.1
-110	94.8	82.7
-110	98.1	85.4
-110	98.5	85.7
-110	104.9	91.1
-110	69.9	61.8
-110	81.6	71.6
-110	55.2	49.5
-110	105.6	91.7
-110	101.5	88.3
-110	73.7	65.0
-110	97.5	84.9
-110	75.9	66.8
-110	48.3	43.7
-91	127.0	109.6

-91	121.8	105.2
-91	70.5	62.3
-91	94.2	82.2
-91	127.3	109.9
-91	119.9	103.7
-91	104.5	90.8
-91	78.6	69.1
-91	98.6	85.8
-91	161.6	138.6
-91	91.3	79.7
-91	115.3	99.8
-91	122.4	105.8
-91	126.3	109.1
-91	108.3	94.0
-91	66.9	59.3
-91	126.7	109.4
-91	69.6	61.6
-91	121.4	104.9
-91	90.0	78.7
-91	153.9	132.2
-91	64.6	57.4
-91	127.2	109.8
-91	99.7	86.7
-91	101.3	88.1
-91	140.4	120.9
-91	78.2	68.7
-91	109.0	94.6
-91	103.9	90.3
-91	126.8	109.5
-91	111.7	96.8
-91	68.6	68.4
-91	81.6	81.3
-91	55.9	55.8
-91	98.8	98.5
-91	71.9	71.7
-91	111.0	110.7
-91	93.5	93.2
-91	79.9	79.7
-91	98.4	98.1
-91	101.1	100.8
-91	79.6	79.4
-91	99.7	99.3
-91	108.1	107.7
-91	93.4	93.1
-91	62.0	61.8
-91	107.1	106.7
-91	145.3	144.8
-91	76.3	76.0
-91	126.5	126.1
-91	126.1	125.7
-91	128.5	128.0
-91	111.4	111.0
-91	130.4	130.0
-91	134.8	134.3
-91	157.3	156.7
-91	105.2	104.9
-91	109.8	109.4
-91	84.9	84.6
-91	62.8	62.7
-91	97.5	97.2
-91	80.2	79.9
-91	134.4	133.9
-91	65.1	65.0
-91	118.6	118.2
-91	67.3	76.1
-91	162.9	189.3
-91	100.0	114.7
-91	91.2	104.3
-91	106.2	122.1
-91	83.2	94.9
-91	91.8	105.0
-91	94.7	108.5
-91	92.9	106.4
-91	69.9	79.2
-91	93.1	106.6
-91	97.9	112.2
-91	73.7	83.7
-91	82.0	93.4
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-91	83.7	95.5
-91	82.1	93.6
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-91	86.7	99.0
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-91	83.1	94.8
-91	88.9	101.6
-91	64.3	72.5

-91	101.6	116.7
-91	94.2	107.9
-91	78.7	89.5
-91	73.0	82.8
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-91	84.4	110.7
-91	97.0	128.5
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-91	96.8	128.2
-91	73.6	95.5
-91	73.0	94.7
-91	73.3	95.1
-91	53.8	67.7
-91	69.5	89.7
-91	65.5	84.0
-91	79.6	104.0
-91	69.8	90.1
-91	90.3	119.0
-91	88.0	115.8
-60	234.1	199.3
-60	114.4	99.1
-60	130.7	112.7
-60	106.7	92.6
-60	161.0	138.1
-60	200.7	171.3
-60	125.2	108.1
-60	145.1	124.8
-60	91.9	80.2
-60	128.1	110.6
-60	164.4	140.9
-60	192.2	164.3
-60	166.3	142.5
-60	177.7	152.1
-60	203.7	173.9
-60	116.0	100.4
-60	221.9	189.1
-60	167.6	143.6
-60	89.8	78.5
-60	156.3	134.1
-60	186.8	159.7
-60	213.5	182.1
-60	164.6	141.1
-60	280.1	237.9
-60	185.9	159.0
-60	127.7	110.2
-60	205.0	175.0
-60	115.6	100.0
-60	107.5	93.3
-60	164.6	141.1
-60	172.0	147.3
-60	108.5	94.2
-60	119.0	102.9
-60	153.5	131.8
-60	158.9	136.4
-60	137.5	118.4
-60	119.5	103.3
-60	130.7	112.8
-60	172.6	147.8
-60	84.5	74.0
-60	244.6	208.1
-60	120.4	104.1
-60	104.5	90.8
-60	163.6	140.2
-60	201.4	172.0
-60	137.8	118.7
-60	173.0	148.1
-60	99.2	86.4
-60	173.4	148.4
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-60	186.0	185.3
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-60	143.9	143.4
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-60	154.0	153.4
-60	176.2	175.6
-60	131.9	131.5
-60	203.9	203.2
-60	142.7	142.2
-60	134.5	134.0
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-60	142.6	142.1
-60	119.7	119.3
-60	141.3	140.8
-60	175.9	175.3
-60	119.6	119.2

-60	102.4	102.0
-60	99.0	98.7
-60	115.1	114.7
-60	172.9	172.3
-60	120.5	120.2
-60	165.2	164.6
-60	125.6	125.2
-60	126.7	126.3
-60	100.4	100.1
-60	131.1	130.7
-60	185.1	184.5
-60	163.6	163.0
-60	126.5	126.1
-60	164.7	164.1
-60	192.7	192.0
-60	134.5	134.1
-60	140.8	140.3
-60	109.9	126.5
-60	131.9	152.5
-60	136.2	157.6
-60	154.0	178.8
-60	115.9	133.6
-60	150.4	174.4
-40	171.0	146.5
-40	569.4	480.2
-40	169.4	145.1
-40	548.7	462.8
-40	529.9	447.1
-40	318.5	270.1
-40	574.8	484.7
-40	360.8	305.4
-40	343.8	291.2
-40	235.8	200.8
-40	529.9	447.1
-40	496.5	419.1
-40	600.0	505.8
-40	113.7	98.5
-40	229.6	195.5
-40	154.2	132.4
-40	221.3	188.6
-40	486.7	410.9
-40	243.8	207.4
-40	202.5	172.8
-40	180.6	154.6
-40	206.7	176.4
-40	240.7	204.9
-40	270.8	230.1
-40	186.4	159.4
-40	255.8	217.5
-40	231.2	196.9
-40	339.4	287.5
-40	403.1	340.9
-40	399.2	337.6
-40	187.3	186.6
-40	101.5	101.2
-40	140.3	139.9
-40	150.2	149.7
-40	187.3	186.6
-40	211.4	210.6
-40	160.5	160.0
-40	214.6	213.8
-40	188.3	187.7
-40	239.3	238.4
-40	112.8	112.4
-40	239.0	238.1
-40	284.9	283.9
-40	254.7	253.7
-40	270.9	269.9
-40	187.0	186.3
-40	170.1	169.5
-40	256.4	255.5
-40	171.4	170.8
-40	103.1	102.8
-40	230.0	229.1
-40	210.0	209.2
-40	198.2	197.5
-40	150.2	149.7
-40	226.8	226.0
-40	158.1	157.5
-40	256.4	255.5
-40	207.6	206.9
-40	213.5	212.8
-40	254.6	253.7
-40	240.0	239.1
-40	309.2	308.0
-40	125.9	145.5
-40	128.9	149.0
-40	198.5	231.5

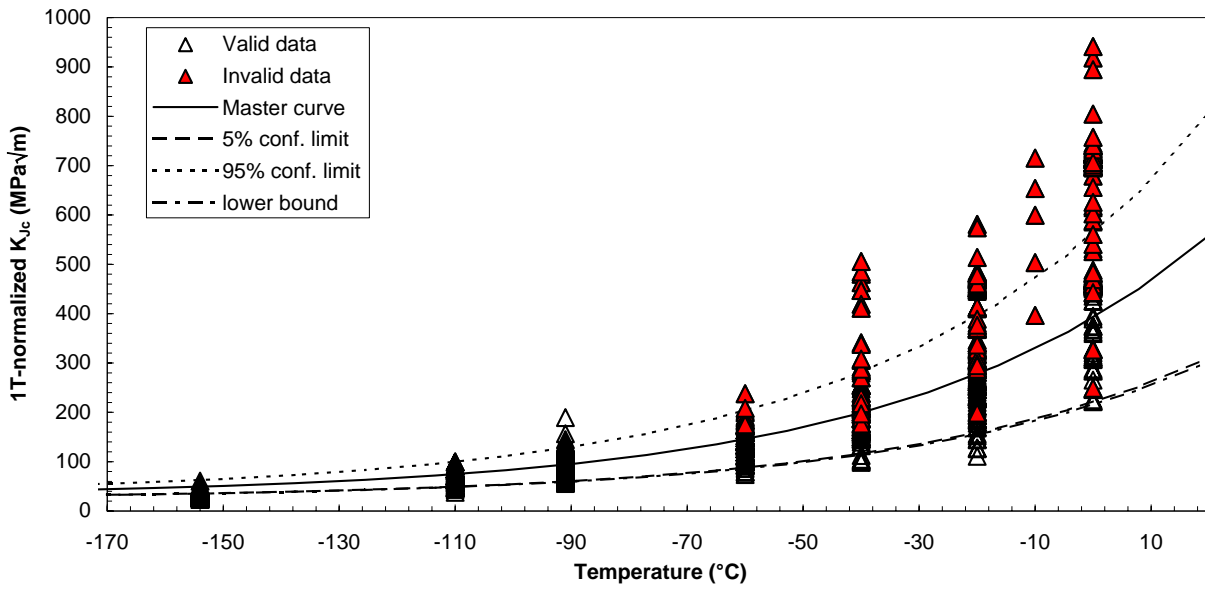
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-40	138.6	160.5
-40	187.7	218.7
-40	173.0	201.2
-40	179.5	208.9
-40	152.6	177.1
-40	153.6	178.3
-40	144.6	167.6
-40	150.7	174.9
-40	139.1	161.0
-40	183.6	213.8
-40	142.0	164.5
-40	187.2	218.0
-40	172.2	200.3
-40	198.0	230.8
-40	130.4	150.8
-40	141.7	164.1
-40	134.5	155.6
-40	115.5	133.1
-40	91.7	104.9
-40	141.1	163.4
-40	239.1	279.6
-40	243.4	284.7
-40	191.9	223.6
-40	146.8	170.2
-40	161.4	187.5
-40	142.3	164.8
-20	128.7	111.1
-20	146.9	126.3
-20	402.8	340.6
-20	409.4	346.2
-20	530.5	447.6
-20	532.2	449.0
-20	534.6	451.0
-20	536.1	452.3
-20	536.1	452.3
-20	536.6	452.7
-20	538.6	454.3
-20	540.5	455.9
-20	543.8	458.7
-20	549.2	463.2
-20	553.7	467.0
-20	556.1	469.0
-20	556.3	469.2
-20	560.6	472.8
-20	565.8	477.2
-20	570.1	480.8
-20	571.1	481.6
-20	233.1	198.5
-20	389.8	329.8
-20	487.9	411.9
-20	438.3	370.4
-20	571.4	481.8
-20	560.7	472.9
-20	561.1	473.2
-20	575.1	484.9
-20	557.5	470.2
-20	572.5	482.7
-20	202.5	201.7
-20	194.7	194.1
-20	262.8	261.8
-20	187.9	187.2
-20	275.8	274.8
-20	261.8	260.9
-20	371.0	369.7
-20	369.1	367.7
-20	462.1	460.4
-20	319.7	318.5
-20	583.1	580.9
-20	231.9	231.0
-20	382.0	380.6
-20	295.9	294.8
-20	576.4	574.2
-20	411.7	410.1
-20	306.4	305.2
-20	324.7	323.5
-20	282.5	281.4
-20	247.2	246.3
-20	233.2	232.4
-20	317.5	316.3
-20	515.6	513.7
-20	263.2	262.3
-20	184.4	183.8
-20	286.9	285.9
-20	341.4	340.1
-20	415.0	413.4
-20	327.9	326.7
-20	170.9	170.3

-20	308.8	307.6
-20	376.5	375.1
-20	228.2	227.4
-20	371.7	370.3
-20	291.6	290.6
-20	337.7	336.4
-20	390.5	389.0
-20	227.3	226.5
-20	201.3	200.6
-20	212.5	211.7
-20	288.4	287.3
-20	479.1	477.3
-20	377.9	376.5
-20	269.6	268.6
-20	184.4	183.8
-20	241.6	240.7
-20	146.4	145.9
-20	299.4	298.3
-20	156.7	156.2
-20	295.6	294.5
-20	167.4	194.6
-20	153.5	178.1
-20	211.2	246.5
-20	220.3	257.3
-20	227.9	266.2
-20	211.1	246.4
-20	217.1	253.4
-20	145.3	168.5
-20	161.2	187.2
-20	131.9	152.5
-20	216.4	252.6
-20	125.0	144.4
-20	378.7	444.9
-20	246.1	287.9
-20	250.9	293.5
-20	251.5	294.3
-20	284.0	332.7
-20	261.1	305.6
-20	351.6	412.8
-20	258.5	302.5
-20	201.3	234.8
-20	110.9	127.7
-20	197.7	230.5
-20	198.9	231.9
-20	200.6	234.0
-20	165.7	192.6
-20	280.1	328.0
-20	279.5	327.3
-20	257.6	301.4
-20	265.2	310.4
-20	156.7	212.6
-20	221.7	304.1
-20	193.9	264.9
-20	191.7	261.9
-20	184.4	251.6
-20	186.7	254.8
-20	184.4	251.6
-20	193.9	264.9
-20	204.4	279.8
-20	224.0	307.4
-20	153.4	207.9
-20	222.6	305.4
-20	162.0	220.0
-20	187.8	256.4
-20	198.2	271.0
-10	656.0	653.4
-10	397.8	396.3
-10	718.1	715.3
-10	601.6	599.3
-10	505.3	503.4
0	541.9	457.1
0	547.0	461.4
0	538.7	454.4
0	540.0	455.5
0	544.8	459.6
0	534.8	451.2
0	557.2	469.9
0	545.0	459.7
0	546.1	460.6
0	549.2	463.2
0	565.1	476.5
0	571.6	482.0
0	553.4	466.8
0	293.2	248.8
0	544.1	459.0
0	552.2	465.7
0	558.0	470.6
0	553.5	466.8

0	557.6	470.3
0	552.4	466.0
0	555.6	468.6
0	558.2	470.8
0	550.6	464.4
0	560.8	473.0
0	569.6	480.4
0	552.5	466.0
0	578.5	487.7
0	556.0	468.9
0	543.8	458.7
0	556.3	469.2
0	327.6	326.4
0	681.4	678.8
0	700.8	698.2
0	698.2	695.5
0	708.4	705.7
0	701.5	698.8
0	724.9	722.1
0	717.4	714.6
0	705.8	703.0
0	709.5	706.8
0	716.7	714.0
0	714.1	711.3
0	658.5	656.0
0	747.5	744.6
0	709.0	706.2
0	719.2	716.4
0	444.5	442.8
0	699.8	697.1
0	704.0	701.3
0	729.5	726.7
0	714.0	711.3
0	725.6	722.8
0	730.2	727.4
0	737.8	734.9
0	590.7	588.4
0	730.3	727.5
0	741.8	738.9
0	744.2	741.3
0	527.7	525.7
0	620.4	618.0
0	727.0	724.2
0	730.3	727.5
0	542.6	540.5
0	726.7	723.9
0	718.7	716.0
0	717.1	714.4
0	721.2	718.5
0	725.3	722.5
0	727.9	725.1
0	727.0	724.2
0	718.5	715.7
0	191.3	222.9
0	269.2	315.2
0	281.2	329.4
0	242.5	283.5
0	318.3	373.3
0	476.2	560.4
0	511.7	602.5
0	621.3	732.2
0	531.3	625.6
0	266.6	312.1
0	599.3	706.2
0	362.9	426.1
0	331.8	389.3
0	227.1	265.3
0	309.5	362.9
0	628.6	740.9
0	210.9	246.1
0	410.7	482.8
0	211.4	246.7
0	778.3	918.2
0	263.4	308.3
0	682.2	804.4
0	386.7	454.3
0	376.2	441.9
0	642.5	757.3
0	306.7	359.6
0	758.4	894.6
0	797.9	941.4
0	246.4	288.2
0	320.1	375.4
0	233.3	320.4
0	238.2	327.4
0	208.3	285.2
0	421.7	585.8
0	226.7	311.2

0	267.0	367.9				
0	163.0	221.4				
0	165.8	225.4				
0	285.9	394.6				
0	342.0	473.5				
0	314.9	435.4				
0	307.6	425.1				
0	383.0	531.4				
0	332.6	460.4				
0	223.6	306.8				
0	442.2	614.7				
-174			43.2	32.6	53.9	32.4
-161.875			46.7	34.4	59.0	34.2
-149.75			51.0	36.7	65.3	36.4
-137.625			56.4	39.7	73.2	39.3
-125.5			63.3	43.4	83.2	42.9
-113.375			71.9	48.0	95.8	47.4
-101.25			82.8	53.9	111.7	53.1
-89.125			96.5	61.3	131.6	60.3
-77			113.7	70.6	156.8	69.4
-64.875			135.4	82.3	188.4	80.7
-52.75			162.7	97.0	228.3	95.1
-40.625			197.0	115.6	278.5	113.1
-28.5			240.3	139.0	341.6	135.9
-16.375			294.8	168.4	421.2	164.5
-4.25			363.4	205.4	521.3	200.5
7.875			449.7	252.1	647.4	245.9
20			558.5	310.8	806.2	303.0

**MASTER CURVE FOR 1TCT WITH CONFIDENCE LIMITS (E1921-05 analysis)
EURO toughness dataset - Complete dataset excluding SX9**



SINTAP - Structural Integrity Assessment Procedures for European Industry
Lower Tail Analysis Procedure

Step 2: Lower MMT Tail Estimation

1. Data censoring

Specimen code	T (°C)	$K_{Jc[exp]}$ (MPa \sqrt{m})	K_{Jc-1T} (MPa \sqrt{m})	K_{CENS} (MPa \sqrt{m})	δ_i	$K_{analysis}$ (MPa \sqrt{m})
GKSS	-154	54.8	49.1	51.0	1	49.1
GKSS	-154	49.8	44.9	51.0	1	44.9
GKSS	-154	37.8	34.9	51.0	1	34.9
GKSS	-154	33.0	30.9	51.0	1	30.9
GKSS	-154	38.9	35.8	51.0	1	35.8
GKSS	-154	24.2	23.6	51.0	1	23.6
GKSS	-154	47.4	43.0	51.0	1	43.0
GKSS	-154	46.5	42.2	51.0	1	42.2
GKSS	-154	31.4	29.6	51.0	1	29.6
GKSS	-154	39.2	36.0	51.0	1	36.0
GKSS	-154	24.2	23.6	51.0	1	23.6
SIEMENS	-154	33.0	30.9	51.0	1	30.9
SIEMENS	-154	41.0	37.6	51.0	1	37.6
SIEMENS	-154	31.7	29.8	51.0	1	29.8
SIEMENS	-154	35.2	32.7	51.0	1	32.7
SIEMENS	-154	44.4	40.5	51.0	1	40.5
SIEMENS	-154	41.5	38.0	51.0	1	38.0
SIEMENS	-154	32.7	30.7	51.0	1	30.7
SIEMENS	-154	34.3	32.0	51.0	1	32.0
SIEMENS	-154	36.7	34.0	51.0	1	34.0
SIEMENS	-154	39.7	36.5	51.0	1	36.5
SIEMENS	-154	46.1	41.8	51.0	1	41.8
SIEMENS	-154	34.6	32.2	51.0	1	32.2
SIEMENS	-154	35.8	33.2	51.0	1	33.2
SIEMENS	-154	29.3	27.8	51.0	1	27.8
SIEMENS	-154	28.6	27.2	51.0	1	27.2
SIEMENS	-154	38.6	35.6	51.0	1	35.6
SIEMENS	-154	44.4	40.5	51.0	1	40.5
SIEMENS	-154	48.9	44.2	51.0	1	44.2
SIEMENS	-154	38.9	35.8	51.0	1	35.8
SIEMENS	-154	36.7	34.0	51.0	1	34.0
SIEMENS	-154	31.7	29.8	51.0	1	29.8
GKSS	-154	41.5	41.4	51.0	1	41.4
GKSS	-154	42.2	42.2	51.0	1	42.2
GKSS	-154	50.0	49.9	51.0	1	49.9
GKSS	-154	34.0	33.9	51.0	1	33.9
GKSS	-154	41.7	41.7	51.0	1	41.7
GKSS	-154	46.1	46.0	51.0	1	46.0
GKSS	-154	44.2	44.1	51.0	1	44.1
GKSS	-154	36.7	36.6	51.0	1	36.6
GKSS	-154	29.0	28.9	51.0	1	28.9
GKSS	-154	53.0	52.9	51.0	0	51.0
GKSS	-154	39.4	39.3	51.0	1	39.3
GKSS	-154	29.0	28.9	51.0	1	28.9
SIEMENS	-154	34.6	34.5	51.0	1	34.5
SIEMENS	-154	33.0	33.0	51.0	1	33.0
SIEMENS	-154	38.1	38.0	51.0	1	38.0
SIEMENS	-154	28.6	28.6	51.0	1	28.6
SIEMENS	-154	28.6	28.6	51.0	1	28.6
SIEMENS	-154	38.6	38.5	51.0	1	38.5
SIEMENS	-154	36.4	36.3	51.0	1	36.3
SIEMENS	-154	33.4	33.3	51.0	1	33.3
SIEMENS	-154	36.9	36.9	51.0	1	36.9
SIEMENS	-154	31.1	31.0	51.0	1	31.0
SIEMENS	-154	34.3	34.2	51.0	1	34.2
SIEMENS	-154	30.4	30.4	51.0	1	30.4
SIEMENS	-154	49.6	49.5	51.0	1	49.5
SIEMENS	-154	41.0	40.9	51.0	1	40.9
SIEMENS	-154	34.0	33.9	51.0	1	33.9
SIEMENS	-154	30.7	30.7	51.0	1	30.7
SIEMENS	-154	41.2	41.2	51.0	1	41.2
SIEMENS	-154	26.7	26.7	51.0	1	26.7
SIEMENS	-154	35.5	35.4	51.0	1	35.4
SIEMENS	-154	33.4	33.3	51.0	1	33.3
SIEMENS	-154	36.7	36.6	51.0	1	36.6
SIEMENS	-154	32.4	32.4	51.0	1	32.4
SIEMENS	-154	45.1	45.0	51.0	1	45.0
SIEMENS	-154	33.4	33.3	51.0	1	33.3
SIEMENS	-154	34.0	33.9	51.0	1	33.9
SIEMENS	-154	30.7	30.7	51.0	1	30.7
SIEMENS	-154	26.7	26.7	51.0	1	26.7
GKSS	-154	33.7	36.2	51.0	1	36.2
GKSS	-154	42.7	46.9	51.0	1	46.9
GKSS	-154	37.2	40.4	51.0	1	40.4
GKSS	-154	54.4	60.8	51.0	0	51.0
GKSS	-154	34.6	37.3	51.0	1	37.3
GKSS	-154	44.2	48.7	51.0	1	48.7

Benchmark $T_o = -90.7$ °C

GKSS	-154	29.7	31.5	51.0	1	31.5
GKSS	-154	36.4	39.4	51.0	1	39.4
GKSS	-154	36.4	39.4	51.0	1	39.4
GKSS	-154	28.2	29.8	51.0	1	29.8
GKSS	-154	28.2	29.8	51.0	1	29.8
NE	-154	30.0	31.9	51.0	1	31.9
NE	-154	36.4	39.4	51.0	1	39.4
NE	-154	37.5	40.7	51.0	1	40.7
NE	-154	30.0	31.9	51.0	1	31.9
NE	-154	30.7	32.7	51.0	1	32.7
NE	-154	30.4	32.3	51.0	1	32.3
NE	-154	30.7	32.7	51.0	1	32.7
NE	-154	31.7	33.9	51.0	1	33.9
NE	-154	41.7	45.8	51.0	1	45.8
NE	-154	37.2	40.4	51.0	1	40.4
NE	-154	34.9	37.6	51.0	1	37.6
NE	-154	38.3	41.7	51.0	1	41.7
NE	-154	31.4	33.5	51.0	1	33.5
NE	-154	33.7	36.2	51.0	1	36.2
NE	-154	32.7	35.1	51.0	1	35.1
NE	-154	43.0	47.2	51.0	1	47.2
NE	-154	32.7	35.1	51.0	1	35.1
NE	-154	30.0	31.9	51.0	1	31.9
NE	-154	36.9	40.1	51.0	1	40.1
NE	-154	33.4	35.8	51.0	1	35.8
NE	-154	30.0	31.9	51.0	1	31.9
GKSS	-110	98.1	85.4	78.5	0	78.5
GKSS	-110	59.0	52.7	78.5	1	52.7
GKSS	-110	80.0	70.3	78.5	1	70.3
GKSS	-110	57.2	51.2	78.5	1	51.2
GKSS	-110	88.3	77.2	78.5	1	77.2
GKSS	-110	96.2	83.9	78.5	0	78.5
GKSS	-110	81.6	71.6	78.5	1	71.6
GKSS	-110	66.9	59.3	78.5	1	59.3
GKSS	-110	85.6	75.0	78.5	1	75.0
GKSS	-110	86.8	76.0	78.5	1	76.0
GKSS	-110	114.2	98.9	78.5	0	78.5
GKSS	-110	73.5	64.8	78.5	1	64.8
GKSS	-110	92.7	80.9	78.5	0	78.5
GKSS	-110	77.5	68.2	78.5	1	68.2
GKSS	-110	61.5	54.7	78.5	1	54.7
GKSS	-110	51.8	46.7	78.5	1	46.7
GKSS	-110	73.6	64.9	78.5	1	64.9
GKSS	-110	52.8	47.5	78.5	1	47.5
GKSS	-110	41.2	37.8	78.5	1	37.8
GKSS	-110	115.3	99.8	78.5	0	78.5
GKSS	-110	73.2	64.5	78.5	1	64.5
GKSS	-110	74.0	65.3	78.5	1	65.3
GKSS	-110	67.5	59.8	78.5	1	59.8
GKSS	-110	71.0	62.7	78.5	1	62.7
GKSS	-110	53.4	48.0	78.5	1	48.0
GKSS	-110	96.5	84.0	78.5	0	78.5
GKSS	-110	71.3	63.0	78.5	1	63.0
GKSS	-110	71.7	63.3	78.5	1	63.3
GKSS	-110	81.7	71.7	78.5	1	71.7
GKSS	-110	64.0	56.8	78.5	1	56.8
GKSS	-110	74.2	65.4	78.5	1	65.4
GKSS	-110	70.4	62.2	78.5	1	62.2
GKSS	-110	91.2	79.6	78.5	0	78.5
GKSS	-110	72.0	63.6	78.5	1	63.6
GKSS	-110	64.8	57.5	78.5	1	57.5
GKSS	-110	79.2	69.6	78.5	1	69.6
GKSS	-110	52.2	47.0	78.5	1	47.0
GKSS	-110	82.9	72.7	78.5	1	72.7
GKSS	-110	93.2	81.3	78.5	0	78.5
GKSS	-110	75.4	66.4	78.5	1	66.4
GKSS	-110	75.0	66.1	78.5	1	66.1
GKSS	-110	78.6	69.1	78.5	1	69.1
GKSS	-110	94.8	82.7	78.5	0	78.5
GKSS	-110	98.1	85.4	78.5	0	78.5
GKSS	-110	98.5	85.7	78.5	0	78.5
GKSS	-110	104.9	91.1	78.5	0	78.5
GKSS	-110	69.9	61.8	78.5	1	61.8
GKSS	-110	81.6	71.6	78.5	1	71.6
GKSS	-110	55.2	49.5	78.5	1	49.5
GKSS	-110	105.6	91.7	78.5	0	78.5
GKSS	-110	101.5	88.3	78.5	0	78.5
GKSS	-110	73.7	65.0	78.5	1	65.0
GKSS	-110	97.5	84.9	78.5	0	78.5
GKSS	-110	75.9	66.8	78.5	1	66.8
GKSS	-110	48.3	43.7	78.5	1	43.7
GKSS	-91	127.0	109.6	99.6	0	99.6
GKSS	-91	121.8	105.2	99.6	0	99.6
GKSS	-91	70.5	62.3	99.6	1	62.3
GKSS	-91	94.2	82.2	99.6	1	82.2
GKSS	-91	127.3	109.9	99.6	0	99.6
GKSS	-91	119.9	103.7	99.6	0	99.6
GKSS	-91	104.5	90.8	99.6	1	90.8

GKSS	-91	78.6	69.1	99.6	1	69.1
GKSS	-91	98.6	85.8	99.6	1	85.8
GKSS	-91	161.6	138.6	99.6	0	99.6
THA	-91	91.3	79.7	99.6	1	79.7
THA	-91	115.3	99.8	99.6	0	99.6
THA	-91	122.4	105.8	99.6	0	99.6
THA	-91	126.3	109.1	99.6	0	99.6
THA	-91	108.3	94.0	99.6	1	94.0
THA	-91	66.9	59.3	99.6	1	59.3
THA	-91	126.7	109.4	99.6	0	99.6
THA	-91	69.6	61.6	99.6	1	61.6
THA	-91	121.4	104.9	99.6	0	99.6
THA	-91	90.0	78.7	99.6	1	78.7
THA	-91	153.9	132.2	99.6	0	99.6
THA	-91	64.6	57.4	99.6	1	57.4
THA	-91	127.2	109.8	99.6	0	99.6
THA	-91	99.7	86.7	99.6	1	86.7
THA	-91	101.3	88.1	99.6	1	88.1
THA	-91	140.4	120.9	99.6	0	99.6
THA	-91	78.2	68.7	99.6	1	68.7
THA	-91	109.0	94.6	99.6	1	94.6
THA	-91	103.9	90.3	99.6	1	90.3
THA	-91	126.8	109.5	99.6	0	99.6
THA	-91	111.7	96.8	99.6	1	96.8
GKSS	-91	68.6	68.4	99.6	1	68.4
GKSS	-91	81.6	81.3	99.6	1	81.3
GKSS	-91	55.9	55.8	99.6	1	55.8
GKSS	-91	98.8	98.5	99.6	1	98.5
GKSS	-91	71.9	71.7	99.6	1	71.7
GKSS	-91	111.0	110.7	99.6	0	99.6
GKSS	-91	93.5	93.2	99.6	1	93.2
GKSS	-91	79.9	79.7	99.6	1	79.7
GKSS	-91	98.4	98.1	99.6	1	98.1
GKSS	-91	101.1	100.8	99.6	0	99.6
TWI	-91	79.6	79.4	99.6	1	79.4
TWI	-91	99.7	99.3	99.6	1	99.3
TWI	-91	108.1	107.7	99.6	0	99.6
TWI	-91	93.4	93.1	99.6	1	93.1
TWI	-91	62.0	61.8	99.6	1	61.8
TWI	-91	107.1	106.7	99.6	0	99.6
TWI	-91	145.3	144.8	99.6	0	99.6
TWI	-91	76.3	76.0	99.6	1	76.0
TWI	-91	126.5	126.1	99.6	0	99.6
TWI	-91	126.1	125.7	99.6	0	99.6
TWI	-91	128.5	128.0	99.6	0	99.6
TWI	-91	111.4	111.0	99.6	0	99.6
TWI	-91	130.4	130.0	99.6	0	99.6
TWI	-91	134.8	134.3	99.6	0	99.6
TWI	-91	157.3	156.7	99.6	0	99.6
TWI	-91	105.2	104.9	99.6	0	99.6
TWI	-91	109.8	109.4	99.6	0	99.6
TWI	-91	84.9	84.6	99.6	1	84.6
TWI	-91	62.8	62.7	99.6	1	62.7
TWI	-91	97.5	97.2	99.6	1	97.2
TWI	-91	80.2	79.9	99.6	1	79.9
TWI	-91	134.4	133.9	99.6	0	99.6
TWI	-91	65.1	65.0	99.6	1	65.0
TWI	-91	118.6	118.2	99.6	0	99.6
GKSS	-91	67.3	76.1	99.6	1	76.1
GKSS	-91	162.9	189.3	99.6	0	99.6
GKSS	-91	100.0	114.7	99.6	0	99.6
GKSS	-91	91.2	104.3	99.6	0	99.6
GKSS	-91	106.2	122.1	99.6	0	99.6
GKSS	-91	83.2	94.9	99.6	1	94.9
GKSS	-91	91.8	105.0	99.6	0	99.6
GKSS	-91	94.7	108.5	99.6	0	99.6
GKSS	-91	92.9	106.4	99.6	0	99.6
GKSS	-91	69.9	79.2	99.6	1	79.2
NE	-91	93.1	106.6	99.6	0	99.6
NE	-91	97.9	112.2	99.6	0	99.6
NE	-91	73.7	83.7	99.6	1	83.7
NE	-91	82.0	93.4	99.6	1	93.4
NE	-91	76.3	86.7	99.6	1	86.7
NE	-91	93.1	106.6	99.6	0	99.6
NE	-91	83.7	95.5	99.6	1	95.5
NE	-91	82.1	93.6	99.6	1	93.6
NE	-91	86.8	99.2	99.6	1	99.2
NE	-91	86.7	99.0	99.6	1	99.0
NE	-91	92.3	105.7	99.6	0	99.6
NE	-91	83.1	94.8	99.6	1	94.8
NE	-91	88.9	101.6	99.6	0	99.6
NE	-91	64.3	72.5	99.6	1	72.5
NE	-91	101.6	116.7	99.6	0	99.6
NE	-91	94.2	107.9	99.6	0	99.6
NE	-91	78.7	89.5	99.6	1	89.5
NE	-91	73.0	82.8	99.6	1	82.8
NE	-91	64.2	72.3	99.6	1	72.3
NE	-91	98.9	113.5	99.6	0	99.6

GKSS	-91	103.2	137.2	99.6	0	99.6
GKSS	-91	84.4	110.7	99.6	0	99.6
GKSS	-91	97.0	128.5	99.6	0	99.6
GKSS	-91	92.7	122.4	99.6	0	99.6
GKSS	-91	96.8	128.2	99.6	0	99.6
NE	-91	73.6	95.5	99.6	1	95.5
NE	-91	73.0	94.7	99.6	1	94.7
NE	-91	73.3	95.1	99.6	1	95.1
NE	-91	53.8	67.7	99.6	1	67.7
NE	-91	69.5	89.7	99.6	1	89.7
NE	-91	65.5	84.0	99.6	1	84.0
NE	-91	79.6	104.0	99.6	0	99.6
NE	-91	69.8	90.1	99.6	1	90.1
NE	-91	90.3	119.0	99.6	0	99.6
NE	-91	88.0	115.8	99.6	0	99.6
GKSS	-60	205.5	175.4	155.4	0	155.4
GKSS	-60	114.4	99.1	155.4	1	99.1
GKSS	-60	130.7	112.7	155.4	1	112.7
GKSS	-60	106.7	92.6	155.4	1	92.6
GKSS	-60	161.0	138.1	155.4	1	138.1
GKSS	-60	200.7	171.3	155.4	0	155.4
GKSS	-60	125.2	108.1	155.4	1	108.1
GKSS	-60	145.1	124.8	155.4	1	124.8
GKSS	-60	91.9	80.2	155.4	1	80.2
GKSS	-60	128.1	110.6	155.4	1	110.6
GKSS	-60	164.4	140.9	155.4	1	140.9
GKSS	-60	192.2	164.3	155.4	0	155.4
GKSS	-60	166.3	142.5	155.4	1	142.5
GKSS	-60	177.7	152.1	155.4	1	152.1
GKSS	-60	202.0	172.5	155.4	0	155.4
GKSS	-60	116.0	100.4	155.4	1	100.4
GKSS	-60	202.0	172.5	155.4	0	155.4
GKSS	-60	167.6	143.6	155.4	1	143.6
GKSS	-60	89.8	78.5	155.4	1	78.5
GKSS	-60	156.3	134.1	155.4	1	134.1
GKSS	-60	186.8	159.7	155.4	0	155.4
GKSS	-60	203.2	173.4	155.4	0	155.4
GKSS	-60	164.6	141.1	155.4	1	141.1
GKSS	-60	202.6	173.0	155.4	0	155.4
GKSS	-60	185.9	159.0	155.4	0	155.4
GKSS	-60	127.7	110.2	155.4	1	110.2
GKSS	-60	201.2	171.7	155.4	0	155.4
GKSS	-60	115.6	100.0	155.4	1	100.0
GKSS	-60	107.5	93.3	155.4	1	93.3
SIEMENS	-60	164.6	141.1	155.4	1	141.1
SIEMENS	-60	172.0	147.3	155.4	1	147.3
SIEMENS	-60	108.5	94.2	155.4	1	94.2
SIEMENS	-60	119.0	102.9	155.4	1	102.9
SIEMENS	-60	153.5	131.8	155.4	1	131.8
SIEMENS	-60	158.9	136.4	155.4	1	136.4
SIEMENS	-60	137.5	118.4	155.4	1	118.4
SIEMENS	-60	119.5	103.3	155.4	1	103.3
SIEMENS	-60	130.7	112.8	155.4	1	112.8
SIEMENS	-60	172.6	147.8	155.4	1	147.8
SIEMENS	-60	84.5	74.0	155.4	1	74.0
SIEMENS	-60	213.4	182.0	155.4	0	155.4
SIEMENS	-60	120.4	104.1	155.4	1	104.1
SIEMENS	-60	104.5	90.8	155.4	1	90.8
SIEMENS	-60	163.6	140.2	155.4	1	140.2
SIEMENS	-60	201.4	172.0	155.4	0	155.4
SIEMENS	-60	137.8	118.7	155.4	1	118.7
SIEMENS	-60	173.0	148.1	155.4	1	148.1
SIEMENS	-60	99.2	86.4	155.4	1	86.4
SIEMENS	-60	173.4	148.4	155.4	1	148.4
SIEMENS	-60	131.5	113.4	155.4	1	113.4
GKSS	-60	186.0	185.3	155.4	0	155.4
GKSS	-60	151.8	151.3	155.4	1	151.3
GKSS	-60	111.7	111.3	155.4	1	111.3
GKSS	-60	143.9	143.4	155.4	1	143.4
GKSS	-60	105.4	105.1	155.4	1	105.1
GKSS	-60	154.0	153.4	155.4	1	153.4
GKSS	-60	176.2	175.6	155.4	0	155.4
GKSS	-60	131.9	131.5	155.4	1	131.5
GKSS	-60	203.9	203.2	155.4	0	155.4
GKSS	-60	142.7	142.2	155.4	1	142.2
TWI	-60	134.5	134.0	155.4	1	134.0
TWI	-60	130.1	129.7	155.4	1	129.7
TWI	-60	142.6	142.1	155.4	1	142.1
TWI	-60	119.7	119.3	155.4	1	119.3
TWI	-60	141.3	140.8	155.4	1	140.8
TWI	-60	175.9	175.3	155.4	0	155.4
TWI	-60	119.6	119.2	155.4	1	119.2
TWI	-60	102.4	102.0	155.4	1	102.0
TWI	-60	99.0	98.7	155.4	1	98.7
TWI	-60	115.1	114.7	155.4	1	114.7
TWI	-60	172.9	172.3	155.4	0	155.4
TWI	-60	120.5	120.2	155.4	1	120.2
TWI	-60	165.2	164.6	155.4	0	155.4

TWI	-60	125.6	125.2	155.4	1	125.2
TWI	-60	126.7	126.3	155.4	1	126.3
TWI	-60	100.4	100.1	155.4	1	100.1
TWI	-60	131.1	130.7	155.4	1	130.7
TWI	-60	185.1	184.5	155.4	0	155.4
TWI	-60	163.6	163.0	155.4	0	155.4
TWI	-60	126.5	126.1	155.4	1	126.1
TWI	-60	164.7	164.1	155.4	0	155.4
TWI	-60	192.7	192.0	155.4	0	155.4
TWI	-60	134.5	134.1	155.4	1	134.1
TWI	-60	140.8	140.3	155.4	1	140.3
GKSS	-60	109.9	126.5	155.4	1	126.5
GKSS	-60	131.9	152.5	155.4	1	152.5
GKSS	-60	136.2	157.6	155.4	0	155.4
GKSS	-60	154.0	178.8	155.4	0	155.4
GKSS	-60	115.9	133.6	155.4	1	133.6
GKSS	-60	150.4	174.4	155.4	0	155.4
BAM	-40	171.0	146.5	213.4	1	146.5
BAM	-40	206.2	176.0	213.4	1	176.0
BAM	-40	169.4	145.1	213.4	1	145.1
BAM	-40	203.6	173.7	213.4	1	173.7
BAM	-40	202.5	172.9	213.4	1	172.9
BAM	-40	207.2	176.8	213.4	1	176.8
BAM	-40	205.9	175.7	213.4	1	175.7
BAM	-40	206.5	176.2	213.4	1	176.2
BAM	-40	207.3	176.9	213.4	1	176.9
BAM	-40	205.1	175.1	213.4	1	175.1
BAM	-40	202.8	173.1	213.4	1	173.1
BAM	-40	204.9	174.8	213.4	1	174.8
BAM	-40	205.2	175.1	213.4	1	175.1
BAM	-40	113.7	98.5	213.4	1	98.5
BAM	-40	204.8	174.8	213.4	1	174.8
BAM	-40	154.2	132.4	213.4	1	132.4
BAM	-40	206.2	176.0	213.4	1	176.0
BAM	-40	204.2	174.3	213.4	1	174.3
BAM	-40	207.3	176.9	213.4	1	176.9
BAM	-40	202.5	172.8	213.4	1	172.8
GKSS	-40	180.6	154.6	213.4	1	154.6
GKSS	-40	203.5	173.7	213.4	1	173.7
GKSS	-40	198.2	169.3	213.4	1	169.3
GKSS	-40	199.6	170.5	213.4	1	170.5
GKSS	-40	186.4	159.4	213.4	1	159.4
GKSS	-40	199.4	170.3	213.4	1	170.3
GKSS	-40	204.4	174.4	213.4	1	174.4
GKSS	-40	202.4	172.7	213.4	1	172.7
GKSS	-40	203.2	173.4	213.4	1	173.4
GKSS	-40	200.9	171.5	213.4	1	171.5
BAM	-40	187.3	186.6	213.4	1	186.6
BAM	-40	101.5	101.2	213.4	1	101.2
BAM	-40	140.3	139.9	213.4	1	139.9
BAM	-40	150.2	149.7	213.4	1	149.7
BAM	-40	187.3	186.6	213.4	1	186.6
BAM	-40	211.4	210.6	213.4	1	210.6
BAM	-40	160.5	160.0	213.4	1	160.0
BAM	-40	214.6	213.8	213.4	0	213.4
BAM	-40	188.3	187.7	213.4	1	187.7
BAM	-40	239.3	238.4	213.4	0	213.4
BAM	-40	112.8	112.4	213.4	1	112.4
BAM	-40	239.0	238.1	213.4	0	213.4
BAM	-40	284.9	283.9	213.4	0	213.4
BAM	-40	254.7	253.7	213.4	0	213.4
BAM	-40	270.9	269.9	213.4	0	213.4
BAM	-40	187.0	186.3	213.4	1	186.3
BAM	-40	170.1	169.5	213.4	1	169.5
BAM	-40	256.4	255.5	213.4	0	213.4
BAM	-40	171.4	170.8	213.4	1	170.8
BAM	-40	103.1	102.8	213.4	1	102.8
BAM	-40	230.0	229.1	213.4	0	213.4
BAM	-40	210.0	209.2	213.4	1	209.2
GKSS	-40	198.2	197.5	213.4	1	197.5
GKSS	-40	150.2	149.7	213.4	1	149.7
GKSS	-40	226.8	226.0	213.4	0	213.4
GKSS	-40	158.1	157.5	213.4	1	157.5
GKSS	-40	256.4	255.5	213.4	0	213.4
GKSS	-40	207.6	206.9	213.4	1	206.9
GKSS	-40	213.5	212.8	213.4	1	212.8
GKSS	-40	254.6	253.7	213.4	0	213.4
GKSS	-40	240.0	239.1	213.4	0	213.4
GKSS	-40	279.0	278.0	213.4	0	213.4
GKSS	-40	125.9	145.5	213.4	1	145.5
GKSS	-40	128.9	149.0	213.4	1	149.0
GKSS	-40	198.5	231.5	213.4	0	213.4
GKSS	-40	212.0	247.5	213.4	0	213.4
GKSS	-40	138.6	160.5	213.4	1	160.5
GKSS	-40	187.7	218.7	213.4	0	213.4
GKSS	-40	173.0	201.2	213.4	1	201.2
GKSS	-40	179.5	208.9	213.4	1	208.9
GKSS	-40	152.6	177.1	213.4	1	177.1

GKSS	-40	153.6	178.3	213.4	1	178.3
THA	-40	144.6	167.6	213.4	1	167.6
THA	-40	150.7	174.9	213.4	1	174.9
THA	-40	139.1	161.0	213.4	1	161.0
THA	-40	183.6	213.8	213.4	0	213.4
THA	-40	142.0	164.5	213.4	1	164.5
THA	-40	187.2	218.0	213.4	0	213.4
THA	-40	172.2	200.3	213.4	1	200.3
THA	-40	198.0	230.8	213.4	0	213.4
THA	-40	130.4	150.8	213.4	1	150.8
THA	-40	141.7	164.1	213.4	1	164.1
THA	-40	134.5	155.6	213.4	1	155.6
THA	-40	115.5	133.1	213.4	1	133.1
THA	-40	91.7	104.9	213.4	1	104.9
THA	-40	141.1	163.4	213.4	1	163.4
THA	-40	239.1	279.6	213.4	0	213.4
THA	-40	243.4	284.7	213.4	0	213.4
THA	-40	191.9	223.6	213.4	0	213.4
THA	-40	146.8	170.2	213.4	1	170.2
THA	-40	161.4	187.5	213.4	1	187.5
THA	-40	142.3	164.8	213.4	1	164.8
CISE	-20	128.7	111.1	298.2	1	111.1
CISE	-20	146.9	126.3	298.2	1	126.3
CISE	-20	204.3	174.4	298.2	1	174.4
CISE	-20	198.3	169.3	298.2	1	169.3
CISE	-20	195.0	166.6	298.2	1	166.6
CISE	-20	197.8	168.9	298.2	1	168.9
CISE	-20	195.6	167.1	298.2	1	167.1
CISE	-20	196.2	167.6	298.2	1	167.6
CISE	-20	194.0	165.7	298.2	1	165.7
CISE	-20	198.3	169.3	298.2	1	169.3
CISE	-20	201.2	171.8	298.2	1	171.8
CISE	-20	200.9	171.5	298.2	1	171.5
CISE	-20	195.6	167.1	298.2	1	167.1
CISE	-20	197.6	168.8	298.2	1	168.8
CISE	-20	201.9	172.4	298.2	1	172.4
CISE	-20	202.5	172.8	298.2	1	172.8
CISE	-20	198.1	169.2	298.2	1	169.2
CISE	-20	198.1	169.2	298.2	1	169.2
CISE	-20	200.7	171.3	298.2	1	171.3
CISE	-20	199.8	170.6	298.2	1	170.6
CISE	-20	201.5	172.0	298.2	1	172.0
GKSS	-20	200.6	171.2	298.2	1	171.2
GKSS	-20	200.6	171.2	298.2	1	171.2
GKSS	-20	199.8	170.6	298.2	1	170.6
GKSS	-20	198.2	169.2	298.2	1	169.2
GKSS	-20	199.3	170.2	298.2	1	170.2
GKSS	-20	196.6	167.9	298.2	1	167.9
GKSS	-20	198.6	169.6	298.2	1	169.6
GKSS	-20	200.7	171.3	298.2	1	171.3
GKSS	-20	195.0	166.6	298.2	1	166.6
GKSS	-20	198.6	169.6	298.2	1	169.6
GKSS	-20	202.5	201.7	298.2	1	201.7
GKSS	-20	194.7	194.1	298.2	1	194.1
GKSS	-20	262.8	261.8	298.2	1	261.8
GKSS	-20	187.9	187.2	298.2	1	187.2
GKSS	-20	275.8	274.8	298.2	1	274.8
GKSS	-20	261.8	260.9	298.2	1	260.9
GKSS	-20	283.2	282.2	298.2	1	282.2
GKSS	-20	283.1	282.0	298.2	1	282.0
GKSS	-20	284.0	283.0	298.2	1	283.0
GKSS	-20	284.2	283.1	298.2	1	283.1
VTT	-20	284.0	282.9	298.2	1	282.9
VTT	-20	231.9	231.0	298.2	1	231.0
VTT	-20	279.4	278.3	298.2	1	278.3
VTT	-20	280.3	279.2	298.2	1	279.2
VTT	-20	279.4	278.3	298.2	1	278.3
VTT	-20	278.6	277.5	298.2	1	277.5
VTT	-20	281.9	280.9	298.2	1	280.9
VTT	-20	279.4	278.3	298.2	1	278.3
VTT	-20	282.5	281.4	298.2	1	281.4
VTT	-20	247.2	246.3	298.2	1	246.3
VTT	-20	233.2	232.4	298.2	1	232.4
VTT	-20	283.2	282.2	298.2	1	282.2
VTT	-20	288.9	287.8	298.2	1	287.8
VTT	-20	263.2	262.3	298.2	1	262.3
VTT	-20	184.4	183.8	298.2	1	183.8
VTT	-20	283.7	282.7	298.2	1	282.7
VTT	-20	280.8	279.8	298.2	1	279.8
VTT	-20	280.9	279.8	298.2	1	279.8
VTT	-20	280.9	279.8	298.2	1	279.8
VTT	-20	170.9	170.3	298.2	1	170.3
VTT	-20	282.9	281.9	298.2	1	281.9
VTT	-20	275.7	274.6	298.2	1	274.6
VTT	-20	228.2	227.4	298.2	1	227.4
VTT	-20	282.0	281.0	298.2	1	281.0
VTT	-20	280.9	279.8	298.2	1	279.8
VTT	-20	281.8	280.7	298.2	1	280.7

VTT	-20	281.4	280.4	298.2	1	280.4
VTT	-20	227.3	226.5	298.2	1	226.5
VTT	-20	201.3	200.6	298.2	1	200.6
VTT	-20	212.5	211.7	298.2	1	211.7
VTT	-20	256.5	255.5	298.2	1	255.5
VTT	-20	284.8	283.8	298.2	1	283.8
VTT	-20	282.3	281.3	298.2	1	281.3
VTT	-20	269.6	268.6	298.2	1	268.6
VTT	-20	184.4	183.8	298.2	1	183.8
VTT	-20	241.6	240.7	298.2	1	240.7
VTT	-20	146.4	145.9	298.2	1	145.9
VTT	-20	280.0	279.0	298.2	1	279.0
VTT	-20	156.7	156.2	298.2	1	156.2
VTT	-20	277.0	276.0	298.2	1	276.0
CISE	-20	167.4	194.6	298.2	1	194.6
CISE	-20	153.5	178.1	298.2	1	178.1
CISE	-20	211.2	246.5	298.2	1	246.5
CISE	-20	220.3	257.3	298.2	1	257.3
CISE	-20	227.9	266.2	298.2	1	266.2
CISE	-20	211.1	246.4	298.2	1	246.4
CISE	-20	217.1	253.4	298.2	1	253.4
CISE	-20	145.3	168.5	298.2	1	168.5
CISE	-20	161.2	187.2	298.2	1	187.2
CISE	-20	131.9	152.5	298.2	1	152.5
CISE	-20	216.4	252.6	298.2	1	252.6
CISE	-20	125.0	144.4	298.2	1	144.4
CISE	-20	378.7	444.9	298.2	0	298.2
CISE	-20	246.1	287.9	298.2	1	287.9
CISE	-20	250.9	293.5	298.2	1	293.5
CISE	-20	251.5	294.3	298.2	1	294.3
CISE	-20	284.0	332.7	298.2	0	298.2
CISE	-20	261.1	305.6	298.2	0	298.2
CISE	-20	351.6	412.8	298.2	0	298.2
CISE	-20	258.5	302.5	298.2	0	298.2
GKSS	-20	201.3	234.8	298.2	1	234.8
GKSS	-20	110.9	127.7	298.2	1	127.7
GKSS	-20	197.7	230.5	298.2	1	230.5
GKSS	-20	198.9	231.9	298.2	1	231.9
GKSS	-20	200.6	234.0	298.2	1	234.0
GKSS	-20	165.7	192.6	298.2	1	192.6
GKSS	-20	280.1	328.0	298.2	0	298.2
GKSS	-20	279.5	327.3	298.2	0	298.2
GKSS	-20	257.6	301.4	298.2	0	298.2
GKSS	-20	265.2	310.4	298.2	0	298.2
GKSS	-20	156.7	212.6	298.2	1	212.6
GKSS	-20	221.7	304.1	298.2	0	298.2
GKSS	-20	193.9	264.9	298.2	1	264.9
GKSS	-20	191.7	261.9	298.2	1	261.9
GKSS	-20	184.4	251.6	298.2	1	251.6
NE	-20	186.7	254.8	298.2	1	254.8
NE	-20	184.4	251.6	298.2	1	251.6
NE	-20	193.9	264.9	298.2	1	264.9
NE	-20	204.4	279.8	298.2	1	279.8
NE	-20	224.0	307.4	298.2	0	298.2
NE	-20	153.4	207.9	298.2	1	207.9
NE	-20	222.6	305.4	298.2	0	298.2
NE	-20	162.0	220.0	298.2	1	220.0
NE	-20	187.8	256.4	298.2	1	256.4
NE	-20	198.2	271.0	298.2	1	271.0
SCK-CEN	-10	280.0	279.0	354.3	1	279.0
SCK-CEN	-10	281.2	280.2	354.3	1	280.2
SCK-CEN	-10	282.6	281.5	354.3	1	281.5
SCK-CEN	-10	284.0	282.9	354.3	1	282.9
SCK-CEN	-10	280.9	279.9	354.3	1	279.9
GKSS	0	196.8	168.1	422.2	1	168.1
GKSS	0	193.7	165.5	422.2	1	165.5
GKSS	0	192.9	164.8	422.2	1	164.8
GKSS	0	196.7	168.0	422.2	1	168.0
GKSS	0	196.1	167.5	422.2	1	167.5
GKSS	0	194.7	166.3	422.2	1	166.3
GKSS	0	196.3	167.7	422.2	1	167.7
GKSS	0	195.9	167.3	422.2	1	167.3
GKSS	0	195.2	166.8	422.2	1	166.8
GKSS	0	193.3	165.1	422.2	1	165.1
SCK-CEN	0	198.4	169.4	422.2	1	169.4
SCK-CEN	0	199.1	170.0	422.2	1	170.0
SCK-CEN	0	198.2	169.2	422.2	1	169.2
SCK-CEN	0	197.6	168.8	422.2	1	168.8
SCK-CEN	0	201.2	171.8	422.2	1	171.8
SCK-CEN	0	200.0	170.8	422.2	1	170.8
SCK-CEN	0	197.4	168.6	422.2	1	168.6
SCK-CEN	0	199.6	170.4	422.2	1	170.4
SCK-CEN	0	203.4	173.6	422.2	1	173.6
SCK-CEN	0	199.2	170.1	422.2	1	170.1
SCK-CEN	0	200.5	171.2	422.2	1	171.2
SCK-CEN	0	202.4	172.7	422.2	1	172.7
SCK-CEN	0	197.2	168.4	422.2	1	168.4
SCK-CEN	0	205.8	175.6	422.2	1	175.6

SCK-CEN	0	205.5	175.4	422.2	1	175.4
SCK-CEN	0	202.4	172.7	422.2	1	172.7
SCK-CEN	0	203.4	173.6	422.2	1	173.6
SCK-CEN	0	205.2	175.1	422.2	1	175.1
SCK-CEN	0	202.3	172.7	422.2	1	172.7
SCK-CEN	0	201.6	172.1	422.2	1	172.1
GKSS	0	282.4	281.4	422.2	1	281.4
GKSS	0	283.7	282.7	422.2	1	282.7
GKSS	0	284.9	283.9	422.2	1	283.9
GKSS	0	282.8	281.8	422.2	1	281.8
GKSS	0	284.4	283.4	422.2	1	283.4
GKSS	0	284.9	283.8	422.2	1	283.8
GKSS	0	279.6	278.6	422.2	1	278.6
GKSS	0	283.9	282.8	422.2	1	282.8
GKSS	0	285.7	284.7	422.2	1	284.7
GKSS	0	283.0	281.9	422.2	1	281.9
SCK-CEN	0	277.0	276.0	422.2	1	276.0
SCK-CEN	0	276.7	275.7	422.2	1	275.7
SCK-CEN	0	276.9	275.9	422.2	1	275.9
SCK-CEN	0	277.9	276.8	422.2	1	276.8
SCK-CEN	0	276.9	275.9	422.2	1	275.9
SCK-CEN	0	278.2	277.2	422.2	1	277.2
SCK-CEN	0	278.0	277.0	422.2	1	277.0
SCK-CEN	0	275.9	274.9	422.2	1	274.9
SCK-CEN	0	277.6	276.6	422.2	1	276.6
SCK-CEN	0	278.2	277.2	422.2	1	277.2
SCK-CEN	0	277.3	276.3	422.2	1	276.3
VTT	0	280.3	279.3	422.2	1	279.3
VTT	0	275.5	274.5	422.2	1	274.5
VTT	0	280.3	279.3	422.2	1	279.3
VTT	0	275.2	274.2	422.2	1	274.2
VTT	0	278.0	277.0	422.2	1	277.0
VTT	0	278.5	277.5	422.2	1	277.5
VTT	0	279.7	278.6	422.2	1	278.6
VTT	0	267.2	266.2	422.2	1	266.2
VTT	0	279.8	278.8	422.2	1	278.8
VTT	0	278.6	277.6	422.2	1	277.6
VTT	0	278.3	277.3	422.2	1	277.3
VTT	0	280.0	278.9	422.2	1	278.9
VTT	0	274.3	273.3	422.2	1	273.3
VTT	0	276.0	275.0	422.2	1	275.0
VTT	0	278.7	277.7	422.2	1	277.7
VTT	0	278.0	277.0	422.2	1	277.0
VTT	0	279.1	278.0	422.2	1	278.0
VTT	0	278.6	277.5	422.2	1	277.5
VTT	0	279.4	278.4	422.2	1	278.4
VTT	0	276.2	275.2	422.2	1	275.2
GKSS	0	191.3	222.9	422.2	1	222.9
GKSS	0	269.2	315.2	422.2	1	315.2
GKSS	0	281.2	329.4	422.2	1	329.4
GKSS	0	242.5	283.5	422.2	1	283.5
GKSS	0	318.3	373.3	422.2	1	373.3
GKSS	0	395.4	464.7	422.2	0	422.2
GKSS	0	396.5	465.9	422.2	0	422.2
GKSS	0	394.9	464.1	422.2	0	422.2
GKSS	0	396.3	465.7	422.2	0	422.2
GKSS	0	266.6	312.1	422.2	1	312.1
GKSS	0	395.2	464.4	422.2	0	422.2
GKSS	0	362.9	426.1	422.2	0	422.2
GKSS	0	331.8	389.3	422.2	1	389.3
GKSS	0	227.1	265.3	422.2	1	265.3
GKSS	0	309.5	362.9	422.2	1	362.9
GKSS	0	395.4	464.7	422.2	0	422.2
GKSS	0	210.9	246.1	422.2	1	246.1
GKSS	0	394.9	464.1	422.2	0	422.2
GKSS	0	211.4	246.7	422.2	1	246.7
GKSS	0	393.9	462.8	422.2	0	422.2
GKSS	0	263.4	308.3	422.2	1	308.3
GKSS	0	393.3	462.1	422.2	0	422.2
GKSS	0	386.7	454.3	422.2	0	422.2
GKSS	0	376.2	441.9	422.2	0	422.2
GKSS	0	394.4	463.5	422.2	0	422.2
GKSS	0	306.7	359.6	422.2	1	359.6
GKSS	0	394.8	464.0	422.2	0	422.2
GKSS	0	393.9	462.8	422.2	0	422.2
GKSS	0	246.4	288.2	422.2	1	288.2
GKSS	0	320.1	375.4	422.2	1	375.4
CISE	0	233.3	320.4	422.2	1	320.4
CISE	0	238.2	327.4	422.2	1	327.4
CISE	0	208.3	285.2	422.2	1	285.2
CISE	0	421.7	585.8	422.2	0	422.2
CISE	0	226.7	311.2	422.2	1	311.2
CISE	0	267.0	367.9	422.2	1	367.9
CISE	0	163.0	221.4	422.2	1	221.4
CISE	0	165.8	225.4	422.2	1	225.4
CISE	0	285.9	394.6	422.2	1	394.6
CISE	0	342.0	473.5	422.2	0	422.2
GKSS	0	314.9	435.4	422.2	0	422.2

GKSS	0	307.6	425.1	422.2	0	422.2
GKSS	0	383.0	531.4	422.2	0	422.2
GKSS	0	332.6	460.4	422.2	0	422.2
GKSS	0	223.6	306.8	422.2	1	306.8
GKSS	0	442.2	614.7	422.2	0	422.2

2. Analysis of the censored data and obtainment of a new estimate of T_0

Specimen code	T (°C)	$K_{Jc[exp]}$ (MPa√m)	K_{Jc-T} (MPa√m)	$K_{analysis}$ (MPa√m)	δ_i	1° member	2° member
GKSS	-154	54.8	49.1	49.1	1	0.0000	0.0000
GKSS	-154	49.8	44.9	44.9	1	0.0000	0.0000
GKSS	-154	37.8	34.9	34.9	1	0.0000	0.0000
GKSS	-154	33.0	30.9	30.9	1	0.0000	0.0000
GKSS	-154	38.9	35.8	35.8	1	0.0000	0.0000
GKSS	-154	24.2	23.6	23.6	1	0.0000	0.0000
GKSS	-154	47.4	43.0	43.0	1	0.0000	0.0000
GKSS	-154	46.5	42.2	42.2	1	0.0000	0.0000
GKSS	-154	31.4	29.6	29.6	1	0.0000	0.0000
GKSS	-154	39.2	36.0	36.0	1	0.0000	0.0000
GKSS	-154	24.2	23.6	23.6	1	0.0000	0.0000
SIEMENS	-154	33.0	30.9	30.9	1	0.0000	0.0000
SIEMENS	-154	41.0	37.6	37.6	1	0.0000	0.0000
SIEMENS	-154	31.7	29.8	29.8	1	0.0000	0.0000
SIEMENS	-154	35.2	32.7	32.7	1	0.0000	0.0000
SIEMENS	-154	44.4	40.5	40.5	1	0.0000	0.0000
SIEMENS	-154	41.5	38.0	38.0	1	0.0000	0.0000
SIEMENS	-154	32.7	30.7	30.7	1	0.0000	0.0000
SIEMENS	-154	34.3	32.0	32.0	1	0.0000	0.0000
SIEMENS	-154	36.7	34.0	34.0	1	0.0000	0.0000
SIEMENS	-154	39.7	36.5	36.5	1	0.0000	0.0000
SIEMENS	-154	46.1	41.8	41.8	1	0.0000	0.0000
SIEMENS	-154	34.6	32.2	32.2	1	0.0000	0.0000
SIEMENS	-154	35.8	33.2	33.2	1	0.0000	0.0000
SIEMENS	-154	29.3	27.8	27.8	1	0.0000	0.0000
SIEMENS	-154	28.6	27.2	27.2	1	0.0000	0.0000
SIEMENS	-154	38.6	35.6	35.6	1	0.0000	0.0000
SIEMENS	-154	44.4	40.5	40.5	1	0.0000	0.0000
SIEMENS	-154	48.9	44.2	44.2	1	0.0000	0.0000
SIEMENS	-154	38.9	35.8	35.8	1	0.0000	0.0000
SIEMENS	-154	36.7	34.0	34.0	1	0.0000	0.0000
SIEMENS	-154	31.7	29.8	29.8	1	0.0000	0.0000
GKSS	-154	41.5	41.4	41.4	1	0.0000	0.0000
GKSS	-154	42.2	42.2	42.2	1	0.0000	0.0000
GKSS	-154	50.0	49.9	49.9	1	0.0000	0.0000
GKSS	-154	34.0	33.9	33.9	1	0.0000	0.0000
GKSS	-154	41.7	41.7	41.7	1	0.0000	0.0000
GKSS	-154	46.1	46.0	46.0	1	0.0000	0.0000
GKSS	-154	44.2	44.1	44.1	1	0.0000	0.0000
GKSS	-154	36.7	36.6	36.6	1	0.0000	0.0000
GKSS	-154	29.0	28.9	28.9	1	0.0000	0.0000
GKSS	-154	53.0	52.9	51.0	0	0.0000	0.0000
GKSS	-154	39.4	39.3	39.3	1	0.0000	0.0000
GKSS	-154	29.0	28.9	28.9	1	0.0000	0.0000
SIEMENS	-154	34.6	34.5	34.5	1	0.0000	0.0000
SIEMENS	-154	33.0	33.0	33.0	1	0.0000	0.0000
SIEMENS	-154	38.1	38.0	38.0	1	0.0000	0.0000
SIEMENS	-154	28.6	28.6	28.6	1	0.0000	0.0000
SIEMENS	-154	28.6	28.6	28.6	1	0.0000	0.0000
SIEMENS	-154	38.6	38.5	38.5	1	0.0000	0.0000
SIEMENS	-154	36.4	36.3	36.3	1	0.0000	0.0000
SIEMENS	-154	33.4	33.3	33.3	1	0.0000	0.0000
SIEMENS	-154	36.9	36.9	36.9	1	0.0000	0.0000
SIEMENS	-154	31.1	31.0	31.0	1	0.0000	0.0000
SIEMENS	-154	34.3	34.2	34.2	1	0.0000	0.0000
SIEMENS	-154	30.4	30.4	30.4	1	0.0000	0.0000
SIEMENS	-154	49.6	49.5	49.5	1	0.0000	0.0000
SIEMENS	-154	41.0	40.9	40.9	1	0.0000	0.0000
SIEMENS	-154	34.0	33.9	33.9	1	0.0000	0.0000
SIEMENS	-154	30.7	30.7	30.7	1	0.0000	0.0000
SIEMENS	-154	41.2	41.2	41.2	1	0.0000	0.0000
SIEMENS	-154	26.7	26.7	26.7	1	0.0000	0.0000
SIEMENS	-154	35.5	35.4	35.4	1	0.0000	0.0000
SIEMENS	-154	33.4	33.3	33.3	1	0.0000	0.0000
SIEMENS	-154	36.7	36.6	36.6	1	0.0000	0.0000
SIEMENS	-154	32.4	32.4	32.4	1	0.0000	0.0000
SIEMENS	-154	45.1	45.0	45.0	1	0.0000	0.0000
SIEMENS	-154	33.4	33.3	33.3	1	0.0000	0.0000
SIEMENS	-154	34.0	33.9	33.9	1	0.0000	0.0000
SIEMENS	-154	30.7	30.7	30.7	1	0.0000	0.0000
SIEMENS	-154	26.7	26.7	26.7	1	0.0000	0.0000
GKSS	-154	33.7	36.2	36.2	1	0.0000	0.0000
GKSS	-154	42.7	46.9	46.9	1	0.0000	0.0000
GKSS	-154	37.2	40.4	40.4	1	0.0000	0.0000
GKSS	-154	54.4	60.8	51.0	0	0.0000	0.0000

USE LIMITS : YES

T limits
-136
-36

Sum of 1° member: 2.723

Sum of 2° member: 2.723

Difference: 0.000

$T_0 = -90.8$ °C

Use new estimate as benchmark

N = 698
r = 547

$K_{min} = 20$ MPa√m

$K_{o,eq} = 143.0$ MPa√m

$K_{med,eq} = 132.2$ MPa√m

GKSS	-154	34.6	37.3	37.3	1	0.0000	0.0000
GKSS	-154	44.2	48.7	48.7	1	0.0000	0.0000
GKSS	-154	29.7	31.5	31.5	1	0.0000	0.0000
GKSS	-154	36.4	39.4	39.4	1	0.0000	0.0000
GKSS	-154	36.4	39.4	39.4	1	0.0000	0.0000
GKSS	-154	28.2	29.8	29.8	1	0.0000	0.0000
GKSS	-154	28.2	29.8	29.8	1	0.0000	0.0000
NE	-154	30.0	31.9	31.9	1	0.0000	0.0000
NE	-154	36.4	39.4	39.4	1	0.0000	0.0000
NE	-154	37.5	40.7	40.7	1	0.0000	0.0000
NE	-154	30.0	31.9	31.9	1	0.0000	0.0000
NE	-154	30.7	32.7	32.7	1	0.0000	0.0000
NE	-154	30.4	32.3	32.3	1	0.0000	0.0000
NE	-154	30.7	32.7	32.7	1	0.0000	0.0000
NE	-154	31.7	33.9	33.9	1	0.0000	0.0000
NE	-154	41.7	45.8	45.8	1	0.0000	0.0000
NE	-154	37.2	40.4	40.4	1	0.0000	0.0000
NE	-154	34.9	37.6	37.6	1	0.0000	0.0000
NE	-154	38.3	41.7	41.7	1	0.0000	0.0000
NE	-154	31.4	33.5	33.5	1	0.0000	0.0000
NE	-154	33.7	36.2	36.2	1	0.0000	0.0000
NE	-154	32.7	35.1	35.1	1	0.0000	0.0000
NE	-154	43.0	47.2	47.2	1	0.0000	0.0000
NE	-154	32.7	35.1	35.1	1	0.0000	0.0000
NE	-154	30.0	31.9	31.9	1	0.0000	0.0000
NE	-154	36.9	40.1	40.1	1	0.0000	0.0000
NE	-154	33.4	35.8	35.8	1	0.0000	0.0000
NE	-154	30.0	31.9	31.9	1	0.0000	0.0000
GKSS	-110	98.1	85.4	78.5	0	0.0000	0.0114
GKSS	-110	59.0	52.7	52.7	1	0.0108	0.0007
GKSS	-110	80.0	70.3	70.3	1	0.0108	0.0040
GKSS	-110	57.2	51.2	51.2	1	0.0108	0.0006
GKSS	-110	88.3	77.2	77.2	1	0.0108	0.0067
GKSS	-110	96.2	83.9	78.5	0	0.0000	0.0103
GKSS	-110	81.6	71.6	71.6	1	0.0108	0.0044
GKSS	-110	66.9	59.3	59.3	1	0.0108	0.0015
GKSS	-110	85.6	75.0	75.0	1	0.0108	0.0057
GKSS	-110	86.8	76.0	76.0	1	0.0108	0.0061
GKSS	-110	114.2	98.9	78.5	0	0.0000	0.0241
GKSS	-110	73.5	64.8	64.8	1	0.0108	0.0025
GKSS	-110	92.7	80.9	78.5	0	0.0000	0.0085
GKSS	-110	77.5	68.2	68.2	1	0.0108	0.0033
GKSS	-110	61.5	54.7	54.7	1	0.0108	0.0009
GKSS	-110	51.8	46.7	46.7	1	0.0108	0.0003
GKSS	-110	73.6	64.9	64.9	1	0.0108	0.0025
GKSS	-110	52.8	47.5	47.5	1	0.0108	0.0004
GKSS	-110	41.2	37.8	37.8	1	0.0108	0.0001
GKSS	-110	115.3	99.8	78.5	0	0.0000	0.0253
GKSS	-110	73.2	64.5	64.5	1	0.0108	0.0024
GKSS	-110	74.0	65.3	65.3	1	0.0108	0.0026
GKSS	-110	67.5	59.8	59.8	1	0.0108	0.0016
GKSS	-110	71.0	62.7	62.7	1	0.0108	0.0021
GKSS	-110	53.4	48.0	48.0	1	0.0108	0.0004
GKSS	-110	96.5	84.0	78.5	0	0.0000	0.0105
GKSS	-110	71.3	63.0	63.0	1	0.0108	0.0021
GKSS	-110	71.7	63.3	63.3	1	0.0108	0.0022
GKSS	-110	81.7	71.7	71.7	1	0.0108	0.0044
GKSS	-110	64.0	56.8	56.8	1	0.0108	0.0011
GKSS	-110	74.2	65.4	65.4	1	0.0108	0.0026
GKSS	-110	70.4	62.2	62.2	1	0.0108	0.0020
GKSS	-110	91.2	79.6	78.5	0	0.0000	0.0079
GKSS	-110	72.0	63.6	63.6	1	0.0108	0.0022
GKSS	-110	64.8	57.5	57.5	1	0.0108	0.0012
GKSS	-110	79.2	69.6	69.6	1	0.0108	0.0038
GKSS	-110	52.2	47.0	47.0	1	0.0108	0.0003
GKSS	-110	82.9	72.7	72.7	1	0.0108	0.0048
GKSS	-110	93.2	81.3	78.5	0	0.0000	0.0088
GKSS	-110	75.4	66.4	66.4	1	0.0108	0.0029
GKSS	-110	75.0	66.1	66.1	1	0.0108	0.0028
GKSS	-110	78.6	69.1	69.1	1	0.0108	0.0036
GKSS	-110	94.8	82.7	78.5	0	0.0000	0.0096
GKSS	-110	98.1	85.4	78.5	0	0.0000	0.0114
GKSS	-110	98.5	85.7	78.5	0	0.0000	0.0116
GKSS	-110	104.9	91.1	78.5	0	0.0000	0.0159
GKSS	-110	69.9	61.8	61.8	1	0.0108	0.0019
GKSS	-110	81.6	71.6	71.6	1	0.0108	0.0044
GKSS	-110	55.2	49.5	49.5	1	0.0108	0.0005
GKSS	-110	105.6	91.7	78.5	0	0.0000	0.0164
GKSS	-110	101.5	88.3	78.5	0	0.0000	0.0135
GKSS	-110	73.7	65.0	65.0	1	0.0108	0.0026
GKSS	-110	97.5	84.9	78.5	0	0.0000	0.0111
GKSS	-110	75.9	66.8	66.8	1	0.0108	0.0030
GKSS	-110	48.3	43.7	43.7	1	0.0108	0.0002
GKSS	-91	127.0	109.6	99.6	0	0.0000	0.0124
GKSS	-91	121.8	105.2	99.6	0	0.0000	0.0101
GKSS	-91	70.5	62.3	62.3	1	0.0114	0.0006
GKSS	-91	94.2	82.2	82.2	1	0.0114	0.0029
GKSS	-91	127.3	109.9	99.6	0	0.0000	0.0125

GKSS	-91	119.9	103.7	99.6	0	0.0000	0.0094
GKSS	-91	104.5	90.8	90.8	1	0.0114	0.0048
GKSS	-91	78.6	69.1	69.1	1	0.0114	0.0011
GKSS	-91	98.6	85.8	85.8	1	0.0114	0.0036
GKSS	-91	161.6	138.6	99.6	0	0.0000	0.0379
THA	-91	91.3	79.7	79.7	1	0.0114	0.0024
THA	-91	115.3	99.8	99.6	0	0.0000	0.0078
THA	-91	122.4	105.8	99.6	0	0.0000	0.0104
THA	-91	126.3	109.1	99.6	0	0.0000	0.0121
THA	-91	108.3	94.0	94.0	1	0.0114	0.0057
THA	-91	66.9	59.3	59.3	1	0.0114	0.0005
THA	-91	126.7	109.4	99.6	0	0.0000	0.0122
THA	-91	69.6	61.6	61.6	1	0.0114	0.0006
THA	-91	121.4	104.9	99.6	0	0.0000	0.0100
THA	-91	90.0	78.7	78.7	1	0.0114	0.0023
THA	-91	153.9	132.2	99.6	0	0.0000	0.0303
THA	-91	64.6	57.4	57.4	1	0.0114	0.0004
THA	-91	127.2	109.8	99.6	0	0.0000	0.0124
THA	-91	99.7	86.7	86.7	1	0.0114	0.0038
THA	-91	101.3	88.1	88.1	1	0.0114	0.0041
THA	-91	140.4	120.9	99.6	0	0.0000	0.0198
THA	-91	78.2	68.7	68.7	1	0.0114	0.0011
THA	-91	109.0	94.6	94.6	1	0.0114	0.0059
THA	-91	103.9	90.3	90.3	1	0.0114	0.0047
THA	-91	126.8	109.5	99.6	0	0.0000	0.0123
THA	-91	111.7	96.8	96.8	1	0.0114	0.0067
GKSS	-91	68.6	68.4	68.4	1	0.0114	0.0011
GKSS	-91	81.6	81.3	81.3	1	0.0114	0.0027
GKSS	-91	55.9	55.8	55.8	1	0.0114	0.0003
GKSS	-91	98.8	98.5	98.5	1	0.0114	0.0073
GKSS	-91	71.9	71.7	71.7	1	0.0114	0.0014
GKSS	-91	111.0	110.7	99.6	0	0.0000	0.0129
GKSS	-91	93.5	93.2	93.2	1	0.0114	0.0055
GKSS	-91	79.9	79.7	79.7	1	0.0114	0.0024
GKSS	-91	98.4	98.1	98.1	1	0.0114	0.0071
GKSS	-91	101.1	100.8	99.6	0	0.0000	0.0082
TWI	-91	79.6	79.4	79.4	1	0.0114	0.0024
TWI	-91	99.7	99.3	99.3	1	0.0114	0.0076
TWI	-91	108.1	107.7	99.6	0	0.0000	0.0113
TWI	-91	93.4	93.1	93.1	1	0.0114	0.0055
TWI	-91	62.0	61.8	61.8	1	0.0114	0.0006
TWI	-91	107.1	106.7	99.6	0	0.0000	0.0108
TWI	-91	145.3	144.8	99.6	0	0.0000	0.0464
TWI	-91	76.3	76.0	76.0	1	0.0114	0.0019
TWI	-91	126.5	126.1	99.6	0	0.0000	0.0243
TWI	-91	126.1	125.7	99.6	0	0.0000	0.0239
TWI	-91	128.5	128.0	99.6	0	0.0000	0.0261
TWI	-91	111.4	111.0	99.6	0	0.0000	0.0132
TWI	-91	130.4	130.0	99.6	0	0.0000	0.0280
TWI	-91	134.8	134.3	99.6	0	0.0000	0.0327
TWI	-91	157.3	156.7	99.6	0	0.0000	0.0670
TWI	-91	105.2	104.9	99.6	0	0.0000	0.0099
TWI	-91	109.8	109.4	99.6	0	0.0000	0.0123
TWI	-91	84.9	84.6	84.6	1	0.0114	0.0033
TWI	-91	62.8	62.7	62.7	1	0.0114	0.0006
TWI	-91	97.5	97.2	97.2	1	0.0114	0.0068
TWI	-91	80.2	79.9	79.9	1	0.0114	0.0025
TWI	-91	134.4	133.9	99.6	0	0.0000	0.0323
TWI	-91	65.1	65.0	65.0	1	0.0114	0.0008
TWI	-91	118.6	118.2	99.6	0	0.0000	0.0178
GKSS	-91	67.3	76.1	76.1	1	0.0114	0.0019
GKSS	-91	162.9	189.3	99.6	0	0.0000	0.1573
GKSS	-91	100.0	114.7	99.6	0	0.0000	0.0154
GKSS	-91	91.2	104.3	99.6	0	0.0000	0.0097
GKSS	-91	106.2	122.1	99.6	0	0.0000	0.0208
GKSS	-91	83.2	94.9	94.9	1	0.0114	0.0060
GKSS	-91	91.8	105.0	99.6	0	0.0000	0.0100
GKSS	-91	94.7	108.5	99.6	0	0.0000	0.0117
GKSS	-91	92.9	106.4	99.6	0	0.0000	0.0107
GKSS	-91	69.9	79.2	79.2	1	0.0114	0.0023
NE	-91	93.1	106.6	99.6	0	0.0000	0.0108
NE	-91	97.9	112.2	99.6	0	0.0000	0.0139
NE	-91	73.7	83.7	83.7	1	0.0114	0.0031
NE	-91	82.0	93.4	93.4	1	0.0114	0.0056
NE	-91	76.3	86.7	86.7	1	0.0114	0.0038
NE	-91	93.1	106.6	99.6	0	0.0000	0.0108
NE	-91	83.7	95.5	95.5	1	0.0114	0.0062
NE	-91	82.1	93.6	93.6	1	0.0114	0.0056
NE	-91	86.8	99.2	99.2	1	0.0114	0.0075
NE	-91	86.7	99.0	99.0	1	0.0114	0.0075
NE	-91	92.3	105.7	99.6	0	0.0000	0.0103
NE	-91	83.1	94.8	94.8	1	0.0114	0.0060
NE	-91	88.9	101.6	99.6	0	0.0000	0.0085
NE	-91	64.3	72.5	72.5	1	0.0114	0.0015
NE	-91	101.6	116.7	99.6	0	0.0000	0.0168
NE	-91	94.2	107.9	99.6	0	0.0000	0.0115
NE	-91	78.7	89.5	89.5	1	0.0114	0.0045
NE	-91	73.0	82.8	82.8	1	0.0114	0.0030

NE	-91	64.2	72.3	72.3	1	0.0114	0.0014
NE	-91	98.9	113.5	99.6	0	0.0000	0.0146
GKSS	-91	103.2	137.2	99.6	0	0.0000	0.0361
GKSS	-91	84.4	110.7	99.6	0	0.0000	0.0129
GKSS	-91	97.0	128.5	99.6	0	0.0000	0.0265
GKSS	-91	92.7	122.4	99.6	0	0.0000	0.0210
GKSS	-91	96.8	128.2	99.6	0	0.0000	0.0262
NE	-91	73.6	95.5	95.5	1	0.0114	0.0062
NE	-91	73.0	94.7	94.7	1	0.0114	0.0060
NE	-91	73.3	95.1	95.1	1	0.0114	0.0061
NE	-91	53.8	67.7	67.7	1	0.0114	0.0010
NE	-91	69.5	89.7	89.7	1	0.0114	0.0045
NE	-91	65.5	84.0	84.0	1	0.0114	0.0032
NE	-91	79.6	104.0	99.6	0	0.0000	0.0095
NE	-91	69.8	90.1	90.1	1	0.0114	0.0046
NE	-91	90.3	119.0	99.6	0	0.0000	0.0184
NE	-91	88.0	115.8	99.6	0	0.0000	0.0161
GKSS	-60	205.5	175.4	155.4	0	0.0000	0.0141
GKSS	-60	114.4	99.1	99.1	1	0.0120	0.0009
GKSS	-60	130.7	112.7	112.7	1	0.0120	0.0018
GKSS	-60	106.7	92.6	92.6	1	0.0120	0.0007
GKSS	-60	161.0	138.1	138.1	1	0.0120	0.0047
GKSS	-60	200.7	171.3	155.4	0	0.0000	0.0127
GKSS	-60	125.2	108.1	108.1	1	0.0120	0.0015
GKSS	-60	145.1	124.8	124.8	1	0.0120	0.0029
GKSS	-60	91.9	80.2	80.2	1	0.0120	0.0003
GKSS	-60	128.1	110.6	110.6	1	0.0120	0.0016
GKSS	-60	164.4	140.9	140.9	1	0.0120	0.0052
GKSS	-60	192.2	164.3	155.4	0	0.0000	0.0105
GKSS	-60	166.3	142.5	142.5	1	0.0120	0.0055
GKSS	-60	177.7	152.1	152.1	1	0.0120	0.0074
GKSS	-60	202.0	172.5	155.4	0	0.0000	0.0131
GKSS	-60	116.0	100.4	100.4	1	0.0120	0.0010
GKSS	-60	202.0	172.5	155.4	0	0.0000	0.0131
GKSS	-60	167.6	143.6	143.6	1	0.0120	0.0056
GKSS	-60	89.8	78.5	78.5	1	0.0120	0.0003
GKSS	-60	156.3	134.1	134.1	1	0.0120	0.0041
GKSS	-60	186.8	159.7	155.4	0	0.0000	0.0092
GKSS	-60	203.2	173.4	155.4	0	0.0000	0.0134
GKSS	-60	164.6	141.1	141.1	1	0.0120	0.0052
GKSS	-60	202.6	173.0	155.4	0	0.0000	0.0132
GKSS	-60	185.9	159.0	155.4	0	0.0000	0.0090
GKSS	-60	127.7	110.2	110.2	1	0.0120	0.0016
GKSS	-60	201.2	171.7	155.4	0	0.0000	0.0128
GKSS	-60	115.6	100.0	100.0	1	0.0120	0.0010
GKSS	-60	107.5	93.3	93.3	1	0.0120	0.0007
SIEMENS	-60	164.6	141.1	141.1	1	0.0120	0.0052
SIEMENS	-60	172.0	147.3	147.3	1	0.0120	0.0064
SIEMENS	-60	108.5	94.2	94.2	1	0.0120	0.0007
SIEMENS	-60	119.0	102.9	102.9	1	0.0120	0.0011
SIEMENS	-60	153.5	131.8	131.8	1	0.0120	0.0038
SIEMENS	-60	158.9	136.4	136.4	1	0.0120	0.0044
SIEMENS	-60	137.5	118.4	118.4	1	0.0120	0.0023
SIEMENS	-60	119.5	103.3	103.3	1	0.0120	0.0012
SIEMENS	-60	130.7	112.8	112.8	1	0.0120	0.0018
SIEMENS	-60	172.6	147.8	147.8	1	0.0120	0.0065
SIEMENS	-60	84.5	74.0	74.0	1	0.0120	0.0002
SIEMENS	-60	213.4	182.0	155.4	0	0.0000	0.0167
SIEMENS	-60	120.4	104.1	104.1	1	0.0120	0.0012
SIEMENS	-60	104.5	90.8	90.8	1	0.0120	0.0006
SIEMENS	-60	163.6	140.2	140.2	1	0.0120	0.0051
SIEMENS	-60	201.4	172.0	155.4	0	0.0000	0.0129
SIEMENS	-60	137.8	118.7	118.7	1	0.0120	0.0023
SIEMENS	-60	173.0	148.1	148.1	1	0.0120	0.0065
SIEMENS	-60	99.2	86.4	86.4	1	0.0120	0.0005
SIEMENS	-60	173.4	148.4	148.4	1	0.0120	0.0066
SIEMENS	-60	131.5	113.4	113.4	1	0.0120	0.0018
GKSS	-60	186.0	185.3	155.4	0	0.0000	0.0181
GKSS	-60	151.8	151.3	151.3	1	0.0120	0.0072
GKSS	-60	111.7	111.3	111.3	1	0.0120	0.0017
GKSS	-60	143.9	143.4	143.4	1	0.0120	0.0056
GKSS	-60	105.4	105.1	105.1	1	0.0120	0.0013
GKSS	-60	154.0	153.4	153.4	1	0.0120	0.0077
GKSS	-60	176.2	175.6	155.4	0	0.0000	0.0142
GKSS	-60	131.9	131.5	131.5	1	0.0120	0.0037
GKSS	-60	203.9	203.2	155.4	0	0.0000	0.0272
GKSS	-60	142.7	142.2	142.2	1	0.0120	0.0054
TWI	-60	134.5	134.0	134.0	1	0.0120	0.0041
TWI	-60	130.1	129.7	129.7	1	0.0120	0.0035
TWI	-60	142.6	142.1	142.1	1	0.0120	0.0054
TWI	-60	119.7	119.3	119.3	1	0.0120	0.0024
TWI	-60	141.3	140.8	140.8	1	0.0120	0.0052
TWI	-60	175.9	175.3	155.4	0	0.0000	0.0141
TWI	-60	119.6	119.2	119.2	1	0.0120	0.0023
TWI	-60	102.4	102.0	102.0	1	0.0120	0.0011
TWI	-60	99.0	98.7	98.7	1	0.0120	0.0009
TWI	-60	115.1	114.7	114.7	1	0.0120	0.0019
TWI	-60	172.9	172.3	155.4	0	0.0000	0.0130

TWI	-60	120.5	120.2	120.2	1	0.0120	0.0024
TWI	-60	165.2	164.6	155.4	0	0.0000	0.0106
TWI	-60	125.6	125.2	125.2	1	0.0120	0.0030
TWI	-60	126.7	126.3	126.3	1	0.0120	0.0031
TWI	-60	100.4	100.1	100.1	1	0.0120	0.0010
TWI	-60	131.1	130.7	130.7	1	0.0120	0.0036
TWI	-60	185.1	184.5	155.4	0	0.0000	0.0177
TWI	-60	163.6	163.0	155.4	0	0.0000	0.0101
TWI	-60	126.5	126.1	126.1	1	0.0120	0.0031
TWI	-60	164.7	164.1	155.4	0	0.0000	0.0104
TWI	-60	192.7	192.0	155.4	0	0.0000	0.0212
TWI	-60	134.5	134.1	134.1	1	0.0120	0.0041
TWI	-60	140.8	140.3	140.3	1	0.0120	0.0051
GKSS	-60	109.9	126.5	126.5	1	0.0120	0.0031
GKSS	-60	131.9	152.5	152.5	1	0.0120	0.0075
GKSS	-60	136.2	157.6	155.4	0	0.0000	0.0087
GKSS	-60	154.0	178.8	155.4	0	0.0000	0.0154
GKSS	-60	115.9	133.6	133.6	1	0.0120	0.0040
GKSS	-60	150.4	174.4	155.4	0	0.0000	0.0138
BAM	-40	171.0	146.5	146.5	1	0.0123	0.0015
BAM	-40	206.2	176.0	176.0	1	0.0123	0.0035
BAM	-40	169.4	145.1	145.1	1	0.0123	0.0015
BAM	-40	203.6	173.7	173.7	1	0.0123	0.0033
BAM	-40	202.5	172.9	172.9	1	0.0123	0.0033
BAM	-40	207.2	176.8	176.8	1	0.0123	0.0036
BAM	-40	205.9	175.7	175.7	1	0.0123	0.0035
BAM	-40	206.5	176.2	176.2	1	0.0123	0.0035
BAM	-40	207.3	176.9	176.9	1	0.0123	0.0036
BAM	-40	205.1	175.1	175.1	1	0.0123	0.0034
BAM	-40	202.8	173.1	173.1	1	0.0123	0.0033
BAM	-40	204.9	174.8	174.8	1	0.0123	0.0034
BAM	-40	205.2	175.1	175.1	1	0.0123	0.0034
BAM	-40	113.7	98.5	98.5	1	0.0123	0.0002
BAM	-40	204.8	174.8	174.8	1	0.0123	0.0034
BAM	-40	154.2	132.4	132.4	1	0.0123	0.0009
BAM	-40	206.2	176.0	176.0	1	0.0123	0.0035
BAM	-40	204.2	174.3	174.3	1	0.0123	0.0034
BAM	-40	207.3	176.9	176.9	1	0.0123	0.0036
BAM	-40	202.5	172.8	172.8	1	0.0123	0.0032
GKSS	-40	180.6	154.6	154.6	1	0.0123	0.0020
GKSS	-40	203.5	173.7	173.7	1	0.0123	0.0033
GKSS	-40	198.2	169.3	169.3	1	0.0123	0.0030
GKSS	-40	199.6	170.5	170.5	1	0.0123	0.0031
GKSS	-40	186.4	159.4	159.4	1	0.0123	0.0022
GKSS	-40	199.4	170.3	170.3	1	0.0123	0.0030
GKSS	-40	204.4	174.4	174.4	1	0.0123	0.0034
GKSS	-40	202.4	172.7	172.7	1	0.0123	0.0032
GKSS	-40	203.2	173.4	173.4	1	0.0123	0.0033
GKSS	-40	200.9	171.5	171.5	1	0.0123	0.0031
BAM	-40	187.3	186.6	186.6	1	0.0123	0.0046
BAM	-40	101.5	101.2	101.2	1	0.0123	0.0003
BAM	-40	140.3	139.9	139.9	1	0.0123	0.0012
BAM	-40	150.2	149.7	149.7	1	0.0123	0.0017
BAM	-40	187.3	186.6	186.6	1	0.0123	0.0046
BAM	-40	211.4	210.6	210.6	1	0.0123	0.0079
BAM	-40	160.5	160.0	160.0	1	0.0123	0.0023
BAM	-40	214.6	213.8	213.4	0	0.0000	0.0084
BAM	-40	188.3	187.7	187.7	1	0.0123	0.0047
BAM	-40	239.3	238.4	213.4	0	0.0000	0.0136
BAM	-40	112.8	112.4	112.4	1	0.0123	0.0004
BAM	-40	239.0	238.1	213.4	0	0.0000	0.0135
BAM	-40	284.9	283.9	213.4	0	0.0000	0.0289
BAM	-40	254.7	253.7	213.4	0	0.0000	0.0178
BAM	-40	270.9	269.9	213.4	0	0.0000	0.0232
BAM	-40	187.0	186.3	186.3	1	0.0123	0.0046
BAM	-40	170.1	169.5	169.5	1	0.0123	0.0030
BAM	-40	256.4	255.5	213.4	0	0.0000	0.0183
BAM	-40	171.4	170.8	170.8	1	0.0123	0.0031
BAM	-40	103.1	102.8	102.8	1	0.0123	0.0003
BAM	-40	230.0	229.1	213.4	0	0.0000	0.0114
BAM	-40	210.0	209.2	209.2	1	0.0123	0.0076
GKSS	-40	198.2	197.5	197.5	1	0.0123	0.0059
GKSS	-40	150.2	149.7	149.7	1	0.0123	0.0017
GKSS	-40	226.8	226.0	213.4	0	0.0000	0.0107
GKSS	-40	158.1	157.5	157.5	1	0.0123	0.0021
GKSS	-40	256.4	255.5	213.4	0	0.0000	0.0183
GKSS	-40	207.6	206.9	206.9	1	0.0123	0.0073
GKSS	-40	213.5	212.8	212.8	1	0.0123	0.0082
GKSS	-40	254.6	253.7	213.4	0	0.0000	0.0178
GKSS	-40	240.0	239.1	213.4	0	0.0000	0.0137
GKSS	-40	279.0	278.0	213.4	0	0.0000	0.0264
GKSS	-40	125.9	145.5	145.5	1	0.0123	0.0015
GKSS	-40	128.9	149.0	149.0	1	0.0123	0.0016
GKSS	-40	198.5	231.5	213.4	0	0.0000	0.0119
GKSS	-40	212.0	247.5	213.4	0	0.0000	0.0159
GKSS	-40	138.6	160.5	160.5	1	0.0123	0.0023
GKSS	-40	187.7	218.7	213.4	0	0.0000	0.0093
GKSS	-40	173.0	201.2	201.2	1	0.0123	0.0064

GKSS	-40	179.5	208.9	208.9	1	0.0123	0.0076
GKSS	-40	152.6	177.1	177.1	1	0.0123	0.0036
GKSS	-40	153.6	178.3	178.3	1	0.0123	0.0037
THA	-40	144.6	167.6	167.6	1	0.0123	0.0028
THA	-40	150.7	174.9	174.9	1	0.0123	0.0034
THA	-40	139.1	161.0	161.0	1	0.0123	0.0024
THA	-40	183.6	213.8	213.4	0	0.0000	0.0084
THA	-40	142.0	164.5	164.5	1	0.0123	0.0026
THA	-40	187.2	218.0	213.4	0	0.0000	0.0091
THA	-40	172.2	200.3	200.3	1	0.0123	0.0063
THA	-40	198.0	230.8	213.4	0	0.0000	0.0118
THA	-40	130.4	150.8	150.8	1	0.0123	0.0017
THA	-40	141.7	164.1	164.1	1	0.0123	0.0026
THA	-40	134.5	155.6	155.6	1	0.0123	0.0020
THA	-40	115.5	133.1	133.1	1	0.0123	0.0010
THA	-40	91.7	104.9	104.9	1	0.0123	0.0003
THA	-40	141.1	163.4	163.4	1	0.0123	0.0025
THA	-40	239.1	279.6	213.4	0	0.0000	0.0270
THA	-40	243.4	284.7	213.4	0	0.0000	0.0292
THA	-40	191.9	223.6	213.4	0	0.0000	0.0102
THA	-40	146.8	170.2	170.2	1	0.0123	0.0030
THA	-40	161.4	187.5	187.5	1	0.0123	0.0047
THA	-40	142.3	164.8	164.8	1	0.0123	0.0026
CISE	-20	128.7	111.1	111.1	1	0.0000	0.0000
CISE	-20	146.9	126.3	126.3	1	0.0000	0.0000
CISE	-20	204.3	174.4	174.4	1	0.0000	0.0000
CISE	-20	198.3	169.3	169.3	1	0.0000	0.0000
CISE	-20	195.0	166.6	166.6	1	0.0000	0.0000
CISE	-20	197.8	168.9	168.9	1	0.0000	0.0000
CISE	-20	195.6	167.1	167.1	1	0.0000	0.0000
CISE	-20	196.2	167.6	167.6	1	0.0000	0.0000
CISE	-20	194.0	165.7	165.7	1	0.0000	0.0000
CISE	-20	198.3	169.3	169.3	1	0.0000	0.0000
CISE	-20	201.2	171.8	171.8	1	0.0000	0.0000
CISE	-20	200.9	171.5	171.5	1	0.0000	0.0000
CISE	-20	195.6	167.1	167.1	1	0.0000	0.0000
CISE	-20	197.6	168.8	168.8	1	0.0000	0.0000
CISE	-20	201.9	172.4	172.4	1	0.0000	0.0000
CISE	-20	202.5	172.8	172.8	1	0.0000	0.0000
CISE	-20	198.1	169.2	169.2	1	0.0000	0.0000
CISE	-20	198.1	169.2	169.2	1	0.0000	0.0000
CISE	-20	200.7	171.3	171.3	1	0.0000	0.0000
CISE	-20	199.8	170.6	170.6	1	0.0000	0.0000
CISE	-20	201.5	172.0	172.0	1	0.0000	0.0000
GKSS	-20	200.6	171.2	171.2	1	0.0000	0.0000
GKSS	-20	200.6	171.2	171.2	1	0.0000	0.0000
GKSS	-20	199.8	170.6	170.6	1	0.0000	0.0000
GKSS	-20	198.2	169.2	169.2	1	0.0000	0.0000
GKSS	-20	199.3	170.2	170.2	1	0.0000	0.0000
GKSS	-20	196.6	167.9	167.9	1	0.0000	0.0000
GKSS	-20	198.6	169.6	169.6	1	0.0000	0.0000
GKSS	-20	200.7	171.3	171.3	1	0.0000	0.0000
GKSS	-20	195.0	166.6	166.6	1	0.0000	0.0000
GKSS	-20	198.6	169.6	169.6	1	0.0000	0.0000
GKSS	-20	202.5	201.7	201.7	1	0.0000	0.0000
GKSS	-20	194.7	194.1	194.1	1	0.0000	0.0000
GKSS	-20	262.8	261.8	261.8	1	0.0000	0.0000
GKSS	-20	187.9	187.2	187.2	1	0.0000	0.0000
GKSS	-20	275.8	274.8	274.8	1	0.0000	0.0000
GKSS	-20	261.8	260.9	260.9	1	0.0000	0.0000
GKSS	-20	283.2	282.2	282.2	1	0.0000	0.0000
GKSS	-20	283.1	282.0	282.0	1	0.0000	0.0000
GKSS	-20	284.0	283.0	283.0	1	0.0000	0.0000
GKSS	-20	284.2	283.1	283.1	1	0.0000	0.0000
VTT	-20	284.0	282.9	282.9	1	0.0000	0.0000
VTT	-20	231.9	231.0	231.0	1	0.0000	0.0000
VTT	-20	279.4	278.3	278.3	1	0.0000	0.0000
VTT	-20	280.3	279.2	279.2	1	0.0000	0.0000
VTT	-20	279.4	278.3	278.3	1	0.0000	0.0000
VTT	-20	278.6	277.5	277.5	1	0.0000	0.0000
VTT	-20	281.9	280.9	280.9	1	0.0000	0.0000
VTT	-20	279.4	278.3	278.3	1	0.0000	0.0000
VTT	-20	282.5	281.4	281.4	1	0.0000	0.0000
VTT	-20	247.2	246.3	246.3	1	0.0000	0.0000
VTT	-20	233.2	232.4	232.4	1	0.0000	0.0000
VTT	-20	283.2	282.2	282.2	1	0.0000	0.0000
VTT	-20	288.9	287.8	287.8	1	0.0000	0.0000
VTT	-20	263.2	262.3	262.3	1	0.0000	0.0000
VTT	-20	184.4	183.8	183.8	1	0.0000	0.0000
VTT	-20	283.7	282.7	282.7	1	0.0000	0.0000
VTT	-20	280.8	279.8	279.8	1	0.0000	0.0000
VTT	-20	280.9	279.8	279.8	1	0.0000	0.0000
VTT	-20	280.9	279.8	279.8	1	0.0000	0.0000
VTT	-20	170.9	170.3	170.3	1	0.0000	0.0000
VTT	-20	282.9	281.9	281.9	1	0.0000	0.0000
VTT	-20	275.7	274.6	274.6	1	0.0000	0.0000
VTT	-20	228.2	227.4	227.4	1	0.0000	0.0000
VTT	-20	282.0	281.0	281.0	1	0.0000	0.0000

VTT	-20	280.9	279.8	279.8	1	0.0000	0.0000
VTT	-20	281.8	280.7	280.7	1	0.0000	0.0000
VTT	-20	281.4	280.4	280.4	1	0.0000	0.0000
VTT	-20	227.3	226.5	226.5	1	0.0000	0.0000
VTT	-20	201.3	200.6	200.6	1	0.0000	0.0000
VTT	-20	212.5	211.7	211.7	1	0.0000	0.0000
VTT	-20	256.5	255.5	255.5	1	0.0000	0.0000
VTT	-20	284.8	283.8	283.8	1	0.0000	0.0000
VTT	-20	282.3	281.3	281.3	1	0.0000	0.0000
VTT	-20	269.6	268.6	268.6	1	0.0000	0.0000
VTT	-20	184.4	183.8	183.8	1	0.0000	0.0000
VTT	-20	241.6	240.7	240.7	1	0.0000	0.0000
VTT	-20	146.4	145.9	145.9	1	0.0000	0.0000
VTT	-20	280.0	279.0	279.0	1	0.0000	0.0000
VTT	-20	156.7	156.2	156.2	1	0.0000	0.0000
VTT	-20	277.0	276.0	276.0	1	0.0000	0.0000
CISE	-20	167.4	194.6	194.6	1	0.0000	0.0000
CISE	-20	153.5	178.1	178.1	1	0.0000	0.0000
CISE	-20	211.2	246.5	246.5	1	0.0000	0.0000
CISE	-20	220.3	257.3	257.3	1	0.0000	0.0000
CISE	-20	227.9	266.2	266.2	1	0.0000	0.0000
CISE	-20	211.1	246.4	246.4	1	0.0000	0.0000
CISE	-20	217.1	253.4	253.4	1	0.0000	0.0000
CISE	-20	145.3	168.5	168.5	1	0.0000	0.0000
CISE	-20	161.2	187.2	187.2	1	0.0000	0.0000
CISE	-20	131.9	152.5	152.5	1	0.0000	0.0000
CISE	-20	216.4	252.6	252.6	1	0.0000	0.0000
CISE	-20	125.0	144.4	144.4	1	0.0000	0.0000
CISE	-20	378.7	444.9	298.2	0	0.0000	0.0000
CISE	-20	246.1	287.9	287.9	1	0.0000	0.0000
CISE	-20	250.9	293.5	293.5	1	0.0000	0.0000
CISE	-20	251.5	294.3	294.3	1	0.0000	0.0000
CISE	-20	284.0	332.7	298.2	0	0.0000	0.0000
CISE	-20	261.1	305.6	298.2	0	0.0000	0.0000
CISE	-20	351.6	412.8	298.2	0	0.0000	0.0000
CISE	-20	258.5	302.5	298.2	0	0.0000	0.0000
GKSS	-20	201.3	234.8	234.8	1	0.0000	0.0000
GKSS	-20	110.9	127.7	127.7	1	0.0000	0.0000
GKSS	-20	197.7	230.5	230.5	1	0.0000	0.0000
GKSS	-20	198.9	231.9	231.9	1	0.0000	0.0000
GKSS	-20	200.6	234.0	234.0	1	0.0000	0.0000
GKSS	-20	165.7	192.6	192.6	1	0.0000	0.0000
GKSS	-20	280.1	328.0	298.2	0	0.0000	0.0000
GKSS	-20	279.5	327.3	298.2	0	0.0000	0.0000
GKSS	-20	257.6	301.4	298.2	0	0.0000	0.0000
GKSS	-20	265.2	310.4	298.2	0	0.0000	0.0000
GKSS	-20	156.7	212.6	212.6	1	0.0000	0.0000
GKSS	-20	221.7	304.1	298.2	0	0.0000	0.0000
GKSS	-20	193.9	264.9	264.9	1	0.0000	0.0000
GKSS	-20	191.7	261.9	261.9	1	0.0000	0.0000
GKSS	-20	184.4	251.6	251.6	1	0.0000	0.0000
NE	-20	186.7	254.8	254.8	1	0.0000	0.0000
NE	-20	184.4	251.6	251.6	1	0.0000	0.0000
NE	-20	193.9	264.9	264.9	1	0.0000	0.0000
NE	-20	204.4	279.8	279.8	1	0.0000	0.0000
NE	-20	224.0	307.4	298.2	0	0.0000	0.0000
NE	-20	153.4	207.9	207.9	1	0.0000	0.0000
NE	-20	222.6	305.4	298.2	0	0.0000	0.0000
NE	-20	162.0	220.0	220.0	1	0.0000	0.0000
NE	-20	187.8	256.4	256.4	1	0.0000	0.0000
NE	-20	198.2	271.0	271.0	1	0.0000	0.0000
SCK-CEN	-10	280.0	279.0	279.0	1	0.0000	0.0000
SCK-CEN	-10	281.2	280.2	280.2	1	0.0000	0.0000
SCK-CEN	-10	282.6	281.5	281.5	1	0.0000	0.0000
SCK-CEN	-10	284.0	282.9	282.9	1	0.0000	0.0000
SCK-CEN	-10	280.9	279.9	279.9	1	0.0000	0.0000
GKSS	0	196.8	168.1	168.1	1	0.0000	0.0000
GKSS	0	193.7	165.5	165.5	1	0.0000	0.0000
GKSS	0	192.9	164.8	164.8	1	0.0000	0.0000
GKSS	0	196.7	168.0	168.0	1	0.0000	0.0000
GKSS	0	196.1	167.5	167.5	1	0.0000	0.0000
GKSS	0	194.7	166.3	166.3	1	0.0000	0.0000
GKSS	0	196.3	167.7	167.7	1	0.0000	0.0000
GKSS	0	195.9	167.3	167.3	1	0.0000	0.0000
GKSS	0	195.2	166.8	166.8	1	0.0000	0.0000
GKSS	0	193.3	165.1	165.1	1	0.0000	0.0000
SCK-CEN	0	198.4	169.4	169.4	1	0.0000	0.0000
SCK-CEN	0	199.1	170.0	170.0	1	0.0000	0.0000
SCK-CEN	0	198.2	169.2	169.2	1	0.0000	0.0000
SCK-CEN	0	197.6	168.8	168.8	1	0.0000	0.0000
SCK-CEN	0	201.2	171.8	171.8	1	0.0000	0.0000
SCK-CEN	0	200.0	170.8	170.8	1	0.0000	0.0000
SCK-CEN	0	197.4	168.6	168.6	1	0.0000	0.0000
SCK-CEN	0	199.6	170.4	170.4	1	0.0000	0.0000
SCK-CEN	0	203.4	173.6	173.6	1	0.0000	0.0000
SCK-CEN	0	199.2	170.1	170.1	1	0.0000	0.0000
SCK-CEN	0	200.5	171.2	171.2	1	0.0000	0.0000
SCK-CEN	0	202.4	172.7	172.7	1	0.0000	0.0000

