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Item 4.8.2 of the provisional agenda

1958 Agreement – Consideration of draft amendments to existing Regulations submitted by GRSG

Proposal for the 01 series of amendments to Regulation No. 43 (Safety glazing)

Submitted by the Working Party on General Safety Provisions*

The text reproduced below was adopted by the Working Party on General Safety Provisions (GRSG) at its ninety-ninth session, to transpose the requirements of global technical regulation No. 6 into Regulation No. 43. It is based on ECE/TRANS/WP.29/GRSG/2010/10/Rev.1, as amended by Annex III of the report (ECE/TRANS/WP.29/GRSG/78, para. 19). It is submitted to the World Forum for Harmonization of Vehicle Regulations (WP.29) and to the Administrative Committee (AC.1) for consideration.

* In accordance with the programme of work of the Inland Transport Committee for 2006–2010 (ECE/TRANS/166/Add.1, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

In the whole existing Regulation, replace "panes other than windscreens" by "panes"

In the whole existing Regulation, replace "panes" by "glazing"

Paragraph 2., amend to read:

"2. Definitions

For the purpose of this Regulation:

- 2.1. *"Toughened-glass"* means glazing consisting of a single layer of glass which has been subjected to special treatment to increase its mechanical strength and to condition its fragmentation after shattering.
- 2.2. *"Laminated-glass"* means glazing consisting of two or more layers of glass held together by one or more interlayer of plastics material; it may be:
 - 2.2.1. *"Ordinary laminated glass"*, when none of the layers of glass of which it is composed has been treated; or
 - 2.2.2. *"Treated laminated glass"*, when at least one of the layers of glass, of which it is composed, has been specially treated to increase its mechanical strength and to condition its fragmentation after shattering;
- 2.3. *"Interlayer"* means any material designed to be used to hold together the component layers of laminated-glass.
- 2.4. *"Safety-glass faced with plastics material"* means glazing as defined in paragraphs 2.1. or 2.2. with a layer of plastics material on its inner face.
- 2.5. *"Glass-plastics"* means glazing consisting of any glazing material that comprises one layer of glass and one or more layers of plastic in which a plastic surface of the product faces the inner side.
- 2.6. *"Plastic glazing"* is a glazing material that contains as an essential ingredient one or more organic polymeric substances of large molecular weight, is solid in its finished state and, at some stage in its manufacture or processing into finished articles, can be shaped by flow.
 - 2.6.1. *"Rigid plastic glazing"* means a plastic glazing material which does not deflect vertically more than 50 mm in the flexibility test (Annex 3, paragraph 12.).
 - 2.6.2. *"Flexible plastic glazing"* means a plastic glazing material which deflects vertically more than 50 mm in the flexibility test (Annex 3, paragraph 12.).
- 2.7. *"Double window"* means an assembly of two panes separately installed within the same opening of the vehicle.
- 2.8. *"Double-glazed unit"* means an assembly of two panes permanently assembled in manufacture and separated by a uniform gap.
 - 2.8.1. *"Symmetrical double-glazed unit"* means a double-glazed unit where the two component panes are identical (e.g., both toughened glass).
 - 2.8.2. *"Asymmetrical double-glazed unit"* means a double-glazed unit where the two component panes are not identical (e.g., one is toughened glass and the other is laminated glass).
- 2.9. *"Bullet resistant glazing" or "Bullet-proof glazing", means glazing constructed so as to be resistant to firearms."*

- 2.10. "*Principal characteristic*" means a characteristic that appreciably modifies the optical and/or mechanical properties of a safety glazing material in a way not without significance to the function which it is intended to perform in a vehicle. The term also covers the trade names or marks as specified by the holder of the approval.
- 2.11. "*Secondary characteristic*" means a characteristic capable of modifying the optical and/or mechanical properties of a safety glazing material in a way which is of significance to the function which it is intended to perform in a vehicle. The extent of such modification is assessed in relation to the indices of difficulty.
- 2.12. The term "*indices of difficulty*" covers a two-stage grading system applying to the variations observed in practice in each secondary characteristic. A change from index "1" to index "2" indicates the need for additional tests.
- 2.13. "*Windscreen*" means the glazing in front of the driver through which the driver views the road ahead.
- 2.14. "*Developed area of windscreen*" means the minimum rectangular area of glass from which a windscreen can be manufactured.
- 2.15. "*Inclination angle of a windscreen*" means the angle included between on the one hand a vertical line and on the other hand a straight line passing through the top and bottom edges of the windscreen, both lines being contained in a vertical plane containing the longitudinal axis of the vehicle;
- 2.15.1. Measurement of the inclination angle shall be performed on a vehicle standing on level ground, and in the case of a passenger-transport vehicle the vehicle shall be in running order, shall be fully charged with fuel coolant and lubricant, and shall be equipped with tools and the spare wheel or wheels (if they are provided as standard equipment by the vehicle manufacturer); allowance shall be made for the mass of the driver, and also, in the case of a passenger-transport vehicle, for that of one front-seat passenger, the mass of the driver and that of the passenger each being deemed to be 75 +/- 1 kg;
- 2.15.2. Vehicles equipped with hydropneumatic, hydraulic or pneumatic suspension or with a device for automatic adjustment of ground clearance according to load shall be tested in the normal running conditions specified by the manufacturer.
- 2.16. "*Group of windscreens*" means a group comprising windscreens of differing sizes and shapes subjected to an examination of their mechanical properties, their mode of fragmentation and their behaviour in environmental-aggression resistance tests.
- 2.16.1. "*Flat windscreen*" means a windscreen exhibiting no normal curvature resulting in a height of segment greater than 10 mm per linear meter;
- 2.16.2. "*Curved windscreen*" means a windscreen exhibiting a normal curvature resulting in a height of segment greater than 10 mm per linear meter.
- 2.17. "*Pane*" means any single piece of glazing other than a windscreen;
- 2.17.1. "*Curved pane*" means a pane with a height of segment "h" greater than 10 mm per linear meter;
- 2.17.2. "*Flat pane*" means a pane with a height of segment equal to or less than 10 mm per linear meter.

