



Bending Test For Suspension Damper Piston Rods

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 test specification defines the test conditions, test sequence and requirements for static testing of the bending characteristics of suspension damper piston rods to be used for validation and to verify on-going process control.

1.2 Applicability. This procedure applies to all suspension hydraulic struts and shocks. The intent is to validate that the rods do not fail with a brittle fracture.

1.3 Remarks. Samples of components or materials released to this specification shall be tested for conformity with the requirements of this specification and be approved by Product Engineering and Design prior to commencement of delivery of bulk supplies.

In the case of intended deviation from this specification the manufacturer is under an obligation to send samples to the customer, without specific request, for repeat sampling and approval by Product Engineering and Design before the deviation in the delivery may commence.

2 References

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

2.1 External Standards/Specifications.

ISO 7500-1

2.2 GM Standards/Specifications.

None

3 Resources

3.1 Facilities. The facility should be equipped with a Materials Testing Machine.

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 Materials Testing Machine. A materials testing machine equipped in such a way that the test pieces can be subjected to bending deformation at a rate of 30 mm/minute maximum. The maximum test forces of the machine are based on the requirements for the test. A test machine complying with ISO 7500-1 is suitable.

3.2.1.1 In addition, the test machine shall fulfill the requirements:

- Accuracy of the force measurement: $\pm 1\%$ of the measured value.
- Accuracy of the deflection: ± 0.01 mm.

3.2.2 A coordinates plotter (x-y plotter), which records the force/deflection characteristics of the test piece.

3.2.3 Suitable devices to hold the suspension damper piston rod (see Figure 1).

3.3 Test Vehicle/Test Piece. The damper piston rod-piston assembly is used as the test piece for the test.

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3.4 Test Time.

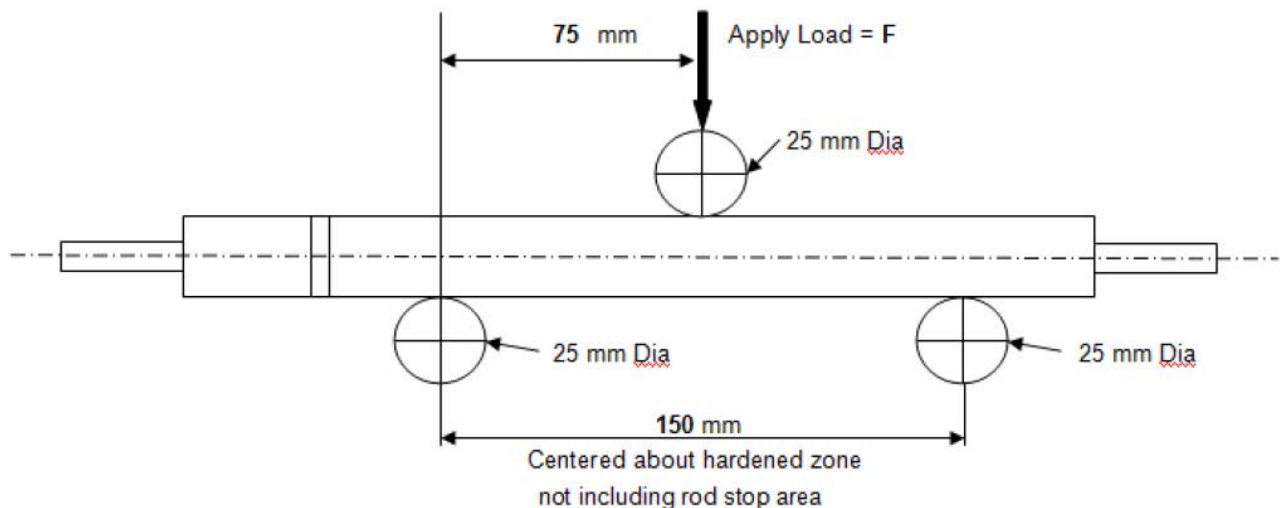
Calendar time: 1 days
 Test hours: 8 hours
 Coordination hours: 2 weeks

3.5 Test Required Information. Unless otherwise specified, a minimum of six (6) test pieces shall be tested in first sample delivery and in arbitration purposes. For quality control, a minimum of six (6) parts per batch taken randomly shall be selected if batch tempering is used. If induction tempering is used, a minimum of six (6) test pieces for each 1.5 h or at each run, whichever is more frequent.

3.6 Personnel/Skills. Operators shall be experienced with using a servo-hydraulic or electro-mechanical test equipment. Operator shall be capable of using basic measurement equipment.

4 Procedure

4.1 Preparation. See Figure 1 for test setup.



Note: Dia = Diameter.

Figure 1: Test Setup

4.1.1 Prior to installation of the fixture or the components to test, insure that the calibrations of all sensors, load and displacement are up to date.

4.1.2 Install the components on the fixtures. Ensure proper torques and fitment of the fixtures on the machine. Ensure that the maximum force capabilities of the machine are not exceeded.

4.1.3 The fixture should be designed to ensure consistent and repeatable testing.

4.2 Conditions.

4.2.1 Environmental Conditions. The test shall be undertaken at +15 °C to +35 °C without any special preconditioning.

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 Machine Settings.

4.3.1.1 The piston rod shall be subjected to a bending stress using a ramp waveform at a constant push rate of 30 mm/minute to the applied load force (F) as shown in Figure 1.

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