

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)		NUMBER: MPAPS L-6038
		Former Designation: <i>TMS-6038</i>
Rubber Hood Straps		CURRENT REV No.: 1602
		DATE: Feb. 2016
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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: Supersedes TMS 6038; Corrected Type I load requirements in Table 2; Defined material property sampling requirements for Table 3		

1.0 APPLICATION

This specification covers rubber straps that are used as hood straps. These types of parts can be produced using various processes as may be dictated by the particular application and/or design.

- Type I – Injection Molded EPDM for DuraStar, ProStar and WorkStar Hood (Part # 3544924C1)
- Type II – Injection Molded EPDM for HX (SBA), TranStar, LoneStar, TerraStar, AE Bus, 5900 SBA w/DEAC Hoods (Part # 3811831C1)
- Type III – Injection Molded EPDM for CE Bus Hoods (Part # 499523C3)
- Type IV – No Active Usage (Part # 556947C2)
- Type V – No Active Usage (Part # 3577832C1)
- Type VI – Injection Molded EPDM for 9100, 9200, 9400, 9900, HX (SFA), 5900 SFA Hoods (Part # 3604378C1)

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>	CFR 29, Part 1910	ASTM D 2137
NAVISTAR Engineering Design Std. A-16	ASTM D 412	ASTM D 2240
NAVISTAR Manufacturing Std. MS-D-13	ASTM D 624	ASTM D 3395
NAVISTAR MPAPS-9543	ASTM D 925	ASTM D 325
NAVISTAR MPAPS B-50	ASTM D 429	

4.0 REQUIREMENTS (All Grades unless otherwise indicated)

4.1 General Requirements

4.1.1 Color

Shall be black or charcoal gray in color.

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4.1.2 Finish

Parts shall be free of pin-holes, blow-holes, bubbles, mold flash and present a smooth exterior surface.

4.2 Property and Performance Requirements

4.2.1 Nick Resistance

4.2.1.1 Method: Cut a 5mm nick into the center of the strap on one of the radii with a razor blade (see Figs. 1 & 2). Bend the strap back on itself 180 degrees with the nicked surface to the outside of the bend (Types I and II), or use a 1.25" diameter mandrel to bend back the strap (Types III, IV, V and VI).

4.2.1.2 Required: No breakage or tearing of the strap is permitted.



Fig. 1. Types I and II

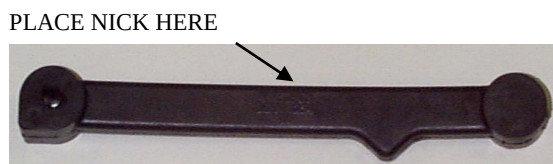


Fig. 2. Types III, IV, V and VI

4.2.2 Heat Aging

4.2.2.1 Method: Measure and record the length of three samples in the unlatched position at ambient temperature. Precondition each sample by latching and unlatching them twenty times each. Place the three samples in the latched position and then condition them in a recirculating oven set at 71°C for one week. Remove the samples from the oven and let cool in the unlatched position. After one hour, measure and record the length of the samples in the unlatched position. Latch samples and return them to the oven. Repeat and record for eight weeks.

4.2.2.2 Required: The straps must return to within 3mm of their original length each time the straps are measured throughout the eight week process.

4.2.3 Cyclic Test

4.2.3.1 Method: Precondition nine test samples (three each) in the following temperatures for 16 hours: -29°C, +23°C and 60°C, then flex the hood strap ten times to its maximum design displacement while at those conditions.

Type	Maximum design displacement/Extension
Type I	29.2 mm
Type II	31.8 mm
Type III	53.3 mm
Type IV	89.0 mm
Type V & VI	78.0 mm

4.2.3.2 Required: Each sample shall meet the load deflection requirement of the Load at Design Latch Point (See Table 1) on the tenth extension (see Fig. 3) and shall then meet a minimum ultimate breaking strength.

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<u>Type</u>	<u>Minimum ultimate breaking strength</u>
Type I	1330 N (300 lbs)
Type II	1112 N (250 lbs)
Type III	1334 N (300 lbs)
Type IV	1112 N (250 lbs)
Type V	1334 N (300 lbs)
Type VI	2001 N (450 lbs)

Table 1. Required Load at Design Latch Point for Cyclic Test

Type	Design Latch Point	Temperature		
		-29° C	+23° C	60° C
Type I	Load (Newtons) during 10 th pull at 16.5 mm stretch	535 max.	340 +45,-25	180 min.
Type II	Load (Newtons) during 10 th pull at 25.4mm stretch	680 max.	410 ± 45	320 min.
Type III	Load (Newtons) during 10 th pull at 34.3mm stretch	535 max.	245 +45,-25	180 min.
Type IV	Load (Newtons) during 10 th pull at 40.6mm stretch	265 max.	249 ± 45	220 min.
Type V	Load (Newtons) during 10 th pull at 40.6mm stretch	370 max.	305 ± 45	295 min.
Type VI	Load (Newtons) during 10 th pull at 40.6mm stretch	435 max.	375 ± 45	295 min.

4.2.4 Load Decay

Method: Precondition three test specimens at ambient temperature by flexing to the Displacement at Design Latch Point position length (Item C, Table 2) ten times. On the tenth pull, record the load from load frame while flexed to latch position (see Fig. No. 4). On the eleventh pull, hold the strap in the latched position for 1 hour and record the final load prior to release.

Required: Decay must not exceed 20% of initial value of load recorded on the 10th pull.

4.2.5 Low Temperature Flexibility

Method: Measure the length of three straps at ambient temperature. Place the straps in the latched position and then condition them for 16 hrs at -40°C. Remove one sample from the freezer, then unlatch and measure the length within three seconds. Repeat and record the length for the other samples.

Required: The final length of each sample must be within 4.8 mm of the initial measurement.

4.2.6 Adhesion

Method 1: Applicable to any mold bonded components, ASTM D 429 Method A

Required: 1.4 MPa minimum.

Method 2: Types IV, V and VI only – Fixture parts in truck position and pull to ultimate failure.

Required: There shall be no loss of adhesion of the washer when parts are stretched to their breaking point.