SCK-CEN	0	197.2	168.4	168.4	1	0.0000	0.0000
SCK-CEN	0	205.8	175.6	175.6	1	0.0000	0.0000
SCK-CEN	0	205.5	175.4	175.4	1	0.0000	0.0000
SCK-CEN	0	202.4	172.7	172.7	1	0.0000	0.0000
SCK-CEN	0	203.4	173.6	173.6	1	0.0000	0.0000
SCK-CEN	0	205.2	175.1	175.1	1	0.0000	0.0000
SCK-CEN	0	202.3	172.7	172.7	1	0.0000	0.0000
SCK-CEN	0	201.6	172.1	172.1	1	0.0000	0.0000
GKSS	0	282.4	281.4	281.4	1	0.0000	0.0000
GKSS	0	283.7	282.7	282.7	1	0.0000	0.0000
GKSS	0	284.9	283.9	283.9	1	0.0000	0.0000
GKSS	0	282.8	281.8	281.8	1	0.0000	0.0000
GKSS	0	284.4	283.4	283.4	1	0.0000	0.0000
GKSS	0	284.9	283.8	283.8	1	0.0000	0.0000
GKSS	0	279.6	278.6	278.6	1	0.0000	0.0000
GKSS	0	283.9	282.8	282.8	1	0.0000	0.0000
GKSS	0	285.7	284.7	284.7	1	0.0000	0.0000
GKSS	0	283.0	281.9	281.9	1	0.0000	0.0000
SCK-CEN	0	277.0	276.0	276.0	1	0.0000	0.0000
SCK-CEN	0	276.7	275.7	275.7	1	0.0000	0.0000
SCK-CEN	0	276.9	275.9	275.9	1	0.0000	0.0000
SCK-CEN	0	277.9	276.8	276.8	1	0.0000	0.0000
SCK-CEN	0	276.9	275.9	275.9	1	0.0000	0.0000
SCK-CEN	0	278.2	277.2	277.2	1	0.0000	0.0000
SCK-CEN	0	278.0	277.0	277.0	1	0.0000	0.0000
SCK-CEN	0	275.9	274.9	274.9	1	0.0000	0.0000
SCK-CEN	0	277.6	276.6	276.6	1	0.0000	0.0000
SCK-CEN	0	278.2	277.2	277.2	1	0.0000	0.0000
SCK-CEN	0	277.3	276.3	276.3	1	0.0000	0.0000
VTT	0	280.3	279.3	279.3	1	0.0000	0.0000
VTT	0	275.5	274.5	274.5	1	0.0000	0.0000
VTT	0	280.3	279.3	279.3	1	0.0000	0.0000
VTT	0	275.2	274.2	274.2	1	0.0000	0.0000
VTT	0	278.0	277.0	277.0	1	0.0000	0.0000
VTT	0	278.5	277.5	277.5	1	0.0000	0.0000
VTT	0	279.7	278.6	278.6	1	0.0000	0.0000
VTT	0	267.2	266.2	266.2	1	0.0000	0.0000
VTT	0	279.8	278.8	278.8	1	0.0000	0.0000
VTT	0	278.6	277.6	277.6	1	0.0000	0.0000
VTT	0	278.3	277.3	277.3	1	0.0000	0.0000
VTT	0	280.0	278.9	278.9	1	0.0000	0.0000
VTT	0	274.3	273.3	273.3	1	0.0000	0.0000
VTT	0	276.0	275.0	275.0	1	0.0000	0.0000
VTT	0	278.7	277.7	277.7	1	0.0000	0.0000
VTT	0	278.0	277.0	277.0	1	0.0000	0.0000
VTT	0	279.1	278.0	278.0	1	0.0000	0.0000
VTT	0	278.6	277.5	277.5	1	0.0000	0.0000
VTT	0	279.4	278.4	278.4	1	0.0000	0.0000
VTT	0	276.2	275.2	275.2	1	0.0000	0.0000
GKSS	0	191.3	222.9	222.9	1	0.0000	0.0000
GKSS	0	269.2	315.2	315.2	1	0.0000	0.0000
GKSS	0	281.2	329.4	329.4	1	0.0000	0.0000
GKSS	0	242.5	283.5	283.5	1	0.0000	0.0000
GKSS	0	318.3	373.3	373.3	1	0.0000	0.0000
GKSS	0	395.4	464.7	422.2	0	0.0000	0.0000
GKSS	0	396.5	465.9	422.2	0	0.0000	0.0000
GKSS	0	394.9	464.1	422.2	0	0.0000	0.0000
GKSS	0	396.3	465.7	422.2	0	0.0000	0.0000
GKSS	0	266.6	312.1	312.1	1	0.0000	0.0000
GKSS	0	395.2	464.4	422.2	0	0.0000	0.0000
GKSS	0	362.9	426.1	422.2	0	0.0000	0.0000
GKSS	0	331.8	389.3	389.3	1	0.0000	0.0000
GKSS	0	227.1	265.3	265.3	1	0.0000	0.0000
GKSS	0	309.5	362.9	362.9	1	0.0000	0.0000
GKSS	0	395.4	464.7	422.2	0	0.0000	0.0000
GKSS	0	210.9	246.1	246.1	1	0.0000	0.0000
GKSS	0	394.9	464.1	422.2	0	0.0000	0.0000
GKSS	0	211.4	246.7	246.7	1	0.0000	0.0000
GKSS	0	393.9	462.8	422.2	0	0.0000	0.0000
GKSS	0	263.4	308.3	308.3	1	0.0000	0.0000
GKSS	0	393.3	462.1	422.2	0	0.0000	0.0000
GKSS	0	386.7	454.3	422.2	0	0.0000	0.0000
GKSS	0	376.2	441.9	422.2	0	0.0000	0.0000
GKSS	0	394.4	463.5	422.2	0	0.0000	0.0000
GKSS	0	306.7	359.6	359.6	1	0.0000	0.0000
GKSS	0	394.8	464.0	422.2	0	0.0000	0.0000
GKSS	0	393.9	462.8	422.2	0	0.0000	0.0000
GKSS	0	246.4	288.2	288.2	1	0.0000	0.0000
GKSS	0	320.1	375.4	375.4	1	0.0000	0.0000
CISE	0	233.3	320.4	320.4	1	0.0000	0.0000
CISE	0	238.2	327.4	327.4	1	0.0000	0.0000
CISE	0	208.3	285.2	285.2	1	0.0000	0.0000
CISE	0	421.7	585.8	422.2	0	0.0000	0.0000
CISE	0	226.7	311.2	311.2	1	0.0000	0.0000
CISE	0	267.0	367.9	367.9	1	0.0000	0.0000
CISE	0	163.0	221.4	221.4	1	0.0000	0.0000
CISE	0	165.8	225.4	225.4	1	0.0000	0.0000
CISE	0	285.9	394.6	394.6	1	0.0000	0.0000

CISE	0	342.0	473.5	422.2	0	0.0000	0.0000
GKSS	0	314.9	435.4	422.2	0	0.0000	0.0000
GKSS	0	307.6	425.1	422.2	0	0.0000	0.0000
GKSS	0	383.0	531.4	422.2	0	0.0000	0.0000
GKSS	0	332.6	460.4	422.2	0	0.0000	0.0000
GKSS	0	223.6	306.8	306.8	1	0.0000	0.0000
GKSS	0	442.2	614.7	422.2	0	0.0000	0.0000

3. Revised Master Curve fit to data

Temperature adj. = 1.1 °C (est.) Stand. dev. on T_0 = 0.8 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-154	54.8	49.1				
-154	49.8	44.9				
-154	37.8	34.9				
-154	33.0	30.9				
-154	38.9	35.8				
-154	24.2	23.6				
-154	47.4	43.0				
-154	46.5	42.2				
-154	31.4	29.6				
-154	39.2	36.0				
-154	24.2	23.6				
-154	33.0	30.9				
-154	41.0	37.6				
-154	31.7	29.8				
-154	35.2	32.7				
-154	44.4	40.5				
-154	41.5	38.0				
-154	32.7	30.7				
-154	34.3	32.0				
-154	36.7	34.0				
-154	39.7	36.5				
-154	46.1	41.8				
-154	34.6	32.2				
-154	35.8	33.2				
-154	29.3	27.8				
-154	28.6	27.2				
-154	38.6	35.6				
-154	44.4	40.5				
-154	48.9	44.2				
-154	38.9	35.8				
-154	36.7	34.0				
-154	31.7	29.8				
-154	41.5	41.4				
-154	42.2	42.2				
-154	50.0	49.9				
-154	34.0	33.9				
-154	41.7	41.7				
-154	46.1	46.0				
-154	44.2	44.1				
-154	36.7	36.6				
-154	29.0	28.9				
-154	53.0	52.9				
-154	39.4	39.3				
-154	29.0	28.9				
-154	34.6	34.5				
-154	33.0	33.0				
-154	38.1	38.0				
-154	28.6	28.6				
-154	28.6	28.6				
-154	38.6	38.5				
-154	36.4	36.3				
-154	33.4	33.3				
-154	36.9	36.9				
-154	31.1	31.0				
-154	34.3	34.2				
-154	30.4	30.4				
-154	49.6	49.5				
-154	41.0	40.9				
-154	34.0	33.9				
-154	30.7	30.7				
-154	41.2	41.2				
-154	26.7	26.7				
-154	35.5	35.4				
-154	33.4	33.3				
-154	36.7	36.6				
-154	32.4	32.4				
-154	45.1	45.0				
-154	33.4	33.3				
-154	34.0	33.9				
-154	30.7	30.7				
-154	26.7	26.7				
-154	33.7	36.2				
-154	42.7	46.9				

-154	37.2	40.4
-154	54.4	60.8
-154	34.6	37.3
-154	44.2	48.7
-154	29.7	31.5
-154	36.4	39.4
-154	36.4	39.4
-154	28.2	29.8
-154	28.2	29.8
-154	30.0	31.9
-154	36.4	39.4
-154	37.5	40.7
-154	30.0	31.9
-154	30.7	32.7
-154	30.4	32.3
-154	30.7	32.7
-154	31.7	33.9
-154	41.7	45.8
-154	37.2	40.4
-154	34.9	37.6
-154	38.3	41.7
-154	31.4	33.5
-154	33.7	36.2
-154	32.7	35.1
-154	43.0	47.2
-154	32.7	35.1
-154	30.0	31.9
-154	36.9	40.1
-154	33.4	35.8
-154	30.0	31.9
-110	98.1	85.4
-110	59.0	52.7
-110	80.0	70.3
-110	57.2	51.2
-110	88.3	77.2
-110	96.2	83.9
-110	81.6	71.6
-110	66.9	59.3
-110	85.6	75.0
-110	86.8	76.0
-110	114.2	98.9
-110	73.5	64.8
-110	92.7	80.9
-110	77.5	68.2
-110	61.5	54.7
-110	51.8	46.7
-110	73.6	64.9
-110	52.8	47.5
-110	41.2	37.8
-110	115.3	99.8
-110	73.2	64.5
-110	74.0	65.3
-110	67.5	59.8
-110	71.0	62.7
-110	53.4	48.0
-110	96.5	84.0
-110	71.3	63.0
-110	71.7	63.3
-110	81.7	71.7
-110	64.0	56.8
-110	74.2	65.4
-110	70.4	62.2
-110	91.2	79.6
-110	72.0	63.6
-110	64.8	57.5
-110	79.2	69.6
-110	52.2	47.0
-110	82.9	72.7
-110	93.2	81.3
-110	75.4	66.4
-110	75.0	66.1
-110	78.6	69.1
-110	94.8	82.7
-110	98.1	85.4
-110	98.5	85.7
-110	104.9	91.1
-110	69.9	61.8
-110	81.6	71.6
-110	55.2	49.5
-110	105.6	91.7
-110	101.5	88.3
-110	73.7	65.0
-110	97.5	84.9
-110	75.9	66.8
-110	48.3	43.7
-91	127.0	109.6
-91	121.8	105.2
-91	70.5	62.3

-91	94.2	82.2
-91	127.3	109.9
-91	119.9	103.7
-91	104.5	90.8
-91	78.6	69.1
-91	98.6	85.8
-91	161.6	138.6
-91	91.3	79.7
-91	115.3	99.8
-91	122.4	105.8
-91	126.3	109.1
-91	108.3	94.0
-91	66.9	59.3
-91	126.7	109.4
-91	69.6	61.6
-91	121.4	104.9
-91	90.0	78.7
-91	153.9	132.2
-91	64.6	57.4
-91	127.2	109.8
-91	99.7	86.7
-91	101.3	88.1
-91	140.4	120.9
-91	78.2	68.7
-91	109.0	94.6
-91	103.9	90.3
-91	126.8	109.5
-91	111.7	96.8
-91	68.6	68.4
-91	81.6	81.3
-91	55.9	55.8
-91	98.8	98.5
-91	71.9	71.7
-91	111.0	110.7
-91	93.5	93.2
-91	79.9	79.7
-91	98.4	98.1
-91	101.1	100.8
-91	79.6	79.4
-91	99.7	99.3
-91	108.1	107.7
-91	93.4	93.1
-91	62.0	61.8
-91	107.1	106.7
-91	145.3	144.8
-91	76.3	76.0
-91	126.5	126.1
-91	126.1	125.7
-91	128.5	128.0
-91	111.4	111.0
-91	130.4	130.0
-91	134.8	134.3
-91	157.3	156.7
-91	105.2	104.9
-91	109.8	109.4
-91	84.9	84.6
-91	62.8	62.7
-91	97.5	97.2
-91	80.2	79.9
-91	134.4	133.9
-91	65.1	65.0
-91	118.6	118.2
-91	67.3	76.1
-91	162.9	189.3
-91	100.0	114.7
-91	91.2	104.3
-91	106.2	122.1
-91	83.2	94.9
-91	91.8	105.0
-91	94.7	108.5
-91	92.9	106.4
-91	69.9	79.2
-91	93.1	106.6
-91	97.9	112.2
-91	73.7	83.7
-91	82.0	93.4
-91	76.3	86.7
-91	93.1	106.6
-91	83.7	95.5
-91	82.1	93.6
-91	86.8	99.2
-91	86.7	99.0
-91	92.3	105.7
-91	83.1	94.8
-91	88.9	101.6
-91	64.3	72.5
-91	101.6	116.7
-91	94.2	107.9

-91	78.7	89.5
-91	73.0	82.8
-91	64.2	72.3
-91	98.9	113.5
-91	103.2	137.2
-91	84.4	110.7
-91	97.0	128.5
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-91	96.8	128.2
-91	73.6	95.5
-91	73.0	94.7
-91	73.3	95.1
-91	53.8	67.7
-91	69.5	89.7
-91	65.5	84.0
-91	79.6	104.0
-91	69.8	90.1
-91	90.3	119.0
-91	88.0	115.8
-60	234.1	199.3
-60	114.4	99.1
-60	130.7	112.7
-60	106.7	92.6
-60	161.0	138.1
-60	200.7	171.3
-60	125.2	108.1
-60	145.1	124.8
-60	91.9	80.2
-60	128.1	110.6
-60	164.4	140.9
-60	192.2	164.3
-60	166.3	142.5
-60	177.7	152.1
-60	203.7	173.9
-60	116.0	100.4
-60	221.9	189.1
-60	167.6	143.6
-60	89.8	78.5
-60	156.3	134.1
-60	186.8	159.7
-60	213.5	182.1
-60	164.6	141.1
-60	280.1	237.9
-60	185.9	159.0
-60	127.7	110.2
-60	205.0	175.0
-60	115.6	100.0
-60	107.5	93.3
-60	164.6	141.1
-60	172.0	147.3
-60	108.5	94.2
-60	119.0	102.9
-60	153.5	131.8
-60	158.9	136.4
-60	137.5	118.4
-60	119.5	103.3
-60	130.7	112.8
-60	172.6	147.8
-60	84.5	74.0
-60	244.6	208.1
-60	120.4	104.1
-60	104.5	90.8
-60	163.6	140.2
-60	201.4	172.0
-60	137.8	118.7
-60	173.0	148.1
-60	99.2	86.4
-60	173.4	148.4
-60	131.5	113.4
-60	186.0	185.3
-60	151.8	151.3
-60	111.7	111.3
-60	143.9	143.4
-60	105.4	105.1
-60	154.0	153.4
-60	176.2	175.6
-60	131.9	131.5
-60	203.9	203.2
-60	142.7	142.2
-60	134.5	134.0
-60	130.1	129.7
-60	142.6	142.1
-60	119.7	119.3
-60	141.3	140.8
-60	175.9	175.3
-60	119.6	119.2
-60	102.4	102.0
-60	99.0	98.7

-60	115.1	114.7
-60	172.9	172.3
-60	120.5	120.2
-60	165.2	164.6
-60	125.6	125.2
-60	126.7	126.3
-60	100.4	100.1
-60	131.1	130.7
-60	185.1	184.5
-60	163.6	163.0
-60	126.5	126.1
-60	164.7	164.1
-60	192.7	192.0
-60	134.5	134.1
-60	140.8	140.3
-60	109.9	126.5
-60	131.9	152.5
-60	136.2	157.6
-60	154.0	178.8
-60	115.9	133.6
-60	150.4	174.4
-40	171.0	146.5
-40	569.4	480.2
-40	169.4	145.1
-40	548.7	462.8
-40	529.9	447.1
-40	318.5	270.1
-40	574.8	484.7
-40	360.8	305.4
-40	343.8	291.2
-40	235.8	200.8
-40	529.9	447.1
-40	496.5	419.1
-40	600.0	505.8
-40	113.7	98.5
-40	229.6	195.5
-40	154.2	132.4
-40	221.3	188.6
-40	486.7	410.9
-40	243.8	207.4
-40	202.5	172.8
-40	180.6	154.6
-40	206.7	176.4
-40	240.7	204.9
-40	270.8	230.1
-40	186.4	159.4
-40	255.8	217.5
-40	231.2	196.9
-40	339.4	287.5
-40	403.1	340.9
-40	399.2	337.6
-40	187.3	186.6
-40	101.5	101.2
-40	140.3	139.9
-40	150.2	149.7
-40	187.3	186.6
-40	211.4	210.6
-40	160.5	160.0
-40	214.6	213.8
-40	188.3	187.7
-40	239.3	238.4
-40	112.8	112.4
-40	239.0	238.1
-40	284.9	283.9
-40	254.7	253.7
-40	270.9	269.9
-40	187.0	186.3
-40	170.1	169.5
-40	256.4	255.5
-40	171.4	170.8
-40	103.1	102.8
-40	230.0	229.1
-40	210.0	209.2
-40	198.2	197.5
-40	150.2	149.7
-40	226.8	226.0
-40	158.1	157.5
-40	256.4	255.5
-40	207.6	206.9
-40	213.5	212.8
-40	254.6	253.7
-40	240.0	239.1
-40	309.2	308.0
-40	125.9	145.5
-40	128.9	149.0
-40	198.5	231.5
-40	212.0	247.5
-40	138.6	160.5

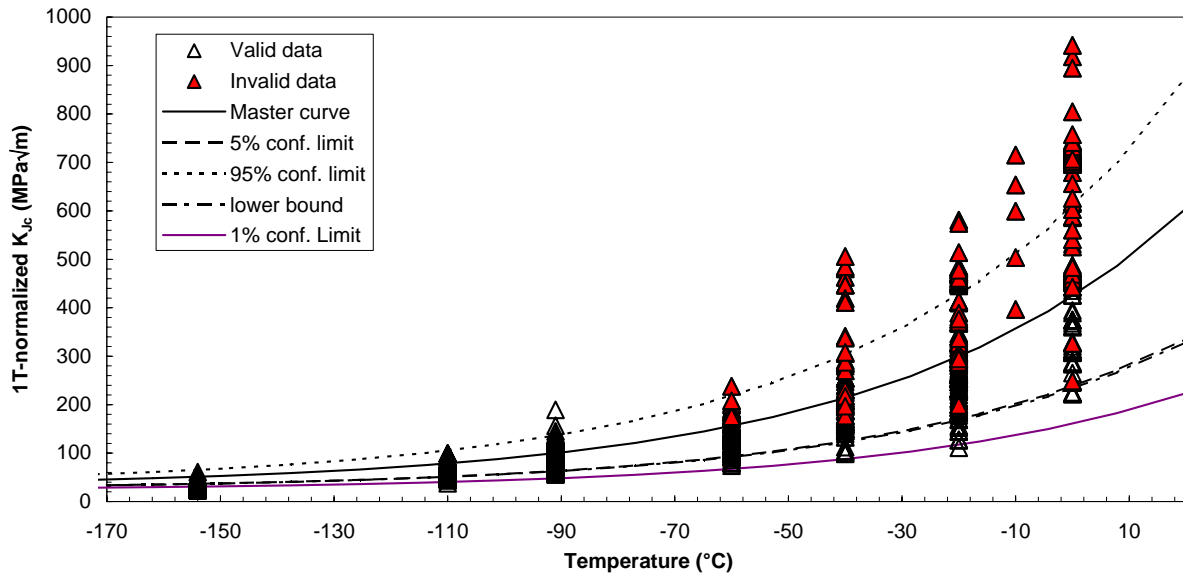
-40	187.7	218.7
-40	173.0	201.2
-40	179.5	208.9
-40	152.6	177.1
-40	153.6	178.3
-40	144.6	167.6
-40	150.7	174.9
-40	139.1	161.0
-40	183.6	213.8
-40	142.0	164.5
-40	187.2	218.0
-40	172.2	200.3
-40	198.0	230.8
-40	130.4	150.8
-40	141.7	164.1
-40	134.5	155.6
-40	115.5	133.1
-40	91.7	104.9
-40	141.1	163.4
-40	239.1	279.6
-40	243.4	284.7
-40	191.9	223.6
-40	146.8	170.2
-40	161.4	187.5
-40	142.3	164.8
-20	128.7	111.1
-20	146.9	126.3
-20	402.8	340.6
-20	409.4	346.2
-20	530.5	447.6
-20	532.2	449.0
-20	534.6	451.0
-20	536.1	452.3
-20	536.1	452.3
-20	536.6	452.7
-20	538.6	454.3
-20	540.5	455.9
-20	543.8	458.7
-20	549.2	463.2
-20	553.7	467.0
-20	556.1	469.0
-20	556.3	469.2
-20	560.6	472.8
-20	565.8	477.2
-20	570.1	480.8
-20	571.1	481.6
-20	233.1	198.5
-20	389.8	329.8
-20	487.9	411.9
-20	438.3	370.4
-20	571.4	481.8
-20	560.7	472.9
-20	561.1	473.2
-20	575.1	484.9
-20	557.5	470.2
-20	572.5	482.7
-20	202.5	201.7
-20	194.7	194.1
-20	262.8	261.8
-20	187.9	187.2
-20	275.8	274.8
-20	261.8	260.9
-20	371.0	369.7
-20	369.1	367.7
-20	462.1	460.4
-20	319.7	318.5
-20	583.1	580.9
-20	231.9	231.0
-20	382.0	380.6
-20	295.9	294.8
-20	576.4	574.2
-20	411.7	410.1
-20	306.4	305.2
-20	324.7	323.5
-20	282.5	281.4
-20	247.2	246.3
-20	233.2	232.4
-20	317.5	316.3
-20	515.6	513.7
-20	263.2	262.3
-20	184.4	183.8
-20	286.9	285.9
-20	341.4	340.1
-20	415.0	413.4
-20	327.9	326.7
-20	170.9	170.3
-20	308.8	307.6
-20	376.5	375.1

-20	228.2	227.4
-20	371.7	370.3
-20	291.6	290.6
-20	337.7	336.4
-20	390.5	389.0
-20	227.3	226.5
-20	201.3	200.6
-20	212.5	211.7
-20	288.4	287.3
-20	479.1	477.3
-20	377.9	376.5
-20	269.6	268.6
-20	184.4	183.8
-20	241.6	240.7
-20	146.4	145.9
-20	299.4	298.3
-20	156.7	156.2
-20	295.6	294.5
-20	167.4	194.6
-20	153.5	178.1
-20	211.2	246.5
-20	220.3	257.3
-20	227.9	266.2
-20	211.1	246.4
-20	217.1	253.4
-20	145.3	168.5
-20	161.2	187.2
-20	131.9	152.5
-20	216.4	252.6
-20	125.0	144.4
-20	378.7	444.9
-20	246.1	287.9
-20	250.9	293.5
-20	251.5	294.3
-20	284.0	332.7
-20	261.1	305.6
-20	351.6	412.8
-20	258.5	302.5
-20	201.3	234.8
-20	110.9	127.7
-20	197.7	230.5
-20	198.9	231.9
-20	200.6	234.0
-20	165.7	192.6
-20	280.1	328.0
-20	279.5	327.3
-20	257.6	301.4
-20	265.2	310.4
-20	156.7	212.6
-20	221.7	304.1
-20	193.9	264.9
-20	191.7	261.9
-20	184.4	251.6
-20	186.7	254.8
-20	184.4	251.6
-20	193.9	264.9
-20	204.4	279.8
-20	224.0	307.4
-20	153.4	207.9
-20	222.6	305.4
-20	162.0	220.0
-20	187.8	256.4
-20	198.2	271.0
-10	656.0	653.4
-10	397.8	396.3
-10	718.1	715.3
-10	601.6	599.3
-10	505.3	503.4
0	541.9	457.1
0	547.0	461.4
0	538.7	454.4
0	540.0	455.5
0	544.8	459.6
0	534.8	451.2
0	557.2	469.9
0	545.0	459.7
0	546.1	460.6
0	549.2	463.2
0	565.1	476.5
0	571.6	482.0
0	553.4	466.8
0	293.2	248.8
0	544.1	459.0
0	552.2	465.7
0	558.0	470.6
0	553.5	466.8
0	557.6	470.3
0	552.4	466.0

0	555.6	468.6
0	558.2	470.8
0	550.6	464.4
0	560.8	473.0
0	569.6	480.4
0	552.5	466.0
0	578.5	487.7
0	556.0	468.9
0	543.8	458.7
0	556.3	469.2
0	327.6	326.4
0	681.4	678.8
0	700.8	698.2
0	698.2	695.5
0	708.4	705.7
0	701.5	698.8
0	724.9	722.1
0	717.4	714.6
0	705.8	703.0
0	709.5	706.8
0	716.7	714.0
0	714.1	711.3
0	658.5	656.0
0	747.5	744.6
0	709.0	706.2
0	719.2	716.4
0	444.5	442.8
0	699.8	697.1
0	704.0	701.3
0	729.5	726.7
0	714.0	711.3
0	725.6	722.8
0	730.2	727.4
0	737.8	734.9
0	590.7	588.4
0	730.3	727.5
0	741.8	738.9
0	744.2	741.3
0	527.7	525.7
0	620.4	618.0
0	727.0	724.2
0	730.3	727.5
0	542.6	540.5
0	726.7	723.9
0	718.7	716.0
0	717.1	714.4
0	721.2	718.5
0	725.3	722.5
0	727.9	725.1
0	727.0	724.2
0	718.5	715.7
0	191.3	222.9
0	269.2	315.2
0	281.2	329.4
0	242.5	283.5
0	318.3	373.3
0	476.2	560.4
0	511.7	602.5
0	621.3	732.2
0	531.3	625.6
0	266.6	312.1
0	599.3	706.2
0	362.9	426.1
0	331.8	389.3
0	227.1	265.3
0	309.5	362.9
0	628.6	740.9
0	210.9	246.1
0	410.7	482.8
0	211.4	246.7
0	778.3	918.2
0	263.4	308.3
0	682.2	804.4
0	386.7	454.3
0	376.2	441.9
0	642.5	757.3
0	306.7	359.6
0	758.4	894.6
0	797.9	941.4
0	246.4	288.2
0	320.1	375.4
0	233.3	320.4
0	238.2	327.4
0	208.3	285.2
0	421.7	585.8
0	226.7	311.2
0	267.0	367.9
0	163.0	221.4

0	165.8	225.4				
0	285.9	394.6				
0	342.0	473.5				
0	314.9	435.4				
0	307.6	425.1				
0	383.0	531.4				
0	332.6	460.4				
0	223.6	306.8				
0	442.2	614.7				
-174			44.4	33.2	55.6	33.0
-161.875			48.2	35.2	61.1	35.0
-149.75			52.9	37.7	68.0	37.5
-137.625			58.8	40.9	76.6	40.6
-125.5			66.2	45.0	87.5	44.6
-113.375			75.6	50.0	101.2	49.5
-101.25			87.4	56.4	118.4	55.8
-89.125			102.3	64.4	140.2	63.6
-77			121.0	74.6	167.5	73.5
-64.875			144.6	87.3	202.0	86.0
-52.75			174.3	103.3	245.3	101.7
-40.625			211.7	123.5	299.9	121.5
-28.5			258.8	148.9	368.6	146.4
-16.375			318.1	181.0	455.2	177.7
-4.25			392.7	221.3	564.1	217.2
7.875			486.7	272.0	701.3	266.9
20			605.0	335.9	874.1	329.4

MASTER CURVE WITH CONFIDENCE LIMITS - SINTAP lower tail analysis
EURO toughness dataset - Complete dataset excluding SX9



SINTAP - Structural Integrity Assessment Procedures for European Industry
Lower Tail Analysis Procedure

Step 3: Minimum value estimation

1. Calculation of the maximum value of T_o (based on a single data point) and establishment of T_o for the data set

Specimen code	T (°C)	$K_{Jc[exp]}$ (MPa√m)	K_{Jc-1T} (MPa√m)	K_{CENS} (MPa√m)	δ_i	$T_{o(i)}$ (°C)
GKSS	-154	54.8	49.1	51.0	1	-219.2
GKSS	-154	49.8	44.9	51.0	1	-214.3
GKSS	-154	37.8	34.9	51.0	1	-200.3
GKSS	-154	33.0	30.9	51.0	1	-193.5
GKSS	-154	38.9	35.8	51.0	1	-201.7
GKSS	-154	24.2	23.6	51.0	1	-178.1
GKSS	-154	47.4	43.0	51.0	1	-211.8
GKSS	-154	46.5	42.2	51.0	1	-210.8
GKSS	-154	31.4	29.6	51.0	1	-191.0
GKSS	-154	39.2	36.0	51.0	1	-202.1
GKSS	-154	24.2	23.6	51.0	1	-178.1
SIEMENS	-154	33.0	30.9	51.0	1	-193.5
SIEMENS	-154	41.0	37.6	51.0	1	-204.4
SIEMENS	-154	31.7	29.8	51.0	1	-191.5
SIEMENS	-154	35.2	32.7	51.0	1	-196.7
SIEMENS	-154	44.4	40.5	51.0	1	-208.5
SIEMENS	-154	41.5	38.0	51.0	1	-205.0
SIEMENS	-154	32.7	30.7	51.0	1	-193.1
SIEMENS	-154	34.3	32.0	51.0	1	-195.4
SIEMENS	-154	36.7	34.0	51.0	1	-198.8
SIEMENS	-154	39.7	36.5	51.0	1	-202.8
SIEMENS	-154	46.1	41.8	51.0	1	-210.3
SIEMENS	-154	34.6	32.2	51.0	1	-195.9
SIEMENS	-154	35.8	33.2	51.0	1	-197.6
SIEMENS	-154	29.3	27.8	51.0	1	-187.6
SIEMENS	-154	28.6	27.2	51.0	1	-186.3
SIEMENS	-154	38.6	35.6	51.0	1	-201.4
SIEMENS	-154	44.4	40.5	51.0	1	-208.5
SIEMENS	-154	48.9	44.2	51.0	1	-213.4
SIEMENS	-154	38.9	35.8	51.0	1	-201.7
SIEMENS	-154	36.7	34.0	51.0	1	-198.8
SIEMENS	-154	31.7	29.8	51.0	1	-191.5
GKSS	-154	41.5	41.4	51.0	1	-209.8
GKSS	-154	42.2	42.2	51.0	1	-210.8
GKSS	-154	50.0	49.9	51.0	1	-220.0
GKSS	-154	34.0	33.9	51.0	1	-198.7
GKSS	-154	41.7	41.7	51.0	1	-210.1
GKSS	-154	46.1	46.0	51.0	1	-215.5
GKSS	-154	44.2	44.1	51.0	1	-213.3
GKSS	-154	36.7	36.6	51.0	1	-202.9
GKSS	-154	29.0	28.9	51.0	1	-189.8
GKSS	-154	53.0	52.9	51.0	0	-
GKSS	-154	39.4	39.3	51.0	1	-207.0
GKSS	-154	29.0	28.9	51.0	1	-189.8
SIEMENS	-154	34.6	34.5	51.0	1	-199.7
SIEMENS	-154	33.0	33.0	51.0	1	-197.2
SIEMENS	-154	38.1	38.0	51.0	1	-205.0
SIEMENS	-154	28.6	28.6	51.0	1	-189.1
SIEMENS	-154	28.6	28.6	51.0	1	-189.1
SIEMENS	-154	38.6	38.5	51.0	1	-205.8
SIEMENS	-154	36.4	36.3	51.0	1	-202.5
SIEMENS	-154	33.4	33.3	51.0	1	-197.7
SIEMENS	-154	36.9	36.9	51.0	1	-203.4
SIEMENS	-154	31.1	31.0	51.0	1	-193.7
SIEMENS	-154	34.3	34.2	51.0	1	-199.2
SIEMENS	-154	30.4	30.4	51.0	1	-192.5
SIEMENS	-154	49.6	49.5	51.0	1	-219.6
SIEMENS	-154	41.0	40.9	51.0	1	-209.1
SIEMENS	-154	34.0	33.9	51.0	1	-198.7
SIEMENS	-154	30.7	30.7	51.0	1	-193.1
SIEMENS	-154	41.2	41.2	51.0	1	-209.5
SIEMENS	-154	26.7	26.7	51.0	1	-185.2
SIEMENS	-154	35.5	35.4	51.0	1	-201.2
SIEMENS	-154	33.4	33.3	51.0	1	-197.7
SIEMENS	-154	36.7	36.6	51.0	1	-202.9
SIEMENS	-154	32.4	32.4	51.0	1	-196.1
SIEMENS	-154	45.1	45.0	51.0	1	-214.4
SIEMENS	-154	33.4	33.3	51.0	1	-197.7
SIEMENS	-154	34.0	33.9	51.0	1	-198.7
SIEMENS	-154	30.7	30.7	51.0	1	-193.1
SIEMENS	-154	26.7	26.7	51.0	1	-185.2
GKSS	-154	33.7	36.2	51.0	1	-202.3
GKSS	-154	42.7	46.9	51.0	1	-216.7

Max value $T_{o(max)} = -129 \text{ } ^\circ\text{C}$

$T_{o(max)} - 8 \text{ } ^\circ\text{C} > T_{o(step 2)}$: **NO**
→ DATA IS HOMOGENEOUS

T_o for the data set: $T_o = -90.8 \text{ } ^\circ\text{C}$

GKSS	-154	37.2	40.4	51.0	1	-208.4
GKSS	-154	54.4	60.8	51.0	0	-
GKSS	-154	34.6	37.3	51.0	1	-204.0
GKSS	-154	44.2	48.7	51.0	1	-218.7
GKSS	-154	29.7	31.5	51.0	1	-194.6
GKSS	-154	36.4	39.4	51.0	1	-207.0
GKSS	-154	36.4	39.4	51.0	1	-207.0
GKSS	-154	28.2	29.8	51.0	1	-191.4
GKSS	-154	28.2	29.8	51.0	1	-191.4
NE	-154	30.0	31.9	51.0	1	-195.3
NE	-154	36.4	39.4	51.0	1	-207.0
NE	-154	37.5	40.7	51.0	1	-208.9
NE	-154	30.0	31.9	51.0	1	-195.3
NE	-154	30.7	32.7	51.0	1	-196.7
NE	-154	30.4	32.3	51.0	1	-196.0
NE	-154	30.7	32.7	51.0	1	-196.7
NE	-154	31.7	33.9	51.0	1	-198.7
NE	-154	41.7	45.8	51.0	1	-215.3
NE	-154	37.2	40.4	51.0	1	-208.4
NE	-154	34.9	37.6	51.0	1	-204.5
NE	-154	38.3	41.7	51.0	1	-210.2
NE	-154	31.4	33.5	51.0	1	-198.1
NE	-154	33.7	36.2	51.0	1	-202.3
NE	-154	32.7	35.1	51.0	1	-200.6
NE	-154	43.0	47.2	51.0	1	-217.0
NE	-154	32.7	35.1	51.0	1	-200.6
NE	-154	30.0	31.9	51.0	1	-195.3
NE	-154	36.9	40.1	51.0	1	-208.0
NE	-154	33.4	35.8	51.0	1	-201.8
NE	-154	30.0	31.9	51.0	1	-195.3
GKSS	-110	98.1	85.4	78.5	0	-
GKSS	-110	59.0	52.7	78.5	1	-179.0
GKSS	-110	80.0	70.3	78.5	1	-194.7
GKSS	-110	57.2	51.2	78.5	1	-177.4
GKSS	-110	88.3	77.2	78.5	1	-199.8
GKSS	-110	96.2	83.9	78.5	0	-
GKSS	-110	81.6	71.6	78.5	1	-195.7
GKSS	-110	66.9	59.3	78.5	1	-185.4
GKSS	-110	85.6	75.0	78.5	1	-198.2
GKSS	-110	86.8	76.0	78.5	1	-198.9
GKSS	-110	114.2	98.9	78.5	0	-
GKSS	-110	73.5	64.8	78.5	1	-190.3
GKSS	-110	92.7	80.9	78.5	0	-
GKSS	-110	77.5	68.2	78.5	1	-193.0
GKSS	-110	61.5	54.7	78.5	1	-181.1
GKSS	-110	51.8	46.7	78.5	1	-172.4
GKSS	-110	73.6	64.9	78.5	1	-190.4
GKSS	-110	52.8	47.5	78.5	1	-173.4
GKSS	-110	41.2	37.8	78.5	1	-160.7
GKSS	-110	115.3	99.8	78.5	0	-
GKSS	-110	73.2	64.5	78.5	1	-190.1
GKSS	-110	74.0	65.3	78.5	1	-190.7
GKSS	-110	67.5	59.8	78.5	1	-185.9
GKSS	-110	71.0	62.7	78.5	1	-188.5
GKSS	-110	53.4	48.0	78.5	1	-173.9
GKSS	-110	96.5	84.0	78.5	0	-
GKSS	-110	71.3	63.0	78.5	1	-188.7
GKSS	-110	71.7	63.3	78.5	1	-189.0
GKSS	-110	81.7	71.7	78.5	1	-195.8
GKSS	-110	64.0	56.8	78.5	1	-183.2
GKSS	-110	74.2	65.4	78.5	1	-190.8
GKSS	-110	70.4	62.2	78.5	1	-188.1
GKSS	-110	91.2	79.6	78.5	0	-
GKSS	-110	72.0	63.6	78.5	1	-189.3
GKSS	-110	64.8	57.5	78.5	1	-183.8
GKSS	-110	79.2	69.6	78.5	1	-194.2
GKSS	-110	52.2	47.0	78.5	1	-172.8
GKSS	-110	82.9	72.7	78.5	1	-196.5
GKSS	-110	93.2	81.3	78.5	0	-
GKSS	-110	75.4	66.4	78.5	1	-191.6
GKSS	-110	75.0	66.1	78.5	1	-191.4
GKSS	-110	78.6	69.1	78.5	1	-193.7
GKSS	-110	94.8	82.7	78.5	0	-
GKSS	-110	98.1	85.4	78.5	0	-
GKSS	-110	98.5	85.7	78.5	0	-
GKSS	-110	104.9	91.1	78.5	0	-
GKSS	-110	69.9	61.8	78.5	1	-187.8
GKSS	-110	81.6	71.6	78.5	1	-195.7
GKSS	-110	55.2	49.5	78.5	1	-175.6
GKSS	-110	105.6	91.7	78.5	0	-
GKSS	-110	101.5	88.3	78.5	0	-
GKSS	-110	73.7	65.0	78.5	1	-190.5
GKSS	-110	97.5	84.9	78.5	0	-
GKSS	-110	75.9	66.8	78.5	1	-191.9
GKSS	-110	48.3	43.7	78.5	1	-168.7

GKSS	-91	127.0	109.6	99.6	0	-
GKSS	-91	121.8	105.2	99.6	0	-
GKSS	-91	70.5	62.3	99.6	1	-169.2
GKSS	-91	94.2	82.2	99.6	1	-184.2
GKSS	-91	127.3	109.9	99.6	0	-
GKSS	-91	119.9	103.7	99.6	0	-
GKSS	-91	104.5	90.8	99.6	1	-189.5
GKSS	-91	78.6	69.1	99.6	1	-174.7
GKSS	-91	98.6	85.8	99.6	1	-186.5
GKSS	-91	161.6	138.6	99.6	0	-
THA	-91	91.3	79.7	99.6	1	-182.5
THA	-91	115.3	99.8	99.6	0	-
THA	-91	122.4	105.8	99.6	0	-
THA	-91	126.3	109.1	99.6	0	-
THA	-91	108.3	94.0	99.6	1	-191.4
THA	-91	66.9	59.3	99.6	1	-166.4
THA	-91	126.7	109.4	99.6	0	-
THA	-91	69.6	61.6	99.6	1	-168.5
THA	-91	121.4	104.9	99.6	0	-
THA	-91	90.0	78.7	99.6	1	-181.8
THA	-91	153.9	132.2	99.6	0	-
THA	-91	64.6	57.4	99.6	1	-164.7
THA	-91	127.2	109.8	99.6	0	-
THA	-91	99.7	86.7	99.6	1	-187.0
THA	-91	101.3	88.1	99.6	1	-187.9
THA	-91	140.4	120.9	99.6	0	-
THA	-91	78.2	68.7	99.6	1	-174.5
THA	-91	109.0	94.6	99.6	1	-191.7
THA	-91	103.9	90.3	99.6	1	-189.2
THA	-91	126.8	109.5	99.6	0	-
THA	-91	111.7	96.8	99.6	1	-193.0
GKSS	-91	68.6	68.4	99.6	1	-174.2
GKSS	-91	81.6	81.3	99.6	1	-183.6
GKSS	-91	55.9	55.8	99.6	1	-163.2
GKSS	-91	98.8	98.5	99.6	1	-193.9
GKSS	-91	71.9	71.7	99.6	1	-176.8
GKSS	-91	111.0	110.7	99.6	0	-
GKSS	-91	93.5	93.2	99.6	1	-190.9
GKSS	-91	79.9	79.7	99.6	1	-182.5
GKSS	-91	98.4	98.1	99.6	1	-193.7
GKSS	-91	101.1	100.8	99.6	0	-
TWI	-91	79.6	79.4	99.6	1	-182.3
TWI	-91	99.7	99.3	99.6	1	-194.4
TWI	-91	108.1	107.7	99.6	0	-
TWI	-91	93.4	93.1	99.6	1	-190.8
TWI	-91	62.0	61.8	99.6	1	-168.7
TWI	-91	107.1	106.7	99.6	0	-
TWI	-91	145.3	144.8	99.6	0	-
TWI	-91	76.3	76.0	99.6	1	-180.0
TWI	-91	126.5	126.1	99.6	0	-
TWI	-91	126.1	125.7	99.6	0	-
TWI	-91	128.5	128.0	99.6	0	-
TWI	-91	111.4	111.0	99.6	0	-
TWI	-91	130.4	130.0	99.6	0	-
TWI	-91	134.8	134.3	99.6	0	-
TWI	-91	157.3	156.7	99.6	0	-
TWI	-91	105.2	104.9	99.6	0	-
TWI	-91	109.8	109.4	99.6	0	-
TWI	-91	84.9	84.6	99.6	1	-185.7
TWI	-91	62.8	62.7	99.6	1	-169.5
TWI	-91	97.5	97.2	99.6	1	-193.2
TWI	-91	80.2	79.9	99.6	1	-182.6
TWI	-91	134.4	133.9	99.6	0	-
TWI	-91	65.1	65.0	99.6	1	-171.4
TWI	-91	118.6	118.2	99.6	0	-
GKSS	-91	67.3	76.1	99.6	1	-180.0
GKSS	-91	162.9	189.3	99.6	0	-
GKSS	-91	100.0	114.7	99.6	0	-
GKSS	-91	91.2	104.3	99.6	0	-
GKSS	-91	106.2	122.1	99.6	0	-
GKSS	-91	83.2	94.9	99.6	1	-191.9
GKSS	-91	91.8	105.0	99.6	0	-
GKSS	-91	94.7	108.5	99.6	0	-
GKSS	-91	92.9	106.4	99.6	0	-
GKSS	-91	69.9	79.2	99.6	1	-182.1
NE	-91	93.1	106.6	99.6	0	-
NE	-91	97.9	112.2	99.6	0	-
NE	-91	73.7	83.7	99.6	1	-185.1
NE	-91	82.0	93.4	99.6	1	-191.0
NE	-91	76.3	86.7	99.6	1	-187.0
NE	-91	93.1	106.6	99.6	0	-
NE	-91	83.7	95.5	99.6	1	-192.2
NE	-91	82.1	93.6	99.6	1	-191.1
NE	-91	86.8	99.2	99.6	1	-194.2
NE	-91	86.7	99.0	99.6	1	-194.2

NE	-91	92.3	105.7	99.6	0	-
NE	-91	83.1	94.8	99.6	1	-191.8
NE	-91	88.9	101.6	99.6	0	-
NE	-91	64.3	72.5	99.6	1	-177.4
NE	-91	101.6	116.7	99.6	0	-
NE	-91	94.2	107.9	99.6	0	-
NE	-91	78.7	89.5	99.6	1	-188.8
NE	-91	73.0	82.8	99.6	1	-184.6
NE	-91	64.2	72.3	99.6	1	-177.2
NE	-91	98.9	113.5	99.6	0	-
GKSS	-91	103.2	137.2	99.6	0	-
GKSS	-91	84.4	110.7	99.6	0	-
GKSS	-91	97.0	128.5	99.6	0	-
GKSS	-91	92.7	122.4	99.6	0	-
GKSS	-91	96.8	128.2	99.6	0	-
NE	-91	73.6	95.5	99.6	1	-192.2
NE	-91	73.0	94.7	99.6	1	-191.8
NE	-91	73.3	95.1	99.6	1	-192.0
NE	-91	53.8	67.7	99.6	1	-173.6
NE	-91	69.5	89.7	99.6	1	-188.9
NE	-91	65.5	84.0	99.6	1	-185.3
NE	-91	79.6	104.0	99.6	0	-
NE	-91	69.8	90.1	99.6	1	-189.1
NE	-91	90.3	119.0	99.6	0	-
NE	-91	88.0	115.8	99.6	0	-
GKSS	-60	205.5	175.4	155.4	0	-
GKSS	-60	114.4	99.1	155.4	1	-163.2
GKSS	-60	130.7	112.7	155.4	1	-170.1
GKSS	-60	106.7	92.6	155.4	1	-159.6
GKSS	-60	161.0	138.1	155.4	1	-181.0
GKSS	-60	200.7	171.3	155.4	0	-
GKSS	-60	125.2	108.1	155.4	1	-167.9
GKSS	-60	145.1	124.8	155.4	1	-175.6
GKSS	-60	91.9	80.2	155.4	1	-151.8
GKSS	-60	128.1	110.6	155.4	1	-169.1
GKSS	-60	164.4	140.9	155.4	1	-182.1
GKSS	-60	192.2	164.3	155.4	0	-
GKSS	-60	166.3	142.5	155.4	1	-182.7
GKSS	-60	177.7	152.1	155.4	1	-186.1
GKSS	-60	202.0	172.5	155.4	0	-
GKSS	-60	116.0	100.4	155.4	1	-163.9
GKSS	-60	202.0	172.5	155.4	0	-
GKSS	-60	167.6	143.6	155.4	1	-183.1
GKSS	-60	89.8	78.5	155.4	1	-150.6
GKSS	-60	156.3	134.1	155.4	1	-179.4
GKSS	-60	186.8	159.7	155.4	0	-
GKSS	-60	203.2	173.4	155.4	0	-
GKSS	-60	164.6	141.1	155.4	1	-182.1
GKSS	-60	202.6	173.0	155.4	0	-
GKSS	-60	185.9	159.0	155.4	0	-
GKSS	-60	127.7	110.2	155.4	1	-168.9
GKSS	-60	201.2	171.7	155.4	0	-
GKSS	-60	115.6	100.0	155.4	1	-163.7
GKSS	-60	107.5	93.3	155.4	1	-160.0
SIEMENS	-60	164.6	141.1	155.4	1	-182.1
SIEMENS	-60	172.0	147.3	155.4	1	-184.4
SIEMENS	-60	108.5	94.2	155.4	1	-160.5
SIEMENS	-60	119.0	102.9	155.4	1	-165.2
SIEMENS	-60	153.5	131.8	155.4	1	-178.5
SIEMENS	-60	158.9	136.4	155.4	1	-180.3
SIEMENS	-60	137.5	118.4	155.4	1	-172.8
SIEMENS	-60	119.5	103.3	155.4	1	-165.5
SIEMENS	-60	130.7	112.8	155.4	1	-170.1
SIEMENS	-60	172.6	147.8	155.4	1	-184.6
SIEMENS	-60	84.5	74.0	155.4	1	-147.5
SIEMENS	-60	213.4	182.0	155.4	0	-
SIEMENS	-60	120.4	104.1	155.4	1	-165.8
SIEMENS	-60	104.5	90.8	155.4	1	-158.5
SIEMENS	-60	163.6	140.2	155.4	1	-181.8
SIEMENS	-60	201.4	172.0	155.4	0	-
SIEMENS	-60	137.8	118.7	155.4	1	-172.9
SIEMENS	-60	173.0	148.1	155.4	1	-184.7
SIEMENS	-60	99.2	86.4	155.4	1	-155.8
SIEMENS	-60	173.4	148.4	155.4	1	-184.8
SIEMENS	-60	131.5	113.4	155.4	1	-170.4
GKSS	-60	186.0	185.3	155.4	0	-
GKSS	-60	151.8	151.3	155.4	1	-185.8
GKSS	-60	111.7	111.3	155.4	1	-169.5
GKSS	-60	143.9	143.4	155.4	1	-183.0
GKSS	-60	105.4	105.1	155.4	1	-166.4
GKSS	-60	154.0	153.4	155.4	1	-186.6
GKSS	-60	176.2	175.6	155.4	0	-
GKSS	-60	131.9	131.5	155.4	1	-178.4
GKSS	-60	203.9	203.2	155.4	0	-
GKSS	-60	142.7	142.2	155.4	1	-182.6

TWI	-60	134.5	134.0	155.4	1	-179.4
TWI	-60	130.1	129.7	155.4	1	-177.6
TWI	-60	142.6	142.1	155.4	1	-182.5
TWI	-60	119.7	119.3	155.4	1	-173.1
TWI	-60	141.3	140.8	155.4	1	-182.0
TWI	-60	175.9	175.3	155.4	0	-
TWI	-60	119.6	119.2	155.4	1	-173.1
TWI	-60	102.4	102.0	155.4	1	-164.8
TWI	-60	99.0	98.7	155.4	1	-163.0
TWI	-60	115.1	114.7	155.4	1	-171.1
TWI	-60	172.9	172.3	155.4	0	-
TWI	-60	120.5	120.2	155.4	1	-173.5
TWI	-60	165.2	164.6	155.4	0	-
TWI	-60	125.6	125.2	155.4	1	-175.7
TWI	-60	126.7	126.3	155.4	1	-176.2
TWI	-60	100.4	100.1	155.4	1	-163.7
TWI	-60	131.1	130.7	155.4	1	-178.0
TWI	-60	185.1	184.5	155.4	0	-
TWI	-60	163.6	163.0	155.4	0	-
TWI	-60	126.5	126.1	155.4	1	-176.1
TWI	-60	164.7	164.1	155.4	0	-
TWI	-60	192.7	192.0	155.4	0	-
TWI	-60	134.5	134.1	155.4	1	-179.4
TWI	-60	140.8	140.3	155.4	1	-181.8
GKSS	-60	109.9	126.5	155.4	1	-176.3
GKSS	-60	131.9	152.5	155.4	1	-186.3
GKSS	-60	136.2	157.6	155.4	0	-
GKSS	-60	154.0	178.8	155.4	0	-
GKSS	-60	115.9	133.6	155.4	1	-179.2
GKSS	-60	150.4	174.4	155.4	0	-
BAM	-40	171.0	146.5	213.4	1	-164.1
BAM	-40	206.2	176.0	213.4	1	-173.9
BAM	-40	169.4	145.1	213.4	1	-163.6
BAM	-40	203.6	173.7	213.4	1	-173.2
BAM	-40	202.5	172.9	213.4	1	-173.0
BAM	-40	207.2	176.8	213.4	1	-174.2
BAM	-40	205.9	175.7	213.4	1	-173.8
BAM	-40	206.5	176.2	213.4	1	-174.0
BAM	-40	207.3	176.9	213.4	1	-174.2
BAM	-40	205.1	175.1	213.4	1	-173.6
BAM	-40	202.8	173.1	213.4	1	-173.0
BAM	-40	204.9	174.8	213.4	1	-173.6
BAM	-40	205.2	175.1	213.4	1	-173.6
BAM	-40	113.7	98.5	213.4	1	-142.9
BAM	-40	204.8	174.8	213.4	1	-173.5
BAM	-40	154.2	132.4	213.4	1	-158.7
BAM	-40	206.2	176.0	213.4	1	-173.9
BAM	-40	204.2	174.3	213.4	1	-173.4
BAM	-40	207.3	176.9	213.4	1	-174.2
BAM	-40	202.5	172.8	213.4	1	-172.9
GKSS	-40	180.6	154.6	213.4	1	-167.0
GKSS	-40	203.5	173.7	213.4	1	-173.2
GKSS	-40	198.2	169.3	213.4	1	-171.8
GKSS	-40	199.6	170.5	213.4	1	-172.2
GKSS	-40	186.4	159.4	213.4	1	-168.6
GKSS	-40	199.4	170.3	213.4	1	-172.2
GKSS	-40	204.4	174.4	213.4	1	-173.4
GKSS	-40	202.4	172.7	213.4	1	-172.9
GKSS	-40	203.2	173.4	213.4	1	-173.1
GKSS	-40	200.9	171.5	213.4	1	-172.5
BAM	-40	187.3	186.6	213.4	1	-177.0
BAM	-40	101.5	101.2	213.4	1	-144.4
BAM	-40	140.3	139.9	213.4	1	-161.7
BAM	-40	150.2	149.7	213.4	1	-165.3
BAM	-40	187.3	186.6	213.4	1	-177.0
BAM	-40	211.4	210.6	213.4	1	-183.5
BAM	-40	160.5	160.0	213.4	1	-168.8
BAM	-40	214.6	213.8	213.4	0	-
BAM	-40	188.3	187.7	213.4	1	-177.3
BAM	-40	239.3	238.4	213.4	0	-
BAM	-40	112.8	112.4	213.4	1	-150.0
BAM	-40	239.0	238.1	213.4	0	-
BAM	-40	284.9	283.9	213.4	0	-
BAM	-40	254.7	253.7	213.4	0	-
BAM	-40	270.9	269.9	213.4	0	-
BAM	-40	187.0	186.3	213.4	1	-176.9
BAM	-40	170.1	169.5	213.4	1	-171.9
BAM	-40	256.4	255.5	213.4	0	-
BAM	-40	171.4	170.8	213.4	1	-172.3
BAM	-40	103.1	102.8	213.4	1	-145.2
BAM	-40	230.0	229.1	213.4	0	-
BAM	-40	210.0	209.2	213.4	1	-183.1
GKSS	-40	198.2	197.5	213.4	1	-180.0
GKSS	-40	150.2	149.7	213.4	1	-165.3
GKSS	-40	226.8	226.0	213.4	0	-

GKSS	-40	158.1	157.5	213.4	1	-168.0
GKSS	-40	256.4	255.5	213.4	0	-
GKSS	-40	207.6	206.9	213.4	1	-182.5
GKSS	-40	213.5	212.8	213.4	1	-184.0
GKSS	-40	254.6	253.7	213.4	0	-
GKSS	-40	240.0	239.1	213.4	0	-
GKSS	-40	279.0	278.0	213.4	0	-
GKSS	-40	125.9	145.5	213.4	1	-163.7
GKSS	-40	128.9	149.0	213.4	1	-165.0
GKSS	-40	198.5	231.5	213.4	0	-
GKSS	-40	212.0	247.5	213.4	0	-
GKSS	-40	138.6	160.5	213.4	1	-169.0
GKSS	-40	187.7	218.7	213.4	0	-
GKSS	-40	173.0	201.2	213.4	1	-181.0
GKSS	-40	179.5	208.9	213.4	1	-183.0
GKSS	-40	152.6	177.1	213.4	1	-174.2
GKSS	-40	153.6	178.3	213.4	1	-174.6
THA	-40	144.6	167.6	213.4	1	-171.3
THA	-40	150.7	174.9	213.4	1	-173.6
THA	-40	139.1	161.0	213.4	1	-169.2
THA	-40	183.6	213.8	213.4	0	-
THA	-40	142.0	164.5	213.4	1	-170.3
THA	-40	187.2	218.0	213.4	0	-
THA	-40	172.2	200.3	213.4	1	-180.8
THA	-40	198.0	230.8	213.4	0	-
THA	-40	130.4	150.8	213.4	1	-165.7
THA	-40	141.7	164.1	213.4	1	-170.2
THA	-40	134.5	155.6	213.4	1	-167.3
THA	-40	115.5	133.1	213.4	1	-159.0
THA	-40	91.7	104.9	213.4	1	-146.3
THA	-40	141.1	163.4	213.4	1	-170.0
THA	-40	239.1	279.6	213.4	0	-
THA	-40	243.4	284.7	213.4	0	-
THA	-40	191.9	223.6	213.4	0	-
THA	-40	146.8	170.2	213.4	1	-172.1
THA	-40	161.4	187.5	213.4	1	-177.3
THA	-40	142.3	164.8	213.4	1	-170.4
CISE	-20	128.7	111.1	298.2	1	-129.3
CISE	-20	146.9	126.3	298.2	1	-136.2
CISE	-20	204.3	174.4	298.2	1	-153.4
CISE	-20	198.3	169.3	298.2	1	-151.8
CISE	-20	195.0	166.6	298.2	1	-151.0
CISE	-20	197.8	168.9	298.2	1	-151.7
CISE	-20	195.6	167.1	298.2	1	-151.1
CISE	-20	196.2	167.6	298.2	1	-151.3
CISE	-20	194.0	165.7	298.2	1	-150.7
CISE	-20	198.3	169.3	298.2	1	-151.8
CISE	-20	201.2	171.8	298.2	1	-152.6
CISE	-20	200.9	171.5	298.2	1	-152.5
CISE	-20	195.6	167.1	298.2	1	-151.1
CISE	-20	197.6	168.8	298.2	1	-151.7
CISE	-20	201.9	172.4	298.2	1	-152.8
CISE	-20	202.5	172.8	298.2	1	-152.9
CISE	-20	198.1	169.2	298.2	1	-151.8
CISE	-20	198.1	169.2	298.2	1	-151.8
CISE	-20	200.7	171.3	298.2	1	-152.5
CISE	-20	199.8	170.6	298.2	1	-152.2
CISE	-20	201.5	172.0	298.2	1	-152.7
GKSS	-20	200.6	171.2	298.2	1	-152.4
GKSS	-20	200.6	171.2	298.2	1	-152.4
GKSS	-20	199.8	170.6	298.2	1	-152.3
GKSS	-20	198.2	169.2	298.2	1	-151.8
GKSS	-20	199.3	170.2	298.2	1	-152.1
GKSS	-20	196.6	167.9	298.2	1	-151.4
GKSS	-20	198.6	169.6	298.2	1	-151.9
GKSS	-20	200.7	171.3	298.2	1	-152.5
GKSS	-20	195.0	166.6	298.2	1	-151.0
GKSS	-20	198.6	169.6	298.2	1	-151.9
GKSS	-20	202.5	201.7	298.2	1	-161.2
GKSS	-20	194.7	194.1	298.2	1	-159.1
GKSS	-20	262.8	261.8	298.2	1	-175.0
GKSS	-20	187.9	187.2	298.2	1	-157.2
GKSS	-20	275.8	274.8	298.2	1	-177.6
GKSS	-20	261.8	260.9	298.2	1	-174.8
GKSS	-20	283.2	282.2	298.2	1	-179.0
GKSS	-20	283.1	282.0	298.2	1	-178.9
GKSS	-20	284.0	283.0	298.2	1	-179.1
GKSS	-20	284.2	283.1	298.2	1	-179.2
VTT	-20	284.0	282.9	298.2	1	-179.1
VTT	-20	231.9	231.0	298.2	1	-168.4
VTT	-20	279.4	278.3	298.2	1	-178.2
VTT	-20	280.3	279.2	298.2	1	-178.4
VTT	-20	279.4	278.3	298.2	1	-178.2
VTT	-20	278.6	277.5	298.2	1	-178.1
VTT	-20	281.9	280.9	298.2	1	-178.7

VTT	-20	279.4	278.3	298.2	1	-178.2
VTT	-20	282.5	281.4	298.2	1	-178.8
VTT	-20	247.2	246.3	298.2	1	-171.8
VTT	-20	233.2	232.4	298.2	1	-168.7
VTT	-20	283.2	282.2	298.2	1	-179.0
VTT	-20	288.9	287.8	298.2	1	-180.0
VTT	-20	263.2	262.3	298.2	1	-175.1
VTT	-20	184.4	183.8	298.2	1	-156.2
VTT	-20	283.7	282.7	298.2	1	-179.1
VTT	-20	280.8	279.8	298.2	1	-178.5
VTT	-20	280.9	279.8	298.2	1	-178.5
VTT	-20	280.9	279.8	298.2	1	-178.5
VTT	-20	170.9	170.3	298.2	1	-152.1
VTT	-20	282.9	281.9	298.2	1	-178.9
VTT	-20	275.7	274.6	298.2	1	-177.5
VTT	-20	228.2	227.4	298.2	1	-167.5
VTT	-20	282.0	281.0	298.2	1	-178.8
VTT	-20	280.9	279.8	298.2	1	-178.5
VTT	-20	281.8	280.7	298.2	1	-178.7
VTT	-20	281.4	280.4	298.2	1	-178.6
VTT	-20	227.3	226.5	298.2	1	-167.3
VTT	-20	201.3	200.6	298.2	1	-160.9
VTT	-20	212.5	211.7	298.2	1	-163.7
VTT	-20	256.5	255.5	298.2	1	-173.7
VTT	-20	284.8	283.8	298.2	1	-179.3
VTT	-20	282.3	281.3	298.2	1	-178.8
VTT	-20	269.6	268.6	298.2	1	-176.4
VTT	-20	184.4	183.8	298.2	1	-156.2
VTT	-20	241.6	240.7	298.2	1	-170.6
VTT	-20	146.4	145.9	298.2	1	-143.9
VTT	-20	280.0	279.0	298.2	1	-178.4
VTT	-20	156.7	156.2	298.2	1	-147.6
VTT	-20	277.0	276.0	298.2	1	-177.8
CISE	-20	167.4	194.6	298.2	1	-159.2
CISE	-20	153.5	178.1	298.2	1	-154.5
CISE	-20	211.2	246.5	298.2	1	-171.8
CISE	-20	220.3	257.3	298.2	1	-174.1
CISE	-20	227.9	266.2	298.2	1	-175.9
CISE	-20	211.1	246.4	298.2	1	-171.8
CISE	-20	217.1	253.4	298.2	1	-173.3
CISE	-20	145.3	168.5	298.2	1	-151.6
CISE	-20	161.2	187.2	298.2	1	-157.2
CISE	-20	131.9	152.5	298.2	1	-146.3
CISE	-20	216.4	252.6	298.2	1	-173.1
CISE	-20	125.0	144.4	298.2	1	-143.3
CISE	-20	378.7	444.9	298.2	0	-
CISE	-20	246.1	287.9	298.2	1	-180.0
CISE	-20	250.9	293.5	298.2	1	-181.1
CISE	-20	251.5	294.3	298.2	1	-181.2
CISE	-20	284.0	332.7	298.2	0	-
CISE	-20	261.1	305.6	298.2	0	-
CISE	-20	351.6	412.8	298.2	0	-
CISE	-20	258.5	302.5	298.2	0	-
GKSS	-20	201.3	234.8	298.2	1	-169.2
GKSS	-20	110.9	127.7	298.2	1	-136.8
GKSS	-20	197.7	230.5	298.2	1	-168.2
GKSS	-20	198.9	231.9	298.2	1	-168.6
GKSS	-20	200.6	234.0	298.2	1	-169.0
GKSS	-20	165.7	192.6	298.2	1	-158.7
GKSS	-20	280.1	328.0	298.2	0	-
GKSS	-20	279.5	327.3	298.2	0	-
GKSS	-20	257.6	301.4	298.2	0	-
GKSS	-20	265.2	310.4	298.2	0	-
GKSS	-20	156.7	212.6	298.2	1	-164.0
GKSS	-20	221.7	304.1	298.2	0	-
GKSS	-20	193.9	264.9	298.2	1	-175.6
GKSS	-20	191.7	261.9	298.2	1	-175.0
GKSS	-20	184.4	251.6	298.2	1	-172.9
NE	-20	186.7	254.8	298.2	1	-173.6
NE	-20	184.4	251.6	298.2	1	-172.9
NE	-20	193.9	264.9	298.2	1	-175.6
NE	-20	204.4	279.8	298.2	1	-178.5
NE	-20	224.0	307.4	298.2	0	-
NE	-20	153.4	207.9	298.2	1	-162.8
NE	-20	222.6	305.4	298.2	0	-
NE	-20	162.0	220.0	298.2	1	-165.8
NE	-20	187.8	256.4	298.2	1	-173.9
NE	-20	198.2	271.0	298.2	1	-176.8
SCK-CEN	-10	280.0	279.0	354.3	1	-168.4
SCK-CEN	-10	281.2	280.2	354.3	1	-168.6
SCK-CEN	-10	282.6	281.5	354.3	1	-168.8
SCK-CEN	-10	284.0	282.9	354.3	1	-169.1
SCK-CEN	-10	280.9	279.9	354.3	1	-168.5
GKSS	0	196.8	168.1	422.2	1	-131.5
GKSS	0	193.7	165.5	422.2	1	-130.6

GKSS	0	192.9	164.8	422.2	1	-130.4
GKSS	0	196.7	168.0	422.2	1	-131.4
GKSS	0	196.1	167.5	422.2	1	-131.3
GKSS	0	194.7	166.3	422.2	1	-130.9
GKSS	0	196.3	167.7	422.2	1	-131.3
GKSS	0	195.9	167.3	422.2	1	-131.2
GKSS	0	195.2	166.8	422.2	1	-131.0
GKSS	0	193.3	165.1	422.2	1	-130.5
SCK-CEN	0	198.4	169.4	422.2	1	-131.9
SCK-CEN	0	199.1	170.0	422.2	1	-132.1
SCK-CEN	0	198.2	169.2	422.2	1	-131.8
SCK-CEN	0	197.6	168.8	422.2	1	-131.7
SCK-CEN	0	201.2	171.8	422.2	1	-132.6
SCK-CEN	0	200.0	170.8	422.2	1	-132.3
SCK-CEN	0	197.4	168.6	422.2	1	-131.6
SCK-CEN	0	199.6	170.4	422.2	1	-132.2
SCK-CEN	0	203.4	173.6	422.2	1	-133.2
SCK-CEN	0	199.2	170.1	422.2	1	-132.1
SCK-CEN	0	200.5	171.2	422.2	1	-132.4
SCK-CEN	0	202.4	172.7	422.2	1	-132.9
SCK-CEN	0	197.2	168.4	422.2	1	-131.5
SCK-CEN	0	205.8	175.6	422.2	1	-133.8
SCK-CEN	0	205.5	175.4	422.2	1	-133.7
SCK-CEN	0	202.4	172.7	422.2	1	-132.9
SCK-CEN	0	203.4	173.6	422.2	1	-133.2
SCK-CEN	0	205.2	175.1	422.2	1	-133.6
SCK-CEN	0	202.3	172.7	422.2	1	-132.9
SCK-CEN	0	201.6	172.1	422.2	1	-132.7
GKSS	0	282.4	281.4	422.2	1	-158.8
GKSS	0	283.7	282.7	422.2	1	-159.1
GKSS	0	284.9	283.9	422.2	1	-159.3
GKSS	0	282.8	281.8	422.2	1	-158.9
GKSS	0	284.4	283.4	422.2	1	-159.2
GKSS	0	284.9	283.8	422.2	1	-159.3
GKSS	0	279.6	278.6	422.2	1	-158.3
GKSS	0	283.9	282.8	422.2	1	-159.1
GKSS	0	285.7	284.7	422.2	1	-159.4
GKSS	0	283.0	281.9	422.2	1	-158.9
SCK-CEN	0	277.0	276.0	422.2	1	-157.8
SCK-CEN	0	276.7	275.7	422.2	1	-157.7
SCK-CEN	0	276.9	275.9	422.2	1	-157.8
SCK-CEN	0	277.9	276.8	422.2	1	-158.0
SCK-CEN	0	276.9	275.9	422.2	1	-157.8
SCK-CEN	0	278.2	277.2	422.2	1	-158.0
SCK-CEN	0	278.0	277.0	422.2	1	-158.0
SCK-CEN	0	275.9	274.9	422.2	1	-157.6
SCK-CEN	0	277.6	276.6	422.2	1	-157.9
SCK-CEN	0	278.2	277.2	422.2	1	-158.0
SCK-CEN	0	277.3	276.3	422.2	1	-157.9
VTT	0	280.3	279.3	422.2	1	-158.4
VTT	0	275.5	274.5	422.2	1	-157.5
VTT	0	280.3	279.3	422.2	1	-158.4
VTT	0	275.2	274.2	422.2	1	-157.4
VTT	0	278.0	277.0	422.2	1	-158.0
VTT	0	278.5	277.5	422.2	1	-158.1
VTT	0	279.7	278.6	422.2	1	-158.3
VTT	0	267.2	266.2	422.2	1	-155.9
VTT	0	279.8	278.8	422.2	1	-158.3
VTT	0	278.6	277.6	422.2	1	-158.1
VTT	0	278.3	277.3	422.2	1	-158.0
VTT	0	280.0	278.9	422.2	1	-158.4
VTT	0	274.3	273.3	422.2	1	-157.3
VTT	0	276.0	275.0	422.2	1	-157.6
VTT	0	278.7	277.7	422.2	1	-158.1
VTT	0	278.0	277.0	422.2	1	-158.0
VTT	0	279.1	278.0	422.2	1	-158.2
VTT	0	278.6	277.5	422.2	1	-158.1
VTT	0	279.4	278.4	422.2	1	-158.3
VTT	0	276.2	275.2	422.2	1	-157.6
GKSS	0	191.3	222.9	422.2	1	-146.5
GKSS	0	269.2	315.2	422.2	1	-164.8
GKSS	0	281.2	329.4	422.2	1	-167.2
GKSS	0	242.5	283.5	422.2	1	-159.2
GKSS	0	318.3	373.3	422.2	1	-173.8
GKSS	0	395.4	464.7	422.2	0	-
GKSS	0	396.5	465.9	422.2	0	-
GKSS	0	394.9	464.1	422.2	0	-
GKSS	0	396.3	465.7	422.2	0	-
GKSS	0	266.6	312.1	422.2	1	-164.3
GKSS	0	395.2	464.4	422.2	0	-
GKSS	0	362.9	426.1	422.2	0	-
GKSS	0	331.8	389.3	422.2	1	-176.0
GKSS	0	227.1	265.3	422.2	1	-155.7
GKSS	0	309.5	362.9	422.2	1	-172.3
GKSS	0	395.4	464.7	422.2	0	-

GKSS	0	210.9	246.1	422.2	1	-151.7
GKSS	0	394.9	464.1	422.2	0	-
GKSS	0	211.4	246.7	422.2	1	-151.8
GKSS	0	393.9	462.8	422.2	0	-
GKSS	0	263.4	308.3	422.2	1	-163.7
GKSS	0	393.3	462.1	422.2	0	-
GKSS	0	386.7	454.3	422.2	0	-
GKSS	0	376.2	441.9	422.2	0	-
GKSS	0	394.4	463.5	422.2	0	-
GKSS	0	306.7	359.6	422.2	1	-171.8
GKSS	0	394.8	464.0	422.2	0	-
GKSS	0	393.9	462.8	422.2	0	-
GKSS	0	246.4	288.2	422.2	1	-160.1
GKSS	0	320.1	375.4	422.2	1	-174.1
CISE	0	233.3	320.4	422.2	1	-165.7
CISE	0	238.2	327.4	422.2	1	-166.8
CISE	0	208.3	285.2	422.2	1	-159.5
CISE	0	421.7	585.8	422.2	0	-
CISE	0	226.7	311.2	422.2	1	-164.2
CISE	0	267.0	367.9	422.2	1	-173.0
CISE	0	163.0	221.4	422.2	1	-146.1
CISE	0	165.8	225.4	422.2	1	-147.0
CISE	0	285.9	394.6	422.2	1	-176.7
CISE	0	342.0	473.5	422.2	0	-
GKSS	0	314.9	435.4	422.2	0	-
GKSS	0	307.6	425.1	422.2	0	-
GKSS	0	383.0	531.4	422.2	0	-
GKSS	0	332.6	460.4	422.2	0	-
GKSS	0	223.6	306.8	422.2	1	-163.4
GKSS	0	442.2	614.7	422.2	0	-

2. Final Master Curve fit to data

Temperature adj. = 1.1 °C (est.) Stand. dev. on T₀ = 0.8 °C (est.)

T (°C)	K _{Jc(exp)} (MPa √m)	K _{Jc(1T)} (MPa √m)	K _{MC(1T)} (MPa √m)	5% conf. (MPa √m)	95% conf. (MPa √m)	5% L.B. (MPa √m)
-154	54.8	49.1				
-154	49.8	44.9				
-154	37.8	34.9				
-154	33.0	30.9				
-154	38.9	35.8				
-154	24.2	23.6				
-154	47.4	43.0				
-154	46.5	42.2				
-154	31.4	29.6				
-154	39.2	36.0				
-154	24.2	23.6				
-154	33.0	30.9				
-154	41.0	37.6				
-154	31.7	29.8				
-154	35.2	32.7				
-154	44.4	40.5				
-154	41.5	38.0				
-154	32.7	30.7				
-154	34.3	32.0				
-154	36.7	34.0				
-154	39.7	36.5				
-154	46.1	41.8				
-154	34.6	32.2				
-154	35.8	33.2				
-154	29.3	27.8				
-154	28.6	27.2				
-154	38.6	35.6				
-154	44.4	40.5				
-154	48.9	44.2				
-154	38.9	35.8				
-154	36.7	34.0				
-154	31.7	29.8				
-154	41.5	41.4				
-154	42.2	42.2				
-154	50.0	49.9				
-154	34.0	33.9				
-154	41.7	41.7				
-154	46.1	46.0				

-154	44.2	44.1
-154	36.7	36.6
-154	29.0	28.9
-154	53.0	52.9
-154	39.4	39.3
-154	29.0	28.9
-154	34.6	34.5
-154	33.0	33.0
-154	38.1	38.0
-154	28.6	28.6
-154	28.6	28.6
-154	38.6	38.5
-154	36.4	36.3
-154	33.4	33.3
-154	36.9	36.9
-154	31.1	31.0
-154	34.3	34.2
-154	30.4	30.4
-154	49.6	49.5
-154	41.0	40.9
-154	34.0	33.9
-154	30.7	30.7
-154	41.2	41.2
-154	26.7	26.7
-154	35.5	35.4
-154	33.4	33.3
-154	36.7	36.6
-154	32.4	32.4
-154	45.1	45.0
-154	33.4	33.3
-154	34.0	33.9
-154	30.7	30.7
-154	26.7	26.7
-154	33.7	36.2
-154	42.7	46.9
-154	37.2	40.4
-154	54.4	60.8
-154	34.6	37.3
-154	44.2	48.7
-154	29.7	31.5
-154	36.4	39.4
-154	36.4	39.4
-154	28.2	29.8
-154	28.2	29.8
-154	30.0	31.9
-154	36.4	39.4
-154	37.5	40.7
-154	30.0	31.9
-154	30.7	32.7
-154	30.4	32.3
-154	30.7	32.7
-154	31.7	33.9
-154	41.7	45.8
-154	37.2	40.4
-154	34.9	37.6
-154	38.3	41.7
-154	31.4	33.5
-154	33.7	36.2
-154	32.7	35.1
-154	43.0	47.2
-154	32.7	35.1
-154	30.0	31.9
-154	36.9	40.1
-154	33.4	35.8
-154	30.0	31.9
-110	98.1	85.4
-110	59.0	52.7
-110	80.0	70.3
-110	57.2	51.2
-110	88.3	77.2
-110	96.2	83.9
-110	81.6	71.6

-110	66.9	59.3
-110	85.6	75.0
-110	86.8	76.0
-110	114.2	98.9
-110	73.5	64.8
-110	92.7	80.9
-110	77.5	68.2
-110	61.5	54.7
-110	51.8	46.7
-110	73.6	64.9
-110	52.8	47.5
-110	41.2	37.8
-110	115.3	99.8
-110	73.2	64.5
-110	74.0	65.3
-110	67.5	59.8
-110	71.0	62.7
-110	53.4	48.0
-110	96.5	84.0
-110	71.3	63.0
-110	71.7	63.3
-110	81.7	71.7
-110	64.0	56.8
-110	74.2	65.4
-110	70.4	62.2
-110	91.2	79.6
-110	72.0	63.6
-110	64.8	57.5
-110	79.2	69.6
-110	52.2	47.0
-110	82.9	72.7
-110	93.2	81.3
-110	75.4	66.4
-110	75.0	66.1
-110	78.6	69.1
-110	94.8	82.7
-110	98.1	85.4
-110	98.5	85.7
-110	104.9	91.1
-110	69.9	61.8
-110	81.6	71.6
-110	55.2	49.5
-110	105.6	91.7
-110	101.5	88.3
-110	73.7	65.0
-110	97.5	84.9
-110	75.9	66.8
-110	48.3	43.7
-91	127.0	109.6
-91	121.8	105.2
-91	70.5	62.3
-91	94.2	82.2
-91	127.3	109.9
-91	119.9	103.7
-91	104.5	90.8
-91	78.6	69.1
-91	98.6	85.8
-91	161.6	138.6
-91	91.3	79.7
-91	115.3	99.8
-91	122.4	105.8
-91	126.3	109.1
-91	108.3	94.0
-91	66.9	59.3
-91	126.7	109.4
-91	69.6	61.6
-91	121.4	104.9
-91	90.0	78.7
-91	153.9	132.2
-91	64.6	57.4
-91	127.2	109.8
-91	99.7	86.7

-91	101.3	88.1
-91	140.4	120.9
-91	78.2	68.7
-91	109.0	94.6
-91	103.9	90.3
-91	126.8	109.5
-91	111.7	96.8
-91	68.6	68.4
-91	81.6	81.3
-91	55.9	55.8
-91	98.8	98.5
-91	71.9	71.7
-91	111.0	110.7
-91	93.5	93.2
-91	79.9	79.7
-91	98.4	98.1
-91	101.1	100.8
-91	79.6	79.4
-91	99.7	99.3
-91	108.1	107.7
-91	93.4	93.1
-91	62.0	61.8
-91	107.1	106.7
-91	145.3	144.8
-91	76.3	76.0
-91	126.5	126.1
-91	126.1	125.7
-91	128.5	128.0
-91	111.4	111.0
-91	130.4	130.0
-91	134.8	134.3
-91	157.3	156.7
-91	105.2	104.9
-91	109.8	109.4
-91	84.9	84.6
-91	62.8	62.7
-91	97.5	97.2
-91	80.2	79.9
-91	134.4	133.9
-91	65.1	65.0
-91	118.6	118.2
-91	67.3	76.1
-91	162.9	189.3
-91	100.0	114.7
-91	91.2	104.3
-91	106.2	122.1
-91	83.2	94.9
-91	91.8	105.0
-91	94.7	108.5
-91	92.9	106.4
-91	69.9	79.2
-91	93.1	106.6
-91	97.9	112.2
-91	73.7	83.7
-91	82.0	93.4
-91	76.3	86.7
-91	93.1	106.6
-91	83.7	95.5
-91	82.1	93.6
-91	86.8	99.2
-91	86.7	99.0
-91	92.3	105.7
-91	83.1	94.8
-91	88.9	101.6
-91	64.3	72.5
-91	101.6	116.7
-91	94.2	107.9
-91	78.7	89.5
-91	73.0	82.8
-91	64.2	72.3
-91	98.9	113.5
-91	103.2	137.2

-91	84.4	110.7
-91	97.0	128.5
-91	92.7	122.4
-91	96.8	128.2
-91	73.6	95.5
-91	73.0	94.7
-91	73.3	95.1
-91	53.8	67.7
-91	69.5	89.7
-91	65.5	84.0
-91	79.6	104.0
-91	69.8	90.1
-91	90.3	119.0
-91	88.0	115.8
-60	234.1	199.3
-60	114.4	99.1
-60	130.7	112.7
-60	106.7	92.6
-60	161.0	138.1
-60	200.7	171.3
-60	125.2	108.1
-60	145.1	124.8
-60	91.9	80.2
-60	128.1	110.6
-60	164.4	140.9
-60	192.2	164.3
-60	166.3	142.5
-60	177.7	152.1
-60	203.7	173.9
-60	116.0	100.4
-60	221.9	189.1
-60	167.6	143.6
-60	89.8	78.5
-60	156.3	134.1
-60	186.8	159.7
-60	213.5	182.1
-60	164.6	141.1
-60	280.1	237.9
-60	185.9	159.0
-60	127.7	110.2
-60	205.0	175.0
-60	115.6	100.0
-60	107.5	93.3
-60	164.6	141.1
-60	172.0	147.3
-60	108.5	94.2
-60	119.0	102.9
-60	153.5	131.8
-60	158.9	136.4
-60	137.5	118.4
-60	119.5	103.3
-60	130.7	112.8
-60	172.6	147.8
-60	84.5	74.0
-60	244.6	208.1
-60	120.4	104.1
-60	104.5	90.8
-60	163.6	140.2
-60	201.4	172.0
-60	137.8	118.7
-60	173.0	148.1
-60	99.2	86.4
-60	173.4	148.4
-60	131.5	113.4
-60	186.0	185.3
-60	151.8	151.3
-60	111.7	111.3
-60	143.9	143.4
-60	105.4	105.1
-60	154.0	153.4
-60	176.2	175.6
-60	131.9	131.5

-60	203.9	203.2
-60	142.7	142.2
-60	134.5	134.0
-60	130.1	129.7
-60	142.6	142.1
-60	119.7	119.3
-60	141.3	140.8
-60	175.9	175.3
-60	119.6	119.2
-60	102.4	102.0
-60	99.0	98.7
-60	115.1	114.7
-60	172.9	172.3
-60	120.5	120.2
-60	165.2	164.6
-60	125.6	125.2
-60	126.7	126.3
-60	100.4	100.1
-60	131.1	130.7
-60	185.1	184.5
-60	163.6	163.0
-60	126.5	126.1
-60	164.7	164.1
-60	192.7	192.0
-60	134.5	134.1
-60	140.8	140.3
-60	109.9	126.5
-60	131.9	152.5
-60	136.2	157.6
-60	154.0	178.8
-60	115.9	133.6
-60	150.4	174.4
-40	171.0	146.5
-40	569.4	480.2
-40	169.4	145.1
-40	548.7	462.8
-40	529.9	447.1
-40	318.5	270.1
-40	574.8	484.7
-40	360.8	305.4
-40	343.8	291.2
-40	235.8	200.8
-40	529.9	447.1
-40	496.5	419.1
-40	600.0	505.8
-40	113.7	98.5
-40	229.6	195.5
-40	154.2	132.4
-40	221.3	188.6
-40	486.7	410.9
-40	243.8	207.4
-40	202.5	172.8
-40	180.6	154.6
-40	206.7	176.4
-40	240.7	204.9
-40	270.8	230.1
-40	186.4	159.4
-40	255.8	217.5
-40	231.2	196.9
-40	339.4	287.5
-40	403.1	340.9
-40	399.2	337.6
-40	187.3	186.6
-40	101.5	101.2
-40	140.3	139.9
-40	150.2	149.7
-40	187.3	186.6
-40	211.4	210.6
-40	160.5	160.0
-40	214.6	213.8
-40	188.3	187.7
-40	239.3	238.4

-40	112.8	112.4
-40	239.0	238.1
-40	284.9	283.9
-40	254.7	253.7
-40	270.9	269.9
-40	187.0	186.3
-40	170.1	169.5
-40	256.4	255.5
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-40	103.1	102.8
-40	230.0	229.1
-40	210.0	209.2
-40	198.2	197.5
-40	150.2	149.7
-40	226.8	226.0
-40	158.1	157.5
-40	256.4	255.5
-40	207.6	206.9
-40	213.5	212.8
-40	254.6	253.7
-40	240.0	239.1
-40	309.2	308.0
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-40	128.9	149.0
-40	198.5	231.5
-40	212.0	247.5
-40	138.6	160.5
-40	187.7	218.7
-40	173.0	201.2
-40	179.5	208.9
-40	152.6	177.1
-40	153.6	178.3
-40	144.6	167.6
-40	150.7	174.9
-40	139.1	161.0
-40	183.6	213.8
-40	142.0	164.5
-40	187.2	218.0
-40	172.2	200.3
-40	198.0	230.8
-40	130.4	150.8
-40	141.7	164.1
-40	134.5	155.6
-40	115.5	133.1
-40	91.7	104.9
-40	141.1	163.4
-40	239.1	279.6
-40	243.4	284.7
-40	191.9	223.6
-40	146.8	170.2
-40	161.4	187.5
-40	142.3	164.8
-20	128.7	111.1
-20	146.9	126.3
-20	402.8	340.6
-20	409.4	346.2
-20	530.5	447.6
-20	532.2	449.0
-20	534.6	451.0
-20	536.1	452.3
-20	536.1	452.3
-20	536.6	452.7
-20	538.6	454.3
-20	540.5	455.9
-20	543.8	458.7
-20	549.2	463.2
-20	553.7	467.0
-20	556.1	469.0
-20	556.3	469.2
-20	560.6	472.8
-20	565.8	477.2
-20	570.1	480.8

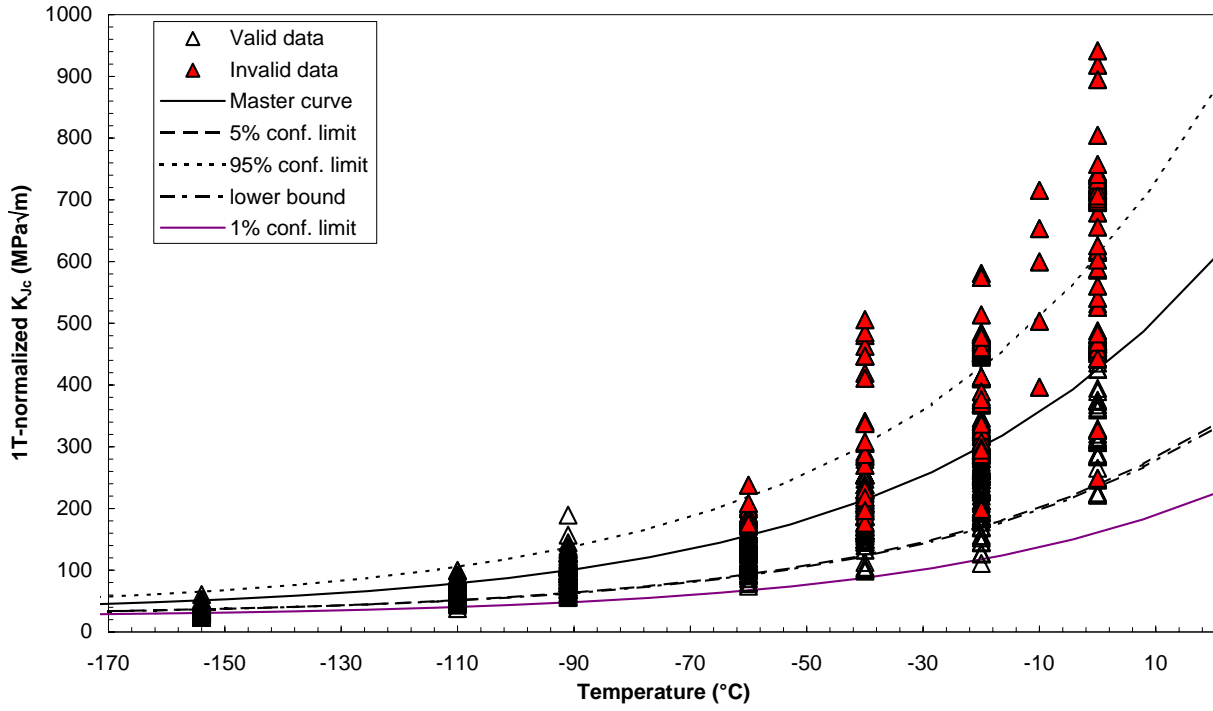
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-20	233.1	198.5
-20	389.8	329.8
-20	487.9	411.9
-20	438.3	370.4
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-20	560.7	472.9
-20	561.1	473.2
-20	575.1	484.9
-20	557.5	470.2
-20	572.5	482.7
-20	202.5	201.7
-20	194.7	194.1
-20	262.8	261.8
-20	187.9	187.2
-20	275.8	274.8
-20	261.8	260.9
-20	371.0	369.7
-20	369.1	367.7
-20	462.1	460.4
-20	319.7	318.5
-20	583.1	580.9
-20	231.9	231.0
-20	382.0	380.6
-20	295.9	294.8
-20	576.4	574.2
-20	411.7	410.1
-20	306.4	305.2
-20	324.7	323.5
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-20	247.2	246.3
-20	233.2	232.4
-20	317.5	316.3
-20	515.6	513.7
-20	263.2	262.3
-20	184.4	183.8
-20	286.9	285.9
-20	341.4	340.1
-20	415.0	413.4
-20	327.9	326.7
-20	170.9	170.3
-20	308.8	307.6
-20	376.5	375.1
-20	228.2	227.4
-20	371.7	370.3
-20	291.6	290.6
-20	337.7	336.4
-20	390.5	389.0
-20	227.3	226.5
-20	201.3	200.6
-20	212.5	211.7
-20	288.4	287.3
-20	479.1	477.3
-20	377.9	376.5
-20	269.6	268.6
-20	184.4	183.8
-20	241.6	240.7
-20	146.4	145.9
-20	299.4	298.3
-20	156.7	156.2
-20	295.6	294.5
-20	167.4	194.6
-20	153.5	178.1
-20	211.2	246.5
-20	220.3	257.3
-20	227.9	266.2
-20	211.1	246.4
-20	217.1	253.4
-20	145.3	168.5
-20	161.2	187.2
-20	131.9	152.5
-20	216.4	252.6

-20	125.0	144.4
-20	378.7	444.9
-20	246.1	287.9
-20	250.9	293.5
-20	251.5	294.3
-20	284.0	332.7
-20	261.1	305.6
-20	351.6	412.8
-20	258.5	302.5
-20	201.3	234.8
-20	110.9	127.7
-20	197.7	230.5
-20	198.9	231.9
-20	200.6	234.0
-20	165.7	192.6
-20	280.1	328.0
-20	279.5	327.3
-20	257.6	301.4
-20	265.2	310.4
-20	156.7	212.6
-20	221.7	304.1
-20	193.9	264.9
-20	191.7	261.9
-20	184.4	251.6
-20	186.7	254.8
-20	184.4	251.6
-20	193.9	264.9
-20	204.4	279.8
-20	224.0	307.4
-20	153.4	207.9
-20	222.6	305.4
-20	162.0	220.0
-20	187.8	256.4
-20	198.2	271.0
-10	656.0	653.4
-10	397.8	396.3
-10	718.1	715.3
-10	601.6	599.3
-10	505.3	503.4
0	541.9	457.1
0	547.0	461.4
0	538.7	454.4
0	540.0	455.5
0	544.8	459.6
0	534.8	451.2
0	557.2	469.9
0	545.0	459.7
0	546.1	460.6
0	549.2	463.2
0	565.1	476.5
0	571.6	482.0
0	553.4	466.8
0	293.2	248.8
0	544.1	459.0
0	552.2	465.7
0	558.0	470.6
0	553.5	466.8
0	557.6	470.3
0	552.4	466.0
0	555.6	468.6
0	558.2	470.8
0	550.6	464.4
0	560.8	473.0
0	569.6	480.4
0	552.5	466.0
0	578.5	487.7
0	556.0	468.9
0	543.8	458.7
0	556.3	469.2
0	327.6	326.4
0	681.4	678.8
0	700.8	698.2

0	698.2	695.5
0	708.4	705.7
0	701.5	698.8
0	724.9	722.1
0	717.4	714.6
0	705.8	703.0
0	709.5	706.8
0	716.7	714.0
0	714.1	711.3
0	658.5	656.0
0	747.5	744.6
0	709.0	706.2
0	719.2	716.4
0	444.5	442.8
0	699.8	697.1
0	704.0	701.3
0	729.5	726.7
0	714.0	711.3
0	725.6	722.8
0	730.2	727.4
0	737.8	734.9
0	590.7	588.4
0	730.3	727.5
0	741.8	738.9
0	744.2	741.3
0	527.7	525.7
0	620.4	618.0
0	727.0	724.2
0	730.3	727.5
0	542.6	540.5
0	726.7	723.9
0	718.7	716.0
0	717.1	714.4
0	721.2	718.5
0	725.3	722.5
0	727.9	725.1
0	727.0	724.2
0	718.5	715.7
0	191.3	222.9
0	269.2	315.2
0	281.2	329.4
0	242.5	283.5
0	318.3	373.3
0	476.2	560.4
0	511.7	602.5
0	621.3	732.2
0	531.3	625.6
0	266.6	312.1
0	599.3	706.2
0	362.9	426.1
0	331.8	389.3
0	227.1	265.3
0	309.5	362.9
0	628.6	740.9
0	210.9	246.1
0	410.7	482.8
0	211.4	246.7
0	778.3	918.2
0	263.4	308.3
0	682.2	804.4
0	386.7	454.3
0	376.2	441.9
0	642.5	757.3
0	306.7	359.6
0	758.4	894.6
0	797.9	941.4
0	246.4	288.2
0	320.1	375.4
0	233.3	320.4
0	238.2	327.4
0	208.3	285.2
0	421.7	585.8

0	226.7	311.2				
0	267.0	367.9				
0	163.0	221.4				
0	165.8	225.4				
0	285.9	394.6				
0	342.0	473.5				
0	314.9	435.4				
0	307.6	425.1				
0	383.0	531.4				
0	332.6	460.4				
0	223.6	306.8				
0	442.2	614.7				
-174			44.4	33.2	55.6	33.0
-161.875			48.2	35.2	61.1	35.0
-149.75			52.9	37.7	68.0	37.5
-137.625			58.8	40.9	76.6	40.6
-125.5			66.2	45.0	87.5	44.6
-113.375			75.6	50.0	101.2	49.5
-101.25			87.4	56.4	118.4	55.8
-89.125			102.3	64.4	140.2	63.6
-77			121.0	74.6	167.5	73.5
-64.875			144.6	87.3	202.0	86.0
-52.75			174.3	103.3	245.3	101.7
-40.625			211.7	123.5	299.9	121.5
-28.5			258.8	148.9	368.6	146.4
-16.375			318.1	181.0	455.2	177.7
-4.25			392.7	221.3	564.1	217.2
7.875			486.7	272.0	701.3	266.9
20			605.0	335.9	874.1	329.4

**MASTER CURVE WITH CONFIDENCE LIMITS - SINTAP lower tail analysis
EURO toughness dataset - Complete dataset excluding SX9**



MASTER CURVE ANALYSIS OF RANDOM INHOMOGENEITIES

Single Point Estimation Method

Step 1: Estimate of the median value of fracture toughness (ASTM E1921-05)

1. Material characteristics

Material specifications : **EURO toughness data set - Complete dataset excluding SX9**

2. Dimensional and crack growth requirements

Specimen code	T (°C)	a ₀ (mm)	W (mm)	B (mm)	b ₀ (mm)	Δa (mm)	K _{Jc[exp]} (MPa√m)	σ _{ys} (MPa)	E' (GPa)	K _{lim} (MPa√m)	DATA VALID	K _{Jc[calc]} (MPa√m)
GKSS	-154	14.47	25	12.5	10.530	0.00	54.8	674.5	237.6	237.2	YES	54.8
GKSS	-154	14.17	25	12.5	10.830	0.00	49.8	674.5	237.6	240.5	YES	49.8
GKSS	-154	14.15	25	12.5	10.850	0.00	37.8	674.5	237.6	240.8	YES	37.8
GKSS	-154	14.36	25	12.5	10.640	0.00	33.0	674.5	237.6	238.4	YES	33.0
GKSS	-154	14.06	25	12.5	10.940	0.00	38.9	674.5	237.6	241.8	YES	38.9
GKSS	-154	14.11	25	12.5	10.890	0.00	24.2	674.5	237.6	241.2	YES	24.2
GKSS	-154	14.06	25	12.5	10.940	0.00	47.4	674.5	237.6	241.8	YES	47.4
GKSS	-154	14.50	25	12.5	10.500	0.00	46.5	674.5	237.6	236.9	YES	46.5
GKSS	-154	13.79	25	12.5	11.210	0.00	31.4	674.5	237.6	244.7	YES	31.4
GKSS	-154	14.28	25	12.5	10.720	0.00	39.2	674.5	237.6	239.3	YES	39.2
GKSS	-154	14.11	25	12.5	10.890	0.00	24.2	674.5	237.6	241.2	YES	24.2
SIEMENS	-154	13.17	25	12.5	11.830	0.00	33.0	674.5	237.6	251.4	YES	33.0
SIEMENS	-154	13.07	25	12.5	11.930	0.00	41.0	674.5	237.6	252.5	YES	41.0
SIEMENS	-154	13.15	25	12.5	11.850	0.00	31.7	674.5	237.6	251.6	YES	31.7
SIEMENS	-154	13.11	25	12.5	11.890	0.00	35.2	674.5	237.6	252.0	YES	35.2
SIEMENS	-154	13.14	25	12.5	11.860	0.00	44.4	674.5	237.6	251.7	YES	44.4
SIEMENS	-154	13.32	25	12.5	11.680	0.00	41.5	674.5	237.6	249.8	YES	41.5
SIEMENS	-154	13.17	25	12.5	11.830	0.00	32.7	674.5	237.6	251.4	YES	32.7
SIEMENS	-154	13.19	25	12.5	11.810	0.00	34.3	674.5	237.6	251.2	YES	34.3
SIEMENS	-154	13.21	25	12.5	11.790	0.00	36.7	674.5	237.6	251.0	YES	36.7
SIEMENS	-154	13.30	25	12.5	11.700	0.00	39.7	674.5	237.6	250.0	YES	39.7
SIEMENS	-154	13.24	25	12.5	11.760	0.00	46.1	674.5	237.6	250.7	YES	46.1
SIEMENS	-154	13.23	25	12.5	11.770	0.00	34.6	674.5	237.6	250.8	YES	34.6
SIEMENS	-154	13.21	25	12.5	11.790	0.00	35.8	674.5	237.6	251.0	YES	35.8
SIEMENS	-154	13.31	25	12.5	11.690	0.00	29.3	674.5	237.6	249.9	YES	29.3
SIEMENS	-154	13.33	25	12.5	11.670	0.00	28.6	674.5	237.6	249.7	YES	28.6
SIEMENS	-154	13.21	25	12.5	11.790	0.00	38.6	674.5	237.6	251.0	YES	38.6
SIEMENS	-154	13.32	25	12.5	11.680	0.00	44.4	674.5	237.6	249.8	YES	44.4
SIEMENS	-154	13.18	25	12.5	11.820	0.00	48.9	674.5	237.6	251.3	YES	48.9
SIEMENS	-154	13.27	25	12.5	11.730	0.00	38.9	674.5	237.6	250.3	YES	38.9
SIEMENS	-154	13.17	25	12.5	11.830	0.00	36.7	674.5	237.6	251.4	YES	36.7
SIEMENS	-154	13.53	25	12.5	11.470	0.00	31.7	674.5	237.6	247.6	YES	31.7
GKSS	-154	28.21	50	25.0	21.790	0.00	41.5	674.5	237.6	341.2	YES	41.5
GKSS	-154	27.98	50	25.0	22.020	0.00	42.2	674.5	237.6	343.0	YES	42.2
GKSS	-154	27.64	50	25.0	22.360	0.00	50.0	674.5	237.6	345.6	YES	50.0
GKSS	-154	27.73	50	25.0	22.270	0.00	34.0	674.5	237.6	344.9	YES	34.0
GKSS	-154	28.15	50	25.0	21.850	0.00	41.7	674.5	237.6	341.7	YES	41.7
GKSS	-154	27.58	50	25.0	22.420	0.00	46.1	674.5	237.6	346.1	YES	46.1
GKSS	-154	27.98	50	25.0	22.020	0.00	44.2	674.5	237.6	343.0	YES	44.2
GKSS	-154	28.10	50	25.0	21.900	0.00	36.7	674.5	237.6	342.1	YES	36.7
GKSS	-154	27.96	50	25.0	22.040	0.00	29.0	674.5	237.6	343.2	YES	29.0
GKSS	-154	28.17	50	25.0	21.830	0.00	53.0	674.5	237.6	341.5	YES	53.0
GKSS	-154	29.45	50	25.0	20.550	0.00	39.4	674.5	237.6	331.4	YES	39.4
GKSS	-154	27.96	50	25.0	22.040	0.00	29.0	674.5	237.6	343.2	YES	29.0
SIEMENS	-154	26.52	50	25.0	23.480	0.00	34.6	674.5	237.6	354.2	YES	34.6
SIEMENS	-154	26.60	50	25.0	23.400	0.00	33.0	674.5	237.6	353.6	YES	33.0
SIEMENS	-154	26.63	50	25.0	23.370	0.00	38.1	674.5	237.6	353.4	YES	38.1
SIEMENS	-154	26.81	50	25.0	23.190	0.00	28.6	674.5	237.6	352.0	YES	28.6
SIEMENS	-154	26.61	50	25.0	23.390	0.00	28.6	674.5	237.6	353.5	YES	28.6
SIEMENS	-154	26.69	50	25.0	23.310	0.00	38.6	674.5	237.6	352.9	YES	38.6
SIEMENS	-154	26.74	50	25.0	23.260	0.00	36.4	674.5	237.6	352.5	YES	36.4
SIEMENS	-154	26.43	50	25.0	23.570	0.00	33.4	674.5	237.6	354.9	YES	33.4
SIEMENS	-154	26.48	50	25.0	23.520	0.00	36.9	674.5	237.6	354.5	YES	36.9
SIEMENS	-154	26.49	50	25.0	23.510	0.00	31.1	674.5	237.6	354.4	YES	31.1
SIEMENS	-154	26.44	50	25.0	23.560	0.00	34.3	674.5	237.6	354.8	YES	34.3
SIEMENS	-154	26.42	50	25.0	23.580	0.00	30.4	674.5	237.6	354.9	YES	30.4
SIEMENS	-154	26.44	50	25.0	23.560	0.00	49.6	674.5	237.6	354.8	YES	49.6
SIEMENS	-154	26.55	50	25.0	23.450	0.00	41.0	674.5	237.6	354.0	YES	41.0
SIEMENS	-154	26.83	50	25.0	23.170	0.00	34.0	674.5	237.6	351.8	YES	34.0
SIEMENS	-154	27.01	50	25.0	22.990	0.00	30.7	674.5	237.6	350.5	YES	30.7
SIEMENS	-154	26.74	50	25.0	23.260	0.00	41.2	674.5	237.6	352.5	YES	41.2
SIEMENS	-154	26.65	50	25.0	23.350	0.00	26.7	674.5	237.6	353.2	YES	26.7
SIEMENS	-154	26.63	50	25.0	23.370	0.00	35.5	674.5	237.6	353.4	YES	35.5
SIEMENS	-154	26.52	50	25.0	23.480	0.00	33.4	674.5	237.6	354.2	YES	33.4
SIEMENS	-154	26.77	50	25.0	23.230	0.00	36.7	674.5	237.6	352.3	YES	36.7
SIEMENS	-154	26.68	50	25.0	23.320	0.00	32.4	674.5	237.6	353.0	YES	32.4
SIEMENS	-154	26.48	50	25.0	23.520	0.00	45.1	674.5	237.6	354.5	YES	45.1
SIEMENS	-154	26.43	50	25.0	23.570	0.00	33.4	674.5	237.6	354.9	YES	33.4
SIEMENS	-154	26.83	50	25.0	23.170	0.00	34.0	674.5	237.6	351.8	YES	34.0
SIEMENS	-154	27.01	50	25.0	22.990	0.00	30.7	674.5	237.6	350.5	YES	30.7
SIEMENS	-154	26.65	50	25.0	23.350	0.00	26.7	674.5	237.6	353.2	YES	26.7

