



PERFORMANCE, DIRECT GLAZING ADHESIVE, ONE COMPONENT, POLYURETHANE

WSS-M11P67-A1

1. SCOPE

This specification defined the performance requirement of a one component urethane adhesive which is primerless to clear coat paint chemistries, to clear glass and to ceramic frit qualities.

2. APPLICATION

This specification was released for material used to bond primerless glass windshields, glass rear windows and quarter windows to painted metal surfaces. These materials will bond primerless to clear coat paint qualities, to e-coated surfaces that are contaminate free and can also be used in conjunction with metal flange primers or glass primers.

3. REQUIREMENTS

3.1 APPROVED SOURCES

This specification is performance based and does not have approved sources. Approved sources are listed under their respective material specifications, see General Information.

3.2 SYSTEMS COMPONENTS

3.2.1 Substrates and Compatibility

The adhesive must be compatible with all related materials, e.g. top coat, clear coat, glass, ceramic paint, EC, primer surfacer, etc.

Note: If any other substrate gets relevant for manufacturing, the adhesive has to be tested according to this specification on this substrate. The adhesive supplier must certify compliance to all requirements of relevant adhesive and / or performance specification (test values, not nominal values).

3.3 PERFORMANCE PROPERTIES

3.3.1 Green Strength

0.1 MPa min

Test Method:

Prepare test specimens per SAE J1529, or FLTM BV 154-03, section B, para. 1 and 2.

Cure test specimens for 3 h at 23 +/- 2 °C and 50 +/- 5% RH

Determine shear strength according to para 3.3.2.

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3.3.2 Shear Adhesion

2.5 MPa min at -40 °C
2.5 MPa min at RT
1.5 MPa min at 90 °C

Test Method and Exceptions:

Prepare shear assemblies per SAE J1529 or FLTM BV 154-03 section B, para. 1 and 2. Adhesive has to be applied 4 hours after clear coat application unless approved by Materials Engineering. A minimum of 5 specimens shall be tested.

Test panels are to be prepared according to process standards of the adhesives, using production as well as repair enamel.

Dimension of test specimens: 100 x 25 x 6 mm float glass with ceramic coating
(∇ WSS-M99P6-C1/C2) Body steel specimens: 100 x 25 x 0.75 (+/- 0.5 mm).

Apply 8 mm overlap bead adhesive along the glass coupon surface. Within 5 minutes after adhesive application, position the adhesive on the glass coupon in contact with the painted metal surface. Maintain a 5 mm nominal adhesive bond line thickness.

Allow adhesive to cure for 7 days at standard atmosphere (23 °C, 50% RH).

Determine shear adhesion in a tensile machine having a jaw separation rate of 25 mm/minute. Report the shear strength value and mode of failure. No single value allowed below 2.5 MPa or 1.5 MPa depending on temperature. Paint delamination is allowed at values above 2.5 MPa.

Note: Any new paint system or ceramic coated glass must be tested for adhesion properties. Adhesion values and mode of failure shall be reported prior to approval and release for plant application.

Exposure Conditions - Bonded Test Assemblies:

- 3.3.2.1 Normal, test at R.T., -40 +/- 1 °C, and 90 +/- 2 °C
- 3.3.2.2 Aged, (Age 3 months at 35 +/- 2°C) test at R.T., -40 +/- 1 °C, and 90 +/- 2 °C
- 3.3.2.3 After Heat Aging, 1 week at 90 +/- 2 °C, and 1 hour at RT. Test at RT.
- 3.3.2.4 After Water Immersion, 240 h immersion at 32 +/- 1 °C (FLTM BI 104-01) Test at RT.
- 3.3.2.5 After Humidity Aging, 2 weeks at 98 +/- 2% relative humidity and 38 +/- 2 °C, and 1 hour at RT. Test at RT.
- 3.3.2.6 After Environmental Cycling

Test Method: Samples must be exposed four times to the following cycle in the sequence indicated below:

16 hours at 38 +/- 2 °C and 98 +/- 2% RH
4 hours at minus 40 +/- 1 °C
4 hours at 80 +/- 2 °C

After four cycles specimens to be stored at 23 +/- 2 °C for 72 hours before testing at RT.



After Cataplasma test

Test Method:

Test specimens to be wrapped with hydrophilic cotton patting and put into sealed containers of approximately 160 ml volume space with 100 ml distilled water to provide constant conditions for following storage:

14 days at 70 +/- 2 °C
2 hours at - 20 +/- 2 °C
2 hours at 23 +/- 2 °C

Remove wet cotton and test shear strength within 2 hours at RT. In case of paint failure before reaching minimum shear strength requirement, the test is to be rated as satisfactory and the result noted in the report.

3.3.2.8 After 2000 h Weatherometer (SAE J1885). Test at RT.

3.3.2.9 After 2 years Florida exposure, 5° South DWI. Test at R.T., -40 +/- 1 °C, and 90 +/- 2 °C

3.3.3 Static shear modulus 1.0 MPa min
(DIN EN 1465)

3.3.3.1 Original For test Conditions see 3.3.2.1.

3.3.3.2 After Heat Aging: For test Conditions see 3.3.2.3.

3.3.3.3 After Humidity Aging: For test Conditions see 3.3.2.5.

3.3.3.4 After Cataplasma Test: For test Conditions see 3.3.2.7.

3.3.4 Electrical Resistivity 1 x 10⁶ Ohm cm min
(DIN IEC 93)

3.3.4.1 Original: For test Conditions see 3.3.2.1

3.3.4.2 After Humidity Aging: For test Conditions see 3.3.2.5

3.3.5 Peel Adhesion (Quick Knife Adhesion)
(FLTM BU 154-01, use 9 mm x 13 mm x 254 mm.

After 7 days at 23 °C +/- 2 °C

Start testing at original conditions to 3.3.2.1

Continue testing of specimen by heat aging at conditions according to 3.3.2.3.

Continue testing of specimen by environmental cycling at conditions according to 3.3.2.6

Continue with cataplasma test at conditions according to 3.3.2.7

Evaluate for type of failure after every exposure.

The material shall exhibit 100% cohesive failure of the urethane to production pretreatment, electro-coat, spray primer and topcoat In case of paint failure, the test is to be rated as satisfactory and the result noted in the report.

