

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)		NUMBER: MPAPS F-1054
		Former Designation: TMS-1054
TITLE: Tube, Oil Level Gauge and Fill		CURRENT REV No.: 1606
		DATE: June 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>		

1.0 APPLICATION

This specification covers requirements for oil level gauge tubes and transmission fill tubes.
(Note: See MPAPS F-1058 for 1.625-inch diameter oil fill tubes.)

2.0 SCOPE

This specification covers the requirements for the steel tubing, tube finish, plastic end-cup, and supplier's responsibility. A general information section is added to provide design guidance.

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 ISO 9001 or TS-16949	NAVISTAR MPAPS A-45, Pt. I	ASTM D471
CFR Title 29, Part 1910	NAVISTAR MPAPS G-9009	ASTM D638
NAVISTAR Manufacturing Std. MS-D-13	NAVISTAR MPAPS GT-31	ASTM D648
NAVISTAR Engineering Design Std A-16	NAVISTAR MPAPS K-6900	ASTM D790
NAVISTAR MPAPS B-50	ASTM B117	ASTM D792
NAVISTAR MPAPS A-10, Pt. I	ASTM D256	SAE J2527

4.0 REQUIREMENTS

4.1 Tubing Material

Selection of steel tubing depends upon the availability and manufacturing requirements such as formability and weldability. Unless otherwise specified on the individual part drawing, one of the following tubing options are required:

- Option I Steel Tubing, Grade C-5, MPAPS A-10, Part I
- Option II Steel Tubing, Grade 3 Or 6, MPAPS A-45, Part I

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4.2 Tube Thickness

Unless otherwise specified on the engineering drawing, the nominal tubing wall thickness shall be either 0.71 mm (0.028 in) or 0.89 mm (0.035 in). (See Section A.0, General Information, for guidance on tubing selection and part design.)

4.2.1 Thickness Option

Heavier tube wall thickness of 1.25 mm and 1.6 mm (0.049 and 0.063 in) may be used, with engineering approval.

4.3 Bend Radius

Minimum bend radius shall be 38 mm (1.5 in) for tubing diameter of 19 mm (3/4 in) or less.

4.4 Finish

All tubing (assembly) shall be provided to the using NAVISTAR facility with the following finish on the outer surface only:

Paint per MPAPS G-9009, Class IIC

[NOTE: Paint was formerly classified as Option I finish. Drawings which still specify finish as Option I will be provided as painted. Finish options II (phosphate coating) and III (zinc plating) are no longer used. Drawings requiring finish to be Option II or Option III will be supplied painted.]

4.5 Tube Assemblies with Plastic End-Cup

The following requirements shall be met for tube assemblies with plastic components.

4.5.1 Plastic Components

The end-cup material will be nylon with dry-as-molded (DAM) properties as indicated in Table 1.

Table 1 Dry-as-Molded Property

DAM Property	Test Procedure	Requirement
Specific Gravity	ASTM D792	1.12 ± 0.02
Tensile Strength, MPa (psi), min.	ASTM D638	81.4 (11 800)
Tensile Modulus, MPa (psi), min.	ASTM D638	2620 (380 000)
Flexural Strength, MPa (psi), min.	ASTM D790	113.8 (16 500)
Flexural Modulus, MPa (psi), min.	ASTM D790	2758 (400 000)
Izod Impact Strength (Notched), J/m (ft-lbf/in), min	ASTM D256	58.7 (1.1)
Deflection Temperature, °C (°F) @ 1.8 MPa	ASTM D648	65.5 (150)
Accelerated Weather Resistance, hours (kJ/m ²), (no change in color or other material properties)	SAE J2527	250 (345)

4.5.2 Adhesive Bonding

If the plastic end-cup is adhesively bonded to the steel tube, the bond strength and adhesive properties will meet requirements of MPAPS K-6900, except testing to be done on tube assemblies instead of lap shear samples and torsional testing (twisting of the assembly) is to be added. Bond strength values determined from torsional test should correlate favorably with expected lap shear strength values.

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