

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)		NUMBER: MPAPS S-BM-11.101-GS/PL
		Former Designation: ESP-BM-11.101-GS
TITLE: Round Head Short Square Neck (Carriage) Bolts Metric Series - (Noun Code – 0810)	CURRENT REV No.: 1506	DATE: June 2015
WRITTEN/EDITED BY: Materials Engineering	APPROVED BY: Materials Engineering	SUPERSEDES: ESP-BM-11.101-GS - August 2006
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>		
Change Notice: Changed to New MPAPS format; Combined GS, GI, PP.		

1.0 GENERAL:

This standard is based on, and contains elements of, the following standard:
American National Standard: ANSI B 18.5.2.1 M

Bolts in this standard approximate the neck (depth of square) dimensions of the inch Short Square Neck Carriage Bolts per ANSI B18.5 and intended primarily for applications in thin metals.

This standard is essentially the same as latest proposed American National Standard covering Metric Round Head Short Square Neck Bolts.

The inclusion of dimensional data is not intended to imply that all the bolts described are stock production sizes.

Inch dimensioned standard bolts may be found in MPAPS S-B-10.101-GS/PL.

Letter symbols designating dimensional characteristics are in accord with those used in ANSI and ISO standards.

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3.0 DESIGN CONSIDERATION: Where Class 9.8 material is specified as acceptable option to 8.8, the design must be to the 8.8 strength level. Class 9.8 is acceptable to assure maximum material availability in North America. Designing to Class 8.8 assures material availability and interchangeability worldwide.

Coarse thread series only will be considered as part of this standard, because of the following advantages:

- Less tendency to cross thread.
- Resists nicking and has less stress concentration at the thread roots.
- Less likely to be seriously affected by decarburization and oversize minor diameter of internal threads.

4.0 METRIC-INCH RELATED SIZES: During the inch to metric design transition period, the following chart of related sizes can be used for reference. This information is not to be considered as a recommendation for substitutions but only as a means of determining approximate dimensional equivalents.

Metric Series mm	Approximate Inch Series
6	1/4
8	5/16
10	3/8
12	1/2
16	9/16, 5/8
20	3/4

5.0 THREADS: The ISO basic profile is essentially the same geometric configuration as the unified screw thread basic form. The threads will be coarse series, tolerance class 6g (Ext).

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6.0 THREAD TOLERANCES: The ISO medium class of fit 6H(Int)/6g(Ext) is approximately the same as the 2A/2B allowance in the U.S. unified thread series for comparable size. For example:

Thread	Allowance
M10 x 1.5 - 6H(Int)/6g(Ext)	0.032 mm (.00126 in)
3/8-16 UNC 2A(Ext)/2B(Int)	.0013 in (0.033 mm)

7.0 THREAD LENGTH FORMULA: The thread lengths shown on Table 2 are based on the formulas shown below:

Millimeters		
Nominal Length		Formula for Thread Length
Over	To	
-	125	2d + 6
125	200	2d + 12
200	-	2d + 25

d = Nominal Diameter of the Bolt

8.0 PROPERTY CLASS: The property class designation symbol for steel bolts consists of two parts, the first is approximately one-hundredth of the minimum tensile in megapascals (MPa) * and the second is one-tenth of the ratio between the minimum yield stress and the minimum tensile strength, expressed as a percentage. The multiplication of the figures will approximate 1/10 the minimum yield stress in megapascals (MPa).

* 1 MPa = 1 N/mm²

9.0 HARDNESS COMPARISON:

CORE HARDNESS	ISO***	Navistar*	ISO***
	Class 8.8	Type 5	Class 9.8**
Min (Rockwell)	C23	C25	C27
Max (Rockwell)	C34	C34	C36
Range (Min to Max)	11	9	11

* For sizes 1/4 thru 1 inch.

** Acceptable optional material for 8.8 design, sizes 6 mm thru 16 mm.

*** Hardness figures are those shown in ISO 898/1.

10.0 COLOR CODING: Not Recommended, except in cases where adequate insurance is needed to prevent mixing of "metric parts" with look-alike "inch parts." The color blue is the standard identifier used in some industries (Automotive, etc.). This must be handled internally at individual plants where needed and is meant to be a supplemental to the normal finish and easily deleted when the need for supplemental identification no longer exists. The supplemental blue color should not be used on finishes such as chromium bright which are specified for cosmetic purposes or phosphate coating which may cause a loss of color identity.

11.0 METHOD OF DESIGNATION: Round head short square neck bolts are designated by the following data, preferably in the sequence shown: product name, nominal diameter, nominal length, steel property class or material identification special feature, if any, finish and part number as shown in the following examples:

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