II

(Acts whose publication is not obligatory)

COMMISSION

COMMISSION DIRECTIVE

of 6 December 1991

adapting to technical progress Council Directive 74/297/EEC in respect of the behaviour of the steering wheel and column in an impact

(91/662/EEC)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community,

Having regard to Council Directive 74/297/EEC of 4 June 1974 on the approximation of the laws of the Member States relating to the interior fittings of motor vehicles (the behaviour of the steering mechanism in the event of an impact) (1), and in particular Article 5 thereof,

Whereas, in view of experience gained and of the state of the art, it is now appropriate, in the case of a frontal impact, to improve protection offered to the driver by controlling the behaviour of the sterring wheel and mechanism which is the aim of Directive 74/297/EEC, by aligning it with the latest developments in the relevant Regulation of the United Nations Economic Commission for Europe and by the introduction of some further improvements;

Whereas, in view of experience gained from accidents indicating that the steering wheel should be soft to protect the driver's face from serious injury, further modifications to this Directive should be introduced for this purpose; whereas, as several proposals for a test method are available, the Commission should bring forward a further proposal to the Committee for Adaptation to Technical Progress by 31 December 1991;

Whereas the provisions of this Directive are in accordance with the opinion of the Committee for the Adaptation to Technical Progress of the Directives on Motor Vehicles,

HAS ADOPTED THIS DIRECTIVE:

Article 1

The Annexes to Directive 74/297/EEC are hereby amended in accordance with the Annexes to this Directive.

Article 2

1. With effect from 1 October 1992 no Member State may

(a) — refuse, in respect of a type of vehicle, to grant EC 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 (2), or to grant national type-approval, or

— prohibit the entry into service of vehicles,

on grounds relating to their *steering mechanism* if this has been approved in accordance with Directive 74/297/EEC as amended by this Directive;

(b) — refuse to grant EC type-approval in respect of a type of steering control intended for installation in a vehicle or vehicles, or

— prohibit the placing on the market of steering controls intended for installation in a vehicle or vehicles

if the said *steering control* complies with the requirements of Directive 74/297/EEC as amended by this Directive.

(1) OJ No L 165, 20. 6. 1974, p. 16.

(2) OJ No L 42, 23. 2. 1970, p. 1.

2. With effect from 1 October 1996, in respect of motor vehicles of category M_1 which are not forward control, 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, and

— may refuse to grant national type-approval

on grounds relating to the *steering mechanism* if this does not comply with the requirements of Directive 74/297/EEC as amended by this Directive.

3. With effect from 1 October 1995, in respect of forward-control motor vehicles of category M_1 and all N_1 motor vehicles with a permissible maximum mass not exceeding 1 500 kilograms, 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, and

— may refuse to grant national type-approval

on grounds relating to the *steering mechanism* if this does not comply with the requirements of Directive 74/297/EEC as amended by this Directive.

4. With effect from 1 October 1996, in respect of types of *steering control,* 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, and

— may refuse to grant national type-approval

on grounds relating to steering controls if these steering controls do not comply with the requirements of paragraphs 5.2, 5.3 and 5.4 of Annex I to Directive 74/297/EEC as amended by this Directive.

5. With effect from 1 October 1996 Member States may prohibit the first entry into service of *vehicles* in which the steering mechanisms do not comply with the requirements of Directive 74/297/EEC, as amended by this Directive.

However, this shall not apply until 1 October 1997:

— to a forward-control vehicle of category M_1, or

— to a vehicle of category N_1 with a maximum permissible mass not exceeding 1 500 kilograms, or

— in the case of a vehicle of category M_1 other than a forward-control vehicle, with respect to the requirements laid down in paragraph 5.1 of Annex I (maximum vertical displacement of the steering column).

6. With effect from 1 October 1995 Member States may prohibit the placing on the market of *steering controls* intended for the installation in a vehicle or vehicles if these steering controls do not comply with the requirements laid down in paragraphs 5.2, 5.3 and 5.4 of Annex I to Directive 74/297/EEC, as amended by this Directive.

Article 3

1. Member States shall bring into force the legislative, regulatory and administrative provisions necessary in order to comply with this Directive before 1 October 1992 and shall forthwith inform the Commission thereof.

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

2. Member States shall ensure that the terms of the main provisions of national law which they adopt in the field covered by this Directive are communicated to the Commission.

Article 4

This Directive is addressed to the Member States.

Done at Brussels, 6 December 1991.

For the Commission
Martin BANGEMANN
Vice-President

ANNEX I

DEFINITIONS, APPLICATION FOR EC TYPE-APPROVAL, EC TYPE-APPROVAL, SPECIFICATIONS, TESTS, CONFORMITY OF PRODUCTION

1. SCOPE

This Directive applies to the behaviour of the steering mechanism of motor vehicles of category M_1, and vehicles of category N_1 with a maximum permissible mass less than 1 500 kilograms, with regard to the protection of the driver in a frontal collision.

At the request of a manufacturer, vehicles belonging to other categories may be approved under this Directive.

2. DEFINITIONS

For the purposes of this Directive

2.1. *'Behaviour of the steering mechanism in the event of an impact'* means the behaviour of this mechanism under the effect of three types of force, ie:

2.1.1. those resulting from a frontal collision which may produce displacement of the steering column towards the rear;

2.1.2. those due to the driver's head inertia in the event of an impact against the steering control in a frontal collision;

2.1.3. those due to the driver's body inertia in the event of an impact against the steering control in a frontal collision.

