



Body System-Front Lower Air Deflector Durability Test

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 determines the overall durability performance of a front lower air deflector system when subjected to parking block or curb impact and scrub action.

1.2 Applicability. All vehicles with a front lower air deflector.

1.3 Remarks. Full vehicles are used for this test in order to replicate the function of suspension and tires contributing to a more realistic simulation of parking block or curb intrusion. Also, testing the designed air deflector system in the actual vehicle configuration provides examination of all related front end components that might interact during test.

2 References

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

2.1 External Standards/Specifications.

ISO/IEC 17025 ISO/TS 16949

2.2 GM Standards/Specifications.

None

2.3 Additional References.

- Subsystem Technical Specifications (SSTS)
- Unigraphics (UG) file TLL00754

3 Resources

3.1 Facilities. The test facilities shall be certified to ISO/TS 16949, ISO/IEC 17025, or equivalent.

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

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.

3.2.1 Air deflector cycle test fixture as shown in UG file TLL00754.

3.2.2 Environmental test chamber large enough for full vehicle and test fixture.

3.2.3 A plotter (or other equivalent means) to verify command (program) and feedback velocity signals.

3.3 Test Vehicle/Test Piece. A full vehicle is required to test the air deflector.

3.4 Test Time.

Calendar time: 3 d
Test time: 32 h
Coordination time: 4 h

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August 2017

Page 1 of 9

3.5 Test Required Information. Dimension in millimeters (mm) from the lowest point of the bottom of air deflector to ground for the vehicle at nominal curb mass and vehicle architecture type (Body On Frame, Body Frame Integral).

3.6 Personnel/Skills. The test facility shall have sufficient personnel having the necessary education, training, technical knowledge, and experience for performing the required tests.

4 Procedure

4.1 Preparation.

4.1.1 Pre-Test Vehicle Inspection.

4.1.1.1 The design engineer and the validation engineer shall inspect the air deflector system to ensure all parts, fasteners, and reinforcements are present and assembled properly. Record the observations on Data Sheet A1.

4.1.1.2 Photograph assembled air deflector system and include in the test report.

4.1.1.3 Mark accessible fasteners to indicate any possible linear or circular movement resulting from test.

4.1.2 Program Determination. Build a command signal profile with total cycles that meets the cycle rate requirements defined in 4.2.2.2.

4.1.3 Determine Parking Block/Curb Interference.

4.1.3.1 Determine Distance to Ground from Lowest Point. Using math data determine the distance to ground from the lowest point of the air deflector at nominal curb mass that will contact the curb as shown in Figure 1. Document distance in Data Sheet A2.

4.1.3.2 Air Deflectors Less Than 180 mm to Ground.

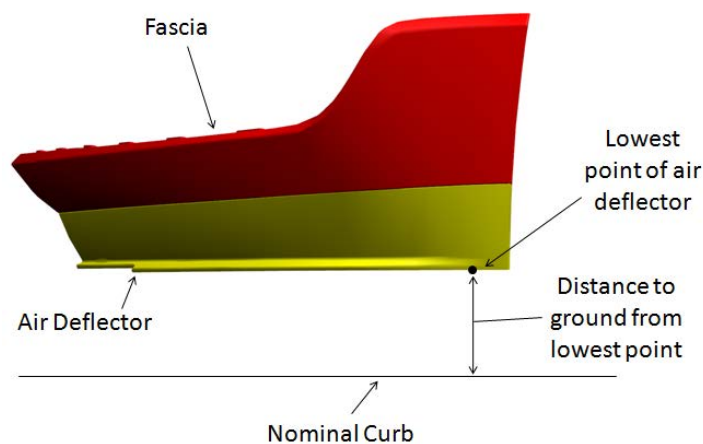


Figure 1: Ground Clearance Determination (Side View Shown)

4.1.3.2.1 Parking Block/Curb Interference Calculation. Subtract the dimension determined in 4.1.3.1 from 180 mm to calculate the required amount of curb interference to the bottom of the air deflector. 180 mm represents the height of a standard parking block/curb. Document the calculated interference in Data Sheet A2, Appendix A. See the following and Figure 2 for an example:

Example: Height of standard parking block/curb = 180 mm
Distance to ground from lowest point = 163 mm

Parking Block/Curb Interference = 180 mm - Distance to ground from lowest

Parking Block/Curb Interference = 180 mm - 163 mm

Parking Block/Curb Interference = 17 mm

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August 2017

Page 2 of 9

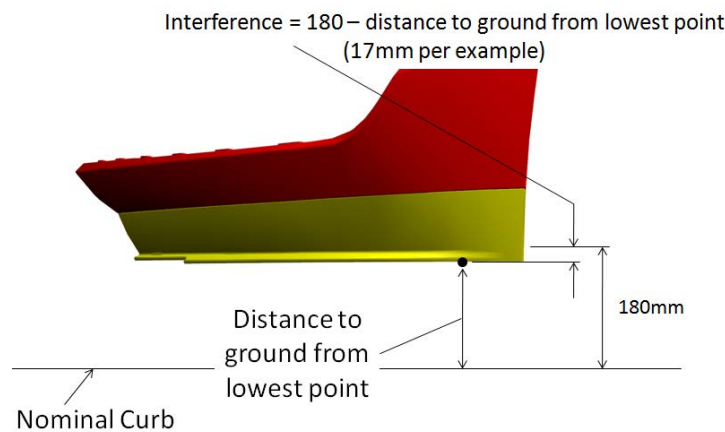


Figure 2: Interference Calculation for Air Deflectors Less Than 180 mm to Ground

4.1.3.3 Air Deflectors Greater Than 180 mm to Ground.

4.1.3.3.1 Determine Air Deflector Section Height. Using math data determine the air deflector section height as shown in Figure 3. Document distance in Data Sheet A2.

4.1.3.3.2 Parking Block/Curb Interference Calculation. Multiply the section height of the air deflector determined in 4.1.3.3.1 by 20% to calculate the amount of curb interference to the bottom of the air deflector, not to exceed 20 mm. Document the interference in Data Sheet A2. See the following and Figure 3 for an example.

Example 1: Section height of air deflector = 75 mm
 Parking Block/Curb Interference = Section height of air deflector * 20%
 Parking Block/Curb Interference = 75 * 20% = 15 mm
 Parking Block/Curb Interference = 15 mm

Example 2: Section height of air deflector = 150 mm
 Parking Block/Curb Interference = Section height of air deflector * 20%
 Parking Block/Curb Interference = 150 * 20% = 30 mm
 Parking Block/Curb Interference = 30 mm > 20 mm
 Parking Block/Curb Interference = 20 mm

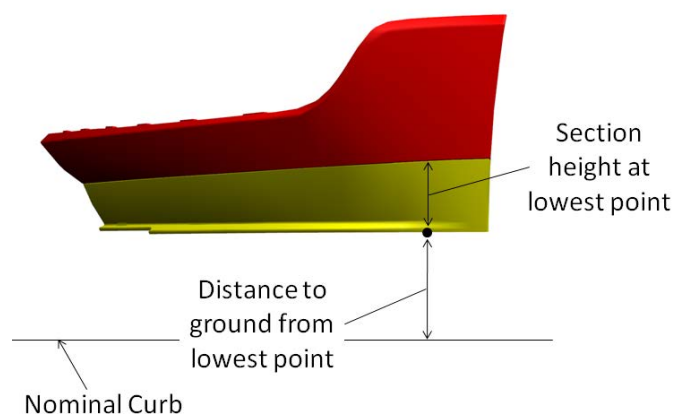


Figure 3: Interference Calculation for Air Deflectors Greater Than 180 mm to Ground

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