



Coating Requirements for Elastomeric Seals

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 specification covers the requirements of functional and appearance coatings on weatherstrips in the body and glass area. Functional coatings are coatings that are applied to the functional surfaces of weatherstrips (i.e., bulb of primary seal, lip of glass run) for one or more performance purposes, including but not limited to abrasion resistance, noise suppression, and freeze release. Appearance coatings are coatings applied to the show surfaces of seals for aesthetic purposes, including but not limited to enhanced color matching and weatherability. These coatings can be spray applied or co-extruded.

1.2 Applicability. This specification is applicable to all coated weatherstrips.

1.3 Remarks. Not applicable.

2 References

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

2.1 External Standards/Specifications.

ISO 105-X12	ISO 4892	SAE J1976	SAE J2527
ISO 188	ISO 23529		

2.2 GM Standards/Specifications.

9985670	B 440 0029	GMW14650	GMW15726
B 040 0218	GMW3059	GMW14757	GMW16953

2.3 Additional References.

- CG1019 Weatherstrip Component Technical Specification (CTS) (ID)
- GM Part Number 1050173

(ID) = This document is limited to internal distribution within General Motors and shall not be distributed outside this company. Contact the GM Lead Engineer for further instructions.

3 Test Preparation and Evaluation

3.1 Resources.

3.1.1 Facilities. Conforming to the relevant test procedures.

3.1.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.1.2 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.

3.1.2 Equipment. Conforming to the relevant test procedures.

3.1.2.1 Suitable apparatus for determination of the thickness of the coating (reference GMW15726).

3.1.2.2 Scalpel suitable for cross-hatching through the coating.

3.1.2.3 Adhesive tape: Scotch 8981, Tesaband 4651, Tesaband 4661, or equivalent.

3.1.2.4 Mandrel of 50 mm diameter.

3.1.3 Test Vehicle/Test Piece. Unless otherwise specified, the shape, size and number of test pieces shall be in accordance with the relevant test procedure listed in Section 2.

3.1.3.1 The number of test pieces required for material approval is defined in the Weatherstrip CTS (CG1019).

3.1.3.2 For Design and Product Validation, test pieces shall be cut from at least three (3) finished parts; for routine quality control from at least one (1) finished part.

3.1.4 Test Time. Reference the specified lab test procedures in Section 2 for test times.

3.1.5 Test Required Information. Not applicable.

3.1.6 Personnel/Skills. Per laboratory accreditation requirements.

3.2 Preparation. Not applicable.

3.3 Conditions.

3.3.1 Environmental Conditions. The minimum time between vulcanization and testing of elastomers shall be 72 h. The test pieces shall be maintained at a temperature of $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ for at least 8 h prior to test and shall be free from strain during this period.

3.3.2 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.

3.4 Instructions. Reference the specified laboratory test procedures in Section 2 for test instructions.

3.5 Data. Not applicable.

3.6 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.

3.7 Documentation. Samples of components or material released to this standard shall be tested for conformity with the requirements of this standard and approved by the responsible GM Department prior to the start of delivery of production level components or materials.

Any change to the component or material, e.g., design, function, properties, manufacturing process and/or location of manufacture requires a new release of the product. It is the sole responsibility of the supplier to provide the customer, unsolicited, with documentation of any change or modification to the product/process, and to apply for a new release.

If not otherwise agreed to, the entire verification test shall be repeated and documented by the supplier prior to start of delivery of the modified or changed product. In some cases, a shorter test can be agreed to between the responsible GM department and the supplier.

3.7.1 Test Results. With reference to this standard the test results shall be presented in a test report.

4 Requirements and Procedure

4.1 Appearance. The weatherstrip shall be coated in the area defined on the drawing or in the math data file. The coating shall be uniform and free from breaks or porosity.

4.2 Performance Requirements. If a seal consists of several sections/profiles (extrusions and/or molds), the specified tests shall be conducted on each section (each extrusion section and each mold section). Unless otherwise stated, the tests and evaluations shall be performed at the temperature of $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$. See Table 1, Table 2 and Table 3. Samples are to be taken from finished parts.

