NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)	*NUMBER:* **MPAPS B-50**	
	Former Designation: ***CEMS B-50***	
TITLE: **Restricted Chemical Substances**	*CURRENT REV No.:* **22-05**	*DATE:* **May 2022**
MAINTAINED BY: **Materials Engineering**	*SUPERSEDES:* **20-04**	**April 2020**

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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.

1.0 SCOPE

The purpose of this specification is to describe Navistar policy concerning the usage of certain chemical substances in Navistar products. These restrictions are based on environmental regulations and/or corporate requirements of Navistar, Inc. These substances shall be either excluded from or restricted in parts, materials, equipment, manufacturing processes, or other goods, supplied to and/or manufactured by Navistar, Inc., and intended for use in Navistar trucks, engines, and other branded products. Parts and materials received by Navistar facilities for non- Navistar branded products manufactured under contract are subject to the restricted and reportable substance requirements of the contractee.

2.0 INTRODUCTION

Navistar believes that good environmental practice is good business and is committed to pursuing sustainable strategies related to environmental protection. Sustainability means ensuring success in the present without compromising the future, so Navistar is committed to delivering great products that drive the economy while also operating in a manner that helps the environment and benefits society. Thus, Navistar operates on certain business principles which support environmental protection and reduce the impact of our products on the environment throughout the entire product lifecycle. These principles include producing vehicles and engines which meet all applicable environmental standards in the regions and countries in which we operate, eliminating or minimizing toxic substances from our production materials and end products, and ensuring that employees, suppliers, and customers accept responsibility for meeting environmental requirements when conducting business.

2.1 Regulations

2.1.1 General

Currently companies that sell electronic or automotive products are subject to a variety of environmental regulations. These include RoHS (Restriction of Hazardous Substances directive) which restricts the use of certain chemical substances in the manufacture of electrical and electronic equipment; WEEE (Waste Electrical and Electronic Equipment directive) which sets collection, recycling, and recovery targets related to the disposal of electrical goods; and ELV (End of Life Vehicles directive) which targets hazardous substances related to the dismantling of vehicles and components at their end of life. The automotive industry adheres to the requirements of the Global Automotive Declarable Substance List (GADSL), which covers declaration of certain information about substances relevant to parts and materials supplied by the supply chain to automotive manufacturers.

2.1.2 REACH

The European Union (EU) has adopted restricted substance regulations collectively known as REACH (Registration, Evaluation, Authorization, and Restriction of Chemicals), which requires mandatory tracking of substances in most every product used by the EU or shipped into the EU. This regulation requires the registration of hazardous substances that are sold, imported, manufactured, or used above certain quantities, and includes basic substances, materials, and components. In principle, REACH applies to all chemicals: not only chemicals used in industrial processes but also in our day-to-day life, for example in cleaning products and paints, as well as in articles such as clothes, furniture and electrical appliances. REACH applies to all substances with a few exemptions: radioactive substances, substances under customs supervision, waste, substances used in medicinal products (or other substances covered by equivalent legislation). Polymers are, for the time being, exempted from registration. REACH regulations also include substances of very high concern (SVHC), which are classified as: carcinogenic, mutagenic, or toxic to reproduction; persistent, bioaccumulative and toxic (PBT) or very persistent and very bioaccumulative (vPvB); or those substances identified, on a case-by-case basis, as causing probable serious effects to human health or the environment (e.g. endocrine disrupters).

2.1.3 Conflict Minerals

Conflict minerals are minerals mined in conditions of armed conflict and human rights abuses. The U.S. Congress enacted section 1502 of the Dodd-Frank Act which required the Securities and Exchange Commission (SEC) to adopt rules to require certain SEC registrants to publicly disclose their use of Conflict Minerals originating from the Democratic Republic of the Congo (DRC) or any of the nine adjoining countries: Angola, Burundi, Central African Republic, Congo Republic, Rwanda, Sudan, Tanzania, Uganda, and Zambia. These rules went into effect at the end of 2012 and require companies to report on their Conflict Mineral use annually starting in 2013. Navistar is committed to complying with the requirements of the SEC rules.

2.1.3.1 The conflict minerals include gold, columbite-tantalite (coltan), cassiterite, wolframite, or their derivatives tantalum, tin, and tungsten.

