Proposta di decisione del Consiglio relativa alla posizione della Comunità europea sul progetto di regolamento della Commissione economica per l'Europa delle Nazioni Unite concernente l'omologazione dei moduli airbag quali sistemi airbag di ricambio, volanti di ricambio muniti di modulo airbag di tipo omologato e sistemi airbag di ricambio diversi da quello alloggiato nel volante

(2000/C 337 E/02)

(Testo rilevante ai fini del SEE)

COM(2000) 25 def. — 2000/0029(AVC)

(Presentata dalla Commissione il 27 gennaio 2000)

IL CONSIGLIO DELL'UNIONE EUROPEA,

visto il trattato che istituisce la Comunità europea,

vista la decisione 97/836/CE del Consiglio, del 27 novembre 1997, ai fini dell'adesione della Comunità europea all'accordo della Commissione economica per l'Europa delle Nazioni Unite relativo all'adozione di prescrizioni tecniche uniformi applicabili ai veicoli a motore, agli accessori ed alle parti che possono essere installati o utilizzati sui veicoli a motore ed alle condizioni del riconoscimento reciproco delle omologazioni rilasciate sulla base di tali prescrizioni [1], in particolare l'articolo 4, paragrafo 2, secondo trattino;

vista la proposta della Commissione,

visto il parere del Parlamento europeo,

considerando quanto segue:

(1) Le prescrizioni uniformi del progetto di regolamento concernente l'omologazione dei moduli airbag quali sistemi airbag di ricambio, volanti di ricambio muniti di modulo airbag di tipo omologato e sistemi airbag di ricambio diversi da quello alloggiato nel volante, elimineranno gli ostacoli agli scambi dei veicoli a motore tra le parti contraenti relativamente a questi componenti, preservando nel contempo un livello elevato di sicurezza e di protezione dell'ambiente.

(2) Questo regolamento sarà integrato nel sistema di omologazione dei veicoli a motore, integrando così la legislazione in vigore nella Comunità,

DECIDE:

Articolo unico

La Comunità europea esprime voto favorevole in merito al progetto di regolamento dell'UNECE, concernente l'omologazione dei moduli airbag quali sistemi airbag di ricambio, volanti di ricambio muniti di modulo airbag di tipo omologato e sistemi airbag di ricambio diversi da quello alloggiato nel volante, come stabilito nel documento TRANS.WP.29/1999/40, sottoposto a votazione nella riunione del comitato amministrativo indetta l'8 marzo 2000, in occasione della 120° riunione del Gruppo di lavoro sulla costruzione dei veicoli della Commissione economica per l'Europa delle Nazioni Unite, od eventualmente all'atto della sua votazione in una riunione successiva.

[1] GU L 346 del 17.12.1997, pag. 78.

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1. SCOPE

This Regulation applies to the following aftermarket equipment:

1.1. to airbag modules for replacement airbag systems intended to be installed on motor vehicles;

1.2. to replacement steering wheels for vehicles of categories M_1 and N_1, equipped with an airbag module of an approved type and intended to be installed as an additional restraint system beside safety-belts and other restraint systems in power-driven vehicles, i.e. a system which, in the event of a severe impact, automatically deploys a flexible structure intended to reduce the severity of injuries of the occupants;

1.3. to replacement airbag systems other than those installed in steering wheels and equipped with airbag modules of an approved type as an additional restraint system beside safety-belts and other restraint systems in power-driven vehicles of categories M_1 and N_1, i.e. a system which, in the event of a severe impact, automatically deploys a flexible structure intended to reduce the severity of injuries of the occupants.

2. DEFINITIONS

2.1. 'Airbag system' means a group of components which, once installed in vehicle(s), perform all functions provided for by the manufacturer. This system comprises as a minimum a release unit activating one or more airbag modules and the electrical wiring harness, if present.

2.2. 'Airbag' means a flexible material, forming an enclosed volume that receives the gas from the inflator and restrains the occupant.

2.3. 'Airbag module' means the smallest sub-assembly comprising the energy source for its deployment and the airbag involved in the deployment.

2.4. 'Replacement steering wheel' (equipped with an airbag module) means an aftermarket steering wheel which is supplied to modify a motor vehicle and which may vary in its functional dimensions, form and/or material from the original steering wheel provided by the vehicle manufacturer.

2.5. 'Replacement airbag system' means an aftermarket airbag system which is supplied to modify a motor vehicle, and which may vary in its functional dimensions, form, materials or operation from any original airbag system provided by the vehicle manufacturer for that motor vehicle.

2.6. Categories of airbag modules for replacement airbag systems:

2.6.1. Category A: Device intended to protect the driver of a vehicle in the event of a frontal collision.

2.6.2. Category B: Device intended to protect front seat passenger(s) other than the driver in the event of a frontal collision.

2.6.3. Category C: Device intended to protect the passenger(s) in seats other than the front seats in the event of a frontal collision.

2.6.4. Category D: Device intended to protect the front seat occupant(s) in the event of a lateral collision.

2.7. 'Instant of release' means the moment at which, in the event of an impact causing deployment, the components producing that deployment are irreversibly actuated.

2.8. 'Control unit or release unit' means the sub-assembly comprising all components permitting the collision to be detected and producing release.

2.9. 'Wiring harness' means all the electrical conductors and connections linking the various parts of the complete airbag system to each other and possibly to the vehicle.

2.10. 'Unladen kerb weight' means the mass of the vehicle in running order, unoccupied and unladen but complete with fuel, coolant, lubricant, tools and spare wheel (if these are provided as a standard equipment by the vehicle manufacturer).

2.11. 'Type of an airbag module for a replacement airbag system' comprises airbag modules which do not differ in such aspects as:

(a) the category of an airbag module,

(b) the geometry of the airbag,

(c) the material of the airbag,

(d) the vents or equivalent devices,

(e) the gas generator,

(f) the envelope principle,

(g) the material, structure and dimension of the cover,

(h) the composition of the propellant,

(i) the method of fixation of the module.

2.12. 'Type of a replacement steering wheel equipped with an airbag module' means aftermarket steering wheels which do not differ in such essential respects as:

(a) presence of an airbag,

(b) the dimension and diameter of the steering wheel,

(c) the form, in so far as the safety performance and the strength performance is influenced,

(d) the material,

(e) the type definition of an airbag module for a replacement airbag system according to paragraph 2.11 above.

2.13. 'Type of a replacement airbag system other than that installed in a steering wheel' comprises replacement airbag systems which do not differ in such essential respects as:

(a) the category of airbag module,

(b) the geometry of the airbag,

(c) the material of the airbag,

(d) the vents or equivalent devices,

(e) the gas generator,

(f) the envelope principle,

(g) the material, structure and dimension of the cover,

(h) the composition of the propellant,

(i) the method of fixation of the module.

