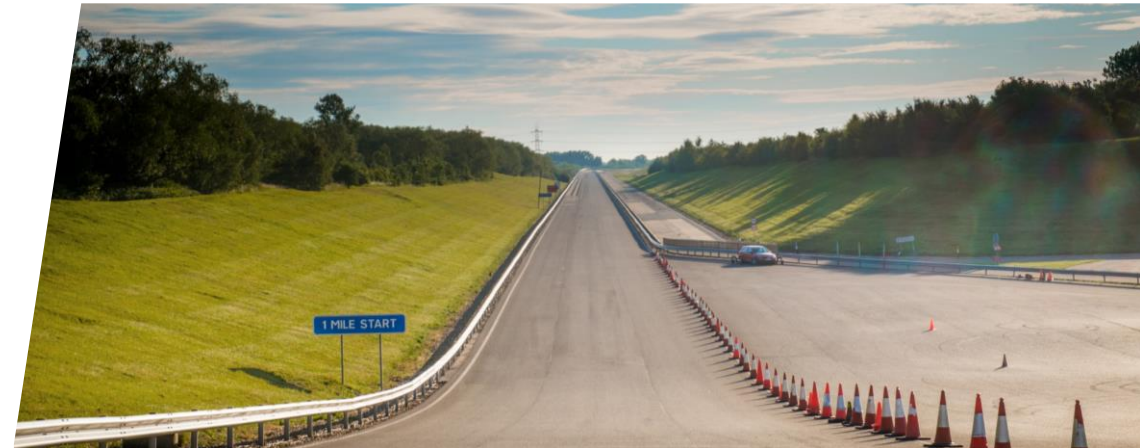


GRSP- 73th session

TSG
Testing Universal booster cushion
with Q10 dummies

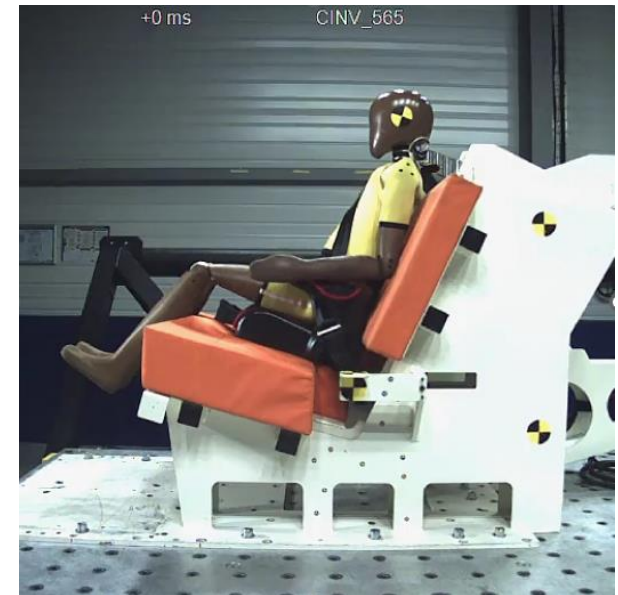
05/2023



Universal Booster cushion (without a back rest) were integrated into R129 in serie 3 comp 3

The universal booster cushion shall be tested on the bench in frontal dynamic testing :

§ 6.6.4.1.3. The Enhanced Child Restraint System of the i-Size booster seat and Universal booster cushion categories shall be tested on the test bench described in Annex 6, and in conformity with paragraph 7.1.3.1. below.



The requirements are the following :

