



**DUPLEX SEALER, VINYL BASED, NON-YELLOWING, PUMPABLE
OR AIRLESS, SPRAYABLE, HEAT CURING, PAINTABLE,
INTERIOR AND EXTERIOR**

WSS-M4G359-A

**DUPLEX SEALER, VINYL BASED, NON-YELLOWING, PUMPABLE
OR AIRLESS, SPRAYABLE, LOW DENSITY, HEAT CURING, PAINTABLE,
IMPROVED STONE CHIP PERFORMANCE, INTERIOR AND EXTERIOR,
CONVENTIONAL PAINT SYSTEMS**

WSS-M4G359-A3

1. SCOPE

The material defined by this specification is a vinyl based, pumpable, or airless sprayable, paintable, heat curing sealer which is non-yellowing.

WSS-M4G359-A is suitable for three wet and traditional paint systems; however compatibility with paints should be verified for any material on the approved source list. Upon initial qualification, sealers are tested to paint systems in current use and need to be validated on a regional basis.

WSS-M4G359-A3 needs to be fully cured (e.g. in Primer Oven) before paint application used in conventional paint systems.

2. APPLICATION

This specification was released originally for sealing interior and exterior body seams, including door hem flanges, Underbody Coating and Roof Ditch Sealing.

The material is intended for use in the paint shop and applied over freshly baked electrocoat. Acceptable paintability is achieved with or without primer surfacer. The material has been formulated to prevent topcoat yellowing and allow topcoat cure in low airflow conditions.

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 RHEOLOGY

Suppliers must submit flow characterization data to Ford Motor Company for flow modeling and process window determination. For a specified temperature range, the requested properties include, but are not limited to, viscosity and yield stress. This data constitutes the reference standard and shall be kept on file at the designated material laboratory.

Date	Action	Revisions	Rev. 3
2017 05 31	Revision/ Released A3	See Summary of Revisions	W. Janitschke, FOE
2010 06 16	Revised	See Summary of Revisions	M. Mehandru, FNA W. Janitschke, FOE
1995 07 13	Activated		W. Curtiss G. Molnar



Rheometer Instrument: e.g. Bohlin CVO 50 or equivalent equipment

Parameter:

Viscometry: Shear Rate

Measuring System: PP 20

Gap: 500µm

Temperature Modus: Isotherm

Temperature: 20°C

Temperature Time out: 100 s

Pre-Shear: off

Sweep Type: Table, linear

Start: 131.0 s⁻¹

End: 0.0 s⁻¹

Ramp: down

Delay: 5 s

Integration: 1 s

Delay Time: constant

Data Points: 20

Viscosity: Measure 30 times at 30 sec and 90 sec; calculate the mean and the standard Deviation.

Yield stress: Take the data points 1 – 18 and calculate the regression line. The intersection to the y-axis is the Yield stress.

3.2.1. Initial	A	A3
Viscosity at 30 sec [Pas]:	Report or 3 – 5	3 – 5
Viscosity at 90 sec [Pas]:	Report or 5.5 – 7.5	5.5 – 7.5
Yield stress [Pa]:	Report or 220 - 280	100 – 160

3.2.2 Aged	+ 50 % from Initial max
(Material aged in closed container for 168 h at 40 +/- 1 °C, conditioning Method A)	

3.3 SOLIDS	96% min
(FLTM BV 150-10. After 30 minutes curing per FLTM BV 150-05 (nominal), for each region to be used. Save sample for next test, para 3.4)	

3.4 ASH (Based on solids weight)	40% max
(FLTM BV 150-10, 760 +/- 30 °C)	

The ash content tolerance for any one supplier shall be +/- 5% based on the recorded ash content for their originally approved production sample.

3.5 WEIGHT PER VOLUME	A	A3
(ASTM D 816)	1.20 – 1.61 kg/L	0.8 – 1.19 kg/L

The weight tolerance for any one supplier shall be +/- 0.05 kg/L, not to exceed either limit, based on the recorded weight of their original approved production sample

3.6 FLASHPOINT	> 100 °C
(ASTM D 93, Method A)	

Note: If testing at higher temperatures is not feasible because of gelling of test material, the supplier must certify in writing that each separate volatile ingredient has a flash point > 100 °C

**3.7 VISCOSITY at 23 °C**

(SAE J1524, VIS-2, 1.32 mm orifice, 280 kPa)

Final approval of a specific material viscosity for production shipments shall be made by the affected manufacturing activity. In all cases, the viscosity shall be within process limits as identified on the material control plan.

