NAVISTAR, INC.			
Material, Parts, and Process Specifications (MPAPS)		*NUMBER:* **MPAPS S-F-1.101-GS/PL**	
		Former Designation: **ESP-F-1.101-GS**	
TITLE: **Spring Lock Washers – English Series Not Recommended (Noun Code 9720)**		*CURRENT REV No.:* **1506**	*DATE:* **June 2015**
WRITTEN/EDITED BY: **Materials Engineering**	*APPROVED BY:* **Materials Engineering**	*SUPERSEDES:* **ESP-F-1.101-GS - December 2012**	

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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, NPP.**

1.0 GENERAL: Lock washers covered in this standard are intended for general applications and based primarily on A.S.M.E. Standard B-18.21.1.
Spring lock washers are available in Regular, Heavy and Extra Duty series. Washers in certain materials are not available in all of the series covered by this standard.

It should be noted that the word "Lock" appearing in the names of the products in this standard is a generic term historically associated with their identification and is not intended to imply an indefinite permanency of fixity in attachments where they are used.

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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 in volume buying.

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

Sizes:	1/4, 5/16, 3/8, 1/2, 5/8, and 3/4
Type:	Regular Series
Finish:	Zinc Trivalent (ZN6A)
Material:	Steel (STL)

4.0 WASHER SECTION: The section of finished washers will be slightly trapezoidal in shape with the thickness at the inner periphery greater than the thickness at the outer periphery by an amount varying from a minimum of .0005 inch to a maximum of .001 inch per .0156 inch of the minimum section width. The minimum thickness specified in the dimensional tables represents the nominal mean thickness of the trapezoid. Reduced to formulas, the increase in thickness from the outer periphery to inner periphery is t_i minus t_o or .032W (minimum) to .064W (maximum). The tolerance on the nominal mean thickness of the trapezoid will be plus and equal to the following:

Size No. 12 and smaller	.006 inch
Size 1/4 to 13/16	.010 inch
Size 7/8 to 1-1/2	.020 inch

5.0 MANUFACTURING DETAIL: Washers will be coiled such that the free height is approximately twice the thickness of washer section. The gap and relationship of severed ends will be such as to prevent washers tangling and insure that the washers will compress flat. The internal and external circumferential edges will be rounded sufficiently to avoid checks. The flat faces and inner and outer peripheries will be smooth and free from knurling, serrations, die marks, deep scratches, etc., although slight feed roll marks will be permissible.

6.0 MATERIAL: Steel (STL) SAE 1050-1065, with a hardness range of Rockwell 38-46 HRC. Washers will be ground to assure removal of decarburized or plated surfaces before hardness test

Stainless Steel (SST), Type 302 or 305, per MPAPS A-37, with a hardness range of Rockwell 35-43 HRC

7.0 DECARBURIZATION: Carbon steel lock washers shall meet the limits for decarburization shown in Table 1. Method of testing decarburization limits shall conform to SAE J 419.

Table 1

Diameter of Round Wire or Sections of Equivalent Area	Maximum Free Ferrite	Maximum Total Affected Depth, (Free Ferrite Plus Partial Decarburization
Up to .140 incl	.002	.006
Over .140 to .250 Incl	.003	.008
Over .250 to .375 Incl	.004	.010
Over .375 to .500 Incl	.006	.015

8.0 FINISHES: Washers will be furnished in accordance with MPAPS and class listed below:

Plain (PLN).
Zinc Trivalent (ZN6A) – MPAPS G-20, Class 6A or Class 6AM.
Phosphate Coated (PHC) – MPAPS G-1, Class B2.

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