2.1.3.2 Under the 1502 Dodd-Frank Act, companies subject to the SEC annual reporting requirement are required to exercise due diligence on the source and chain of custody of their conflict minerals.

2.1.3.3 Navistar is required to make the annual report available on their website and maintain records relating to the country of origin inquiries from their suppliers.

2.2 Design Requirements

It is expected that all suppliers to Navistar become familiar with the requirements of this specification, and that the design and fabrication of Navistar products, parts, components, or assemblies comply with the requirements defined herein.

3.0 APPLICATION

This specification is applicable to all parts, materials, components, assemblies, and subassemblies, whose material and/or product specifications are referenced to this specification.

4.0 REFERENCE DOCUMENTS

Unless otherwise specified, the latest issue of all referenced documents shall apply. The following Specifications, Standards, and Regulations are referenced in this specification.

Document Number	Document Title
ISQ-001-QM	Navistar Integrated Supplier Quality Requirements
CFR Title 29, Part 1910	Code of Federal Regulations, Occupational Safety and Health Standards
NAVISTAR ENG_DOC-81	Key Product Characteristics (KPC)
NAVISTAR MPAPS B-50	Restricted Chemical Substances
CFR Title 40, Part 82	Protection of Stratospheric Ozone
ASTM C1111	Standard Test Method for Determining Elements in Waste Streams by Inductively Coupled Plasma-Atomic Emission Spectroscopy
ASTM E30	Standard Test Methods for Chemical Analysis of Steel, Cast Iron, Open-Hearth Iron, and Wrought Iron
ASTM E334	Standard Practice for General Techniques of Infrared Microanalysis
ASTM E1508	Standard Guide for Quantitative Analysis by Energy-Dispersive Spectroscopy
ASTM E1621	Standard Guide for Elemental Analysis by Wavelength Dispersive X-Ray Fluorescence Spectrometry
ASTM E1642	Standard Practice for General Techniques of Gas Chromatography Infrared (GC/ IR) Analysis
	Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)
	Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment
	Global Automotive Declarable Substance List (GADSL)
	Copper-Free Brakes Initiative "Memorandum of Understanding on Copper Mitigation in Watersheds and Waterways"
SAE J866	Friction Coefficient Identification and Environmental Marking System for Brake Linings

5.0 GENERAL REQUIREMENTS

The requirements for restricted chemical substances per this specification align with the requirements listed in the Global Automotive Declarable Substances List (GADSL), which is available at www.gadsl.org, except as indicated in Section 5.4. Materials identified as (P) "prohibited" in the GADSL list must not be used in Navistar products, how and where indicated in the referenced legal requirement and regulatory documents. The use of materials listed as (D) "declarable" in GADSL as well as those defined as "SVHC" by REACH must be avoided in design of our products because the continuing availability of these materials is in question. Declaration of all substances exceeding the threshold limits, as calculated for homogenous material is required. Declaration is not required for amounts below threshold limits. The intentional addition of any of these restricted chemical substances to any part, component, or material being manufactured by Navistar or used by Navistar in the assembly of its products must be avoided.

5.1. Specified Intentional Additions

In cases where the addition of certain restricted chemical substances is necessary in order to meet the required content as described in a Navistar material specification, product specification, or purchase order, that maximum content described in the specification and/or purchase order is acceptable and exempted from the requirements of this specification.

5.2 Deviations

In specific cases where technical requirements make the use of a prohibited substance necessary and alternative or substitute materials meeting the technical requirements for that restricted substance are not yet available, a temporary deviation (limited to one year maximum duration) to allow the use of that restricted chemical substance may be authorized. In such cases, the standard Navistar policies regarding deviation authority, deviation approval, etc., shall apply.

5.3 Reporting Requirements by All Suppliers

In order to ensure compliance to the regulations in Section 2.1, suppliers are required to submit to Navistar objective evidence and declaration of all material and substance data subject to regulation and requirements defined in RoHS, REACH, GADSL and California Proposition 65 and this document.

5.4 Navistar Chemical Restrictions

(*Specific requirements are given in the GADSL list*, www.gadsl.org and as indicated below)

5.4.1 Cadmium

Cadmium and cadmium compounds are prohibited and shall not be used in surface treatments, dyes, paints, plastic colorizers, plastic resins, pigments, or stabilizers. The use of cadmium as a plating in certain safety devices, electrical contacts, and on fasteners must be eliminated. In those limited cases where substitute plating materials are not yet fully developed, temporary deviations to permit cadmium plating may be requested if no other material is deemed suitable for the application. The threshold for cadmium impurities is 0.01%.