2.2. *'Vehicle type'* means a category of motor vehicles which do not differ in such essential respects as:

2.2.1. the structure, dimensions, lines and constituent materials of that part of the vehicle forward of the steering control;

2.2.2. the mass of the vehicle in running order, as defined in item 2.6 of Annex I to Directive 70/156/EEC without the driver.

2.3. *'Steering control'* means the steering device, usually the steering wheel, which is actuated by the driver.

2.4. *'Steering control type'* means a category of steering controls which do not differ in such essential respects as the structure, dimensions, lines and constituent materials.

2.5. *'Approval of a steering control'* means the approval of a steering control type with regard to the protection of the driver's head and body against the steering control in the event of an impact.

2.6. *'Approval of a vehicle'* means the approval of a vehicle type with regard to the protection of the driver's head and body against the steering mechanism in the event of an impact.

2.7. *'General steering control'* means a steering control which can be fitted to more than one vehicle type where differences in the attachment of the steering control to the steering column do not affect the impact performance of the steering control.

2.8. *'Air bag'* means a flexible bag that is designed to be filled with a gas under pressure, and is:

2.8.1. designed to protect the vehicle driver in an impact against the steering control, and

2.8.2. inflated by a device which is actuated in case of vehicle's impact.

2.9. *'Steering control rim'* means the quasi-toroidal outer ring in the case of the steering wheel usually gripped by the driver's hand during driving.

2.10. *'Spoke'* means a bar connecting the steering control rim to the boss.

2.11. *'Boss'* means that part of the steering control, usually at the centre, that:

2.11.1. joins the steering control to the steering shaft;

2.11.2. transmits the torque from the steering control to the steering shaft.

2.12. *'Centre of the steering control boss'* means that point on the surface of the boss which is in line with the axis of the steering shaft.

2.13. *'Plane of the steering control'* means, in the case of the steering wheel, the flat surface that splits the steering wheel rim equally between the driver and the front of the vehicle.

2.14. *'Steering shaft'* means the component which transmits to the steering gear housing the torque applied to the steering control.

2.15. *'Steering column'* means the housing enclosing the steering shaft.

2.16. *'Steering mechanism'* means the aggregate comprising the steering control, the steering column, the assembly accessories, the steering shaft, the steering gear housing, and all other components such as those designed to contribute to the absorption of energy in the event of impact against the steering control.

2.17. *'Passenger compartment'* means the space for occupant accommodation bounded by the roof, floor, side walls, doors, outside glazing, front bulkhead and the plane of the rear seat back support.

2.18. *'Impactor'* means the rigid hemispherical headform 165 mm in diameter, in accordance with Annex IV paragraph 3.

2.19. *'R-point'*, means the seating reference point defined in Annex III to Directive 77/649/EEC, as amended by Directive 90/630/EEC.

3. APPLICATION FOR EC TYPE-APPROVAL

3.1. **Vehicle type**

3.1.1. The application for EC approval of a vehicle type with regard to the protection of the driver against the steering mechanism in the event of impact shall be submitted by the vehicle manufacturer or by his duly authorized representative.

3.1.2. It shall be accompanied by the undermentioned documents in triplicate and the following particulars:

3.1.2.1. a detailed description of the vehicle type with respect to the structure, dimensions, lines and constituent materials of that part of the vehicle forward of the steering control;

3.1.2.2. drawings, on an appropriate scale and in sufficient detail, of the steering mechanism and of its attachment to the vehicle chassis and body;

3.1.2.3. a technical description of that mechanism;

3.1.2.4. the mass of the vehicle in running order;

3.1.2.5. evidence that the steering control has been approved in accordance with items 5.2 and 5.3 below if applicable.

3.1.3. The following shall be submitted to the technical service responsible for conducting approval tests:

3.1.3.1. a vehicle, representative of the vehicle type to be approved, for the test referred to in item 5.1 below;

3.1.3.2. at the manufacturer's discretion, with the agreement of the technical service, either a second vehicle, or those parts of the vehicle which are essential for tests referred to in items 5.2 and 5.3 below.

3.2. **Steering control type**

3.2.1. The application for EC approval of a steering control type shall be submitted by the steering control manufacturer or by his duly authorized representative.

3.2.2. It shall be accompanied by the undermentioned documents in triplicate and the following particulars:

3.2.2.1. a detailed description of the steering control type with respect to the structure, the dimensions and the constituent materials of the steering control;

3.2.2.2. drawings, on an appropriate scale and in sufficient detail, of the steering mechanism and of its attachment to the vehicle chassis and body.

3.2.3. A steering control representative of the steering control type to be approved plus, at the manufacturer's discretion, with the agreement of the technical service, those parts of the vehicle which are essential for the test, shall be submitted to the technical service responsible for conducting approval tests, for the tests referred to in items 5.2 and 5.3 below.

4. EC TYPE-APPROVAL

4.1. The approval authority shall verify the existence of satisfactory arrangements for ensuring effective control of the conformity of production before type-approval is granted.

4.2. A certificate conforming to the model specified in 4.2.1 or 4.2.2 shall be attached to the EC type-approval certificate:

4.2.1. Annex V A for applications referred to in 3.1;

4.2.2. Annex V B for applications referred to in 3.2.

5. SPECIFICATIONS

5.1. When the vehicle, in running order, without a manikin, is collision-tested against a barrier at a speed of 48,3 km/h the top of the steering column and its shaft shall not move backwards, horizontally and parallel to the longitudinal axis of the vehicle, by more than 12,7 cm in relation to a point of the vehicle not affected by the impact and 12,7 cm vertically.