- 2.18. "*Height of segment 'h'*" means the maximum distance, measured at right angles approximately to the glazing, separating the inner surface of the glazing from a plane passing through the ends of the glazing (see Annex 17, figure 1).
- 2.19. "*Type of safety glazing material*" means a glazing as defined in paragraphs 2.1. to 2.7. not exhibiting any essential differences, with respect, in particular, to the principal and secondary characteristics defined in Annexes 4 to 12 and 14 to 16;
- 2.19.1. Although a change in the principal characteristics implies that the product is of a new type, it is recognised that in certain cases a change in shape and dimension does not necessarily require a complete set of tests to be carried out. For certain of the tests prescribed in the individual annexes, glazings may be grouped if it is evident that they have similar principal characteristics;
- 2.19.2. Types of glazing exhibiting differences only as regards their secondary characteristics may be deemed to be of the same type. Certain tests may however be carried out on samples of such glazings if the performance of those tests is explicitly stipulated in the test condition;
- 2.20. "*Nominal thickness*": means the manufacturer's design thickness with a tolerance of $\pm (n \times 0.2 \text{ mm})$ where n equals the number of glass layers in the glazing.
- 2.21. "*Curvature 'r'*" means the approximate value of the smallest radius of arc of the windscreen as measured in the most curved area.
- 2.22. "*HIC (Head Injury Criteria)*" value means a value for the characteristics of skull-brain injury arising from the deceleration forces which result from a blunt perpendicular impact with the glazing.
- 2.23. "*Safety glazing material requisite for driver visibility*"
- 2.23.1. "*Safety glazing material requisite for the driver's forward field of vision*" means all the glazing situated in front of a plane passing through the driver's R point and perpendicular to the longitudinal median plane of the vehicle through which the driver can view the road when driving or manoeuvring the vehicle.
- 2.23.2. "*Safety glazing material requisite for the driver's rearward field of vision*" means all glazing situated behind a plane passing through the driver's R point and perpendicular to the longitudinal median plane of the vehicle through which the driver can view the road when driving or manoeuvring the vehicle.
- 2.24. "*Opaque obscuration*" means any area of the glazing preventing light transmission, including any screen-printed area, whether solid or dot-printed, but excluding any shade band.
- 2.25. "*Shade band*" means any area of the glazing with a reduced light transmittance, excluding any opaque obscuration.
- 2.26. "*Transparent area of the windscreen*" means the glazing area contained within the design glass outline, excluding any allowed opaque obscuration (see Annex 18), but including any shade band.
- 2.27. "*Design glass outline*" means the design maximum unobstructed vehicle aperture designated to be glazed, before the glazing is installed or mounted, including all trims, but excluding obscuration bands.

- 2.28. "Optical distortion" means an optical defect in a windscreen that changes the appearance of an object viewed through the windscreen.
- 2.29. "Secondary image" means a spurious or ghost image, in addition to the bright primary image, usually seen at night when the object being viewed is very bright in relation to its surroundings, for example, the headlights of an approaching vehicle.
- 2.30. "Secondary image separation" means the angular distance between the position of the primary and secondary images.
- 2.31. "Regular light transmittance" means light transmittance measured perpendicularly to the glazing.
- 2.32. "Design seat-back angle" means the angle between the vertical line through the R point and the torso line defined by the vehicle manufacturer.
- 2.33. "Sample" means a specially prepared piece of glazing representative of a finished product or a piece cut from a finished product.
- 2.34. "Test piece" means a sample or a finished product of glazing.
- 2.35. "Type of vehicle", as regards the installation of safety glazing, means vehicles belonging to the same category which do not differ in at least the following essential respects:
- (a) The manufacturer;
 - (b) The manufacturer's type designation;
 - (c) Essential aspects of construction and design.
- 2.36. "Central driving position" is defined when Y co-ordinate of the R point is in Y0 position within + or – 60 mm."

Paragraph 5.2., amend to read

- "5.2. An approval number ... two digits (at present 01 for the Regulation) ... glazing material."

Paragraph 5.5.1., amend to read (including the deletion of footnote 3/):

- "5.5.1. in the case of a windscreen:
- I for toughened glass
 - II for ordinary laminated glass
 - III for treated laminated glass
 - IV for glass - plastics glazing."

Insert new paragraphs 5.5.9. and 5.5.10., to read:

- "5.5.9. XII in the case of glass-plastic panes
- 5.5.10. /P in the case of a safety glazing made of glass, with a layer of plastics material on its inner face"

Paragraph 5.9., amend to read:

- "5.9. An approval number ...two digits (at present 01 for the Regulation) ... in paragraph 2.35. above."

Paragraph 8.1.3.5., amend to read:

"8.1.3.5. Resistance-to-temperature-changes test

The purpose of this test is to check that plastics material(s) used in safety glazing above will withstand the effects of prolonged exposure to extremes of temperature without significant deterioration.

Paragraph 8.1.4.4., should be deleted

Paragraph 8.1.5., amend to read:

"8.1.5. Burning-behaviour (fire-resistance) test

The purpose of this test is to verify that a safety glazing material has a sufficiently low burn rate."

Paragraph 8.1.6., amend to read:

"8.1.6. Test of resistance to chemicals

The purpose of this test is to determine whether the safety glazing material will withstand the effects of exposure to chemicals likely to be normally present or used within the vehicle (e.g. cleaning compounds) without significant deterioration."

Paragraph 8.2., amend to read:

"8.2. Tests prescribed"

Paragraph 8.2.1.1., the table, the complete row "identification of colours", should be deleted

Paragraphs 12.1. and 12.2. should be deleted

Paragraph 12.3. to 12.5., should be renumbered as paragraphs 12.1. to 12.3.

Insert new paragraphs 12.4. to 12.7., to read:

"12.4 As from the official date of entry into force of the 01 series of amendments, no Contracting Party applying this Regulation shall refuse to grant approval under this Regulation as amended by the 01 series of amendments.

12.5 As from 24 months after the date of entry into force, Contracting Parties applying this Regulation shall grant approvals only if the type of safety glazing material to be approved meets the requirements of this Regulation as amended by the 01 series of amendments.

12.6. Even after the entry into force of the 01 series of amendments to this Regulation, approvals of safety glazing materials to the 00 series of amendments to this Regulation shall remain valid and Contracting Parties applying this Regulation shall continue to accept them, and Contracting Parties shall not refuse to grant extensions of approvals to the 00 series of amendments to this Regulation.