5.4.2 Chlorofluorocarbons

The use of chlorofluorocarbon refrigerants in Navistar air conditioning, or other cooling systems, is prohibited. The use of chlorofluorocarbon refrigerants in automotive air conditioning systems was halted by Federal mandate effective December 31, 1995 (CFR 40-82). The use of any chlorofluorocarbon compound described in CFR Title 40, Part 82, in any Navistar cooling or other heat-exchange system is prohibited.

5.4.3 Hexavalent Chrome

The use of hexavalent chrome/chromates (as used, for example, as a passivation for zinc plating) in finished form is prohibited. The use of materials, tooling and processes, that contain or rely on hexavalent chromium or which result in the formation of hexavalent chromium shall not be allowed in any Navistar manufacturing facility. The intentional addition of any hexavalent chrome in any form and quantity to any material, part, or component being supplied to the requirements of this specification (as used, for example in the pretreatment of aluminum to promote paint adhesion) must be declared. Presence in any individual part at concentrations of up to 0.1% by weight in homogeneous material shall be tolerated for non- RoHS regulated parts and assemblies and up to 0.01% in RoHS regulated parts and assemblies, or as specified on the part drawing.

5.4.4 Lead and Lead Compounds

Lead and lead compounds shall not be used in surface treatments, dyes, pigments, paints, plastic colorizers, plastic resins, or stabilizers. The intentional addition or use of lead in any material or product, whose material or product specification does not specifically require such usage, is prohibited. Lead present as an impurity in brake pad/shoe ***Friction Materials*** in Air Disc, Hydraulic Disc, and S-Cam Drum Brake systems, is limited to 0.1 % by weight in components supplied to Navistar and may not be intentionally added.

5.4.5 Mercury and Mercury Compounds

The intentional addition of mercury or any mercury compound to any material, part, or component, whose material and/or product specifications are referenced to this specification, is prohibited.

5.4.5.1 Mercury Switches and Contacts: The use of mercury switches and/or contacts in parts or components being manufactured by Navistar or used by Navistar in the assembly of its products is prohibited.

5.4.5.2 Mercury Lamps and Lights: The use of mercury and/or mercury compounds in lamps and/or lights is being restricted by several countries, in some cases use of mercury compounds after mid-2006 is prohibited. Therefore, the use of mercury in lamps and lights in Navistar products should be avoided.

5.4.6 PCBs and PBBs

The use of polychlorinated biphenyls (PCBs), polybrominated biphenyls (PBBs) and/ or Decabromodiphenyl ether (DecaBDE) or any other polybrominated diphenyl ethers (PBDEs) in materials, parts, or components supplied to Navistar, including plastic packaging materials, is prohibited. The use of PCBs and PBBs in new products is banned by the EPA. These products are no longer produced commercially in the USA.

5.4.7 Radioactive Compounds

The use of any radioactive material or compound in any material, part, product, or component supplied to Navistar is prohibited.

5.4.8 Copper Used in Brake Pads and Shoes

5.4.8.1 The brake pads and shoes used in Air Disc, Hydraulic Disc, S-Cam Drum Brake systems are constructed to include a ***Friction Material*** that is consumed during vehicle braking.

5.4.8.1.1 Effective January 1, 2021, Navistar requires that these ***Friction Materials***, contain less than 5% Copper by weight.

5.4.8.1.2 Effective January 1, 2025, Navistar requires that these ***Friction Materials***, contain less than 0.5% Copper by weight.

5.4.8.1.3 These requirements do not apply to parking brakes or brakes designed primarily to hold a motor vehicle stationary.

5.4.8.2 All brake pads and shoes received by Navistar as an individual part or in a brake assembly must be marked per SAE J866™ MAR2019 "Friction Coefficient Identification and Environmental Marking System for Brake Linings", Table 2, in accordance with the *Memorandum Of Understanding On Copper Mitigation In Watersheds And Waterways (MOU)* signed by *U.S. Environmental Protection Agency* and signatories representing a consortium of industry associations and alliances on January 21, 2015. Refer to Appendix A for further guidance and examples.

