



Long Term Load Loss Set Assessment for Weatherstrips

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. This test procedure determines the amount of long term load loss set (LLS) of elastomeric seals after they have been compressed to a defined deflection at elevated temperature.

1.2 Applicability. Applicable to elastomer seal, such as body and glass weatherstrips.

2 References

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

2.1 External Standards/Specifications.

ISO 188

2.2 GM Standards/Specifications.

GMW14685

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 Compression Fixture.

3.2.2 Mounting Fixtures.

3.2.3 Holding Fixture. Designed for heat aging of seals.

3.2.4 Oven. Heating oven capable of maintaining the required temperatures within the specified tolerances (e.g., heat oven to ISO 188 Method B).

3.2.5 Steel Scale.

3.3 Test Vehicle/Test Piece. For long term load loss testing, three (3) specimens shall be tested. The test specimens shall be 100 mm $\pm$ 1 mm in length, and cut such that the seal is not significantly bent or deformed during cutting.

3.4 Test Time. Reference the lab test procedure(s) in Section 4 for timing details.

3.5 Test Required Information. Not applicable.

3.6 Personnel/Skills. Per laboratory accreditation requirements.

4 Procedure

4.1 Preparation.

4.1.1 Summary of Test Procedure. The ability of a seal to maintain good sealing force over time is measured by comparing an unstrained, new production seal force to the force remaining after the section has been conditioned (aged) under elevated temperature under constant load and increasing time.

Compressibility at a defined deflection (compression load deflection (CLD), GMW14685) is measured on each seal sample. The samples are then compressed to a defined deflection, and aged for a specified period of time at +80 °C. After each aging period, the CLD is re-measured.

The long term load loss set of an elastomeric seal shall be defined as the amount of CLD lost (expressed as a percentage), after the seal has been aged for a specified period of time at a specified temperature.

4.2 Conditions.

4.2.1 Environmental Conditions. The minimum time period between vulcanization and testing of elastomers shall be 72 h. The test piece shall remain at a temperature of +23 °C ± 5 °C for at least 8 h before testing, and shall be free from strain during this period.

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.

4.3 Instructions.

4.3.1 Assessment of load loss set for body seals shall be made at the minimum and maximum seal gaps, unless otherwise specified. For glass run channels and belt seals, the inner and/or outer lips shall be compressed to the designed nominal positions, unless otherwise specified.

4.3.2 Mount the seals on a flange (or in a suitable holding fixture) representative of the thickness of the mounting section (e.g., header section for body seals, upper B-pillar for glass seals). The part shall be securely mounted such that it does not rock on the mounting flange. It is recommended to use a fixture that is common for GMW14685 and GMW15564.

4.3.3 Measure and record the initial CLD of each seal section according to GMW14685-2B2, with the following exception for pre-flexing the seals.

- For body seals, measure the initial CLD by pre-flexing the parts to 2 mm beyond the heat aged gap (i.e., if the heat aged gap is 15 mm, the part should be pre-flexed to 13 mm).
- For glass seals, the parts should be pre-flexed 1 mm beyond the designed nominal position unless they come into contact with the support pedestal. If a sealing wing contacts the support pedestal, the position where the wing first contacts the pedestal would be considered the pre-flex position. Parts shall be pre-flexed **ten** (10) times.

4.3.4 After the CLD measurement, compress the seal to the defined deflection (heat aged gap), and place the seal/fixture assembly in an oven at +80 °C ± 3 °C for the time period specified in Appendix A, Table A1.

4.3.5 At the end of the aging period, remove the assembly from the oven. Immediately remove the compression feature from the fixture. Allow the weatherstrip to cool for 1 h ± 0.1 h.

4.3.6 Re-measure the CLD at the defined heat aged gap according to GMW14685-2B2.

4.3.7 Re-install the compression feature of the fixture.

4.3.8 Repeat 4.3.4 through 4.3.7 for reassessment of CLD for all intervals specified in Appendix A, Table A1.

5 Data

5.1 Calculations. Not applicable.

5.2 Interpretation of Results. Not applicable.

5.3 Test Documentation. The following information shall be reported.

5.3.1 Part information including part name, program name/vehicle program name, specimen number, production or development batch number.

5.3.2 Location, date, and time of test.

5.3.3 Conditioning of the test specimen, if any.