12.7. Even after the date of entry into force of the 01 series of amendments, approvals of a vehicle type to the 00 series of amendments to this Regulation shall remain valid and Contracting Parties applying the Regulation shall continue to accept them, and Contracting Parties shall not refuse to grant extensions of approvals to the 00 series of amendments to this Regulation."

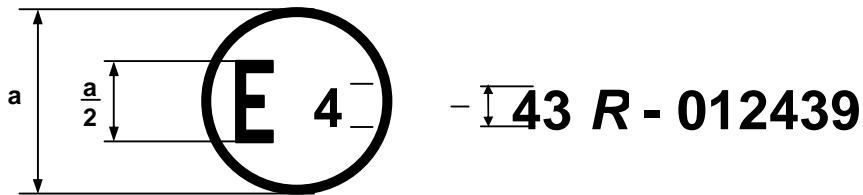
Annex 2, amend to read:

"Annex 2

Arrangements of approval marks for components

(See paragraph 5.5. of this Regulation)

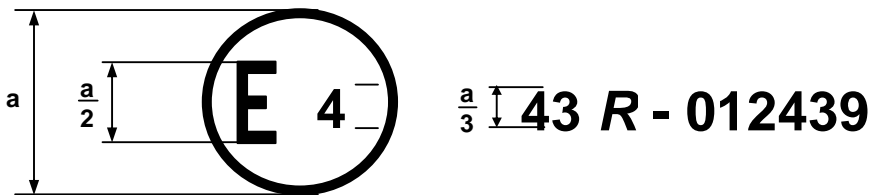
Toughened-glass windscreens



a = 8 mm mini.

The above approval mark ... under approval No. 012439. The approval number indicates ... Regulation No. 43, as amended by the 01 series of amendments.

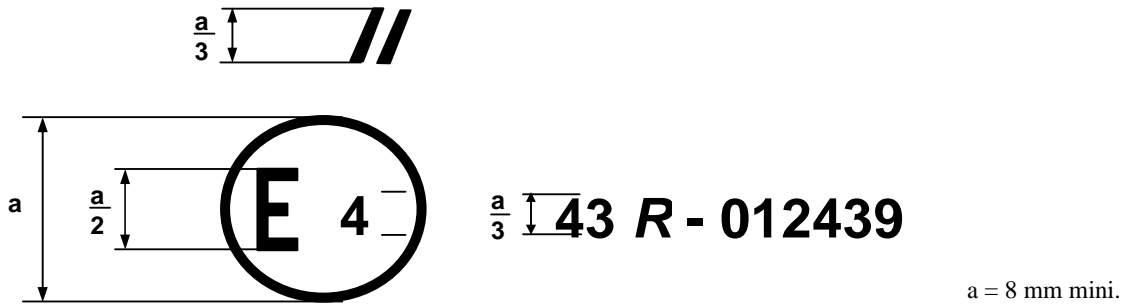
Toughened-glass windscreens faced with plastics material



a = 8 mm mini.

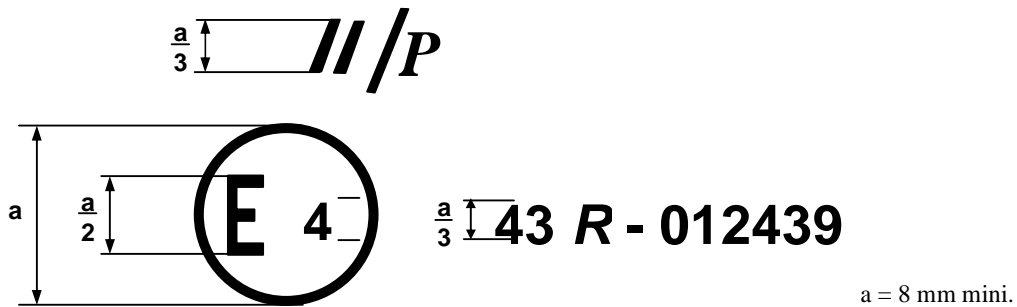
The above approval mark ... under approval No. 012439. The approval number indicates ... Regulation No. 43, as amended by the 01 series of amendments.

Ordinary laminated-glass windscreens



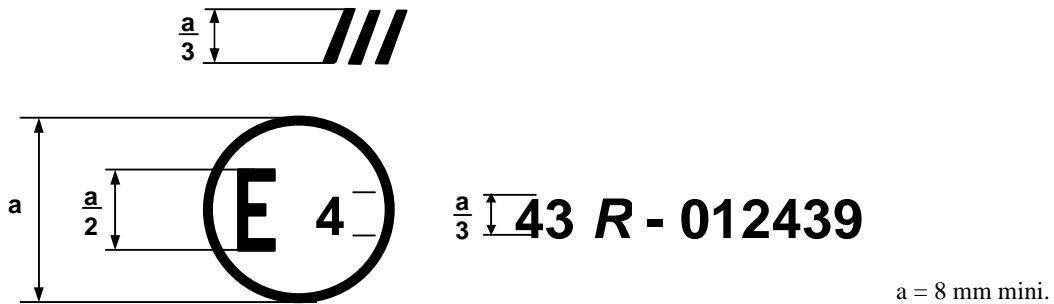
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Ordinary laminated-glass windscreens faced with plastics material

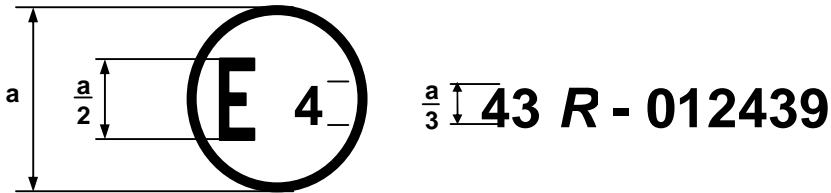


The above approval mark ... under approval No. 012439. The approval number indicates ... Regulation No. 43, as amended by the 01 series of amendments.

