NAVISTAR, INC.

Material, Parts, and Process Specifications (MPAPS)	NUMBER: MPAPS S-NM-21.101-GS/PL	
	Former Designation: ESP-NM-21.101-GS	
TITLE: Metal Balls – Metric Series (Noun Code - 0460)	*CURRENT REV No.:* 1506	*DATE:* June 2015
WRITTEN/EDITED BY: Materials Engineering / *APPROVED BY:* Materials Engineering	*SUPERSEDES:* ESP-NM-21.101-GS – September 2000	

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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.

Change Notice:; **Changed to New MPAPS format; Combined GS, PP.**

1.0 GENERAL: This specification contains the essentials of the following standard:

International Organization For Standardization: ISO 3290
This standard specifies requirements for finished metal balls for rolling bearings.
Inch metal balls may be found on MPAPS S-N-21.101-GS/PL.

2.0 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 POLICY FOR SELECTING PARTS FOR NEW DESIGN: Approved parts are so designated to reduce variety of parts and assure maximum availability, interchangeability, and cost savings.

For new design, parts shall be selected from "Approved" part list only.

Nominal Sizes: 2, 2.5, 3, 3.5, 4, 4.5, 5, 6, 7, 8, 9,10, 12, 14,16, 20, 25, 30 and 35

Material: Chrome Alloy Steel

Grade: 28

4.0 DEFINITIONS: The following definitions will apply to terms used in this standard:

4.1 Nominal Size: The diameter value which is used for the purpose of general identification of a ball size.

4.2 Grade: A specific combination of dimensional, form, surface roughness, and sorting tolerances.

4.3 Diameter Tolerance Per Ball: The allowable range between the largest and smallest measurable diameters of a ball.

4.4 Diameter Tolerance Per Unit Container: The allowable range between the actual diameter of the largest ball and that of the smallest ball within a shipped unit container.

4.5 Surface Roughness: All those irregularities of the surface which are conventionally defined within the area where deviations of form and waviness are eliminated.

5.0 MATERIAL: Steel, high grade chrome alloy per CEMS A-34. Balls will be free from surface decarburization.

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6.0 METHOD OF DESIGNATION: Balls will be designated by nominal size, grade, description, material and part number as shown in the following:

10 mm, Grade 28 ball, chrome alloy, part number

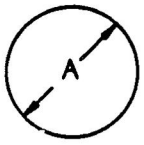
GRADES AND TOLERANCES

Navistar Grade	Diameter Tolerance Per Ball	"V" Block Out-of-Round in 120° Angle	Diameter Tolerance Per Unit Container	Maximum Surface Roughness
28	0.7	0.7	1.4	0.05
100 *	2.5	2.5	5	0.125
200 *	5	5	10	0.2

7.0 BALL GRADES AND TOLERANCES: Ball grades and tolerances will conform to the following:

* Non-Preferred Grades

8.0 WORKMANSHIP: Balls will conform in all respects to the requirements of ISO 3290.



9.0 PART LIST:

9.1 Approved:

A Nominal Size	Approximate kg/1000 Balls	Navistar Part Number		
		Grades		
		28	100 *	200 *
7	1.41	30725R1	-	-

* Non-Preferred Sizes and Grades.

10.0 TECHNICAL INFORMATION:

For further information related to the technical content of this specification, contact:	Suppliers may purchase controlled copies of this specification by contacting:
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