2.14. 'Vehicle type' means a category of power-driven vehicles which do not differ in such essential respects in so far as they have an effect on the results of the impact tests prescribed in this Regulation:

(a) the structure, dimension, body version and materials of the vehicle,

(b) the unladen kerb weight, as defined in paragraph 2.10 above,

(c) the steering control, the seat and the safety-belt system and other restraint systems,

(d) the siting and orientation of the engine,

(e) the parts and optional arrangements or fittings of the vehicle which influence the performance of the airbag.

3. APPLICATION FOR APPROVAL

3.1. *Application for approval of an airbag module for a replacement airbag system*

3.1.1. The application for approval of an airbag module shall be submitted by the holder of the trade mark of the airbag module manufacturer, the component manufacturer or by their duly accredited representatives.

3.1.2. For each category of an airbag module for a replacement airbag system, the application shall be accompanied by the following documents in triplicate and the following particulars:

3.1.2.1. a technical description, including mounting instructions and specifying the type(s) of vehicle for which the airbag module is intended,

3.1.2.2. sufficiently detailed drawings to permit the verification of the positions intended for the approval mark as required under paragraph 4.1.4 below.

3.1.2.3. A sufficient number of airbag modules shall be submitted to the technical service responsible for the tests and verification of the conformity with the relevant paragraphs 5 and 6 of this Regulation.

3.2. *Application for approval of a replacement steering wheel equipped with an airbag module of an approved type*

3.2.1. The application for approval of a replacement steering wheel equipped with an airbag module shall be submitted by the holder of the trademark of the replacement steering wheel or by the manufacturer, or by their duly accredited representative.

3.2.2. For each type of a replacement steering wheel equipped with an airbag module, the application shall be accompanied by the following documents in triplicate and the following particulars:

3.2.2.1. a technical description, including mounting instructions,

3.2.2.2. sufficiently detailed drawings,

3.2.2.3. drawings showing the position of the airbag module(s) and its (their) attachment(s) on the steering wheel,

3.2.2.4. the position intended for the approval mark and required under paragraph 4.2.4 below,

3.2.2.5. a sufficient number of replacement steering wheels equipped with airbag modules and vehicles representative of the types for which the replacement steering wheel shall be approved for shall be submitted to the technical service responsible for conducting the approval tests so as to verify conformity with the relevant paragraphs 5 and 6 of this Regulation.

3.3. *Application for approval of a replacement airbag system other than that installed in a steering wheel*

3.3.1. The application for approval of a replacement airbag system other than that installed in a steering wheel shall be submitted by the holder of the trade mark of the replacement airbag system or by the manufacturer, or by their duly accredited representatives.

3.3.2. For each type of a replacement airbag system, the application shall be accompanied by the following documents in triplicate and the following particulars:

3.3.2.1. a technical description, including mounting instructions,

3.3.2.2. sufficiently detailed drawings,

3.3.2.3. drawings showing the position of the airbag system(s) and its (their) attachment(s) on the vehicle,

3.3.2.4. the position intended for the approval mark and required under paragraph 4.3.4 below,

3.3.2.5. a sufficient number of replacement airbag systems and vehicles representative of the types for which the replacement system shall be approved for, shall be submitted to the technical service responsible for conducting the approval tests so as to verify conformity with the relevant paragraphs 5 and 6 of this Regulation.

4. APPROVAL

4.1. *Approval of an airbag module for a replacement airbag system*

4.1.1. If the samples of the airbag module submitted for approval meet the requirements of the relevant paragraphs 5 and 6 below, approval for this type of airbag module for a replacement airbag system shall be granted.

4.1.2. An approval number shall be assigned to each type approved. Its first two digits (00 at present) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party may not assign the same number to another type of airbag module for a replacement airbag system.

4.1.3. Notice of approval or of refusal or extension or withdrawal of approval or of definite discontinuation of production of a type of airbag module for a replacement airbag system, pursuant to this Regulation, shall be communicated to the Parties to the Agreement applying this Regulation, by means of a form conforming to the model in annex 1 to this Regulation.

4.1.4. The samples of airbag modules for a replacement airbag system shall be clearly and indelibly marked with the manufacturer's trade name or mark and an approval mark consisting of:

4.1.4.1. a circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted approval [1],

4.1.4.2. an approval number,

4.1.4.3. an additional symbol, indicating the airbag module category (see paragraph 2.6 above).

4.1.5. The approval mark and the additional symbol shall be clearly legible and indelible.

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[1] 1 for Germany, 2 for France, 3 for Italy, 4 for the Netherlands, 5 for Sweden, 6 for Belgium, 7 for Hungary, 8 for the Czech Republic, 9 for Spain, 10 for Yugoslavia, 11 for the United Kingdom, 12 for Austria, 13 for Luxembourg, 14 for Switzerland, 15 (vacant), 16 for Norway, 17 for Finland, 18 for Denmark, 19 for Romania, 20 for Poland, 21 for Portugal, 22 for the Russian Federation, 23 for Greece, 24 for Ireland, 25 for Croatia, 26 for Slovenia, 27 for Slovakia, 28 for Belarus, 29 for Estonia, 30 (vacant), 31 for Bosnia and Herzegovina, 32 for Latvia, 33-36 (vacant), 37 for Turkey, 38-39 (vacant), 40 for The former Yugoslav Republic of Macedonia, 41 (vacant), 42 for the European Community (Approvals are granted by its Member States using their respective ECE symbol) and 43 for Japan. Subsequent numbers shall be assigned to other countries in the chronological order in which they ratify or accede to the Agreement Concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions, and the numbers thus assigned shall be communicated by the Secretary-General of the United Nations to the Contracting Parties to the Agreement.

4.1.6. Annex 4 to this Regulation gives an example of the approval mark and the additional symbol mentioned above.

4.2. *Approval of a replacement steering wheel equipped with an airbag module of an approved type*

4.2.1. If a replacement steering wheel type equipped with an airbag module of an approved type submitted for approval meets the requirements of the relevant paragraphs 5 and 6 below, approval of that type of replacement steering wheel equipped with an airbag module of an approved type shall be granted.

4.2.2. An approval number shall be assigned to each type approved. Its first two digits (00 at present) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party may not assign the same number to another type of replacement steering wheel.

4.2.3. Notice of approval or refusal or extension or withdrawal of approval or of definite discontinuation of production of a type of replacement steering wheel equipped with an airbag module of an approved type pursuant to this Regulation shall be communicated to the Parties to the Agreement applying this Regulation, by means of a form conforming to the model in annex 2 to this Regulation.

