

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)		NUMBER: MPAPS P-9555
		Former Designation: TMS-9555
Quality Requirements For Fuel Tanks		CURRENT REV. No: 1608
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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 Engineering quality requirements for purchased fuel tanks used on Navistar trucks as assembled in Navistar plants, and to such components as may be provided for field service applications.

2.0 SCOPE

Metal fuel tanks consist of a center section with end-caps, fill-pipe, and flanges or spuds suitable for the installation of all fittings. The center section, end-caps, fill-pipe, and flanges are all suitably welded to provide a single unit for assembly or service. The plastic fuel tank consists of a plastic shell, fill-pipe, and flanges or spuds suitable for the installation of all fittings. The plastic shell, fill-pipe, flanges and inserts are all suitably molded to provide a single unit for assembly or service. This specification covers the material and performance requirements of aluminized steel, aluminum, and plastic fuel 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.

2.1 Restricted Chemical Substances

Effective January 1, 2007, all products 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-6, Part I	FMCSR 393.65
CFR Title 23, Part 658	NAVISTAR MPAPS A-6, Part II	FMCSR 393.67
CFR Title 29, Part 1910	NAVISTAR MPAPS B-32	Alum. Assn AA 45
NAVISTAR Supplier Packing and Shipping Std. D-13	NAVISTAR MPAPS C-10	SAE J703
NAVISTAR RQ-COM-0032-WI	NAVISTAR MPAPS G-4513	SAE J2527
NAVISTAR TEM-PR-7.03	NAVISTAR MPAPS P-9511	ASTM D 1435
ASME Y14.5M-1994*	NAVISTAR MPAPS P-9543	NBR 11477
NAVISTAR MPAPS B-50	NAVISTAR MPAPS D-28	EPS-145
AWS D1.2, D1.1, D1.3	NAVISTAR MPAPS G-9009	ECE 34 annex 5
ASTM D543	NAVISTAR MPAPS P-9605	SAE J1926
NAVISTAR TDS- SD-10	SAE J1748	ISO 175

*Conformance to the 1994 version of ASME Y14.5M 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 fuel 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 – For supplier designed tanks, 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.

4.2 Construction

The fuel tank consists of a center section with end-caps, fill-pipe, and flanges or spuds suitable for the installation of all fittings. The fuel tank shall be constructed in accordance with requirements described in FMCSR 393.67(c). All welds must meet the requirements of MPAPS P-9511 and American Welding Society AWS D1.2 (for aluminum), and AWS D1.1/1.3 (for steel). The plastic fuel tank consists of a molded plastic shell, fill-pipe, and flanges or spuds suitable for the installation of all fittings. The fuel tank shall be constructed in accordance with requirements described in FMCSR 393.67(c) and ECE 34.

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. Post-production requests for material deviations must be submitted to the plant metallurgist and/or the quality control manager of the using Navistar plant for approval in accordance with NAVISTAR RQ-COM-0032-WI.

4.2.1.1 Aluminized Steel Tanks

4.2.1.1.1 Tank Material: Aluminized steel, Grade 1A, Class T1-75, per MPAPS A-6, Part II

4.2.1.1.2 Tank Finish: Exterior - Paint per MPAPS G-9009, Class IIA (unless otherwise specified)
Interior - See Section 5.0 for interior fogging requirements.

4.2.1.1.3 Fuel Filler Necks for Painted Steel Tanks: Interior surfaces of filler necks will be coated with the approved coating specified in Section 10.0.

4.2.1.1.4 Fuel Compatibility: Tanks must be compatible with Diesel, B20 biodiesel, and Gasoline fuels.

4.2.1.2 Aluminum Tanks

4.2.1.2.1 Tank Material: 5052-H34 or 5052-H32 aluminum per MPAPS C-10

4.2.1.2.2 Tank Finish: Unless otherwise specified, non-polished aluminum tanks will have a bright-etched finish. Polished aluminum tanks will have a buffed finish AA-M22 per Aluminum Association Document 45. The polished/buffed surface will be protected with a sprayed coating per MPAPS G-4513 or other protective wrap prior to shipping.

