

## Draft Supplement 1 to Regulation No. 127 in its original version

### I. Proposal

*Paragraph 2.1.*, amend to read:

"2.1. ~~"Adult headform test area" is an area on the outer surfaces of the front structure. The area is bounded, in the front, by a wrap around distance (WAD) of 1,700 mm and, at the rear, by the rear reference line for adult headform and, at each side, by the side reference line.~~

- (a) **in the front, by a wrap around distance (WAD) of 1,700 or a line 82.5 mm rearward of the bonnet leading edge reference line, whichever is most rearward at a given lateral position,**
- (b) **at the rear, by a WAD 2,100 or a line 82.5 mm forward of the bonnet rear reference line, whichever is most forward at a given lateral position, and**
- (c) **at each side, by a line 82.5 mm inside the side reference line.**

**The distance of 82.5 mm is to be set with a flexible tape held tautly along the outer surface of the vehicle."**

*Insert a new paragraph 2.9.*, to read:

"2.9. **"Bonnet top test area" is composed of the child headform test area and the adult headform test area as defined in paragraphs 2.14. and 2.1. respectively."**

*Paragraphs 2.9. and 2.10.(former)*, renumber as paragraphs 2.10 and 2.11.

*Paragraph 2.11. (former)*, renumber as paragraph 2.12. and amend to read:

"~~2.11.2.~~ **"Bumper test area" means the frontal surface of the bumper limited by two longitudinal vertical planes intersecting the corners of the bumper and moved 66 mm parallel and inboard of the corners of the bumpers. points 66 mm inside the defined corners of the bumper. This distance is to be set with a flexible tape held tautly along the outer surface of the vehicle."**

*Paragraph 2.12.(former)*, renumber as paragraph 2.13.

*Paragraph 2.13. (former)*, renumber as paragraph 2.14. and amend to read:

"~~2.13.14.~~ **"Child headform test area" is an area on the outer surfaces of the front structure. The area is bounded, in the front, by the front reference line for child headform, and, at the rear, by the WAD1700 line, and by the side reference lines.**

- (a) **in the front, by a WAD 1,000 or a line 82.5 mm rearward of the bonnet leading edge reference line, whichever is most rearward at a given lateral position,**
- (b) **at the rear, by a WAD 1,700 or a line 82.5 mm forward of the bonnet rear reference line, whichever is most forward at a given lateral position, and**

(c) at each side, by a line 82.5 mm inside the side reference line.

The distance of 82.5 mm is to be set with a flexible tape held tautly along the outer surface of the vehicle."

Paragraphs 2.14. to 2.21, renumber as paragraphs 2.15. to 2.22.

Paragraph 2.22. (former), shall be deleted.

Figure 7, shall be deleted.

Figure 8 (former), renumber as Figure 7.

Insert new paragraphs 2.26. to 2.26.2. and new figures 8A and 8B, to read:

**"2.26. "Measuring point"**

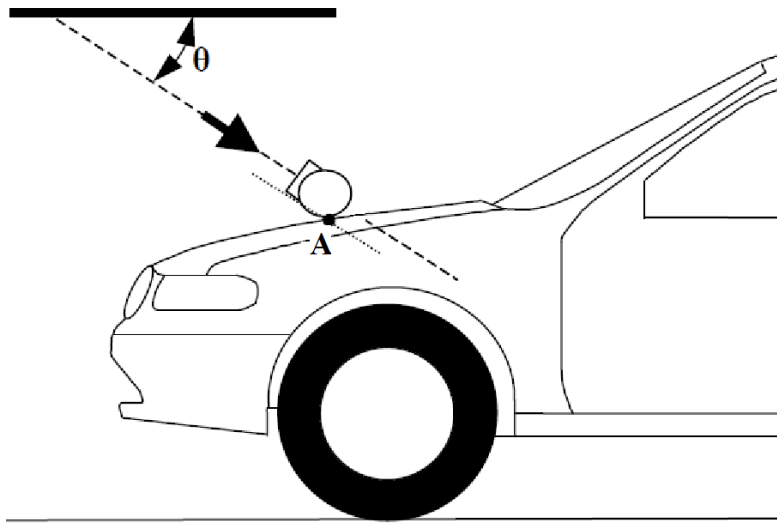
The measuring point may also be referred to as "test point" or "impact point". In all cases, the result of the test shall be attributed to this point, independent of where first contact occurs.

