

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)		NUMBER: MPAPS P- 9534
		Former Designation: TMS-9534
TITLE: Truck and Bus Seating Assembly Design, Performance, and Quality Requirements		CURRENT REV No.: 1412
		DATE: Dec. 2014
WRITTEN/EDITED BY: Materials Engineering	APPROVED BY: Materials Engineering	SUPERSEDES: Rev. 1410 – Oct. 2014
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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 preload requirement in Section 4.3.10.1.		

1.0 APPLICATION

This specification covers requirements for the complete seat assembly and includes performance design criteria.

2.0 SCOPE

This specification covers the general, durability, performance, design, quality, qualification, shipping and identification, source approval and KCC requirements for truck and bus seat assemblies. Four service categories are covered: Medium Duty, Heavy Duty, Severe Service, and Bus passenger seats (Note: Bus drivers' seats are considered the same as Medium Duty). Requirements for individual materials used in the seat assembly are covered in separate specifications.

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 TMS-7116	FMVSS 207
Navistar Manufacturing Std. MS-D-13	NAVISTAR TMS-7121	FMVSS 210
NAVISTAR Eng'r Design Std. A-16	NAVISTAR TMS-7125	FMVSS 302
NAVISTAR MPAPS B-50	NAVISTAR TMS-7126	SAE J1051
NAVISTAR TMS-6501	NAVISTAR MPAPS G-9009	SAE J1454
NAVISTAR MPAPS L-6505	NAVISTAR MPAPS P-9543	SAE J826
NAVISTAR TMS-7005	NAVISTAR TMS-9544	
NAVISTAR TMS-7113		

4.0 DESIGN REQUIREMENTS

The seat assembly(ies) used in all NAVISTAR trucks is (are) expected to be sufficiently durable so as to provide a minimum of 10 years of service with one seat cover change. The design of the seat assembly (other than bus passenger seats) shall be sufficiently flexible/adjustable to provide for the anthropometric requirements of and provide full functionality for a customer base encompassing the fifth (5th) percentile female through the ninety-fifth (95th) percentile male.

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DECEMBER 2014



Documents

Page 1 of 11

Document Sharing Hub

NUMBER: MPAPS P-9534	TITLE: Truck and Bus Seating Assembly Design, Performance, and Quality Requirements	REVISION: 1412
--------------------------------	---	--------------------------

4.1 Anthropometric Data

Anthropometric data for the 5th, 50th, and 95th percentile truck and bus drivers are shown in Tables 1 and 2, page 11. Use the data in Table 1 for Bus, Severe Service, Heavy Duty, and Regional Haul applications. Use the data in Table 2 for Medium Duty applications and for bus passenger seats. (Given that current anthropometric data for U.S. children are not available, the data from the U.S. civilian population will be used as a conservative estimate.).

4.2 General Requirements

The supplier of the seat assembly is responsible for the quality and durability of all materials and components used in the finished assembly.

4.2.1 Materials

The materials used shall meet requirements of their respective specifications:

4.2.1.1 Upholstery Fabric – TMS-7113

4.2.1.2 Injection Molded Trim Panels – TMS-7116

4.2.1.3 Upholstery vinyl coated fabric and leather - TMS-7121

4.2.1.4 Composite Trim Panels – TMS-7125

4.2.1.5 Seat Back Carpet – TMS-7126, Type A

4.2.1.6 Foam Padding – TMS-6501, MPAPS L-6505

4.2.1.7 Thread – TMS-7005

4.2.1.8 Other Materials - may be used by agreement between the supplier and purchaser. Bonded or laminated or dielectrically embossed composites are covered by TMS-7028.

4.2.1.9 Painted Metallic Parts - unless otherwise specified, metallic components of the seat assembly shall be painted NAV0004 Black, Class IIIA, per MPAPS G-9009.

4.2.2 Flammability Resistance: TMS-9544 (FMVSS 302)

Material supplied to this specification shall meet all requirements of TMS-9544 and the latest issue of Federal Motor Vehicle Safety Standard #302 – Flammability of Interior Materials. The supplier shall provide certification of compliance in accordance with requirements of MPAPS P-9543.

4.3 Durability Requirements

These requirements are guidelines for setting each test. When new vehicles or applications are developed (or current ones significantly modified), the test conditions should be studied to evaluate their effectiveness in testing the seat assembly to that application. In many situations, test parameters may be modified (with guidance and approval from engineering) to better simulate how the product will be used. Such changes or modifications shall be documented in writing and reported completely on the test report.

4.3.1 Seat Cushion Squirm Test

4.3.1.1 Procedure: Equipment, set up and procedure shall be per SAE J1454, Dynamic Durability Testing of Seat Cushions for Off-Road Work Machines, with the exceptions indicated below.

4.3.1.1.1 Inspect and replace cotton duck in the saddle test as required.

NUMBER: MPAPS P-9534	TITLE: Truck and Bus Seating Assembly Design, Performance, and Quality Requirements	REVISION: 1412
---------------------------------------	--	---------------------------------

		<u>MEDIUM DUTY</u>	<u>HEAVY DUTY</u>	<u>SEVERE SERVICE</u>	<u>BUS PASSENGER</u>
Saddle, Test Weight	lbs	207	207	207	183
	Newtons	921	921	921	814
Cycles		20,000	50,000	35,000	20,000
Rate [cycles/min]		4	4	10	4
Rotation [$\pm$ degrees]		21	21	30	21

4.3.1.2 Required: Seat shall complete the specified cycles without fracture of the frame, spring or spring elements, deterioration of the padding or cover, or general degradation of the appearance or function of the seat which would make it unacceptable for customer use. Report per SAE J1454.