GKSS	-154	56.79	100	50.0	43.210	0.00	33.7	674.5	237.6	480.5	YES	33.7
GKSS	-154	55.00	100	50.0	45.000	0.00	42.7	674.5	237.6	490.3	YES	42.7
GKSS	-154	55.62	100	50.0	44.380	0.00	37.2	674.5	237.6	486.9	YES	37.2
GKSS	-154	55.81	100	50.0	44.190	0.00	54.4	674.5	237.6	485.9	YES	54.4
GKSS	-154	55.97	100	50.0	44.030	0.00	34.6	674.5	237.6	485.0	YES	34.6
GKSS	-154	55.45	100	50.0	44.550	0.00	44.2	674.5	237.6	487.9	YES	44.2
GKSS	-154	57.86	100	50.0	42.140	0.00	29.7	674.5	237.6	474.5	YES	29.7
GKSS	-154	55.20	100	50.0	44.800	0.00	36.4	674.5	237.6	489.2	YES	36.4
GKSS	-154	55.95	100	50.0	44.050	0.00	36.4	674.5	237.6	485.1	YES	36.4
GKSS	-154	54.42	100	50.0	45.580	0.00	28.2	674.5	237.6	493.5	YES	28.2
GKSS	-154	54.42	100	50.0	45.580	0.00	28.2	674.5	237.6	493.5	YES	28.2
NE	-154	55.67	100	50.0	44.330	0.00	30.0	674.5	237.6	486.7	YES	30.0
NE	-154	56.75	100	50.0	43.250	0.00	36.4	674.5	237.6	480.7	YES	36.4
NE	-154	56.43	100	50.0	43.570	0.00	37.5	674.5	237.6	482.5	YES	37.5
NE	-154	56.35	100	50.0	43.650	0.00	30.0	674.5	237.6	482.9	YES	30.0
NE	-154	56.21	100	50.0	43.790	0.00	30.7	674.5	237.6	483.7	YES	30.7
NE	-154	57.23	100	50.0	42.770	0.00	30.4	674.5	237.6	478.0	YES	30.4
NE	-154	58.12	100	50.0	41.880	0.00	30.7	674.5	237.6	473.0	YES	30.7
NE	-154	56.50	100	50.0	43.500	0.00	31.7	674.5	237.6	482.1	YES	31.7
NE	-154	57.11	100	50.0	42.890	0.00	41.7	674.5	237.6	478.7	YES	41.7
NE	-154	56.45	100	50.0	43.550	0.00	37.2	674.5	237.6	482.4	YES	37.2
NE	-154	56.52	100	50.0	43.480	0.00	34.9	674.5	237.6	482.0	YES	34.9
NE	-154	56.28	100	50.0	43.720	0.00	38.3	674.5	237.6	483.3	YES	38.3
NE	-154	56.35	100	50.0	43.650	0.00	31.4	674.5	237.6	482.9	YES	31.4
NE	-154	56.41	100	50.0	43.590	0.00	33.7	674.5	237.6	482.6	YES	33.7
NE	-154	56.35	100	50.0	43.650	0.00	32.7	674.5	237.6	482.9	YES	32.7
NE	-154	56.36	100	50.0	43.640	0.00	43.0	674.5	237.6	482.9	YES	43.0
NE	-154	56.08	100	50.0	43.920	0.00	32.7	674.5	237.6	484.4	YES	32.7
NE	-154	56.51	100	50.0	43.490	0.00	30.0	674.5	237.6	482.0	YES	30.0
NE	-154	56.47	100	50.0	43.530	0.00	36.9	674.5	237.6	482.3	YES	36.9
NE	-154	56.42	100	50.0	43.580	0.00	33.4	674.5	237.6	482.5	YES	33.4
NE	-154	56.35	100	50.0	43.650	0.00	30.0	674.5	237.6	482.9	YES	30.0
GKSS	-110	14.51	25	12.5	10.490	0.00	98.1	567.6	234.7	215.8	YES	98.1
GKSS	-110	14.34	25	12.5	10.660	0.00	59.0	567.6	234.7	217.6	YES	59.0
GKSS	-110	14.38	25	12.5	10.620	0.00	80.0	567.6	234.7	217.2	YES	80.0
GKSS	-110	14.72	25	12.5	10.280	0.00	57.2	567.6	234.7	213.7	YES	57.2
GKSS	-110	14.64	25	12.5	10.360	0.00	88.3	567.6	234.7	214.5	YES	88.3
GKSS	-110	14.27	25	12.5	10.730	0.00	96.2	567.6	234.7	218.3	YES	96.2
GKSS	-110	14.62	25	12.5	10.380	0.00	81.6	567.6	234.7	214.7	YES	81.6
GKSS	-110	14.30	25	12.5	10.700	0.00	66.9	567.6	234.7	218.0	YES	66.9
GKSS	-110	14.64	25	12.5	10.360	0.00	85.6	567.6	234.7	214.5	YES	85.6
GKSS	-110	14.40	25	12.5	10.600	0.00	86.8	567.6	234.7	217.0	YES	86.8
GKSS	-110	14.44	25	12.5	10.560	0.00	114.2	567.6	234.7	216.6	YES	114.2
GKSS	-110	14.20	25	12.5	10.800	0.00	73.5	567.6	234.7	219.0	YES	73.5
GKSS	-110	13.96	25	12.5	11.040	0.00	92.7	567.6	234.7	221.4	YES	92.7
GKSS	-110	14.10	25	12.5	10.900	0.00	77.5	567.6	234.7	220.0	YES	77.5
GKSS	-110	14.14	25	12.5	10.860	0.00	61.5	567.6	234.7	219.6	YES	61.5
GKSS	-110	14.06	25	12.5	10.940	0.00	51.8	567.6	234.7	220.4	YES	51.8
GKSS	-110	14.23	25	12.5	10.770	0.00	73.6	567.6	234.7	218.7	YES	73.6
GKSS	-110	14.10	25	12.5	10.900	0.00	52.8	567.6	234.7	220.0	YES	52.8
GKSS	-110	14.00	25	12.5	11.000	0.00	41.2	567.6	234.7	221.0	YES	41.2
GKSS	-110	14.20	25	12.5	10.800	0.00	115.3	567.6	234.7	219.0	YES	115.3
GKSS	-110	13.98	25	12.5	11.020	0.00	73.2	567.6	234.7	221.2	YES	73.2
GKSS	-110	13.97	25	12.5	11.030	0.00	74.0	567.6	234.7	221.3	YES	74.0
GKSS	-110	14.45	25	12.5	10.550	0.00	67.5	567.6	234.7	216.5	YES	67.5
GKSS	-110	14.58	25	12.5	10.420	0.00	71.0	567.6	234.7	215.1	YES	71.0
GKSS	-110	14.35	25	12.5	10.650	0.00	53.4	567.6	234.7	217.5	YES	53.4
GKSS	-110	14.55	25	12.5	10.450	0.00	96.5	567.6	234.7	215.4	YES	96.5
GKSS	-110	14.54	25	12.5	10.460	0.00	71.3	567.6	234.7	215.5	YES	71.3
GKSS	-110	14.39	25	12.5	10.610	0.00	71.7	567.6	234.7	217.1	YES	71.7
GKSS	-110	14.54	25	12.5	10.460	0.00	81.7	567.6	234.7	215.5	YES	81.7
GKSS	-110	14.32	25	12.5	10.680	0.00	64.0	567.6	234.7	217.8	YES	64.0
GKSS	-110	14.36	25	12.5	10.640	0.00	74.2	567.6	234.7	217.4	YES	74.2
GKSS	-110	14.30	25	12.5	10.700	0.00	70.4	567.6	234.7	218.0	YES	70.4
GKSS	-110	14.25	25	12.5	10.750	0.00	91.2	567.6	234.7	218.5	YES	91.2
GKSS	-110	14.17	25	12.5	10.830	0.00	72.0	567.6	234.7	219.3	YES	72.0
GKSS	-110	14.46	25	12.5	10.540	0.00	64.8	567.6	234.7	216.3	YES	64.8
GKSS	-110	14.37	25	12.5	10.630	0.00	79.2	567.6	234.7	217.3	YES	79.2
GKSS	-110	14.24	25	12.5	10.760	0.00	52.2	567.6	234.7	218.6	YES	52.2
GKSS	-110	14.22	25	12.5	10.780	0.00	82.9	567.6	234.7	218.8	YES	82.9
GKSS	-110	14.37	25	12.5	10.630	0.00	93.2	567.6	234.7	217.3	YES	93.2
GKSS	-110	14.51	25	12.5	10.490	0.00	75.4	567.6	234.7	215.8	YES	75.4
GKSS	-110	14.26	25	12.5	10.740	0.00	75.0	567.6	234.7	218.4	YES	75.0
GKSS	-110	14.66	25	12.5	10.340	0.00	78.6	567.6	234.7	214.3	YES	78.6
GKSS	-110	14.53	25	12.5	10.470	0.00	94.8	567.6	234.7	215.6	YES	94.8
GKSS	-110	14.33	25	12.5	10.670	0.00	98.1	567.6	234.7	217.7	YES	98.1
GKSS	-110	14.29	25	12.5	10.710	0.00	98.5	567.6	234.7	218.1	YES	98.5
GKSS	-110	14.56	25	12.5	10.440	0.00	104.9	567.6	234.7	215.3	YES	104.9
GKSS	-110	14.35	25	12.5	10.650	0.00	69.9	567.6	234.7	217.5	YES	69.9
GKSS	-110	14.30	25	12.5	10.700	0.00	81.6	567.6	234.7	218.0	YES	81.6
GKSS	-110	14.35	25	12.5	10.650	0.00	55.2	567.6	234.7	217.5	YES	55.2
GKSS	-110	14.35	25	12.5	10.650	0.00	105.6	567.6	234.7	217.5	YES	105.6
GKSS	-110	14.36	25	12.5	10.640	0.00	101.5	567.6	234.7	217.4	YES	101.5
GKSS	-110	14.41	25	12.5	10.590	0.00	73.7	567.6	234.7	216.9	YES	73.7
GKSS	-110	14.39	25	12.5	10.610	0.00	97.5	567.6	234.7	217.1	YES	97.5
GKSS	-110	14.48	25	12.5	10.520	0.00	75.9	567.6	234.7	216.1	YES	75.9
GKSS	-110	14.37	25	12.5	10.630	0.00	48.3	567.6	234.7	217.3	YES	48.3

GKSS	-91	14.41	25	12.5	10.590	0.00	127.0	538.9	233.5	210.8	YES	127.0
GKSS	-91	14.39	25	12.5	10.610	0.00	121.8	538.9	233.5	211.0	YES	121.8
GKSS	-91	14.29	25	12.5	10.710	0.00	70.5	538.9	233.5	211.9	YES	70.5
GKSS	-91	14.41	25	12.5	10.590	0.00	94.2	538.9	233.5	210.8	YES	94.2
GKSS	-91	14.17	25	12.5	10.830	0.00	127.3	538.9	233.5	213.1	YES	127.3
GKSS	-91	14.11	25	12.5	10.890	0.00	119.9	538.9	233.5	213.7	YES	119.9
GKSS	-91	14.19	25	12.5	10.810	0.00	104.5	538.9	233.5	212.9	YES	104.5
GKSS	-91	14.16	25	12.5	10.840	0.00	78.6	538.9	233.5	213.2	YES	78.6
GKSS	-91	14.06	25	12.5	10.940	0.00	98.6	538.9	233.5	214.2	YES	98.6
GKSS	-91	14.24	25	12.5	10.760	0.00	161.6	538.9	233.5	212.4	YES	161.6
THA	-91	13.95	25	12.5	11.050	0.00	91.3	538.9	233.5	215.3	YES	91.3
THA	-91	14.15	25	12.5	10.850	0.00	115.3	538.9	233.5	213.3	YES	115.3
THA	-91	13.96	25	12.5	11.040	0.02	122.4	538.9	233.5	215.2	YES	122.4
THA	-91	14.33	25	12.5	10.670	0.02	126.3	538.9	233.5	211.5	YES	126.3
THA	-91	14.49	25	12.5	10.510	0.00	108.3	538.9	233.5	210.0	YES	108.3
THA	-91	14.28	25	12.5	10.720	0.00	66.9	538.9	233.5	212.0	YES	66.9
THA	-91	14.29	25	12.5	10.710	0.02	126.7	538.9	233.5	211.9	YES	126.7
THA	-91	14.18	25	12.5	10.820	0.00	69.6	538.9	233.5	213.0	YES	69.6
THA	-91	14.52	25	12.5	10.480	0.00	121.4	538.9	233.5	209.7	YES	121.4
THA	-91	14.29	25	12.5	10.710	0.00	90.0	538.9	233.5	211.9	YES	90.0
THA	-91	13.90	25	12.5	11.100	0.05	153.9	538.9	233.5	215.8	YES	153.9
THA	-91	14.21	25	12.5	10.790	0.00	64.6	538.9	233.5	212.7	YES	64.6
THA	-91	14.52	25	12.5	10.480	0.01	127.2	538.9	233.5	209.7	YES	127.2
THA	-91	14.12	25	12.5	10.880	0.00	99.7	538.9	233.5	213.6	YES	99.7
THA	-91	14.38	25	12.5	10.620	0.00	101.3	538.9	233.5	211.1	YES	101.3
THA	-91	14.34	25	12.5	10.660	0.00	140.4	538.9	233.5	211.4	YES	140.4
THA	-91	14.25	25	12.5	10.750	0.00	78.2	538.9	233.5	212.3	YES	78.2
THA	-91	14.26	25	12.5	10.740	0.00	109.0	538.9	233.5	212.2	YES	109.0
THA	-91	14.44	25	12.5	10.560	0.00	103.9	538.9	233.5	210.5	YES	103.9
THA	-91	14.33	25	12.5	10.670	0.04	126.8	538.9	233.5	211.5	YES	126.8
THA	-91	14.33	25	12.5	10.670	0.00	111.7	538.9	233.5	211.5	YES	111.7
GKSS	-91	28.43	50	25.0	21.570	0.00	68.6	538.9	233.5	300.8	YES	68.6
GKSS	-91	28.35	50	25.0	21.650	0.00	81.6	538.9	233.5	301.3	YES	81.6
GKSS	-91	27.33	50	25.0	22.670	0.00	55.9	538.9	233.5	308.4	YES	55.9
GKSS	-91	28.38	50	25.0	21.620	0.00	98.8	538.9	233.5	301.1	YES	98.8
GKSS	-91	27.88	50	25.0	22.120	0.00	71.9	538.9	233.5	304.6	YES	71.9
GKSS	-91	28.18	50	25.0	21.820	0.00	111.0	538.9	233.5	302.5	YES	111.0
GKSS	-91	28.41	50	25.0	21.590	0.00	93.5	538.9	233.5	300.9	YES	93.5
GKSS	-91	28.19	50	25.0	21.810	0.00	79.9	538.9	233.5	302.4	YES	79.9
GKSS	-91	28.27	50	25.0	21.730	0.00	98.4	538.9	233.5	301.9	YES	98.4
GKSS	-91	28.06	50	25.0	21.940	0.00	101.1	538.9	233.5	303.3	YES	101.1
TWI	-91	27.61	50	25.0	22.390	0.00	79.6	538.9	233.5	306.4	YES	79.6
TWI	-91	27.70	50	25.0	22.300	0.00	99.7	538.9	233.5	305.8	YES	99.7
TWI	-91	27.47	50	25.0	22.530	0.00	108.1	538.9	233.5	307.4	YES	108.1
TWI	-91	27.73	50	25.0	22.270	0.00	93.4	538.9	233.5	305.6	YES	93.4
TWI	-91	27.70	50	25.0	22.300	0.00	62.0	538.9	233.5	305.8	YES	62.0
TWI	-91	27.74	50	25.0	22.260	0.00	107.1	538.9	233.5	305.6	YES	107.1
TWI	-91	27.78	50	25.0	22.220	0.06	145.3	538.9	233.5	305.3	YES	145.3
TWI	-91	27.49	50	25.0	22.510	0.00	76.3	538.9	233.5	307.3	YES	76.3
TWI	-91	27.64	50	25.0	22.360	0.00	126.5	538.9	233.5	306.2	YES	126.5
TWI	-91	27.91	50	25.0	22.090	0.04	126.1	538.9	233.5	304.4	YES	126.1
TWI	-91	27.27	50	25.0	22.730	0.05	128.5	538.9	233.5	308.8	YES	128.5
TWI	-91	27.73	50	25.0	22.270	0.00	111.4	538.9	233.5	305.6	YES	111.4
TWI	-91	27.49	50	25.0	22.510	0.00	130.4	538.9	233.5	307.3	YES	130.4
TWI	-91	27.60	50	25.0	22.400	0.00	134.8	538.9	233.5	306.5	YES	134.8
TWI	-91	27.87	50	25.0	22.130	0.00	157.3	538.9	233.5	304.7	YES	157.3
TWI	-91	27.31	50	25.0	22.690	0.00	105.2	538.9	233.5	308.5	YES	105.2
TWI	-91	27.61	50	25.0	22.390	0.00	109.8	538.9	233.5	306.4	YES	109.8
TWI	-91	26.01	50	25.0	23.990	0.00	84.9	538.9	233.5	317.2	YES	84.9
TWI	-91	27.94	50	25.0	22.060	0.00	62.8	538.9	233.5	304.2	YES	62.8
TWI	-91	28.64	50	25.0	21.360	0.00	97.5	538.9	233.5	299.3	YES	97.5
TWI	-91	27.37	50	25.0	22.630	0.00	80.2	538.9	233.5	308.1	YES	80.2
TWI	-91	27.52	50	25.0	22.480	0.05	134.4	538.9	233.5	307.1	YES	134.4
TWI	-91	27.60	50	25.0	22.400	0.00	65.1	538.9	233.5	306.5	YES	65.1
TWI	-91	27.47	50	25.0	22.530	0.00	118.6	538.9	233.5	307.4	YES	118.6
GKSS	-91	56.39	100	50.0	43.610	0.00	67.3	538.9	233.5	427.7	YES	67.3
GKSS	-91	55.98	100	50.0	44.020	0.00	162.9	538.9	233.5	429.7	YES	162.9
GKSS	-91	55.90	100	50.0	44.100	0.00	100.0	538.9	233.5	430.1	YES	100.0
GKSS	-91	56.12	100	50.0	43.880	0.00	91.2	538.9	233.5	429.0	YES	91.2
GKSS	-91	55.74	100	50.0	44.260	0.00	106.2	538.9	233.5	430.9	YES	106.2
GKSS	-91	55.74	100	50.0	44.260	0.00	83.2	538.9	233.5	430.9	YES	83.2
GKSS	-91	56.46	100	50.0	43.540	0.00	91.8	538.9	233.5	427.3	YES	91.8
GKSS	-91	55.78	100	50.0	44.220	0.00	94.7	538.9	233.5	430.7	YES	94.7
GKSS	-91	55.68	100	50.0	44.320	0.00	92.9	538.9	233.5	431.1	YES	92.9
GKSS	-91	55.29	100	50.0	44.710	0.00	69.9	538.9	233.5	433.0	YES	69.9
NE	-91	56.42	100	50.0	43.580	0.00	93.1	538.9	233.5	427.5	YES	93.1
NE	-91	56.77	100	50.0	43.230	0.00	97.9	538.9	233.5	425.8	YES	97.9
NE	-91	56.26	100	50.0	43.740	0.00	73.7	538.9	233.5	428.3	YES	73.7
NE	-91	56.26	100	50.0	43.740	0.00	82.0	538.9	233.5	428.3	YES	82.0
NE	-91	56.31	100	50.0	43.690	0.00	76.3	538.9	233.5	428.1	YES	76.3
NE	-91	56.42	100	50.0	43.580	0.00	93.1	538.9	233.5	427.5	YES	93.1
NE	-91	56.39	100	50.0	43.610	0.00	83.7	538.9	233.5	427.7	YES	83.7
NE	-91	56.41	100	50.0	43.590	0.00	82.1	538.9	233.5	427.6	YES	82.1
NE	-91	56.38	100	50.0	43.620	0.00	86.8	538.9	233.5	427.7	YES	86.8
NE	-91	56.30	100	50.0	43.700	0.00	86.7	538.9	233.5	428.1	YES	86.7
NE	-91	56.35	100	50.0	43.650	0.00	92.3	538.9	233.5	427.9	YES	92.3
NE	-91	56.74	100	50.0	43.260	0.00	83.1	538.9	233.5	426.0	YES	83.1

NE	-91	56.42	100	50.0	43.580	0.00	88.9	538.9	233.5	427.5	YES	88.9
NE	-91	56.36	100	50.0	43.640	0.00	64.3	538.9	233.5	427.8	YES	64.3
NE	-91	56.48	100	50.0	43.520	0.00	101.6	538.9	233.5	427.2	YES	101.6
NE	-91	56.41	100	50.0	43.590	0.00	94.2	538.9	233.5	427.6	YES	94.2
NE	-91	56.34	100	50.0	43.660	0.00	78.7	538.9	233.5	427.9	YES	78.7
NE	-91	56.55	100	50.0	43.450	0.00	73.0	538.9	233.5	426.9	YES	73.0
NE	-91	56.51	100	50.0	43.490	0.00	64.2	538.9	233.5	427.1	YES	64.2
NE	-91	56.49	100	50.0	43.510	0.00	98.9	538.9	233.5	427.2	YES	98.9
GKSS	-91	112.50	200	100.0	87.500	0.00	103.2	538.9	233.5	605.8	YES	103.2
GKSS	-91	111.92	200	100.0	88.080	0.00	84.4	538.9	233.5	607.8	YES	84.4
GKSS	-91	110.92	200	100.0	89.080	0.00	97.0	538.9	233.5	611.2	YES	97.0
GKSS	-91	112.15	200	100.0	87.850	0.00	92.7	538.9	233.5	607.0	YES	92.7
GKSS	-91	112.48	200	100.0	87.520	0.00	96.8	538.9	233.5	605.9	YES	96.8
NE	-91	111.78	200	100.0	88.220	0.00	73.6	538.9	233.5	608.3	YES	73.6
NE	-91	112.90	200	100.0	87.100	0.00	73.0	538.9	233.5	604.4	YES	73.0
NE	-91	111.41	200	100.0	88.590	0.00	73.3	538.9	233.5	609.6	YES	73.3
NE	-91	111.95	200	100.0	88.050	0.00	53.8	538.9	233.5	607.7	YES	53.8
NE	-91	112.66	200	100.0	87.340	0.00	69.5	538.9	233.5	605.2	YES	69.5
NE	-91	115.23	200	100.0	84.770	0.00	65.5	538.9	233.5	596.3	YES	65.5
NE	-91	111.72	200	100.0	88.280	0.00	79.6	538.9	233.5	608.5	YES	79.6
NE	-91	112.52	200	100.0	87.480	0.00	69.8	538.9	233.5	605.7	YES	69.8
NE	-91	113.20	200	100.0	86.800	0.00	90.3	538.9	233.5	603.4	YES	90.3
NE	-91	109.16	200	100.0	90.840	0.00	88.0	538.9	233.5	617.3	YES	88.0
GKSS	-60	14.19	25	12.5	10.810	0.05	234.1	506.4	231.4	205.5	NO	205.5
GKSS	-60	14.16	25	12.5	10.840	0.00	114.4	506.4	231.4	205.8	YES	114.4
GKSS	-60	14.31	25	12.5	10.690	0.00	130.7	506.4	231.4	204.4	YES	130.7
GKSS	-60	14.13	25	12.5	10.870	0.00	106.7	506.4	231.4	206.1	YES	106.7
GKSS	-60	14.08	25	12.5	10.920	0.00	161.0	506.4	231.4	206.5	YES	161.0
GKSS	-60	13.58	25	12.5	11.420	0.00	200.7	506.4	231.4	211.2	YES	200.7
GKSS	-60	14.26	25	12.5	10.740	0.00	125.2	506.4	231.4	204.8	YES	125.2
GKSS	-60	14.19	25	12.5	10.810	0.00	145.1	506.4	231.4	205.5	YES	145.1
GKSS	-60	14.00	25	12.5	11.000	0.00	91.9	506.4	231.4	207.3	YES	91.9
GKSS	-60	13.94	25	12.5	11.060	0.00	128.1	506.4	231.4	207.9	YES	128.1
GKSS	-60	14.59	25	12.5	10.410	0.00	164.4	506.4	231.4	201.7	YES	164.4
GKSS	-60	14.53	25	12.5	10.470	0.00	192.2	506.4	231.4	202.2	YES	192.2
GKSS	-60	14.76	25	12.5	10.240	0.00	166.3	506.4	231.4	200.0	YES	166.3
GKSS	-60	14.48	25	12.5	10.520	0.00	177.7	506.4	231.4	202.7	YES	177.7
GKSS	-60	14.55	25	12.5	10.450	0.00	203.7	506.4	231.4	202.0	NO	202.0
GKSS	-60	14.46	25	12.5	10.540	0.00	116.0	506.4	231.4	202.9	YES	116.0
GKSS	-60	14.55	25	12.5	10.450	0.11	221.9	506.4	231.4	202.0	NO	202.0
GKSS	-60	14.77	25	12.5	10.230	0.00	167.6	506.4	231.4	199.9	YES	167.6
GKSS	-60	14.35	25	12.5	10.650	0.00	89.8	506.4	231.4	204.0	YES	89.8
GKSS	-60	14.56	25	12.5	10.440	0.00	156.3	506.4	231.4	201.9	YES	156.3
GKSS	-60	14.49	25	12.5	10.510	0.00	186.8	506.4	231.4	202.6	YES	186.8
GKSS	-60	14.43	25	12.5	10.570	0.00	213.5	506.4	231.4	203.2	NO	203.2
GKSS	-60	14.39	25	12.5	10.610	0.00	164.6	506.4	231.4	203.6	YES	164.6
GKSS	-60	14.49	25	12.5	10.510	0.28	280.1	506.4	231.4	202.6	NO	202.6
GKSS	-60	14.43	25	12.5	10.570	0.00	185.9	506.4	231.4	203.2	YES	185.9
GKSS	-60	14.85	25	12.5	10.150	0.00	127.7	506.4	231.4	199.1	YES	127.7
GKSS	-60	14.64	25	12.5	10.360	0.00	205.0	506.4	231.4	201.2	NO	201.2
GKSS	-60	14.25	25	12.5	10.750	0.00	115.6	506.4	231.4	204.9	YES	115.6
GKSS	-60	14.44	25	12.5	10.560	0.00	107.5	506.4	231.4	203.1	YES	107.5
SIEMENS	-60	13.24	25	12.5	11.760	0.00	164.6	506.4	231.4	214.3	YES	164.6
SIEMENS	-60	13.29	25	12.5	11.710	0.00	172.0	506.4	231.4	213.9	YES	172.0
SIEMENS	-60	13.24	25	12.5	11.760	0.00	108.5	506.4	231.4	214.3	YES	108.5
SIEMENS	-60	13.28	25	12.5	11.720	0.00	119.0	506.4	231.4	214.0	YES	119.0
SIEMENS	-60	13.26	25	12.5	11.740	0.00	153.5	506.4	231.4	214.2	YES	153.5
SIEMENS	-60	13.22	25	12.5	11.780	0.00	158.9	506.4	231.4	214.5	YES	158.9
SIEMENS	-60	13.27	25	12.5	11.730	0.00	137.5	506.4	231.4	214.1	YES	137.5
SIEMENS	-60	13.18	25	12.5	11.820	0.00	119.5	506.4	231.4	214.9	YES	119.5
SIEMENS	-60	13.18	25	12.5	11.820	0.00	130.7	506.4	231.4	214.9	YES	130.7
SIEMENS	-60	13.24	25	12.5	11.760	0.00	172.6	506.4	231.4	214.3	YES	172.6
SIEMENS	-60	13.24	25	12.5	11.760	0.00	84.5	506.4	231.4	214.3	YES	84.5
SIEMENS	-60	13.34	25	12.5	11.660	0.00	244.6	506.4	231.4	213.4	NO	213.4
SIEMENS	-60	13.20	25	12.5	11.800	0.00	120.4	506.4	231.4	214.7	YES	120.4
SIEMENS	-60	13.31	25	12.5	11.690	0.00	104.5	506.4	231.4	213.7	YES	104.5
SIEMENS	-60	13.23	25	12.5	11.770	0.00	163.6	506.4	231.4	214.4	YES	163.6
SIEMENS	-60	13.28	25	12.5	11.720	0.00	201.4	506.4	231.4	214.0	YES	201.4
SIEMENS	-60	13.20	25	12.5	11.800	0.00	137.8	506.4	231.4	214.7	YES	137.8
SIEMENS	-60	13.19	25	12.5	11.810	0.00	173.0	506.4	231.4	214.8	YES	173.0
SIEMENS	-60	13.22	25	12.5	11.780	0.00	99.2	506.4	231.4	214.5	YES	99.2
SIEMENS	-60	13.22	25	12.5	11.780	0.00	173.4	506.4	231.4	214.5	YES	173.4
SIEMENS	-60	13.29	25	12.5	11.710	0.00	131.5	506.4	231.4	213.9	YES	131.5
GKSS	-60	28.06	50	25.0	21.940	0.00	186.0	506.4	231.4	292.8	YES	186.0
GKSS	-60	27.75	50	25.0	22.250	0.00	151.8	506.4	231.4	294.8	YES	151.8
GKSS	-60	27.62	50	25.0	22.380	0.00	111.7	506.4	231.4	295.7	YES	111.7
GKSS	-60	27.65	50	25.0	22.350	0.00	143.9	506.4	231.4	295.5	YES	143.9
GKSS	-60	27.71	50	25.0	22.290	0.00	105.4	506.4	231.4	295.1	YES	105.4
GKSS	-60	28.01	50	25.0	21.990	0.00	154.0	506.4	231.4	293.1	YES	154.0
GKSS	-60	27.97	50	25.0	22.030	0.00	176.2	506.4	231.4	293.4	YES	176.2
GKSS	-60	27.51	50	25.0	22.490	0.00	131.9	506.4	231.4	296.4	YES	131.9
GKSS	-60	27.86	50	25.0	22.140	0.00	203.9	506.4	231.4	294.1	YES	203.9
GKSS	-60	27.51	50	25.0	22.490	0.00	142.7	506.4	231.4	296.4	YES	142.7
TWI	-60	27.42	50	25.0	22.580	0.06	134.5	506.4	231.4	297.0	YES	134.5
TWI	-60	27.43	50	25.0	22.570	0.00	130.1	506.4	231.4	296.9	YES	130.1
TWI	-60	27.62	50	25.0	22.380	0.07	142.6	506.4	231.4	295.7	YES	142.6
TWI	-60	27.47	50	25.0	22.530	0.05	119.7	506.4	231.4	296.7	YES	119.7

TWI	-60	27.49	50	25.0	22.510	0.07	141.3	506.4	231.4	296.5	YES	141.3
TWI	-60	27.95	50	25.0	22.050	0.10	175.9	506.4	231.4	293.5	YES	175.9
TWI	-60	27.62	50	25.0	22.380	0.00	119.6	506.4	231.4	295.7	YES	119.6
TWI	-60	27.65	50	25.0	22.350	0.00	102.4	506.4	231.4	295.5	YES	102.4
TWI	-60	27.68	50	25.0	22.320	0.00	99.0	506.4	231.4	295.3	YES	99.0
TWI	-60	27.82	50	25.0	22.180	0.05	115.1	506.4	231.4	294.4	YES	115.1
TWI	-60	27.98	50	25.0	22.020	0.11	172.9	506.4	231.4	293.3	YES	172.9
TWI	-60	27.72	50	25.0	22.280	0.03	120.5	506.4	231.4	295.0	YES	120.5
TWI	-60	27.48	50	25.0	22.520	0.00	165.2	506.4	231.4	296.6	YES	165.2
TWI	-60	27.54	50	25.0	22.460	0.00	125.6	506.4	231.4	296.2	YES	125.6
TWI	-60	27.88	50	25.0	22.120	0.05	126.7	506.4	231.4	294.0	YES	126.7
TWI	-60	27.79	50	25.0	22.210	0.00	100.4	506.4	231.4	294.6	YES	100.4
TWI	-60	27.56	50	25.0	22.440	0.05	131.1	506.4	231.4	296.1	YES	131.1
TWI	-60	27.58	50	25.0	22.420	0.06	185.1	506.4	231.4	295.9	YES	185.1
TWI	-60	27.59	50	25.0	22.410	0.09	163.6	506.4	231.4	295.9	YES	163.6
TWI	-60	27.68	50	25.0	22.320	0.09	126.5	506.4	231.4	295.3	YES	126.5
TWI	-60	27.65	50	25.0	22.350	0.10	164.7	506.4	231.4	295.5	YES	164.7
TWI	-60	27.73	50	25.0	22.270	0.16	192.7	506.4	231.4	294.9	YES	192.7
TWI	-60	27.65	50	25.0	22.350	0.05	134.5	506.4	231.4	295.5	YES	134.5
TWI	-60	27.86	50	25.0	22.140	0.05	140.8	506.4	231.4	294.1	YES	140.8
GKSS	-60	57.56	100	50.0	42.440	0.00	109.9	506.4	231.4	407.2	YES	109.9
GKSS	-60	56.69	100	50.0	43.310	0.00	131.9	506.4	231.4	411.3	YES	131.9
GKSS	-60	56.69	100	50.0	43.310	0.00	136.2	506.4	231.4	411.3	YES	136.2
GKSS	-60	56.51	100	50.0	43.490	0.00	154.0	506.4	231.4	412.2	YES	154.0
GKSS	-60	56.15	100	50.0	43.850	0.00	115.9	506.4	231.4	413.9	YES	115.9
GKSS	-60	55.96	100	50.0	44.040	0.00	150.4	506.4	231.4	414.8	YES	150.4
BAM	-40	13.63	25	12.5	11.370	0.08	171.0	492.0	230.1	207.1	YES	171.0
BAM	-40	13.73	25	12.5	11.270	2.05	569.4	492.0	230.1	206.2	NO	206.2
BAM	-40	13.78	25	12.5	11.220	0.13	169.4	492.0	230.1	205.8	YES	169.4
BAM	-40	14.02	25	12.5	10.980	1.93	548.7	492.0	230.1	203.6	NO	203.6
BAM	-40	14.13	25	12.5	10.870	1.67	529.9	492.0	230.1	202.5	NO	202.5
BAM	-40	13.62	25	12.5	11.380	0.36	318.5	492.0	230.1	207.2	NO	207.2
BAM	-40	13.77	25	12.5	11.230	2.07	574.8	492.0	230.1	205.9	NO	205.9
BAM	-40	13.70	25	12.5	11.300	0.69	360.8	492.0	230.1	206.5	NO	206.5
BAM	-40	13.61	25	12.5	11.390	0.60	343.8	492.0	230.1	207.3	NO	207.3
BAM	-40	13.85	25	12.5	11.150	0.26	235.8	492.0	230.1	205.1	NO	205.1
BAM	-40	14.10	25	12.5	10.900	1.79	529.9	492.0	230.1	202.8	NO	202.8
BAM	-40	13.88	25	12.5	11.120	1.44	496.5	492.0	230.1	204.9	NO	204.9
BAM	-40	13.84	25	12.5	11.160	2.08	600.0	492.0	230.1	205.2	NO	205.2
BAM	-40	13.91	25	12.5	11.090	0.07	113.7	492.0	230.1	204.6	YES	113.7
BAM	-40	13.89	25	12.5	11.110	0.21	229.6	492.0	230.1	204.8	NO	204.8
BAM	-40	13.99	25	12.5	11.010	0.09	154.2	492.0	230.1	203.8	YES	154.2
BAM	-40	13.73	25	12.5	11.270	0.24	221.3	492.0	230.1	206.2	NO	206.2
BAM	-40	13.95	25	12.5	11.050	1.37	486.7	492.0	230.1	204.2	NO	204.2
BAM	-40	13.61	25	12.5	11.390	0.25	243.8	492.0	230.1	207.3	NO	207.3
BAM	-40	13.74	25	12.5	11.260	0.17	202.5	492.0	230.1	206.1	YES	202.5
GKSS	-40	14.00	25	12.5	11.000	0.00	180.6	492.0	230.1	203.7	YES	180.6
GKSS	-40	14.03	25	12.5	10.970	0.00	206.7	492.0	230.1	203.5	NO	203.5
GKSS	-40	14.59	25	12.5	10.410	0.00	240.7	492.0	230.1	198.2	NO	198.2
GKSS	-40	14.44	25	12.5	10.560	0.00	270.8	492.0	230.1	199.6	NO	199.6
GKSS	-40	14.05	25	12.5	10.950	0.00	186.4	492.0	230.1	203.3	YES	186.4
GKSS	-40	14.46	25	12.5	10.540	0.18	255.8	492.0	230.1	199.4	NO	199.4
GKSS	-40	13.93	25	12.5	11.070	0.12	231.2	492.0	230.1	204.4	NO	204.4
GKSS	-40	14.15	25	12.5	10.850	0.44	339.4	492.0	230.1	202.4	NO	202.4
GKSS	-40	14.06	25	12.5	10.940	0.83	403.1	492.0	230.1	203.2	NO	203.2
GKSS	-40	14.31	25	12.5	10.690	0.83	399.2	492.0	230.1	200.9	NO	200.9
BAM	-40	27.73	50	25.0	22.270	0.09	187.3	492.0	230.1	289.9	YES	187.3
BAM	-40	27.76	50	25.0	22.240	0.05	101.5	492.0	230.1	289.7	YES	101.5
BAM	-40	27.54	50	25.0	22.460	0.06	140.3	492.0	230.1	291.1	YES	140.3
BAM	-40	26.90	50	25.0	23.100	0.08	150.2	492.0	230.1	295.3	YES	150.2
BAM	-40	27.34	50	25.0	22.660	0.09	187.3	492.0	230.1	292.4	YES	187.3
BAM	-40	27.00	50	25.0	23.000	0.18	211.4	492.0	230.1	294.6	YES	211.4
BAM	-40	26.82	50	25.0	23.180	0.12	160.5	492.0	230.1	295.8	YES	160.5
BAM	-40	26.88	50	25.0	23.120	0.11	214.6	492.0	230.1	295.4	YES	214.6
BAM	-40	27.28	50	25.0	22.720	0.15	188.3	492.0	230.1	292.8	YES	188.3
BAM	-40	27.52	50	25.0	22.480	0.23	239.3	492.0	230.1	291.3	YES	239.3
BAM	-40	27.16	50	25.0	22.840	0.05	112.8	492.0	230.1	293.6	YES	112.8
BAM	-40	27.71	50	25.0	22.290	0.23	239.0	492.0	230.1	290.0	YES	239.0
BAM	-40	27.48	50	25.0	22.520	0.38	284.9	492.0	230.1	291.5	YES	284.9
BAM	-40	27.17	50	25.0	22.830	0.31	254.7	492.0	230.1	293.5	YES	254.7
BAM	-40	27.33	50	25.0	22.670	0.23	270.9	492.0	230.1	292.5	YES	270.9
BAM	-40	27.39	50	25.0	22.610	0.14	187.0	492.0	230.1	292.1	YES	187.0
BAM	-40	27.53	50	25.0	22.470	0.13	170.1	492.0	230.1	291.2	YES	170.1
BAM	-40	26.83	50	25.0	23.170	0.25	256.4	492.0	230.1	295.7	YES	256.4
BAM	-40	27.51	50	25.0	22.490	0.11	171.4	492.0	230.1	291.3	YES	171.4
BAM	-40	26.62	50	25.0	23.380	0.05	103.1	492.0	230.1	297.0	YES	103.1
BAM	-40	28.84	50	25.0	21.160	0.23	230.0	492.0	230.1	282.6	YES	230.0
BAM	-40	26.72	50	25.0	23.280	0.20	210.0	492.0	230.1	296.4	YES	210.0
GKSS	-40	27.99	50	25.0	22.010	0.00	198.2	492.0	230.1	288.2	YES	198.2
GKSS	-40	28.02	50	25.0	21.980	0.00	150.2	492.0	230.1	288.0	YES	150.2
GKSS	-40	28.32	50	25.0	21.680	0.00	226.8	492.0	230.1	286.0	YES	226.8
GKSS	-40	28.13	50	25.0	21.870	0.00	158.1	492.0	230.1	287.3	YES	158.1
GKSS	-40	28.17	50	25.0	21.830	0.00	256.4	492.0	230.1	287.0	YES	256.4
GKSS	-40	28.10	50	25.0	21.900	0.00	207.6	492.0	230.1	287.5	YES	207.6
GKSS	-40	27.84	50	25.0	22.160	0.19	213.5	492.0	230.1	289.2	YES	213.5
GKSS	-40	28.14	50	25.0	21.860	0.25	254.6	492.0	230.1	287.2	YES	254.6
GKSS	-40	28.26	50	25.0	21.740	0.24	240.0	492.0	230.1	286.4	YES	240.0

GKSS	-40	29.37	50	25.0	20.630	0.41	309.2	492.0	230.1	279.0	NO	279.0
GKSS	-40	56.43	100	50.0	43.570	0.00	125.9	492.0	230.1	405.5	YES	125.9
GKSS	-40	56.39	100	50.0	43.610	0.00	128.9	492.0	230.1	405.7	YES	128.9
GKSS	-40	56.29	100	50.0	43.710	0.00	198.5	492.0	230.1	406.2	YES	198.5
GKSS	-40	54.58	100	50.0	45.420	0.00	212.0	492.0	230.1	414.0	YES	212.0
GKSS	-40	56.61	100	50.0	43.390	0.00	138.6	492.0	230.1	404.7	YES	138.6
GKSS	-40	56.75	100	50.0	43.250	0.00	187.7	492.0	230.1	404.0	YES	187.7
GKSS	-40	56.59	100	50.0	43.410	0.00	173.0	492.0	230.1	404.8	YES	173.0
GKSS	-40	56.48	100	50.0	43.520	0.00	179.5	492.0	230.1	405.3	YES	179.5
GKSS	-40	57.40	100	50.0	42.600	0.00	152.6	492.0	230.1	401.0	YES	152.6
GKSS	-40	56.44	100	50.0	43.560	0.00	153.6	492.0	230.1	405.5	YES	153.6
THA	-40	56.27	100	50.0	43.730	0.00	144.6	492.0	230.1	406.2	YES	144.6
THA	-40	56.17	100	50.0	43.830	0.00	150.7	492.0	230.1	406.7	YES	150.7
THA	-40	56.43	100	50.0	43.570	0.00	139.1	492.0	230.1	405.5	YES	139.1
THA	-40	56.26	100	50.0	43.740	0.00	183.6	492.0	230.1	406.3	YES	183.6
THA	-40	56.26	100	50.0	43.740	0.00	142.0	492.0	230.1	406.3	YES	142.0
THA	-40	56.79	100	50.0	43.210	0.16	187.2	492.0	230.1	403.8	YES	187.2
THA	-40	56.58	100	50.0	43.420	0.12	172.2	492.0	230.1	404.8	YES	172.2
THA	-40	56.29	100	50.0	43.710	0.15	198.0	492.0	230.1	406.2	YES	198.0
THA	-40	56.57	100	50.0	43.430	0.00	130.4	492.0	230.1	404.8	YES	130.4
THA	-40	56.56	100	50.0	43.440	0.00	141.7	492.0	230.1	404.9	YES	141.7
THA	-40	56.67	100	50.0	43.330	0.00	134.5	492.0	230.1	404.4	YES	134.5
THA	-40	56.77	100	50.0	43.230	0.00	115.5	492.0	230.1	403.9	YES	115.5
THA	-40	57.53	100	50.0	42.470	0.00	91.7	492.0	230.1	400.4	YES	91.7
THA	-40	56.44	100	50.0	43.560	0.00	141.1	492.0	230.1	405.5	YES	141.1
THA	-40	56.40	100	50.0	43.600	0.21	239.1	492.0	230.1	405.6	YES	239.1
THA	-40	56.45	100	50.0	43.550	0.23	243.4	492.0	230.1	405.4	YES	243.4
THA	-40	56.33	100	50.0	43.670	0.14	191.9	492.0	230.1	406.0	YES	191.9
THA	-40	56.78	100	50.0	43.220	0.00	146.8	492.0	230.1	403.9	YES	146.8
THA	-40	56.42	100	50.0	43.580	0.00	161.4	492.0	230.1	405.5	YES	161.4
THA	-40	56.67	100	50.0	43.330	0.00	142.3	492.0	230.1	404.4	YES	142.3
CISE	-20	14.20	25	12.5	10.800	0.00	128.7	481.3	228.8	199.1	YES	128.7
CISE	-20	13.93	25	12.5	11.070	0.00	146.9	481.3	228.8	201.6	YES	146.9
CISE	-20	13.63	25	12.5	11.370	0.74	402.8	481.3	228.8	204.3	NO	204.3
CISE	-20	14.29	25	12.5	10.710	1.05	409.4	481.3	228.8	198.3	NO	198.3
CISE	-20	14.64	25	12.5	10.360	2.38	530.5	481.3	228.8	195.0	NO	195.0
CISE	-20	14.34	25	12.5	10.660	2.64	532.2	481.3	228.8	197.8	NO	197.8
CISE	-20	14.58	25	12.5	10.420	2.46	534.6	481.3	228.8	195.6	NO	195.6
CISE	-20	14.51	25	12.5	10.490	2.58	536.1	481.3	228.8	196.2	NO	196.2
CISE	-20	14.75	25	12.5	10.250	2.17	536.1	481.3	228.8	194.0	NO	194.0
CISE	-20	14.29	25	12.5	10.710	2.78	536.6	481.3	228.8	198.3	NO	198.3
CISE	-20	13.97	25	12.5	11.030	2.62	538.6	481.3	228.8	201.2	NO	201.2
CISE	-20	14.01	25	12.5	10.990	2.40	540.5	481.3	228.8	200.9	NO	200.9
CISE	-20	14.58	25	12.5	10.420	2.77	543.8	481.3	228.8	195.6	NO	195.6
CISE	-20	14.36	25	12.5	10.640	2.58	549.2	481.3	228.8	197.6	NO	197.6
CISE	-20	13.89	25	12.5	11.110	2.48	553.7	481.3	228.8	201.9	NO	201.9
CISE	-20	13.83	25	12.5	11.170	2.47	556.1	481.3	228.8	202.5	NO	202.5
CISE	-20	14.31	25	12.5	10.690	2.51	556.3	481.3	228.8	198.1	NO	198.1
CISE	-20	14.31	25	12.5	10.690	2.51	560.6	481.3	228.8	198.1	NO	198.1
CISE	-20	14.03	25	12.5	10.970	2.83	565.8	481.3	228.8	200.7	NO	200.7
CISE	-20	14.13	25	12.5	10.870	2.43	570.1	481.3	228.8	199.8	NO	199.8
CISE	-20	13.94	25	12.5	11.060	2.63	571.1	481.3	228.8	201.5	NO	201.5
GKSS	-20	14.04	25	12.5	10.960	0.00	233.1	481.3	228.8	200.6	NO	200.6
GKSS	-20	14.04	25	12.5	10.960	0.74	389.8	481.3	228.8	200.6	NO	200.6
GKSS	-20	14.12	25	12.5	10.880	1.31	487.9	481.3	228.8	199.8	NO	199.8
GKSS	-20	14.30	25	12.5	10.700	1.07	438.3	481.3	228.8	198.2	NO	198.2
GKSS	-20	14.18	25	12.5	10.820	2.76	571.4	481.3	228.8	199.3	NO	199.3
GKSS	-20	14.47	25	12.5	10.530	2.41	560.7	481.3	228.8	196.6	NO	196.6
GKSS	-20	14.25	25	12.5	10.750	2.71	561.1	481.3	228.8	198.6	NO	198.6
GKSS	-20	14.03	25	12.5	10.970	2.83	575.1	481.3	228.8	200.7	NO	200.7
GKSS	-20	14.64	25	12.5	10.360	2.64	557.5	481.3	228.8	195.0	NO	195.0
GKSS	-20	14.26	25	12.5	10.740	2.65	572.5	481.3	228.8	198.6	NO	198.6
GKSS	-20	27.87	50	25.0	22.130	0.00	202.5	481.3	228.8	285.0	YES	202.5
GKSS	-20	28.00	50	25.0	22.000	0.00	194.7	481.3	228.8	284.2	YES	194.7
GKSS	-20	27.61	50	25.0	22.390	0.00	262.8	481.3	228.8	286.7	YES	262.8
GKSS	-20	28.02	50	25.0	21.980	0.00	187.9	481.3	228.8	284.0	YES	187.9
GKSS	-20	28.15	50	25.0	21.850	0.31	275.8	481.3	228.8	283.2	YES	275.8
GKSS	-20	28.12	50	25.0	21.880	0.21	261.8	481.3	228.8	283.4	YES	261.8
GKSS	-20	28.15	50	25.0	21.850	0.68	371.0	481.3	228.8	283.2	NO	283.2
GKSS	-20	28.17	50	25.0	21.830	0.65	369.1	481.3	228.8	283.1	NO	283.1
GKSS	-20	28.02	50	25.0	21.980	1.13	462.1	481.3	228.8	284.0	NO	284.0
GKSS	-20	28.00	50	25.0	22.000	0.47	319.7	481.3	228.8	284.2	NO	284.2
VTT	-20	28.03	50	25.0	21.970	1.80	583.1	481.3	228.8	284.0	NO	284.0
VTT	-20	28.62	50	25.0	21.380	0.18	231.9	481.3	228.8	280.1	YES	231.9
VTT	-20	28.74	50	25.0	21.260	0.77	382.0	481.3	228.8	279.4	NO	279.4
VTT	-20	28.60	50	25.0	21.400	0.35	295.9	481.3	228.8	280.3	NO	280.3
VTT	-20	28.74	50	25.0	21.260	2.14	576.4	481.3	228.8	279.4	NO	279.4
VTT	-20	28.86	50	25.0	21.140	0.89	411.7	481.3	228.8	278.6	NO	278.6
VTT	-20	28.35	50	25.0	21.650	0.30	306.4	481.3	228.8	281.9	NO	281.9
VTT	-20	28.74	50	25.0	21.260	0.46	324.7	481.3	228.8	279.4	NO	279.4
VTT	-20	27.98	50	25.0	22.020	0.31	282.5	481.3	228.8	284.3	YES	282.5
VTT	-20	28.64	50	25.0	21.360	0.23	247.2	481.3	228.8	280.0	YES	247.2
VTT	-20	28.68	50	25.0	21.320	0.16	233.2	481.3	228.8	279.7	YES	233.2
VTT	-20	28.15	50	25.0	21.850	0.47	317.5	481.3	228.8	283.2	NO	283.2
VTT	-20	27.27	50	25.0	22.730	1.54	515.6	481.3	228.8	288.9	NO	288.9
VTT	-20	29.06	50	25.0	20.940	0.26	263.2	481.3	228.8	277.2	YES	263.2
VTT	-20	27.09	50	25.0	22.910	0.05	184.4	481.3	228.8	290.0	YES	184.4

VTT	-20	28.07	50	25.0	21.930	0.38	286.9	481.3	228.8	283.7	NO	283.7
VTT	-20	28.52	50	25.0	21.480	0.62	341.4	481.3	228.8	280.8	NO	280.8
VTT	-20	28.51	50	25.0	21.490	0.79	415.0	481.3	228.8	280.9	NO	280.9
VTT	-20	28.51	50	25.0	21.490	0.44	327.9	481.3	228.8	280.9	NO	280.9
VTT	-20	28.56	50	25.0	21.440	0.06	170.9	481.3	228.8	280.5	YES	170.9
VTT	-20	28.19	50	25.0	21.810	0.46	308.8	481.3	228.8	282.9	NO	282.9
VTT	-20	29.30	50	25.0	20.700	0.64	376.5	481.3	228.8	275.7	NO	275.7
VTT	-20	28.22	50	25.0	21.780	0.16	228.2	481.3	228.8	282.8	YES	228.2
VTT	-20	28.33	50	25.0	21.670	0.81	371.7	481.3	228.8	282.0	NO	282.0
VTT	-20	28.51	50	25.0	21.490	0.37	291.6	481.3	228.8	280.9	NO	280.9
VTT	-20	28.37	50	25.0	21.630	0.50	337.7	481.3	228.8	281.8	NO	281.8
VTT	-20	28.42	50	25.0	21.580	0.82	390.5	481.3	228.8	281.4	NO	281.4
VTT	-20	28.54	50	25.0	21.460	0.12	227.3	481.3	228.8	280.7	YES	227.3
VTT	-20	28.13	50	25.0	21.870	0.13	201.3	481.3	228.8	283.3	YES	201.3
VTT	-20	27.90	50	25.0	22.100	0.15	212.5	481.3	228.8	284.8	YES	212.5
VTT	-20	32.08	50	25.0	17.920	0.36	288.4	481.3	228.8	256.5	NO	256.5
VTT	-20	27.90	50	25.0	22.100	1.62	479.1	481.3	228.8	284.8	NO	284.8
VTT	-20	28.29	50	25.0	21.710	0.95	377.9	481.3	228.8	282.3	NO	282.3
VTT	-20	28.84	50	25.0	21.160	0.35	269.6	481.3	228.8	278.7	YES	269.6
VTT	-20	29.33	50	25.0	20.670	0.09	184.4	481.3	228.8	275.5	YES	184.4
VTT	-20	29.42	50	25.0	20.580	0.25	241.6	481.3	228.8	274.9	YES	241.6
VTT	-20	29.37	50	25.0	20.630	0.00	146.4	481.3	228.8	275.2	YES	146.4
VTT	-20	28.64	50	25.0	21.360	0.41	299.4	481.3	228.8	280.0	NO	280.0
VTT	-20	28.23	50	25.0	21.770	0.00	156.7	481.3	228.8	282.7	YES	156.7
VTT	-20	29.10	50	25.0	20.900	0.34	295.6	481.3	228.8	277.0	NO	277.0
CISE	-20	56.40	100	50.0	43.600	0.00	167.4	481.3	228.8	400.1	YES	167.4
CISE	-20	56.54	100	50.0	43.460	0.00	153.5	481.3	228.8	399.4	YES	153.5
CISE	-20	56.35	100	50.0	43.650	0.12	211.2	481.3	228.8	400.3	YES	211.2
CISE	-20	56.82	100	50.0	43.180	0.00	220.3	481.3	228.8	398.1	YES	220.3
CISE	-20	56.63	100	50.0	43.370	0.18	227.9	481.3	228.8	399.0	YES	227.9
CISE	-20	56.83	100	50.0	43.170	0.00	211.1	481.3	228.8	398.1	YES	211.1
CISE	-20	56.30	100	50.0	43.700	0.00	217.1	481.3	228.8	400.5	YES	217.1
CISE	-20	56.86	100	50.0	43.140	0.00	145.3	481.3	228.8	397.9	YES	145.3
CISE	-20	56.22	100	50.0	43.780	0.00	161.2	481.3	228.8	400.9	YES	161.2
CISE	-20	57.02	100	50.0	42.980	0.00	131.9	481.3	228.8	397.2	YES	131.9
CISE	-20	56.43	100	50.0	43.570	0.15	216.4	481.3	228.8	399.9	YES	216.4
CISE	-20	56.97	100	50.0	43.030	0.00	125.0	481.3	228.8	397.4	YES	125.0
CISE	-20	57.01	100	50.0	42.990	0.76	378.7	481.3	228.8	397.2	YES	378.7
CISE	-20	56.88	100	50.0	43.120	0.25	246.1	481.3	228.8	397.8	YES	246.1
CISE	-20	56.40	100	50.0	43.600	0.21	250.9	481.3	228.8	400.1	YES	250.9
CISE	-20	56.48	100	50.0	43.520	0.27	251.5	481.3	228.8	399.7	YES	251.5
CISE	-20	56.94	100	50.0	43.060	0.37	284.0	481.3	228.8	397.6	YES	284.0
CISE	-20	56.46	100	50.0	43.540	0.23	261.1	481.3	228.8	399.8	YES	261.1
CISE	-20	57.04	100	50.0	42.960	0.45	351.6	481.3	228.8	397.1	YES	351.6
CISE	-20	56.38	100	50.0	43.620	0.32	258.5	481.3	228.8	400.1	YES	258.5
GKSS	-20	56.19	100	50.0	43.810	0.00	201.3	481.3	228.8	401.0	YES	201.3
GKSS	-20	56.01	100	50.0	43.990	0.00	110.9	481.3	228.8	401.8	YES	110.9
GKSS	-20	56.65	100	50.0	43.350	0.00	197.7	481.3	228.8	398.9	YES	197.7
GKSS	-20	56.39	100	50.0	43.610	0.00	198.9	481.3	228.8	400.1	YES	198.9
GKSS	-20	56.30	100	50.0	43.700	0.00	200.6	481.3	228.8	400.5	YES	200.6
GKSS	-20	56.89	100	50.0	43.110	0.00	165.7	481.3	228.8	397.8	YES	165.7
GKSS	-20	56.12	100	50.0	43.880	0.37	280.1	481.3	228.8	401.3	YES	280.1
GKSS	-20	56.29	100	50.0	43.710	0.37	279.5	481.3	228.8	400.6	YES	279.5
GKSS	-20	56.04	100	50.0	43.960	0.29	257.6	481.3	228.8	401.7	YES	257.6
GKSS	-20	57.64	100	50.0	42.360	0.32	265.2	481.3	228.8	394.3	YES	265.2
GKSS	-20	113.67	200	100.0	86.330	0.00	156.7	481.3	228.8	562.9	YES	156.7
GKSS	-20	112.96	200	100.0	87.040	0.00	221.7	481.3	228.8	565.2	YES	221.7
GKSS	-20	112.18	200	100.0	87.820	0.00	193.9	481.3	228.8	567.8	YES	193.9
GKSS	-20	110.04	200	100.0	89.960	0.00	191.7	481.3	228.8	574.6	YES	191.7
GKSS	-20	113.10	200	100.0	86.900	0.00	184.4	481.3	228.8	564.8	YES	184.4
NE	-20	112.21	200	100.0	87.790	0.11	186.7	481.3	228.8	567.7	YES	186.7
NE	-20	112.21	200	100.0	87.790	0.11	184.4	481.3	228.8	567.7	YES	184.4
NE	-20	110.84	200	100.0	89.160	0.11	193.9	481.3	228.8	572.1	YES	193.9
NE	-20	111.83	200	100.0	88.170	0.14	204.4	481.3	228.8	568.9	YES	204.4
NE	-20	111.89	200	100.0	88.110	0.16	224.0	481.3	228.8	568.7	YES	224.0
NE	-20	111.52	200	100.0	88.480	0.09	153.4	481.3	228.8	569.9	YES	153.4
NE	-20	112.52	200	100.0	87.480	0.16	222.6	481.3	228.8	566.7	YES	222.6
NE	-20	112.36	200	100.0	87.640	0.10	162.0	481.3	228.8	567.2	YES	162.0
NE	-20	112.39	200	100.0	87.610	0.11	187.8	481.3	228.8	567.1	YES	187.8
NE	-20	111.64	200	100.0	88.360	0.12	198.2	481.3	228.8	569.5	YES	198.2
SCK-CEN	-10	28.39	50	25.0	21.610	3.23	656.0	477.0	228.1	280.0	NO	280.0
SCK-CEN	-10	28.20	50	25.0	21.800	0.81	397.8	477.0	228.1	281.2	NO	281.2
SCK-CEN	-10	27.99	50	25.0	22.010	4.21	718.1	477.0	228.1	282.6	NO	282.6
SCK-CEN	-10	27.77	50	25.0	22.230	2.68	601.6	477.0	228.1	284.0	NO	284.0
SCK-CEN	-10	28.25	50	25.0	21.750	1.52	505.3	477.0	228.1	280.9	NO	280.9
GKSS	0	14.21	25	12.5	10.790	2.51	541.9	473.3	227.5	196.8	NO	196.8
GKSS	0	14.55	25	12.5	10.450	2.45	547.0	473.3	227.5	193.7	NO	193.7
GKSS	0	14.63	25	12.5	10.370	2.44	538.7	473.3	227.5	192.9	NO	192.9
GKSS	0	14.22	25	12.5	10.780	2.47	540.0	473.3	227.5	196.7	NO	196.7
GKSS	0	14.29	25	12.5	10.710	2.55	544.8	473.3	227.5	196.1	NO	196.1
GKSS	0	14.44	25	12.5	10.560	2.49	534.8	473.3	227.5	194.7	NO	194.7
GKSS	0	14.26	25	12.5	10.740	2.53	557.2	473.3	227.5	196.3	NO	196.3
GKSS	0	14.31	25	12.5	10.690	2.51	545.0	473.3	227.5	195.9	NO	195.9
GKSS	0	14.38	25	12.5	10.620	2.56	546.1	473.3	227.5	195.2	NO	195.2
GKSS	0	14.59	25	12.5	10.410	2.53	549.2	473.3	227.5	193.3	NO	193.3
SCK-CEN	0	14.03	25	12.5	10.970	1.80	565.1	473.3	227.5	198.4	NO	198.4
SCK-CEN	0	13.96	25	12.5	11.040	2.57	571.6	473.3	227.5	199.1	NO	199.1

SCK-CEN	0	14.06	25	12.5	10.940	2.65	553.4	473.3	227.5	198.2	NO	198.2
SCK-CEN	0	14.12	25	12.5	10.880	0.28	293.2	473.3	227.5	197.6	NO	197.6
SCK-CEN	0	13.72	25	12.5	11.280	2.34	544.1	473.3	227.5	201.2	NO	201.2
SCK-CEN	0	13.85	25	12.5	11.150	2.49	552.2	473.3	227.5	200.0	NO	200.0
SCK-CEN	0	14.14	25	12.5	10.860	2.18	558.0	473.3	227.5	197.4	NO	197.4
SCK-CEN	0	13.90	25	12.5	11.100	2.53	553.5	473.3	227.5	199.6	NO	199.6
SCK-CEN	0	13.47	25	12.5	11.530	2.56	557.6	473.3	227.5	203.4	NO	203.4
SCK-CEN	0	13.94	25	12.5	11.060	2.25	552.4	473.3	227.5	199.2	NO	199.2
SCK-CEN	0	13.80	25	12.5	11.200	2.34	555.6	473.3	227.5	200.5	NO	200.5
SCK-CEN	0	13.59	25	12.5	11.410	2.42	558.2	473.3	227.5	202.4	NO	202.4
SCK-CEN	0	14.17	25	12.5	10.830	2.36	550.6	473.3	227.5	197.2	NO	197.2
SCK-CEN	0	13.20	25	12.5	11.800	1.88	560.8	473.3	227.5	205.8	NO	205.8
SCK-CEN	0	13.23	25	12.5	11.770	2.59	569.6	473.3	227.5	205.5	NO	205.5
SCK-CEN	0	13.59	25	12.5	11.410	2.57	552.5	473.3	227.5	202.4	NO	202.4
SCK-CEN	0	13.47	25	12.5	11.530	2.54	578.5	473.3	227.5	203.4	NO	203.4
SCK-CEN	0	13.27	25	12.5	11.730	2.61	556.0	473.3	227.5	205.2	NO	205.2
SCK-CEN	0	13.60	25	12.5	11.400	2.61	543.8	473.3	227.5	202.3	NO	202.3
SCK-CEN	0	13.68	25	12.5	11.320	2.49	556.3	473.3	227.5	201.6	NO	201.6
GKSS	0	27.78	50	25.0	22.220	0.56	327.6	473.3	227.5	282.4	NO	282.4
GKSS	0	27.57	50	25.0	22.430	4.68	681.4	473.3	227.5	283.7	NO	283.7
GKSS	0	27.38	50	25.0	22.620	4.89	700.8	473.3	227.5	284.9	NO	284.9
GKSS	0	27.71	50	25.0	22.290	4.59	698.2	473.3	227.5	282.8	NO	282.8
GKSS	0	27.46	50	25.0	22.540	4.75	708.4	473.3	227.5	284.4	NO	284.4
GKSS	0	27.39	50	25.0	22.610	4.84	701.5	473.3	227.5	284.9	NO	284.9
GKSS	0	28.22	50	25.0	21.780	4.67	724.9	473.3	227.5	279.6	NO	279.6
GKSS	0	27.55	50	25.0	22.450	4.68	717.4	473.3	227.5	283.9	NO	283.9
GKSS	0	27.25	50	25.0	22.750	5.13	705.8	473.3	227.5	285.7	NO	285.7
GKSS	0	27.69	50	25.0	22.310	5.08	709.5	473.3	227.5	283.0	NO	283.0
SCK-CEN	0	28.62	50	25.0	21.380	4.56	716.7	473.3	227.5	277.0	NO	277.0
SCK-CEN	0	28.67	50	25.0	21.330	4.42	714.1	473.3	227.5	276.7	NO	276.7
SCK-CEN	0	28.63	50	25.0	21.370	3.68	658.5	473.3	227.5	276.9	NO	276.9
SCK-CEN	0	28.49	50	25.0	21.510	4.89	747.5	473.3	227.5	277.9	NO	277.9
SCK-CEN	0	28.63	50	25.0	21.370	4.22	709.0	473.3	227.5	276.9	NO	276.9
SCK-CEN	0	28.43	50	25.0	21.570	4.70	719.2	473.3	227.5	278.2	NO	278.2
SCK-CEN	0	28.46	50	25.0	21.540	1.31	444.5	473.3	227.5	278.0	NO	278.0
SCK-CEN	0	28.79	50	25.0	21.210	4.57	699.8	473.3	227.5	275.9	NO	275.9
SCK-CEN	0	28.53	50	25.0	21.470	4.73	704.0	473.3	227.5	277.6	NO	277.6
SCK-CEN	0	28.44	50	25.0	21.560	4.18	729.5	473.3	227.5	278.2	NO	278.2
SCK-CEN	0	28.57	50	25.0	21.430	4.46	714.0	473.3	227.5	277.3	NO	277.3
VTT	0	28.11	50	25.0	21.890	4.85	725.6	473.3	227.5	280.3	NO	280.3
VTT	0	28.85	50	25.0	21.150	4.56	730.2	473.3	227.5	275.5	NO	275.5
VTT	0	28.11	50	25.0	21.890	5.10	737.8	473.3	227.5	280.3	NO	280.3
VTT	0	28.90	50	25.0	21.100	3.05	590.7	473.3	227.5	275.2	NO	275.2
VTT	0	28.46	50	25.0	21.540	4.94	730.3	473.3	227.5	278.0	NO	278.0
VTT	0	28.39	50	25.0	21.610	4.95	741.8	473.3	227.5	278.5	NO	278.5
VTT	0	28.21	50	25.0	21.790	5.01	744.2	473.3	227.5	279.7	NO	279.7
VTT	0	30.11	50	25.0	19.890	2.11	527.7	473.3	227.5	267.2	NO	267.2
VTT	0	28.18	50	25.0	21.820	2.67	620.4	473.3	227.5	279.8	NO	279.8
VTT	0	28.37	50	25.0	21.630	4.54	727.0	473.3	227.5	278.6	NO	278.6
VTT	0	28.42	50	25.0	21.580	4.46	730.3	473.3	227.5	278.3	NO	278.3
VTT	0	28.16	50	25.0	21.840	2.29	542.6	473.3	227.5	280.0	NO	280.0
VTT	0	29.04	50	25.0	20.960	4.78	726.7	473.3	227.5	274.3	NO	274.3
VTT	0	28.77	50	25.0	21.230	4.44	718.7	473.3	227.5	276.0	NO	276.0
VTT	0	28.36	50	25.0	21.640	5.09	717.1	473.3	227.5	278.7	NO	278.7
VTT	0	28.46	50	25.0	21.540	4.36	721.2	473.3	227.5	278.0	NO	278.0
VTT	0	28.30	50	25.0	21.700	4.87	725.3	473.3	227.5	279.1	NO	279.1
VTT	0	28.38	50	25.0	21.620	4.47	727.9	473.3	227.5	278.6	NO	278.6
VTT	0	28.25	50	25.0	21.750	4.75	727.0	473.3	227.5	279.4	NO	279.4
VTT	0	28.75	50	25.0	21.250	4.36	718.5	473.3	227.5	276.2	NO	276.2
GKSS	0	56.36	100	50.0	43.640	0.10	191.3	473.3	227.5	395.8	YES	191.3
GKSS	0	57.61	100	50.0	42.390	0.28	269.2	473.3	227.5	390.1	YES	269.2
GKSS	0	56.51	100	50.0	43.490	0.38	281.2	473.3	227.5	395.1	YES	281.2
GKSS	0	56.08	100	50.0	43.920	0.29	242.5	473.3	227.5	397.0	YES	242.5
GKSS	0	56.31	100	50.0	43.690	0.53	318.3	473.3	227.5	396.0	YES	318.3
GKSS	0	56.44	100	50.0	43.560	1.33	476.2	473.3	227.5	395.4	NO	395.4
GKSS	0	56.20	100	50.0	43.800	1.65	511.7	473.3	227.5	396.5	NO	396.5
GKSS	0	56.54	100	50.0	43.460	2.74	621.3	473.3	227.5	394.9	NO	394.9
GKSS	0	56.25	100	50.0	43.750	1.85	531.3	473.3	227.5	396.3	NO	396.3
GKSS	0	56.04	100	50.0	43.960	0.30	266.6	473.3	227.5	397.2	YES	266.6
GKSS	0	56.49	100	50.0	43.510	2.50	599.3	473.3	227.5	395.2	NO	395.2
GKSS	0	56.42	100	50.0	43.580	0.78	362.9	473.3	227.5	395.5	YES	362.9
GKSS	0	56.67	100	50.0	43.330	0.60	331.8	473.3	227.5	394.4	YES	331.8
GKSS	0	56.76	100	50.0	43.240	0.18	227.1	473.3	227.5	393.9	YES	227.1
GKSS	0	56.21	100	50.0	43.790	0.54	309.5	473.3	227.5	396.4	YES	309.5
GKSS	0	56.43	100	50.0	43.570	3.05	628.6	473.3	227.5	395.4	NO	395.4
GKSS	0	56.65	100	50.0	43.350	0.00	210.9	473.3	227.5	394.4	YES	210.9
GKSS	0	56.54	100	50.0	43.460	0.90	410.7	473.3	227.5	394.9	NO	394.9
GKSS	0	56.40	100	50.0	43.600	0.00	211.4	473.3	227.5	395.6	YES	211.4
GKSS	0	56.78	100	50.0	43.220	5.09	778.3	473.3	227.5	393.9	NO	393.9
GKSS	0	56.75	100	50.0	43.250	0.00	263.4	473.3	227.5	394.0	YES	263.4
GKSS	0	56.91	100	50.0	43.090	3.73	682.2	473.3	227.5	393.3	NO	393.3
GKSS	0	56.43	100	50.0	43.570	0.83	386.7	473.3	227.5	395.4	YES	386.7
GKSS	0	57.03	100	50.0	42.970	0.78	376.2	473.3	227.5	392.7	YES	376.2
GKSS	0	56.65	100	50.0	43.350	3.05	642.5	473.3	227.5	394.4	NO	394.4
GKSS	0	56.41	100	50.0	43.590	0.37	306.7	473.3	227.5	395.5	YES	306.7
GKSS	0	56.57	100	50.0	43.430	4.84	758.4	473.3	227.5	394.8	NO	394.8
GKSS	0	56.78	100	50.0	43.220	5.61	797.9	473.3	227.5	393.9	NO	393.9

GKSS	0	56.31	100	50.0	43.690	0.00	246.4	473.3	227.5	396.0	YES	246.4
GKSS	0	56.60	100	50.0	43.400	0.43	320.1	473.3	227.5	394.7	YES	320.1
CISE	0	111.79	200	100.0	88.210	0.22	233.3	473.3	227.5	562.7	YES	233.3
CISE	0	112.47	200	100.0	87.530	0.22	238.2	473.3	227.5	560.5	YES	238.2
CISE	0	112.08	200	100.0	87.920	0.21	208.3	473.3	227.5	561.7	YES	208.3
CISE	0	112.01	200	100.0	87.990	1.01	421.7	473.3	227.5	562.0	YES	421.7
CISE	0	112.75	200	100.0	87.250	0.14	226.7	473.3	227.5	559.6	YES	226.7
CISE	0	112.32	200	100.0	87.680	0.29	267.0	473.3	227.5	561.0	YES	267.0
CISE	0	111.95	200	100.0	88.050	0.00	163.0	473.3	227.5	562.2	YES	163.0
CISE	0	112.11	200	100.0	87.890	0.07	165.8	473.3	227.5	561.6	YES	165.8
CISE	0	111.68	200	100.0	88.320	0.36	285.9	473.3	227.5	563.0	YES	285.9
CISE	0	112.71	200	100.0	87.290	0.68	342.0	473.3	227.5	559.7	YES	342.0
GKSS	0	113.15	200	100.0	86.850	0.48	314.9	473.3	227.5	558.3	YES	314.9
GKSS	0	113.65	200	100.0	86.350	0.41	307.6	473.3	227.5	556.7	YES	307.6
GKSS	0	111.81	200	100.0	88.190	0.81	383.0	473.3	227.5	562.6	YES	383.0
GKSS	0	113.63	200	100.0	86.370	0.57	332.6	473.3	227.5	556.8	YES	332.6
GKSS	0	112.54	200	100.0	87.460	0.00	223.6	473.3	227.5	560.3	YES	223.6
GKSS	0	111.92	200	100.0	88.080	1.16	442.2	473.3	227.5	562.2	YES	442.2

3. Application of the multi-temperature approach for the calculation of the reference temperature

T limits

Specimen code	T (°C)	$K_{Jc[calc]}$ (MPa√m)	$K_{Jc(1T)}$ (MPa√m)	δ_i	n_i	1° member	2° member
GKSS	-154	54.8	49.1	0	0.000	0.0000	0.0000
GKSS	-154	49.8	44.9	0	0.000	0.0000	0.0000
GKSS	-154	37.8	34.9	0	0.000	0.0000	0.0000
GKSS	-154	33.0	30.9	0	0.000	0.0000	0.0000
GKSS	-154	38.9	35.8	0	0.000	0.0000	0.0000
GKSS	-154	24.2	23.6	0	0.000	0.0000	0.0000
GKSS	-154	47.4	43.0	0	0.000	0.0000	0.0000
GKSS	-154	46.5	42.2	0	0.000	0.0000	0.0000
GKSS	-154	31.4	29.6	0	0.000	0.0000	0.0000
GKSS	-154	39.2	36.0	0	0.000	0.0000	0.0000
GKSS	-154	24.2	23.6	0	0.000	0.0000	0.0000
SIEMENS	-154	33.0	30.9	0	0.000	0.0000	0.0000
SIEMENS	-154	41.0	37.6	0	0.000	0.0000	0.0000
SIEMENS	-154	31.7	29.8	0	0.000	0.0000	0.0000
SIEMENS	-154	35.2	32.7	0	0.000	0.0000	0.0000
SIEMENS	-154	44.4	40.5	0	0.000	0.0000	0.0000
SIEMENS	-154	41.5	38.0	0	0.000	0.0000	0.0000
SIEMENS	-154	32.7	30.7	0	0.000	0.0000	0.0000
SIEMENS	-154	34.3	32.0	0	0.000	0.0000	0.0000
SIEMENS	-154	36.7	34.0	0	0.000	0.0000	0.0000
SIEMENS	-154	39.7	36.5	0	0.000	0.0000	0.0000
SIEMENS	-154	46.1	41.8	0	0.000	0.0000	0.0000
SIEMENS	-154	34.6	32.2	0	0.000	0.0000	0.0000
SIEMENS	-154	35.8	33.2	0	0.000	0.0000	0.0000
SIEMENS	-154	29.3	27.8	0	0.000	0.0000	0.0000
SIEMENS	-154	28.6	27.2	0	0.000	0.0000	0.0000
SIEMENS	-154	38.6	35.6	0	0.000	0.0000	0.0000
SIEMENS	-154	44.4	40.5	0	0.000	0.0000	0.0000
SIEMENS	-154	48.9	44.2	0	0.000	0.0000	0.0000
SIEMENS	-154	38.9	35.8	0	0.000	0.0000	0.0000
SIEMENS	-154	36.7	34.0	0	0.000	0.0000	0.0000
SIEMENS	-154	31.7	29.8	0	0.000	0.0000	0.0000
GKSS	-154	41.5	41.4	0	0.000	0.0000	0.0000
GKSS	-154	42.2	42.2	0	0.000	0.0000	0.0000
GKSS	-154	50.0	49.9	0	0.000	0.0000	0.0000
GKSS	-154	34.0	33.9	0	0.000	0.0000	0.0000
GKSS	-154	41.7	41.7	0	0.000	0.0000	0.0000
GKSS	-154	46.1	46.0	0	0.000	0.0000	0.0000
GKSS	-154	44.2	44.1	0	0.000	0.0000	0.0000
GKSS	-154	36.7	36.6	0	0.000	0.0000	0.0000
GKSS	-154	29.0	28.9	0	0.000	0.0000	0.0000
GKSS	-154	53.0	52.9	0	0.000	0.0000	0.0000
GKSS	-154	39.4	39.3	0	0.000	0.0000	0.0000
GKSS	-154	29.0	28.9	0	0.000	0.0000	0.0000
SIEMENS	-154	34.6	34.5	0	0.000	0.0000	0.0000
SIEMENS	-154	33.0	33.0	0	0.000	0.0000	0.0000
SIEMENS	-154	38.1	38.0	0	0.000	0.0000	0.0000
SIEMENS	-154	28.6	28.6	0	0.000	0.0000	0.0000
SIEMENS	-154	28.6	28.6	0	0.000	0.0000	0.0000
SIEMENS	-154	38.6	38.5	0	0.000	0.0000	0.0000
SIEMENS	-154	36.4	36.3	0	0.000	0.0000	0.0000
SIEMENS	-154	33.4	33.3	0	0.000	0.0000	0.0000
SIEMENS	-154	36.9	36.9	0	0.000	0.0000	0.0000
SIEMENS	-154	31.1	31.0	0	0.000	0.0000	0.0000
SIEMENS	-154	34.3	34.2	0	0.000	0.0000	0.0000
SIEMENS	-154	30.4	30.4	0	0.000	0.0000	0.0000
SIEMENS	-154	49.6	49.5	0	0.000	0.0000	0.0000
SIEMENS	-154	41.0	40.9	0	0.000	0.0000	0.0000
SIEMENS	-154	34.0	33.9	0	0.000	0.0000	0.0000
SIEMENS	-154	30.7	30.7	0	0.000	0.0000	0.0000
SIEMENS	-154	41.2	41.2	0	0.000	0.0000	0.0000

USE LIMITS : YES

-136
-36

Sum of 1° member:

Sum of 2° member:

Difference:

$T_o = -86.4 \text{ } ^\circ\text{C}$
(valid per ASTM E1921)

$\sum_i n_i = 51.36$

N = 698
r = 316

$K_{min} = 20 \text{ MPa}\sqrt{\text{m}}$

$K_{o,eq} = 143.0 \text{ MPa}\sqrt{\text{m}}$

$K_{med,eq} = 132.2 \text{ MPa}\sqrt{\text{m}}$

SIEMENS	-154	26.7	26.7	0	0.000	0.0000	0.0000
SIEMENS	-154	35.5	35.4	0	0.000	0.0000	0.0000
SIEMENS	-154	33.4	33.3	0	0.000	0.0000	0.0000
SIEMENS	-154	36.7	36.6	0	0.000	0.0000	0.0000
SIEMENS	-154	32.4	32.4	0	0.000	0.0000	0.0000
SIEMENS	-154	45.1	45.0	0	0.000	0.0000	0.0000
SIEMENS	-154	33.4	33.3	0	0.000	0.0000	0.0000
SIEMENS	-154	34.0	33.9	0	0.000	0.0000	0.0000
SIEMENS	-154	30.7	30.7	0	0.000	0.0000	0.0000
SIEMENS	-154	26.7	26.7	0	0.000	0.0000	0.0000
GKSS	-154	33.7	36.2	0	0.000	0.0000	0.0000
GKSS	-154	42.7	46.9	0	0.000	0.0000	0.0000
GKSS	-154	37.2	40.4	0	0.000	0.0000	0.0000
GKSS	-154	54.4	60.8	0	0.000	0.0000	0.0000
GKSS	-154	34.6	37.3	0	0.000	0.0000	0.0000
GKSS	-154	44.2	48.7	0	0.000	0.0000	0.0000
GKSS	-154	29.7	31.5	0	0.000	0.0000	0.0000
GKSS	-154	36.4	39.4	0	0.000	0.0000	0.0000
GKSS	-154	36.4	39.4	0	0.000	0.0000	0.0000
GKSS	-154	28.2	29.8	0	0.000	0.0000	0.0000
GKSS	-154	28.2	29.8	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
NE	-154	36.4	39.4	0	0.000	0.0000	0.0000
NE	-154	37.5	40.7	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
NE	-154	30.7	32.7	0	0.000	0.0000	0.0000
NE	-154	30.4	32.3	0	0.000	0.0000	0.0000
NE	-154	30.7	32.7	0	0.000	0.0000	0.0000
NE	-154	31.7	33.9	0	0.000	0.0000	0.0000
NE	-154	41.7	45.8	0	0.000	0.0000	0.0000
NE	-154	37.2	40.4	0	0.000	0.0000	0.0000
NE	-154	34.9	37.6	0	0.000	0.0000	0.0000
NE	-154	38.3	41.7	0	0.000	0.0000	0.0000
NE	-154	31.4	33.5	0	0.000	0.0000	0.0000
NE	-154	33.7	36.2	0	0.000	0.0000	0.0000
NE	-154	32.7	35.1	0	0.000	0.0000	0.0000
NE	-154	43.0	47.2	0	0.000	0.0000	0.0000
NE	-154	32.7	35.1	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
NE	-154	36.9	40.1	0	0.000	0.0000	0.0000
NE	-154	33.4	35.8	0	0.000	0.0000	0.0000
NE	-154	30.0	31.9	0	0.000	0.0000	0.0000
GKSS	-110	98.1	85.4	1	0.143	0.0106	0.0148
GKSS	-110	59.0	52.7	1	0.143	0.0106	0.0009
GKSS	-110	80.0	70.3	1	0.143	0.0106	0.0052
GKSS	-110	57.2	51.2	1	0.143	0.0106	0.0008
GKSS	-110	88.3	77.2	1	0.143	0.0106	0.0087
GKSS	-110	96.2	83.9	1	0.143	0.0106	0.0135
GKSS	-110	81.6	71.6	1	0.143	0.0106	0.0057
GKSS	-110	66.9	59.3	1	0.143	0.0106	0.0019
GKSS	-110	85.6	75.0	1	0.143	0.0106	0.0074
GKSS	-110	86.8	76.0	1	0.143	0.0106	0.0079
GKSS	-110	114.2	98.9	1	0.143	0.0106	0.0314
GKSS	-110	73.5	64.8	1	0.143	0.0106	0.0033
GKSS	-110	92.7	80.9	1	0.143	0.0106	0.0111
GKSS	-110	77.5	68.2	1	0.143	0.0106	0.0044
GKSS	-110	61.5	54.7	1	0.143	0.0106	0.0012
GKSS	-110	51.8	46.7	1	0.143	0.0106	0.0004
GKSS	-110	73.6	64.9	1	0.143	0.0106	0.0033
GKSS	-110	52.8	47.5	1	0.143	0.0106	0.0005
GKSS	-110	41.2	37.8	1	0.143	0.0106	0.0001
GKSS	-110	115.3	99.8	1	0.143	0.0106	0.0329
GKSS	-110	73.2	64.5	1	0.143	0.0106	0.0032
GKSS	-110	74.0	65.3	1	0.143	0.0106	0.0034
GKSS	-110	67.5	59.8	1	0.143	0.0106	0.0020
GKSS	-110	71.0	62.7	1	0.143	0.0106	0.0027
GKSS	-110	53.4	48.0	1	0.143	0.0106	0.0005
GKSS	-110	96.5	84.0	1	0.143	0.0106	0.0136
GKSS	-110	71.3	63.0	1	0.143	0.0106	0.0028
GKSS	-110	71.7	63.3	1	0.143	0.0106	0.0029
GKSS	-110	81.7	71.7	1	0.143	0.0106	0.0058
GKSS	-110	64.0	56.8	1	0.143	0.0106	0.0015
GKSS	-110	74.2	65.4	1	0.143	0.0106	0.0034
GKSS	-110	70.4	62.2	1	0.143	0.0106	0.0026
GKSS	-110	91.2	79.6	1	0.143	0.0106	0.0102
GKSS	-110	72.0	63.6	1	0.143	0.0106	0.0029
GKSS	-110	64.8	57.5	1	0.143	0.0106	0.0016
GKSS	-110	79.2	69.6	1	0.143	0.0106	0.0049
GKSS	-110	52.2	47.0	1	0.143	0.0106	0.0004
GKSS	-110	82.9	72.7	1	0.143	0.0106	0.0062
GKSS	-110	93.2	81.3	1	0.143	0.0106	0.0115
GKSS	-110	75.4	66.4	1	0.143	0.0106	0.0038
GKSS	-110	75.0	66.1	1	0.143	0.0106	0.0037
GKSS	-110	78.6	69.1	1	0.143	0.0106	0.0047
GKSS	-110	94.8	82.7	1	0.143	0.0106	0.0125
GKSS	-110	98.1	85.4	1	0.143	0.0106	0.0148
GKSS	-110	98.5	85.7	1	0.143	0.0106	0.0151

GKSS	-110	104.9	91.1	1	0.143	0.0106	0.0207
GKSS	-110	69.9	61.8	1	0.143	0.0106	0.0025
GKSS	-110	81.6	71.6	1	0.143	0.0106	0.0057
GKSS	-110	55.2	49.5	1	0.143	0.0106	0.0006
GKSS	-110	105.6	91.7	1	0.143	0.0106	0.0214
GKSS	-110	101.5	88.3	1	0.143	0.0106	0.0176
GKSS	-110	73.7	65.0	1	0.143	0.0106	0.0033
GKSS	-110	97.5	84.9	1	0.143	0.0106	0.0144
GKSS	-110	75.9	66.8	1	0.143	0.0106	0.0039
GKSS	-110	48.3	43.7	1	0.143	0.0106	0.0003
GKSS	-91	127.0	109.6	1	0.167	0.0112	0.0164
GKSS	-91	121.8	105.2	1	0.167	0.0112	0.0134
GKSS	-91	70.5	62.3	1	0.167	0.0112	0.0008
GKSS	-91	94.2	82.2	1	0.167	0.0112	0.0038
GKSS	-91	127.3	109.9	1	0.167	0.0112	0.0166
GKSS	-91	119.9	103.7	1	0.167	0.0112	0.0125
GKSS	-91	104.5	90.8	1	0.167	0.0112	0.0064
GKSS	-91	78.6	69.1	1	0.167	0.0112	0.0015
GKSS	-91	98.6	85.8	1	0.167	0.0112	0.0048
GKSS	-91	161.6	138.6	1	0.167	0.0112	0.0502
THA	-91	91.3	79.7	1	0.167	0.0112	0.0032
THA	-91	115.3	99.8	1	0.167	0.0112	0.0103
THA	-91	122.4	105.8	1	0.167	0.0112	0.0138
THA	-91	126.3	109.1	1	0.167	0.0112	0.0160
THA	-91	108.3	94.0	1	0.167	0.0112	0.0076
THA	-91	66.9	59.3	1	0.167	0.0112	0.0006
THA	-91	126.7	109.4	1	0.167	0.0112	0.0162
THA	-91	69.6	61.6	1	0.167	0.0112	0.0008
THA	-91	121.4	104.9	1	0.167	0.0112	0.0132
THA	-91	90.0	78.7	1	0.167	0.0112	0.0030
THA	-91	153.9	132.2	1	0.167	0.0112	0.0402
THA	-91	64.6	57.4	1	0.167	0.0112	0.0005
THA	-91	127.2	109.8	1	0.167	0.0112	0.0165
THA	-91	99.7	86.7	1	0.167	0.0112	0.0050
THA	-91	101.3	88.1	1	0.167	0.0112	0.0055
THA	-91	140.4	120.9	1	0.167	0.0112	0.0263
THA	-91	78.2	68.7	1	0.167	0.0112	0.0014
THA	-91	109.0	94.6	1	0.167	0.0112	0.0079
THA	-91	103.9	90.3	1	0.167	0.0112	0.0062
THA	-91	126.8	109.5	1	0.167	0.0112	0.0163
THA	-91	111.7	96.8	1	0.167	0.0112	0.0088
GKSS	-91	68.6	68.4	1	0.167	0.0112	0.0014
GKSS	-91	81.6	81.3	1	0.167	0.0112	0.0036
GKSS	-91	55.9	55.8	1	0.167	0.0112	0.0004
GKSS	-91	98.8	98.5	1	0.167	0.0112	0.0096
GKSS	-91	71.9	71.7	1	0.167	0.0112	0.0018
GKSS	-91	111.0	110.7	1	0.167	0.0112	0.0172
GKSS	-91	93.5	93.2	1	0.167	0.0112	0.0073
GKSS	-91	79.9	79.7	1	0.167	0.0112	0.0032
GKSS	-91	98.4	98.1	1	0.167	0.0112	0.0094
GKSS	-91	101.1	100.8	1	0.167	0.0112	0.0108
TWI	-91	79.6	79.4	1	0.167	0.0112	0.0032
TWI	-91	99.7	99.3	1	0.167	0.0112	0.0101
TWI	-91	108.1	107.7	1	0.167	0.0112	0.0150
TWI	-91	93.4	93.1	1	0.167	0.0112	0.0072
TWI	-91	62.0	61.8	1	0.167	0.0112	0.0008
TWI	-91	107.1	106.7	1	0.167	0.0112	0.0144
TWI	-91	145.3	144.8	1	0.167	0.0112	0.0616
TWI	-91	76.3	76.0	1	0.167	0.0112	0.0025
TWI	-91	126.5	126.1	1	0.167	0.0112	0.0322
TWI	-91	126.1	125.7	1	0.167	0.0112	0.0317
TWI	-91	128.5	128.0	1	0.167	0.0112	0.0346
TWI	-91	111.4	111.0	1	0.167	0.0112	0.0175
TWI	-91	130.4	130.0	1	0.167	0.0112	0.0372
TWI	-91	134.8	134.3	1	0.167	0.0112	0.0434
TWI	-91	157.3	156.7	1	0.167	0.0112	0.0888
TWI	-91	105.2	104.9	1	0.167	0.0112	0.0132
TWI	-91	109.8	109.4	1	0.167	0.0112	0.0163
TWI	-91	84.9	84.6	1	0.167	0.0112	0.0044
TWI	-91	62.8	62.7	1	0.167	0.0112	0.0008
TWI	-91	97.5	97.2	1	0.167	0.0112	0.0090
TWI	-91	80.2	79.9	1	0.167	0.0112	0.0033
TWI	-91	134.4	133.9	1	0.167	0.0112	0.0428
TWI	-91	65.1	65.0	1	0.167	0.0112	0.0010
TWI	-91	118.6	118.2	1	0.167	0.0112	0.0236
GKSS	-91	67.3	76.1	1	0.167	0.0112	0.0025
GKSS	-91	162.9	189.3	1	0.167	0.0112	0.2087
GKSS	-91	100.0	114.7	1	0.167	0.0112	0.0205
GKSS	-91	91.2	104.3	1	0.167	0.0112	0.0128
GKSS	-91	106.2	122.1	1	0.167	0.0112	0.0276
GKSS	-91	83.2	94.9	1	0.167	0.0112	0.0080
GKSS	-91	91.8	105.0	1	0.167	0.0112	0.0133
GKSS	-91	94.7	108.5	1	0.167	0.0112	0.0156
GKSS	-91	92.9	106.4	1	0.167	0.0112	0.0141
GKSS	-91	69.9	79.2	1	0.167	0.0112	0.0031
NE	-91	93.1	106.6	1	0.167	0.0112	0.0143
NE	-91	97.9	112.2	1	0.167	0.0112	0.0184

NE	-91	73.7	83.7	1	0.167	0.0112	0.0042
NE	-91	82.0	93.4	1	0.167	0.0112	0.0074
NE	-91	76.3	86.7	1	0.167	0.0112	0.0050
NE	-91	93.1	106.6	1	0.167	0.0112	0.0143
NE	-91	83.7	95.5	1	0.167	0.0112	0.0083
NE	-91	82.1	93.6	1	0.167	0.0112	0.0074
NE	-91	86.8	99.2	1	0.167	0.0112	0.0100
NE	-91	86.7	99.0	1	0.167	0.0112	0.0099
NE	-91	92.3	105.7	1	0.167	0.0112	0.0137
NE	-91	83.1	94.8	1	0.167	0.0112	0.0079
NE	-91	88.9	101.6	1	0.167	0.0112	0.0112
NE	-91	64.3	72.5	1	0.167	0.0112	0.0019
NE	-91	101.6	116.7	1	0.167	0.0112	0.0222
NE	-91	94.2	107.9	1	0.167	0.0112	0.0152
NE	-91	78.7	89.5	1	0.167	0.0112	0.0059
NE	-91	73.0	82.8	1	0.167	0.0112	0.0040
NE	-91	64.2	72.3	1	0.167	0.0112	0.0019
NE	-91	98.9	113.5	1	0.167	0.0112	0.0194
GKSS	-91	103.2	137.2	1	0.167	0.0112	0.0479
GKSS	-91	84.4	110.7	1	0.167	0.0112	0.0172
GKSS	-91	97.0	128.5	1	0.167	0.0112	0.0351
GKSS	-91	92.7	122.4	1	0.167	0.0112	0.0279
GKSS	-91	96.8	128.2	1	0.167	0.0112	0.0348
NE	-91	73.6	95.5	1	0.167	0.0112	0.0083
NE	-91	73.0	94.7	1	0.167	0.0112	0.0079
NE	-91	73.3	95.1	1	0.167	0.0112	0.0081
NE	-91	53.8	67.7	1	0.167	0.0112	0.0013
NE	-91	69.5	89.7	1	0.167	0.0112	0.0060
NE	-91	65.5	84.0	1	0.167	0.0112	0.0043
NE	-91	79.6	104.0	1	0.167	0.0112	0.0127
NE	-91	69.8	90.1	1	0.167	0.0112	0.0062
NE	-91	90.3	119.0	1	0.167	0.0112	0.0244
NE	-91	88.0	115.8	1	0.167	0.0112	0.0214
GKSS	-60	205.5	175.4	0	0.000	0.0000	0.0191
GKSS	-60	114.4	99.1	1	0.167	0.0120	0.0013
GKSS	-60	130.7	112.7	1	0.167	0.0120	0.0024
GKSS	-60	106.7	92.6	1	0.167	0.0120	0.0009
GKSS	-60	161.0	138.1	1	0.167	0.0120	0.0064
GKSS	-60	200.7	171.3	1	0.167	0.0120	0.0172
GKSS	-60	125.2	108.1	1	0.167	0.0120	0.0020
GKSS	-60	145.1	124.8	1	0.167	0.0120	0.0040
GKSS	-60	91.9	80.2	1	0.167	0.0120	0.0004
GKSS	-60	128.1	110.6	1	0.167	0.0120	0.0022
GKSS	-60	164.4	140.9	1	0.167	0.0120	0.0070
GKSS	-60	192.2	164.3	1	0.167	0.0120	0.0142
GKSS	-60	166.3	142.5	1	0.167	0.0120	0.0074
GKSS	-60	177.7	152.1	1	0.167	0.0120	0.0100
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0177
GKSS	-60	116.0	100.4	1	0.167	0.0120	0.0014
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0177
GKSS	-60	167.6	143.6	1	0.167	0.0120	0.0077
GKSS	-60	89.8	78.5	1	0.167	0.0120	0.0004
GKSS	-60	156.3	134.1	1	0.167	0.0120	0.0056
GKSS	-60	186.8	159.7	1	0.167	0.0120	0.0125
GKSS	-60	203.2	173.4	0	0.000	0.0000	0.0182
GKSS	-60	164.6	141.1	1	0.167	0.0120	0.0071
GKSS	-60	202.6	173.0	0	0.000	0.0000	0.0180
GKSS	-60	185.9	159.0	1	0.167	0.0120	0.0122
GKSS	-60	127.7	110.2	1	0.167	0.0120	0.0022
GKSS	-60	201.2	171.7	0	0.000	0.0000	0.0174
GKSS	-60	115.6	100.0	1	0.167	0.0120	0.0013
GKSS	-60	107.5	93.3	1	0.167	0.0120	0.0009
SIEMENS	-60	164.6	141.1	1	0.167	0.0120	0.0071
SIEMENS	-60	172.0	147.3	1	0.167	0.0120	0.0086
SIEMENS	-60	108.5	94.2	1	0.167	0.0120	0.0010
SIEMENS	-60	119.0	102.9	1	0.167	0.0120	0.0015
SIEMENS	-60	153.5	131.8	1	0.167	0.0120	0.0051
SIEMENS	-60	158.9	136.4	1	0.167	0.0120	0.0060
SIEMENS	-60	137.5	118.4	1	0.167	0.0120	0.0031
SIEMENS	-60	119.5	103.3	1	0.167	0.0120	0.0016
SIEMENS	-60	130.7	112.8	1	0.167	0.0120	0.0024
SIEMENS	-60	172.6	147.8	1	0.167	0.0120	0.0088
SIEMENS	-60	84.5	74.0	1	0.167	0.0120	0.0003
SIEMENS	-60	213.4	182.0	0	0.000	0.0000	0.0226
SIEMENS	-60	120.4	104.1	1	0.167	0.0120	0.0016
SIEMENS	-60	104.5	90.8	1	0.167	0.0120	0.0008
SIEMENS	-60	163.6	140.2	1	0.167	0.0120	0.0069
SIEMENS	-60	201.4	172.0	1	0.167	0.0120	0.0175
SIEMENS	-60	137.8	118.7	1	0.167	0.0120	0.0031
SIEMENS	-60	173.0	148.1	1	0.167	0.0120	0.0088
SIEMENS	-60	99.2	86.4	1	0.167	0.0120	0.0006
SIEMENS	-60	173.4	148.4	1	0.167	0.0120	0.0089
SIEMENS	-60	131.5	113.4	1	0.167	0.0120	0.0025
GKSS	-60	186.0	185.3	1	0.167	0.0120	0.0245
GKSS	-60	151.8	151.3	1	0.167	0.0120	0.0097
GKSS	-60	111.7	111.3	1	0.167	0.0120	0.0023
GKSS	-60	143.9	143.4	1	0.167	0.0120	0.0076

GKSS	-60	105.4	105.1	1	0.167	0.0120	0.0017
GKSS	-60	154.0	153.4	1	0.167	0.0120	0.0104
GKSS	-60	176.2	175.6	1	0.167	0.0120	0.0192
GKSS	-60	131.9	131.5	1	0.167	0.0120	0.0051
GKSS	-60	203.9	203.2	1	0.167	0.0120	0.0370
GKSS	-60	142.7	142.2	1	0.167	0.0120	0.0073
TWI	-60	134.5	134.0	1	0.167	0.0120	0.0055
TWI	-60	130.1	129.7	1	0.167	0.0120	0.0047
TWI	-60	142.6	142.1	1	0.167	0.0120	0.0073
TWI	-60	119.7	119.3	1	0.167	0.0120	0.0032
TWI	-60	141.3	140.8	1	0.167	0.0120	0.0070
TWI	-60	175.9	175.3	1	0.167	0.0120	0.0191
TWI	-60	119.6	119.2	1	0.167	0.0120	0.0032
TWI	-60	102.4	102.0	1	0.167	0.0120	0.0015
TWI	-60	99.0	98.7	1	0.167	0.0120	0.0013
TWI	-60	115.1	114.7	1	0.167	0.0120	0.0026
TWI	-60	172.9	172.3	1	0.167	0.0120	0.0176
TWI	-60	120.5	120.2	1	0.167	0.0120	0.0033
TWI	-60	165.2	164.6	1	0.167	0.0120	0.0143
TWI	-60	125.6	125.2	1	0.167	0.0120	0.0040
TWI	-60	126.7	126.3	1	0.167	0.0120	0.0042
TWI	-60	100.4	100.1	1	0.167	0.0120	0.0013
TWI	-60	131.1	130.7	1	0.167	0.0120	0.0049
TWI	-60	185.1	184.5	1	0.167	0.0120	0.0240
TWI	-60	163.6	163.0	1	0.167	0.0120	0.0137
TWI	-60	126.5	126.1	1	0.167	0.0120	0.0042
TWI	-60	164.7	164.1	1	0.167	0.0120	0.0141
TWI	-60	192.7	192.0	1	0.167	0.0120	0.0287
TWI	-60	134.5	134.1	1	0.167	0.0120	0.0056
TWI	-60	140.8	140.3	1	0.167	0.0120	0.0069
GKSS	-60	109.9	126.5	1	0.167	0.0120	0.0042
GKSS	-60	131.9	152.5	1	0.167	0.0120	0.0101
GKSS	-60	136.2	157.6	1	0.167	0.0120	0.0118
GKSS	-60	154.0	178.8	1	0.167	0.0120	0.0209
GKSS	-60	115.9	133.6	1	0.167	0.0120	0.0055
GKSS	-60	150.4	174.4	1	0.167	0.0120	0.0187
BAM	-40	171.0	146.5	1	0.167	0.0123	0.0021
BAM	-40	206.2	176.0	0	0.000	0.0000	0.0048
BAM	-40	169.4	145.1	1	0.167	0.0123	0.0020
BAM	-40	203.6	173.7	0	0.000	0.0000	0.0046
BAM	-40	202.5	172.9	0	0.000	0.0000	0.0045
BAM	-40	207.2	176.8	0	0.000	0.0000	0.0049
BAM	-40	205.9	175.7	0	0.000	0.0000	0.0048
BAM	-40	206.5	176.2	0	0.000	0.0000	0.0049
BAM	-40	207.3	176.9	0	0.000	0.0000	0.0049
BAM	-40	205.1	175.1	0	0.000	0.0000	0.0047
BAM	-40	202.8	173.1	0	0.000	0.0000	0.0045
BAM	-40	204.9	174.8	0	0.000	0.0000	0.0047
BAM	-40	205.2	175.1	0	0.000	0.0000	0.0047
BAM	-40	113.7	98.5	1	0.167	0.0123	0.0003
BAM	-40	204.8	174.8	0	0.000	0.0000	0.0047
BAM	-40	154.2	132.4	1	0.167	0.0123	0.0013
BAM	-40	206.2	176.0	0	0.000	0.0000	0.0048
BAM	-40	204.2	174.3	0	0.000	0.0000	0.0046
BAM	-40	207.3	176.9	0	0.000	0.0000	0.0049
BAM	-40	202.5	172.8	1	0.167	0.0123	0.0044
GKSS	-40	180.6	154.6	1	0.167	0.0123	0.0027
GKSS	-40	203.5	173.7	0	0.000	0.0000	0.0045
GKSS	-40	198.2	169.3	0	0.000	0.0000	0.0040
GKSS	-40	199.6	170.5	0	0.000	0.0000	0.0042
GKSS	-40	186.4	159.4	1	0.167	0.0123	0.0031
GKSS	-40	199.4	170.3	0	0.000	0.0000	0.0042
GKSS	-40	204.4	174.4	0	0.000	0.0000	0.0046
GKSS	-40	202.4	172.7	0	0.000	0.0000	0.0044
GKSS	-40	203.2	173.4	0	0.000	0.0000	0.0045
GKSS	-40	200.9	171.5	0	0.000	0.0000	0.0043
BAM	-40	187.3	186.6	1	0.167	0.0123	0.0063
BAM	-40	101.5	101.2	1	0.167	0.0123	0.0004
BAM	-40	140.3	139.9	1	0.167	0.0123	0.0017
BAM	-40	150.2	149.7	1	0.167	0.0123	0.0023
BAM	-40	187.3	186.6	1	0.167	0.0123	0.0063
BAM	-40	211.4	210.6	1	0.167	0.0123	0.0108
BAM	-40	160.5	160.0	1	0.167	0.0123	0.0031
BAM	-40	214.6	213.8	1	0.167	0.0123	0.0115
BAM	-40	188.3	187.7	1	0.167	0.0123	0.0064
BAM	-40	239.3	238.4	1	0.167	0.0123	0.0186
BAM	-40	112.8	112.4	1	0.167	0.0123	0.0006
BAM	-40	239.0	238.1	1	0.167	0.0123	0.0184
BAM	-40	284.9	283.9	1	0.167	0.0123	0.0395
BAM	-40	254.7	253.7	1	0.167	0.0123	0.0243
BAM	-40	270.9	269.9	1	0.167	0.0123	0.0318
BAM	-40	187.0	186.3	1	0.167	0.0123	0.0062
BAM	-40	170.1	169.5	1	0.167	0.0123	0.0041
BAM	-40	256.4	255.5	1	0.167	0.0123	0.0251
BAM	-40	171.4	170.8	1	0.167	0.0123	0.0042
BAM	-40	103.1	102.8	1	0.167	0.0123	0.0004
BAM	-40	230.0	229.1	1	0.167	0.0123	0.0156

