

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)		NUMBER: MPAPS L-6610
		Former Designation: TMS-6610
TITLE: Thermal Insulation		CURRENT REV No.: 1709
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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 outlines the requirements for interior cab insulation, which is used as a thermal barrier to improve the heating and cooling characteristics of the cab. Several types of thermal insulation/heat shields are included in this specification. If a specific insulation material is required, it shall be described on the print.

Note: *This specification is for thermal insulators and heat shields. Although some of these materials may have acoustic benefits (see note on acoustic insulation below), materials with specific acoustic requirements may be found in these specifications: Cab floor and dash insulation is covered in MPAPS L-6606, urethane foam insulation in MPAPS L-6505, molded fiberglass engine tunnel cover and external cab insulators in MPAPS L-6609, and other acoustic insulation in MPAPS L-6612.*

2.0 SCOPE

This specification covers the general requirements, property and performance requirements, quality, qualification, source approval, and quality control for cab insulators and composite heat shields.

NOTE: *For existing engineering drawings/blueprints which reference this specification but do not specify a Type (I, II, III, IV, V, VI, VII, VIII, IX, X, or XI), Type I*

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	CFR Title 29, Part 1910	ASTM D 903
NAVISTAR Supplier Packing and Shipping Std. D-13	ASTM B 117	ASTM D 3330
NAVISTAR Eng. Design Std. A-16	ASTM C 177	ASTM D 3574
NAVISTAR MPAPS P-9544	ASTM C 518	FMVSS-302
NAVISTAR MPAPS K-6929	ASTM D 751	
NAVISTAR MPAPS L-6505	ASTM D 1056	
NAVISTAR MPAPS L-6609	AATCC Method 30	
NAVISTAR MPAPS L-6606	NAVISTAR MPAPS C-10	
NAVISTAR MPAPS L-6612	NAVISTAR MPAPS A-37	
NAVISTAR MPAPS P-9543	NAVISTAR MPAPS B-50	
NAVISTAR MPAPS B-50	NAVISTAR MPAPS C-10	

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4.0 GENERAL REQUIREMENTS

4.1 Product Type Descriptions and Specific Requirements

4.1.1 Type I: Insulation that consists of polyester spun fibers. The cab insulator shall have a nominal thickness of 2.5 cm (1 in) except for designated areas on the drawing where the thickness is increased to afford better insulation properties. (Thickness of some part families may vary depending upon die plate requirements.)

4.1.2 Type II: Insulation that consists of an open cell, urethane foam. The foam shall be uniform in thickness, will be free from thin spots or voids and shall show no sign of surface shedding or crumbling.

4.1.3 Type III: Polyethylene closed-cell foam with a pressure-sensitive adhesive that can be easily repositioned during assembly. The foam shall be uniform in thickness, will be free from thin spots or voids and shall show no sign of surface shedding or crumbling. This type of insulation is typically used in the dash, door and floor areas where additional thermal insulation is desired but no acoustic benefit is needed. The closed nature of this product is particularly beneficial in areas that may be wet or exposed to the environment.

4.1.4 Type IV: Foam, glass fiber or polyester fiber covered on one or both sides with a 1-mil metalized polyester facing film or encapsulated within a fibrous scrim covering. Foam, if applicable, shall be uniform in thickness, will be free from thin spots or voids and shall show no sign of surface shedding or crumbling. These products are typically used for under-hood thermal insulation and may be fastened with pressure sensitive adhesive (PSA) film with release liner, liquid adhesive or by mechanical fasteners. This product may need to have edges sealed or wrapped, depending on the application, and shall be so designated on the engineering print.

4.1.5 Type V: Composite insulation having aluminum foil on one or both sides with multiple layers of polyester or glass fibers sandwiched between additional layers of foil. Material will be manufactured such that sharp edges are not exposed. Thickness will be uniform and show no evidence of delamination. These products are typically used for under-hood thermal insulation where temperatures may reach up to 400° F. They may be fastened with PSA film with release liner, liquid adhesive or by mechanical fasteners. This product may need to have edges sealed or wrapped, depending on the application, and shall be so designated on the engineering print. Specific composite constructions shall be indicated on the engineering print or as a letter designation in this specification.