5.2. When the steering control is struck by a body block released against this control at a relative speed of 24,1 km/h, in accordance with the procedures in Annex III, the force applied to the body by the steering control shall not exceed 1,111 daN.

5.3. When the steering control is struck by an impactor released against this control at a relative speed of 24,1 km/h, in accordance with the procedures in Annex IV, the deceleration of the impactor shall not exceed 80 g cumulative for more than 3 milliseconds. The deceleration shall always be lower than 120 g with CFC 600 Hz.

5.4. The steering control shall be designed, constructed and fitted in such a way that:

5.4.1. *Before* the impact test required in items 5.2 and 5.3 no part of the steering control surface, directed towards the driver, which can be contacted by a sphere of 165 mm in diameter shall present any roughness or sharp edges with a radius of curvature of less than 2,5 mm.

5.4.1.1. *After* any impact test required in items 5.2 and 5.3 the part of the steering control surface directed towards the driver shall not present any sharp or rough edges likely to increase the danger or severity of injuries to the driver. Small surface cracks and fissures shall be disregarded.

5.4.2. The steering control shall be designed, constructed and fitted so as not to embody components or accessories, including the horn control and assembly accessories, capable of catching in the driver's clothing or jewellery in normal driving movements.

5.4.3. In the case of steering controls not intended to form part of the original equipment they shall be required to meet the specification when tested in accordance with Annex III, item 2.1.3 and Annex IV, item 2.3.

5.4.4. In the case of 'general steering controls', the requirements shall be met over:

5.4.4.1. the full range of column angles, it being understood that the tests shall be performed at least for the maximum and minimum column angles for the range of vehicle types for which the controls are intended;

5.4.4.2. the full range of possible impactor and body-block positions in relation to the steering control, it being understood that the test shall be performed at least for the mean position for the range of approved vehicle types for which the controls are intended. Where a steering column is used, it shall be of a type corresponding to the 'worst case' conditions.

5.4.5. Where adaptors are used to adapt a single type of steering control to a range of steering columns, and it can be demonstrated that with such adaptors the energy-absorbing characteristics of the system are the same, all the tests may be performed with one type of adaptor.

6. TESTS

6.1. Compliance with the requirements of item 5 above shall be checked in accordance with the methods set out in Annexes II, III and IV. All measurements should be done on the basis of ISO 6487-1987.

6.2. However, other tests may be permitted at the discretion of the approval authority provided equivalence can be demonstrated. In such a case a report shall be attached to the approval documentation describing the methods used and the results obtained.

7. CONFORMITY OF PRODUCTION

7.1. In the case of an EC approval of the vehicle type, in order to verify conformity, a sufficient number of production steering controls shall be subjected to random checks.

7.2. In the case of an EC approval of the steering control type, in order to verify conformity, a sufficient number of production steering controls shall be subjected to random checks.

7.3. As a general rule the checks as aforesaid shall be confined to the taking of measurements. However, if necessary, the vehicles or the steering controls shall be subjected to the test prescribed in item 5.

ANNEX II

FRONTAL IMPACT TEST AGAINST A BARRIER

1. PURPOSE

The purpose of this test is to verify whether the vehicle satisfies the requirements set forth in item 5.1 of Annex I.

2. INSTALLATIONS, PROCEDURE AND MEASURING INSTRUMENTS

2.1. **Testing ground**

The test area shall be large enough to accommodate the run-up track, barrier and technical installations necessary for the test. The last part of the track, for at least 5 m before the barrier, shall be horizontal (slope less than 3 % measured over a length of one metre), flat and smooth.

2.2. **Barrier**

The barrier shall consist of a block of reinforced concrete not less than 3 m wide in front and not less than 1,5 m high. The barrier shall be of such thickness that its mass is at least 70 tonnes. The front face shall be flat, vertical and perpendicular to the axis of the run-up track. It shall be covered with plywood boards 19 ± 1 mm thick, in good condition. A structure on a steel plate at least 25 mm thick may be placed between the plywood board and the barrier. A barrier with different characteristics may likewise by used, provided that the area of the impact surface is greater than the frontal crash area of the vehicle being tested and provided that it gives equivalent results.

2.3. **Propulsion of vehicles**

At the moment of impact the vehicle shall no longer be subject to the action of any additional steering or propelling device. It shall reach the obstacle on a course perpendicular to the barrier: the maximum lateral misalignment tolerated between the vertical median line of the front of the vehicle and the vertical median line of the barrier is ± 30 cm.

2.4. **State of vehicle**

2.4.1. For the test, the vehicle shall either be fitted with all the normal components and equipment included in its unladen kerb mass or be in such a condition as to satisfy this requirement so far as the components and equipment of concern to the passenger compartment and the distribution of the mass of the vehicle as a whole, in running order, are concerned. At the request of the manufacturer, notwithstanding item 5.1 of Annex I the test may be carried out with manikins in position, provided they do not at any time hinder the movement of the steering mechanism. The mass of the manikins shall not be taken into account for the purposes of the test.

2.4.2. If the vehicle is driven by external means, the fuel feed system shall be filled to at least 90 % of its capacity with a non-flammable liquid having a density between 0,7 and 1. All the other systems (brake-fluid reservoirs, radiator, etc) may be empty.

