



Hood Hold-Open System - Truck Drive-By

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. To evaluate the ability of a hood hold-open device to keep a hood open when passed by a tractor-trailer truck. This procedure can also be used to evaluate deck lids, hatches and convertible tops.

1.2 Applicability. Passenger cars and light-duty trucks with hood hold-open designs using gas struts, mechanical springs or manual prop rod. Applicable to complete new hood and hold-open designs after approval of this procedure. Optional on carryover vehicles with redesigned hood and/or hood hold-open designs prior to approval of this procedure. This specification was written for traditional front vehicle engine hoods. Applicability to other type hoods must be reviewed.

1.3 Remarks. Differing air pressure, created by a passing tractor-trailer truck, on either side of an open hood generates forces that act on the hold-open system. This procedure evaluates the ability of hood to remain open after being subjected to these forces. This procedure is limited to evaluation of forces on the hood hold-open system generated by passing tractor-trailer trucks. Other forces, such as physical bumping of a prop rod system, are not evaluated with this test procedure.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW16155

2.3 Additional References.

- CG190 GM Evaluation Report
- CG583 Development/Validation Test and Vehicle Review
- Front Closures Vehicle Technical Specification (VTS) and Subsystem Technical Specification (SSTS)

3 Resources

3.1 Facilities. Level road where a tractor-trailer truck, see 3.2.1, can drive by test vehicle at 100 km/h (60 mph) in the adjacent lane. Facilities must accommodate drive-by evaluations as described in Figure 2. The North-South Straightaway has been used at the Milford Proving Ground (MPG). The Straight Away Track has been used at Dudenhofen Proving Ground, with an alternative track available at Pferdsfeld Test Grounds.

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.

GM Confidential

© Copyright 2014 General Motors Company All Rights Reserved

March 2014

Page 1 of 8



Documents

Document Sharing Hub

3.2 Equipment.

3.2.1 Tractor-trailer Truck. The tractor-trailer truck has traditionally been selected based on availability in the general fleet and engineering judgment (based on volume of air displaced). See Figure 1.

Note: All regional safety inspections on both the tractor and trailer shall have been completed prior to testing.

3.2.1.1 Tractor.

- Approximately 4 m (10 ft) from ground to top of cab roof
- Cab over design

3.2.1.2 Trailer.

- Approximately 3.7 m (13 ft 6 in) height
- 15 m to 17 m (48 ft to 53 ft) length
- Approximately 2.5 m (8 ft) width
- Approximately 9.25 m² (134 ft²) frontal area
- Enclosed box design

Note: Tractor-trailer truck designs vary widely with geographic area. No engineering studies are known to exist comparing test performance with tractor-trailer design.



Figure 1: Typical Tractor-trailer Truck Combinations

3.2.2 Force gage for determining hood closing efforts on vehicles with gas struts or mechanical springs.

3.2.3 Instrumentation to measure and record hood travel if requested by the engineer.

3.3 Test Vehicle/Test Piece.

3.3.1 Hood and Attaching Components Representative of the Model being Tested. The hood shall have worst case specification of physical dimensions and/or properties for retention of prop rod, if applicable.

3.3.2 Test Components. Select one of the following:

3.3.2.1 Gas Strut Design. Gas struts with force output equal to the minimum specification. Special gas struts may be used to simulate strut force output at low temperature if testing at low temperature is not possible or would be difficult. Temperature at which gas struts are tested is determined by engineer in 4.1.1.

3.3.2.2 Mechanical Spring Design. Springs with force output equal to the minimum specification.

3.3.2.3 Manual Prop Rod Design. Prop rod with worst case specification of physical dimensions and/or properties for retention of hood as determined by engineer.

3.3.3 Owner's Manual, Vehicle Labels or other User Instructions. Used for positioning prop rod, if applicable.

3.3.4 Test Vehicle. Representative of system design and set to curb mass.

GM Confidential

© Copyright 2014 General Motors Company All Rights Reserved

March 2014

Page 2 of 8

3.3.5 Hood Hinge Lubrication. Representative of design intent.

3.4 Test Time.

Calendar time: 3 days
Test hours: 1 to 4 hours
Coordination hours: 1 hour

3.5 Test Required Information. The Evaluation Report, CG190, or equivalent, must include documentation (make, model, and photo/video) of the tractor-trailer truck used for the test.

3.6 Personnel/Skills. The driver of the tractor-trailer truck will comply with all regional license requirements/certifications.

4 Procedure

4.1 Preparation.

4.1.1 Engineer Shall:

- Fill out test and vehicle information at the top of Data Sheets A2 and A3 in Appendix A.
- For gas struts only, determine ambient temperature at which to run test or obtain special struts with force output equal to force at desired test temperature.
- Determine if measurement is to be made of the maximum distance hood moves from the open position during the truck drive-by. Engineer shall also determine measurement location. String-pots may need to be installed if verifying to technical specifications with distance requirements. This measurement will most likely be needed for gas strut tests at low temperature or temperature-compensated gas struts. The measurement is not required for prop rod designs.

Note: The default is to visually observe movement and record if the distance exceeds approximately 8 cm (3 in). If it exceeds 8 cm (3 in), the engineer may decide to rerun the test with instrumentation. Observer(s) must be cautious due to the speed and close proximity of the passing tractor-trailer truck. Two-way radio communication between the observer(s) and driver is recommended.

4.1.2 Record hood pull-down force for gas strut or mechanical spring systems at room temperature. Use procedure GMW16155 for measurement technique.

4.1.3 Gas Strut Systems Only. If special temperature-compensated gas struts are not used: Stabilize gas strut and hood system at ambient temperature determined in 4.1.1 for 2 h.

4.1.4 Record test area temperature and wind speed and direction in the middle of Data Sheet A2 in Appendix A.

4.2 Conditions.

4.2.1 Environmental Conditions. Wind speed shall be less than 16 km/h (10 mph) maximum. For gas strut designs, ambient temperatures are as specified by engineer.

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. The hood hold-open device must meet the requirements of the Front Closures VTS or SSTs. Deviations to the requirements must be documented on the pre-test sign off form, CG583, or equivalent, and be included in the test report.

4.3.1 Drive-by Evaluation. Park vehicle on level test area to accommodate Run 1, 2, 3 or 4. See Figure 2. Runs do not have to be made in order. Vehicle engine shall be OFF to prevent engine heat from warming gas struts and affecting output, if applicable. Select one of the following:

Note: All regional safety requirements shall be followed when doing this evaluation, e.g., road closure to other test traffic, etc.

GM Confidential

© Copyright 2014 General Motors Company All Rights Reserved

March 2014

Page 3 of 8