BAM	-40	210.0	209.2	1	0.167	0.0123	0.0105
GKSS	-40	198.2	197.5	1	0.167	0.0123	0.0081
GKSS	-40	150.2	149.7	1	0.167	0.0123	0.0023
GKSS	-40	226.8	226.0	1	0.167	0.0123	0.0147
GKSS	-40	158.1	157.5	1	0.167	0.0123	0.0029
GKSS	-40	256.4	255.5	1	0.167	0.0123	0.0251
GKSS	-40	207.6	206.9	1	0.167	0.0123	0.0099
GKSS	-40	213.5	212.8	1	0.167	0.0123	0.0113
GKSS	-40	254.6	253.7	1	0.167	0.0123	0.0243
GKSS	-40	240.0	239.1	1	0.167	0.0123	0.0188
GKSS	-40	279.0	278.0	0	0.000	0.0000	0.0361
GKSS	-40	125.9	145.5	1	0.167	0.0123	0.0020
GKSS	-40	128.9	149.0	1	0.167	0.0123	0.0023
GKSS	-40	198.5	231.5	1	0.167	0.0123	0.0163
GKSS	-40	212.0	247.5	1	0.167	0.0123	0.0218
GKSS	-40	138.6	160.5	1	0.167	0.0123	0.0032
GKSS	-40	187.7	218.7	1	0.167	0.0123	0.0127
GKSS	-40	173.0	201.2	1	0.167	0.0123	0.0088
GKSS	-40	179.5	208.9	1	0.167	0.0123	0.0104
GKSS	-40	152.6	177.1	1	0.167	0.0123	0.0050
GKSS	-40	153.6	178.3	1	0.167	0.0123	0.0051
THA	-40	144.6	167.6	1	0.167	0.0123	0.0039
THA	-40	150.7	174.9	1	0.167	0.0123	0.0047
THA	-40	139.1	161.0	1	0.167	0.0123	0.0032
THA	-40	183.6	213.8	1	0.167	0.0123	0.0115
THA	-40	142.0	164.5	1	0.167	0.0123	0.0036
THA	-40	187.2	218.0	1	0.167	0.0123	0.0125
THA	-40	172.2	200.3	1	0.167	0.0123	0.0086
THA	-40	198.0	230.8	1	0.167	0.0123	0.0161
THA	-40	130.4	150.8	1	0.167	0.0123	0.0024
THA	-40	141.7	164.1	1	0.167	0.0123	0.0035
THA	-40	134.5	155.6	1	0.167	0.0123	0.0028
THA	-40	115.5	133.1	1	0.167	0.0123	0.0013
THA	-40	91.7	104.9	1	0.167	0.0123	0.0004
THA	-40	141.1	163.4	1	0.167	0.0123	0.0035
THA	-40	239.1	279.6	1	0.167	0.0123	0.0370
THA	-40	243.4	284.7	1	0.167	0.0123	0.0400
THA	-40	191.9	223.6	1	0.167	0.0123	0.0140
THA	-40	146.8	170.2	1	0.167	0.0123	0.0041
THA	-40	161.4	187.5	1	0.167	0.0123	0.0064
THA	-40	142.3	164.8	1	0.167	0.0123	0.0036
CISE	-20	128.7	111.1	0	0.000	0.0000	0.0000
CISE	-20	146.9	126.3	0	0.000	0.0000	0.0000
CISE	-20	204.3	174.4	0	0.000	0.0000	0.0000
CISE	-20	198.3	169.3	0	0.000	0.0000	0.0000
CISE	-20	195.0	166.6	0	0.000	0.0000	0.0000
CISE	-20	197.8	168.9	0	0.000	0.0000	0.0000
CISE	-20	195.6	167.1	0	0.000	0.0000	0.0000
CISE	-20	196.2	167.6	0	0.000	0.0000	0.0000
CISE	-20	194.0	165.7	0	0.000	0.0000	0.0000
CISE	-20	198.3	169.3	0	0.000	0.0000	0.0000
CISE	-20	201.2	171.8	0	0.000	0.0000	0.0000
CISE	-20	200.9	171.5	0	0.000	0.0000	0.0000
CISE	-20	195.6	167.1	0	0.000	0.0000	0.0000
CISE	-20	197.6	168.8	0	0.000	0.0000	0.0000
CISE	-20	201.9	172.4	0	0.000	0.0000	0.0000
CISE	-20	202.5	172.8	0	0.000	0.0000	0.0000
CISE	-20	198.1	169.2	0	0.000	0.0000	0.0000
CISE	-20	198.1	169.2	0	0.000	0.0000	0.0000
CISE	-20	200.7	171.3	0	0.000	0.0000	0.0000
CISE	-20	199.8	170.6	0	0.000	0.0000	0.0000
CISE	-20	201.5	172.0	0	0.000	0.0000	0.0000
GKSS	-20	200.6	171.2	0	0.000	0.0000	0.0000
GKSS	-20	200.6	171.2	0	0.000	0.0000	0.0000
GKSS	-20	199.8	170.6	0	0.000	0.0000	0.0000
GKSS	-20	198.2	169.2	0	0.000	0.0000	0.0000
GKSS	-20	199.3	170.2	0	0.000	0.0000	0.0000
GKSS	-20	196.6	167.9	0	0.000	0.0000	0.0000
GKSS	-20	198.6	169.6	0	0.000	0.0000	0.0000
GKSS	-20	200.7	171.3	0	0.000	0.0000	0.0000
GKSS	-20	195.0	166.6	0	0.000	0.0000	0.0000
GKSS	-20	198.6	169.6	0	0.000	0.0000	0.0000
GKSS	-20	202.5	201.7	0	0.000	0.0000	0.0000
GKSS	-20	194.7	194.1	0	0.000	0.0000	0.0000
GKSS	-20	262.8	261.8	0	0.000	0.0000	0.0000
GKSS	-20	187.9	187.2	0	0.000	0.0000	0.0000
GKSS	-20	275.8	274.8	0	0.000	0.0000	0.0000
GKSS	-20	261.8	260.9	0	0.000	0.0000	0.0000
GKSS	-20	283.2	282.2	0	0.000	0.0000	0.0000
GKSS	-20	283.1	282.0	0	0.000	0.0000	0.0000
GKSS	-20	284.0	283.0	0	0.000	0.0000	0.0000
GKSS	-20	284.2	283.1	0	0.000	0.0000	0.0000
VTT	-20	284.0	282.9	0	0.000	0.0000	0.0000
VTT	-20	231.9	231.0	0	0.000	0.0000	0.0000
VTT	-20	279.4	278.3	0	0.000	0.0000	0.0000
VTT	-20	280.3	279.2	0	0.000	0.0000	0.0000
VTT	-20	279.4	278.3	0	0.000	0.0000	0.0000

VTT	-20	278.6	277.5	0	0.000	0.0000	0.0000
VTT	-20	281.9	280.9	0	0.000	0.0000	0.0000
VTT	-20	279.4	278.3	0	0.000	0.0000	0.0000
VTT	-20	282.5	281.4	0	0.000	0.0000	0.0000
VTT	-20	247.2	246.3	0	0.000	0.0000	0.0000
VTT	-20	233.2	232.4	0	0.000	0.0000	0.0000
VTT	-20	283.2	282.2	0	0.000	0.0000	0.0000
VTT	-20	288.9	287.8	0	0.000	0.0000	0.0000
VTT	-20	263.2	262.3	0	0.000	0.0000	0.0000
VTT	-20	184.4	183.8	0	0.000	0.0000	0.0000
VTT	-20	283.7	282.7	0	0.000	0.0000	0.0000
VTT	-20	280.8	279.8	0	0.000	0.0000	0.0000
VTT	-20	280.9	279.8	0	0.000	0.0000	0.0000
VTT	-20	280.9	279.8	0	0.000	0.0000	0.0000
VTT	-20	170.9	170.3	0	0.000	0.0000	0.0000
VTT	-20	282.9	281.9	0	0.000	0.0000	0.0000
VTT	-20	275.7	274.6	0	0.000	0.0000	0.0000
VTT	-20	228.2	227.4	0	0.000	0.0000	0.0000
VTT	-20	282.0	281.0	0	0.000	0.0000	0.0000
VTT	-20	280.9	279.8	0	0.000	0.0000	0.0000
VTT	-20	281.8	280.7	0	0.000	0.0000	0.0000
VTT	-20	281.4	280.4	0	0.000	0.0000	0.0000
VTT	-20	227.3	226.5	0	0.000	0.0000	0.0000
VTT	-20	201.3	200.6	0	0.000	0.0000	0.0000
VTT	-20	212.5	211.7	0	0.000	0.0000	0.0000
VTT	-20	256.5	255.5	0	0.000	0.0000	0.0000
VTT	-20	284.8	283.8	0	0.000	0.0000	0.0000
VTT	-20	282.3	281.3	0	0.000	0.0000	0.0000
VTT	-20	269.6	268.6	0	0.000	0.0000	0.0000
VTT	-20	184.4	183.8	0	0.000	0.0000	0.0000
VTT	-20	241.6	240.7	0	0.000	0.0000	0.0000
VTT	-20	146.4	145.9	0	0.000	0.0000	0.0000
VTT	-20	280.0	279.0	0	0.000	0.0000	0.0000
VTT	-20	156.7	156.2	0	0.000	0.0000	0.0000
VTT	-20	277.0	276.0	0	0.000	0.0000	0.0000
CISE	-20	167.4	194.6	0	0.000	0.0000	0.0000
CISE	-20	153.5	178.1	0	0.000	0.0000	0.0000
CISE	-20	211.2	246.5	0	0.000	0.0000	0.0000
CISE	-20	220.3	257.3	0	0.000	0.0000	0.0000
CISE	-20	227.9	266.2	0	0.000	0.0000	0.0000
CISE	-20	211.1	246.4	0	0.000	0.0000	0.0000
CISE	-20	217.1	253.4	0	0.000	0.0000	0.0000
CISE	-20	145.3	168.5	0	0.000	0.0000	0.0000
CISE	-20	161.2	187.2	0	0.000	0.0000	0.0000
CISE	-20	131.9	152.5	0	0.000	0.0000	0.0000
CISE	-20	216.4	252.6	0	0.000	0.0000	0.0000
CISE	-20	125.0	144.4	0	0.000	0.0000	0.0000
CISE	-20	378.7	444.9	0	0.000	0.0000	0.0000
CISE	-20	246.1	287.9	0	0.000	0.0000	0.0000
CISE	-20	250.9	293.5	0	0.000	0.0000	0.0000
CISE	-20	251.5	294.3	0	0.000	0.0000	0.0000
CISE	-20	284.0	332.7	0	0.000	0.0000	0.0000
CISE	-20	261.1	305.6	0	0.000	0.0000	0.0000
CISE	-20	351.6	412.8	0	0.000	0.0000	0.0000
CISE	-20	258.5	302.5	0	0.000	0.0000	0.0000
GKSS	-20	201.3	234.8	0	0.000	0.0000	0.0000
GKSS	-20	110.9	127.7	0	0.000	0.0000	0.0000
GKSS	-20	197.7	230.5	0	0.000	0.0000	0.0000
GKSS	-20	198.9	231.9	0	0.000	0.0000	0.0000
GKSS	-20	200.6	234.0	0	0.000	0.0000	0.0000
GKSS	-20	165.7	192.6	0	0.000	0.0000	0.0000
GKSS	-20	280.1	328.0	0	0.000	0.0000	0.0000
GKSS	-20	279.5	327.3	0	0.000	0.0000	0.0000
GKSS	-20	257.6	301.4	0	0.000	0.0000	0.0000
GKSS	-20	265.2	310.4	0	0.000	0.0000	0.0000
GKSS	-20	156.7	212.6	0	0.000	0.0000	0.0000
GKSS	-20	221.7	304.1	0	0.000	0.0000	0.0000
GKSS	-20	193.9	264.9	0	0.000	0.0000	0.0000
GKSS	-20	191.7	261.9	0	0.000	0.0000	0.0000
GKSS	-20	184.4	251.6	0	0.000	0.0000	0.0000
NE	-20	186.7	254.8	0	0.000	0.0000	0.0000
NE	-20	184.4	251.6	0	0.000	0.0000	0.0000
NE	-20	193.9	264.9	0	0.000	0.0000	0.0000
NE	-20	204.4	279.8	0	0.000	0.0000	0.0000
NE	-20	224.0	307.4	0	0.000	0.0000	0.0000
NE	-20	153.4	207.9	0	0.000	0.0000	0.0000
NE	-20	222.6	305.4	0	0.000	0.0000	0.0000
NE	-20	162.0	220.0	0	0.000	0.0000	0.0000
NE	-20	187.8	256.4	0	0.000	0.0000	0.0000
NE	-20	198.2	271.0	0	0.000	0.0000	0.0000
SCK-CEN	-10	280.0	279.0	0	0.000	0.0000	0.0000
SCK-CEN	-10	281.2	280.2	0	0.000	0.0000	0.0000
SCK-CEN	-10	282.6	281.5	0	0.000	0.0000	0.0000
SCK-CEN	-10	284.0	282.9	0	0.000	0.0000	0.0000
SCK-CEN	-10	280.9	279.9	0	0.000	0.0000	0.0000
GKSS	0	196.8	168.1	0	0.000	0.0000	0.0000
GKSS	0	193.7	165.5	0	0.000	0.0000	0.0000

GKSS	0	192.9	164.8	0	0.000	0.0000	0.0000
GKSS	0	196.7	168.0	0	0.000	0.0000	0.0000
GKSS	0	196.1	167.5	0	0.000	0.0000	0.0000
GKSS	0	194.7	166.3	0	0.000	0.0000	0.0000
GKSS	0	196.3	167.7	0	0.000	0.0000	0.0000
GKSS	0	195.9	167.3	0	0.000	0.0000	0.0000
GKSS	0	195.2	166.8	0	0.000	0.0000	0.0000
GKSS	0	193.3	165.1	0	0.000	0.0000	0.0000
SCK-CEN	0	198.4	169.4	0	0.000	0.0000	0.0000
SCK-CEN	0	199.1	170.0	0	0.000	0.0000	0.0000
SCK-CEN	0	198.2	169.2	0	0.000	0.0000	0.0000
SCK-CEN	0	197.6	168.8	0	0.000	0.0000	0.0000
SCK-CEN	0	201.2	171.8	0	0.000	0.0000	0.0000
SCK-CEN	0	200.0	170.8	0	0.000	0.0000	0.0000
SCK-CEN	0	197.4	168.6	0	0.000	0.0000	0.0000
SCK-CEN	0	199.6	170.4	0	0.000	0.0000	0.0000
SCK-CEN	0	203.4	173.6	0	0.000	0.0000	0.0000
SCK-CEN	0	199.2	170.1	0	0.000	0.0000	0.0000
SCK-CEN	0	200.5	171.2	0	0.000	0.0000	0.0000
SCK-CEN	0	202.4	172.7	0	0.000	0.0000	0.0000
SCK-CEN	0	197.2	168.4	0	0.000	0.0000	0.0000
SCK-CEN	0	205.8	175.6	0	0.000	0.0000	0.0000
SCK-CEN	0	205.5	175.4	0	0.000	0.0000	0.0000
SCK-CEN	0	202.4	172.7	0	0.000	0.0000	0.0000
SCK-CEN	0	203.4	173.6	0	0.000	0.0000	0.0000
SCK-CEN	0	205.2	175.1	0	0.000	0.0000	0.0000
SCK-CEN	0	202.3	172.7	0	0.000	0.0000	0.0000
SCK-CEN	0	201.6	172.1	0	0.000	0.0000	0.0000
GKSS	0	282.4	281.4	0	0.000	0.0000	0.0000
GKSS	0	283.7	282.7	0	0.000	0.0000	0.0000
GKSS	0	284.9	283.9	0	0.000	0.0000	0.0000
GKSS	0	282.8	281.8	0	0.000	0.0000	0.0000
GKSS	0	284.4	283.4	0	0.000	0.0000	0.0000
GKSS	0	284.9	283.8	0	0.000	0.0000	0.0000
GKSS	0	279.6	278.6	0	0.000	0.0000	0.0000
GKSS	0	283.9	282.8	0	0.000	0.0000	0.0000
GKSS	0	285.7	284.7	0	0.000	0.0000	0.0000
GKSS	0	283.0	281.9	0	0.000	0.0000	0.0000
SCK-CEN	0	277.0	276.0	0	0.000	0.0000	0.0000
SCK-CEN	0	276.7	275.7	0	0.000	0.0000	0.0000
SCK-CEN	0	276.9	275.9	0	0.000	0.0000	0.0000
SCK-CEN	0	277.9	276.8	0	0.000	0.0000	0.0000
SCK-CEN	0	276.9	275.9	0	0.000	0.0000	0.0000
SCK-CEN	0	278.2	277.2	0	0.000	0.0000	0.0000
SCK-CEN	0	278.0	277.0	0	0.000	0.0000	0.0000
SCK-CEN	0	275.9	274.9	0	0.000	0.0000	0.0000
SCK-CEN	0	277.6	276.6	0	0.000	0.0000	0.0000
SCK-CEN	0	278.2	277.2	0	0.000	0.0000	0.0000
SCK-CEN	0	277.3	276.3	0	0.000	0.0000	0.0000
VTT	0	280.3	279.3	0	0.000	0.0000	0.0000
VTT	0	275.5	274.5	0	0.000	0.0000	0.0000
VTT	0	280.3	279.3	0	0.000	0.0000	0.0000
VTT	0	275.2	274.2	0	0.000	0.0000	0.0000
VTT	0	278.0	277.0	0	0.000	0.0000	0.0000
VTT	0	278.5	277.5	0	0.000	0.0000	0.0000
VTT	0	279.7	278.6	0	0.000	0.0000	0.0000
VTT	0	267.2	266.2	0	0.000	0.0000	0.0000
VTT	0	279.8	278.8	0	0.000	0.0000	0.0000
VTT	0	278.6	277.6	0	0.000	0.0000	0.0000
VTT	0	278.3	277.3	0	0.000	0.0000	0.0000
VTT	0	280.0	278.9	0	0.000	0.0000	0.0000
VTT	0	274.3	273.3	0	0.000	0.0000	0.0000
VTT	0	276.0	275.0	0	0.000	0.0000	0.0000
VTT	0	278.7	277.7	0	0.000	0.0000	0.0000
VTT	0	278.0	277.0	0	0.000	0.0000	0.0000
VTT	0	279.1	278.0	0	0.000	0.0000	0.0000
VTT	0	278.6	277.5	0	0.000	0.0000	0.0000
VTT	0	279.4	278.4	0	0.000	0.0000	0.0000
VTT	0	276.2	275.2	0	0.000	0.0000	0.0000
GKSS	0	191.3	222.9	0	0.000	0.0000	0.0000
GKSS	0	269.2	315.2	0	0.000	0.0000	0.0000
GKSS	0	281.2	329.4	0	0.000	0.0000	0.0000
GKSS	0	242.5	283.5	0	0.000	0.0000	0.0000
GKSS	0	318.3	373.3	0	0.000	0.0000	0.0000
GKSS	0	395.4	464.7	0	0.000	0.0000	0.0000
GKSS	0	396.5	465.9	0	0.000	0.0000	0.0000
GKSS	0	394.9	464.1	0	0.000	0.0000	0.0000
GKSS	0	396.3	465.7	0	0.000	0.0000	0.0000
GKSS	0	266.6	312.1	0	0.000	0.0000	0.0000
GKSS	0	395.2	464.4	0	0.000	0.0000	0.0000
GKSS	0	362.9	426.1	0	0.000	0.0000	0.0000
GKSS	0	331.8	389.3	0	0.000	0.0000	0.0000
GKSS	0	227.1	265.3	0	0.000	0.0000	0.0000
GKSS	0	309.5	362.9	0	0.000	0.0000	0.0000
GKSS	0	395.4	464.7	0	0.000	0.0000	0.0000
GKSS	0	210.9	246.1	0	0.000	0.0000	0.0000
GKSS	0	394.9	464.1	0	0.000	0.0000	0.0000

GKSS	0	211.4	246.7	0	0.000	0.0000	0.0000
GKSS	0	393.9	462.8	0	0.000	0.0000	0.0000
GKSS	0	263.4	308.3	0	0.000	0.0000	0.0000
GKSS	0	393.3	462.1	0	0.000	0.0000	0.0000
GKSS	0	386.7	454.3	0	0.000	0.0000	0.0000
GKSS	0	376.2	441.9	0	0.000	0.0000	0.0000
GKSS	0	394.4	463.5	0	0.000	0.0000	0.0000
GKSS	0	306.7	359.6	0	0.000	0.0000	0.0000
GKSS	0	394.8	464.0	0	0.000	0.0000	0.0000
GKSS	0	393.9	462.8	0	0.000	0.0000	0.0000
GKSS	0	246.4	288.2	0	0.000	0.0000	0.0000
GKSS	0	320.1	375.4	0	0.000	0.0000	0.0000
CISE	0	233.3	320.4	0	0.000	0.0000	0.0000
CISE	0	238.2	327.4	0	0.000	0.0000	0.0000
CISE	0	208.3	285.2	0	0.000	0.0000	0.0000
CISE	0	421.7	585.8	0	0.000	0.0000	0.0000
CISE	0	226.7	311.2	0	0.000	0.0000	0.0000
CISE	0	267.0	367.9	0	0.000	0.0000	0.0000
CISE	0	163.0	221.4	0	0.000	0.0000	0.0000
CISE	0	165.8	225.4	0	0.000	0.0000	0.0000
CISE	0	285.9	394.6	0	0.000	0.0000	0.0000
CISE	0	342.0	473.5	0	0.000	0.0000	0.0000
GKSS	0	314.9	435.4	0	0.000	0.0000	0.0000
GKSS	0	307.6	425.1	0	0.000	0.0000	0.0000
GKSS	0	383.0	531.4	0	0.000	0.0000	0.0000
GKSS	0	332.6	460.4	0	0.000	0.0000	0.0000
GKSS	0	223.6	306.8	0	0.000	0.0000	0.0000
GKSS	0	442.2	614.7	0	0.000	0.0000	0.0000

4. Master curve fit to data

Temperature adj. = 1.5 °C (est.) Stand. dev. on T_0 = 1.0 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-154	54.8	49.3				
-154	49.8	45.0				
-154	37.8	35.0				
-154	33.0	31.0				
-154	38.9	35.9				
-154	24.2	23.6				
-154	47.4	43.0				
-154	46.5	42.3				
-154	31.4	29.6				
-154	39.2	36.1				
-154	24.2	23.6				
-154	33.0	31.0				
-154	41.0	37.6				
-154	31.7	29.9				
-154	35.2	32.8				
-154	44.4	40.5				
-154	41.5	38.1				
-154	32.7	30.7				
-154	34.3	32.0				
-154	36.7	34.0				
-154	39.7	36.6				
-154	46.1	41.9				
-154	34.6	32.3				
-154	35.8	33.3				
-154	29.3	27.9				
-154	28.6	27.2				
-154	38.6	35.7				
-154	44.4	40.5				
-154	48.9	44.3				
-154	38.9	35.9				
-154	36.7	34.0				
-154	31.7	29.9				
-154	41.5	41.5				
-154	42.2	42.2				
-154	50.0	50.0				
-154	34.0	34.0				
-154	41.7	41.7				
-154	46.1	46.1				
-154	44.2	44.2				
-154	36.7	36.7				
-154	29.0	29.0				
-154	53.0	53.0				
-154	39.4	39.4				
-154	29.0	29.0				
-154	34.6	34.6				
-154	33.0	33.0				
-154	38.1	38.1				
-154	28.6	28.6				
-154	28.6	28.6				
-154	38.6	38.6				
-154	36.4	36.4				
-154	33.4	33.4				
-154	36.9	36.9				
-154	31.1	31.1				
-154	34.3	34.3				
-154	30.4	30.4				
-154	49.6	49.6				
-154	41.0	41.0				
-154	34.0	34.0				
-154	30.7	30.7				
-154	41.2	41.2				
-154	26.7	26.7				
-154	35.5	35.5				
-154	33.4	33.4				
-154	36.7	36.7				
-154	32.4	32.4				
-154	45.1	45.1				
-154	33.4	33.4				
-154	34.0	34.0				
-154	30.7	30.7				
-154	26.7	26.7				
-154	33.7	36.3				
-154	42.7	47.0				
-154	37.2	40.5				
-154	54.4	60.9				
-154	34.6	37.4				
-154	44.2	48.8				
-154	29.7	31.5				
-154	36.4	39.5				
-154	36.4	39.5				

-154	28.2	29.8
-154	28.2	29.8
-154	30.0	32.0
-154	36.4	39.5
-154	37.5	40.8
-154	30.0	32.0
-154	30.7	32.8
-154	30.4	32.4
-154	30.7	32.8
-154	31.7	34.0
-154	41.7	45.9
-154	37.2	40.5
-154	34.9	37.7
-154	38.3	41.8
-154	31.4	33.6
-154	33.7	36.3
-154	32.7	35.1
-154	43.0	47.3
-154	32.7	35.1
-154	30.0	32.0
-154	36.9	40.2
-154	33.4	35.9
-154	30.0	32.0
-110	98.1	85.6
-110	59.0	52.8
-110	80.0	70.5
-110	57.2	51.3
-110	88.3	77.4
-110	96.2	84.1
-110	81.6	71.8
-110	66.9	59.4
-110	85.6	75.2
-110	86.8	76.2
-110	114.2	99.2
-110	73.5	65.0
-110	92.7	81.1
-110	77.5	68.4
-110	61.5	54.9
-110	51.8	46.8
-110	73.6	65.1
-110	52.8	47.6
-110	41.2	37.9
-110	115.3	100.1
-110	73.2	64.7
-110	74.0	65.4
-110	67.5	59.9
-110	71.0	62.9
-110	53.4	48.1
-110	96.5	84.3
-110	71.3	63.1
-110	71.7	63.5
-110	81.7	71.9
-110	64.0	57.0
-110	74.2	65.6
-110	70.4	62.4
-110	91.2	79.9
-110	72.0	63.7
-110	64.8	57.7
-110	79.2	69.8
-110	52.2	47.1
-110	82.9	72.9
-110	93.2	81.6
-110	75.4	66.6
-110	75.0	66.3
-110	78.6	69.3
-110	94.8	82.9
-110	98.1	85.6
-110	98.5	86.0
-110	104.9	91.4
-110	69.9	62.0
-110	81.6	71.8
-110	55.2	49.6
-110	105.6	92.0
-110	101.5	88.6
-110	73.7	65.2
-110	97.5	85.2
-110	75.9	67.0
-110	48.3	43.8
-91	127.0	110.0
-91	121.8	105.6
-91	70.5	62.5
-91	94.2	82.4
-91	127.3	110.3
-91	119.9	104.0
-91	104.5	91.1
-91	78.6	69.3
-91	98.6	86.1

-91	161.6	139.0
-91	91.3	80.0
-91	115.3	100.1
-91	122.4	106.1
-91	126.3	109.4
-91	108.3	94.3
-91	66.9	59.4
-91	126.7	109.8
-91	69.6	61.7
-91	121.4	105.3
-91	90.0	78.9
-91	153.9	132.6
-91	64.6	57.5
-91	127.2	110.1
-91	99.7	87.0
-91	101.3	88.4
-91	140.4	121.3
-91	78.2	68.9
-91	109.0	94.9
-91	103.9	90.5
-91	126.8	109.8
-91	111.7	97.1
-91	68.6	68.6
-91	81.6	81.6
-91	55.9	55.9
-91	98.8	98.8
-91	71.9	71.9
-91	111.0	111.0
-91	93.5	93.5
-91	79.9	79.9
-91	98.4	98.4
-91	101.1	101.1
-91	79.6	79.6
-91	99.7	99.7
-91	108.1	108.1
-91	93.4	93.4
-91	62.0	62.0
-91	107.1	107.1
-91	145.3	145.3
-91	76.3	76.3
-91	126.5	126.5
-91	126.1	126.1
-91	128.5	128.5
-91	111.4	111.4
-91	130.4	130.4
-91	134.8	134.8
-91	157.3	157.3
-91	105.2	105.2
-91	109.8	109.8
-91	84.9	84.9
-91	62.8	62.8
-91	97.5	97.5
-91	80.2	80.2
-91	134.4	134.4
-91	65.1	65.1
-91	118.6	118.6
-91	67.3	76.3
-91	162.9	190.0
-91	100.0	115.1
-91	91.2	104.7
-91	106.2	122.5
-91	83.2	95.2
-91	91.8	105.3
-91	94.7	108.8
-91	92.9	106.7
-91	69.9	79.4
-91	93.1	107.0
-91	97.9	112.6
-91	73.7	83.9
-91	82.0	93.7
-91	76.3	86.9
-91	93.1	107.0
-91	83.7	95.8
-91	82.1	93.9
-91	86.8	99.5
-91	86.7	99.3
-91	92.3	106.0
-91	83.1	95.1
-91	88.9	101.9
-91	64.3	72.7
-91	101.6	117.1
-91	94.2	108.3
-91	78.7	89.8
-91	73.0	83.1
-91	64.2	72.5
-91	98.9	113.9
-91	103.2	137.6

-91	84.4	111.0
-91	97.0	128.9
-91	92.7	122.8
-91	96.8	128.6
-91	73.6	95.8
-91	73.0	95.0
-91	73.3	95.4
-91	53.8	67.8
-91	69.5	90.0
-91	65.5	84.3
-91	79.6	104.3
-91	69.8	90.4
-91	90.3	119.4
-91	88.0	116.2
-60	234.1	200.0
-60	114.4	99.4
-60	130.7	113.1
-60	106.7	92.9
-60	161.0	138.5
-60	200.7	171.9
-60	125.2	108.4
-60	145.1	125.2
-60	91.9	80.4
-60	128.1	110.9
-60	164.4	141.4
-60	192.2	164.8
-60	166.3	143.0
-60	177.7	152.6
-60	203.7	174.5
-60	116.0	100.7
-60	221.9	189.8
-60	167.6	144.1
-60	89.8	78.7
-60	156.3	134.6
-60	186.8	160.2
-60	213.5	182.7
-60	164.6	141.6
-60	280.1	238.7
-60	185.9	159.5
-60	127.7	110.6
-60	205.0	175.6
-60	115.6	100.4
-60	107.5	93.6
-60	164.6	141.6
-60	172.0	147.8
-60	108.5	94.5
-60	119.0	103.2
-60	153.5	132.3
-60	158.9	136.8
-60	137.5	118.8
-60	119.5	103.7
-60	130.7	113.1
-60	172.6	148.3
-60	84.5	74.2
-60	244.6	208.9
-60	120.4	104.4
-60	104.5	91.1
-60	163.6	140.7
-60	201.4	172.6
-60	137.8	119.0
-60	173.0	148.6
-60	99.2	86.6
-60	173.4	149.0
-60	131.5	113.7
-60	186.0	186.0
-60	151.8	151.8
-60	111.7	111.7
-60	143.9	143.9
-60	105.4	105.4
-60	154.0	154.0
-60	176.2	176.2
-60	131.9	131.9
-60	203.9	203.9
-60	142.7	142.7
-60	134.5	134.5
-60	130.1	130.1
-60	142.6	142.6
-60	119.7	119.7
-60	141.3	141.3
-60	175.9	175.9
-60	119.6	119.6
-60	102.4	102.4
-60	99.0	99.0
-60	115.1	115.1
-60	172.9	172.9
-60	120.5	120.5
-60	165.2	165.2

-60	125.6	125.6
-60	126.7	126.7
-60	100.4	100.4
-60	131.1	131.1
-60	185.1	185.1
-60	163.6	163.6
-60	126.5	126.5
-60	164.7	164.7
-60	192.7	192.7
-60	134.5	134.5
-60	140.8	140.8
-60	109.9	126.9
-60	131.9	153.0
-60	136.2	158.2
-60	154.0	179.4
-60	115.9	134.1
-60	150.4	175.1
-40	171.0	147.0
-40	569.4	482.0
-40	169.4	145.6
-40	548.7	464.6
-40	529.9	448.8
-40	318.5	271.0
-40	574.8	486.5
-40	360.8	306.6
-40	343.8	292.3
-40	235.8	201.5
-40	529.9	448.8
-40	496.5	420.7
-40	600.0	507.7
-40	113.7	98.8
-40	229.6	196.2
-40	154.2	132.8
-40	221.3	189.3
-40	486.7	412.4
-40	243.8	208.2
-40	202.5	173.4
-40	180.6	155.1
-40	206.7	177.0
-40	240.7	205.6
-40	270.8	230.9
-40	186.4	159.9
-40	255.8	218.3
-40	231.2	197.6
-40	339.4	288.6
-40	403.1	342.2
-40	399.2	338.8
-40	187.3	187.3
-40	101.5	101.5
-40	140.3	140.3
-40	150.2	150.2
-40	187.3	187.3
-40	211.4	211.4
-40	160.5	160.5
-40	214.6	214.6
-40	188.3	188.3
-40	239.3	239.3
-40	112.8	112.8
-40	239.0	239.0
-40	284.9	284.9
-40	254.7	254.7
-40	270.9	270.9
-40	187.0	187.0
-40	170.1	170.1
-40	256.4	256.4
-40	171.4	171.4
-40	103.1	103.1
-40	230.0	230.0
-40	210.0	210.0
-40	198.2	198.2
-40	150.2	150.2
-40	226.8	226.8
-40	158.1	158.1
-40	256.4	256.4
-40	207.6	207.6
-40	213.5	213.5
-40	254.6	254.6
-40	240.0	240.0
-40	309.2	309.2
-40	125.9	146.0
-40	128.9	149.5
-40	198.5	232.3
-40	212.0	248.4
-40	138.6	161.1
-40	187.7	219.5
-40	173.0	201.9
-40	179.5	209.7

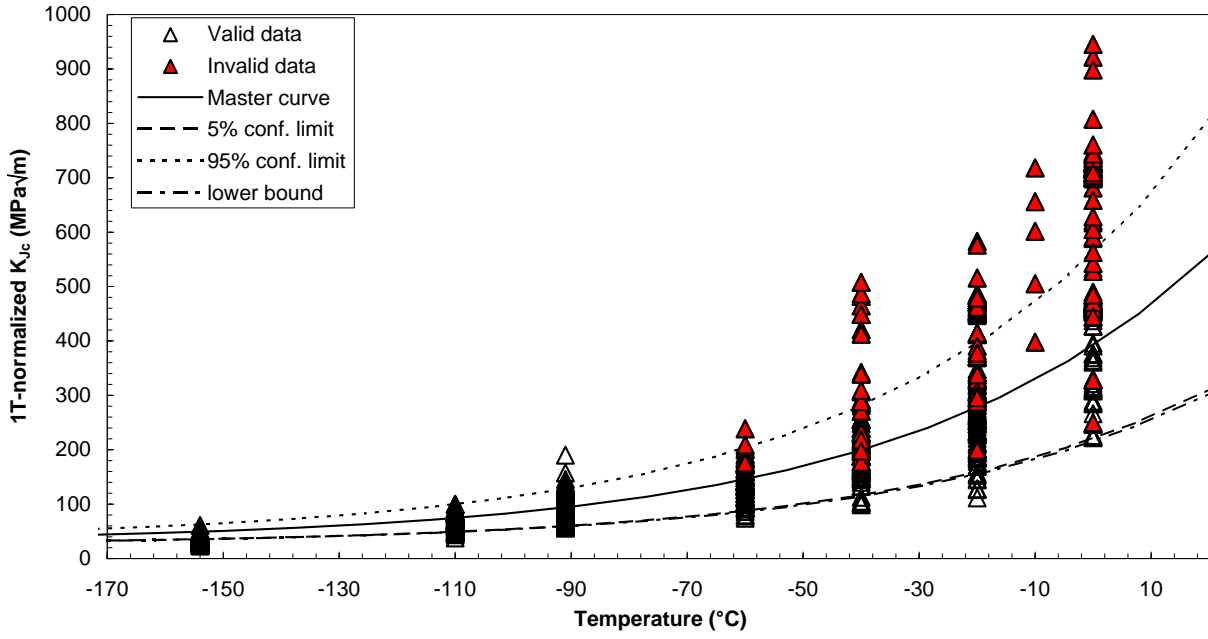
-40	152.6	177.7
-40	153.6	178.9
-40	144.6	168.2
-40	150.7	175.5
-40	139.1	161.6
-40	183.6	214.5
-40	142.0	165.1
-40	187.2	218.8
-40	172.2	201.0
-40	198.0	231.7
-40	130.4	151.3
-40	141.7	164.7
-40	134.5	156.1
-40	115.5	133.5
-40	91.7	105.2
-40	141.1	164.0
-40	239.1	280.6
-40	243.4	285.7
-40	191.9	224.5
-40	146.8	170.8
-40	161.4	188.1
-40	142.3	165.4
-20	128.7	111.4
-20	146.9	126.7
-20	402.8	341.9
-20	409.4	347.5
-20	530.5	449.3
-20	532.2	450.7
-20	534.6	452.8
-20	536.1	454.0
-20	536.1	454.0
-20	536.6	454.4
-20	538.6	456.1
-20	540.5	457.7
-20	543.8	460.5
-20	549.2	465.0
-20	553.7	468.8
-20	556.1	470.8
-20	556.3	471.0
-20	560.6	474.6
-20	565.8	479.0
-20	570.1	482.6
-20	571.1	483.4
-20	233.1	199.2
-20	389.8	331.0
-20	487.9	413.5
-20	438.3	371.8
-20	571.4	483.6
-20	560.7	474.7
-20	561.1	475.0
-20	575.1	486.8
-20	557.5	472.0
-20	572.5	484.6
-20	202.5	202.5
-20	194.7	194.7
-20	262.8	262.8
-20	187.9	187.9
-20	275.8	275.8
-20	261.8	261.8
-20	371.0	371.0
-20	369.1	369.1
-20	462.1	462.1
-20	319.7	319.7
-20	583.1	583.1
-20	231.9	231.9
-20	382.0	382.0
-20	295.9	295.9
-20	576.4	576.4
-20	411.7	411.7
-20	306.4	306.4
-20	324.7	324.7
-20	282.5	282.5
-20	247.2	247.2
-20	233.2	233.2
-20	317.5	317.5
-20	515.6	515.6
-20	263.2	263.2
-20	184.4	184.4
-20	286.9	286.9
-20	341.4	341.4
-20	415.0	415.0
-20	327.9	327.9
-20	170.9	170.9
-20	308.8	308.8
-20	376.5	376.5
-20	228.2	228.2
-20	371.7	371.7

-20	291.6	291.6
-20	337.7	337.7
-20	390.5	390.5
-20	227.3	227.3
-20	201.3	201.3
-20	212.5	212.5
-20	288.4	288.4
-20	479.1	479.1
-20	377.9	377.9
-20	269.6	269.6
-20	184.4	184.4
-20	241.6	241.6
-20	146.4	146.4
-20	299.4	299.4
-20	156.7	156.7
-20	295.6	295.6
-20	167.4	195.3
-20	153.5	178.8
-20	211.2	247.4
-20	220.3	258.3
-20	227.9	267.2
-20	211.1	247.3
-20	217.1	254.4
-20	145.3	169.1
-20	161.2	187.9
-20	131.9	153.0
-20	216.4	253.6
-20	125.0	144.9
-20	378.7	446.6
-20	246.1	288.9
-20	250.9	294.6
-20	251.5	295.4
-20	284.0	334.0
-20	261.1	306.7
-20	351.6	414.3
-20	258.5	303.6
-20	201.3	235.6
-20	110.9	128.1
-20	197.7	231.3
-20	198.9	232.8
-20	200.6	234.8
-20	165.7	193.3
-20	280.1	329.3
-20	279.5	328.6
-20	257.6	302.5
-20	265.2	311.6
-20	156.7	213.4
-20	221.7	305.2
-20	193.9	265.9
-20	191.7	262.8
-20	184.4	252.6
-20	186.7	255.8
-20	184.4	252.6
-20	193.9	265.9
-20	204.4	280.8
-20	224.0	308.5
-20	153.4	208.6
-20	222.6	306.5
-20	162.0	220.8
-20	187.8	257.3
-20	198.2	272.0
-10	656.0	656.0
-10	397.8	397.8
-10	718.1	718.1
-10	601.6	601.6
-10	505.3	505.3
0	541.9	458.9
0	547.0	463.1
0	538.7	456.2
0	540.0	457.3
0	544.8	461.3
0	534.8	452.9
0	557.2	471.7
0	545.0	461.5
0	546.1	462.4
0	549.2	465.0
0	565.1	478.4
0	571.6	483.8
0	553.4	468.6
0	293.2	249.7
0	544.1	460.7
0	552.2	467.5
0	558.0	472.4
0	553.5	468.6
0	557.6	472.1
0	552.4	467.7
0	555.6	470.4

0	558.2	472.6
0	550.6	466.2
0	560.8	474.8
0	569.6	482.2
0	552.5	467.8
0	578.5	489.6
0	556.0	470.7
0	543.8	460.5
0	556.3	471.0
0	327.6	327.6
0	681.4	681.4
0	700.8	700.8
0	698.2	698.2
0	708.4	708.4
0	701.5	701.5
0	724.9	724.9
0	717.4	717.4
0	705.8	705.8
0	709.5	709.5
0	716.7	716.7
0	714.1	714.1
0	658.5	658.5
0	747.5	747.5
0	709.0	709.0
0	719.2	719.2
0	444.5	444.5
0	699.8	699.8
0	704.0	704.0
0	729.5	729.5
0	714.0	714.0
0	725.6	725.6
0	730.2	730.2
0	737.8	737.8
0	590.7	590.7
0	730.3	730.3
0	741.8	741.8
0	744.2	744.2
0	527.7	527.7
0	620.4	620.4
0	727.0	727.0
0	730.3	730.3
0	542.6	542.6
0	726.7	726.7
0	718.7	718.7
0	717.1	717.1
0	721.2	721.2
0	725.3	725.3
0	727.9	727.9
0	727.0	727.0
0	718.5	718.5
0	191.3	223.7
0	269.2	316.4
0	281.2	330.6
0	242.5	284.6
0	318.3	374.7
0	476.2	562.5
0	511.7	604.8
0	621.3	735.0
0	531.3	628.0
0	266.6	313.3
0	599.3	709.0
0	362.9	427.7
0	331.8	390.8
0	227.1	266.2
0	309.5	364.2
0	628.6	743.7
0	210.9	247.0
0	410.7	484.7
0	211.4	247.6
0	778.3	921.7
0	263.4	309.5
0	682.2	807.5
0	386.7	456.1
0	376.2	443.6
0	642.5	760.3
0	306.7	361.0
0	758.4	898.1
0	797.9	945.1
0	246.4	289.2
0	320.1	376.8
0	233.3	321.6
0	238.2	328.6
0	208.3	286.3
0	421.7	588.1
0	226.7	312.4
0	267.0	369.3
0	163.0	222.2

0	165.8	226.2				
0	285.9	396.1				
0	342.0	475.3				
0	314.9	437.1				
0	307.6	426.7				
0	383.0	533.4				
0	332.6	462.1				
0	223.6	307.9				
0	442.2	617.1				
-174			43.2	32.6	53.9	32.4
-161.875			46.7	34.4	59.0	34.2
-149.75			51.0	36.7	65.3	36.4
-137.625			56.4	39.7	73.2	39.3
-125.5			63.3	43.4	83.2	42.9
-113.375			71.9	48.0	95.8	47.4
-101.25			82.8	53.9	111.7	53.1
-89.125			96.5	61.3	131.6	60.3
-77			113.7	70.6	156.8	69.4
-64.875			135.4	82.3	188.4	80.7
-52.75			162.7	97.0	228.3	95.1
-40.625			197.0	115.6	278.5	113.1
-28.5			240.3	139.0	341.6	135.9
-16.375			294.8	168.4	421.2	164.5
-4.25			363.4	205.4	521.3	200.5
7.875			449.7	252.1	647.4	245.9
20			558.5	310.8	806.2	303.0

MASTER CURVE FOR 1TCT WITH CONFIDENCE LIMITS (E1921-05 analysis)
EURO toughness dataset - Complete dataset excluding SX9



MASTER CURVE ANALYSIS OF RANDOM INHOMOGENEITIES

Single Point Estimation Method

Step 2: Single point estimation

1. Calculation of the maximum value of T_o (based on a single data point) and establishment of T_o for the data set

Specimen code	T (°C)	$K_{Jc[exp]}$ (MPa√m)	K_{Jc-1T} (MPa√m)	$K_{analysis}$ (MPa√m)	δ_i	$T_{o(i)}$ (°C)
GKSS	-154	54.8	49.1	49.1	0	-
GKSS	-154	49.8	44.9	49.8	0	-
GKSS	-154	37.8	34.9	37.8	0	-
GKSS	-154	33.0	30.9	33.0	0	-
GKSS	-154	38.9	35.8	38.9	0	-
GKSS	-154	24.2	23.6	24.2	(*)	-
GKSS	-154	47.4	43.0	47.4	0	-
GKSS	-154	46.5	42.2	46.5	0	-
GKSS	-154	31.4	29.6	31.4	(*)	-
GKSS	-154	39.2	36.0	39.2	0	-
GKSS	-154	24.2	23.6	24.2	(*)	-
SIEMENS	-154	33.0	30.9	33.0	0	-
SIEMENS	-154	41.0	37.6	41.0	0	-
SIEMENS	-154	31.7	29.8	31.7	(*)	-
SIEMENS	-154	35.2	32.7	35.2	0	-
SIEMENS	-154	44.4	40.5	44.4	0	-
SIEMENS	-154	41.5	38.0	41.5	0	-
SIEMENS	-154	32.7	30.7	32.7	0	-
SIEMENS	-154	34.3	32.0	34.3	0	-
SIEMENS	-154	36.7	34.0	36.7	0	-
SIEMENS	-154	39.7	36.5	39.7	0	-
SIEMENS	-154	46.1	41.8	46.1	0	-
SIEMENS	-154	34.6	32.2	34.6	0	-
SIEMENS	-154	35.8	33.2	35.8	0	-
SIEMENS	-154	29.3	27.8	29.3	(*)	-
SIEMENS	-154	28.6	27.2	28.6	(*)	-
SIEMENS	-154	38.6	35.6	38.6	0	-
SIEMENS	-154	44.4	40.5	44.4	0	-
SIEMENS	-154	48.9	44.2	48.9	0	-
SIEMENS	-154	38.9	35.8	38.9	0	-
SIEMENS	-154	36.7	34.0	36.7	0	-
SIEMENS	-154	31.7	29.8	31.7	(*)	-
GKSS	-154	41.5	41.4	41.5	0	-
GKSS	-154	42.2	42.2	42.2	0	-
GKSS	-154	50.0	49.9	50.0	0	-
GKSS	-154	34.0	33.9	34.0	0	-
GKSS	-154	41.7	41.7	41.7	0	-
GKSS	-154	46.1	46.0	46.1	0	-
GKSS	-154	44.2	44.1	44.2	0	-
GKSS	-154	36.7	36.6	36.7	0	-
GKSS	-154	29.0	28.9	29.0	(*)	-
GKSS	-154	53.0	52.9	53.0	0	-
GKSS	-154	39.4	39.3	39.4	0	-
GKSS	-154	29.0	28.9	29.0	(*)	-
SIEMENS	-154	34.6	34.5	34.6	0	-
SIEMENS	-154	33.0	33.0	33.0	0	-
SIEMENS	-154	38.1	38.0	38.1	0	-
SIEMENS	-154	28.6	28.6	28.6	(*)	-
SIEMENS	-154	28.6	28.6	28.6	(*)	-
SIEMENS	-154	38.6	38.5	38.6	0	-
SIEMENS	-154	36.4	36.3	36.4	0	-
SIEMENS	-154	33.4	33.3	33.4	0	-
SIEMENS	-154	36.9	36.9	36.9	0	-
SIEMENS	-154	31.1	31.0	31.1	0	-
SIEMENS	-154	34.3	34.2	34.3	0	-
SIEMENS	-154	30.4	30.4	30.4	0	-
SIEMENS	-154	49.6	49.5	49.6	0	-
SIEMENS	-154	41.0	40.9	41.0	0	-
SIEMENS	-154	34.0	33.9	34.0	0	-
SIEMENS	-154	30.7	30.7	30.7	0	-
SIEMENS	-154	41.2	41.2	41.2	0	-
SIEMENS	-154	26.7	26.7	26.7	(*)	-
SIEMENS	-154	35.5	35.4	35.5	0	-
SIEMENS	-154	33.4	33.3	33.4	0	-
SIEMENS	-154	36.7	36.6	36.7	0	-
SIEMENS	-154	32.4	32.4	32.4	0	-
SIEMENS	-154	45.1	45.0	45.1	0	-
SIEMENS	-154	33.4	33.3	33.4	0	-
SIEMENS	-154	34.0	33.9	34.0	0	-
SIEMENS	-154	30.7	30.7	30.7	0	-
SIEMENS	-154	26.7	26.7	26.7	(*)	-

$T_{o(SP)} = -85.3 \text{ °C}$

$\sigma_{T_o(SP)} = 0 \text{ °C}$

(*) $K_{Jc-1T} < 30 \text{ MPa}\sqrt{\text{m}}$

GKSS	-154	33.7	36.2	33.7	0	-
GKSS	-154	42.7	46.9	42.7	0	-
GKSS	-154	37.2	40.4	37.2	0	-
GKSS	-154	54.4	60.8	54.4	0	-
GKSS	-154	34.6	37.3	34.6	0	-
GKSS	-154	44.2	48.7	44.2	0	-
GKSS	-154	29.7	31.5	29.7	0	-
GKSS	-154	36.4	39.4	36.4	0	-
GKSS	-154	36.4	39.4	36.4	0	-
GKSS	-154	28.2	29.8	28.2	(*)	-
GKSS	-154	28.2	29.8	28.2	(*)	-
NE	-154	30.0	31.9	30.0	0	-
NE	-154	36.4	39.4	36.4	0	-
NE	-154	37.5	40.7	37.5	0	-
NE	-154	30.0	31.9	30.0	0	-
NE	-154	30.7	32.7	30.7	0	-
NE	-154	30.4	32.3	30.4	0	-
NE	-154	30.7	32.7	30.7	0	-
NE	-154	31.7	33.9	31.7	0	-
NE	-154	41.7	45.8	41.7	0	-
NE	-154	37.2	40.4	37.2	0	-
NE	-154	34.9	37.6	34.9	0	-
NE	-154	38.3	41.7	38.3	0	-
NE	-154	31.4	33.5	31.4	0	-
NE	-154	33.7	36.2	33.7	0	-
NE	-154	32.7	35.1	32.7	0	-
NE	-154	43.0	47.2	43.0	0	-
NE	-154	32.7	35.1	32.7	0	-
NE	-154	30.0	31.9	30.0	0	-
NE	-154	36.9	40.1	36.9	0	-
NE	-154	33.4	35.8	33.4	0	-
NE	-154	30.0	31.9	30.0	0	-
GKSS	-110	98.1	85.4	98.1	1	-98
GKSS	-110	59.0	52.7	59.0	1	-51
GKSS	-110	80.0	70.3	80.0	1	-81
GKSS	-110	57.2	51.2	57.2	1	-47
GKSS	-110	88.3	77.2	88.3	1	-89
GKSS	-110	96.2	83.9	96.2	1	-96
GKSS	-110	81.6	71.6	81.6	1	-83
GKSS	-110	66.9	59.3	66.9	1	-64
GKSS	-110	85.6	75.0	85.6	1	-87
GKSS	-110	86.8	76.0	86.8	1	-88
GKSS	-110	114.2	98.9	114.2	1	-109
GKSS	-110	73.5	64.8	73.5	1	-73
GKSS	-110	92.7	80.9	92.7	1	-93
GKSS	-110	77.5	68.2	77.5	1	-78
GKSS	-110	61.5	54.7	61.5	1	-55
GKSS	-110	51.8	46.7	51.8	1	-34
GKSS	-110	73.6	64.9	73.6	1	-73
GKSS	-110	52.8	47.5	52.8	1	-37
GKSS	-110	41.2	37.8	41.2	1	6
GKSS	-110	115.3	99.8	115.3	1	-110
GKSS	-110	73.2	64.5	73.2	1	-73
GKSS	-110	74.0	65.3	74.0	1	-74
GKSS	-110	67.5	59.8	67.5	1	-65
GKSS	-110	71.0	62.7	71.0	1	-70
GKSS	-110	53.4	48.0	53.4	1	-39
GKSS	-110	96.5	84.0	96.5	1	-96
GKSS	-110	71.3	63.0	71.3	1	-70
GKSS	-110	71.7	63.3	71.7	1	-71
GKSS	-110	81.7	71.7	81.7	1	-83
GKSS	-110	64.0	56.8	64.0	1	-60
GKSS	-110	74.2	65.4	74.2	1	-74
GKSS	-110	70.4	62.2	70.4	1	-69
GKSS	-110	91.2	79.6	91.2	1	-92
GKSS	-110	72.0	63.6	72.0	1	-71
GKSS	-110	64.8	57.5	64.8	1	-61
GKSS	-110	79.2	69.6	79.2	1	-80
GKSS	-110	52.2	47.0	52.2	1	-36
GKSS	-110	82.9	72.7	82.9	1	-84
GKSS	-110	93.2	81.3	93.2	1	-94
GKSS	-110	75.4	66.4	75.4	1	-76
GKSS	-110	75.0	66.1	75.0	1	-75
GKSS	-110	78.6	69.1	78.6	1	-79
GKSS	-110	94.8	82.7	94.8	1	-95
GKSS	-110	98.1	85.4	98.1	1	-98
GKSS	-110	98.5	85.7	98.5	1	-98
GKSS	-110	104.9	91.1	104.9	1	-103
GKSS	-110	69.9	61.8	69.9	1	-69
GKSS	-110	81.6	71.6	81.6	1	-83
GKSS	-110	55.2	49.5	55.2	1	-43
GKSS	-110	105.6	91.7	105.6	1	-103
GKSS	-110	101.5	88.3	101.5	1	-100
GKSS	-110	73.7	65.0	73.7	1	-74
GKSS	-110	97.5	84.9	97.5	1	-97

GKSS	-110	75.9	66.8	75.9	1	-76
GKSS	-110	48.3	43.7	48.3	1	-24
GKSS	-91	127.0	109.6	127.0	1	-98
GKSS	-91	121.8	105.2	121.8	1	-95
GKSS	-91	70.5	62.3	70.5	1	-50
GKSS	-91	94.2	82.2	94.2	1	-76
GKSS	-91	127.3	109.9	127.3	1	-98
GKSS	-91	119.9	103.7	119.9	1	-94
GKSS	-91	104.5	90.8	104.5	1	-84
GKSS	-91	78.6	69.1	78.6	1	-60
GKSS	-91	98.6	85.8	98.6	1	-79
GKSS	-91	161.6	138.6	161.6	1	-114
THA	-91	91.3	79.7	91.3	1	-73
THA	-91	115.3	99.8	115.3	1	-91
THA	-91	122.4	105.8	122.4	1	-95
THA	-91	126.3	109.1	126.3	1	-97
THA	-91	108.3	94.0	108.3	1	-86
THA	-91	66.9	59.3	66.9	1	-45
THA	-91	126.7	109.4	126.7	1	-98
THA	-91	69.6	61.6	69.6	1	-49
THA	-91	121.4	104.9	121.4	1	-95
THA	-91	90.0	78.7	90.0	1	-72
THA	-91	153.9	132.2	153.9	1	-111
THA	-91	64.6	57.4	64.6	1	-42
THA	-91	127.2	109.8	127.2	1	-98
THA	-91	99.7	86.7	99.7	1	-80
THA	-91	101.3	88.1	101.3	1	-81
THA	-91	140.4	120.9	140.4	1	-105
THA	-91	78.2	68.7	78.2	1	-60
THA	-91	109.0	94.6	109.0	1	-87
THA	-91	103.9	90.3	103.9	1	-83
THA	-91	126.8	109.5	126.8	1	-98
THA	-91	111.7	96.8	111.7	1	-89
GKSS	-91	68.6	68.4	68.6	1	-59
GKSS	-91	81.6	81.3	81.6	1	-75
GKSS	-91	55.9	55.8	55.9	1	-38
GKSS	-91	98.8	98.5	98.8	1	-90
GKSS	-91	71.9	71.7	71.9	1	-64
GKSS	-91	111.0	110.7	111.0	1	-98
GKSS	-91	93.5	93.2	93.5	1	-86
GKSS	-91	79.9	79.7	79.9	1	-73
GKSS	-91	98.4	98.1	98.4	1	-90
GKSS	-91	101.1	100.8	101.1	1	-92
TWI	-91	79.6	79.4	79.6	1	-73
TWI	-91	99.7	99.3	99.7	1	-91
TWI	-91	108.1	107.7	108.1	1	-96
TWI	-91	93.4	93.1	93.4	1	-86
TWI	-91	62.0	61.8	62.0	1	-50
TWI	-91	107.1	106.7	107.1	1	-96
TWI	-91	145.3	144.8	145.3	1	-117
TWI	-91	76.3	76.0	76.3	1	-69
TWI	-91	126.5	126.1	126.5	1	-108
TWI	-91	126.1	125.7	126.1	1	-107
TWI	-91	128.5	128.0	128.5	1	-109
TWI	-91	111.4	111.0	111.4	1	-99
TWI	-91	130.4	130.0	130.4	1	-110
TWI	-91	134.8	134.3	134.8	1	-112
TWI	-91	157.3	156.7	157.3	1	-122
TWI	-91	105.2	104.9	105.2	1	-95
TWI	-91	109.8	109.4	109.8	1	-98
TWI	-91	84.9	84.6	84.9	1	-78
TWI	-91	62.8	62.7	62.8	1	-51
TWI	-91	97.5	97.2	97.5	1	-89
TWI	-91	80.2	79.9	80.2	1	-73
TWI	-91	134.4	133.9	134.4	1	-112
TWI	-91	65.1	65.0	65.1	1	-54
TWI	-91	118.6	118.2	118.6	1	-103
GKSS	-91	67.3	76.1	67.3	1	-69
GKSS	-91	162.9	189.3	162.9	1	-134
GKSS	-91	100.0	114.7	100.0	1	-101
GKSS	-91	91.2	104.3	91.2	1	-94
GKSS	-91	106.2	122.1	106.2	1	-105
GKSS	-91	83.2	94.9	83.2	1	-87
GKSS	-91	91.8	105.0	91.8	1	-95
GKSS	-91	94.7	108.5	94.7	1	-97
GKSS	-91	92.9	106.4	92.9	1	-96
GKSS	-91	69.9	79.2	69.9	1	-72
NE	-91	93.1	106.6	93.1	1	-96
NE	-91	97.9	112.2	97.9	1	-99
NE	-91	73.7	83.7	73.7	1	-77
NE	-91	82.0	93.4	82.0	1	-86
NE	-91	76.3	86.7	76.3	1	-80
NE	-91	93.1	106.6	93.1	1	-96
NE	-91	83.7	95.5	83.7	1	-88
NE	-91	82.1	93.6	82.1	1	-86

NE	-91	86.8	99.2	86.8	1	-90
NE	-91	86.7	99.0	86.7	1	-90
NE	-91	92.3	105.7	92.3	1	-95
NE	-91	83.1	94.8	83.1	1	-87
NE	-91	88.9	101.6	88.9	1	-92
NE	-91	64.3	72.5	64.3	1	-65
NE	-91	101.6	116.7	101.6	1	-102
NE	-91	94.2	107.9	94.2	1	-97
NE	-91	78.7	89.5	78.7	1	-82
NE	-91	73.0	82.8	73.0	1	-76
NE	-91	64.2	72.3	64.2	1	-64
NE	-91	98.9	113.5	98.9	1	-100
GKSS	-91	103.2	137.2	103.2	1	-113
GKSS	-91	84.4	110.7	84.4	1	-98
GKSS	-91	97.0	128.5	97.0	1	-109
GKSS	-91	92.7	122.4	92.7	1	-106
GKSS	-91	96.8	128.2	96.8	1	-109
NE	-91	73.6	95.5	73.6	1	-88
NE	-91	73.0	94.7	73.0	1	-87
NE	-91	73.3	95.1	73.3	1	-87
NE	-91	53.8	67.7	53.8	1	-58
NE	-91	69.5	89.7	69.5	1	-83
NE	-91	65.5	84.0	65.5	1	-77
NE	-91	79.6	104.0	79.6	1	-94
NE	-91	69.8	90.1	69.8	1	-83
NE	-91	90.3	119.0	90.3	1	-104
NE	-91	88.0	115.8	88.0	1	-102
GKSS	-60	234.1	199.3	205.5	0	-
GKSS	-60	114.4	99.1	114.4	1	-59
GKSS	-60	130.7	112.7	130.7	1	-69
GKSS	-60	106.7	92.6	106.7	1	-54
GKSS	-60	161.0	138.1	161.0	1	-83
GKSS	-60	200.7	171.3	200.7	1	-97
GKSS	-60	125.2	108.1	125.2	1	-66
GKSS	-60	145.1	124.8	145.1	1	-76
GKSS	-60	91.9	80.2	91.9	1	-43
GKSS	-60	128.1	110.6	128.1	1	-67
GKSS	-60	164.4	140.9	164.4	1	-84
GKSS	-60	192.2	164.3	192.2	1	-94
GKSS	-60	166.3	142.5	166.3	1	-85
GKSS	-60	177.7	152.1	177.7	1	-89
GKSS	-60	203.7	173.9	202.0	0	-
GKSS	-60	116.0	100.4	116.0	1	-60
GKSS	-60	221.9	189.1	202.0	0	-
GKSS	-60	167.6	143.6	167.6	1	-85
GKSS	-60	89.8	78.5	89.8	1	-41
GKSS	-60	156.3	134.1	156.3	1	-81
GKSS	-60	186.8	159.7	186.8	1	-92
GKSS	-60	213.5	182.1	203.2	0	-
GKSS	-60	164.6	141.1	164.6	1	-84
GKSS	-60	280.1	237.9	202.6	0	-
GKSS	-60	185.9	159.0	185.9	1	-92
GKSS	-60	127.7	110.2	127.7	1	-67
GKSS	-60	205.0	175.0	201.2	0	-
GKSS	-60	115.6	100.0	115.6	1	-60
GKSS	-60	107.5	93.3	107.5	1	-55
SIEMENS	-60	164.6	141.1	164.6	1	-84
SIEMENS	-60	172.0	147.3	172.0	1	-87
SIEMENS	-60	108.5	94.2	108.5	1	-55
SIEMENS	-60	119.0	102.9	119.0	1	-62
SIEMENS	-60	153.5	131.8	153.5	1	-80
SIEMENS	-60	158.9	136.4	158.9	1	-82
SIEMENS	-60	137.5	118.4	137.5	1	-72
SIEMENS	-60	119.5	103.3	119.5	1	-62
SIEMENS	-60	130.7	112.8	130.7	1	-69
SIEMENS	-60	172.6	147.8	172.6	1	-87
SIEMENS	-60	84.5	74.0	84.5	1	-36
SIEMENS	-60	244.6	208.1	213.4	0	-
SIEMENS	-60	120.4	104.1	120.4	1	-63
SIEMENS	-60	104.5	90.8	104.5	1	-53
SIEMENS	-60	163.6	140.2	163.6	1	-84
SIEMENS	-60	201.4	172.0	201.4	1	-97
SIEMENS	-60	137.8	118.7	137.8	1	-72
SIEMENS	-60	173.0	148.1	173.0	1	-88
SIEMENS	-60	99.2	86.4	99.2	1	-49
SIEMENS	-60	173.4	148.4	173.4	1	-88
SIEMENS	-60	131.5	113.4	131.5	1	-69
GKSS	-60	186.0	185.3	186.0	1	-102
GKSS	-60	151.8	151.3	151.8	1	-89
GKSS	-60	111.7	111.3	111.7	1	-68
GKSS	-60	143.9	143.4	143.9	1	-85
GKSS	-60	105.4	105.1	105.4	1	-64
GKSS	-60	154.0	153.4	154.0	1	-90
GKSS	-60	176.2	175.6	176.2	1	-99
GKSS	-60	131.9	131.5	131.9	1	-80

GKSS	-60	203.9	203.2	203.9	1	-108
GKSS	-60	142.7	142.2	142.7	1	-85
TWI	-60	134.5	134.0	134.5	1	-81
TWI	-60	130.1	129.7	130.1	1	-79
TWI	-60	142.6	142.1	142.6	1	-85
TWI	-60	119.7	119.3	119.7	1	-73
TWI	-60	141.3	140.8	141.3	1	-84
TWI	-60	175.9	175.3	175.9	1	-98
TWI	-60	119.6	119.2	119.6	1	-73
TWI	-60	102.4	102.0	102.4	1	-62
TWI	-60	99.0	98.7	99.0	1	-59
TWI	-60	115.1	114.7	115.1	1	-70
TWI	-60	172.9	172.3	172.9	1	-97
TWI	-60	120.5	120.2	120.5	1	-73
TWI	-60	165.2	164.6	165.2	1	-94
TWI	-60	125.6	125.2	125.6	1	-76
TWI	-60	126.7	126.3	126.7	1	-77
TWI	-60	100.4	100.1	100.4	1	-60
TWI	-60	131.1	130.7	131.1	1	-79
TWI	-60	185.1	184.5	185.1	1	-102
TWI	-60	163.6	163.0	163.6	1	-94
TWI	-60	126.5	126.1	126.5	1	-77
TWI	-60	164.7	164.1	164.7	1	-94
TWI	-60	192.7	192.0	192.7	1	-104
TWI	-60	134.5	134.1	134.5	1	-81
TWI	-60	140.8	140.3	140.8	1	-84
GKSS	-60	109.9	126.5	109.9	1	-77
GKSS	-60	131.9	152.5	131.9	1	-89
GKSS	-60	136.2	157.6	136.2	1	-92
GKSS	-60	154.0	178.8	154.0	1	-100
GKSS	-60	115.9	133.6	115.9	1	-81
GKSS	-60	150.4	174.4	150.4	1	-98
BAM	-40	171.0	146.5	171.0	1	-67
BAM	-40	569.4	480.2	206.2	0	-
BAM	-40	169.4	145.1	169.4	1	-66
BAM	-40	548.7	462.8	203.6	0	-
BAM	-40	529.9	447.1	202.5	0	-
BAM	-40	318.5	270.1	207.2	0	-
BAM	-40	574.8	484.7	205.9	0	-
BAM	-40	360.8	305.4	206.5	0	-
BAM	-40	343.8	291.2	207.3	0	-
BAM	-40	235.8	200.8	205.1	0	-
BAM	-40	529.9	447.1	202.8	0	-
BAM	-40	496.5	419.1	204.9	0	-
BAM	-40	600.0	505.8	205.2	0	-
BAM	-40	113.7	98.5	113.7	1	-39
BAM	-40	229.6	195.5	204.8	0	-
BAM	-40	154.2	132.4	154.2	1	-60
BAM	-40	221.3	188.6	206.2	0	-
BAM	-40	486.7	410.9	204.2	0	-
BAM	-40	243.8	207.4	207.3	0	-
BAM	-40	202.5	172.8	202.5	1	-78
GKSS	-40	180.6	154.6	180.6	1	-70
GKSS	-40	206.7	176.4	203.5	0	-
GKSS	-40	240.7	204.9	198.2	0	-
GKSS	-40	270.8	230.1	199.6	0	-
GKSS	-40	186.4	159.4	186.4	1	-72
GKSS	-40	255.8	217.5	199.4	0	-
GKSS	-40	231.2	196.9	204.4	0	-
GKSS	-40	339.4	287.5	202.4	0	-
GKSS	-40	403.1	340.9	203.2	0	-
GKSS	-40	399.2	337.6	200.9	0	-
BAM	-40	187.3	186.6	187.3	1	-82
BAM	-40	101.5	101.2	101.5	1	-41
BAM	-40	140.3	139.9	140.3	1	-64
BAM	-40	150.2	149.7	150.2	1	-68
BAM	-40	187.3	186.6	187.3	1	-82
BAM	-40	211.4	210.6	211.4	1	-90
BAM	-40	160.5	160.0	160.5	1	-73
BAM	-40	214.6	213.8	214.6	1	-91
BAM	-40	188.3	187.7	188.3	1	-83
BAM	-40	239.3	238.4	239.3	1	-97
BAM	-40	112.8	112.4	112.8	1	-49
BAM	-40	239.0	238.1	239.0	1	-97
BAM	-40	284.9	283.9	284.9	1	-108
BAM	-40	254.7	253.7	254.7	1	-101
BAM	-40	270.9	269.9	270.9	1	-105
BAM	-40	187.0	186.3	187.0	1	-82
BAM	-40	170.1	169.5	170.1	1	-76
BAM	-40	256.4	255.5	256.4	1	-102
BAM	-40	171.4	170.8	171.4	1	-77
BAM	-40	103.1	102.8	103.1	1	-42
BAM	-40	230.0	229.1	230.0	1	-95
BAM	-40	210.0	209.2	210.0	1	-89
GKSS	-40	198.2	197.5	198.2	1	-86

GKSS	-40	150.2	149.7	150.2	1	-68
GKSS	-40	226.8	226.0	226.8	1	-94
GKSS	-40	158.1	157.5	158.1	1	-72
GKSS	-40	256.4	255.5	256.4	1	-102
GKSS	-40	207.6	206.9	207.6	1	-89
GKSS	-40	213.5	212.8	213.5	1	-91
GKSS	-40	254.6	253.7	254.6	1	-101
GKSS	-40	240.0	239.1	240.0	1	-98
GKSS	-40	309.2	308.0	279.0	0	-
GKSS	-40	125.9	145.5	125.9	1	-66
GKSS	-40	128.9	149.0	128.9	1	-68
GKSS	-40	198.5	231.5	198.5	1	-96
GKSS	-40	212.0	247.5	212.0	1	-100
GKSS	-40	138.6	160.5	138.6	1	-73
GKSS	-40	187.7	218.7	187.7	1	-92
GKSS	-40	173.0	201.2	173.0	1	-87
GKSS	-40	179.5	208.9	179.5	1	-89
GKSS	-40	152.6	177.1	152.6	1	-79
GKSS	-40	153.6	178.3	153.6	1	-80
THA	-40	144.6	167.6	144.6	1	-76
THA	-40	150.7	174.9	150.7	1	-78
THA	-40	139.1	161.0	139.1	1	-73
THA	-40	183.6	213.8	183.6	1	-91
THA	-40	142.0	164.5	142.0	1	-74
THA	-40	187.2	218.0	187.2	1	-92
THA	-40	172.2	200.3	172.2	1	-87
THA	-40	198.0	230.8	198.0	1	-95
THA	-40	130.4	150.8	130.4	1	-69
THA	-40	141.7	164.1	141.7	1	-74
THA	-40	134.5	155.6	134.5	1	-71
THA	-40	115.5	133.1	115.5	1	-60
THA	-40	91.7	104.9	91.7	1	-44
THA	-40	141.1	163.4	141.1	1	-74
THA	-40	239.1	279.6	239.1	1	-107
THA	-40	243.4	284.7	243.4	1	-108
THA	-40	191.9	223.6	191.9	1	-94
THA	-40	146.8	170.2	146.8	1	-77
THA	-40	161.4	187.5	161.4	1	-83
THA	-40	142.3	164.8	142.3	1	-75
CISE	-20	128.7	111.1	128.7	0	-
CISE	-20	146.9	126.3	146.9	0	-
CISE	-20	402.8	340.6	204.3	0	-
CISE	-20	409.4	346.2	198.3	0	-
CISE	-20	530.5	447.6	195.0	0	-
CISE	-20	532.2	449.0	197.8	0	-
CISE	-20	534.6	451.0	195.6	0	-
CISE	-20	536.1	452.3	196.2	0	-
CISE	-20	536.1	452.3	194.0	0	-
CISE	-20	536.6	452.7	198.3	0	-
CISE	-20	538.6	454.3	201.2	0	-
CISE	-20	540.5	455.9	200.9	0	-
CISE	-20	543.8	458.7	195.6	0	-
CISE	-20	549.2	463.2	197.6	0	-
CISE	-20	553.7	467.0	201.9	0	-
CISE	-20	556.1	469.0	202.5	0	-
CISE	-20	556.3	469.2	198.1	0	-
CISE	-20	560.6	472.8	198.1	0	-
CISE	-20	565.8	477.2	200.7	0	-
CISE	-20	570.1	480.8	199.8	0	-
CISE	-20	571.1	481.6	201.5	0	-
GKSS	-20	233.1	198.5	200.6	0	-
GKSS	-20	389.8	329.8	200.6	0	-
GKSS	-20	487.9	411.9	199.8	0	-
GKSS	-20	438.3	370.4	198.2	0	-
GKSS	-20	571.4	481.8	199.3	0	-
GKSS	-20	560.7	472.9	196.6	0	-
GKSS	-20	561.1	473.2	198.6	0	-
GKSS	-20	575.1	484.9	200.7	0	-
GKSS	-20	557.5	470.2	195.0	0	-
GKSS	-20	572.5	482.7	198.6	0	-
GKSS	-20	202.5	201.7	202.5	0	-
GKSS	-20	194.7	194.1	194.7	0	-
GKSS	-20	262.8	261.8	262.8	0	-
GKSS	-20	187.9	187.2	187.9	0	-
GKSS	-20	275.8	274.8	275.8	0	-
GKSS	-20	261.8	260.9	261.8	0	-
GKSS	-20	371.0	369.7	283.2	0	-
GKSS	-20	369.1	367.7	283.1	0	-
GKSS	-20	462.1	460.4	284.0	0	-
GKSS	-20	319.7	318.5	284.2	0	-
VTT	-20	583.1	580.9	284.0	0	-
VTT	-20	231.9	231.0	231.9	0	-
VTT	-20	382.0	380.6	279.4	0	-
VTT	-20	295.9	294.8	280.3	0	-
VTT	-20	576.4	574.2	279.4	0	-

VTT	-20	411.7	410.1	278.6	0	-
VTT	-20	306.4	305.2	281.9	0	-
VTT	-20	324.7	323.5	279.4	0	-
VTT	-20	282.5	281.4	282.5	0	-
VTT	-20	247.2	246.3	247.2	0	-
VTT	-20	233.2	232.4	233.2	0	-
VTT	-20	317.5	316.3	283.2	0	-
VTT	-20	515.6	513.7	288.9	0	-
VTT	-20	263.2	262.3	263.2	0	-
VTT	-20	184.4	183.8	184.4	0	-
VTT	-20	286.9	285.9	283.7	0	-
VTT	-20	341.4	340.1	280.8	0	-
VTT	-20	415.0	413.4	280.9	0	-
VTT	-20	327.9	326.7	280.9	0	-
VTT	-20	170.9	170.3	170.9	0	-
VTT	-20	308.8	307.6	282.9	0	-
VTT	-20	376.5	375.1	275.7	0	-
VTT	-20	228.2	227.4	228.2	0	-
VTT	-20	371.7	370.3	282.0	0	-
VTT	-20	291.6	290.6	280.9	0	-
VTT	-20	337.7	336.4	281.8	0	-
VTT	-20	390.5	389.0	281.4	0	-
VTT	-20	227.3	226.5	227.3	0	-
VTT	-20	201.3	200.6	201.3	0	-
VTT	-20	212.5	211.7	212.5	0	-
VTT	-20	288.4	287.3	256.5	0	-
VTT	-20	479.1	477.3	284.8	0	-
VTT	-20	377.9	376.5	282.3	0	-
VTT	-20	269.6	268.6	269.6	0	-
VTT	-20	184.4	183.8	184.4	0	-
VTT	-20	241.6	240.7	241.6	0	-
VTT	-20	146.4	145.9	146.4	0	-
VTT	-20	299.4	298.3	280.0	0	-
VTT	-20	156.7	156.2	156.7	0	-
VTT	-20	295.6	294.5	277.0	0	-
CISE	-20	167.4	194.6	167.4	0	-
CISE	-20	153.5	178.1	153.5	0	-
CISE	-20	211.2	246.5	211.2	0	-
CISE	-20	220.3	257.3	220.3	0	-
CISE	-20	227.9	266.2	227.9	0	-
CISE	-20	211.1	246.4	211.1	0	-
CISE	-20	217.1	253.4	217.1	0	-
CISE	-20	145.3	168.5	145.3	0	-
CISE	-20	161.2	187.2	161.2	0	-
CISE	-20	131.9	152.5	131.9	0	-
CISE	-20	216.4	252.6	216.4	0	-
CISE	-20	125.0	144.4	125.0	0	-
CISE	-20	378.7	444.9	378.7	0	-
CISE	-20	246.1	287.9	246.1	0	-
CISE	-20	250.9	293.5	250.9	0	-
CISE	-20	251.5	294.3	251.5	0	-
CISE	-20	284.0	332.7	284.0	0	-
CISE	-20	261.1	305.6	261.1	0	-
CISE	-20	351.6	412.8	351.6	0	-
CISE	-20	258.5	302.5	258.5	0	-
GKSS	-20	201.3	234.8	201.3	0	-
GKSS	-20	110.9	127.7	110.9	0	-
GKSS	-20	197.7	230.5	197.7	0	-
GKSS	-20	198.9	231.9	198.9	0	-
GKSS	-20	200.6	234.0	200.6	0	-
GKSS	-20	165.7	192.6	165.7	0	-
GKSS	-20	280.1	328.0	280.1	0	-
GKSS	-20	279.5	327.3	279.5	0	-
GKSS	-20	257.6	301.4	257.6	0	-
GKSS	-20	265.2	310.4	265.2	0	-
GKSS	-20	156.7	212.6	156.7	0	-
GKSS	-20	221.7	304.1	221.7	0	-
GKSS	-20	193.9	264.9	193.9	0	-
GKSS	-20	191.7	261.9	191.7	0	-
GKSS	-20	184.4	251.6	184.4	0	-
NE	-20	186.7	254.8	186.7	0	-
NE	-20	184.4	251.6	184.4	0	-
NE	-20	193.9	264.9	193.9	0	-
NE	-20	204.4	279.8	204.4	0	-
NE	-20	224.0	307.4	224.0	0	-
NE	-20	153.4	207.9	153.4	0	-
NE	-20	222.6	305.4	222.6	0	-
NE	-20	162.0	220.0	162.0	0	-
NE	-20	187.8	256.4	187.8	0	-
NE	-20	198.2	271.0	198.2	0	-
SCK-CEN	-10	656.0	653.4	280.0	0	-
SCK-CEN	-10	397.8	396.3	281.2	0	-
SCK-CEN	-10	718.1	715.3	282.6	0	-
SCK-CEN	-10	601.6	599.3	284.0	0	-
SCK-CEN	-10	505.3	503.4	280.9	0	-

GKSS	0	541.9	457.1	196.8	0	-
GKSS	0	547.0	461.4	193.7	0	-
GKSS	0	538.7	454.4	192.9	0	-
GKSS	0	540.0	455.5	196.7	0	-
GKSS	0	544.8	459.6	196.1	0	-
GKSS	0	534.8	451.2	194.7	0	-
GKSS	0	557.2	469.9	196.3	0	-
GKSS	0	545.0	459.7	195.9	0	-
GKSS	0	546.1	460.6	195.2	0	-
GKSS	0	549.2	463.2	193.3	0	-
SCK-CEN	0	565.1	476.5	198.4	0	-
SCK-CEN	0	571.6	482.0	199.1	0	-
SCK-CEN	0	553.4	466.8	198.2	0	-
SCK-CEN	0	293.2	248.8	197.6	0	-
SCK-CEN	0	544.1	459.0	201.2	0	-
SCK-CEN	0	552.2	465.7	200.0	0	-
SCK-CEN	0	558.0	470.6	197.4	0	-
SCK-CEN	0	553.5	466.8	199.6	0	-
SCK-CEN	0	557.6	470.3	203.4	0	-
SCK-CEN	0	552.4	466.0	199.2	0	-
SCK-CEN	0	555.6	468.6	200.5	0	-
SCK-CEN	0	558.2	470.8	202.4	0	-
SCK-CEN	0	550.6	464.4	197.2	0	-
SCK-CEN	0	560.8	473.0	205.8	0	-
SCK-CEN	0	569.6	480.4	205.5	0	-
SCK-CEN	0	552.5	466.0	202.4	0	-
SCK-CEN	0	578.5	487.7	203.4	0	-
SCK-CEN	0	556.0	468.9	205.2	0	-
SCK-CEN	0	543.8	458.7	202.3	0	-
SCK-CEN	0	556.3	469.2	201.6	0	-
GKSS	0	327.6	326.4	282.4	0	-
GKSS	0	681.4	678.8	283.7	0	-
GKSS	0	700.8	698.2	284.9	0	-
GKSS	0	698.2	695.5	282.8	0	-
GKSS	0	708.4	705.7	284.4	0	-
GKSS	0	701.5	698.8	284.9	0	-
GKSS	0	724.9	722.1	279.6	0	-
GKSS	0	717.4	714.6	283.9	0	-
GKSS	0	705.8	703.0	285.7	0	-
GKSS	0	709.5	706.8	283.0	0	-
SCK-CEN	0	716.7	714.0	277.0	0	-
SCK-CEN	0	714.1	711.3	276.7	0	-
SCK-CEN	0	658.5	656.0	276.9	0	-
SCK-CEN	0	747.5	744.6	277.9	0	-
SCK-CEN	0	709.0	706.2	276.9	0	-
SCK-CEN	0	719.2	716.4	278.2	0	-
SCK-CEN	0	444.5	442.8	278.0	0	-
SCK-CEN	0	699.8	697.1	275.9	0	-
SCK-CEN	0	704.0	701.3	277.6	0	-
SCK-CEN	0	729.5	726.7	278.2	0	-
SCK-CEN	0	714.0	711.3	277.3	0	-
VTT	0	725.6	722.8	280.3	0	-
VTT	0	730.2	727.4	275.5	0	-
VTT	0	737.8	734.9	280.3	0	-
VTT	0	590.7	588.4	275.2	0	-
VTT	0	730.3	727.5	278.0	0	-
VTT	0	741.8	738.9	278.5	0	-
VTT	0	744.2	741.3	279.7	0	-
VTT	0	527.7	525.7	267.2	0	-
VTT	0	620.4	618.0	279.8	0	-
VTT	0	727.0	724.2	278.6	0	-
VTT	0	730.3	727.5	278.3	0	-
VTT	0	542.6	540.5	280.0	0	-
VTT	0	726.7	723.9	274.3	0	-
VTT	0	718.7	716.0	276.0	0	-
VTT	0	717.1	714.4	278.7	0	-
VTT	0	721.2	718.5	278.0	0	-
VTT	0	725.3	722.5	279.1	0	-
VTT	0	727.9	725.1	278.6	0	-
VTT	0	727.0	724.2	279.4	0	-
VTT	0	718.5	715.7	276.2	0	-
GKSS	0	191.3	222.9	191.3	0	-
GKSS	0	269.2	315.2	269.2	0	-
GKSS	0	281.2	329.4	281.2	0	-
GKSS	0	242.5	283.5	242.5	0	-
GKSS	0	318.3	373.3	318.3	0	-
GKSS	0	476.2	560.4	395.4	0	-
GKSS	0	511.7	602.5	396.5	0	-
GKSS	0	621.3	732.2	394.9	0	-
GKSS	0	531.3	625.6	396.3	0	-
GKSS	0	266.6	312.1	266.6	0	-
GKSS	0	599.3	706.2	395.2	0	-
GKSS	0	362.9	426.1	362.9	0	-
GKSS	0	331.8	389.3	331.8	0	-
GKSS	0	227.1	265.3	227.1	0	-

GKSS	0	309.5	362.9	309.5	0	-
GKSS	0	628.6	740.9	395.4	0	-
GKSS	0	210.9	246.1	210.9	0	-
GKSS	0	410.7	482.8	394.9	0	-
GKSS	0	211.4	246.7	211.4	0	-
GKSS	0	778.3	918.2	393.9	0	-
GKSS	0	263.4	308.3	263.4	0	-
GKSS	0	682.2	804.4	393.3	0	-
GKSS	0	386.7	454.3	386.7	0	-
GKSS	0	376.2	441.9	376.2	0	-
GKSS	0	642.5	757.3	394.4	0	-
GKSS	0	306.7	359.6	306.7	0	-
GKSS	0	758.4	894.6	394.8	0	-
GKSS	0	797.9	941.4	393.9	0	-
GKSS	0	246.4	288.2	246.4	0	-
GKSS	0	320.1	375.4	320.1	0	-
CISE	0	233.3	320.4	233.3	0	-
CISE	0	238.2	327.4	238.2	0	-
CISE	0	208.3	285.2	208.3	0	-
CISE	0	421.7	585.8	421.7	0	-
CISE	0	226.7	311.2	226.7	0	-
CISE	0	267.0	367.9	267.0	0	-
CISE	0	163.0	221.4	163.0	0	-
CISE	0	165.8	225.4	165.8	0	-
CISE	0	285.9	394.6	285.9	0	-
CISE	0	342.0	473.5	342.0	0	-
GKSS	0	314.9	435.4	314.9	0	-
GKSS	0	307.6	425.1	307.6	0	-
GKSS	0	383.0	531.4	383.0	0	-
GKSS	0	332.6	460.4	332.6	0	-
GKSS	0	223.6	306.8	223.6	0	-
GKSS	0	442.2	614.7	442.2	0	-

2. Revised Master Curve fit to data

<i>T</i> (°C)	<i>K_{Jc(exp)}</i> (MPa √m)	<i>K_{Jc(1T)}</i> (MPa √m)	<i>K_{MC(1T)}</i> (MPa √m)	5% conf. (MPa √m)	95% conf. (MPa √m)	5% L.B. (MPa √m)
-154	54.8	49.3				
-154	49.8	45.0				
-154	37.8	35.0				
-154	33.0	31.0				
-154	38.9	35.9				
-154	24.2	23.6				
-154	47.4	43.0				
-154	46.5	42.3				
-154	31.4	29.6				
-154	39.2	36.1				
-154	24.2	23.6				
-154	33.0	31.0				
-154	41.0	37.6				
-154	31.7	29.9				
-154	35.2	32.8				
-154	44.4	40.5				
-154	41.5	38.1				
-154	32.7	30.7				
-154	34.3	32.0				
-154	36.7	34.0				
-154	39.7	36.6				
-154	46.1	41.9				
-154	34.6	32.3				
-154	35.8	33.3				
-154	29.3	27.9				
-154	28.6	27.2				
-154	38.6	35.7				
-154	44.4	40.5				
-154	48.9	44.3				
-154	38.9	35.9				
-154	36.7	34.0				
-154	31.7	29.9				
-154	41.5	41.5				
-154	42.2	42.2				
-154	50.0	50.0				
-154	34.0	34.0				

-154	41.7	41.7
-154	46.1	46.1
-154	44.2	44.2
-154	36.7	36.7
-154	29.0	29.0
-154	53.0	53.0
-154	39.4	39.4
-154	29.0	29.0
-154	34.6	34.6
-154	33.0	33.0
-154	38.1	38.1
-154	28.6	28.6
-154	28.6	28.6
-154	38.6	38.6
-154	36.4	36.4
-154	33.4	33.4
-154	36.9	36.9
-154	31.1	31.1
-154	34.3	34.3
-154	30.4	30.4
-154	49.6	49.6
-154	41.0	41.0
-154	34.0	34.0
-154	30.7	30.7
-154	41.2	41.2
-154	26.7	26.7
-154	35.5	35.5
-154	33.4	33.4
-154	36.7	36.7
-154	32.4	32.4
-154	45.1	45.1
-154	33.4	33.4
-154	34.0	34.0
-154	30.7	30.7
-154	26.7	26.7
-154	33.7	36.3
-154	42.7	47.0
-154	37.2	40.5
-154	54.4	60.9
-154	34.6	37.4
-154	44.2	48.8
-154	29.7	31.5
-154	36.4	39.5
-154	36.4	39.5
-154	28.2	29.8
-154	28.2	29.8
-154	30.0	32.0
-154	36.4	39.5
-154	37.5	40.8
-154	30.0	32.0
-154	30.7	32.8
-154	30.4	32.4
-154	30.7	32.8
-154	31.7	34.0
-154	41.7	45.9
-154	37.2	40.5
-154	34.9	37.7
-154	38.3	41.8
-154	31.4	33.6
-154	33.7	36.3
-154	32.7	35.1
-154	43.0	47.3
-154	32.7	35.1
-154	30.0	32.0
-154	36.9	40.2
-154	33.4	35.9
-154	30.0	32.0
-110	98.1	85.6
-110	59.0	52.8
-110	80.0	70.5
-110	57.2	51.3

-110	88.3	77.4
-110	96.2	84.1
-110	81.6	71.8
-110	66.9	59.4
-110	85.6	75.2
-110	86.8	76.2
-110	114.2	99.2
-110	73.5	65.0
-110	92.7	81.1
-110	77.5	68.4
-110	61.5	54.9
-110	51.8	46.8
-110	73.6	65.1
-110	52.8	47.6
-110	41.2	37.9
-110	115.3	100.1
-110	73.2	64.7
-110	74.0	65.4
-110	67.5	59.9
-110	71.0	62.9
-110	53.4	48.1
-110	96.5	84.3
-110	71.3	63.1
-110	71.7	63.5
-110	81.7	71.9
-110	64.0	57.0
-110	74.2	65.6
-110	70.4	62.4
-110	91.2	79.9
-110	72.0	63.7
-110	64.8	57.7
-110	79.2	69.8
-110	52.2	47.1
-110	82.9	72.9
-110	93.2	81.6
-110	75.4	66.6
-110	75.0	66.3
-110	78.6	69.3
-110	94.8	82.9
-110	98.1	85.6
-110	98.5	86.0
-110	104.9	91.4
-110	69.9	62.0
-110	81.6	71.8
-110	55.2	49.6
-110	105.6	92.0
-110	101.5	88.6
-110	73.7	65.2
-110	97.5	85.2
-110	75.9	67.0
-110	48.3	43.8
-91	127.0	110.0
-91	121.8	105.6
-91	70.5	62.5
-91	94.2	82.4
-91	127.3	110.3
-91	119.9	104.0
-91	104.5	91.1
-91	78.6	69.3
-91	98.6	86.1
-91	161.6	139.0
-91	91.3	80.0
-91	115.3	100.1
-91	122.4	106.1
-91	126.3	109.4
-91	108.3	94.3
-91	66.9	59.4
-91	126.7	109.8
-91	69.6	61.7
-91	121.4	105.3
-91	90.0	78.9

-91	153.9	132.6
-91	64.6	57.5
-91	127.2	110.1
-91	99.7	87.0
-91	101.3	88.4
-91	140.4	121.3
-91	78.2	68.9
-91	109.0	94.9
-91	103.9	90.5
-91	126.8	109.8
-91	111.7	97.1
-91	68.6	68.6
-91	81.6	81.6
-91	55.9	55.9
-91	98.8	98.8
-91	71.9	71.9
-91	111.0	111.0
-91	93.5	93.5
-91	79.9	79.9
-91	98.4	98.4
-91	101.1	101.1
-91	79.6	79.6
-91	99.7	99.7
-91	108.1	108.1
-91	93.4	93.4
-91	62.0	62.0
-91	107.1	107.1
-91	145.3	145.3
-91	76.3	76.3
-91	126.5	126.5
-91	126.1	126.1
-91	128.5	128.5
-91	111.4	111.4
-91	130.4	130.4
-91	134.8	134.8
-91	157.3	157.3
-91	105.2	105.2
-91	109.8	109.8
-91	84.9	84.9
-91	62.8	62.8
-91	97.5	97.5
-91	80.2	80.2
-91	134.4	134.4
-91	65.1	65.1
-91	118.6	118.6
-91	67.3	76.3
-91	162.9	190.0
-91	100.0	115.1
-91	91.2	104.7
-91	106.2	122.5
-91	83.2	95.2
-91	91.8	105.3
-91	94.7	108.8
-91	92.9	106.7
-91	69.9	79.4
-91	93.1	107.0
-91	97.9	112.6
-91	73.7	83.9
-91	82.0	93.7
-91	76.3	86.9
-91	93.1	107.0
-91	83.7	95.8
-91	82.1	93.9
-91	86.8	99.5
-91	86.7	99.3
-91	92.3	106.0
-91	83.1	95.1
-91	88.9	101.9
-91	64.3	72.7
-91	101.6	117.1
-91	94.2	108.3

-91	78.7	89.8
-91	73.0	83.1
-91	64.2	72.5
-91	98.9	113.9
-91	103.2	137.6
-91	84.4	111.0
-91	97.0	128.9
-91	92.7	122.8
-91	96.8	128.6
-91	73.6	95.8
-91	73.0	95.0
-91	73.3	95.4
-91	53.8	67.8
-91	69.5	90.0
-91	65.5	84.3
-91	79.6	104.3
-91	69.8	90.4
-91	90.3	119.4
-91	88.0	116.2
-60	234.1	200.0
-60	114.4	99.4
-60	130.7	113.1
-60	106.7	92.9
-60	161.0	138.5
-60	200.7	171.9
-60	125.2	108.4
-60	145.1	125.2
-60	91.9	80.4
-60	128.1	110.9
-60	164.4	141.4
-60	192.2	164.8
-60	166.3	143.0
-60	177.7	152.6
-60	203.7	174.5
-60	116.0	100.7
-60	221.9	189.8
-60	167.6	144.1
-60	89.8	78.7
-60	156.3	134.6
-60	186.8	160.2
-60	213.5	182.7
-60	164.6	141.6
-60	280.1	238.7
-60	185.9	159.5
-60	127.7	110.6
-60	205.0	175.6
-60	115.6	100.4
-60	107.5	93.6
-60	164.6	141.6
-60	172.0	147.8
-60	108.5	94.5
-60	119.0	103.2
-60	153.5	132.3
-60	158.9	136.8
-60	137.5	118.8
-60	119.5	103.7
-60	130.7	113.1
-60	172.6	148.3
-60	84.5	74.2
-60	244.6	208.9
-60	120.4	104.4
-60	104.5	91.1
-60	163.6	140.7
-60	201.4	172.6
-60	137.8	119.0
-60	173.0	148.6
-60	99.2	86.6
-60	173.4	149.0
-60	131.5	113.7
-60	186.0	186.0
-60	151.8	151.8

-60	111.7	111.7
-60	143.9	143.9
-60	105.4	105.4
-60	154.0	154.0
-60	176.2	176.2
-60	131.9	131.9
-60	203.9	203.9
-60	142.7	142.7
-60	134.5	134.5
-60	130.1	130.1
-60	142.6	142.6
-60	119.7	119.7
-60	141.3	141.3
-60	175.9	175.9
-60	119.6	119.6
-60	102.4	102.4
-60	99.0	99.0
-60	115.1	115.1
-60	172.9	172.9
-60	120.5	120.5
-60	165.2	165.2
-60	125.6	125.6
-60	126.7	126.7
-60	100.4	100.4
-60	131.1	131.1
-60	185.1	185.1
-60	163.6	163.6
-60	126.5	126.5
-60	164.7	164.7
-60	192.7	192.7
-60	134.5	134.5
-60	140.8	140.8
-60	109.9	126.9
-60	131.9	153.0
-60	136.2	158.2
-60	154.0	179.4
-60	115.9	134.1
-60	150.4	175.1
-40	171.0	147.0
-40	569.4	482.0
-40	169.4	145.6
-40	548.7	464.6
-40	529.9	448.8
-40	318.5	271.0
-40	574.8	486.5
-40	360.8	306.6
-40	343.8	292.3
-40	235.8	201.5
-40	529.9	448.8
-40	496.5	420.7
-40	600.0	507.7
-40	113.7	98.8
-40	229.6	196.2
-40	154.2	132.8
-40	221.3	189.3
-40	486.7	412.4
-40	243.8	208.2
-40	202.5	173.4
-40	180.6	155.1
-40	206.7	177.0
-40	240.7	205.6
-40	270.8	230.9
-40	186.4	159.9
-40	255.8	218.3
-40	231.2	197.6
-40	339.4	288.6
-40	403.1	342.2
-40	399.2	338.8
-40	187.3	187.3
-40	101.5	101.5
-40	140.3	140.3

-40	150.2	150.2
-40	187.3	187.3
-40	211.4	211.4
-40	160.5	160.5
-40	214.6	214.6
-40	188.3	188.3
-40	239.3	239.3
-40	112.8	112.8
-40	239.0	239.0
-40	284.9	284.9
-40	254.7	254.7
-40	270.9	270.9
-40	187.0	187.0
-40	170.1	170.1
-40	256.4	256.4
-40	171.4	171.4
-40	103.1	103.1
-40	230.0	230.0
-40	210.0	210.0
-40	198.2	198.2
-40	150.2	150.2
-40	226.8	226.8
-40	158.1	158.1
-40	256.4	256.4
-40	207.6	207.6
-40	213.5	213.5
-40	254.6	254.6
-40	240.0	240.0
-40	309.2	309.2
-40	125.9	146.0
-40	128.9	149.5
-40	198.5	232.3
-40	212.0	248.4
-40	138.6	161.1
-40	187.7	219.5
-40	173.0	201.9
-40	179.5	209.7
-40	152.6	177.7
-40	153.6	178.9
-40	144.6	168.2
-40	150.7	175.5
-40	139.1	161.6
-40	183.6	214.5
-40	142.0	165.1
-40	187.2	218.8
-40	172.2	201.0
-40	198.0	231.7
-40	130.4	151.3
-40	141.7	164.7
-40	134.5	156.1
-40	115.5	133.5
-40	91.7	105.2
-40	141.1	164.0
-40	239.1	280.6
-40	243.4	285.7
-40	191.9	224.5
-40	146.8	170.8
-40	161.4	188.1
-40	142.3	165.4
-20	128.7	111.4
-20	146.9	126.7
-20	402.8	341.9
-20	409.4	347.5
-20	530.5	449.3
-20	532.2	450.7
-20	534.6	452.8
-20	536.1	454.0
-20	536.1	454.0
-20	536.6	454.4
-20	538.6	456.1
-20	540.5	457.7

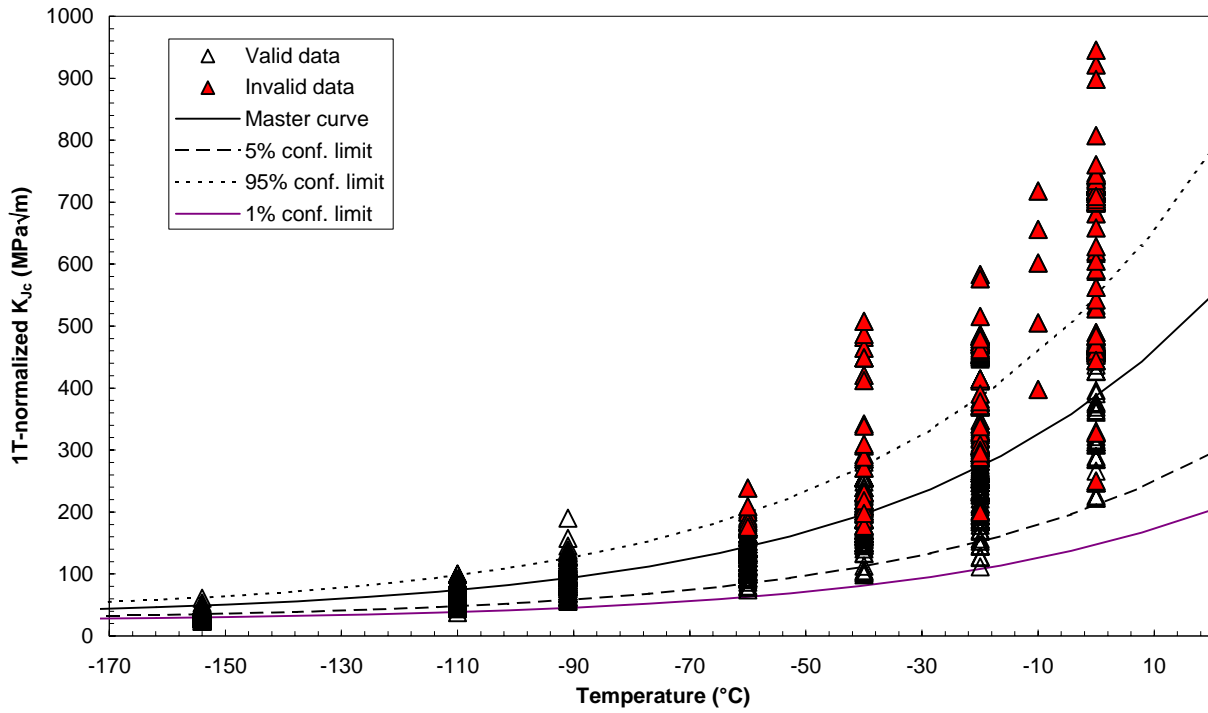
-20	543.8	460.5
-20	549.2	465.0
-20	553.7	468.8
-20	556.1	470.8
-20	556.3	471.0
-20	560.6	474.6
-20	565.8	479.0
-20	570.1	482.6
-20	571.1	483.4
-20	233.1	199.2
-20	389.8	331.0
-20	487.9	413.5
-20	438.3	371.8
-20	571.4	483.6
-20	560.7	474.7
-20	561.1	475.0
-20	575.1	486.8
-20	557.5	472.0
-20	572.5	484.6
-20	202.5	202.5
-20	194.7	194.7
-20	262.8	262.8
-20	187.9	187.9
-20	275.8	275.8
-20	261.8	261.8
-20	371.0	371.0
-20	369.1	369.1
-20	462.1	462.1
-20	319.7	319.7
-20	583.1	583.1
-20	231.9	231.9
-20	382.0	382.0
-20	295.9	295.9
-20	576.4	576.4
-20	411.7	411.7
-20	306.4	306.4
-20	324.7	324.7
-20	282.5	282.5
-20	247.2	247.2
-20	233.2	233.2
-20	317.5	317.5
-20	515.6	515.6
-20	263.2	263.2
-20	184.4	184.4
-20	286.9	286.9
-20	341.4	341.4
-20	415.0	415.0
-20	327.9	327.9
-20	170.9	170.9
-20	308.8	308.8
-20	376.5	376.5
-20	228.2	228.2
-20	371.7	371.7
-20	291.6	291.6
-20	337.7	337.7
-20	390.5	390.5
-20	227.3	227.3
-20	201.3	201.3
-20	212.5	212.5
-20	288.4	288.4
-20	479.1	479.1
-20	377.9	377.9
-20	269.6	269.6
-20	184.4	184.4
-20	241.6	241.6
-20	146.4	146.4
-20	299.4	299.4
-20	156.7	156.7
-20	295.6	295.6
-20	167.4	195.3
-20	153.5	178.8

-20	211.2	247.4
-20	220.3	258.3
-20	227.9	267.2
-20	211.1	247.3
-20	217.1	254.4
-20	145.3	169.1
-20	161.2	187.9
-20	131.9	153.0
-20	216.4	253.6
-20	125.0	144.9
-20	378.7	446.6
-20	246.1	288.9
-20	250.9	294.6
-20	251.5	295.4
-20	284.0	334.0
-20	261.1	306.7
-20	351.6	414.3
-20	258.5	303.6
-20	201.3	235.6
-20	110.9	128.1
-20	197.7	231.3
-20	198.9	232.8
-20	200.6	234.8
-20	165.7	193.3
-20	280.1	329.3
-20	279.5	328.6
-20	257.6	302.5
-20	265.2	311.6
-20	156.7	213.4
-20	221.7	305.2
-20	193.9	265.9
-20	191.7	262.8
-20	184.4	252.6
-20	186.7	255.8
-20	184.4	252.6
-20	193.9	265.9
-20	204.4	280.8
-20	224.0	308.5
-20	153.4	208.6
-20	222.6	306.5
-20	162.0	220.8
-20	187.8	257.3
-20	198.2	272.0
-10	656.0	656.0
-10	397.8	397.8
-10	718.1	718.1
-10	601.6	601.6
-10	505.3	505.3
0	541.9	458.9
0	547.0	463.1
0	538.7	456.2
0	540.0	457.3
0	544.8	461.3
0	534.8	452.9
0	557.2	471.7
0	545.0	461.5
0	546.1	462.4
0	549.2	465.0
0	565.1	478.4
0	571.6	483.8
0	553.4	468.6
0	293.2	249.7
0	544.1	460.7
0	552.2	467.5
0	558.0	472.4
0	553.5	468.6
0	557.6	472.1
0	552.4	467.7
0	555.6	470.4
0	558.2	472.6
0	550.6	466.2

0	560.8	474.8
0	569.6	482.2
0	552.5	467.8
0	578.5	489.6
0	556.0	470.7
0	543.8	460.5
0	556.3	471.0
0	327.6	327.6
0	681.4	681.4
0	700.8	700.8
0	698.2	698.2
0	708.4	708.4
0	701.5	701.5
0	724.9	724.9
0	717.4	717.4
0	705.8	705.8
0	709.5	709.5
0	716.7	716.7
0	714.1	714.1
0	658.5	658.5
0	747.5	747.5
0	709.0	709.0
0	719.2	719.2
0	444.5	444.5
0	699.8	699.8
0	704.0	704.0
0	729.5	729.5
0	714.0	714.0
0	725.6	725.6
0	730.2	730.2
0	737.8	737.8
0	590.7	590.7
0	730.3	730.3
0	741.8	741.8
0	744.2	744.2
0	527.7	527.7
0	620.4	620.4
0	727.0	727.0
0	730.3	730.3
0	542.6	542.6
0	726.7	726.7
0	718.7	718.7
0	717.1	717.1
0	721.2	721.2
0	725.3	725.3
0	727.9	727.9
0	727.0	727.0
0	718.5	718.5
0	191.3	223.7
0	269.2	316.4
0	281.2	330.6
0	242.5	284.6
0	318.3	374.7
0	476.2	562.5
0	511.7	604.8
0	621.3	735.0
0	531.3	628.0
0	266.6	313.3
0	599.3	709.0
0	362.9	427.7
0	331.8	390.8
0	227.1	266.2
0	309.5	364.2
0	628.6	743.7
0	210.9	247.0
0	410.7	484.7
0	211.4	247.6
0	778.3	921.7
0	263.4	309.5
0	682.2	807.5
0	386.7	456.1

0	376.2	443.6				
0	642.5	760.3				
0	306.7	361.0				
0	758.4	898.1				
0	797.9	945.1				
0	246.4	289.2				
0	320.1	376.8				
0	233.3	321.6				
0	238.2	328.6				
0	208.3	286.3				
0	421.7	588.1				
0	226.7	312.4				
0	267.0	369.3				
0	163.0	222.2				
0	165.8	226.2				
0	285.9	396.1				
0	342.0	475.3				
0	314.9	437.1				
0	307.6	426.7				
0	383.0	533.4				
0	332.6	462.1				
0	223.6	307.9				
0	442.2	617.1				
-174			43.1	32.0	53.3	28.0
-161.875			46.4	33.8	58.1	29.2
-149.75			50.7	36.0	64.2	30.6
-137.625			56.0	38.8	72.0	32.5
-125.5			62.8	42.3	81.7	34.8
-113.375			71.3	46.7	93.9	37.8
-101.25			81.9	52.3	109.3	41.5
-89.125			95.4	59.3	128.7	46.2
-77			112.3	68.1	153.1	52.0
-64.875			133.6	79.3	183.8	59.4
-52.75			160.4	93.2	222.5	68.7
-40.625			194.2	110.9	271.2	80.5
-28.5			236.8	133.1	332.5	95.2
-16.375			290.3	161.0	409.8	113.8
-4.25			357.8	196.2	507.0	137.2
7.875			442.7	240.4	629.4	166.7
20			549.6	296.2	783.5	203.8

MASTER CURVE WITH CONFIDENCE LIMITS - Single Point Estimation Method
EURO toughness dataset - Complete dataset excluding SX9



Calculation name: EURO dataset - Complete excluding SX9			
Data set length:	698	Submitted on:	2006-Nov-13 12:39:02
Data set limit:	max. allowed	Calculation time:	16.438 seconds

Master Curve results (Version 1.1.3.0)

1. Master Curve analysis of homogeneous material (ASTM E1921-05)

Reference temperature T_0 (°C)	-86.4
One standard deviation on T_0 (°C)	1.0
$K_{Jc,1T,med.,eq}$ (MPaVm)	126.8
Left temperature window (°C)	-136.4
Right temperature window (°C)	-36.4
Number of data	698
Number of data outside the temperature window	351
Number of valid data, r	316
Sum of n_i	51.36
Sum of \ln of probability density	-1520.45

Minimum number of specimen satisfied

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-136.4	32.9	39.4	57.2	73.6	79.7
-129.2	34.3	41.5	61.2	79.3	86.1
-122.1	35.9	43.8	65.7	85.9	93.3
-115.0	37.6	46.5	70.9	93.3	101.7
-107.8	39.7	49.6	76.8	101.9	111.2
-100.7	42.1	53.2	83.6	111.7	122.1
-93.5	44.8	57.2	91.4	122.9	134.6
-86.4	47.9	61.9	100.3	135.8	148.9
-79.2	51.4	67.2	110.5	150.5	165.3
-72.1	55.5	73.3	122.2	167.4	184.1
-65.0	60.1	80.3	135.6	186.7	205.6
-57.8	65.4	88.3	150.9	208.8	230.2
-50.7	71.5	97.5	168.5	234.1	258.4
-43.5	78.5	108.0	188.6	263.2	290.8
-36.4	86.5	120.0	211.7	296.4	327.8

2. Bi-modal Master Curve analysis for data set suspected to contains two populations

Reference temperature population A, T_a	-79.5 °C
One standard deviation on T_a	1.1 °C
Reference temperature population B, T_b	-99.6 °C
One standard deviation on T_b	3.5 °C
Likelihood to be from population A, p_a	0.88
One standard deviation on p_a	0.0
Left temperature window (°C)	-166.4
Right temperature window(°C)	-35.0

Warning: Using an estimate T_0 to an estimate temperature window is established and used to select data within the temperature window. The selected data are used to established a new estimate of T_0 . The procedure iterates until convergence is obtained. Unfortunately, in this particular case the convergence is not obtained. The temperature window is the one from the previous iteration.