2.4.3. If the vehicle is driven by its own engine, the fuel tank shall be at least 90 % full. All other reservoirs shall be filled to capacity.

If the manufacturer so desires and the technical service agrees, the fuel feed to the engine may be provided from an auxiliary tank of small capacity. In such case, the fuel tank shall be filled to not less than 90 % of its capacity with a non-flammable liquid of a density between 0,7 and 1.

2.4.4. If the manufacturer so requests, the technical service responsible for conducting the tests may allow the same vehicle as is used for tests prescribed by other Directives (including tests capable of affecting its structure) to be used also for the tests prescribed by this Directive.

2.5. **Speed on impact**

The speed on impact shall be between 48,3 km/h and 53,1 km/h. However, if the test has been carried out at a higher impact speed and the vehicle has met the requirements laid down, the test shall be considered satisfactory.

2.6. **Measuring instruments**

The instrument used to record the speed referred to in item 2.5 above shall be accurate to within 1 %.

3. RESULTS

3.1. To determine the rearward and upward movement of the steering control, a recording (1) shall be made, during the collision, of the variation in the distance — measured horizontally (2) and parallel to the longitudinal axis of the vehicle and, vertically, in the direction perpendicular to that axis — between the top of the steering column (and shaft) and a point on the vehicle which is not affected by the impact. The largest value of this variation, taken from the recording, shall be taken as the rearward and upward movement.

3.2. After the test, the damage sustained by the vehicle shall be described in a written report; one photograph at least shall be taken of each of the following views of the vehicle:

3.2.1. — sides (right and left),

3.2.2. — front,

3.2.3. — bottom,

3.2.4. — affected area inside the passenger compartment.

4. CORRECTION FACTORS

4.1. **Notation**

v: recorded speed in km/h;

m_0: mass of prototype in the state defined in paragraph 2.4 of this Annex;

m_1: mass of prototype with testing apparatus;

d_0: variation in the distance measured during the impact, as defined in item 3.1 of this Annex;

d_1: variation in the distance used to determine the results of the test;

K_1: the greater of $(48{,}3/V)^2$ and 0,83;

K_2: the greater of m_0/m_1 and 0,8.

4.2. The corrected variation D_1 used to check the conformity of the prototype with the requirements of this Directive shall be calculated by the following formula:

$$D_1 = D_0 \cdot K_1 \cdot K_2$$

4.3. A frontal impact test against a barrier is not needed in the case of a vehicle which is identical to the prototype considered as regards the characteristics specified in item 2.2 of Annex I but whose mass m_1 is greater than m_0, if m_1 is not more than 1,25 m_0 and if the corrected variation D_2 obtained from the variation D_1 by the formula $D_2 = (m_1 \cdot D_1)/m_0$ is such as to show that the new vehicle still meets the requirements of item 5 of Annex I.

5. EQUIVALENT PROCEDURES

5.1. Alternative tests may be permitted at the discretion of the approval authority provided equivalence can be demonstrated. A report shall be attached to the approval documentation describing the method used and the results obtained or the reason for not carrying out the test.

5.2. Responsibility for demonstrating the equivalence of the alternative method shall rest with the manufacturer or his representative wishing to use such a method.

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(1) This recording may be replaced by maximum measurements.

(2) 'Horizontally' means with reference to the passenger compartment when the vehicle is immobile before the test, not in space during movement of the vehicle in relation to the ground, and vertically is perpendicular to horizontally and upwards.

ANNEX III

BODY-BLOCK TEST

1. PURPOSE

The purpose of this test is to verify whether the vehicle meets the requirements set out in paragraph 5.2 of Annex I.

2. INSTALLATIONS, PROCEDURES AND MEASURING INSTRUMENTS

2.1. **Mounting of the steering control**

2.1.1. The control shall be mounted on the front section of the vehicle obtained by cutting the body transversely at the level of the front seats, and possibly eliminating the roof, windscreen and doors. This section shall be fixed rigidly to the test bench, so that it does not move under the impact of the body block.

The tolerance on the control mounting angle shall be ± 2 degrees of the design angle.

2.1.2. However, at the request of the manufacturer and with the agreement of the technical service, the steering control may be mounted on a framework simulating the mounting of the steering mechanism provided that, as compared with the real front body section/steering mechanism assembly, the framework/steering mechanism assembly has:

2.1.2.1. the same geometrical layout, and

2.1.2.2. greater rigidity.

2.1.3. *Mounting the stearing control when seeking steering control approval only*

The steering control shall be tested complete with trim. The steering control must have a minimum collapsing space of 100 mm between the steering control and the test bench. The steering shaft shall be firmly attached to the test bench so that the steering shaft does not move under impact. (See Figure 2)

2.2. **Setting of the steering mechanism for the tests**

2.2.1. During the first test, the steering control shall be turned so that its most rigid spoke is perpendicular to the point of contact with the body block; if the steering control is a steering wheel, the test shall be repeated with the most flexible part of the steering wheel perpendicular to that point of contact. In the case of an adjustable steering control, both tests shall be made with the wheel adjusted to the middle position.

2.2.2. If the vehicle is equipped with a device to adjust the slope and position of the steering wheel, the test shall be performed with the latter in the normal position of use indicated by the manufacturer and regarded by the laboratory as representative from the standpoint of energy absorption.