4.2.4. The samples of the replacement airbag steering wheel and the hub (adapters) shall be clearly and indelibly marked with the manufacturer's trade name or mark and an approval mark consisting of:

4.2.4.1. a circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted approval [2],

4.2.4.2. an approval number,

4.2.4.3. an additional symbol, indicating the airbag module category (see paragraph 2.6 above).

4.2.5. The approval mark and the additional symbol shall be clearly legible and indelible.

4.2.6. The approval mark shall be placed on the replacement steering wheel and on the hub (adapter). If the replacement steering wheel and hub are in one piece, one approval mark and one mark with the manufacturer's trade name or mark is sufficient.

4.2.7. Annex 5 to this Regulation gives an example of the approval mark and the additional symbol mentioned above.

4.3. *Approval of a replacement airbag system other than that installed in a steering wheel*

4.3.1. If a replacement airbag system other than that installed in a steering wheel submitted for approval meets the requirements of the relevant paragraphs 5 and 6 below, approval of that type of replacement airbag system shall be granted.

4.3.2. An approval number shall be assigned to each type approved. Its first two digits (00 at present) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party may not assign the same number to another type of replacement airbag system.

4.3.3. Notice of approval or refusal or extension or withdrawal of approval or of definite discontinuation of production of a replacement airbag system pursuant to this Regulation shall be communicated to the Parties to the Agreement applying this Regulation, by means of a form conforming to the model in annex 3 to this Regulation.

4.3.4. The samples of the replacement airbag system shall be clearly and indelibly marked with the manufacturer's trade name or mark and an approval mark consisting of:

4.3.4.1. a circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted approval [3],

4.3.4.2. an approval number,

4.3.4.3. an additional symbol, indicating the airbag module category (see paragraph 2.6 above).

4.3.5. The approval mark and the additional symbol shall be clearly legible and indelible.

4.3.6. Annex 6 to this Regulation gives an example of the approval mark and the additional symbol mentioned above.

5. REQUIREMENTS

5.1. *General requirements for the approval of an airbag module for a replacement airbag system, a replacement steering wheel equipped with an airbag module of an approved type, or a replacement airbag system other than that installed in a steering wheel*

5.1.1. Before type approval is granted according to paragraphs 4.1, 4.2 and/or 4.3, the competent authority shall verify the existence of satisfactory arrangements for ensuring:

5.1.1.1. installation, maintenance, repair and dismantling of the system by trained technicians only according to a manual, which shall be prepared by the applicant of the approval.

5.1.1.2. substitution of a part or the complete system after guaranteed lifetime,

5.1.1.3. labelling and notices for rescue persons, labelling and information for the use of child restraint systems.

5.1.2. Interference from magnetic fields shall not disrupt the operation of the airbag system.

5.1.3. A complete system shall comprise a device alerting the user if the airbag system is not in working order as designed.

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[2] See footnote No 1.
[3] See footnote No 1.

5.1.4. Airbag modules for replacement airbag system of category A shall be so designed that, when they are submitted to a test in accordance with the requirements of paragraph 5.2.2.7, static deployment test, the airbag may be pushed aside manually after full deployment.

5.1.5. Toxicity and burns

A certificate shall be presented stating that the nature, concentration and temperature of the gases and solid particles released on deployment of an airbag are not such as to be liable to injure seriously the occupants of the vehicle. The authorities responsible for issuing the approval shall reserve the right to verify the accuracy of the statement.

5.2. *Requirements for the approval of an airbag module for a replacement airbag system*

5.2.1. Each airbag module shall comply with the requirements of the 'International Standard ISO 12097-2 ROAD VEHICLES-AIRBAG COMPONENT TESTING-PART 2: Testing of Airbag Modules' version: 1996-08-00, to guarantee the operating safety of the airbag modules.

The module manufacturer shall state that the above-mentioned tests were carried out with positive test results. In case of doubts the approval authority responsible for issuing the approval shall reserve the right to verify the accuracy of this statement.

5.2.2. Instead of paragraph 5.2.1, a reduced test program is permitted which shows as a minimum the following test elements:

5.2.2.1. Drop test

5.2.2.2. Mechanical impact test

5.2.2.3. Simultaneous vibration temperature test

5.2.2.4. Thermal humidity cycling test

5.2.2.5. Solar radiation simulation test

5.2.2.6. Temperature shock test

5.2.2.7. Static deployment test

5.3. *Requirements for the approval of a replacement steering wheel equipped with an airbag module of an approved type*

5.3.1. Before type approval is granted according to paragraph 4.2, the competent authority shall verify the existence of satisfactory arrangements for carrying:

5.3.1.1. a heat test of the replacement steering wheel (all parts except the airbag module), as described in paragraph 6.2.1.1, to guarantee a cohesion of all materials.

5.3.1.2. a bending test, as described in paragraph 6.2.1.2, to guarantee a minimum deformation of the steering wheel rim,

5.3.1.3. a torque test, as described in paragraph 6.2.1.3, to guarantee a sufficient stiffness when the replacement steering wheel is loaded tangentially to the steering wheel rim,

5.3.1.4. a fatigue test, as described in paragraph 6.2.1.4, to guarantee a sufficient lifetime.

5.3.2. For the replacement steering wheel, it must be guaranteed that the effective diameter is not substantially smaller than the effective diameter of the steering wheel installed by the manufacturer of the vehicle. This requirement is deemed fulfilled when the effective diameter of the replacement steering wheel is not less than 0,9 times the effective diameter of the steering wheel used by the vehicle manufacturer.

5.3.3. The size and fitting of the replacement steering wheel to the steering column must be within the dimensions and tolerances specified by the vehicle manufacturer. Otherwise the replacement manufacturer shall demonstrate to the Technical Service the proper function of any other chosen fixing method.

5.3.4. The replacement steering wheel shall allow the drivers a direct view to all important instruments and indicators such as

(a) the speedometer and

(b) the tell tales for:

— direction indicator

— main beam

— rear fog lamp

— hazard warning signal

— automatic antilock system

— brake system malfunctions

— airbag function indicator

The tests shall be carried out according to the prescription laid down in paragraph 6.2.2.

5.3.5. Replacement steering wheels equipped with airbag modules of an approved type shall be such that, when installed in a vehicle, this vehicle fulfils the requirements of paragraphs 5.2.1.1, 5.2.1.2, 5.2.1.3, 5.2.1.4 and 5.2.1.5 of Regulation No 94, 01 series of amendments.

If the technical service responsible for this test has doubts that the aftermarket airbag system works well, additional test results, proving the correct function of the system, shall be presented by the manufacturer of the aftermarket airbag system.

