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| <b>NAVISTAR, INC.</b>                                                                                                                                                                                                                                                                                                                   |                                  |                                            |
| <b>Material, Parts, and Process Specifications<br/>(MPAPS)</b>                                                                                                                                                                                                                                                                          |                                  | NUMBER:<br><b>MPAPS F-6033</b>             |
|                                                                                                                                                                                                                                                                                                                                         |                                  | Former Designation: <b>TMS-6033</b>        |
| TITLE:<br><b>Air Duct, Engine, Clean Air</b>                                                                                                                                                                                                                                                                                            |                                  | CURRENT REV No.:<br><b>1802</b>            |
|                                                                                                                                                                                                                                                                                                                                         |                                  | DATE:<br><b>Feb 2018</b>                   |
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| <b>PRINTED COPIES OF THIS DOCUMENT MUST BE VERIFIED FOR CURRENT REVISION</b>                                                                                                                                                                                                                                                            |                                  |                                            |
| <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 two types of formed or molded rubber hose connectors for use in the engine clean air supply system. Type 1 connectors are used in standard applications. Type 2 connectors are used where higher temperature resistance is necessary.

## 2.0 SCOPE

This specification covers general requirements, identification, inspection, property and performance requirements, quality plan, and source approval and quality control requirements.

### 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 and standards are referenced in this specification.

ISO 9001/TS 16949 – Quality Management Systems-- Requirements  
 CFR Title 29, Part 1910 – Occupational Health and Safety Standards  
 NAVISTAR ISQ-001-QM – Integrated Supplier Quality Requirements  
 NAVISTAR D-13 – Supplier Packing and Shipping Standard.  
 NAVISTAR EDS-A16 – Key Control Characteristics (KCC)  
 NAVISTAR MPAPS B-50 – Restricted Chemical Substances  
 ASME/ANSI Y14.5M-1994 - Dimensioning and Tolerancing  
 NAVISTAR MPAPS L-6039 - Rubber (TSR) Molding Compounds  
 NAVISTAR MPAPS P-9543 - Engineering Test Report Requirements  
 ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension

## 4.0 GENERAL REQUIREMENTS

The connectors shall be formed or molded of EPDM rubber, suitably reinforced, ribbed and spliced of one or more parts as necessary to meet design and performance requirements.

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|--------------------------------|----------------------------------------------|--------------------------|
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|--------------------------------|----------------------------------------------|--------------------------|

Type 1: Standard engine compartment connections for use on legacy vehicles. This specification should not be used on new designs. The material shall meet TSR70-10a (TSR-0006) per MPAPS L-6039.

Type 2: Engine clean air (vacuum) supply connections on all vehicles. The material shall meet TSR-H70-10a (TSR-0012) per MPAPS L-6039

#### **4.1 Property And Performance Requirements**

All test samples shall be taken from finish formed or molded parts unless otherwise specified.

##### **4.1.1 Tear Resistance after Heat Age**

Perform tear resistance and heat age per MPAPS L-6039 additionally. Material shall retain 60% minimum tear resistance.

##### **4.1.2 Vacuum Collapse**

Method: Measure the outside dimensions of the part at one or more points and mark the measured points. Install the part onto a test fixture, simulating the installed condition. Both ends of the test part shall be held rigidly with the end-plugs inserted to their design depth. Place the fixture and test part into a forced convection oven and heat soak at 82°C (180°F) for a minimum of 2 hours. Apply a vacuum of 10 kPa (40 inches of water) to the test part for 5 minutes. Measure the outside dimensions at the indicated test points while under vacuum.

Required: 20% maximum collapse

NOTE: The vacuum collapse requirement must be met for each part number and shall be requalified for any design change which affects the part number.

##### **4.1.3 Splice Strength** - ASTM D 412, Die C

Method: Tensile test samples shall be taken perpendicular to the splice with the splice contained within the reduced gage length of the test bar.

Required: 80% (min.) of the original tensile strength.

NOTE: The splicing of parts together is not a desired manufacturing method; however, it is recognized that it may not always be possible or practical to avoid this practice.

#### **4.2 Dimensional Tolerances**

Key Control Characteristics shall be measured using finished parts per Table 2. All other dimensions shall be measured using the tooling per Table 1. All modified or spliced lengths shall have a tolerance of  $\pm 3$  mm [ $\pm 0.125$  in.].

*Note: These tolerances take precedence over standard blueprint tolerances unless it is a tolerance noted directly on the design drawing and/or the blueprint/drawing is developed utilizing Geometric Dimensioning and Tolerancing (GD&T; refer to ASME/ANSI Y 14.5M-1994\*). When GD&T is used on the drawing, those tolerances take precedence. [For proper application and use of GD&T tolerance information on drawings, refer to International Design Template DM123448000201].*

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