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Legislation

Contents

Acts whose titles are printed in light type are those relating to day-to-day management of agricultural matters, and are generally valid for a limited period.

The titles of all other Acts are printed in bold type and preceded by an asterisk.

II

(Acts whose publication is not obligatory)

COMMISSION

COMMISSION DIRECTIVE

of 30 October 1990

adapting to technical progress Council Directive 77/541/EEC on the approximation of the laws of the Member States relating to safety belts and restraint systems of motor vehicles

(90/628/EEC)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community,

Having regard to Council Directive 77/541/EEC of 28 June 1977 on the approximation of the laws of the Member States relating to safety belts and restraint systems of motor vehicles (1), as last amended by the Act of Accession of Spain and Portugal, and in particular Article 10 thereof,

Whereas a comprehensive evaluation of Directive 77/541/EEC has shown that it is possible to improve road safety further by applying practical experience and technological development and taking into account the progress made in the Economic Community for Europe of the United Nations, notably in Regulation No 16, by

— inserting requirements for type-approval of 'harness belts' for special vehicle types,

— inserting requirements for type-approval of safety belts with preloaders,

— specifying installation of appropriate safety belts for all seating positions in all motor vehicle categories with minimal exemptions as necessary,

— introducing a model for a document certifying the actual installation of safety belts in a specific vehicle type to be approved,

— introducing test requirements for height adjustment devices for belts,

and

— introducing more stringent requirements on the conformity of production;

Whereas that experience shows that some existing definitions and requirements have to be adjusted slightly;

Whereas the protection of passengers, especially of passengers in buses and coaches, against ejection in case of an accident must be improved and further modifications to the Directive should be introduced for this purpose;

Whereas everything should be done in order that these modifications can be applied by 31 December 1991 at the latest;

Whereas the adoption of a Directive on the mandatory wearing of safety belts for all occupants of vehicles of less then 3,5 tonnes should be linked to a further modification of the Directive aiming to render mandatory the installation of three-point belts with retractors also for the rear outboard seats of such vehicles;

Whereas the provisions of this Directive are in accordance with the opinion of the Committee on the Adaptation to Technical Progress of the Directives on the removal of technical barriers to trade in motor vehicles,

HAS ADOPTED THIS DIRECTIVE:

Article 1

The Annexes to Directive 77/541/EEC are hereby amended in accordance with the Annex to this Directive.

(1) OJ No L 220, 29. 8. 1977, p. 95.

Article 2

1. With effect from 1 May 1991 no Member State may

(a) on grounds relating to safety belts or restraint systems:

— refuse, in respect of a type of vehicle, to grant EEC type-approval, or to issue the copy of the certificate provided for in the last indent of Article 10 (1) of Council Directive 70/156/EEC [1], or to grant national type-approval, or

— prohibit the entry into service of vehicles

if the safety belts or restraint systems of this type of vehicle or of these vehicles have been approved in accordance with Directive 77/541/EEC, as amended by this Directive;

(b) — refuse to grant EEC component type-approval in respect of a type of safety belt or restraint system, intended for installation in a vehicle, which complies with the requirements of Directive 77/541/EEC, as amended by this Directive,

— prohibit the placing on the market of such safety belts and restraint systems which bear the EEC component type-approval marks prescribed in this Directive.

2. With effect from 1 July 1992 Member States:

(a) — shall no longer issue the copy of the certificate provided for in the last indent of Article 10 (1) of Directive 70/156/EEC in respect of a type of vehicle,

— may refuse to grant national type-approval in respect of a type of vehicle,

of which the safety belts or restraint systems have not been approved in accordance with Directive 77/541/EEC, as amended by this Directive;

(b) — may refuse to grant EEC component type-approval in respect of a type of safety belt or restraint system, intended for installation in a vehicle, which does not comply with the requirements of Directive 77/541/EEC, as amended by this Directive.

3. With effect from 1 July 1997 Member States:

— may prohibit the entry into service of vehicles of which the safety belts or restraint system have not been approved in accordance with Directive 77/541/EEC, as amended by this Directive,

— may prohibit the placing on the market of safety belts and restraint systems, intended for installation in a vehicle, which do not bear the EEC component type-approval marks prescribed in the Directive.

Article 3

Member States shall implement the provisions necessary to comply with this Directive before 1 May 1991. They shall forthwith inform the Commission thereof.

When Member States adopt these provisions, these shall contain a reference to this Directive or shall be accompanied by such reference at the time of their official publication. The procedure for such reference shall be adopted by Member States.

Article 4

This Directive is addressed to the Member States.

Done at Brussels, 30 October 1990.

For the Commission
Martin BANGEMANN
Vice-President

[1] OJ No L 42, 23. 2. 1970, p. 1.

ANNEX

Annex I is amended as follows:

1.4. Item 1.4: add at the end:

'. . . adjusting device, except in the case of a harness belt buckle'.

Add the following new item 1.8.6:

'1.8.6. *"Belt adjustment device for height"* means a device enabling the position in height of the upper loop of a belt to be adjusted according to the requirements of the individual wearer and the position of the seat. Such a device may be considered as a part of the belt or a part of the anchorage of the belt'.

After item 1.12, a new item 1.12.1 is added:

'1.12.1. A *"front passenger seat"* means any seat where the "foremost H-point" of the seat in question is in or in front of the vertical transverse plane through the drivers R-point'.

Add the following new item 1.22:

'1.22. *"Preloading device"* means an additional or integrated device which tightens the strap in order to reduce the slack of the belt during a crash sequence'.

Item 2.1.2.1: modify the first sentence as follows:

'. . . drawings and,

— in the case of retractors, installation instructions for the sensing device shall be provided.

— for pre-loading devices or systems, a full technical description of the construction and function including the sensing device, if any, describing the method of activation and any necessary method to avoid inadvertent activation shall be provided.

The drawings must show . . .'

Add to item 2.1.2.1:

'If the belt is designed to be fixed to the vehicle structure through a belt adjustment device for height, the technical description shall specify whether or not this device is considered as a part of the belt;'

Add a new item 2.1.4 to read as follows:

2.1.4. 'The competent authority shall verify the existence of satisfactory arrangements for ensuring effective checks on conformity of production before type-approval is granted.'

2.4.2.1. Item 2.4.2.1, modify the last sentence as follows:

'The parts of the buckle likely to contact the body of the wearer shall present a section of not less than 20 cm^2 and at least 46 mm in width, measured in a plane situated at a maximum distance of 2,5 mm from the contact surface.

In the case of harness belt buckles, the latter requirement shall be regarded as satisfied if the contact area of the buckle with the wearer's body is comprised between 20 and 40 cm^2.'

Add at the end of item 2.4.2.3, as amended by Directive 82/319/EEC, the following new sentence [1]:

'In the case of harness belt buckles, this test may be carried out without all the tongues being introduced.'

Modify item 2.4.4 as follows:

[1] OJ No L 139, 19. 5. 1982, p. 17.

'2.4.4. *Attachments and belt adjustment devices for height*

The attachments shall be tested for strength as prescribed in items 2.7.6.1 and 2.7.6.2. The actual belt adjustment devices for height shall be tested for strength as prescribed in item 2.7.6.2 of the present Directive where they have not been tested on the vehicle in application of amended Directive 76/115/EEC relating to anchorages for safety belts. These parts must not break or become detached under the tension set up by the prescribed load.'

Add the following new item 2.4.6:

'2.4.6. *Pre-loading device*

2.4.6.1. After being submitted to corrosion testing in accordance with item 2.7.2, the pre-loading device (including the impact sensor connected to the device by the original plugs but without any current passing through them) shall operate normally.

2.4.6.2. It shall be verified that inadvertent operation of the device does not involve any risk of bodily injury for the wearer.

2.4.6.3. In the case of pyrotechnic pre-loading devices:

2.4.6.3.1. After being submitted to conditioning in accordance with item 2.7.10.2, operation of the pre-loading device must not have been activated by temperature and the device shall operate normally.

2.4.6.3.2. Precautions shall be taken to prevent the hot gases expelled from igniting adjacent flammable materials.'

2.6.1.2. Item 2.6.1.2, add at the end:

'In the case of safety belts with retractors, the retractor shall have been subjected to the dust resistance test laid down in item 2.7.7.3; in addition, in the case of safety belts or restraint system equipped with a pre-loading device comprising pyrotechnic means, the device shall have been subjected to the conditioning specified in item 2.7.10.2.'

Add the following new item 2.6.1.2.3:

'2.6.1.2.3. In the case of a belt intended for use with a belt adjustment device for height, as defined in item 1.8.6 above, the test shall be carried out with the device adjusted in the most unfavourable position(s) chosen by the technical service responsible for testing. However if the adjustment device for height consists of the anchorage itself, as permitted by Directive 76/115/EEC, the technical service responsible for the tests can, if it so wishes, apply the provisions of item 2.7.8.1 hereafter.'

Add the following new item 2.6.1.2.4:

'2.6.1.2.4. In the case of a safety belt with pre-loading device, one of the dynamic tests shall be carried out with the device in operation and the other with the device not in use.

In the first case:

2.6.1.2.4.1. During the test the minimum displacements specified in item 2.6.1.3.2. above, may be reduced by half.

2.6.1.2.4.2. After the test, the force measured as indicated in item 2.7.10.1 shall not exceed 100 daN.'

2.6.1.3.2. Item 2.6.1.3.2, add after the first sentence:

'In case of a harness belt the minimum displacement specified for the pelvis may be reduced by half.' (remainder unchanged).

Item 2.7.6.1. After the first sentence of item 2.7.6.1., as amended by Directive 82/319/EEC, add a new sentence to read:

'In the case of harness belts, the buckle shall be connected to the testing apparatus by the straps which are attached to the buckle and the tongue or two tongues located in an approximately symmetrical way to the geometric centre of the buckle.'

