

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)		NUMBER: MPAPS P-9563
		Former Designation: TMS-9563
TITLE: Quality Requirements for Diesel Exhaust Fluid Tanks		CURRENT REV No.: 1402
		DATE: Feb. 2014
WRITTEN/EDITED BY: Materials Engineering	APPROVED BY: Materials Engineering	SUPERSEDES: TMS-9563 - August 2013
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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: Modified Section 4.4.3.5 (Extraction in DEF); modified Section 4.4.3.6 (Tank Media Resistance to DEF); editorial changes.		

1.0 APPLICATION

This specification covers engineering quality and functional requirements for purchased Diesel Exhaust Fluid (DEF) tanks used on Navistar vehicles as assembled in Navistar plants and for field service applications.

2.0 SCOPE

This specification covers the material and performance requirements of DEF tanks, including requirements of the Process Verification Plan and Report, the manufacturing quality plan, quality control and source approval, supplier's compliance reports, painting, appearance criteria, and shipping and identification requirements. DEF tanks can be made of plastic or stainless steel and generally come as an assembly complete with a shell, fill pipe, flanges, connectors, and fittings.

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 <i>TS-16949</i>	NAVISTAR CEMS A-37	FMCSR 393.67
CFR Title 23, Part 658	NAVISTAR CEMS F-2	DIN 70070
CFR Title 29, Part 1910	NAVISTAR MPAPS D-28	ISO 2241-1
NAVISTAR Manufacturing Std MS-D-13	NAVISTAR TMS-4117	ASTM 5420
NAVISTAR RQ-COM-0032-WI	NAVISTAR CEMS G-7	EPS-145
NAVISTAR TEM-PR-7.03	NAVISTAR TMS-6929	AWS D1.6
ASME Y14.5M-1994*	NAVISTAR MPAPS GT-31	AWS D1.1
ARM Low Temperature Impact Test	SAE J1926	AWS D1.3
	NAVISTAR MPAPS B-50	ASTM D 543

*Conformance to the 1994 version of ASMY14.5M is required.

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4.0 GENERAL REQUIREMENTS

4.1 Design Guidelines

4.1.1 GD&T – GD&T is required on all new DEF tank drawings. GD&T will be applied to drawings per ASME Y14.5-1994 and TDS-SD-10. NAVISTAR Chassis Engineering will review and approve all GD&T drawings.

4.1.2 CAD Requirements - Supplier shall submit a drawing (and/or solid model) to Navistar for each tank. All drawings and solid models will be in UNIGRAPHICS per CAD/CAM Supplier Data Design Requirements per TEM-PR-7.03.

4.1.3 DEF Requirement: All references to DEF shall refer to DEF complying with ISO 22241-1.

4.2 Construction

Plastic DEF tanks consist of a plastic shell, fill-pipe, flanges, fluid connector fittings, and metallic inserts. The entire DEF tank assembly shall be molded to provide a single unit for service; no post-molded inserts are allowed in the tank. Stainless Steel DEF tanks consist of a center section with end-caps, fill-pipe, fluid connector fittings, and flanges or spuds for fittings. The center section, end-caps, fill-pipe, and flanges shall be suitably welded to provide a single unit for assembly or service. All welds on stainless steel DEF tanks must meet the requirements of TMS-9512 and AWS D1.1/1.3. All materials that contact DEF fluid must be made from either High Density Polyethylene material per MPAPS D-28; Stainless Steel, grade 304, per CEMS A-37, and passivated per TMS-4117 Type 5; or other approved materials designated by Navistar Materials Engineering.

4.2.1 Tank Material and Finish Requirements

Suppliers are responsible for meeting all specified material requirements. The controlling Engineering Design Responsible group must approve pre-production requests for material deviations. Navistar Industrial Design will designate the tank exterior finish. Post-production requests for material deviations must be submitted to the quality control manager of the using Navistar plant for approval in accordance with NAVISTAR RQ-COM-0032-WI.

4.2.2 Plastic Tanks

4.3.2.1 Plastic Materials: Medium or High Density Polyethylene that meets or exceeds the properties of PE, A46A66C0DF940K17M6SA55YB3600AC1Z1, material per MPAPS D-28. Z1: F₀ > 1000 hours in 100% Igepal per ASTM D1693.