4.3.2 Seat Back Folding Durability

4.3.2.1 Procedure: The seatback shall be disengaged, the seat back articulated through its full range of motion and returned to its upright and locked position. The cycle shall be repeated 25,000 times at not more than 20 cycles/minute.

4.3.2.2 Required: The lock assembly shall complete the specified cycles with no loss of functionality, excessive wear or general degradation of the appearance or function of the seat that would make it unacceptable for customer use.

4.3.3 Seat Cushion Fatigue (Jounce)

4.3.3.1 Procedure: Set up as per SAE J1454 for jounce, with the following exceptions:

		<u>MEDIUM DUTY</u>	<u>HEAVY DUTY</u>	<u>SEVERE SERVICE</u>	<u>BUS PASSENGER</u>
Saddle Weight	lbs	312	312	312	263
	Newton	1388	1388	1388	1170
Jounce	Cycles	200,000	500,000	200,000	200,000
	Rate, cycles/ min	100	100	100	100

4.3.3.2 Required: Seat shall complete the specified cycles without fracture of the frame, spring or spring elements, deterioration of the padding or cover, or general degradation of the appearance or function of the seat which would make it unacceptable for customer use. Report per SAE J1454.

4.3.4 Ingress/Egress

4.3.4.1 Procedure: The saddle shall be a Burke Porter buttock form or equivalent and shall approach the seat horizontally at 60 degrees to the longitudinal centerline of the seat at a rate of 6 cycles/minute. Cooling of the seat assembly by fan during tests is acceptable. The saddle shall be a Burke Porter buttock form or equivalent and shall initiate from a static position in the center of the seat with the correct saddle weight applied. From this position the Burke Porter buttock form or equivalent shall slide horizontally (no vertical movement in the positive direction) to collapse/flatten the outboard bolster of the seat cushion at a rate of 6 cycles/minute. Cooling of the seat assembly by fan during tests is acceptable.

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DECEMBER 2014

NUMBER: MPAPS P-9534	TITLE: Truck and Bus Seating Assembly Design, Performance, and Quality Requirements	REVISION: 1412
---------------------------------------	--	---------------------------------

	<u>MEDIUM DUTY</u>	<u>HEAVY DUTY</u>	<u>SEVERE SERVICE</u>	<u>BUS PASSENGER</u>
Cycles	30,000	30,000	30,000	30,000
Saddle Weight [lbs]	100	150	150	100
[Newton]	445	667	667	445

4.3.4.2 Required: Seat shall complete the specified cycles without fracture of the frame, spring or spring elements, deterioration of the padding or cover, or general degradation of the appearance or function which would make it unacceptable for customer use.

4.3.5 Seat Back Rearward Fatigue Cycle

4.3.5.1 Procedure: The seat frame assembly is to be tested as a complete seat frame assembly including risers and the seat is to be tested in the rear most position with a new seat frame for each test position. The complete seat frame assembly is to be rigidly attached to the test fixture. A rigid bar is to be attached to the seat back frame 305 mm (12 in.) above the H-point. The load cylinder is to be attached using a U-joint at the cylinder attachment. Perform 25,000 rearward cycles at 20-30 cycles/minute with a load of 230 lbs. (1023N), regardless of seat type, to the upper most seat back structure.

4.3.5.2 Required: No more than a 2 degree set per 1000 cycles and 6 degree set overall in the back frame. The frame assembly must sustain the specified load cycle without structural collapse and must not exhibit any weld or fatigue cracks. The system with adjusters and/or risers must meet the same requirements as the frame assembly. All mechanisms must be functional after testing.

4.3.6 Torsional Strength and Rigidity

4.3.6.1 Procedure: Apply a 150 lb (667N) rearward load to the upper corner of the free pivot side (non locking side) of the seat back at a rate of 300lb/second and hold for 10 seconds. This test is to be performed only on a seat with a single sided recliner.

4.3.6.2 Required: No more than 7.6 mm set at the point of loading.

4.3.7 Seat Back Ultimate Rearward Load

4.3.7.1 Procedure: The seat frame assembly (cushion, back frames and attaching means assembled and attached as a system) is to be rigidly attached to the test fixture at the cushion attachment points (no adjusters and risers required). A rigid bar is to be attached to the seat back frame 305mm (12 in.) above the H-point. The load cylinder is to be attached using a U-joint at the cylinder attachment. Apply a 263 lb. (1170N) load, regardless of seat type, simultaneously through the vertical planes of the H-points. Attaching fasteners must meet design intent.

4.3.7.2 Required: No more than 7.6 mm (0.3 in.) set measured at the same point of load on the seat back, or general degradation of the appearance or function of the seat that would make it unacceptable for customer use.

4.3.8 Impact on Seat Cushion

4.3.8.1 Procedure: Drop a Burke Porter buttock form loaded to 263 lbs (1170N) from a height of 6 inches (152 mm) onto a fully trimmed seat at -30° C and 80° C. The H-point plane of the Burke Porter

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DECEMBER 2014



Documents

Page 4 of 11

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