2.2.3. If the steering control is fitted with an air bag the test shall be carried out with the air bag inflated. At the request of the manufacturer, and with the agreement of the technical service, the test may be carried out without the air bag inflated.

2.3. **Body block**

The body block shall have the shape, dimensions, mass and characteristics shown in the Appendix to this Annex.

2.4. **Measurement of forces**

2.4.1. Measurements shall be made of the maximum force, acting horizontally and parallel to the longitudinal axis of the vehicle, applied to the body block as a result of impact against the steering control.

2.4.2. This force may be measured directly or indirectly or may be calculated from values recorded during the test.

2.5. **Propulsion of the body block**

2.5.1. Any method of propulsion may be used, provided that when the body block strikes the steering control it is free from all connection with the propelling device. The body block shall strike this control after an approximately straight trajectory parallel to the longitudinal axis of the vehicle.

2.5.2. The H-point of the body block, indicated by a special mark, shall be adjusted so that before the impact it is in the horizontal plane passing through the R-point as indicated by the manufacturer of the vehicle.

2.6. **Speed**

The body block shall strike the steering control at a speed of 24,1 + 1,2/-0 km/h. However, if the test has been carried out at a higher impact speed and the control has met the requirements laid down, the test shall be considered satisfactory.

2.7. **Measuring instruments**

2.7.1. The instrumentation used to record the parameters referred to in paragraph 5.2 of Annex I shall enable the measurements to be made with the following accuracy:

2.7.1.1. speed of body block: within 2 %;

2.7.1.2. time recording: within 1/1000 second.

2.7.1.3. The beginning of the impact (zero point) at the moment of first contact of the body block with the steering control shall be identified on the recordings and films used for analysing the results of the test.

2.7.1.4. *Measurement of force*

The instrumentation used shall comply with ISO 6487-1987 unless otherwise specified in this Directive.

2.7.1.4.1. With load transducers inserted on the steering system: the channel amplitude class shall be 1 960 daN (2 000 kg) and the channel frequency class 600 Hz.

2.7.1.4.2. With accelerometers or load transducers inserted on the body block:

Two unidirectional accelerometers shall be placed symmetrically in the transverse plane of the centre of gravity of the body block. The channel amplitude class shall be 60 g and the channel frequency class 180 Hz. Other methods with regard to the number and positioning of the measuring accelerometers shall be allowed, such as by dividing the test apparatus in separate parts at the centre of gravity of which accelerometers are placed to measure the acceleration horizontally and parallel to the longitudinal axis of the vehicle. The resultant force shall be the force corresponding to the maximum of the sum of forces calculated or measured directly for each part of the body block.

2.8. **Ambient temperature: stabilized at 20°C ± 5°C.**

3. RESULTS

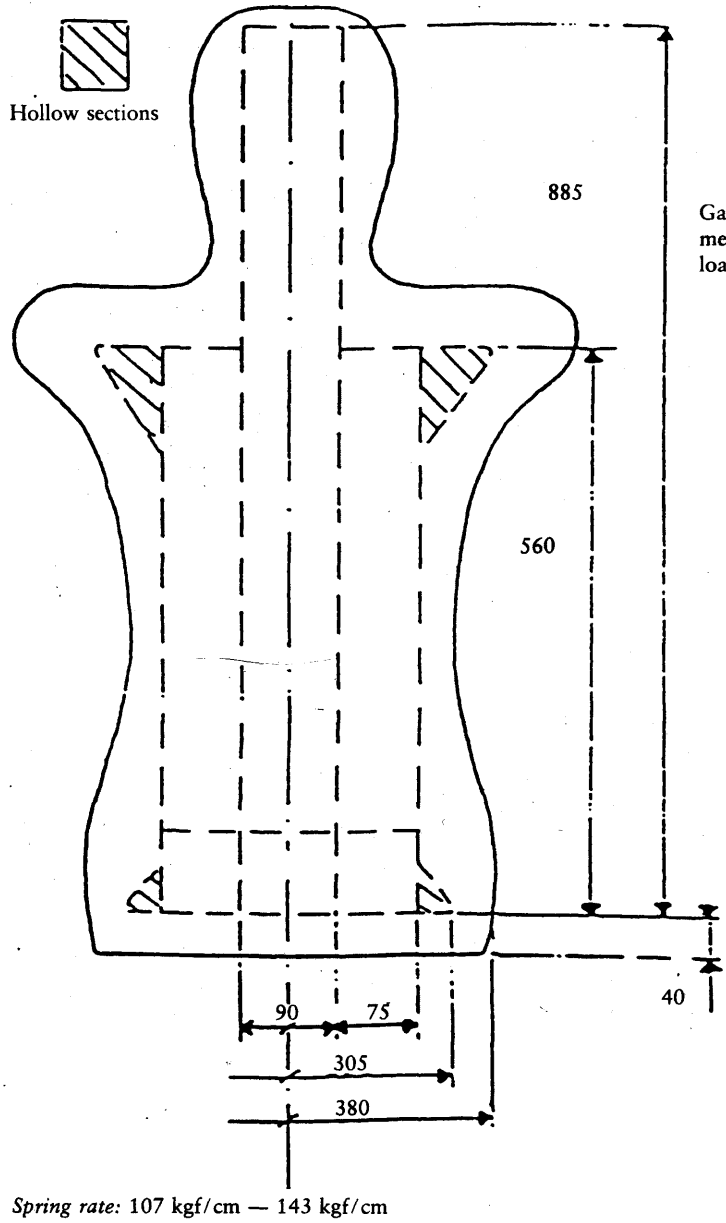
3.1. After the test, the damage sustained by the steering mechanism shall be ascertained and described in a written report; at least one side-view and one front-view photograph of the steering control/steering column/instrument panel area shall be taken.

