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25 March 2003

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 */

(Revision 2, including the amendments which entered into force on 16 October 1995)

Addendum 20: Regulation No. 21

Revision 2 - Amendment 2

Supplement 3 to the 01 series of amendments - Date of entry into force: 31 January 2003

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF VEHICLES WITH REGARD TO THEIR INTERIOR FITTINGS

UNITED NATIONS

*/ Former title of the Agreement:

Agreement Concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts, done at Geneva on 20 March 1958.

Paragraph 1., amend to read:

"1. This Regulation applies to the interior fittings of vehicles of category M1 with regard to:

1.1. the interior parts of the passenger compartment other than the rear-view mirror or mirrors;

1.2. the arrangement of the controls;

1.3. the roof or opening roof, and

1.4. the seat-back and the rear parts of seats.

1.5. power-operation of windows, roof panels and partition systems."

Paragraph 2.2., amend to read:

"2.2. "vehicle type" with regard to the interior fittings of the passenger compartment means vehicles of category M1 which do not differ in such essential respects as:"

Insert new paragraphs 2.2.3. and 2.2.3.1., to read:

"2.2.3. the performance of the protective system, if the reference zone within the head impact zone determined according to annex 8 (dynamic evaluation) is chosen by the applicant.

2.2.3.1. Vehicles that differ only in the performance of the protective system(s) belong to the same vehicle type if they offer an equal or better protection for the occupants compared with the system or vehicle submitted to the technical service responsible for conducting the approval tests."

Paragraph 2.3., amend to read:

"2.3. "reference zone" is the head impact zone as defined in annex 1 to this Regulation, or at the choice of the manufacturer, according to annex 8, excluding the following areas: (see annex 10, explanatory notes, paragraphs 2.3. and 2.3.1.)"

Paragraph 2.3.1., amend to read:

" ..... straight ahead. (see annex 10, explanatory notes, paragraphs 2.3. and 2.3.1.)"

Paragraph 2.3.2., amend to read:

" ..... steering control and; (see annex 10, explanatory notes, paragraphs 2.3. and 2.3.1.)"

Paragraph 2.3.3., amend to read:

" ..... side pillars; (see annex 10, explanatory notes, paragraphs 2.3. and 2.3.1.)"

Paragraph 2.4., amend to read:

" ..... to the instrument panel; (see annex 10, explanatory notes, paragraph 2.4.)"

Paragraph 2.5., amend to read:

" ..... of the side-walls; (see annex 10, explanatory notes, paragraph 2.5.)"

Paragraph 2.7., amend to read:

" ..... seat-belt anchorages points; (see annex 10, explanatory notes, paragraphs 2.5. and 2.7.)"

Paragraph 2.8., amend to read:

" ..... belt line (see annex 10, explanatory notes, paragraph 2.5.);"

Insert new paragraphs 2.10. to 2.18., to read:

"2.10. "Protective system" means interior fittings and devices intended to restrain the occupants.

2.11. "Type of a protective system", means a category of protective devices which do not differ in such essential respects as:

2.11.1. their technology;

2.11.2. their geometry;

2.11.3. their constituent materials.

2.12. "Power-operated windows" means windows which are closed by power supply of the vehicle.

2.13. "Power-operated roof-panel systems" means movable panels in the vehicle roof which are closed by power supply of the vehicle by either a sliding and/or tilting motion, and which do not include convertible top systems.

2.14. "Power-operated partition systems" means systems which divide a passenger car compartment into at least two sections and which are closed using the power supply of the vehicle.

2.15. "Opening" is the maximum unobstructed aperture between the upper edge or leading edge, depending on the closing direction, of a power-operated window or partition or roof panel and the vehicle structure which forms the boundary of the window, partition or roof panel, when viewed from the interior of the vehicle or, in the case of partition system, from the rear part of the passenger compartment.
To measure an opening, a cylindrical test rod shall (without exerting force) be placed through it normally perpendicular to the edge of the window, roof panel or partition and perpendicular to the closing direction as shown in Figure 1 of annex 9, from the interior through to the exterior of the vehicle or, as applicable, from the rear part of the passenger compartment.

2.16. "Key"

2.16.1. "Ignition key" means the device that operates the electric power supply necessary to operate the engine or motor of the vehicle. This definition does not preclude a non mechanical device.

2.16.2. "Power key" means the device which allows power to be supplied to the power systems of the vehicle. This key may also be the ignition key. This definition does not preclude a non mechanical device.

2.17. "Airbag" means a device installed to supplement safety belts and restraint systems in power driven vehicles, i.e. systems which in the event of a severe impact affecting the vehicle automatically deploy a flexible structure intended to limit, by compression of the gas contained within it, the severity of the

contacts of one or more parts of an occupant of the vehicle with the interior of the passenger compartment.

2.18. A "sharp edge" is an edge of a rigid material having a radius of curvature of less than 2.5 mm except in the case of projections of less than 3.2 mm, measured from the panel according to the procedure described in paragraph 1 of annex 6. In this case, the minimum radius of curvature shall not apply provided the height of the projection is not more than half its width and its edges are blunted (see annex 10, explanatory notes, paragraph 2.18.)"

Paragraph 5.1.1., amend to read:

" ... of serious injury to the occupants. If the head impact area is determined according to annex 1, the parts referred to in paragraphs 5.1.2. to 5.1.6. below shall be deemed satisfactory if they comply with the requirements of those paragraphs. If the head impact area is determined according to annex 8, the requirements of paragraph 5.1.7. shall apply (see annex 10, explanatory notes, paragraph 5.1.1.)."

Paragraph 5.1.2., amend to read:

" .... from consideration if: (see annex 10, explanatory notes, paragraph 5.1.2.)"