The rest of the paragraph is unchanged.

Item 2.7.6.2, amend to read:

'2.7.6.2. The attachments and any belt adjustment devices for height shall be tested in the manner . . . with the strap completely unwound from the reel.'

Item 2.7.7.2.2, amend the second sentence as follows:

'The design of any such test apparatus shall ensure that the required acceleration is achieved before the webbing is drawn out of the retractor by more than 5 mm and that the withdrawal takes place at an average rate of increase of acceleration of at least 25 g/s and not more than 150 g/s.'

Item 2.7.8.1, add at the end the following new sentences:

'In that case, when the dynamic test has been carried out for a type of vehicle it need not be repeated for other types of vehicle where each anchorage point is less than 50 mm distant from the corresponding anchorage point of the tested belt. Alternatively, manufacturers may determine hypothetical anchorage position for testing in order to enclose the maximum number of real anchorage points. If the belt is equipped with a belt adjustment device for height such as defined in 1.8.6 above, the position of the device and the means of securing it shall be the same as those of the vehicle design.'

Correct the fifth line of the existing item 2.7.8.1 (English text) to read:

' . . .or with the data supplied by the manufacturer . . .'

Modify item 2.7.8.1.1 to add the following two sentences at the beginning:

'In the case of a safety belt or restraint system with pre-loading devices relying on component parts other than those incorporated in the belt assembly itself, the belt assembly shall be mounted in conjunction with the necessary additional vehicle parts on the test trolley in the manner prescribed in items 2.7.8.1.2 to 2.7.8.1.6.

Alternatively, in the case where those devices cannot be tested on the test trolley, the manufacturer may demonstrate by a conventional frontal impact test at 50 km/h in conformity with ISO procedure 3560 (1975/11/01 — Road vehicles — Frontal fixed barrier collision test method) that the device complies with the requirements of the Directive.'

Item 2.7.9.2. Amend the second sentence of item 2.7.9.2, as amended by Directive 82/319/EEC, to read:

'A load shall be applied to the buckle by direct traction via the straps tied to it so that all the straps are subjected to the force of 60/n daN; "n" is the number of straps linked to the buckle when it is in a locked position, its minimum is deemed to be 2.'

Add the following new item 2.7.10:

'2.7.10. *Additional tests on safety belts with pre-loading devices*

2.7.10.1. The pre-loading force shall be measured in less than four seconds after the impact as close as possible to the contact point with the manikin on the free length of the strap between the manikin and the pre-loading device or sash guide, if any, the manikin having been replaced in its originally seated position if necessary.

2.7.10.2. *Conditioning*

The pre-loading device may be separated from the safety belt to be tested and kept for 24 hours at a temperature of 60 ± 5 °C. The temperature shall then raised to 100 ± 5 °C for two hours. Subsequently it shall be kept for 24 hours at a temperature of − 30 ± 5 °C. After being removed from conditioning, the device shall warm up to ambient temperature. If it has been separated it shall be fitted again to the safety belt.'

Renumber item 2.8 to read:

'2.8. **Conformity of production**

2.8.1. Any safety belt or restraint system approved under this Directive shall be so manufactured as to conform to the type approved by meeting the requirements set forth in 2.3, 2.4, 2.5, 2.6 and 2.7 above.

2.8.2. In order to verify that the requirements of item 2.8.1 are met, suitable controls of the production shall be carried out.

2.8.3. The holder of the approval shall in particular:

2.8.3.1. Ensure existence of procedures for the effective control of the quality of products;

2.8.3.2. Have access to the control equipment necessary for checking the conformity of each approved type;

2.8.3.3. Ensure that data of test results are recorded and that annexed documents remain available for a period to be determined in accordance with the administrative service;

2.8.3.4. Analyse the results of each type of test, in order to verify and ensure the stability of the safety belt or restraint system characteristics, making allowance for variation of an industrial production;

2.8.3.5. Ensure that, for each type of safety belt or restraint system, at least the tests prescribed in Annex XVI are carried out;

2.8.3.6. Ensure that any samples or test pieces giving evidence of non-conformity with the type of test considered shall give rise to another sampling and another test. All the necessary steps shall be taken to re-establish the conformity of the corresponding production.

2.8.4. The competent authority which has granted type-approval may at any time verify the conformity control methods applicable to each production unit.

2.8.4.1. In every inspection, the test books and production survey records shall be presented to the visiting inspector.

2.8.4.2. The inspector may take samples at random which will be tested in the manufacturer's laboratory. The minimum number of samples may be determined according to the results of the manufacturer's own verification.

2.8.4.3. When the quality level appears unsatisfactory, or when it seems necessary to verify the validity of the tests carried out in application of item 2.8.4.2, the inspector shall select samples to be sent to the technical service which has conducted the type-approval tests.

2.8.4.4. The competent authority may carry out any test prescribed in this Directive.

2.8.4.5. The normal frequency of inspections authorized by the competent authority shall be two per year. In the case where negative results are recorded during one of these inspections, the competent authority shall ensure that all necessary steps are taken to re-establish the conformity of production as rapidly as possible.'

Items 3.1 to 3.1.5 are replaced by the following:

'3.1. *Vehicle equipment* (1)

3.1.1. Any vehicle covered by Article 9, in categories M and N (except those vehicles which include places specially designed for standing passengers in categories M_2 over 3,5 t and M_3 must be equipped with safety belts or restraint systems which satisfy the requirements of this Directive.

3.1.2. The types of safety belts or restraint systems for each seating position where installation is required shall be those specified in Annex XV (with which neither non-locking retractors (1.8.1) nor manually unlocking retractors (1.8.2) can be used). For all seating positions where lap belts type B are specified in Annex XV lap belts type Br3 are permitted except in the case that, in use, they retract to such an extent as to reduce comfort in a notable way after normal buckling up.

3.1.3. However, for outboard seating positions, other than front, of vehicles of the category M_1 shown in Annex XV and marked with the symbol o, the installation of a lap belt of the type B, Br3 or Br4m is allowed, where there exists a passage between a seat and the nearest side wall of the vehicle intended to permit access of passengers to other parts of the vehicle. A space between a seat and the side wall is considered as a passage, if the distance between that side wall, with all doors closed, and a vertical longitudinal plane passing throw the centreline of the seat concerned — measured at the R-point position and perpendicularly to the median longitudinal plane of the vehicle — is more than 500 mm.

3.1.4. Where no safety belts are required any type of safety belt or restraint system conforming to this Directive may be provided at the choice of the manufacturer. A-type belts of the types permitted in Annex XV may be provided as an alternative to lap belts for those seating positions where lap belts are specified in Annex XV.

3.1.5. On three point belts fitted with retractors, one retractor must operate at least on the diagonal strap.

3.1.6. Except for vehicles of category M_1 an emergency locking retractor of type 4N (1.8.5) may be permitted instead of a retractor of type 4 (1.8.4) where it has been shown to the satisfaction of the services responsible for the tests that the fitting of a type 4 retractor would not be practical.

3.1.7. For the front outboard and front centre seating positions shown in Annex XV and marked with the symbol *, lap belts of the type specified on that Annex shall be considered adequate where the windscreen is located outside the reference zone defined in Annex II to Directive 74/60/EEC.

As regards safety belts, the windscreen is considered as part of the reference zone when it is capable of entering into static contact with the test apparatus according to the method described in Annex II to Directive 74/60/EEC.

3.1.8. For all seating positions in Annex XV marked with the symbol #, lap belts of the types specified in Annex XV must be provided where an "exposed seating position" as defined in 3.1.9 exists.

3.1.9. An "exposed seating position" is one where there is no "protective screen" in front of the seat within the following defined space:

— between two horizontal planes, one through the H-point and the other 400 mm above it,

— between two vertical longitudinal planes which are symmetrical in relation to the H-point and are 400 mm apart,

— behind a transverse vertical plane 1,30 m from the H-point.

For the purpose of this requirement "protective screen" means a surface of suitable strength and showing no discontinuities such that, if a sphere of 165 mm diameter is geometrically projected in a longitudinal horizontal direction through any point of the space defined above and through the centre of the sphere, nowhere in the protective screen is there any aperture through which the geometrical projection of the sphere could be passed.

A seat is considered to be an "exposed seating position", if the protective screens within the space defined above have a combined surface area of less than 800 cm².'

(1) In addition to the requirements of 3.1, Member States may, under national law, accept other types of safety belts or restraint systems covered by this Directive for certain vehicle types.

After item 3.2.2.3, a new item 3.2.2.4 is added:

'3.2.2.4. The design and installation of every safety belt provided for each seating position shall be such as to be readily available for use. Furthermore, where the complete seat or the seat cushion and/or the seat back can be folded to permit access to the rear of the vehicle or to carry goods or luggage, after folding and restoring those seats to the seating position, the safety belts provided for those seats shall be accessible for use or can be easily recovered from under or behind the seat by one person, according to instructions in the vehicle users handbook, without the need for that person to have training or practice.'

Item 3.3.2, the fourth sentence is amended as follows:

'In the case of safety belts or restraint systems for front outboard seating positions, except if these are harness belts, the buckle shall also be capable of being locked in the same manner.'

The last sentence of item 3.3.2 is replaced by the following:

'A check shall be made to ensure that if the buckle is in contact with the wearer, the contact surface satisfies the requirements of 2.4.2.1 of this Annex.'

Annex II, item 1, add:

'. . ./device for height adjustment of the upper loop (1).'

