



## Structural Integrity of Window Regulator Components

### 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 evaluate the structural integrity of window regulator components. This procedure covers the creep behavior of regulator.

**1.2 Applicability.** This procedure applies to all cable-drive regulator systems.

### 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

#### 2.3 Additional References.

- Applicable Component Technical Specifications (CTS)

### 3 Resources

**3.1 Facilities.** The regulator supplier is responsible for this test, which should be performed at supplier's 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.** Testing should be performed using a test fixture as shown in Appendix A, Figure A1.

**3.3 Test Vehicle/Test Piece.** One (1) sample.

#### 3.4 Test Time.

Calendar time: 42 to 44 working days

Test hours: 1000 h

Coordination hours: 40 h to 60 h

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

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

### 4 Procedure

**4.1 Preparation.** Not applicable.

#### 4.2 Conditions.

**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.

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#### 4.3 Instructions.

**4.3.1** Mount the regulator in a fixed rigid fixture as shown in Appendix A, Figure A1. Attach the rigid rod to the carriers. Attach the rigid stop to the rigid fixture. Set the carriers at the glass-fully-up positions. Mount the regulator so all of the components, including pulleys, sliders, glass carrier blocks, cable routing pattern and electric motor are oriented correctly per design. In order to simulate the worse-case condition (cable run off) shown in Appendix A, Figure A2; position the cable assembly groove of the pulley in the middle of the cable contact area during the test.

**4.3.2** Stall the system for 1000 h at 85 °C with the following conditions: 16.0 stall volts  $\pm$  0.2 stall volts as measured at the motor terminals. To ensure cable tension is maintained, cycle the system 3 times per day to stall.

**4.3.3** Cool down the system to room temperature.

**4.3.4** Examine the system for any component damage or permanent deformation.

### 5 Data

**5.1 Calculations.** Not applicable.

**5.2 Interpretation of Results.** Regulator components including pulley, slider, glass carrier block, and cable shall not have any damage or significant permanent deformation per the CTS specified. Cable should not cut into the pulley/slider groove or run off.

**5.3 Test Documentation.** Not applicable.

### 6 Safety

This Engineering Standard may involve safety requirements for hazardous materials, the method of operations and equipment. This standard does not propose to address all the safety issues associated with its use. It is the responsibility of the user of this standard to ensure compliance with all appropriate safety and health practices. This would include any specific training that may be required. The safety and health standards include site specific rules and procedures, company rules and procedures, and Government Standards. Contact shall be made with the appropriate site Safety and Health personnel for further direction and guidance in these matters.

### 7 Notes

#### 7.1 Glossary.

**Glass Guidance System:** A hardware subsystem of side-door, end-gate, or mid-gate that controls the movement of window glass.

**Window Regulator:** A window regulator is a hardware subsystem that controls the mechanism of glass movement.

#### 7.2 Acronyms, Abbreviations, and Symbols.

**CTS** Component Technical Specification

**GSSLT** Global Subsystem Leadership Team

### 8 Coding System

This standard shall be referenced in other documents, drawings, etc., as follows:

Test to GMW15078