

PennEngineering®

SELF-CLINCHING NUTS



BULLETIN

CL



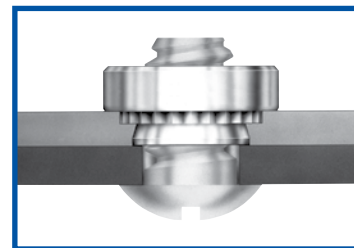
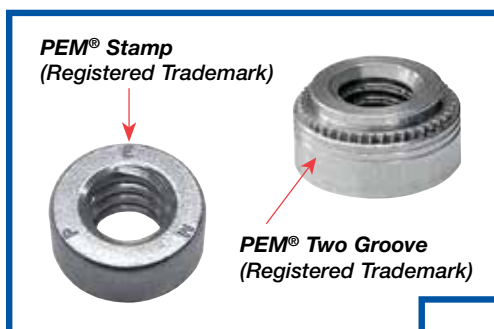
814
Rev 1214

SELF-CLINCHING NUTS

Self-clinching nuts are installed by placing them in properly sized holes in sheets and applying a parallel squeezing force to the head of the nut. The sheet metal surrounding the head cold flows into an undercut thereby making the fastener an integral part of the sheet. A serrated clinching ring prevents the fastener from rotating after installation.

Types S/SS/CLA/CLS/CLSS nuts provide load-bearing threads in thin sheets with high pushout and torque-out resistance- PAGES 4 and 5		Type SMPS nuts are for thinner sheet/ close-to-edge applications - PAGE 7	
Type SP, PEM 300® nuts provide strong load-bearing threads in stainless steel sheets as thin as .030"/0.8 mm - PAGES 4 and 5		Type SL self-locking nuts are designed with a unique and economical TRI-DENT® locking feature, meeting 3 cycle locking performance requirements- PAGE 8	
Type SH hard panel nuts install into thin, harder, high strength steel materials - PAGE 6	 NEW	Material and finish specifications - PAGE 9	
Type H (non-locking) and Type HNL (locking) nuts have threads that provide high pushout and torque-out resistance - PAGE 7		Installation - PAGES 10 and 11	
		Performance data - PAGES 12 - 14	

Many PEM self-clinching nuts in this bulletin are dimensionally equivalent to nuts manufactured to NASM45938/1 specifications. Consult our Marketing department for a complete Military Specifications and National Aerospace Standards guide (Bulletin NASM) on our website.



SELF-CLINCHING NUTS

PEM® SELF-CLINCHING NUT SELECTOR GUIDE

PEM Nut Type	Application Requires:							
	Recommended panel material (1)	Thinnest sheet .025" / 0.64 mm	Self-locking	Closest centerline-to-edge distance	Superior corrosion resistance	Installs into stainless steel sheets	Compatible with aluminum anodizing	Thin, harder high strength steel material
S/SS/H	steel / aluminum							
CLS/CLSS	steel / aluminum				•			
CLA	aluminum				•		•	
SH	hardened alloy steel							•
SP	stainless steel				•	•		
HNL	aluminum		•					
SMPS	steel / aluminum	•		•	•			
SL	steel / aluminum		•					

(1) Describes "best practice" for typical applications. Fasteners can be used in other panel materials not listed here if specified hardness limits are met. In all cases "For Use in Sheet Hardness" information is shown in chart on page 9.

Thread Mask

PEM® Blu-Coat™ thread mask is available for applications where hardware is installed prior to painting. During assembly, the threads of the mating hardware will remove paint, electro deposited automotive under coatings, and weld spatter upon application of torque. PEM nuts can be specially ordered with thread mask applied.



"BC" suffix will be added to part number to designate Blu-Coat thread mask to fastener.



Fastener drawings and models are available at www.pemnet.com

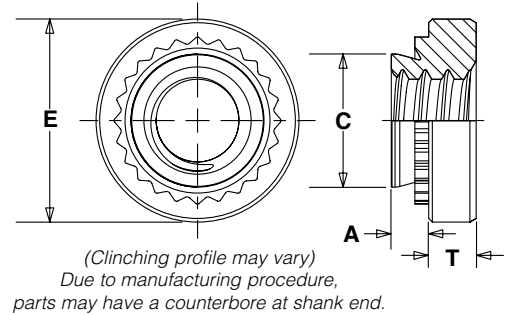


SELF-CLINCHING NUTS

- Types S/SS are recommended for use in steel or aluminum sheets HRB 80 / HB 150 or less.
- Types CLS/CLSS are recommended for use in steel or aluminum sheets HRB 70 / HB 125 or less.
- Type SP is recommended for use in stainless steel sheets HRB 90 / HB 192 or less.
- Type CLA is recommended for use in steel or aluminum sheets HRB 50 / HB 82 or less.

PART NUMBER DESIGNATION

S	-	632	-	1	ZI
SS	-	632	-	1	ZI
CL	S	-	632	-	1
CLS	S	-	632	-	1
S	P	-	632	-	1
CL	A	-	632	-	1
Type	Material Code	Thread Size Code	Shank Code	Finish Code	



TYPES S/SS/CLS/CLSS/SP

All dimensions are in inches.

