

Flexible, Extensible Silicone Gel Sealant Strip

1. SCOPE

This specification covers the requirements of flexible, extensible, double-sided silicone gel sealant strip for corrosion protection of metal parts.

2. APPLICABLE DOCUMENTS

2.1 American Society for Testing and Materials (ASTM):

ASTM D412 *Standard Method of Tension Testing of Vulcanized Rubber and Thermoplastic Elastomers-Tension.*

ASTM D792 *Standard Test Method for Density and Specific Gravity of Plastics by Displacement.*

(Copies of ASTM publications may be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103).

2.2

Underwriters Laboratories, Incorporated

UL 94 (Fifth ed. Oct. 29, 1996) Test for Flammability of Plastic Materials for Parts in Devices and Appliances.

(Copies of UL publications may be obtained from Underwriters Laboratories, Inc., 1285 Walt Whitman Road, Melville, Long Island, New York 11746).

3. MATERIALS

3.1 The strip shall be made from crosslinked silicone gel carried on or impregnated into an extensible carrier.

3.2

The materials shall meet the requirements of individual specification sheets.

4. CLASSIFICATION OF TESTS

4.1 Qualification tests

Qualification tests are those performed on finished product or base material submitted for Qualification as a satisfactory product and shall consist of all tests listed in the applicable Specification sheet.

4.2

Acceptance tests

Acceptance tests are those performed on product submitted for acceptance under contract.

Acceptance tests are dimensions, tensile strength, ultimate elongation, density and adhesive tack.

5. SAMPLING INSTRUCTIONS

Qualification and acceptance test samples shall be cut from a piece of standard manufactured sheet, selected at random. The sheet shall be not less than five square feet, and shall be conditioned at room temperature for one hour immediately prior to testing. All release sheet shall be removed before testing, except where otherwise specified herein.

- 5.1 Qualification Test Samples
Qualification of any size within each size range specified below will qualify all sizes in the same range.

Size Range

0.030" – 0.090"

0.120" – 0.280"

6.0 TEST METHODS

6.1 DIMENSIONS

Dimensions are measured on specimens with release liner in place using Mitutoyo Standup 10 gram load cell force thickness guage. Check that measurement foot on tight. Zero the guage with release liner only. Allow gage measurement foot to contact product surface and record thickness within about 5 seconds of contact.

Table 1: Dimensions

| Size | Thickness (Nominal) | |
|-------|---------------------|------|
| | mm. | in. |
| T0.03 | .76 | .030 |
| T0.06 | 1.52 | .060 |
| T0.09 | 2.28 | .090 |
| T0.12 | 3.05 | .120 |
| T0.15 | 3.81 | .150 |
| T0.17 | 4.32 | .170 |

- 6.2 **ULTIMATE ELONGATION (%) and TENSILE STRENGTH (psi)**
The ultimate elongation and tensile strength shall be measured in accordance with ASTM D412, (exceptions noted below), using D-die dumbbells cut parallel to the machine direction. Masking tape is required over the ends of the specimen, and a jaw pressure of approximately 40 psi. Crosshead speed shall be 50 mm (2 in) per minute. Initial jaw separation shall be 50mm (2 in.) per minute.
- 6.3 **DENSITY (gm/cc)**
Specimens of about 3-4 sq. cm are cut from finished product and tested per TUS-36-3009 (ASTM D792 Method A1 by water displacement, hung on wire).
- 6.4 **ADHESIVE TACK (gm)**
A sample at least 63.5 x 63.5 mm (2.5 x 2.5 inches) is clamped unstretched such that an unsupported circular area 25.4 mm (1 inch) in diameter is securely held at least 7.6 mm (0.3 inch) above the stage of a TA-XT2 Texture Analyser. This should be fitted with the cylindrical (12.7 mm or 0.5 inch diameter) acrylic probe centered over the specimen. Using 2 mm penetration depth, at a penetration rate of 0.2 mm / sec, the *retraction* force is recorded from the result displayed on the monitor.
- 6.5 **HEAT RESISTANCE**
Specimens are placed on Teflon-impregnated glass fiber release sheet and aged in convection oven for specified time and temperature. After removal from oven specimens are to be conditioned at ambient temperature and humidity for 3 hours minimum prior to testing.
- 6.6 **WEIGHT LOSS**
Specimens (approx. 5 sq. cm.) are cut from the final product and release paper is removed. Original weight is recorded to the nearest 0.0001 gram. Specimens are placed on Teflon-impregnated glass fiber release sheet and aged in convection oven for specified time and temperature. After removal from oven specimens are to be conditioned at ambient temperature and humidity for 3 hours minimum prior to weighing.

6.7 SPECIFIC FLUID RESISTANCE

Three specimens approximately 2.54 cm x 2.54 cm are cut from the final product and immersed for 168 hours in each of the test fluids listed in the specification sheet at the specified temperature. The volume of the fluid shall not be less than 20 times that of the specimen. After conditioning, all the specimens shall be lightly wiped and air dried for 30 to 60 minutes at $23 \pm 3^{\circ}\text{C}$ ($73 \pm 5^{\circ}\text{F}$). The specimens shall be weighed to nearest 0.0001 gram, before and after immersion and weight change be calculated as a percentage.

6.8 FLAMMABILITY

Samples of final product are die-cut and conditioned as described in the appropriate section of UL 94 Horizontal Burning Test 94HB. For 94HB, a 45° wire support fixture 120mm long constructed of 2 mm diameter wires with 1 cm x 1 cm openings is used. Samples are tested per UL 94 specified flame application time and location.

7. REJECTION and RETEST

Failure of any sample to conform to any one of the requirements of this specification shall be cause for rejection of the lot represented. If deemed appropriate by a qualified Tyco review committee, product lots which have been rejected may be sorted and/or reworked to correct the defect(s), and resubmitted for full Q.C. acceptance inspection.

8. PACKAGING and LABELLING

8.1 The specific form of the gel strip product supplied shall be as described in the factory order.

8.2 Packaging shall be in accordance with good industrial practice and hygiene, in a suitable manner for the specific gel strip product supplied.

8.3 Each shipping container of product shall be securely and legibly marked with product identification, lot number and quantity.

Table 2: Properties

| Property | Unit | Requirement | Test Method |
|--|----------------------|----------------------------|------------------------------|
| PHYSICAL | | | |
| Dimensions | mm (<i>inches</i>) | In accordance with Table 1 | Section 6.1 |
| Tensile Strength | psi | 18 minimum | Section 6.2 ASTM D412 |
| Ultimate Elongation | % | 150 minimum | Section 6.2 ASTM D412 |
| Density | gr/cc | 0.85 minimum | Section 6.3 ASTM D792 A-1 |
| Adhesive Tack | gr | 25 minimum | Section 6.4 |
| Heat Resistance 336 hrs at 150°C (302°F) Followed by test for: | | | |
| Tensile Strength | psi | 15 minimum | Section 6.5 ASTM D412 |
| Ultimate Elongation | % | 120 minimum | |
| Weight Loss | % | 5 maximum | Section 6.6 |
| SPECIFIC FLUID RESISTANCE | | | |
| Seven-day room temperature Immersion in specified fluids: | | | |
| 10% HCl | % | 1 max. | Section 6.7 |
| 30% H2SO4 | | 1 max. | |
| De-icing fluid MIL A8243 | | 1 max. | |
| Ethylene Glycol | | 1 max. | |
| ASTM oil #1 | | 15 max. | |
| Motor oil SAE 10W30 | | 15 max. | |
| Skydrol 500 | | 15 max. | |