



## SEALER, HEAT EXPANDING, LOWER EXPANSION, HIGH TEMPERATURE CURE, NON WELDABLE, PERFORMANCE REQUIREMENT

WSS-M18P19-A

### 1. SCOPE

The material defines the performance requirements for a die cut, injection molded, or extruded sealer that expands upon exposure to heat. This material can be supplied with or without a pressure sensitive adhesive coating (PSA) or a release liner.

### 2. APPLICATION

This specification was originally released for materials used to isolate bodyside strainers, seal fuel fillers, and roof bows from exterior sheet metal panels.

The material can be supplied with or without an aggressive pressure sensitive adhesive which promotes adhesion to oily, uncleaned cold rolled and galvanized steel. This material expands during the electrocoat bake schedules per para. 4.2.

Material cure is critical to long term material performance. It is recommended that time/temperature data packs be placed on a vehicle in the intended locations to determine the time at temperature requirements for a given application prior to release. The on-vehicle material time at electrocoat oven temperatures must fall within the cure window for the approved material. After release, periodic follow-up time/temperature checks are recommended to insure cure performance is maintained.

The Manufacturing Properties and Engineering Performance requirements defined in these specifications are based on laboratory sample testing and define the minimum acceptance criteria for adhesive/polymer material performance. The function and design requirements for the engineered part are defined by the component SDS (Sub-system Design Specification), key life test requirements, or vehicle program requirements.

Prior to use, the engineered part must be evaluated under the intended application processing parameters. The choice of substrates, stamping lubricants, stamping and assembly plant processing conditions and specific design application may affect engineered part performance. Compliance with this specification does not guarantee the engineered part will function for all potential applications on a vehicle.

### 3. REQUIREMENTS

Material specification requirements are to be used for initial qualification of materials.

#### 3.1 APPROVED SOURCES

This specification requires the use of approved sources. Only the sources identified on the Ford Approved Source List (ASL) can be used when this specification is listed on the drawing, CAD file, or other documents. The list of approved sources is located within Ford at [www.mats.ford.com](http://www.mats.ford.com) or available externally through a Ford Materials Engineer.

| Date       | Action    | Revisions                 | Rev 01                    |
|------------|-----------|---------------------------|---------------------------|
| 2015 11 02 | Revised   | See 5 summary of revision | B. Witkowski, C. Orr (NA) |
| 2006 05 26 | Activated |                           | J. Crist                  |



### 3.2 CONDITIONING AND TEST CONDITIONS

All test values are based on material conditioned for not less than 24 h prior to testing in a controlled environment of 23 +/- 2 °C and 50 +/- 5% relative humidity. Testing of the material should occur in the conditioning environment or soon after removal.

### 3.3 SYSTEM COMPATIBILITY

Initial material approval was based on a specific material system which included the substrate, stamping lubricants and adhesive/polymer. The originally approved material system was oven cured using specific production process parameters. The choice of substrates, stamping lubricants, stamping and assembly plant processing conditions and specific design application may affect adhesive/polymer/engineered part performance. If any of these parameters are changed, the material performance must be validated using the new parameters.

### 3.4 DIMENSIONS

Cross sections/dimensions for tape shall be specified on the engineering drawing.

### 3.5 MATERIAL PROPERTIES

- |       |                                                                                   |         |
|-------|-----------------------------------------------------------------------------------|---------|
| 3.5.1 | Density<br>(ISO 845/ASTM D 3574, cured per para 4.2,<br>Test A, interior density) | +/- 10% |
|-------|-----------------------------------------------------------------------------------|---------|

The density variation for any one supplier shall be +/- 10%, based on the recorded density of their original approved production sample.

- |       |                                                                                                      |        |
|-------|------------------------------------------------------------------------------------------------------|--------|
| 3.5.2 | Water Absorption<br>(FLTM BV 117-01, Method A,<br>8 h soak time, cure material per<br>paragraph 4.2) | 5% max |
|-------|------------------------------------------------------------------------------------------------------|--------|

- |       |                                                                  |  |
|-------|------------------------------------------------------------------|--|
| 3.5.3 | Volume Expansion<br>(FLTM BV 108-02, material cure per para 4.2) |  |
|-------|------------------------------------------------------------------|--|

|         |              |            |
|---------|--------------|------------|
| 3.5.3.1 | Minimum bake | 200 - 450% |
|---------|--------------|------------|

|         |              |            |
|---------|--------------|------------|
| 3.5.3.2 | Maximum bake | 200 - 450% |
|---------|--------------|------------|

The volume change variation for any one supplier shall be +/- 25%, based on the recorded volume change of their original approved production sample.