Thread Size	Type Fastener Material			Thread Code	Shank Code	A (Shank) Max.	Rec. Min. Sheet Thickness (1)	Hole Size In Sheet +.003 - .000	C Max.	E ±.010	T ±.010	Min. Dist. Hole Φ To Edge
	Carbon Steel	Stainless Steel	Hardened Stainless Steel									
.086-56 (#2-56)	S	CLS	SP	256	0	.030	.030	.166	.165	.250	.070	.19
					1	.038	.040					
					2	.054	.056					
.099-48 (#3-48)	S	CLS	—	348	0	.030	.030	.166	.165	.250	.070	.19
					1	.038	.040					
					2	.054	.056					
.112-40 (#4-40)	S	CLS	SP	440	0	.030	.030	.166	.165	.250	.070	.19
					1	.038	.040					
					2	.054	.056					
					3 (2)	.087	.090					
.138-32 (#6-32)	S	CLS	SP	632	0	.030	.030	.1875	.187	.280	.070	.22
					1	.038	.040					
					2	.054	.056					
					3 (2)	.087	.090					
.164-32 (#8-32)	S	CLS	SP	832	0	.030	.030	.213	.212	.310	.090	.27
					1	.038	.040					
					2	.054	.056					
					3 (2)	.087	.090					
.190-24 (#10-24)	SS	CLSS	SP	024	0	.030	.030	.250	.249	.340	.090	.28
					1	.038	.040					
					2	.054	.056					
					3 (2)	.087	.090					
.190-32 (#10-32)	SS	CLSS	SP	032	0	.030	.030	.250	.249	.340	.090	.28
					1	.038	.040					
					2	.054	.056					
					3 (2)	.087	.090					
.216-24 (#12-24)	S	CLS	—	1224	1	.038	.040	.277	.276	.370	.130	.31
					2	.054	.056					
					3	.087	.090					
.250-20 (1/4-20)	S (3)	CLS	SP	0420	0	.045	.047	.344	.343	.440	.170	.34
					1	.054	.056					
					2	.087	.090					
					3 (2)	.120	.125					
.250-28 (1/4-28)	S	CLS	—	0428	1	.054	.056	.344	.343	.440	.170	.34
					2	.087	.090					
					3	.120	.125					
.313-18 (5/16-18)	S (3)	CLS	SP	0518	1	.054	.056	.413	.412	.500	.230	.38
					2	.087	.090					
					3 (2)	.120	.125					
.313-24 (5/16-24)	S	CLS	SP	0524	1	.054	.056	.413	.412	.500	.230	.38
					2	.087	.090					
					3 (2)	.120	.125					
.375-16 (3/8-16)	S	CLS	SP	0616	1	.087	.090	.500	.499	.560	.270	.44
					2	.120	.125					
					3 (2)	.235	.250					
.375-24 (3/8-24)	S	CLS	SP	0624	1	.087	.090	.500	.499	.560	.270	.44
					2	.120	.125					
					3 (2)	.235	.250					
.438-20 (7/16-20)	S	—	—	0720	1	.087	.092	.562	.561	.687	.311	.562
.500-13 (1/2-13)	S	CLS	—	0813	1	.120	.125	.656	.655	.810	.360	.63
					2	.235	.250					
.500-20 (1/2-20)	S	CLS	—	0820	1	.120	.125	.656	.655	.810	.360	.63
					2	.235	.250					

(1) For maximum performance, we recommend that you use the maximum shank length for your sheet thickness.

(2) This shank code not available for Type SP.

(3) This thread size Type S nut, with a -2 shank code, can be installed successfully without the need to pre punch a mounting hole in a separate operation. See page 15 for more information.

The increased hardness of stainless steel panels requires careful consideration when installing self-clinching fasteners. Refer to Fastener Installation Dos and Don'ts on our web site.

SELF-CLINCHING NUTS

TYPES S/SS/CLS/CLSS/SP (See drawing at top of page 4) All dimensions are in millimeters.