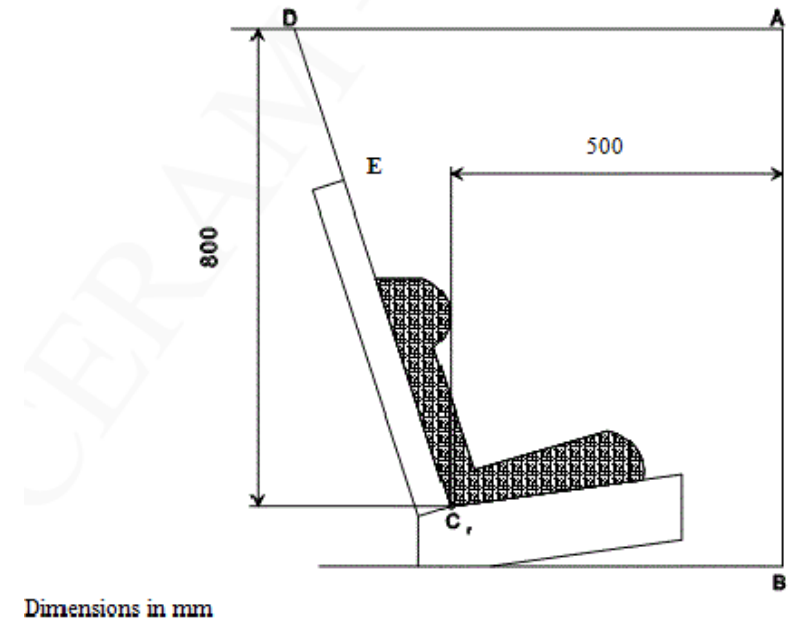
§ 6.6.4.4.1.1. *Non-integral booster cushion: No part of the head of the dummy shall pass beyond the planes BA and DA as defined in Figure 1 below.*

This shall be judged up to 300 ms or the moment that the dummy has come to a definitive standstill, whatever occurs first.

When testing using Q10 dummy the following apply:

- (a) The value in relation to the BA plane is 550 mm; and*
- (b) The value in relation to the DA plane is 840 mm; and*
- (c) The rebound phase is not considered for the assessment of the plane DA.*
- (d) In case of dummy contact with a rigid part of the test bench in the rebound phase, the head acceleration criterion during that contact shall not be considered.*

Arrangement for testing a forward-facing device

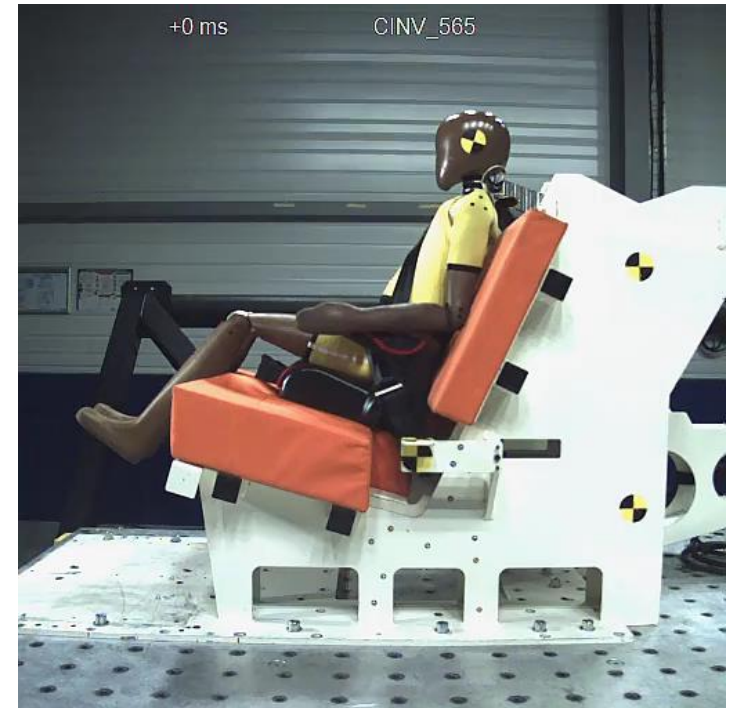


First frontal impacts tests were performed with universal booster cushion and Q10 dummy