In Annex II after the type approval certificate the following model document shall be added:

'Appendix 1

MODEL DOCUMENT

INSTALLATION OF SEAT BELTS AND RESTRAINT SYSTEMS

(Maximum format A 4)

Name of Administration issuing notification .....

Notification concerning an evaluation of the installation of seat belts or restraint systems in a vehicle in accordance with item 3 to Annex I to Directive 77/541/EEC, as amended by Directives 81/576/EEC, 82/319/EEC and 90/628/EEC.

This notification is a summary of the main features of the installation and states whether the administration considered it to be satisfactory, unsatisfactory or no longer satisfactory.

Notification reference number .....

1. Trade name or mark of the motor vehicle .....

2. Vehicle type and category .....

3. Name and address of manufacturer .....
.....

4. If applicable, name and address of his representative .....
.....

5. Description on the seat belts or restraint systems. This shall include the following:

5.1. Seat belts
Make .....
Basic approval number .....
Position on vehicle .....

5.2. Seat belt anchorages
Basic approval number .....

5.3. Seats and their anchorages
Basic approval number .....

6. Vehicle submitted for evaluation on .....

7. Technical service conducting the inspection .....
.....

8. Date of report issued by that service .....

9. Number of report issued by that service .....

10. The installation is considered to be satisfactory/unsatisfactory/no longer satisfactory (1) in terms of 3.1 to 3.3.4 of Annex I

11. Place .....

12. Date .....

13. The following documents, relating to this notification, can be obtained if specially requested: approval reports, photographs and/or sketches for the item listed at 5.1, 5.2 and 5.3.

14. Signature: .....

(1) Strike out what does not apply.'

Annex III is amended as follows:

Item 1.1.1:

— add:

'9 for Spain
21 for Portugal'

— replace the letters 'GR' by 'EL'.

Add a new item 1.1.3.2.3 as follows:

'1.1.3.2.3. the letter "p" in the case of a safety belt with a pre-loading device'.

Annex VII is amended as follows:

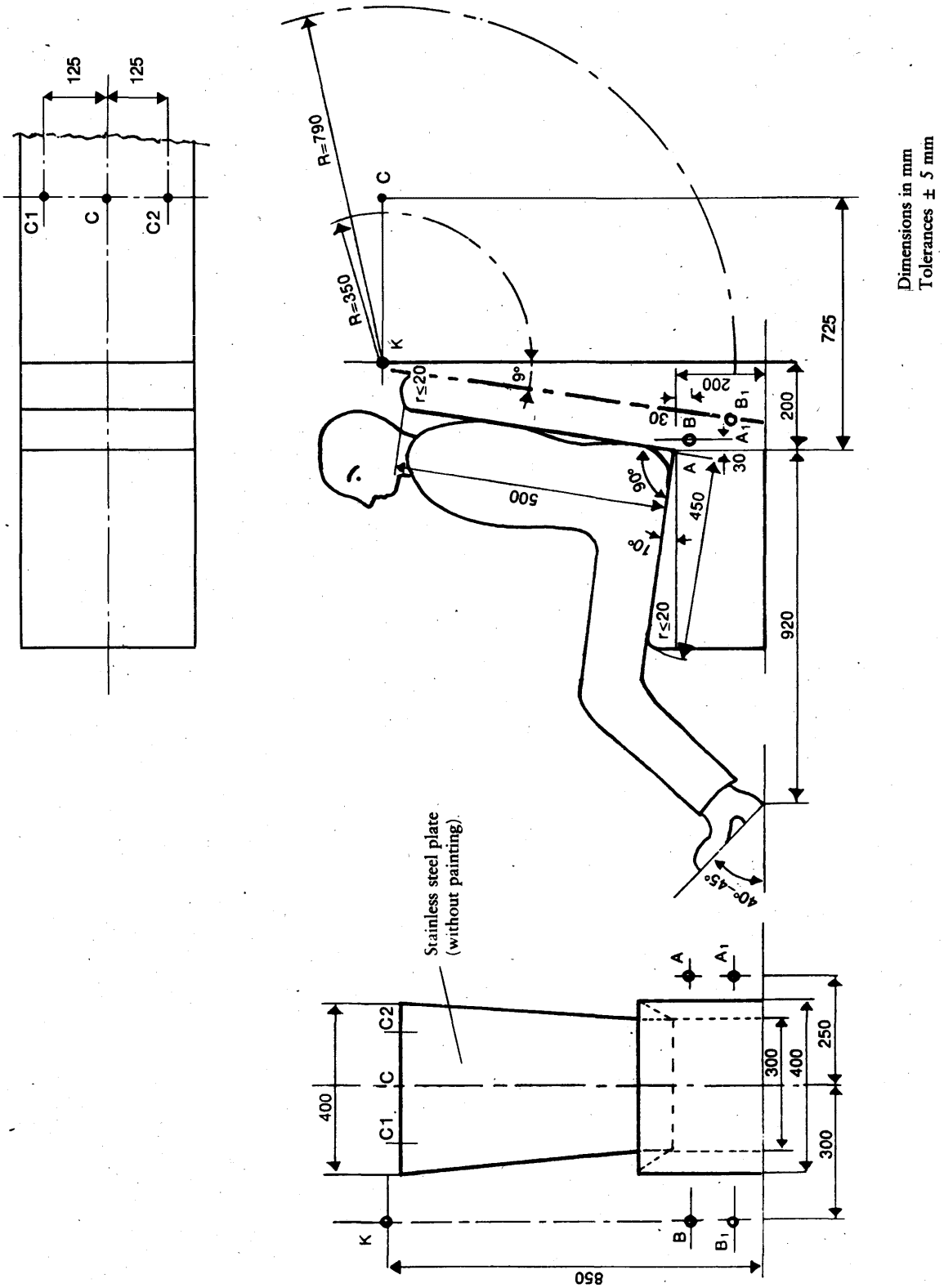
Item 3: add to the first paragraph the following new sentence:

'The tolerance on the position of the anchorage points is such that each anchorage point shall be situated at most at 50 mm from corresponding A, B and K indicated in figure 1, or A1, B1 and K, as the case may be.'

Add the following item 3.1:

'3.1. In the case of a belt equipped with a belt adjustment device for height as defined in 1.8.6 of this Directive, this device shall be secured either to a rigid frame, or to a part of the vehicle on which it is normally mounted which shall be securely fixed on the test trolley.'

Figure 1 is replaced by the following figure:



Dimensions in mm
Tolerances ± 5 mm

Figure 1

TROLLEY, SEAT, ANCHORAGE

Annex X is amended as follows:

Modify item 2 (g) to add at the end: '. . . or, when a seat belt is equipped with a pre-loading device, when the latter has been activated'.

Add the following new Annexes XV and XVI

'ANNEX XV

SAFETY BELT INSTALLATION SHOWING THE BELT TYPES AND RETRACTOR TYPES

Vehicle categories	Outboard seating positions			Centre seating positions	
	Front		Other than front	Front	Other than front
	Driver	Passenger			
M_1	Ar4m	Ar4m	∅ A Ar4m	* B or A Br3 Br4m Ar4m	B Br3 Br4m
$M_2 \leqq 3{,}5$ tonnes	Ar4m Ar4Nm	Ar4m Ar4Nm	# B Br3 Br4m Br4Nm	* B or A Br3 Br4m Ar4m Br4Nm Ar4Nm	# B Br3 Br4m Br4Nm
$M_2 > 3{,}5$ tonnes	B Br3 Br4m Br4Nm	B Br3 Br4m Br4Nm	# B Br3 Br4m Br4Nm	B Br3 Br4m Br4Nm	# B Br3 Br4m Br4Nm
M_3	B Br3 Br4m Br4Nm	B Br3 Br4m Br4Nm	# B Br3 Br4m Br4Nm	B Br3 Br4m Br4Nm	# B Br3 Br4m Br4Nm
N_1	Ar4m Ar4Nm	Ar4m Ar4Nm	# B Br3 Br4m Br4Nm	* B or A Br3 Br4m Ar4m Br4Nm Ar4Nm	# B Br3 Br4m Br4Nm
N_2	B Br3 Br4m Br4Nm	* B or A Br3 Br4m Ar4m Br4Nm Ar4Nm	# B Br3 Br4m Br4Nm	* B or A Br3 Br4m Ar4m Br4Nm Ar4Nm	# B Br3 Br4m Br4Nm
N_3	B Br3 Br4m Br4Nm	* B or A Br3 Br4m Ar4m Br4Nm Ar4Nm	# B Br3 Br4m Br4Nm	* B or A Br3 Br4m Ar4m Br4Nm Ar4Nm	# B Br3 Br4m Br4Nm

Notes:

*: refers to paragraph Annex I, 3.1.7.

#: refers to paragraphs Annex I, 3.1.8 and 3.1.9.

∅: refers to paragraph Annex I, 3.1.3.'

'*ANNEX XVI*

CONTROL OF CONFORMITY OF PRODUCTION

1. TESTS

Safety belts shall be required to demonstrate compliance with the requirements on which the following tests are based:

1.1. **Verification of the locking threshold and durability of emergency locking retractors**

According to the provisions of item 2.7.7.2, in the most unfavourable direction as appropriate after having undergone the durability testing detailed in items 2.7.2, 2.7.7.1 and 2.7.7.3, as a requirement of item 2.4.5.2.5.

1.2. **Verification of the durability of automatically locking retractors**

According to the provisions of item 2.7.7.1, supplemented by the tests in items 2.7.2 and 2.7.7.3, as a requirement of 2.4.5.1.3.

1.3. **Test for strength of straps after conditioning**

According to the procedure described in item 2.7.5, after conditioning according to the requirements of items 2.7.3.1 to 2.7.3.5.