4.1.6 Type VI: Embossed aluminum or stainless steel heat shields made with multiple layers that can be flat stamped or formed. Material will be manufactured such that sharp edges are not exposed. Thickness will be uniform although variance due to forming will be accepted. Ceramic, glass or polyester fiber insulation may be, optionally, used to insulate and separate the various layers. These materials are typically used to shield areas from localized hot spots that can reach temperatures up to 550°C, by reflecting and laterally conducting the heat outward over a relatively large surface area (note: aluminum is a better heat shield material but would have a lower temperature limit and more subject to physical damage; stainless steel should be used when appropriate). They are typically attached by mechanical means or by spot welds. This product may need to have edges sealed or wrapped, depending on the application and handling concerns. Specific composite constructions shall be indicated on the engineering print or as a letter designation in this specification.

4.1.7 Type VII A tri-layer composite consisting of ½” polyurethane foam faced on each side with Aluminized Polyester Facing, a ¼” air gap achieved with Foam Tape spaced throughout the part, and a ¼” polyurethane foam faced on each side with Aluminized Polyester Facing.

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4.1.8 Type VIII Glass fiber insulation encapsulated within a fibrous scrim covering (this covering may be applied in bus assembly). These products are to be used only in bus applications only and may be temporarily fastened with liquid adhesive or by mechanical techniques for assembly purposes and shall be completely encased in the final assembly.

4.1.9 Type IX A silicone sponge usually faced by aluminum foil or scrim attached with a silicone PSA. This is commonly available in thicknesses of 3 and 5 mm and can withstand temperatures up to 200°C.

4.1.10 Type X A glass fabric cloth faced with aluminum foil which may be fastened or bonded with a PSA.

4.1.11 Type XI A non-woven pad comprised of a combination of polypropylene micro-fibers and polyester staple fibers. The facing may be either a polypropylene scrim, a polyester scrim, or an embossed combination material. *There are four performance levels of Type XI that have different thicknesses. They are summarized in Section 4.2.*

4.2 Sound Absorption Properties:

Several of the materials listed above may provide a desired noise control function. Applications with specific acoustic requirements can be found in these specifications: Cab floor and dash insulation is covered in MPAPS L-6606, urethane foam insulation in MPAPS L-6505, molded fiberglass engine tunnel cover and external cab insulators in MPAPS L-6609, and other acoustic insulation in MPAPS L-6612. Specifically Types I, II and VII are expected to provide this benefit in the intended applications. Care should be given in applying and sourcing this product such that the end result does not defeat this purpose.

Additionally, Types IV and V can be designed and used to have additional acoustic benefit although MPAPS L-6609 is usually used in this manner. Types II, VIII and IX are not considered to provide any benefit. Type VI does not provide any benefit either, although it may be preferred over solid sheet metal shields which can cause acoustic/vibration issues. Please consult Materials Engineering and NVH Engineering for assistance in this regard.

Sound absorption requirements for other applications may be specified by the following test method and material grades:

4.2.1 Method: Test in accordance with ASTM E 1050. Test sample/assembly shall include scrim if applicable and be of equivalent composition as intended for production. The scrim is to face the sound source with no air gap between the sample/assembly and back plate.

4.2.2 Sample Size: Material shall be acquired from a minimum of three manufacturing lots for final validation, with at least three sample sets from each lot. Material thickness for this test shall be nominally 25 mm, regardless of the actual design thickness for the application.

4.2.3 Required: Shall meet the following minimum requirements for absorption coefficients. Shall also report density, thickness, and composition of test sample/assembly. Normal-incidence absorption will be measured at 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, and 4000 Hz.

4.2.4

Grade A: The normal-incidence absorption coefficient at any one frequency shall not be less than 0.10 and the average of the absorption coefficients shall not be less than 0.35.

Grade B: The normal-incidence absorption coefficient at any one frequency shall not be less than 0.15 and the average of the absorption coefficients shall not be less than 0.60.