

Informal document No. GRSG-93-24  
(93<sup>rd</sup> GRSG, 23-26 October 2007,  
Agenda item 13 (a))

Global technical regulations (gtrs) under the 1998 Agreement

Draft corrigendum proposal to the draft gtr concerning safety glazing materials for motor vehicles

Transmitted by the Informal GRSG Safety Glazing GTR Working Group

The text reproduced below was prepared by the expert from the Informal GRSG Safety Glazing GTR Working Group. It proposes editorial corrections to and clarifications of the draft gtr proposal on safety glazing materials, document ECE/TRANS/WP.29/GRSG/2007/28. The modifications of the current text are marked in **Bold** characters **and or double strike through**.

## A. Proposals

### Paragraph 1 (a), second paragraph, amend to read:

While some Contracting Parties allow the use of plastic glazing for window panes in vehicles, other Contracting Parties prohibit plastic glazing due to its limited durability. Historically, plastic glazing degrades gradually over time, particularly, ~~in hot and humid climate~~ **due to the effects of weather, radiation, oxidation and mechanical abuse.**

### Paragraph 1 (a), third paragraph, amend to read:

An informal working group (IWG) was established under the Chairmanship of Germany, the sponsor of the gtr.

### Paragraph 1 (b), second paragraph, amend to read:

Four tests and requirements are used in the gtr for mechanical properties: a fragmentation test, a 227 g steel ball, a 2.26 kg steel ball and a 10 kg head-form. **The first three appears** in all of the national or regional regulations.

### Paragraph 1 (b), third paragraph, amend to read:

Three types of optical qualities ~~were~~ **are** addressed by the gtr: light transmission, optical distortion and double image.

### Paragraph 1 (b), add new paragraph after paragraph 4, to read:

**The IWG understands that research to update some of the environmental tests is currently being conducted within the glazing industry. However, for the time being, the GTR can only consider the available practice and test requirements. Once the new test procedures/test equipments are validated and updated by the industry, proposals could be made to update the GTR, accordingly. Other areas that could be the subject of future proposals to upgrade the GTR include installation provisions, plastic glazing, markings and rear light transmittance, are subject to the approval by WP.29 and AC.3.**

### Paragraph 2 (b), delete and reword the final sentence, to read:

~~For lack of safety justification for these requirements, they were included in the gtr.~~  
**Because a safety justification for these requirements exists, they were included in the gtr.**

**Paragraph 2 (c), delete the fourth paragraph:**

~~This gtr specifies mechanical requirements for both laminated and toughened glazing to be installed as panes. The different mechanical properties of toughened glazing are sufficient in these applications and it was felt that manufacturers could have the option of choosing between laminated and toughened glazing.~~

**Paragraph 2 (c), paragraph 5, amend item (iii), to read:**

(iii) **2.26** kg steel ball test;

**Paragraph 2 (c), paragraph 6, amend to read:**

In the case of breakage, it is desired that the glazing shatter into very small, blunt pieces rather than large, sharp fragments ~~and thus~~ **thereby** significantly reducing the risk of serious injuries.

**Paragraph 2 (c), paragraph 11, amend to read:**

While the North American technique is a simpler test to perform, the recent use of very thin toughened glazing would ~~allow growing the fragment size significantly~~ **permit a significant increase of the fragment size.**

**Paragraph 2 (c), paragraph 12, amend to read:**

Therefore, it was decided that the lowest height, 2 m, used in any national or regional regulation, would be sufficient to ~~evaluate the behaviour of a pane, penetrated~~ **assess a pane impacted** by a stone or other small object.

