

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)		NUMBER: MPAPS G-20
		<i>Former Designation: CEMS G-20</i>
TITLE: Zinc Plating		CURRENT Rev. No.: 1710
		DATE: Oct. 2017
WRITTEN/REVIEWED BY: J. Goldschmidt	APPROVED BY: R. Goluch	SUPERSEDES: 1608 – August 2016
PRINTED COPIES OF THIS DOCUMENT MUST BE VERIFIED FOR CURRENT REVISION		
<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>		

NOTE: All product supplied to the requirements of this specification must be free of hexavalent chrome.

1.0 SCOPE

This specification covers Navistar's requirements for electrodeposited zinc coatings on iron and steel substrates. Provision is also made to specify mechanical plated zinc coatings by the addition of a suffix "M" to the class designation.

2.0 INTRODUCTION

Zinc plating is used primarily for corrosion resistance. This specification provides for several classes of zinc plating for use on both Engineering designed parts and Engineering Standard Parts. Typical parts include clips, clamps, brackets, small stampings, tubes, rivets, rivnuts, lock bolt collars, screws, bolts and nuts, washers, and fittings. **Zinc plated parts or their corrosion products must not come in contact with stressed polyamides (nylon 6 or 66) or PTFE (e.g., ball joints/raceways).**

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 CONTENTS

	PAGE
REFERENCE DOCUMENTS	1
CLASSIFICATION	2
GENERAL REQUIREMENTS	2
QUALITY	4
METHODS OF TEST	5
SOURCE APPROVAL AND QUALITY CONTROL	5
DESIGNATION ON DRAWINGS AND PURCHASE ORDERS	6
PACKING, SHIPPING AND IDENTIFICATION	6
TECHNICAL INFORMATION	6

This document is restricted and may not be sent outside Navistar, Inc. or reproduced without permission from Corporate Technical Standards. Suppliers are required to assume all patent liability. ©2017 by Navistar, Inc.

OCTOBER 2017

NUMBER: MPAPS G-20	TITLE Zinc Plating	REVISION: 1710
------------------------------	------------------------------	--------------------------

4.0 REFERENCE DOCUMENTS

Unless otherwise specified, the latest issue of all referenced standards shall apply. The following standards, specifications and regulations are referenced in this specification:

Quality System Standard *ISO 9001* or TS-16949
NAVISTAR D13 - Supplier Packing and Shipping Standard
CFR Title 29, Part 1910
NAVISTAR MPAPS B-50 – Restricted Chemical Substances
NAVISTAR MPAPS GT-Paint – Paint Test Methods
ASTM B117 - Practice for Operating Salt Spray (Fog) Apparatus
ASTM B201 - Practice for Testing Chromate Coatings on Zinc and Cadmium Surfaces
ASTM B487 - Test Method for Measurement of Metal and Oxide Coating Thickness by Microscopical Examination of Cross Section
ASTM B499 - Test Method for Measurement of Coating Thicknesses by the Magnetic Method: Nonmagnetic Coatings on Magnetic Basis Metals
ASTM B633 - Specification for Electrodeposited Coatings of Zinc on Iron and Steel
ASTM B695 - Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel
ASTM D6492 - Practice for Detection of Hexavalent Chromium On Zinc and Zinc/Aluminum Alloy Coated Steel

5.0 CLASSIFICATION

Zinc plating is classified by coating thickness and level of corrosion resistance, as described in Table 1 below.

6.0 GENERAL REQUIREMENTS

Parts to be plated will be thoroughly cleaned and free of rust, scale, oil and other foreign matter. The cleaning operation must be controlled to prevent hydrogen embrittlement, especially in those parts that are hardened, cold worked, or subject to high service stresses. In the case of high strength, high hardness parts (see Section 7.1), mechanical plating (ASTM B695) may be preferred since relief of hydrogen embrittlement may be difficult to achieve. In this case, mechanical zinc plating will be specified on the engineering drawing by the addition of an “M” suffix to the Class designation (example: Class 8AM, etc.).

