

Test Results from the Full Size Prototype Test of W7-X Joint (P1-E-346)

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The superconducting magnet system of the WENDELSTEIN 7-X (W7-X) experiment consists of 50 non-planar and 20 planar coils which are connected by 121 bus bars in series of seven groups of ten coils each. The connection of the bus bars will be provided by 184 joints each with a maximum allowable resistance of 5 nΩ. To allow for possibly replacements and repair after installation all joints have to be designed as demountable joints. The principle of such a demountable joint was tested by two joints in SULTAN Test facility CRPP, Switzerland in 2002. Both joints showed resistances less than 1 nΩ; at 20 kA in a magnetic field of 2 T. In the meantime efforts to improve the design of the casing and the design of the clamping parts have been carried out. Tools for the installation at W7-X and mounting procedures were developed using the test joints to ensure the best possible reproducibility. These improvements led to the requirement to repeat the measurement of joint resistance. This joint test was carried out in the test facility of SINTEZ of the Efremov Institute in St. Petersburg, Russia. This paper describes the design of the joint and the test facility and focus on the comparison of test results at SULTAN and SINTEZ.