

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)		NUMBER: MPAPS L-6044
		<i>Former Designation: TMS-6044</i>
TITLE: Rear Hood Mounting		CURRENT REV No.: 1702
		DATE: Feb. 2017
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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>		

1.0 APPLICATION.

This specification covers elastomer rear hood mounts. These types of parts can be produced using various processes as may be dictated by the particular application and/or design.

Type I – Urethane hood support either cast or molded.

Type II – Urethane hood support, softer than Type I

Type III – Injection Molded EPDM hood support with an internal lubricant.

2.0 SCOPE

This specification covers the general requirements, property and performance requirements and quality.

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 MPAPS B-50 specification.

3.0 REFERENCE DOCUMENTS

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

Quality System Standard <i>ISO-9001 or TS-16949</i>	ASTM D 5592	ASTM D 2137
NAVISTAR Engineering Design Std. A-16	ASTM D 412	ASTM D 2240
CFR 29, Part 1910	ASTM D 624	ASTM D 395
NAVISTAR Supplier Packing and Shipping Std. D-13	ASTM D 925	ASTM D 325
NAVISTAR MPAPS P-9543	ASTM D 1894	ASTM D 2228
NAVISTAR MPAPS G-9009	ASTM D 925	ASTM D 2000
NAVISTAR MPAPS B-50	ASTM D 573	ASTM D 865
NAVISTAR MPAPS A-6, Part I	ASTM B 117	

4.0 GENERAL REQUIREMENTS

4.1 Color

Shall be black unless otherwise specified on the engineering print.

4.2 Finish

Parts shall be free of pin-holes, blow-holes, bubbles, mold flash and present a smooth exterior surface. Painted steel shall meet requirements of MPAPS G-9009 Class IIA.

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4.3 Steel

Shall meet requirements of MPAPS A-6, Part I, Grade 1 or 2, unless otherwise specified.

4.4 Material Properties – Elastomers

Test samples should be taken from finished parts. Samples from finished parts are preferred even when the referenced test method is for slab samples. Values shown in Table 1 are minimum values unless shown as a range. Requirements shown in the tables are based upon the following methods:

4.4.1 Hardness: ASTM D 2240 – Type A or D. All values are ± 3 points from specified value.

4.4.2 Tensile Strength: ASTM D 412, Die C. Reported as MPa.

4.4.3 Elongation: ASTM D 412, Die C. Reported as % elongation.

4.4.4 Tear Resistance: ASTM D 624, Die B. Reported as kN/m.

4.4.5 Compression Set: ASTM D 395, Method B, 22 hours. Reported as maximum % set.

4.4.6 Low Temperature Brittleness: ASTM D 2137, Method A, Non-Brittle at -40°C (-40°F) unless otherwise designated.

4.4.7 Ozone Resistance: ASTM D 1171, Method B, Expose samples to 70 hours of 100 mPa (0.0000145 psi) ozone partial pressure at 38°C (100°F).

4.4.8 Adhesion: ASTM D 429, Method A. This test applies to any bonded assembly. All fracture modes are to be cohesive fractures or fracture through the substrate. The Qualification Test Report will include the fracture loads reported as Mpa values, tested at standard lab conditions. Any adhesive failure modes shall be noted and explained in the report

4.4.9 Abrasion Resistance: Pico Abrasion per ASTM D 2228. 4.5 kg load, 80 revolutions at 1 Hz. Calculate and report standard and Pico index.

4.4.10 Staining Resistance: This requirement is *temporarily* ASTM D 925, Method B, to be consistent with ASTM D 2000 classifications.

4.4.11 Coefficient of Friction: ASTM D 1894 – Perform against mating material (contact Materials Engineering for assistance). Report static and kinetic results.

4.5 Aged Properties

Test samples shall be taken from finish parts whenever possible.

4.5.1 Heat Resistance: ASTM D 573 or ASTM D 865, age samples for 168 hours at 70°C.

4.5.2 Salt Spray/Adhesion ASTM B 117 salt spray test for 100 hours. Test per **4.4.8 Adhesion**.

4.5.3 Heat Aged/Adhesion Age test samples for the time, temperature and method specified in **4.5.1 Heat Resistance**. Perform test as per **4.4.8 Adhesion**.

4.6 Property And Performance Requirements

The need for these tests, and details of the specific tests to be performed, will be indicated on the Engineering drawing for the part or assembly. Additional details of the testing may be included in the Engineering Validation Plan for these parts. Unless otherwise specified all tests shall be performed on finished parts. Test fixtures, replicating, as closely possible, the production usage and intent shall be built. Details of the test fixtures, including engineering drawings and pictures shall be included in the supplier's qualification report (see Section 5.1).

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4.6.1 Rub Test

Test samples shall be fixtured so that the rubber and the bracket have a 2mm (0.078in) interference fit. The part shall be tested at a rate of 10Hz for 1,000,000 cycles. Each specimen shall be weighed before and after testing.

4.6.2 Knock Test

Test samples shall be fixtured so that the rubber is cycled from side to side at a rate of 10Hz contacting the bracket during each cycle. The part shall be tested for a total of 1,000,000 cycles.

4.6.3 Static Compression Deflection: ASTM D 575 Test, Method A, except that a finished part shall be used. The direction and amount of deflection shall be indicated on the engineering drawing or taken from production installation.

4.6.4 Dynamic Spring Rate and Damping; ASTM D 5992. The engineering drawing will indicate:

4.6.4.1 The set-up procedure or test configuration including the part numbers of other components required to complete the test set-up configuration.

4.6.4.2 Direction of test.

4.6.4.3 Preload.

4.6.4.4 Amplitude.

4.6.4.5 Frequency.

4.6.4.6 Temperature of test.

4.6.4.7 Spring rate required with tolerance (if a tolerance is not noted it shall be assumed to be $\pm 5\%$).

4.6.4.8 Damping required with tolerance (if a tolerance is not noted it shall be assumed to be $\pm 5\%$).

4.6.5 Dynamic Fatigue: ASTM D 5992 except as required for durability cycle. The engineering print shall indicate the following:

4.6.5.1 The set-up procedure or test configuration including the part numbers of other components required to complete the test set-up configuration.

4.6.5.2 Direction of test.

4.6.5.3 Preload⁽¹⁾.

4.6.5.4 Amplitude⁽¹⁾.

4.6.5.5 Frequency⁽¹⁾.

4.6.5.6 Duration of test⁽¹⁾.

4.6.5.7 Temperature of test.

4.6.5.8 Spring rate required with failure tolerance⁽²⁾ (tolerance is $\pm 10\%$ if not otherwise indicated).

4.6.5.9 Damping required with failure tolerance⁽²⁾ (tolerance is $\pm 10\%$ if not otherwise indicated).

⁽¹⁾ In many cases this procedure may be described in a block cycle requiring multiple/different inputs. In such case a separate reference on the Engineering drawing should be made to the Engineering validation test plan and the required test profile fully described in that document.

⁽²⁾ Exceeding the failure tolerance is the criteria used to determine component failure.

5.0 QUALITY

All parts supplied to this specification shall be uniform in appearance and free from pinholes, blowholes, bubbles, and mold flash. No change in the formulation shall be made by the supplier without prior approval of Materials Engineering, Truck Development and Technology Center.

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