Paragraph 5.1.3., amend to read:

" .... not less than 19 mm. (see annex 10, explanatory notes, paragraph 5.1.3.)"

Paragraph 5.1.4., amend to read:

" ..... not less than 2.5 mm.: (see annex 10, explanatory notes, paragraph 5.1.4.)"

Paragraph 5.1.5., amend to read:

" ..... not less than 6.5 cm^2 in area. (see annex 10, explanatory notes, paragraph 5.1.5.)"

Paragraph 5.1.6., amend to read:

"5.1.6. In the case of a projection comprising a component made of non-rigid material of less than 50 shore A hardness mounted on a rigid support, the requirements of paragraphs 5.1.4. and 5.1.5. shall apply only to the rigid support or it shall be demonstrated by sufficient tests according to the procedure described in annex 4

that the soft material of less than 50 shore A hardness will not be cut so as to contact the support during the specified impact test. In that case the radius requirements shall not apply (see annex 10, explanatory notes, paragraph 5.1.6.)"

Insert new paragraphs 5.1.7. to 5.1.7.2., to read:

"5.1.7. The following paragraphs shall apply:

5.1.7.1. If the protective system of the vehicle type cannot prevent head contacts of the occupants defined in paragraph 1.2.1. of annex 8 with the instrument panel, and a dynamic reference zone according to annex 8 is determined, the requirements of paragraphs 5.1.2. to 5.1.6. are applicable only to the parts located in that zone.

Parts in other areas of the dashboard above the level of the instrument panel, if contractable by a 165 mm diameter sphere, shall be at least blunted.

5.1.7.2. If the protective system of the vehicle type is able to prevent head contacts of the occupants defined in paragraph 1.2.1. of annex 8 with the instrument panel and therefore no reference zone can be determined, the requirements of paragraphs 5.1.2. to 5.1.6. are not applicable to this vehicle type.

Parts of the dashboard above the level of the instrument panel, if contractable by a 165 mm diameter sphere, shall be at least blunted."

Paragraph 5.2.2., amend to read:

" .... of paragraph 5.3.2.3. below (see annex 10, explanatory notes, paragraph 5.2.2.)."

Paragraph 5.2.3., amend to read:

" .... of the following conditions (see annex 10, explanatory notes, paragraph 5.2.3.)."

Paragraph 5.2.3.1., amend to read:

" .... longitudinal direction (see annex 10, explanatory notes, paragraph 5.2.3.1.)."

Paragraph 5.2.3.2., amend to read:

" .... other similar items (see annex 10, explanatory notes, paragraph 5.2.3.2.)."

Paragraph 5.2.4., amend to read:

" ..... shall apply only to the rigid support or it can be demonstrated by sufficient tests according to the procedure described in annex 4 that the soft material of less than 50 shore A hardness will not be cut so as to contact the support during the specified impact test. In that case the radius requirements shall not apply."

Paragraph 5.3., amend to read:

" ..... on the rearmost seats (see annex 10, explanatory notes, paragraph 5.3.)"

Paragraph 5.3.2., amend to read:

" ..... to have been fulfilled if: (see annex 10, explanatory notes, paragraph 5.3.2.)"

Paragraph 5.3.2.1., amend to read:

" ..... not less than 3.2 mm (see annex 10, explanatory notes, paragraph 5.3.2.1.)."

Paragraph 5.3.2.2., amend to read:

" ..... surface of the panel (see annex 10, explanatory notes, paragraph 5.3.2.2.);"

Paragraph 5.3.2.3., amend to read:

" ..... not less than 3.2 mm (see annex 10, explanatory notes, paragraph 5.3.2.3.)."

Paragraph 5.3.4., amend to read:

" ..... with such elements (see annex 10, explanatory notes, paragraph 5.3.4.)."

Paragraph 5.3.4.1., amend to read:

" ..... requirements of annex 4 (see annex 10, explanatory notes, paragraph 5.3.4.1.)."

Paragraph 5.3.5., amend to read:

" ..... shall apply only to the rigid support. or it can be demonstrated by sufficient tests according to the procedure described in annex 4 that the soft material of less than 50 shore A hardness will not be cut so as to contact the support during the specified impact test. In that case the radius requirements shall not apply."

Insert a new paragraph 5.3.6., to read:

"5.3.6. In addition, power operated windows and partition systems and their controls shall meet the requirements of paragraph 5.8. below."

Paragraph 5.4., amend to read:

"5.4. Roof (see annex 10, explanatory notes, paragraph 5.4.)"

Paragraph 5.4.2.1., amend to read:

" .... more than 19 mm (see annex 10, explanatory notes, paragraph 5.4.2.1.)."

Paragraph 5.5., amend to read:

"5.5. Vehicles with an opening roof (see annex 10, explanatory notes, paragraph 5.5.)"

Paragraph 5.5.1.2., amend to read:

" .... operating devices shall (see annex 10, explanatory notes, paragraphs 5.5.1.2., 5.5.1.2.1., and 5.5.1.2.2.):"

Paragraph 5.5.1.2.1., amend to read:

" .... as far as possible (see annex 10, explanatory notes, paragraphs 5.5.1.2., 5.5.1.2.1., and 5.5.1.2.2.);"

Paragraph 5.5.1.2.2., amend to read:

" .... not less than 5 mm (see annex 10, explanatory notes, paragraphs 5.5.1.2., 5.5.1.2.1., and 5.5.1.2.2.);"

Paragraph 5.5.1.2.3., amend to read:

" .... no dangerous projections shall remain (see annex 10, explanatory notes, paragraph 5.5.1.2.3.)."