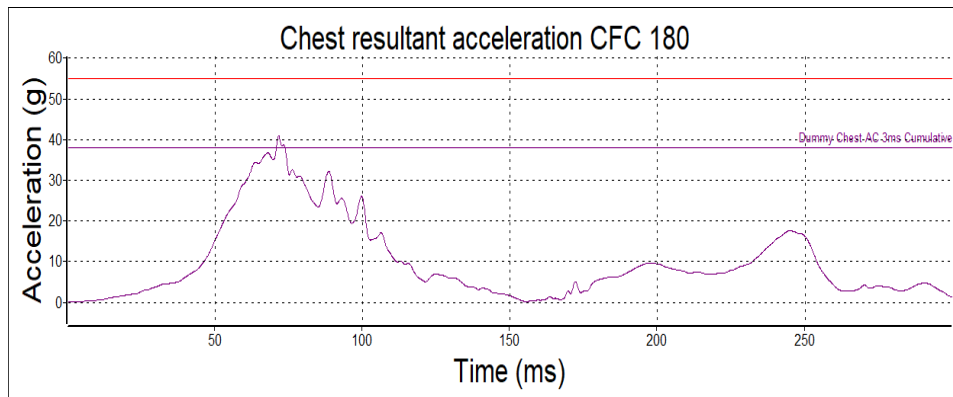
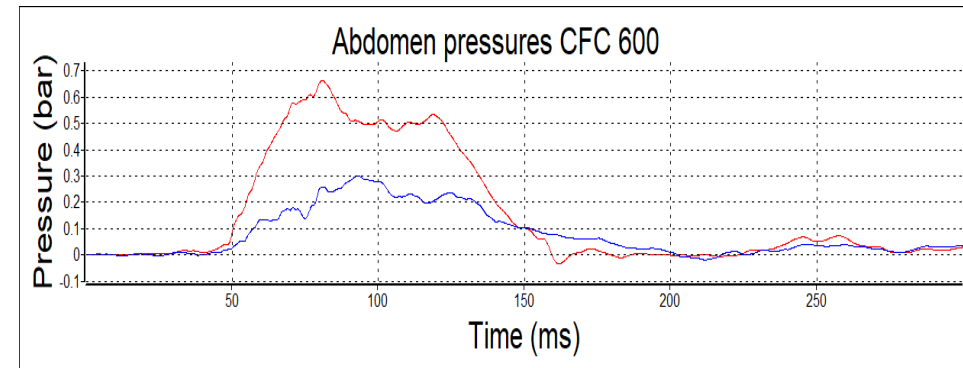
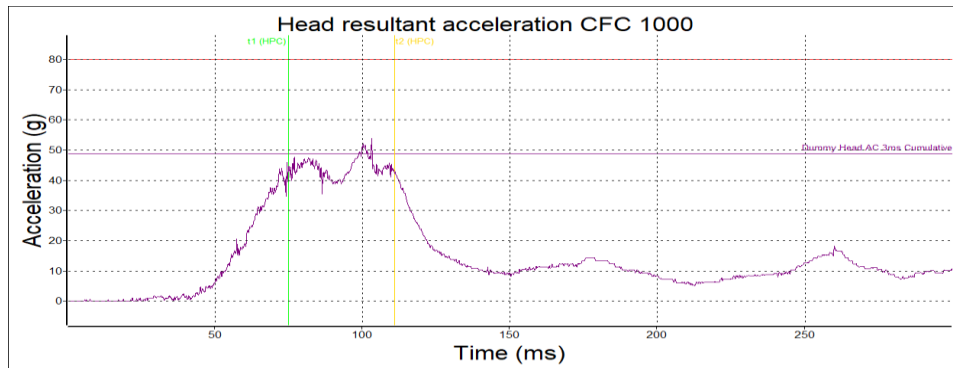
The Regulation 129 imposes that all the criteria (head displacements and injury criterias) must be respected within a time interval of 300 ms, which includes the rebound phase (at the end of the time interval).

But during the rebound phase of the test, we can observe an important extension of the neck, because no headrest are positioned on the bench

