



STRUCTURAL PERFORMANCE, CAVITY REINFORCING ENGINEERED PARTS, HEAT CURING

WSS-M99P33-A

1. SCOPE

This specification defines the adhesive/polymer material performance requirements for cavity reinforcing heat curing, engineered parts applied in the body shop. These parts are used to improve localized joint stiffness and torsional rigidity.

2. APPLICATION

The specification was originally released for the adhesive/polymer in engineered parts applied to oily metal in the body shop and cured in the electrocoat oven. The parts are used to improve localized joint stiffness and torsional rigidity in applications such as window frame, pillar to roof, pillar to rocker, rocker and rail sections. These engineered parts are not intended to be used for skin panel stiffening or oil canning. Special consideration is required when evaluating the use of these engineered parts in crash or crush sensitive locations. Sensitivity studies should be conducted since the material properties can change with temperature and environmental aging.

The engineered parts are supplied with an adhesive/polymer as a drop-in part or attached to a carrier. The adhesive/polymer on drop-in parts may be supplied in a pressure sensitive/tacky version or non-tacky version with attachments. On parts supplied with a carrier, the carrier may be a thin metal foil, metal backing plate, nylon or other specified carrier material. The adhesive/polymer cures at electrocoat oven temperatures.

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 this specification is based on laboratory sample testing and defines 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.

Date	Action	Revisions	Rev. 01
2016 11 17	Revised	See Summary of Revisions	S. Short, NA
2002 08 19	Activated		





3. REQUIREMENTS

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 or available externally through a Ford Materials Engineer.

3.2 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.

3.3 ENGINEERED PART

The dimensions and construction of the engineered part, adhesive/polymer plus attachments or carrier if required, shall be specified on the engineering drawing.

Each part shall meet the specification requirements under the time/temperature cure conditions for each body application site. On-vehicle time/temperature oven charts shall be provided for each application site.

Test data for the paragraphs listed below shall be submitted for each new part prior to release. Surrogate part testing for similar parts may be accepted, if concurred upon by the responsible Supplier Technical Assistance Activity.

3.3.1 Wash Resistance

3.3.2 Uncured Adhesion

3.3.3 Adhesion Test

3.3.4 Adhesion Bake Test

3.3.5 Adhesion to the carrier / Attachment

3.3.6 Release Paper Adherence and Removal

3.3.7 CETP-00.00-L-467 (6 weeks)
(Part shall show no evidence of undercutting between the material and carrier or attachment. Material shall be firmly anchored to the carrier or attachment.)



3.4 MATERIAL PROPERTIES

- 3.4.1 Density Report
(ISO 845/ASTM D3574,
Test A, interior density)

The density variation for any one supplier shall be +/- 10 %, based on the recorded density of their original approved production sample. Reference para 4.3.

- 3.4.2 Volume Change Report
(FLTM BV 108-02, material
cure per para 4.2)

The volume change variation for any one supplier shall be +/- 25 %, based on the recorded volume change of their original approved production sample. Reference para 4.4.

- 3.4.3 Volatile Organic Compounds (VOC) Content Report
(EPA Method 24, Procedure B)

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.

- 3.4.4 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 change, para 3.4.2
- Compressive modulus, para 3.6.1
- Shear adhesion, para 3.6.2



- 3.4.5 Differential Scanning Calorimetry
(20 +/- 1 mg sample size, 10 °C/min
heating rate, 25 - 250 °C temperature
range, submit Heat Flow vs. Temperature
curve)

Report onset of reaction

3.5 MANUFACTURING PROPERTIES

3.5.1 Wash Resistance

Pressure Sensitive/Tacky Materials - No measurable movement, dissolution, displacement or evidence of material wash off or lifting from panel.

Non-tacky Materials - No measurable dissolution or evidence of material wash off.

Constructed Parts - No measurable movement, dissolution, displacement or evidence of material wash off from carrier, if present. Attachment, if present, shall not be dislodged or displaced.

(FLTM BV 116-01, Methods B, substrates
per para 4.1)

Panel Preparation:

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

For pressure sensitive or tacky materials, pass a 2.2 kg roller over samples per ASTM D 1000.

For non-tacky materials, attach material to the 300 x 300 mm panels using pin attachments in each of the four corners of the adhesive/polymer strip.

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

For constructed parts, fixture part and perform test.



- 3.5.2 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.

- 3.5.3 Uncured Adhesion

Pressure Sensitive/Tacky Materials - The uncured material shall not peel at the edges or fall off the panel.

Non-tacky Materials - The uncured material shall not slump or sag between attachments or flow off the carrier.

Constructed Parts - The uncured materials shall not slump, sag, peel or fall off the carrier, if present. An attachment, if present, shall not be dislodged or displaced.

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.

For pressure sensitive or tacky materials, pass a 2.2 kg roller over samples per ASTM D1000.

For non-tacky materials, attach material to the 300 x 300 mm panels using pin attachments in each of the four corners of the adhesive / polymer strip.

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.

Save panels for Adhesion Bake Test, para 3.5.4

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.

Save panels for Adhesion Bake Test, para 3.5.4.

For constructed parts, fixture and condition for 72 h at 40 °C. Observe for slump, sag, peel or materials separation from the carrier, if present. Observe for any change to the attachment, if present.

Save parts for Adhesion Bake Test, para 3.5.4