Insert a new paragraph 5.5.2., to read:

"5.5.2. In addition, power-operated roof-panel systems and their controls shall meet the requirements of paragraph 5.8. below."

Paragraph 5.6., amend to read:

"5.6. Convertible vehicles (see annex 10, explanatory notes, paragraph 5.6.)"

Paragraph 5.6.1., amend to read:

" .... directed rearwards or downwards (see annex 10, explanatory notes, paragraph 5.6.1.)."

Paragraph 5.7.1.1., amend to read:

" .... of injury to the occupants (see annex 10, explanatory notes, paragraph 5.7.1.1.)."

Paragraph 5.7.1.2., amend to read:

" .... by the manufacturer (see annex 10, explanatory notes, paragraph 5.7.1.2.)."

Paragraph 5.7.1.2.3., amend to read:

" .... in annex 4 to this Regulation (see annex 10, explanatory notes, paragraph 5.7.1.2.3.)."

Paragraph 5.7.3., amend to read:

"5.7.3. The requirements of paragraph 5. 7. shall be considered to be satisfied in the case of rear parts of seats that are part of a vehicle type approved under Regulation No. 17 (03 series of amendments or later)."

Insert new paragraphs 5.8. to 5.8.7., to read:

"5.8. Power-operation of windows, roof-panel systems and partition systems

5.8.1. The requirements below apply to power-operation of windows/roof-panel systems/partition systems to minimize the possibility of injuries caused by accidental or improper operation.

5.8.2. Normal operating requirements
Except as provided in paragraph 5.8.3., power-operated windows/roof-panel systems/ partition systems may be closed under one or more of the following conditions:

5.8.2.1. when the ignition key is inserted in the ignition control in any position of use or in an equivalent condition in case of a non mechanical device;

5.8.2.2. when the power key has been used to activate the power supply to the power operated windows, partitions or roof panel systems;

5.8.2.3. by muscular force unassisted by power supply of the vehicle;

5.8.2.4. on continuous activation of a closing system located on the exterior of the vehicle;

5.8.2.5. during the interval of time between the moment the ignition has been switched off or the ignition key has been removed, or an equivalent condition has happened in case of a non mechanical device, and the moment that neither of the two front doors has been opened sufficiently to permit egress of occupants;

5.8.2.6. when the closing movement of a power-operated window, roof panel or partition starts at an opening not exceeding 4 mm;

5.8.2.7. when the power-operated window of a vehicle's door without an upper door frame closes automatically whenever the pertinent door is closed. In this case the maximum opening, as defined in paragraph 2.15., prior to window closing, shall not exceed 12 mm.

5.8.2.8. Remote closing shall be allowed by continuous activation of a remote actuation device, provided one of the following conditions is fulfilled:

5.8.2.8.1. the operation distance between the actuation device and the vehicle shall not exceed 6 m;

5.8.2.8.2. the operation distance between the actuation device and the vehicle shall not exceed 11 m, provided that the system requires a direct line of sight between the actuation device and the vehicle. This may be tested by placing an opaque surface between the actuation device and the vehicle.

5.8.2.9. One-touch closing shall be permitted only for the power-operated window of the driver's door and the roof panel, and only during the time when the ignition key is in the engine running position. It is also allowed when the engine has been switched off or the ignition key/power key has been removed, or an equivalent condition has happened in case of a non mechanical device, as long as neither of the two front doors has been opened sufficiently to permit egress of occupants.

5.8.3. Auto-reversing requirements

5.8.3.1. None of the requirements in item 5.8.2. shall apply, if a power-operated window/roof panel system/partition system is fitted with an auto-reversing device.

5.8.3.1.1. This device shall reverse the window/roof panel/partition before it exerts a pinch force of more than 100 N within the opening of 200 mm to 4 mm above the top edge of a power-operated window/partition or in front of the leading edge of a sliding roof panel and at the trailing edge of a tilting roof panel.

5.8.3.1.2. After such an auto-reversal, the window or roof panel or partition shall open to one of the following positions:

5.8.3.1.2.1. a position that permits a semi-rigid cylindrical rod of a diameter of 200 mm to be placed through the opening at the same contact point(s) used to determine the reversing behaviour in paragraph 5.8.3.1.1.;

5.8.3.1.2.2. a position that represents at least the initial position before closing was initiated;

5.8.3.1.2.3. a position at least 50 mm more open than the position at the time when reversing was initiated;

5.8.3.1.2.4. in the case of tilting motion of a roof panel, the maximum angular opening.

5.8.3.1.3. To check power-operated windows/roof-panel systems/partition systems with reversing devices as per paragraph 5.8.3.1.1., a measuring instrument/test rod shall be placed through the opening from the inside through to the exterior of the vehicle or, in the case of a partition system, from the rear part of the passenger compartment in such a way that the cylindrical surface of the rod contacts any part of the vehicle structure which forms the boundary of the window/roof-panel partition aperture. The force deflection ratio of the measuring instrument shall be 10 ± 0.5 N/mm. The positions of the test rod

(normally located perpendicular to the edge of the window/roof panel/partition and perpendicular to the closing direction) are illustrated in Figure 1 of annex 9 to this Regulation. The position of the test rod relative to the edge and the closing direction shall be kept throughout the test.

5.8.4. Switch location and operation

5.8.4.1. Switches of power-operated windows/roof panels/partitions shall be located or operated in such a way to minimize the risk of accidental closing. The switches shall require continuous actuation for closing except in the case of paragraphs 5.8.2.7., 5.8.2.9. or 5.8.3.