1.3.1. *Test for strength of straps after abrasion*

According to the procedure described in item 2.7.5, after conditioning according to the requirements described in item 2.7.3.6.

1.4. **Microslip test**

According to the procedure described in item 2.7.4.

1.5. **Test of the rigid parts**

According to the procedure described in item 2.7.6.

1.6. **Verification of the performance requirements of the safety belt or restraint system when subjected to the dynamic test**

1.6.1. *Tests with conditioning*

1.6.1.1. Belts or restraint systems fitted with an emergency locking retractor: according to the provisions set out in items 2.7.8 and 2.7.9, using a belt which was previously been subjected to 45 000 cycles of the endurance test of the retractor prescribed in item 2.7.7.1 and to the tests defined in items 2.4.2.3, 2.7.2 and 2.7.7.3.

1.6.1.2. Belts or restraint systems fitted with an automatically-locking retractor: according to the provisions set out in items 2.7.8 and 2.7.9, using a belt which has previously been subjected to 10 000 cycles of the endurance test of the retractor prescribed in item 2.7.7.1 and also to the tests prescribed in items 2.4.2.3, 2.7.2 and 2.7.7.3.

1.6.1.3. Static belt: according to the provisions set out in items 2.7.8 and 2.7.9, on a safety belt which has been subjected to the test prescribed in items 2.4.2.3 and 2.7.2.

1.6.2. *Test without any conditioning*

According to the provisions set out in items 2.7.8 and 2.7.9.

2. TEST FREQUENCY AND RESULTS

2.1. The frequency of testing to the requirements of items 1.1 to 1.5 shall be on a statistically controlled and random basis in accordance with one of the regular quality assurance procedures.

2.1.1. Furthermore, in the case of emergency locking retractors, all assemblies shall be checked:

2.1.1.1. either according to the provisions set out in items 2.7.7.2.1 and 2.7.7.2.2, in the most unfavourable direction, as specified in item 2.7.7.2.1.2. Test results shall meet the requirements of items 2.4.5.2.1.1 and 2.4.5.2.3.

2.1.1.2. or according to the provisions set out in item 2.7.7.2.3, in the most unfavourable direction. Nevertheless, the speed of inclination can be more than the prescribed speed in so far as it does not affect the test results. Test results shall meet the requirements of item 2.4.5.2.1.4.

2.2. In the case of verification of compliance with the dynamic test according to item 1.6 of this Annex, this shall be carried out with a minimum frequency of:

2.2.1. *Tests with conditioning*

2.2.1.1. In the case of belts fitted with an emergency locking retractor,

— where the daily production is greater than 1 000 belts: one in 100 000 belts produced, with a minimum frequency of one every two weeks,

— where the daily production is smaller than or equal to 1 000 belts: one in 10 000 belts produced, with a minimum frequency on one per year,

per sort of locking mechanism (1), shall be subjected to the test prescribed in item 1.6.1.1 of this Annex.

2.2.1.2. In the case of belts fitted with an automatically-locking retractor and of static belts,

— where the daily production is greater than 1 000 belts: one in 100 000 belts produced, with a minimum frequency of one every two weeks,

— where the daily production is smaller than or equal to 1 000 belts: one in 10 000 belts produced, with a minimum frequency of one per year,

shall be subjected to the test prescribed in item 1.6.1.2 or 1.6.1.3 of this Annex respectively.

2.2.2. *Tests without conditioning*

2.2.2.1. In the case of belts fitted with an emergency locking retractor, the following number of samples shall be subjected to the test prescribed in item 1.6.2 of this Annex:

2.2.2.1.1. for a production of not less than 5 000 belts per day, two belts per 25 000 produced with a minimum frequency of one per day, per sort of locking mechanism;

2.2.2.1.2. for a production of less than 5 000 belts per day, one belt per 5 000 produced with a minimum frequency of one per year, per sort of locking mechanism.

2.2.2.2. In the case of belts fitted with an automatically locking retractor and of static belts, the following number of samples shall be subjected to the test prescribed in item 1.6.2 of this Annex:

2.2.2.2.1. for a production of not less than 5 000 belts per day, two belts per 25 000 produced with a minimum frequency of one per day, per approved type,

2.2.2.2.2. for a production of less than 5 000 belts per day, one belt per 5 000 produced with a minimum frequency of one per year, per approved type.

2.2.3. *Results*

Test results shall meet the requirements set out in item 2.6.1.3.1 of Annex I.

The forward displacement of the manikin may be controlled with regard to item 2.6.1.3.2 of Annex I (or item 2.6.1.4 where applicable) during a test performed with conditioning according to item 1.6.1 of this Annex by means of a simplified adapted method.

2.3. Where a test sample fails a particular test to which it has been subjected, a further test to the same requirements shall be carried out on at least three other samples. In the case of dynamic tests if one of the latter fails the test, the holder of the approval or his duly accredited representative shall notify the competent authority which has granted type approval indicating what steps have been taken to re-establish the conformity of production.'

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(1) For the purposes of this Annex "sort of locking mechanism" means all emergency locking retractors whose mechanisms differ only in the lead angle(s) of the sensing device to the vehicle's reference axis system.

COMMISSION DIRECTIVE

of 30 October 1990

adapting to technical progress Council Directive 76/115/EEC on the approximation of the laws of the Member States relating to anchorages for motor vehicle safety belts

(90/629/EEC)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community,

Having regard to Council Directive 76/115/EEC of 18 December 1975 on the approximation of the laws of the Member States relating to anchorages for motor-vehicle safety belts [1], as last amended by Commission Directive 82/318/EEC [2], and in particular Article 6 thereof,

Whereas practical experience and technological development show that it is possible to improve road safety by applying similar requirements to those existing already to vehicle categories M_2 with a permissible maximum mass exceeding 3 500 kilograms and M_3 (buses) which were not covered hitherto and to generally extend the requirements to seating positions, not covered hitherto, of other vehicle categories;

Whereas that experience shows that some existing definitions and requirements have to be adjusted slightly;

Whereas the protection against "submarining" should be improved, which could be provided by modified positioning of the anchorages for safety belts and/or modifications to the seat construction; whereas a test procedure must be developed which enables the improvement in the level of protection to be shown;

Whereas the provisions of this Directive are in accordance with the opinion of the Committee on the Adaptation to Technical Progress of the Directives on the removal of technical barriers to trade in motor vehicles,

HAS ADOPTED THIS DIRECTIVE:

Article 1

Annex I to Directive 76/115/EEC, is hereby amended in accordance with the Annex to this Directive.

Article 2

1. With effect from 1 May 1991 no Member State may, on grounds relating to anchorages for safety belts:

— refuse, in respect of a type of vehicle, to grant EEC type-approval, or to issue the copy of the certificate provided for in the last indent of Article 10 (1) of Directive 70/156/EEC [3], or to grant national type-approval, or

— prohibit the entry into service of vehicles

if the anchorages in this type of vehicle or in these vehicles comply with the requirements of Directive 76/115/EEC, as amended by this Directive.

2. With effect from 1 July 1992 Member States:

— shall no longer issue the copy of the certificate provided for in the last indent of Article 10 (1) of Directive 70/156/EEC in respect of a type of vehicle,

— may refuse to grant national type-approval in respect of a type of vehicle

in which the anchorages do not comply with the requirements of Directive 76/115/EEC, as amended by this Directive.

3. With effect from 1 July 1997 Member States may prohibit the entry into service of vehicles in which the anchorages do not comply with the requirements of Directive 76/115/EEC, as amended by this Directive.

Article 3

The Commission shall, not later than 31 December 1992, proceed to a further review of the provisions of Directive 76/115/EEC and notably Annex I, item 4.4.3 thereof, in order to improve the protection against the risk of submarining, which amendment might include new measures and related dynamic test methods.

(1) OJ No L 24, 30. 1. 1976, p. 6.
(2) OJ No L 139, 19. 5. 1982, p. 9.
(3) OJ No L 42, 23. 2. 1970, p. 1.

Article 4

Member States shall implement the provisions necessary in order to comply with this Directive before 1 May 1991. They shall forthwith inform the Commission thereof.

When Member States adopt these provisions, these shall contain a reference to this Directive or shall be accompanied by such reference at the time of their official publication. The procedure for such reference shall be adopted by Member States.

Article 5

This Directive is addressed to the Member States.

Done at Brussels, 30 October 1990.

For the Commission
Martin BANGEMANN
Vice-President

ANNEX

Annex I is amended as follows:

After item 1.6, a new item 1.6.1 is added:

'1.6.1. a "front passenger seat" means any seat where the "foremost H-point" of the seat in question is in or in front of the vertical tranverse plane through the drivers R-point.'

Item 4.2.1.1, amend to read:

'incorporate retractors. *This provision shall not apply to vehicles for which, according to item 4.3, lap belts only for front outboard seating positions are allowed.* If anchorages . . .'.

(Remainder unchanged)

Item 4.3 is replaced by the following:

'4.3. **Minimum number of belt anchorages to be provided (see Appendix 1).**

4.3.1. Any vehicle in categories M and N (except those vehicles which include places specially designed for standing passengers in categories M_2 over 3,5 tonnes and M_3) must be equipped with safety belt anchorages which satisfy the requirements of this Directive.

4.3.2. The minimum number of safety belt anchorages for each forward directed seating position shall be as specified in Appendix 1.

4.3.3. However, for outboard seating positions — other than front — of vehicles of the category M_1, shown in Appendix 1 and marked with the symbol ∅, two lower anchorages are allowed, where there exists a passage between a seat and the nearest side wall of the vehicle intended to permit access of passengers to other parts of the vehicle. A space between a seat and the side wall is considered as a passage, if the distance between that side wall, with all doors closed, and a vertical longitudinal plane passing through the centreline of the seat concerned — measured at the R-point position and perpendicularly to the median longitudinal plane of the vehicle — is more than 500 mm.