Treated laminated-glass windscreens

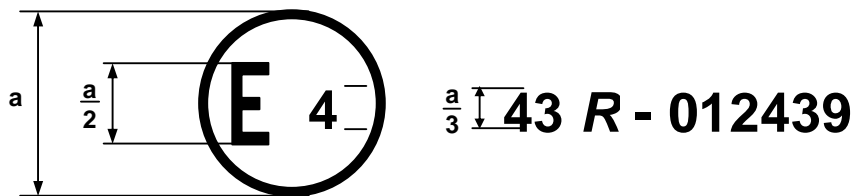
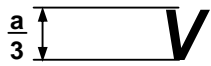


The above approval mark ... under approval No. 012439. The approval number indicates ... Regulation No. 43, as amended by the 01 series of amendments.

Glass-plastics windscreens

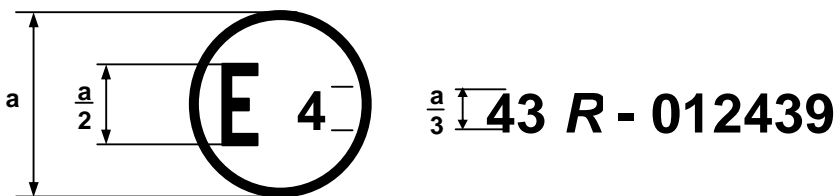
a = 8 mm mini.

The above approval mark ... under approval No. 012439. The approval number indicates ... Regulation No. 43, as amended by the 01 series of amendments.

Glass panes having a regular light transmittance < 70 per cent

a = 8 mm mini.

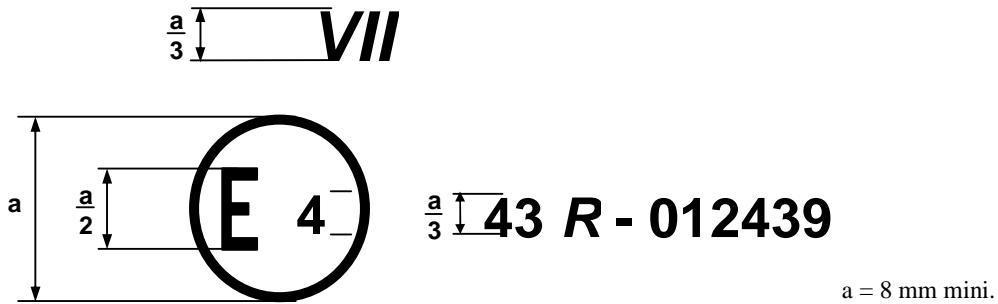
The above approval mark affixed to a glass pane to which ... under approval No. 012439. The approval number indicates ... Regulation No. 43, as amended by the 01 series of amendments.

Double-glazed units having a regular light transmittance < 70 per cent

a = 8 mm mini.

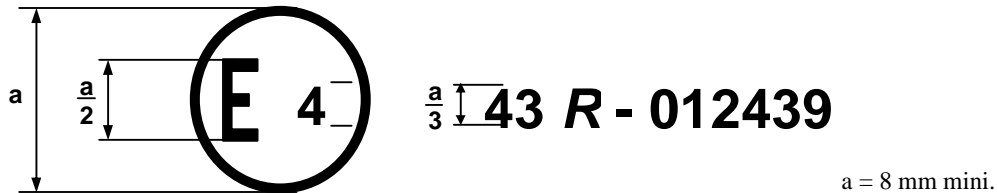
The above approval mark ... under approval No. 012439. The approval number indicates ... Regulation No. 43, as amended by the 01 series of amendments.

Uniformly-toughened glass to be used as windscreen for slow-moving vehicles which by construction cannot exceed 40 km/h



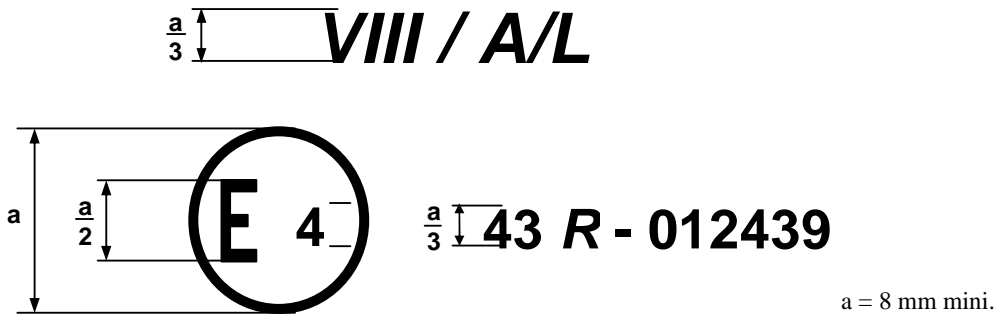
The above approval mark affixed to a uniformly-toughened glass shows ... under approval No. 012439. The approval number indicates ... Regulation No. 43, as amended by the 01 series of amendments.

Uniformly toughened glass panes having a regular light transmittance ≥ 70 per cent



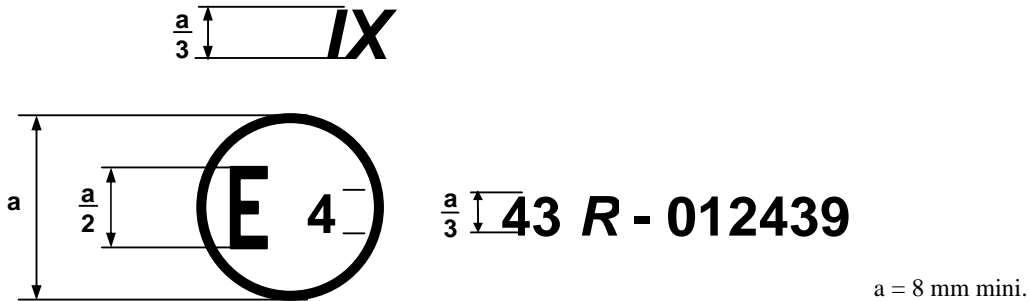
The above approval mark affixed to a glass pane to which ... under approval No. 012439. The approval number indicates ... Regulation No. 43, as amended by the 01 series of amendments.