Table 1: Body Seal Coating Requirements

Property	Test Procedure	Unit	Value
4.2.1 Coating Thickness Measurement			
Spray applied coatings	GMW15726		
Polyurethane Coatings	Coating Thickness.	microns	14 (+6/-3) Unless otherwise specified on drawing or math data file
Silicone Coatings	Coating Thickness.	microns	7 ± 2 Unless otherwise specified on drawing or math data file
Particulated Coatings (any chemistry)	Coating Thickness.	microns	As specified on drawing or math data file
Co-extruded coatings	GMW15726		
	Coating Thickness.	microns	As specified on drawing or math data file
4.2.2 Adhesion Strength			
Spray applied coatings	Square cut test piece with a length of 20 mm minimum and maximum width which can be obtained from the part. The coating shall be cross-hatched with six (6) lines in in each direction through to the base material at intervals of approximately 1 mm. The adhesive tape shall be pressed onto the surface of the cured lacquer, such that its side edge is at an angle of 45 degrees to the cross-hatching lines. Visual inspection.		After stripping off the tape, no cured coating shall be removed from the test piece
4.2.3 Heat Resistance			
All Types	ISO 188, Method B, Type 1 oven, 24 h (+0 h/-2 h) at 90 °C ± 3 °C. Test piece: length 200 mm ± 5 mm, width 4 mm ± 1 mm, thickness 1 mm to 2 mm Bend 180 degrees around radius of 25 mm ± 0.5 mm Visual Examination.		No visual change in coating. No cracks. No loss of adhesion .
4.2.4 Cold Resistance (Low Temperature Flexibility)			
All Types	Condition per ISO 23529, -40 °C ± 3 °C; 4 h ± 0.5 h then bend around mandrel. Test piece: length 200 mm ± 5 mm, width 4 mm ± 1 mm, thickness 1 mm to 2 mm. Bend 180 degrees around radius of 25 mm ± 0.5 mm. Visual Examination.		No cracks. No loss of adhesion .

Property	Test Procedure	Unit	Value
4.2.5 Chemical and Abrasion Resistance			
All Types	ISO 105-X12 (Crockmeter) Test piece shall have a uniform thickness over the total width. If the width of the test piece is smaller than the rubbing finger, the downward force shall be reduced adequately. (See Appendix A, Table A2.) Test Conditions: Cylinder 16 mm diameter, 80 mm minimum travel, 1 cycle/s, cotton crocking cloth. Downward force of 9 N, (one cycle shall be one to-and-fro movement). Dry test fabric. Wet test fabric (Deionized water). Pre-wetting shall be repeated after 50 cycles. With test fabric soaked in cleaning anti-freeze solution 2-Propanol: Water = 1:2 Pre-wetting shall be repeated after 50 cycles. Test fabric soaked in windshield wash solvent 9985670 (Methanol): Water = 2:3 Pre-wetting shall be repeated after 50 cycles. No judgment shall be made of the cloth; only the coated surface shall be evaluated.	cycles cycles cycles cycles	Coating shall not be worn through after: 100 minimum 100 minimum 100 minimum 100 minimum
4.2.6 Coating Cure Test			
Spray Applied Coatings	ISO 105-X12 (Crockmeter). Test piece shall have a uniform thickness over the total width. If the width of the test piece is smaller than the rubbing finger, the downward force shall be reduced adequately. (See Appendix A, Table A2.) Test Conditions: Cylinder 16 mm diameter, 80 mm minimum travel, 1 cycle/s, cotton crocking cloth, pre-soaked with Naphtha (Varnish Makers & Painters (VM&P) Naphtha or equivalent). Downward force of 4.3 N, 5 cycles (one cycle shall be one to-and-fro movement).		Rating 0 or 1 per Appendix A, Table A1. The rating of the coated surface overrides the rating of the cloth, if only cloth is out of requirement.
4.2.7 Cleaning and Solvent Resistance			
All Types	ISO 105-X12 (Crockmeter). Test piece and test conditions: See Chemical and Abrasion Resistance. Downward force of 4.3 N, 10 cycles (one cycle shall be one to-and-fro movement). Commercial car shampoo (e.g., Sonax 314300). Commercial paintwork cleaning product (e.g., Sonax 302200). Commercial household ammoniated window cleaner (e.g., Windex). Commercial chrome cleaner and polish (e.g., GM chrome cleaner and polish, Part Number 1050173).		No staining, discoloration, surface softening, or loss of grain. Rating 0 or 1 per Appendix A, Table A1. The rating of the coated surface overrides the rating of the cloth, if only cloth is out of requirement.
4.2.8 Wear Resistance Test			
Body Mounted Primary and Secondary Seals Only	GMW16953, Code B Unless otherwise specified on drawing/math data file	cycles	No wear-through of the coating after 5000 minimum.