



ADHESIVE, MOISTURE CURING URETHANE, ONE COMPONENT,
PRIMERLESS TO SILANE BASED CLEARCOAT PAINT,
DIRECT FIRED OVENS ONLY

▽ WSS-M2G316-B2

ADHESIVE, MOISTURE CURING URETHANE, ONE COMPONENT,
PRIMERLESS TO NON SILANE BASED CLEARCOAT PAINT

▽ WSS-M2G316-B3

ADHESIVE, MOISTURE CURING URETHANE, ONE COMPONENT,
PRIMERLESS TO SILANE BASED CLEARCOAT PAINT

▽ WSS-M2G316-B5

1. SCOPE

The material defined by these specifications is a one component moisture curing urethane adhesive which is primerless to clearcoat paint chemistries.

2. APPLICATION

These specifications were released originally for material used in conjunction with a two stage glass priming operation (primers identified per para 4) to bond glass windshields, glass rear windows and quarter windows to painted metal surfaces. These materials will bond primerless to e-coated surfaces that are contaminate free and can also be used in conjunction with metal flange primers.

▽WSS-M2G316-B2 shall be used in assembly plants with silane based clearcoat painted metal surfaces baked only in direct fired oven.

▽WSS-M2G316-B3 shall be used in assembly plants with non silane based clearcoat painted metal surfaces. It must not be used with silane based clearcoat painted surfaces

▽WSS-M2G316-B5 Shall be used in assembly plants where data has shown a compatibility with the assembly plant's clearcoat chemistry. This material was originally released for silane based clearcoat painted metal surfaces baked in direct or indirect fired oven.

2.1 MANUFACTURING PROCESS RECOMMENDATION

These adhesives are moisture sensitive and require special handling as outlined in Table 2.

- The process parameters listed in Table 2 cover the critical elements for these materials and are not all inclusive. Please consult with Materials Engineering for any questions.
- Approved suppliers are responsible for maintaining the accuracy and relevancy of these process parameters (in their Process Standard). Approved suppliers must submit any changes to these process parameters in a timely manner (within 30 days) for review and approval by Materials Engineering.

Date	Action	Revisions
2007 04 19	Revised	Inserted 2.1, 4.1.4, 4.1.5 & Table 2; Rev 2. & 4.1 heading M. Mehandru
2005 06 24	Revised	Revised title on WSS-M2G316-B2; revised para 2, 3.4.3, 3.4.4, 3.5.2 and 4.3.3; added B5 M. Mehandru
2000 08 17	Activated	M. Black





3. REQUIREMENTS

3.1 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

Material suppliers and part producers must conform to the Company's Standard Requirements For Production Materials (WSS-M99P1111-A).

3.2 UNCURED ADHESIVE PROPERTIES

3.2.1 Rheology

(SAE J1524, rotational rheometer with 40 mm diameter parallel plates, 500 micron gap, 50 Pa/sec ramp, stress controlled rheometers use stress range 0 - 3500 Pa, strain controlled rheometers use strain range 0 - 100 sec-1, evaluate material to highest stress of strain as the formulation will allow, report material batch/lot number, identify rheometer make and model, for each test condition report yield stress and submit plots for shear stress vs shear rate, submit plot for viscosity vs temperature at mid-range shear rate.

3.2.1.1 Initial (as received)

Test at 23 +/- 1 °C

Test at application temperature +/- 2 °C

Test over range 10 to 50 °C at increments of 10 °C

3.2.1.2 Aged (Age then test at 23 °C and application temperature)

7 days at 40 +/- 1 °C

90 days at 32 +/- 1 °C

The rheology variation for any one supplier shall be +/- 30%, based on the recorded rheology of the original approved production sample. The flow curves established for initial approval shall constitute the reference standard and shall be kept on file at the designated material laboratory. All samples shall produce flow curves that correspond to the reference standard when tested under the same conditions.

