NAVISTAR, INC.			
Material, Parts, and Process Specifications (MPAPS)		*NUMBER:* **MPAPS S-D-40.101-GS/PL**	
		Former Designation: **ESP-D-40.101-GS**	
TITLE: **Self-Drilling Tapping Screws - English Series (Noun Code 7450)**		*CURRENT REV No.:* **1506**	*DATE:* **June 2015**
WRITTEN/EDITED BY: **Materials Engineering**	*APPROVED BY:* **Materials Engineering**	*SUPERSEDES:* **ESP-D-40.101-GS - August 2006**	
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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 standard covers requirements for carbon steel self-drilling tapping screws suitable for use in general engineering applications.

The objective of this standard is to insure that carbon steel self-drilling tapping screws drill a hole and form or cut mating threads in material into which they are driven, without deforming their own thread and without breaking during assembly.

It is the intent that all types of self-drilling tapping screws will meet the mechanical and performance requirements specified in this standard with the only difference between types being in their dimensional characteristics.

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3.0 SCREW TYPES AND APPLICATION: The two types of self-drilling tapping screws covered by this standard are designated and described as follows:

3.1 Type BSD: Type BSD screws will have spaced threads (same as ANSI Type B tapping screws) with drill points of varying configuration, designated Style 2 and Style 3, designed to accommodate different panel thickness conditions as delineated in Table 1.

3.2 Type CSD: Type CSD screws will have threads of machine screw diameter-pitch combinations approximately Unified Form with drill points of varying configuration, designated Style 2 and Style 3, designed to accommodate different panel thickness conditions and delineated in Table 1. Type CSD screws are not subject to thread gaging but will meet dimensions specified in this standard. They are intended for application where the use of a machine screw pitch thread is preferred over the spaced thread.

Table 1 - Self-Drilling Tapping Screw Selection Chart

Screw Type	Point Style	Nominal Screw Size	p[a] Recommended Panel Thickness, in.
BSD and CSD	2	4	.035 - .080 max
		6	.035 - .090 max
		8	.035 - .100 max
		10	.035 - .110 max
		12	.035 - .140 max
		1/4	.035 - .175 max
	3	6	.090 - .110
		8	.100 - .140
		10	.110 - .175
		12	.110 - .210
		1/4	.110 - .210

If the panel to be drilled is comprised of two or more layers. See Figures 1B and 1C, the gap between the layers (which might consist of a sealing strip, air space caused by warpage, etc.. or just the separation caused by the pressure exerted by the driver) must be considered in determining the point style for the particular fastener. Using a self-drilling tapping screw as covered in this standard in a multi-layer application with an excessive gap could result in point breakage since the tapping in one layer begins before completion of the drilling of the other layers and since the advancement of the screw in the tapping operation is much faster than in the drilling operation.

FIGURE 1 - TYPICAL PANEL CONFIGURATIONS

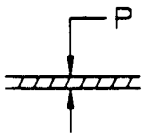

FIGURE 1A - SINGLE PANEL

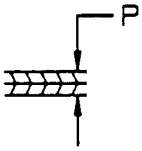

FIGURE 1B - DOUBLE PANEL

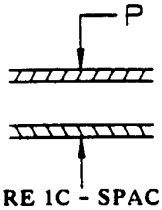

FIGURE 1C - SPACED PANEL

For multipanel applications which exceed the thickness tabulated, clearance holes should be provided in the uppermost panel or panels to reduce the thickness to be drilled by the screw.

Driving tools which operate between 1800 and 3000 rpm are commonly used for self-drilling tapping screw applications.

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Torque output of the driver should be equivalent to the torque required to drive a comparable standard thread forming or thread cutting tapping screw in a predrilled hole.

.035 is minimum steel sheet thickness recommended, using self-drilling tapping screws described in this standard.

To avoid skidding, self-drilling screws must be driven perpendicular to the work surface unless a dimple is provided.

Curved surfaces or angular drilling requires controlled conditions, a modification of the drill point and/or a dimple.

Magnetic bits and sockets are not recommended for sealing applications or when material thickness is near the maximum drilling limit of the particular screw (see Table 1) because of possible chip collection under the head.

Excessive drilling pressure, especially during the initial penetration of the drill point, increases the amount of material being removed by the flutes and could result in drilling torques in excess of the strength of the drill point.

4.0 HEAD TYPES: The head types covered by this specification include, pan, oval, flat and hex washer as specified in SAE J478 and ANSI B18.6.4 ANSI Type I recess (Phillips) is the only cross recess considered in this standard.

Slotted head screws and hex (non-washer) head screws are not recommended for self-drilling screws.

5.0 DIMENSIONAL REQUIREMENTS:

5.1 General Dimensions: Dimension and general specifications applicable to heads, body, and screw length for Type BSD and Type CSD screws will conform to those specified for Type B and Type C tapping screws, respectively, as specified in SAE J478 or ANSI B 18.6.4 or Navistar standards for flat, oval and pan head (except for #6 size which has extra .018 max and min heights) cross recess and hex washer head tapping screws in section D, except as specified in paragraph "Heads" which follows.

5.2 Heads: The underside on all non-countersunk styles of heads on milled point self-drilling screws may be chamfered at the periphery of head in accordance with the dimensions specified in Figure 2 and Table 2.

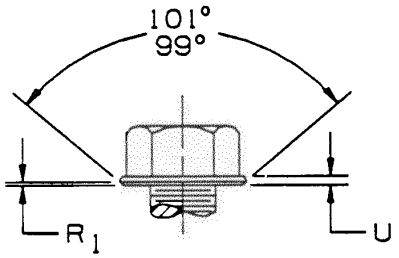

FIGURE 2A - HEX WASHER HEAD

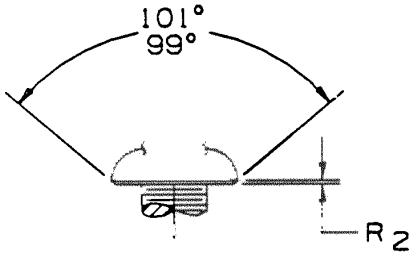

FIGURE 2B - RECESSED HEADS

FIGURE 2 - HEAD CHAMFERS ON MILLED POINT SCREWS

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