

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)		NUMBER: MPAPS S-E-56.101-GS/PL
		Former Designation: ESP-E-56.101-GS
TITLE: Prevailing Torque Hex Locknuts – All Metal – English Series (Noun Code 5780)		CURRENT REV No.: 1506
		DATE: June 2015
WRITTEN/EDITED BY: Materials Engineering	APPROVED BY: Materials Engineering	SUPERSEDES: ESP-E-56.101-GS - July 2010
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, PP, NPP.		

1.0 GENERAL: Prevailing torque type locknuts, as defined for this standard, are all metal, one piece locknuts which spin on freely until the locking element engages the mating part. These nuts must be wrenched to final position. They will lock in any position on a bolt providing the locking element is fully engaged by the bolt threads. Prevailing torque locknuts do not depend on the bolt being loaded for locking action.

The locking feature will consist of three constrictions equally spaced or two constrictions diametrically opposed. The constrictions usually appear on the top of the conical surface, though two constrictions on the upper portion of the flats diametrically opposite are permissible.

2.0 CONTENTS:

	Page
General	1
Material	2
Marking	2
Thread Start	2
Basic Dimensions	2
Bearing Surface	2
Hole Concentricity	2
Countersink On Bearing Surface	2
Finish	2
Restricted Chemical Substances	2
Lubrication	3
Prevailing Torque and Torque Tension Test	3
Policy for Selecting Parts for New Design	4
Surface Discontinuities	5
Proof Load, Clamp Load, Tightening Torque	6
Prevailing “ON” and “OFF” Torque	7
Part List	8
Technical Information	8

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. ©2015 by Navistar, Inc.

JUNE 2015

NUMBER: MPAPS S-E-56.101-GS/PL	TITLE: <i>Prevailing Torque Hex Lockout – All Metal</i>	REVISION: 1506
--	---	--------------------------

3.0 MATERIAL: These nuts are available in three strength grades, International Types 1, 5, and 8, (approximate IFI Grades A, B and C) per MPAPS F-31, Part II.

Type 8 nuts with hardness in excess of Rockwell C32 plated with metal must be suitably treated to relieve hydrogen embrittlement.

For convenience, proof load requirements are shown in the Proof Load, Clamp Load Table in the document.

4.0 MARKING: Type 1 locknuts are not required to be marked for grade identification.

Type 5 - three equally or symmetrically spaced; raised projections must appear on top of the conical surface for grade identification.

Type 8 - Six equally or symmetrically spaced; raised projections must appear on top of the conical surface for grade identification.

Double projections at one or more locations, radial or circumferential linear marks or letters in locking constrictions or corners may be used for source identification.

5.0 THREAD START: Constriction of the locking feature will be such that nuts 3/8 inch size and smaller will assemble a minimum of one half turn, and size 7/16 inch and larger a minimum of one full turn, by hand, on a basic "GO" thread plug gage. The plug gage will be without a chip groove, and will have a point with dimensions conforming to those for the point on hex capscrews as specified in International Engineering Standard Parts Book, Section B.

6.0 BASIC DIMENSIONS: Prevailing torque locknuts will conform to the dimensions given in the Dimensions Table in this document. The portion of the locknut containing the prevailing torque feature may have a special contour within the maximum permitted width across flats and thickness. The minimum width across flats will not apply at depressed portion of locknut at prevailing torque feature.

7.0 BEARING SURFACE: Bearing surface will be flat with chamfered corners and square with axis of threaded hole pitch cylinder such that total runout over bearing circle is within "Bearing Surface TIR" shown in the Dimensions Table in this document.

8.0 HOLE CONCENTRICITY: The axis of pitch cylinder of threaded hole will be concentric with axis of nut within TIR specified in the Dimensions Table in this document (3% maximum width across flats).

9.0 COUNTERSINK ON BEARING SURFACE: The threaded hole will be countersunk on the bearing surface. The diameter of countersink will not exceed the thread basic (major) diameter plus .030 inch for sizes 3/8 inch and smaller of 1.08 times the thread basic diameter for larger sizes.