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

3.2.2	Solids, min (ASTM D 2834, except heat for 3 h at 100 +/- 3 °C in a mechanical convection oven)	98%
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3.2.3	Ash, based on solids weight, max (ASTM D 482)	21%
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3.2.4	Weight per Volume (ASTM D 816)	
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The weight tolerance for any one supplier shall be +/- 0.02 kg/L based on the weight of the original approved production sample. Reference paragraph 4.5.



3.2.5 Sag, max 4 mm

Test Method:

- Apply a 76 mm long right triangular shaped bead of material 6 mm wide at the base and 15 mm high on a glass or steel panel.
- Permit the panel to air dry for 30 minutes at R.T. in a plane 60° angle from the horizontal. Measure the sag.

3.2.6 Sensitivity to Alcohol

CAUTION: Slight traces of alcohol will inhibit the cure of this adhesive. The use of alcohol or alcohol containing solvents is prohibited for cleanup or other uses.

▽ 3.2.7 Storage Stability

Shall be stored at ambient room temperature below 40 °C, away from all sources of heat, such as ovens, direct sunlight, etc. Shall not be stored outside. Under these storage conditions, the max shelf life to the material, from date of shipment from the supplier, shall be 3 months.

The supplier must label each container to indicate the expiration date of the material, and production usage beyond the expiration date is not permitted.

When stored at temperatures below 23 °C, it must be conditioned at R.T. for 72 h prior to use.

3.2.8 Odor

The material must not have a toxic or noxious odor. After curing, the material must be relatively non-odorous as defined by the affected assembly plant.

3.2.9 Fogging Test
(SAE J1756, 3 h @ 100 °C heating, 21 °C cooling plate, post test conditioning 1 and 16 hrs.)

Fog Number, min 70%

Any fog film present shall be examined for the formation of droplets or coalescence into a clear film. Such conditions, if present, shall be cause for rejection. Uncured and cured samples shall be tested.

3.2.10 Quality

Shall be a smooth homogeneous mixture free from foreign materials and properties detrimental to normal production operation.

▽ 3.2.11 Non-Interchangeability of Materials

Only approved materials, all from the same production (supplier) source, shall be used in conjunction with one another.



3.3 CURE RATE PROPERTIES

3.3.1 Tack Free

A 150 mm long and 6 mm diameter bead shall be tack free in 30 minutes and cured after 72 h at 23 +/- 2 °C, 50% +/- 5% R.H. Apply beads of adhesive to a clean float glass panel. Touch the bead gently using a cotton swab for tack free test. Cut the bead using a sharp razor blade for curing test.

3.3.2 Sandwich Tensile Pull Strength Versus Cure Time, min

Cure Time	Sandwich Tensile Pull Strength
1.5 hours	240 kPa
3.0 hours	517 kPa
6.0 hours	1.2 MPa
24.0 hours	2.5 MPa
72.0 hours	2.5 MPa

Test Method: Sandwich Tensile Pull Strength

- Prepare a minimum of 3 sandwich assemblies for each cure time tensile pull strength test as per Figure 2.
- Brush apply glass primer wipe onto float glass substrate in area where adhesive is to be applied. Wipe off with a clean cloth immediately after application.
- With 10 minutes maximum after glass primer wipe off, brush apply blackout glass primer to the glass surface in the same area. Condition primer at R.T. for 5 minutes min, 72 h max.
- Apply a 50 mm long by 6.4 mm diameter bead of adhesive to the primed glass, as illustrated in Figure 2. Within 5 minutes after adhesive application, position the adhesive on the glass coupon in contact with the painted metal surface (electrocoated panel may also be used). Maintain a 5 mm nominal adhesive bondline thickness.
- Condition assemblies same at R.T. for various cure times as indicated above.
- Determine the adhesion in a tensile machine having a jaw separation rate of 25 mm/minutes. Report strength value and mode of failure.
- See para 4.1, 4.2, 4.3, 4.4.