Number of data	698
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Number of data outside the temperature window	248
Number of valid data, r	419
Sum of ln of probability density	-1964.32

This dataset is likely not homogeneous

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-166.4	28.3	32.5	44.1	55.7	61.4
-157.1	29.3	33.9	46.8	59.9	66.6
-147.7	30.4	35.6	50.0	65.0	72.9
-138.3	31.7	37.6	53.9	71.1	80.4
-128.9	33.3	40.0	58.6	78.3	89.4
-119.5	35.2	42.9	64.2	86.9	100.2
-110.1	37.5	46.3	70.8	97.3	113.1
-100.7	40.2	50.4	78.7	109.7	128.5
-91.3	43.5	55.3	88.2	124.5	147.0
-82.0	47.4	61.2	99.5	142.2	169.1
-72.6	52.1	68.2	113.0	163.4	195.5
-63.2	57.6	76.6	129.2	188.7	227.0
-53.8	64.3	86.6	148.6	219.0	264.7
-44.4	72.2	98.5	171.7	255.2	309.8
-35.0	81.7	112.8	199.3	298.4	363.7

3. Master Curve analysis for data set suspected to be randomly inhomogeneous

Mean reference temperature, T	-85.0 °C
One standard deviation on the mean T	6.4 °C
Left temperature window(°C)	-147.9
Right temperature window(°C)	-22.2
Number of data	698
Number of data outside the temperature window	351
Number of valid data, r	316
Sum of ln of probability density	-1513.46

This dataset is likely not homogeneous

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-147.9	30.7	36.2	51.3	66.5	72.8
-138.9	32.1	38.2	55.2	72.5	79.7
-129.9	33.7	40.6	59.8	79.6	88.0
-121.0	35.6	43.4	65.4	88.1	97.7
-112.0	37.8	46.7	71.9	98.1	109.3
-103.0	40.4	50.7	79.7	110.0	123.1
-94.0	43.6	55.4	88.9	124.2	139.4
-85.0	47.3	61.0	99.9	140.9	158.8
-76.1	51.7	67.7	112.8	160.8	181.8
-67.1	56.9	75.5	128.2	184.4	209.1
-58.1	63.1	84.8	146.4	212.3	241.4
-49.1	70.4	95.9	168.1	245.5	279.7
-40.2	79.1	109.0	193.7	284.9	325.2
-31.2	89.5	124.6	224.1	331.5	379.1
-22.2	101.7	143.0	260.2	386.8	443.1

ANNEX 3

Master Curve analyses performed on block SX9

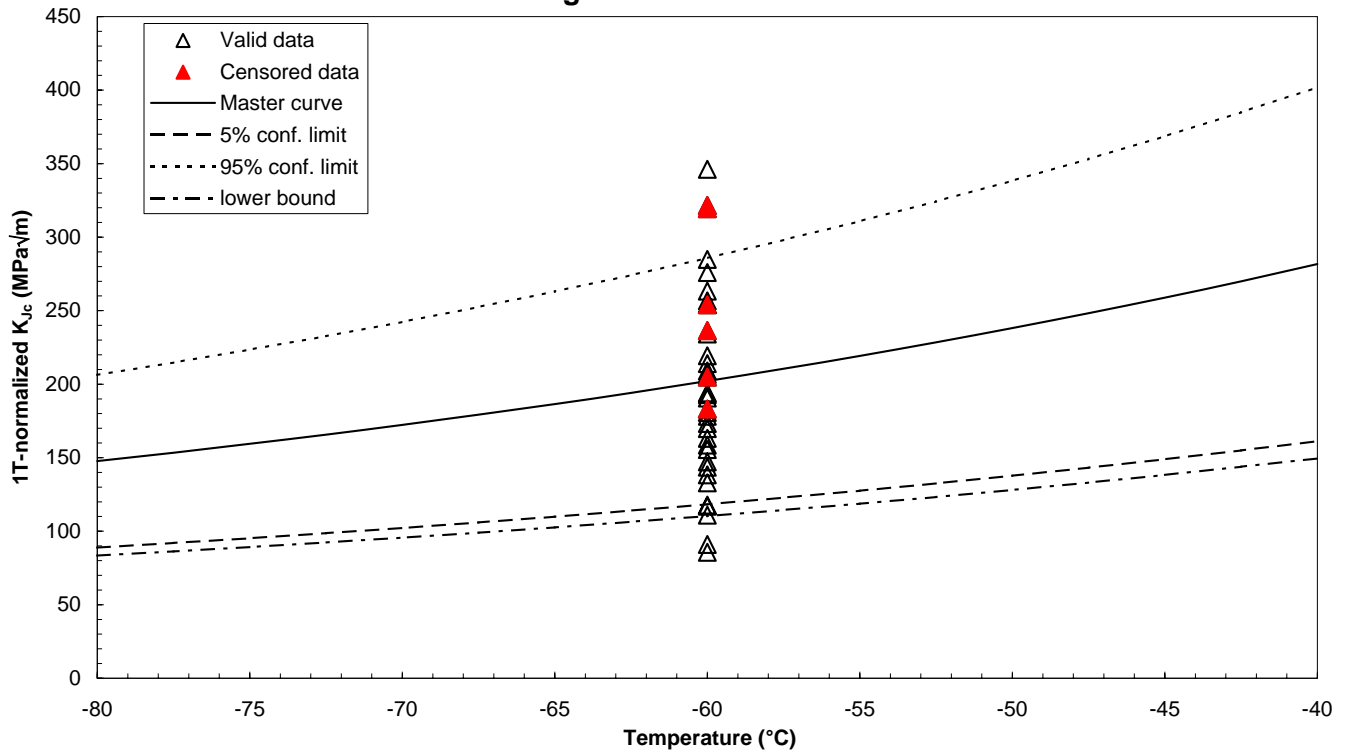
SX9.4.1	-60	119.9	138.4	1	0.167	0.0123	0.0015
SX9.4.2	-60	79.9	91.0	1	0.167	0.0123	0.0002
SX9.4.3	-60	140.9	163.2	1	0.167	0.0123	0.0032
SX9.4.4	-60	115.3	132.9	1	0.167	0.0123	0.0012
SX9.5.1	-60	137.0	158.6	1	0.167	0.0123	0.0028
SX9.5.2	-60	166.9	194.0	1	0.167	0.0123	0.0070
SX9.5.3	-60	225.4	263.3	1	0.167	0.0123	0.0267
SX9.5.4	-60	200.7	234.1	1	0.167	0.0123	0.0160

4. Master curve fit to data

Temperature adj. = 4.7 °C (est.) Stand. dev. on T_0 = 3.3 °C (est.)

<i>T</i> (°C)	<i>K_{Jc(exp)}</i> (MPa √m)	<i>K_{Jc(1T)}</i> (MPa √m)	<i>K_{MC(1T)}</i> (MPa √m)	5% conf. (MPa √m)	95% conf. (MPa √m)	5% L.B. (MPa √m)	Size	Lab
-60	167.6	143.6					-60.5	-60.5
-60	128.6	110.9					-60.5	-60.5
-60	377.4	319.3					-60.5	-60.5
-60	98.4	85.7					-60.5	-60.5
-60	278.4	236.4					-60.5	-60.5
-60	240.7	204.9					-60.5	-60.5
-60	380.0	321.5					-60.5	-60.5
-60	171.9	147.2					-60.5	-60.5
-60	136.8	117.8					-60.5	-60.5
-60	135.8	117.0					-60.5	-60.5
-60	214.7	183.1					-60.5	-60.5
-60	299.5	254.1					-60.5	-60.5
-60	295.3	346.1					-59.5	-59.5
-60	217.7	254.2					-59.5	-59.5
-60	219.8	256.6					-59.5	-59.5
-60	165.9	192.8					-59.5	-59.5
-60	153.6	178.2					-59.5	-59.5
-60	183.8	214.0					-59.5	-59.5
-60	236.1	275.9					-59.5	-59.5
-60	149.4	173.3					-59.5	-59.5
-60	179.5	209.0					-59.5	-59.5
-60	177.6	206.7					-59.5	-59.5
-60	188.3	219.4					-59.5	-59.5
-60	134.5	155.6					-59.5	-59.5
-60	243.6	284.9					-59.5	-59.5
-60	155.7	180.8					-59.5	-59.5
-60	164.0	190.6					-59.5	-59.5
-60	146.5	169.8					-59.5	-59.5
-60	119.9	138.4					-59.5	-59.5
-60	79.9	91.0					-59.5	-59.5
-60	140.9	163.2					-59.5	-59.5
-60	115.3	132.9					-59.5	-59.5
-60	137.0	158.6					-59.5	-60.5
-60	166.9	194.0					-59.5	-60.5
-60	225.4	263.3					-59.5	-60.5
-60	200.7	234.1					-59.5	-60.5
-80			147.7	89.0	206.4	83.5		
-77.5			153.4	92.0	214.8	86.3		
-75			159.4	95.3	223.6	89.3		
-72.5			165.7	98.7	232.8	92.4		
-70			172.3	102.3	242.4	95.6		
-67.5			179.2	106.0	252.5	99.1		
-65			186.5	109.9	263.1	102.6		
-62.5			194.1	114.0	274.2	106.4		
-60			202.1	118.3	285.9	110.3		
-57.5			210.5	122.9	298.1	114.5		
-55			219.3	127.6	310.9	118.8		
-52.5			228.5	132.6	324.4	123.4		
-50			238.1	137.8	338.5	128.1		
-47.5			248.2	143.3	353.2	133.1		
-45			258.9	149.0	368.7	138.4		
-42.5			270.0	155.0	385.0	143.9		
-40			281.7	161.3	402.0	149.6		

Master Curve with tolerance bounds EURO toughness dataset - Block SX9



SINTAP - Structural Integrity Assessment Procedures for European Industry
Lower Tail Analysis Procedure

Step 1: Estimate of the median value of fracture toughness (ASTM E1921-05)

1. Material characteristics

Material specifications : **EURO toughness data set - Block SX9**

2. Dimensional and crack growth requirements

Specimen code	T (°C)	a _o (mm)	W (mm)	B (mm)	b _o (mm)	Δa (mm)	K _{Jc[exp]} (MPa√m)	σ _{ys} (MPa)	E' (GPa)	K _{lim} (MPa√m)	DATA VALID	K _{Jc[calc]} (MPa√m)
GKSS	-60	14.61	25	12.5	10.39	0.00	167.6	506.4	231.4	201.5	YES	167.6
GKSS	-60	14.41	25	12.5	10.59	0.00	128.6	506.4	231.4	203.4	YES	128.6
GKSS	-60	14.45	25	12.5	10.55	0.70	377.4	506.4	231.4	203.0	NO	203.0
GKSS	-60	14.37	25	12.5	10.63	0.00	98.4	506.4	231.4	203.8	YES	98.4
GKSS	-60	14.42	25	12.5	10.58	0.29	278.4	506.4	231.4	203.3	NO	203.3
GKSS	-60	14.49	25	12.5	10.51	0.18	240.7	506.4	231.4	202.6	NO	202.6
GKSS	-60	14.59	25	12.5	10.41	0.75	380.0	506.4	231.4	201.7	NO	201.7
GKSS	-60	14.04	25	12.5	10.96	0.00	171.9	506.4	231.4	206.9	YES	171.9
GKSS	-60	14.49	25	12.5	10.51	0.00	136.8	506.4	231.4	202.6	YES	136.8
GKSS	-60	14.80	25	12.5	10.20	0.00	135.8	506.4	231.4	199.6	YES	135.8
GKSS	-60	14.68	25	12.5	10.32	0.13	214.7	506.4	231.4	200.8	NO	200.8
GKSS	-60	14.47	25	12.5	10.53	0.41	299.5	506.4	231.4	202.8	NO	202.8
GKSS	-60	56.44	100	50.0	43.56	0.12	295.3	506.4	231.4	412.5	YES	295.3
GKSS	-60	56.53	100	50.0	43.47	0.00	217.7	506.4	231.4	412.1	YES	217.7
GKSS	-60	56.45	100	50.0	43.55	0.00	219.8	506.4	231.4	412.5	YES	219.8
GKSS	-60	56.49	100	50.0	43.51	0.00	165.9	506.4	231.4	412.3	YES	165.9
THA	-60	56.57	100	50.0	43.43	0.00	153.6	506.4	231.4	411.9	YES	153.6
THA	-60	56.38	100	50.0	43.62	0.00	183.8	506.4	231.4	412.8	YES	183.8
THA	-60	56.31	100	50.0	43.69	0.00	236.1	506.4	231.4	413.1	YES	236.1
THA	-60	56.20	100	50.0	43.80	0.00	149.4	506.4	231.4	413.6	YES	149.4
THA	-60	56.83	100	50.0	43.17	0.00	179.5	506.4	231.4	410.7	YES	179.5
THA	-60	56.83	100	50.0	43.17	0.00	177.6	506.4	231.4	410.7	YES	177.6
THA	-60	56.55	100	50.0	43.45	0.00	188.3	506.4	231.4	412.0	YES	188.3
THA	-60	56.56	100	50.0	43.44	0.00	134.5	506.4	231.4	411.9	YES	134.5
THA	-60	56.65	100	50.0	43.35	0.00	243.6	506.4	231.4	411.5	YES	243.6
THA	-60	56.56	100	50.0	43.44	0.00	155.7	506.4	231.4	411.9	YES	155.7
THA	-60	56.18	100	50.0	43.82	0.00	164.0	506.4	231.4	413.7	YES	164.0
THA	-60	56.68	100	50.0	43.32	0.00	146.5	506.4	231.4	411.4	YES	146.5
THA	-60	56.51	100	50.0	43.49	0.00	119.9	506.4	231.4	412.2	YES	119.9
THA	-60	56.31	100	50.0	43.69	0.00	79.9	506.4	231.4	413.1	YES	79.9
THA	-60	56.57	100	50.0	43.43	0.00	140.9	506.4	231.4	411.9	YES	140.9
THA	-60	55.62	100	50.0	44.38	0.00	115.3	506.4	231.4	416.4	YES	115.3
THA	-60	56.56	100	50.0	43.44	0.00	137.0	506.4	231.4	411.9	YES	137.0
THA	-60	56.57	100	50.0	43.43	0.00	166.9	506.4	231.4	411.9	YES	166.9
THA	-60	56.53	100	50.0	43.47	0.00	225.4	506.4	231.4	412.1	YES	225.4
THA	-60	56.32	100	50.0	43.68	0.00	200.7	506.4	231.4	413.1	YES	200.7

3. Application of the multi-temperature approach for the calculation of the reference temperature

Specimen code	T (°C)	K _{Jc[calc]} (MPa√m)	K _{Jc(1T)} (MPa√m)	δ _i	n _i	T°	
						1° member	2° member
GKSS	-60	167.6	143.6	1	0.167	0.0123	0.0018
GKSS	-60	128.6	110.9	1	0.167	0.0123	0.0005
GKSS	-60	203.0	173.3	0	0.000	0.0000	0.0042
GKSS	-60	98.4	85.7	1	0.167	0.0123	0.0001
GKSS	-60	203.3	173.5	0	0.000	0.0000	0.0042
GKSS	-60	202.6	173.0	0	0.000	0.0000	0.0042
GKSS	-60	201.7	172.1	0	0.000	0.0000	0.0041
GKSS	-60	171.9	147.2	1	0.167	0.0123	0.0020
GKSS	-60	136.8	117.8	1	0.167	0.0123	0.0007
GKSS	-60	135.8	117.0	1	0.167	0.0123	0.0007
GKSS	-60	200.8	171.4	0	0.000	0.0000	0.0040
GKSS	-60	202.8	173.1	0	0.000	0.0000	0.0042
GKSS	-60	295.3	346.1	1	0.167	0.0123	0.0862
GKSS	-60	217.7	254.2	1	0.167	0.0123	0.0229
GKSS	-60	219.8	256.6	1	0.167	0.0123	0.0239
GKSS	-60	165.9	192.8	1	0.167	0.0123	0.0068
THA	-60	153.6	178.2	1	0.167	0.0123	0.0048
THA	-60	183.8	214.0	1	0.167	0.0123	0.0108
THA	-60	236.1	275.9	1	0.167	0.0123	0.0327
THA	-60	149.4	173.3	1	0.167	0.0123	0.0042
THA	-60	179.5	209.0	1	0.167	0.0123	0.0097
THA	-60	177.6	206.7	1	0.167	0.0123	0.0093
THA	-60	188.3	219.4	1	0.167	0.0123	0.0120
THA	-60	134.5	155.6	1	0.167	0.0123	0.0026
THA	-60	243.6	284.9	1	0.167	0.0123	0.0375
THA	-60	155.7	180.8	1	0.167	0.0123	0.0051
THA	-60	164.0	190.6	1	0.167	0.0123	0.0065
THA	-60	146.5	169.8	1	0.167	0.0123	0.0038
THA	-60	119.9	138.4	1	0.167	0.0123	0.0015
THA	-60	79.9	91.0	1	0.167	0.0123	0.0002

T limits
 -157
 -57

USE LIMITS : YES

Sum of 1° member:

Sum of 2° member:

Difference:

T_o = -107.3 °C
 (valid per ASTM E1921)

Σ n_i = 5.00

N = 36
 r = 30

K_{min} = 20 MPa√m

K_{o,eq} = 219.6 MPa√m

K_{med,eq} = 202.1 MPa√m

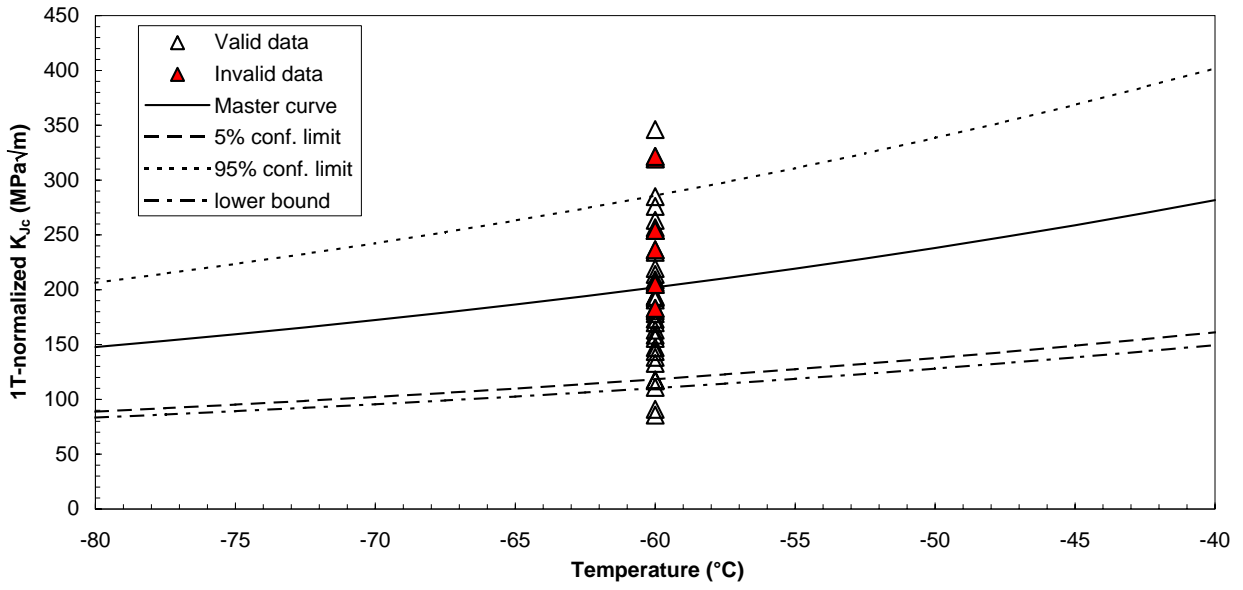
THA	-60	140.9	163.2	1	0.167	0.0123	0.0032
THA	-60	115.3	132.9	1	0.167	0.0123	0.0012
THA	-60	137.0	158.6	1	0.167	0.0123	0.0028
THA	-60	166.9	194.0	1	0.167	0.0123	0.0070
THA	-60	225.4	263.3	1	0.167	0.0123	0.0267
THA	-60	200.7	234.1	1	0.167	0.0123	0.0160

4. Master curve fit to data

Temperature adj. = 4.7 °C (est.) Stand. dev. on T_0 = 3.3 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-60	167.6	143.6				
-60	128.6	110.9				
-60	377.4	319.3				
-60	98.4	85.7				
-60	278.4	236.4				
-60	240.7	204.9				
-60	380.0	321.5				
-60	171.9	147.2				
-60	136.8	117.8				
-60	135.8	117.0				
-60	214.7	183.1				
-60	299.5	254.1				
-60	295.3	346.1				
-60	217.7	254.2				
-60	219.8	256.6				
-60	165.9	192.8				
-60	153.6	178.2				
-60	183.8	214.0				
-60	236.1	275.9				
-60	149.4	173.3				
-60	179.5	209.0				
-60	177.6	206.7				
-60	188.3	219.4				
-60	134.5	155.6				
-60	243.6	284.9				
-60	155.7	180.8				
-60	164.0	190.6				
-60	146.5	169.8				
-60	119.9	138.4				
-60	79.9	91.0				
-60	140.9	163.2				
-60	115.3	132.9				
-60	137.0	158.6				
-60	166.9	194.0				
-60	225.4	263.3				
-60	200.7	234.1				
-80			147.7	89.0	206.4	83.5
-77.5			153.4	92.0	214.8	86.3
-75			159.4	95.3	223.6	89.3
-72.5			165.7	98.7	232.8	92.4
-70			172.3	102.3	242.4	95.6
-67.5			179.2	106.0	252.5	99.1
-65			186.5	109.9	263.1	102.6
-62.5			194.1	114.0	274.2	106.4
-60			202.1	118.3	285.9	110.3
-57.5			210.5	122.9	298.1	114.5
-55			219.3	127.6	310.9	118.8
-52.5			228.5	132.6	324.4	123.4
-50			238.1	137.8	338.5	128.1
-47.5			248.2	143.3	353.2	133.1
-45			258.9	149.0	368.7	138.4
-42.5			270.0	155.0	385.0	143.9
-40			281.7	161.3	402.0	149.6

MASTER CURVE FOR 1TCT WITH CONFIDENCE LIMITS (E1921-05 analysis)
EURO toughness dataset - Block SX9



SINTAP - Structural Integrity Assessment Procedures for European Industry
Lower Tail Analysis Procedure

Step 2: Lower MMT Tail Estimation

1. Data censoring

Specimen code	T (°C)	$K_{Jc[exp]}$ (MPa√m)	K_{Jc-1T} (MPa√m)	K_{CENS} (MPa√m)	δ_i	$K_{analysis}$ (MPa√m)
GKSS	-60	167.6	143.6	174.1	1	143.6
GKSS	-60	128.6	110.9	174.1	1	110.9
GKSS	-60	203.0	173.3	174.1	1	173.3
GKSS	-60	98.4	85.7	174.1	1	85.7
GKSS	-60	203.3	173.5	174.1	1	173.5
GKSS	-60	202.6	173.0	174.1	1	173.0
GKSS	-60	201.7	172.1	174.1	1	172.1
GKSS	-60	171.9	147.2	174.1	1	147.2
GKSS	-60	136.8	117.8	174.1	1	117.8
GKSS	-60	135.8	117.0	174.1	1	117.0
GKSS	-60	200.8	171.4	174.1	1	171.4
GKSS	-60	202.8	173.1	174.1	1	173.1
GKSS	-60	295.3	346.1	174.1	0	174.1
GKSS	-60	217.7	254.2	174.1	0	174.1
GKSS	-60	219.8	256.6	174.1	0	174.1
GKSS	-60	165.9	192.8	174.1	0	174.1
THA	-60	153.6	178.2	174.1	0	174.1
THA	-60	183.8	214.0	174.1	0	174.1
THA	-60	236.1	275.9	174.1	0	174.1
THA	-60	149.4	173.3	174.1	1	173.3
THA	-60	179.5	209.0	174.1	0	174.1
THA	-60	177.6	206.7	174.1	0	174.1
THA	-60	188.3	219.4	174.1	0	174.1
THA	-60	134.5	155.6	174.1	1	155.6
THA	-60	243.6	284.9	174.1	0	174.1
THA	-60	155.7	180.8	174.1	0	174.1
THA	-60	164.0	190.6	174.1	0	174.1
THA	-60	146.5	169.8	174.1	1	169.8
THA	-60	119.9	138.4	174.1	1	138.4
THA	-60	79.9	91.0	174.1	1	91.0
THA	-60	140.9	163.2	174.1	1	163.2
THA	-60	115.3	132.9	174.1	1	132.9
THA	-60	137.0	158.6	174.1	1	158.6
THA	-60	166.9	194.0	174.1	0	174.1
THA	-60	225.4	263.3	174.1	0	174.1
THA	-60	200.7	234.1	174.1	0	174.1

Benchmark $T_o = -98.0$ °C

2. Analysis of the censored data and obtainment of a new estimate of T_o

Specimen code	T (°C)	$K_{Jc[exp]}$ (MPa√m)	K_{Jc-1T} (MPa√m)	$K_{analysis}$ (MPa√m)	δ_i	1° member	2° member
GKSS	-60	167.6	143.6	143.6	1	0.0121	0.0036
GKSS	-60	128.6	110.9	110.9	1	0.0121	0.0011
GKSS	-60	203.0	173.3	173.3	1	0.0121	0.0086
GKSS	-60	98.4	85.7	85.7	1	0.0121	0.0003
GKSS	-60	203.3	173.5	173.5	1	0.0121	0.0086
GKSS	-60	202.6	173.0	173.0	1	0.0121	0.0085
GKSS	-60	201.7	172.1	172.1	1	0.0121	0.0083
GKSS	-60	171.9	147.2	147.2	1	0.0121	0.0041
GKSS	-60	136.8	117.8	117.8	1	0.0121	0.0014
GKSS	-60	135.8	117.0	117.0	1	0.0121	0.0014
GKSS	-60	200.8	171.4	171.4	1	0.0121	0.0082
GKSS	-60	202.8	173.1	173.1	1	0.0121	0.0085
GKSS	-60	295.3	346.1	174.1	0	0.0000	0.0088
GKSS	-60	217.7	254.2	174.1	0	0.0000	0.0088
GKSS	-60	219.8	256.6	174.1	0	0.0000	0.0088
GKSS	-60	165.9	192.8	174.1	0	0.0000	0.0088
THA	-60	153.6	178.2	174.1	0	0.0000	0.0088
THA	-60	183.8	214.0	174.1	0	0.0000	0.0088
THA	-60	236.1	275.9	174.1	0	0.0000	0.0088
THA	-60	149.4	173.3	173.3	1	0.0121	0.0086
THA	-60	179.5	209.0	174.1	0	0.0000	0.0088
THA	-60	177.6	206.7	174.1	0	0.0000	0.0088
THA	-60	188.3	219.4	174.1	0	0.0000	0.0088
THA	-60	134.5	155.6	155.6	1	0.0121	0.0053
THA	-60	243.6	284.9	174.1	0	0.0000	0.0088
THA	-60	155.7	180.8	174.1	0	0.0000	0.0088
THA	-60	164.0	190.6	174.1	0	0.0000	0.0088
THA	-60	146.5	169.8	169.8	1	0.0121	0.0078
THA	-60	119.9	138.4	138.4	1	0.0121	0.0031
THA	-60	79.9	91.0	91.0	1	0.0121	0.0004
THA	-60	140.9	163.2	163.2	1	0.0121	0.0065
THA	-60	115.3	132.9	132.9	1	0.0121	0.0025
THA	-60	137.0	158.6	158.6	1	0.0121	0.0057

USE LIMITS : NO

T limits
-9999
9999

Sum of 1° member: 0.243

Sum of 2° member: 0.243

Difference: 0.000

$T_o = -97.2$ °C

Use new estimate as benchmark

N = 36
r = 20

$K_{min} = 20$ MPa√m

$K_{o,eq} = 219.6$ MPa√m

$K_{med,eq} = 202.1$ MPa√m

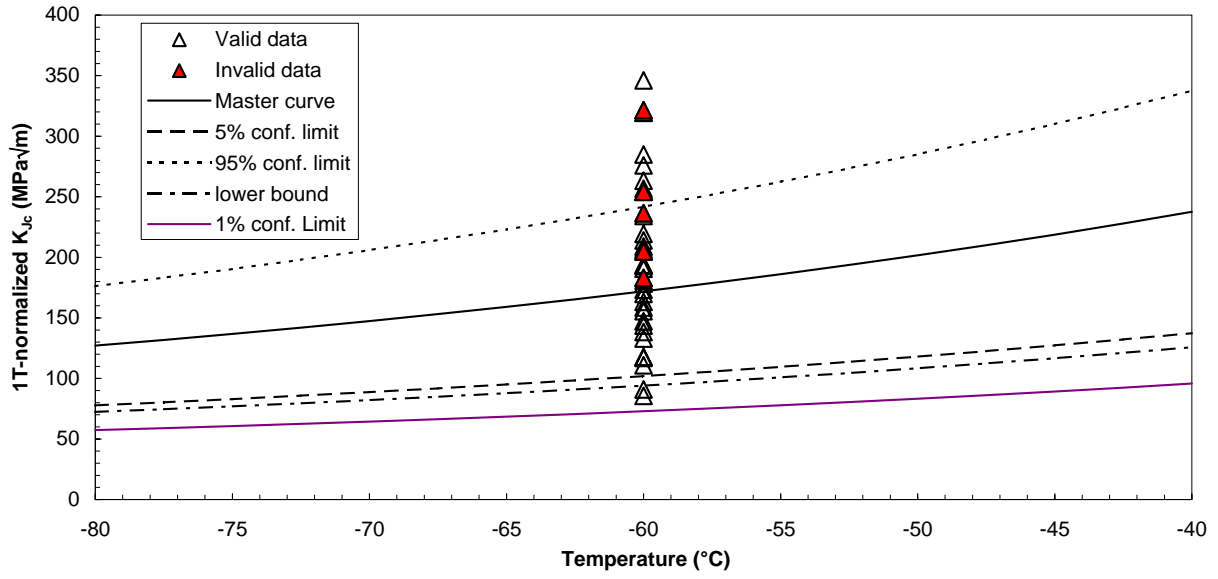
THA	-60	166.9	194.0	174.1	0	0.0000	0.0088
THA	-60	225.4	263.3	174.1	0	0.0000	0.0088
THA	-60	200.7	234.1	174.1	0	0.0000	0.0088

3. Revised Master Curve fit to data

Temperature adj. = 5.8 °C (est.) Stand. dev. on T_0 = 4.0 °C (est.)

<i>T</i> (°C)	<i>K_{Jc(exp)}</i> (MPa √m)	<i>K_{Jc(1T)}</i> (MPa √m)	<i>K_{MC(1T)}</i> (MPa √m)	5% conf. (MPa √m)	95% conf. (MPa √m)	5% L.B. (MPa √m)
-60	167.6	143.6				
-60	128.6	110.9				
-60	377.4	319.3				
-60	98.4	85.7				
-60	278.4	236.4				
-60	240.7	204.9				
-60	380.0	321.5				
-60	171.9	147.2				
-60	136.8	117.8				
-60	135.8	117.0				
-60	214.7	183.1				
-60	299.5	254.1				
-60	295.3	346.1				
-60	217.7	254.2				
-60	219.8	256.6				
-60	165.9	192.8				
-60	153.6	178.2				
-60	183.8	214.0				
-60	236.1	275.9				
-60	149.4	173.3				
-60	179.5	209.0				
-60	177.6	206.7				
-60	188.3	219.4				
-60	134.5	155.6				
-60	243.6	284.9				
-60	155.7	180.8				
-60	164.0	190.6				
-60	146.5	169.8				
-60	119.9	138.4				
-60	79.9	91.0				
-60	140.9	163.2				
-60	115.3	132.9				
-60	137.0	158.6				
-60	166.9	194.0				
-60	225.4	263.3				
-60	200.7	234.1				
-80			127.1	77.8	176.3	72.4
-77.5			131.8	80.4	183.2	74.6
-75			136.7	83.0	190.4	77.0
-72.5			141.9	85.8	198.0	79.5
-70			147.4	88.8	206.0	82.2
-67.5			153.1	91.9	214.3	84.9
-65			159.1	95.1	223.1	87.8
-62.5			165.4	98.5	232.2	90.9
-60			171.9	102.1	241.8	94.1
-57.5			178.9	105.8	251.9	97.4
-55			186.1	109.7	262.5	100.9
-52.5			193.7	113.8	273.6	104.6
-50			201.6	118.1	285.2	108.4
-47.5			210.0	122.6	297.4	112.5
-45			218.8	127.3	310.2	116.7
-42.5			227.9	132.3	323.6	121.1
-40			237.6	137.5	337.6	125.8

MASTER CURVE WITH CONFIDENCE LIMITS - SINTAP lower tail analysis
EURO toughness dataset - Block SX9



SINTAP - Structural Integrity Assessment Procedures for European Industry
Lower Tail Analysis Procedure

Step 3: Minimum value estimation

1. Calculation of the maximum value of T_o (based on a single data point) and establishment of T_o for the data set

Specimen code	T (°C)	$K_{Jc[exp]}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	K_{CENS} (MPa \sqrt{m})	δ_i	$T_{o(i)}$ (°C)
GKSS	-60	167.6	143.6	174.1	1	-143.2
GKSS	-60	128.6	110.9	174.1	1	-129.2
GKSS	-60	203.0	173.3	174.1	1	-153.4
GKSS	-60	98.4	85.7	174.1	1	-115.0
GKSS	-60	203.3	173.5	174.1	1	-153.5
GKSS	-60	202.6	173.0	174.1	1	-153.3
GKSS	-60	201.7	172.1	174.1	1	-153.1
GKSS	-60	171.9	147.2	174.1	1	-144.6
GKSS	-60	136.8	117.8	174.1	1	-132.5
GKSS	-60	135.8	117.0	174.1	1	-132.1
GKSS	-60	200.8	171.4	174.1	1	-152.8
GKSS	-60	202.8	173.1	174.1	1	-153.4
GKSS	-60	295.3	346.1	174.1	0	-
GKSS	-60	217.7	254.2	174.1	0	-
GKSS	-60	219.8	256.6	174.1	0	-
GKSS	-60	165.9	192.8	174.1	0	-
THA	-60	153.6	178.2	174.1	0	-
THA	-60	183.8	214.0	174.1	0	-
THA	-60	236.1	275.9	174.1	0	-
THA	-60	149.4	173.3	174.1	1	-153.4
THA	-60	179.5	209.0	174.1	0	-
THA	-60	177.6	206.7	174.1	0	-
THA	-60	188.3	219.4	174.1	0	-
THA	-60	134.5	155.6	174.1	1	-147.6
THA	-60	243.6	284.9	174.1	0	-
THA	-60	155.7	180.8	174.1	0	-
THA	-60	164.0	190.6	174.1	0	-
THA	-60	146.5	169.8	174.1	1	-152.3
THA	-60	119.9	138.4	174.1	1	-141.2
THA	-60	79.9	91.0	174.1	1	-118.3
THA	-60	140.9	163.2	174.1	1	-150.2
THA	-60	115.3	132.9	174.1	1	-139.0
THA	-60	137.0	158.6	174.1	1	-148.6
THA	-60	166.9	194.0	174.1	0	-
THA	-60	225.4	263.3	174.1	0	-
THA	-60	200.7	234.1	174.1	0	-

Max value $T_{o(max)} = -115$ °C

$T_{o(max)} - 8$ °C > $T_{o(step 2)}$: **NO**
→ DATA IS HOMOGENEOUS

T_o for the data set: $T_o = -97.2$ °C

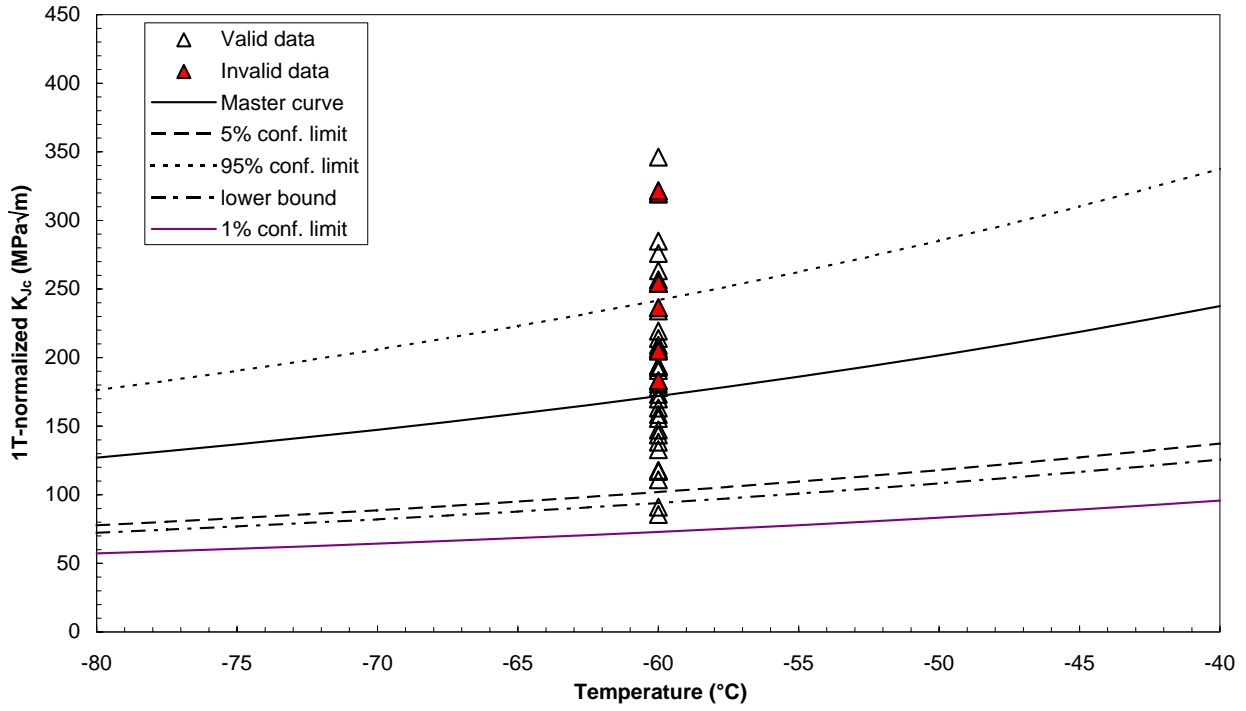
2. Final Master Curve fit to data

Temperature adj. = 5.8 °C (est.) Stand. dev. on T_o = 4.0 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-60	167.6	143.6				
-60	128.6	110.9				
-60	377.4	319.3				
-60	98.4	85.7				
-60	278.4	236.4				
-60	240.7	204.9				
-60	380.0	321.5				
-60	171.9	147.2				
-60	136.8	117.8				
-60	135.8	117.0				
-60	214.7	183.1				
-60	299.5	254.1				
-60	295.3	346.1				
-60	217.7	254.2				
-60	219.8	256.6				
-60	165.9	192.8				
-60	153.6	178.2				
-60	183.8	214.0				
-60	236.1	275.9				
-60	149.4	173.3				
-60	179.5	209.0				
-60	177.6	206.7				
-60	188.3	219.4				

-60	134.5	155.6				
-60	243.6	284.9				
-60	155.7	180.8				
-60	164.0	190.6				
-60	146.5	169.8				
-60	119.9	138.4				
-60	79.9	91.0				
-60	140.9	163.2				
-60	115.3	132.9				
-60	137.0	158.6				
-60	166.9	194.0				
-60	225.4	263.3				
-60	200.7	234.1				
-80			127.1	77.8	176.3	72.4
-77.5			131.8	80.4	183.2	74.6
-75			136.7	83.0	190.4	77.0
-72.5			141.9	85.8	198.0	79.5
-70			147.4	88.8	206.0	82.2
-67.5			153.1	91.9	214.3	84.9
-65			159.1	95.1	223.1	87.8
-62.5			165.4	98.5	232.2	90.9
-60			171.9	102.1	241.8	94.1
-57.5			178.9	105.8	251.9	97.4
-55			186.1	109.7	262.5	100.9
-52.5			193.7	113.8	273.6	104.6
-50			201.6	118.1	285.2	108.4
-47.5			210.0	122.6	297.4	112.5
-45			218.8	127.3	310.2	116.7
-42.5			227.9	132.3	323.6	121.1
-40			237.6	137.5	337.6	125.8

MASTER CURVE WITH CONFIDENCE LIMITS - SINTAP lower tail analysis
EURO toughness dataset - Block SX9



MASTER CURVE ANALYSIS OF RANDOM INHOMOGENEITIES

Single Point Estimation Method

Step 1: Estimate of the median value of fracture toughness (ASTM E1921-05)

1. Material characteristics

Material specifications : **EURO toughness data set - Block 9**

2. Dimensional and crack growth requirements

Specimen code	T (°C)	a ₀ (mm)	W (mm)	B (mm)	b ₀ (mm)	Δa (mm)	K _{Jc[exp]} (MPa√m)	σ _{ys} (MPa)	E' (GPa)	K _{lim} (MPa√m)	DATA VALID	K _{Jc[calc]} (MPa√m)
SX9.5.1.1	-60	14.61	25	12.5	10.390	0.00	167.6	506.4	231.4	201.5	YES	167.6
SX9.5.1.2	-60	14.41	25	12.5	10.590	0.00	128.6	506.4	231.4	203.4	YES	128.6
SX9.5.1.3	-60	14.45	25	12.5	10.550	0.70	377.4	506.4	231.4	203.0	NO	203.0
SX9.5.2.1	-60	14.37	25	12.5	10.630	0.00	98.4	506.4	231.4	203.8	YES	98.4
SX9.5.2.2	-60	14.42	25	12.5	10.580	0.29	278.4	506.4	231.4	203.3	NO	203.3
SX9.5.2.3	-60	14.49	25	12.5	10.510	0.18	240.7	506.4	231.4	202.6	NO	202.6
SX9.5.3.1	-60	14.59	25	12.5	10.410	0.75	380.0	506.4	231.4	201.7	NO	201.7
SX9.5.3.2	-60	14.04	25	12.5	10.960	0.00	171.9	506.4	231.4	206.9	YES	171.9
SX9.5.3.3	-60	14.49	25	12.5	10.510	0.00	136.8	506.4	231.4	202.6	YES	136.8
SX9.5.4.1	-60	14.80	25	12.5	10.200	0.00	135.8	506.4	231.4	199.6	YES	135.8
SX9.5.4.2	-60	14.68	25	12.5	10.320	0.13	214.7	506.4	231.4	200.8	NO	200.8
SX9.5.4.3	-60	14.47	25	12.5	10.530	0.41	299.5	506.4	231.4	202.8	NO	202.8
SX9.1.1	-60	56.44	100	50.0	43.560	0.12	295.3	506.4	231.4	412.5	YES	295.3
SX9.1.2	-60	56.53	100	50.0	43.470	0.00	217.7	506.4	231.4	412.1	YES	217.7
SX9.1.3	-60	56.45	100	50.0	43.550	0.00	219.8	506.4	231.4	412.5	YES	219.8
SX9.1.4	-60	56.49	100	50.0	43.510	0.00	165.9	506.4	231.4	412.3	YES	165.9
SX9.2.1	-60	56.57	100	50.0	43.430	0.00	153.6	506.4	231.4	411.9	YES	153.6
SX9.2.2	-60	56.38	100	50.0	43.620	0.00	183.8	506.4	231.4	412.8	YES	183.8
SX9.2.3	-60	56.31	100	50.0	43.690	0.00	236.1	506.4	231.4	413.1	YES	236.1
SX9.2.4	-60	56.20	100	50.0	43.800	0.00	149.4	506.4	231.4	413.6	YES	149.4
SX9.3.1	-60	56.83	100	50.0	43.170	0.00	179.5	506.4	231.4	410.7	YES	179.5
SX9.3.2	-60	56.83	100	50.0	43.170	0.00	177.6	506.4	231.4	410.7	YES	177.6
SX9.3.3	-60	56.55	100	50.0	43.450	0.00	188.3	506.4	231.4	412.0	YES	188.3
SX9.3.4	-60	56.56	100	50.0	43.440	0.00	134.5	506.4	231.4	411.9	YES	134.5
SX9.3.5	-60	56.65	100	50.0	43.350	0.00	243.6	506.4	231.4	411.5	YES	243.6
SX9.3.6	-60	56.56	100	50.0	43.440	0.00	155.7	506.4	231.4	411.9	YES	155.7
SX9.3.7	-60	56.18	100	50.0	43.820	0.00	164.0	506.4	231.4	413.7	YES	164.0
SX9.3.8	-60	56.68	100	50.0	43.320	0.00	146.5	506.4	231.4	411.4	YES	146.5
SX9.4.1	-60	56.51	100	50.0	43.490	0.00	119.9	506.4	231.4	412.2	YES	119.9
SX9.4.2	-60	56.31	100	50.0	43.690	0.00	79.9	506.4	231.4	413.1	YES	79.9
SX9.4.3	-60	56.57	100	50.0	43.430	0.00	140.9	506.4	231.4	411.9	YES	140.9
SX9.4.4	-60	55.62	100	50.0	44.380	0.00	115.3	506.4	231.4	416.4	YES	115.3
SX9.5.1	-60	56.56	100	50.0	43.440	0.00	137.0	506.4	231.4	411.9	YES	137.0
SX9.5.2	-60	56.57	100	50.0	43.430	0.00	166.9	506.4	231.4	411.9	YES	166.9
SX9.5.3	-60	56.53	100	50.0	43.470	0.00	225.4	506.4	231.4	412.1	YES	225.4
SX9.5.4	-60	56.32	100	50.0	43.680	0.00	200.7	506.4	231.4	413.1	YES	200.7

3. Application of the multi-temperature approach for the calculation of the reference temperature

Specimen code	T (°C)	K _{Jc[calc]} (MPa√m)	K _{Jc(1T)} (MPa√m)	δ _i	n _i	1° member	2° member
SX9.5.1.1	-60	167.6	143.6	1	0.167	0.0123	0.0018
SX9.5.1.2	-60	128.6	110.9	1	0.167	0.0123	0.0005
SX9.5.1.3	-60	203.0	173.3	0	0.000	0.0000	0.0042
SX9.5.2.1	-60	98.4	85.7	1	0.167	0.0123	0.0001
SX9.5.2.2	-60	203.3	173.5	0	0.000	0.0000	0.0042
SX9.5.2.3	-60	202.6	173.0	0	0.000	0.0000	0.0042
SX9.5.3.1	-60	201.7	172.1	0	0.000	0.0000	0.0041
SX9.5.3.2	-60	171.9	147.2	1	0.167	0.0123	0.0020
SX9.5.3.3	-60	136.8	117.8	1	0.167	0.0123	0.0007
SX9.5.4.1	-60	135.8	117.0	1	0.167	0.0123	0.0007
SX9.5.4.2	-60	200.8	171.4	0	0.000	0.0000	0.0040
SX9.5.4.3	-60	202.8	173.1	0	0.000	0.0000	0.0042
SX9.1.1	-60	295.3	346.1	1	0.167	0.0123	0.0862
SX9.1.2	-60	217.7	254.2	1	0.167	0.0123	0.0229
SX9.1.3	-60	219.8	256.6	1	0.167	0.0123	0.0239
SX9.1.4	-60	165.9	192.8	1	0.167	0.0123	0.0068
SX9.2.1	-60	153.6	178.2	1	0.167	0.0123	0.0048
SX9.2.2	-60	183.8	214.0	1	0.167	0.0123	0.0108
SX9.2.3	-60	236.1	275.9	1	0.167	0.0123	0.0327
SX9.2.4	-60	149.4	173.3	1	0.167	0.0123	0.0042
SX9.3.1	-60	179.5	209.0	1	0.167	0.0123	0.0097
SX9.3.2	-60	177.6	206.7	1	0.167	0.0123	0.0093
SX9.3.3	-60	188.3	219.4	1	0.167	0.0123	0.0120
SX9.3.4	-60	134.5	155.6	1	0.167	0.0123	0.0026
SX9.3.5	-60	243.6	284.9	1	0.167	0.0123	0.0375
SX9.3.6	-60	155.7	180.8	1	0.167	0.0123	0.0051
SX9.3.7	-60	164.0	190.6	1	0.167	0.0123	0.0065

T limits

USE LIMITS : YES

-157

-57

Sum of 1° member: 0.368

Sum of 2° member: 0.368

Difference: 0.000

T₀ = -107.3 °C
(valid per ASTM E1921)

∑ n_i = 5.00

N = 36
r = 30

K_{min} = 20 MPa√m

K_{o,eq} = 219.6 MPa√m

K_{med,eq} = 202.1 MPa√m

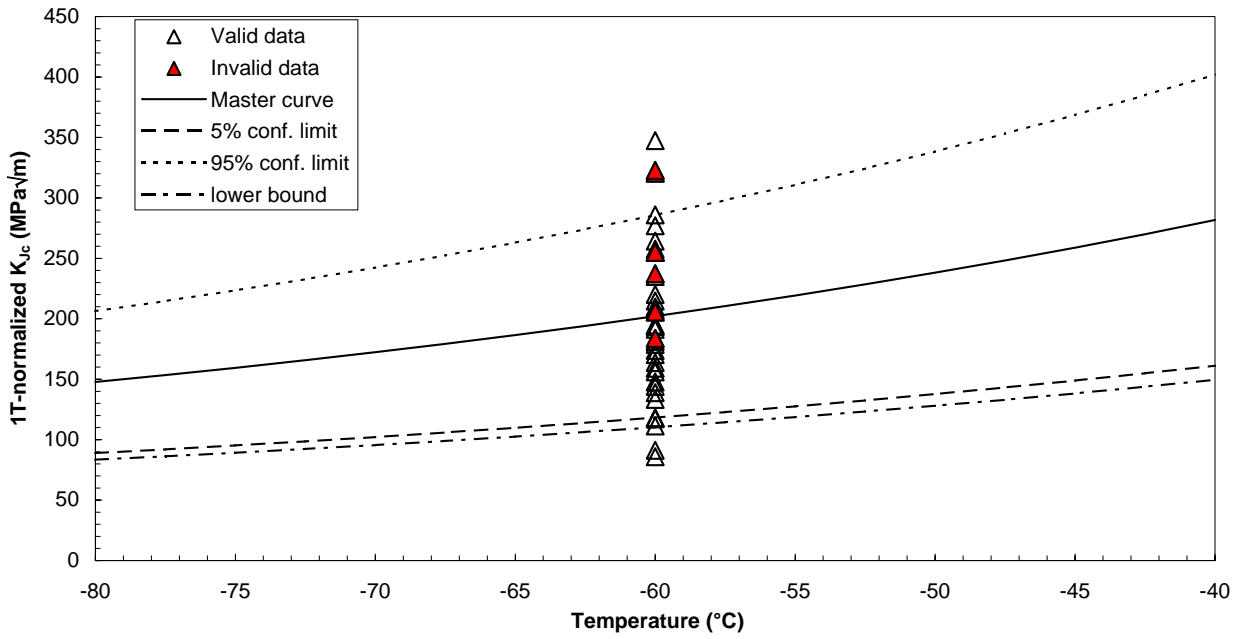
SX9.3.8	-60	146.5	169.8	1	0.167	0.0123	0.0038
SX9.4.1	-60	119.9	138.4	1	0.167	0.0123	0.0015
SX9.4.2	-60	79.9	91.0	1	0.167	0.0123	0.0002
SX9.4.3	-60	140.9	163.2	1	0.167	0.0123	0.0032
SX9.4.4	-60	115.3	132.9	1	0.167	0.0123	0.0012
SX9.5.1	-60	137.0	158.6	1	0.167	0.0123	0.0028
SX9.5.2	-60	166.9	194.0	1	0.167	0.0123	0.0070
SX9.5.3	-60	225.4	263.3	1	0.167	0.0123	0.0267
SX9.5.4	-60	200.7	234.1	1	0.167	0.0123	0.0160

4. Master curve fit to data

Temperature adj. = 4.7 °C (est.) Stand. dev. on T_0 = 3.3 °C (est.)

<i>T</i> (°C)	<i>K_{Jc(exp)}</i> (MPa √m)	<i>K_{Jc(1T)}</i> (MPa √m)	<i>K_{MC(1T)}</i> (MPa √m)	5% conf. (MPa √m)	95% conf. (MPa √m)	5% L.B. (MPa √m)
-60	167.6	144.1				
-60	128.6	111.3				
-60	377.4	320.5				
-60	98.4	85.9				
-60	278.4	237.3				
-60	240.7	205.6				
-60	380.0	322.7				
-60	171.9	147.7				
-60	136.8	118.2				
-60	135.8	117.4				
-60	214.7	183.7				
-60	299.5	255.0				
-60	295.3	347.4				
-60	217.7	255.1				
-60	219.8	257.6				
-60	165.9	193.5				
-60	153.6	178.8				
-60	183.8	214.7				
-60	236.1	277.0				
-60	149.4	173.9				
-60	179.5	209.7				
-60	177.6	207.4				
-60	188.3	220.2				
-60	134.5	156.1				
-60	243.6	285.9				
-60	155.7	181.4				
-60	164.0	191.3				
-60	146.5	170.4				
-60	119.9	138.8				
-60	79.9	91.2				
-60	140.9	163.7				
-60	115.3	133.3				
-60	137.0	159.2				
-60	166.9	194.7				
-60	225.4	264.2				
-60	200.7	234.9				
-80			147.7	89.0	206.4	83.5
-77.5			153.4	92.0	214.8	86.3
-75			159.4	95.3	223.6	89.3
-72.5			165.7	98.7	232.8	92.4
-70			172.3	102.3	242.4	95.6
-67.5			179.2	106.0	252.5	99.1
-65			186.5	109.9	263.1	102.6
-62.5			194.1	114.0	274.2	106.4
-60			202.1	118.3	285.9	110.3
-57.5			210.5	122.9	298.1	114.5
-55			219.3	127.6	310.9	118.8
-52.5			228.5	132.6	324.4	123.4
-50			238.1	137.8	338.5	128.1
-47.5			248.2	143.3	353.2	133.1
-45			258.9	149.0	368.7	138.4
-42.5			270.0	155.0	385.0	143.9
-40			281.7	161.3	402.0	149.6

MASTER CURVE FOR 1TCT WITH CONFIDENCE LIMITS (E1921-05 analysis)
EURO toughness dataset - Block SX9



MASTER CURVE ANALYSIS OF RANDOM INHOMOGENEITIES

Single Point Estimation Method

Step 2: Single point estimation

1. Calculation of the maximum value of T_0 (based on a single data point) and establishment of T_0 for the data set

Specimen code	T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	K_{Jc-1T} (MPa \sqrt{m})	$K_{analysis}$ (MPa \sqrt{m})	δ_i	$T_{o(i)}$ (°C)
SX9.5.1.1	-60	167.6	143.6	143.6	1	-85
SX9.5.1.2	-60	128.6	110.9	128.6	1	-68
SX9.5.1.3	-60	377.4	319.3	203.0	0	-
SX9.5.2.1	-60	98.4	85.7	98.4	1	-48
SX9.5.2.2	-60	278.4	236.4	203.3	0	-
SX9.5.2.3	-60	240.7	204.9	202.6	0	-
SX9.5.3.1	-60	380.0	321.5	201.7	0	-
SX9.5.3.2	-60	171.9	147.2	171.9	1	-87
SX9.5.3.3	-60	136.8	117.8	136.8	1	-72
SX9.5.4.1	-60	135.8	117.0	135.8	1	-71
SX9.5.4.2	-60	214.7	183.1	200.8	0	-
SX9.5.4.3	-60	299.5	254.1	202.8	0	-
SX9.1.1	-60	295.3	346.1	295.3	1	-139
SX9.1.2	-60	217.7	254.2	217.7	1	-121
SX9.1.3	-60	219.8	256.6	219.8	1	-122
SX9.1.4	-60	165.9	192.8	165.9	1	-104
SX9.2.1	-60	153.6	178.2	153.6	1	-99
SX9.2.2	-60	183.8	214.0	183.8	1	-111
SX9.2.3	-60	236.1	275.9	236.1	1	-126
SX9.2.4	-60	149.4	173.3	149.4	1	-98
SX9.3.1	-60	179.5	209.0	179.5	1	-109
SX9.3.2	-60	177.6	206.7	177.6	1	-109
SX9.3.3	-60	188.3	219.4	188.3	1	-112
SX9.3.4	-60	134.5	155.6	134.5	1	-91
SX9.3.5	-60	243.6	284.9	243.6	1	-128
SX9.3.6	-60	155.7	180.8	155.7	1	-100
SX9.3.7	-60	164.0	190.6	164.0	1	-104
SX9.3.8	-60	146.5	169.8	146.5	1	-96
SX9.4.1	-60	119.9	138.4	119.9	1	-83
SX9.4.2	-60	79.9	91.0	79.9	1	-53
SX9.4.3	-60	140.9	163.2	140.9	1	-94
SX9.4.4	-60	115.3	132.9	115.3	1	-80
SX9.5.1	-60	137.0	158.6	137.0	1	-92
SX9.5.2	-60	166.9	194.0	166.9	1	-105
SX9.5.3	-60	225.4	263.3	225.4	1	-123
SX9.5.4	-60	200.7	234.1	200.7	1	-116

$$T_{0(SP)} = -102.3 \text{ } ^\circ\text{C}$$

$$\sigma_{T0(SP)} = 5.1 \text{ } ^\circ\text{C}$$

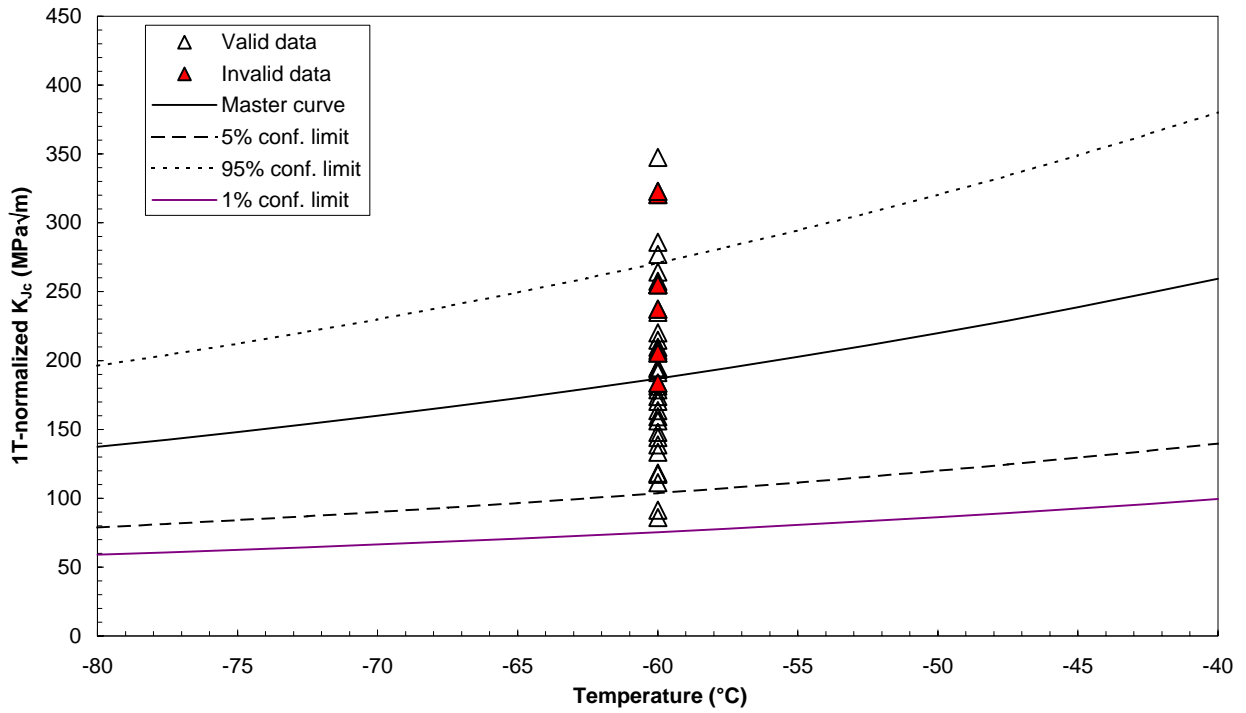
(*) $K_{Jc-1T} < 30 \text{ MPa}\sqrt{m}$

2. Revised Master Curve fit to data

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-60	167.6	144.1				
-60	128.6	111.3				
-60	377.4	320.5				
-60	98.4	85.9				
-60	278.4	237.3				
-60	240.7	205.6				
-60	380.0	322.7				
-60	171.9	147.7				
-60	136.8	118.2				
-60	135.8	117.4				
-60	214.7	183.7				
-60	299.5	255.0				
-60	295.3	347.4				
-60	217.7	255.1				
-60	219.8	257.6				
-60	165.9	193.5				
-60	153.6	178.8				
-60	183.8	214.7				
-60	236.1	277.0				
-60	149.4	173.9				
-60	179.5	209.7				

-60	177.6	207.4				
-60	188.3	220.2				
-60	134.5	156.1				
-60	243.6	285.9				
-60	155.7	181.4				
-60	164.0	191.3				
-60	146.5	170.4				
-60	119.9	138.8				
-60	79.9	91.2				
-60	140.9	163.7				
-60	115.3	133.3				
-60	137.0	159.2				
-60	166.9	194.7				
-60	225.4	264.2				
-60	200.7	234.9				
-80			137.3	78.8	196.1	59.0
-77.5			142.6	81.4	204.0	60.7
-75			148.0	84.1	212.2	62.5
-72.5			153.8	87.0	220.9	64.4
-70			159.8	90.0	230.0	66.4
-67.5			166.1	93.2	239.5	68.5
-65			172.7	96.5	249.4	70.7
-62.5			179.7	99.9	259.9	73.0
-60			187.0	103.6	270.9	75.4
-57.5			194.6	107.4	282.4	77.9
-55			202.6	111.4	294.4	80.6
-52.5			211.0	115.6	307.1	83.3
-50			219.8	120.0	320.3	86.3
-47.5			229.0	124.6	334.2	89.3
-45			238.7	129.4	348.8	92.5
-42.5			248.9	134.5	364.1	95.9
-40			259.5	139.8	380.2	99.4

MASTER CURVE WITH CONFIDENCE LIMITS - Single Point Estimation Method
EURO toughness dataset - Block SX9



Calculation name: EURO dataset - Block SX9			
Data set length:	36	Submitted on:	2006-Nov-03 12:35:33
Data set limit:	max. allowed	Calculation time:	0.484 seconds

Master Curve results (Version 1.1.2.0)

1. Master Curve analysis of homogeneous material (ASTM E1921-05)

Reference temperature T_0 (°C)	-107.4
One standard deviation on T_0 (°C)	3.3
$K_{Jc,1T,med.,eq}$ (MPaVm)	202.1
Left temperature window (°C)	-157.4
Right temperature window (°C)	-57.4
Number of data	36
Number of data outside the temperature window	0
Number of valid data, r	30
Sum of n_i	5.00
Sum of \ln of probability density	-170.05

Minimum number of specimen satisfied

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-157.4	32.9	39.4	57.2	73.6	79.7
-150.2	34.3	41.5	61.2	79.3	86.1
-143.1	35.9	43.8	65.7	85.9	93.3
-135.9	37.6	46.5	70.9	93.3	101.7
-128.8	39.7	49.6	76.8	101.9	111.2
-121.6	42.1	53.2	83.6	111.7	122.1
-114.5	44.8	57.2	91.4	122.9	134.6
-107.4	47.9	61.9	100.3	135.8	148.9
-100.2	51.4	67.2	110.5	150.5	165.3
-93.1	55.5	73.3	122.2	167.4	184.1
-85.9	60.1	80.3	135.6	186.7	205.6
-78.8	65.4	88.3	150.9	208.8	230.2
-71.6	71.5	97.5	168.5	234.1	258.4
-64.5	78.5	108.0	188.6	263.2	290.8
-57.4	86.5	120.0	211.7	296.4	327.8

2. Bi-modal Master Curve analysis for data set suspected to contains two populations

Reference temperature population A, T_a	-93.3 °C
One standard deviation on T_a	5.4 °C
Reference temperature population B, T_b	-115.1 °C
One standard deviation on T_b	5.3 °C
Likelihood to be from population A, p_a	0.51
One standard deviation on p_a	0.1
Left temperature window (°C)	-165.1
Right temperature window(°C)	-43.3
Number of data	36
Number of data outside the temperature window	0
Number of valid data, r	30
Sum of \ln of probability density	-167.89

This dataset is likely not homogeneous

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-165.1	30.8	36.2	51.8	70.2	77.3
-156.4	32.1	38.1	55.7	76.8	84.8
-147.7	33.6	40.4	60.3	84.5	93.7
-139.0	35.3	43.1	65.7	93.7	104.2
-130.3	37.4	46.3	72.0	104.5	116.5
-121.6	39.9	50.0	79.5	117.2	131.0
-112.9	42.8	54.4	88.3	132.3	148.2
-104.2	46.3	59.6	98.7	150.0	168.5
-95.5	50.3	65.7	111.0	170.9	192.4
-86.8	55.1	72.8	125.5	195.6	220.6
-78.1	60.7	81.3	142.5	224.7	253.8
-69.4	67.4	91.4	162.7	259.0	293.0
-60.7	75.2	103.2	186.4	299.5	339.3
-52.0	84.5	117.1	214.5	347.3	393.9
-43.3	95.4	133.6	247.5	403.6	458.2

3. Master Curve analysis for data set suspected to be randomly inhomogeneous

Mean reference temperature, T	-104.0 °C
One standard deviation on the mean T	10.8 °C
Left temperature window(°C)	-175.7
Right temperature window(°C)	-32.3
Number of data	36
Number of data outside the temperature window	0
Number of valid data, r	30
Sum of ln of probability density	-167.94

This dataset is likely not homogeneous

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-175.7	29.4	34.2	47.9	63.3	70.6
-165.4	30.7	36.1	51.7	69.7	78.3
-155.2	32.2	38.4	56.3	77.4	87.7
-144.9	34.1	41.2	62.0	86.8	99.0
-134.7	36.3	44.5	68.7	98.3	112.9
-124.5	39.0	48.6	77.0	112.1	129.7
-114.2	42.3	53.6	87.1	129.0	150.2
-104.0	46.2	59.5	99.3	149.5	175.0
-93.7	51.1	66.8	114.1	174.5	205.2
-83.5	56.9	75.7	132.2	204.8	241.9
-73.3	64.0	86.4	154.0	241.6	286.5
-63.0	72.7	99.5	180.7	286.3	340.6
-52.8	83.2	115.3	213.0	340.7	406.4
-42.5	95.9	134.6	252.2	406.7	486.3
-32.3	111.4	157.9	299.9	486.9	583.4

Calculation name: EURO dataset - Block SX9 - 1/2TC(T) specimens			
Data set length:	12	Submitted on:	2006-Nov-03 16:42:50
Data set limit:	max. allowed	Calculation time:	0.203 seconds

Master Curve results (Version 1.1.2.0)

1. Master Curve analysis of homogeneous material (ASTM E1921-05)

Reference temperature T_0 (°C)	-95.1
One standard deviation on T_0 (°C)	7.3
$K_{Jc,1T,med.,eq}$ (MPaVm)	166.4
Left temperature window (°C)	-145.1
Right temperature window (°C)	-45.1
Number of data	12
Number of data outside the temperature window	0
Number of valid data, r	6
Sum of n_i	1.00
Sum of \ln of probability density	-37.08

Minimum number of specimen satisfied

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-145.1	32.9	39.4	57.2	73.6	79.7
-138.0	34.3	41.5	61.2	79.3	86.1
-130.8	35.9	43.8	65.7	85.9	93.3
-123.7	37.6	46.5	70.9	93.3	101.7
-116.5	39.7	49.6	76.8	101.9	111.2
-109.4	42.1	53.2	83.6	111.7	122.1
-102.2	44.8	57.2	91.4	122.9	134.6
-95.1	47.9	61.9	100.3	135.8	148.9
-88.0	51.4	67.2	110.5	150.5	165.3
-80.8	55.5	73.3	122.2	167.4	184.1
-73.7	60.1	80.3	135.6	186.7	205.6
-66.5	65.4	88.3	150.9	208.8	230.2
-59.4	71.5	97.5	168.5	234.1	258.4
-52.2	78.5	108.0	188.6	263.2	290.8
-45.1	86.5	120.0	211.7	296.4	327.8

2. Bi-modal Master Curve analysis for data set suspected to contains two populations

Reference temperature population A, T_a	-72.3 °C
One standard deviation on T_a	10.2 °C
Reference temperature population B, T_b	-1295.1 °C
One standard deviation on T_b	160.0 °C
Likelihood to be from population A, p_a	0.51
One standard deviation on p_a	0.2
Left temperature window (°C)	-1345.1
Right temperature window(°C)	-22.3
Number of data	12
Number of data outside the temperature window	0
Number of valid data, r	6
Sum of \ln of probability density	-35.32

This dataset is likely not homogeneous

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-1345.1	24.1	26.2	34.9	70.1	77.3
-1250.6	24.1	26.2	35.5	253.9	287.3
-1156.1	24.1	26.2	35.5	1360.2	1551.4
-1061.6	24.1	26.2	35.5	8020.4	9162.1
-967.2	24.1	26.2	35.5	48116.9	54980.6
-872.7	24.1	26.2	35.5	289509.5	330821.6
-778.2	24.1	26.2	35.5	1742764.6	1991465.8
-683.7	24.1	26.2	35.5	10491789.8	11989035.2
-589.2	24.1	26.3	35.5	63163509.4	72177360.0
-494.7	24.1	26.3	35.5	380262841.1	434528878.0
-400.3	24.2	26.3	35.7	2289294610.7	2615992194.4
-305.8	24.5	26.7	36.8	13782230525.8	15749046602.0
-211.3	26.2	29.4	43.3	82973104167.1	94813918689.8
-116.8	36.5	45.0	82.1	499522629073.9	570807834819.9
-22.3	98.8	139.1	316.2	3007273977897.3	3436432001536.9

3. Master Curve analysis for data set suspected to be randomly inhomogeneous

Mean reference temperature, T	-97.5 °C
One standard deviation on the mean T	22.6 °C
Left temperature window(°C)	-192.8
Right temperature window(°C)	-2.3
Number of data	12
Number of data outside the temperature window	0
Number of valid data, r	6
Sum of ln of probability density	-36.10

This dataset is likely not homogeneous

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-192.8	27.0	30.5	41.4	58.1	68.7
-179.2	27.9	32.0	44.7	65.5	79.0
-165.6	29.1	33.7	48.9	75.2	92.5
-152.0	30.6	36.0	54.4	87.7	110.0
-138.4	32.5	38.9	61.5	104.0	132.6
-124.8	34.9	42.6	70.7	125.1	162.0
-111.1	38.0	47.4	82.6	152.4	200.0
-97.5	41.9	53.6	98.1	187.8	249.2
-83.9	47.1	61.6	118.1	233.6	313.0
-70.3	53.6	71.9	144.1	293.0	395.6
-56.7	62.2	85.2	177.7	369.9	502.6
-43.1	73.2	102.5	221.1	469.5	641.2
-29.5	87.4	124.8	277.5	598.5	820.6
-15.9	105.9	153.6	350.4	765.6	1052.9
-2.3	129.7	191.1	444.9	981.9	1353.9

Calculation name: EURO dataset - Block SX9 - 2TC(T) specimens			
Data set length:	20	Submitted on:	2006-Nov-03 16:54:47
Data set limit:	max. allowed	Calculation time:	0.265 seconds

Master Curve results (Version 1.1.2.0)

1. Master Curve analysis of homogeneous material (ASTM E1921-05)

Reference temperature T_0 (°C)	-109.4
One standard deviation on T_0 (°C)	4.0
$K_{Jc,1T,med.,eq}$ (MPaVm)	209.0
Left temperature window (°C)	-159.4
Right temperature window (°C)	-59.4
Number of data	20
Number of data outside the temperature window	0
Number of valid data, r	20
Sum of n_i	3.33
Sum of \ln of probability density	-110.30

Minimum number of specimen satisfied

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-159.4	32.9	39.4	57.2	73.6	79.7
-152.3	34.3	41.5	61.2	79.3	86.1
-145.1	35.9	43.8	65.7	85.9	93.3
-138.0	37.6	46.5	70.9	93.3	101.7
-130.9	39.7	49.6	76.8	101.9	111.2
-123.7	42.1	53.2	83.6	111.7	122.1
-116.6	44.8	57.2	91.4	122.9	134.6
-109.4	47.9	61.9	100.3	135.8	148.9
-102.3	51.4	67.2	110.5	150.5	165.3
-95.1	55.5	73.3	122.2	167.4	184.1
-88.0	60.1	80.3	135.6	186.7	205.6
-80.9	65.4	88.3	150.9	208.8	230.2
-73.7	71.5	97.5	168.5	234.1	258.4
-66.6	78.5	108.0	188.6	263.2	290.8
-59.4	86.5	120.0	211.7	296.4	327.8

2. Bi-modal Master Curve analysis for data set suspected to contains two populations

Reference temperature population A, T_a	-98.8 °C
One standard deviation on T_a	6.5 °C
Reference temperature population B, T_b	-118.6 °C
One standard deviation on T_b	7.5 °C
Likelihood to be from population A, p_a	0.64
One standard deviation on p_a	0.1
Left temperature window (°C)	-168.6
Right temperature window(°C)	-48.8
Number of data	20
Number of data outside the temperature window	0
Number of valid data, r	20
Sum of \ln of probability density	-108.97

The analysis is unable to guarantee that the data contains two populations

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-168.6	30.6	36.0	51.2	68.6	76.1
-160.0	31.9	37.9	54.9	74.8	83.4
-151.5	33.4	40.1	59.2	82.1	91.8
-142.9	35.1	42.7	64.3	90.7	101.9
-134.4	37.1	45.8	70.4	100.8	113.6
-125.8	39.5	49.3	77.4	112.8	127.5
-117.3	42.3	53.6	85.7	126.8	143.8
-108.7	45.6	58.5	95.5	143.3	163.0
-100.2	49.5	64.3	107.0	162.7	185.5
-91.6	54.0	71.2	120.5	185.6	212.0
-83.1	59.4	79.3	136.4	212.5	243.3
-74.5	65.7	88.8	155.1	244.1	280.0
-66.0	73.1	99.9	177.1	281.4	323.2
-57.4	81.9	113.1	203.0	325.2	374.0
-48.8	92.1	128.5	233.5	376.7	433.8

3. Master Curve analysis for data set suspected to be randomly inhomogeneous

Mean reference temperature, T	-106.3 °C
One standard deviation on the mean T	9.3 °C
Left temperature window(°C)	-174.8
Right temperature window(°C)	-37.7
Number of data	20
Number of data outside the temperature window	0
Number of valid data, r	20
Sum of ln of probability density	-109.16

This dataset is likely not homogeneous

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-174.8	29.9	34.9	49.0	64.3	71.2
-165.0	31.2	36.8	52.9	70.5	78.6
-155.2	32.7	39.1	57.5	78.0	87.6
-145.4	34.6	42.0	63.1	87.1	98.3
-135.6	36.8	45.3	69.8	98.0	111.3
-125.8	39.5	49.4	77.9	111.2	127.0
-116.1	42.8	54.3	87.7	127.0	145.9
-106.3	46.6	60.1	99.5	146.1	168.6
-96.5	51.3	67.2	113.7	169.1	196.0
-86.7	57.0	75.8	130.8	196.8	229.0
-76.9	63.8	86.0	151.3	230.3	268.8
-67.1	72.0	98.4	176.1	270.5	316.7
-57.3	81.9	113.3	206.0	319.0	374.4
-47.5	93.8	131.2	241.9	377.4	443.9
-37.7	108.1	152.8	285.2	447.7	527.6

Calculation name: EURO dataset - Block SX9 - GKSS tests			
Data set length:	16	Submitted on:	2006-Nov-03 17:01:40
Data set limit:	max. allowed	Calculation time:	0.234 seconds

Master Curve results (Version 1.1.2.0)

1. Master Curve analysis of homogeneous material (ASTM E1921-05)

Reference temperature T_0 (°C)	-101.9
One standard deviation on T_0 (°C)	5.7
$K_{Jc,1T,med.,eq}$ (MPaVm)	185.3
Left temperature window (°C)	-151.9
Right temperature window (°C)	-51.9
Number of data	16
Number of data outside the temperature window	0
Number of valid data, r	10
Sum of n_i	1.67
Sum of \ln of probability density	-58.85

Minimum number of specimen satisfied

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-151.9	32.9	39.4	57.2	73.6	79.7
-144.8	34.3	41.5	61.2	79.3	86.1
-137.6	35.9	43.8	65.7	85.9	93.3
-130.5	37.6	46.5	70.9	93.3	101.7
-123.4	39.7	49.6	76.8	101.9	111.2
-116.2	42.1	53.2	83.6	111.7	122.1
-109.1	44.8	57.2	91.4	122.9	134.6
-101.9	47.9	61.9	100.3	135.8	148.9
-94.8	51.4	67.2	110.5	150.5	165.3
-87.6	55.5	73.3	122.2	167.4	184.1
-80.5	60.1	80.3	135.6	186.7	205.6
-73.4	65.4	88.3	150.9	208.8	230.2
-66.2	71.5	97.5	168.5	234.1	258.4
-59.1	78.5	108.0	188.6	263.2	290.8
-51.9	86.5	120.0	211.7	296.4	327.8

2. Bi-modal Master Curve analysis for data set suspected to contains two populations

Reference temperature population A, T_a	-71.9 °C
One standard deviation on T_a	13.7 °C
Reference temperature population B, T_b	-108.9 °C
One standard deviation on T_b	8.6 °C
Likelihood to be from population A, p_a	0.27
One standard deviation on p_a	0.2
Left temperature window (°C)	-158.9
Right temperature window(°C)	-21.9
Number of data	16
Number of data outside the temperature window	0
Number of valid data, r	10
Sum of \ln of probability density	-57.59

This dataset is likely not homogeneous

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-158.9	30.4	35.7	52.8	72.2	78.7
-149.1	31.7	37.6	57.5	80.0	87.5
-139.3	33.2	40.0	63.2	89.4	98.0
-129.5	35.1	42.9	70.1	100.7	110.7
-119.7	37.4	46.3	78.3	114.2	126.0
-110.0	40.1	50.4	88.3	130.7	144.4
-100.2	43.3	55.4	100.4	150.4	166.6
-90.4	47.3	61.3	115.0	174.1	193.3
-80.6	52.0	68.4	132.5	202.8	225.6
-70.8	57.6	77.1	153.6	237.2	264.3
-61.0	64.5	87.4	179.1	278.7	311.0
-51.2	72.7	99.9	209.8	328.7	367.2
-41.5	82.6	114.9	246.7	388.9	434.9
-31.7	94.5	133.0	291.2	461.4	516.5
-21.9	108.8	154.7	344.9	548.8	614.7

3. Master Curve analysis for data set suspected to be randomly inhomogeneous

Mean reference temperature, T	-100.2 °C
One standard deviation on the mean T	15.3 °C
Left temperature window(°C)	-180.8
Right temperature window(°C)	-19.7
Number of data	16
Number of data outside the temperature window	0
Number of valid data, r	10
Sum of ln of probability density	-58.32

This dataset is likely not homogeneous

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-180.8	28.4	32.6	45.1	61.0	69.4
-169.3	29.5	34.3	48.7	67.7	78.0
-157.8	30.9	36.4	53.2	76.2	88.8
-146.3	32.6	39.1	58.8	86.6	102.1
-134.8	34.8	42.3	65.8	99.7	118.8
-123.3	37.4	46.3	74.5	116.0	139.5
-111.8	40.7	51.3	85.3	136.2	165.4
-100.2	44.8	57.6	98.8	161.5	197.5
-88.7	49.9	65.3	115.5	192.9	237.5
-77.2	56.2	74.8	136.4	231.9	287.3
-65.7	64.0	86.8	162.3	280.6	349.2
-54.2	73.8	101.6	194.5	341.1	426.3
-42.7	85.9	120.0	234.8	416.4	522.2
-31.2	101.0	143.0	284.6	510.1	641.6
-19.7	119.7	171.6	346.7	626.7	790.1

Calculation name: EURO dataset - Block SX9 - THA tests			
Data set length:	20	Submitted on:	2006-Nov-03 17:08:47
Data set limit:	max. allowed	Calculation time:	0.281 seconds

Master Curve results (Version 1.1.2.0)

1. Master Curve analysis of homogeneous material (ASTM E1921-05)

No valid data. Master curve analysis could not be performed

2. Bi-modal Master Curve analysis for data set suspected to contains two populations

Reference temperature population A, Ta	-108.5 °C
One standard deviation on Ta	6.5 °C
Reference temperature population B, Tb	-128.1 °C
One standard deviation on Tb	7.5 °C
Likelihood to be from population A, pa	0.64
One standard deviation on pa	0.1
Left temperature window (°C)	-178.1
Right temperature window(°C)	-58.5
Number of data	20
Number of data outside the temperature window	0
Number of valid data, r	20
Sum of ln of probability density	-112.44

The analysis is unable to guarantee that the data contains two populations

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-178.1	30.7	36.0	51.2	68.6	76.1
-169.6	31.9	37.9	54.9	74.8	83.3
-161.0	33.4	40.1	59.3	82.1	91.8
-152.5	35.1	42.7	64.4	90.7	101.8
-143.9	37.1	45.8	70.4	100.8	113.6
-135.4	39.5	49.4	77.5	112.7	127.4
-126.9	42.3	53.6	85.8	126.7	143.6
-118.3	45.6	58.5	95.5	143.1	162.8
-109.8	49.5	64.4	107.0	162.5	185.2
-101.2	54.0	71.2	120.5	185.3	211.7
-92.7	59.4	79.3	136.4	212.1	242.8
-84.2	65.7	88.8	155.1	243.6	279.3
-75.6	73.1	99.9	177.1	280.7	322.4
-67.1	81.8	113.1	202.9	324.3	373.0
-58.5	92.1	128.5	233.4	375.6	432.5

3. Master Curve analysis for data set suspected to be randomly inhomogeneous

Mean reference temperature, T	-115.9 °C
One standard deviation on the mean T	9.2 °C
Left temperature window(°C)	-184.3
Right temperature window(°C)	-47.5
Number of data	20
Number of data outside the temperature window	0
Number of valid data, r	20

Sum of ln of probability density

-112.63

This dataset is likely not homogeneous

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-184.3	29.9	34.9	49.1	64.4	71.3
-174.5	31.2	36.9	52.9	70.6	78.7
-164.7	32.7	39.2	57.6	78.1	87.6
-155.0	34.6	42.0	63.2	87.1	98.3
-145.2	36.8	45.4	69.9	98.0	111.3
-135.4	39.5	49.4	78.0	111.1	126.9
-125.6	42.8	54.3	87.8	126.9	145.6
-115.9	46.7	60.2	99.5	145.9	168.3
-106.1	51.4	67.2	113.7	168.9	195.5
-96.3	57.0	75.8	130.7	196.4	228.3
-86.6	63.8	86.0	151.2	229.7	267.8
-76.8	72.0	98.3	175.9	269.7	315.4
-67.0	81.8	113.2	205.6	317.8	372.7
-57.2	93.7	131.0	241.4	375.8	441.7
-47.5	107.9	152.6	284.4	445.6	524.7

ANNEX 4

Master Curve analyses performed
on tests performed at -60 °C
(including block SX9)

**STANDARD TEST METHOD FOR THE DETERMINATION OF REFERENCE TEMPERATURE
T₀ FOR FERRITIC STEELS IN THE TRANSITION RANGE**

[MULTI-TEMPERATURE APPROACH - IN ACCORDANCE WITH ASTM E1921-05]

1. Material characteristics

Material specifications : **EURO toughness data set - Dataset at -60 °C (including SX9)**

2. Dimensional and crack growth requirements

Testing lab	T (°C)	a _o (mm)	W (mm)	B (mm)	b _o (mm)	Δa (mm)	K _{Jc[exp]} (MPa√m)	σ _{ys} (MPa)	E' (GPa)	K _{lim} (MPa√m)	DATA VALID	K _{Jc[calc]} (MPa√m)
GKSS	-60	14.19	25	12.5	10.81	0.05	234.1	506.4	231.4	205.5	NO	205.5
GKSS	-60	14.16	25	12.5	10.84	0.00	114.4	506.4	231.4	205.8	YES	114.4
GKSS	-60	14.31	25	12.5	10.69	0.00	130.7	506.4	231.4	204.4	YES	130.7
GKSS	-60	14.13	25	12.5	10.87	0.00	106.7	506.4	231.4	206.1	YES	106.7
GKSS	-60	14.08	25	12.5	10.92	0.00	161.0	506.4	231.4	206.5	YES	161.0
GKSS	-60	13.58	25	12.5	11.42	0.00	200.7	506.4	231.4	211.2	YES	200.7
GKSS	-60	14.26	25	12.5	10.74	0.00	125.2	506.4	231.4	204.8	YES	125.2
GKSS	-60	14.19	25	12.5	10.81	0.00	145.1	506.4	231.4	205.5	YES	145.1
GKSS	-60	14.00	25	12.5	11.00	0.00	91.9	506.4	231.4	207.3	YES	91.9
GKSS	-60	13.94	25	12.5	11.06	0.00	128.1	506.4	231.4	207.9	YES	128.1
GKSS	-60	14.59	25	12.5	10.41	0.00	164.4	506.4	231.4	201.7	YES	164.4
GKSS	-60	14.53	25	12.5	10.47	0.00	192.2	506.4	231.4	202.2	YES	192.2
GKSS	-60	14.76	25	12.5	10.24	0.00	166.3	506.4	231.4	200.0	YES	166.3
GKSS	-60	14.48	25	12.5	10.52	0.00	177.7	506.4	231.4	202.7	YES	177.7
GKSS	-60	14.61	25	12.5	10.39	0.00	167.6	506.4	231.4	201.5	YES	167.6
GKSS	-60	14.41	25	12.5	10.59	0.00	128.6	506.4	231.4	203.4	YES	128.6
GKSS	-60	14.45	25	12.5	10.55	0.70	377.4	506.4	231.4	203.0	NO	203.0
GKSS	-60	14.37	25	12.5	10.63	0.00	98.4	506.4	231.4	203.8	YES	98.4
GKSS	-60	14.42	25	12.5	10.58	0.29	278.4	506.4	231.4	203.3	NO	203.3
GKSS	-60	14.49	25	12.5	10.51	0.18	240.7	506.4	231.4	202.6	NO	202.6
GKSS	-60	14.59	25	12.5	10.41	0.75	380.0	506.4	231.4	201.7	NO	201.7
GKSS	-60	14.04	25	12.5	10.96	0.00	171.9	506.4	231.4	206.9	YES	171.9
GKSS	-60	14.49	25	12.5	10.51	0.00	136.8	506.4	231.4	202.6	YES	136.8
GKSS	-60	14.80	25	12.5	10.20	0.00	135.8	506.4	231.4	199.6	YES	135.8
GKSS	-60	14.68	25	12.5	10.32	0.13	214.7	506.4	231.4	200.8	NO	200.8
GKSS	-60	14.47	25	12.5	10.53	0.41	299.5	506.4	231.4	202.8	NO	202.8
GKSS	-60	14.55	25	12.5	10.45	0.00	203.7	506.4	231.4	202.0	NO	202.0
GKSS	-60	14.46	25	12.5	10.54	0.00	116.0	506.4	231.4	202.9	YES	116.0
GKSS	-60	14.55	25	12.5	10.45	0.11	221.9	506.4	231.4	202.0	NO	202.0
GKSS	-60	14.77	25	12.5	10.23	0.00	167.6	506.4	231.4	199.9	YES	167.6
GKSS	-60	14.35	25	12.5	10.65	0.00	89.8	506.4	231.4	204.0	YES	89.8
GKSS	-60	14.56	25	12.5	10.44	0.00	156.3	506.4	231.4	201.9	YES	156.3
GKSS	-60	14.49	25	12.5	10.51	0.00	186.8	506.4	231.4	202.6	YES	186.8
GKSS	-60	14.43	25	12.5	10.57	0.00	213.5	506.4	231.4	203.2	NO	203.2
GKSS	-60	14.39	25	12.5	10.61	0.00	164.6	506.4	231.4	203.6	YES	164.6
GKSS	-60	14.49	25	12.5	10.51	0.28	280.1	506.4	231.4	202.6	NO	202.6
GKSS	-60	14.43	25	12.5	10.57	0.00	185.9	506.4	231.4	203.2	YES	185.9
GKSS	-60	14.85	25	12.5	10.15	0.00	127.7	506.4	231.4	199.1	YES	127.7
GKSS	-60	14.64	25	12.5	10.36	0.00	205.0	506.4	231.4	201.2	NO	201.2
GKSS	-60	14.25	25	12.5	10.75	0.00	115.6	506.4	231.4	204.9	YES	115.6
GKSS	-60	14.44	25	12.5	10.56	0.00	107.5	506.4	231.4	203.1	YES	107.5
SIEMENS	-60	13.24	25	12.5	11.76	0.00	164.6	506.4	231.4	214.3	YES	164.6
SIEMENS	-60	13.29	25	12.5	11.71	0.00	172.0	506.4	231.4	213.9	YES	172.0
SIEMENS	-60	13.24	25	12.5	11.76	0.00	108.5	506.4	231.4	214.3	YES	108.5
SIEMENS	-60	13.28	25	12.5	11.72	0.00	119.0	506.4	231.4	214.0	YES	119.0
SIEMENS	-60	13.26	25	12.5	11.74	0.00	153.5	506.4	231.4	214.2	YES	153.5
SIEMENS	-60	13.22	25	12.5	11.78	0.00	158.9	506.4	231.4	214.5	YES	158.9
SIEMENS	-60	13.27	25	12.5	11.73	0.00	137.5	506.4	231.4	214.1	YES	137.5
SIEMENS	-60	13.18	25	12.5	11.82	0.00	119.5	506.4	231.4	214.9	YES	119.5
SIEMENS	-60	13.18	25	12.5	11.82	0.00	130.7	506.4	231.4	214.9	YES	130.7
SIEMENS	-60	13.24	25	12.5	11.76	0.00	172.6	506.4	231.4	214.3	YES	172.6
SIEMENS	-60	13.24	25	12.5	11.76	0.00	84.5	506.4	231.4	214.3	YES	84.5
SIEMENS	-60	13.34	25	12.5	11.66	0.00	244.6	506.4	231.4	213.4	NO	213.4
SIEMENS	-60	13.20	25	12.5	11.80	0.00	120.4	506.4	231.4	214.7	YES	120.4
SIEMENS	-60	13.31	25	12.5	11.69	0.00	104.5	506.4	231.4	213.7	YES	104.5
SIEMENS	-60	13.23	25	12.5	11.77	0.00	163.6	506.4	231.4	214.4	YES	163.6
SIEMENS	-60	13.28	25	12.5	11.72	0.00	201.4	506.4	231.4	214.0	YES	201.4
SIEMENS	-60	13.20	25	12.5	11.80	0.00	137.8	506.4	231.4	214.7	YES	137.8
SIEMENS	-60	13.19	25	12.5	11.81	0.00	173.0	506.4	231.4	214.8	YES	173.0
SIEMENS	-60	13.22	25	12.5	11.78	0.00	99.2	506.4	231.4	214.5	YES	99.2
SIEMENS	-60	13.22	25	12.5	11.78	0.00	173.4	506.4	231.4	214.5	YES	173.4
SIEMENS	-60	13.29	25	12.5	11.71	0.00	131.5	506.4	231.4	213.9	YES	131.5
GKSS	-60	28.06	50	25.0	21.94	0.00	186.0	506.4	231.4	292.8	YES	186.0
GKSS	-60	27.75	50	25.0	22.25	0.00	151.8	506.4	231.4	294.8	YES	151.8
GKSS	-60	27.62	50	25.0	22.38	0.00	111.7	506.4	231.4	295.7	YES	111.7
GKSS	-60	27.65	50	25.0	22.35	0.00	143.9	506.4	231.4	295.5	YES	143.9
GKSS	-60	27.71	50	25.0	22.29	0.00	105.4	506.4	231.4	295.1	YES	105.4
GKSS	-60	28.01	50	25.0	21.99	0.00	154.0	506.4	231.4	293.1	YES	154.0
GKSS	-60	27.97	50	25.0	22.03	0.00	176.2	506.4	231.4	293.4	YES	176.2
GKSS	-60	27.51	50	25.0	22.49	0.00	131.9	506.4	231.4	296.4	YES	131.9
GKSS	-60	27.86	50	25.0	22.14	0.00	203.9	506.4	231.4	294.1	YES	203.9

GKSS	-60	27.51	50	25.0	22.49	0.00	142.7	506.4	231.4	296.4	YES	142.7
TWI	-60	27.42	50	25.0	22.58	0.06	134.5	506.4	231.4	297.0	YES	134.5
TWI	-60	27.43	50	25.0	22.57	0.00	130.1	506.4	231.4	296.9	YES	130.1
TWI	-60	27.62	50	25.0	22.38	0.07	142.6	506.4	231.4	295.7	YES	142.6
TWI	-60	27.47	50	25.0	22.53	0.05	119.7	506.4	231.4	296.7	YES	119.7
TWI	-60	27.49	50	25.0	22.51	0.07	141.3	506.4	231.4	296.5	YES	141.3
TWI	-60	27.95	50	25.0	22.05	0.10	175.9	506.4	231.4	293.5	YES	175.9
TWI	-60	27.62	50	25.0	22.38	0.00	119.6	506.4	231.4	295.7	YES	119.6
TWI	-60	27.65	50	25.0	22.35	0.00	102.4	506.4	231.4	295.5	YES	102.4
TWI	-60	27.68	50	25.0	22.32	0.00	99.0	506.4	231.4	295.3	YES	99.0
TWI	-60	27.82	50	25.0	22.18	0.05	115.1	506.4	231.4	294.4	YES	115.1
TWI	-60	27.98	50	25.0	22.02	0.11	172.9	506.4	231.4	293.3	YES	172.9
TWI	-60	27.72	50	25.0	22.28	0.03	120.5	506.4	231.4	295.0	YES	120.5
TWI	-60	27.48	50	25.0	22.52	0.00	165.2	506.4	231.4	296.6	YES	165.2
TWI	-60	27.54	50	25.0	22.46	0.00	125.6	506.4	231.4	296.2	YES	125.6
TWI	-60	27.88	50	25.0	22.12	0.05	126.7	506.4	231.4	294.0	YES	126.7
TWI	-60	27.79	50	25.0	22.21	0.00	100.4	506.4	231.4	294.6	YES	100.4
TWI	-60	27.56	50	25.0	22.44	0.05	131.1	506.4	231.4	296.1	YES	131.1
TWI	-60	27.58	50	25.0	22.42	0.06	185.1	506.4	231.4	295.9	YES	185.1
TWI	-60	27.59	50	25.0	22.41	0.09	163.6	506.4	231.4	295.9	YES	163.6
TWI	-60	27.68	50	25.0	22.32	0.09	126.5	506.4	231.4	295.3	YES	126.5
TWI	-60	27.65	50	25.0	22.35	0.10	164.7	506.4	231.4	295.5	YES	164.7
TWI	-60	27.73	50	25.0	22.27	0.16	192.7	506.4	231.4	294.9	YES	192.7
TWI	-60	27.65	50	25.0	22.35	0.05	134.5	506.4	231.4	295.5	YES	134.5
TWI	-60	27.86	50	25.0	22.14	0.05	140.8	506.4	231.4	294.1	YES	140.8
GKSS	-60	56.44	100	50.0	43.56	0.12	295.3	506.4	231.4	412.5	YES	295.3
GKSS	-60	56.53	100	50.0	43.47	0.00	217.7	506.4	231.4	412.1	YES	217.7
GKSS	-60	56.45	100	50.0	43.55	0.00	219.8	506.4	231.4	412.5	YES	219.8
GKSS	-60	56.49	100	50.0	43.51	0.00	165.9	506.4	231.4	412.3	YES	165.9
GKSS	-60	57.56	100	50.0	42.44	0.00	109.9	506.4	231.4	407.2	YES	109.9
GKSS	-60	56.69	100	50.0	43.31	0.00	131.9	506.4	231.4	411.3	YES	131.9
GKSS	-60	56.69	100	50.0	43.31	0.00	136.2	506.4	231.4	411.3	YES	136.2
GKSS	-60	56.51	100	50.0	43.49	0.00	154.0	506.4	231.4	412.2	YES	154.0
GKSS	-60	56.15	100	50.0	43.85	0.00	115.9	506.4	231.4	413.9	YES	115.9
GKSS	-60	55.96	100	50.0	44.04	0.00	150.4	506.4	231.4	414.8	YES	150.4
THA	-60	56.57	100	50.0	43.43	0.00	153.6	506.4	231.4	411.9	YES	153.6
THA	-60	56.38	100	50.0	43.62	0.00	183.8	506.4	231.4	412.8	YES	183.8
THA	-60	56.31	100	50.0	43.69	0.00	236.1	506.4	231.4	413.1	YES	236.1
THA	-60	56.20	100	50.0	43.80	0.00	149.4	506.4	231.4	413.6	YES	149.4
THA	-60	56.83	100	50.0	43.17	0.00	179.5	506.4	231.4	410.7	YES	179.5
THA	-60	56.83	100	50.0	43.17	0.00	177.6	506.4	231.4	410.7	YES	177.6
THA	-60	56.55	100	50.0	43.45	0.00	188.3	506.4	231.4	412.0	YES	188.3
THA	-60	56.56	100	50.0	43.44	0.00	134.5	506.4	231.4	411.9	YES	134.5
THA	-60	56.65	100	50.0	43.35	0.00	243.6	506.4	231.4	411.5	YES	243.6
THA	-60	56.56	100	50.0	43.44	0.00	155.7	506.4	231.4	411.9	YES	155.7
THA	-60	56.18	100	50.0	43.82	0.00	164.0	506.4	231.4	413.7	YES	164.0
THA	-60	56.68	100	50.0	43.32	0.00	146.5	506.4	231.4	411.4	YES	146.5
THA	-60	56.51	100	50.0	43.49	0.00	119.9	506.4	231.4	412.2	YES	119.9
THA	-60	56.31	100	50.0	43.69	0.00	79.9	506.4	231.4	413.1	YES	79.9
THA	-60	56.57	100	50.0	43.43	0.00	140.9	506.4	231.4	411.9	YES	140.9
THA	-60	55.62	100	50.0	44.38	0.00	115.3	506.4	231.4	416.4	YES	115.3
THA	-60	56.56	100	50.0	43.44	0.00	137.0	506.4	231.4	411.9	YES	137.0
THA	-60	56.57	100	50.0	43.43	0.00	166.9	506.4	231.4	411.9	YES	166.9
THA	-60	56.53	100	50.0	43.47	0.00	225.4	506.4	231.4	412.1	YES	225.4
THA	-60	56.32	100	50.0	43.68	0.00	200.7	506.4	231.4	413.1	YES	200.7

3. Application of the multi-temperature approach for the calculation of the reference temperature

T limits

Specimen code	T (°C)	$K_{Jc[calc]}$ (MPa√m)	$K_{Jc(1T)}$ (MPa√m)	δ_i	n_i	1° member	2° member
GKSS	-60	205.5	175.4	0	0.000	0.0000	0.0112
GKSS	-60	114.4	99.1	1	0.167	0.0121	0.0007
GKSS	-60	130.7	112.7	1	0.167	0.0121	0.0014
GKSS	-60	106.7	92.6	1	0.167	0.0121	0.0005
GKSS	-60	161.0	138.1	1	0.167	0.0121	0.0037
GKSS	-60	200.7	171.3	1	0.167	0.0121	0.0101
GKSS	-60	125.2	108.1	1	0.167	0.0121	0.0012
GKSS	-60	145.1	124.8	1	0.167	0.0121	0.0023
GKSS	-60	91.9	80.2	1	0.167	0.0121	0.0003
GKSS	-60	128.1	110.6	1	0.167	0.0121	0.0013
GKSS	-60	164.4	140.9	1	0.167	0.0121	0.0041
GKSS	-60	192.2	164.3	1	0.167	0.0121	0.0083
GKSS	-60	166.3	142.5	1	0.167	0.0121	0.0043
GKSS	-60	177.7	152.1	1	0.167	0.0121	0.0058
GKSS	-60	167.6	143.6	1	0.167	0.0121	0.0045
GKSS	-60	128.6	110.9	1	0.167	0.0121	0.0013
GKSS	-60	203.0	173.3	0	0.000	0.0000	0.0106
GKSS	-60	98.4	85.7	0	0.167	0.0121	0.0004
GKSS	-60	203.3	173.5	0	0.000	0.0000	0.0107
GKSS	-60	202.6	173.0	0	0.000	0.0000	0.0105
GKSS	-60	201.7	172.1	0	0.000	0.0000	0.0103
GKSS	-60	171.9	147.2	1	0.167	0.0121	0.0050
GKSS	-60	136.8	117.8	1	0.167	0.0121	0.0018

USE LIMITS : YES

-144

-44

Sum of 1° member:

Sum of 2° member:

Difference:

$T_o = -94.2$ °C
(valid per ASTM E1921)

$\sum n_i = 18.83$

N = 126
r = 113

$K_{min} = 20$ MPa√m

$K_{o,eq} = 177.9$ MPa√m

$K_{med,eq} = 164.0$ MPa√m

GKSS	-60	135.8	117.0	1	0.167	0.0121	0.0017
GKSS	-60	200.8	171.4	0	0.000	0.0000	0.0101
GKSS	-60	202.8	173.1	0	0.000	0.0000	0.0105
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0104
GKSS	-60	116.0	100.4	1	0.167	0.0121	0.0008
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0104
GKSS	-60	167.6	143.6	1	0.167	0.0121	0.0045
GKSS	-60	89.8	78.5	1	0.167	0.0121	0.0002
GKSS	-60	156.3	134.1	1	0.167	0.0121	0.0033
GKSS	-60	186.8	159.7	1	0.167	0.0121	0.0073
GKSS	-60	203.2	173.4	0	0.000	0.0000	0.0106
GKSS	-60	164.6	141.1	1	0.167	0.0121	0.0041
GKSS	-60	202.6	173.0	0	0.000	0.0000	0.0105
GKSS	-60	185.9	159.0	1	0.167	0.0121	0.0072
GKSS	-60	127.7	110.2	1	0.167	0.0121	0.0013
GKSS	-60	201.2	171.7	0	0.000	0.0000	0.0102
GKSS	-60	115.6	100.0	1	0.167	0.0121	0.0008
GKSS	-60	107.5	93.3	1	0.167	0.0121	0.0006
SIEMENS	-60	164.6	141.1	1	0.167	0.0121	0.0041
SIEMENS	-60	172.0	147.3	1	0.167	0.0121	0.0050
SIEMENS	-60	108.5	94.2	1	0.167	0.0121	0.0006
SIEMENS	-60	119.0	102.9	1	0.167	0.0121	0.0009
SIEMENS	-60	153.5	131.8	1	0.167	0.0121	0.0030
SIEMENS	-60	158.9	136.4	1	0.167	0.0121	0.0035
SIEMENS	-60	137.5	118.4	1	0.167	0.0121	0.0018
SIEMENS	-60	119.5	103.3	1	0.167	0.0121	0.0009
SIEMENS	-60	130.7	112.8	1	0.167	0.0121	0.0014
SIEMENS	-60	172.6	147.8	1	0.167	0.0121	0.0051
SIEMENS	-60	84.5	74.0	1	0.167	0.0121	0.0002
SIEMENS	-60	213.4	182.0	0	0.000	0.0000	0.0132
SIEMENS	-60	120.4	104.1	1	0.167	0.0121	0.0010
SIEMENS	-60	104.5	90.8	1	0.167	0.0121	0.0005
SIEMENS	-60	163.6	140.2	1	0.167	0.0121	0.0040
SIEMENS	-60	201.4	172.0	1	0.167	0.0121	0.0102
SIEMENS	-60	137.8	118.7	1	0.167	0.0121	0.0018
SIEMENS	-60	173.0	148.1	1	0.167	0.0121	0.0052
SIEMENS	-60	99.2	86.4	1	0.167	0.0121	0.0004
SIEMENS	-60	173.4	148.4	1	0.167	0.0121	0.0052
SIEMENS	-60	131.5	113.4	1	0.167	0.0121	0.0015
GKSS	-60	186.0	185.3	1	0.167	0.0121	0.0143
GKSS	-60	151.8	151.3	1	0.167	0.0121	0.0057
GKSS	-60	111.7	111.3	1	0.167	0.0121	0.0013
GKSS	-60	143.9	143.4	1	0.167	0.0121	0.0044
GKSS	-60	105.4	105.1	1	0.167	0.0121	0.0010
GKSS	-60	154.0	153.4	1	0.167	0.0121	0.0061
GKSS	-60	176.2	175.6	1	0.167	0.0121	0.0112
GKSS	-60	131.9	131.5	1	0.167	0.0121	0.0030
GKSS	-60	203.9	203.2	1	0.167	0.0121	0.0216
GKSS	-60	142.7	142.2	1	0.167	0.0121	0.0043
TWI	-60	134.5	134.0	1	0.167	0.0121	0.0032
TWI	-60	130.1	129.7	1	0.167	0.0121	0.0028
TWI	-60	142.6	142.1	1	0.167	0.0121	0.0043
TWI	-60	119.7	119.3	1	0.167	0.0121	0.0019
TWI	-60	141.3	140.8	1	0.167	0.0121	0.0041
TWI	-60	175.9	175.3	1	0.167	0.0121	0.0112
TWI	-60	119.6	119.2	1	0.167	0.0121	0.0019
TWI	-60	102.4	102.0	1	0.167	0.0121	0.0009
TWI	-60	99.0	98.7	1	0.167	0.0121	0.0007
TWI	-60	115.1	114.7	1	0.167	0.0121	0.0015
TWI	-60	172.9	172.3	1	0.167	0.0121	0.0103
TWI	-60	120.5	120.2	1	0.167	0.0121	0.0019
TWI	-60	165.2	164.6	1	0.167	0.0121	0.0084
TWI	-60	125.6	125.2	1	0.167	0.0121	0.0023
TWI	-60	126.7	126.3	1	0.167	0.0121	0.0025
TWI	-60	100.4	100.1	1	0.167	0.0121	0.0008
TWI	-60	131.1	130.7	1	0.167	0.0121	0.0029
TWI	-60	185.1	184.5	1	0.167	0.0121	0.0140
TWI	-60	163.6	163.0	1	0.167	0.0121	0.0080
TWI	-60	126.5	126.1	1	0.167	0.0121	0.0024
TWI	-60	164.7	164.1	1	0.167	0.0121	0.0083
TWI	-60	192.7	192.0	1	0.167	0.0121	0.0168
TWI	-60	134.5	134.1	1	0.167	0.0121	0.0032
TWI	-60	140.8	140.3	1	0.167	0.0121	0.0040
GKSS	-60	295.3	346.1	1	0.167	0.0121	0.2169
GKSS	-60	217.7	254.2	1	0.167	0.0121	0.0577
GKSS	-60	219.8	256.6	1	0.167	0.0121	0.0601
GKSS	-60	165.9	192.8	1	0.167	0.0121	0.0171
GKSS	-60	109.9	126.5	1	0.167	0.0121	0.0025
GKSS	-60	131.9	152.5	1	0.167	0.0121	0.0059
GKSS	-60	136.2	157.6	1	0.167	0.0121	0.0069
GKSS	-60	154.0	178.8	1	0.167	0.0121	0.0122
GKSS	-60	115.9	133.6	1	0.167	0.0121	0.0032
GKSS	-60	150.4	174.4	1	0.167	0.0121	0.0109
THA	-60	153.6	178.2	1	0.167	0.0121	0.0120
THA	-60	183.8	214.0	1	0.167	0.0121	0.0271
THA	-60	236.1	275.9	1	0.167	0.0121	0.0823