5.8.4.2. All rear-window, roof-panel and partition switches intended for use by occupants in the rear of the vehicle shall be capable of being switched off by a driver-controlled switch which is located forward of a vertical transverse plane passing through the R points of the front seats. The driver controlled switch is not required if a rear window, roof panel or partition is equipped with an auto-reversing device. If, however, the driver-controlled switch is present, it shall not be able to override the auto-reversing device or prevent lowering of the partition system.
The driver-controlled switch shall be located so as to minimize any accidental manipulating. It shall be identified by the symbol shown in Figure 2 of annex 9 to this Regulation or an equivalent symbol, for example according to ISO 2575:1998 reproduced in figure 3 of annex 9 to this Regulation.

5.8.5. Protection devices

All protection devices which are used to prevent damage to the power source in the case of an overload or stalling shall reset themselves after the overload or the automatic switch off. After resetting of the protection devices, the motion in the closing direction shall not resume without a deliberate action on the control device.

5.8.6. Handbook instructions

5.8.6.1. The owner's manual of the vehicle shall contain clear instructions relating to the power-operated window/roof panel/partition, including:

5.8.6.1.1. explanation of possible consequences (entrapment),

5.8.6.1.2. use of the driver-controlled switch,

5.8.6.1.3. a "WARNING" message indicating the dangers, particularly to children in the case of improper use/activation of the power-operated windows/roof-panel systems/partition systems. This information should indicate the responsibilities of the driver, including instructions for other occupants and the recommendation to leave the vehicle only if the ignition key/power key has been removed, or an equivalent condition has happened in case of a non mechanical device,

5.8.6.1.4. a "WARNING" message indicating that special care should be taken when using remote closing systems (see paragraph 5.8.2.8), for example to actuate it only when the operator has a clear view of the vehicle to be sure that nobody can be trapped by power-operated windows/roof-panel/partition equipment.

5.8.7. If a power-operated window, roof-opening and/ or partition system is installed in a vehicle that can not be tested according to the test procedures mentioned above the approval may be granted if the manufacturer can demonstrate an equal or improved protection-effect for the occupants."

Paragraph 5.8.(former), renumber as paragraph 5.9., and amend to read:

"5.9. Other non-specified fittings.

Paragraph 5.8.1.(former), renumber as paragraph 5.9.1., and amend to read:

"5.9.1. The requirements of paragraph 5. shall apply to such fittings not mentioned in previous paragraphs which, within the meaning of the various requirements in paragraphs 5.1. to 5.7. and according to their location in the vehicle, are capable of being contacted by the occupants. If such parts are made of a material of less than 50 shore A hardness, mounted on a rigid support, the requirements in question shall apply only to the rigid support, or it can be demonstrated by sufficient tests according to the procedure described in annex 4 that the soft material of less than 50 shore A hardness will not be cut during the specified impact test. In that case the required radius shall apply to the soft surface only."

Insert a new paragraph 5.9.2., to read:

"5.9.2. For parts like a centre console, for example, or other components of the vehicle which belong to 5.9.1., it is not necessary to perform an energy dissipation test according to annex 4 to any component contactable by the device and procedure specified in annex 1 if:

in the opinion of the Technical Service the occupant's head is unlikely to contact the component, because of the restraint system(s) installed in the vehicle,
or,

because the manufacturer can prove the lack of such contact using, for example, the method described in annex 8, or any equivalent method."

Explanatory notes, should be deleted

Annex 1,

Paragraph 2.1.1.2., amend to read:

" ..... shift of 127 mm or 19 mm (see annex 10, explanatory notes to paragraph 2.1.1.2. of annex 1)."

Paragraph 2.2., amend to read:

" ..... dimensions of the vehicle (see annex 10, explanatory notes to paragraph 2.2. of annex 1)."

Annex 4,

Paragraph 1.4., amend to read:

"1.4. Test procedure (see annex 10, explanatory notes to paragraph 1.4. of annex 4)"

Annex 5,

Paragraph 4., amend to read:

"4. PROCEDURE FOR "H" POINT AND ACTUAL TORSO ANGLE DETERMINATION (see annex 10, explanatory notes to paragraph 4. of annex 5)"

Insert new annexes 8 to 10, to read:

"Annex 8

DETERMINATION OF A DYNAMICALLY DETERMINED HEAD IMPACT ZONE

1. Determination of the dynamically determined head impact zone with regard to the protective system

1.1. Differing from the procedure described in annex 1 the applicant may prove, by a procedure accepted by the technical service responsible for conducting the tests, that a dynamically determined head impact zone is relevant for this vehicle type.

1.2. A suitable method to prove a dynamically determined head impact zone may be either:

1.2.1. Vehicle impact tests

to determine the sequence of movement of the occupants with regard to the protective system installed in the vehicle type, using the frontal impact conditions in the range of ± 30° against a fixed rigid barrier with an impact speed of at least 48.3 km/h. Normally it will be sufficient to test at 0°, + 30° and – 30°.

The dynamically determined head impact zone has to be evaluated for the occupants represented by adult dummies of the types 5th percentile female, 50th percentile male and 95th percentile male, each placed in its recommended seating position before the test as defined by the manufacturer, or

1.2.2. Sled tests

The sequence of movement shall be investigated under the effect of the deceleration-time diagram as shown in annex 8 of Regulation No. 16 (change of velocity 50 km/h) respecting the above prescribed dummy family and producing a direction of a forward displacement of the respective dummies corresponding to the movement of the dummies during real frontal impact tests according to paragraph 1.2.1.

