

The Displacement Test as an Alternative to the 60 mm Gap Requirement
Submitted by the United States

ECE 17, Section 5.8 provides an alternative compliance option of application of a load to the gap area rather than limiting the gap to 60 mm. NHTSA stated in the preamble of the NPRM for FMVSS No. 202 (66 FR 982) that we assume “the concept behind this option is that if pushing on the gap area with a head form does not cause deflection of more than 102 mm, the gap is acceptable.” The requirement was not included in the new regulation, because NHTSA could not justify this test as an alternative method of compliance.

The 102 mm displacement limit has been in FMVSS No. 208 since 1968 and is designed to assure that a head restraint does not allow an occupant's head to displace excessively once it comes in contact with the head restraint, due to head restraint and seat back deflection. The 60 mm gap limit is also intended to limit head displacement. A head restraint with excessively large gaps will defeat the purpose of good head restraint positioning.

For example, there are two head restraint designs with everything equal except the gap size. The first has gap “a” that is less than 60 mm and the second has gap “A” that is greater than 60 mm. The figure below shows that a head restraint with a larger gap will allow more head form displacement, from an initial position forward of the head restraint, than the head restraint with the smaller gap. After head restraint contact and the 373 Nm moment is applied, the head form displacement is the same for both gaps.

To accept the displacement test as an alternative to the 60 mm maximum gap requirement in the gtr, they both must produce equivalent results. If we are trying to limit an occupant's head displacement into the head restraint, the 60 mm maximum gap requirement appears to be more stringent than the displacement test requirement.

Have we misinterpreted the ECE requirement? How does the 60 mm gap limit and 102 mm displacement/373 Nm force requirement applied at the gap offer equivalent levels of safety?

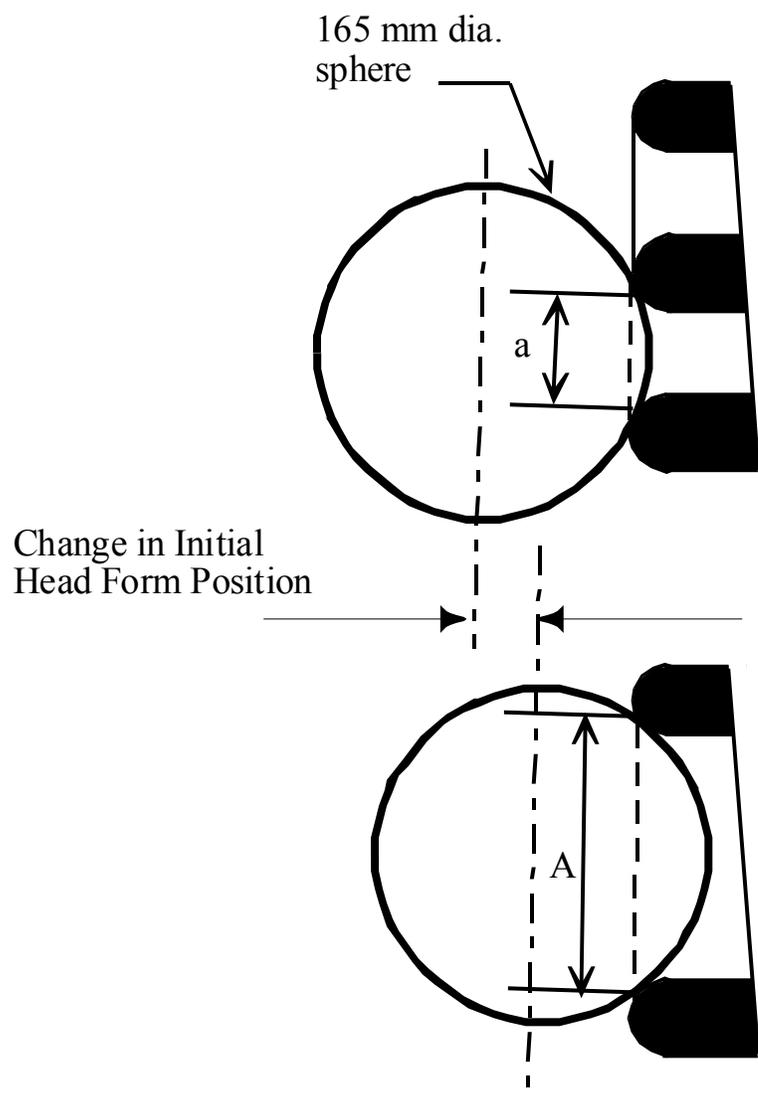


Figure 1