5.4.8.2.1 Effective January 1, 2021, brake pads and shoes must either be marked with a "B"+ year of manufacture (example: "B21") to indicate the friction material contains less than 5 % Copper by weight, or, be marked with a "N"+ year of manufacture (example: "N21") to indicate that the friction material contains less than 0.5% Copper by weight.

5.4.8.2.2 Effective January 1, 2025, brake pads and shoes must be marked with a "N"+ year of manufacture to indicate that the friction material contains less than 0.5 % Copper by weight.

5.4.9 Other Compounds

The following substances has been prohibited or restricted by the EPA and their use in materials, parts and components supplied to Navistar is prohibited: Phenol, isopropylated phosphate (3:1) (PIP (3:1)); 2,4,6-Tris(tert-butyl)phenol (2,4,6-TTBP); Hexachlorobutadiene (HCBD); Pentachlorothiophenol (PCTP).

6.0 QUALITY

See primary material or product specification for requirements.

7.0 METHODS OF TEST

7.1 When necessary, commonly accepted methods of chemical analysis may be used to determine the presence of restricted chemical substances at or below their allowable levels. See ASTM E334 and E1642 for gas chromatography methods and ASTM C1111 for atomic absorption methods. See ASTM E30, E158, E1508, and E1621 for emission spectrochemical analysis methods.

7.2 ASTM Standards are available from ASTM International by phone in the USA and Canada at (877-909-2786, and for all other countries at (610) 832-9585, or via their website at www.astm.org .

8.0 SOURCE APPROVAL AND QUALITY CONTROL

See primary material or product specification for requirements.

9.0 DESIGNATION ON DRAWINGS AND CONTROL DOCUMENTS

This material specification shall be referenced in other material specifications (e.g MPAPS, etc.), engineering standards (e.g., ESP), design requirements documents (DRD), and other control documents as follows:

> **"Effective January 1, 2007, all product supplied to the requirements of this specification must comply with the requirements of the MPAPS B-50 specification on Restricted Chemical Substances."**

New or revised engineering drawings should include the following statement, if not automatically included in the title block program: ***"All parts supplied to Navistar must comply with MPAPS B-50 for restricted chemical substances."***

10.0 PACKING, SHIPPING AND IDENTIFICATION

See primary material or product specification for requirements.

REVISION HISTORY

Revision Level	Change	Approved by	Date Approved
1910	Revised General Requirements Reporting Requirements; Revised restrictions applicable to Hexavalent Chromium; Added Navistar Restrictions on the use of copper and lead in brake pad linings; Added Decabromodiphenyl ether (DecaBDE) Phenol, isopropylated phosphate (3:1) (PIP (3:1)); 2,4,6-Tris(tert-butyl)phenol (2,4,6-TTBP); Hexachlorobutadiene (HCBD); Pentachlorothiophenol (PCTP) to list of prohibited materials. Editorial Revisions	R. Goluch	10/2/2019
20-04	Revised requirements concerning the use of the copper in brake shoe and brake pad friction materials including Appendix A.	R. Goluch	4/27/2020
22-05	Removed addresses and contact information	W. Cook	5/25/2022

Appendix A

Information and Guidance for Brake Pad and Brake Shoe Environmental Compliance Part and Package Markings and Friction Material Registration

A.1 Parts: Compliant brake lining pads or shoes will be marked per **SAE J866™ MAR2019** Friction Coefficient Identification and Environmental Marking System for Brake Linings, Table 2. The marking is typically on the edge code or the back of the brake pad or shoe. Locations acceptable per State of Washington can be found in their government publication 13-04-011 "Focus on the Better Brakes Rule". See Figure A1 below for an example of how a brake pad could be marked.

A.1.1 An environmental compliance marking with a "B" + year of manufacture indicates that the friction material on the part contain less than 5 % Copper by weight

A.1.2 An environmental compliance marking with a "N" + year of manufacture indicates that the friction material contains less than 0.5 % Copper by weight.

A.1.3 Manufacturers of brake pad/shoe products with friction materials that comply with AASA/MEMA* per the MOU and its appendices can register their friction material formulations and associated SAE J866: MAR2019 unique identification codes with NSF International an independent certification organization. All certified and registered friction materials and their Unique Identification Codes can be searched at the NSF Registered Friction Materials Search page.