2.26.1. "Measuring point" for the headform test means a point on the vehicle's outer surface selected for assessment. The measuring point is where the headform's profile contacts the vehicle's outer surface cross section in a vertical longitudinal plane through the center of gravity of the headform (see Figure 8A).

2.26.2. "Measuring point" for the lower legform to bumper test and the upper legform to bumper test is located in the vertical longitudinal plane through the central axis of the impactor (see Figure 8B).

**Figure 8A**

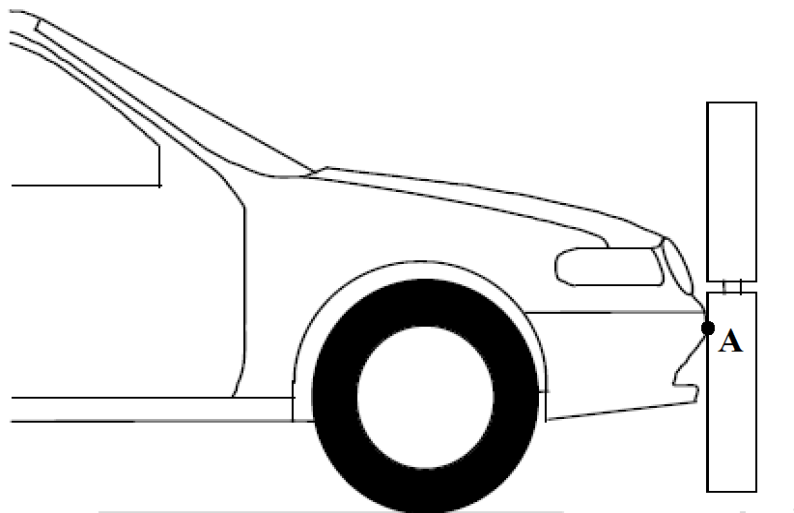
Measuring point in the vertical longitudinal plane through the center of the headform impactor (see paragraph 2.26.1.)<sup>2</sup>



<sup>2</sup> Remark: due to the spatial geometry of the bonnet top, the first contact may not occur in the same vertical longitudinal or transverse plane which contains measuring point A.

**Figure 8B**

**Measuring point in the vertical longitudinal plane through the central axis of the legform impactor (see paragraph 2.26.2.)**



*Paragraphs 2.26 to 2.28., renumber as paragraphs 2.27. to 2.29.*

*Paragraph 2.29. (former), shall be deleted.*

*Paragraph 5.2.1., amend to read:*

"5.2.1. Child and Adult Headform Tests:

When tested in accordance with Annex 5, paragraphs 3., 4., and 5., the HIC recorded shall not exceed 1,000 over two thirds of the **bonnet top test area** ~~combined child and adult headform test areas~~. The HIC for the remaining areas shall not exceed 1,700 for both headforms.

In case there is only a child headform test area, the HIC recorded shall not exceed 1,000 over two thirds of the test area. For the remaining area the HIC shall not exceed 1,700."

*Annex 5,*

*Paragraph 1.4., amend to read:*

"1.4. The selected **measuring target** points shall be in the bumper test area **as defined in paragraph 2.12.**"

*Paragraph 1.5., amend to read:*

"1.5. A minimum of three lower legform to bumper tests shall be carried out, one each to the middle and the outer thirds of the bumper at positions judged to be the most likely to cause injury. Tests shall be to different types of structure, where they vary throughout the area to be assessed. The selected ~~test~~ **measuring** points shall be a minimum of 132 mm apart **horizontally**, and a minimum of 66 mm inside the defined corners of the bumper. These minimum distances are to be set with a flexible tape held tautly along the outer surface of the vehicle. The positions tested by the laboratories shall be indicated in the test report."

