



Front and Rear Shock Absorber to Frame Bracket Durability

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. The purpose of this test is to determine the durability characteristics of front and rear shock absorber to frame attachments when subjected to shock absorber loads under programmed or non-programmed Proving Ground loads.

1.2 Applicability. This test procedure applies to light duty trucks.

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.

- CG943 Frame SSTS Part C2
- Problem Resolution Tracking System (PRTS)
(<https://gmweb.gm.com/sites/PRTSDynamics/Pages/SystemAccess.aspx>)

3 Resources

3.1 Facilities. Equipped with bedplate, 2.1 m × 2.1 m, with hydraulic capability.

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 A test site control computer is required if programmed test loads are used.

3.2.2 Angle stands with adjustable brackets to mount the frame component rigidly to the bedplate in the shock absorber bracket area.

3.2.3 Hydraulic actuator with sufficient force to exert the maximum loads and highest frequency required.

3.2.4 Load cell of the proper range.

3.2.5 Servo hydraulic control console.

3.2.6 Rod end bearing and stud to adapt the actuator to the shock absorber end fitting. Load is to be applied to the frame bracket through the shock fitting representing the production condition.

All instrumentation is to be calibrated as required. Record instrumentation details and date of calibration unless the information is otherwise preserved in the laboratory records.

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3.3 Test Vehicle/Test Piece. Three (3) frame sections with representative shock absorber brackets from each source. (Six (6) frame sections if a Weibull analysis is required).

3.4 Test Time.

Calendar time: 49 days to 89 days

Test hours: 840 h to 1680 h

Coordination hours: 40 h

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Prior experience in setting up and running similar tests and experience in the use of the referenced test equipment is required for a successful evaluation.

4 Procedure

4.1 Preparation.

4.1.1 Install a strain gaged shock absorber in a representative Proving Ground vehicle loaded according to the ballasting schedule.

4.1.2 Install the required recording equipment in vehicle to read the strain gage data.

4.1.3 Run the vehicle over the relevant Proving Ground schedule and record the load information.

4.1.4 Generate peak-valley matrices for each subsection of the appropriate Proving Ground Schedule. If a non-programmed durability test is to be run, omit 4.1.6, 4.3.3, and 4.3.4. If a programmed durability test is to be run, omit 4.1.5, 4.3.1, and 4.3.2.

4.1.5 Determine the non-programmed durability test loads by taking the higher of the load representing the 95th percentile of all loads recorded; or the Nth highest load recorded where N is the number of miles on the Proving Ground schedule.

4.1.6 To determine the programmed durability test loads; create a test command signal by eliminating all non-damaging data and recombine matrices in a proportion specified by the Test Engineer.

4.1.7 Mount a frame section with representative shock absorber bracket to angle stands at the frame and body or equipment mounts without isolation, except at the mount adjacent to the shock absorber mounting area, which should use a released production body mount.

4.1.8 Fasten the servo hydraulic actuator with attached load cell to the shock absorber bracket through the rod end bearing and stud. Mount the actuator to the angle stand so the load is applied in the same plane as the shock absorber at curb height.

4.1.9 Connect and calibrate the instrumentation.

4.1.10 A typical test setup is shown in Appendix A (see Figure A1 and Figure A2).

4.2 Conditions.

4.2.1 Environmental Conditions. Not applicable.

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 For non-programmed durability testing, set up the control console for the constant amplitude load derived in 4.1.5.

4.3.2 Run the test at 2.5 Hz for 2 500 000 cycles.

4.3.3 For the programmed durability testing, program the test command signal derived in 4.1.6 into the test site computer and set up the console for closed-loop operation.

4.3.4 Run the test to the equivalent of the appropriate Proving Ground Schedule.

5 Data

5.1 Calculations.

5.1.1 Reliability Calculations. Supply Validation Engineer with all test data for reliability evaluation.

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