4.2.1.2.3 Fuel Compatibility: Tanks must be compatible with Diesel, B20 biodiesel, and Gasoline fuels.

4.2.1.3 Plastic Tanks

4.2.1.3.1 Tank Material: Blow molding grade HDPE material per MPAPS D-28 and the material callout on the supplied drawing.

4.2.1.3.2 Flange material: per MPAPS D-28 and the material callout on the supplied drawing

4.2.1.3.3 Fuel Compatibility: Fuel system parts from molding compounds that come in contact with diesel fuel shall be demonstrated to be resistant to chemical interaction at the place of use up to 180°F (80 °C) by a suitable immersion test method (ASTM D 543, ISO 175, SAE J1748 or similar).

4.2.1.3.4 Plastic material will be tested to SAE J2527 for long term outdoor exposure, test duration dependent on application.

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4.2.1.4 Weight

The weight of the fuel 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 MPAPS P-9605 for preferred units and precision of measurement.

4.2.2 Fittings

4.2.2.1 Material

Brass fittings are not to be used with any diesel fuel tank anymore. Instead, steel fittings that have been ZnNi plated are to be used to prevent corrosion. Use of other fittings in aluminum fuel tanks must have prior approval by Navistar.

4.2.2.2 Torque

The following table provides the assembly torque requirements for straight threaded O-ring fuel tank fittings used in the supply and return lines. [Note that these values are for steel fittings in steel ports. For brass or aluminum fittings, decrease the torque value by 35%. For stainless steel fittings, use the upper limit of the torque range.]

Unless otherwise specified, pipe thread fittings will be hand tightened plus 2-3 turns after the fitting has been installed.

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

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%.

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For compression fittings, tighten nut hand tight. From that point, tighten with a wrench the number of turns indicated in the chart below:

Tube Size	Additional Turns From Hand Tight
1/8" thru 1/4"	1-1/4
5/16"	1-3/4
3/8" thru 1"	2-1/4

4.3 Design Performance

The fuel tank shall be capable of meeting all performance requirements specified herein. The controlling Engineering Design Responsible group must approve any deviation from the specified performance requirements.

4.3.1 Design – Service Life

The fuel 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.

4.3.2 Testing

4.3.2.1 Manufacturing Tests

Each tank shall be tested for joint and fitting leakage prior to painting or packaging. Testing will be performed by application of a soap solution to all joints and fittings, or by submersion, or by an equivalent means of leak detection, while the tank is subjected to a minimum internal pressure of 10 psig. Plastic tank tested by pressure decay. Any discernible leakage in metal fuel tanks shall be repaired using the same methods as were used in the fabrication of the tank. Refer to Section 6.3, Process Control. No repair allowed at the manufacturing level for plastic fuel tanks. In addition, a final air leak test will be performed before shipment to Navistar assembly plants, after the tank is assembled with the specified hardware. The same testing method should be used as explained above with the exception of the test pressure to be 4 psig minimum. Any leakage must be addressed by supplier and corrected before shipment to Navistar assembly plants.

4.3.2.1.1 Plastic specific wall thickness will be tested by ultrasonic gauge at a minimum of 14 points.

4.3.2.1.2 Plastic specific pinch area of tank seam will have a microtome slide inspected by microscope and will be subjected to a weld strength test using a 2 in/minute pull rate.

4.3.2.2 Liquid Fuel Tank Tests

4.3.2.2.1 Safety Venting System Test – test to be performed per requirements of FMCSR 393.67(d)(1)

4.3.2.2.2 Leakage Test - test to be performed per requirements of FMCSR 393.67(d)(2) (i) & (ii) with the additional requirement that neither the tank nor any fitting shall show any discernible leakage in any position the tank may assume during this test.

4.3.2.3 Side Mounted Liquid Fuel Tank Tests

4.3.2.3.1 Drop Test - test to be performed per requirements of FMCSR 393.67(e)(1)

4.3.2.3.1.1 Plastic specific pendulum test per ECE 34

4.3.2.3.1.2 Plastic specific 6 meter drop test performed @ -40C° per NBR 11477

4.3.2.3.2 Fill-pipe Test - test to be performed per requirements of FMCSR 393.67(e)(2)

4.3.2.3.2.1 Plastic specific 1 meter drop test directly on the fill pipe @ -40° C per NBR 11477

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