The direction of the forward displacement of the dummies is deemed satisfactory, if the centre line of the test object, normally a body shell, covers the range of ± 18° from the longitudinal centreline of the sled. Normally it will be sufficient to test at O°, + 18° and –18°, or

1.2.3. Simulated impact testing

The sequence of movements of the occupants, represented by the dummy family described in paragraph 1.2.1. above shall be investigated as described in paragraphs 1.2.1. or 1.2.2. above. The simulation method shall be validated by at least three of the impact conditions as prescribed in paragraphs 1.2.1. or 1.2.2. above.

2. The dynamically determined head impact zone includes all areas of the instrument panel that may be contacted by the head of restraint occupants using the protective system installed in the vehicle type.

3. If the vehicle type can be fitted with different protective systems it is sufficient to investigate the protective system with the minimum performance. However, protective systems that can be deactivated by the driver or the occupant have to be set as recommended and indicated by the manufacturer in the owners handbook.
If the manufacturer provide for permanent deactivation of a part of the protective system, then this part has to be set to the deactivated configuration.

4. The manufacturer or his representative is entitled to present calculations, simulations, test data or test results which sufficiently prove the dynamically determined head impact zone.

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Annex 9

TYPICAL POSITION OF CYLINDRICAL TEST ROD IN THE OPENING ROOF AND WINDOW OPENINGS

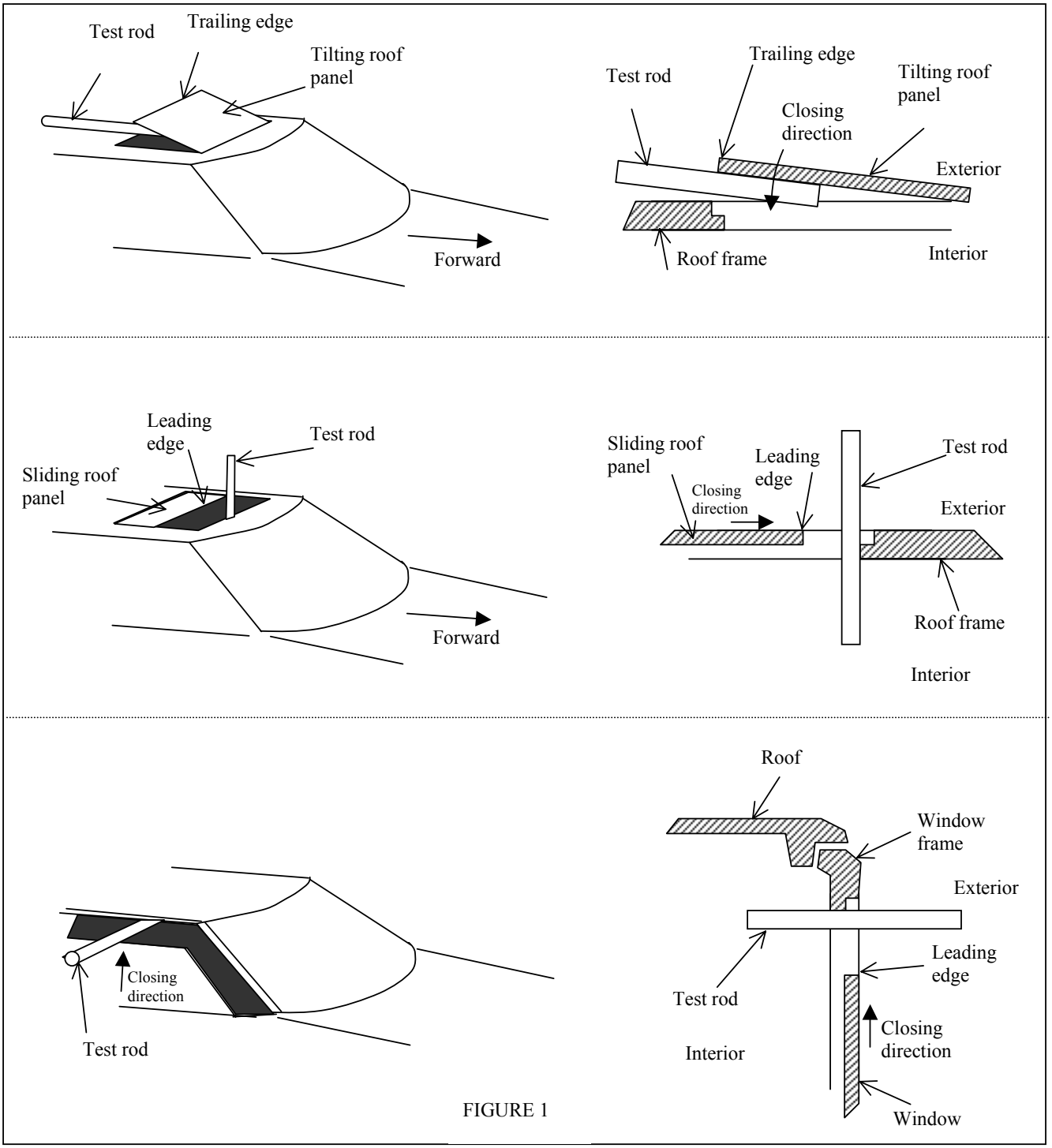

FIGURE 1

EXAMPLES OF SYMBOLS FOR DRIVER CONTROLLED SWITCH

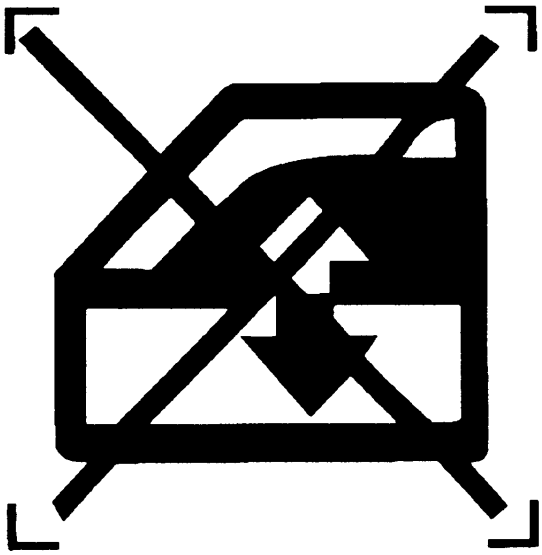

FIGURE 2

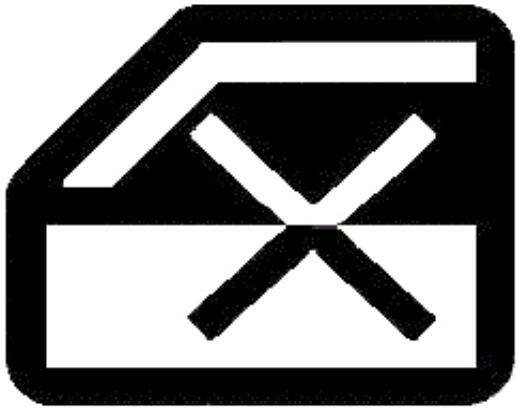

FIGURE 3
(ISO 2575:1998)

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Annex 10

EXPLANATORY NOTES

Paragraph 2.3.

The reference zone is outlined without rear view mirror. The energy-dissipation test is accomplished without the rear view mirror. The pendulum shall not impact the mirror mounting.

Paragraphs 2.3. and 2.3.1.

The exempted area behind the steering wheel as defined by these paragraphs is also valid for the head impact area of the front passengers.

In the case of adjustable steering wheels the zone finally exempted is reduced to the common area of the exempted zones for each of the driving positions which the steering wheel may assume.

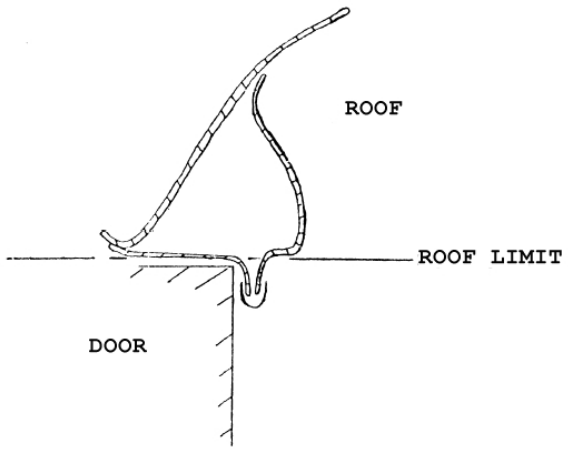
In the case where it is possible to choose between various steering wheels the exempted zone is determined by the use of the least favourable steering wheel having the smallest diameter.