4.3.4. For the front centre seating positions shown in Appendix 1 and marked with the symbol *, two lower anchorages shall be considered adequate where the windscreen is located outside the reference zone defined in Annex II to Directive 74/60/EEC; if located inside this reference zone, three anchorages are required.

As regards belt anchorages, the windscreen is considered as part of the reference zone when it is capable of entering into static contact with the test apparatus according to the method described in Annex II to Directive 74/60/EEC.

4.3.5. For all seating positions shown in Appendix 1 and marked with the symbol #, each exposed seating position, as defined in item 4.3.6, must be equipped with two lower anchorages.

4.3.6. An "exposed seating position" is one where there is no "protective screen" in front of the seat within the following defined space:

— between two horizontal planes, one through the H-point and the other 400 mm above it,

— between two vertical longitudinal planes which are symmetrical in relation to the H-point and are 400 mm apart,

— behind a transverse vertical plane 1,30 m from the H-point.

For the purposes of this requirement "protective screen" means a surface of suitable strength and showing no discontinuities such that, if a sphere of 165 mm diameter is geometrically projected in a longitudinal horizontal direction through any point of the space defined above and through the centre of the sphere, nowhere in the protective screen is there any aperture through which the geometrical projection of the sphere could be passed.

A seat is considered to be an "exposed seating position", if the protective screens within the space defined above have a combined surface area of less than 800 cm^2.

4.3.7. For all folding seats, as well as all the seats of any vehicle which are not covered in items 4.3.1 to 4.3.5, no belt anchorages are required. However, if the vehicle is fitted with anchorages for such seats, these anchorages must comply with the provisions of this Directive.

In this case, two lower anchorages shall be sufficient.'

Item 4.4.3 reads as follows:

'4.4.3. *Location of the effective lower belt anchorages (see Apendix 2)*

4.4.3.1. Front seats, vehicle-category M_1

In motor vehicles of category M_1 the angle $\alpha 1$ (other than buckle side) shall be within the range of 30 to 80° and the angle $\alpha 2$ (buckle side) shall be within the range of 45 to 80°. Both angle-requirements shall be valid for all normal travelling positions of the front seats. Where at least one of the angles $\alpha 1$ and $\alpha 2$ is constant in all normal positions of use, its value shall be $60 \pm 10°$.

In case of adjustable seats with an adjusting device as described in item 1.12, with a seatback inclination angle of less than 20° (see Annex III, figure 1), the angle $\alpha 1$ may be below the minimum value (30°) stipulated above, provided it is not less than 20° in any normal position of use.

4.4.3.2. Rear seats, vehicle category M_1

In motor vehicles of category M_1 the angles $\alpha 1$ and $\alpha 2$ shall be within the range of 30 to 80° for all rear seats. If rear seats are adjustable the above angles shall be valid for all normal travelling positions.

4.4.3.3. Front seats, vehicle categories other than M_1

In motor vehicles of categories other than M_1 the angles $\alpha 1$ and $\alpha 2$ must be between 30 to 80° for all normal travelling positions of the front seats. Where in the case of front seats of vehicles with a maximum vehicle mass not exceeding 3,5 tonnes at least one of the angles $\alpha 1$ and $\alpha 2$ is constant in all normal positions of use, its value shall be $60 \pm 10°$.

4.4.3.4. Rear seats and special front or rear seats, vehicle categories other than M_1

In vehicles of categories other than M_1, in the case of:

— bench seats,

— adjustable seats (front and rear) with an adjusting device as described in item 1.12 with a seatback angle of less than 20° (see Annex III, figure 1), and

— other rear seats,

angles $\alpha 1$ and $\alpha 2$ may be between 20 and 80° in any normal position of use. Where in the case of front seats of vehicles with a maximum vehicle mass not exceeding 3,5 tonnes at least one of the angles $\alpha 1$ and $\alpha 2$ is constant in all normal positions of use, its value shall be $60 \pm 10°$.'

Old item 4.4.3.3 becomes 4.4.3.5.

Add at the end of 4.4.4.1:

'Where a two-door configuration is used to provide access to both the front and rear seats and the upper anchorage is fitted to the "B" post, the system must be designed so as not to impede access to or egress from the vehicle.'

After item 5.2.3, a new item 5.2.4 is added:

'5.2.4. If a test method other than that prescribed in items 5.2.1 to 5.2.3 of this Directive is used, evidence must be furnished that it is equivalent.'

Item 5.3.5.3 reads as follows:

'5.3.5.3. When a manufacturer supplies his vehicle with safety belts, the corresponding belt anchorages may, at the request of the manufacturer, be submitted only to a test in which the loads are transmitted to them by means of a device reproducing the geometry of the type of belts to be attached to these anchorages.'

Item 5.3.6 reads as follows:

'5.3.6. If no upper belt anchorages are provided for the outboard seats and the centre seats, the lower belt anchorages shall be submitted to the test prescribed in 5.4.3, in which the loads are transmitted to these anchorages by means of a device reproducing the geometry of a lap belt.'

Item 5.4.1.2 reads as follows:

'5.4.1.2. For vehicles in categories M_1 and N_1, a test load of 1 350 ± 20 daN shall be applied by a traction device (see Annex IV, figure 2) attached to the belt anchorages of the same belt by means of a device reproducing the geometry of the upper torso strap of such a safety belt.

For vehicles in categories M_2 and N_2, the test load shall be 675 ± 20 daN.

For vehicles in categories M_3 and N_3, the test load shall be 450 ± 20 daN.'

Item 5.4.1.3 reads as follows:

'5.4.1.3. For vehicles in categories M_1 and N_1, at the same time a tractive force of 1 350 ± 20 daN shall be applied to a traction device (see Annex IV, figure 1) attached to the two lower belt anchorages.

For vehicles in categories M_2 and N_2, this test load shall be 675 ± 20 daN.

For vehicles in categories M_3 and N_3, this test load shall be 450 ± 20 daN.'

Item 5.4.2.1 reads as follows:

'5.4.2.1. For vehicles in categories M_1 and N_1, a test load of 1 350 ± 20 daN shall be applied to a traction device (see Annex IV, figure 2) attached to the belt upper anchorage and to the opposite lower belt anchorage of the same belt, using, if supplied by the manufacturer, a retractor fixed at the upper belt anchorage.

For vehicles in categories M_2 and N_2, this test load shall be 675 ± 20 daN.

For vehicles in categories M_3 and N_3, this test load shall be 450 ± 20 daN.'

Item 5.4.2.2 reads as follows:

'5.4.2.2. For vehicles in categories M_1 and N_1, at the same time a tractive force of 1 350 ± 20 daN shall be applied to a traction device (see Annex IV, figure 1) attached to the lower belt anchorages.

For vehicles in categories M_2 and N_2, this test load shall be 675 ± 20 daN.

For vehicles in categories M_3 and N_3, this test load shall be 450 ± 20 daN.'

Item 5.4.3 reads as follows:

'5.4.3. *Test in configuration of a lap belt.*

For vehicles in categories M_1 and N_1, a test load of 2 225 ± 20 daN shall be applied to a traction device (see Annex IV, figure 1) attached to the two lower belt anchorages.

For vehicles in categories M_2 and N_2, this test load shall be 1 110 ± 20 daN.

For vehicles in categories M_3 and N_3, this test load shall be 740 ± 20 daN.'

Item 5.4.4.2, amend the sentence which was added with Directive 82/318/EEC to read:

'In the case of vehicles in categories M_2 and N_2, this force must be equal to 10 times the weight of the complete seat; for categories M_3 and N_3 it must be equal to 6,6 times the weight of the complete seat.'

Replace old items 5.4.5.2 and 5.4.5.3 by the following new 5.4.5.2:

'5.4.5.2. For vehicles in categories M_1 and N_1, at the same time, a tractive force of 1 350 ± 20 daN shall be applied to a traction device (see Annex IV, figure 3) attached to the two lower belt anchorages.

For vehicles in categories M_2 and N_2, this test load shall be 675 ± 20 daN.

For vehicles in categories M_3 and N_3, this test load shall be 450 ± 20 daN.'

Add new Appendices 1 and 2 to Annex I as follows:

'Appendix 1

MINIMUM NUMBER OF ANCHORAGE POINTS

Vehicle categories	Outboard seating positions			Centre seating positions	
	Front		Other than front	Front	Other than front
	Driver	Passenger			
M_1	3	3	⌀ 3	*	2
$M_2 \leqq 3{,}5$ tonnes	3	3	#	*	#
$M_2 > 3{,}5$ tonnes	3	3	#	2	#
M_3	3	3	#	2	#
N_1	3	3	#	*	#
N_2	3	3	#	*	#
N_3	3	3	#	*	#

Notes:
2: two lower anchorages which allow the installation of a lap belt.
*: refers to items 4.3.4.
#: refers to items 4.3.5 and 4.3.6.
3: two lower anchorages and one upper anchorage which allow the installation of a three point safety belt, with the exception of front outboard seats on vehicles in categories M_1, N_1 and M_2 with a maximum vehicle mass not exceeding 3,5 tonnes, for which the anchorages shall allow the installation of a safety belt type Ar.
⌀: refers to item 4.3.3.'