- |       |                                                                                |        |
|-------|--------------------------------------------------------------------------------|--------|
| 3.5.4 | Volatile Organic Compounds (VOC) Content, kg/L<br>(EPA Method 24, Procedure B) | Report |
|-------|--------------------------------------------------------------------------------|--------|

The VOC Content variation for any one supplier shall be +/- 0.05 kg/L, based on the recorded VOC Content of their original approved production sample.

- |       |                                                                                         |        |
|-------|-----------------------------------------------------------------------------------------|--------|
| 3.5.5 | Hardness, Durometer "A or D"<br>(ASTM D 2240, reading after 15s, cure per<br>para. 4.2) | Report |
|-------|-----------------------------------------------------------------------------------------|--------|



- 3.5.6 Cure Requirements Report  
(Define the process cure window for material cure, Report minimum and maximum time at temperature requirements to define performance boundaries)

Critical performance characteristics shall include, but are not limited to, the following:

- Volume Expansion, para 3.5.3
- Adhesion, para 3.6.6
- Shear Adhesion Strength para. 3.7.3.1

## 3.6 MANUFACTURING PROPERTIES

- 3.6.1 Differential Scanning Calorimetry Report  
(10 +/- 1 mg sample size, 5 °C/min heating rate, 25 - 250 °C temperature range, submit Heat Flow vs. Temperature curve)

Report onset of reaction

- 3.6.2 Bridging 3 mm max  
(SAE J243, ADS-9, Section 3.3, Method D, non-flow fixture, substrates per para 4.1, cure conditions per para 4.2)

- 3.6.3 Sag Resistance 3 mm  
(FLTM BV 118-01, substrates per para. 4.1, cure conditions per para 4.2)

- 3.6.4 Phosphate Wash Resistance (For PSA/Tacky only)  
(FLTM BV 116-03, 2000 psi, 23 °C, substrates per para 4.1)

Panel Preparation:

Cut a 100 x 150 strip at production thickness of and apply a 300 x 300 mm panels prepared for each substrate per para 5.1.

Pass a 2.2 kg roller over samples per ASTM D1000.

Condition at 23 +/- 2 °C for 1 hour prior to performing wash test.

- 3.6.5 Electrocoat Compatibility Must Pass  
(FLTM BV 119-01, use current production paints as identified by Materials Engineering)

Shall not contaminate electrocoat primer bath or cause electrocoat film irregularities.



## 3.6.6 Uncured Adhesion (PSA/Tacky only)

### Test Method:

Prepare four panels for each substrate per para 4.1.

Cut four 100 x 150 x 4 mm strips of the material and apply to four 300 x 300 mm panels prepared for each substrate per para 4.1.

Pass a 2.2 kg roller over samples per ASTM D1000.

Invert two panels immediately after material application and condition for 72 h at 40 °C. Observe for peeling or lifting of adhesive/polymer from panel or slump or sag between attachments, as appropriate.

Stand the remaining two panels vertically immediately after material application and condition for 72 h at 40 °C. Observe for peeling or lifting of material from panel or slump or sag between attachments, as appropriate.

## 3.6.7 Adhesion Characteristics

Test Method: Apply two 200 mm length ribbons of material to each of two 0.89 x 100 x 300 mm steel per para 4.1 and condition panels at 23 +/-2 °C for 1 h. Bake one panel at min and max bake per para 4.2. Position panels in a horizontal attitude during bake. After bake, condition panels at 23 +/-2 °C for 4 h min. Evaluate adhesion by inserting the top of a sharp spatula under the end of the material strip. Grasp the tab of sealer and attempt to peel 180°.

The material shall not be removable in a continuous coherent film. Observe for any indication that the material fails to adhere to the substrate or is brittle.

## 3.6.8 Release Paper Adherence and Removal (Pressure Sensitive/Tacky Materials only)

The release paper must remain attached to the adhesive/polymer surface during shipment and handling. It must be easily removed from the adhesive/polymer without part distortion or paper tear at ambient plant conditions (7 to 38 °C). Final approval for the release paper may be part and plant specific. Release paper information shall be noted in the supplier control plan.

## 3.6.9 Odor

3.6.9.1 Shall be free from objectionable odors as determined by the manufacturing facility, both as received and after storage.

3.6.9.2 FLTM BO 131-03, Method D Rating 3 max