

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)	NUMBER: MPAPS A-6 Part II	
	Former Designation CEMS A-6 Part II	
TITLE: Low Carbon Steel, Flat Rolled and Structural Shapes - Part II. METALLIC COATED SHEET AND STRIP	CURRENT REV No.: 1408	DATE: AUGUST 2014
WRITTEN/EDITED BY: Materials Engineering	APPROVED BY: Materials Engineering	SUPERSEDES: Rev. 1402 – Feb. 2014
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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>		
Change Notice: Added Type M to Section 4.3.2.1; editorial changes.		

MPAPS A-6 is divided into three parts, as follows:

- Part I - Covers uncoated base metal requirements for low carbon steel products
- Part II - Metallic Coated Low Carbon Steel Sheet/Strip (including galvanized and aluminized)
- Part III - Organic Coated Low Carbon Steel Sheet/Strip

Part II. METALLIC COATED SHEET AND STRIP

1.0 SCOPE

Part II of this specification covers the Company's requirements for metallic coated steel sheet and strip.

2.0 APPLICATION

This specification covers the requirements for metallic coated steel sheet and strip products, and describes a system for specifying such products on engineering drawings. Metallic coatings are designated by grade (Grade 1A for aluminum, or Grade 1GALV or Grade 6GALV for zinc) and by coating weight for each class of coating within each grade. The coating weight/class applies equally to both sides of the sheet for Grade 1A, but to only one side of the sheet for Grade 1GALV or Grade 6GALV. **(Note: The use of terne coating per this specification is no longer permitted in Navistar products; contact Materials Engineering for guidance.)**

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 Engineering Design Std A-16
CFR Title 29, Part 1910	NAVISTAR MPAPS B-50
NAVISTAR Manufacturing Std. MS-D-13	NAVISTAR MPAPS A-6 Part I

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ASTM A 90
ASTM A 428
ASTM A 463
SAE J911
SAE J810

ASTM A 792
ASTM A 879
ASTM A 917
ASTM A 924
SAE J1562

4.0 REQUIREMENTS

4.1 Classification

Metallic coatings are classified by the type of coating and the weight or thickness of the coated layer. Metallic coating types will be identified according to Grades shown in Table I for Navistar parts.

TABLE I. Metallic Coating Types

Grade	Type of Coating
1A	aluminum and aluminum alloy
1GALV 6GALV	zinc and zinc alloy

4.2 Base Metal

Unless otherwise specified, material furnished to the requirements of this specification will meet applicable requirements of ASTM A 924 for sheet and strip products metallic coated by the Hot Dip Process, or ASTM A 917 for sheet and strip products metallic coated by the Electrolytic Process. Properties of the material furnished shall conform to limits established for the Grade, Type, and quality of the sheet or strip specified on the Engineering drawing and/or purchase order, as described in MPAPS A-6, Part I. Other qualities and Types may be specified on the engineering drawing or purchase order. When not otherwise specified on drawings or purchase orders, Commercial Steel (CS) will be supplied. A minimum yield strength of 22 ksi (150 MPa) is required for all material supplied as Grade 1 GALV, and materials supplied as Grade 6 GALV must meet minimum yield strength for the specified material type (e.g., Type 340X) as defined in MPAPS A-6, Part I, unless otherwise specified on the drawing and/or purchase order or unless approved by the controlling Engineering Department.

4.3 Coating Class And Requirements

4.3.1 Grade 1A - Aluminum and Aluminum Alloy Coatings

Unless otherwise specified, material supplied to this grade shall have coatings applied by the Hot Dip Process and shall meet applicable requirements of ASTM A 463 (Types T1 and T2) or ASTM A 792 (Type AZ). The Type 1 (T1) aluminum-silicon (5-11%) alloy coating is used in heat resisting applications where both heat and corrosion resistance are involved. The Type 2 (T2) pure aluminum coating is used in applications where better corrosion resistance is needed without the heat resistance. The AZ coatings are an aluminum-zinc alloy used in special applications where high temperature galvanic corrosion protection is needed. Coating class and weight requirements are shown in Table II.

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TABLE II. ALUMINUM AND ALUMINUM ALLOY COATINGS *

COATING CLASS	OBSOLETE NAVISTAR DESIGNATION oz/ft ²	COATING WEIGHT – BOTH SIDES **	
		NOMINAL TRIPLE SPOT TEST g/m ²	MINIMUM SINGLE SPOT TEST g/m ²
T1 – 75 ***	T1 – 25	75	60
T1 – 120	T1 – 40	120	90
T2 – 200	--	200	180
T2 – 300	--	300	270
AZ-150	--	150	130
AZ-165	--	165	150
AZ-180	--	180	155

* On existing drawings where Grade 1A is specified and where type of coating T1/T2 is not shown, Type 1 will be supplied.