'Appendix 2

LOCATION OF LOWER ANCHORAGES, ANGLE REQUIREMENTS ONLY: α (°)

	Old requirements		New requirements	
	M_1	Other than M_1	M_1	Other than M_1
Front (outboard and centre)				
— buckle side	30 – 80	30 – 80	45 – 80	30 – 80
— other than buckle side	30 – 80	30 – 80	30 – 80	30 – 80
— angle constant	50 – 70	30 – 80	50 – 70	50 – 70
— bench:	30 – 80	20 – 80		
— buckle side			45 – 80	20 – 80
— other than buckle side			30 – 80	20 – 80
— adjustable seat with seat back angle < 20°	20 – 80	20 – 80	20 – 80 45 – 80 (*)	20 – 80
Rear (outboard and centre)	20 – 80	20 – 80	30 – 80	20 – 80
Folding seat	No belt anchorage required. If anchorage is fitted: see angle requirements Front and Rear.			

(*) "other than buckle side" (α1): 20 – 80°
"buckle side" (α2): 45 – 80°
(both: if angle is not constant: see item 4.4.3.1).'

COMMISSION DIRECTIVE

of 30 October 1990

adapting to technical progress Council Directive 77/649/EEC on the approximation of the laws of the Member States relating to the field of vision of motor vehicle drivers

(90/630/EEC)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community,

Having regard to Council Directive 77/649/EEC of 27 September 1977 on the approximation of the laws of the Member States relating to the field of vision of motor vehicles (1), as last amended by Commission Directive 88/366/EEC (2), and in particular Article 5 thereof,

Whereas, in view of experience gained and of the state of the art, it is now appropriate to render more precise the test procedure laid down in Annex III to Directive 77/649/EEC, and in particular, to align it to the latest developments in the United Nations Economic Commission for Europe;

Whereas the provisions of this Directive are in accordance with the opinion of the Committee on the Adaptation to Technical Progress of the Directives on the removal of technical barriers to trade in motor vehicles,

HAS ADOPTED THIS DIRECTIVE:

Article 1

Annex III to Directive 77/649/EEC is hereby amended in accordance with the Annex to this Directive.

Article 2

1. With effect from 1 May 1991 no Member State may, on grounds relating to field of vision:

— refuse, in respect of a type of vehicle, to grant EEC type-approval, or to issue the copy of the certificate provided for in the last indent of Article 10 (1) of Directive 70/156/EEC (3), or to grant national type-approval, or

— prohibit the entry into service of vehicles

where the field of vision of drivers of such type of vehicle or of such vehicles has been determined in accordance with Directive 77/649/EEC, as amended by this Directive.

2. With effect from 1 October 1991 Member States:

— shall no longer issue the copy of the certificate provided for in the last indent of Article 10 (1) of Directive 70/156/EEC in respect of a type of vehicle of which the driver's field of vision has not been determined in accordance with Directive 77/649/EEC, as amended by this Directive,

— may refuse to grant national type-approval of a type of vehicle of which the driver's field of vision has not been determined in accordance with Directive 77/649/EEC, as amended by this Directive.

Article 3

Member States shall implement the provisions necessary in order to comply with this Directive before 1 May 1991. They shall forthwith inform the Commission thereof.

When Member States adopt these provisions, these shall contain a reference to this Directive or shall be accompanied by such reference at the time of their official publication. The procedure for such reference shall be adopted by Member States.

Article 4

This Directive is addressed to the Member States.

Done at Brussels, 30 October 1990.

For the Commission
Martin BANGEMANN
Vice-President

(1) OJ No L 267, 19. 10. 1977, p. 1.
(2) OJ No L 181, 12. 7. 1988, p. 40.
(3) OJ No L 42, 23. 2. 1970, p. 1.

ANNEX

Annex III to Directive 77/649/EEC is replaced by the following:

'Annex III

PROCEDURE FOR DETERMINING THE "H" POINT AND THE ACTUAL TORSO ANGLE FOR SEATING POSITIONS IN MOTOR VEHICLES

1. PURPOSE

The procedure described in this Annex is used to establish the "H" point location and the actual torso angle for one or several seating positions in a motor vehicle and to verify the relationship of measured data to design specifications given by the vehicle manufacturer (1)

2. DEFINITIONS

For the purposes of this Annex:

2.1. *"Reference data"* means one or several of the following characteristics of a seating position:

2.1.1. the "H" point and the "R" point and their relationship,

2.1.2. the actual torso angle and the design torso angle and their relationship.

2.2. *"Three-dimensional 'H' point machine"* (3 DH machine) means the device used for the determination of "H" points and actual torso angles. This device is described in Appendix 1 to this Annex;

2.3. *"'H' point"* means the pivot centre of the torso and thigh of the 3 DH machine installed in the vehicle seat in accordance with paragraph 4 below. The "H" point is located in the centre of the centreline of the device which is between the "H" point sight buttons on either side of the 3 DH machine. The "H" point corresponds theoretically to the "R" point (for tolerances see item 3.2.2 below). Once determined in accordance with the procedure described in paragraph 4, the "H" point is considered fixed in relation to the seat-cushion structure and to move with it when the seat is adjusted;

2.4. *"'R' point"* or *"seating reference point"* means a design point defined by the vehicle manufacturer for each seating position and established with respect to the three-dimensional reference system;

2.5. *"Torso-line"* means the centreline of the probe of the 3 DH machine with the probe in the fully rearward position;

2.6. *"Actual torso angle"* means the angle measured between a vertical line through the "H" point and the torso line using the back angle quadrant on the 3 DH machine. The actual torso angle corresponds theoretically to the design torso angle (for tolerances see item 3.2.2 below);

2.7. *"Design torso angle"* means the angle measured between a vertical line through the "R" point and the torso line in a position which corresponds to the design position of the seat-back established by the vehicle manufacturer;

2.8. *"Centreplane of occupant"* (C/LO) means the median plane of the 3 DH machine positioned in each designated seating position; it is represented by the co-ordinate of the "H" point on the "Y" axis. For individual seats, the centreplane of the seat coincides with the centreplane of the occupant. For other seats, the centreplane of the occupant is specified by the manufacturer;

2.9. *"Three-dimensional reference system"* means a system as described in Appendix 2 to this Annex;

2.10. *"Fiducial marks"* are physical points (holes, surfaces, marks or indentations) on the vehicle body as defined by the manufacturer;

2.11. *"Vehicle measuring attitude"* means the position of the vehicle as defined by the coordinates of fiducial marks in the three-dimensional reference system.

(1) In any seating position other than front seats where the "H" point cannot be determined using the "three-dimensional 'H' point machine" or procedures, the "R" point indicated by the manufacturer may be taken as a reference at the discretion of the competent authority.

3. REQUIREMENTS

3.1. **Data presentation**

For each seating position where reference data are required in order to demonstrate compliance with the provisions of the present Directive, all or an appropriate selection of the following data shall be presented in the form indicated in Appendix 3 to this Annex:

3.1.1. the coordinates of the "R" point relative to the three-dimensional reference system;

3.1.2. the design torso angle;

3.1.3. all indications necessary to adjust the seat (if it is adjustable) to the measuring position set out in item 4.3 below.

3.2. **Relationship between measured data and design specifications**

3.2.1. The coordinates of the "H" point and the value of the actual torso angle obtained by the procedure set out in item 4 below shall be compared, respectively, with the coordinates of the "R" point and the value of the design torso angle indicated by the vehicle manufacturer.

3.2.2. The relative positions of the "R" point and the "H" point and the relationship between the design torso angle and the actual torso angle shall be considered satisfactory for the seating position in question if the "H" point, as defined by its coordinates, lies within a square of 50 mm side length with horizontal and vertical sides whose diagonals intersect at the "R" point, and if the actual torso angle is within 5° of the design torso angle.

3.2.3. If these conditions are met, the "R" point and the design torso angle shall be used to demonstrate compliance with the provisions of this Directive.

3.2.4. If the "H" point or the actual torso angle does not satisfy the requirements of item 3.2.2 above, the "H" point and the actual torso angle shall be determined twice more (three times in all). If the results of two of these three operations satisfy the requirements, the conditions of item 3.2.3 above shall apply.

3.2.5. If the results of at least two of the three operations described in item 3.2.4 above do not satisfy the requirements of item 3.2.2 above, or if the verification cannot take place because the vehicle manufacturer has failed to supply information regarding the position of the "R" point or regarding the design torso angle, the centroid of the three measured points or the average of the three measured angles shall be used and be regarded as applicable in all cases where the "R" point or the design torso angle is referred to in this Directive.

4. PROCEDURE FOR "H" POINT AND ACTUAL TORSO ANGLE DETERMINATION

4.1. The vehicle shall be preconditioned at the manufacturer's discretion, at a temperature of 20 ± 10 °C to ensure that the seat material reaches room temperature. If the seat to be checked has never been sat upon, a 70 to 80 kg person or device shall sit on the seat twice for one minute to flex the cushion and back. At the manufacturer's request, all seat assemblies shall remain unloaded for a minimum period of 30 minutes prior to installation of the 3 DH machine.

4.2. The vehicle shall be at the measuring attitude defined in item 2.11 above.

4.3. The seat, if it is adjustable, shall be adjusted first to the rearmost normal driving or riding position, as indicated by the vehicle manufacturer, taking into consideration only the longitudinal adjustment of the seat, excluding seat travel used for purposes other than normal driving or riding positions. Where other modes of seat adjustment exist (vertical, angular, seat-back, etc.) these will be then adjusted to the position specified by the vehicle manufacturer. For suspension seats, the vertical position shall be rigidly fixed corresponding to a normal driving position as specified by the manufacturer.

4.4. The area of the seating position contacted by the 3 DH machine shall be covered by a muslin cotton, of sufficient size and appropriate texture, described as a plain cotton fabric having 18,9 threads per cm^2 and weighing 0,228 kg/m^2 or knitted or non-woven fabric having equivalent characteristics.

