GM WORLDWIDE ENGINEERING STANDARDS	Test Procedure	GMW14300

Retractor – Vehicle Sensitive Retractor (VSR) Tilt Angle and Sensitivity

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 procedure is to accurately measure the static tilt angle, the sensitivity to webbing acceleration, and sensitivity characteristics of a retractor to acceleration, in the fore, aft and lateral directions. To determine the minimum angle of retractor rotation and the level of accelerations required to lock-up a Vehicle Sensitive Retractor (VSR)/Webbing Sensitive Retractor.

1.2 Applicability. To all emergency locking seat belt retractors.

1.3 Remarks. Not applicable.

2 References

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

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW14831

2.3 Additional References.

- American National Standard for Calibration, Calibration Laboratories and Measuring and Test Equipment – General Requirements
- GM Master Three Dimensional (3D) Math File
- GM Math File Log

3 Resources

3.1 Facilities. GM certified test lab.

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. The following equipment or equivalent is required.

3.2.1 Retractors to be tested.

3.2.2 Acceleration test device capable of reaching the desired acceleration level in less than 50 ms. Overshoot must not exceed 10% of the test value. Acceleration must remain constant within ± 5%.

3.2.3 Acceleration data recorder.

3.2.4 Fixture to mount retractor in body position as defined by GM Master Three Dimensional (3D) Math File.

3.2.5 Static tilt angle fixture.

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Note: All equipment must be calibrated in accordance with American National Standard for Calibration, Calibration Laboratories and Measuring and Test Equipment – General Requirements.

3.3 Test Vehicle/Test Piece. Test fixture as required per 3.2.4.

3.4 Test Time. Time for setup and test as required.

3.5 Test Required Information. Record test data.

3.6 Personnel/Skills. Test technician/test engineer.

4 Procedure

4.1 Preparation. See GMW14831.

4.2 Conditions. See GMW14831.

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. Deviations from the requirements of this standard shall be approved by GM engineering and documented in the GM Math File Log.

4.3 Instructions.

4.3.1 Retractor Acceleration Sensitivity.

Note: For retractors with dual spools and a common sensor mechanism, the sensitivity of each spool must be checked simultaneously with each webbing displacement individually measured.

4.3.1.1 Mount the appropriate mounting fixture with the retractor to the sled such that the retractor is in body position and will be excited in the forward direction, to simulate a frontal impact.

4.3.1.2 With the specified amount of webbing remaining on the spool, attach the webbing end to the fixture clip or hook.

4.3.1.3 Set the sled start position to 0 mm and set the check position to 25.4 mm.

4.3.1.4 Accelerate the retractor once at the specified **Must Lock** acceleration to pack the retractor. (Do not record the test result.)

4.3.1.5 Accelerate the retractor at the specified **No Lock** acceleration, at a rate of less than 38G/s, and record the amount of webbing payout if lock-up occurs. The chosen onset rate is to be used for the remainder of the test process (i.e., at all subsequent acceleration levels). **Note:** It is permissible to start sampling at a higher rate of acceleration, if the minimum sensitivity is identified.

4.3.1.6 If the retractor did not lock-up within the maximum specified payout limit, increase the acceleration level by 0.05G and repeat the test. Continue to increase the acceleration level by 0.05G and retest the retractor each time the retractor does not lock-up within the specified payout limit.

4.3.1.7 Once the retractor has locked-up within the specified payout limit, move the starting position of the sled or fixed end of webbing 2 mm. Adjust the check position if required. Retest the retractor.

4.3.1.8 Each time the retractor locks-up within the specified payout limit, index the retractor's start and check positions (per 4.3.1.7) and test for lock-up. Continue this test sequence until the retractor is tested at ten consecutive positions or the retractor does not lock-up as specified. If the retractor did not lock-up as specified, move the sled back to the starting position, reset the check position to 25.4 mm, increase the acceleration level by 0.05G and retest as outlined. After ten consecutive lock-ups, record the amount of webbing payout and acceleration level.

4.3.1.9 Repeat 4.3.1.1 through 4.3.1.8 for the rearward, inboard and outboard excitation directions.

4.3.2 Webbing Acceleration Sensitivity.

4.3.2.1 Mount the retractor to the fixed portion of the sled.

4.3.2.2 With the specified amount of webbing remaining on the spool, attach the webbing end to the sled.

4.3.2.3 Set the sled start position to 0 mm and set the check position to 50 mm.

4.3.2.4 Holding the retractor fixed, accelerate the webbing out of the retractor once at the specified **Must Lock** acceleration to pack the retractor (do not record the test result).

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