GM WORLDWIDE ENGINEERING STANDARDS	Test Procedure	GMW14305

Retractor – Vehicle Sensitive Retractor (VSR) Durability Tests for Life Cycle, Comfort Feature and Blockout Mechanism

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. To determine the durability of an emergency locking Vehicle Sensitive Retractor (VSR) including comfort feature and blockout mechanism if applicable.

1.2 Applicability. To all vehicle sensitive safety belt assemblies and dual mode retractors**.**

1.3 Remarks. Included in this procedure are life cycle testing of the retractor and locking mechanism, comfort feature set and release, and blockout mechanism. Dependent on the test equipment available, these tests may be performed separately as written or combined.

Retractor assemblies being tested beyond one life are subjected to dust exposure and environmental conditioning prior only to the first life.

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
- Belt Assembly Drawing
- GM Master 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 Safety belt assemblies to be tested.

3.2.2 Torque wrench with a 70 N·m capability.

3.2.3 Cycling equipment for vehicle sensitive retractors. Equipment capable of conducting and monitoring life cycles, comfort feature cycles and blockout mechanism cycles.

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3.2.4 Recorder or oscilloscope and accelerometer to check and adjust rate of acceleration.

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. Retractor assemblies as applicable.

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, section Appendix G; Analysis, Design Verification Plan and Report (ADVP&R) Outline.

4.2 Conditions. See GMW14831, section Appendix G; Analysis, Design Verification Plan and Report (ADVP&R) Outline.

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 Emergency Locking Retractor Life Cycle Test.

4.3.1.1 Use the specified bolt installation torque, mount the retractor to the sled of the cycle machine in body position as defined by the GM Master Math File.

If practical, orient the retractor such that it will be excited in the forward direction (initial movement of the vehicle sensor is towards the front of the vehicle to simulate a frontal impact).

4.3.1.2 Position the rollers or belt guides such that the retractor can be cycled without the webbing contacting the opening of the retractor (remove the retractor snorkel if necessary).

4.3.1.3 Extract the webbing to the specified amount for full stowage or park position (refer to the Belt Assembly Drawing) and attach the webbing to the belt extension/retraction mechanism of the cycle machine.

4.3.1.4 Preset the counter(s) (if available) to the specified cycle count.

4.3.1.5 Adjust the sled acceleration level to fire above the must lock acceleration.

4.3.1.6 Operate the retractor cycle machine at a rate that is slow enough to allow the pendulum to settle between cycles (approximately 8 cycles per minute to 10 cycles per minute for a retractor with 2100 mm stowed, the webbing extract/retract rate should not exceed 600 mm/s). The performance of each retractor must be monitored and all malfunctions must be recorded.

A cycle shall consist of a complete extension, load to 90 N and full retraction. A lock check shall be performed at the interval specified. To perform a lock check, actuate the locking mechanism above the must lock acceleration level while the belt is being extracted and load to 90 N, allow the belt to return to full retraction. Distribute the lock checks at a minimum of three locations between 50% and 90% of extraction (example, 50%, 70% and 90% of extraction). All lock checks may be performed consecutively and then complete the durability cycles if the equipment is not capable of intermixing cycles.

4.3.1.7 At the end of the first cycle life check the retractor for retraction/extraction efforts, tilt lock and sensitivity. At the end of the second, check the retractor for tilt lock and sensitivity.

Note: For dual mode retractors Automatic Locking Retractor (ALR)/Emergency Locking Retractor (ELR), ALR locks can be combined into the ELR cycling sequence.

4.3.2 Comfort Feature Durability Test.

4.3.2.1 Mount the retractors to the comfort feature cycle machine (using the specified bolt installation torque, refer to Belt Assembly Drawing). If the retractors are not mounted in body installation position (permissible for testing of the comfort feature only), block either the pendulum or lock mechanism to prevent lock-ups.

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