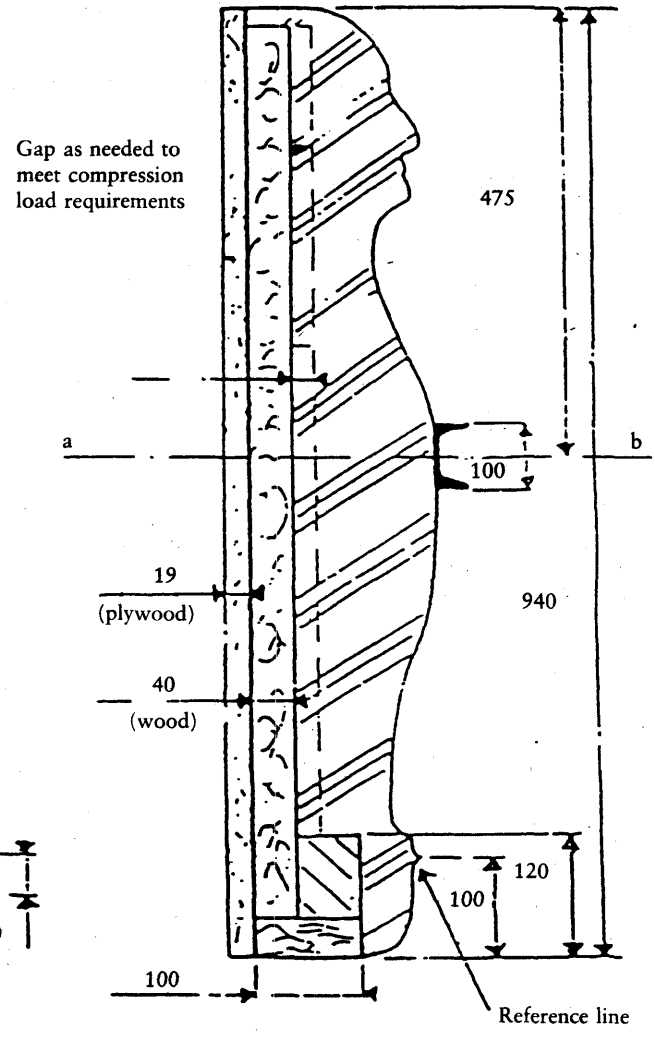
3.2. The maximum value of the force shall be measured or calculated as indicated in paragraph 2.4.

Appendix

BODY BLOCK

(Mass: 34 — 36 kg. 50th percentile torso-shaped body block)

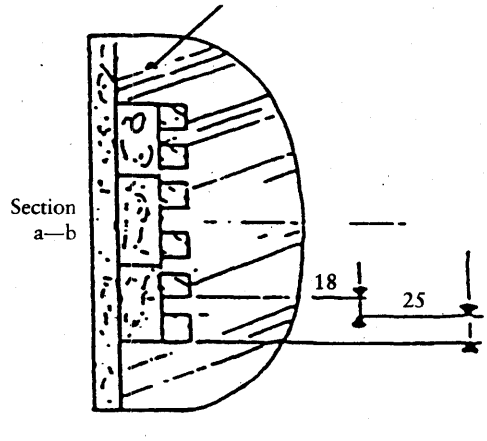




Spring rate: 107 kgf/cm — 143 kgf/cm

The chest is loaded with a 100 mm beam as shown, 90° to the longitudinal axis of the block and parallel to the backing plate. The load is measured when the beam has moved 12,7 mm into the body block.

Rubber-like material strapped and taped to backing plate



Dimensions in mm

ANNEX IV

HEAD FORM TEST

1. PURPOSE

The purpose of this test is to verify that the steering control meets the requirements set out in item 5.3 of Annex I.

2. INSTALLATIONS, PROCEDURES AND MEASURING INSTRUMENTS

2.1. **General**

2.1.1. The steering control shall be tested complete with trim.

2.1.2. If the steering control is fitted with an air bag the test shall be carried out with the air bag inflated. At the request of the manufacturer, and with the agreement of the technical service, the test may be carried out without the air bag inflated.

2.2. **Mounting of the steering control when seeking steering control approval related to vehicle approval**

2.2.1. The control shall be mounted on the front section of the vehicle obtained by cutting the body transversely at the level of the front seats, and possibly eliminating the roof, windscreen and doors.

This section shall be fixed rigidly to the test bench, so that it does not move under the impact of the head form.

The tolerance on the control mounting angle shall be ± 2 degrees of the design angle.

2.2.2. However, at the request of the manufacturer and with the agreement of the technical service, the steering control may be mounted on a framework simulating the mounting of the steering mechanism provided that, as compared with the real front body section/steering mechanism assembly, the framework/steering mechanism assembly has:

2.2.2.1. the same geometric layout, and

2.2.2.2. greater rigidity.

2.3. **Mounting the steering control when seeking steering control approval only**

The steering control shall be tested complete with trim. The steering control must have a minimum collapsing space of 100 mm between the steering control and the test bench. The steering shaft shall be firmly attached to the test bench so that the steering shaft does not move under impact (See Figure 2).

