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| <b>NAVISTAR, INC.</b>                                                                                                                                                                                                                                                                                                                   |                                         |                                                  |
| <b>Material, Parts, and Process Specifications<br/>(MPAPS)</b>                                                                                                                                                                                                                                                                          |                                         | <b>NUMBER:</b><br><b>MPAPS B-6815</b>            |
|                                                                                                                                                                                                                                                                                                                                         |                                         | Former Designation: TMS-6815                     |
| <b>TITLE:</b><br><b>Sheet Metal Processing Lubricants</b>                                                                                                                                                                                                                                                                               |                                         | <b>CURRENT REV No.:</b><br><b>1606</b>           |
|                                                                                                                                                                                                                                                                                                                                         |                                         | <b>DATE:</b><br><b>June 2016</b>                 |
| <b>WRITTEN/EDITED BY:</b><br><b>S. Brailey</b>                                                                                                                                                                                                                                                                                          | <b>APPROVED BY:</b><br><b>R. Goluch</b> | <b>SUPERSEDES:</b><br><b>Rev. D – April 2006</b> |
| <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 mill oils and drawing lubricants used in processing of sheet aluminum, galvanized steel, hot and cold rolled steel, and pre-painted sheet steel.

## 2.0 SCOPE

This specification covers requirements for corrosion protection, formability, compatibility with subsequent operations and qualification of materials. It is not the intent to dictate the lubricant composition; however, changes in composition from initially qualified samples are not permitted.

### 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 MPAPS G-5    |
| CFR Title 29, Part 1910                      | NAVISTAR MPAPS GT-24  |
| NAVISTAR Manufacturing Std. MS-D-13          | NAVISTAR MPAPS K-6915 |
| NAVISTAR Engineering Design Std A-16         | NAVISTAR MPAPS K-6916 |
| NAVISTAR MPAPS B-50                          | NAVISTAR MPAPS K-6917 |

## 4.0 REQUIREMENTS

### 4.1 Corrosion Protection

During shipping and handling or for 90 days after coating, production sheet metal coated with these lubricants shall not exhibit any corrosion or staining which could impair subsequent processing or part appearance. When service parts are stored unheated indoors for one year, any sheet metal coated with these lubricants shall not exhibit any corrosion or staining which could impair subsequent processing or part appearance.

**4.1.1 Prepared Panels:** Test panels, prepared as per Section 5.1-Test Panel Preparation, shall not exhibit more corrosion or staining than the control panels (see Section 5.1) after 1, 5 and 10 cycles of 16 hours at 100°F/100% RH and 8 hours at room temperature.

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

## **4.2 Formability (Drawing Lubricants Only)**

Lubricants shall be qualified by plant trial for ability to perform in the required metal forming operations. Lubricant concentrations and coating thicknesses required for difficult draws, and metals tested and approved with each lubricant, will be documented as part of the qualification procedure.

**4.2.1 Formability Test:** Prepared panels\* shall provide results equal or superior to the control panels\* when tested by the round bottom cup test and the flat die strip draw test.

(\*See Section 5.1 on Test Panel Preparation.)

## **4.3 Weldability**

Lubricants shall be qualified by plant trial to perform satisfactorily in all welding methods used by the plant for the type of sheet metal for which the lubricant is approved.

**4.3.1 Panel Weld Tests:** Weldability shall be equal or superior to that of the control panels\*.

(\*See Section 5.1 on Test Panel Preparation.)

## **4.4 Compatibility With Sealers And Adhesives**

Prepared panels\* shall meet the adhesive strength requirements specified when evaluated with MPAPS K-6915; MPAPS K-6916; MPAPS K-6917.

(\*See Section 5.1 on Test Panel Preparation.)

## **4.5 Compatibility With Wash/Phosphate**

The supplier of the test lubricant will have an approved supplier of the wash/phosphate system perform compatibility tests per MPAPS GT-24. Test results will be submitted in writing to Materials Engineering. Navistar will be solely responsible for review and acceptance of supplier test results.

**4.5.4 Phosphate:** Shall provide complete coverage at a coating weight of zinc phosphate of 150 mg/ft<sup>2</sup> minimum for cold rolled and galvanized steel, and 50 mg/ft<sup>2</sup> minimum for aluminum. Panels shall not be streaked or blushed.

**4.5.5 Painting:** Phosphated panels that have been finished with current production materials shall meet the adhesion, salt spray and humidity requirements of Grade 18 and/or Grade 56 per MPAPS G-5.

## **4.6 General Requirements**

No silicone or lanolin compound of any kind is allowed as a component in a lubricant covered by this specification.

**4.6.1** International will conduct an infrared spectral analysis and a chemical analysis on the initial qualified samples for each approved material. This information will become part of the master control file, and will be used to detect any subsequent changes in composition (See Qualification).

**4.6.2** The material must be formulated such that dilution does not require special mixing equipment and that no more than moderate agitation is required to achieve a uniform and stable mixture. Cleaning of dies and application equipment shall not require excessive effort. Material shall not become separated, rancid or otherwise unusable or objectionable after 30 days storage either neat or as diluted for use.

**4.6.3** All materials furnished under this specification shall be formulated and manufactured using good commercial practice and comply with all applicable OSHA, FDA and EPA regulations concerning use, handling and disposal.

## **5.0 QUALIFICATION**

Production material can be furnished under this specification only after formal qualification, which will include approvals from Materials Engineering and from the using plant(s). All material submitted for qualification shall be accompanied by certification and by complete test data showing conformance to this specification, and by Materials Safety Data Sheets. The data will be submitted to Materials Engineering which will verify test results and arrange for additional testing and trials, as required.

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