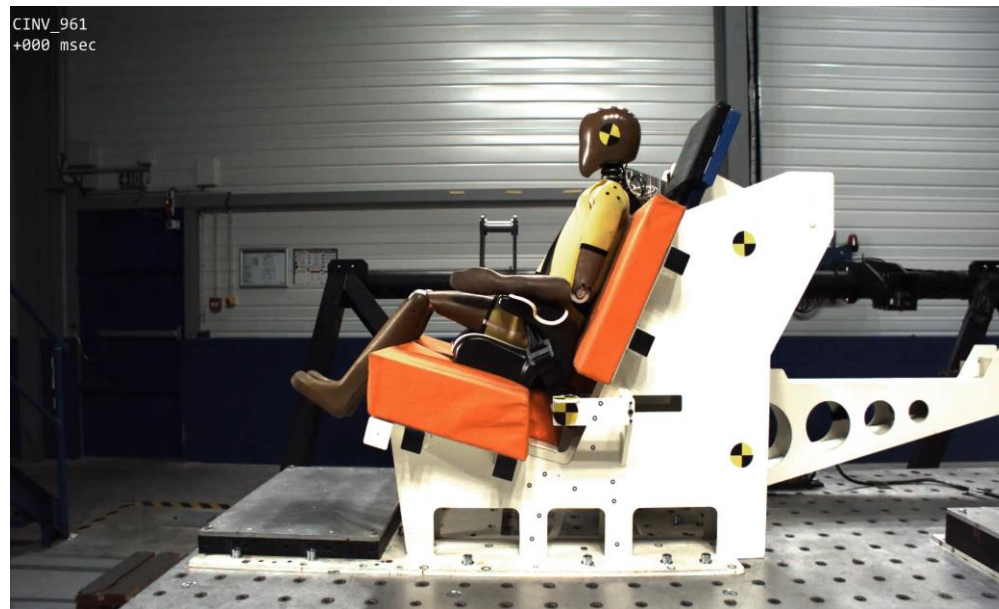
→ This could damage the Q10 neck



Based on the first tests already carried out in this configuration, the injury assessment criteria reach their maximum values during the forward extension of the dummy's head and before the rebound phase.

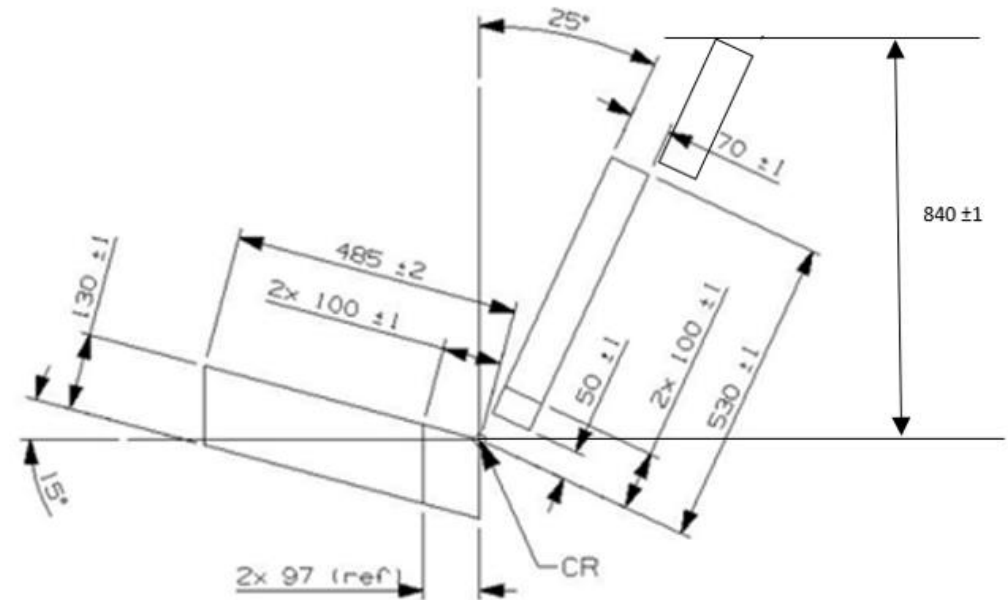


In order to test the universal booster cushion, without damaging the neck, a solution could be to add a headrest to the bench for these tests