2.3.1. However, at the request of the manufacturer the test may be carried out under the conditions specified in paragraph 2.2 above. In this case the approval is only valid for mounting on a specified vehicle type(s).

3. TEST APPARATUS

3.1. This apparatus consists of a fully-guided linear impactor with a mass of 6,8 kg.

3.2. The head-form shall be fitted with two accelerometers and a speed-measuring device, all capable of measuring values in the impact direction.

3.3. **Measuring instruments**

3.3.1. The measuring instruments used shall comply with ISO 6487-1987. In addition they shall have the following characteristics:

3.3.2. *Acceleration*

Channel amplitude class 150 g
Channel frequency class (600) Hz;

3.3.3. *Speed*

Accurate to within ± 1 %;

3.3.4. *Time recording*

The instrumentation shall enable the action to be recorded throughout its duration and the readings to be made accurate to one thousandth of a second. The beginning of the impact at the moment of first contact between the impactor and the steering control shall be noted on the recordings used for analysing the test.

4. TEST PROCEDURE

4.1. The plane of the steering control shall be set up perpendicular to the direction of impact.

4.2. A maximum of four and a minimum of three positions on each steering control type shall be impacted. A new steering control shall be used for each impact. On successive impacts the axial axis of the impactor shall be in line with one of the following points:

4.2.1. the centre of the steering control boss;

4.2.2. the joint of the stiffest or most supported spoke to the inner edge of the steering control rim;

4.2.3. the mid-point of the shortest unsupported arc of the steering control rim that does not include a spoke;

4.2.4. at the discretion of the approval authority, the 'worst case' position on the steering control.

4.3. The impactor shall strike the steering control at a velocity of 24,1 km/h; this velocity shall be achieved either by the mere energy of propulsion or by using an additional propelling device.

5. RESULTS

5.1. In the tests carried out according to the above procedures, the deceleration rate of the impactor shall be taken as the simultaneous average of the readings of the two decelerometers.

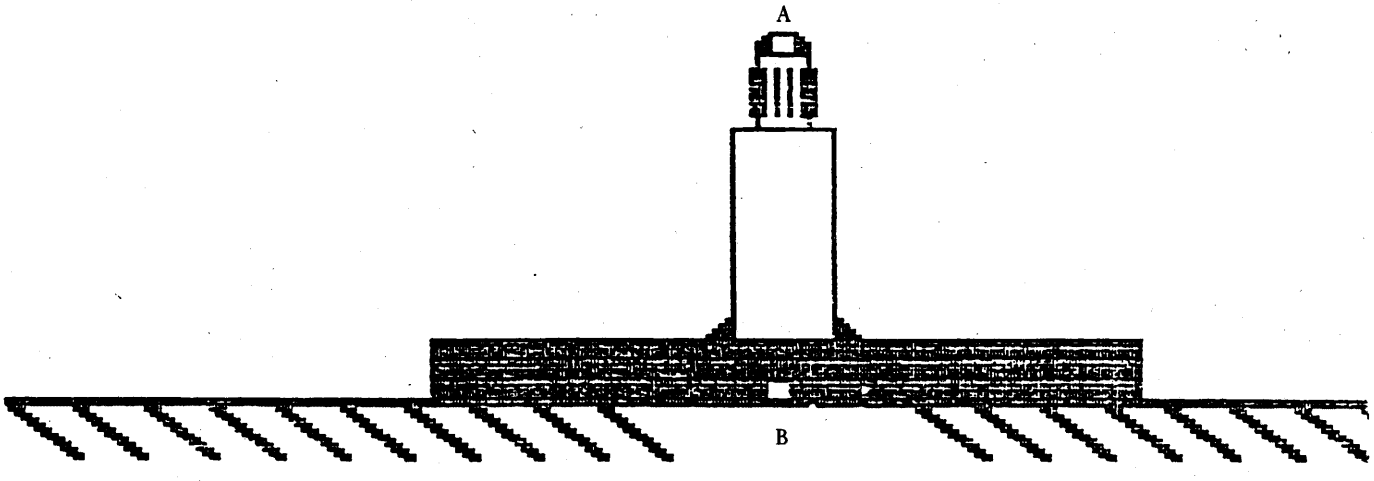
6. EQUIVALENT PROCEDURES

6.1. Alternative tests may be permitted at the discretion of the approval authority provided equivalence can be demonstrated. A report shall be attached to the approval documentation describing the method used and the results obtained.