5.4. *Requirements for the approval of a replacement airbag system other than that installed in a steering wheel*

5.4.1. Replacement airbag systems shall be equipped with an approved airbag module or it shall be demonstrated to the satisfaction of the technical service, responsible for this test, that the system used complies with the requirements prescribed in paragraphs 5.1 and 5.2 above.

5.4.2. Replacement airbag systems other than those installed in steering wheels shall be such that, when installed in a vehicle, this vehicle fulfils the requirements of paragraphs 5.2.1.1, 5.2.1.2, 5.2.1.3, 5.2.1.4 and 5.2.1.5 of Regulation No 94, 01 series of amendments, and/or the requirements of paragraphs 5.2.1.1, 5.2.1.2, 5.2.1.3, and 5.2.1.4 of Regulation No 95, 01 series of amendments, depending on the category and location of the replacement airbag system(s).

In the case of airbag modules of category C, additional instrumented dummies shall be used for the verification of the performance of each airbag system.

6. TESTS

6.1. *Tests of an airbag module for a replacement airbag system*

The tests shall be carried out according to ISO/DIS 12097-Part 2, version 1996-08-00.

6.2. *Tests of a replacement steering wheel equipped with an airbag module of an approved type*

6.2.1. Strength tests:

6.2.1.1. Heat test

The replacement steering wheel (except the airbag module) is exposed to the following temperature cycle with immediate repetition:

— 16 hours at – 15 °C ± 2 °C

— 30 minutes at + 22 °C ± 2 °C

— 3 hours at + 80 °C ± 2 °C

— 30 minutes at – 22 °C ± 2 °C

This test must leave no permanent deformation over and above the design tolerances, or any cracks or fractures.

6.2.1.2. Bending test

The replacement steering wheel is exposed to a temperature of at least – 15 °C ± 2 °C for 16 hours. The replacement steering wheel is then mounted with its hub on a rigid shaft and the steering wheel rim is subjected to a static loading of 70 daN ± 0,5 daN acting perpendicular to the plane of the rim. The test loading must be applied on the rim and between two spokes that confine the greatest angle.

This test may not leave any permanent deformation on the rim of the replacement steering wheel that would be greater than 8 per cent of the steering wheel diameter. There must be no signs of any cracks or fractures which will affect the operational safety of the steering wheel.

6.2.1.3. Torque test

The replacement steering wheel is mounted with its hub on a rigid shaft and subjected statically to a test load of 70 daN ± 0,5 daN applied tangentially to the steering wheel rim. The permanent deformation resulting from this test may not exceed 1 degree in the direction of rotation. The test may not leave any signs of cracks or fractures which might affect the operational safety of the steering wheel. The steering wheel rim is then subjected to a tangential load corresponding to a torque of 22 daNm ± 0,5 daNm. This must not affect the steering wheel's operational safety even if the permanent deformation is greater than 1 degree in the direction of rotation.

6.2.1.4. Fatigue test

The replacement steering wheel is mounted with its rim in a test jig, as shown in annex 7, figure of an example of a fatigue test device, and subjected to a approximate sinusoidal endurance load cycle test with a torque of 14 daNm ± 0,5 daNm at a frequency of 1,5 Hz ± 0,25 Hz.

The replacement steering wheel must withstand at least 1×10^5 load cycles without showing any signs of cracks or fractures which might affect its operational safety.

6.2.2. Installation requirement tests and driver's view to the instrument panel

6.2.2.1. The driver's view to:

(a) the speedometer

(b) the tell tales for:

— direction indicator

— main beam

— rear fog lamp

— hazard warning signal

— automatic antilock system

— brake system malfunctions

— airbag function indicator

shall be guaranteed. The visibility is assessed by means of a comparative evaluation of photographs taken of the instrument panel of the vehicle under test equipped with a replacement steering wheel. The H points are measured after the vehicle has been aligned on the three dimensional measuring device.

The relation between vehicle and coordinate system is established through reference points of the body.

If the coordinates of the R point are not known, the H point is determined using a 50 percentile manikin. The driver's seat is adjusted as follows:

(a) seat in rearmost position of the device for longitudinal adjustment;

(b) backrest inclined corresponding to 25° back angle of the manikin;

(c) other adjusting devices in central position.

A 35 mm camera inclined by 15° towards the horizontal plane is used to simulate binocular viewing and photos are taken from each of the eye points.

Position of the eye points related to the R or H point in the coordinate system in accordance with ISO 4130 (dimensions in mm):

x	y	z
0	– 32,5	+ 635,0

x	y	z
0	+ 32,5	+ 635,0

For the camera the eye points are determined 35 mm in front of the plane of representation (normally the film plane) and on the centre axis of the optical system.

6.2.2.2. Operation of control elements

An examination is made to find out whether the minimum and maximum distances indicated below between the control elements for instance for direction indicator and headlamp flasher and the steering wheel rim are maintained. Thus, satisfactory operation of the control elements and satisfactory handling of the replacement steering wheel are to be ensured:

(a) the measure 'a' with a limitation of a minimum 30 mm refers to the control element with the smallest distance to the replacement steering wheel. It denotes the shortest distance between the control element and the rearplane of the steering wheel rim facing the instrument panel.

(b) The measure 'b' with a limitation of a maximum value of 130 mm denotes the distance from the centre of the direction indicator control element and the front plane of the steering wheel rim facing the driver.

6.2.2.3. Testing of installation

The conditions of installation, the diameter of the replacement steering wheel as compared with the original version of the vehicle manufacturer, the repositioning of direction indicator control, the function of the audible warning device and the function of the airbag tell tale are considered in the examination. Also the function of sensors monitoring the driver's seat or the passenger seat(s) and providing a deployment status to the airbag controller shall be examined, if available.

6.2.2.4. Testing of adapters

The fitting dimensions (e.g. toothing of the steering shaft) are compared with the dimensions as provided by the manufacturer using a profile projector.

The strength of the replacement adapters is checked by tightening the fixing nut/screw applying twice the tightening torque specified by the vehicle manufacturer but not more than 85 Nm.

Adequate examinations are made to verify that the adapters for vehicle types with anti-theft systems integrated into the steering wheel conform to the corresponding features of the steering wheel produced by the vehicle manufacture in terms of strength, dimensions and the materials and function, or tests of the anti-theft system in accordance with Regulation No 18 shall be carried out to demonstrate that he replacement steering wheel system fulfils the above mentioned Regulation.

6.2.3. Frontal impact test(s) with vehicle(s) for replacement steering wheel(s) equipped with an airbag module of an approved type.