** Due to the variability involved in the Hot Dip Process, the coating weight is not always distributed uniformly from edge to edge or on both sides of the sheet, however it may be expected that not less than 40% of the single spot test limit will be found on either side.

*** On existing drawings where Grade 1A Class T1 is specified and the Class of coating is not designated, Class T1-75 will be supplied.

4.3.2 Grade 1GALV or Grade 6GALV -Zinc and Zinc Alloy Coatings

This specification includes a system for specifying zinc and zinc alloy coatings on sheet and strip products, and applies to both the Electrolytic and Hot Dip Processes. The coating classification (similar to ASTM A 879 and/or SAE J1562) is based upon the minimum and maximum single-spot coating weight on each side of the sheet. A 7-character alpha-numeric code is used to describe the zinc or zinc alloy coating and the coating weight on **each side** of the sheet. The classification and coating weight requirements are shown in Table III for Hot Dip coated steels and in Table IV for Electrogalvanize coated steels. The system includes a surface appearance quality requirement by identifying parts where the exposed surface must be capable of providing a Class A painted appearance* (refer to Appendix Section A.5 for definition of surface classifications). The 7-character code is described below.

* Steel ordered for exposed applications will exhibit an R_a surface roughness of 0.5-1.6 µm and a peak count greater than 40 peaks/cm, as measured in accordance with SAE J911, using a 1.25 µm bandwidth for determining peaks per cm and an appropriate traverse as per SAE J911. (See MPAPS A-6, Part I)

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Note: The prefix EG added to the 7-character code means that electrolytic coating is required.

Characters:

- 1st and 2nd Designates the coating **weight** on the **nonvisible** side of the sheet or panel
- 3rd Designates the **type** of zinc/alloy coating on the **nonvisible** side of the sheet or panel
- 4th and 5th Designates the coating weight on the **visible/exposed** side of the sheet or panel
- 6th Designates the type of zinc/alloy coating on the **visible/exposed** side of the sheet/panel
- 7th Designates the intended use of the part as: E = exposed part* or U = unexposed part

* Steel ordered for exposed applications will exhibit an R_a surface roughness of 0.5-1.6 μm and a peak count greater than 40 peaks/cm, as measured in accordance with SAE J911, using a 1.25 μm bandwidth for determining peaks per cm and an appropriate traverse as per SAE J911. (See MPAPS A-6, Part I)

4.3.2.1 Zinc/Zinc Alloy Coating Types

The following types of zinc and zinc alloy coatings are covered by this specification:

- M = Zinc-Aluminum-Magnesium Alloy (zinc with 6% aluminum and 3% magnesium)
- G = Zinc (essentially 99% pure zinc)
- A = Zinc-Iron Alloy (zinc with 8-12% bulk iron)
- N = Zinc-Nickel Alloy (zinc with 9-16% nickel)
- X = preceded by 00; indicates no coating/bare surface

Examples:

<u>60G60GU</u> =	<u>60</u> minimum 60 g/m ² coating weight on unexposed side	<u>G</u> zinc	<u>60</u> minimum 60 g/m ² weight exposed side	<u>G</u> zinc on exposed side	<u>U</u> application is an unexposed part
<u>60A01AE</u> =	<u>60</u> minimum 60 g/m ² coating weight on unexposed side	<u>A</u> zinc-iron	<u>01</u> no minimum on exposed side	<u>A</u> zinc-Iron on exposed side	<u>E</u> application is an exposed part

EG 70G00XE : EG = Electrogalvanized coating is required

<u>(70G00XE)</u>	<u>70</u> minimum 70 g/m ² coating weight on unexposed side	<u>G</u> zinc	<u>00</u> no coating on exposed side	<u>X</u> bare metal surface on exposed side	<u>E</u> application is an exposed part
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4.3.2.2 Surface Condition

The hot dip zinc coating surface is normally spangled and unsuitable for painting (i.e., not a Class A surface relative to appearance). Treating the surface during solidification provides a minimized spangle surface which can be further refined by a cold rolling skin pass to provide an extra smooth surface. Zinc-iron and all electrolytic coatings are not spangled and provide a smooth surface suitable for painting.

4.3.2.2.1 Suffix U: All Hot Dip Coating classes identified with the suffix U (unexposed) will be supplied with minimized spangle surface.

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