



Curb Bumping - Parallel

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. This procedure describes a method to determine the durability of suspension components when subjected to severe vehicle-to-curb impact.

1.2 Applicability. This specification applies to passenger cars and light duty trucks.

1.3 Remarks. Not applicable.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

ISO 9001

2.2 GM Standards/Specifications.

None

2.3 Additional References. None.

3 Resources

3.1 Facilities. This test can be performed at a Curb Impact Facility (Crash Center) (Version A) or on a Proving Ground (Version B), Use Version C only at the Dudenhofen Proving Ground. See 3.2.1, 3.2.2 and 3.2.3 for details.

3.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.1.1 Record instrument calibrations on Appendix A, Data Sheet A1 as necessary.

3.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.2 Equipment. Record vehicle data on Appendix A, Data Sheet A2

3.2.1 Test Version A. Curb Impact Facility (Crash Center).

3.2.1.1 Adjustable curb test fixture and transducer element for measuring curb impact forces.

3.2.1.2 Vehicle transport device appropriate to test site.

3.2.1.3 Recording equipment to record force levels imparted to curb during impact tests.

3.2.1.4 Prick punch, hammer, scribe and a scale with 0.5 mm divisions.

3.2.1.5 Photographic or video equipment as necessary.

3.2.2 Test Version B. Proving Ground.

3.2.2.1 Fixed curb on a proving ground and the Drive Robot System to drive the car (radio controlled) or human driver.

3.2.2.2 Vehicle transport device appropriate to test site.

3.2.2.3 Recording equipment to capture force levels imparted to curb during impact tests.

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November 2014

Page 1 of 9

3.2.2.4 Prick punch, hammer, scribe and a scale with 0.5 mm divisions.

3.2.2.5 Photographic or video equipment as necessary.

3.2.3 Test Version C. Dudenhofen Proving Ground only.

3.2.3.1 Test Facility (Flying Floor).

3.2.3.2 Curb with 60 degree fixing.

3.2.3.3 Teflon Polytetrafluoroethylene (PTFE) tiling.

3.2.3.3.1 PTFE tiling for the Flying Floor.

3.2.3.3.2 PTFE tiling for the tire contact area.

3.2.3.4 Test equipment to record the data.

3.2.3.5 Recording equipment to capture force levels imparted to curb during impact tests.

3.2.3.6 Photographic or video equipment as necessary.

3.3 Test Vehicle/Test Piece.

3.3.1 Test vehicle should be ballasted to Gross Vehicle Mass Rating (GVMR).

3.3.2 Test vehicle wheels and tires should be selected by the test engineer.

3.4 Test Time.

Calendar time: 1 day

Test hours: 8 hours

Coordination hours: 1 hour

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Operator must be qualified and documented as capable to run this test as required by ISO 9001.

4 Procedure

4.1 Preparation.

4.1.1 Ensure that all test components are within manufacturer's specifications, as determined by the test engineer.

4.1.2 Inspect the vehicle for any damage or other unusual characteristics to the front suspension, frame, steering linkage, sheet metal, brake lines and hoses or trim disc, if included. Correct as required.

4.1.3 Install test components and torque to minimum specifications. Record torques on Appendix A, Data Sheet A3.

4.1.4 Install check valve and line pressure gage in front wheel brake hydraulic line so the front wheels may be locked independently of rear wheels.

4.1.5 Record manufacturer's specifications for toe setting, caster, camber and optional: wheel lateral run-out. Adjust and record toe setting, caster and camber to manufacturer's mean specifications. Check and record front (Z) heights at vehicle mass as observed. Heights must be within manufacturer's specification. Correct by changing springs as required. All test information is to be recorded on the data sheets contained in Appendix A, Data Sheet A2.

4.1.6 Optional: Measure and record wheel lateral run-out.

4.1.7 Install external ignition shut-off switch.

4.1.8 On areas of interest, scribe adjacent parts for relative movement tracking and prick punch marks along the parts to show bending. Record locations and dimensions as required on Appendix A, Data Sheet A2.

Note: The location of the scribe(s) and the prick punch mark(s) are left to the discretion of the test engineer.

4.1.9 Load vehicle to GVMR.

4.2 Conditions.

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November 2014

Page 2 of 9

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4.2.1 Environmental Conditions.

For Test Version A: No restrictions.

For Test Version B: No rain, temperature > 5 °C.

For Test Version C: No rain, temperature > 5 °C.

4.2.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

4.3 Instructions.**4.3.1 Instructions Specific to Test Version A.**

4.3.1.1 Deliver test vehicle to the Curb Impact Facility (Crash Center).

4.3.1.2 Line up front wheel cart and vehicle with front wheels turned fully to the left, in area best for photographic coverage.

4.3.1.3 Adjust curb position parallel to right front wheel. Test vehicle should be aligned so that the impact line of force, lines up approximately with pivot center of curb. Reposition test vehicle as required. Tighten curb securely in place.

4.3.1.4 Back test vehicle away from curb impact site.

4.3.1.5 Place cart directly in front of test vehicle with steer dolly engaged on guide rail.

4.3.1.6 Place clamp on rail in front of cart.

4.3.1.7 Drive test vehicle up onto cart in same position as when aligned originally.

4.3.1.8 Turn wheels to straight ahead position; engage front wheel brakes with line pressure sufficient to dynamically lock front brakes. Close check valve tightly.

4.3.1.9 Remove clamp from rail.

4.3.1.10 Place snubbing material (Hexcel, or equivalent) at curb to snub cart and steer dolly.

4.3.1.11 Set up the load recording equipment (if required) which adapts to transducer section of curb, to record impact load on curb.

4.3.1.12 The steering wheel is to be constrained to maintain the proper front wheel angle. The steering column lock must be disengaged; and, for power steering equipped vehicles, the engine is to be running to provide a steering power source.

4.3.1.13 Attach the tow cable to the cart and tow the test vehicle into curb at speeds starting at 8 km/h or as specified by test engineer.

4.3.1.14 When stopped, release front brake. Move test vehicle away from curb.

4.3.1.15 Inspect for visible damage as defined within 4.3.4. Determine if the test vehicle is operable. Photograph as necessary.

4.3.1.16 Repeat, at increasing speed increments of 2 km/h (or as directed) until vehicle jumps over the curb or damage occurs as defined in applicable subsections of 4.3.4.

4.3.2 Instructions Specific to Test Version B.

4.3.2.1 The curb bumping test may be conducted against a 15 cm high obstacle rigidly bolted to a level surface. See Figure 1.

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November 2014

Page 3 of 9

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