Replacement steering wheels equipped with airbag modules of an approved type shall be such that, when installed in a vehicle, this vehicle fulfils the requirements of paragraphs 5.2.1.1, 5.2.1.2, 5.2.1.3, 5.2.1.4 and 5.2.1.5 of Regulation No 94, 01 series of amendments.

If the technical service responsible for this test has doubts that the aftermarket airbag system works well, additional test results, proving the correct function of the system, shall be presented by the manufacturer of the aftermarket airbag system.

6.3. *Tests of a replacement airbag system other than that installed in a steering wheel*

6.3.1. Tests of an airbag module for a replacement airbag system

The replacement airbag system shall be equipped with an approved airbag module or the manufacturer of the replacement airbag system shall demonstrate to the satisfaction of the technical service, responsible for this test, that the system fulfils the requirements as prescribed in paragraphs 5.1 and 5.2 above.

6.3.2. Impact test(s) with vehicle(s) for airbag system(s) other than those installed in steering wheels

Replacement airbag systems other than those installed in steering wheels shall be such that, when installed in a vehicle, this vehicle fulfils the requirements of paragraphs 5.2.1.1, 5.2.1.2, 5.2.1.3, 5.2.1.4 and 5.2.1.5 of Regulation No 94, 01 series of amendments, and/or the requirements of paragraphs 5.2.1.1, 5.2.1.2, 5.2.1.3, and 5.2.1.4 of Regulation No 95, 01 series of amendments, depending on the category and location of the replacement airbag system(s).

In the case of airbag modules of category C, additional instrumented dummies shall be used for the verification of the performance of each airbag system.

7. INSTRUCTIONS FOR USERS

7.1. The manufacturer of the replacement airbag systems shall include in the operating instructions any recommendations or precautions to be taken during the use, maintenance or destruction of the system or of any of its components.

7.1.1. In particular:

7.1.1.1. If the system is fitted with a monitoring device intended to inform the user of its operating condition, it shall be clearly indicated how messages delivered by the system, of whatever kind, are to be interpreted. An indication shall be given of measures to be taken in the event of a message warning of malfunctioning, together with a description of any risk involved in using the vehicle in such a condition;

7.1.1.2. It shall be indicated whether maintenance or repair work is to be performed exclusively by specially trained personnel, and whether any risks are involved in disassembling the system;

7.1.1.3. The procedure to be followed in the event of deployment shall be explained. In particular, details shall be given of any precautions to be taken as regards products generated by deployment, in the form of gases, liquids or solids. Similarly, if there is any danger from the components of the system as a result of deployment, such as dangerous roughness or sharp edges, temperature, corrosion, etc., these dangers shall be described, as well as the ways of avoiding them;

7.1.1.4. If the scrapping of the replacement airbag system(s) can lead to situations which are dangerous either directly to humans or to the environment, an appropriate procedure for avoiding them shall be indicated. This may consist in a method for deliberately releasing the airbag if its released state does not lead to a dangerous situation, in an obligation to return the system or part of it to the constructor or manufacturer, or in any other appropriate measure.

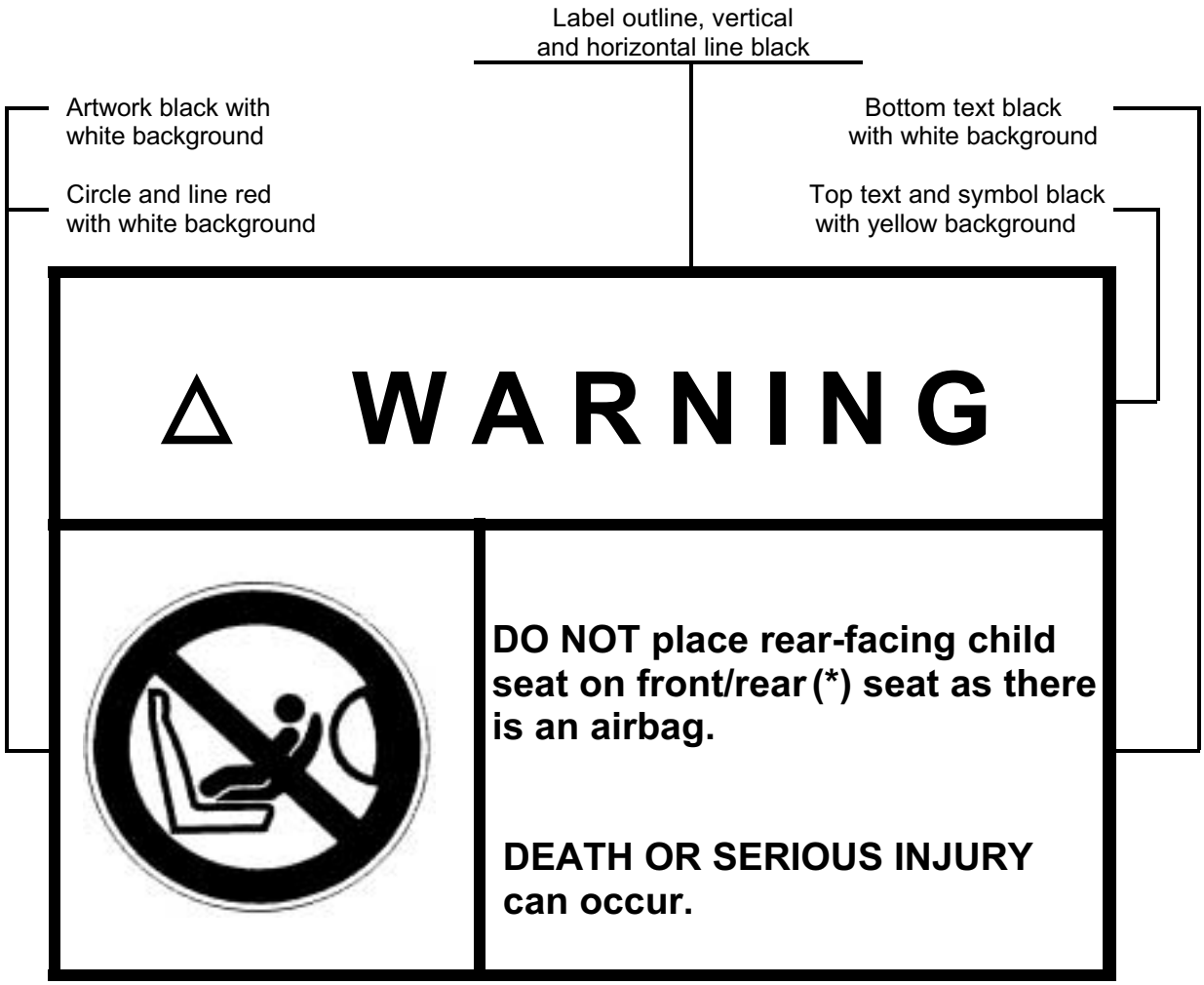
7.2. The replacement airbag system shall carry labelling and information for the use of child restraint systems according to Regulation No 94.

