GTR Head Restraint
CLEPA - Draft proposal for a modified wording of the energy dissipation test

5.2.1. Energy absorption. When the front surface of the head restraint is impacted in accordance with Annex 5, the deceleration of the head form must not exceed 785 m/s^2 (80 g) continuously for more than 3 milliseconds.

Annex 5

Energy Absorption Test Procedure

1. Procedures for energy absorption. Demonstrate compliance with 5.2.1. of this regulation in accordance with 1.1. through 1.4. of this Annex, and the adjustable head restraints in any height and backset position of adjustment.

[1.1. Seat setting up

The seat, as mounted in the vehicle, shall be firmly secured to the test bench with the attachment parts provided by the manufacturer, so as to remain stationary when the impact is applied.

The seat-back, if adjustable, shall be locked in the design position specified by the vehicle manufacturer.

If the seat is fitted with a head restraint, the head restraint shall be mounted on the seat-back as in the vehicle. Where the head restraint is separate, it shall be secured to the part of the vehicle structure to which it is normally attached.]

1.2. Test equipment

1.2.1. Use an impactor with a semispherical head form ~~and~~ of a 165 ± 2 mm diameter and a surface roughness of less than 1.6 μm, root mean square **for the impacting part of the impactor**. The head form and associated base have a combined mass **such that at**

a speed of 24.1 ± 0.5 km/h at the time of impact an energy of 152 ± 6 Joule will be reached.

1.2.2. Instrument the impactor with an acceleration sensing device whose output is recorded in a data channel that conforms to the requirements for a 600 Hz channel class filter as specified **in ISO Standard 6487 (2002);** The axis of the acceleration-sensing device coincides with the geometric center of the head form and the direction of impact. **As an alternative the impactor can be equipped with 2 decelerometers sensing in the direction of impact and placed symmetrically in comparison to the geometric center of the spherical head form. In this case the deceleration rate shall be taken as the simultaneous average of the readings on the two decelerometers.**

1.3. Accuracy of the test equipment

The recording instruments used shall be such that measurements can be made with the following degrees of accuracy:

1.3.1. Acceleration:

Accuracy = + 5 % of the actual value;

Cross-axis sensitivity = < 5 % of the lowest point on the scale.

1.3.2. Speed:

Accuracy: + 2.5 % of the actual value;

Sensitivity: 0.5 km/h.

1.3.3. Time recording:

The instrumentation shall enable the action to be recorded throughout its duration and readings to be made to within one one-thousandth of a second; the beginning of the impact at the moment of first contact between the headform and the item being tested shall be detected on the recordings used for analyzing the test.

1.4. Test procedure

1.4.1. Propel the impactor toward the head restraint. At the time of ~~launch~~ **impact**, the longitudinal axis of the impactor is within ±2 degrees of being horizontal and parallel to the vehicle longitudinal axis **and the impactor at a speed of not more than 24,1 km/h.**

1.2.4. ~~[Constrain the movement of the head form so that it travels linearly along the path described in 6.2.5.4 of this section for not less than 25 mm before making contact with the head restraint.]~~

1.4.2. Impact the anterior surface of the seat or head restraint at any point with a height greater than 635 mm **[from the R-point]** and within a distance of the head restraint vertical centerline of 70 mm.

Justification :

Free motion head form impactor and pendulum impactor shall be allowed for the GTR. To guarantee a comparability of the test results, the use of the reduced mass as defined in ECE 17 is not precise enough. The energy of impact is a factor which guarantees the same level of impact and therefore the same level of results.

Energy = ½ m v^2 = ½ 6,8 kg x (24,1 km/h) ^{2} = 152,37 Joule