Rigid plastic glazings other than windscreens



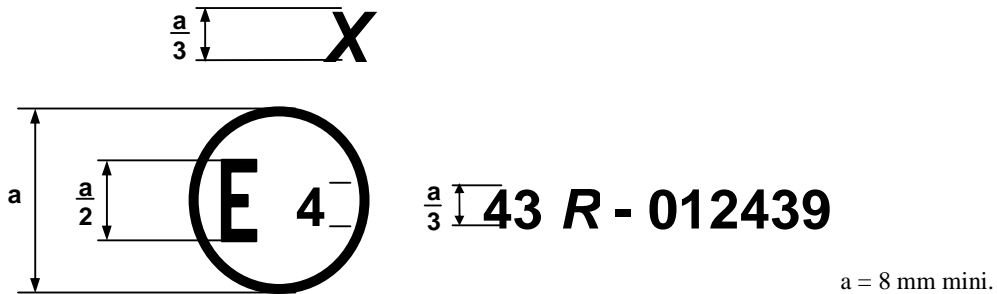
The above approval mark ... under approval No. 012439. The approval number indicates ... Regulation No. 43, as amended by the 01 series of amendments.

Flexible plastic glazings other than windscreens



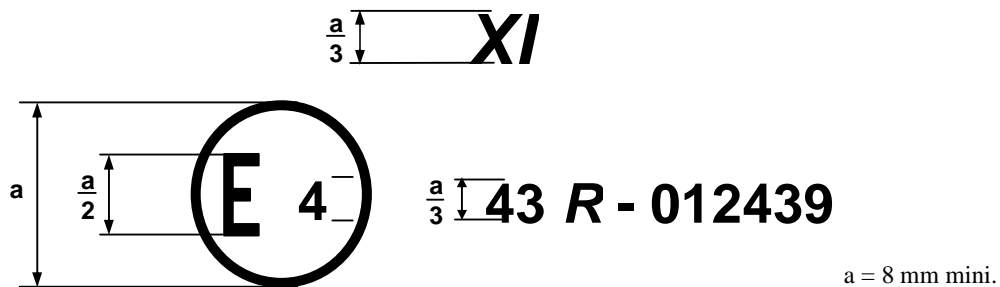
The above approval mark ... under approval No. 012439. The approval number indicates ... Regulation No. 43, as amended by the 01 series of amendments.

Rigid plastic double glazed units



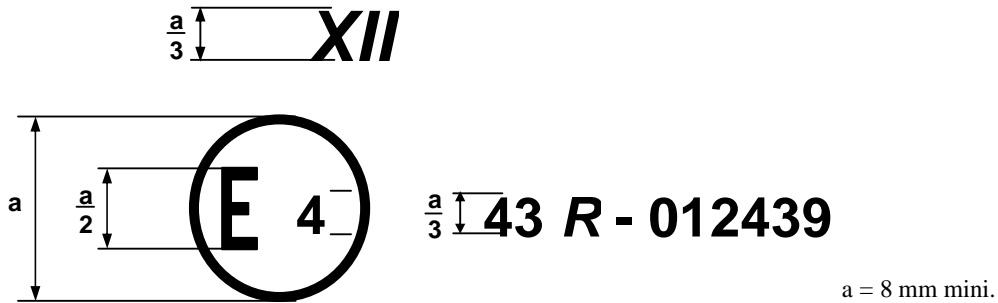
The above approval mark ... under approval No. 012439. The approval number indicates ... Regulation No. 43, as amended by the 01 series of amendments.

Laminated glass panels other than windscreens



The above approval mark ... under approval No. 012439. The approval number indicates ... Regulation No. 43, as amended by the 01 series of amendments.

Glass-plastic panes



The above approval mark affixed to glass-plastic pane, shows that the component concerned has been approved in the Netherlands (E 4) pursuant to Regulation No. 43 under approval No. 012439. The approval number indicates that the approval was granted in accordance with the requirements of Regulation No. 43, as amended by the 01 series of amendments"

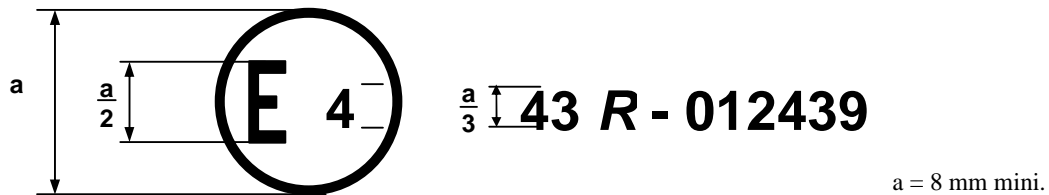
Annex 2A, amend to read:

"Annex 2A

Arrangements of approval marks for vehicles

Model A

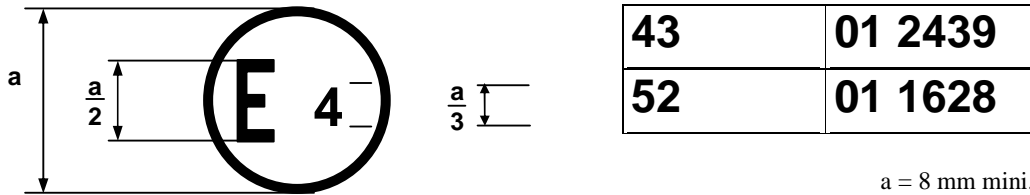
(see paragraph 5.11. of this Regulation)



The above approval mark ... under approval No. 012439. The approval number indicates ... Regulation No. 43, as amended by the 01 series of amendments.

Model B

(see paragraph 5.12. of this Regulation)



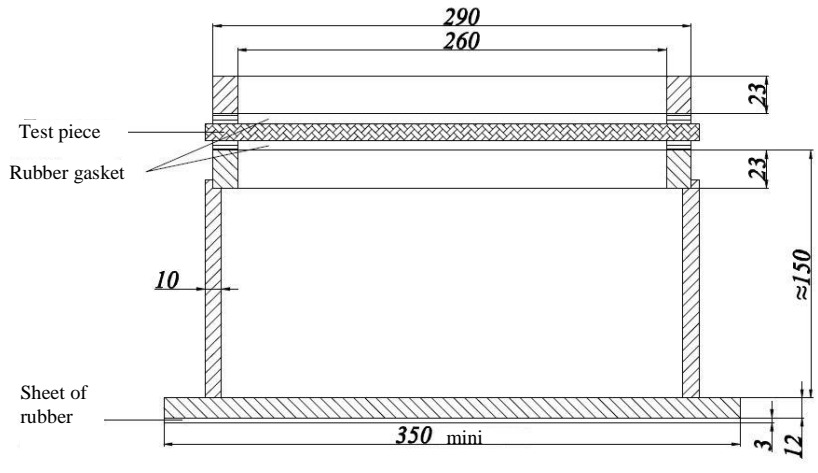
The above approval mark ... pursuant to Regulations Nos. 43 and 52. The approval numbers ... Regulation No. 43 included the 01 series of amendments and Regulation No. 52 included the 01 series of amendments."