**Paragraph 2 (c), paragraph 13, amend to read:**

For other glazing the differences between the regulations examined generally related to the drop height used during the test. The gtr specifies **a drop height of 9 m** as in the North American regulations for windscreens. Unlike panes, the impact force on windscreens is difficult to determine as it depends on the velocity of both the object and the vehicle. Quite frequently existing glazing is manufactured meet the most severe test conditions in existing regulations around the globe, and therefore the feasibility of meeting the more severe standard is demonstrated. Therefore, the North American test height was chosen to ensure that the glazing **is resistant** to penetration under ~~a wide range of ambient~~ **ambient** conditions. The ~~only exception is that the~~ drop heights in the European and Asian regulations ~~was~~ **were** kept for the low and high temperature tests, ~~as these tests do not exist in the North American regulations examine~~ **to assess the interlayer performance over extreme temperature conditions.**

**Paragraph 2 (c), paragraph 14, amend to read:**

~~The purpose of the 2.26 kg steel ball test is to assess the penetration resistance of laminated glazing materials for windscreens, to the impact from a heavy object. There are only minor differences between the existing regulations, and the European and Asian version was included in the gtr as the drop height was the same when measured in meters.~~

**The purpose of the 2.26 kg steel ball test is to assess the penetration resistance of laminated glazing materials used for windscreens to impact from a heavy object. The US regulation requires a resistance to penetration from 3.66 m while the European and Japanese regulations require performance from 4.0 m. Many windscreen produced in the US are dual certified for both the 3.66 m and the 4.0 m performance levels already. Therefore the higher height of 4.0m was selected for inclusion in the GTR.**

**Paragraph 2 (c), paragraph 15, amend to read:**

The requirement of the 2.26 kg ball drop test, which is used to assess the penetration resistance of the laminated glazing material ~~is are~~ considered satisfactory even if no breakage occurs.

**Paragraph 2 (d), paragraph 1, amend to read:**

In developing the gtr, there was agreement that glazing requisite for the driver's primary visibility should exhibit good light transmission properties, ~~but not all countries agree which locations this included.~~

**Paragraph 2 (d), paragraph 6, amend to read:**

The gtr ~~also~~ specifies **optical** testing ~~only~~ in the vision areas currently specified in the European and Asian regulations. Because modern windscreens are larger, the actual area used by the driver under normal conditions is ~~lower~~ **limited**.

**Paragraph 3.3.7. of B. TEXT OF REGULATION, paragraph 3., amend to read:**

Uniformly Toughened-glass

**Paragraphs 4.1.1.2. and 4.1.1.3., amend to read the paragraphs in [ ]:**

[4.1.1.2 Every glazing shall bear the following markings: Global glazing manufacturer identification mark, gtr mark, identification mark(s).

4.1.1.3 Contracting Parties may require additional markings.]

**Paragraph 4.2., amend to read the paragraph in [ ]:**

**[4.2.            Installation**

**Each Contracting Party, as defined under the 1998 Agreement on global technical regulations (gtr), shall specify which type of glazing is allowed in which vehicles and at which locations.]**

**Paragraph 5.3.3.1., amend to read:**

When tested in accordance with paragraph 6.9., at the time specified in paragraph ~~6.9.4.1.~~ ~~or 6.9.1.2.~~ **6.9.1.4. or 6.9.1.5.**, as appropriate, no significant change, e.g., whitening, bubbles, or delamination, excepting surface cracks, shall be observed more than 10 mm from the uncut edges and more than 15 mm from the cut edges.

**Paragraphs 5.4.3. to 5.4.3.4.1., amend to read the paragraphs in [ ]:**

**[5.4.3.            Head-form test on windscreens**

**When tested in accordance with paragraph 6.5., at the drop height of 1.5 m  $\begin{smallmatrix} +0 \\ -5 \end{smallmatrix}$  mm, the windscreen shall meet the following requirements:**

**5.4.3.1.            The windscreen shall break displaying numerous circular cracks centred approximately on the point of impact, the cracks nearest to the point of impact being not more than 80 mm from it.**

**5.4.3.2.            The layers of glass shall remain adhering to the interlayer. One or more partial separations from the interlayer with a distance of less than 4 mm in breadth, on either side of the crack, are allowed outside a circle of 60 mm diameter centred on the point of impact.**

**5.4.3.3.            On the impact side:**

**5.4.3.3.1.          The interlayer shall not be laid bare over an area of more than 20 cm<sup>2</sup>.**

**5.4.3.3.2.          A tear in the interlayer up to a length of 35 mm is allowed.**

**5.4.3.4.            Test pieces**

**5.4.3.4.1.          Eight windscreens shall be tested and at least seven shall meet the requirements.]**

**Paragraph 5.5.1.1.5.1., amend to read:**

Fragment ends ~~are not knife-edged~~ do not converge to a point.