Paragraph 2.4.

The level of the instrument panel extends over the entire width of the passenger compartment and is defined by the rearmost points of contact of a vertical line with the surface of the instrument panel when the line is moved across the width of the vehicle. Where two or more points of contact occur simultaneously, the lower point of contact shall be used to establish the level of the instrument panel. In the case of consoles, if it is not possible to determine the level of the instrument panel by reference to the points of contact of a vertical line the level of the instrument panel shall be where a horizontal line 25.4 mm above the "H" point of the front seats intersects the console.

Paragraph 2.5.

At the vehicle sides the roof shall commence at the upper edge of the door aperture. In the normal case, the lateral roof limits will be represented by the contours formed by the bottom edge (lateral view) of the remaining body when the door has been opened. In the case of windows, the lateral limitation of the roof will be the continuous transparent line (penetration point of the lateral windowpanes). At the posts, the lateral roof limitation will pass through the connecting line between the transparent lines. The definition of paragraph 2.5. is also valid for any opening for the roof, in the closed position, of a vehicle as defined in paragraphs 2.7. or 2.8. For measuring purposes, downward facing flanges shall be ignored. These will be considered as forming part of the vehicle sidewall.



Paragraph 2.7.

A non-removable rear window is understood to be a rigid structural element.

Cars with non-removable rear windows of rigid material are considered to be cars with opening roofs as defined under paragraph 2. 8.

Paragraph 2.18.

In case of a gap between the edge of a rigid material and the panel, this edge shall be rounded to a minimum radius of curvature depending on the gap shown in the table in the explanatory note to paragraph 5.1.1. This also applies, if the height of the projection, determined according to the procedure described in paragraph 1. of annex 6, is equal or less than 3.2 mm.

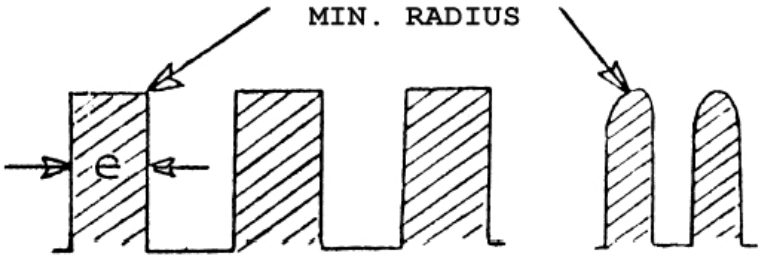
If the gap is located in a zone where a head impact test has to be carried out, the edges which can be contacted during the test(s) resulting from displacement of parts shall be protected by a minimum radius of 2.5 mm

Paragraph 5.1.1.

A sharp edge is an edge of a rigid material having a radius of curvature of less than 2.5 mm except in the case of projections of less than 3.2 mm, measured from the panel. In this case, the minimum radius of curvature shall not apply provided the height of the projection is not more than half its width and its edges are blunted.

