

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)		NUMBER: MPAPS K-6915
		Former Designation: TMS-6915
TITLE: Heat Curing Sealant, Body Cabs		CURRENT REV No.: 1512
		DATE: Dec. 2015
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<i>This specification may involve hazardous materials, equipment, and procedures. This specification does not purport to address all of the safety issues associated with its use. The user is responsible to consult appropriate safety and health practices and to determine the applicability of regulatory limits prior to use.</i>		
Change Notice: <i>Updated to MPAPS format, changed approved sources table; editorial changes</i>		

1.0 APPLICATION

This specification outlines the requirements for several types of non-solvent, heat-cured plastisol type sealants used in truck cab applications prior to finish paint.

2.0 SCOPE

This specification covers the general requirements, property and performance requirements, quality, source approval and quality control requirements for the various plastisol sealants, and all approved source lists.

2.1 Restricted Chemical Substances

Effective January 1, 2007, all product supplied to the requirements of this specification must comply with the requirements of the CEMS B-50 specification.

3.0 REFERENCE DOCUMENTS

Unless otherwise specified, the latest issue of all referenced standards shall apply. The following Specifications, Standards, and Regulations are referenced in this specification.

Quality System Standard ISO 9001 or TS-16949	NAVISTAR MPAPS P-9543	ASTM D5
CFR Title 29, Part 1910	NAVISTAR MPAPS G-5	ASTM D471
NAVISTAR Manufacturing Std. MS-D-13	NAVISTAR MPAPS K-6927	ASTM D2240
NAVISTAR Engineering Design Std A-16	NAVISTAR TMS-9013	ASTM D412
NAVISTAR CEMS B-50	NAVISTAR TMS-6925	ASTM B117
NAVISTAR MPAPS A-6	NAVISTAR MPAPS C-10	ASTM G154
NAVISTAR MPAPS GT-Paint	NAVISTAR TMS-9010	ASTM D792
SAE J243	NAVISTAR TMS 6916	ASTM D1000
SAE J1524	NAVISTAR MPAPS K-6900	SAE J1523

4.0 REQUIREMENTS

4.1 Description of Types

A description of the sealant types, their cure temperatures, and design guidance in the selection of the proper type to be used in each application, is included in the General Information (section A.0) at the end of this specification.

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4.2 Uncured Sealant Properties

The requirements for uncured sealant properties have been outlined in Table 3 at the end of this specification.

4.2.1 Solids

4.2.1.1 Method: SAE J243 Procedure ADS-7, Method A

4.2.1.2 Required: See table 3.

4.2.2 Density

4.2.2.1 Method: ASTM D792, Method A

4.2.2.2 Required: See table 3.

4.2.3 Viscosity

4.2.3.1 Method A: SAE J243, Procedure ADS-1, Agitated - Conditioning Method C, Pressure Flow Method (Unless Otherwise Indicated), 275 kPa (40 psi), $25 \pm 1^\circ\text{C}$ ($77 \pm 2^\circ\text{F}$), 20 g.

4.2.3.1.1 Types I, III, IIIA, IIIB, VI: 2.64 mm (0.104 in) Orifice

4.2.3.1.2 Type IL, IIA: 1.32 mm (0.052 in) Orifice

4.2.3.2 Method B: (Types II, IIL only) SAE J243, ADS-1, Test 2.2 Brookfield, spindle 7, 50 RPM

4.2.3.3 Method C: (Types IV, IVL only) ASTM D5 Penetration Method, 100 g T.M.L., 5 sec.

4.2.3.4 Required: See table 3.

4.2.4 Aged Viscosity

4.2.4.1 Method: Age sample at $43 \pm 1^\circ\text{C}$ ($110 \pm 2^\circ\text{F}$) for 72 hours. Test per corresponding method on section 4.2.3.

4.2.4.2 Required: See table 3.

4.2.5 Process Compatibility and Topcoat compatibility for other types.

Uncured, Type III sealer/adhesive shall remain in joints without flow or washout through the spray and immersion stages of pre-treat and E-coat as required under TMS-9013. It shall be the supplier's responsibility to work with E-coat primer and pretreatment suppliers to determine that Type III sealer/adhesive will not cause contamination of these process baths.

4.2.6 Cleaning

The uncured sealant shall clean readily from metal surface, without streaking, when wiped with a cloth dampened with mineral spirits or isopropanol.

4.2.7 Odor

It shall be the supplier's responsibility to determine that the constituent material and finished product are deemed to be non-objectionable and meet all safety standards.

4.2.8 Storage Life

This material shall have a storage life of no less than 90 days when stored at a temperature less than 32°C (90°F) without thickening or having a deleterious effect on the performance of the product. Agreements must be made between the supplier and user as to satisfactory storage life of the material in the event longer storage periods are required.

4.3 Property and Performance Requirements

4.3.1 Sample Preparation

A minimum of five samples shall be prepared for each condition tested. The surface condition tested should be representative of production conditions and must be fully described in the test report. The cure conditions should match production conditions as closely as possible and shall be described fully in the test report.

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4.3.1.1 Temperature: Times and temperatures used should represent actual bond line conditions rather than the indicated temperatures of the heating elements or the oven air temperature. The oven bake schedules per facility are outlined on table 1 at the end of this specification.

4.3.2 Cure Temperature Cycle

Materials shall be tested at both minimum cure and in an **over-cure** condition by heating in a hot air circulating oven for 60 minutes at the **maximum** of the cure temperature range and for 20 minutes at the **minimum** of the cure temperature range.