If a test is run on a seat outside the vehicle, the floor on which the seat is placed shall have the same essential characteristics (1) as the floor of the vehicle in which the seat is intended to be used.

(1) Tilt angle, height difference with a seat mounting, surface texture, etc.

4.5. Place the seat and back assembly of the 3 DH machine so that the centreplane of the occupant (C/LO) coincides with the centreplane of the 3 DH machine. At the manufacturer's request, the 3 DH machine may be moved inboard with respect to the C/LO if the 3 DH machine is located so far outboard that the seat edge will not permit levelling of the 3 DH machine.

4.6. Attach the foot and lower leg assemblies to the seat pan assembly, either individually or by using the T-bar and lower leg assembly. A line through the "H" point sight buttons shall be parallel to the ground and perpendicular to the longitudinal centreplane of the seat.

4.7. Adjust the feet and leg position of the 3 DH machine as follows:

4.7.1. *Designated seating position: driver and outside front passenger*

4.7.1.1. Both feet and leg assemblies shall be moved forward in such a way that the feet take up natural positions on the floor, between the operating pedals if necessary. Where possible the left foot shall be located approximately the same distance to the left of the centreplane of the 3 DH machine as the right foot is to the right. The spirit level verifying the transverse orientation of the 3 DH machine is brought to the horizontal by readjustment of the seat pan if necessary, or by adjusting the leg and foot assemblies towards the rear. The line passing through the "H" point sight buttons shall be maintained perpendicular to the longitudinal centreplane of the seat.

4.7.1.2. If the left leg cannot be kept parallel to the right leg and the left foot cannot be supported by the structure, move the left foot until it is supported. The alignment of the sight buttons shall be maintained.

4.7.2. *Designated seating position: outboard rear*

For rear seats or auxiliary seats, the legs are located as specified by the manufacturer. If the feet then rest on parts of the floor which are at different levels, the foot which first comes into contact with the front seat shall serve as a reference and the other foot shall be so arranged that the spirit level giving the transverse orientation of the seat of the device indicates the horizontal.

4.7.3. Other designated seating positions:

The general procedure indicated in item 4.7.1 above shall be followed except that the feet shall be placed as specified by the vehicle manufacturer.

4.8. Apply lower leg and thigh weights and level the 3 DH machine.

4.9. Tilt the back pan forward against the forward stop and draw the 3 DH machine away from the seat-back using the T-bar. Reposition the 3 DH machine on the seat by one of the following methods:

4.9.1. If the 3 DH machine tends to slide rearward, use the following procedure. Allow the 3 DH machine to slide rearward until a forward horizontal restraining load on the T-bar is no longer required i.e. until the seat pan contacts the seat-back. If necessary reposition the lower leg;

4.9.2. If the 3 DH machine does not tend to slide rearward, use the following procedure. Slide the 3 DH machine rearward by applying a horizontal rearward load to the T-bar until the seat pan contacts the seat-back (see figure 2 of Appendix 1 to this Annex).

4.10. Apply a 100 ± 10 N load to the back and pan assembly of the 3 DH machine at the intersection of the hip angle quadrant and the T-bar housing. The direction of load application shall be maintained along a line passing by the above intersection to a point just above the thigh bar housing (see figure 2 of Appendix 1 to this Annex). Then carefully return the back pan to the seat-back. Care must be exercised throughout the remainder of the procedure to prevent the 3 DH machine from sliding forward.

4.11. Install the right and left buttock weights and then, alternately, the eight torso weights. Maintain the 3 DH machine level.

4.12. Tilt the back pan forward to release the tension on the seat-back. Rock the 3 DH machine from side to side through a 10° arc (5° to each side of the vertical centreplane) for three complete cycles to release any accumulated friction between the 3 DH machine and the seat;

During the rocking action, the T-bar of the 3 DH machine may tend to diverge from the specified horizontal and vertical alignment. The T-bar must therefore be restrained by applying an appropriate lateral load during the rocking motions. Care shall be exercised in holding the T-bar and rocking the 3 DH machine to ensure that no inadvertent exterior loads are applied in a vertical or fore and aft direction.

The feet of the 3 DH machine are not to be restrained or held during this step. If the feet change position, they should be allowed to remain in that attitude for the moment.

Carefully return the back pan to the seat-back and check the two spirit levels for zero position. If any movement of the feet has occurred during the rocking operation of the 3 DH machine, they must be repositioned as follows:

Alternately, lift each foot off the floor the minimum necessary amount until no additional foot movement is obtained. During this lifting, the feet are to be free to rotate; and no forward or lateral loads are to be applied. When each foot is placed back in the down position, the heel is to be in contact with the structure designed for this.

Check the lateral spirit level for zero position; if necessary, apply a lateral load to the top of the back pan sufficient to level the 3 DH machine's seat pan on the seat.

4.13. Holding the T-bar to prevent the 3 DH machine from sliding forward on the seat cushion, proceed as follows:

(a) return the back pan to the seat-back;

(b) alternately apply and release a horizontal rearward load, not to exceed 25 N, to the back angle bar at a height approximately at the centre of the torso weights until the hip angle quadrant indicates that a stable position has been reached after load release. Care shall be exercised to ensure that no exterior downward or lateral loads are applied to the 3 DH machine. If another level adjustment of the 3 DH machine is necessary, rotate the back pan forward, re-level, and repeat the procedure from item 4.12.

4.14. Take all measurements:

4.14.1. The coordinates of the "H" point are measured with respect to the three-dimensional reference system.

4.14.2. The actual torso angle is read at the back angle quadrant of the 3 DH machine with the probe in its fully rearward position.

4.15. If a re-run of the installation of the 3 DH machine is desired, the seat assembly should remain unloaded for a minimum period of 30 min prior to the re-run. The 3 DH machine should not be left loaded on the seat assembly longer than the time required to perform the test.

4.16. If the seats in the same row can be regarded as similar (bench seat, identical seats, etc.) only one "H" point and one "actual torso angle" shall be determined for each row of seats, the 3 DH machine described in Appendix 1 to this Annex being seated in a place regarded as representative for the row. This place shall be:

4.16.1. in the case of the front row, the driver's seat;

4.16.2. in the case of the rear row or rows, an outer seat.

Appendix 1

DESCRIPTION OF THE THREE DIMENSIONAL "H" POINT MACHINE (1) (3 DH machine)

1. *Back and seat pans*

The back and seat pans are constructed of reinforced plastic and metal; they simulate the human torso and thigh and are mechanically hinged at the "H" point. A quadrant is fastened to the probe hinged at the "H" to measure the actual torso angle. An adjustable thigh bar, attached to the set pan, establishes the thigh centreline and serves as a baseline for the hip angle quadrant.

2. *Body and leg elements*

Lower leg segments are connected to the seat pan assembly at the T-bar joining the knees, which is a lateral extension of the adjustable thigh bar. Quadrants are incorporated in the lower leg segments to measure knee angles. Shoe and foot assemblies are calibrated to measure the foot angle. Two spirit levels orient the device in space. Body element weights are placed at the corresponding centres of gravity to provide seat penetration equivalent to a 76 kg male. All joints of the 3 DH machine should be checked for free movement without encountering noticeable friction.

(1) The machine corresponds to that described in ISO Standard 6549-1980. For details of the construction of the 3 DH machine refer to Society of Automotive Engineers (SAE), 400 Commonwealth Drive, Warrendale, Pennsylvania 15096, United States of America.