Airbag systems with airbag modules of category A, B, C or D shall carry the inscription 'AIRBAG' located in the interior of the circumference of the replacement steering wheel or on the cover of the airbag module; this inscription shall be durably affixed and easily visible.

In addition, in the case of a frontal protection airbag system intended for use in any passenger seating position, the following label shall be permanently attached to the visible surface of the cover of the airbag module (the text information shown is a minimum).

This label shall be provided in the language(s) of the country where the device is sold.

Label minimum size: 60 × 120 mm



(*) delete as appropriate.

8. CONFORMITY OF PRODUCTION

The conformity of production procedures shall comply with those set out in the Agreement, appendix 2 (E/ECE/324-E/ECE/TRANS/505/Rev.2) with the following requirements:

8.1. The authority which has granted type approval may at any time verify the conformity control methods applied in each production facility. The normal frequency of these verifications shall be once every two years. Where negative results are recorded during one of these verifications, their frequency may be increased.

8.2. Conformity of production of an airbag module for a replacement airbag system

Airbag modules approved under this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraphs 5.1 and 5.2 above.

8.3. Conformity of production of replacement steering wheel equipped with an airbag module of an approved type

Replacement steering wheels equipped with an airbag module of an approved type and approved under this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraphs 5.1 and 5.3 above.

8.4. Conformity of production of a replacement airbag system other than that installed in a steering wheel

Replacement airbag systems other than those installed in steering wheels approved under this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraphs 5.1 and 5.4 above.

9. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

The approval granted for a type of airbag module for a replacement airbag system, a type of replacement steering wheel equipped with an airbag of an approved type, or a type of replacement airbag system other than that installed in a steering wheel, pursuant to this Regulation, may be withdrawn if the requirements laid down in paragraph 8. above are not complied with.

10. MODIFICATIONS OF THE TYPE OF AIRBAG MODULE FOR A REPLACEMENT AIRBAG SYSTEM OR THE TYPE OF REPLACEMENT STEERING WHEEL WITH AN AIRBAG MODULE OF AN APPROVED TYPE OR THE TYPE OF REPLACEMENT AIRBAG SYSTEM, OTHER THAN THAT INSTALLED IN A STEERING WHEEL

10.1. Every modification of the type of the above-mentioned system shall be notified to the administrative department which approved the type. The department may then either:

10.1.1. decide that the modifications made are unlikely to have an appreciable adverse effect and that in any case the module or the system or the replacement steering wheel still meets the requirements,

10.1.2. require a further test report from the technical service responsible for conducting the tests.

10.2. Confirmation or refusal of approval, specifying the alterations, shall be communicated by the procedure specified in paragraphs 4.1 to 4.3 above to the other Parties to the Agreement applying this Regulation.

10.3. The competent authority which has issued the extension of approval shall assign a series number to that extension and so inform the other Parties to the 1958 Agreement applying this Regulation, by means of a communication form conforming to the models in annexes 1, 2 and 3 to this Regulation.

11. PRODUCTION DEFINITELY DISCONTINUED

If the holder of the approval ceases completely to manufacture a type of airbag module for a replacement airbag system or a type of replacement steering wheel equipped with an airbag of an approved type or a type of replacement airbag system other than that installed in a steering wheel under this Regulation, he shall inform the authority which granted the approval. Upon receiving the relevant communication, that authority shall inform thereof the other Parties to the 1958 Agreement applying this Regulation, by means of a communication form conforming to the models in annexes 1, 2 and 3 to this Regulation.

12. NAMES AND ADDRESSES OF TECHNICAL SERVICES RESPONSIBLE FOR APPROVAL TESTS, AND OF ADMINISTRATIVE DEPARTMENTS

The Parties to the 1958 Agreement applying this Regulation shall communicate to the United Nations secretariat the names and addresses of the technical services responsible for conducting approval tests and of the administrative departments which grant approval and to which forms certifying approval or extension, or refusal or withdrawal of approval, issued in other countries, are to be sent.

Annex 1

COMMUNICATION

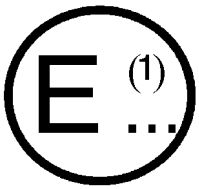
(maximum format: A4 (210 × 297 mm))

issued by: Name of administration:

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concerning: (2) APPROVAL GRANTED
APPROVAL EXTENDED
APPROVAL REFUSED
APPROVAL WITHDRAWN
PRODUCTION DEFINITELY DISCONTINUED

of a type of airbag module for a replacement airbag system pursuant to Regulation No . . .

Approval No: . . . . . Extension No: . . . . . .

1. Replacement airbag module of categories A, B, C, D: . . . . . .
2. Trade name or mark:. . . . . .
3. Description of the type of airbag module for a replacement airbag system given by the manufacturer: . . . . . .
4. Manufacturer's name:. . . . . .
5. If applicable, name and address of manufacturer's representative: . . . . . .
   . . . . . .
6. Airbag module for a replacment airbag system system submitted for approval on: . . . . . .
7. Technical service responsible for conducting approval tests: . . . . . .
8. Date of test report issued by this service: . . . . . .
9. Number of test report issued by this service: . . . . . .
10. Approval granted/refused/extended/withdrawn for general use/for use in a specific vehicle or in specific types of vehicles (2)
11. Position of the approval mark: . . . . . .
12. Place: . . . . . .
13. Date: . . . . . .
14. Signature: . . . . . .
15. The list of documents deposited with the administrative service which has granted approval is annexed to this communication and may be obtained on request.

(1) Distinguishing number of the country which has granted/extended/withdrawn approval (see approval provisions in the Regulation).

(2) Strike out what does not apply.

Annex 2

COMMUNICATION

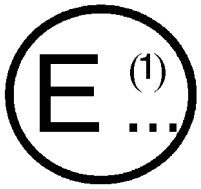
(maximum format: A4 (210 × 297 mm))

issued by: Name of administration:

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concerning: (2) APPROVAL GRANTED
APPROVAL EXTENDED
APPROVAL REFUSED
APPROVAL WITHDRAWN
PRODUCTION DEFINITELY DISCONTINUED

of a type of replacement steering wheel equipped with an airbag module of an approved type pursuant to Regulation No: . . .

Approval No: . . . . . Extension No: . . . . . .

1. Trade name or mark of the replacement steering wheel:. . . . . .
2. Manufacturer's name and address: . . . . . .
3. If applicable, name and address of manufacturer's representative: . . . . . .
4. Trade name and mark of the type of the airbag module and approval No: . . . . . .
5. Extension of approval of the type of replacement steering wheel: . . . . . .

