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**ECONOMIC COMMISSION FOR EUROPE**

**INLAND TRANSPORT COMMITTEE**

World Forum for Harmonization of Vehicle Regulations

Working Party on Passive Safety

Forty-fifth session

Geneva, 25-29 May 2009

Item 11(a) of the provisional agenda

**REGULATION No. 16**  
**(Safety-belts)**

**Proposal for draft amendments**

**Proposal for draft Corrigendum 1 to Revision 5 to Regulation No. 16**

**Submitted by the expert from the European Association of Automotive Suppliers \*/**

The text reproduced below was prepared by the expert from the European Association of Automotive Suppliers (CLEPA) in order to remove any ambiguity in the emergency locking retractor test. It is based on a document without symbol (informal document No. GRSP-44-20) distributed during the forty-fourth session of the Working Party on Passive Safety (GRSP). The modifications to the current text of Regulation No. 16 are marked in bold characters.

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\*/ 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 performance of vehicles with respect to passive safety. The present document is submitted in conformity with that mandate.

A. PROPOSAL

Paragraph 7.6.2.2., amend to read:

"7.6.2.2. A suitable apparatus for the tests specified in paragraph 7.6.2.1. above is described in Annex 4 to this Regulation. The design of any such test apparatus shall ensure that the required acceleration is given before the webbing is withdrawn out of the retractor by more than 5 mm and that the withdrawal takes place at an average rate of increase of acceleration of at least **55 g/s 4/** and not more than 150 g/s 4/ **in testing sensitivity for strap movement and of at least 25 g/s 4/ and not more than 150 g/s 4/ in testing sensitivity for vehicle deceleration 4/."**

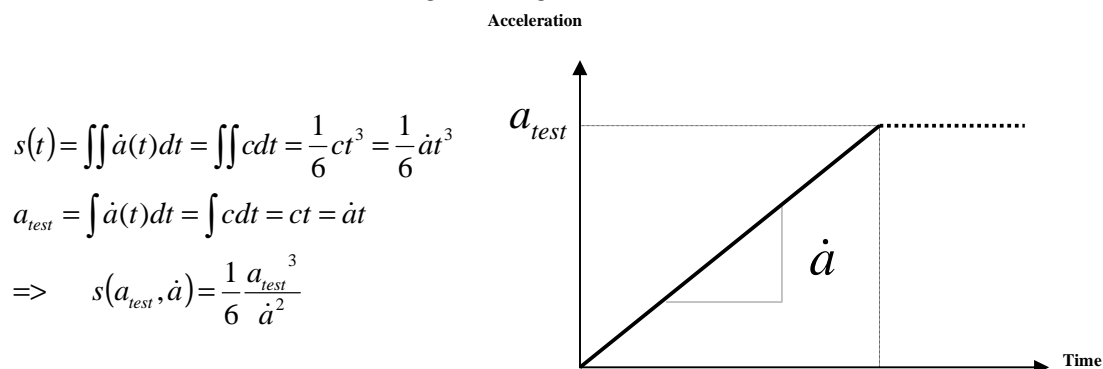
B. JUSTIFICATION

The above proposal refers to an ambiguity of Regulation No. 16 paragraph 7.6.2.2. which should be removed. Paragraph 7.6.2.2. of Regulation No. 16 for the approval of safety-belts defines one aspect of the test conditions that shall be applied during acceleration tests. In those tests a retractor as part of a safety belt system is checked for conformity with the regulations in paragraph 6. The two relevant test procedures are for testing sensitivity for strap movement and testing sensitivity for vehicle deceleration. In both an acceleration profile is applied on either the retractor with fixed strap or on the strap with a fixed retractor. The general conditions for the acceleration profile are regulated in paragraph 7.6.2.2.

The section combines two aspects:

- (a) An average acceleration onset between 25-150 g/s should be used to reach the test acceleration.
- (b) The test acceleration must be reached before 5 mm webbing extraction.