*Paragraph 1.10., amend to read:*

"1.10. ~~At the time of first contact the centre line of the impactor shall be within a  $\pm 10$  mm tolerance to the selected impact location.~~ **For the lower legform testing, a horizontal and vertical impact tolerance of  $\pm 10$  mm shall apply. The test laboratory may verify at a sufficient number of measuring points that this condition can be met and the tests are thus being conducted with the necessary accuracy.**"

*Paragraph 2.4.*, amend to read:

"2.4. The selected **measuring target** points shall be in the bumper test area as defined in paragraph 2.1+2."

*Paragraph 2.5.*, amend to read:

"2.5. A minimum of three upper legform to bumper tests shall be carried out, one each to the middle and the outer thirds of the bumper at positions judged to be the most likely to cause injury. Tests shall be to different types of structure, where they vary throughout the area to be assessed. The selected ~~test~~ **measuring** points shall be a minimum of 132 mm apart **horizontally**, and a minimum of 66 mm inside the defined corners of the bumper.

These minimum distances are to be set with a flexible tape held taut along the outer surface of the vehicle. The positions tested by the laboratories shall be indicated in the test report."

*Paragraph 2.6.*, amend to read:

"2.6. The direction of impact shall be parallel to the longitudinal axis of the vehicle, with the axis of the upper legform vertical at the time of first contact. The tolerance to this direction is  $\pm 2^\circ$ .

**At the time of first contact the impactor centre line shall be vertically midway between the upper bumper reference line and the lower bumper reference line with a  $\pm 10$  mm tolerance and the impactor vertical centre line shall be positioned laterally with the selected impact location with a tolerance of  $\pm 10$  mm. The test laboratory may verify at a sufficient number of measuring points that this condition can be met and the tests are thus being conducted with the necessary accuracy."**

*Paragraph 3.3.1.*, amend to read:

"3.3.1. The acceleration time histories shall be recorded, and HIC shall be calculated. The ~~first measuring point of contact~~ on the front structure of the vehicle shall be recorded. Recording of test results shall be in accordance with ISO 6487:2002."

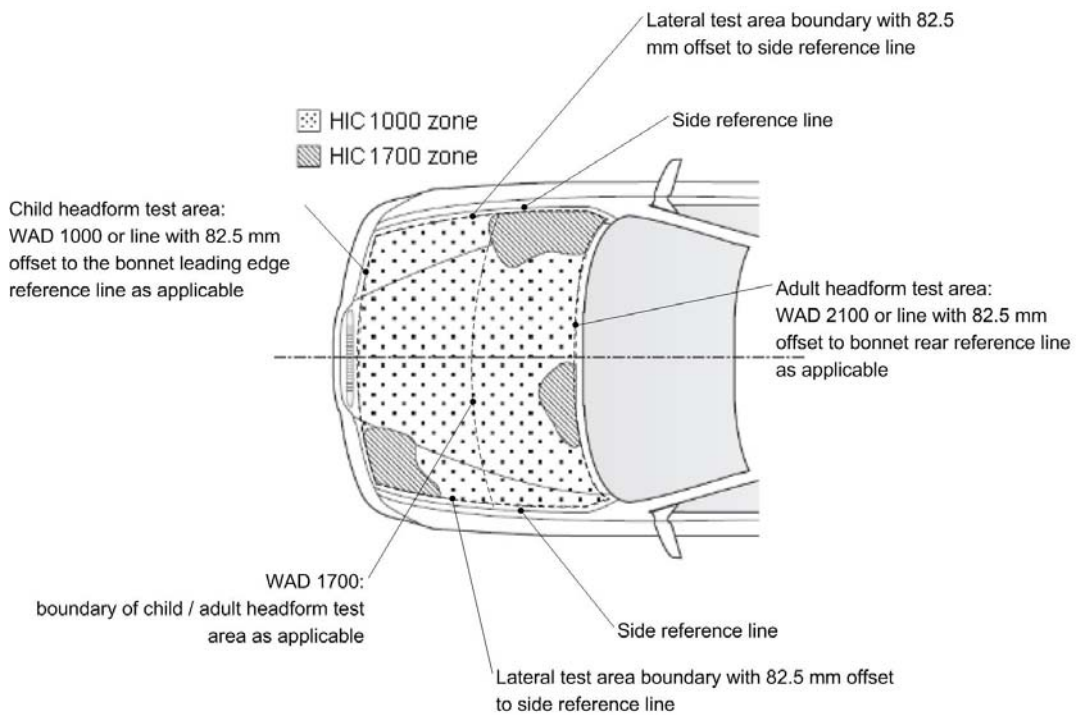
*Paragraph 3.4.1.*, amend to read:

