

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)		NUMBER: MPAPS- F-6042
		Former Designation: TMS-6042
TITLE: Brake Hose, Low Pressure, Hydraulic		CURRENT REV No.: 1604
		DATE: April 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: Replacement for TMS 6042, Editorial changes		

1.0 APPLICATION

This specification covers low-pressure hydraulic brake hose suitable for use with DOT 3 brake fluid using clamped or fitted connections.

2.0 SCOPE

This specification covers the general requirements, identification, property and performance requirements, and source approval and quality control.

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 specifications, standards, and regulations are referenced in this specification.

Quality System Standard <i>ISO 9001 or TS-16949</i>	NAVISTAR MPAPS F-2	ASTM B 117
NAVISTAR Manufacturing Std. MS-D-13	NAVISTAR MPAPS P-9543	ASTM D 380
NAVISTAR MPAPS C-3	CFR Title 29, Part 1910	ASTM D 471
NAVISTAR MPAPS A-0, Part I and II	SAE J30	ASTM D 622
NAVISTAR MPAPS G-20	SAE J526	ASTM D 3884
MPAPS B-50	SAE J1019	ASTM G 154
	SAE J1873	

4.0 GENERAL REQUIREMENTS

4.1 Hose Construction

This hose shall consist of a smooth-bore tube of non-plasticized EPDM reinforced with one ply of braided, knit, or woven rayon yarn or two-ply counter directional helically wound rayon yarn and covered by an outside layer of non-plasticized EPDM. This hose is available as either bulk, straight hose or as formed (curved) hose and may be assembled with either clamps or with crimped fittings.

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APRIL 2016

NUMBER: MPAPS F-6042	TITLE: Brake Hose, Low Pressure, Hydraulic	REVISION: 1604
--------------------------------	--	--------------------------

4.2 Fittings

The hose fittings shall be permanently attached ends of brass or coated steel.

4.2.1 Brass: Shall be C36000 (half hard), C34500, C35000 for bar or extruded stock or C37700 for forgings as per MPAPS C-3.

4.2.2 Steel: Shall meet the requirements of Code 0-115 per MPAPS A-0, Part II. Flareless type ferrules shall be made from steel meeting the requirements of Code 0-100 or Code 0-115 as per MPAPS A-0, Part II and will be zinc plated per MPAPS G-20, Class 6A. Tubing shall be per SAE J526 and will have a corrosion resistant coating viable for 500 hours salt spray per ASTM B117.

4.3 Dimensions and Tolerances

Unless otherwise specified, hose shall meet the dimension and tolerance requirements shown in Table 1.

TABLE 1. DIMENSIONS AND TOLERANCES

Nominal ID	Inside Diameter	Outside Diameter
Inches	in. (mm)	in. (mm)
9/32	.281 ± .020 (7.16 ± .5)	.480 ± .020 (12.2 ± .5)
5/16	.315 ± .020 (8.0 ± .5)	.630 ± .020 (16.0 ± .5)
3/8	.394 ± .020 (10.0 ± .5)	.709 ± .024 (18.0 ± .6)
5/8	.594 ± .024 (15.1 ± .6)	.909 ± .024 (23.1 ± .6)

4.4 Property and Performance Requirements

All tests shall be in accordance with ASTM D380 or ASTM D622 as appropriate unless otherwise specified.

4.4.1 Original Properties

Tensile	Tube and Cover	8.0 MPa (1160 psi) minimum
Elongation	Tube and Cover	250% minimum
Adhesion	All Plies	2.0N/mm (11.4 lbf/in) width minimum
Burst Strength	All Sizes	2.0 MPa (290 psi) minimum
Assembly Tensile Strength	All Sizes	1.45 kN (325 LB) minimum – crimp only

4.4.2 Cold Flexibility

4.4.2.1 Method

Perform test on unaged hose, and on brake fluid aged hose [70 hours @125°± 2°C (257°± 5°F)]; perform Cold Flexibility test per SAE J30 method for SAE30R7 hose.