10.0 FINISHES: Nuts will be furnished plated or coated in accordance with the specification below.

Phosphate Coating (PHC) – MPAPS G-1, Class B2.

Zinc Aluminum Clear (ZACLR) – MPAPS G-4518, Type II.

11.0 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.

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. ©2015 by Navistar, Inc.

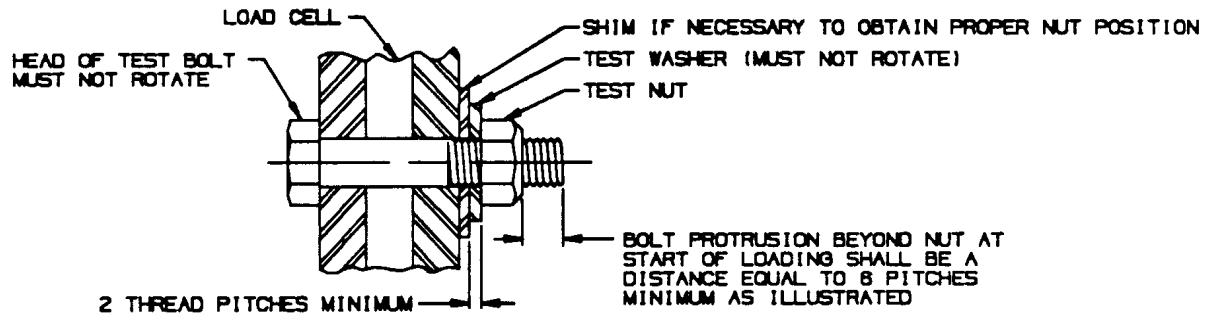
JUNE 2015

NUMBER: MPAPS S-E-56.101-GS/PL	TITLE: <i>Prevailing Torque Hex Lockout – All Metal</i>	REVISION: 1506
--	---	--------------------------

12.0 LUBRICATION: To minimize galling during assembly and promote uniform performance, cadmium plated nuts will be coated with a supplemental lubricant following plating which will be clean and dry to the touch. Lubricant will not deteriorate due to temperature and humidity variations so as to affect nut performance for a period of one year when nuts are stored, shipped, or handled in a normal manner.

13.0 PREVAILING TORQUE AND TORQUE TENSION TEST:

13.1 Test Conditions:



Section through Typical Test Machine
(Hydraulic Load Cell)

The same grade steel bolt and nut should be used for testing (Type 5 bolt with Type 5 nut). The test bolt used in the prevailing torque test will have a zinc phosphate and oil finish without any additional lubrication such as oil, grease, or wax which would alter frictional characteristics of threads. Bolt threads will be Unified Series Class 2A rolled, on sizes 1 inch diameter and smaller. Test washers will be non-rotating (square washers are recommended), hardened, with electrodeposited zinc plating.

A new test bolt and test washer will be used for testing each nut.

13.2 Testing: All torque specifications tabulated in the Proof Load and Prevailing “on” and “off” torque tables apply only to locknuts having the required plating, lubrication, and assembled as illustrated under test conditions. A hand torque wrench or mechanical drive unit will be used for all assembly and disassembly operations. Driving speed must not exceed 30 rpm and will be continuous and uniform.

On initial assembly, the maximum prevailing torque “on” will be recorded and will not exceed the prevailing torque first time on, specified in the Prevailing “on” and “off” torque table.

The nut will be tightened against the hardened washer until the specified clamping load is developed in the bolt. The torque necessary to develop this load will be recorded and must be within the specified limits for tightening torque.

The nut will then be backed off until the tensile load in the bolt has been reduced to zero or an axial play of .031 inch maximum is obtained. There must be perceptible drag or torque encountered throughout the next 360 degrees of rotation and the maximum and minimum torque obtained will be recorded. The maximum torque will not be less than the first removal “highest reading”

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. ©2015 by Navistar, Inc.

JUNE 2015