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

	A	A3
3.7.1 As received (Conditioning Method A)	as received +/- 10%	30 - 70 s
3.7.2 Aged (Material aged in closed container for 168 h at 40 +/- 1 °C, conditioning Method A)		Original + 50% max
3.7.3 90 Day Storage Stability at 23 +/- 2 °C		

The supplier shall provide a viscosity profile versus time from initial through 90 days storage at 23 +/- 2 °C and 32 +/- 2 °C. Measurements shall be taken at weekly intervals. Curves shall be made available to Materials Engineering prior to addition on the Approved Source List.

3.8 SAG RESISTANCE

3.8.1 Horizontal	6.4 mm max
3.8.2 Vertical	6.4 mm max
3.8.3 Inverted	No loss of material

Test Method:

- Apply a 3 x 30 x 200 mm ribbon of material along the center line of two of the three electrocoated panels prepared per para 4.2
- Scribe panels to mark the initial material location.
- Position the panels with the material in the attitude above for 1 h at RT.
- Immediately after conditioning, place panels in an oven to cure material at the minimum bake schedule per FLTM BV 150-05 table according to the region to be used. Maintain panels in the specified attitude during baking and cooling.
- Allow the panel to cool to 23 +/- 2 °C.
- Determine the sag by measuring the material movement below the scribe mark.
- Repeat the test using the second set of panels at the maximum bake per FLTM BV 150-05 table according to the region to be used.



3.9 BRIDGING

3.0 mm max sagging

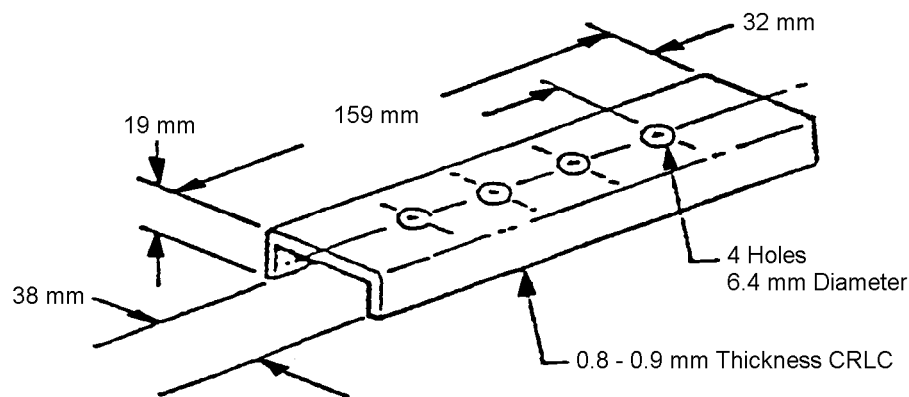
Test Method:

- Apply a 20 x 40 x 160 mm material bead over the 6.4 mm diameter holes shown in sketch below.

Condition the test fixture with material bead for 15 minutes at 23 +/- 2 °C, then bake fixture at the minimum bake schedule acc. to FLTM BV 150-05 for each region to be used.

- Measure the amount of material sag through hole. Max. 3 mm according to para 3.8

BRIDGING TEST FIXTURE



3.10 ADHESION

Shall not be peeled off in a continuous film at any thickness.

Test Method:

- Apply 6.4 - 0 mm tapered material ribbon on two electrocoated panels. See sketch below.
- Subject one test panel, to the minimum bake schedule and the other test panel to the maximum bake schedule acc. to FLTM BV 150-05 for each region to be used.
- Condition panels after baking at 23 +/- 2 °C for 1 h minimum.
 - Evaluate adhesion by cutting a 25 mm wide strip across the tapered ribbon. Using the tip of a square spatula, lift the material at both the thin and thick film edges then attempt to had peel material at 90 degrees from substrate.
 - Save test panels for Heat Resistance Test, para 3.13 and Corrosion Resistance Test, para 3.14