Annex 3

Paragraph 2.1.1.3, figure 1, amend to read:

"Figure 1

Support for ball tests



Paragraph 5.3.2., amend to read:

"5.3.2. A set of test pieces or samples submitted for approval shall be considered satisfactory from the point of view of the test for resistance to high temperature if all the tests have given a satisfactory result."

Paragraphs 5.3.2.1. and 5.3.2.2., should be deleted

Paragraphs 6.3.1.1.1. and 6.3.1.1.2., should be deleted

Paragraph 6.3.1.2., renumber as paragraph 6.3.1.1.1. and amend to read:

"6.3.1.1.1. below 70 per cent in the case of windscreens and other glazing located in a position requisite for driving visibility."

Paragraph 6.3.2., amend to read:

"6.3.2. A set of test pieces or samples submitted for approval shall be considered satisfactory from the point of view of the resistance to radiation test if all the tests have given a satisfactory result."

Paragraphs 6.3.2.1 and 6.3.2.2., should be deleted

Paragraph 7.3.2. amend to read:

"7.3.2. A set of test pieces or samples submitted for approval shall be considered satisfactory from the point of view of the test for resistance to humidity if all the tests have given a satisfactory result."

Paragraphs 7.3.2.1. and 7.3.2.2., should be deleted

Paragraph 9.2.1.1.1., amend to read:

"9.2.1.1.1. "Optical deviation" means the angle between the true and the apparent direction of a point viewed through the windscreen, the magnitude of the angle being a function of the angle of incidence of the line of sight, the thickness and inclination of the windscreen, and the radius of curvature "r" at the point of incidence."

Paragraph 9.2.5.2.1., amend to read:

"9.2.5.2.1. the "eye-point" or the "O" Point" means the point located 625 mm above the R Point of the driver's seat in the vertical plane parallel to the longitudinal median plane of the vehicle for which the windscreen is intended, passing through the axis of the steering wheel."

Paragraphs 9.2.6. to 9.2.6.5., amend to read:

"9.2.6. Interpretation of Results

A windscreen type shall be considered satisfactory with respect to optical distortion if, in the four samples submitted for testing, optical distortion does not exceed the values given below for each zone or test area.

<i>Vehicle category</i>	<i>Zone</i>	<i>Maximum values of optical distortion</i>
M ₁ and N ₁	A - extended according to para. 9.2.2.1.	2' of arc
	B - reduced according to para. 2.4. of annex 18	6' of arc
M and N categories other than M ₁	I	2' of arc
Agricultural vehicles etc. for which it is not possible to determine zone I	I'	2' of arc

9.2.6.1. No measurements shall be made in a peripheral area 25 mm inboard of the design glass outline and of any opaque obscuration, provided that it does not impinge into the extended zone A or zone I.

- 9.2.6.2. For agricultural and forestry tractors and for construction-site vehicles, no measurements shall be made in a peripheral area 100 mm wide.
- 9.2.6.3. In the case of split windscreens, no measurements shall be made in a strip 35 mm from the edge of the windscreen, which is adjacent to the dividing pillar.
- 9.2.6.4. A maximum value of 6' of arc is permitted for all portions of Zone I or Zone A in a peripheral area 100 mm inboard of the design glass outline.
- 9.2.6.5. Slight deviations from the requirements may be allowed in the reduced test area B according to paragraph 2.4. of Annex 18 provided they are localized and recorded in the report."

Paragraphs 9.3.5. to 9.3.5.5., amend to read

"9.3.5. Interpretation of Results

A windscreen type shall be considered satisfactory with respect to secondary image separation if, in the four samples submitted for testing, separation of the primary and secondary – images does not exceed the values given below for each zone or test area.

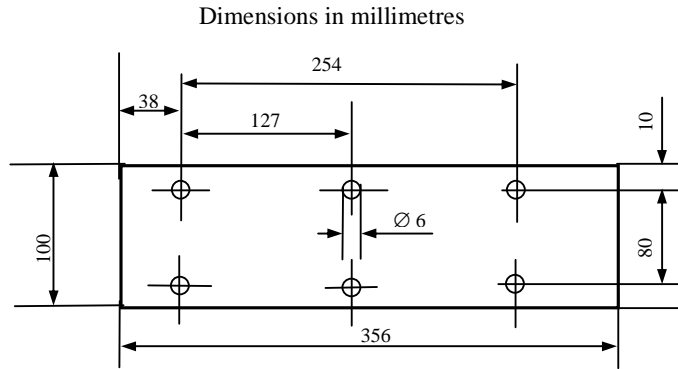
<i>Vehicle category</i>	<i>Zone</i>	<i>Maximum values of optical distortion</i>
M ₁ and N ₁	A - extended according to para. 9.2.2.1.	15' of arc
	B - reduced according to para. 2.4. of annex 18	25' of arc
M and N categories other than M ₁	I	15' of arc
Agricultural vehicles etc. for which it is not possible to determine zone I	I'	15' of arc

- 9.3.5.1. No measurements shall be made in a peripheral area 25 mm inboard of the design glass outline and of any opaque obscuration, provided that it does not impinge into the extended zone A or zone I.
- 9.3.5.2. For agricultural and forestry tractors and for construction-site vehicles, no measurements shall be made in a peripheral area 100 mm wide.
- 9.3.5.3. In the case of split windscreens, no measurements shall be made in a strip 35 mm from the edge of the windscreen, which is adjacent to the dividing pillar.
- 9.3.5.4. A maximum value of 25' of arc is permitted for all portions of Zone I or Zone A in a peripheral area 100 mm inboard of the design glass outline.
- 9.3.5.5. Slight deviations from the requirements may be allowed in the reduced test area B according to paragraph 2.4. of Annex 18 provided they are localized and recorded in the report."