THA	-60	149.4	173.3	1	0.167	0.0121	0.0106
THA	-60	179.5	209.0	1	0.167	0.0121	0.0245
THA	-60	177.6	206.7	1	0.167	0.0121	0.0233
THA	-60	188.3	219.4	1	0.167	0.0121	0.0303
THA	-60	134.5	155.6	1	0.167	0.0121	0.0065
THA	-60	243.6	284.9	1	0.167	0.0121	0.0944
THA	-60	155.7	180.8	1	0.167	0.0121	0.0128
THA	-60	164.0	190.6	1	0.167	0.0121	0.0162
THA	-60	146.5	169.8	1	0.167	0.0121	0.0097
THA	-60	119.9	138.4	1	0.167	0.0121	0.0038
THA	-60	79.9	91.0	1	0.167	0.0121	0.0005
THA	-60	140.9	163.2	1	0.167	0.0121	0.0081
THA	-60	115.3	132.9	1	0.167	0.0121	0.0031
THA	-60	137.0	158.6	1	0.167	0.0121	0.0071
THA	-60	166.9	194.0	1	0.167	0.0121	0.0176
THA	-60	225.4	263.3	1	0.167	0.0121	0.0672
THA	-60	200.7	234.1	1	0.167	0.0121	0.0403

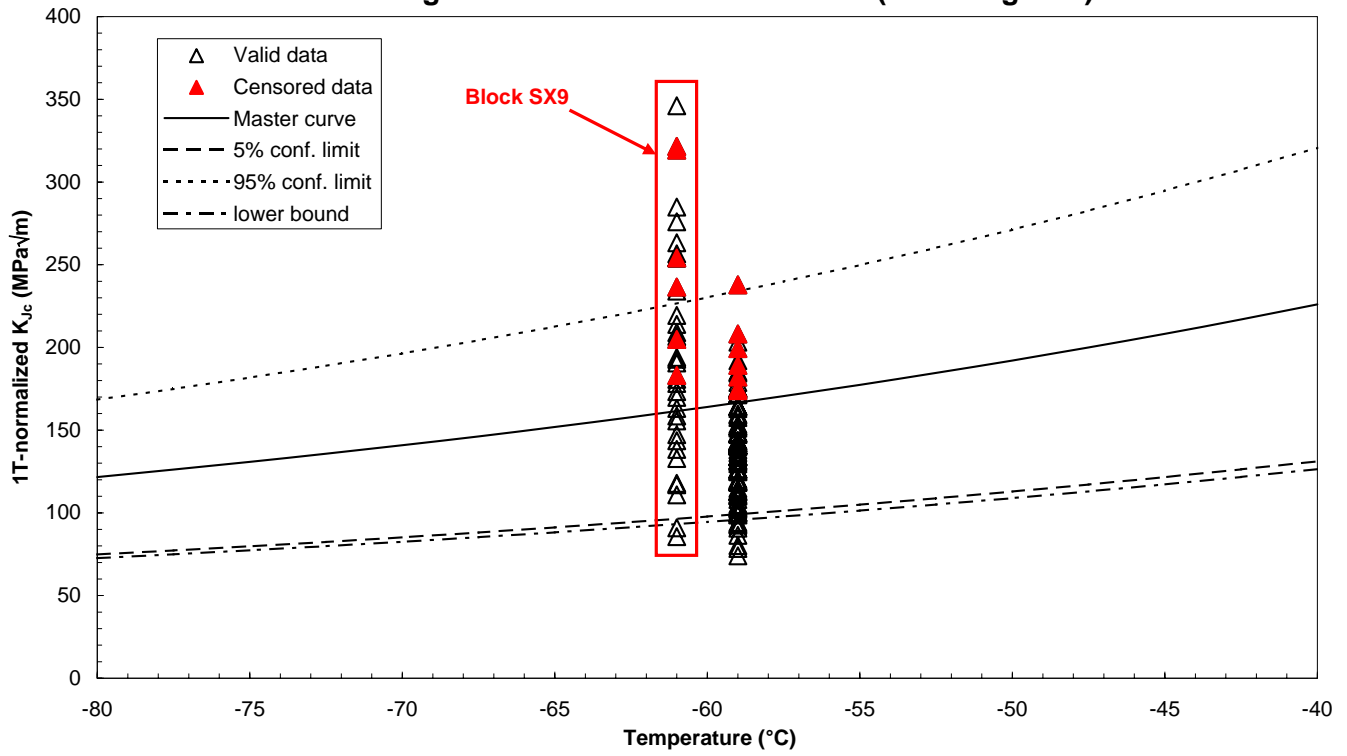
4. Master curve fit to data

Temperature adj. = 2.4 °C (est.) Stand. dev. on T_0 = 1.7 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-59	234.1	199.3				
-59	114.4	99.1				
-59	130.7	112.7				
-59	106.7	92.6				
-59	161.0	138.1				
-59	200.7	171.3				
-59	125.2	108.1				
-59	145.1	124.8				
-59	91.9	80.2				
-59	128.1	110.6				
-59	164.4	140.9				
-59	192.2	164.3				
-59	166.3	142.5				
-59	177.7	152.1				
-61	167.6	143.6				
-61	128.6	110.9				
-61	377.4	319.3				
-61	98.4	85.7				
-61	278.4	236.4				
-61	240.7	204.9				
-61	380.0	321.5				
-61	171.9	147.2				
-61	136.8	117.8				
-61	135.8	117.0				
-61	214.7	183.1				
-61	299.5	254.1				
-59	203.7	173.9				
-59	116.0	100.4				
-59	221.9	189.1				
-59	167.6	143.6				
-59	89.8	78.5				
-59	156.3	134.1				
-59	186.8	159.7				
-59	213.5	182.1				
-59	164.6	141.1				
-59	280.1	237.9				
-59	185.9	159.0				
-59	127.7	110.2				
-59	205.0	175.0				
-59	115.6	100.0				
-59	107.5	93.3				
-59	164.6	141.1				
-59	172.0	147.3				
-59	108.5	94.2				
-59	119.0	102.9				
-59	153.5	131.8				
-59	158.9	136.4				
-59	137.5	118.4				
-59	119.5	103.3				
-59	130.7	112.8				
-59	172.6	147.8				
-59	84.5	74.0				
-59	244.6	208.1				
-59	120.4	104.1				
-59	104.5	90.8				
-59	163.6	140.2				
-59	201.4	172.0				
-59	137.8	118.7				
-59	173.0	148.1				
-59	99.2	86.4				
-59	173.4	148.4				

-59	131.5	113.4				
-59	186.0	185.3				
-59	151.8	151.3				
-59	111.7	111.3				
-59	143.9	143.4				
-59	105.4	105.1				
-59	154.0	153.4				
-59	176.2	175.6				
-59	131.9	131.5				
-59	203.9	203.2				
-59	142.7	142.2				
-59	134.5	134.0				
-59	130.1	129.7				
-59	142.6	142.1				
-59	119.7	119.3				
-59	141.3	140.8				
-59	175.9	175.3				
-59	119.6	119.2				
-59	102.4	102.0				
-59	99.0	98.7				
-59	115.1	114.7				
-59	172.9	172.3				
-59	120.5	120.2				
-59	165.2	164.6				
-59	125.6	125.2				
-59	126.7	126.3				
-59	100.4	100.1				
-59	131.1	130.7				
-59	185.1	184.5				
-59	163.6	163.0				
-59	126.5	126.1				
-59	164.7	164.1				
-59	192.7	192.0				
-59	134.5	134.1				
-59	140.8	140.3				
-61	295.3	346.1				
-61	217.7	254.2				
-61	219.8	256.6				
-61	165.9	192.8				
-59	109.9	126.5				
-59	131.9	152.5				
-59	136.2	157.6				
-59	154.0	178.8				
-59	115.9	133.6				
-59	150.4	174.4				
-61	153.6	178.2				
-61	183.8	214.0				
-61	236.1	275.9				
-61	149.4	173.3				
-61	179.5	209.0				
-61	177.6	206.7				
-61	188.3	219.4				
-61	134.5	155.6				
-61	243.6	284.9				
-61	155.7	180.8				
-61	164.0	190.6				
-61	146.5	169.8				
-61	119.9	138.4				
-61	79.9	91.0				
-61	140.9	163.2				
-61	115.3	132.9				
-61	137.0	158.6				
-61	166.9	194.0				
-61	225.4	263.3				
-61	200.7	234.1				
-80			121.7	74.9	168.4	72.7
-77.5			126.1	77.3	174.9	75.0
-75			130.8	79.8	181.8	77.4
-72.5			135.7	82.5	188.9	79.9
-70			140.8	85.3	196.4	82.5
-67.5			146.2	88.2	204.3	85.3
-65			151.9	91.2	212.6	88.2
-62.5			157.8	94.4	221.2	91.3
-60			164.0	97.8	230.3	94.5
-57.5			170.6	101.3	239.8	97.9
-55			177.4	105.0	249.8	101.4
-52.5			184.6	108.9	260.3	105.1
-50			192.1	112.9	271.3	109.0
-47.5			200.0	117.2	282.8	113.0
-45			208.2	121.7	294.8	117.3
-42.5			216.9	126.3	307.5	121.8
-40			226.0	131.2	320.8	126.5

Master Curve with tolerance bounds
EURO toughness dataset - Dataset -60 °C (including SX9)



SINTAP - Structural Integrity Assessment Procedures for European Industry
Lower Tail Analysis Procedure

Step 1: Estimate of the median value of fracture toughness (ASTM E1921-05)

1. Material characteristics

Material specifications : **EURO toughness data set - Dataset -60 °C (including SX9)**

2. Dimensional and crack growth requirements

Specimen code	T (°C)	a _o (mm)	W (mm)	B (mm)	b _o (mm)	Δa (mm)	K _{Jc[exp]} (MPa√m)	σ _{ys} (MPa)	E' (GPa)	K _{lim} (MPa√m)	DATA VALID	K _{Jc[calc]} (MPa√m)
GKSS	-60	14.19	25	12.5	10.81	0.05	234.1	506.4	231.4	205.5	NO	205.5
GKSS	-60	14.16	25	12.5	10.84	0.00	114.4	506.4	231.4	205.8	YES	114.4
GKSS	-60	14.31	25	12.5	10.69	0.00	130.7	506.4	231.4	204.4	YES	130.7
GKSS	-60	14.13	25	12.5	10.87	0.00	106.7	506.4	231.4	206.1	YES	106.7
GKSS	-60	14.08	25	12.5	10.92	0.00	161.0	506.4	231.4	206.5	YES	161.0
GKSS	-60	13.58	25	12.5	11.42	0.00	200.7	506.4	231.4	211.2	YES	200.7
GKSS	-60	14.26	25	12.5	10.74	0.00	125.2	506.4	231.4	204.8	YES	125.2
GKSS	-60	14.19	25	12.5	10.81	0.00	145.1	506.4	231.4	205.5	YES	145.1
GKSS	-60	14.00	25	12.5	11.00	0.00	91.9	506.4	231.4	207.3	YES	91.9
GKSS	-60	13.94	25	12.5	11.06	0.00	128.1	506.4	231.4	207.9	YES	128.1
GKSS	-60	14.59	25	12.5	10.41	0.00	164.4	506.4	231.4	201.7	YES	164.4
GKSS	-60	14.53	25	12.5	10.47	0.00	192.2	506.4	231.4	202.2	YES	192.2
GKSS	-60	14.76	25	12.5	10.24	0.00	166.3	506.4	231.4	200.0	YES	166.3
GKSS	-60	14.48	25	12.5	10.52	0.00	177.7	506.4	231.4	202.7	YES	177.7
GKSS	-60	14.61	25	12.5	10.39	0.00	167.6	506.4	231.4	201.5	YES	167.6
GKSS	-60	14.41	25	12.5	10.59	0.00	128.6	506.4	231.4	203.4	YES	128.6
GKSS	-60	14.45	25	12.5	10.55	0.70	377.4	506.4	231.4	203.0	NO	203.0
GKSS	-60	14.37	25	12.5	10.63	0.00	98.4	506.4	231.4	203.8	YES	98.4
GKSS	-60	14.42	25	12.5	10.58	0.29	278.4	506.4	231.4	203.3	NO	203.3
GKSS	-60	14.49	25	12.5	10.51	0.18	240.7	506.4	231.4	202.6	NO	202.6
GKSS	-60	14.59	25	12.5	10.41	0.75	380.0	506.4	231.4	201.7	NO	201.7
GKSS	-60	14.04	25	12.5	10.96	0.00	171.9	506.4	231.4	206.9	YES	171.9
GKSS	-60	14.49	25	12.5	10.51	0.00	136.8	506.4	231.4	202.6	YES	136.8
GKSS	-60	14.80	25	12.5	10.20	0.00	135.8	506.4	231.4	199.6	YES	135.8
GKSS	-60	14.68	25	12.5	10.32	0.13	214.7	506.4	231.4	200.8	NO	200.8
GKSS	-60	14.47	25	12.5	10.53	0.41	299.5	506.4	231.4	202.8	NO	202.8
GKSS	-60	14.55	25	12.5	10.45	0.00	203.7	506.4	231.4	202.0	NO	202.0
GKSS	-60	14.46	25	12.5	10.54	0.00	116.0	506.4	231.4	202.9	YES	116.0
GKSS	-60	14.55	25	12.5	10.45	0.11	221.9	506.4	231.4	202.0	NO	202.0
GKSS	-60	14.77	25	12.5	10.23	0.00	167.6	506.4	231.4	199.9	YES	167.6
GKSS	-60	14.35	25	12.5	10.65	0.00	89.8	506.4	231.4	204.0	YES	89.8
GKSS	-60	14.56	25	12.5	10.44	0.00	156.3	506.4	231.4	201.9	YES	156.3
GKSS	-60	14.49	25	12.5	10.51	0.00	186.8	506.4	231.4	202.6	YES	186.8
GKSS	-60	14.43	25	12.5	10.57	0.00	213.5	506.4	231.4	203.2	NO	203.2
GKSS	-60	14.39	25	12.5	10.61	0.00	164.6	506.4	231.4	203.6	YES	164.6
GKSS	-60	14.49	25	12.5	10.51	0.28	280.1	506.4	231.4	202.6	NO	202.6
GKSS	-60	14.43	25	12.5	10.57	0.00	185.9	506.4	231.4	203.2	YES	185.9
GKSS	-60	14.85	25	12.5	10.15	0.00	127.7	506.4	231.4	199.1	YES	127.7
GKSS	-60	14.64	25	12.5	10.36	0.00	205.0	506.4	231.4	201.2	NO	201.2
GKSS	-60	14.25	25	12.5	10.75	0.00	115.6	506.4	231.4	204.9	YES	115.6
GKSS	-60	14.44	25	12.5	10.56	0.00	107.5	506.4	231.4	203.1	YES	107.5
SIEMENS	-60	13.24	25	12.5	11.76	0.00	164.6	506.4	231.4	214.3	YES	164.6
SIEMENS	-60	13.29	25	12.5	11.71	0.00	172.0	506.4	231.4	213.9	YES	172.0
SIEMENS	-60	13.24	25	12.5	11.76	0.00	108.5	506.4	231.4	214.3	YES	108.5
SIEMENS	-60	13.28	25	12.5	11.72	0.00	119.0	506.4	231.4	214.0	YES	119.0
SIEMENS	-60	13.26	25	12.5	11.74	0.00	153.5	506.4	231.4	214.2	YES	153.5
SIEMENS	-60	13.22	25	12.5	11.78	0.00	158.9	506.4	231.4	214.5	YES	158.9
SIEMENS	-60	13.27	25	12.5	11.73	0.00	137.5	506.4	231.4	214.1	YES	137.5
SIEMENS	-60	13.18	25	12.5	11.82	0.00	119.5	506.4	231.4	214.9	YES	119.5
SIEMENS	-60	13.18	25	12.5	11.82	0.00	130.7	506.4	231.4	214.9	YES	130.7
SIEMENS	-60	13.24	25	12.5	11.76	0.00	172.6	506.4	231.4	214.3	YES	172.6
SIEMENS	-60	13.24	25	12.5	11.76	0.00	84.5	506.4	231.4	214.3	YES	84.5
SIEMENS	-60	13.34	25	12.5	11.66	0.00	244.6	506.4	231.4	213.4	NO	213.4
SIEMENS	-60	13.20	25	12.5	11.80	0.00	120.4	506.4	231.4	214.7	YES	120.4
SIEMENS	-60	13.31	25	12.5	11.69	0.00	104.5	506.4	231.4	213.7	YES	104.5
SIEMENS	-60	13.23	25	12.5	11.77	0.00	163.6	506.4	231.4	214.4	YES	163.6
SIEMENS	-60	13.28	25	12.5	11.72	0.00	201.4	506.4	231.4	214.0	YES	201.4
SIEMENS	-60	13.20	25	12.5	11.80	0.00	137.8	506.4	231.4	214.7	YES	137.8
SIEMENS	-60	13.19	25	12.5	11.81	0.00	173.0	506.4	231.4	214.8	YES	173.0
SIEMENS	-60	13.22	25	12.5	11.78	0.00	99.2	506.4	231.4	214.5	YES	99.2
SIEMENS	-60	13.22	25	12.5	11.78	0.00	173.4	506.4	231.4	214.5	YES	173.4
SIEMENS	-60	13.29	25	12.5	11.71	0.00	131.5	506.4	231.4	213.9	YES	131.5
GKSS	-60	28.06	50	25.0	21.94	0.00	186.0	506.4	231.4	292.8	YES	186.0
GKSS	-60	27.75	50	25.0	22.25	0.00	151.8	506.4	231.4	294.8	YES	151.8
GKSS	-60	27.62	50	25.0	22.38	0.00	111.7	506.4	231.4	295.7	YES	111.7
GKSS	-60	27.65	50	25.0	22.35	0.00	143.9	506.4	231.4	295.5	YES	143.9
GKSS	-60	27.71	50	25.0	22.29	0.00	105.4	506.4	231.4	295.1	YES	105.4
GKSS	-60	28.01	50	25.0	21.99	0.00	154.0	506.4	231.4	293.1	YES	154.0
GKSS	-60	27.97	50	25.0	22.03	0.00	176.2	506.4	231.4	293.4	YES	176.2
GKSS	-60	27.51	50	25.0	22.49	0.00	131.9	506.4	231.4	296.4	YES	131.9
GKSS	-60	27.86	50	25.0	22.14	0.00	203.9	506.4	231.4	294.1	YES	203.9

GKSS	-60	27.51	50	25.0	22.49	0.00	142.7	506.4	231.4	296.4	YES	142.7
TWI	-60	27.42	50	25.0	22.58	0.06	134.5	506.4	231.4	297.0	YES	134.5
TWI	-60	27.43	50	25.0	22.57	0.00	130.1	506.4	231.4	296.9	YES	130.1
TWI	-60	27.62	50	25.0	22.38	0.07	142.6	506.4	231.4	295.7	YES	142.6
TWI	-60	27.47	50	25.0	22.53	0.05	119.7	506.4	231.4	296.7	YES	119.7
TWI	-60	27.49	50	25.0	22.51	0.07	141.3	506.4	231.4	296.5	YES	141.3
TWI	-60	27.95	50	25.0	22.05	0.10	175.9	506.4	231.4	293.5	YES	175.9
TWI	-60	27.62	50	25.0	22.38	0.00	119.6	506.4	231.4	295.7	YES	119.6
TWI	-60	27.65	50	25.0	22.35	0.00	102.4	506.4	231.4	295.5	YES	102.4
TWI	-60	27.68	50	25.0	22.32	0.00	99.0	506.4	231.4	295.3	YES	99.0
TWI	-60	27.82	50	25.0	22.18	0.05	115.1	506.4	231.4	294.4	YES	115.1
TWI	-60	27.98	50	25.0	22.02	0.11	172.9	506.4	231.4	293.3	YES	172.9
TWI	-60	27.72	50	25.0	22.28	0.03	120.5	506.4	231.4	295.0	YES	120.5
TWI	-60	27.48	50	25.0	22.52	0.00	165.2	506.4	231.4	296.6	YES	165.2
TWI	-60	27.54	50	25.0	22.46	0.00	125.6	506.4	231.4	296.2	YES	125.6
TWI	-60	27.88	50	25.0	22.12	0.05	126.7	506.4	231.4	294.0	YES	126.7
TWI	-60	27.79	50	25.0	22.21	0.00	100.4	506.4	231.4	294.6	YES	100.4
TWI	-60	27.56	50	25.0	22.44	0.05	131.1	506.4	231.4	296.1	YES	131.1
TWI	-60	27.58	50	25.0	22.42	0.06	185.1	506.4	231.4	295.9	YES	185.1
TWI	-60	27.59	50	25.0	22.41	0.09	163.6	506.4	231.4	295.9	YES	163.6
TWI	-60	27.68	50	25.0	22.32	0.09	126.5	506.4	231.4	295.3	YES	126.5
TWI	-60	27.65	50	25.0	22.35	0.10	164.7	506.4	231.4	295.5	YES	164.7
TWI	-60	27.73	50	25.0	22.27	0.16	192.7	506.4	231.4	294.9	YES	192.7
TWI	-60	27.65	50	25.0	22.35	0.05	134.5	506.4	231.4	295.5	YES	134.5
TWI	-60	27.86	50	25.0	22.14	0.05	140.8	506.4	231.4	294.1	YES	140.8
GKSS	-60	56.44	100	50.0	43.56	0.12	295.3	506.4	231.4	412.5	YES	295.3
GKSS	-60	56.53	100	50.0	43.47	0.00	217.7	506.4	231.4	412.1	YES	217.7
GKSS	-60	56.45	100	50.0	43.55	0.00	219.8	506.4	231.4	412.5	YES	219.8
GKSS	-60	56.49	100	50.0	43.51	0.00	165.9	506.4	231.4	412.3	YES	165.9
GKSS	-60	57.56	100	50.0	42.44	0.00	109.9	506.4	231.4	407.2	YES	109.9
GKSS	-60	56.69	100	50.0	43.31	0.00	131.9	506.4	231.4	411.3	YES	131.9
GKSS	-60	56.69	100	50.0	43.31	0.00	136.2	506.4	231.4	411.3	YES	136.2
GKSS	-60	56.51	100	50.0	43.49	0.00	154.0	506.4	231.4	412.2	YES	154.0
GKSS	-60	56.15	100	50.0	43.85	0.00	115.9	506.4	231.4	413.9	YES	115.9
GKSS	-60	55.96	100	50.0	44.04	0.00	150.4	506.4	231.4	414.8	YES	150.4
THA	-60	56.57	100	50.0	43.43	0.00	153.6	506.4	231.4	411.9	YES	153.6
THA	-60	56.38	100	50.0	43.62	0.00	183.8	506.4	231.4	412.8	YES	183.8
THA	-60	56.31	100	50.0	43.69	0.00	236.1	506.4	231.4	413.1	YES	236.1
THA	-60	56.20	100	50.0	43.80	0.00	149.4	506.4	231.4	413.6	YES	149.4
THA	-60	56.83	100	50.0	43.17	0.00	179.5	506.4	231.4	410.7	YES	179.5
THA	-60	56.83	100	50.0	43.17	0.00	177.6	506.4	231.4	410.7	YES	177.6
THA	-60	56.55	100	50.0	43.45	0.00	188.3	506.4	231.4	412.0	YES	188.3
THA	-60	56.56	100	50.0	43.44	0.00	134.5	506.4	231.4	411.9	YES	134.5
THA	-60	56.65	100	50.0	43.35	0.00	243.6	506.4	231.4	411.5	YES	243.6
THA	-60	56.56	100	50.0	43.44	0.00	155.7	506.4	231.4	411.9	YES	155.7
THA	-60	56.18	100	50.0	43.82	0.00	164.0	506.4	231.4	413.7	YES	164.0
THA	-60	56.68	100	50.0	43.32	0.00	146.5	506.4	231.4	411.4	YES	146.5
THA	-60	56.51	100	50.0	43.49	0.00	119.9	506.4	231.4	412.2	YES	119.9
THA	-60	56.31	100	50.0	43.69	0.00	79.9	506.4	231.4	413.1	YES	79.9
THA	-60	56.57	100	50.0	43.43	0.00	140.9	506.4	231.4	411.9	YES	140.9
THA	-60	55.62	100	50.0	44.38	0.00	115.3	506.4	231.4	416.4	YES	115.3
THA	-60	56.56	100	50.0	43.44	0.00	137.0	506.4	231.4	411.9	YES	137.0
THA	-60	56.57	100	50.0	43.43	0.00	166.9	506.4	231.4	411.9	YES	166.9
THA	-60	56.53	100	50.0	43.47	0.00	225.4	506.4	231.4	412.1	YES	225.4
THA	-60	56.32	100	50.0	43.68	0.00	200.7	506.4	231.4	413.1	YES	200.7

3. Application of the multi-temperature approach for the calculation of the reference temperature

T limits

Specimen code	T (°C)	$K_{Jc[calc]}$ (MPa√m)	$K_{Jc(T)}$ (MPa√m)	δ_i	n_i	τ°	
						1° member	2° member
GKSS	-60	205.5	175.4	0	0.000	0.0000	0.0112
GKSS	-60	114.4	99.1	1	0.167	0.0121	0.0007
GKSS	-60	130.7	112.7	1	0.167	0.0121	0.0014
GKSS	-60	106.7	92.6	1	0.167	0.0121	0.0005
GKSS	-60	161.0	138.1	1	0.167	0.0121	0.0037
GKSS	-60	200.7	171.3	1	0.167	0.0121	0.0101
GKSS	-60	125.2	108.1	1	0.167	0.0121	0.0012
GKSS	-60	145.1	124.8	1	0.167	0.0121	0.0023
GKSS	-60	91.9	80.2	1	0.167	0.0121	0.0003
GKSS	-60	128.1	110.6	1	0.167	0.0121	0.0013
GKSS	-60	164.4	140.9	1	0.167	0.0121	0.0041
GKSS	-60	192.2	164.3	1	0.167	0.0121	0.0083
GKSS	-60	166.3	142.5	1	0.167	0.0121	0.0043
GKSS	-60	177.7	152.1	1	0.167	0.0121	0.0058
GKSS	-60	167.6	143.6	1	0.167	0.0121	0.0045
GKSS	-60	128.6	110.9	1	0.167	0.0121	0.0013
GKSS	-60	203.0	173.3	0	0.000	0.0000	0.0106
GKSS	-60	98.4	85.7	1	0.167	0.0121	0.0004
GKSS	-60	203.3	173.5	0	0.000	0.0000	0.0107
GKSS	-60	202.6	173.0	0	0.000	0.0000	0.0105
GKSS	-60	201.7	172.1	0	0.000	0.0000	0.0103
GKSS	-60	171.9	147.2	1	0.167	0.0121	0.0050
GKSS	-60	136.8	117.8	1	0.167	0.0121	0.0018

USE LIMITS : YES

-144
-44

Sum of 1° member: 1.366

Sum of 2° member: 1.366

Difference: 0.000

$T_o = -94.2 \text{ }^\circ\text{C}$
(valid per ASTM E1921)

$\sum n_i = 18.83$

N = 126
r = 113

$K_{min} = 20 \text{ MPa}\sqrt{\text{m}}$

$K_{o,eq} = 177.9 \text{ MPa}\sqrt{\text{m}}$

$K_{med,eq} = 164.0 \text{ MPa}\sqrt{\text{m}}$

GKSS	-60	135.8	117.0	1	0.167	0.0121	0.0017
GKSS	-60	200.8	171.4	0	0.000	0.0000	0.0101
GKSS	-60	202.8	173.1	0	0.000	0.0000	0.0105
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0104
GKSS	-60	116.0	100.4	1	0.167	0.0121	0.0008
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0104
GKSS	-60	167.6	143.6	1	0.167	0.0121	0.0045
GKSS	-60	89.8	78.5	1	0.167	0.0121	0.0002
GKSS	-60	156.3	134.1	1	0.167	0.0121	0.0033
GKSS	-60	186.8	159.7	1	0.167	0.0121	0.0073
GKSS	-60	203.2	173.4	0	0.000	0.0000	0.0106
GKSS	-60	164.6	141.1	1	0.167	0.0121	0.0041
GKSS	-60	202.6	173.0	0	0.000	0.0000	0.0105
GKSS	-60	185.9	159.0	1	0.167	0.0121	0.0072
GKSS	-60	127.7	110.2	1	0.167	0.0121	0.0013
GKSS	-60	201.2	171.7	0	0.000	0.0000	0.0102
GKSS	-60	115.6	100.0	1	0.167	0.0121	0.0008
GKSS	-60	107.5	93.3	1	0.167	0.0121	0.0006
SIEMENS	-60	164.6	141.1	1	0.167	0.0121	0.0041
SIEMENS	-60	172.0	147.3	1	0.167	0.0121	0.0050
SIEMENS	-60	108.5	94.2	1	0.167	0.0121	0.0006
SIEMENS	-60	119.0	102.9	1	0.167	0.0121	0.0009
SIEMENS	-60	153.5	131.8	1	0.167	0.0121	0.0030
SIEMENS	-60	158.9	136.4	1	0.167	0.0121	0.0035
SIEMENS	-60	137.5	118.4	1	0.167	0.0121	0.0018
SIEMENS	-60	119.5	103.3	1	0.167	0.0121	0.0009
SIEMENS	-60	130.7	112.8	1	0.167	0.0121	0.0014
SIEMENS	-60	172.6	147.8	1	0.167	0.0121	0.0051
SIEMENS	-60	84.5	74.0	1	0.167	0.0121	0.0002
SIEMENS	-60	213.4	182.0	0	0.000	0.0000	0.0132
SIEMENS	-60	120.4	104.1	1	0.167	0.0121	0.0010
SIEMENS	-60	104.5	90.8	1	0.167	0.0121	0.0005
SIEMENS	-60	163.6	140.2	1	0.167	0.0121	0.0040
SIEMENS	-60	201.4	172.0	1	0.167	0.0121	0.0102
SIEMENS	-60	137.8	118.7	1	0.167	0.0121	0.0018
SIEMENS	-60	173.0	148.1	1	0.167	0.0121	0.0052
SIEMENS	-60	99.2	86.4	1	0.167	0.0121	0.0004
SIEMENS	-60	173.4	148.4	1	0.167	0.0121	0.0052
SIEMENS	-60	131.5	113.4	1	0.167	0.0121	0.0015
GKSS	-60	186.0	185.3	1	0.167	0.0121	0.0143
GKSS	-60	151.8	151.3	1	0.167	0.0121	0.0057
GKSS	-60	111.7	111.3	1	0.167	0.0121	0.0013
GKSS	-60	143.9	143.4	1	0.167	0.0121	0.0044
GKSS	-60	105.4	105.1	1	0.167	0.0121	0.0010
GKSS	-60	154.0	153.4	1	0.167	0.0121	0.0061
GKSS	-60	176.2	175.6	1	0.167	0.0121	0.0112
GKSS	-60	131.9	131.5	1	0.167	0.0121	0.0030
GKSS	-60	203.9	203.2	1	0.167	0.0121	0.0216
GKSS	-60	142.7	142.2	1	0.167	0.0121	0.0043
TWI	-60	134.5	134.0	1	0.167	0.0121	0.0032
TWI	-60	130.1	129.7	1	0.167	0.0121	0.0028
TWI	-60	142.6	142.1	1	0.167	0.0121	0.0043
TWI	-60	119.7	119.3	1	0.167	0.0121	0.0019
TWI	-60	141.3	140.8	1	0.167	0.0121	0.0041
TWI	-60	175.9	175.3	1	0.167	0.0121	0.0112
TWI	-60	119.6	119.2	1	0.167	0.0121	0.0019
TWI	-60	102.4	102.0	1	0.167	0.0121	0.0009
TWI	-60	99.0	98.7	1	0.167	0.0121	0.0007
TWI	-60	115.1	114.7	1	0.167	0.0121	0.0015
TWI	-60	172.9	172.3	1	0.167	0.0121	0.0103
TWI	-60	120.5	120.2	1	0.167	0.0121	0.0019
TWI	-60	165.2	164.6	1	0.167	0.0121	0.0084
TWI	-60	125.6	125.2	1	0.167	0.0121	0.0023
TWI	-60	126.7	126.3	1	0.167	0.0121	0.0025
TWI	-60	100.4	100.1	1	0.167	0.0121	0.0008
TWI	-60	131.1	130.7	1	0.167	0.0121	0.0029
TWI	-60	185.1	184.5	1	0.167	0.0121	0.0140
TWI	-60	163.6	163.0	1	0.167	0.0121	0.0080
TWI	-60	126.5	126.1	1	0.167	0.0121	0.0024
TWI	-60	164.7	164.1	1	0.167	0.0121	0.0083
TWI	-60	192.7	192.0	1	0.167	0.0121	0.0168
TWI	-60	134.5	134.1	1	0.167	0.0121	0.0032
TWI	-60	140.8	140.3	1	0.167	0.0121	0.0040
GKSS	-60	295.3	346.1	1	0.167	0.0121	0.2169
GKSS	-60	217.7	254.2	1	0.167	0.0121	0.0577
GKSS	-60	219.8	256.6	1	0.167	0.0121	0.0601
GKSS	-60	165.9	192.8	1	0.167	0.0121	0.0171
GKSS	-60	109.9	126.5	1	0.167	0.0121	0.0025
GKSS	-60	131.9	152.5	1	0.167	0.0121	0.0059
GKSS	-60	136.2	157.6	1	0.167	0.0121	0.0069
GKSS	-60	154.0	178.8	1	0.167	0.0121	0.0122
GKSS	-60	115.9	133.6	1	0.167	0.0121	0.0032
GKSS	-60	150.4	174.4	1	0.167	0.0121	0.0109
THA	-60	153.6	178.2	1	0.167	0.0121	0.0120
THA	-60	183.8	214.0	1	0.167	0.0121	0.0271
THA	-60	236.1	275.9	1	0.167	0.0121	0.0823

THA	-60	149.4	173.3	1	0.167	0.0121	0.0106
THA	-60	179.5	209.0	1	0.167	0.0121	0.0245
THA	-60	177.6	206.7	1	0.167	0.0121	0.0233
THA	-60	188.3	219.4	1	0.167	0.0121	0.0303
THA	-60	134.5	155.6	1	0.167	0.0121	0.0065
THA	-60	243.6	284.9	1	0.167	0.0121	0.0944
THA	-60	155.7	180.8	1	0.167	0.0121	0.0128
THA	-60	164.0	190.6	1	0.167	0.0121	0.0162
THA	-60	146.5	169.8	1	0.167	0.0121	0.0097
THA	-60	119.9	138.4	1	0.167	0.0121	0.0038
THA	-60	79.9	91.0	1	0.167	0.0121	0.0005
THA	-60	140.9	163.2	1	0.167	0.0121	0.0081
THA	-60	115.3	132.9	1	0.167	0.0121	0.0031
THA	-60	137.0	158.6	1	0.167	0.0121	0.0071
THA	-60	166.9	194.0	1	0.167	0.0121	0.0176
THA	-60	225.4	263.3	1	0.167	0.0121	0.0672
THA	-60	200.7	234.1	1	0.167	0.0121	0.0403

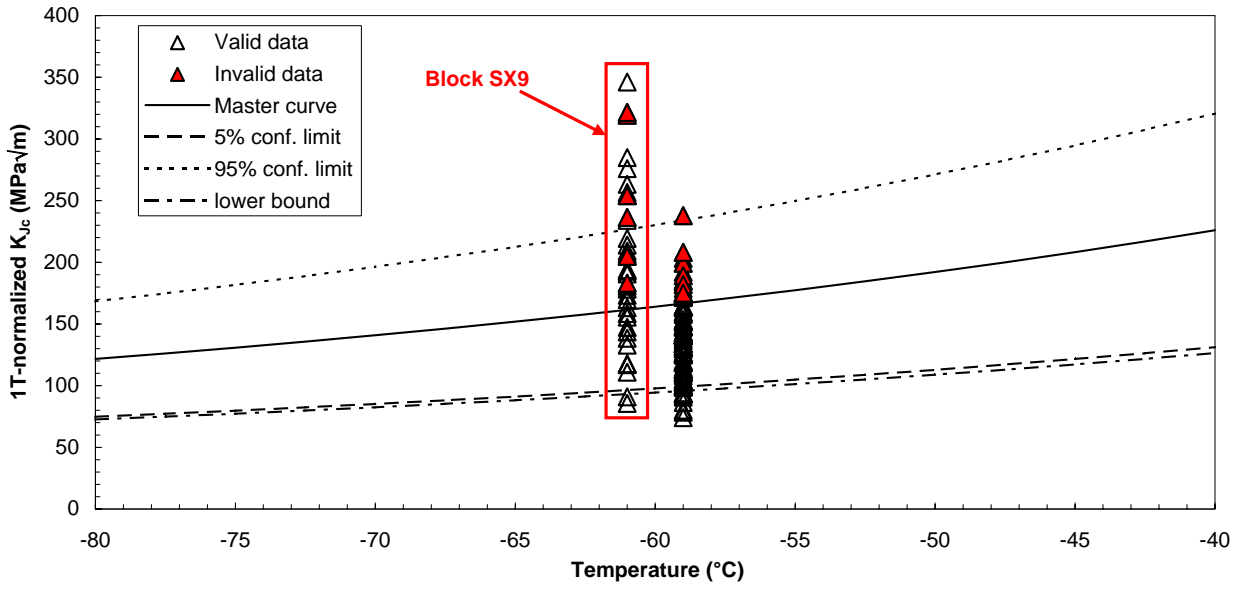
4. Master curve fit to data

Temperature adj. = 2.4 °C (est.) Stand. dev. on T₀ = 1.7 °C (est.)

T (°C)	K _{Jc(exp)} (MPa √m)	K _{Jc(1T)} (MPa √m)	K _{MC(1T)} (MPa √m)	5% conf. (MPa √m)	95% conf. (MPa √m)	5% L.B. (MPa √m)
-59	234.1	199.3				
-59	114.4	99.1				
-59	130.7	112.7				
-59	106.7	92.6				
-59	161.0	138.1				
-59	200.7	171.3				
-59	125.2	108.1				
-59	145.1	124.8				
-59	91.9	80.2				
-59	128.1	110.6				
-59	164.4	140.9				
-59	192.2	164.3				
-59	166.3	142.5				
-59	177.7	152.1				
-61	167.6	143.6				
-61	128.6	110.9				
-61	377.4	319.3				
-61	98.4	85.7				
-61	278.4	236.4				
-61	240.7	204.9				
-61	380.0	321.5				
-61	171.9	147.2				
-61	136.8	117.8				
-61	135.8	117.0				
-61	214.7	183.1				
-61	299.5	254.1				
-59	203.7	173.9				
-59	116.0	100.4				
-59	221.9	189.1				
-59	167.6	143.6				
-59	89.8	78.5				
-59	156.3	134.1				
-59	186.8	159.7				
-59	213.5	182.1				
-59	164.6	141.1				
-59	280.1	237.9				
-59	185.9	159.0				
-59	127.7	110.2				
-59	205.0	175.0				
-59	115.6	100.0				
-59	107.5	93.3				
-59	164.6	141.1				
-59	172.0	147.3				
-59	108.5	94.2				
-59	119.0	102.9				
-59	153.5	131.8				
-59	158.9	136.4				
-59	137.5	118.4				
-59	119.5	103.3				
-59	130.7	112.8				
-59	172.6	147.8				
-59	84.5	74.0				
-59	244.6	208.1				
-59	120.4	104.1				
-59	104.5	90.8				
-59	163.6	140.2				
-59	201.4	172.0				
-59	137.8	118.7				
-59	173.0	148.1				
-59	99.2	86.4				
-59	173.4	148.4				

-59	131.5	113.4				
-59	186.0	185.3				
-59	151.8	151.3				
-59	111.7	111.3				
-59	143.9	143.4				
-59	105.4	105.1				
-59	154.0	153.4				
-59	176.2	175.6				
-59	131.9	131.5				
-59	203.9	203.2				
-59	142.7	142.2				
-59	134.5	134.0				
-59	130.1	129.7				
-59	142.6	142.1				
-59	119.7	119.3				
-59	141.3	140.8				
-59	175.9	175.3				
-59	119.6	119.2				
-59	102.4	102.0				
-59	99.0	98.7				
-59	115.1	114.7				
-59	172.9	172.3				
-59	120.5	120.2				
-59	165.2	164.6				
-59	125.6	125.2				
-59	126.7	126.3				
-59	100.4	100.1				
-59	131.1	130.7				
-59	185.1	184.5				
-59	163.6	163.0				
-59	126.5	126.1				
-59	164.7	164.1				
-59	192.7	192.0				
-59	134.5	134.1				
-59	140.8	140.3				
-61	295.3	346.1				
-61	217.7	254.2				
-61	219.8	256.6				
-61	165.9	192.8				
-59	109.9	126.5				
-59	131.9	152.5				
-59	136.2	157.6				
-59	154.0	178.8				
-59	115.9	133.6				
-59	150.4	174.4				
-61	153.6	178.2				
-61	183.8	214.0				
-61	236.1	275.9				
-61	149.4	173.3				
-61	179.5	209.0				
-61	177.6	206.7				
-61	188.3	219.4				
-61	134.5	155.6				
-61	243.6	284.9				
-61	155.7	180.8				
-61	164.0	190.6				
-61	146.5	169.8				
-61	119.9	138.4				
-61	79.9	91.0				
-61	140.9	163.2				
-61	115.3	132.9				
-61	137.0	158.6				
-61	166.9	194.0				
-61	225.4	263.3				
-61	200.7	234.1				
-80			121.7	74.9	168.4	72.7
-77.5			126.1	77.3	174.9	75.0
-75			130.8	79.8	181.8	77.4
-72.5			135.7	82.5	188.9	79.9
-70			140.8	85.3	196.4	82.5
-67.5			146.2	88.2	204.3	85.3
-65			151.9	91.2	212.6	88.2
-62.5			157.8	94.4	221.2	91.3
-60			164.0	97.8	230.3	94.5
-57.5			170.6	101.3	239.8	97.9
-55			177.4	105.0	249.8	101.4
-52.5			184.6	108.9	260.3	105.1
-50			192.1	112.9	271.3	109.0
-47.5			200.0	117.2	282.8	113.0
-45			208.2	121.7	294.8	117.3
-42.5			216.9	126.3	307.5	121.8
-40			226.0	131.2	320.8	126.5

MASTER CURVE FOR 1TCT WITH CONFIDENCE LIMITS (E1921-05 analysis)
EURO toughness dataset - Dataset -60 °C (including SX9)



SINTAP - Structural Integrity Assessment Procedures for European Industry
Lower Tail Analysis Procedure

Step 2: Lower MMT Tail Estimation

1. Data censoring

Specimen code	T (°C)	$K_{Jc[exp]}$ (MPa \sqrt{m})	K_{Jc-1T} (MPa \sqrt{m})	K_{CENS} (MPa \sqrt{m})	δ_i	$K_{analysis}$ (MPa \sqrt{m})
GKSS	-60	205.5	175.4	168.1	0	168.1
GKSS	-60	114.4	99.1	168.1	1	99.1
GKSS	-60	130.7	112.7	168.1	1	112.7
GKSS	-60	106.7	92.6	168.1	1	92.6
GKSS	-60	161.0	138.1	168.1	1	138.1
GKSS	-60	200.7	171.3	168.1	0	168.1
GKSS	-60	125.2	108.1	168.1	1	108.1
GKSS	-60	145.1	124.8	168.1	1	124.8
GKSS	-60	91.9	80.2	168.1	1	80.2
GKSS	-60	128.1	110.6	168.1	1	110.6
GKSS	-60	164.4	140.9	168.1	1	140.9
GKSS	-60	192.2	164.3	168.1	1	164.3
GKSS	-60	166.3	142.5	168.1	1	142.5
GKSS	-60	177.7	152.1	168.1	1	152.1
GKSS	-60	167.6	143.6	168.1	1	143.6
GKSS	-60	128.6	110.9	168.1	1	110.9
GKSS	-60	203.0	173.3	168.1	0	168.1
GKSS	-60	98.4	85.7	168.1	1	85.7
GKSS	-60	203.3	173.5	168.1	0	168.1
GKSS	-60	202.6	173.0	168.1	0	168.1
GKSS	-60	201.7	172.1	168.1	0	168.1
GKSS	-60	171.9	147.2	168.1	1	147.2
GKSS	-60	136.8	117.8	168.1	1	117.8
GKSS	-60	135.8	117.0	168.1	1	117.0
GKSS	-60	200.8	171.4	168.1	0	168.1
GKSS	-60	202.8	173.1	168.1	0	168.1
GKSS	-60	202.0	172.5	168.1	0	168.1
GKSS	-60	116.0	100.4	168.1	1	100.4
GKSS	-60	202.0	172.5	168.1	0	168.1
GKSS	-60	167.6	143.6	168.1	1	143.6
GKSS	-60	89.8	78.5	168.1	1	78.5
GKSS	-60	156.3	134.1	168.1	1	134.1
GKSS	-60	186.8	159.7	168.1	1	159.7
GKSS	-60	203.2	173.4	168.1	0	168.1
GKSS	-60	164.6	141.1	168.1	1	141.1
GKSS	-60	202.6	173.0	168.1	0	168.1
GKSS	-60	185.9	159.0	168.1	1	159.0
GKSS	-60	127.7	110.2	168.1	1	110.2
GKSS	-60	201.2	171.7	168.1	0	168.1
GKSS	-60	115.6	100.0	168.1	1	100.0
GKSS	-60	107.5	93.3	168.1	1	93.3
SIEMENS	-60	164.6	141.1	168.1	1	141.1
SIEMENS	-60	172.0	147.3	168.1	1	147.3
SIEMENS	-60	108.5	94.2	168.1	1	94.2
SIEMENS	-60	119.0	102.9	168.1	1	102.9
SIEMENS	-60	153.5	131.8	168.1	1	131.8
SIEMENS	-60	158.9	136.4	168.1	1	136.4
SIEMENS	-60	137.5	118.4	168.1	1	118.4
SIEMENS	-60	119.5	103.3	168.1	1	103.3
SIEMENS	-60	130.7	112.8	168.1	1	112.8
SIEMENS	-60	172.6	147.8	168.1	1	147.8
SIEMENS	-60	84.5	74.0	168.1	1	74.0
SIEMENS	-60	213.4	182.0	168.1	0	168.1
SIEMENS	-60	120.4	104.1	168.1	1	104.1
SIEMENS	-60	104.5	90.8	168.1	1	90.8
SIEMENS	-60	163.6	140.2	168.1	1	140.2
SIEMENS	-60	201.4	172.0	168.1	0	168.1
SIEMENS	-60	137.8	118.7	168.1	1	118.7
SIEMENS	-60	173.0	148.1	168.1	1	148.1
SIEMENS	-60	99.2	86.4	168.1	1	86.4
SIEMENS	-60	173.4	148.4	168.1	1	148.4
SIEMENS	-60	131.5	113.4	168.1	1	113.4
GKSS	-60	186.0	185.3	168.1	0	168.1
GKSS	-60	151.8	151.3	168.1	1	151.3
GKSS	-60	111.7	111.3	168.1	1	111.3
GKSS	-60	143.9	143.4	168.1	1	143.4
GKSS	-60	105.4	105.1	168.1	1	105.1
GKSS	-60	154.0	153.4	168.1	1	153.4
GKSS	-60	176.2	175.6	168.1	0	168.1
GKSS	-60	131.9	131.5	168.1	1	131.5
GKSS	-60	203.9	203.2	168.1	0	168.1
GKSS	-60	142.7	142.2	168.1	1	142.2
TWI	-60	134.5	134.0	168.1	1	134.0
TWI	-60	130.1	129.7	168.1	1	129.7
TWI	-60	142.6	142.1	168.1	1	142.1
TWI	-60	119.7	119.3	168.1	1	119.3

Benchmark $T_o = -95.8$ °C

TWI	-60	141.3	140.8	168.1	1	140.8
TWI	-60	175.9	175.3	168.1	0	168.1
TWI	-60	119.6	119.2	168.1	1	119.2
TWI	-60	102.4	102.0	168.1	1	102.0
TWI	-60	99.0	98.7	168.1	1	98.7
TWI	-60	115.1	114.7	168.1	1	114.7
TWI	-60	172.9	172.3	168.1	0	168.1
TWI	-60	120.5	120.2	168.1	1	120.2
TWI	-60	165.2	164.6	168.1	1	164.6
TWI	-60	125.6	125.2	168.1	1	125.2
TWI	-60	126.7	126.3	168.1	1	126.3
TWI	-60	100.4	100.1	168.1	1	100.1
TWI	-60	131.1	130.7	168.1	1	130.7
TWI	-60	185.1	184.5	168.1	0	168.1
TWI	-60	163.6	163.0	168.1	1	163.0
TWI	-60	126.5	126.1	168.1	1	126.1
TWI	-60	164.7	164.1	168.1	1	164.1
TWI	-60	192.7	192.0	168.1	0	168.1
TWI	-60	134.5	134.1	168.1	1	134.1
TWI	-60	140.8	140.3	168.1	1	140.3
GKSS	-60	295.3	346.1	168.1	0	168.1
GKSS	-60	217.7	254.2	168.1	0	168.1
GKSS	-60	219.8	256.6	168.1	0	168.1
GKSS	-60	165.9	192.8	168.1	0	168.1
GKSS	-60	109.9	126.5	168.1	1	126.5
GKSS	-60	131.9	152.5	168.1	1	152.5
GKSS	-60	136.2	157.6	168.1	1	157.6
GKSS	-60	154.0	178.8	168.1	0	168.1
GKSS	-60	115.9	133.6	168.1	1	133.6
GKSS	-60	150.4	174.4	168.1	0	168.1
THA	-60	153.6	178.2	168.1	0	168.1
THA	-60	183.8	214.0	168.1	0	168.1
THA	-60	236.1	275.9	168.1	0	168.1
THA	-60	149.4	173.3	168.1	0	168.1
THA	-60	179.5	209.0	168.1	0	168.1
THA	-60	177.6	206.7	168.1	0	168.1
THA	-60	188.3	219.4	168.1	0	168.1
THA	-60	134.5	155.6	168.1	1	155.6
THA	-60	243.6	284.9	168.1	0	168.1
THA	-60	155.7	180.8	168.1	0	168.1
THA	-60	164.0	190.6	168.1	0	168.1
THA	-60	146.5	169.8	168.1	0	168.1
THA	-60	119.9	138.4	168.1	1	138.4
THA	-60	79.9	91.0	168.1	1	91.0
THA	-60	140.9	163.2	168.1	1	163.2
THA	-60	115.3	132.9	168.1	1	132.9
THA	-60	137.0	158.6	168.1	1	158.6
THA	-60	166.9	194.0	168.1	0	168.1
THA	-60	225.4	263.3	168.1	0	168.1
THA	-60	200.7	234.1	168.1	0	168.1

2. Analysis of the censored data and obtainment of a new estimate of T_0

Specimen code	T (°C)	$K_{Jc,exp}$ (MPa√m)	K_{Jc-1T} (MPa√m)	$K_{analysis}$ (MPa√m)	δ_i	1° member	2° member
GKSS	-60	205.5	175.4	168.1	0	0.0000	0.0083
GKSS	-60	114.4	99.1	99.1	1	0.0121	0.0007
GKSS	-60	130.7	112.7	112.7	1	0.0121	0.0013
GKSS	-60	106.7	92.6	92.6	1	0.0121	0.0005
GKSS	-60	161.0	138.1	138.1	1	0.0121	0.0033
GKSS	-60	200.7	171.3	168.1	0	0.0000	0.0090
GKSS	-60	125.2	108.1	108.1	1	0.0121	0.0010
GKSS	-60	145.1	124.8	124.8	1	0.0121	0.0021
GKSS	-60	91.9	80.2	80.2	1	0.0121	0.0002
GKSS	-60	128.1	110.6	110.6	1	0.0121	0.0012
GKSS	-60	164.4	140.9	140.9	1	0.0121	0.0037
GKSS	-60	192.2	164.3	164.3	1	0.0121	0.0074
GKSS	-60	166.3	142.5	142.5	1	0.0121	0.0039
GKSS	-60	177.7	152.1	152.1	1	0.0121	0.0052
GKSS	-60	167.6	143.6	143.6	1	0.0121	0.0040
GKSS	-60	128.6	110.9	110.9	1	0.0121	0.0012
GKSS	-60	203.0	173.3	168.1	0	0.0000	0.0095
GKSS	-60	98.4	85.7	85.7	1	0.0121	0.0003
GKSS	-60	203.3	173.5	168.1	0	0.0000	0.0095
GKSS	-60	202.6	173.0	168.1	0	0.0000	0.0094
GKSS	-60	201.7	172.1	168.1	0	0.0000	0.0092
GKSS	-60	171.9	147.2	147.2	1	0.0121	0.0045
GKSS	-60	136.8	117.8	117.8	1	0.0121	0.0016
GKSS	-60	135.8	117.0	117.0	1	0.0121	0.0015
GKSS	-60	200.8	171.4	168.1	0	0.0000	0.0090
GKSS	-60	202.8	173.1	168.1	0	0.0000	0.0094
GKSS	-60	202.0	172.5	168.1	0	0.0000	0.0093
GKSS	-60	116.0	100.4	100.4	1	0.0121	0.0007
GKSS	-60	202.0	172.5	168.1	0	0.0000	0.0093

T limits

-144

-44

USE LIMITS : YES

Sum of 1° member: 1.017

Sum of 2° member: 1.221

Difference: -0.204

$T_0 = -95.8$ °C

Use new estimate as benchmark

N = 126

r = 84

$K_{min} = 20$ MPa√m

$K_{o,eq} = 177.9$ MPa√m

$K_{med,eq} = 164.0$ MPa√m

GKSS	-60	167.6	143.6	143.6	1	0.0121	0.0040
GKSS	-60	89.8	78.5	78.5	1	0.0121	0.0002
GKSS	-60	156.3	134.1	134.1	1	0.0121	0.0029
GKSS	-60	186.8	159.7	159.7	1	0.0121	0.0065
GKSS	-60	203.2	173.4	168.1	0	0.0000	0.0095
GKSS	-60	164.6	141.1	141.1	1	0.0121	0.0037
GKSS	-60	202.6	173.0	168.1	0	0.0000	0.0094
GKSS	-60	185.9	159.0	159.0	1	0.0121	0.0064
GKSS	-60	127.7	110.2	110.2	1	0.0121	0.0011
GKSS	-60	201.2	171.7	168.1	0	0.0000	0.0091
GKSS	-60	115.6	100.0	100.0	1	0.0121	0.0007
GKSS	-60	107.5	93.3	93.3	1	0.0121	0.0005
SIEMENS	-60	164.6	141.1	141.1	1	0.0121	0.0037
SIEMENS	-60	172.0	147.3	147.3	1	0.0121	0.0045
SIEMENS	-60	108.5	94.2	94.2	1	0.0121	0.0005
SIEMENS	-60	119.0	102.9	102.9	1	0.0121	0.0008
SIEMENS	-60	153.5	131.8	131.8	1	0.0121	0.0027
SIEMENS	-60	158.9	136.4	136.4	1	0.0121	0.0032
SIEMENS	-60	137.5	118.4	118.4	1	0.0121	0.0016
SIEMENS	-60	119.5	103.3	103.3	1	0.0121	0.0008
SIEMENS	-60	130.7	112.8	112.8	1	0.0121	0.0013
SIEMENS	-60	172.6	147.8	147.8	1	0.0121	0.0046
SIEMENS	-60	84.5	74.0	74.0	1	0.0121	0.0001
SIEMENS	-60	213.4	182.0	168.1	0	0.0000	0.0118
SIEMENS	-60	120.4	104.1	104.1	1	0.0121	0.0009
SIEMENS	-60	104.5	90.8	90.8	1	0.0121	0.0004
SIEMENS	-60	163.6	140.2	140.2	1	0.0121	0.0036
SIEMENS	-60	201.4	172.0	168.1	0	0.0000	0.0092
SIEMENS	-60	137.8	118.7	118.7	1	0.0121	0.0016
SIEMENS	-60	173.0	148.1	148.1	1	0.0121	0.0046
SIEMENS	-60	99.2	86.4	86.4	1	0.0121	0.0003
SIEMENS	-60	173.4	148.4	148.4	1	0.0121	0.0047
SIEMENS	-60	131.5	113.4	113.4	1	0.0121	0.0013
GKSS	-60	186.0	185.3	168.1	0	0.0000	0.0128
GKSS	-60	151.8	151.3	151.3	1	0.0121	0.0051
GKSS	-60	111.7	111.3	111.3	1	0.0121	0.0012
GKSS	-60	143.9	143.4	143.4	1	0.0121	0.0040
GKSS	-60	105.4	105.1	105.1	1	0.0121	0.0009
GKSS	-60	154.0	153.4	153.4	1	0.0121	0.0054
GKSS	-60	176.2	175.6	168.1	0	0.0000	0.0101
GKSS	-60	131.9	131.5	131.5	1	0.0121	0.0027
GKSS	-60	203.9	203.2	168.1	0	0.0000	0.0193
GKSS	-60	142.7	142.2	142.2	1	0.0121	0.0038
TWI	-60	134.5	134.0	134.0	1	0.0121	0.0029
TWI	-60	130.1	129.7	129.7	1	0.0121	0.0025
TWI	-60	142.6	142.1	142.1	1	0.0121	0.0038
TWI	-60	119.7	119.3	119.3	1	0.0121	0.0017
TWI	-60	141.3	140.8	140.8	1	0.0121	0.0037
TWI	-60	175.9	175.3	168.1	0	0.0000	0.0100
TWI	-60	119.6	119.2	119.2	1	0.0121	0.0017
TWI	-60	102.4	102.0	102.0	1	0.0121	0.0008
TWI	-60	99.0	98.7	98.7	1	0.0121	0.0007
TWI	-60	115.1	114.7	114.7	1	0.0121	0.0014
TWI	-60	172.9	172.3	168.1	0	0.0000	0.0092
TWI	-60	120.5	120.2	120.2	1	0.0121	0.0017
TWI	-60	165.2	164.6	164.6	1	0.0121	0.0075
TWI	-60	125.6	125.2	125.2	1	0.0121	0.0021
TWI	-60	126.7	126.3	126.3	1	0.0121	0.0022
TWI	-60	100.4	100.1	100.1	1	0.0121	0.0007
TWI	-60	131.1	130.7	130.7	1	0.0121	0.0026
TWI	-60	185.1	184.5	168.1	0	0.0000	0.0126
TWI	-60	163.6	163.0	163.0	1	0.0121	0.0072
TWI	-60	126.5	126.1	126.1	1	0.0121	0.0022
TWI	-60	164.7	164.1	164.1	1	0.0121	0.0074
TWI	-60	192.7	192.0	168.1	0	0.0000	0.0150
TWI	-60	134.5	134.1	134.1	1	0.0121	0.0029
TWI	-60	140.8	140.3	140.3	1	0.0121	0.0036
GKSS	-60	295.3	346.1	168.1	0	0.0000	0.1943
GKSS	-60	217.7	254.2	168.1	0	0.0000	0.0517
GKSS	-60	219.8	256.6	168.1	0	0.0000	0.0538
GKSS	-60	165.9	192.8	168.1	0	0.0000	0.0153
GKSS	-60	109.9	126.5	126.5	1	0.0121	0.0022
GKSS	-60	131.9	152.5	152.5	1	0.0121	0.0053
GKSS	-60	136.2	157.6	157.6	1	0.0121	0.0062
GKSS	-60	154.0	178.8	168.1	0	0.0000	0.0109
GKSS	-60	115.9	133.6	133.6	1	0.0121	0.0029
GKSS	-60	150.4	174.4	168.1	0	0.0000	0.0098
THA	-60	153.6	178.2	168.1	0	0.0000	0.0108
THA	-60	183.8	214.0	168.1	0	0.0000	0.0243
THA	-60	236.1	275.9	168.1	0	0.0000	0.0737
THA	-60	149.4	173.3	168.1	0	0.0000	0.0095
THA	-60	179.5	209.0	168.1	0	0.0000	0.0219
THA	-60	177.6	206.7	168.1	0	0.0000	0.0209
THA	-60	188.3	219.4	168.1	0	0.0000	0.0271
THA	-60	134.5	155.6	155.6	1	0.0121	0.0058
THA	-60	243.6	284.9	168.1	0	0.0000	0.0845
THA	-60	155.7	180.8	168.1	0	0.0000	0.0115

THA	-60	164.0	190.6	168.1	0	0.0000	0.0145
THA	-60	146.5	169.8	168.1	0	0.0000	0.0087
THA	-60	119.9	138.4	138.4	1	0.0121	0.0034
THA	-60	79.9	91.0	91.0	1	0.0121	0.0004
THA	-60	140.9	163.2	163.2	1	0.0121	0.0072
THA	-60	115.3	132.9	132.9	1	0.0121	0.0028
THA	-60	137.0	158.6	158.6	1	0.0121	0.0063
THA	-60	166.9	194.0	168.1	0	0.0000	0.0158
THA	-60	225.4	263.3	168.1	0	0.0000	0.0602
THA	-60	200.7	234.1	168.1	0	0.0000	0.0361

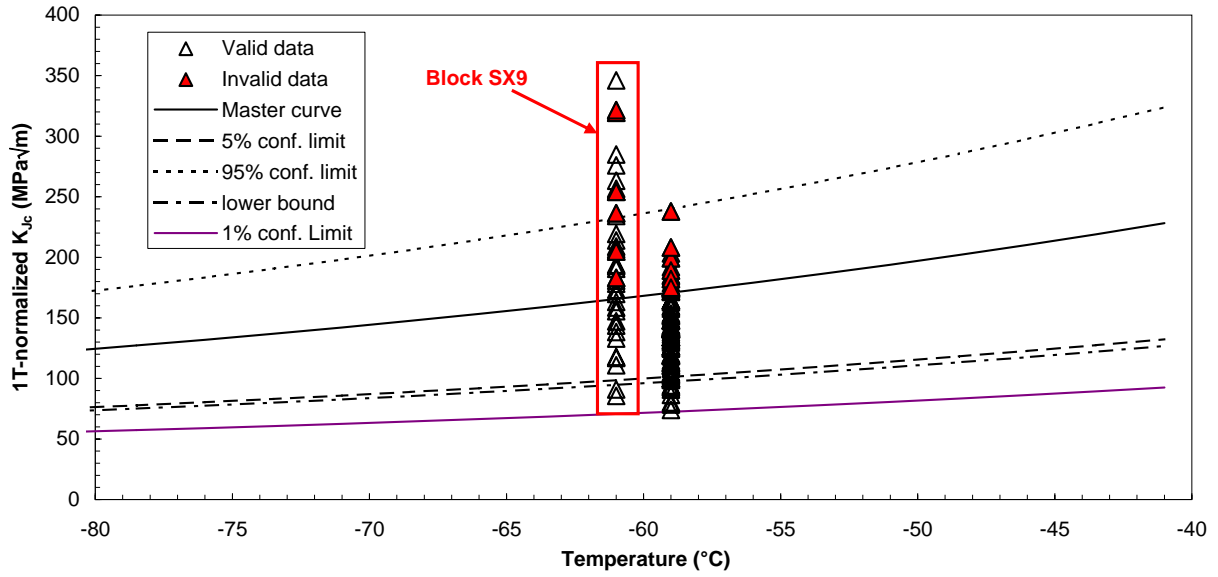
3. Revised Master Curve fit to data

Temperature adj. = 2.8 °C (est.) Stand. dev. on T_0 = 2.0 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-59	234.1	199.3				
-59	114.4	99.1				
-59	130.7	112.7				
-59	106.7	92.6				
-59	161.0	138.1				
-59	200.7	171.3				
-59	125.2	108.1				
-59	145.1	124.8				
-59	91.9	80.2				
-59	128.1	110.6				
-59	164.4	140.9				
-59	192.2	164.3				
-59	166.3	142.5				
-59	177.7	152.1				
-61	167.6	143.6				
-61	128.6	110.9				
-61	377.4	319.3				
-61	98.4	85.7				
-61	278.4	236.4				
-61	240.7	204.9				
-61	380.0	321.5				
-61	171.9	147.2				
-61	136.8	117.8				
-61	135.8	117.0				
-61	214.7	183.1				
-61	299.5	254.1				
-59	203.7	173.9				
-59	116.0	100.4				
-59	221.9	189.1				
-59	167.6	143.6				
-59	89.8	78.5				
-59	156.3	134.1				
-59	186.8	159.7				
-59	213.5	182.1				
-59	164.6	141.1				
-59	280.1	237.9				
-59	185.9	159.0				
-59	127.7	110.2				
-59	205.0	175.0				
-59	115.6	100.0				
-59	107.5	93.3				
-59	164.6	141.1				
-59	172.0	147.3				
-59	108.5	94.2				
-59	119.0	102.9				
-59	153.5	131.8				
-59	158.9	136.4				
-59	137.5	118.4				
-59	119.5	103.3				
-59	130.7	112.8				
-59	172.6	147.8				
-59	84.5	74.0				
-59	244.6	208.1				
-59	120.4	104.1				
-59	104.5	90.8				
-59	163.6	140.2				
-59	201.4	172.0				
-59	137.8	118.7				
-59	173.0	148.1				
-59	99.2	86.4				
-59	173.4	148.4				
-59	131.5	113.4				
-59	186.0	185.3				
-59	151.8	151.3				
-59	111.7	111.3				
-59	143.9	143.4				
-59	105.4	105.1				
-59	154.0	153.4				
-59	176.2	175.6				

-59	131.9	131.5				
-59	203.9	203.2				
-59	142.7	142.2				
-59	134.5	134.0				
-59	130.1	129.7				
-59	142.6	142.1				
-59	119.7	119.3				
-59	141.3	140.8				
-59	175.9	175.3				
-59	119.6	119.2				
-59	102.4	102.0				
-59	99.0	98.7				
-59	115.1	114.7				
-59	172.9	172.3				
-59	120.5	120.2				
-59	165.2	164.6				
-59	125.6	125.2				
-59	126.7	126.3				
-59	100.4	100.1				
-59	131.1	130.7				
-59	185.1	184.5				
-59	163.6	163.0				
-59	126.5	126.1				
-59	164.7	164.1				
-59	192.7	192.0				
-59	134.5	134.1				
-59	140.8	140.3				
-61	295.3	346.1				
-61	217.7	254.2				
-61	219.8	256.6				
-61	165.9	192.8				
-59	109.9	126.5				
-59	131.9	152.5				
-59	136.2	157.6				
-59	154.0	178.8				
-59	115.9	133.6				
-59	150.4	174.4				
-61	153.6	178.2				
-61	183.8	214.0				
-61	236.1	275.9				
-61	149.4	173.3				
-61	179.5	209.0				
-61	177.6	206.7				
-61	188.3	219.4				
-61	134.5	155.6				
-61	243.6	284.9				
-61	155.7	180.8				
-61	164.0	190.6				
-61	146.5	169.8				
-61	119.9	138.4				
-61	79.9	91.0				
-61	140.9	163.2				
-61	115.3	132.9				
-61	137.0	158.6				
-61	166.9	194.0				
-61	225.4	263.3				
-61	200.7	234.1				
-81			122.7	75.5	169.9	72.8
-78.5			127.2	77.9	176.5	75.1
-76			131.9	80.4	183.4	77.6
-73.5			136.9	83.1	190.7	80.1
-71			142.1	85.9	198.2	82.8
-68.5			147.5	88.9	206.2	85.6
-66			153.3	92.0	214.6	88.5
-63.5			159.3	95.2	223.3	91.5
-61			165.5	98.6	232.5	94.8
-58.5			172.1	102.2	242.1	98.1
-56			179.0	105.9	252.2	101.7
-53.5			186.3	109.8	262.8	105.4
-51			193.9	113.9	273.9	109.3
-48.5			201.9	118.2	285.5	113.4
-46			210.2	122.7	297.7	117.6
-43.5			219.0	127.5	310.5	122.1
-41			228.2	132.4	324.0	126.8

MASTER CURVE WITH CONFIDENCE LIMITS - SINTAP lower tail analysis
EURO toughness dataset - Dataset -60 °C (including SX9)



SINTAP - Structural Integrity Assessment Procedures for European Industry
Lower Tail Analysis Procedure

Step 3: Minimum value estimation

1. Calculation of the maximum value of T_o (based on a single data point) and establishment of T_o for the data set

Specimen code	T (°C)	$K_{Jc[exp]}$ (MPa√m)	K_{Jc-1T} (MPa√m)	K_{CENS} (MPa√m)	δ_i	$T_{o(i)}$ (°C)
GKSS	-60	205.5	175.4	168.1	0	-
GKSS	-60	114.4	99.1	168.1	1	-140.1
GKSS	-60	130.7	112.7	168.1	1	-147.1
GKSS	-60	106.7	92.6	168.1	1	-136.4
GKSS	-60	161.0	138.1	168.1	1	-158.0
GKSS	-60	200.7	171.3	168.1	0	-
GKSS	-60	125.2	108.1	168.1	1	-144.8
GKSS	-60	145.1	124.8	168.1	1	-152.6
GKSS	-60	91.9	80.2	168.1	1	-128.6
GKSS	-60	128.1	110.6	168.1	1	-146.1
GKSS	-60	164.4	140.9	168.1	1	-159.1
GKSS	-60	192.2	164.3	168.1	1	-167.4
GKSS	-60	166.3	142.5	168.1	1	-159.8
GKSS	-60	177.7	152.1	168.1	1	-163.2
GKSS	-60	167.6	143.6	168.1	1	-160.1
GKSS	-60	128.6	110.9	168.1	1	-146.2
GKSS	-60	203.0	173.3	168.1	0	-
GKSS	-60	98.4	85.7	168.1	1	-132.2
GKSS	-60	203.3	173.5	168.1	0	-
GKSS	-60	202.6	173.0	168.1	0	-
GKSS	-60	201.7	172.1	168.1	0	-
GKSS	-60	171.9	147.2	168.1	1	-161.5
GKSS	-60	136.8	117.8	168.1	1	-149.5
GKSS	-60	135.8	117.0	168.1	1	-149.1
GKSS	-60	200.8	171.4	168.1	0	-
GKSS	-60	202.8	173.1	168.1	0	-
GKSS	-60	202.0	172.5	168.1	0	-
GKSS	-60	116.0	100.4	168.1	1	-140.8
GKSS	-60	202.0	172.5	168.1	0	-
GKSS	-60	167.6	143.6	168.1	1	-160.1
GKSS	-60	89.8	78.5	168.1	1	-127.4
GKSS	-60	156.3	134.1	168.1	1	-156.5
GKSS	-60	186.8	159.7	168.1	1	-165.8
GKSS	-60	203.2	173.4	168.1	0	-
GKSS	-60	164.6	141.1	168.1	1	-159.2
GKSS	-60	202.6	173.0	168.1	0	-
GKSS	-60	185.9	159.0	168.1	1	-165.6
GKSS	-60	127.7	110.2	168.1	1	-145.9
GKSS	-60	201.2	171.7	168.1	0	-
GKSS	-60	115.6	100.0	168.1	1	-140.6
GKSS	-60	107.5	93.3	168.1	1	-136.8
SIEMENS	-60	164.6	141.1	168.1	1	-159.2
SIEMENS	-60	172.0	147.3	168.1	1	-161.5
SIEMENS	-60	108.5	94.2	168.1	1	-137.3
SIEMENS	-60	119.0	102.9	168.1	1	-142.2
SIEMENS	-60	153.5	131.8	168.1	1	-155.5
SIEMENS	-60	158.9	136.4	168.1	1	-157.4
SIEMENS	-60	137.5	118.4	168.1	1	-149.8
SIEMENS	-60	119.5	103.3	168.1	1	-142.4
SIEMENS	-60	130.7	112.8	168.1	1	-147.1
SIEMENS	-60	172.6	147.8	168.1	1	-161.7
SIEMENS	-60	84.5	74.0	168.1	1	-124.2
SIEMENS	-60	213.4	182.0	168.1	0	-
SIEMENS	-60	120.4	104.1	168.1	1	-142.8
SIEMENS	-60	104.5	90.8	168.1	1	-135.4
SIEMENS	-60	163.6	140.2	168.1	1	-158.9
SIEMENS	-60	201.4	172.0	168.1	0	-
SIEMENS	-60	137.8	118.7	168.1	1	-149.9
SIEMENS	-60	173.0	148.1	168.1	1	-161.8
SIEMENS	-60	99.2	86.4	168.1	1	-132.6
SIEMENS	-60	173.4	148.4	168.1	1	-161.9
SIEMENS	-60	131.5	113.4	168.1	1	-147.4
GKSS	-60	186.0	185.3	168.1	0	-
GKSS	-60	151.8	151.3	168.1	1	-162.9
GKSS	-60	111.7	111.3	168.1	1	-146.4
GKSS	-60	143.9	143.4	168.1	1	-160.1
GKSS	-60	105.4	105.1	168.1	1	-143.3
GKSS	-60	154.0	153.4	168.1	1	-163.7
GKSS	-60	176.2	175.6	168.1	0	-
GKSS	-60	131.9	131.5	168.1	1	-155.4
GKSS	-60	203.9	203.2	168.1	0	-
GKSS	-60	142.7	142.2	168.1	1	-159.6

Max value $T_{o(max)} = -124$ °C

$T_{o(max)} - 8$ °C > $T_{o(step 2)}$: **NO**
→ DATA IS HOMOGENEOUS

T_o for the data set: $T_o = -95.8$ °C

TWI	-60	134.5	134.0	168.1	1	-156.4
TWI	-60	130.1	129.7	168.1	1	-154.7
TWI	-60	142.6	142.1	168.1	1	-159.6
TWI	-60	119.7	119.3	168.1	1	-150.2
TWI	-60	141.3	140.8	168.1	1	-159.1
TWI	-60	175.9	175.3	168.1	0	-
TWI	-60	119.6	119.2	168.1	1	-150.1
TWI	-60	102.4	102.0	168.1	1	-141.7
TWI	-60	99.0	98.7	168.1	1	-139.9
TWI	-60	115.1	114.7	168.1	1	-148.1
TWI	-60	172.9	172.3	168.1	0	-
TWI	-60	120.5	120.2	168.1	1	-150.5
TWI	-60	165.2	164.6	168.1	1	-167.5
TWI	-60	125.6	125.2	168.1	1	-152.8
TWI	-60	126.7	126.3	168.1	1	-153.3
TWI	-60	100.4	100.1	168.1	1	-140.7
TWI	-60	131.1	130.7	168.1	1	-155.1
TWI	-60	185.1	184.5	168.1	0	-
TWI	-60	163.6	163.0	168.1	1	-167.0
TWI	-60	126.5	126.1	168.1	1	-153.1
TWI	-60	164.7	164.1	168.1	1	-167.3
TWI	-60	192.7	192.0	168.1	0	-
TWI	-60	134.5	134.1	168.1	1	-156.5
TWI	-60	140.8	140.3	168.1	1	-158.9
GKSS	-60	295.3	346.1	168.1	0	-
GKSS	-60	217.7	254.2	168.1	0	-
GKSS	-60	219.8	256.6	168.1	0	-
GKSS	-60	165.9	192.8	168.1	0	-
GKSS	-60	109.9	126.5	168.1	1	-153.3
GKSS	-60	131.9	152.5	168.1	1	-163.4
GKSS	-60	136.2	157.6	168.1	1	-165.1
GKSS	-60	154.0	178.8	168.1	0	-
GKSS	-60	115.9	133.6	168.1	1	-156.3
GKSS	-60	150.4	174.4	168.1	0	-
THA	-60	153.6	178.2	168.1	0	-
THA	-60	183.8	214.0	168.1	0	-
THA	-60	236.1	275.9	168.1	0	-
THA	-60	149.4	173.3	168.1	0	-
THA	-60	179.5	209.0	168.1	0	-
THA	-60	177.6	206.7	168.1	0	-
THA	-60	188.3	219.4	168.1	0	-
THA	-60	134.5	155.6	168.1	1	-164.5
THA	-60	243.6	284.9	168.1	0	-
THA	-60	155.7	180.8	168.1	0	-
THA	-60	164.0	190.6	168.1	0	-
THA	-60	146.5	169.8	168.1	0	-
THA	-60	119.9	138.4	168.1	1	-158.2
THA	-60	79.9	91.0	168.1	1	-135.5
THA	-60	140.9	163.2	168.1	1	-167.0
THA	-60	115.3	132.9	168.1	1	-156.0
THA	-60	137.0	158.6	168.1	1	-165.5
THA	-60	166.9	194.0	168.1	0	-
THA	-60	225.4	263.3	168.1	0	-
THA	-60	200.7	234.1	168.1	0	-

2. Final Master Curve fit to data

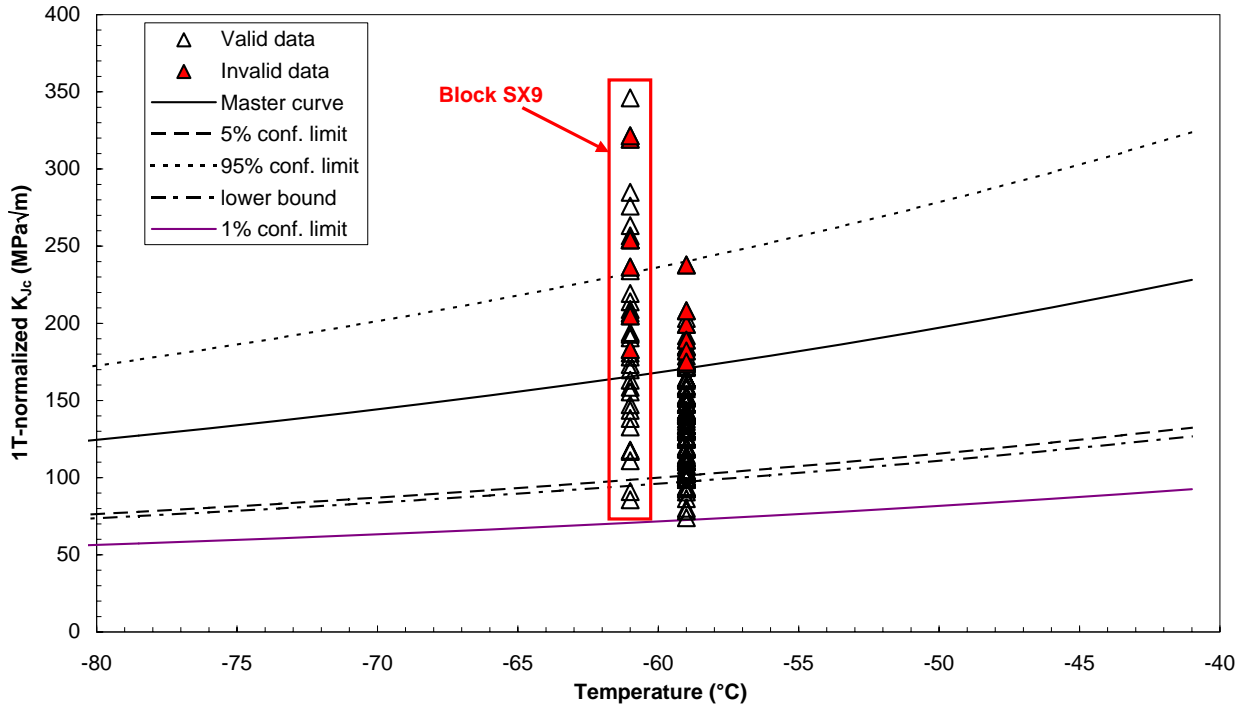
Temperature adj. = 2.8 °C (est.) Stand. dev. on I_0 = 2.0 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-59	234.1	199.3				
-59	114.4	99.1				
-59	130.7	112.7				
-59	106.7	92.6				
-59	161.0	138.1				
-59	200.7	171.3				
-59	125.2	108.1				
-59	145.1	124.8				
-59	91.9	80.2				
-59	128.1	110.6				
-59	164.4	140.9				
-59	192.2	164.3				
-59	166.3	142.5				
-59	177.7	152.1				
-61	167.6	143.6				
-61	128.6	110.9				
-61	377.4	319.3				

-61	98.4	85.7
-61	278.4	236.4
-61	240.7	204.9
-61	380.0	321.5
-61	171.9	147.2
-61	136.8	117.8
-61	135.8	117.0
-61	214.7	183.1
-61	299.5	254.1
-59	203.7	173.9
-59	116.0	100.4
-59	221.9	189.1
-59	167.6	143.6
-59	89.8	78.5
-59	156.3	134.1
-59	186.8	159.7
-59	213.5	182.1
-59	164.6	141.1
-59	280.1	237.9
-59	185.9	159.0
-59	127.7	110.2
-59	205.0	175.0
-59	115.6	100.0
-59	107.5	93.3
-59	164.6	141.1
-59	172.0	147.3
-59	108.5	94.2
-59	119.0	102.9
-59	153.5	131.8
-59	158.9	136.4
-59	137.5	118.4
-59	119.5	103.3
-59	130.7	112.8
-59	172.6	147.8
-59	84.5	74.0
-59	244.6	208.1
-59	120.4	104.1
-59	104.5	90.8
-59	163.6	140.2
-59	201.4	172.0
-59	137.8	118.7
-59	173.0	148.1
-59	99.2	86.4
-59	173.4	148.4
-59	131.5	113.4
-59	186.0	185.3
-59	151.8	151.3
-59	111.7	111.3
-59	143.9	143.4
-59	105.4	105.1
-59	154.0	153.4
-59	176.2	175.6
-59	131.9	131.5
-59	203.9	203.2
-59	142.7	142.2
-59	134.5	134.0
-59	130.1	129.7
-59	142.6	142.1
-59	119.7	119.3
-59	141.3	140.8
-59	175.9	175.3
-59	119.6	119.2
-59	102.4	102.0
-59	99.0	98.7
-59	115.1	114.7
-59	172.9	172.3
-59	120.5	120.2
-59	165.2	164.6
-59	125.6	125.2
-59	126.7	126.3
-59	100.4	100.1

-59	131.1	130.7				
-59	185.1	184.5				
-59	163.6	163.0				
-59	126.5	126.1				
-59	164.7	164.1				
-59	192.7	192.0				
-59	134.5	134.1				
-59	140.8	140.3				
-61	295.3	346.1				
-61	217.7	254.2				
-61	219.8	256.6				
-61	165.9	192.8				
-59	109.9	126.5				
-59	131.9	152.5				
-59	136.2	157.6				
-59	154.0	178.8				
-59	115.9	133.6				
-59	150.4	174.4				
-61	153.6	178.2				
-61	183.8	214.0				
-61	236.1	275.9				
-61	149.4	173.3				
-61	179.5	209.0				
-61	177.6	206.7				
-61	188.3	219.4				
-61	134.5	155.6				
-61	243.6	284.9				
-61	155.7	180.8				
-61	164.0	190.6				
-61	146.5	169.8				
-61	119.9	138.4				
-61	79.9	91.0				
-61	140.9	163.2				
-61	115.3	132.9				
-61	137.0	158.6				
-61	166.9	194.0				
-61	225.4	263.3				
-61	200.7	234.1				
-81			122.7	75.5	169.9	72.8
-78.5			127.2	77.9	176.5	75.1
-76			131.9	80.4	183.4	77.6
-73.5			136.9	83.1	190.7	80.1
-71			142.1	85.9	198.2	82.8
-68.5			147.5	88.9	206.2	85.6
-66			153.3	92.0	214.6	88.5
-63.5			159.3	95.2	223.3	91.5
-61			165.5	98.6	232.5	94.8
-58.5			172.1	102.2	242.1	98.1
-56			179.0	105.9	252.2	101.7
-53.5			186.3	109.8	262.8	105.4
-51			193.9	113.9	273.9	109.3
-48.5			201.9	118.2	285.5	113.4
-46			210.2	122.7	297.7	117.6
-43.5			219.0	127.5	310.5	122.1
-41			228.2	132.4	324.0	126.8

MASTER CURVE WITH CONFIDENCE LIMITS - SINTAP lower tail analysis
EURO toughness dataset - Dataset -60 °C (including SX9)



MASTER CURVE ANALYSIS OF RANDOM INHOMOGENEITIES

Single Point Estimation Method

Step 1: Estimate of the median value of fracture toughness (ASTM E1921-05)

1. Material characteristics

Material specifications : **EURO toughness data set - Dataset -60 °C (including SX9)**

2. Dimensional and crack growth requirements

Specimen code	T (°C)	a _o (mm)	W (mm)	B (mm)	b _o (mm)	Δa (mm)	K _{Jc[exp]} (MPa√m)	σ _{ys} (MPa)	E' (GPa)	K _{lim} (MPa√m)	DATA VALID	K _{Jc[calc]} (MPa√m)
GKSS	-60	14.19	25	12.5	10.810	0.05	234.1	506.4	231.4	205.5	NO	205.5
GKSS	-60	14.16	25	12.5	10.840	0.00	114.4	506.4	231.4	205.8	YES	114.4
GKSS	-60	14.31	25	12.5	10.690	0.00	130.7	506.4	231.4	204.4	YES	130.7
GKSS	-60	14.13	25	12.5	10.870	0.00	106.7	506.4	231.4	206.1	YES	106.7
GKSS	-60	14.08	25	12.5	10.920	0.00	161.0	506.4	231.4	206.5	YES	161.0
GKSS	-60	13.58	25	12.5	11.420	0.00	200.7	506.4	231.4	211.2	YES	200.7
GKSS	-60	14.26	25	12.5	10.740	0.00	125.2	506.4	231.4	204.8	YES	125.2
GKSS	-60	14.19	25	12.5	10.810	0.00	145.1	506.4	231.4	205.5	YES	145.1
GKSS	-60	14.00	25	12.5	11.000	0.00	91.9	506.4	231.4	207.3	YES	91.9
GKSS	-60	13.94	25	12.5	11.060	0.00	128.1	506.4	231.4	207.9	YES	128.1
GKSS	-60	14.59	25	12.5	10.410	0.00	164.4	506.4	231.4	201.7	YES	164.4
GKSS	-60	14.53	25	12.5	10.470	0.00	192.2	506.4	231.4	202.2	YES	192.2
GKSS	-60	14.76	25	12.5	10.240	0.00	166.3	506.4	231.4	200.0	YES	166.3
GKSS	-60	14.48	25	12.5	10.520	0.00	177.7	506.4	231.4	202.7	YES	177.7
GKSS	-60	14.61	25	12.5	10.390	0.00	167.6	506.4	231.4	201.5	YES	167.6
GKSS	-60	14.41	25	12.5	10.590	0.00	128.6	506.4	231.4	203.4	YES	128.6
GKSS	-60	14.45	25	12.5	10.550	0.70	377.4	506.4	231.4	203.0	NO	203.0
GKSS	-60	14.37	25	12.5	10.630	0.00	98.4	506.4	231.4	203.8	YES	98.4
GKSS	-60	14.42	25	12.5	10.580	0.29	278.4	506.4	231.4	203.3	NO	203.3
GKSS	-60	14.49	25	12.5	10.510	0.18	240.7	506.4	231.4	202.6	NO	202.6
GKSS	-60	14.59	25	12.5	10.410	0.75	380.0	506.4	231.4	201.7	NO	201.7
GKSS	-60	14.04	25	12.5	10.960	0.00	171.9	506.4	231.4	206.9	YES	171.9
GKSS	-60	14.49	25	12.5	10.510	0.00	136.8	506.4	231.4	202.6	YES	136.8
GKSS	-60	14.80	25	12.5	10.200	0.00	135.8	506.4	231.4	199.6	YES	135.8
GKSS	-60	14.68	25	12.5	10.320	0.13	214.7	506.4	231.4	200.8	NO	200.8
GKSS	-60	14.47	25	12.5	10.530	0.41	299.5	506.4	231.4	202.8	NO	202.8
GKSS	-60	14.55	25	12.5	10.450	0.00	203.7	506.4	231.4	202.0	NO	202.0
GKSS	-60	14.46	25	12.5	10.540	0.00	116.0	506.4	231.4	202.9	YES	116.0
GKSS	-60	14.55	25	12.5	10.450	0.11	221.9	506.4	231.4	202.0	NO	202.0
GKSS	-60	14.77	25	12.5	10.230	0.00	167.6	506.4	231.4	199.9	YES	167.6
GKSS	-60	14.35	25	12.5	10.650	0.00	89.8	506.4	231.4	204.0	YES	89.8
GKSS	-60	14.56	25	12.5	10.440	0.00	156.3	506.4	231.4	201.9	YES	156.3
GKSS	-60	14.49	25	12.5	10.510	0.00	186.8	506.4	231.4	202.6	YES	186.8
GKSS	-60	14.43	25	12.5	10.570	0.00	213.5	506.4	231.4	203.2	NO	203.2
GKSS	-60	14.39	25	12.5	10.610	0.00	164.6	506.4	231.4	203.6	YES	164.6
GKSS	-60	14.49	25	12.5	10.510	0.28	280.1	506.4	231.4	202.6	NO	202.6
GKSS	-60	14.43	25	12.5	10.570	0.00	185.9	506.4	231.4	203.2	YES	185.9
GKSS	-60	14.85	25	12.5	10.150	0.00	127.7	506.4	231.4	199.1	YES	127.7
GKSS	-60	14.64	25	12.5	10.360	0.00	205.0	506.4	231.4	201.2	NO	201.2
GKSS	-60	14.25	25	12.5	10.750	0.00	115.6	506.4	231.4	204.9	YES	115.6
GKSS	-60	14.44	25	12.5	10.560	0.00	107.5	506.4	231.4	203.1	YES	107.5
SIEMENS	-60	13.24	25	12.5	11.760	0.00	164.6	506.4	231.4	214.3	YES	164.6
SIEMENS	-60	13.29	25	12.5	11.710	0.00	172.0	506.4	231.4	213.9	YES	172.0
SIEMENS	-60	13.24	25	12.5	11.760	0.00	108.5	506.4	231.4	214.3	YES	108.5
SIEMENS	-60	13.28	25	12.5	11.720	0.00	119.0	506.4	231.4	214.0	YES	119.0
SIEMENS	-60	13.26	25	12.5	11.740	0.00	153.5	506.4	231.4	214.2	YES	153.5
SIEMENS	-60	13.22	25	12.5	11.780	0.00	158.9	506.4	231.4	214.5	YES	158.9
SIEMENS	-60	13.27	25	12.5	11.730	0.00	137.5	506.4	231.4	214.1	YES	137.5
SIEMENS	-60	13.18	25	12.5	11.820	0.00	119.5	506.4	231.4	214.9	YES	119.5
SIEMENS	-60	13.18	25	12.5	11.820	0.00	130.7	506.4	231.4	214.9	YES	130.7
SIEMENS	-60	13.24	25	12.5	11.760	0.00	172.6	506.4	231.4	214.3	YES	172.6
SIEMENS	-60	13.24	25	12.5	11.760	0.00	84.5	506.4	231.4	214.3	YES	84.5
SIEMENS	-60	13.34	25	12.5	11.660	0.00	244.6	506.4	231.4	213.4	NO	213.4
SIEMENS	-60	13.20	25	12.5	11.800	0.00	120.4	506.4	231.4	214.7	YES	120.4
SIEMENS	-60	13.31	25	12.5	11.690	0.00	104.5	506.4	231.4	213.7	YES	104.5
SIEMENS	-60	13.23	25	12.5	11.770	0.00	163.6	506.4	231.4	214.4	YES	163.6
SIEMENS	-60	13.28	25	12.5	11.720	0.00	201.4	506.4	231.4	214.0	YES	201.4
SIEMENS	-60	13.20	25	12.5	11.800	0.00	137.8	506.4	231.4	214.7	YES	137.8
SIEMENS	-60	13.19	25	12.5	11.810	0.00	173.0	506.4	231.4	214.8	YES	173.0
SIEMENS	-60	13.22	25	12.5	11.780	0.00	99.2	506.4	231.4	214.5	YES	99.2
SIEMENS	-60	13.22	25	12.5	11.780	0.00	173.4	506.4	231.4	214.5	YES	173.4
SIEMENS	-60	13.29	25	12.5	11.710	0.00	131.5	506.4	231.4	213.9	YES	131.5
GKSS	-60	28.06	50	25.0	21.940	0.00	186.0	506.4	231.4	292.8	YES	186.0
GKSS	-60	27.75	50	25.0	22.250	0.00	151.8	506.4	231.4	294.8	YES	151.8
GKSS	-60	27.62	50	25.0	22.380	0.00	111.7	506.4	231.4	295.7	YES	111.7
GKSS	-60	27.65	50	25.0	22.350	0.00	143.9	506.4	231.4	295.5	YES	143.9
GKSS	-60	27.71	50	25.0	22.290	0.00	105.4	506.4	231.4	295.1	YES	105.4
GKSS	-60	28.01	50	25.0	21.990	0.00	154.0	506.4	231.4	293.1	YES	154.0
GKSS	-60	27.97	50	25.0	22.030	0.00	176.2	506.4	231.4	293.4	YES	176.2
GKSS	-60	27.51	50	25.0	22.490	0.00	131.9	506.4	231.4	296.4	YES	131.9

GKSS	-60	27.86	50	25.0	22.140	0.00	203.9	506.4	231.4	294.1	YES	203.9
GKSS	-60	27.51	50	25.0	22.490	0.00	142.7	506.4	231.4	296.4	YES	142.7
TWI	-60	27.42	50	25.0	22.580	0.06	134.5	506.4	231.4	297.0	YES	134.5
TWI	-60	27.43	50	25.0	22.570	0.00	130.1	506.4	231.4	296.9	YES	130.1
TWI	-60	27.62	50	25.0	22.380	0.07	142.6	506.4	231.4	295.7	YES	142.6
TWI	-60	27.47	50	25.0	22.530	0.05	119.7	506.4	231.4	296.7	YES	119.7
TWI	-60	27.49	50	25.0	22.510	0.07	141.3	506.4	231.4	296.5	YES	141.3
TWI	-60	27.95	50	25.0	22.050	0.10	175.9	506.4	231.4	293.5	YES	175.9
TWI	-60	27.62	50	25.0	22.380	0.00	119.6	506.4	231.4	295.7	YES	119.6
TWI	-60	27.65	50	25.0	22.350	0.00	102.4	506.4	231.4	295.5	YES	102.4
TWI	-60	27.68	50	25.0	22.320	0.00	99.0	506.4	231.4	295.3	YES	99.0
TWI	-60	27.82	50	25.0	22.180	0.05	115.1	506.4	231.4	294.4	YES	115.1
TWI	-60	27.98	50	25.0	22.020	0.11	172.9	506.4	231.4	293.3	YES	172.9
TWI	-60	27.72	50	25.0	22.280	0.03	120.5	506.4	231.4	295.0	YES	120.5
TWI	-60	27.48	50	25.0	22.520	0.00	165.2	506.4	231.4	296.6	YES	165.2
TWI	-60	27.54	50	25.0	22.460	0.00	125.6	506.4	231.4	296.2	YES	125.6
TWI	-60	27.88	50	25.0	22.120	0.05	126.7	506.4	231.4	294.0	YES	126.7
TWI	-60	27.79	50	25.0	22.210	0.00	100.4	506.4	231.4	294.6	YES	100.4
TWI	-60	27.56	50	25.0	22.440	0.05	131.1	506.4	231.4	296.1	YES	131.1
TWI	-60	27.58	50	25.0	22.420	0.06	185.1	506.4	231.4	295.9	YES	185.1
TWI	-60	27.59	50	25.0	22.410	0.09	163.6	506.4	231.4	295.9	YES	163.6
TWI	-60	27.68	50	25.0	22.320	0.09	126.5	506.4	231.4	295.3	YES	126.5
TWI	-60	27.65	50	25.0	22.350	0.10	164.7	506.4	231.4	295.5	YES	164.7
TWI	-60	27.73	50	25.0	22.270	0.16	192.7	506.4	231.4	294.9	YES	192.7
TWI	-60	27.65	50	25.0	22.350	0.05	134.5	506.4	231.4	295.5	YES	134.5
TWI	-60	27.86	50	25.0	22.140	0.05	140.8	506.4	231.4	294.1	YES	140.8
GKSS	-60	56.44	100	50.0	43.560	0.12	295.3	506.4	231.4	412.5	YES	295.3
GKSS	-60	56.53	100	50.0	43.470	0.00	217.7	506.4	231.4	412.1	YES	217.7
GKSS	-60	56.45	100	50.0	43.550	0.00	219.8	506.4	231.4	412.5	YES	219.8
GKSS	-60	56.49	100	50.0	43.510	0.00	165.9	506.4	231.4	412.3	YES	165.9
GKSS	-60	57.56	100	50.0	42.440	0.00	109.9	506.4	231.4	407.2	YES	109.9
GKSS	-60	56.69	100	50.0	43.310	0.00	131.9	506.4	231.4	411.3	YES	131.9
GKSS	-60	56.69	100	50.0	43.310	0.00	136.2	506.4	231.4	411.3	YES	136.2
GKSS	-60	56.51	100	50.0	43.490	0.00	154.0	506.4	231.4	412.2	YES	154.0
GKSS	-60	56.15	100	50.0	43.850	0.00	115.9	506.4	231.4	413.9	YES	115.9
GKSS	-60	55.96	100	50.0	44.040	0.00	150.4	506.4	231.4	414.8	YES	150.4
THA	-60	56.57	100	50.0	43.430	0.00	153.6	506.4	231.4	411.9	YES	153.6
THA	-60	56.38	100	50.0	43.620	0.00	183.8	506.4	231.4	412.8	YES	183.8
THA	-60	56.31	100	50.0	43.690	0.00	236.1	506.4	231.4	413.1	YES	236.1
THA	-60	56.20	100	50.0	43.800	0.00	149.4	506.4	231.4	413.6	YES	149.4
THA	-60	56.83	100	50.0	43.170	0.00	179.5	506.4	231.4	410.7	YES	179.5
THA	-60	56.83	100	50.0	43.170	0.00	177.6	506.4	231.4	410.7	YES	177.6
THA	-60	56.55	100	50.0	43.450	0.00	188.3	506.4	231.4	412.0	YES	188.3
THA	-60	56.56	100	50.0	43.440	0.00	134.5	506.4	231.4	411.9	YES	134.5
THA	-60	56.65	100	50.0	43.350	0.00	243.6	506.4	231.4	411.5	YES	243.6
THA	-60	56.56	100	50.0	43.440	0.00	155.7	506.4	231.4	411.9	YES	155.7
THA	-60	56.18	100	50.0	43.820	0.00	164.0	506.4	231.4	413.7	YES	164.0
THA	-60	56.68	100	50.0	43.320	0.00	146.5	506.4	231.4	411.4	YES	146.5
THA	-60	56.51	100	50.0	43.490	0.00	119.9	506.4	231.4	412.2	YES	119.9
THA	-60	56.31	100	50.0	43.690	0.00	79.9	506.4	231.4	413.1	YES	79.9
THA	-60	56.57	100	50.0	43.430	0.00	140.9	506.4	231.4	411.9	YES	140.9
THA	-60	55.62	100	50.0	44.380	0.00	115.3	506.4	231.4	416.4	YES	115.3
THA	-60	56.56	100	50.0	43.440	0.00	137.0	506.4	231.4	411.9	YES	137.0
THA	-60	56.57	100	50.0	43.430	0.00	166.9	506.4	231.4	411.9	YES	166.9
THA	-60	56.53	100	50.0	43.470	0.00	225.4	506.4	231.4	412.1	YES	225.4
THA	-60	56.32	100	50.0	43.680	0.00	200.7	506.4	231.4	413.1	YES	200.7

3. Application of the multi-temperature approach for the calculation of the reference temperature

T limits

Specimen code	T (°C)	$K_{Jc[calc]}$ (MPa√m)	$K_{Jc(1T)}$ (MPa√m)	δ_i	n_i	1° member	2° member
GKSS	-60	205.5	175.4	0	0.000	0.0000	0.0112
GKSS	-60	114.4	99.1	1	0.167	0.0121	0.0007
GKSS	-60	130.7	112.7	1	0.167	0.0121	0.0014
GKSS	-60	106.7	92.6	1	0.167	0.0121	0.0005
GKSS	-60	161.0	138.1	1	0.167	0.0121	0.0037
GKSS	-60	200.7	171.3	1	0.167	0.0121	0.0101
GKSS	-60	125.2	108.1	1	0.167	0.0121	0.0012
GKSS	-60	145.1	124.8	1	0.167	0.0121	0.0023
GKSS	-60	91.9	80.2	1	0.167	0.0121	0.0003
GKSS	-60	128.1	110.6	1	0.167	0.0121	0.0013
GKSS	-60	164.4	140.9	1	0.167	0.0121	0.0041
GKSS	-60	192.2	164.3	1	0.167	0.0121	0.0083
GKSS	-60	166.3	142.5	1	0.167	0.0121	0.0043
GKSS	-60	177.7	152.1	1	0.167	0.0121	0.0058
GKSS	-60	167.6	143.6	1	0.167	0.0121	0.0045
GKSS	-60	128.6	110.9	1	0.167	0.0121	0.0013
GKSS	-60	203.0	173.3	0	0.000	0.0000	0.0106
GKSS	-60	98.4	85.7	1	0.167	0.0121	0.0004
GKSS	-60	203.3	173.5	0	0.000	0.0000	0.0107
GKSS	-60	202.6	173.0	0	0.000	0.0000	0.0105
GKSS	-60	201.7	172.1	0	0.000	0.0000	0.0103
GKSS	-60	171.9	147.2	1	0.167	0.0121	0.0050

USE LIMITS : YES

-144

-44

Sum of 1° member: 1.366

Sum of 2° member: 1.366

Difference: 0.000

$T_o = -94.2$ °C
(valid per ASTM E1921)

$\sum n_i = 18.83$

N = 126

r = 113

$K_{min} = 20$ MPa√m

$K_{o,eq} = 177.9$ MPa√m

$K_{med,eq} = 164.0$ MPa√m

GKSS	-60	136.8	117.8	1	0.167	0.0121	0.0018
GKSS	-60	135.8	117.0	1	0.167	0.0121	0.0017
GKSS	-60	200.8	171.4	0	0.000	0.0000	0.0101
GKSS	-60	202.8	173.1	0	0.000	0.0000	0.0105
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0104
GKSS	-60	116.0	100.4	1	0.167	0.0121	0.0008
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0104
GKSS	-60	167.6	143.6	1	0.167	0.0121	0.0045
GKSS	-60	89.8	78.5	1	0.167	0.0121	0.0002
GKSS	-60	156.3	134.1	1	0.167	0.0121	0.0033
GKSS	-60	186.8	159.7	1	0.167	0.0121	0.0073
GKSS	-60	203.2	173.4	0	0.000	0.0000	0.0106
GKSS	-60	164.6	141.1	1	0.167	0.0121	0.0041
GKSS	-60	202.6	173.0	0	0.000	0.0000	0.0105
GKSS	-60	185.9	159.0	1	0.167	0.0121	0.0072
GKSS	-60	127.7	110.2	1	0.167	0.0121	0.0013
GKSS	-60	201.2	171.7	0	0.000	0.0000	0.0102
GKSS	-60	115.6	100.0	1	0.167	0.0121	0.0008
GKSS	-60	107.5	93.3	1	0.167	0.0121	0.0006
SIEMENS	-60	164.6	141.1	1	0.167	0.0121	0.0041
SIEMENS	-60	172.0	147.3	1	0.167	0.0121	0.0050
SIEMENS	-60	108.5	94.2	1	0.167	0.0121	0.0006
SIEMENS	-60	119.0	102.9	1	0.167	0.0121	0.0009
SIEMENS	-60	153.5	131.8	1	0.167	0.0121	0.0030
SIEMENS	-60	158.9	136.4	1	0.167	0.0121	0.0035
SIEMENS	-60	137.5	118.4	1	0.167	0.0121	0.0018
SIEMENS	-60	119.5	103.3	1	0.167	0.0121	0.0009
SIEMENS	-60	130.7	112.8	1	0.167	0.0121	0.0014
SIEMENS	-60	172.6	147.8	1	0.167	0.0121	0.0051
SIEMENS	-60	84.5	74.0	1	0.167	0.0121	0.0002
SIEMENS	-60	213.4	182.0	0	0.000	0.0000	0.0132
SIEMENS	-60	120.4	104.1	1	0.167	0.0121	0.0010
SIEMENS	-60	104.5	90.8	1	0.167	0.0121	0.0005
SIEMENS	-60	163.6	140.2	1	0.167	0.0121	0.0040
SIEMENS	-60	201.4	172.0	1	0.167	0.0121	0.0102
SIEMENS	-60	137.8	118.7	1	0.167	0.0121	0.0018
SIEMENS	-60	173.0	148.1	1	0.167	0.0121	0.0052
SIEMENS	-60	99.2	86.4	1	0.167	0.0121	0.0004
SIEMENS	-60	173.4	148.4	1	0.167	0.0121	0.0052
SIEMENS	-60	131.5	113.4	1	0.167	0.0121	0.0015
GKSS	-60	186.0	185.3	1	0.167	0.0121	0.0143
GKSS	-60	151.8	151.3	1	0.167	0.0121	0.0057
GKSS	-60	111.7	111.3	1	0.167	0.0121	0.0013
GKSS	-60	143.9	143.4	1	0.167	0.0121	0.0044
GKSS	-60	105.4	105.1	1	0.167	0.0121	0.0010
GKSS	-60	154.0	153.4	1	0.167	0.0121	0.0061
GKSS	-60	176.2	175.6	1	0.167	0.0121	0.0112
GKSS	-60	131.9	131.5	1	0.167	0.0121	0.0030
GKSS	-60	203.9	203.2	1	0.167	0.0121	0.0216
GKSS	-60	142.7	142.2	1	0.167	0.0121	0.0043
TWI	-60	134.5	134.0	1	0.167	0.0121	0.0032
TWI	-60	130.1	129.7	1	0.167	0.0121	0.0028
TWI	-60	142.6	142.1	1	0.167	0.0121	0.0043
TWI	-60	119.7	119.3	1	0.167	0.0121	0.0019
TWI	-60	141.3	140.8	1	0.167	0.0121	0.0041
TWI	-60	175.9	175.3	1	0.167	0.0121	0.0112
TWI	-60	119.6	119.2	1	0.167	0.0121	0.0019
TWI	-60	102.4	102.0	1	0.167	0.0121	0.0009
TWI	-60	99.0	98.7	1	0.167	0.0121	0.0007
TWI	-60	115.1	114.7	1	0.167	0.0121	0.0015
TWI	-60	172.9	172.3	1	0.167	0.0121	0.0103
TWI	-60	120.5	120.2	1	0.167	0.0121	0.0019
TWI	-60	165.2	164.6	1	0.167	0.0121	0.0084
TWI	-60	125.6	125.2	1	0.167	0.0121	0.0023
TWI	-60	126.7	126.3	1	0.167	0.0121	0.0025
TWI	-60	100.4	100.1	1	0.167	0.0121	0.0008
TWI	-60	131.1	130.7	1	0.167	0.0121	0.0029
TWI	-60	185.1	184.5	1	0.167	0.0121	0.0140
TWI	-60	163.6	163.0	1	0.167	0.0121	0.0080
TWI	-60	126.5	126.1	1	0.167	0.0121	0.0024
TWI	-60	164.7	164.1	1	0.167	0.0121	0.0083
TWI	-60	192.7	192.0	1	0.167	0.0121	0.0168
TWI	-60	134.5	134.1	1	0.167	0.0121	0.0032
TWI	-60	140.8	140.3	1	0.167	0.0121	0.0040
GKSS	-60	295.3	346.1	1	0.167	0.0121	0.2169
GKSS	-60	217.7	254.2	1	0.167	0.0121	0.0577
GKSS	-60	219.8	256.6	1	0.167	0.0121	0.0601
GKSS	-60	165.9	192.8	1	0.167	0.0121	0.0171
GKSS	-60	109.9	126.5	1	0.167	0.0121	0.0025
GKSS	-60	131.9	152.5	1	0.167	0.0121	0.0059
GKSS	-60	136.2	157.6	1	0.167	0.0121	0.0069
GKSS	-60	154.0	178.8	1	0.167	0.0121	0.0122
GKSS	-60	115.9	133.6	1	0.167	0.0121	0.0032
GKSS	-60	150.4	174.4	1	0.167	0.0121	0.0109
THA	-60	153.6	178.2	1	0.167	0.0121	0.0120
THA	-60	183.8	214.0	1	0.167	0.0121	0.0271