**Paragraphs 5.5.3.2. to 5.5.3.2.4.3., amend to read the paragraphs in [ ]:**

**[5.5.3.2. Head-form test**

**When tested in accordance with paragraph 6.5., at a drop height of 1.50 m  $\begin{smallmatrix} +0 \\ -5 \end{smallmatrix}$  mm, the test pieces shall meet following requirements:**

- 5.5.3.2.1. A double-glazed unit consisting of two uniformly toughened-glass panes shall break.**
- 5.5.3.2.2. A double-glazed unit consisting of laminated-glass panes and/or glass-plastics panes shall meet the following requirements:**
  - 5.5.3.2.2.1. The two components of the test piece yield and break, displaying numerous circular cracks centred approximately on the point of impact;**
  - 5.5.3.2.2.2. Tears in the interlayer(s) are allowed provided that the head-form does not pass through the test piece;**
  - 5.5.3.2.2.3. No fragment larger than 10 cm<sup>2</sup> becomes detached from the interlayer.**
- 5.5.3.2.3. A double-glazed unit consisting of a uniformly toughened-glass pane and of a laminated-glass pane or glass-plastics pane shall meet the following requirements:**
  - 5.5.3.2.3.1. The uniformly toughened glass pane breaks;**
  - 5.5.3.2.3.2. The laminated-glass pane or glass-plastics pane:**
    - 5.5.3.2.3.2.1. Yields and breaks, displaying numerous circular cracks centred approximately on the point of impact;**
    - 5.5.3.2.3.2.2. Tears in the interlayer(s) are allowed provided that the head-form does not pass through the test piece;**
    - 5.5.4.2.3.2.3. No fragment larger than 10 cm<sup>2</sup> becomes detached from the interlayer.**
- 5.5.3.2.4. Test pieces**

5.5.3.2.4.1. Twelve test pieces shall be tested and at least eleven shall meet the requirements.

5.5.3.2.4.2. The test pieces shall be as described in paragraph 6.5.5.1.

5.5.3.2.4.3. In the case of an asymmetrical double-glazed unit, six tests shall be carried out on one side and six tests on the other side.]

Paragraphs 6.5. to 6.5.5.2., amend to read the paragraphs in [ ]:

[6.5. Head-form tests

6.5.1. Apparatus

6.5.1.1. Head-form

6.5.1.1.1. Spherical or semi-spherical head-form made of laminated hardwood covered with replaceable felt and with or without a crossbeam made of wood. There is a neck-shaped intermediate piece between the spherical part and the crossbeam and a mounting rod on the other side of the rod on the other side of the crossbeam.