Figure 1

3 DH MACHINE ELEMENTS DESIGNATION

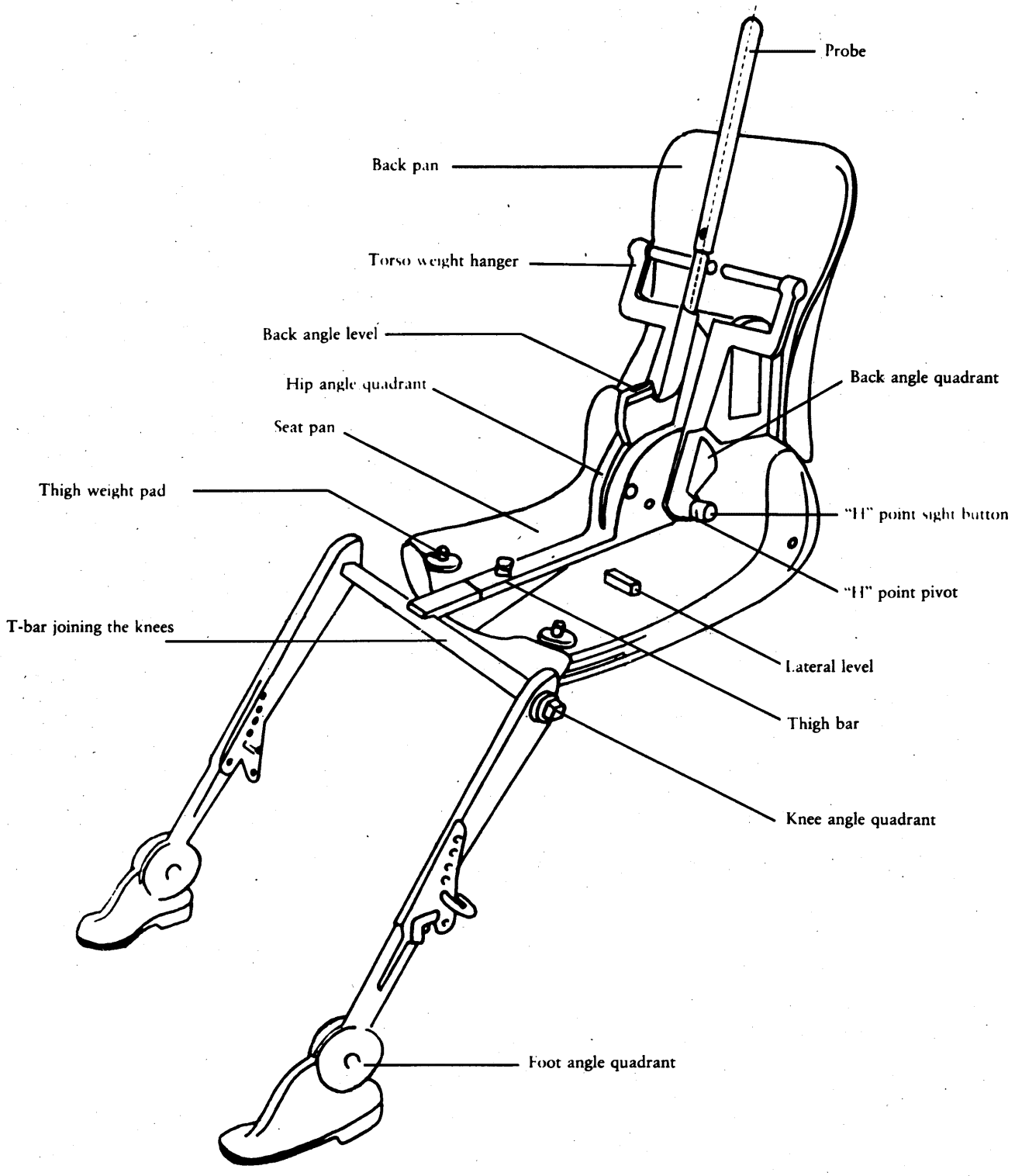
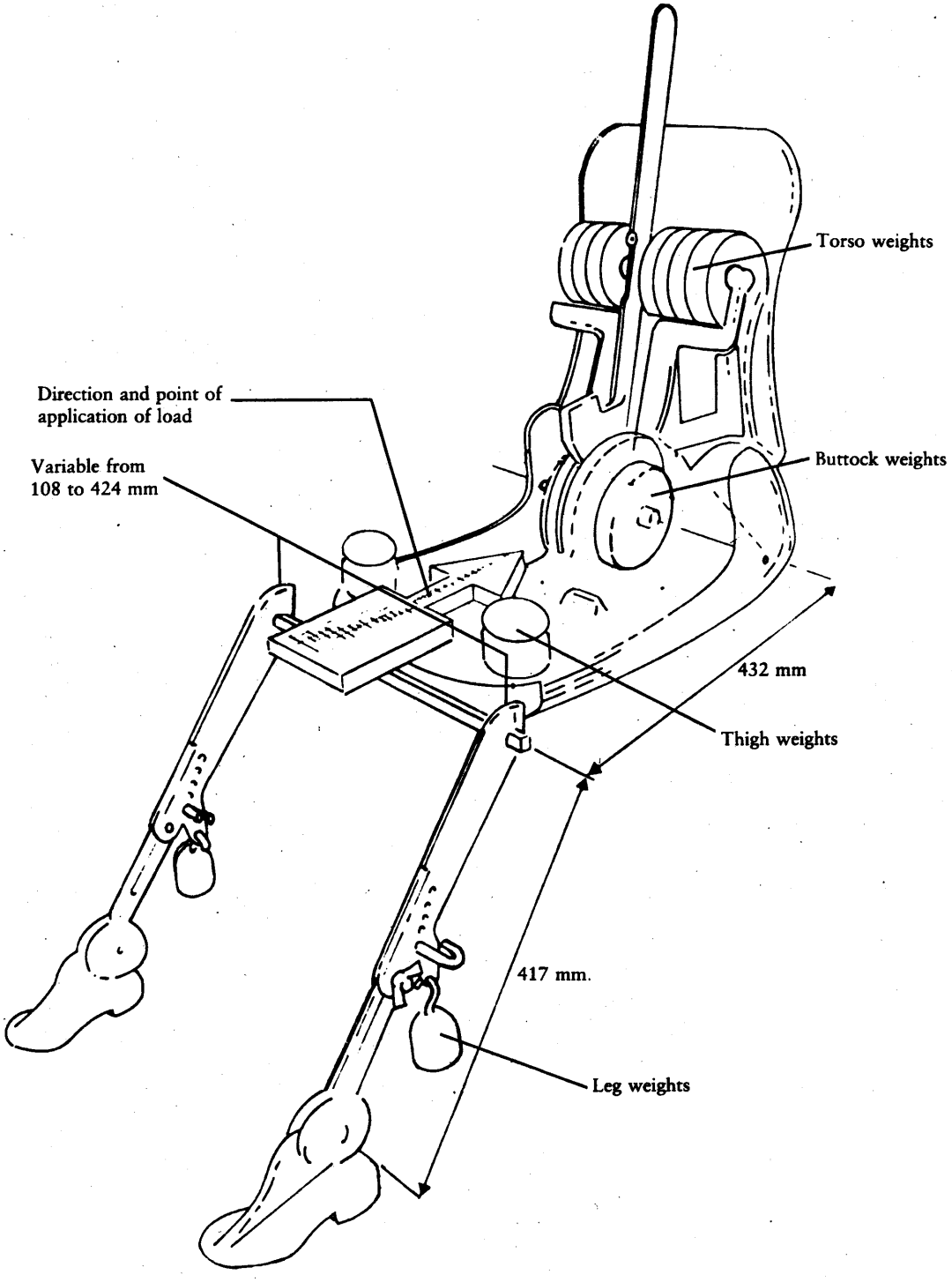


Figure 2

DIMENSIONS OF THE 3 DH MACHINE ELEMENTS AND LOAD DISTRIBUTION



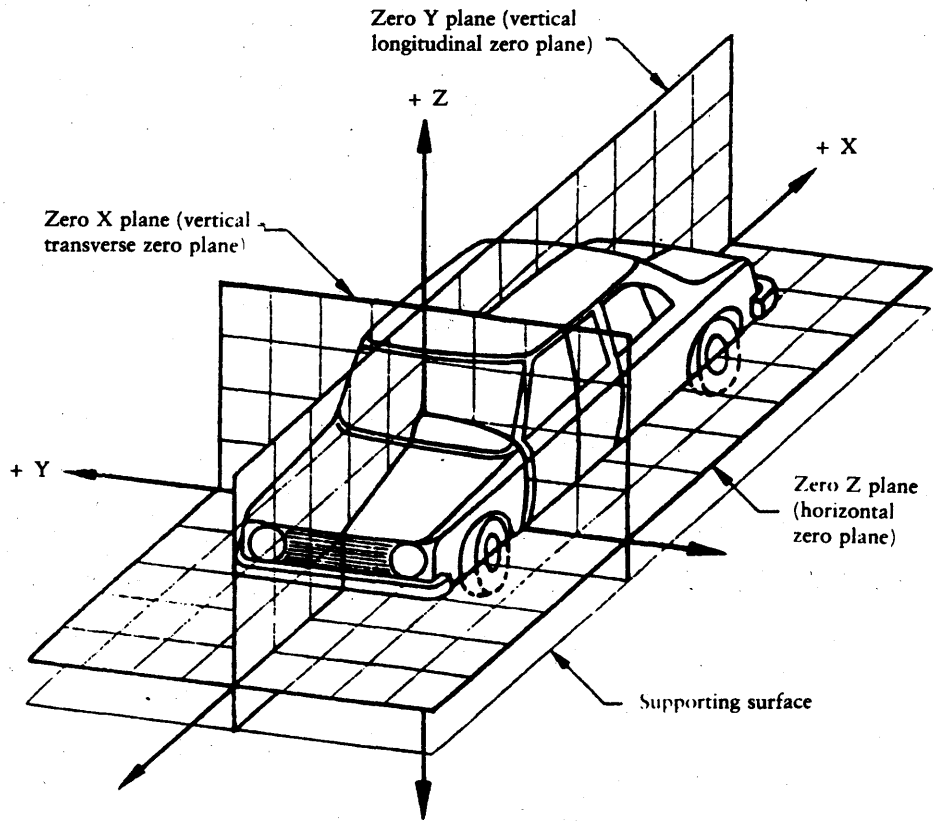
Appendix 2

THREE-DIMENSIONAL REFERENCE SYSTEM

1. The three-dimensional reference system is defined by three orthogonal planes established by the vehicle manufacturer (see figure) (1).

2. The vehicle measuring attitude is established by positioning the vehicle on the supporting surface such that the coordinates of the fiducial marks correspond to the values indicated by the manufacturer.

3. The coordinates of the "R" point and the "H" point are established in relation to the fiducial marks defined by the vehicle manufacturer.



Three-dimensional reference system

(1) The reference system corresponds to ISO standard 4130-1978.

Appendix 3

REFERENCE DATA CONCERNING SEATING POSITIONS

1. *Coding of reference data*

Reference data are listed consecutively for each seating position. Seating positions are identified by a two-digit code. The first digit is an Arabic numeral and designates the row of seats, counting from the front to the rear of the vehicle. The second digit is a capital letter which designates the location of the seating position in a row, as viewed in the direction of forward motion of the vehicle; the following letters shall be used.

— L = left,
— C = centre,
— R = right.

2. *Description of vehicle measuring attitude*

2.1. Coordinates of fiducial marks

X .....

Y .....

Z .....

3. *List of reference data*

3.1. Seating position: .....

3.1.1. Coordinates of "R" point

X .....

Y .....

Z .....

3.1.2. Design torso angle: .....

3.1.3. Specifications for seat adjustment (1)

horizontal: .....

vertical: .....

angular: .....

torso angle: .....

Note: List reference data for further seating positions under items 3.2, 3.3 etc.

(1) Strike out what does not apply.'