"3.4.1. The manufacturer shall identify the zones of the bonnet top **test area** where the HIC must not exceed 1,000 (HIC1000 Zone) or 1,700 (HIC1700 Zone) (see Figure 3)."

*Annex 5, Figure 3*, amend to read:

"Figure 3

**Example of marking of HIC1000 zone and HIC1700 zone**



"

Paragraphs 3.4.2. to 3.4.4., amend to read:

- 3.4.2. Marking of the "bonnet top ~~test area~~ ~~impact area~~" as well as "HIC1000 zone" and "HIC1700 zone" will be based on a drawing supplied by the manufacturer, when viewed from a horizontal plane above the vehicle that is parallel to the vehicle horizontal zero plane. A sufficient number of x and y co-ordinates shall be supplied by the manufacturer to mark up the areas on the actual vehicle while considering the vehicle outer contour in the z direction.
- 3.4.3. The areas of "HIC1000 zone" and "HIC1700 zone" may consist of several parts, with the number of these parts not being limited. The determination of the impacted zone is done by the ~~first contact measuring point of the headform with the "bonnet top"~~.
- 3.4.4. The calculation of the surface of the ~~impact~~ **bonnet top test** area as well as the surface areas of "HIC1000 zone" and "HIC1700 zone" shall be done on the basis of a projected bonnet when viewed from a horizontal plane parallel to the horizontal zero plane above the vehicle, on the basis of the drawing data supplied by the manufacturer."

Paragraph 3.5., amend to read:

- 3.5. **Impact test Measuring points – Particular specifications**
- Notwithstanding the provisions of paragraphs 4.2. and 5.2. below, if a number of ~~test positions~~ **measuring points** have been selected in order of potential to cause injury and the test area remaining is too small to select another ~~test position~~ **measuring point** while maintaining the minimum spacing between ~~tests-points~~, then less than nine tests for each impactor may be performed. The positions tested by the laboratories shall be indicated in the test report. However, the technical services conducting the tests shall perform as many tests as necessary to guarantee the compliance of the vehicle with the head injury criteria (HIC) limit values of 1000 for the HIC1000 zone and 1700 for the HIC1700 zone, especially in the points near to the borders between the two types of zones."

Paragraphs 4.3. to 4.5., amend to read:

"4.3. The selected **measuring test**—points for the child/small adult headform impactor shall be ~~at the time of first contact~~; **a minimum of 165 mm apart and within the child headform test area as defined in paragraph 2.14.**

(a) ~~— A minimum of 165 mm apart, and~~

(b) ~~— A minimum of 82.5 mm inside the defined side reference lines, and;~~

(c) ~~— Forward of the WAD1700 line or a minimum of 82.5 mm forward of the bonnet rear reference line, whichever is most forward at the point of measurement, and~~

(d) ~~— Rearward of the WAD1000 line, or a minimum of 82.5 mm rearward of the bonnet leading edge reference line, whichever is most rearward at the point of measurement.~~

These minimum distances are to be set with a flexible tape held tautly along the outer surface of the vehicle.

4.4. No **measuring impact** point shall be located so that the impactor will impact the test area with a glancing blow resulting in a more severe second impact outside the test area.