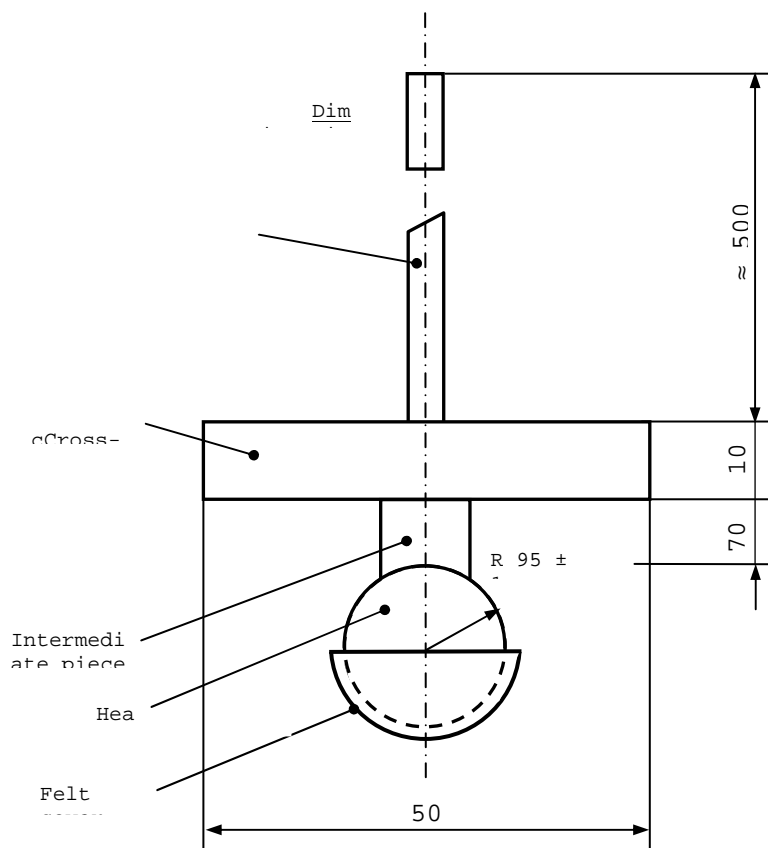


Figure 2 Head-form

6.5.1.1.2. The dimensions shall be in accordance with Figure 2.

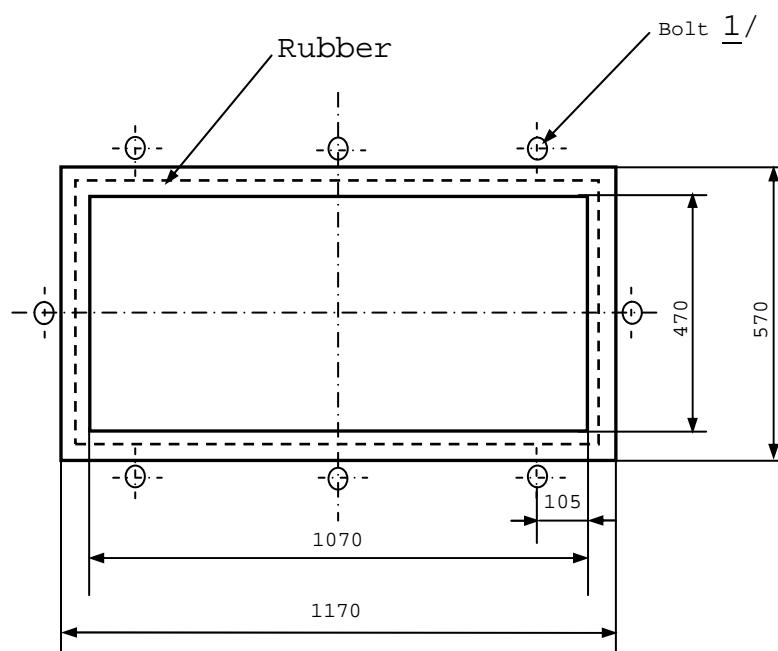
6.5.1.1.3. The total mass of the head-form shall be  $10 \pm 0.2$  kg.

6.5.1.2. Means for dropping the head-form freely from a height to be specified, or means for giving the head-form a velocity equivalent to that obtained by the free fall. When a device to project the head-form is used, the tolerance on velocity shall be  $\pm 1\%$  of the velocity equivalent to that obtained by the free fall.

6.5.1.3. Supporting fixture, as shown in Figure 3, for testing flat test pieces.

The fixture is composed of two steel frames, with machined borders 50 mm wide, fitting one over the other and faced with rubber gaskets 3 mm thick and  $15 \pm 1$  mm wide and of hardness  $70 \pm 10$  IRHD. The upper frame is held pressed against the lower frame by at least eight bolts. The torque on the bolts shall ensure that the movement of the test piece during the test will not exceed 2 mm.

