



Measurement of Front Longitudinal Bending Stiffness

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. Determination of static stiffness of the front longitudinal.

1.2 Applicability. For all body frame integral (BFI) passenger vehicles.

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

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 Test plate (clamping plate 5 x 3 m).

3.2.2 Two (2) crossbars for body fixation.

3.2.3 Measuring amplifier with one channel.

3.2.4 Load cell (up to 500 kg).

3.2.5 Crossbar for load application.

3.2.6 Mechanical spindle.

3.2.7 Forty (40) gauges (range 10 mm, accuracy 0.01 mm).

3.2.8 Forty (40) magnetic mounts.

3.2.9 Measuring disks with fastening material (plastilina).

3.3 Test Vehicle/Test Piece. Body in white (BIW) with fenders, and all reinforcing components, e.g., steering crossmember, screw-mounted front crossmember (hard-bolted), subframe, rear axle in vehicles with torsion bar suspension, bumper beams, tower braces, IP beam, tunnel braces, radiator braces, rear seat braces, all fixed glass, and when testing convertible vehicles add doors if wedges are used. All items added to the BIW will be noted on the test log sheet.

3.4 Test Time. Varies by program.

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Not applicable.

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4 Procedure

4.1 Preparation.

4.1.1 Setting Up the Body.

4.1.1.1 Basis of measurement is the test plate.

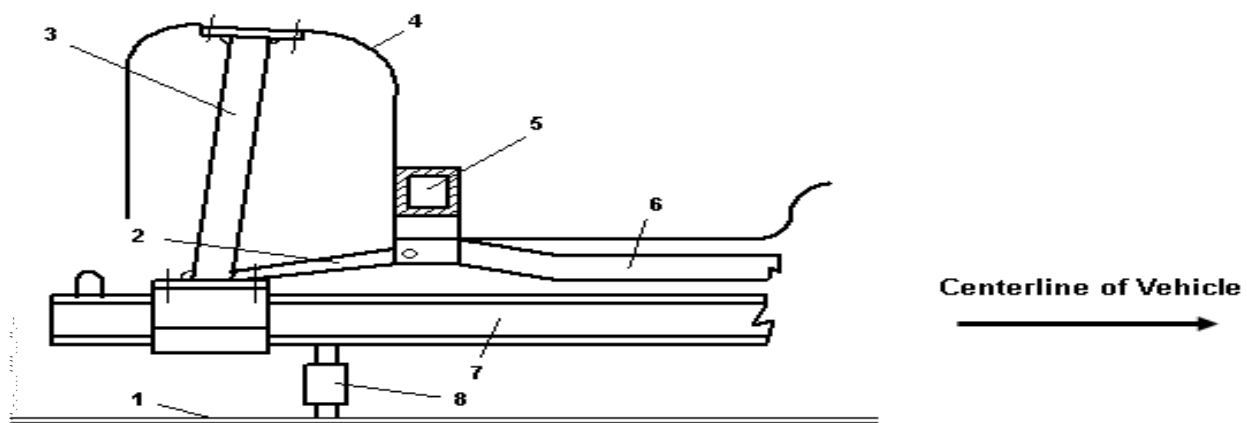
4.1.1.2 Put the BIW on the test plate (on wooden blocks).

4.1.1.3 Using production release urethane attach all fixed glass: front (windshield), rear window (rear window in notchback vehicles) and fixed side glass (do not include pop-out windows).

4.1.1.4 Vertical adjustable fixation of front and rear crossbar on test plate.

4.1.1.5 Installation of subframe and suspension arms in vehicles with front wheel drive.

A rigid connection shall be produced between outer suspension arm and the center of the shock absorber bearing in the tower. The connection shall be perpendicular to the tower cap (see Figure 1). The front shall be constrained in three (3) directions at the shock towers.



Note:

- 1 Bed plate
- 2 Suspension arm
- 3 Tube
- 4 Strut towers
- 5 Front longitudinal
- 6 Subframe
- 7 Front bar
- 8 Vertical adjustable support

Figure 1: Front Bar Fixation of Body in White

4.1.1.6 **Front End Fixation.** Fixation of rigid tower connection on front cross bar (see Figure 1). Rear spring seat shall be constrained in the vertical direction on both sides (Left Hand (LH) and Right Hand (RH)).

4.1.1.7 **Rear End Fixation.** Vertical adjustable fixation of the rear crossbar on test plate. The rear end fixation is depended on the rear axle construction (see Figure 2 and Figure 3).

4.1.1.7.1 **Rear Axle with Spring Strut or Separate Spring Damper Unit.** Establish rigid connection between spring seat and rear crossbar (see Figure 2).