THA	-60	236.1	275.9	1	0.167	0.0121	0.0823
THA	-60	149.4	173.3	1	0.167	0.0121	0.0106
THA	-60	179.5	209.0	1	0.167	0.0121	0.0245
THA	-60	177.6	206.7	1	0.167	0.0121	0.0233
THA	-60	188.3	219.4	1	0.167	0.0121	0.0303
THA	-60	134.5	155.6	1	0.167	0.0121	0.0065
THA	-60	243.6	284.9	1	0.167	0.0121	0.0944
THA	-60	155.7	180.8	1	0.167	0.0121	0.0128
THA	-60	164.0	190.6	1	0.167	0.0121	0.0162
THA	-60	146.5	169.8	1	0.167	0.0121	0.0097
THA	-60	119.9	138.4	1	0.167	0.0121	0.0038
THA	-60	79.9	91.0	1	0.167	0.0121	0.0005
THA	-60	140.9	163.2	1	0.167	0.0121	0.0081
THA	-60	115.3	132.9	1	0.167	0.0121	0.0031
THA	-60	137.0	158.6	1	0.167	0.0121	0.0071
THA	-60	166.9	194.0	1	0.167	0.0121	0.0176
THA	-60	225.4	263.3	1	0.167	0.0121	0.0672
THA	-60	200.7	234.1	1	0.167	0.0121	0.0403

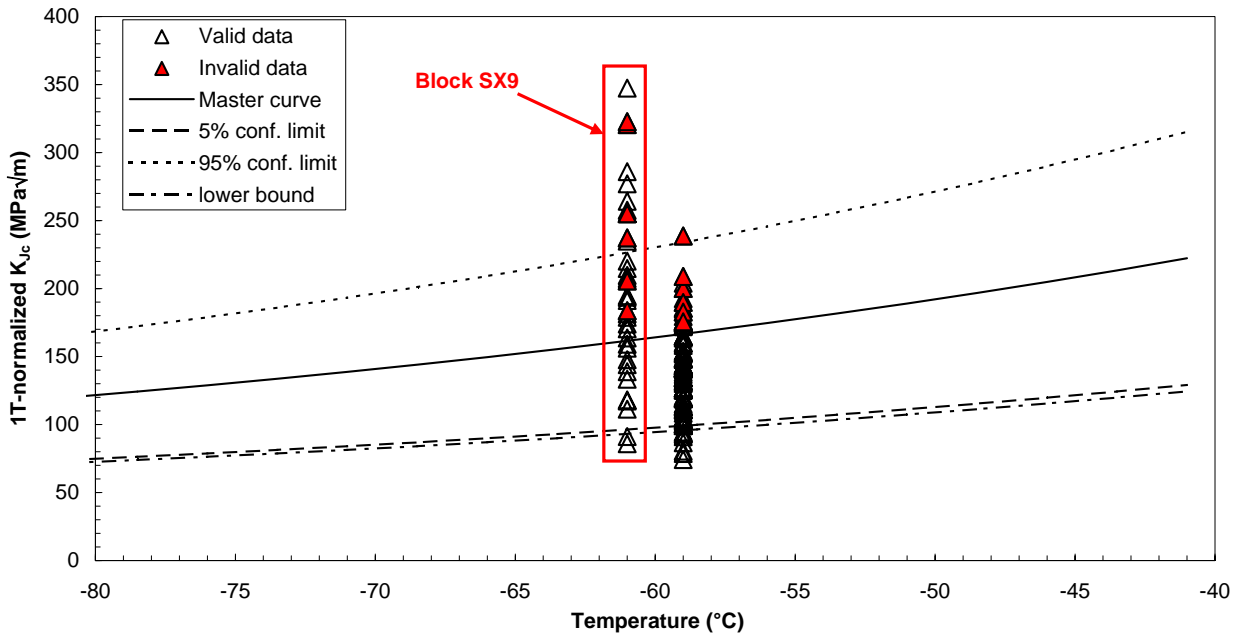
4. Master curve fit to data

Temperature adj. = 2.4 °C (est.) Stand. dev. on T_0 = 1.7 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-59	234.1	200.0				
-59	114.4	99.4				
-59	130.7	113.1				
-59	106.7	92.9				
-59	161.0	138.5				
-59	200.7	171.9				
-59	125.2	108.4				
-59	145.1	125.2				
-59	91.9	80.4				
-59	128.1	110.9				
-59	164.4	141.4				
-59	192.2	164.8				
-59	166.3	143.0				
-59	177.7	152.6				
-61	167.6	144.1				
-61	128.6	111.3				
-61	377.4	320.5				
-61	98.4	85.9				
-61	278.4	237.3				
-61	240.7	205.6				
-61	380.0	322.7				
-61	171.9	147.7				
-61	136.8	118.2				
-61	135.8	117.4				
-61	214.7	183.7				
-61	299.5	255.0				
-59	203.7	174.5				
-59	116.0	100.7				
-59	221.9	189.8				
-59	167.6	144.1				
-59	89.8	78.7				
-59	156.3	134.6				
-59	186.8	160.2				
-59	213.5	182.7				
-59	164.6	141.6				
-59	280.1	238.7				
-59	185.9	159.5				
-59	127.7	110.6				
-59	205.0	175.6				
-59	115.6	100.4				
-59	107.5	93.6				
-59	164.6	141.6				
-59	172.0	147.8				
-59	108.5	94.5				
-59	119.0	103.2				
-59	153.5	132.3				
-59	158.9	136.8				
-59	137.5	118.8				
-59	119.5	103.7				
-59	130.7	113.1				
-59	172.6	148.3				
-59	84.5	74.2				
-59	244.6	208.9				
-59	120.4	104.4				
-59	104.5	91.1				
-59	163.6	140.7				
-59	201.4	172.6				
-59	137.8	119.0				
-59	173.0	148.6				
-59	99.2	86.6				

-59	173.4	149.0				
-59	131.5	113.7				
-59	186.0	186.0				
-59	151.8	151.8				
-59	111.7	111.7				
-59	143.9	143.9				
-59	105.4	105.4				
-59	154.0	154.0				
-59	176.2	176.2				
-59	131.9	131.9				
-59	203.9	203.9				
-59	142.7	142.7				
-59	134.5	134.5				
-59	130.1	130.1				
-59	142.6	142.6				
-59	119.7	119.7				
-59	141.3	141.3				
-59	175.9	175.9				
-59	119.6	119.6				
-59	102.4	102.4				
-59	99.0	99.0				
-59	115.1	115.1				
-59	172.9	172.9				
-59	120.5	120.5				
-59	165.2	165.2				
-59	125.6	125.6				
-59	126.7	126.7				
-59	100.4	100.4				
-59	131.1	131.1				
-59	185.1	185.1				
-59	163.6	163.6				
-59	126.5	126.5				
-59	164.7	164.7				
-59	192.7	192.7				
-59	134.5	134.5				
-59	140.8	140.8				
-61	295.3	347.4				
-61	217.7	255.1				
-61	219.8	257.6				
-61	165.9	193.5				
-59	109.9	126.9				
-59	131.9	153.0				
-59	136.2	158.2				
-59	154.0	179.4				
-59	115.9	134.1				
-59	150.4	175.1				
-61	153.6	178.8				
-61	183.8	214.7				
-61	236.1	277.0				
-61	149.4	173.9				
-61	179.5	209.7				
-61	177.6	207.4				
-61	188.3	220.2				
-61	134.5	156.1				
-61	243.6	285.9				
-61	155.7	181.4				
-61	164.0	191.3				
-61	146.5	170.4				
-61	119.9	138.8				
-61	79.9	91.2				
-61	140.9	163.7				
-61	115.3	133.3				
-61	137.0	159.2				
-61	166.9	194.7				
-61	225.4	264.2				
-61	200.7	234.9				
-81			119.9	74.0	165.9	71.8
-78.5			124.3	76.3	172.3	74.0
-76			128.9	78.8	179.0	76.4
-73.5			133.7	81.4	186.0	78.9
-71			138.8	84.1	193.4	81.5
-68.5			144.1	87.0	201.1	84.2
-66			149.6	90.0	209.2	87.1
-63.5			155.4	93.1	217.7	90.1
-61			161.5	96.4	226.6	93.2
-58.5			167.9	99.9	236.0	96.5
-56			174.6	103.5	245.8	100.0
-53.5			181.7	107.3	256.0	103.6
-51			189.0	111.3	266.8	107.4
-48.5			196.8	115.5	278.1	111.4
-46			204.9	119.8	289.9	115.6
-43.5			213.4	124.4	302.4	120.0
-41			222.3	129.3	315.4	124.6

MASTER CURVE FOR 1TCT WITH CONFIDENCE LIMITS (E1921-05 analysis)
EURO toughness dataset - Dataset -60 °C (including SX9)



MASTER CURVE ANALYSIS OF RANDOM INHOMOGENEITIES

Single Point Estimation Method

Step 2: Single point estimation

1. Calculation of the maximum value of T_0 (based on a single data point) and establishment of T_0 for the data set

Specimen code	T (°C)	$K_{Jc[exp]}$ (MPa√m)	K_{Jc-1T} (MPa√m)	$K_{analysis}$ (MPa√m)	δ_i	$T_{o(i)}$ (°C)
GKSS	-60	234.1	199.3	175.4	0	-
GKSS	-60	114.4	99.1	99.1	1	-59
GKSS	-60	130.7	112.7	112.7	1	-69
GKSS	-60	106.7	92.6	92.6	1	-54
GKSS	-60	161.0	138.1	138.1	1	-83
GKSS	-60	200.7	171.3	171.3	1	-97
GKSS	-60	125.2	108.1	108.1	1	-66
GKSS	-60	145.1	124.8	124.8	1	-76
GKSS	-60	91.9	80.2	80.2	1	-43
GKSS	-60	128.1	110.6	110.6	1	-67
GKSS	-60	164.4	140.9	140.9	1	-84
GKSS	-60	192.2	164.3	164.3	1	-94
GKSS	-60	166.3	142.5	142.5	1	-85
GKSS	-60	177.7	152.1	152.1	1	-89
GKSS	-60	167.6	143.6	143.6	1	-85
GKSS	-60	128.6	110.9	110.9	1	-68
GKSS	-60	377.4	319.3	173.3	0	-
GKSS	-60	98.4	85.7	85.7	1	-48
GKSS	-60	278.4	236.4	173.5	0	-
GKSS	-60	240.7	204.9	173.0	0	-
GKSS	-60	380.0	321.5	172.1	0	-
GKSS	-60	171.9	147.2	147.2	1	-87
GKSS	-60	136.8	117.8	117.8	1	-72
GKSS	-60	135.8	117.0	117.0	1	-71
GKSS	-60	214.7	183.1	171.4	0	-
GKSS	-60	299.5	254.1	173.1	0	-
GKSS	-60	203.7	173.9	172.5	0	-
GKSS	-60	116.0	100.4	100.4	1	-60
GKSS	-60	221.9	189.1	172.5	0	-
GKSS	-60	167.6	143.6	143.6	1	-85
GKSS	-60	89.8	78.5	78.5	1	-41
GKSS	-60	156.3	134.1	134.1	1	-81
GKSS	-60	186.8	159.7	159.7	1	-92
GKSS	-60	213.5	182.1	173.4	0	-
GKSS	-60	164.6	141.1	141.1	1	-84
GKSS	-60	280.1	237.9	173.0	0	-
GKSS	-60	185.9	159.0	159.0	1	-92
GKSS	-60	127.7	110.2	110.2	1	-67
GKSS	-60	205.0	175.0	171.7	0	-
GKSS	-60	115.6	100.0	100.0	1	-60
GKSS	-60	107.5	93.3	93.3	1	-55
SIEMENS	-60	164.6	141.1	141.1	1	-84
SIEMENS	-60	172.0	147.3	147.3	1	-87
SIEMENS	-60	108.5	94.2	94.2	1	-55
SIEMENS	-60	119.0	102.9	102.9	1	-62
SIEMENS	-60	153.5	131.8	131.8	1	-80
SIEMENS	-60	158.9	136.4	136.4	1	-82
SIEMENS	-60	137.5	118.4	118.4	1	-72
SIEMENS	-60	119.5	103.3	103.3	1	-62
SIEMENS	-60	130.7	112.8	112.8	1	-69
SIEMENS	-60	172.6	147.8	147.8	1	-87
SIEMENS	-60	84.5	74.0	74.0	1	-36
SIEMENS	-60	244.6	208.1	182.0	0	-
SIEMENS	-60	120.4	104.1	104.1	1	-63
SIEMENS	-60	104.5	90.8	90.8	1	-53
SIEMENS	-60	163.6	140.2	140.2	1	-84
SIEMENS	-60	201.4	172.0	172.0	1	-97
SIEMENS	-60	137.8	118.7	118.7	1	-72
SIEMENS	-60	173.0	148.1	148.1	1	-88
SIEMENS	-60	99.2	86.4	86.4	1	-49
SIEMENS	-60	173.4	148.4	148.4	1	-88
SIEMENS	-60	131.5	113.4	113.4	1	-69
GKSS	-60	186.0	185.3	185.3	1	-102
GKSS	-60	151.8	151.3	151.3	1	-89
GKSS	-60	111.7	111.3	111.3	1	-68
GKSS	-60	143.9	143.4	143.4	1	-85
GKSS	-60	105.4	105.1	105.1	1	-64
GKSS	-60	154.0	153.4	153.4	1	-90
GKSS	-60	176.2	175.6	175.6	1	-99
GKSS	-60	131.9	131.5	131.5	1	-80

$T_{0(SP)} = -87.2 \text{ } ^\circ\text{C}$

$\sigma_{T0(SP)} = 0 \text{ } ^\circ\text{C}$

(*) $K_{Jc-1T} < 30 \text{ MPa}\sqrt{\text{m}}$

GKSS	-60	203.9	203.2	203.2	1	-108
GKSS	-60	142.7	142.2	142.2	1	-85
TWI	-60	134.5	134.0	134.0	1	-81
TWI	-60	130.1	129.7	129.7	1	-79
TWI	-60	142.6	142.1	142.1	1	-85
TWI	-60	119.7	119.3	119.3	1	-73
TWI	-60	141.3	140.8	140.8	1	-84
TWI	-60	175.9	175.3	175.3	1	-98
TWI	-60	119.6	119.2	119.2	1	-73
TWI	-60	102.4	102.0	102.0	1	-62
TWI	-60	99.0	98.7	98.7	1	-59
TWI	-60	115.1	114.7	114.7	1	-70
TWI	-60	172.9	172.3	172.3	1	-97
TWI	-60	120.5	120.2	120.2	1	-73
TWI	-60	165.2	164.6	164.6	1	-94
TWI	-60	125.6	125.2	125.2	1	-76
TWI	-60	126.7	126.3	126.3	1	-77
TWI	-60	100.4	100.1	100.1	1	-60
TWI	-60	131.1	130.7	130.7	1	-79
TWI	-60	185.1	184.5	184.5	1	-102
TWI	-60	163.6	163.0	163.0	1	-94
TWI	-60	126.5	126.1	126.1	1	-77
TWI	-60	164.7	164.1	164.1	1	-94
TWI	-60	192.7	192.0	192.0	1	-104
TWI	-60	134.5	134.1	134.1	1	-81
TWI	-60	140.8	140.3	140.3	1	-84
GKSS	-60	295.3	346.1	346.1	1	-139
GKSS	-60	217.7	254.2	254.2	1	-121
GKSS	-60	219.8	256.6	256.6	1	-122
GKSS	-60	165.9	192.8	192.8	1	-104
GKSS	-60	109.9	126.5	126.5	1	-77
GKSS	-60	131.9	152.5	152.5	1	-89
GKSS	-60	136.2	157.6	157.6	1	-92
GKSS	-60	154.0	178.8	178.8	1	-100
GKSS	-60	115.9	133.6	133.6	1	-81
GKSS	-60	150.4	174.4	174.4	1	-98
THA	-60	153.6	178.2	178.2	1	-99
THA	-60	183.8	214.0	214.0	1	-111
THA	-60	236.1	275.9	275.9	1	-126
THA	-60	149.4	173.3	173.3	1	-98
THA	-60	179.5	209.0	209.0	1	-109
THA	-60	177.6	206.7	206.7	1	-109
THA	-60	188.3	219.4	219.4	1	-112
THA	-60	134.5	155.6	155.6	1	-91
THA	-60	243.6	284.9	284.9	1	-128
THA	-60	155.7	180.8	180.8	1	-100
THA	-60	164.0	190.6	190.6	1	-104
THA	-60	146.5	169.8	169.8	1	-96
THA	-60	119.9	138.4	138.4	1	-83
THA	-60	79.9	91.0	91.0	1	-53
THA	-60	140.9	163.2	163.2	1	-94
THA	-60	115.3	132.9	132.9	1	-80
THA	-60	137.0	158.6	158.6	1	-92
THA	-60	166.9	194.0	194.0	1	-105
THA	-60	225.4	263.3	263.3	1	-123

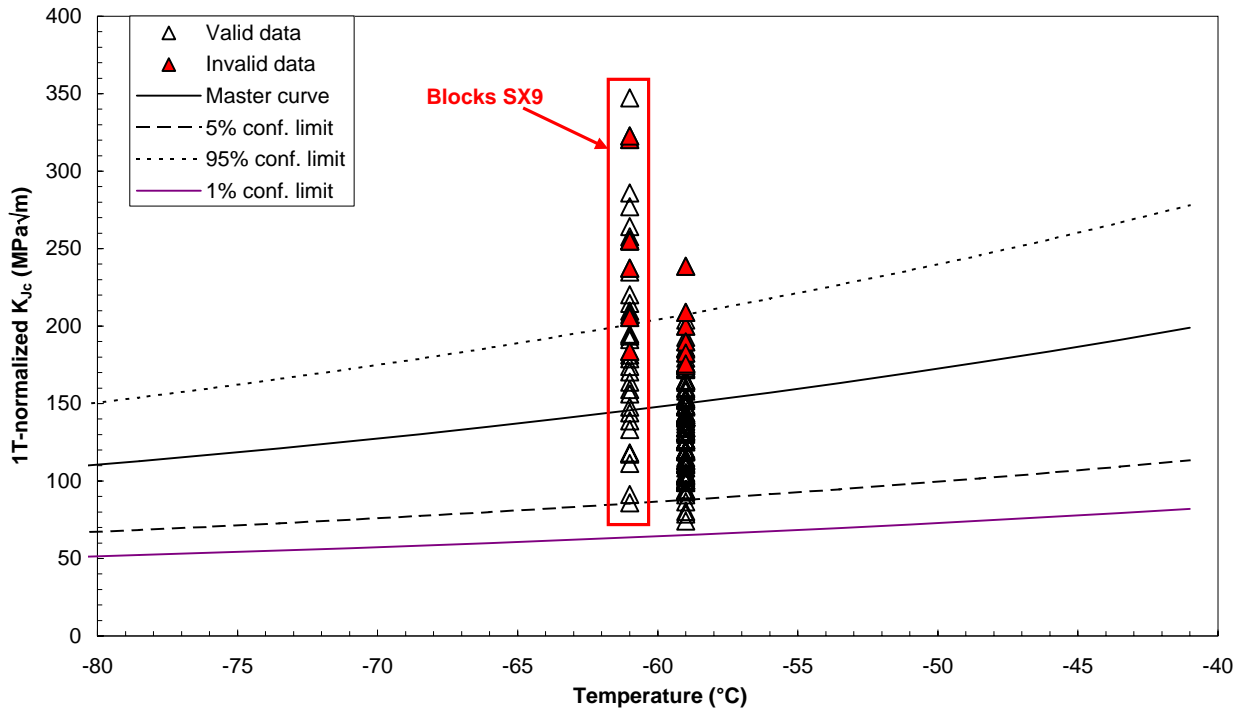
2. Revised Master Curve fit to data

<i>T</i> (°C)	<i>K_{Jc(exp)}</i> (MPa √m)	<i>K_{Jc(1T)}</i> (MPa √m)	<i>K_{MC(1T)}</i> (MPa √m)	5% conf. (MPa √m)	95% conf. (MPa √m)	5% L.B. (MPa √m)
-59	234.1	200.0				
-59	114.4	99.4				
-59	130.7	113.1				
-59	106.7	92.9				
-59	161.0	138.5				
-59	200.7	171.9				
-59	125.2	108.4				
-59	145.1	125.2				
-59	91.9	80.4				
-59	128.1	110.9				
-59	164.4	141.4				
-59	192.2	164.8				
-59	166.3	143.0				
-59	177.7	152.6				
-61	167.6	144.1				
-61	128.6	111.3				

-61	377.4	320.5
-61	98.4	85.9
-61	278.4	237.3
-61	240.7	205.6
-61	380.0	322.7
-61	171.9	147.7
-61	136.8	118.2
-61	135.8	117.4
-61	214.7	183.7
-61	299.5	255.0
-59	203.7	174.5
-59	116.0	100.7
-59	221.9	189.8
-59	167.6	144.1
-59	89.8	78.7
-59	156.3	134.6
-59	186.8	160.2
-59	213.5	182.7
-59	164.6	141.6
-59	280.1	238.7
-59	185.9	159.5
-59	127.7	110.6
-59	205.0	175.6
-59	115.6	100.4
-59	107.5	93.6
-59	164.6	141.6
-59	172.0	147.8
-59	108.5	94.5
-59	119.0	103.2
-59	153.5	132.3
-59	158.9	136.8
-59	137.5	118.8
-59	119.5	103.7
-59	130.7	113.1
-59	172.6	148.3
-59	84.5	74.2
-59	244.6	208.9
-59	120.4	104.4
-59	104.5	91.1
-59	163.6	140.7
-59	201.4	172.6
-59	137.8	119.0
-59	173.0	148.6
-59	99.2	86.6
-59	173.4	149.0
-59	131.5	113.7
-59	186.0	186.0
-59	151.8	151.8
-59	111.7	111.7
-59	143.9	143.9
-59	105.4	105.4
-59	154.0	154.0
-59	176.2	176.2
-59	131.9	131.9
-59	203.9	203.9
-59	142.7	142.7
-59	134.5	134.5
-59	130.1	130.1
-59	142.6	142.6
-59	119.7	119.7
-59	141.3	141.3
-59	175.9	175.9
-59	119.6	119.6
-59	102.4	102.4
-59	99.0	99.0
-59	115.1	115.1
-59	172.9	172.9
-59	120.5	120.5
-59	165.2	165.2
-59	125.6	125.6

-59	126.7	126.7				
-59	100.4	100.4				
-59	131.1	131.1				
-59	185.1	185.1				
-59	163.6	163.6				
-59	126.5	126.5				
-59	164.7	164.7				
-59	192.7	192.7				
-59	134.5	134.5				
-59	140.8	140.8				
-61	295.3	347.4				
-61	217.7	255.1				
-61	219.8	257.6				
-61	165.9	193.5				
-59	109.9	126.9				
-59	131.9	153.0				
-59	136.2	158.2				
-59	154.0	179.4				
-59	115.9	134.1				
-59	150.4	175.1				
-61	153.6	178.8				
-61	183.8	214.7				
-61	236.1	277.0				
-61	149.4	173.9				
-61	179.5	209.7				
-61	177.6	207.4				
-61	188.3	220.2				
-61	134.5	156.1				
-61	243.6	285.9				
-61	155.7	181.4				
-61	164.0	191.3				
-61	146.5	170.4				
-61	119.9	138.8				
-61	79.9	91.2				
-61	140.9	163.7				
-61	115.3	133.3				
-61	137.0	159.2				
-61	166.9	194.7				
-61	225.4	264.2				
-61	200.7	234.9				
-81			109.1	66.4	148.4	50.9
-78.5			112.9	68.5	153.9	52.2
-76			116.9	70.6	159.8	53.6
-73.5			121.2	72.8	165.9	55.1
-71			125.6	75.1	172.2	56.6
-68.5			130.2	77.5	178.9	58.3
-66			135.1	80.0	186.0	59.9
-63.5			140.2	82.7	193.3	61.7
-61			145.6	85.5	201.1	63.6
-58.5			151.2	88.4	209.2	65.5
-56			157.1	91.5	217.7	67.6
-53.5			163.3	94.7	226.6	69.7
-51			169.8	98.1	235.9	72.0
-48.5			176.6	101.7	245.7	74.3
-46			183.7	105.4	256.0	76.8
-43.5			191.2	109.3	266.8	79.4
-41			199.0	113.4	278.1	82.1

MASTER CURVE WITH CONFIDENCE LIMITS - Single Point Estimation Method
EURO toughness dataset - Dataset -60 °C (including SX9)



Calculation name: EURO - Data -60 °C incl SX9			
Data set length:	126	Submitted on:	2006-Oct-26 16:58:41
Data set limit:	max. allowed	Calculation time:	2.14 seconds

Master Curve results (Version 1.1.2.0)

1. Master Curve analysis of homogeneous material (ASTM E1921-05)

Reference temperature T_0 (°C)	-94.2
One standard deviation on T_0 (°C)	1.7
$K_{Jc,1T,med.,eq}$ (MPaVm)	164.0
Left temperature window (°C)	-144.2
Right temperature window (°C)	-44.2
Number of data	126
Number of data outside the temperature window	0
Number of valid data, r	113
Sum of n_i	18.83
Sum of \ln of probability density	-622.99

Minimum number of specimen satisfied

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-144.2	32.9	39.4	57.2	73.6	79.7
-137.0	34.3	41.5	61.2	79.3	86.1
-129.9	35.9	43.8	65.7	85.9	93.3
-122.8	37.6	46.5	70.9	93.3	101.7
-115.6	39.7	49.6	76.8	101.9	111.2
-108.5	42.1	53.2	83.6	111.7	122.1
-101.3	44.8	57.2	91.4	122.9	134.6
-94.2	47.9	61.9	100.3	135.8	148.9
-87.0	51.4	67.2	110.5	150.5	165.3
-79.9	55.5	73.3	122.2	167.4	184.1
-72.8	60.1	80.3	135.6	186.7	205.6
-65.6	65.4	88.3	150.9	208.8	230.2
-58.5	71.5	97.5	168.5	234.1	258.4
-51.3	78.5	108.0	188.6	263.2	290.8
-44.2	86.5	120.0	211.7	296.4	327.8

2. Bi-modal Master Curve analysis for data set suspected to contains two populations

Reference temperature population A, T_a	-83.3 °C
One standard deviation on T_a	2.2 °C
Reference temperature population B, T_b	-114.2 °C
One standard deviation on T_b	5.8 °C
Likelihood to be from population A, p_a	0.81
One standard deviation on p_a	0.0
Left temperature window (°C)	-164.2
Right temperature window(°C)	-33.3
Number of data	126
Number of data outside the temperature window	0
Number of valid data, r	113
Sum of \ln of probability density	-598.29

This dataset is likely not homogeneous

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-164.2	29.1	33.7	46.5	63.9	73.3
-154.8	30.1	35.3	49.7	70.0	80.9
-145.5	31.4	37.2	53.5	77.4	89.9
-136.1	33.0	39.5	58.0	86.2	100.7
-126.8	34.8	42.2	63.3	96.7	113.6
-117.4	37.0	45.5	69.7	109.3	129.0
-108.1	39.6	49.4	77.4	124.4	147.4
-98.7	42.7	54.1	86.5	142.4	169.4
-89.4	46.4	59.6	97.4	163.9	195.7
-80.0	50.8	66.3	110.4	189.5	227.0
-70.7	56.1	74.2	125.9	220.2	264.4
-61.3	62.4	83.7	144.5	256.8	309.1
-52.0	69.9	95.1	166.6	300.6	362.6
-42.6	78.9	108.6	193.1	352.8	426.4
-33.3	89.6	124.8	224.7	415.2	502.5

3. Master Curve analysis for data set suspected to be randomly inhomogeneous

Mean reference temperature, T	-88.2 °C
One standard deviation on the mean T	13.5 °C
Left temperature window(°C)	-165.2
Right temperature window(°C)	-11.1
Number of data	126
Number of data outside the temperature window	0
Number of valid data, r	113
Sum of ln of probability density	-599.63

This dataset is likely not homogeneous

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-165.2	28.8	33.2	46.1	61.8	69.8
-154.2	30.0	35.0	49.8	68.4	78.0
-143.2	31.4	37.2	54.4	76.6	88.2
-132.2	33.2	39.9	60.0	86.6	100.8
-121.2	35.4	43.2	67.0	99.0	116.2
-110.2	38.0	47.2	75.5	114.3	135.3
-99.2	41.4	52.2	86.0	133.2	158.9
-88.2	45.4	58.4	99.0	156.4	187.9
-77.2	50.4	66.0	115.0	185.1	223.7
-66.1	56.5	75.3	134.6	220.4	267.8
-55.1	64.1	86.8	158.9	264.0	322.2
-44.1	73.5	100.9	188.9	317.7	389.3
-33.1	85.0	118.4	225.8	383.9	471.9
-22.1	99.1	139.9	271.3	465.6	573.8
-11.1	116.6	166.4	327.3	566.2	699.4

ANNEX 5

Master Curve analyses performed
on tests performed at -60 °C
(excluding block SX9)

**STANDARD TEST METHOD FOR THE DETERMINATION OF REFERENCE TEMPERATURE
T₀ FOR FERRITIC STEELS IN THE TRANSITION RANGE**

[MULTI-TEMPERATURE APPROACH - IN ACCORDANCE WITH ASTM E1921-05]

1. Material characteristics

Material specifications : **EURO toughness data set - Dataset at -60 °C (excluding SX9)**

2. Dimensional and crack growth requirements

Testing lab	T (°C)	a ₀ (mm)	W (mm)	B (mm)	b ₀ (mm)	Δa (mm)	K _{Jc[exp]} (MPa√m)	σ _{ys} (MPa)	E' (GPa)	K _{lim} (MPa√m)	DATA VALID	K _{Jc[calc]} (MPa√m)
GKSS	-60	14.19	25	12.5	10.81	0.05	234.1	506.4	231.4	205.5	NO	205.5
GKSS	-60	14.16	25	12.5	10.84	0.00	114.4	506.4	231.4	205.8	YES	114.4
GKSS	-60	14.31	25	12.5	10.69	0.00	130.7	506.4	231.4	204.4	YES	130.7
GKSS	-60	14.13	25	12.5	10.87	0.00	106.7	506.4	231.4	206.1	YES	106.7
GKSS	-60	14.08	25	12.5	10.92	0.00	161.0	506.4	231.4	206.5	YES	161.0
GKSS	-60	13.58	25	12.5	11.42	0.00	200.7	506.4	231.4	211.2	YES	200.7
GKSS	-60	14.26	25	12.5	10.74	0.00	125.2	506.4	231.4	204.8	YES	125.2
GKSS	-60	14.19	25	12.5	10.81	0.00	145.1	506.4	231.4	205.5	YES	145.1
GKSS	-60	14.00	25	12.5	11.00	0.00	91.9	506.4	231.4	207.3	YES	91.9
GKSS	-60	13.94	25	12.5	11.06	0.00	128.1	506.4	231.4	207.9	YES	128.1
GKSS	-60	14.59	25	12.5	10.41	0.00	164.4	506.4	231.4	201.7	YES	164.4
GKSS	-60	14.53	25	12.5	10.47	0.00	192.2	506.4	231.4	202.2	YES	192.2
GKSS	-60	14.76	25	12.5	10.24	0.00	166.3	506.4	231.4	200.0	YES	166.3
GKSS	-60	14.48	25	12.5	10.52	0.00	177.7	506.4	231.4	202.7	YES	177.7
GKSS	-60	14.55	25	12.5	10.45	0.00	203.7	506.4	231.4	202.0	NO	202.0
GKSS	-60	14.46	25	12.5	10.54	0.00	116.0	506.4	231.4	202.9	YES	116.0
GKSS	-60	14.55	25	12.5	10.45	0.11	221.9	506.4	231.4	202.0	NO	202.0
GKSS	-60	14.77	25	12.5	10.23	0.00	167.6	506.4	231.4	199.9	YES	167.6
GKSS	-60	14.35	25	12.5	10.65	0.00	89.8	506.4	231.4	204.0	YES	89.8
GKSS	-60	14.56	25	12.5	10.44	0.00	156.3	506.4	231.4	201.9	YES	156.3
GKSS	-60	14.49	25	12.5	10.51	0.00	186.8	506.4	231.4	202.6	YES	186.8
GKSS	-60	14.43	25	12.5	10.57	0.00	213.5	506.4	231.4	203.2	NO	203.2
GKSS	-60	14.39	25	12.5	10.61	0.00	164.6	506.4	231.4	203.6	YES	164.6
GKSS	-60	14.49	25	12.5	10.51	0.28	280.1	506.4	231.4	202.6	NO	202.6
GKSS	-60	14.43	25	12.5	10.57	0.00	185.9	506.4	231.4	203.2	YES	185.9
GKSS	-60	14.85	25	12.5	10.15	0.00	127.7	506.4	231.4	199.1	YES	127.7
GKSS	-60	14.64	25	12.5	10.36	0.00	205.0	506.4	231.4	201.2	NO	201.2
GKSS	-60	14.25	25	12.5	10.75	0.00	115.6	506.4	231.4	204.9	YES	115.6
GKSS	-60	14.44	25	12.5	10.56	0.00	107.5	506.4	231.4	203.1	YES	107.5
SIEMENS	-60	13.24	25	12.5	11.76	0.00	164.6	506.4	231.4	214.3	YES	164.6
SIEMENS	-60	13.29	25	12.5	11.71	0.00	172.0	506.4	231.4	213.9	YES	172.0
SIEMENS	-60	13.24	25	12.5	11.76	0.00	108.5	506.4	231.4	214.3	YES	108.5
SIEMENS	-60	13.28	25	12.5	11.72	0.00	119.0	506.4	231.4	214.0	YES	119.0
SIEMENS	-60	13.26	25	12.5	11.74	0.00	153.5	506.4	231.4	214.2	YES	153.5
SIEMENS	-60	13.22	25	12.5	11.78	0.00	158.9	506.4	231.4	214.5	YES	158.9
SIEMENS	-60	13.27	25	12.5	11.73	0.00	137.5	506.4	231.4	214.1	YES	137.5
SIEMENS	-60	13.18	25	12.5	11.82	0.00	119.5	506.4	231.4	214.9	YES	119.5
SIEMENS	-60	13.18	25	12.5	11.82	0.00	130.7	506.4	231.4	214.9	YES	130.7
SIEMENS	-60	13.24	25	12.5	11.76	0.00	172.6	506.4	231.4	214.3	YES	172.6
SIEMENS	-60	13.24	25	12.5	11.76	0.00	84.5	506.4	231.4	214.3	YES	84.5
SIEMENS	-60	13.34	25	12.5	11.66	0.00	244.6	506.4	231.4	213.4	NO	213.4
SIEMENS	-60	13.20	25	12.5	11.80	0.00	120.4	506.4	231.4	214.7	YES	120.4
SIEMENS	-60	13.31	25	12.5	11.69	0.00	104.5	506.4	231.4	213.7	YES	104.5
SIEMENS	-60	13.23	25	12.5	11.77	0.00	163.6	506.4	231.4	214.4	YES	163.6
SIEMENS	-60	13.28	25	12.5	11.72	0.00	201.4	506.4	231.4	214.0	YES	201.4
SIEMENS	-60	13.20	25	12.5	11.80	0.00	137.8	506.4	231.4	214.7	YES	137.8
SIEMENS	-60	13.19	25	12.5	11.81	0.00	173.0	506.4	231.4	214.8	YES	173.0
SIEMENS	-60	13.22	25	12.5	11.78	0.00	99.2	506.4	231.4	214.5	YES	99.2
SIEMENS	-60	13.22	25	12.5	11.78	0.00	173.4	506.4	231.4	214.5	YES	173.4
SIEMENS	-60	13.29	25	12.5	11.71	0.00	131.5	506.4	231.4	213.9	YES	131.5
GKSS	-60	28.06	50	25.0	21.94	0.00	186.0	506.4	231.4	292.8	YES	186.0
GKSS	-60	27.75	50	25.0	22.25	0.00	151.8	506.4	231.4	294.8	YES	151.8
GKSS	-60	27.62	50	25.0	22.38	0.00	111.7	506.4	231.4	295.7	YES	111.7
GKSS	-60	27.65	50	25.0	22.35	0.00	143.9	506.4	231.4	295.5	YES	143.9
GKSS	-60	27.71	50	25.0	22.29	0.00	105.4	506.4	231.4	295.1	YES	105.4
GKSS	-60	28.01	50	25.0	21.99	0.00	154.0	506.4	231.4	293.1	YES	154.0
GKSS	-60	27.97	50	25.0	22.03	0.00	176.2	506.4	231.4	293.4	YES	176.2
GKSS	-60	27.51	50	25.0	22.49	0.00	131.9	506.4	231.4	296.4	YES	131.9
GKSS	-60	27.86	50	25.0	22.14	0.00	203.9	506.4	231.4	294.1	YES	203.9
GKSS	-60	27.51	50	25.0	22.49	0.00	142.7	506.4	231.4	296.4	YES	142.7
TWI	-60	27.42	50	25.0	22.58	0.06	134.5	506.4	231.4	297.0	YES	134.5
TWI	-60	27.43	50	25.0	22.57	0.00	130.1	506.4	231.4	296.9	YES	130.1
TWI	-60	27.62	50	25.0	22.38	0.07	142.6	506.4	231.4	295.7	YES	142.6
TWI	-60	27.47	50	25.0	22.53	0.05	119.7	506.4	231.4	296.7	YES	119.7
TWI	-60	27.49	50	25.0	22.51	0.07	141.3	506.4	231.4	296.5	YES	141.3
TWI	-60	27.95	50	25.0	22.05	0.10	175.9	506.4	231.4	293.5	YES	175.9
TWI	-60	27.62	50	25.0	22.38	0.00	119.6	506.4	231.4	295.7	YES	119.6
TWI	-60	27.65	50	25.0	22.35	0.00	102.4	506.4	231.4	295.5	YES	102.4
TWI	-60	27.68	50	25.0	22.32	0.00	99.0	506.4	231.4	295.3	YES	99.0
TWI	-60	27.82	50	25.0	22.18	0.05	115.1	506.4	231.4	294.4	YES	115.1
TWI	-60	27.98	50	25.0	22.02	0.11	172.9	506.4	231.4	293.3	YES	172.9

TWI	-60	27.72	50	25.0	22.28	0.03	120.5	506.4	231.4	295.0	YES	120.5
TWI	-60	27.48	50	25.0	22.52	0.00	165.2	506.4	231.4	296.6	YES	165.2
TWI	-60	27.54	50	25.0	22.46	0.00	125.6	506.4	231.4	296.2	YES	125.6
TWI	-60	27.88	50	25.0	22.12	0.05	126.7	506.4	231.4	294.0	YES	126.7
TWI	-60	27.79	50	25.0	22.21	0.00	100.4	506.4	231.4	294.6	YES	100.4
TWI	-60	27.56	50	25.0	22.44	0.05	131.1	506.4	231.4	296.1	YES	131.1
TWI	-60	27.58	50	25.0	22.42	0.06	185.1	506.4	231.4	295.9	YES	185.1
TWI	-60	27.59	50	25.0	22.41	0.09	163.6	506.4	231.4	295.9	YES	163.6
TWI	-60	27.68	50	25.0	22.32	0.09	126.5	506.4	231.4	295.3	YES	126.5
TWI	-60	27.65	50	25.0	22.35	0.10	164.7	506.4	231.4	295.5	YES	164.7
TWI	-60	27.73	50	25.0	22.27	0.16	192.7	506.4	231.4	294.9	YES	192.7
TWI	-60	27.65	50	25.0	22.35	0.05	134.5	506.4	231.4	295.5	YES	134.5
TWI	-60	27.86	50	25.0	22.14	0.05	140.8	506.4	231.4	294.1	YES	140.8
GKSS	-60	57.56	100	50.0	42.44	0.00	109.9	506.4	231.4	407.2	YES	109.9
GKSS	-60	56.69	100	50.0	43.31	0.00	131.9	506.4	231.4	411.3	YES	131.9
GKSS	-60	56.69	100	50.0	43.31	0.00	136.2	506.4	231.4	411.3	YES	136.2
GKSS	-60	56.51	100	50.0	43.49	0.00	154.0	506.4	231.4	412.2	YES	154.0
GKSS	-60	56.15	100	50.0	43.85	0.00	115.9	506.4	231.4	413.9	YES	115.9
GKSS	-60	55.96	100	50.0	44.04	0.00	150.4	506.4	231.4	414.8	YES	150.4

3. Application of the multi-temperature approach for the calculation of the reference temperature

T limits

Specimen code	T (°C)	$K_{Jc[calc]}$ (MPa√m)	$K_{Jc(1T)}$ (MPa√m)	δ_i	n_i	1° member	2° member
GKSS	-60	205.5	175.4	0	0.000	0.0000	0.0251
GKSS	-60	114.4	99.1	1	0.167	0.0119	0.0017
GKSS	-60	130.7	112.7	1	0.167	0.0119	0.0032
GKSS	-60	106.7	92.6	1	0.167	0.0119	0.0012
GKSS	-60	161.0	138.1	1	0.167	0.0119	0.0084
GKSS	-60	200.7	171.3	1	0.167	0.0119	0.0226
GKSS	-60	125.2	108.1	1	0.167	0.0119	0.0026
GKSS	-60	145.1	124.8	1	0.167	0.0119	0.0052
GKSS	-60	91.9	80.2	1	0.167	0.0119	0.0006
GKSS	-60	128.1	110.6	1	0.167	0.0119	0.0029
GKSS	-60	164.4	140.9	1	0.167	0.0119	0.0092
GKSS	-60	192.2	164.3	1	0.167	0.0119	0.0186
GKSS	-60	166.3	142.5	1	0.167	0.0119	0.0097
GKSS	-60	177.7	152.1	1	0.167	0.0119	0.0131
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0233
GKSS	-60	116.0	100.4	1	0.167	0.0119	0.0018
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0233
GKSS	-60	167.6	143.6	1	0.167	0.0119	0.0100
GKSS	-60	89.8	78.5	1	0.167	0.0119	0.0005
GKSS	-60	156.3	134.1	1	0.167	0.0119	0.0073
GKSS	-60	186.8	159.7	1	0.167	0.0119	0.0164
GKSS	-60	203.2	173.4	0	0.000	0.0000	0.0238
GKSS	-60	164.6	141.1	1	0.167	0.0119	0.0093
GKSS	-60	202.6	173.0	0	0.000	0.0000	0.0235
GKSS	-60	185.9	159.0	1	0.167	0.0119	0.0160
GKSS	-60	127.7	110.2	1	0.167	0.0119	0.0029
GKSS	-60	201.2	171.7	0	0.000	0.0000	0.0228
GKSS	-60	115.6	100.0	1	0.167	0.0119	0.0018
GKSS	-60	107.5	93.3	1	0.167	0.0119	0.0012
SIEMENS	-60	164.6	141.1	1	0.167	0.0119	0.0093
SIEMENS	-60	172.0	147.3	1	0.167	0.0119	0.0113
SIEMENS	-60	108.5	94.2	1	0.167	0.0119	0.0013
SIEMENS	-60	119.0	102.9	1	0.167	0.0119	0.0020
SIEMENS	-60	153.5	131.8	1	0.167	0.0119	0.0067
SIEMENS	-60	158.9	136.4	1	0.167	0.0119	0.0079
SIEMENS	-60	137.5	118.4	1	0.167	0.0119	0.0040
SIEMENS	-60	119.5	103.3	1	0.167	0.0119	0.0021
SIEMENS	-60	130.7	112.8	1	0.167	0.0119	0.0032
SIEMENS	-60	172.6	147.8	1	0.167	0.0119	0.0115
SIEMENS	-60	84.5	74.0	1	0.167	0.0119	0.0004
SIEMENS	-60	213.4	182.0	0	0.000	0.0000	0.0296
SIEMENS	-60	120.4	104.1	1	0.167	0.0119	0.0021
SIEMENS	-60	104.5	90.8	1	0.167	0.0119	0.0011
SIEMENS	-60	163.6	140.2	1	0.167	0.0119	0.0090
SIEMENS	-60	201.4	172.0	1	0.167	0.0119	0.0229
SIEMENS	-60	137.8	118.7	1	0.167	0.0119	0.0041
SIEMENS	-60	173.0	148.1	1	0.167	0.0119	0.0116
SIEMENS	-60	99.2	86.4	1	0.167	0.0119	0.0008
SIEMENS	-60	173.4	148.4	1	0.167	0.0119	0.0117
SIEMENS	-60	131.5	113.4	1	0.167	0.0119	0.0033
GKSS	-60	186.0	185.3	1	0.167	0.0119	0.0321
GKSS	-60	151.8	151.3	1	0.167	0.0119	0.0128
GKSS	-60	111.7	111.3	1	0.167	0.0119	0.0030
GKSS	-60	143.9	143.4	1	0.167	0.0119	0.0100
GKSS	-60	105.4	105.1	1	0.167	0.0119	0.0023
GKSS	-60	154.0	153.4	1	0.167	0.0119	0.0136
GKSS	-60	176.2	175.6	1	0.167	0.0119	0.0252
GKSS	-60	131.9	131.5	1	0.167	0.0119	0.0066
GKSS	-60	203.9	203.2	1	0.167	0.0119	0.0484

USE LIMITS : YES

-132
-32

Sum of 1° member: 0.986

Sum of 2° member: 0.986

Difference: 0.000

$T_o = -82.4 \text{ °C}$
(valid per ASTM E1921)

$\sum n_i = 13.83$

N = 90
r = 83

$K_{min} = 20 \text{ MPa}\sqrt{m}$

$K_{o,eq} = 148.4 \text{ MPa}\sqrt{m}$

$K_{med,eq} = 137.2 \text{ MPa}\sqrt{m}$

GKSS	-60	142.7	142.2	1	0.167	0.0119	0.0096
TWI	-60	134.5	134.0	1	0.167	0.0119	0.0073
TWI	-60	130.1	129.7	1	0.167	0.0119	0.0062
TWI	-60	142.6	142.1	1	0.167	0.0119	0.0096
TWI	-60	119.7	119.3	1	0.167	0.0119	0.0042
TWI	-60	141.3	140.8	1	0.167	0.0119	0.0092
TWI	-60	175.9	175.3	1	0.167	0.0119	0.0250
TWI	-60	119.6	119.2	1	0.167	0.0119	0.0042
TWI	-60	102.4	102.0	1	0.167	0.0119	0.0019
TWI	-60	99.0	98.7	1	0.167	0.0119	0.0017
TWI	-60	115.1	114.7	1	0.167	0.0119	0.0035
TWI	-60	172.9	172.3	1	0.167	0.0119	0.0231
TWI	-60	120.5	120.2	1	0.167	0.0119	0.0043
TWI	-60	165.2	164.6	1	0.167	0.0119	0.0188
TWI	-60	125.6	125.2	1	0.167	0.0119	0.0053
TWI	-60	126.7	126.3	1	0.167	0.0119	0.0055
TWI	-60	100.4	100.1	1	0.167	0.0119	0.0018
TWI	-60	131.1	130.7	1	0.167	0.0119	0.0065
TWI	-60	185.1	184.5	1	0.167	0.0119	0.0315
TWI	-60	163.6	163.0	1	0.167	0.0119	0.0180
TWI	-60	126.5	126.1	1	0.167	0.0119	0.0054
TWI	-60	164.7	164.1	1	0.167	0.0119	0.0185
TWI	-60	192.7	192.0	1	0.167	0.0119	0.0377
TWI	-60	134.5	134.1	1	0.167	0.0119	0.0073
TWI	-60	140.8	140.3	1	0.167	0.0119	0.0090
GKSS	-60	109.9	126.5	1	0.167	0.0119	0.0055
GKSS	-60	131.9	152.5	1	0.167	0.0119	0.0133
GKSS	-60	136.2	157.6	1	0.167	0.0119	0.0154
GKSS	-60	154.0	178.8	1	0.167	0.0119	0.0273
GKSS	-60	115.9	133.6	1	0.167	0.0119	0.0072
GKSS	-60	150.4	174.4	1	0.167	0.0119	0.0245

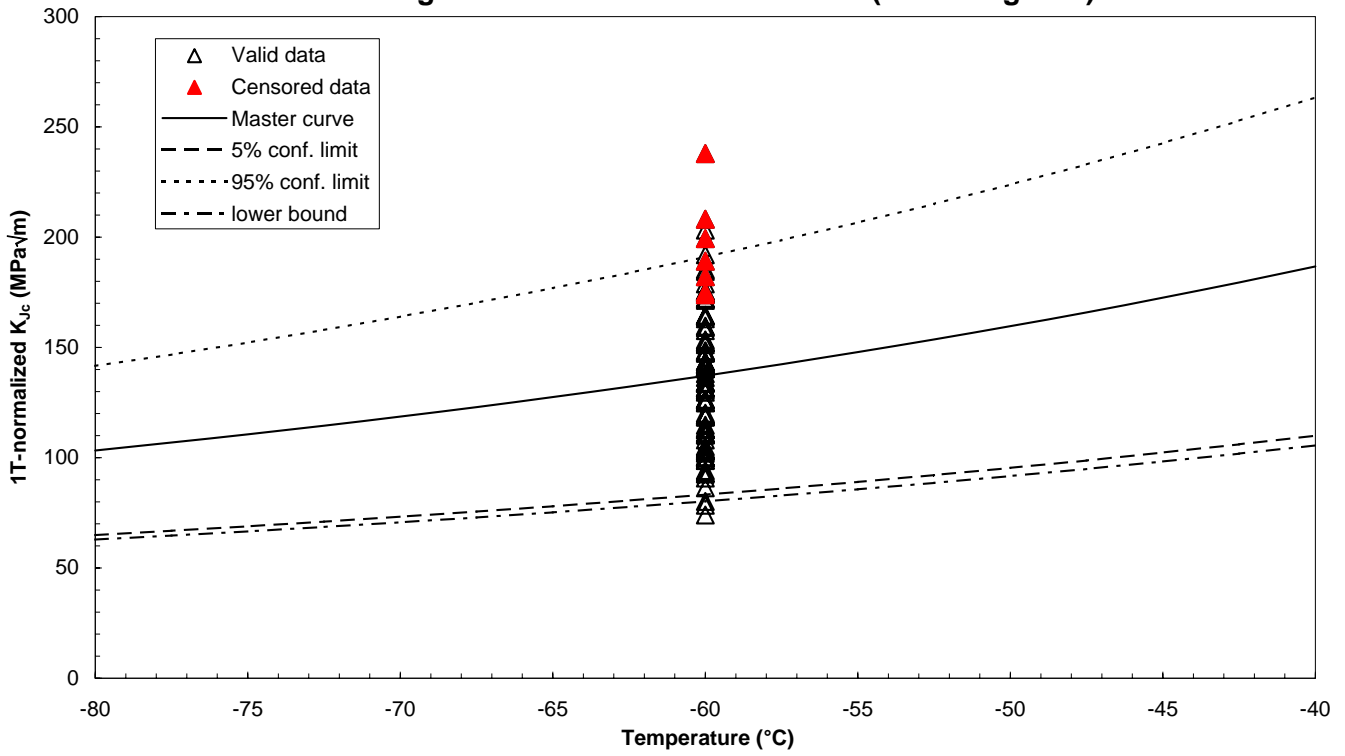
4. Master curve fit to data

Temperature adj. = 2.8 °C (est.) Stand. dev. on T_0 = 2.0 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-60	234.1	199.3				
-60	114.4	99.1				
-60	130.7	112.7				
-60	106.7	92.6				
-60	161.0	138.1				
-60	200.7	171.3				
-60	125.2	108.1				
-60	145.1	124.8				
-60	91.9	80.2				
-60	128.1	110.6				
-60	164.4	140.9				
-60	192.2	164.3				
-60	166.3	142.5				
-60	177.7	152.1				
-60	203.7	173.9				
-60	116.0	100.4				
-60	221.9	189.1				
-60	167.6	143.6				
-60	89.8	78.5				
-60	156.3	134.1				
-60	186.8	159.7				
-60	213.5	182.1				
-60	164.6	141.1				
-60	280.1	237.9				
-60	185.9	159.0				
-60	127.7	110.2				
-60	205.0	175.0				
-60	115.6	100.0				
-60	107.5	93.3				
-60	164.6	141.1				
-60	172.0	147.3				
-60	108.5	94.2				
-60	119.0	102.9				
-60	153.5	131.8				
-60	158.9	136.4				
-60	137.5	118.4				
-60	119.5	103.3				
-60	130.7	112.8				
-60	172.6	147.8				
-60	84.5	74.0				
-60	244.6	208.1				
-60	120.4	104.1				
-60	104.5	90.8				
-60	163.6	140.2				
-60	201.4	172.0				
-60	137.8	118.7				
-60	173.0	148.1				

-60	99.2	86.4				
-60	173.4	148.4				
-60	131.5	113.4				
-60	186.0	185.3				
-60	151.8	151.3				
-60	111.7	111.3				
-60	143.9	143.4				
-60	105.4	105.1				
-60	154.0	153.4				
-60	176.2	175.6				
-60	131.9	131.5				
-60	203.9	203.2				
-60	142.7	142.2				
-60	134.5	134.0				
-60	130.1	129.7				
-60	142.6	142.1				
-60	119.7	119.3				
-60	141.3	140.8				
-60	175.9	175.3				
-60	119.6	119.2				
-60	102.4	102.0				
-60	99.0	98.7				
-60	115.1	114.7				
-60	172.9	172.3				
-60	120.5	120.2				
-60	165.2	164.6				
-60	125.6	125.2				
-60	126.7	126.3				
-60	100.4	100.1				
-60	131.1	130.7				
-60	185.1	184.5				
-60	163.6	163.0				
-60	126.5	126.1				
-60	164.7	164.1				
-60	192.7	192.0				
-60	134.5	134.1				
-60	140.8	140.3				
-60	109.9	126.5				
-60	131.9	152.5				
-60	136.2	157.6				
-60	154.0	178.8				
-60	115.9	133.6				
-60	150.4	174.4				
-80			103.3	65.0	141.6	62.9
-77.5			106.9	66.9	146.8	64.7
-75			110.6	68.9	152.3	66.6
-72.5			114.5	71.0	158.0	68.6
-70			118.6	73.3	164.0	70.7
-67.5			123.0	75.6	170.3	73.0
-65			127.5	78.0	176.9	75.3
-62.5			132.2	80.6	183.8	77.7
-60			137.2	83.3	191.1	80.2
-57.5			142.4	86.1	198.7	82.9
-55			147.9	89.0	206.7	85.7
-52.5			153.6	92.1	215.1	88.6
-50			159.6	95.4	223.8	91.7
-47.5			165.9	98.8	233.0	94.9
-45			172.5	102.4	242.7	98.3
-42.5			179.5	106.1	252.8	101.9
-40			186.7	110.0	263.4	105.6

Master Curve with tolerance bounds
EURO toughness dataset - Dataset -60 °C (excluding SX9)



SINTAP - Structural Integrity Assessment Procedures for European Industry
Lower Tail Analysis Procedure

Step 1: Estimate of the median value of fracture toughness (ASTM E1921-05)

1. Material characteristics

Material specifications : **EURO toughness data set - Dataset -60 °C (excluding SX9)**

2. Dimensional and crack growth requirements

Specimen code	T (°C)	a _o (mm)	W (mm)	B (mm)	b _o (mm)	Δa (mm)	K _{Jc[exp]} (MPa√m)	σ _{ys} (MPa)	E' (GPa)	K _{lim} (MPa√m)	DATA VALID	K _{Jc[calc]} (MPa√m)
GKSS	-60	14.19	25	12.5	10.81	0.05	234.1	506.4	231.4	205.5	NO	205.5
GKSS	-60	14.16	25	12.5	10.84	0.00	114.4	506.4	231.4	205.8	YES	114.4
GKSS	-60	14.31	25	12.5	10.69	0.00	130.7	506.4	231.4	204.4	YES	130.7
GKSS	-60	14.13	25	12.5	10.87	0.00	106.7	506.4	231.4	206.1	YES	106.7
GKSS	-60	14.08	25	12.5	10.92	0.00	161.0	506.4	231.4	206.5	YES	161.0
GKSS	-60	13.58	25	12.5	11.42	0.00	200.7	506.4	231.4	211.2	YES	200.7
GKSS	-60	14.26	25	12.5	10.74	0.00	125.2	506.4	231.4	204.8	YES	125.2
GKSS	-60	14.19	25	12.5	10.81	0.00	145.1	506.4	231.4	205.5	YES	145.1
GKSS	-60	14.00	25	12.5	11.00	0.00	91.9	506.4	231.4	207.3	YES	91.9
GKSS	-60	13.94	25	12.5	11.06	0.00	128.1	506.4	231.4	207.9	YES	128.1
GKSS	-60	14.59	25	12.5	10.41	0.00	164.4	506.4	231.4	201.7	YES	164.4
GKSS	-60	14.53	25	12.5	10.47	0.00	192.2	506.4	231.4	202.2	YES	192.2
GKSS	-60	14.76	25	12.5	10.24	0.00	166.3	506.4	231.4	200.0	YES	166.3
GKSS	-60	14.48	25	12.5	10.52	0.00	177.7	506.4	231.4	202.7	YES	177.7
GKSS	-60	14.55	25	12.5	10.45	0.00	203.7	506.4	231.4	202.0	NO	202.0
GKSS	-60	14.46	25	12.5	10.54	0.00	116.0	506.4	231.4	202.9	YES	116.0
GKSS	-60	14.55	25	12.5	10.45	0.11	221.9	506.4	231.4	202.0	NO	202.0
GKSS	-60	14.77	25	12.5	10.23	0.00	167.6	506.4	231.4	199.9	YES	167.6
GKSS	-60	14.35	25	12.5	10.65	0.00	89.8	506.4	231.4	204.0	YES	89.8
GKSS	-60	14.56	25	12.5	10.44	0.00	156.3	506.4	231.4	201.9	YES	156.3
GKSS	-60	14.49	25	12.5	10.51	0.00	186.8	506.4	231.4	202.6	YES	186.8
GKSS	-60	14.43	25	12.5	10.57	0.00	213.5	506.4	231.4	203.2	NO	203.2
GKSS	-60	14.39	25	12.5	10.61	0.00	164.6	506.4	231.4	203.6	YES	164.6
GKSS	-60	14.49	25	12.5	10.51	0.28	280.1	506.4	231.4	202.6	NO	202.6
GKSS	-60	14.43	25	12.5	10.57	0.00	185.9	506.4	231.4	203.2	YES	185.9
GKSS	-60	14.85	25	12.5	10.15	0.00	127.7	506.4	231.4	199.1	YES	127.7
GKSS	-60	14.64	25	12.5	10.36	0.00	205.0	506.4	231.4	201.2	NO	201.2
GKSS	-60	14.25	25	12.5	10.75	0.00	115.6	506.4	231.4	204.9	YES	115.6
GKSS	-60	14.44	25	12.5	10.56	0.00	107.5	506.4	231.4	203.1	YES	107.5
SIEMENS	-60	13.24	25	12.5	11.76	0.00	164.6	506.4	231.4	214.3	YES	164.6
SIEMENS	-60	13.29	25	12.5	11.71	0.00	172.0	506.4	231.4	213.9	YES	172.0
SIEMENS	-60	13.24	25	12.5	11.76	0.00	108.5	506.4	231.4	214.3	YES	108.5
SIEMENS	-60	13.28	25	12.5	11.72	0.00	119.0	506.4	231.4	214.0	YES	119.0
SIEMENS	-60	13.26	25	12.5	11.74	0.00	153.5	506.4	231.4	214.2	YES	153.5
SIEMENS	-60	13.22	25	12.5	11.78	0.00	158.9	506.4	231.4	214.5	YES	158.9
SIEMENS	-60	13.27	25	12.5	11.73	0.00	137.5	506.4	231.4	214.1	YES	137.5
SIEMENS	-60	13.18	25	12.5	11.82	0.00	119.5	506.4	231.4	214.9	YES	119.5
SIEMENS	-60	13.18	25	12.5	11.82	0.00	130.7	506.4	231.4	214.9	YES	130.7
SIEMENS	-60	13.24	25	12.5	11.76	0.00	172.6	506.4	231.4	214.3	YES	172.6
SIEMENS	-60	13.24	25	12.5	11.76	0.00	84.5	506.4	231.4	214.3	YES	84.5
SIEMENS	-60	13.34	25	12.5	11.66	0.00	244.6	506.4	231.4	213.4	NO	213.4
SIEMENS	-60	13.20	25	12.5	11.80	0.00	120.4	506.4	231.4	214.7	YES	120.4
SIEMENS	-60	13.31	25	12.5	11.69	0.00	104.5	506.4	231.4	213.7	YES	104.5
SIEMENS	-60	13.23	25	12.5	11.77	0.00	163.6	506.4	231.4	214.4	YES	163.6
SIEMENS	-60	13.28	25	12.5	11.72	0.00	201.4	506.4	231.4	214.0	YES	201.4
SIEMENS	-60	13.20	25	12.5	11.80	0.00	137.8	506.4	231.4	214.7	YES	137.8
SIEMENS	-60	13.19	25	12.5	11.81	0.00	173.0	506.4	231.4	214.8	YES	173.0
SIEMENS	-60	13.22	25	12.5	11.78	0.00	99.2	506.4	231.4	214.5	YES	99.2
SIEMENS	-60	13.22	25	12.5	11.78	0.00	173.4	506.4	231.4	214.5	YES	173.4
SIEMENS	-60	13.29	25	12.5	11.71	0.00	131.5	506.4	231.4	213.9	YES	131.5
GKSS	-60	28.06	50	25.0	21.94	0.00	186.0	506.4	231.4	292.8	YES	186.0
GKSS	-60	27.75	50	25.0	22.25	0.00	151.8	506.4	231.4	294.8	YES	151.8
GKSS	-60	27.62	50	25.0	22.38	0.00	111.7	506.4	231.4	295.7	YES	111.7
GKSS	-60	27.65	50	25.0	22.35	0.00	143.9	506.4	231.4	295.5	YES	143.9
GKSS	-60	27.71	50	25.0	22.29	0.00	105.4	506.4	231.4	295.1	YES	105.4
GKSS	-60	28.01	50	25.0	21.99	0.00	154.0	506.4	231.4	293.1	YES	154.0
GKSS	-60	27.97	50	25.0	22.03	0.00	176.2	506.4	231.4	293.4	YES	176.2
GKSS	-60	27.51	50	25.0	22.49	0.00	131.9	506.4	231.4	296.4	YES	131.9
GKSS	-60	27.86	50	25.0	22.14	0.00	203.9	506.4	231.4	294.1	YES	203.9
GKSS	-60	27.51	50	25.0	22.49	0.00	142.7	506.4	231.4	296.4	YES	142.7
TWI	-60	27.42	50	25.0	22.58	0.06	134.5	506.4	231.4	297.0	YES	134.5
TWI	-60	27.43	50	25.0	22.57	0.00	130.1	506.4	231.4	296.9	YES	130.1
TWI	-60	27.62	50	25.0	22.38	0.07	142.6	506.4	231.4	295.7	YES	142.6
TWI	-60	27.47	50	25.0	22.53	0.05	119.7	506.4	231.4	296.7	YES	119.7
TWI	-60	27.49	50	25.0	22.51	0.07	141.3	506.4	231.4	296.5	YES	141.3
TWI	-60	27.95	50	25.0	22.05	0.10	175.9	506.4	231.4	293.5	YES	175.9
TWI	-60	27.62	50	25.0	22.38	0.00	119.6	506.4	231.4	295.7	YES	119.6
TWI	-60	27.65	50	25.0	22.35	0.00	102.4	506.4	231.4	295.5	YES	102.4
TWI	-60	27.68	50	25.0	22.32	0.00	99.0	506.4	231.4	295.3	YES	99.0
TWI	-60	27.82	50	25.0	22.18	0.05	115.1	506.4	231.4	294.4	YES	115.1
TWI	-60	27.98	50	25.0	22.02	0.11	172.9	506.4	231.4	293.3	YES	172.9

TWI	-60	27.72	50	25.0	22.28	0.03	120.5	506.4	231.4	295.0	YES	120.5
TWI	-60	27.48	50	25.0	22.52	0.00	165.2	506.4	231.4	296.6	YES	165.2
TWI	-60	27.54	50	25.0	22.46	0.00	125.6	506.4	231.4	296.2	YES	125.6
TWI	-60	27.88	50	25.0	22.12	0.05	126.7	506.4	231.4	294.0	YES	126.7
TWI	-60	27.79	50	25.0	22.21	0.00	100.4	506.4	231.4	294.6	YES	100.4
TWI	-60	27.56	50	25.0	22.44	0.05	131.1	506.4	231.4	296.1	YES	131.1
TWI	-60	27.58	50	25.0	22.42	0.06	185.1	506.4	231.4	295.9	YES	185.1
TWI	-60	27.59	50	25.0	22.41	0.09	163.6	506.4	231.4	295.9	YES	163.6
TWI	-60	27.68	50	25.0	22.32	0.09	126.5	506.4	231.4	295.3	YES	126.5
TWI	-60	27.65	50	25.0	22.35	0.10	164.7	506.4	231.4	295.5	YES	164.7
TWI	-60	27.73	50	25.0	22.27	0.16	192.7	506.4	231.4	294.9	YES	192.7
TWI	-60	27.65	50	25.0	22.35	0.05	134.5	506.4	231.4	295.5	YES	134.5
TWI	-60	27.86	50	25.0	22.14	0.05	140.8	506.4	231.4	294.1	YES	140.8
GKSS	-60	57.56	100	50.0	42.44	0.00	109.9	506.4	231.4	407.2	YES	109.9
GKSS	-60	56.69	100	50.0	43.31	0.00	131.9	506.4	231.4	411.3	YES	131.9
GKSS	-60	56.69	100	50.0	43.31	0.00	136.2	506.4	231.4	411.3	YES	136.2
GKSS	-60	56.51	100	50.0	43.49	0.00	154.0	506.4	231.4	412.2	YES	154.0
GKSS	-60	56.15	100	50.0	43.85	0.00	115.9	506.4	231.4	413.9	YES	115.9
GKSS	-60	55.96	100	50.0	44.04	0.00	150.4	506.4	231.4	414.8	YES	150.4

3. Application of the multi-temperature approach for the calculation of the reference temperature

T limits

Specimen code	T (°C)	$K_{Jc[calc]}$ (MPa√m)	$K_{Jc(1T)}$ (MPa√m)	δ_i	n_i	1° member	2° member
GKSS	-60	205.5	175.4	0	0.000	0.0000	0.0251
GKSS	-60	114.4	99.1	1	0.167	0.0119	0.0017
GKSS	-60	130.7	112.7	1	0.167	0.0119	0.0032
GKSS	-60	106.7	92.6	1	0.167	0.0119	0.0012
GKSS	-60	161.0	138.1	1	0.167	0.0119	0.0084
GKSS	-60	200.7	171.3	1	0.167	0.0119	0.0226
GKSS	-60	125.2	108.1	1	0.167	0.0119	0.0026
GKSS	-60	145.1	124.8	1	0.167	0.0119	0.0052
GKSS	-60	91.9	80.2	1	0.167	0.0119	0.0006
GKSS	-60	128.1	110.6	1	0.167	0.0119	0.0029
GKSS	-60	164.4	140.9	1	0.167	0.0119	0.0092
GKSS	-60	192.2	164.3	1	0.167	0.0119	0.0186
GKSS	-60	166.3	142.5	1	0.167	0.0119	0.0097
GKSS	-60	177.7	152.1	1	0.167	0.0119	0.0131
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0233
GKSS	-60	116.0	100.4	1	0.167	0.0119	0.0018
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0233
GKSS	-60	167.6	143.6	1	0.167	0.0119	0.0100
GKSS	-60	89.8	78.5	1	0.167	0.0119	0.0005
GKSS	-60	156.3	134.1	1	0.167	0.0119	0.0073
GKSS	-60	186.8	159.7	1	0.167	0.0119	0.0164
GKSS	-60	203.2	173.4	0	0.000	0.0000	0.0238
GKSS	-60	164.6	141.1	1	0.167	0.0119	0.0093
GKSS	-60	202.6	173.0	0	0.000	0.0000	0.0235
GKSS	-60	185.9	159.0	1	0.167	0.0119	0.0160
GKSS	-60	127.7	110.2	1	0.167	0.0119	0.0029
GKSS	-60	201.2	171.7	0	0.000	0.0000	0.0228
GKSS	-60	115.6	100.0	1	0.167	0.0119	0.0018
GKSS	-60	107.5	93.3	1	0.167	0.0119	0.0012
SIEMENS	-60	164.6	141.1	1	0.167	0.0119	0.0093
SIEMENS	-60	172.0	147.3	1	0.167	0.0119	0.0113
SIEMENS	-60	108.5	94.2	1	0.167	0.0119	0.0013
SIEMENS	-60	119.0	102.9	1	0.167	0.0119	0.0020
SIEMENS	-60	153.5	131.8	1	0.167	0.0119	0.0067
SIEMENS	-60	158.9	136.4	1	0.167	0.0119	0.0079
SIEMENS	-60	137.5	118.4	1	0.167	0.0119	0.0040
SIEMENS	-60	119.5	103.3	1	0.167	0.0119	0.0021
SIEMENS	-60	130.7	112.8	1	0.167	0.0119	0.0032
SIEMENS	-60	172.6	147.8	1	0.167	0.0119	0.0115
SIEMENS	-60	84.5	74.0	1	0.167	0.0119	0.0004
SIEMENS	-60	213.4	182.0	0	0.000	0.0000	0.0296
SIEMENS	-60	120.4	104.1	1	0.167	0.0119	0.0021
SIEMENS	-60	104.5	90.8	1	0.167	0.0119	0.0011
SIEMENS	-60	163.6	140.2	1	0.167	0.0119	0.0090
SIEMENS	-60	201.4	172.0	1	0.167	0.0119	0.0229
SIEMENS	-60	137.8	118.7	1	0.167	0.0119	0.0041
SIEMENS	-60	173.0	148.1	1	0.167	0.0119	0.0116
SIEMENS	-60	99.2	86.4	1	0.167	0.0119	0.0008
SIEMENS	-60	173.4	148.4	1	0.167	0.0119	0.0117
SIEMENS	-60	131.5	113.4	1	0.167	0.0119	0.0033
GKSS	-60	186.0	185.3	1	0.167	0.0119	0.0321
GKSS	-60	151.8	151.3	1	0.167	0.0119	0.0128
GKSS	-60	111.7	111.3	1	0.167	0.0119	0.0030
GKSS	-60	143.9	143.4	1	0.167	0.0119	0.0100
GKSS	-60	105.4	105.1	1	0.167	0.0119	0.0023
GKSS	-60	154.0	153.4	1	0.167	0.0119	0.0136
GKSS	-60	176.2	175.6	1	0.167	0.0119	0.0252
GKSS	-60	131.9	131.5	1	0.167	0.0119	0.0066
GKSS	-60	203.9	203.2	1	0.167	0.0119	0.0484

USE LIMITS : YES

-132
-32

Sum of 1° member: 0.986

Sum of 2° member: 0.986

Difference: 0.000

$T_o = -82.4$ °C
(valid per ASTM E1921)

$\sum n_i = 13.83$

N = 90
r = 83

$K_{min} = 20$ MPa√m

$K_{o,eq} = 148.4$ MPa√m

$K_{med,eq} = 137.2$ MPa√m

GKSS	-60	142.7	142.2	1	0.167	0.0119	0.0096
TWI	-60	134.5	134.0	1	0.167	0.0119	0.0073
TWI	-60	130.1	129.7	1	0.167	0.0119	0.0062
TWI	-60	142.6	142.1	1	0.167	0.0119	0.0096
TWI	-60	119.7	119.3	1	0.167	0.0119	0.0042
TWI	-60	141.3	140.8	1	0.167	0.0119	0.0092
TWI	-60	175.9	175.3	1	0.167	0.0119	0.0250
TWI	-60	119.6	119.2	1	0.167	0.0119	0.0042
TWI	-60	102.4	102.0	1	0.167	0.0119	0.0019
TWI	-60	99.0	98.7	1	0.167	0.0119	0.0017
TWI	-60	115.1	114.7	1	0.167	0.0119	0.0035
TWI	-60	172.9	172.3	1	0.167	0.0119	0.0231
TWI	-60	120.5	120.2	1	0.167	0.0119	0.0043
TWI	-60	165.2	164.6	1	0.167	0.0119	0.0188
TWI	-60	125.6	125.2	1	0.167	0.0119	0.0053
TWI	-60	126.7	126.3	1	0.167	0.0119	0.0055
TWI	-60	100.4	100.1	1	0.167	0.0119	0.0018
TWI	-60	131.1	130.7	1	0.167	0.0119	0.0065
TWI	-60	185.1	184.5	1	0.167	0.0119	0.0315
TWI	-60	163.6	163.0	1	0.167	0.0119	0.0180
TWI	-60	126.5	126.1	1	0.167	0.0119	0.0054
TWI	-60	164.7	164.1	1	0.167	0.0119	0.0185
TWI	-60	192.7	192.0	1	0.167	0.0119	0.0377
TWI	-60	134.5	134.1	1	0.167	0.0119	0.0073
TWI	-60	140.8	140.3	1	0.167	0.0119	0.0090
GKSS	-60	109.9	126.5	1	0.167	0.0119	0.0055
GKSS	-60	131.9	152.5	1	0.167	0.0119	0.0133
GKSS	-60	136.2	157.6	1	0.167	0.0119	0.0154
GKSS	-60	154.0	178.8	1	0.167	0.0119	0.0273
GKSS	-60	115.9	133.6	1	0.167	0.0119	0.0072
GKSS	-60	150.4	174.4	1	0.167	0.0119	0.0245

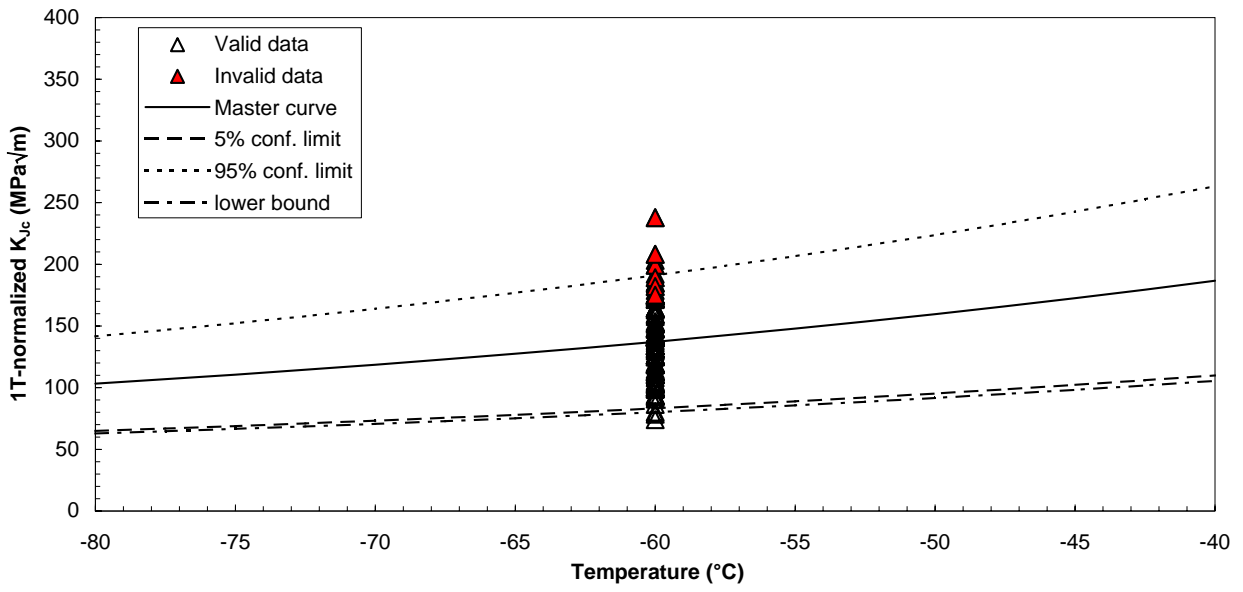
4. Master curve fit to data

Temperature adj. = 2.8 °C (est.) Stand. dev. on T_0 = 2.0 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-60	234.1	199.3				
-60	114.4	99.1				
-60	130.7	112.7				
-60	106.7	92.6				
-60	161.0	138.1				
-60	200.7	171.3				
-60	125.2	108.1				
-60	145.1	124.8				
-60	91.9	80.2				
-60	128.1	110.6				
-60	164.4	140.9				
-60	192.2	164.3				
-60	166.3	142.5				
-60	177.7	152.1				
-60	203.7	173.9				
-60	116.0	100.4				
-60	221.9	189.1				
-60	167.6	143.6				
-60	89.8	78.5				
-60	156.3	134.1				
-60	186.8	159.7				
-60	213.5	182.1				
-60	164.6	141.1				
-60	280.1	237.9				
-60	185.9	159.0				
-60	127.7	110.2				
-60	205.0	175.0				
-60	115.6	100.0				
-60	107.5	93.3				
-60	164.6	141.1				
-60	172.0	147.3				
-60	108.5	94.2				
-60	119.0	102.9				
-60	153.5	131.8				
-60	158.9	136.4				
-60	137.5	118.4				
-60	119.5	103.3				
-60	130.7	112.8				
-60	172.6	147.8				
-60	84.5	74.0				
-60	244.6	208.1				
-60	120.4	104.1				
-60	104.5	90.8				
-60	163.6	140.2				
-60	201.4	172.0				
-60	137.8	118.7				
-60	173.0	148.1				

-60	99.2	86.4			
-60	173.4	148.4			
-60	131.5	113.4			
-60	186.0	185.3			
-60	151.8	151.3			
-60	111.7	111.3			
-60	143.9	143.4			
-60	105.4	105.1			
-60	154.0	153.4			
-60	176.2	175.6			
-60	131.9	131.5			
-60	203.9	203.2			
-60	142.7	142.2			
-60	134.5	134.0			
-60	130.1	129.7			
-60	142.6	142.1			
-60	119.7	119.3			
-60	141.3	140.8			
-60	175.9	175.3			
-60	119.6	119.2			
-60	102.4	102.0			
-60	99.0	98.7			
-60	115.1	114.7			
-60	172.9	172.3			
-60	120.5	120.2			
-60	165.2	164.6			
-60	125.6	125.2			
-60	126.7	126.3			
-60	100.4	100.1			
-60	131.1	130.7			
-60	185.1	184.5			
-60	163.6	163.0			
-60	126.5	126.1			
-60	164.7	164.1			
-60	192.7	192.0			
-60	134.5	134.1			
-60	140.8	140.3			
-60	109.9	126.5			
-60	131.9	152.5			
-60	136.2	157.6			
-60	154.0	178.8			
-60	115.9	133.6			
-60	150.4	174.4			
-80			103.3	65.0	141.6
-77.5			106.9	66.9	146.8
-75			110.6	68.9	152.3
-72.5			114.5	71.0	158.0
-70			118.6	73.3	164.0
-67.5			123.0	75.6	170.3
-65			127.5	78.0	176.9
-62.5			132.2	80.6	183.8
-60			137.2	83.3	191.1
-57.5			142.4	86.1	198.7
-55			147.9	89.0	206.7
-52.5			153.6	92.1	215.1
-50			159.6	95.4	223.8
-47.5			165.9	98.8	233.0
-45			172.5	102.4	242.7
-42.5			179.5	106.1	252.8
-40			186.7	110.0	263.4

**MASTER CURVE FOR 1TCT WITH CONFIDENCE LIMITS (E1921-05 analysis)
EURO toughness dataset - Dataset -60 °C (excluding SX9)**



SINTAP - Structural Integrity Assessment Procedures for European Industry
Lower Tail Analysis Procedure

Step 2: Lower MMT Tail Estimation

1. Data censoring

Specimen code	T (°C)	$K_{Jc[exp]}$ (MPa \sqrt{m})	K_{Jc-1T} (MPa \sqrt{m})	K_{CENS} (MPa \sqrt{m})	δ_i	$K_{analysis}$ (MPa \sqrt{m})
GKSS	-60	205.5	175.4	136.2	0	136.2
GKSS	-60	114.4	99.1	136.2	1	99.1
GKSS	-60	130.7	112.7	136.2	1	112.7
GKSS	-60	106.7	92.6	136.2	1	92.6
GKSS	-60	161.0	138.1	136.2	0	136.2
GKSS	-60	200.7	171.3	136.2	0	136.2
GKSS	-60	125.2	108.1	136.2	1	108.1
GKSS	-60	145.1	124.8	136.2	1	124.8
GKSS	-60	91.9	80.2	136.2	1	80.2
GKSS	-60	128.1	110.6	136.2	1	110.6
GKSS	-60	164.4	140.9	136.2	0	136.2
GKSS	-60	192.2	164.3	136.2	0	136.2
GKSS	-60	166.3	142.5	136.2	0	136.2
GKSS	-60	177.7	152.1	136.2	0	136.2
GKSS	-60	202.0	172.5	136.2	0	136.2
GKSS	-60	116.0	100.4	136.2	1	100.4
GKSS	-60	202.0	172.5	136.2	0	136.2
GKSS	-60	167.6	143.6	136.2	0	136.2
GKSS	-60	89.8	78.5	136.2	1	78.5
GKSS	-60	156.3	134.1	136.2	1	134.1
GKSS	-60	186.8	159.7	136.2	0	136.2
GKSS	-60	203.2	173.4	136.2	0	136.2
GKSS	-60	164.6	141.1	136.2	0	136.2
GKSS	-60	202.6	173.0	136.2	0	136.2
GKSS	-60	185.9	159.0	136.2	0	136.2
GKSS	-60	127.7	110.2	136.2	1	110.2
GKSS	-60	201.2	171.7	136.2	0	136.2
GKSS	-60	115.6	100.0	136.2	1	100.0
GKSS	-60	107.5	93.3	136.2	1	93.3
SIEMENS	-60	164.6	141.1	136.2	0	136.2
SIEMENS	-60	172.0	147.3	136.2	0	136.2
SIEMENS	-60	108.5	94.2	136.2	1	94.2
SIEMENS	-60	119.0	102.9	136.2	1	102.9
SIEMENS	-60	153.5	131.8	136.2	1	131.8
SIEMENS	-60	158.9	136.4	136.2	0	136.2
SIEMENS	-60	137.5	118.4	136.2	1	118.4
SIEMENS	-60	119.5	103.3	136.2	1	103.3
SIEMENS	-60	130.7	112.8	136.2	1	112.8
SIEMENS	-60	172.6	147.8	136.2	0	136.2
SIEMENS	-60	84.5	74.0	136.2	1	74.0
SIEMENS	-60	213.4	182.0	136.2	0	136.2
SIEMENS	-60	120.4	104.1	136.2	1	104.1
SIEMENS	-60	104.5	90.8	136.2	1	90.8
SIEMENS	-60	163.6	140.2	136.2	0	136.2
SIEMENS	-60	201.4	172.0	136.2	0	136.2
SIEMENS	-60	137.8	118.7	136.2	1	118.7
SIEMENS	-60	173.0	148.1	136.2	0	136.2
SIEMENS	-60	99.2	86.4	136.2	1	86.4
SIEMENS	-60	173.4	148.4	136.2	0	136.2
SIEMENS	-60	131.5	113.4	136.2	1	113.4
GKSS	-60	186.0	185.3	136.2	0	136.2
GKSS	-60	151.8	151.3	136.2	0	136.2
GKSS	-60	111.7	111.3	136.2	1	111.3
GKSS	-60	143.9	143.4	136.2	0	136.2
GKSS	-60	105.4	105.1	136.2	1	105.1
GKSS	-60	154.0	153.4	136.2	0	136.2
GKSS	-60	176.2	175.6	136.2	0	136.2
GKSS	-60	131.9	131.5	136.2	1	131.5
GKSS	-60	203.9	203.2	136.2	0	136.2
GKSS	-60	142.7	142.2	136.2	0	136.2
TWI	-60	134.5	134.0	136.2	1	134.0
TWI	-60	130.1	129.7	136.2	1	129.7
TWI	-60	142.6	142.1	136.2	0	136.2
TWI	-60	119.7	119.3	136.2	1	119.3
TWI	-60	141.3	140.8	136.2	0	136.2
TWI	-60	175.9	175.3	136.2	0	136.2
TWI	-60	119.6	119.2	136.2	1	119.2
TWI	-60	102.4	102.0	136.2	1	102.0
TWI	-60	99.0	98.7	136.2	1	98.7
TWI	-60	115.1	114.7	136.2	1	114.7
TWI	-60	172.9	172.3	136.2	0	136.2
TWI	-60	120.5	120.2	136.2	1	120.2
TWI	-60	165.2	164.6	136.2	0	136.2
TWI	-60	125.6	125.2	136.2	1	125.2
TWI	-60	126.7	126.3	136.2	1	126.3
TWI	-60	100.4	100.1	136.2	1	100.1

Benchmark $T_o = -81.9$ °C

TWI	-60	131.1	130.7	136.2	1	130.7
TWI	-60	185.1	184.5	136.2	0	136.2
TWI	-60	163.6	163.0	136.2	0	136.2
TWI	-60	126.5	126.1	136.2	1	126.1
TWI	-60	164.7	164.1	136.2	0	136.2
TWI	-60	192.7	192.0	136.2	0	136.2
TWI	-60	134.5	134.1	136.2	1	134.1
TWI	-60	140.8	140.3	136.2	0	136.2
GKSS	-60	109.9	126.5	136.2	1	126.5
GKSS	-60	131.9	152.5	136.2	0	136.2
GKSS	-60	136.2	157.6	136.2	0	136.2
GKSS	-60	154.0	178.8	136.2	0	136.2
GKSS	-60	115.9	133.6	136.2	1	133.6
GKSS	-60	150.4	174.4	136.2	0	136.2

2. Analysis of the censored data and obtainment of a new estimate of T_0

Specimen code	T (°C)	$K_{Jc[exp]}$ (MPa√m)	K_{Jc-1T} (MPa√m)	$K_{analysis}$ (MPa√m)	δ_i	1° member	2° member
GKSS	-60	205.5	175.4	136.2	0	0.0000	0.0080
GKSS	-60	114.4	99.1	99.1	1	0.0119	0.0017
GKSS	-60	130.7	112.7	112.7	1	0.0119	0.0032
GKSS	-60	106.7	92.6	92.6	1	0.0119	0.0012
GKSS	-60	161.0	138.1	136.2	0	0.0000	0.0080
GKSS	-60	200.7	171.3	136.2	0	0.0000	0.0080
GKSS	-60	125.2	108.1	108.1	1	0.0119	0.0026
GKSS	-60	145.1	124.8	124.8	1	0.0119	0.0053
GKSS	-60	91.9	80.2	80.2	1	0.0119	0.0006
GKSS	-60	128.1	110.6	110.6	1	0.0119	0.0029
GKSS	-60	164.4	140.9	136.2	0	0.0000	0.0080
GKSS	-60	192.2	164.3	136.2	0	0.0000	0.0080
GKSS	-60	166.3	142.5	136.2	0	0.0000	0.0080
GKSS	-60	177.7	152.1	136.2	0	0.0000	0.0080
GKSS	-60	202.0	172.5	136.2	0	0.0000	0.0080
GKSS	-60	116.0	100.4	100.4	1	0.0119	0.0018
GKSS	-60	202.0	172.5	136.2	0	0.0000	0.0080
GKSS	-60	167.6	143.6	136.2	0	0.0000	0.0080
GKSS	-60	89.8	78.5	78.5	1	0.0119	0.0005
GKSS	-60	156.3	134.1	134.1	1	0.0119	0.0074
GKSS	-60	186.8	159.7	136.2	0	0.0000	0.0080
GKSS	-60	203.2	173.4	136.2	0	0.0000	0.0080
GKSS	-60	164.6	141.1	136.2	0	0.0000	0.0080
GKSS	-60	202.6	173.0	136.2	0	0.0000	0.0080
GKSS	-60	185.9	159.0	136.2	0	0.0000	0.0080
GKSS	-60	127.7	110.2	110.2	1	0.0119	0.0029
GKSS	-60	201.2	171.7	136.2	0	0.0000	0.0080
GKSS	-60	115.6	100.0	100.0	1	0.0119	0.0018
GKSS	-60	107.5	93.3	93.3	1	0.0119	0.0013
SIEMENS	-60	164.6	141.1	136.2	0	0.0000	0.0080
SIEMENS	-60	172.0	147.3	136.2	0	0.0000	0.0080
SIEMENS	-60	108.5	94.2	94.2	1	0.0119	0.0013
SIEMENS	-60	119.0	102.9	102.9	1	0.0119	0.0021
SIEMENS	-60	153.5	131.8	131.8	1	0.0119	0.0068
SIEMENS	-60	158.9	136.4	136.2	0	0.0000	0.0080
SIEMENS	-60	137.5	118.4	118.4	1	0.0119	0.0041
SIEMENS	-60	119.5	103.3	103.3	1	0.0119	0.0021
SIEMENS	-60	130.7	112.8	112.8	1	0.0119	0.0032
SIEMENS	-60	172.6	147.8	136.2	0	0.0000	0.0080
SIEMENS	-60	84.5	74.0	74.0	1	0.0119	0.0004
SIEMENS	-60	213.4	182.0	136.2	0	0.0000	0.0080
SIEMENS	-60	120.4	104.1	104.1	1	0.0119	0.0022
SIEMENS	-60	104.5	90.8	90.8	1	0.0119	0.0011
SIEMENS	-60	163.6	140.2	136.2	0	0.0000	0.0080
SIEMENS	-60	201.4	172.0	136.2	0	0.0000	0.0080
SIEMENS	-60	137.8	118.7	118.7	1	0.0119	0.0041
SIEMENS	-60	173.0	148.1	136.2	0	0.0000	0.0080
SIEMENS	-60	99.2	86.4	86.4	1	0.0119	0.0008
SIEMENS	-60	173.4	148.4	136.2	0	0.0000	0.0080
SIEMENS	-60	131.5	113.4	113.4	1	0.0119	0.0033
GKSS	-60	186.0	185.3	136.2	0	0.0000	0.0080
GKSS	-60	151.8	151.3	136.2	0	0.0000	0.0080
GKSS	-60	111.7	111.3	111.3	1	0.0119	0.0030
GKSS	-60	143.9	143.4	136.2	0	0.0000	0.0080
GKSS	-60	105.4	105.1	105.1	1	0.0119	0.0023
GKSS	-60	154.0	153.4	136.2	0	0.0000	0.0080
GKSS	-60	176.2	175.6	136.2	0	0.0000	0.0080
GKSS	-60	131.9	131.5	131.5	1	0.0119	0.0068
GKSS	-60	203.9	203.2	136.2	0	0.0000	0.0080
GKSS	-60	142.7	142.2	136.2	0	0.0000	0.0080
TWI	-60	134.5	134.0	134.0	1	0.0119	0.0074
TWI	-60	130.1	129.7	129.7	1	0.0119	0.0063
TWI	-60	142.6	142.1	136.2	0	0.0000	0.0080
TWI	-60	119.7	119.3	119.3	1	0.0119	0.0042
TWI	-60	141.3	140.8	136.2	0	0.0000	0.0080

USE LIMITS : YES

T limits

-132

-32

Sum of 1° member:

Sum of 2° member:

Difference:

$T_0 = -82.2 \text{ °C}$

Use new estimate as benchmark

N = 90

r = 44

$K_{min} = 20 \text{ MPa}\sqrt{m}$

$K_{o,eq} = 148.4 \text{ MPa}\sqrt{m}$

$K_{med,eq} = 137.2 \text{ MPa}\sqrt{m}$

TWI	-60	175.9	175.3	136.2	0	0.0000	0.0080
TWI	-60	119.6	119.2	119.2	1	0.0119	0.0042
TWI	-60	102.4	102.0	102.0	1	0.0119	0.0020
TWI	-60	99.0	98.7	98.7	1	0.0119	0.0017
TWI	-60	115.1	114.7	114.7	1	0.0119	0.0035
TWI	-60	172.9	172.3	136.2	0	0.0000	0.0080
TWI	-60	120.5	120.2	120.2	1	0.0119	0.0044
TWI	-60	165.2	164.6	136.2	0	0.0000	0.0080
TWI	-60	125.6	125.2	125.2	1	0.0119	0.0053
TWI	-60	126.7	126.3	126.3	1	0.0119	0.0056
TWI	-60	100.4	100.1	100.1	1	0.0119	0.0018
TWI	-60	131.1	130.7	130.7	1	0.0119	0.0066
TWI	-60	185.1	184.5	136.2	0	0.0000	0.0080
TWI	-60	163.6	163.0	136.2	0	0.0000	0.0080
TWI	-60	126.5	126.1	126.1	1	0.0119	0.0055
TWI	-60	164.7	164.1	136.2	0	0.0000	0.0080
TWI	-60	192.7	192.0	136.2	0	0.0000	0.0080
TWI	-60	134.5	134.1	134.1	1	0.0119	0.0074
TWI	-60	140.8	140.3	136.2	0	0.0000	0.0080
GKSS	-60	109.9	126.5	126.5	1	0.0119	0.0056
GKSS	-60	131.9	152.5	136.2	0	0.0000	0.0080
GKSS	-60	136.2	157.6	136.2	0	0.0000	0.0080
GKSS	-60	154.0	178.8	136.2	0	0.0000	0.0080
GKSS	-60	115.9	133.6	133.6	1	0.0119	0.0073
GKSS	-60	150.4	174.4	136.2	0	0.0000	0.0080

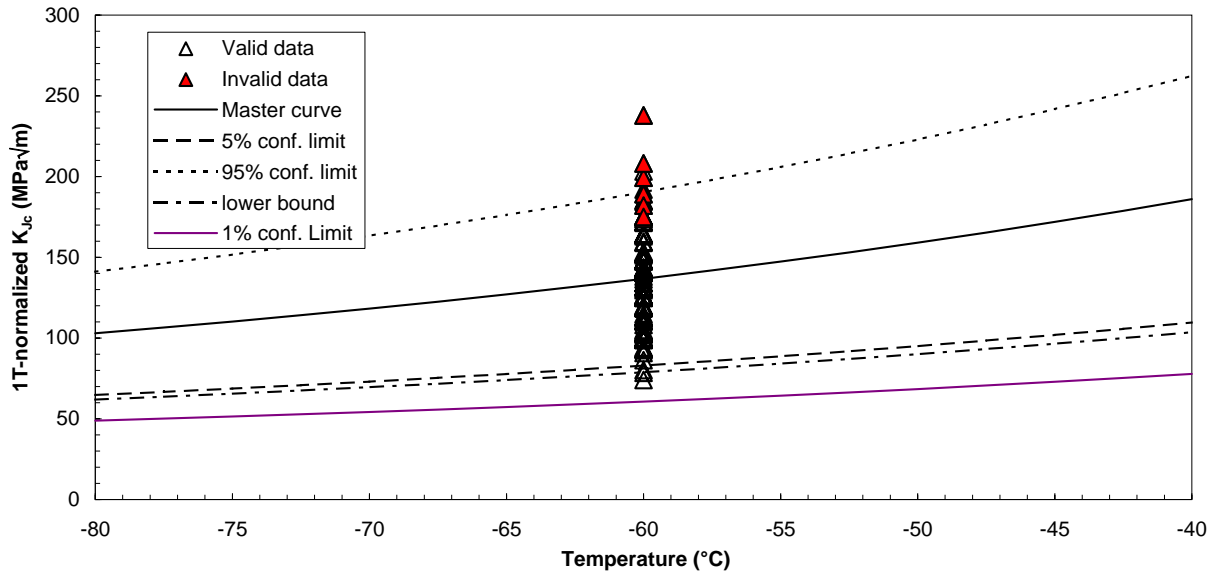
3. Revised Master Curve fit to data

Temperature adj. = 3.9 °C (est.) Stand. dev. on T_0 = 2.7 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-60	234.1	199.3				
-60	114.4	99.1				
-60	130.7	112.7				
-60	106.7	92.6				
-60	161.0	138.1				
-60	200.7	171.3				
-60	125.2	108.1				
-60	145.1	124.8				
-60	91.9	80.2				
-60	128.1	110.6				
-60	164.4	140.9				
-60	192.2	164.3				
-60	166.3	142.5				
-60	177.7	152.1				
-60	203.7	173.9				
-60	116.0	100.4				
-60	221.9	189.1				
-60	167.6	143.6				
-60	89.8	78.5				
-60	156.3	134.1				
-60	186.8	159.7				
-60	213.5	182.1				
-60	164.6	141.1				
-60	280.1	237.9				
-60	185.9	159.0				
-60	127.7	110.2				
-60	205.0	175.0				
-60	115.6	100.0				
-60	107.5	93.3				
-60	164.6	141.1				
-60	172.0	147.3				
-60	108.5	94.2				
-60	119.0	102.9				
-60	153.5	131.8				
-60	158.9	136.4				
-60	137.5	118.4				
-60	119.5	103.3				
-60	130.7	112.8				
-60	172.6	147.8				
-60	84.5	74.0				
-60	244.6	208.1				
-60	120.4	104.1				
-60	104.5	90.8				
-60	163.6	140.2				
-60	201.4	172.0				
-60	137.8	118.7				
-60	173.0	148.1				
-60	99.2	86.4				
-60	173.4	148.4				
-60	131.5	113.4				
-60	186.0	185.3				
-60	151.8	151.3				
-60	111.7	111.3				
-60	143.9	143.4				

-60	105.4	105.1				
-60	154.0	153.4				
-60	176.2	175.6				
-60	131.9	131.5				
-60	203.9	203.2				
-60	142.7	142.2				
-60	134.5	134.0				
-60	130.1	129.7				
-60	142.6	142.1				
-60	119.7	119.3				
-60	141.3	140.8				
-60	175.9	175.3				
-60	119.6	119.2				
-60	102.4	102.0				
-60	99.0	98.7				
-60	115.1	114.7				
-60	172.9	172.3				
-60	120.5	120.2				
-60	165.2	164.6				
-60	125.6	125.2				
-60	126.7	126.3				
-60	100.4	100.1				
-60	131.1	130.7				
-60	185.1	184.5				
-60	163.6	163.0				
-60	126.5	126.1				
-60	164.7	164.1				
-60	192.7	192.0				
-60	134.5	134.1				
-60	140.8	140.3				
-60	109.9	126.5				
-60	131.9	152.5				
-80			103.0	64.8	141.1	62.0
-77.5			106.5	66.7	146.3	63.8
-75			110.3	68.7	151.8	65.6
-72.5			114.2	70.8	157.5	67.6
-70			118.3	73.1	163.4	69.6
-67.5			122.5	75.4	169.7	71.8
-65			127.0	77.8	176.3	74.1
-62.5			131.8	80.4	183.2	76.4
-60			136.7	83.0	190.4	78.9
-57.5			141.9	85.8	198.0	81.5
-55			147.4	88.8	205.9	84.2
-52.5			153.1	91.9	214.3	87.1
-50			159.0	95.1	223.0	90.1
-47.5			165.3	98.5	232.2	93.2
-45			171.9	102.0	241.8	96.5
-42.5			178.8	105.8	251.9	100.0
-40			186.0	109.7	262.4	103.6

MASTER CURVE WITH CONFIDENCE LIMITS - SINTAP lower tail analysis
EURO toughness dataset - Dataset -60 °C (excluding SX9)



SINTAP - Structural Integrity Assessment Procedures for European Industry
Lower Tail Analysis Procedure

Step 3: Minimum value estimation

1. Calculation of the maximum value of T_o (based on a single data point) and establishment of T_o for the data set

Specimen code	T (°C)	$K_{Jc[exp]}$ (MPa√m)	K_{Jc-1T} (MPa√m)	K_{CENS} (MPa√m)	δ_i	$T_{o(i)}$ (°C)
GKSS	-60	205.5	175.4	136.2	0	-
GKSS	-60	114.4	99.1	136.2	1	-135.5
GKSS	-60	130.7	112.7	136.2	1	-142.5
GKSS	-60	106.7	92.6	136.2	1	-131.9
GKSS	-60	161.0	138.1	136.2	0	-
GKSS	-60	200.7	171.3	136.2	0	-
GKSS	-60	125.2	108.1	136.2	1	-140.3
GKSS	-60	145.1	124.8	136.2	1	-148.1
GKSS	-60	91.9	80.2	136.2	1	-124.0
GKSS	-60	128.1	110.6	136.2	1	-141.5
GKSS	-60	164.4	140.9	136.2	0	-
GKSS	-60	192.2	164.3	136.2	0	-
GKSS	-60	166.3	142.5	136.2	0	-
GKSS	-60	177.7	152.1	136.2	0	-
GKSS	-60	202.0	172.5	136.2	0	-
GKSS	-60	116.0	100.4	136.2	1	-136.3
GKSS	-60	202.0	172.5	136.2	0	-
GKSS	-60	167.6	143.6	136.2	0	-
GKSS	-60	89.8	78.5	136.2	1	-122.8
GKSS	-60	156.3	134.1	136.2	1	-152.0
GKSS	-60	186.8	159.7	136.2	0	-
GKSS	-60	203.2	173.4	136.2	0	-
GKSS	-60	164.6	141.1	136.2	0	-
GKSS	-60	202.6	173.0	136.2	0	-
GKSS	-60	185.9	159.0	136.2	0	-
GKSS	-60	127.7	110.2	136.2	1	-141.3
GKSS	-60	201.2	171.7	136.2	0	-
GKSS	-60	115.6	100.0	136.2	1	-136.1
GKSS	-60	107.5	93.3	136.2	1	-132.2
SIEMENS	-60	164.6	141.1	136.2	0	-
SIEMENS	-60	172.0	147.3	136.2	0	-
SIEMENS	-60	108.5	94.2	136.2	1	-132.8
SIEMENS	-60	119.0	102.9	136.2	1	-137.6
SIEMENS	-60	153.5	131.8	136.2	1	-151.0
SIEMENS	-60	158.9	136.4	136.2	0	-
SIEMENS	-60	137.5	118.4	136.2	1	-145.2
SIEMENS	-60	119.5	103.3	136.2	1	-137.8
SIEMENS	-60	130.7	112.8	136.2	1	-142.6
SIEMENS	-60	172.6	147.8	136.2	0	-
SIEMENS	-60	84.5	74.0	136.2	1	-119.6
SIEMENS	-60	213.4	182.0	136.2	0	-
SIEMENS	-60	120.4	104.1	136.2	1	-138.2
SIEMENS	-60	104.5	90.8	136.2	1	-130.8
SIEMENS	-60	163.6	140.2	136.2	0	-
SIEMENS	-60	201.4	172.0	136.2	0	-
SIEMENS	-60	137.8	118.7	136.2	1	-145.3
SIEMENS	-60	173.0	148.1	136.2	0	-
SIEMENS	-60	99.2	86.4	136.2	1	-128.1
SIEMENS	-60	173.4	148.4	136.2	0	-
SIEMENS	-60	131.5	113.4	136.2	1	-142.9
GKSS	-60	186.0	185.3	136.2	0	-
GKSS	-60	151.8	151.3	136.2	0	-
GKSS	-60	111.7	111.3	136.2	1	-141.9
GKSS	-60	143.9	143.4	136.2	0	-
GKSS	-60	105.4	105.1	136.2	1	-138.7
GKSS	-60	154.0	153.4	136.2	0	-
GKSS	-60	176.2	175.6	136.2	0	-
GKSS	-60	131.9	131.5	136.2	1	-150.9
GKSS	-60	203.9	203.2	136.2	0	-
GKSS	-60	142.7	142.2	136.2	0	-
TWI	-60	134.5	134.0	136.2	1	-151.9
TWI	-60	130.1	129.7	136.2	1	-150.1
TWI	-60	142.6	142.1	136.2	0	-
TWI	-60	119.7	119.3	136.2	1	-145.6
TWI	-60	141.3	140.8	136.2	0	-
TWI	-60	175.9	175.3	136.2	0	-
TWI	-60	119.6	119.2	136.2	1	-145.6
TWI	-60	102.4	102.0	136.2	1	-137.1
TWI	-60	99.0	98.7	136.2	1	-135.3
TWI	-60	115.1	114.7	136.2	1	-143.5
TWI	-60	172.9	172.3	136.2	0	-
TWI	-60	120.5	120.2	136.2	1	-146.0