Dimensions in millimeters





1/ The minimum recommended torque for M20 is 30Nm.

Figure 3 Head-form test support for flat samples

**6.5.1.4. Supporting fixture for windscreens**

The support shall consist of a rigid piece corresponding to the shape of the windscreen so that the head-form strikes the inner face of the windscreen. It has an interposed strip of rubber of hardness  $70 \pm 10$  IRHD, thickness 3 mm and width 15 mm. The support shall rest on a rigid stand with an interposed sheet of rubber of hardness  $70 \pm 10$  IRHD and thickness 3 mm.

**6.5.2. Procedure for tests on flat test pieces.**

**6.5.2.1. Condition the test piece at the temperature specified in paragraph 6.1.1. for at least four hours immediately preceding the test.**

**6.5.2.2. Fix the test piece in the supporting frame described in paragraph 6.5.1.3.**

**6.5.2.3. The plane of the test piece shall be perpendicular within  $3^\circ$ , to the incident direction of the head-form.**

**6.5.2.4. The head-form shall strike the test piece within 40 mm of its geometric centre on its inner face.**

**6.5.2.5. The head-form shall make only one impact.**

**6.5.2.6. The impact surface of the felt cover shall be replaced after each successive 12 tests.**

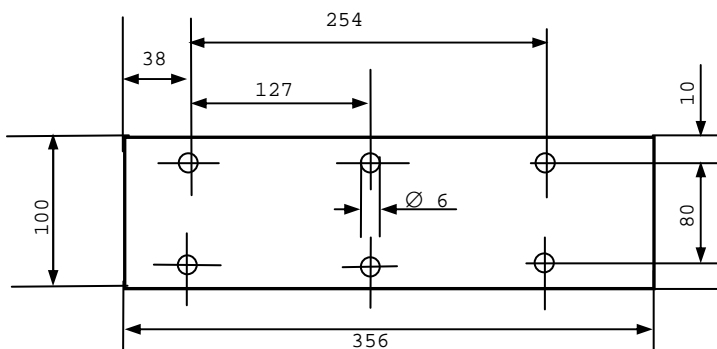
**6.5.3. Procedure for tests on windscreens**

**6.5.3.1. Condition the test piece at the temperature specified in paragraph 6.1.1. for at least four hours immediately preceding the test.**

**6.5.3.2. Place the windscreen freely on a supporting fixture as described in paragraph 6.5.1.4.**

- 6.5.3.3. The plane of the windscreen shall be perpendicular within 3°, to the incident direction of the head-form.
- 6.5.3.4. The head-form shall strike the windscreen within 40 mm of its geometric centre on its inner face.
- 6.5.3.5. The head-form shall make only one impact.
- 6.5.3.6. The impact surface of the felt cover shall be replaced after each successive 12 tests.
- 6.5.4. Drop height
- 6.5.4.1. The drop height shall be measured from the under-face of the head-form to the upper face of the test piece.
- 6.5.4.2. It shall be 1.5 m  $^{+0}_{-5}$  mm for tests conducted on windscreens and on flat samples for double glazed units.
- 6.5.5. Test pieces
- 6.5.5.1. The test pieces according to paragraph 6.5.2. shall be flat samples measuring 1,100 x 500 mm  $^{+10}_{-2}$  mm.
- 6.5.5.2. The test pieces according to paragraph 6.5.3. shall be windscreens.]

**Paragraph 6.14.3.1.1., amend, in the figure, the arrow referencing 254 mm, to read:**



**Paragraph 7.1.3.2.4., amend the referenced footnote 5/, to read:**

5/ But taking into account the fact that the datum points as defined under paragraph ~~7.1.3.2.6.~~ 7.1.4. shall be located in the transparent area.