Grills are considered to comply with the regulations if they meet the minimum requirements of the following table:

Gap between elements [mm]	Flat elements		Rounded elements min. radius [mm]
	e/min. [mm]	min. radius [mm]	
0 – 10	1.5	0.25	0.5
10 – 15	2.0	0.33	0.75
15 - 20	3.0	0.50	1.25



Paragraph 5.1.2.

During the test, it is determined whether parts within the impact zone used for reinforcement may be displaced or protrude so as to increase the hazards to passengers or the severity of injuries.

Paragraph 5.1.3.

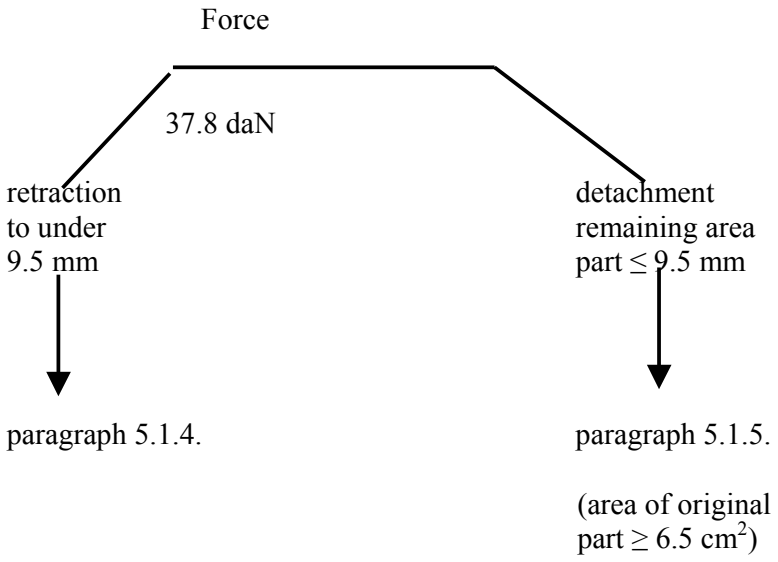
These two concepts (level and lower edge of the instrument panel) may be distinct. However, this point is included in paragraph 5.1. (.... above the level of the instrument panel ...) and, therefore is applicable only where these two concepts are combined. In the case where the two concepts are not combined, i.e. where the bottom edge of the instrument panel is located below the level of the instrument panel, it will be considered under paragraph 5.3.2.1. by reference to paragraph 5.8.

Paragraph 5.1.4.

If a pull handle or knob has a width dimension equal to or more than 50 mm and is located in a zone such that if it were less than 50 mm in width the maximum projection would be determined using the headform measuring apparatus of annex 6, paragraph 2. The maximum projection shall be determined in accordance with annex 6, paragraph 1. , i.e. by using a 165 mm diameter sphere and determining the maximum variation in height of the "y" axis. The cross-sectional area shall be measured in a plane parallel to the surface on which the component is mounted.

Paragraph 5.1.5.

Paragraphs 5.1.4. and 5.1.5. complement each other; the first sentence of paragraph 5.1.5. (i.e. a force of 37.8 daN for retraction or detachment) is applied and then paragraph 5.1.4. in case of retraction up to a protrusion between 3.2 and 9.5 mm or, in the case of detachment, the two last sentences of paragraph 5.1.5. (the cross-section area is measured before the force is applied). However, if, under practical circumstances paragraph 5.1.4. must be applied (retraction to under 9.5 mm and over 3.2 mm) it could be more convenient, at the manufacturer' s discretion, to verify the specifications of paragraph 5.1.4. before applying the force of 37.8 daN specified in paragraph 5.1.5.



Paragraph 5.1.6.

Since, in the presence of soft materials, the requirements apply only to the rigid support, the projection is measured for the rigid support only.

The shore hardness measurement is made on samples of the test subject itself. Where, due to the condition of the material, it is impossible to carry out a hardness measurement by the shore A procedure, comparable measurements shall be used for evaluation.

Paragraph 5.2.1.

Foot pedals, their arms and immediate pivotal mechanism, but not the surrounding support metal, shall be excluded from consideration.

The ignition key is deemed to satisfy the requirements of this paragraph if the protruding part of its shank consists of a material of between 60 and 80 shore A hardness and a thickness of at least 5 mm, or is covered with such a material of 2 mm minimum thickness on all surfaces.

Paragraph 5.2.2.

The criterion to determine whether the parking brake control can be contacted is the use of:

the simulated head specified in annex 1, if the control is located above or on the level of the instrument panel (to be tested in accordance with paragraph 5.1. and within the impact zone);

the knee specified in annex 7 if the control element is located below the level of the instrument panel (in this case the control lever is tested in accordance with paragraph 5.3.2.3.).

Paragraph 5.2.3.

The technical specifications listed in paragraph 5.2.3. apply also to shelves and those parts of consoles below the level of the instrument panel located between the front seats, provided that these are located in front of the "H" point. If a cavity is closed it will be treated as a glove compartment and not be subject to these specifications.

Paragraph 5.2.3.1.

The dimensions specified refer to the surface before the addition of material of less than 50 shore A hardness (see paragraph 5.2.4.). Energy-dissipating tests shall be conducted in the spirit of annex 4.

Paragraph 5.2.3.2.

If a shelf becomes detached or breaks up, no dangerous features must result; this applies not only to the rim but also to other edges facing into the passenger compartment as a result of the applied force.

The strongest part of the shelf shall be considered to be adjacent to a fixture. Also, "substantially distorted" shall mean that, under the effect of the applied force, the deflection of the shelf, measured from the initial point of contact with the test cylinder, must be a fold or a deformation visible to the naked eye. Elastic deformation shall be admissible.