   . . . . . .
6. List of vehicles, where the replacement steering wheel can be installed (name of vehicle manufacturer/commercial name/vehicle code/replacement steering wheel type/adapter type and number):. . . . . .
7. Technical service responsible for conducting approval tests:. . . . . .
8. Date of test report issued by this service: . . . . . .
9. Number of test report issued by this service: . . . . . .
10. Approval granted/refused/extended/withdrawn for general use/for use in a specific vehicle or in specific types of vehicles (2)
11. If applicable, reasons for extension of approval: . . . . . .
12. Position of the approval mark: . . . . . .
13. Place: . . . . . .
14. Date: . . . . . .
15. Signature: . . . . . .
16. The list of documents deposited with the administrative service which has granted approval is annexed to this communication and may be obtained on request.

(1) Distinguishing number of the country which has granted/extended/withdrawn approval (see approval provisions in the Regulation).

(2) Strike out what does not apply.

Annex 3

COMMUNICATION

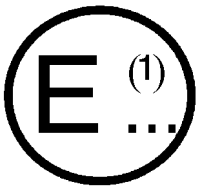
(maximum format: A4 (210 × 297 mm))

issued by: Name of administration:

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concerning: (2) APPROVAL GRANTED
APPROVAL EXTENDED
APPROVAL REFUSED
APPROVAL WITHDRAWN
PRODUCTION DEFINITELY DISCONTINUED

of a type of replacement airbag system other than that installed in a replacement steering wheel pursuant to Regulation No . . .

Approval No: . . . . . Extension No: . . . . . .

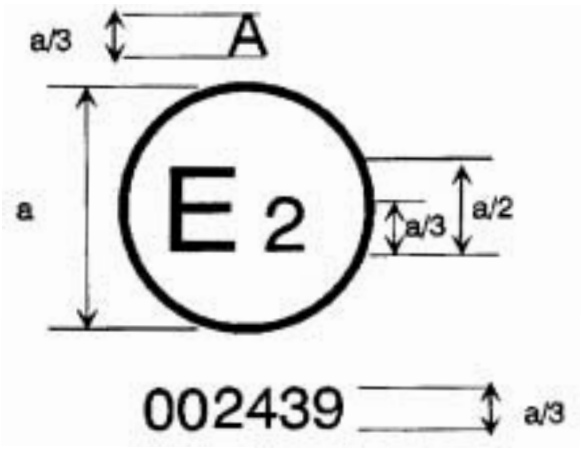
1. Trade name or mark of the replacement airbag system: . . . . . .
2. Trade name and mark of the replacement airbag system, category of the airbag system and approval No. of the airbag module: . . . . . .
3. Manufacturer's name and address: . . . . . .
4. If applicable, name and address of manufacturer's representative: . . . . . .
5. Replacement airbag system and vehicles submitted for approval on: . . . . . .
6. Extension of approval of the type of replacement airbag system: . . . . . .
7. List of vehicles, where the replacement airbag system can be installed: . . . . . .
8. Technical service responsible for conducting approval tests:. . . . . .
9. Date of test report issued by this service: . . . . . .
10. Number of test report issued by this service: . . . . . .
11. Approval granted/refused/extended/withdrawn for general use/for use in a specific vehicle or in specific types of vehicles (2)
12. If applicable, reasons for extension of approval: . . . . . .
13. Position of the approval mark: . . . . . .
14. Place: . . . . . .
15. Date: . . . . . .
16. Signature: . . . . . .
17. The list of documents deposited with the administrative service which has granted approval is annexed to this communication and may be obtained on request.

(1) Distinguishing number of the country which has granted/extended/withdrawn approval (see approval provisions in the Regulation).

(2) Strike out what does not apply.

Annex 4

EXAMPLE OF AN APPROVAL MARK FOR AN AIRBAG MODULE FOR A REPLACEMENT AIRBAG SYSTEM



a = 5 mm min

The airbag module bearing the above approval mark is a category A airbag module approved in France (E2) under the number 002439. The first two digits of the approval number indicate that the approval was granted in accordance with the requirements of the Regulation in its original form.

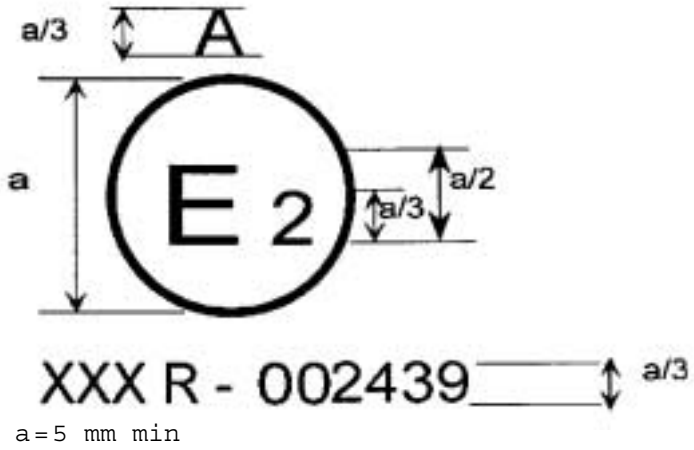
Note:

The approval number and additional symbol(s) must be placed close to the circle and either above or below the 'E' or to the left or right of that letter.

The digits of the approval number must be on the same side of the 'E' and oriented in the same direction. The additional symbol(s) must be diametrically opposite the approval number. The use of Roman numerals as approval numbers should be avoided so as to prevent any confusion with the other symbols.

Annex 5

EXAMPLE OF AN APPROVAL MARK FOR A REPLACEMENT STEERING WHEEL EQUIPPED WITH AN AIRBAG MODULE OF AN APPROVED TYPE



The replacement steering wheel bearing the above approval mark is a steering wheel with an airbag module of category A and approved in France (E2) under the number 002439. The first two digits of the approval number indicate that the approval was granted in accordance with the requirements of the Regulation in its original form.

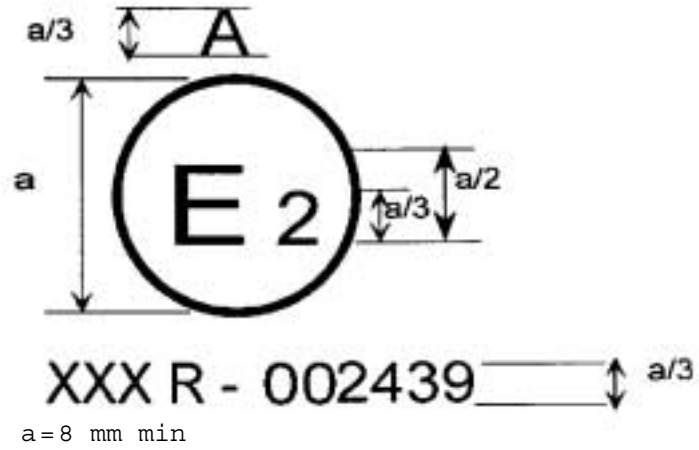
Note:

The approval number and additional symbol(s) must be placed close to the circle and either above or below the 'E' or to the left or right of that letter.