**Paragraphs 7.1.3.2.5. to 7.1.3.2.6.4. renumbered accordingly, to read:**

7.1.3.2.4.6. An area within 25 mm from the edge of the outer surface of the windscreen or from any opaque obscuration. This area shall not impinge on the extended test area A.

7.1.4. Definition of the datum points (see Figure 3)

The datum points are points situated at the intersection with the outer surface of the windscreen of lines radiating forward from the V points:

7.1.4.1. upper vertical datum point forward of  $V_1$  and  $7^\circ$  above the horizontal (Pr1);

7.1.4.2. lower vertical datum point forward of  $V_2$  and  $5^\circ$  below the horizontal (Pr2);

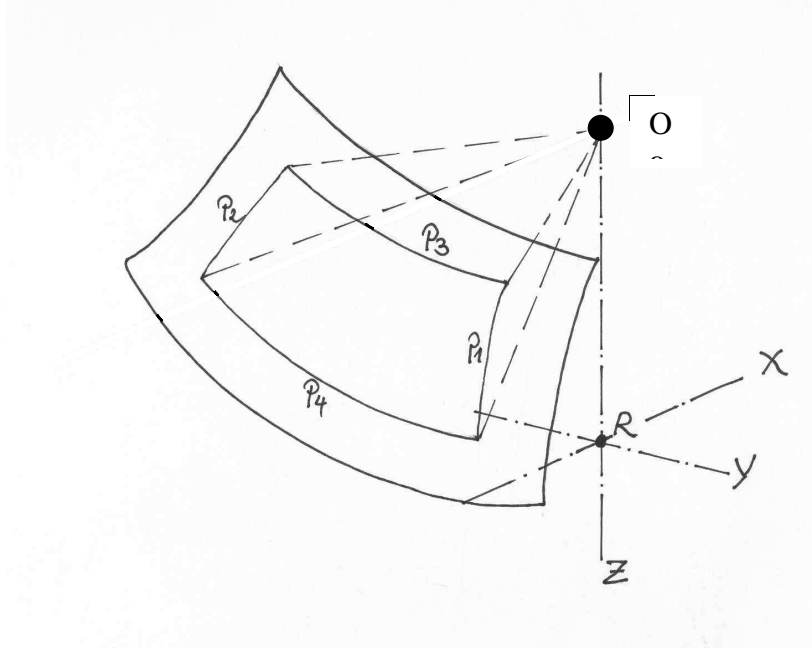
7.1.4.3. horizontal datum point forward of  $V_1$  and  $17^\circ$  to the left (Pr3);

7.1.4.4. three additional datum points symmetrical to the points defined under paragraphs ~~7.1.3.2.6.1. to 7.1.3.2.6.3.~~ **7.1.4.1. to 7.1.4.3.** in relation to the longitudinal median plane of the vehicle (respectively Pr'1, Pr'2, Pr'3).

**Paragraph 7.1.3.3.2., amend 5<sup>th</sup> and 6<sup>th</sup> paragraphs, to read:**

P3 a plane passing through **a transverse horizontal** ~~straight~~ line **containing O** ~~QQ~~ and forming an angle of  $10^\circ$  above the horizontal plane;

P4 a plane passing through **a transverse horizontal** ~~straight~~ line containing O ~~QQ~~ and forming an angle of  $8^\circ$  below the horizontal plane;



## B. JUSTIFICATIONS

The Informal GRSG Safety Glazing GTR WG noticed that the Working Document ECE/TRANS/WP.29/GRSG/2007/28, as posted on UNECE's website, did not exactly reflect the proposal for a draft gtr concerning safety glazing materials for motor vehicles as it had been forwarded, by the expert from Germany, to UNECE's Secretariat. Editorial corrections were required. Moreover, the proposed amendments encompass the latest editorial contributions from the stakeholders. Pending decisions from WP.29/AC.3 (e.g.: Markings), some clarifications were also inserted to avoid misunderstandings.