Paragraph 9.4., should be deleted

Paragraph 10.5.1., figure 20, amend to read:

"Figure 20
Sample



Paragraph 10.9.1., amend to read:

"10.9.1. Safety-glass panes faced with plastics material (paragraph 2.4. of this Regulation) and glass-plastics safety panes (paragraph 2.5. of this Regulation) shall be considered satisfactory from the point of view of the fire-resistance test if the burn rate does not exceed 90 mm/min."

Paragraph 11.2.1., amend to read:

"11.2.1. *Immersion test*

Four test pieces 180 x 25 mm shall be tested for each test and each chemical specified in..."

Paragraph 11.2.3.2., amend to read:

"11.2.3.2. A set of test pieces shall be considered satisfactory with regard to the test for resistance to chemical agents if at least three of the four tests carried out with each chemical have given a satisfactory result."

Paragraphs 11.2.3.2.1. and 11.2.3.2.2., should be deleted

Annex 5

Paragraph 2.3., the table, amend to read:

Kind of glass pane	Number of samples
Flat	4
Curved (minimum radius of curvature \geq 200 mm)	4
Curved (minimum radius of curvature $<$ 200 mm)	8

Paragraph 2.5.1., amend to read

"2.5.1. For flat glass panes and curved glass panes the points of impact represented respectively in Annex 17, figures 3(a) and 3(b) on the one hand, and in Annex 17, figure 3(c) on the other hand, shall be as follows:

Point 1: In the geometric centre of the glass.

Point 2: For curved glass panes having a minimum radius of curvature "r" of less than 200 mm. The point shall be selected on the largest median in that part of the pane where the radius of curvature is smallest."

Paragraphs 2.5.2., amend to read:

"2.5.2. Four panes shall be tested from each point of impact."

Paragraphs 2.6. to 2.6.2., amend to read:

"2.6. *Interpretation of results*

2.6.1. A test shall be deemed to have given a satisfactory result if fragmentation satisfies the following conditions:

2.6.1.1. The number of fragments in any 5 cm x 5 cm square is not less than 40.

2.6.1.2. For the purposes of the above rule, a fragment extending across a side of a square shall count as half a fragment.

2.6.1.3. Fragmentation shall not be checked in a strip 2 cm wide round the edge of the samples, this strip representing the frame of the glass; nor within a radius of 7.5 cm from the point of impact.

2.6.1.4. When a fragment extends beyond the excluded area only the part of the fragment falling outside of the area shall be assessed.

2.6.1.5. Fragments of an area exceeding 3 cm² shall not be allowed except in the parts defined in paragraph 2.6.1.3. above.

2.6.1.6. No fragment longer than 100 mm in length shall be allowed except in the areas defined in paragraph 2.6.1.3. above provided that:"

2.6.1.6.1. Fragment ends do not converge to a point.

2.6.1.6.2. If they extend to the edge of the pane they do not form an angle of more than 45° to it.

2.6.2. A set of samples submitted for approval shall be considered satisfactory from the point of view of fragmentation if at least three of the four tests carried out at each of the points of impact prescribed in paragraph 2.5.1. above have given a satisfactory result."

Paragraphs 2.6.2.1. to 2.6.2.3., should be deleted

Paragraph 3.1.3.2., amend to read:

"3.1.3.2. The height of drop (from the underface of the ball to the upper surface of the test piece) shall be 2.0 m $\begin{matrix} +5 \\ -0 \end{matrix}$ mm"

Paragraph 3.1.4.1., amend to read:

"3.1.4.1. The test shall be deemed to have given a satisfactory result if at least five of the test pieces do not break."

Paragraphs 3.1.4.2. to 3.1.4.2.2., should be deleted

Annex 6

Paragraph 3.2.3.2., amend to read:

"3.2.3.2. A set of samples submitted for approval shall be considered satisfactory from the point of view of the headform test if all the tests give a satisfactory result."

Paragraphs 3.2.3.2.1. and 3.2.3.2.2., should be deleted

Paragraph 3.3., should be deleted

Paragraph 4.2.1., amend to read:

"4.2.1. Twelve square test pieces of 300 mm $\begin{smallmatrix} + 10 \\ - 0 \end{smallmatrix}$ mm side shall be subjected to testing."

Paragraph 4.2.3.2., amend to read:

"4.2.3.2. A set of test pieces submitted for approval shall be considered satisfactory from the point of view of the 2,260 g ball test if at least eleven of the twelve tests have given a satisfactory result."

Paragraphs 4.2.3.2.1 and 4.2.3.2.2., should be deleted

Paragraph 4.3.3.2., the table, amend to read:

Nominal thickness of test piece (mm)	+ 40 ± 2°C		- 20 ± 2°C	
	Height of fall (m)	Maximum permitted mass of the fragments (g)	Height of fall (m)	Maximum permitted mass of the fragments (g)
e ≤ 4.5	9	12	8.5	12
4.5 < e ≤ 5.5	9	15	8.5	15
5.5 < e ≤ 6.5	9	20	8.5	20
e > 6.5	9	25	8.5	25

Paragraph 4.3.4.2., amend to read:

"4.3.4.2. A set of test pieces submitted for approval shall be considered satisfactory from the point of view of the 227 g ball test if at least eight of the ten tests, carried out at each temperature have given a satisfactory result."

Paragraphs 4.3.4.2.1. and 4.3.4.2.2., should be deleted

Annex 7

Paragraphs 3. to 3.4.2.2., should be deleted

Paragraphs 4. and 4.1., renumber as paragraphs 3. and 3.1.

Paragraph 4.2., renumber as paragraph 3.2. and amend to read:

"3.2. *Number of Test Pieces*

Eight flat samples measuring 300 x 300 mm, specially made or cut from the flattest part of a pane shall be tested"

Insert new paragraphs 3.2.1. and 3.2.2., to read:

"3.2.1. Test pieces can alternatively be finished products that may be supported over the apparatus described in paragraphs 2.1.1. to 2.1.1.3. of Annex 3."