4.1.1.7.2 **Spring Seat on Rear Axle Carrier.** Mounting of rear axle carrier and establishing a rigid connection between spring seat and rear crossbar.

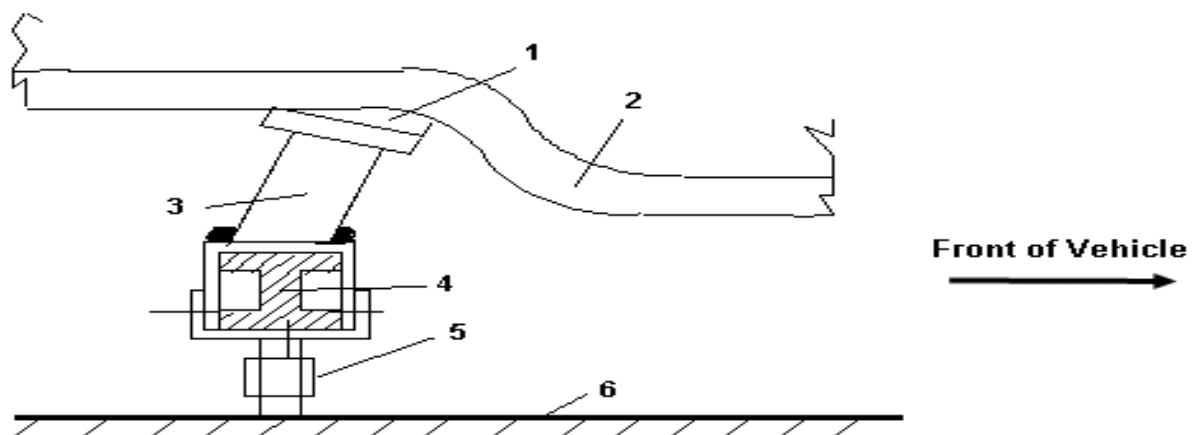
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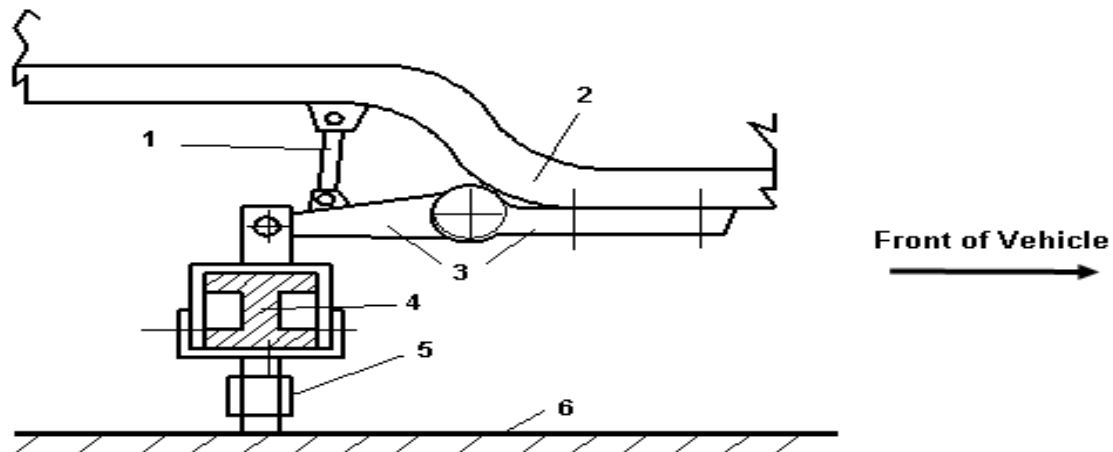
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**Note:**

- 1 Spring seat
- 2 Rear longitudinal
- 3 Support
- 4 Rear cross bar
- 5 Height adjustable support
- 6 Bed plate

Figure 2: Fixation of Rear Support

4.1.1.7.3 Torsion Bar Rear Axle. Installation of the complete rear axle in vehicles with torsion bar suspension. Support shall be effected at the wheel hub. Furthermore, the steering knuckles shall be secured to prevent twisting. This shall be achieved by producing a rigid connection between the shock absorber supports (see Figure 3).

**Note:**

- 1 Support at shock absorber fixation
- 2 Rear longitudinal
- 3 Torsion bar suspension
- 4 Rear crossbar
- 5 Height adjustable support
- 6 Bed plate

Figure 3: Fixation of Rear Support on Vehicles with Torsion Bar Suspension**GM Confidential**

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