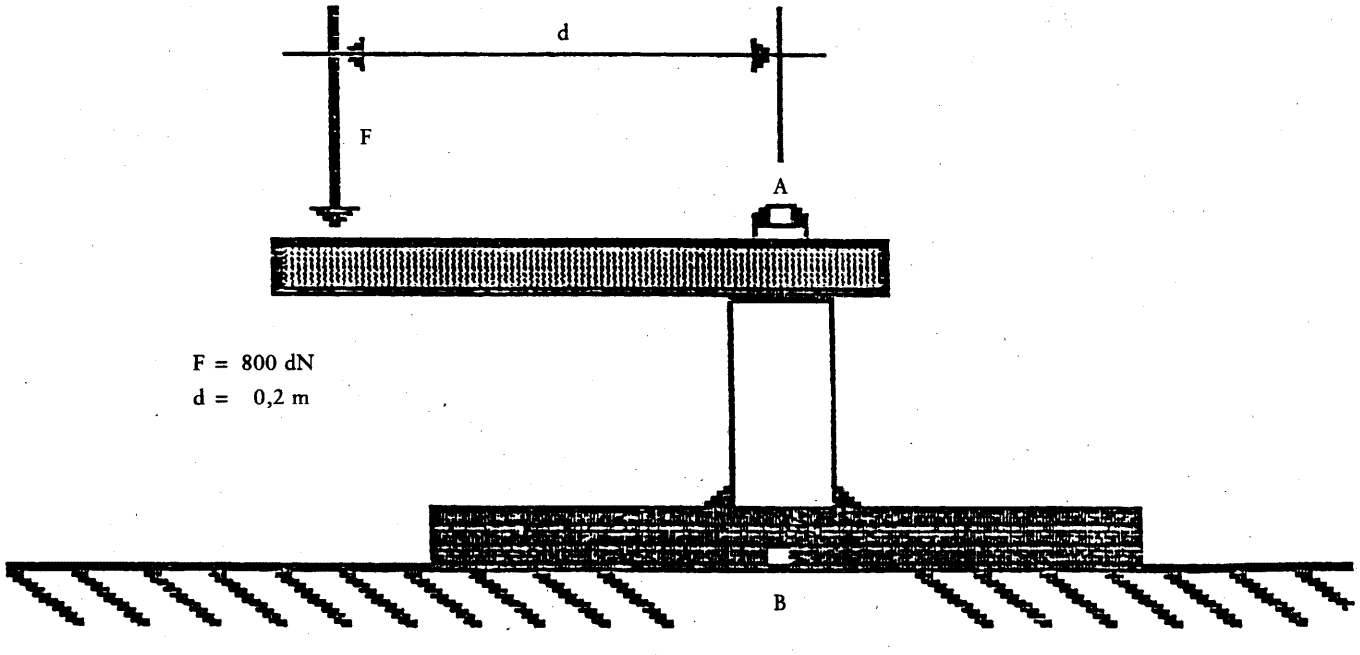
6.2. Responsibility for demonstrating the equivalence of the alternative method shall rest with the manufacturer or his representative wishing to use such a method.

PRESCRIPTIONS OF RIGIDITY BETWEEN STEERING SHAFT AND TEST BENCH

(See Figures 1 and 2)



(Figure 1)



(Figure 2)

Under a load of 800 dN, producing a couple of 160 m.dN in relation to the point B, the displacement in any direction of the point A shall be lower than 2 mm.

ANNEX V A

ANNEX TO THE EC TYPE-APPROVAL CERTIFICATE FOR A VEHICLE TYPE WITH REGARD TO THE BEHAVIOUR OF THE STEERING MECHANISM IN THE EVENT OF AN IMPACT

(Directive 91/662/EEC, amending 74/297/EEC)

(Articles 4 (2) and 10 of Council Directive 70/156/EEC of 6 February 1970 on the approximation of the laws of the Member States relating to the type-approval of motor vehicles and their trailers)

Name of Administration

EEC type-approval No ..... Extension No .....

1. Trade name or mark of the motor vehicle .....
2. Vehicle type .....
3. Manufacturer's name and address .....

   .....
4. If applicable, name and address of the manufacturer's representative .....

   .....

   .....
5. Brief description of the steering mechanism and components of the vehicle contributing to the protection of the driver against the steering mechanism in the event of impact .....

   .....

   .....

   .....
6. Mass of the vehicle during the test

   front axle: .....

   rear axle: .....

   total: .....
7. Vehicle submitted for approval test .....
8. Technical service responsible for conducting approval tests .....

   .....
9. Date of report issued by the service .....
10. Number of report issued by that service .....
11. Approval granted/refused (1)
12. Place .....
13. Date .....
14. Signature .....
15. The following documents, bearing the approval number shown above, can be obtained on request:

    ..... photographs and/or drawings permitting the identification of the basic type(s) of vehicle, and if possible variants, which are covered by the approval; ..... test report(s).

---

(1) Strike out what does not apply.

ANNEX V B

ANNEX OF THE EC TYPE-APPROVAL FOR A STEERING CONTROL TYPE WITH REGARD TO THE PROTECTION OF THE DRIVER AGAINST THE STEERING MECHANISM IN THE EVENT OF IMPACT

(Directive 91/662/EEC, amending 74/297/EEC)

(Article 9a of Council Directive 70/156/EEC of 6 February 1970 on the approximation of the laws of the Member States relating to the type-approval of motor vehicles and their trailers)

Name of Administration

EEC type-approval No ..... Extension No .....

1. Trade name or mark of the steering control type .....
   .....
2. Manufacturer's name and address .....
   .....
3. If applicable, name and address of the manufacturer's representative .....
   .....
   .....
4. Vehicle type(s) to which the control is intended to be fitted .....
   .....
5. Brief description of the steering control for the protection of the driver against the steering mechanism in the event of impact .....
   .....
   .....
6. Steering control submitted for approval on .....
7. Technical service responsible for conducting approval test .....
8. Date of report issued by the service .....
9. Number of report issued by the service .....
10. Approval granted/refused (1) .....
11. Place .....
12. Date .....
13. Signature .....
14. The following documents, bearing the approval number shown above, can be obtained on request:

    ..... photographs and/or drawings permitting the identification of the basic type(s) of vehicle, and if possible variants, which are covered by the approval; ..... test report(s).

(1) Strike out what does not apply.