6.1 Plating Requirements

6.1.1 Passivation Treatments

Zinc plating should always be given a passivating treatment to prevent the occurrence of white (zinc) corrosion products, unless there is a specific reason for the omission of this treatment. Hexavalent chromate conversion coatings are not permitted on zinc-plated parts supplied to Navistar or for parts used in Navistar products. The coating classes reflected in Table 1 below assume use of trivalent chromium passivation or other hex-chrome free conversion coating. Requirements for each class of coating are shown below.

6.1.2 Zinc Plating and Paint

Since some of the plating classes may require an additional sealer/topcoat over the zinc plating in order to achieve the required performance, this may not be desirable if plated parts will be subjected to further painting operations, such as chassis paint. In such cases, with prior approval from Engineering or Materials Engineering, the performance specified in the table may be waived and the acceptance criteria for the given class will be based on the plating thickness rather than salt spray performance or as specified on the engineering drawing or purchase order.

This document is restricted and may not be sent outside Navistar, Inc. or reproduced without permission from Corporate Technical Standards. Suppliers are required to assume all patent liability. ©2017 by Navistar, Inc.

OCTOBER 2017

NUMBER: MPAPS G-20	TITLE Zinc Plating	REVISION: 1710
------------------------------	------------------------------	--------------------------

6.1.3 Transmission Oil Cooler Tubing

Class 6A will be specified on drawings for transmission oil cooler (TOC) steel tubing/assemblies. In this application, a minimum plating thickness of 4 microns will be allowed as long as the salt spray performance is demonstrated to meet a minimum of 24 hours to white corrosion and 96 hours to red rust on formed areas of tubes. Exceptions to this requirement may be specified on the engineering drawing.

Table 1 – CLASSIFICATION AND REQUIREMENTS

Navistar Designation			Min. plating thickness		Neutral Salt Spray Test (ASTM B117)			
Class*	Obsolete Class	Approximate ASTM B633 Service Condition Equivalent	μm	in.	White Corrosion (hours of test)	Red Rust (hours of test)	Sealer	Appearance
12A	12B, 13A/B, A, AC	SC3 (severe)	12	0.0005	120	360	Optional	Clear/silvery color
8F ^{1,2}	--	SC2 (moderate)	8	0.0003	240	480	Required	Clear/silvery color
8A	8B	SC2 (moderate)	8	0.0003	120	240	Optional	Clear/silvery color
6A [†]	6B, 5A/B, 3A/B	SC1 (mild)	6	0.0002	48	96	Optional	Clear/silvery color
1	---	A flash deposit for identification, coloring, or temporary protection from corrosion while in transit.					Not Allowed	Clear; passivation not required

¹ Class 8F includes application of a post-plating sealer (dip solution) for added abrasion resistance and corrosion protection for fasteners. This class would be recommended for use on heavy duty fasteners (such as hex bolts) which would not be subjected to further painting operations. It is not recommended for smaller parts, such as screws. Use of Class 8F for a given part must be specified on the engineering drawing or in the applicable Engineering Standard Parts specification. Also, no torque-tension fluid or wax (in addition to any sealer) will be added to a given part unless specified on drawing or unless approved by NAVISTAR Fastener Engineering.

² For nylon insert locknuts, compatibility of sealer with nylon must be verified and reported.

*Mechanical zinc plating will be specified on the engineering drawing by the addition of an “M” suffix to the Class designation (e.g., Class 8AM, etc.).

[†]See paragraph 6.1.3 above for Transmission Oil Cooler lines.

6.2 Appearance and Color of Plated Parts

In the past, when use of hexavalent chromate passivation was used on zinc plating, plated parts commonly exhibited a yellow iridescent coating appearance. However, that appearance was a function of that type of process, but zinc plating with trivalent chrome passivation is a clear/bright/silvery color. Provision of a yellow color (or other colors) in trivalent passivation coatings can only be achieved with the addition of a color dye. Unless a specific color is designated on the drawing or purchase order, the clear/bright/silvery color will be provided. Note that the addition of a color dye could possibly reduce corrosion performance.

This document is restricted and may not be sent outside Navistar, Inc. or reproduced without permission from Corporate Technical Standards. Suppliers are required to assume all patent liability. ©2017 by Navistar, Inc.

OCTOBER 2017