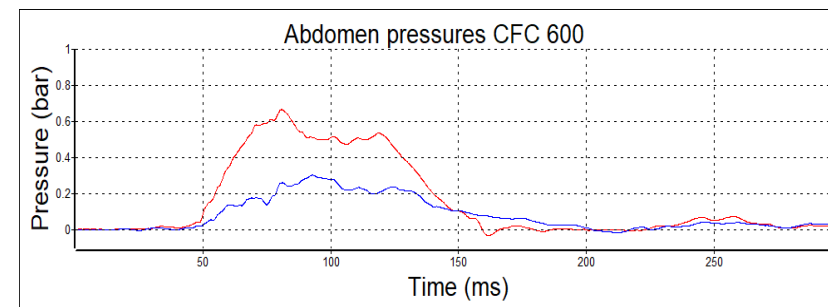
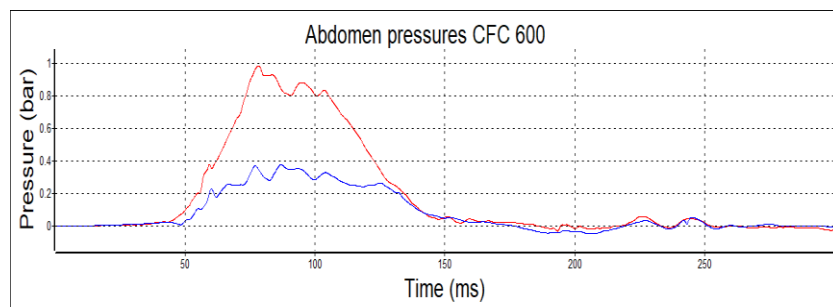
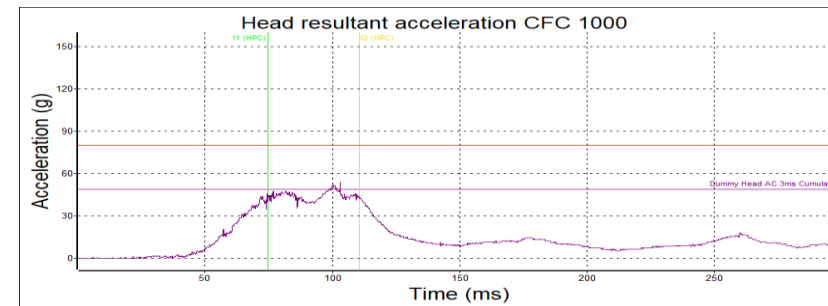
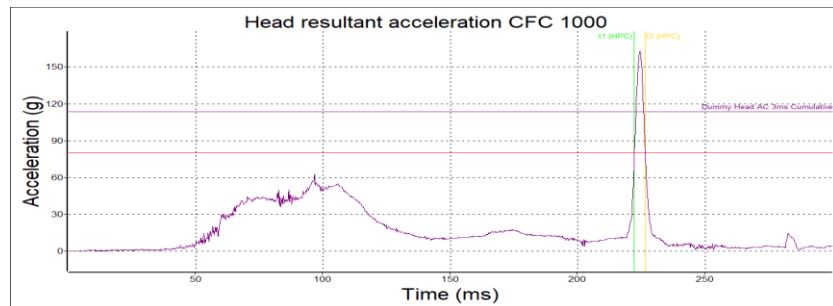
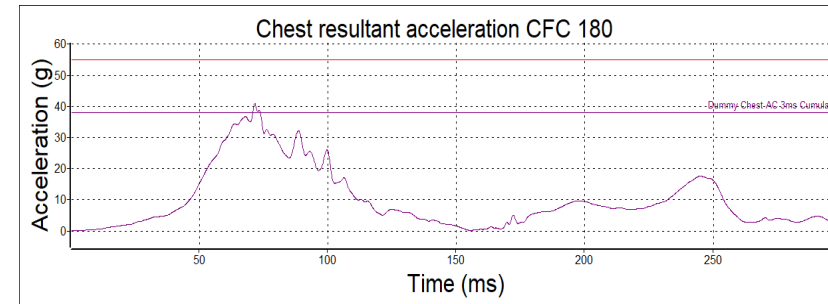
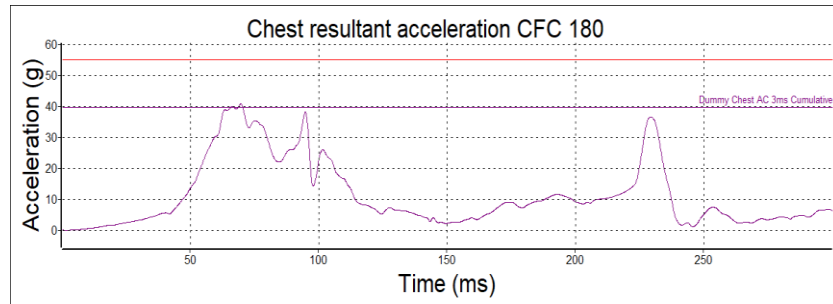


The main characteristics of the additional segment / headrest will be defined in an amendment of REG 129 :

- Foam of the headrest cushion
- Material of the headrest
- Alignment
- Height of the headrest
- Width of the headrest



Curves comparison : with and without headrest



- Modification of REG 129
 - ✓ Allow to install a headrest on the bench for the dynamic frontal test of universal booster cushion with Q10 (It shall be up to the technical service to use the additional segment)
 - ✓ Define minimum requirements for the geometry / material of the headrest
- No modification of the test requirements because the injury assessment criteria reach their maximum values during the forward extension of the dummy's head and before the rebound phase
- No influence on the already approved seats
- Preparation of a working document for GRSP 74th session

Submitted by the expert from France



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