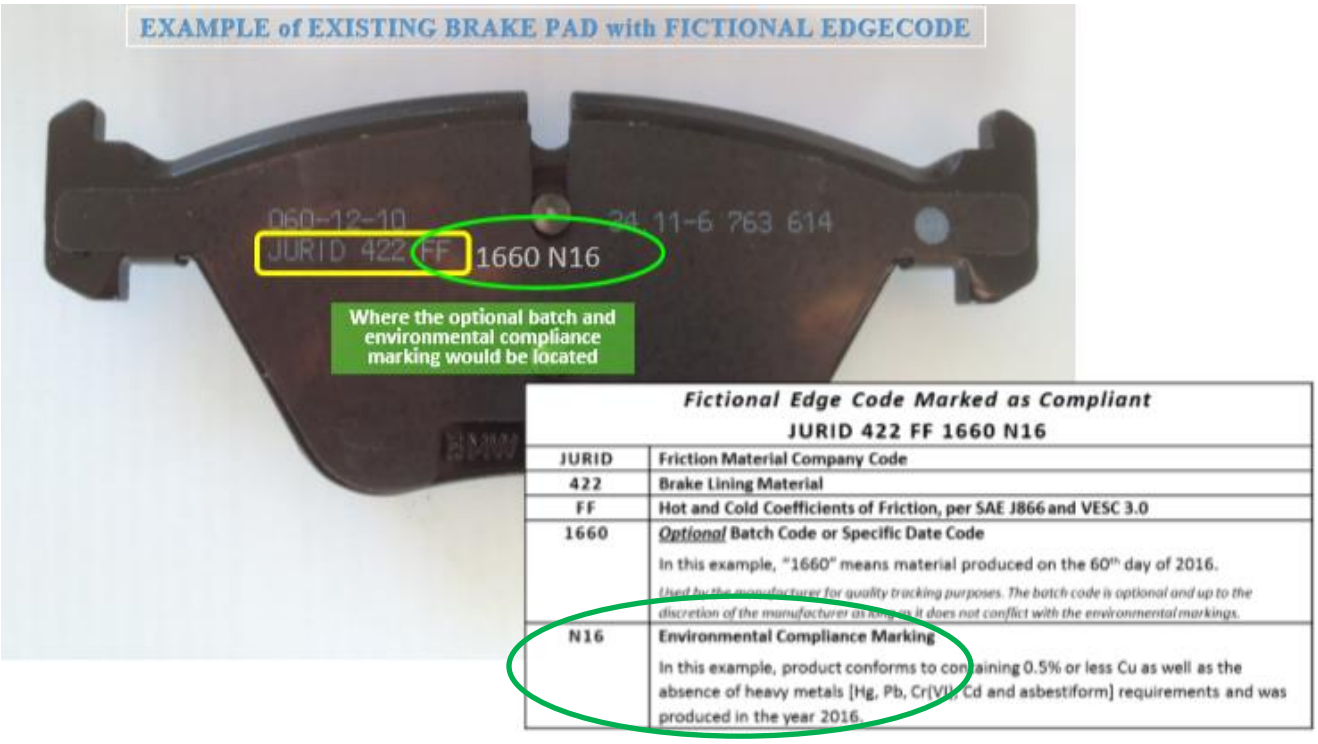

Figure A1. Example of SAE J866: MAR2019 conforming Unique Identification Code with an acceptable Environmental Compliance Marking

A.2 Packaging: The Automotive Aftermarket Suppliers Association and Motor Equipment Manufacturers Association (AASA / MEMA) have created, trademarked, and license a set of "Leaf Mark" symbols that can be used by manufacturers to indicate on their packaging that the contents are made of materials registered and certified as compliant for sale in California and Washington states.

2014 Friction materials on packaged product contain no more than the following by weight

- 0.1% Asbestiform Fibers
- 0.1% Chromium (VI)- salts
- 0.1% Lead and its compounds
- 0.1% Mercury and its compounds
- 0.01% Cadmium and its compounds

2021 Friction materials on packaged product comply as above and contain no more than the following

- 5% Copper and its compounds by weight

2025 Friction materials on packaged product comply as above and contain no more than the following

- 0.5% Copper and its compounds by weight