

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)		NUMBER: MPAPS S-E-70.101-GS/PL
		Former Designation: ESP-E-70.101-GS
TITLE: Spring Nuts (Flat "J" Shape – "U" Shape) - English Series (Noun Code 5780)		CURRENT REV No.: 1506
		DATE: June 2015
WRITTEN/EDITED BY: Materials Engineering	APPROVED BY: Materials Engineering	SUPERSEDES: ESP-E-70.101-GS - August 2006
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<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.		

1.0 GENERAL: This specification covers performance and other requirements for spring nuts described in section 18.0, 19.0 and 20.0.

Single-thread engaging spring nuts are formed by stamping a thread-engaging Boss (impression) in a flat piece of metal. The Boss (impression) can take two shapes: 1. "Twin Prong" in which shear-formed helical prong engage and lock on the screw thread root diameter. 2. "Cone" in which a protruding truncated cone stamped into the metal provides a ramp that the screw climbs as it turns.

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- 3.0 APPLICATIONS:** Single-thread engaging spring nuts generally are used for lighter duty applications than multiple-thread nuts of the same size. These types of fasteners are often used to reduce assembly costs. Spring nuts do not require a large amount of torque; their holding power and resistance to vibration depend solely on spring action. Corrosion of screw threads presents no problem with the engaging of one thread instead of several, spring nuts can be removed easily. When assembly conditions necessitate blind attachment from the front of a panel; "J" shape spring nuts are preferable to "U" shape when full bottom leg is not required for full bearing surface in assembly. Tapping screw pitches are recommended when strength and speed of assembly are considerations or field servicing is involved.
- 4.0 DIMENSIONAL TOLERANCE:** Tolerance on dimensions in the tables will be plus or minus .010 inch unless otherwise specified.
- 5.0 BOSS (IMPRESSION):** The detail of Boss (impression) whether "Twin Prong" or "Cone" will be such as to assemble readily and function satisfactorily with the specified screw and nut performance requirements of this specification.
- 6.0 SCREW LENGTH:** The proper machine screw length to be used with single-thread engaging nuts, is to allow 1-1/2 threads to protrude beyond the thread engaging element of the fastener. Sheet metal screws with tapered ends (Types AB, and B) should protrude two or three threads beyond the thread engaging element to assure engagement on the full screw root diameter.
- 7.0 MATERIAL:** Spring steel, 1050 thru 1065 per MPAPS A-0, Part I, suitably processed to meet the performance requirements of the specification.
- 8.0 FINISH:** Two standard finishes "Phosphate Coated" and "Rustproof." "Phosphate Coating" will comply with Class B-1 per MPAPS G-1, which requires phosphate coating with subsequent oil coating to meet a 48 hour salt spray requirement.

"Rustproof" requires phosphate coating with two subsequent coats of hex-free zinc chromate paint (or paint standard with manufacturer) to meet 72 hour salt spray requirement.
- 9.0 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.
- 10.0 RECOMMENDED HOLE SIZES FOR FLAT SPRING NUTS:** Tests prove that flat spring nuts will withstand greater tensile loads if the screw holes provide a minimum amount of clearance. This does not apply to self-retaining spring nuts such as "U" and "J" types.

Screw Size	Hole Diameter
6	.156
8	.187
10	.218
14	.281
1/4	.281
3/8	.406

• Reference Dimensions

See section 17.0, 18.0 and 19.0 for part numbers.

See section 20.0 for assembly data.

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11.0 HARDNESS:

Hardness Specifications

Material Thickness	Rockwell Scale	Dial Reading	Conversion to Rockwell C Scale
Up to 0.016	15N	81.5 - 85.5	42 - 50
0.017 - 0.024	30N	61.3 - 68.5	42 - 50
0.025 - 0.039	45N	45.5 - 55.0	42 - 50
0.040 and over	C	42 - 50	42 - 50

12.0 ASSEMBLY REQUIREMENTS: The "J" shape and "U" shape spring nuts will pre assemble onto panels within the thickness ranges specified in the dimensional tables (section 19.0 and 20.0) and will remain pre assembled to the panels during final assembly operations.

13.0 RETENTION TESTS: Spring nuts will pre assemble onto test panels of thickness equal to the two extremes of the panel range specified, having minimum diameter holes located at the maximum edge distance. The retaining feature will snap into the hole, and a pull force of 3-lb. minimum, will be required to remove the nuts from the panel.

14.0 INSTALLATION TORQUE AND BACK-OFF TORQUE: A spring nut will be assembled on a test plate and test screws used will be Hexagon head, Type AB, 1-inch minimum length, phosphate and oil finish. When the test screw is tightened to the recommended installation torque, the back-off torques will not be less than the values specified on Table 1. The readings being taken when the screw first moves. Upon disassembly, the boss will return to a position that will accept re-entry of the screw.

15.0 DESTRUCTIVE TORQUE TEST: A spring nut will be assembled on a test plate, and torque applied to a test screw driven into the nut. Torque to cause failure of the nut will not be less than the value shown in Table 1.

16.0 TENSILE TEST: A spring nut will be assembled on a test plate, with a device capable of measuring tensile load on a test screw driven into the nut. The test screw will be engaged with the nut, but no pre load applied by torque. A tensile load will be applied to the test screw, and load to cause failure of the nut will not be less than the value shown in Table 1.

17.0 VIBRATION TEST: Conducted in accordance with SAE Standard J891, to meet figures listed in Table 1.

Table 1 - Performance Requirements for Spring Nuts

Screw		Recom- mended Installation Torque, Max, lb-in	Destruct- ive Torque, Min, lb.-in	Back-Off Torque Min, oz-in		Test Plate Separation in	Tensile Yield Strength, lb	Ultimate Tensile Strength, lb.		Vibration Test Load lb	
				Cone Boss	Twin Prong Boss			Cone Boss	Twin Prong Boss		
											at 5 deg
Type	Size										
Machine	6 -32 *	6	8	33	26	16.5	0.004	89	155	156	25
	8 -32	8	10	45	24.8	20.6	0.005	134	200	189	38
	10 -24	14	17	78	48	40	0.006	221	315	274	50
	1/4-20	35	45	195	256	216	0.008	350	570	550	85
	6 -20 *	12	17	57	42.4	13.8	0.004	312	500	425	70
	8 -18	20	25	96	120.6	54	0.005	420	620	534	95
	10 -16	35	44	168	113.6	8	0.006	525	1000	672	13
	1/4-14	60	80	288	432	150	0.008	891	1130	1158	18

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