However, the two requirements cannot be considered independently from each other. An average onset rate (constant) leads to the following webbing extraction;



By applying the lower threshold of 25 g/s and a test acceleration of 2.0 g, which is the upper limit of the available locking range for webbing sensitive locking (0.8 – 2.0 g see paragraphs 6.2.5.3.1.2. and 6.2.5.3.2.), the resulting webbing extraction leads to  $s = 20,9$  mm and to a violation of the requested 5 mm.

In order to fully comply with the requested maximum 5 mm in testing the sensitivity for strap movement, the minimum average onset rate yields

$$\dot{a} > 51 \text{ g / s .}$$

For further clarification Figure 1 shows the resulting strap extraction as a function of the test acceleration for different onset rates.

The recommendation is to clarify paragraph 7.6.2.2. by differentiation into requirements for tests on the sensitivity for strap movement (upper limit 2.0 g) and for tests on sensitivity for vehicle deceleration (upper limit 0.45 g):

- (a) For the tests on the sensitivity on vehicle deceleration, a range of 25-150 g/s is still reasonable and a violation of the 5mm rule is not possible;
- (b) For the tests on the sensitivity tests on strap movement, an onset rate range of 55-150 g/s is recommended to avoid conflicts.

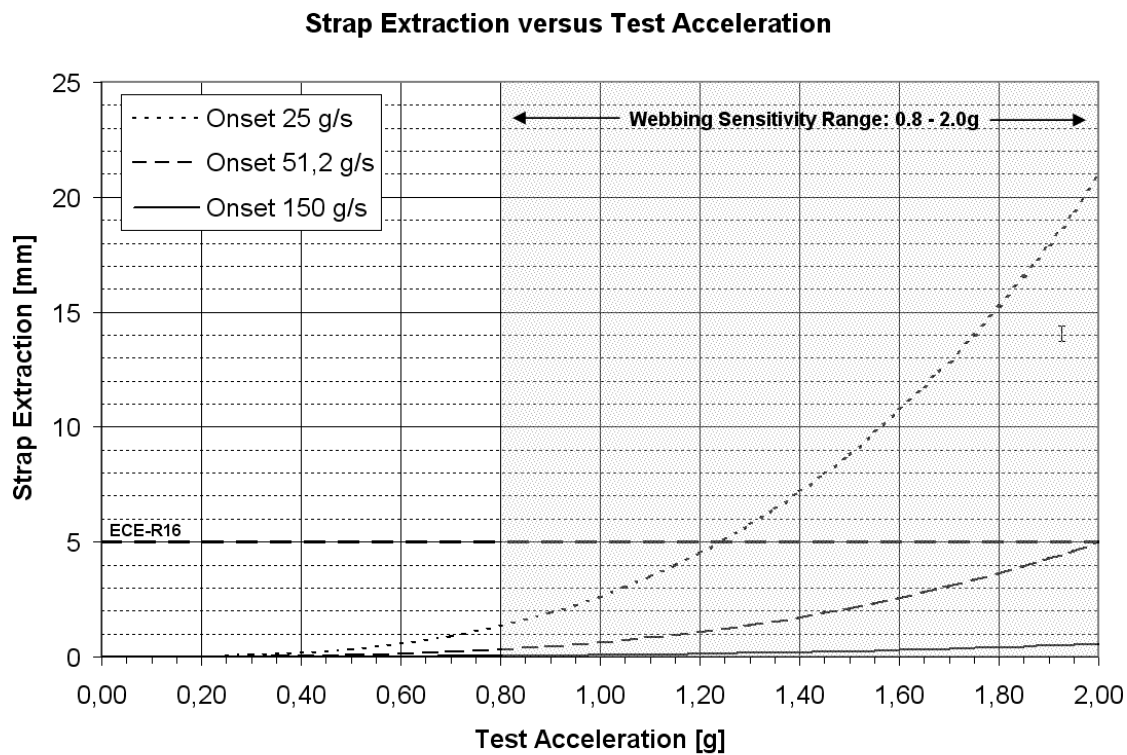


Figure 1: Strap extraction when test acceleration has been reached after acceleration onset phase.