



Fuel Fill Hose Pull Off 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 standard tests the ability of a fuel filler hose/fitting/clamp system to maintain retention of the fuel filler hose on the fitting, under conditions of tensile load parallel to the hose/fitting axis.

1.2 Applicability. This standard is applicable to all fuel fill hoses.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

None

2.3 Additional References.

CG1715

3 Resources

3.1 Facilities.

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 Tensile test machine capable of 13 mm/minute pull rate.

3.2.2 Torque wrench capable of 3.2 N·m measurement to within ± 0.1 N·m.

3.2.3 Force gauge capable of measuring to 3000 N.

3.3 Test Vehicle/Test Piece.

3.3.1 Fuel filler hose samples, 20 cm in length. Inner Diameter (ID) of hose samples should be the largest value permitted by the ID tolerance of the hose, and shall be specified on the hose blueprint, if a production part. Minimum sample set size for the test method is six (6). Record hose ID of all samples and include in the test report.

3.3.2 Hose fittings, one (1) for each end of the hose. Fitting Outer Diameter (OD) should be the smallest value permitted by the OD tolerance of the fitting. The fittings to be used for the test are to be the production release fittings for the hose, or as specified by the GM Design Release Engineer (DRE) for the program for which the hose is to be used. The fitting for one end of the hose shall be a fill pipe fitting. The fitting for the other end of the hose shall be a tank inlet pipe end. Hose fittings shall be modified as needed, on the end of the fitting/plug not inserted into the hose, for secure attachment to the tensile test machine. Record the fitting OD and bead OD for each sample and include in the test report.

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3.3.3 The clamps to be used for the test are to be the production release clamps for the hose, or as specified by the GM DRE for the program for which the hose is to be used. Clamps are to be tightened to the production specification torque for the clamp and this data also included in the test report.

3.4 Test Time.

Calendar time: 16 days
Test time: 336 hours
Coordination time: 24 hours

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Test technician/engineer qualified in data acquisition, test set up, and technical reporting.

4 Procedure

4.1 Preparation. Insert fittings into each end of the hose sample, to design position. Use no lubricant for fitting installation. Place the fill pipe fitting or test plug in one end of the hose, and the tank inlet pipe end or test plug in the other end of the hose. Install clamps on each end of hose sample, in design position. Torque the fill pipe clamp to the production torque specification. Use no lubricant on the clamp.

4.2 Conditions.

4.2.1 Environmental Conditions. Reference 4.3.2.1.

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 Summary of Test Method. A fuel filler hose assembly consisting of a fuel filler hose, hose fitting and clamp is prepared, and the clamp torqued to its specified value. After a minimum period of standing (336 h), the assembly is mounted in a tensile test machine at ambient temperature, and the maximum force required to separate the hose from the fittings is recorded.

4.3.2 Test Procedure.

4.3.2.1 Allow the fuel filler hose assembly to stand at ambient temperature $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ for a minimum of 336 h.

4.3.2.2 Secure the tank inlet pipe end of the fuel filler hose test assembly to the stationary platen of the tensile test machine. Secure the fill pipe end of the assembly to the stationary platen of the tensile test machine.

4.3.2.3 Attach the free end of the hose to the moving platen of the tensile test machine. Set the pull rate of the tensile test machine to 13 mm/minute and begin the tensile test of the assembly. Continue 13 mm/minute separation of test platens until hose has separated from the fill pipe fitting. Record the maximum force exerted on the assembly and the failure mode of the assembly (i.e., hose pulled from fitting, hose tore, etc.)

5 Data

5.1 Calculations. Not applicable.

5.2 Interpretation of Results. The tensile force required to separate the hose from the fitting either by hose pull-off or hose tear shall exceed 2669 N.

5.3 Test Documentation. Report the tensile force required to separate the fuel filler hose from the fill pipe fitting. Report the failure mode of the assembly.

6 Safety

This Engineering Standard may involve safety requirements for hazardous materials, the method of operations and equipment. This standard does not propose to address all the safety issues associated with its use. It is the responsibility of the user of this standard to ensure compliance with all appropriate safety and health practices. This would include any specific training that may be required. The safety and health standards include site specific rules and procedures, company rules and procedures, and Government Standards. Contact shall be made with the appropriate site Safety and Health personnel for further direction and guidance in these matters.

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