Material Type	Cure Temperature:
Types I, II, IV	138°-165°C (280°-330°F)
Types IL, IIL, IVL	120°-135°C (248°-275°F)
Type IIA	130°-140°C (266°-284°F)
Types III, IIIA, IIIB, IIIC, VI	160°-190°C (320°-374°F)

4.3.3 Aluminum Surface Preparation

Three sets of five samples of aluminum test samples shall be made for each condition tested. Prepare samples from aluminum sheet 5052-H32* per MPAPS C-10. Using a solvent (acetone), clean substrate samples thoroughly. The first set shall be tested clean. The second set shall have a light oil coating, as in steps 4.3.3.6 and 4.3.3.7 listed below. The third set shall be prepared in the following manner:

4.3.3.1 Prepare samples from Aluminum sheet 5052-H32* per MPAPS C-10.

4.3.3.2 Clean samples thoroughly with acetone.

4.3.3.3 Apply Mill Oil (Ashland Tectyl 900)** liberally to the bonding surface.

4.3.3.4 Wipe oil off surface with a clean, soft, paper lab towel. A light oil residue should remain.

4.3.3.5 Bake samples for four (4) hours at 200°C (392°F).

4.3.3.6 Apply Drawing lubricant (Quaker 61AUS)** liberally to the bonding surface.

4.3.3.7 Wipe oil off surface with a clean, soft, paper lab towel. A light oil residue should remain.

4.3.3.8 Prepare test samples as required.

** Other grades of aluminum may be used in production. Testing other aluminum grades is not required for qualification but may be necessary in some special cases. Contact Materials Engineering for further information.*

*** Other lubricants will be used in production. Sealants and lubricants shall be compatible with each other. Testing compatibility shall be the responsibility of the supplier of the new material. The Plant Metallurgist and/or Quality Control Engineer at the Navistar Body Plant in Springfield, Ohio, maintain a list of approved lubricants.*

4.3.4 Steel Surface Preparation

Two sets of five samples of electro galvanized steel (Steel, Grade 1GALV, EG60G60GE, per MPAPS A-6, Part II) test samples shall be made for each condition tested. Prepare samples from electro galvanized steel*. Using a solvent (acetone), clean substrate samples thoroughly. The first set shall be tested clean. The second set shall have a light oil coating, as in steps 4.3.3.6 and 4.3.3.7 listed under Section 4.3.3, Aluminum Surface Preparation.

**Other grades of steel may be used in production. Testing other steel types is not usually required but may be necessary in some cases.*

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4.3.5 E-coat Surface Preparation

Materials to be used over E-coat must be tested with current E-coat substrate using a nine-condition test matrix. This matrix tests the adhesion of the sealant to E-coated panels which have been exposed to nominal oven conditions of 30 minutes at 175°C (350°F), over-bake conditions of 60 minutes at 200°C (390 °F), and under-bake conditions of 15 minutes at 160°C (325°F). This matrix also includes test conditions in which the E-coat film thickness is varied at 0.6 mil, 0.9 mil, and 1.2 mil. Ten (10) 4"x12" panels shall be prepared at each condition. See table 2 for bake schedules per condition.

4.3.6 Shear Strength

4.3.6.1 Method: SAE J1523 with shear lap measured using two metal coupons as specified 25 x 100 mm (1 x 4 in), lapped 25 mm (1 in) with the specified bond line thickness, cured and pulled at a rate of 50 mm (2 in) per minute. Aluminum and steel samples shall be prepared as noted above.

4.3.6.1.1 Type I, IL, II, IIA, IIL, IV, IVL: 0.76 mm (0.03 in) thick bond line with E-coat primed steel

4.3.6.1.2 Type III, IIIA: 0.25 mm (0.01 in) thick bond line with aluminum

4.3.6.1.3 Type IIIB: 0.25 mm (0.01 in) thick bond line with electro galvanized steel

4.3.6.2 Required: See table 4.

4.3.7 Corrosion

4.3.7.1 Method: ASTM B117 salt spray test-100 hours, on coupons prepared for shear strength test.

4.3.7.2 Required: See table 4.

4.3.8 Humidity

4.3.8.1 Method: Expose specimens prepared for shear strength to 500 hours of humidity conditions per MPAPS GT-Paint, method 7E. Test residual strength.

4.3.8.2 Required: See table 4.

4.3.9 Staining (Types I, IL II, IIA, IIL, IV and IVL only)

Materials shall be tested under both methods

4.3.9.1 Method A: Apply sample to E-coat primed panels [100 x 200 mm (4 x 8 in)] and cure (unless a wet-on-wet system approval is requested). Paint per MPAPS G-5, Grade -18 (white) and cure paint for 30 minutes at 121°C (250°F). Subject panel to 2500kJ/m² in Xenon Weatherometer exterior cycle per MPAPS GT-31 Method B.

4.3.9.2 Method B: Apply sample to E-coat primed panels [100 x 200 mm (4 x 8 in)] and cure (unless a wet-on-wet system approval is requested). Paint per MPAPS G-5, Grade -18 (white) and cure paint for 30 minutes at 121°C (250°F). Subject panel to 500 hours in QUV-B Test per MPAPS GT-31 Method D.

4.3.9.3 Required: See table 4.

4.3.10 Low Temperature Adhesion

4.3.10.1 Method: SAE J243 procedure ADS-2, Method B, at -29°C (-20°F), 1.0 inch (25 mm) diameter mandrel, .060 inch (1.5 mm) sealer thickness x 1.0 inch (25 mm) wide band applied to 4" x 12" (100X300mm) panel of metal used for shear strength.

4.3.10.2 Required: See table 4.

4.3.11 Shrinkage (Not applicable to Types IIIA, IIIB and VI)

4.3.11.1 Method: Fill small, flat container 50 mm diameter x 6 mm height (2 in diameter x 1/4 in height) with sealant material and subject leveled product to maximum curing temperatures for 40 minutes. Observe at room temperature.

4.3.11.2 Required: See table 4.

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