4.3.2.2 Plastic material will be tested to MPAPS GT-31, Method B, for 3600 kJ for long term outdoor exposure.

4.2.3 Stainless Steel Tanks

4.2.3.1 Tank Material: Stainless Steel, grade 304, per CEMS A-37; passivated per TMS-4117 Type 5.

4.2.3.2 DEF Filler Neck Materials: may be made from Medium-High Density Polyethylene per MPAPS D-28, or Stainless Steel, grade 304, per CEMS A-37 and passivated per TMS-4117 Type 5.

4.2.4 Fittings

Table 1 provides the assembly torque requirements for straight threaded O-ring tank fittings used in the supply and return lines. For stainless steel fittings, use the upper limit of the torque range in Table 1.

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TABLE 1: SAE STRAIGHT THREAD PORT ASSEMBLY (SAE J1926)

SAE Dash Size	Thread Size UN/UNF	Assembly Torque (+10% -0)													
		Non-Adjustable						Adjustable						Plugs	
		Seal-Lok		Triple-Lok Ferulok Pipe Fittings		Seal-Lok Lite		Seal-Lok		Triple-Lok Ferulok		Seal-Lok Lite		Hollow Hex	Hex Head
														HP50N-S	P50N-S
		ft.lbs. (in. lbs)	N-m	ft.lbs. (in. lbs)	N-m	ft.lbs. (in. lbs)	N-m	ft.lbs. (in. lbs)	N-m	ft.lbs. (in. lbs)	N-m	ft.lbs. (in. lbs)	N-m	ft.lbs. (in. lbs)	N-m
2	5/16-24			(85)	10					(60)	7			(30)	3.5
3	3/8-24			(155)	18					(100)	11			(55)	6
4	7/16-20	(310)	35	(260)	29			(180)	20	(180)	20			(120)	13.5
5	1/2-20	(360)	40	(280)	32			(360)	40	(250)	28			(170)	19
6	9/16-18	(420)	46	(350)	40	(260)	29	(420)	46	(350)	40	(260)	30	(410)	46
8	3/4-16	60	80	(620)	70	(350)	40	60	80	(620)	70	(350)	40	60	80
10	7/8-14	100	135	85	115			100	135	85	115			100	135
12	1 1/16-12	135	185	135	183	65	85	135	185	135	183	65	85	135	185
14	1 3/16-12	175	235	175	237			175	235	175	237			175	235
16	1 5/16-12	200	270	200	271	80	110	200	270	200	271	80	110	200	270
20	1 5/8-12	250	340	250	339			250	340	250	339			250	340
24	1 7/8-12	305	415	305	414			305	415	305	414			305	415
32	2 1/2-12	375	510	375	509			375	510	375	509			375	510

Note: Lubricate threads before assembly! Values in chart are for steel fittings in steel ports. For stainless steel fittings, please use the upper limit of torque range. For brass (and other soft metals), decrease torque value by 35%.

4.2.5 Weight

The weight of the DEF tank as delivered to the Navistar Plant assembly line will be reported. In addition, the weight of separate and individual parts included will be reported. All parts having a separate and distinct Navistar Part Number will have their weight reported by part number. Refer to TMS-9605 for preferred units and precision of measurement.

4.3 Design Performance

The DEF tank shall be capable of meeting all performance requirements specified herein as well as conforming to the applicable Navistar DRD(s).

4.3.1 Design – Service Life

The DEF tank shall be capable of providing the normal performance expected of a commercial vehicle (within the anticipated design environment) for the service life designated for that truck application.

4.4 Testing

4.4.1 Functional Tests

These tests should be conducted prior to any tanks being shipped to the assembly plants. Additionally these tests are to be used to test tank assemblies at the conclusion of all Validation Testing unless otherwise specified. All DEF tanks must pass the functional tanks to be utilized by Navistar. If a stainless steel tank fails the functional tests, the steel may be recycled. If a plastic DEF tank fails the functional tests, the plastic may not be recycled or re-enter the manufacturing stream.

4.4.1.1 DEF Tank Leakage Test:

4.4.1.1.1 Preferred Method

The preferred testing shall use a pressure decay tester while the tank is subjected to a minimum internal pressure of 3 ± 0.5 psig and allowed to equilibrate for a period of at least 30 seconds. A