



Adhesive, Foamed Hot Melt, Weatherstrip

1 Scope

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/Material Description. This specification covers a foamed hot melt sealer, obtained from an outside source, which will affect a moisture and dust seal when applied in place during manufacturing of weatherstrip channels. The sealer shall be neutral in color, homogeneous, completely resistant to moisture, have good adhesion to rubber weatherstrips and painted steel and have good aging properties. These materials are density reduced (foamed) to approximately 50% of their original density. This foaming process can be achieved by mechanical foaming or by chemical foaming.

1.1.1 The material may not exhibit excessive stringiness during assembly operations. It will be most effective when assembled at temperatures between +15 °C and +35 °C.

1.2 Symbols. Not applicable.

1.3 Applicability. Typical applications include foamed hot melt sealer in base of weatherstrips.

1.4 Remarks. None.

2 References

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

2.1 External Standards/Specifications.

ASTM D1875

2.2 GM Standards/Specifications.

GMW3059

GMW14270

GMW18002

2.3 Additional References. Not applicable.

3 Requirements

3.1 Stability. As shipped, the sealer in the weatherstrip must be capable of withstanding a temperature of +54 °C for 72 h without any deleterious effects and meet the provisions of the specifications.

3.1.1 The shelf life of the material in the weatherstrip must be at least 120 d at temperatures not exceeding 35 °C and meet the provisions of the specification.

3.2 Odor. The material must not be toxic or noxious and be relatively non-odorous.

3.3 Sample Conditioning. All test weatherstrips shall be conditioned as follows prior to test:

3.3.1 Allow 24 h air cure at +25 °C and 45% to 55% relative humidity (RH).

3.3.2 Expose 16 h at +54 °C.

3.3.3 Cool to room temperature.

3.4 Density (ASTM D1875). Density of the material, before and after foaming, shall be reported. Foaming process (mechanical or chemical) shall also be reported.

3.5 Density Reduction. Target density reduction for materials approved to this specification shall be 50% ± 5%. Density reduction shall be measured as follows:

Weigh and record the mass of ten (10) identical sized specimen containers. Dispense five (5) unfoamed and five (5) foamed samples into the ten (10) containers. Weigh each container with foam sample and record the mass. Subtract the mass of each container from the foam + container mass and record and report the percent (%) Density Reduction:

$$\% \text{ Density Reduction} = \frac{1 - \text{foamed sample weight}}{\text{unfoamed weight}} \times 100\%$$

3.6 Water and Solvent Resistance. There shall be no excessive breakdown of sealer and no washout of filler while using water and Varnish Makers & Painters (VM&P) naphtha. There shall be no absorption of water in the material.

3.6.1 Procedure. Place a globular drop of sealer (approximately 13 mm in diameter) in each of two 60 mL (milliliter) open-mouthed bottles. Add 20 mL of water into each of the bottles, then place in an oven at $+70\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ for 30 minutes ± 1 minute. Remove from oven and shake the hot mixture ten (10) times to test the water solubility. After shaking, add 10 mL of high flash VM&P naphtha to one bottle and 10 mL of emulsified mineral spirits to the other. Shake the mixture again ten (10) times. Examine the contents after the third, sixth, and tenth shakes for washout of binders and fillers.

3.7 Cold Resistance. The material shall have good flexibility, cohesive strength, and adhesion to rubber and lacquered to steel at $-29\text{ }^{\circ}\text{C}$.

3.7.1 Procedure. A 100 mm long painted steel panel is inserted into a weatherstrip channel with foamed-in-place hot melt. The assembly is exposed to $+93\text{ }^{\circ}\text{C}$ for 72 h, followed by exposure at $-30\text{ }^{\circ}\text{C}$ for 4 h. The cold sealer is examined for adhesion to the painted panel and rubber channel and for cohesive strength and flexibility.

3.8 Effect of Aging. The adhesive and cohesive properties shall not be adversely affected by 14 d at $+70\text{ }^{\circ}\text{C}$ aging. The material shall not dry out, bleed oil from cracks, shrink, strain, or expand. After the aging test, the sealer must have good adhesion to painted panel and the rubber channel. Actual parts and painted panels (100 mm long) shall be tested in simulated assemblies.

3.8.1 Apply two 6.4 mm beads, two 9.7 mm beads, and one 3.2 mm thick flat smear of sealer onto two topcoated painted steel panels. Press rubber strips into one of the 6.4 mm beads and into one of the 9.7 mm beads on each panel. Age one panel for 14 d at $+70\text{ }^{\circ}\text{C}$ in a vertical position with beads running horizontal. Bake the other panel for 72 h at $+93\text{ }^{\circ}\text{C}$. After aging, examine the sealer on both panels for adhesion, cohesion, drying, cracks, shrinkage, and expansion.

3.8.2 Apply two 6.4 mm beads, two 9.7 mm beads, and one 3.2 mm thick flat smear of sealer onto two glass plates. Press rubber strips into one of the 6.4 mm beads and into one of the 9.7 mm beads on each plate. Age one plate for 14 d at $+70\text{ }^{\circ}\text{C}$ in a vertical position with beads running horizontal. Bake the other plate for 72 h at $+93\text{ }^{\circ}\text{C}$. After aging, examine the sealer on both panels for adhesion, cohesion, drying, cracks, shrinkage, and expansion.

3.8.3 Fill a 60 mL ointment can with test material. Level off the top with a straight edge and expose the sealer to $+93\text{ }^{\circ}\text{C}$ for 72 h. Remove from heat and allow to cool to room temperature. Inspect for drying, cracking, shrinkage, and expansion.

3.9 Test for Effective Seal. There shall be no evidence of water creepage underneath the sealer to the extent that a leak would occur. This is determined during water test and the plant tryout of the material.

3.10 Insertion (GMW18002). The weatherstrip with its applied sealer shall have the capability of being properly installed and affect a seal upon the application of a load not excessive to that required to install the weatherstrip without sealer.

3.10.1 The test shall apply to the part in the as-received condition and after stability tests.

3.10.2 Sealer is to be tested at four (4) temperature ranges and shall not exceed the maximum allowable insertion value as listed in Table 1.