4.4.2.2 Required

The hose shall not show any cracks, checks, or breaks in the tube or cover. Shall pass a proof test [hold 1.0 MPa (145 psi) pressure for 30 seconds without leakage or failure].

4.4.3 Vacuum Collapse

4.4.3.1 Method

4.4.3.1.1 Install a 45 cm (18 in) length of hose on a test fixture. The test fixture shall hold both ends rigidly with the hose suspended between the ends.

4.4.3.1.2 Measure the OD at several locations and mark these locations.

4.4.3.1.3 Heat soak hose and fixture in a forced convection oven for 4 hours at 125°± 2°C (257°± 5°F).

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APRIL 2016

NUMBER: MPAPS F-6042	TITLE: Brake Hose, Low Pressure, Hydraulic	REVISION: 1604
--------------------------------	--	--------------------------

4.4.3.1.4. While still at temperature in the oven, apply a vacuum to an absolute pressure of 3 millibars (maximum pressure) all sizes.

4.4.3.1.5 Measure the OD at the marked locations while under vacuum.

4.4.3.2 Required:

Diameter shall not decrease by more than 20% during application of a vacuum.

4.4.4 Aged Properties

4.4.4.1 Method - 1

Expose hose sample for 600 hours at $125 \pm 2^{\circ}\text{C}$ ($255 \pm 5^{\circ}\text{F}$), while wrapped 180° over a mandrel with a diameter of 10X the nominal OD. After exposure, remove and slowly straighten (taking 4 to 8 seconds).

4.4.4.1.1 Required:

Sample shall show no cracks, charring or disintegration externally or internally.

4.4.4.2 Method - 2

Expose samples for 70 hours at $125^{\circ}\pm 2^{\circ}\text{C}$ ($255^{\circ}\pm 5^{\circ}\text{F}$)

4.4.4.2.1 Required

4.4.4.2.1.1 Tube and cover: Tensile change = -20% max

4.4.4.2.1.2 Tube and cover: Elongation change = -60% max

4.4.4.2.1.3 Tube and cover: Hardness change = -5, +20 pts

4.4.5 Kink Resistance - Bulk Hose Only

Same as SAE J30 for SAE30R7 hose, except as indicated in Table 2.

TABLE 2

Nominal Hose ID. In. (mm)	Hose Inside Diameter In.	Hole Center Distance In. (mm)	Hole Diameter In. (mm)	Hose Length (per D-30)
9/32 (7.2)	.280	0.50 (12.7)	0.50 (12.7)	11.8 (300)
5/16 (8.0)	.312	1.00 (25.4)	.625 (15.9)	11.8 (300)
3/8 (10.0)	.375	3.00 (76.2)	.750 (19.0)	11.8 (300)
5/8 (15.1)	.625	5.90 (150)	1.14 (29.0)	12.0 (304.8)

4.4.6 Fluid Resistance

4.4.6.1 Method

Per ASTM D471 except immerse samples 168 hours in DOT 3 brake fluid at $125 \pm 2^{\circ}\text{C}$ ($255 \pm 5^{\circ}\text{F}$).

4.4.6.2 Required

4.4.6.2.1 Tube & Cover: Hardness Change = ± 15 pts

4.4.6.2.2 Tube & Cover: Tensile strength reduction = 30% maximum

4.4.6.2.3 Tube & Cover: Elongation reduction = 45% maximum

4.4.6.2.4 Tube & Cover: Volume change = -5 to +15%

4.4.7 Ozone Resistance

4.4.7.1 Method

Three test specimens will be mounted on a mandrel 7X OD. After mounting, the specimens will be aged 168 hours @ 125°C then exposed in the ozone chamber for 168 hours @ 100 ppm.

4.4.7.2 Required

After cooling on the mandrel, inspection of the specimens shall not reveal signs of cracking under 7X magnification.

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APRIL 2016