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| GM WORLDWIDE ENGINEERING STANDARDS | Test Procedure | GMW14306 |

# Retractor - Vibration Exposure

## 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 capability of the retractor to withstand exposure to vibration.

**1.2 Applicability.** To all safety belt retractors.

**1.3 Remarks.** This procedure is intended to expose a safety belt retractor to a standard vibration schedule. The belt assemblies are exposed to the vibration schedule with 600 mm of the webbing remaining on the spool and with the webbing fully retracted. The ability of a belt assembly to maintain a comfort setting throughout the vibration schedule is also checked. All safety assemblies must be checked for proper operation before and after exposure to the vibration schedule.

## 2 References

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

**2.1 External Standards/Specifications.**

None

**2.2 GM Standards/Specifications.**

GMW14300 GMW14831

**2.3 Additional References.**

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

## 3 Resources

**3.1 Facilities.** General Motors 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** Rigid fixture to mount retractor in body position.

**3.2.3** Vibration equipment capable of sweeping from 5 Hz to 20 Hz (or greater if specified on the Belt Assembly Drawing or GMW14831) with a fixed displacement of 4.5 mm. Refer to the belt assembly drawing for the specified acceleration level.



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**3.2.4** Accelerometer and equipment to measure vibration frequency and displacement.

**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.** Not applicable.

**3.4 Test Time.** Not applicable.

**3.5 Test Required Information.** Not applicable.

**3.6 Personnel/Skills.** Not applicable.

## 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** Mount the corresponding mounting fixture with the retractor to the vibration table such that the retractor is maintained in body position.

**4.3.2** For retractors with an intentional set comfort feature, extract 75% of the vehicle installed webbing length and set the comfort feature. **Note:** This may require the comfort release mechanism to be retained. Mark a reference line on the webbing where the webbing exits the retractor. **Note:** The loss of the comfort setting constitutes a failure.

**4.3.3** For retractors without a comfort feature, extract all except 600 mm of the vehicle installed webbing length and restrain the webbing from retracting back into the retractor.

**4.3.4** Set the vibration equipment as follows unless specified otherwise on the belt assembly drawing.

a. Sweep frequencies from 5 Hz to 20 Hz at a constant vertical displacement of 4.5 mm. This will provide an acceleration of 0.24G to 3.6G.

b. Sweep frequencies with a sine wave function.

c. Sweep frequencies at 3 sweeps/minute to 6 sweeps/minute.

d. Conduct the test for the specified time (i.e., 8 h).

**4.3.5** For belt assemblies with a comfort feature, check if the retractor has maintained the comfort setting as marked in 4.3.2.

**4.3.6** Check the retractor for satisfactory operation in body position, as defined by GM 3D Master Math File, including "webbing acceleration sensitivity" and "static tilt angle" per GMW14300.

**4.3.7** Repeat 4.3.4 and 4.3.6 with the webbing fully retracted (per Retractor Shipping Position). It is permissible to use either the same retractor or a new sample.

## 5 Data

**5.1 Calculations.** Not applicable.

**5.2 Interpretation of Results.** Not applicable.

**5.3 Test Documentation.** Not applicable.



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