Max value $T_{o(max)} = -120$ °C

$T_{o(max)} - 8$ °C > $T_{o(step 2)}$: **NO**
→ DATA IS HOMOGENEOUS

T_o for the data set: $T_o = -82.2$ °C

TWI	-60	165.2	164.6	136.2	0	-
TWI	-60	125.6	125.2	136.2	1	-148.2
TWI	-60	126.7	126.3	136.2	1	-148.7
TWI	-60	100.4	100.1	136.2	1	-136.1
TWI	-60	131.1	130.7	136.2	1	-150.6
TWI	-60	185.1	184.5	136.2	0	-
TWI	-60	163.6	163.0	136.2	0	-
TWI	-60	126.5	126.1	136.2	1	-148.6
TWI	-60	164.7	164.1	136.2	0	-
TWI	-60	192.7	192.0	136.2	0	-
TWI	-60	134.5	134.1	136.2	1	-151.9
TWI	-60	140.8	140.3	136.2	0	-
GKSS	-60	109.9	126.5	136.2	1	-148.8
GKSS	-60	131.9	152.5	136.2	0	-
GKSS	-60	136.2	157.6	136.2	0	-
GKSS	-60	154.0	178.8	136.2	0	-
GKSS	-60	115.9	133.6	136.2	1	-151.7
GKSS	-60	150.4	174.4	136.2	0	-

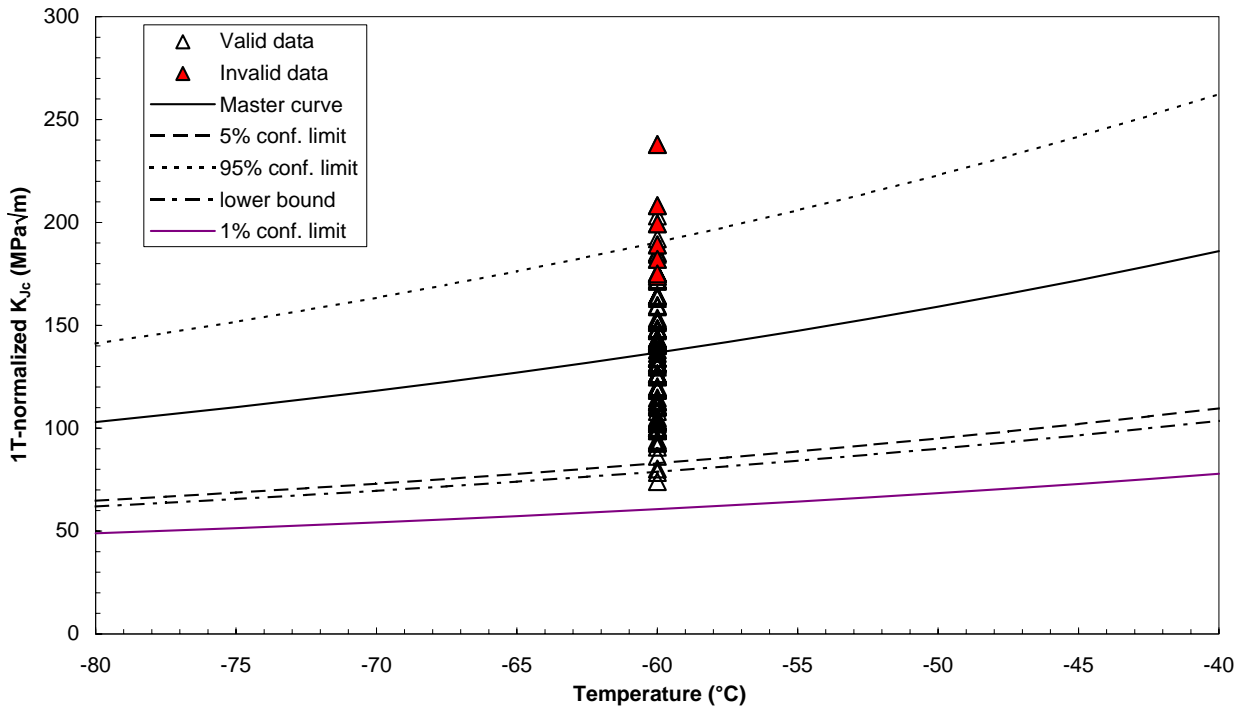
2. Final Master Curve fit to data

Temperature adj. = 3.9 °C (est.) Stand. dev. on T_0 = 2.7 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-60	234.1	199.3				
-60	114.4	99.1				
-60	130.7	112.7				
-60	106.7	92.6				
-60	161.0	138.1				
-60	200.7	171.3				
-60	125.2	108.1				
-60	145.1	124.8				
-60	91.9	80.2				
-60	128.1	110.6				
-60	164.4	140.9				
-60	192.2	164.3				
-60	166.3	142.5				
-60	177.7	152.1				
-60	203.7	173.9				
-60	116.0	100.4				
-60	221.9	189.1				
-60	167.6	143.6				
-60	89.8	78.5				
-60	156.3	134.1				
-60	186.8	159.7				
-60	213.5	182.1				
-60	164.6	141.1				
-60	280.1	237.9				
-60	185.9	159.0				
-60	127.7	110.2				
-60	205.0	175.0				
-60	115.6	100.0				
-60	107.5	93.3				
-60	164.6	141.1				
-60	172.0	147.3				
-60	108.5	94.2				
-60	119.0	102.9				
-60	153.5	131.8				
-60	158.9	136.4				
-60	137.5	118.4				
-60	119.5	103.3				
-60	130.7	112.8				
-60	172.6	147.8				
-60	84.5	74.0				
-60	244.6	208.1				
-60	120.4	104.1				
-60	104.5	90.8				
-60	163.6	140.2				
-60	201.4	172.0				
-60	137.8	118.7				
-60	173.0	148.1				
-60	99.2	86.4				

-60	173.4	148.4				
-60	131.5	113.4				
-60	186.0	185.3				
-60	151.8	151.3				
-60	111.7	111.3				
-60	143.9	143.4				
-60	105.4	105.1				
-60	154.0	153.4				
-60	176.2	175.6				
-60	131.9	131.5				
-60	203.9	203.2				
-60	142.7	142.2				
-60	134.5	134.0				
-60	130.1	129.7				
-60	142.6	142.1				
-60	119.7	119.3				
-60	141.3	140.8				
-60	175.9	175.3				
-60	119.6	119.2				
-60	102.4	102.0				
-60	99.0	98.7				
-60	115.1	114.7				
-60	172.9	172.3				
-60	120.5	120.2				
-60	165.2	164.6				
-60	125.6	125.2				
-60	126.7	126.3				
-60	100.4	100.1				
-60	131.1	130.7				
-60	185.1	184.5				
-60	163.6	163.0				
-60	126.5	126.1				
-60	164.7	164.1				
-60	192.7	192.0				
-60	134.5	134.1				
-60	140.8	140.3				
-60	109.9	126.5				
-60	131.9	152.5				
-80			103.0	64.8	141.1	62.0
-77.5			106.5	66.7	146.3	63.8
-75			110.3	68.7	151.8	65.6
-72.5			114.2	70.8	157.5	67.6
-70			118.3	73.1	163.4	69.6
-67.5			122.5	75.4	169.7	71.8
-65			127.0	77.8	176.3	74.1
-62.5			131.8	80.4	183.2	76.4
-60			136.7	83.0	190.4	78.9
-57.5			141.9	85.8	198.0	81.5
-55			147.4	88.8	205.9	84.2
-52.5			153.1	91.9	214.3	87.1
-50			159.0	95.1	223.0	90.1
-47.5			165.3	98.5	232.2	93.2
-45			171.9	102.0	241.8	96.5
-42.5			178.8	105.8	251.9	100.0
-40			186.0	109.7	262.4	103.6

MASTER CURVE WITH CONFIDENCE LIMITS - SINTAP lower tail analysis
EURO toughness dataset - Dataset -60 °C (excluding SX9)



MASTER CURVE ANALYSIS OF RANDOM INHOMOGENEITIES

Single Point Estimation Method

Step 1: Estimate of the median value of fracture toughness (ASTM E1921-05)

1. Material characteristics

Material specifications : **EURO toughness data set - Dataset -60 °C (excluding SX9)**

2. Dimensional and crack growth requirements

Specimen code	T (°C)	a _o (mm)	W (mm)	B (mm)	b _o (mm)	Δa (mm)	K _{Jc[exp]} (MPa√m)	σ _{ys} (MPa)	E' (GPa)	K _{lim} (MPa√m)	DATA VALID	K _{Jc[calc]} (MPa√m)
GKSS	-60	14.19	25	12.5	10.810	0.05	234.1	506.4	231.4	205.5	NO	205.5
GKSS	-60	14.16	25	12.5	10.840	0.00	114.4	506.4	231.4	205.8	YES	114.4
GKSS	-60	14.31	25	12.5	10.690	0.00	130.7	506.4	231.4	204.4	YES	130.7
GKSS	-60	14.13	25	12.5	10.870	0.00	106.7	506.4	231.4	206.1	YES	106.7
GKSS	-60	14.08	25	12.5	10.920	0.00	161.0	506.4	231.4	206.5	YES	161.0
GKSS	-60	13.58	25	12.5	11.420	0.00	200.7	506.4	231.4	211.2	YES	200.7
GKSS	-60	14.26	25	12.5	10.740	0.00	125.2	506.4	231.4	204.8	YES	125.2
GKSS	-60	14.19	25	12.5	10.810	0.00	145.1	506.4	231.4	205.5	YES	145.1
GKSS	-60	14.00	25	12.5	11.000	0.00	91.9	506.4	231.4	207.3	YES	91.9
GKSS	-60	13.94	25	12.5	11.060	0.00	128.1	506.4	231.4	207.9	YES	128.1
GKSS	-60	14.59	25	12.5	10.410	0.00	164.4	506.4	231.4	201.7	YES	164.4
GKSS	-60	14.53	25	12.5	10.470	0.00	192.2	506.4	231.4	202.2	YES	192.2
GKSS	-60	14.76	25	12.5	10.240	0.00	166.3	506.4	231.4	200.0	YES	166.3
GKSS	-60	14.48	25	12.5	10.520	0.00	177.7	506.4	231.4	202.7	YES	177.7
GKSS	-60	14.55	25	12.5	10.450	0.00	203.7	506.4	231.4	202.0	NO	202.0
GKSS	-60	14.46	25	12.5	10.540	0.00	116.0	506.4	231.4	202.9	YES	116.0
GKSS	-60	14.55	25	12.5	10.450	0.11	221.9	506.4	231.4	202.0	NO	202.0
GKSS	-60	14.77	25	12.5	10.230	0.00	167.6	506.4	231.4	199.9	YES	167.6
GKSS	-60	14.35	25	12.5	10.650	0.00	89.8	506.4	231.4	204.0	YES	89.8
GKSS	-60	14.56	25	12.5	10.440	0.00	156.3	506.4	231.4	201.9	YES	156.3
GKSS	-60	14.49	25	12.5	10.510	0.00	186.8	506.4	231.4	202.6	YES	186.8
GKSS	-60	14.43	25	12.5	10.570	0.00	213.5	506.4	231.4	203.2	NO	203.2
GKSS	-60	14.39	25	12.5	10.610	0.00	164.6	506.4	231.4	203.6	YES	164.6
GKSS	-60	14.49	25	12.5	10.510	0.28	280.1	506.4	231.4	202.6	NO	202.6
GKSS	-60	14.43	25	12.5	10.570	0.00	185.9	506.4	231.4	203.2	YES	185.9
GKSS	-60	14.85	25	12.5	10.150	0.00	127.7	506.4	231.4	199.1	YES	127.7
GKSS	-60	14.64	25	12.5	10.360	0.00	205.0	506.4	231.4	201.2	NO	201.2
GKSS	-60	14.25	25	12.5	10.750	0.00	115.6	506.4	231.4	204.9	YES	115.6
GKSS	-60	14.44	25	12.5	10.560	0.00	107.5	506.4	231.4	203.1	YES	107.5
SIEMENS	-60	13.24	25	12.5	11.760	0.00	164.6	506.4	231.4	214.3	YES	164.6
SIEMENS	-60	13.29	25	12.5	11.710	0.00	172.0	506.4	231.4	213.9	YES	172.0
SIEMENS	-60	13.24	25	12.5	11.760	0.00	108.5	506.4	231.4	214.3	YES	108.5
SIEMENS	-60	13.28	25	12.5	11.720	0.00	119.0	506.4	231.4	214.0	YES	119.0
SIEMENS	-60	13.26	25	12.5	11.740	0.00	153.5	506.4	231.4	214.2	YES	153.5
SIEMENS	-60	13.22	25	12.5	11.780	0.00	158.9	506.4	231.4	214.5	YES	158.9
SIEMENS	-60	13.27	25	12.5	11.730	0.00	137.5	506.4	231.4	214.1	YES	137.5
SIEMENS	-60	13.18	25	12.5	11.820	0.00	119.5	506.4	231.4	214.9	YES	119.5
SIEMENS	-60	13.18	25	12.5	11.820	0.00	130.7	506.4	231.4	214.9	YES	130.7
SIEMENS	-60	13.24	25	12.5	11.760	0.00	172.6	506.4	231.4	214.3	YES	172.6
SIEMENS	-60	13.24	25	12.5	11.760	0.00	84.5	506.4	231.4	214.3	YES	84.5
SIEMENS	-60	13.34	25	12.5	11.660	0.00	244.6	506.4	231.4	213.4	NO	213.4
SIEMENS	-60	13.20	25	12.5	11.800	0.00	120.4	506.4	231.4	214.7	YES	120.4
SIEMENS	-60	13.31	25	12.5	11.690	0.00	104.5	506.4	231.4	213.7	YES	104.5
SIEMENS	-60	13.23	25	12.5	11.770	0.00	163.6	506.4	231.4	214.4	YES	163.6
SIEMENS	-60	13.28	25	12.5	11.720	0.00	201.4	506.4	231.4	214.0	YES	201.4
SIEMENS	-60	13.20	25	12.5	11.800	0.00	137.8	506.4	231.4	214.7	YES	137.8
SIEMENS	-60	13.19	25	12.5	11.810	0.00	173.0	506.4	231.4	214.8	YES	173.0
SIEMENS	-60	13.22	25	12.5	11.780	0.00	99.2	506.4	231.4	214.5	YES	99.2
SIEMENS	-60	13.22	25	12.5	11.780	0.00	173.4	506.4	231.4	214.5	YES	173.4
SIEMENS	-60	13.29	25	12.5	11.710	0.00	131.5	506.4	231.4	213.9	YES	131.5
GKSS	-60	28.06	50	25.0	21.940	0.00	186.0	506.4	231.4	292.8	YES	186.0
GKSS	-60	27.75	50	25.0	22.250	0.00	151.8	506.4	231.4	294.8	YES	151.8
GKSS	-60	27.62	50	25.0	22.380	0.00	111.7	506.4	231.4	295.7	YES	111.7
GKSS	-60	27.65	50	25.0	22.350	0.00	143.9	506.4	231.4	295.5	YES	143.9
GKSS	-60	27.71	50	25.0	22.290	0.00	105.4	506.4	231.4	295.1	YES	105.4
GKSS	-60	28.01	50	25.0	21.990	0.00	154.0	506.4	231.4	293.1	YES	154.0
GKSS	-60	27.97	50	25.0	22.030	0.00	176.2	506.4	231.4	293.4	YES	176.2
GKSS	-60	27.51	50	25.0	22.490	0.00	131.9	506.4	231.4	296.4	YES	131.9
GKSS	-60	27.86	50	25.0	22.140	0.00	203.9	506.4	231.4	294.1	YES	203.9
GKSS	-60	27.51	50	25.0	22.490	0.00	142.7	506.4	231.4	296.4	YES	142.7
TWI	-60	27.42	50	25.0	22.580	0.06	134.5	506.4	231.4	297.0	YES	134.5
TWI	-60	27.43	50	25.0	22.570	0.00	130.1	506.4	231.4	296.9	YES	130.1
TWI	-60	27.62	50	25.0	22.380	0.07	142.6	506.4	231.4	295.7	YES	142.6
TWI	-60	27.47	50	25.0	22.530	0.05	119.7	506.4	231.4	296.7	YES	119.7
TWI	-60	27.49	50	25.0	22.510	0.07	141.3	506.4	231.4	296.5	YES	141.3
TWI	-60	27.95	50	25.0	22.050	0.10	175.9	506.4	231.4	293.5	YES	175.9
TWI	-60	27.62	50	25.0	22.380	0.00	119.6	506.4	231.4	295.7	YES	119.6
TWI	-60	27.65	50	25.0	22.350	0.00	102.4	506.4	231.4	295.5	YES	102.4
TWI	-60	27.68	50	25.0	22.320	0.00	99.0	506.4	231.4	295.3	YES	99.0
TWI	-60	27.82	50	25.0	22.180	0.05	115.1	506.4	231.4	294.4	YES	115.1

TWI	-60	27.98	50	25.0	22.020	0.11	172.9	506.4	231.4	293.3	YES	172.9
TWI	-60	27.72	50	25.0	22.280	0.03	120.5	506.4	231.4	295.0	YES	120.5
TWI	-60	27.48	50	25.0	22.520	0.00	165.2	506.4	231.4	296.6	YES	165.2
TWI	-60	27.54	50	25.0	22.460	0.00	125.6	506.4	231.4	296.2	YES	125.6
TWI	-60	27.88	50	25.0	22.120	0.05	126.7	506.4	231.4	294.0	YES	126.7
TWI	-60	27.79	50	25.0	22.210	0.00	100.4	506.4	231.4	294.6	YES	100.4
TWI	-60	27.56	50	25.0	22.440	0.05	131.1	506.4	231.4	296.1	YES	131.1
TWI	-60	27.58	50	25.0	22.420	0.06	185.1	506.4	231.4	295.9	YES	185.1
TWI	-60	27.59	50	25.0	22.410	0.09	163.6	506.4	231.4	295.9	YES	163.6
TWI	-60	27.68	50	25.0	22.320	0.09	126.5	506.4	231.4	295.3	YES	126.5
TWI	-60	27.65	50	25.0	22.350	0.10	164.7	506.4	231.4	295.5	YES	164.7
TWI	-60	27.73	50	25.0	22.270	0.16	192.7	506.4	231.4	294.9	YES	192.7
TWI	-60	27.65	50	25.0	22.350	0.05	134.5	506.4	231.4	295.5	YES	134.5
TWI	-60	27.86	50	25.0	22.140	0.05	140.8	506.4	231.4	294.1	YES	140.8
GKSS	-60	57.56	100	50.0	42.440	0.00	109.9	506.4	231.4	407.2	YES	109.9
GKSS	-60	56.69	100	50.0	43.310	0.00	131.9	506.4	231.4	411.3	YES	131.9
GKSS	-60	56.69	100	50.0	43.310	0.00	136.2	506.4	231.4	411.3	YES	136.2
GKSS	-60	56.51	100	50.0	43.490	0.00	154.0	506.4	231.4	412.2	YES	154.0
GKSS	-60	56.15	100	50.0	43.850	0.00	115.9	506.4	231.4	413.9	YES	115.9
GKSS	-60	55.96	100	50.0	44.040	0.00	150.4	506.4	231.4	414.8	YES	150.4

3. Application of the multi-temperature approach for the calculation of the reference temperature

T limits

USE LIMITS : YES

-144

-44

Specimen code	T (°C)	$K_{Jc[calc]}$ (MPa√m)	$K_{Jc(1T)}$ (MPa√m)	δ_i	n_i	1° member	2° member
GKSS	-60	205.5	175.4	0	0.000	0.0000	0.0112
GKSS	-60	114.4	99.1	1	0.167	0.0121	0.0007
GKSS	-60	130.7	112.7	1	0.167	0.0121	0.0014
GKSS	-60	106.7	92.6	1	0.167	0.0121	0.0005
GKSS	-60	161.0	138.1	1	0.167	0.0121	0.0037
GKSS	-60	200.7	171.3	1	0.167	0.0121	0.0101
GKSS	-60	125.2	108.1	1	0.167	0.0121	0.0012
GKSS	-60	145.1	124.8	1	0.167	0.0121	0.0023
GKSS	-60	91.9	80.2	1	0.167	0.0121	0.0003
GKSS	-60	128.1	110.6	1	0.167	0.0121	0.0013
GKSS	-60	164.4	140.9	1	0.167	0.0121	0.0041
GKSS	-60	192.2	164.3	1	0.167	0.0121	0.0083
GKSS	-60	166.3	142.5	1	0.167	0.0121	0.0043
GKSS	-60	177.7	152.1	1	0.167	0.0121	0.0058
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0104
GKSS	-60	116.0	100.4	1	0.167	0.0121	0.0008
GKSS	-60	202.0	172.5	0	0.000	0.0000	0.0104
GKSS	-60	167.6	143.6	1	0.167	0.0121	0.0045
GKSS	-60	89.8	78.5	1	0.167	0.0121	0.0002
GKSS	-60	156.3	134.1	1	0.167	0.0121	0.0033
GKSS	-60	186.8	159.7	1	0.167	0.0121	0.0073
GKSS	-60	203.2	173.4	0	0.000	0.0000	0.0106
GKSS	-60	164.6	141.1	1	0.167	0.0121	0.0041
GKSS	-60	202.6	173.0	0	0.000	0.0000	0.0105
GKSS	-60	185.9	159.0	1	0.167	0.0121	0.0072
GKSS	-60	127.7	110.2	1	0.167	0.0121	0.0013
GKSS	-60	201.2	171.7	0	0.000	0.0000	0.0102
GKSS	-60	115.6	100.0	1	0.167	0.0121	0.0008
GKSS	-60	107.5	93.3	1	0.167	0.0121	0.0006
SIEMENS	-60	164.6	141.1	1	0.167	0.0121	0.0041
SIEMENS	-60	172.0	147.3	1	0.167	0.0121	0.0050
SIEMENS	-60	108.5	94.2	1	0.167	0.0121	0.0006
SIEMENS	-60	119.0	102.9	1	0.167	0.0121	0.0009
SIEMENS	-60	153.5	131.8	1	0.167	0.0121	0.0030
SIEMENS	-60	158.9	136.4	1	0.167	0.0121	0.0035
SIEMENS	-60	137.5	118.4	1	0.167	0.0121	0.0018
SIEMENS	-60	119.5	103.3	1	0.167	0.0121	0.0009
SIEMENS	-60	130.7	112.8	1	0.167	0.0121	0.0014
SIEMENS	-60	172.6	147.8	1	0.167	0.0121	0.0051
SIEMENS	-60	84.5	74.0	1	0.167	0.0121	0.0002
SIEMENS	-60	213.4	182.0	0	0.000	0.0000	0.0132
SIEMENS	-60	120.4	104.1	1	0.167	0.0121	0.0010
SIEMENS	-60	104.5	90.8	1	0.167	0.0121	0.0005
SIEMENS	-60	163.6	140.2	1	0.167	0.0121	0.0040
SIEMENS	-60	201.4	172.0	1	0.167	0.0121	0.0102
SIEMENS	-60	137.8	118.7	1	0.167	0.0121	0.0018
SIEMENS	-60	173.0	148.1	1	0.167	0.0121	0.0052
SIEMENS	-60	99.2	86.4	1	0.167	0.0121	0.0004
SIEMENS	-60	173.4	148.4	1	0.167	0.0121	0.0052
SIEMENS	-60	131.5	113.4	1	0.167	0.0121	0.0015
GKSS	-60	186.0	185.3	1	0.167	0.0121	0.0143
GKSS	-60	151.8	151.3	1	0.167	0.0121	0.0057
GKSS	-60	111.7	111.3	1	0.167	0.0121	0.0013
GKSS	-60	143.9	143.4	1	0.167	0.0121	0.0044
GKSS	-60	105.4	105.1	1	0.167	0.0121	0.0010
GKSS	-60	154.0	153.4	1	0.167	0.0121	0.0061
GKSS	-60	176.2	175.6	1	0.167	0.0121	0.0112
GKSS	-60	131.9	131.5	1	0.167	0.0121	0.0030

Sum of 1° member: 1.003

Sum of 2° member: 0.439

Difference: 0.564

$T_0 = -94.2$ °C
(valid per ASTM E1921)

$\sum_i n_i = 13.83$

N = 90
r = 83

$K_{min} = 20$ MPa√m

$K_{o,eq} = 177.9$ MPa√m

$K_{med,eq} = 164.0$ MPa√m

GKSS	-60	203.9	203.2	1	0.167	0.0121	0.0216
GKSS	-60	142.7	142.2	1	0.167	0.0121	0.0043
TWI	-60	134.5	134.0	1	0.167	0.0121	0.0032
TWI	-60	130.1	129.7	1	0.167	0.0121	0.0028
TWI	-60	142.6	142.1	1	0.167	0.0121	0.0043
TWI	-60	119.7	119.3	1	0.167	0.0121	0.0019
TWI	-60	141.3	140.8	1	0.167	0.0121	0.0041
TWI	-60	175.9	175.3	1	0.167	0.0121	0.0112
TWI	-60	119.6	119.2	1	0.167	0.0121	0.0019
TWI	-60	102.4	102.0	1	0.167	0.0121	0.0009
TWI	-60	99.0	98.7	1	0.167	0.0121	0.0007
TWI	-60	115.1	114.7	1	0.167	0.0121	0.0015
TWI	-60	172.9	172.3	1	0.167	0.0121	0.0103
TWI	-60	120.5	120.2	1	0.167	0.0121	0.0019
TWI	-60	165.2	164.6	1	0.167	0.0121	0.0084
TWI	-60	125.6	125.2	1	0.167	0.0121	0.0023
TWI	-60	126.7	126.3	1	0.167	0.0121	0.0025
TWI	-60	100.4	100.1	1	0.167	0.0121	0.0008
TWI	-60	131.1	130.7	1	0.167	0.0121	0.0029
TWI	-60	185.1	184.5	1	0.167	0.0121	0.0140
TWI	-60	163.6	163.0	1	0.167	0.0121	0.0080
TWI	-60	126.5	126.1	1	0.167	0.0121	0.0024
TWI	-60	164.7	164.1	1	0.167	0.0121	0.0083
TWI	-60	192.7	192.0	1	0.167	0.0121	0.0168
TWI	-60	134.5	134.1	1	0.167	0.0121	0.0032
TWI	-60	140.8	140.3	1	0.167	0.0121	0.0040
GKSS	-60	109.9	126.5	1	0.167	0.0121	0.0025
GKSS	-60	131.9	152.5	1	0.167	0.0121	0.0059
GKSS	-60	136.2	157.6	1	0.167	0.0121	0.0069
GKSS	-60	154.0	178.8	1	0.167	0.0121	0.0122
GKSS	-60	115.9	133.6	1	0.167	0.0121	0.0032
GKSS	-60	150.4	174.4	1	0.167	0.0121	0.0109

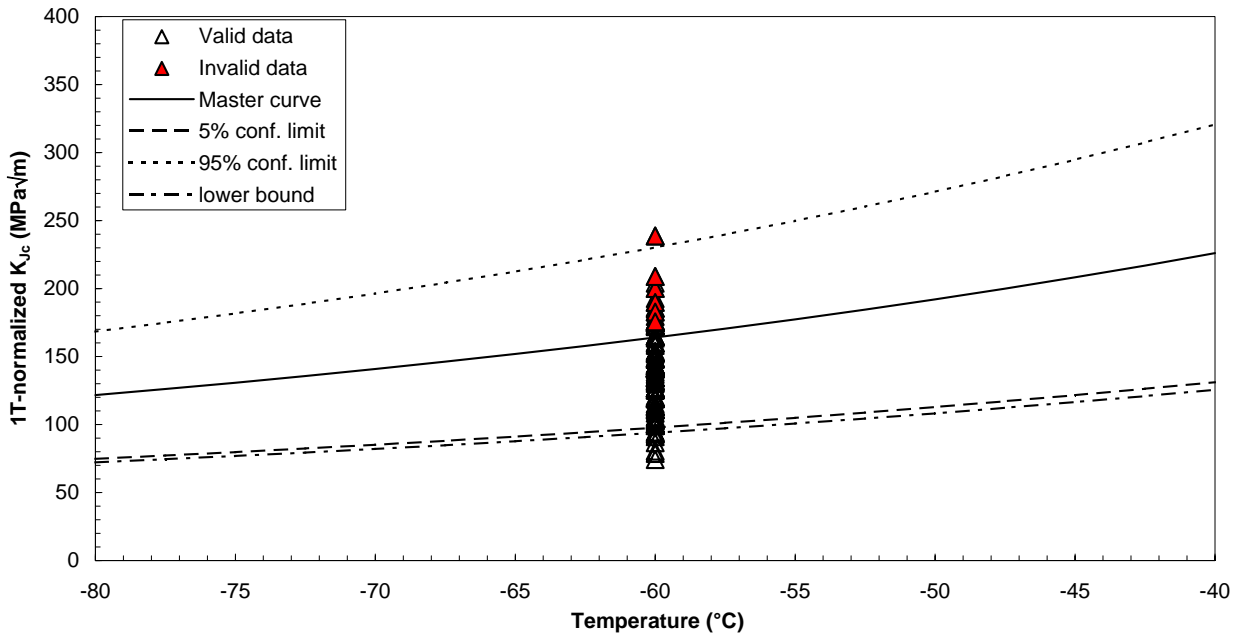
4. Master curve fit to data

Temperature adj. = 2.8 °C (est.) Stand. dev. on T_0 = 2.0 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-60	234.1	200.0				
-60	114.4	99.4				
-60	130.7	113.1				
-60	106.7	92.9				
-60	161.0	138.5				
-60	200.7	171.9				
-60	125.2	108.4				
-60	145.1	125.2				
-60	91.9	80.4				
-60	128.1	110.9				
-60	164.4	141.4				
-60	192.2	164.8				
-60	166.3	143.0				
-60	177.7	152.6				
-60	203.7	174.5				
-60	116.0	100.7				
-60	221.9	189.8				
-60	167.6	144.1				
-60	89.8	78.7				
-60	156.3	134.6				
-60	186.8	160.2				
-60	213.5	182.7				
-60	164.6	141.6				
-60	280.1	238.7				
-60	185.9	159.5				
-60	127.7	110.6				
-60	205.0	175.6				
-60	115.6	100.4				
-60	107.5	93.6				
-60	164.6	141.6				
-60	172.0	147.8				
-60	108.5	94.5				
-60	119.0	103.2				
-60	153.5	132.3				
-60	158.9	136.8				
-60	137.5	118.8				
-60	119.5	103.7				
-60	130.7	113.1				
-60	172.6	148.3				
-60	84.5	74.2				
-60	244.6	208.9				
-60	120.4	104.4				
-60	104.5	91.1				
-60	163.6	140.7				
-60	201.4	172.6				
-60	137.8	119.0				

-60	173.0	148.6				
-60	99.2	86.6				
-60	173.4	149.0				
-60	131.5	113.7				
-60	186.0	186.0				
-60	151.8	151.8				
-60	111.7	111.7				
-60	143.9	143.9				
-60	105.4	105.4				
-60	154.0	154.0				
-60	176.2	176.2				
-60	131.9	131.9				
-60	203.9	203.9				
-60	142.7	142.7				
-60	134.5	134.5				
-60	130.1	130.1				
-60	142.6	142.6				
-60	119.7	119.7				
-60	141.3	141.3				
-60	175.9	175.9				
-60	119.6	119.6				
-60	102.4	102.4				
-60	99.0	99.0				
-60	115.1	115.1				
-60	172.9	172.9				
-60	120.5	120.5				
-60	165.2	165.2				
-60	125.6	125.6				
-60	126.7	126.7				
-60	100.4	100.4				
-60	131.1	131.1				
-60	185.1	185.1				
-60	163.6	163.6				
-60	126.5	126.5				
-60	164.7	164.7				
-60	192.7	192.7				
-60	134.5	134.5				
-60	140.8	140.8				
-60	109.9	126.9				
-60	131.9	153.0				
-60	136.2	158.2				
-60	154.0	179.4				
-60	115.9	134.1				
-60	150.4	175.1				
-80			121.7	74.9	168.4	72.3
-77.5			126.1	77.3	174.9	74.6
-75			130.8	79.8	181.8	77.0
-72.5			135.7	82.5	188.9	79.5
-70			140.8	85.3	196.4	82.1
-67.5			146.2	88.2	204.3	84.9
-65			151.9	91.2	212.6	87.8
-62.5			157.8	94.4	221.2	90.8
-60			164.0	97.8	230.3	94.0
-57.5			170.6	101.3	239.8	97.3
-55			177.4	105.0	249.8	100.8
-52.5			184.6	108.9	260.3	104.5
-50			192.1	112.9	271.3	108.3
-47.5			200.0	117.2	282.8	112.4
-45			208.2	121.7	294.8	116.6
-42.5			216.9	126.3	307.5	121.0
-40			226.0	131.2	320.8	125.7

MASTER CURVE FOR 1TCT WITH CONFIDENCE LIMITS (E1921-05 analysis)
EURO toughness dataset - Dataset -60 °C (excluding SX9)



MASTER CURVE ANALYSIS OF RANDOM INHOMOGENEITIES

Single Point Estimation Method

Step 2: Single point estimation

1. Calculation of the maximum value of T_o (based on a single data point) and establishment of T_o for the data set

Specimen code	T (°C)	$K_{Jc[exp]}$ (MPa√m)	K_{Jc-1T} (MPa√m)	$K_{analysis}$ (MPa√m)	δ_i	$T_{o(i)}$ (°C)
GKSS	-60	234.1	199.3	175.4	0	-
GKSS	-60	114.4	99.1	99.1	1	-59
GKSS	-60	130.7	112.7	112.7	1	-69
GKSS	-60	106.7	92.6	92.6	1	-54
GKSS	-60	161.0	138.1	138.1	1	-83
GKSS	-60	200.7	171.3	171.3	1	-97
GKSS	-60	125.2	108.1	108.1	1	-66
GKSS	-60	145.1	124.8	124.8	1	-76
GKSS	-60	91.9	80.2	80.2	1	-43
GKSS	-60	128.1	110.6	110.6	1	-67
GKSS	-60	164.4	140.9	140.9	1	-84
GKSS	-60	192.2	164.3	164.3	1	-94
GKSS	-60	166.3	142.5	142.5	1	-85
GKSS	-60	177.7	152.1	152.1	1	-89
GKSS	-60	203.7	173.9	172.5	0	-
GKSS	-60	116.0	100.4	100.4	1	-60
GKSS	-60	221.9	189.1	172.5	0	-
GKSS	-60	167.6	143.6	143.6	1	-85
GKSS	-60	89.8	78.5	78.5	1	-41
GKSS	-60	156.3	134.1	134.1	1	-81
GKSS	-60	186.8	159.7	159.7	1	-92
GKSS	-60	213.5	182.1	173.4	0	-
GKSS	-60	164.6	141.1	141.1	1	-84
GKSS	-60	280.1	237.9	173.0	0	-
GKSS	-60	185.9	159.0	159.0	1	-92
GKSS	-60	127.7	110.2	110.2	1	-67
GKSS	-60	205.0	175.0	171.7	0	-
GKSS	-60	115.6	100.0	100.0	1	-60
GKSS	-60	107.5	93.3	93.3	1	-55
SIEMENS	-60	164.6	141.1	141.1	1	-84
SIEMENS	-60	172.0	147.3	147.3	1	-87
SIEMENS	-60	108.5	94.2	94.2	1	-55
SIEMENS	-60	119.0	102.9	102.9	1	-62
SIEMENS	-60	153.5	131.8	131.8	1	-80
SIEMENS	-60	158.9	136.4	136.4	1	-82
SIEMENS	-60	137.5	118.4	118.4	1	-72
SIEMENS	-60	119.5	103.3	103.3	1	-62
SIEMENS	-60	130.7	112.8	112.8	1	-69
SIEMENS	-60	172.6	147.8	147.8	1	-87
SIEMENS	-60	84.5	74.0	74.0	1	-36
SIEMENS	-60	244.6	208.1	182.0	0	-
SIEMENS	-60	120.4	104.1	104.1	1	-63
SIEMENS	-60	104.5	90.8	90.8	1	-53
SIEMENS	-60	163.6	140.2	140.2	1	-84
SIEMENS	-60	201.4	172.0	172.0	1	-97
SIEMENS	-60	137.8	118.7	118.7	1	-72
SIEMENS	-60	173.0	148.1	148.1	1	-88
SIEMENS	-60	99.2	86.4	86.4	1	-49
SIEMENS	-60	173.4	148.4	148.4	1	-88
SIEMENS	-60	131.5	113.4	113.4	1	-69
GKSS	-60	186.0	185.3	185.3	1	-102
GKSS	-60	151.8	151.3	151.3	1	-89
GKSS	-60	111.7	111.3	111.3	1	-68
GKSS	-60	143.9	143.4	143.4	1	-85
GKSS	-60	105.4	105.1	105.1	1	-64
GKSS	-60	154.0	153.4	153.4	1	-90
GKSS	-60	176.2	175.6	175.6	1	-99
GKSS	-60	131.9	131.5	131.5	1	-80
GKSS	-60	203.9	203.2	203.2	1	-108
GKSS	-60	142.7	142.2	142.2	1	-85
TWI	-60	134.5	134.0	134.0	1	-81
TWI	-60	130.1	129.7	129.7	1	-79
TWI	-60	142.6	142.1	142.1	1	-85
TWI	-60	119.7	119.3	119.3	1	-73
TWI	-60	141.3	140.8	140.8	1	-84
TWI	-60	175.9	175.3	175.3	1	-98
TWI	-60	119.6	119.2	119.2	1	-73
TWI	-60	102.4	102.0	102.0	1	-62
TWI	-60	99.0	98.7	98.7	1	-59
TWI	-60	115.1	114.7	114.7	1	-70

$T_{o(SP)} = -82.1 \text{ °C}$

$\sigma_{T_o(SP)} = 0 \text{ °C}$

(*) $K_{Jc-1T} < 30 \text{ MPa}\sqrt{\text{m}}$

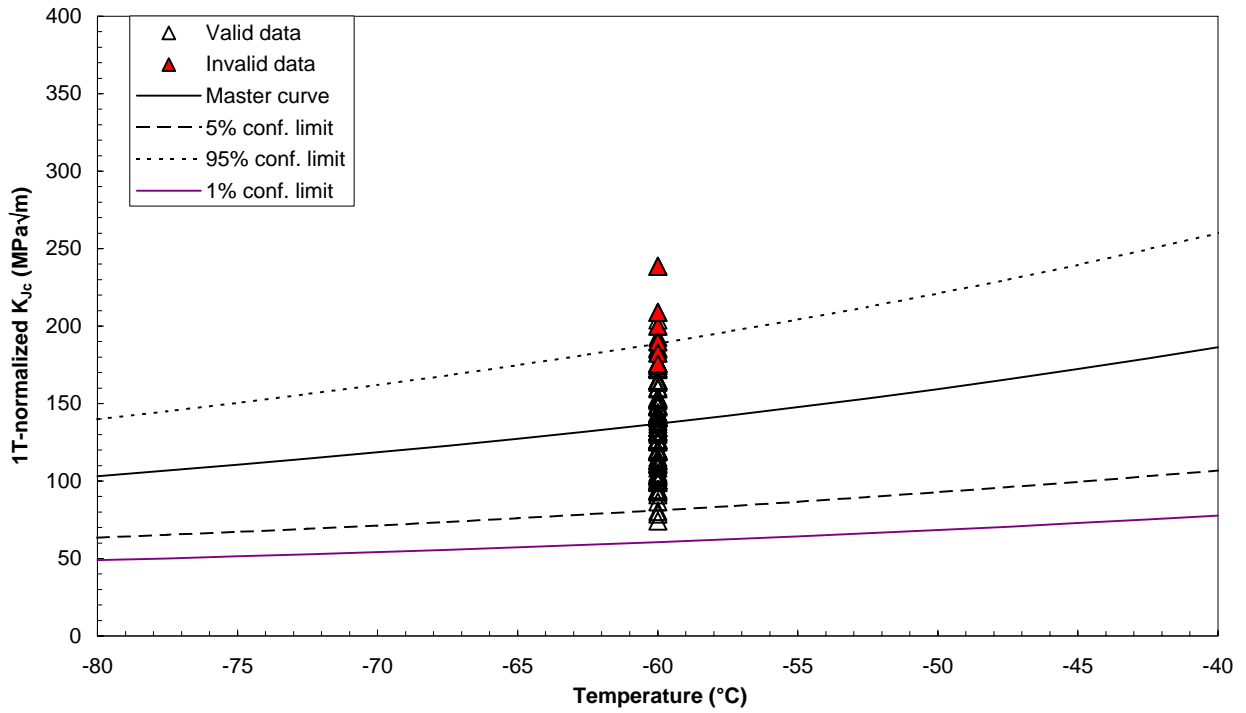
TWI	-60	172.9	172.3	172.3	1	-97
TWI	-60	120.5	120.2	120.2	1	-73
TWI	-60	165.2	164.6	164.6	1	-94
TWI	-60	125.6	125.2	125.2	1	-76
TWI	-60	126.7	126.3	126.3	1	-77
TWI	-60	100.4	100.1	100.1	1	-60
TWI	-60	131.1	130.7	130.7	1	-79
TWI	-60	185.1	184.5	184.5	1	-102
TWI	-60	163.6	163.0	163.0	1	-94
TWI	-60	126.5	126.1	126.1	1	-77
TWI	-60	164.7	164.1	164.1	1	-94
TWI	-60	192.7	192.0	192.0	1	-104
TWI	-60	134.5	134.1	134.1	1	-81
TWI	-60	140.8	140.3	140.3	1	-84
GKSS	-60	109.9	126.5	126.5	1	-77
GKSS	-60	131.9	152.5	152.5	1	-89
GKSS	-60	136.2	157.6	157.6	1	-92
GKSS	-60	154.0	178.8	178.8	1	-100
GKSS	-60	115.9	133.6	133.6	1	-81
GKSS	-60	150.4	174.4	174.4	1	-98

2. Revised Master Curve fit to data

<i>T</i> (°C)	<i>K_{Jc(exp)}</i> (MPa √m)	<i>K_{Jc(1T)}</i> (MPa √m)	<i>K_{MC(1T)}</i> (MPa √m)	5% conf. (MPa √m)	95% conf. (MPa √m)	5% L.B. (MPa √m)
-60	234.1	200.0				
-60	114.4	99.4				
-60	130.7	113.1				
-60	106.7	92.9				
-60	161.0	138.5				
-60	200.7	171.9				
-60	125.2	108.4				
-60	145.1	125.2				
-60	91.9	80.4				
-60	128.1	110.9				
-60	164.4	141.4				
-60	192.2	164.8				
-60	166.3	143.0				
-60	177.7	152.6				
-60	203.7	174.5				
-60	116.0	100.7				
-60	221.9	189.8				
-60	167.6	144.1				
-60	89.8	78.7				
-60	156.3	134.6				
-60	186.8	160.2				
-60	213.5	182.7				
-60	164.6	141.6				
-60	280.1	238.7				
-60	185.9	159.5				
-60	127.7	110.6				
-60	205.0	175.6				
-60	115.6	100.4				
-60	107.5	93.6				
-60	164.6	141.6				
-60	172.0	147.8				
-60	108.5	94.5				
-60	119.0	103.2				
-60	153.5	132.3				
-60	158.9	136.8				
-60	137.5	118.8				
-60	119.5	103.7				
-60	130.7	113.1				
-60	172.6	148.3				
-60	84.5	74.2				
-60	244.6	208.9				
-60	120.4	104.4				
-60	104.5	91.1				
-60	163.6	140.7				
-60	201.4	172.6				
-60	137.8	119.0				

-60	173.0	148.6			
-60	99.2	86.6			
-60	173.4	149.0			
-60	131.5	113.7			
-60	186.0	186.0			
-60	151.8	151.8			
-60	111.7	111.7			
-60	143.9	143.9			
-60	105.4	105.4			
-60	154.0	154.0			
-60	176.2	176.2			
-60	131.9	131.9			
-60	203.9	203.9			
-60	142.7	142.7			
-60	134.5	134.5			
-60	130.1	130.1			
-60	142.6	142.6			
-60	119.7	119.7			
-60	141.3	141.3			
-60	175.9	175.9			
-60	119.6	119.6			
-60	102.4	102.4			
-60	99.0	99.0			
-60	115.1	115.1			
-60	172.9	172.9			
-60	120.5	120.5			
-60	165.2	165.2			
-60	125.6	125.6			
-60	126.7	126.7			
-60	100.4	100.4			
-60	131.1	131.1			
-60	185.1	185.1			
-60	163.6	163.6			
-60	126.5	126.5			
-60	164.7	164.7			
-60	192.7	192.7			
-60	134.5	134.5			
-60	140.8	140.8			
-60	109.9	126.9			
-60	131.9	153.0			
-80			103.2	63.4	139.9
-77.5			106.7	65.2	145.1
-75			110.5	67.2	150.5
-72.5			114.4	69.2	156.1
-70			118.5	71.4	162.0
-67.5			122.8	73.6	168.2
-65			127.3	76.0	174.7
-62.5			132.0	78.4	181.5
-60			137.0	81.0	188.7
-57.5			142.2	83.7	196.2
-55			147.7	86.6	204.1
-52.5			153.4	89.6	212.3
-50			159.4	92.7	221.0
-47.5			165.7	96.0	230.0
-45			172.3	99.4	239.6
-42.5			179.2	103.0	249.5
-40			186.5	106.8	260.0
					77.8

MASTER CURVE WITH CONFIDENCE LIMITS - Single Point Estimation Method
EURO toughness dataset - Dataset -60 °C (excluding SX9)



Calculation name: EURO dataset - Data -60 °C excluding SX9			
Data set length:	90	Submitted on:	2006-Nov-03 22:29:12
Data set limit:	max. allowed	Calculation time:	2.313 seconds

Master Curve results (Version 1.1.2.0)

1. Master Curve analysis of homogeneous material (ASTM E1921-05)

Reference temperature T_0 (°C)	-82.4
One standard deviation on T_0 (°C)	2.0
$K_{Jc,1T,med.,eq}$ (MPaVm)	137.2
Left temperature window (°C)	-132.4
Right temperature window (°C)	-32.4
Number of data	90
Number of data outside the temperature window	0
Number of valid data, r	83
Sum of n_i	13.83
Sum of \ln of probability density	-412.57

Minimum number of specimen satisfied

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-132.4	32.9	39.4	57.2	73.6	79.7
-125.3	34.3	41.5	61.2	79.3	86.1
-118.1	35.9	43.8	65.7	85.9	93.3
-111.0	37.6	46.5	70.9	93.3	101.7
-103.9	39.7	49.6	76.8	101.9	111.2
-96.7	42.1	53.2	83.6	111.7	122.1
-89.6	44.8	57.2	91.4	122.9	134.6
-82.4	47.9	61.9	100.3	135.8	148.9
-75.3	51.4	67.2	110.5	150.5	165.3
-68.1	55.5	73.3	122.2	167.4	184.1
-61.0	60.1	80.3	135.6	186.7	205.6
-53.9	65.4	88.3	150.9	208.8	230.2
-46.7	71.5	97.5	168.5	234.1	258.4
-39.6	78.5	108.0	188.6	263.2	290.8
-32.4	86.5	120.0	211.7	296.4	327.8

2. Bi-modal Master Curve analysis for data set suspected to contains two populations

Reference temperature population A, T_a	-72.1 °C
One standard deviation on T_a	8.2 °C
Reference temperature population B, T_b	-83.3 °C
One standard deviation on T_b	1.9 °C
Likelihood to be from population A, p_a	0.10
One standard deviation on p_a	0.1
Left temperature window (°C)	-133.3
Right temperature window(°C)	-22.1
Number of data	90
Number of data outside the temperature window	0
Number of valid data, r	83
Sum of \ln of probability density	-412.54

The analysis is unable to guarantee that the data contains two populations

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-133.3	32.7	39.0	56.6	73.2	79.4
-125.3	34.1	41.3	61.0	79.5	86.5
-117.4	35.9	43.9	66.0	86.9	94.7
-109.5	37.9	46.9	71.8	95.5	104.3
-101.5	40.2	50.4	78.6	105.4	115.3
-93.6	43.0	54.5	86.6	117.0	128.3
-85.6	46.1	59.3	95.8	130.4	143.3
-77.7	49.8	64.8	106.5	146.1	160.8
-69.7	54.1	71.3	118.9	164.3	181.1
-61.8	59.1	78.8	133.4	185.5	204.8
-53.8	64.9	87.5	150.3	210.1	232.3
-45.9	71.6	97.6	169.9	238.7	264.2
-38.0	79.4	109.4	192.6	272.0	301.4
-30.0	88.5	123.1	219.1	310.7	344.7
-22.1	99.1	139.0	249.9	355.7	394.9

3. Master Curve analysis for data set suspected to be randomly inhomogeneous

Mean reference temperature, T	-82.4 °C
One standard deviation on the mean T	1.1 °C
Left temperature window(°C)	-134.5
Right temperature window(°C)	-30.2
Number of data	90
Number of data outside the temperature window	0
Number of valid data, r	83
Sum of ln of probability density	-412.57

The analysis is unable to guarantee that the material is randomly heterogeneous

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-134.5	32.5	38.8	56.1	72.1	78.1
-127.1	33.9	40.9	60.1	77.9	84.5
-119.6	35.5	43.3	64.6	84.5	91.8
-112.2	37.3	46.0	69.9	92.1	100.3
-104.7	39.4	49.2	76.0	100.8	110.1
-97.3	41.8	52.8	83.0	110.9	121.3
-89.8	44.6	57.0	91.0	122.5	134.3
-82.4	47.8	61.8	100.3	135.9	149.2
-74.9	51.5	67.4	111.0	151.3	166.4
-67.5	55.8	73.9	123.3	169.1	186.2
-60.0	60.7	81.2	137.4	189.6	209.1
-52.6	66.4	89.7	153.8	213.2	235.4
-45.1	72.9	99.5	172.6	240.4	265.7
-37.7	80.4	110.9	194.3	271.7	300.6
-30.2	89.1	123.9	219.2	307.7	340.8

ANNEX 6

Master Curve analyses performed
on blocks SX9 and SX12

**STANDARD TEST METHOD FOR THE DETERMINATION OF REFERENCE TEMPERATURE
T₀ FOR FERRITIC STEELS IN THE TRANSITION RANGE**

[MULTI-TEMPERATURE APPROACH - IN ACCORDANCE WITH ASTM E1921-05]

1. Material characteristics

Material specifications : **EURO toughness data set - Block SX12**

2. Dimensional and crack growth requirements

Block	T (°C)	a ₀ (mm)	W (mm)	B (mm)	b ₀ (mm)	Δa (mm)	K _{Jc[exp]} (MPa√m)	σ _{ys} (MPa)	E' (GPa)	K _{lim} (MPa√m)	DATA VALID	K _{Jc[calc]} (MPa√m)
SX12	-91	111.92	200	100.0	88.08	0.00	84.4	538.9	233.5	607.8	YES	84.4
SX12	-40	14.00	25	12.5	11.00	0.00	180.6	492.0	230.1	203.7	YES	180.6
SX12	-40	14.03	25	12.5	10.97	0.00	206.7	492.0	230.1	203.5	NO	203.5
SX12	-40	14.59	25	12.5	10.41	0.00	240.7	492.0	230.1	198.2	NO	198.2
SX12	-40	14.44	25	12.5	10.56	0.00	270.8	492.0	230.1	199.6	NO	199.6
SX12	-40	14.05	25	12.5	10.95	0.00	186.4	492.0	230.1	203.3	YES	186.4
SX12	-40	14.46	25	12.5	10.54	0.18	255.8	492.0	230.1	199.4	NO	199.4
SX12	-40	13.93	25	12.5	11.07	0.12	231.2	492.0	230.1	204.4	NO	204.4
SX12	-40	14.15	25	12.5	10.85	0.44	339.4	492.0	230.1	202.4	NO	202.4
SX12	-40	14.06	25	12.5	10.94	0.83	403.1	492.0	230.1	203.2	NO	203.2
SX12	-40	14.31	25	12.5	10.69	0.83	399.2	492.0	230.1	200.9	NO	200.9
SX12	-40	13.63	25	12.5	11.37	0.08	171.0	492.0	230.1	207.1	YES	171.0
SX12	-40	13.73	25	12.5	11.27	2.05	569.4	492.0	230.1	206.2	NO	206.2
SX12	-40	13.78	25	12.5	11.22	0.13	169.4	492.0	230.1	205.8	YES	169.4
SX12	-40	14.02	25	12.5	10.98	1.93	548.7	492.0	230.1	203.6	NO	203.6
SX12	-40	14.13	25	12.5	10.87	1.67	529.9	492.0	230.1	202.5	NO	202.5
SX12	-40	13.62	25	12.5	11.38	0.36	318.5	492.0	230.1	207.2	NO	207.2
SX12	-40	13.77	25	12.5	11.23	2.07	574.8	492.0	230.1	205.9	NO	205.9
SX12	-40	13.70	25	12.5	11.30	0.69	360.8	492.0	230.1	206.5	NO	206.5
SX12	-40	13.61	25	12.5	11.39	0.60	343.8	492.0	230.1	207.3	NO	207.3
SX12	-40	13.85	25	12.5	11.15	0.26	235.8	492.0	230.1	205.1	NO	205.1
SX12	-40	14.10	25	12.5	10.90	1.79	529.9	492.0	230.1	202.8	NO	202.8
SX12	-40	13.88	25	12.5	11.12	1.44	496.5	492.0	230.1	204.9	NO	204.9
SX12	-40	13.84	25	12.5	11.16	2.08	600.0	492.0	230.1	205.2	NO	205.2
SX12	-40	13.91	25	12.5	11.09	0.07	113.7	492.0	230.1	204.6	YES	113.7
SX12	-40	13.89	25	12.5	11.11	0.21	229.6	492.0	230.1	204.8	NO	204.8
SX12	-40	13.99	25	12.5	11.01	0.09	154.2	492.0	230.1	203.8	YES	154.2
SX12	-40	13.73	25	12.5	11.27	0.24	221.3	492.0	230.1	206.2	NO	206.2
SX12	-40	13.95	25	12.5	11.05	1.37	486.7	492.0	230.1	204.2	NO	204.2
SX12	-40	13.61	25	12.5	11.39	0.25	243.8	492.0	230.1	207.3	NO	207.3
SX12	-40	13.74	25	12.5	11.26	0.17	202.5	492.0	230.1	206.1	YES	202.5
SX12	-40	27.99	50	25.0	22.01	0.00	198.2	492.0	230.1	288.2	YES	198.2
SX12	-40	28.02	50	25.0	21.98	0.00	150.2	492.0	230.1	288.0	YES	150.2
SX12	-40	28.32	50	25.0	21.68	0.00	226.8	492.0	230.1	286.0	YES	226.8
SX12	-40	28.13	50	25.0	21.87	0.00	158.1	492.0	230.1	287.3	YES	158.1
SX12	-40	28.17	50	25.0	21.83	0.00	256.4	492.0	230.1	287.0	YES	256.4
SX12	-40	28.10	50	25.0	21.90	0.00	207.6	492.0	230.1	287.5	YES	207.6
SX12	-40	27.84	50	25.0	22.16	0.19	213.5	492.0	230.1	289.2	YES	213.5
SX12	-40	28.14	50	25.0	21.86	0.25	254.6	492.0	230.1	287.2	YES	254.6
SX12	-40	28.26	50	25.0	21.74	0.24	240.0	492.0	230.1	286.4	YES	240.0
SX12	-40	29.37	50	25.0	20.63	0.41	309.2	492.0	230.1	279.0	NO	279.0
SX12	-40	27.73	50	25.0	22.27	0.09	187.3	492.0	230.1	289.9	YES	187.3
SX12	-40	27.76	50	25.0	22.24	0.05	101.5	492.0	230.1	289.7	YES	101.5
SX12	-40	27.54	50	25.0	22.46	0.06	140.3	492.0	230.1	291.1	YES	140.3
SX12	-40	26.90	50	25.0	23.10	0.08	150.2	492.0	230.1	295.3	YES	150.2
SX12	-40	27.34	50	25.0	22.66	0.09	187.3	492.0	230.1	292.4	YES	187.3
SX12	-40	27.00	50	25.0	23.00	0.18	211.4	492.0	230.1	294.6	YES	211.4
SX12	-40	26.82	50	25.0	23.18	0.12	160.5	492.0	230.1	295.8	YES	160.5
SX12	-40	26.88	50	25.0	23.12	0.11	214.6	492.0	230.1	295.4	YES	214.6
SX12	-40	27.28	50	25.0	22.72	0.15	188.3	492.0	230.1	292.8	YES	188.3
SX12	-40	27.52	50	25.0	22.48	0.23	239.3	492.0	230.1	291.3	YES	239.3
SX12	-40	27.16	50	25.0	22.84	0.05	112.8	492.0	230.1	293.6	YES	112.8
SX12	-40	27.71	50	25.0	22.29	0.23	239.0	492.0	230.1	290.0	YES	239.0
SX12	-40	27.48	50	25.0	22.52	0.38	284.9	492.0	230.1	291.5	YES	284.9
SX12	-40	27.17	50	25.0	22.83	0.31	254.7	492.0	230.1	293.5	YES	254.7
SX12	-40	27.33	50	25.0	22.67	0.23	270.9	492.0	230.1	292.5	YES	270.9
SX12	-40	27.39	50	25.0	22.61	0.14	187.0	492.0	230.1	292.1	YES	187.0
SX12	-40	27.53	50	25.0	22.47	0.13	170.1	492.0	230.1	291.2	YES	170.1
SX12	-40	26.83	50	25.0	23.17	0.25	256.4	492.0	230.1	295.7	YES	256.4
SX12	-40	27.51	50	25.0	22.49	0.11	171.4	492.0	230.1	291.3	YES	171.4
SX12	-40	26.62	50	25.0	23.38	0.05	103.1	492.0	230.1	297.0	YES	103.1
SX12	-40	28.84	50	25.0	21.16	0.23	230.0	492.0	230.1	282.6	YES	230.0
SX12	-40	26.72	50	25.0	23.28	0.20	210.0	492.0	230.1	296.4	YES	210.0
SX12	-40	56.61	100	50.0	43.39	0.00	138.6	492.0	230.1	404.7	YES	138.6
SX12	-40	56.75	100	50.0	43.25	0.00	187.7	492.0	230.1	404.0	YES	187.7
SX12	-40	56.59	100	50.0	43.41	0.00	173.0	492.0	230.1	404.8	YES	173.0
SX12	-40	56.48	100	50.0	43.52	0.00	179.5	492.0	230.1	405.3	YES	179.5
SX12	-20	112.21	200	100.0	87.79	0.11	186.7	481.3	228.8	567.7	YES	186.7

3. Application of the multi-temperature approach for the calculation of the reference temperature

USE LIMITS : YES

T limits

-143

Block	T (°C)	$K_{Jc[calc]}$ (MPa√m)	$K_{Jc(1T)}$ (MPa√m)	δ_i	n_i	1° member	2° member
SX12	-91	84.4	110.7	1	0.167	0.0114	0.0114
SX12	-40	180.6	154.6	0	0.000	0.0000	0.0000
SX12	-40	203.5	173.7	0	0.000	0.0000	0.0000
SX12	-40	198.2	169.3	0	0.000	0.0000	0.0000
SX12	-40	199.6	170.5	0	0.000	0.0000	0.0000
SX12	-40	186.4	159.4	0	0.000	0.0000	0.0000
SX12	-40	199.4	170.3	0	0.000	0.0000	0.0000
SX12	-40	204.4	174.4	0	0.000	0.0000	0.0000
SX12	-40	202.4	172.7	0	0.000	0.0000	0.0000
SX12	-40	203.2	173.4	0	0.000	0.0000	0.0000
SX12	-40	200.9	171.5	0	0.000	0.0000	0.0000
SX12	-40	171.0	146.5	0	0.000	0.0000	0.0000
SX12	-40	206.2	176.0	0	0.000	0.0000	0.0000
SX12	-40	169.4	145.1	0	0.000	0.0000	0.0000
SX12	-40	203.6	173.7	0	0.000	0.0000	0.0000
SX12	-40	202.5	172.9	0	0.000	0.0000	0.0000
SX12	-40	207.2	176.8	0	0.000	0.0000	0.0000
SX12	-40	205.9	175.7	0	0.000	0.0000	0.0000
SX12	-40	206.5	176.2	0	0.000	0.0000	0.0000
SX12	-40	207.3	176.9	0	0.000	0.0000	0.0000
SX12	-40	205.1	175.1	0	0.000	0.0000	0.0000
SX12	-40	202.8	173.1	0	0.000	0.0000	0.0000
SX12	-40	204.9	174.8	0	0.000	0.0000	0.0000
SX12	-40	205.2	175.1	0	0.000	0.0000	0.0000
SX12	-40	113.7	98.5	0	0.000	0.0000	0.0000
SX12	-40	204.8	174.8	0	0.000	0.0000	0.0000
SX12	-40	154.2	132.4	0	0.000	0.0000	0.0000
SX12	-40	206.2	176.0	0	0.000	0.0000	0.0000
SX12	-40	204.2	174.3	0	0.000	0.0000	0.0000
SX12	-40	207.3	176.9	0	0.000	0.0000	0.0000
SX12	-40	202.5	172.8	0	0.000	0.0000	0.0000
SX12	-40	198.2	197.5	0	0.000	0.0000	0.0000
SX12	-40	150.2	149.7	0	0.000	0.0000	0.0000
SX12	-40	226.8	226.0	0	0.000	0.0000	0.0000
SX12	-40	158.1	157.5	0	0.000	0.0000	0.0000
SX12	-40	256.4	255.5	0	0.000	0.0000	0.0000
SX12	-40	207.6	206.9	0	0.000	0.0000	0.0000
SX12	-40	213.5	212.8	0	0.000	0.0000	0.0000
SX12	-40	254.6	253.7	0	0.000	0.0000	0.0000
SX12	-40	240.0	239.1	0	0.000	0.0000	0.0000
SX12	-40	279.0	278.0	0	0.000	0.0000	0.0000
SX12	-40	187.3	186.6	0	0.000	0.0000	0.0000
SX12	-40	101.5	101.2	0	0.000	0.0000	0.0000
SX12	-40	140.3	139.9	0	0.000	0.0000	0.0000
SX12	-40	150.2	149.7	0	0.000	0.0000	0.0000
SX12	-40	187.3	186.6	0	0.000	0.0000	0.0000
SX12	-40	211.4	210.6	0	0.000	0.0000	0.0000
SX12	-40	160.5	160.0	0	0.000	0.0000	0.0000
SX12	-40	214.6	213.8	0	0.000	0.0000	0.0000
SX12	-40	188.3	187.7	0	0.000	0.0000	0.0000
SX12	-40	239.3	238.4	0	0.000	0.0000	0.0000
SX12	-40	112.8	112.4	0	0.000	0.0000	0.0000
SX12	-40	239.0	238.1	0	0.000	0.0000	0.0000
SX12	-40	284.9	283.9	0	0.000	0.0000	0.0000
SX12	-40	254.7	253.7	0	0.000	0.0000	0.0000
SX12	-40	270.9	269.9	0	0.000	0.0000	0.0000
SX12	-40	187.0	186.3	0	0.000	0.0000	0.0000
SX12	-40	170.1	169.5	0	0.000	0.0000	0.0000
SX12	-40	256.4	255.5	0	0.000	0.0000	0.0000
SX12	-40	171.4	170.8	0	0.000	0.0000	0.0000
SX12	-40	103.1	102.8	0	0.000	0.0000	0.0000
SX12	-40	230.0	229.1	0	0.000	0.0000	0.0000
SX12	-40	210.0	209.2	0	0.000	0.0000	0.0000
SX12	-40	138.6	160.5	0	0.000	0.0000	0.0000
SX12	-40	187.7	218.7	0	0.000	0.0000	0.0000
SX12	-40	173.0	201.2	0	0.000	0.0000	0.0000
SX12	-40	179.5	208.9	0	0.000	0.0000	0.0000
SX12	-20	186.7	254.8	0	0.000	0.0000	0.0000

Sum of 1° member: 0.011

Sum of 2° member: 0.011

Difference: 0.000

$T_o = -92.8 \text{ } ^\circ\text{C}$
(not valid per ASTM E1921)

$\sum_i n_i = 0.17$

N = 68
r = 1

$K_{min} = 20 \text{ MPa}\sqrt{\text{m}}$

$K_{o,eq} = 110.3 \text{ MPa}\sqrt{\text{m}}$

$K_{med,eq} = 102.4 \text{ MPa}\sqrt{\text{m}}$

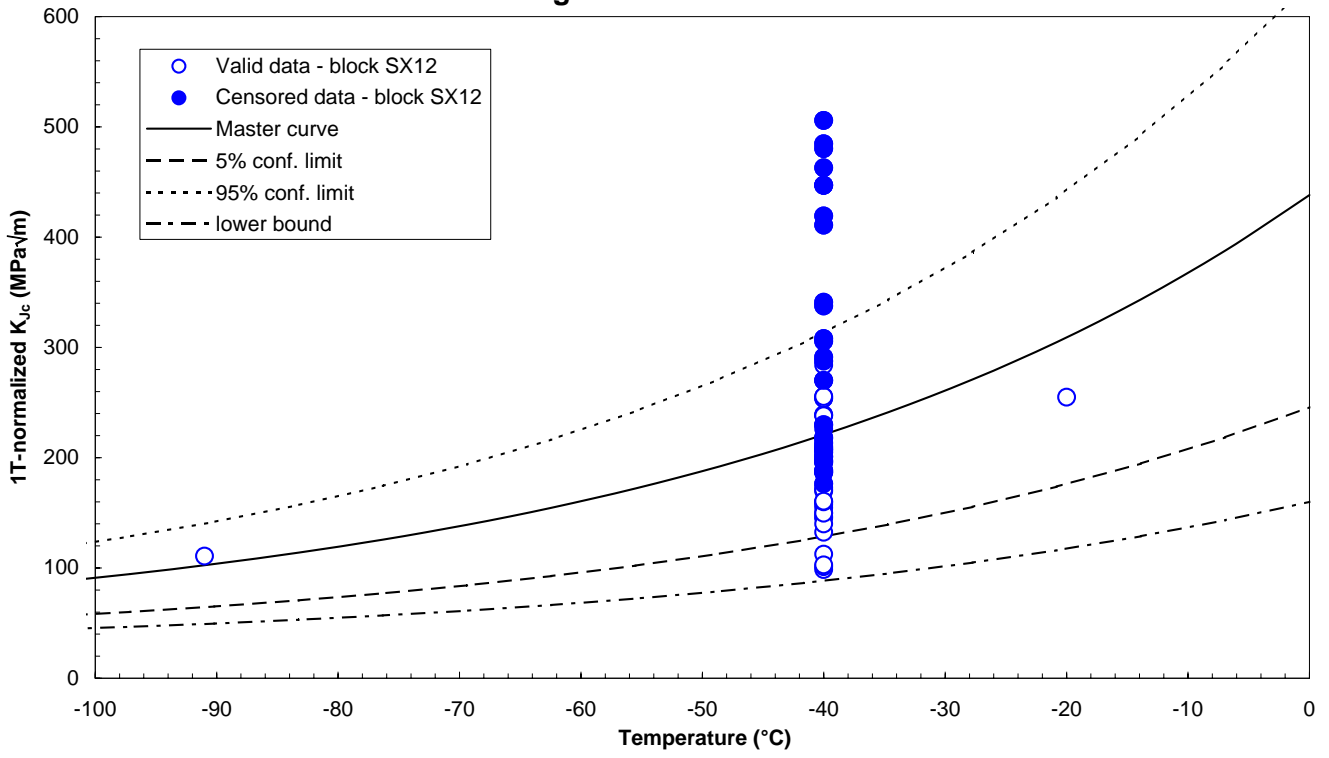
4. Master curve fit to data

Temperature adj. = 25.9 °C (est.) Stand. dev. on T_o = 18.0 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa√m)	$K_{Jc(1T)}$ (MPa√m)	$K_{MC(1T)}$ (MPa√m)	5% conf. (MPa√m)	95% conf. (MPa√m)	5% L.B. (MPa√m)
-91	84.4	110.7				
-40	180.6	154.6				
-40	206.7	176.4				
-40	240.7	204.9				
-40	270.8	230.1				
-40	186.4	159.4				

-40	255.8	217.5				
-40	231.2	196.9				
-40	339.4	287.5				
-40	403.1	340.9				
-40	399.2	337.6				
-40	171.0	146.5				
-40	569.4	480.2				
-40	169.4	145.1				
-40	548.7	462.8				
-40	529.9	447.1				
-40	318.5	270.1				
-40	574.8	484.7				
-40	360.8	305.4				
-40	343.8	291.2				
-40	235.8	200.8				
-40	529.9	447.1				
-40	496.5	419.1				
-40	600.0	505.8				
-40	113.7	98.5				
-40	229.6	195.5				
-40	154.2	132.4				
-40	221.3	188.6				
-40	486.7	410.9				
-40	243.8	207.4				
-40	202.5	172.8				
-40	198.2	197.5				
-40	150.2	149.7				
-40	226.8	226.0				
-40	158.1	157.5				
-40	256.4	255.5				
-40	207.6	206.9				
-40	213.5	212.8				
-40	254.6	253.7				
-40	240.0	239.1				
-40	309.2	308.0				
-40	187.3	186.6				
-40	101.5	101.2				
-40	140.3	139.9				
-40	150.2	149.7				
-40	187.3	186.6				
-40	211.4	210.6				
-40	160.5	160.0				
-40	214.6	213.8				
-40	188.3	187.7				
-40	239.3	238.4				
-40	112.8	112.4				
-40	239.0	238.1				
-40	284.9	283.9				
-40	254.7	253.7				
-40	270.9	269.9				
-40	187.0	186.3				
-40	170.1	169.5				
-40	256.4	255.5				
-40	171.4	170.8				
-40	103.1	102.8				
-40	230.0	229.1				
-40	210.0	209.2				
-40	138.6	160.5				
-40	187.7	218.7				
-40	173.0	201.2				
-40	179.5	208.9				
-20	186.7	254.8				
-111			79.5	52.1	106.9	41.7
-104.0625			86.5	55.9	117.1	44.0
-97.125			94.5	60.2	128.7	46.7
-90.1875			103.6	65.1	142.0	49.7
-83.25			113.9	70.7	157.1	53.1
-76.3125			125.8	77.1	174.4	57.0
-69.375			139.2	84.4	194.1	61.4
-62.4375			154.6	92.7	216.6	66.5
-55.5			172.2	102.2	242.2	72.3
-48.5625			192.2	113.0	271.5	78.9
-41.625			215.1	125.3	304.8	86.5
-34.6875			241.2	139.4	342.9	95.1
-27.75			270.9	155.5	386.3	104.9
-20.8125			304.9	173.8	435.9	116.1
-13.875			343.6	194.7	492.4	128.9
-6.9375			387.8	218.6	556.9	143.5
0			438.2	245.8	630.5	160.1

Master Curve with tolerance bounds EURO toughness dataset - Block SX12



density

This dataset is likely not homogeneous

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-5517.3	-148.5	-148.5	-148.6	-149.0	-149.2
-4714.5	518698579.2	518716912.0	519001970.8	520020744.4	520729297.3
-3911.6	2186154585024038.5	2186231852188865.5	2187433287344500.0	2191727103999577.0	2194713435856337.5
-3108.8	9213968698623878200000.0	9214294355941536000000.0	9219358035332407800000.0	9237455150938289300000.0	9250041620550452800000.0
-2305.9	9213968698623878200000.0	9214294355941536000000.0	9219358035332407800000.0	9237455150938289300000.0	9250041620550452800000.0
-1503.1	9213968698623878200000.0	9214294355941536000000.0	9219358035332407800000.0	9237455150938289300000.0	9250041620550452800000.0
-700.2	9213968698623878200000.0	9214294355941536000000.0	9219358035332407800000.0	9237455150938289300000.0	9250041620550452800000.0
102.6	9213968698623878200000.0	9214294355941536000000.0	9219358035332407800000.0	9237455150938289300000.0	9250041620550452800000.0
905.5	9213968698623878200000.0	9214294355941536000000.0	9219358035332407800000.0	9237455150938289300000.0	9250041620550452800000.0
1708.3	9213968698623878200000.0	9214294355941536000000.0	9219358035332407800000.0	9237455150938289300000.0	9250041620550452800000.0
2511.2	9213968698623878200000.0	9214294355941536000000.0	9219358035332407800000.0	9237455150938289300000.0	9250041620550452800000.0
3314.0	9213968698623878200000.0	9214294355941536000000.0	9219358035332407800000.0	9237455150938289300000.0	9250041620550452800000.0
4116.9	9213968698623878200000.0	9214294355941536000000.0	9219358035332407800000.0	9237455150938289300000.0	9250041620550452800000.0
4919.7	9213968698623878200000.0	9214294355941536000000.0	9219358035332407800000.0	9237455150938289300000.0	9250041620550452800000.0
5722.6	9213968698623878200000.0	9214294355941536000000.0	9219358035332407800000.0	9237455150938289300000.0	9250041620550452800000.0

3. Master Curve analysis for data set suspected to be randomly inhomogeneous

Mean reference temperature, T -87.6 °C
 One standard deviation on the mean T 0.0 °C
 Left temperature window(°C) -137.6
 Right temperature window(°C) -37.6
 Number of data 68
 Number of data outside the temperature window 1
 Number of valid data, r 43
 Sum of ln of probability density -237.77

The analysis is unable to guarantee that the material is randomly heterogeneous

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-137.6	32.9	39.4	57.2	73.6	79.7
-130.5	34.3	41.5	61.2	79.3	86.1
-123.4	35.9	43.8	65.7	85.9	93.4
-116.2	37.7	46.5	70.9	93.3	101.7
-109.1	39.7	49.6	76.8	101.9	111.2
-101.9	42.1	53.2	83.6	111.7	122.1
-94.8	44.8	57.2	91.4	122.9	134.6
-87.6	47.9	61.9	100.3	135.8	148.9
-80.5	51.4	67.2	110.5	150.5	165.3
-73.4	55.5	73.3	122.2	167.4	184.1
-66.2	60.1	80.3	135.6	186.7	205.6
-59.1	65.4	88.3	150.9	208.8	230.2
-51.9	71.5	97.5	168.5	234.1	258.5
-44.8	78.5	108.0	188.7	263.2	290.8
-37.6	86.5	120.0	211.7	296.4	327.8

**STANDARD TEST METHOD FOR THE DETERMINATION OF REFERENCE TEMPERATURE
T₀ FOR FERRITIC STEELS IN THE TRANSITION RANGE**

[MULTI-TEMPERATURE APPROACH - IN ACCORDANCE WITH ASTM E1921-05]

1. Material characteristics

Material specifications : **EURO toughness data set - Blocks SX9 + SX12**

2. Dimensional and crack growth requirements

Block	T (°C)	a ₀ (mm)	W (mm)	B (mm)	b ₀ (mm)	Δa (mm)	K _{Jc[exp]} (MPa√m)	σ _{ys} (MPa)	E' (GPa)	K _{lim} (MPa√m)	DATA VALID	K _{Jc[calc]} (MPa√m)
SX9	-60	14.61	25	12.5	10.39	0.00	167.6	506.4	231.4	201.5	YES	167.6
SX9	-60	14.41	25	12.5	10.59	0.00	128.6	506.4	231.4	203.4	YES	128.6
SX9	-60	14.45	25	12.5	10.55	0.70	377.4	506.4	231.4	203.0	NO	203.0
SX9	-60	14.37	25	12.5	10.63	0.00	98.4	506.4	231.4	203.8	YES	98.4
SX9	-60	14.42	25	12.5	10.58	0.29	278.4	506.4	231.4	203.3	NO	203.3
SX9	-60	14.49	25	12.5	10.51	0.18	240.7	506.4	231.4	202.6	NO	202.6
SX9	-60	14.59	25	12.5	10.41	0.75	380.0	506.4	231.4	201.7	NO	201.7
SX9	-60	14.04	25	12.5	10.96	0.00	171.9	506.4	231.4	206.9	YES	171.9
SX9	-60	14.49	25	12.5	10.51	0.00	136.8	506.4	231.4	202.6	YES	136.8
SX9	-60	14.80	25	12.5	10.20	0.00	135.8	506.4	231.4	199.6	YES	135.8
SX9	-60	14.68	25	12.5	10.32	0.13	214.7	506.4	231.4	200.8	NO	200.8
SX9	-60	14.47	25	12.5	10.53	0.41	299.5	506.4	231.4	202.8	NO	202.8
SX9	-60	56.44	100	50.0	43.56	0.12	295.3	506.4	231.4	412.5	YES	295.3
SX9	-60	56.53	100	50.0	43.47	0.00	217.7	506.4	231.4	412.1	YES	217.7
SX9	-60	56.45	100	50.0	43.55	0.00	219.8	506.4	231.4	412.5	YES	219.8
SX9	-60	56.49	100	50.0	43.51	0.00	165.9	506.4	231.4	412.3	YES	165.9
SX9	-60	56.57	100	50.0	43.43	0.00	153.6	506.4	231.4	411.9	YES	153.6
SX9	-60	56.38	100	50.0	43.62	0.00	183.8	506.4	231.4	412.8	YES	183.8
SX9	-60	56.31	100	50.0	43.69	0.00	236.1	506.4	231.4	413.1	YES	236.1
SX9	-60	56.20	100	50.0	43.80	0.00	149.4	506.4	231.4	413.6	YES	149.4
SX9	-60	56.83	100	50.0	43.17	0.00	179.5	506.4	231.4	410.7	YES	179.5
SX9	-60	56.83	100	50.0	43.17	0.00	177.6	506.4	231.4	410.7	YES	177.6
SX9	-60	56.55	100	50.0	43.45	0.00	188.3	506.4	231.4	412.0	YES	188.3
SX9	-60	56.56	100	50.0	43.44	0.00	134.5	506.4	231.4	411.9	YES	134.5
SX9	-60	56.65	100	50.0	43.35	0.00	243.6	506.4	231.4	411.5	YES	243.6
SX9	-60	56.56	100	50.0	43.44	0.00	155.7	506.4	231.4	411.9	YES	155.7
SX9	-60	56.18	100	50.0	43.82	0.00	164.0	506.4	231.4	413.7	YES	164.0
SX9	-60	56.68	100	50.0	43.32	0.00	146.5	506.4	231.4	411.4	YES	146.5
SX9	-60	56.51	100	50.0	43.49	0.00	119.9	506.4	231.4	412.2	YES	119.9
SX9	-60	56.31	100	50.0	43.69	0.00	79.9	506.4	231.4	413.1	YES	79.9
SX9	-60	56.57	100	50.0	43.43	0.00	140.9	506.4	231.4	411.9	YES	140.9
SX9	-60	55.62	100	50.0	44.38	0.00	115.3	506.4	231.4	416.4	YES	115.3
SX9	-60	56.56	100	50.0	43.44	0.00	137.0	506.4	231.4	411.9	YES	137.0
SX9	-60	56.57	100	50.0	43.43	0.00	166.9	506.4	231.4	411.9	YES	166.9
SX9	-60	56.53	100	50.0	43.47	0.00	225.4	506.4	231.4	412.1	YES	225.4
SX9	-60	56.32	100	50.0	43.68	0.00	200.7	506.4	231.4	413.1	YES	200.7
SX12	-91	111.92	200	100.0	88.08	0.00	84.4	538.9	233.5	607.8	YES	84.4
SX12	-40	14.00	25	12.5	11.00	0.00	180.6	492.0	230.1	203.7	YES	180.6
SX12	-40	14.03	25	12.5	10.97	0.00	206.7	492.0	230.1	203.5	NO	203.5
SX12	-40	14.59	25	12.5	10.41	0.00	240.7	492.0	230.1	198.2	NO	198.2
SX12	-40	14.44	25	12.5	10.56	0.00	270.8	492.0	230.1	199.6	NO	199.6
SX12	-40	14.05	25	12.5	10.95	0.00	186.4	492.0	230.1	203.3	YES	186.4
SX12	-40	14.46	25	12.5	10.54	0.18	255.8	492.0	230.1	199.4	NO	199.4
SX12	-40	13.93	25	12.5	11.07	0.12	231.2	492.0	230.1	204.4	NO	204.4
SX12	-40	14.15	25	12.5	10.85	0.44	339.4	492.0	230.1	202.4	NO	202.4
SX12	-40	14.06	25	12.5	10.94	0.83	403.1	492.0	230.1	203.2	NO	203.2
SX12	-40	14.31	25	12.5	10.69	0.83	399.2	492.0	230.1	200.9	NO	200.9
SX12	-40	13.63	25	12.5	11.37	0.08	171.0	492.0	230.1	207.1	YES	171.0
SX12	-40	13.73	25	12.5	11.27	2.05	569.4	492.0	230.1	206.2	NO	206.2
SX12	-40	13.78	25	12.5	11.22	0.13	169.4	492.0	230.1	205.8	YES	169.4
SX12	-40	14.02	25	12.5	10.98	1.93	548.7	492.0	230.1	203.6	NO	203.6
SX12	-40	14.13	25	12.5	10.87	1.67	529.9	492.0	230.1	202.5	NO	202.5
SX12	-40	13.62	25	12.5	11.38	0.36	318.5	492.0	230.1	207.2	NO	207.2
SX12	-40	13.77	25	12.5	11.23	2.07	574.8	492.0	230.1	205.9	NO	205.9
SX12	-40	13.70	25	12.5	11.30	0.69	360.8	492.0	230.1	206.5	NO	206.5
SX12	-40	13.61	25	12.5	11.39	0.60	343.8	492.0	230.1	207.3	NO	207.3
SX12	-40	13.85	25	12.5	11.15	0.26	235.8	492.0	230.1	205.1	NO	205.1
SX12	-40	14.10	25	12.5	10.90	1.79	529.9	492.0	230.1	202.8	NO	202.8
SX12	-40	13.88	25	12.5	11.12	1.44	496.5	492.0	230.1	204.9	NO	204.9
SX12	-40	13.84	25	12.5	11.16	2.08	600.0	492.0	230.1	205.2	NO	205.2
SX12	-40	13.91	25	12.5	11.09	0.07	113.7	492.0	230.1	204.6	YES	113.7
SX12	-40	13.89	25	12.5	11.11	0.21	229.6	492.0	230.1	204.8	NO	204.8
SX12	-40	13.99	25	12.5	11.01	0.09	154.2	492.0	230.1	203.8	YES	154.2
SX12	-40	13.73	25	12.5	11.27	0.24	221.3	492.0	230.1	206.2	NO	206.2
SX12	-40	13.95	25	12.5	11.05	1.37	486.7	492.0	230.1	204.2	NO	204.2
SX12	-40	13.61	25	12.5	11.39	0.25	243.8	492.0	230.1	207.3	NO	207.3
SX12	-40	13.74	25	12.5	11.26	0.17	202.5	492.0	230.1	206.1	YES	202.5
SX12	-40	27.99	50	25.0	22.01	0.00	198.2	492.0	230.1	288.2	YES	198.2
SX12	-40	28.02	50	25.0	21.98	0.00	150.2	492.0	230.1	288.0	YES	150.2
SX12	-40	28.32	50	25.0	21.68	0.00	226.8	492.0	230.1	286.0	YES	226.8
SX12	-40	28.13	50	25.0	21.87	0.00	158.1	492.0	230.1	287.3	YES	158.1

SX12	-40	28.17	50	25.0	21.83	0.00	256.4	492.0	230.1	287.0	YES	256.4
SX12	-40	28.10	50	25.0	21.90	0.00	207.6	492.0	230.1	287.5	YES	207.6
SX12	-40	27.84	50	25.0	22.16	0.19	213.5	492.0	230.1	289.2	YES	213.5
SX12	-40	28.14	50	25.0	21.86	0.25	254.6	492.0	230.1	287.2	YES	254.6
SX12	-40	28.26	50	25.0	21.74	0.24	240.0	492.0	230.1	286.4	YES	240.0
SX12	-40	29.37	50	25.0	20.63	0.41	309.2	492.0	230.1	279.0	NO	279.0
SX12	-40	27.73	50	25.0	22.27	0.09	187.3	492.0	230.1	289.9	YES	187.3
SX12	-40	27.76	50	25.0	22.24	0.05	101.5	492.0	230.1	289.7	YES	101.5
SX12	-40	27.54	50	25.0	22.46	0.06	140.3	492.0	230.1	291.1	YES	140.3
SX12	-40	26.90	50	25.0	23.10	0.08	150.2	492.0	230.1	295.3	YES	150.2
SX12	-40	27.34	50	25.0	22.66	0.09	187.3	492.0	230.1	292.4	YES	187.3
SX12	-40	27.00	50	25.0	23.00	0.18	211.4	492.0	230.1	294.6	YES	211.4
SX12	-40	26.82	50	25.0	23.18	0.12	160.5	492.0	230.1	295.8	YES	160.5
SX12	-40	26.88	50	25.0	23.12	0.11	214.6	492.0	230.1	295.4	YES	214.6
SX12	-40	27.28	50	25.0	22.72	0.15	188.3	492.0	230.1	292.8	YES	188.3
SX12	-40	27.52	50	25.0	22.48	0.23	239.3	492.0	230.1	291.3	YES	239.3
SX12	-40	27.16	50	25.0	22.84	0.05	112.8	492.0	230.1	293.6	YES	112.8
SX12	-40	27.71	50	25.0	22.29	0.23	239.0	492.0	230.1	290.0	YES	239.0
SX12	-40	27.48	50	25.0	22.52	0.38	284.9	492.0	230.1	291.5	YES	284.9
SX12	-40	27.17	50	25.0	22.83	0.31	254.7	492.0	230.1	293.5	YES	254.7
SX12	-40	27.33	50	25.0	22.67	0.23	270.9	492.0	230.1	292.5	YES	270.9
SX12	-40	27.39	50	25.0	22.61	0.14	187.0	492.0	230.1	292.1	YES	187.0
SX12	-40	27.53	50	25.0	22.47	0.13	170.1	492.0	230.1	291.2	YES	170.1
SX12	-40	26.83	50	25.0	23.17	0.25	256.4	492.0	230.1	295.7	YES	256.4
SX12	-40	27.51	50	25.0	22.49	0.11	171.4	492.0	230.1	291.3	YES	171.4
SX12	-40	26.62	50	25.0	23.38	0.05	103.1	492.0	230.1	297.0	YES	103.1
SX12	-40	28.84	50	25.0	21.16	0.23	230.0	492.0	230.1	282.6	YES	230.0
SX12	-40	26.72	50	25.0	23.28	0.20	210.0	492.0	230.1	296.4	YES	210.0
SX12	-40	56.61	100	50.0	43.39	0.00	138.6	492.0	230.1	404.7	YES	138.6
SX12	-40	56.75	100	50.0	43.25	0.00	187.7	492.0	230.1	404.0	YES	187.7
SX12	-40	56.59	100	50.0	43.41	0.00	173.0	492.0	230.1	404.8	YES	173.0
SX12	-40	56.48	100	50.0	43.52	0.00	179.5	492.0	230.1	405.3	YES	179.5
SX12	-20	112.21	200	100.0	87.79	0.11	186.7	481.3	228.8	567.7	YES	186.7

3. Application of the multi-temperature approach for the calculation of the reference temperature

T limits

Block	T (°C)	$K_{Jc[calc]}$ (MPa√m)	$K_{Jc(1T)}$ (MPa√m)	δ_i	n_i	1° member	2° member
SX9	-60	167.6	143.6	1	0.167	0.0122	0.0032
SX9	-60	128.6	110.9	1	0.167	0.0122	0.0009
SX9	-60	203.0	173.3	0	0.000	0.0000	0.0077
SX9	-60	98.4	85.7	1	0.167	0.0122	0.0003
SX9	-60	203.3	173.5	0	0.000	0.0000	0.0077
SX9	-60	202.6	173.0	0	0.000	0.0000	0.0076
SX9	-60	201.7	172.1	0	0.000	0.0000	0.0074
SX9	-60	171.9	147.2	1	0.167	0.0122	0.0036
SX9	-60	136.8	117.8	1	0.167	0.0122	0.0013
SX9	-60	135.8	117.0	1	0.167	0.0122	0.0012
SX9	-60	200.8	171.4	0	0.000	0.0000	0.0073
SX9	-60	202.8	173.1	0	0.000	0.0000	0.0076
SX9	-60	295.3	346.1	1	0.167	0.0122	0.1568
SX9	-60	217.7	254.2	1	0.167	0.0122	0.0417
SX9	-60	219.8	256.6	1	0.167	0.0122	0.0435
SX9	-60	165.9	192.8	1	0.167	0.0122	0.0124
SX9	-60	153.6	178.2	1	0.167	0.0122	0.0087
SX9	-60	183.8	214.0	1	0.167	0.0122	0.0196
SX9	-60	236.1	275.9	1	0.167	0.0122	0.0595
SX9	-60	149.4	173.3	1	0.167	0.0122	0.0077
SX9	-60	179.5	209.0	1	0.167	0.0122	0.0177
SX9	-60	177.6	206.7	1	0.167	0.0122	0.0168
SX9	-60	188.3	219.4	1	0.167	0.0122	0.0219
SX9	-60	134.5	155.6	1	0.167	0.0122	0.0047
SX9	-60	243.6	284.9	1	0.167	0.0122	0.0682
SX9	-60	155.7	180.8	1	0.167	0.0122	0.0093
SX9	-60	164.0	190.6	1	0.167	0.0122	0.0117
SX9	-60	146.5	169.8	1	0.167	0.0122	0.0070
SX9	-60	119.9	138.4	1	0.167	0.0122	0.0027
SX9	-60	79.9	91.0	1	0.167	0.0122	0.0004
SX9	-60	140.9	163.2	1	0.167	0.0122	0.0058
SX9	-60	115.3	132.9	1	0.167	0.0122	0.0023
SX9	-60	137.0	158.6	1	0.167	0.0122	0.0051
SX9	-60	166.9	194.0	1	0.167	0.0122	0.0127
SX9	-60	225.4	263.3	1	0.167	0.0122	0.0486
SX9	-60	200.7	234.1	1	0.167	0.0122	0.0291
SX12	-91	84.4	110.7	1	0.167	0.0116	0.0077
SX12	-40	180.6	154.6	1	0.000	0.0124	0.0011
SX12	-40	203.5	173.7	0	0.000	0.0000	0.0019
SX12	-40	198.2	169.3	0	0.000	0.0000	0.0017
SX12	-40	199.6	170.5	0	0.000	0.0000	0.0017
SX12	-40	186.4	159.4	1	0.000	0.0124	0.0013
SX12	-40	199.4	170.3	0	0.000	0.0000	0.0017
SX12	-40	204.4	174.4	0	0.000	0.0000	0.0019
SX12	-40	202.4	172.7	0	0.000	0.0000	0.0018

USE LIMITS : NO

-9999
9999

Sum of 1° member: 0.910

Sum of 2° member: 0.910

Difference: 0.000

$T_o = -98.8$ °C
(valid per ASTM E1921)

$\sum_i n_i = 5.17$

N = 104
r = 74

$K_{min} = 20$ MPa√m

$K_{o,eq} = 239.6$ MPa√m

$K_{med,eq} = 220.4$ MPa√m

SX12	-40	203.2	173.4	0	0.000	0.0000	0.0019
SX12	-40	200.9	171.5	0	0.000	0.0000	0.0018
SX12	-40	171.0	146.5	1	0.000	0.0124	0.0009
SX12	-40	206.2	176.0	0	0.000	0.0000	0.0020
SX12	-40	169.4	145.1	1	0.000	0.0124	0.0008
SX12	-40	203.6	173.7	0	0.000	0.0000	0.0019
SX12	-40	202.5	172.9	0	0.000	0.0000	0.0018
SX12	-40	207.2	176.8	0	0.000	0.0000	0.0020
SX12	-40	205.9	175.7	0	0.000	0.0000	0.0020
SX12	-40	206.5	176.2	0	0.000	0.0000	0.0020
SX12	-40	207.3	176.9	0	0.000	0.0000	0.0020
SX12	-40	205.1	175.1	0	0.000	0.0000	0.0019
SX12	-40	202.8	173.1	0	0.000	0.0000	0.0018
SX12	-40	204.9	174.8	0	0.000	0.0000	0.0019
SX12	-40	205.2	175.1	0	0.000	0.0000	0.0019
SX12	-40	113.7	98.5	1	0.000	0.0124	0.0001
SX12	-40	204.8	174.8	0	0.000	0.0000	0.0019
SX12	-40	154.2	132.4	1	0.000	0.0124	0.0005
SX12	-40	206.2	176.0	0	0.000	0.0000	0.0020
SX12	-40	204.2	174.3	0	0.000	0.0000	0.0019
SX12	-40	207.3	176.9	0	0.000	0.0000	0.0020
SX12	-40	202.5	172.8	1	0.000	0.0124	0.0018
SX12	-40	198.2	197.5	1	0.000	0.0124	0.0033
SX12	-40	150.2	149.7	1	0.000	0.0124	0.0010
SX12	-40	226.8	226.0	1	0.000	0.0124	0.0060
SX12	-40	158.1	157.5	1	0.000	0.0124	0.0012
SX12	-40	256.4	255.5	1	0.000	0.0124	0.0103
SX12	-40	207.6	206.9	1	0.000	0.0124	0.0041
SX12	-40	213.5	212.8	1	0.000	0.0124	0.0046
SX12	-40	254.6	253.7	1	0.000	0.0124	0.0100
SX12	-40	240.0	239.1	1	0.000	0.0124	0.0077
SX12	-40	279.0	278.0	0	0.000	0.0000	0.0149
SX12	-40	187.3	186.6	1	0.000	0.0124	0.0026
SX12	-40	101.5	101.2	1	0.000	0.0124	0.0001
SX12	-40	140.3	139.9	1	0.000	0.0124	0.0007
SX12	-40	150.2	149.7	1	0.000	0.0124	0.0009
SX12	-40	187.3	186.6	1	0.000	0.0124	0.0026
SX12	-40	211.4	210.6	1	0.000	0.0124	0.0044
SX12	-40	160.5	160.0	1	0.000	0.0124	0.0013
SX12	-40	214.6	213.8	1	0.000	0.0124	0.0047
SX12	-40	188.3	187.7	1	0.000	0.0124	0.0027
SX12	-40	239.3	238.4	1	0.000	0.0124	0.0076
SX12	-40	112.8	112.4	1	0.000	0.0124	0.0002
SX12	-40	239.0	238.1	1	0.000	0.0124	0.0076
SX12	-40	284.9	283.9	1	0.000	0.0124	0.0163
SX12	-40	254.7	253.7	1	0.000	0.0124	0.0100
SX12	-40	270.9	269.9	1	0.000	0.0124	0.0131
SX12	-40	187.0	186.3	1	0.000	0.0124	0.0026
SX12	-40	170.1	169.5	1	0.000	0.0124	0.0017
SX12	-40	256.4	255.5	1	0.000	0.0124	0.0103
SX12	-40	171.4	170.8	1	0.000	0.0124	0.0017
SX12	-40	103.1	102.8	1	0.000	0.0124	0.0002
SX12	-40	230.0	229.1	1	0.000	0.0124	0.0064
SX12	-40	210.0	209.2	1	0.000	0.0124	0.0043
SX12	-40	138.6	160.5	1	0.000	0.0124	0.0013
SX12	-40	187.7	218.7	1	0.000	0.0124	0.0052
SX12	-40	173.0	201.2	1	0.000	0.0124	0.0036
SX12	-40	179.5	208.9	1	0.000	0.0124	0.0043
SX12	-20	186.7	254.8	1	0.000	0.0126	0.0024

4. Master curve fit to data

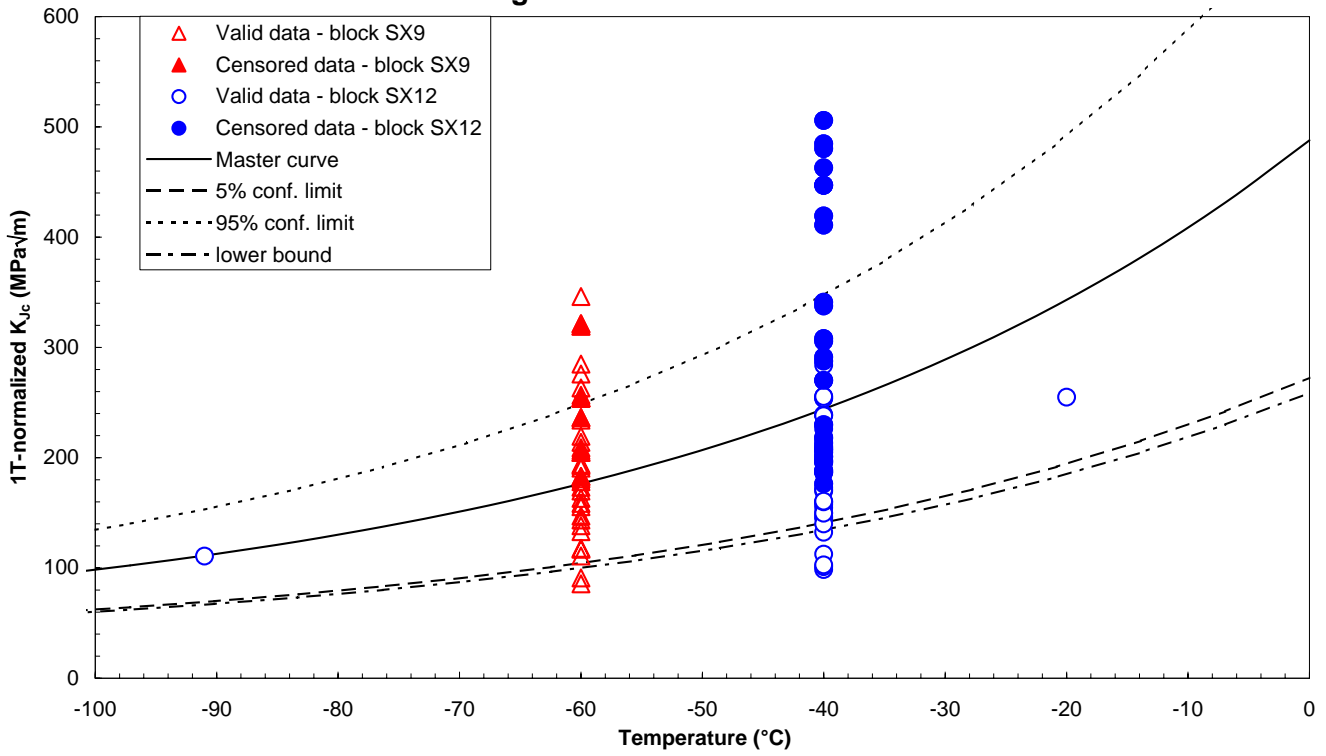
Temperature adj. = 3.0 °C (est.) Stand. dev. on T_0 = 2.1 °C (est.)

T (°C)	$K_{Jc(exp)}$ (MPa \sqrt{m})	$K_{Jc(1T)}$ (MPa \sqrt{m})	$K_{MC(1T)}$ (MPa \sqrt{m})	5% conf. (MPa \sqrt{m})	95% conf. (MPa \sqrt{m})	5% L.B. (MPa \sqrt{m})
-60	167.6	143.6				
-60	128.6	110.9				
-60	377.4	319.3				
-60	98.4	85.7				
-60	278.4	236.4				
-60	240.7	204.9				
-60	380.0	321.5				
-60	171.9	147.2				
-60	136.8	117.8				
-60	135.8	117.0				
-60	214.7	183.1				
-60	299.5	254.1				
-60	295.3	346.1				
-60	217.7	254.2				
-60	219.8	256.6				
-60	165.9	192.8				
-60	153.6	178.2				
-60	183.8	214.0				
-60	236.1	275.9				

-60	149.4	173.3
-60	179.5	209.0
-60	177.6	206.7
-60	188.3	219.4
-60	134.5	155.6
-60	243.6	284.9
-60	155.7	180.8
-60	164.0	190.6
-60	146.5	169.8
-60	119.9	138.4
-60	79.9	91.0
-60	140.9	163.2
-60	115.3	132.9
-60	137.0	158.6
-60	166.9	194.0
-60	225.4	263.3
-60	200.7	234.1
-91	84.4	110.7
-40	180.6	154.6
-40	206.7	176.4
-40	240.7	204.9
-40	270.8	230.1
-40	186.4	159.4
-40	255.8	217.5
-40	231.2	196.9
-40	339.4	287.5
-40	403.1	340.9
-40	399.2	337.6
-40	171.0	146.5
-40	569.4	480.2
-40	169.4	145.1
-40	548.7	462.8
-40	529.9	447.1
-40	318.5	270.1
-40	574.8	484.7
-40	360.8	305.4
-40	343.8	291.2
-40	235.8	200.8
-40	529.9	447.1
-40	496.5	419.1
-40	600.0	505.8
-40	113.7	98.5
-40	229.6	195.5
-40	154.2	132.4
-40	221.3	188.6
-40	486.7	410.9
-40	243.8	207.4
-40	202.5	172.8
-40	198.2	197.5
-40	150.2	149.7
-40	226.8	226.0
-40	158.1	157.5
-40	256.4	255.5
-40	207.6	206.9
-40	213.5	212.8
-40	254.6	253.7
-40	240.0	239.1
-40	309.2	308.0
-40	187.3	186.6
-40	101.5	101.2
-40	140.3	139.9
-40	150.2	149.7
-40	187.3	186.6
-40	211.4	210.6
-40	160.5	160.0
-40	214.6	213.8
-40	188.3	187.7
-40	239.3	238.4
-40	112.8	112.4
-40	239.0	238.1
-40	284.9	283.9
-40	254.7	253.7
-40	270.9	269.9
-40	187.0	186.3
-40	170.1	169.5
-40	256.4	255.5
-40	171.4	170.8
-40	103.1	102.8
-40	230.0	229.1
-40	210.0	209.2
-40	138.6	160.5
-40	187.7	218.7
-40	173.0	201.2
-40	179.5	208.9
-20	186.7	254.8
-111		
	85.6	55.4
	115.7	53.7

-104.0625	93.4	59.6	127.2	57.7
-97.125	102.3	64.5	140.2	62.3
-90.1875	112.5	70.0	155.1	67.5
-83.25	124.1	76.2	172.0	73.4
-76.3125	137.4	83.4	191.4	80.2
-69.375	152.5	91.6	213.5	87.9
-62.4375	169.8	100.9	238.7	96.7
-55.5	189.5	111.5	267.5	106.7
-48.5625	212.0	123.7	300.3	118.2
-41.625	237.6	137.5	337.7	131.3
-34.6875	266.9	153.3	380.4	146.2
-27.75	300.2	171.3	429.1	163.2
-20.8125	338.3	191.9	484.7	182.6
-13.875	381.7	215.3	548.1	204.8
-6.9375	431.3	242.1	620.5	230.0
0	487.8	272.6	703.1	258.9

Master Curve with tolerance bounds EURO toughness dataset - Blocks SX9-SX12



Calculation name: EURO toughness data set - Blocks SX9 & SX12			
Data set length:	104	Submitted on:	2006-Nov-13 14:27:19
Data set limit:	max. allowed	Calculation time:	1.172 seconds

Master Curve results (Version 1.1.3.0)

1. Master Curve analysis of homogeneous material (ASTM E1921-05)

Reference temperature T_0 (°C)	-107.1
One standard deviation on T_0 (°C)	3.2
$K_{Jc,1T,med.,eq}$ (MPaVm)	198.7
Left temperature window (°C)	-157.1
Right temperature window (°C)	-57.1
Number of data	104
Number of data outside the temperature window	67
Number of valid data, r	31
Sum of n_i	5.17
Sum of \ln of probability density	-174.53

Minimum number of specimen satisfied

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-157.1	32.9	39.4	57.2	73.6	79.7
-149.9	34.3	41.5	61.2	79.3	86.1
-142.8	35.9	43.8	65.7	85.9	93.3
-135.6	37.6	46.5	70.9	93.3	101.7
-128.5	39.7	49.6	76.8	101.9	111.2
-121.4	42.1	53.2	83.6	111.7	122.1
-114.2	44.8	57.2	91.4	122.9	134.6
-107.1	47.9	61.9	100.3	135.8	148.9
-99.9	51.4	67.2	110.5	150.5	165.3
-92.8	55.5	73.3	122.2	167.4	184.1
-85.6	60.1	80.3	135.6	186.7	205.6
-78.5	65.4	88.3	150.9	208.8	230.2
-71.4	71.5	97.5	168.5	234.1	258.4
-64.2	78.5	108.0	188.6	263.2	290.8
-57.1	86.5	120.0	211.7	296.4	327.8

2. Bi-modal Master Curve analysis for data set suspected to contains two populations

Reference temperature population A, T_a	-89.2 °C
One standard deviation on T_a	2.5 °C
Reference temperature population B, T_b	-115.8 °C
One standard deviation on T_b	160.0 °C
Likelihood to be from population A, p_a	0.78
One standard deviation on p_a	0.0
Left temperature window (°C)	-165.8
Right temperature window(°C)	-39.2
Number of data	104
Number of data outside the temperature window	1
Number of valid data, r	73
Sum of \ln of probability density	-414.56

The analysis is unable to guarantee that the data contains two populations

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-165.8	29.6	34.4	48.0	65.2	74.0
-156.8	30.7	36.1	51.4	71.3	81.4
-147.7	32.0	38.1	55.3	78.5	90.2
-138.7	33.7	40.5	60.0	87.2	100.6
-129.6	35.5	43.4	65.5	97.4	113.0
-120.6	37.8	46.7	72.1	109.6	127.7
-111.6	40.4	50.7	79.9	124.1	145.1
-102.5	43.6	55.5	89.2	141.3	165.9
-93.5	47.3	61.1	100.2	161.7	190.5
-84.4	51.8	67.8	113.3	186.0	219.7
-75.4	57.0	75.7	128.9	214.8	254.4
-66.4	63.3	85.2	147.3	249.1	295.5
-57.3	70.7	96.3	169.2	289.7	344.5
-48.3	79.6	109.6	195.3	338.0	402.5
-39.2	90.1	125.4	226.1	395.3	471.5

3. Master Curve analysis for data set suspected to be randomly inhomogeneous

Mean reference temperature, T	-95.0 °C
One standard deviation on the mean T	11.8 °C
Left temperature window(°C)	-168.6
Right temperature window(°C)	-21.3
Number of data	104
Number of data outside the temperature window	1
Number of valid data, r	73
Sum of ln of probability density	-415.55

This dataset is likely not homogeneous

T	K 1%	K 5%	K 50%	K 95%	K 99%
(°C)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)	(MPaVm)
-168.6	29.2	33.8	47.2	62.8	70.3
-158.0	30.4	35.7	51.0	69.2	78.2
-147.5	31.9	38.0	55.6	77.1	87.8
-137.0	33.8	40.7	61.2	86.7	99.6
-126.5	36.0	44.0	68.1	98.5	114.0
-116.0	38.7	48.1	76.5	112.8	131.6
-105.5	42.0	53.1	86.7	130.4	153.1
-95.0	45.9	59.2	99.2	151.9	179.4
-84.4	50.8	66.5	114.4	178.1	211.5
-73.9	56.8	75.6	133.0	210.2	250.7
-63.4	64.1	86.6	155.8	249.2	298.6
-52.9	73.0	100.1	183.6	297.0	357.0
-42.4	83.9	116.5	217.5	355.4	428.4
-31.9	97.2	136.5	258.9	426.6	515.7
-21.3	113.3	161.0	309.4	513.6	622.1