The digits of the approval number must be on the same side of the 'E' and oriented in the same direction. The additional symbol(s) must be diametrically opposite the approval number. The use of Roman numerals as approval numbers should be avoided so as to prevent any confusion with the other symbols.

Annex 6

EXAMPLE OF AN APPROVAL MARK FOR A REPLACEMENT AIRBAG SYSTEM OTHER THAN THAT INSTALLED IN A STEERING WHEEL



The replacement airbag system bearing the above approval mark is a category B airbag system approved in France (E2) under the number 002439. The first two digits of the approval number indicate that the approval was granted in accordance with the requirements of the Regulation in its original form.

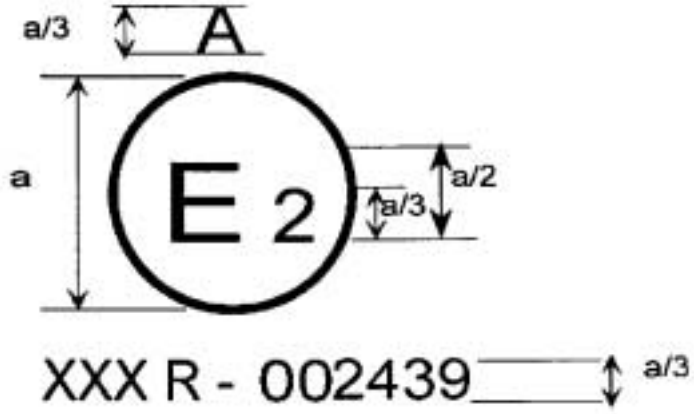
Note:

The approval number and additional symbol(s) must be placed close to the circle and either above or below the 'E' or to the left or right of that letter.

The digits of the approval number must be on the same side of the 'E' and oriented in the same direction. The additional symbol(s) must be diametrically opposite the approval number. The use of Roman numerals as approval numbers should be avoided so as to prevent any confusion with the other symbols.

Annex 7

FATIGUE TEST DEVICE



Example of a fatigue test device

Annex 8

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-D H 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 the thigh of the 3-D H 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-D H machine. The 'H' point corresponds theoretically to the 'R' point (for tolerances see paragraph 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-D H 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-D H machine. The actual torso angle corresponds theoretically to the design torso angle (for tolerances see paragraph 3.2.2 below):

2.7. 'Design torso angle' means the angle measures 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-D H 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 co-ordinates of fiducial marks in the three-dimensional reference system.

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 Regulation, 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 co-ordinates 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 paragraph 4.3 below.

3.2. *Relationship between measured data and design specifications*

3.2.1. The co-ordinates of the 'H' point and the value of the actual torso angle obtained by the procedure set out in paragraph 4. below shall be compared, respectively, with the co-ordinates 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 co-ordinates, 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.

([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.

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

3.2.4. If the 'H' point or the actual torso angle does not satisfy the requirements of paragraph 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 paragraph 3.2.3 above shall apply.

3.2.5. If the results of at least two of the three operations described in paragraph 3.2.4 above do not satisfy the requirements of paragraph 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 Regulation.

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 reached 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 min prior to installation of the 3-D H machine.

4.2. The vehicle shall be at the measuring attitude defined in paragraph 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 then be 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-D H 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 the 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.

4.5. Place the seat and back assembly of the 3-D H machine so that the centreplane of the occupant (C/LO) coincides with the centreplane of the 3-D H machine. At the manufacturer's request, the 3-D H machine may be moved inboard with respect to the C/LO if the 3-D H machine is located so far outboard that the seat edge will not permit levelling of the 3-D H 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 positions of the 3-D H 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-D H machine as the right foot is to the right. The spirit level verifying the transverse orientation of the 3-D H 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 paragraph 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-D H machine.

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

4.9.1. If the 3-D H machine tends to slide rearward, use the following procedure. Allow the 3-D H 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.

[1] Tilt angle, height difference with a seat mounting, surface texture, etc.

4.9.2. If the 3-D H machine does not tend to slide rearward, use the following procedure. Slide the 3-D H machine rearwards 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-D H 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-D H machine from sliding forward.

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

4.12. Tilt the back pan forward to release the tension on the seat-back. Rock the 3-D H 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-D H machine and the seat.

During the rocking action, the T-bar of the 3-D H 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-D H machine to ensure that no inadvertent exterior loads are applied in a vertical or fore and aft direction.

The feet of the 3-D H 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 spirits levels for zero position. If any movement of the feet has occurred during the rocking operation of the 3-D H 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-D H machine's seat pan on the seat.

4.13. Holding the T-bar to prevent the 3-D H 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-D H machine. If another level adjustment of the 3-D H machine is necessary, rotate the back pan forward, re-level, and repeat the procedure from paragraph 4.12.

4.14. Take all measurements:

4.14.1. The co-ordinates 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-D H machine with the probe in its fully rearward position.

4.15. If a re-run of the installation of the 3-D H machine is desired, the seat assembly should remain unloaded for a minimum period of 30 min prior to the re-run. The 3-D H 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-D H 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.

Annex 8

Appendix 1

DESCRIPTION OF THE THREE-DIMENSIONAL 'H' POINT MACHINE [1]

(3-D H 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' point to measure the actual torso angle. An adjustable thigh bar, attached to the seat 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-D H machine should be checked for free movement without encountering noticeable friction.

(OFFSET)

Figure 1 — 3-D H machine elements designation

(OFFSET)

Figure 2 — Dimensions of the 3-D H machine elements and locad distribution

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

Annex 8

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 co-ordinates of the fiducial marks correspond to the values indicated by the manufacturer.
3. The co-ordinates of the 'R' point and the 'H' point are established in relation to the fiducial marks defined by the vehicle manufacturer.

(OFFSET)

Figure — Three-dimensional reference system

[1] The reference system corresponds to ISO standard 4130, 1978.

Annex 8

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. Co-ordinates of fiducial marks

X . . . . . .

Y . . . . . .

Z . . . . . .

3. **List of reference data**

3.1. Seating position: . . . . . .

3.1.1. Co-ordinates 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 3.2, 3.3, etc.

[1] Strike out what does not apply.