The length of the test cylinder shall be at least 50 mm.

Paragraph 5.3.

"Other parts" shall include such parts as window catches, seat belt upper anchorages and other parts located in the foot space and at the door side, unless these parts have been treated previously or are exempted in the text.

Paragraph 5.3.2.

The space between the forward bulkhead and the instrument panel which is located higher than the bottom edge of the instrument panel is not subject to the specifications of paragraph 5.3.

Paragraph 5.3.2.1.

The 3.2 mm radius applies to all contactable components covered by paragraph 5.3. when considered in all positions of use.

As exceptions, glove compartments shall be considered only in the closed position; seat belts will normally be considered only in the fastened position, but any part which has a fixed stowage position shall also comply with the 3.2 mm radius requirement in that stowed position.

Paragraph 5.3.2.2.

The reference surface is found by application of the device described in annex 6, paragraph 2., with a force of 2 daN. Where this is not possible, the method described in annex 6, paragraph 1., shall be used with a force of 2 daN.

The evaluation of dangerous projections is subject to the discretion of the authority responsible for the tests.

The force of 37.8 daN is applied even if the original projection is less than 35 or 25 mm, as applicable. The projection is measured under the applied load.

The horizontal, longitudinal force of 37.8 daN is normally applied by means of a flat-ended ram of not more than 50 mm diameter but, where this is not possible, an equivalent method may be used; for instance, by removing obstacles.

With new modern door designs, window winders handle is sometimes surrounded by the form of the door panel. It is often difficult or impossible for an occupant to touch the handle with his knees. It is up to the Technical Services to decide in this case with the agreement of the manufacturer whether or not to carry out the push test as described or not.

Paragraph 5.3.2.3.

The furthest projecting part, in the case of a gear lever, is that part of the grip or knob first contacted by a vertical transverse plane moved in a longitudinal, horizontal direction. If any part of a gear lever or handbrake lies above the "H" point level, that lever will have to be considered as if the whole of it were above the "H" point level.

Paragraph 5.3.4.

Where the horizontal plane(s) passing through the "H" point of the lowest front and rear seats do not coincide, then a vertical plane perpendicular to the vehicle' s longitudinal axis shall be determined, passing through the front seat "H" point. The exempted zone will then be considered separately for both the front and rear passenger compartments, relative to their respective "H" point and up to the vertical plane defined above.

Paragraph 5.3.4.1.

Movable sun visors shall be considered in all positions of use. The frames of sun visors shall not be regarded as rigid supports (see para. 5.3.5.).

Paragraph 5.4.

When the roof is tested to measure those protrusions and parts which can be contacted by a ball having a diameter of 165 mm, the roof lining must be removed. When evaluating the specified radii the proportions and properties attributable to the materials of the roof lining shall be taken into consideration. The roof testing area shall extend in front of and above the transverse plane limited by the torso reference line of the manikin placed on the rearmost seat.

Paragraph 5.4.2.1.

(See para. 5.1.1. for definition of "sharp edges").

The downward projection shall be measured normal to the roof in accordance with annex 6, paragraph 1.

The width of the projecting part shall be measured at right angles to the line of the projection. In particular the rigid roof sticks or ribs shall not project away from the inner surface of the roof more than 19 mm.

Paragraph 5.5.

Any roof ribs on opening roofs must meet paragraph 5.4. if they are contactable by a 165 mm diameter sphere;

Paragraphs 5.5.1.2., 5.5.1.2.1., 5.5.1.2.2.

The opening and operating devices when in a position of rest and with the roof closed must meet all of the specified conditions.

Paragraph 5.5.1.2.3.

The force of 37.8 daN is applied even if the original projection is 25 mm or less. The projection is measured under the applied load.

The force of 37.8 daN applied in the direction of impact defined in annex 4 as the tangent to the trajectory of the headform is normally applied by means of a flat-ended ram of not more than 50 mm diameter, but where this is not possible an equivalent method may be used; for instance, by removing obstacles.

The "position of rest" means the position of the operating device when it is in the locked position.

Paragraph 5.6.

The rod system of convertible tops does not represent a roll-over bar.

Paragraph 5.6.1.

The top part of the windscreen frame starts above the transparent contour of the windscreen.

Paragraph 5.7.1.1.

See paragraph 5.1.1. for definition of "sharp edge".

Paragraph 5.7.1.2.

In defining the head impact zone of the back of the front seats any structure necessary to support the seat back shall be considered as a component of this seat back.

Paragraph 5.7.1.2.3.

The padding of the seat frame structure shall also avoid dangerous roughness and sharp edges likely to increase the risk of serious injuries to the occupants.

ANNEX 1, DETERMINATION OF THE HEAD-IMPACT ZONE

Paragraph 2.1.1.2.

The choice between the two procedures for determining height is to be left to the manufacturer.

Paragraph 2.2.

When determining points of contact, the length of the arm of the measuring apparatus is not changed during a particular operation. Each operation starts from the vertical position.

Paragraph 3.

The 25.4 mm dimension means the measurement from a horizontal plane passing through the "H" point to the horizontal tangent to the lower profile of the headform.

ANNEX 4, PROCEDURE FOR TESTING ENERGY-DISSIPATING MATERIALS

Paragraph 1.4.

The breakage of any component during the energy-dissipation test, see Note on paragraph 5.1.2.

ANNEX 5, PROCEDURE FOR DETERMINING THE "H" POINT AND THE ACTUAL TORSO ANGLE FOR SEATING POSITIONS IN MOTOR VEHICLES

Paragraph 4.

For determining the "H" point of any seat, other seats may be removed if necessary.

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