

NAVISTAR INC		
TMS (TRUCK MATERIAL SPECIFICATION)		NUMBER: TMS-6933
TITLE: Wood Joining Adhesives		Current Rev. No.: 1010 Date: OCTOBER 2010
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Change Notice: NEW		
Reference: File 30-1	Keywords: Adhesive, adhesive bonding, laminated wood, bus.	

1.0 APPLICATION

This specification covers adhesive systems used for bonding joints in laminated wood materials and the requirements of the joint. This specification covers both joints pre-bonded by suppliers and those bonded in the factory.

2.0 SCOPE

This specification covers the material properties, performance requirements, production quality and process control, supplier's responsibility, source approval and quality control, and sources for the approved adhesive systems.

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 applies. The following specifications, standards, and regulations are referenced herein.

Quality System Standard <i>ISO 9001 or TS-16949</i>	ASTM E 132
NAVISTAR Manufacturing Std. MS-D-13	ASTM D 198
NAVISTAR Eng. Design Std. A-16	ASTM D 1002
CFR Title 29, Section 1910	ASTM D 1037
NAVISTAR TMS-9543	ASTM D 1101
NAVISTAR TMS-6041	ASTM D 1183
NAVISTAR CEMS B-50	SAE J243

4.0 GENERAL REQUIREMENTS

Adhesive materials supplied to this specification shall bond the intended substrates to produce a permanent bond. The general properties of as-received materials are listed in Table 3. Adhesive materials supplied to this specification shall be compatible with current production materials and processes for which the new adhesive approval is sought, including resistance to plasticizer migration. It is the responsibility of the adhesive supplier to insure compatibility of the new adhesive materials with the Assembly Plant's product materials and processes and obtain approval from the Production Process Manager of the assembly plant for the use of new adhesive materials.

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4.1 Liquid Properties

Specific requirements are to be determined between the material supplier, equipment supplier, and the applicator.

Requirement:	Typical Test Method
Solids	SAE J243 Procedure ADS-7, Method A
Viscosity - Method A	SAE J243, Procedure ADS-1, Agitated - Conditioning Method C, Pressure Flow Method 275 kPa (40 psi), 25 ± 1°C (77 ± 2°F), 20 g.
- Method B	SAE J243, Procedure ADS-1, Agitated - Conditioning Method C, Test 2.2 Brookfield, spindle 7, 50 RPM

4.2 Sample Preparation

A minimum of five samples shall be prepared for each condition tested. The surface condition tested shall be representative of production conditions and fully described in the test report. The type and geometry of the wood joint should be clearly recorded and documented in the test report. The samples will measure 3 in wide if greater than or equal to ¼ in thick, and 2 in wide if thickness is less than ¼ in. The final length of the sample before testing will be 2 in plus 24 times the thickness of the sample being tested with the joint located in the middle of the specimen. Samples should be conditioned for 72 hours after preparation in ambient room temperature and humidity before testing. The test sample geometry may vary as necessary for each test to conform to the specified test method, but any deviations are to be stated in the final report. The test sample geometry, including joint type, must be fully described and documented in the Qualification Report (see Section 5.0). The adhesive application conditions (applied pressure, dwell time, and temperature) should match production conditions as closely as possible and will be fully described in the Qualification Report. The failure mode and failure load for each sample will be reported and data summaries, including average values and standard deviations for each test, will be included in the Qualification Report. Any discarded test result must be noted and reasons for discarding the result fully explained in the report.

4.3 Property And Performance Requirements

4.3.1 Three Point Bend Test

4.3.1.1 Method: ASTM D 1037. The joint should be located at the center of the sample. The sample should overhand each end support contact by 1 in on each side and the joint should be centered on the load imparting contact. The sample length and the loading speed are dependent upon the thickness of the material and are listed in Table 1.

4.3.1.2 Required: See Table 2. Report failure mode.

4.3.2 Water Immersion

4.3.2.1 Method: Immerse coupons prepared in 4.2 *Sample Preparation* for bend test in water at 25°C (77°F) ± 2°C (3.6°F) for 168 hours. Test as directed in 4.3.1

4.3.2.2 Required: See Table 2. Report failure mode.

4.3.3 Heat-Aging

4.3.3.1 Method: Prepare samples for bend test as directed in 4.2 *Sample Preparation*. Age in a recirculating air oven for 168 hours at 90± 2°C (194± 3.6°F).

4.3.3.2 Required: See Table 2. Report failure mode.

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