4.5. ~~The point of first contact of the headform impactor shall be within a  $\pm 10$  mm tolerance to the selected impact point~~ **For the child headform testing, a longitudinal and transversal impact tolerance of  $\pm 10$  mm shall apply. This tolerance is measured along the surface of the bonnet. The test laboratory may verify at a sufficient number of measuring points that this condition can be met and the tests are thus being conducted with the necessary accuracy."**

*Paragraphs 5.3. to 5.5., amend to read:*

"5.3. ~~The S~~-selected **measuring impact** points on the bonnet for the adult headform impactor shall be, ~~at the time of first contact~~; **a minimum of 165 mm apart and within the adult headform test area as defined in paragraph 2.1.**

(a) ~~— A minimum of 165 mm apart, and~~

(b) ~~— A minimum of 82.5 mm inside the defined side reference lines, and;~~

(c) ~~— Forward of the WAD2100 line or a minimum of 82.5 mm forward of the bonnet rear reference line, whichever is most forward at the point of measurement, and~~

(d) ~~— Rearward of the WAD1700 line, or a minimum of 82.5 mm rearward of the bonnet leading edge reference line, whichever is most rearward at the point of measurement.~~

These minimum distances are to be set with a flexible tape held tautly along the outer surface of the vehicle.

5.4. No **measuring impact** point shall be located so that the impactor will impact the test area with a glancing blow resulting in a more severe second impact outside the test area.

5.5. ~~The point of first contact of the headform impactor shall be within a  $\pm 10$  mm tolerance to the selected impact point~~ **For the adult headform testing, a longitudinal and transversal impact tolerance of  $\pm 10$  mm shall apply. This tolerance is measured along the surface of the bonnet. The test laboratory may verify at a sufficient number of measuring points that this condition can be met and the tests are thus being conducted with the necessary accuracy."**

*Annex 6,*

*Paragraphs 1.3.1. to 1.3.1.4., amend to read:*

"1.3.1. ~~Calibration~~-**Certification**

- 1.3.1.1. The foam flesh for the test impactor shall be stored for a period of at least four hours in a controlled storage area with a stabilized humidity of  $35 \pm 10$  per cent and a stabilized temperature of  $20 \pm 2$  °C prior to impactor removal for ~~calibration~~-certification. The test impactor itself shall have a temperature of  $20 \pm 2$  °C at the time of impact. The temperature tolerances for the test impactor shall apply at a relative humidity of  $40 \pm 30$  per cent after a soak period of at least four hours prior to their application in a test.
- 1.3.1.2. The test facility used for the ~~calibration~~-certification test shall have a stabilized humidity of  $40 \pm 30$  per cent and a stabilized temperature of  $20 \pm 4$  °C during ~~calibration~~-the certification.
- 1.3.1.3. Each ~~calibration~~-certification shall be completed within two hours of when the impactor to be calibrated is removed from the controlled storage area.
- 1.3.1.4. The relative humidity and temperature of the ~~calibration~~-certification area shall be measured at the time of ~~calibration~~-certification and recorded in the ~~calibration~~-certification report."

*Paragraph 2.2. to 2.2.4., amend to read:*

"2.2.           **Calibration-Certification**

- 2.2.1.           The foam flesh for the test impactor shall be stored for a period of at least four hours in a controlled storage area with a stabilized humidity of  $35 \pm 10$  per cent and a stabilized temperature of  $20 \pm 2$  °C prior to impactor removal for ~~calibration~~-certification. The test impactor itself shall have a temperature of  $20 \pm 2$  °C at the time of impact. The temperature tolerances for the test impactor shall apply at a relative humidity of  $40 \pm 30$  per cent after a soak period of at least four hours prior to their application in a test.
- 2.2.2.           The test facility used for the ~~calibration~~-certification test shall have a stabilized humidity of  $40 \pm 30$  per cent and a stabilized temperature of  $20 \pm 4$  °C during ~~calibration~~-the certification.
- 2.2.3.           Each ~~calibration~~-certification shall be completed within two hours of when the impactor to be calibrated is removed from the controlled storage area.
- 2.2.4.           The relative humidity and temperature of the ~~calibration~~-certification area shall be measured at the time of calibration, and recorded in the ~~calibration~~-certification report."

## II. Justification

With informal document GRSP-54-07, the European Commission presented modifications to the gtr No. 9 considering the discussion on the headform test procedures in the gtr and also including amendments proposed by other parties. The details as well as the proposed wordings were discussed in the GRSP sessions between the 48<sup>th</sup> session in December 2010 and the 53<sup>rd</sup> session in May 2013.

This document presents the subsequent changes to UN Regulation 127.

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