- 3.2.2. If the test pieces are curved, care should be taken to ensure adequate contact with the support."

Paragraphs 4.3. and 4.3.1., renumber as paragraphs 3.3. and 3.3.1.

Paragraph 4.3.2., renumber as paragraph 3.3.2. and amend to read:

- "3.3.2. The height of drop from the underface of the ball to the upper face of the test piece or sample shall be $9\text{ m } \begin{matrix} +25 \\ -0 \end{matrix}$ mm."

Paragraph 4.4. to 4.4.2., renumber as paragraph 3.4. to 3.4.2. and amend to read:

- "3.4. Interpretation of Results

- 3.4.1. The test shall be considered to have given a satisfactory result if the following conditions are met:

- (a) The ball does not pass through the test piece;
- (b) The laminate shall not break into separate pieces;
- (c) At the point immediately opposite the point of impact, small fragments of glass may leave the specimen, but the small area thus affected shall expose less than 645 mm² of reinforcing or strengthening material, the surface of which shall always be well covered with tiny particles of tightly adhering glass. Total separation of glass from the reinforcing or strengthening material shall not exceed 1935 mm² on either side. Spalling of the outer glass surface opposite the point of impact and adjacent to the area of impact is not to be considered a failure.

- 3.4.2. A set of test pieces submitted for approval shall be considered satisfactory from the point of view of the mechanical strength test if at least six of the eight tests have given a satisfactory result."

Paragraphs 4.4.2.1 to 4.4.2.2., should be deleted.

Paragraphs 5. to 6., renumber as paragraphs 4. to 5.

Annex 10

Paragraph 3.2.3.2., amend to read:

- "3.2.3.2. A set of samples submitted for approval shall be considered satisfactory from the point of view of the headform test if all of the tests have given a satisfactory result."

Paragraphs 3.2.3.2.1. and 3.2.3.2.2., should be deleted.

Paragraphs 3.3. to 3.3.3.2.2., should be deleted.

Annex 11

Paragraphs 3. to 3.4.2.2., should be deleted.

Paragraph 4, renumber as paragraph 3. and amend to read:

- "3. Mechanical Strength Test - 227 g Ball Test
The provisions of Annex 7, paragraph 3, shall apply."

Paragraph 4.1. and 4.2., should be deleted.

Paragraphs 5. to 8., renumber as paragraph 4. to 7.

Annex 12, paragraph 3.4.4., amend to read:

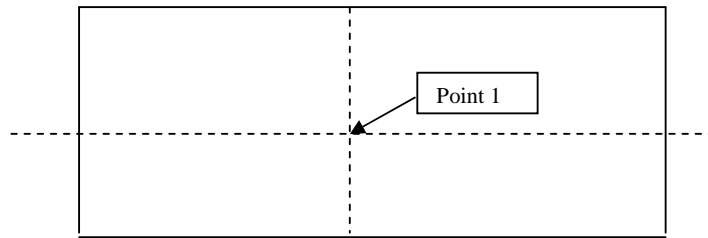
"3.4.4. A set of test pieces submitted for approval shall be considered satisfactory with respect to behavior under head impact, if all of the tests have given a satisfactory result."

Annex 12, paragraphs 3.4.4.1. and 3.4.4.2, should be deleted.

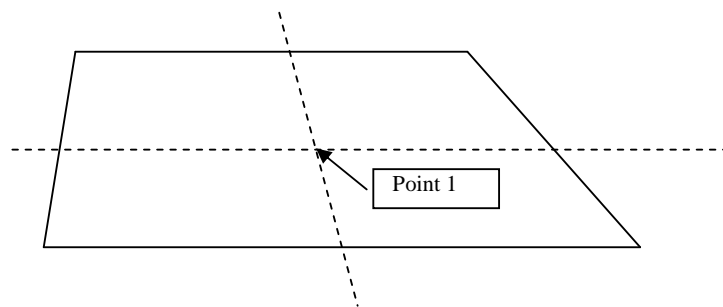
Annex 17, figure 3, amend to read:

"Figure 3

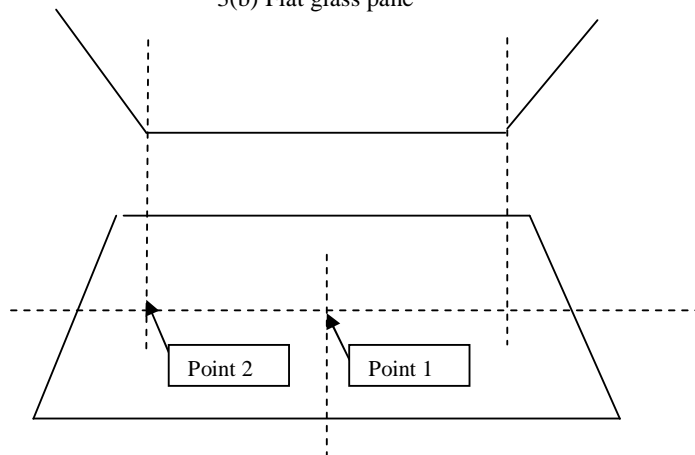
Prescribed points of impact for uniformly toughened glass panes



3(a) Flat glass pane



3(b) Flat glass pane



3(c) Curved glass pane

Annex 19, paragraphs 2.3. and 2.4., amend to read:

"2.3. "H Point" means the pivot centre of the torso and thigh of the 3 DH machine installed in the vehicle seat. The 3 DH machine corresponds to that described in ISO Standard 6549. The coordinates of the H point are determined in relation to the fiducial marks defined by the vehicle manufacturer, according to the three-dimensional system corresponding to ISO Standard 4130.

- 2.4. "R Point or seating reference point", means the position of the H point with the driver's seat in the design driving position as defined by the vehicle manufacturer."

Annex 21

Paragraph 4.2.1.1., amend to read:

- "4.2.1.1. The safety glazing as defined in paragraph 2.23.1. of this Regulation70 per cent."

Paragraph 4.2.2.1., amend to read:

- "4.2.2.1. The safety glazing defined in paragraph 2.23.2. of this Regulation in paragraph 5.5.2. of this Regulation."
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