

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)		NUMBER: MPAPS F-6032
		Former Designation: TMS-6032
TITLE: Hose, Fuel and Oil Resistant, Low Pressure		CURRENT REV No.: 1510
		DATE: OCT. 2015
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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: Added Note after Table 1. Switched format to MPAPS		

1.0 APPLICATION

This specification covers fuel and oil resistant, fabric reinforced rubber hose suitable for use with diesel fuel, oil, or power steering fluid hoses with clamped joints or fitted connections. If Type is not specified on the Engineering drawing, Type I shall be supplied. Type II is no longer available and shall be replaced by Type VI per MPAPS F-6016 unless Engineering approves use of Type I material.

2.0 SCOPE

This specification covers the general requirements, labeling/identification, property and performance requirements, qualification, 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</i> or TS-16949	NAVISTAR TMS-6811	SAE J1019
CFR Title 29, Part 1910	NAVISTAR MPAPS F-2	ASTM D 380
NAVISTAR Manufacturing Std. MS-D-13	NAVISTAR MPAPS-9543	ASTM D 471
NAVISTAR MPAPS A-0, Parts I and II	NAVISTAR MPAPS F-6016	ASTM D 622
NAVISTAR MPAPS A-40	SAE J20	ASTM D 2137
NAVISTAR CEMS C-3	SAE J30	ASTM D 3884
NAVISTAR MPAPS B-50	SAE J246	ASTM G 154

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4.0 GENERAL REQUIREMENTS

4.1 Hose Construction

4.1.1 Type I

This hose shall consist of a smooth-bore tube of butadiene/acrylonitrile copolymer compound, reinforced with one ply of braided, knit or woven polyester fiber yarn or two ply counter directional helically wound yarn (polyester or aramid fiber) and covered with a suitable heat, fuel, oil, and ozone resistant synthetic elastomer. This hose is available as either bulk, straight hose or as formed (curved) hose and may be assembled with either clamps or with crimped hose fittings.

4.1.2 Type II

Type II is no longer available and shall not be specified on new engineering prints. Current requirements specifying Type II shall use TYPE VI per MPAPS F-6016.

4.2 Fittings - Reference SAE J246

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

4.2.1 Brass

UNS No. C36000 (Half hard), C34500, or C35000 for bar or extruded stock, or C37700 for forgings per CEMS 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 1008, 1010, 1112, or 12L14 per MPAPS A-0, Part I, and shall be case hardened Class 3 or Class 3A per MPAPS A-40, Section A.

4.3 Dimensions and Tolerances

Unless otherwise specified, hose shall meet the dimension and tolerance requirements shown in Table 1 (Type I Bulk Hose) and Table 2 (Type I Formed Hose).

TABLE 1: DIMENSIONS TYPE I (Bulk Hose)

Nominal ID	Inside Diameter	Outside Diameter	Part Number
inches	in. (mm)	in. (mm)	Production - Parts
5/32	.156±.016 [3.97±.4]	.366±.024 [9.3±.6]	L2643540 - 2643540R1
3/16	.188±.016 [4.76±.4]	.406±.024 [10.3±.6]	L2643541 - 2643541R1
7/32	.219±.016 [5.56±.4]	.445±.024 [11.3±.6]	L2643542 - 2643542R1
1/4	.232±.016 [5.9±.4]	.482±.024 [12.25±.6]	L2643543 - 2643543R1
5/16	.281±.016 [7.14±.4]	.531±.024 [13.5±.6]	L2643544 - 2643544R1
3/8*	.354±.016 [9.0±.4]	.605±.024 [15.37±.6]	L2643545 - 2643545R1
1/2*	.472±.023 [12.0±.58]	.799±.031 [20.3±.8]	L2643546 - 2643546R1
5/8	.595±.031 [15.1±.79]	.969±.031 [24.62±.8]	L2643547 - 2643547R1
3/4*	.724±.031 [18.4±.79]	1.116±.031 [28.35±.8]	L2643655 - 2643655R1
1*	.968±.031 [24.6±.79]	1.374±.039 [34.9±1.0]	L2643623 - 2643623R1

* Preferred (Standard) sizes for use in new design.

NOTE: For formed hoses with expanded ends, the wall thickness of the expanded end should be 4.0 ± 0.8mm for hose ID sizes between 9.0mm and 25.4mm.

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TABLE 1-A: DIMENSIONS TYPE I (Bulk Hose – Alternative Dimensions)

Nominal ID	Inside Diameter	Outside Diameter	Part Number
inches	in. (mm)	in. (mm)	Production - Parts
1/2	.472±.016[12.0±.4]	.752±.016 [19.1±.4]	L2643546 - 2643546R1
3/4	.724±.016[18.6±.4]	1.026±.014 [26.06±.35]	L2643655 - 2643655R1
1	.968±.016[24.6±.4]	1.374±.039 [34.9±1.0]	L2643623 - 2643623R1

TABLE 2 - LENGTH TOLERANCES (Formed Hose)

Dimension		Straight Hose		Arm Length	
Mm	in	mm	in	±mm	±in
0-150	0 - 6	±3.2	±.12	4.0	.16
150-300	6 - 12	+9.7, -4.8	+38, -.12	6.4	.25
300-610	12 - 24	+9.7, -4.8	+38, -.19	7.2	.28
610-1000	24 - 36	+12.7, -6.4	+50, -.25	9.7	.38
over 1000	over 36	±2%	± 2%	± 2%	± 2%

Inside Diameter - Same as Bulk Hose – See Table 1

4.4 Property And Performance Requirements

All tests shall be in accordance with ASTM D 380 or ASTM D 622 as appropriate unless otherwise specified.

4.4.1 Original Properties

Tensile Strength:	Tube and Cover:	8.0 MPa (1160 psi) minimum
Elongation:	Tube and Cover:	200% minimum
Adhesion:	All plies:	1.0 N/mm (6 lbf/in) width minimum
Burst Strength:	All sizes:	2.0 MPa (290 psi) minimum.
Assembly Tensile Strength:	All Sizes:	145 kN (325 lb) minimum - crimp only.

4.4.2 Cold Flexibility

4.4.2.1 Method

Perform test on virgin (unaged) hose, on heat aged hose (see Method 2 under Section 4.4.4.2), and on fluid aged hose (see Method 1 under “Fluid Resistance”); 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, 4 hours at 125°± 2°C (257°± 5°F).

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