

NAVISTAR INC		
TMS (TRUCK MATERIAL SPECIFICATION)		NUMBER: TMS-9559
TITLE: Adhesive Tear Down and Separation Testing Methods		CURRENT REV. No.: 1012 DATE: December 2010
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Reference:	Keywords:	

1.0 APPLICATION

This specification describes the method to be used for performing both tear down and separation tests on adhesive joints.

2.0 SCOPE

This specification describes the test methods, pass/fail criteria, qualification, source approval and quality control, shipping, packing and identification, designation on drawings, and contact information.

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 ISO 9001 or TS-16949
CFR Title 29, Part 1910 TMS-6929
NAVISTAR Mfg Std MS-D-13

CEMS B-50
TMS-6900

4.0 GENERAL REQUIREMENTS

4.1 Test Methods

4.1.1 Destructive Tear Down

To allow better access, a reciprocating saw can be used to cut apart the piece being tested anywhere between 5–30 cm above the joint where the two joint members are bonded in order to remove the scrap portion. After the excess material has been removed, the joint is to be taken apart. To break apart the joint, a crow bar, or similar instrument of destruction, will be used to forcefully separate the cab body and roof sections. Once the sections of the joint have been forced apart, they will be inspected per section 4.2 of this specification.

4.1.1.1 If it is desired that minimal damage be done to the cab, heat can be used to ease the separation of the joint. If this method is used, the inspection cannot be used as a valid adhesion test.

4.1.2 Adhesive Bead Evaluation by Release Method

In order to determine the wet out and squeeze out patterns of adhesive beads, a release evaluation can be done. This is done by coating both sides of the joint members with a release agent to prevent

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adhesion. The preferred release agent is Poly Vinyl Alcohol (PVA). Wax can be used but should not be used on parts to be baked as it can cause paint contamination on other parts in the oven. Silicone release agents are not to be used in situations where any possibility of contact with parts that are to be painted exists. After applying the release agent, assemble the joint according to the standard assembly process. Once the adhesive has cured, pull the joint apart and document the adhesive bead dimensions, coverage, and level of compression using calipers and digital photographs.

4.1.3 Quick Knife Adhesion Testing

This method is to be used for elastomeric type adhesives. Cut the joint apart down the center of the adhesive bead to separate the joint being tested. Once the joint has been separated, testing can be performed on any section of adhesive remaining bead thickness greater than 3mm. Both substrates in the joint should be tested if at all possible. While pulling back on the adhesive bead at an angle between 130° and 160°, cut the base of the adhesive down to the substrate with a razor blade. Continue pulling the bead back and cutting the adhesive until there is adhesive failure or the bead tears. Report the method of failure and photograph the sample.

4.2 Pass/Fail Criteria

4.2.1 FRP Surfaces

For all FRP surfaces, typically the roof section, the following criteria must be met to pass:

1. The bond line should yield a minimum of 75% fiber tear as a failure mode.
2. The remaining 25% or less of failure modes shall be cohesive failure of the adhesive material.
3. For any given 250 mm linear section of adhesive, there can be no more than 50 mm total adhesive failure.
4. For any given 250 mm linear section of adhesive, there can be no more than 25 mm total bond void.

4.2.2 Metal Surfaces

For all metal surfaces, typically the cab section, the following criteria must be met to pass:

1. The bond line should yield a minimum of 75% cohesive failure of the adhesive.
2. For any given 250 mm linear section of adhesive, there can be no more than 50 mm total adhesive failure.
3. For any given 250 mm linear section of adhesive, there can be no more than 25 mm total bond void.

4.2.3 Pressure Sensitive Adhesives

For all joints bonded with a pressure sensitive adhesive, the following criteria must be met to pass:

1. The bond line should yield a minimum of 75% wet out of the adhesive.
2. For any given 250 mm linear section of adhesive, there can be no more than 50 mm total adhesive failure.
3. For any given 250 mm linear section of adhesive, there can be no more than 25 mm total bond void.

5.0 QUALITY

5.1 Qualification

Material and processes submitted for approval to this specification shall include the following:

5.1.1 Report: A detailed, signed test report documenting testing to this specification per TMS-9543.

5.1.2 Failure Modes: Test coupons or photographs showing failure modes for each test.

5.1.3 Test Procedure: The complete procedure used for preparing and curing materials for test, especially surface preparation, condition of the test cab, and bonding materials used.

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