METRIC	Thread Size	Type			Thread Code	Shank Code	A (Shank) Max.	Rec. Min. Sheet Thickness (1)	Hole Size In Sheet +0.08	C Max.	E ±0.25	T ±0.25	Min. Dist. Hole $\varnothing$ To Edge
		Fastener Material											
		Carbon Steel	Stainless Steel	Hardened Stainless Steel									
	M2 x 0.4	S	CLS	—	M2	0	0.77	0.8	4.22	4.2	6.35	1.5	4.8
						1	0.97	1					
						2	1.38	1.4					
	M2.5 x 0.45	S	CLS	SP	M2.5	0	0.77	0.8	4.22	4.2	6.35	1.5	4.8
						1	0.97	1					
						2	1.38	1.4					
	M3 x 0.5	S	CLS	SP	M3	0	0.77	0.8	4.22	4.2	6.35	1.5	4.8
						1	0.97	1					
						2	1.38	1.4					
	M3.5 x 0.6	S	CLS	—	M3.5	0	0.77	0.8	4.75	4.73	7.11	1.5	5.6
						1	0.97	1					
2						1.38	1.4						
M4 x 0.7	S	CLS	SP	M4	0	0.77	0.8	5.41	5.38	7.87	2	6.9	
					1	0.97	1						
					2	1.38	1.4						
M5 x 0.8	SS	CLSS	SP	M5	0	0.77	0.8	6.35	6.33	8.64	2	7.1	
					1	0.97	1						
					2	1.38	1.4						
M6 x 1	S ⁽³⁾	CLS	SP	M6	00 ⁽²⁾	0.89	0.92	8.75	8.73	11.18	4.08	8.6	
					0 ⁽²⁾	1.15	1.2						
					1	1.38	1.4						
					2	2.21	2.29						
M8 x 1.25	S ⁽³⁾	CLS	SP	M8	1	1.38	1.4	10.5	10.47	12.7	5.47	9.7	
					2	2.21	2.29						
M10 x 1.5	S	CLS	SP	M10	1	2.21	2.29	14	13.97	17.35	7.48	13.5	
					2 ⁽²⁾	3.05	3.18						
M12 x 1.75	S	—	—	M12	1	3.05	3.18	17	16.95	20.57	8.5	16	

TYPE CLA (See drawing at top of page 4) All dimensions are in inches.

UNIFIED	Thread Size	Type	Thread Code	Shank Code	A (Shank) Max.	Min. Sheet Thickness (1)	Hole Size In Sheet +.003 - .000	C Max.	E ±.010	T ±.010	Min. Dist. Hole $\varnothing$ To Edge
		Fastener Material									
		Aluminum									
	.086-56 (#2-56)	CLA	256	1	.038	.040	.166	.165	.250	.070	.19
				2	.054	.056					
	.112-40 (#4-40)	CLA	440	1	.038	.040	.1875	.187	.250	.090	.22
				2	.054	.056					
	.138-32 (#6-32)	CLA	632	1	.038	.040	.213	.212	.280	.090	.27
				2	.054	.056					
	.164-32 (#8-32)	CLA	832	1	.038	.040	.234	.233	.310	.130	.28
				2	.054	.056					
	.190-24 (#10-24)	CLA	024	1	.038	.040	.296	.295	.370	.160	.31
				2	.054	.056					
	.190-32 (#10-32)	CLA	032	1	.038	.040	.296	.295	.370	.160	.31
				2	.054	.056					
	.250-20 (1/4-20)	CLA	0420	1	.054	.056	.344	.343	.440	.170	.34
				2	.087	.091					
				3	.120	.125					

(See drawing at top of page 4) All dimensions are in millimeters.

METRIC	Thread Size x Pitch	Type	Thread Code	Shank Code	A (Shank) Max.	Min. Sheet Thickness (1)	Hole Size In Sheet +0.08	C Max.	E ±0.25	T ±0.25	Min. Dist. Hole $\varnothing$ To Edge
		Fastener Material									
		Aluminum									
	M2 x 0.4	CLA	M2	1	0.98	1	4.22	4.2	6.35	1.5	4.8
				2	1.38	1.4					
	M3 x 0.5	CLA	M3	1	0.98	1	4.75	4.73	6.35	2	5.6
				2	1.38	1.4					
	M3.5 x 0.6	CLA	M3.5	1	0.98	1	5.41	5.38	7.11	2	6.9
				2	1.38	1.4					
	M4 x 0.7	CLA	M4	1	0.98	1	5.94	5.92	7.8	3	7.1
				2	1.38	1.4					
	M5 x 0.8	CLA	M5	1	0.98	1	7.52	7.49	9.4	3.8	7.9
				2	1.38	1.4					
	M6 x 1	CLA	M6	1	1.38	1.4	8.75	8.73	11.18	4.08	8.6
				2	2.21	2.3					

(1) For maximum performance, we recommend that you use the maximum shank length for your sheet thickness.

(2) This shank code not available for Type SP.

(3) This thread size Type S nut, with a -2 shank code, can be installed successfully without the need to pre punch a mounting hole in a separate operation. See page 15 for more information.



SELF-CLINCHING NUTS

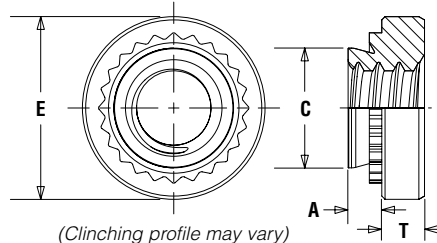


TYPE SH™ HARD PANEL NUTS

- Installs into thin, harder, high strength steel materials (high strength steel sheets up to 975MPa)
- Allows overall weight reduction for all vehicles
- Addresses environmental / recycle concerns
- Provides lower installed cost
- Allows component standardization

PART NUMBER DESIGNATION

SH - **0420** - **1** **X**
 ↓ ↓ ↓ ↓
 Type Thread Shank Finish
 Size Code Code Code



(Clinching profile may vary)
 Due to manufacturing procedure, parts
 may have a counterbore at shank end.

All dimensions are in inches.

UNIFIED	Thread Size	Type	Thread Code	Shank Code	A (Shank) Max.	Min. Sheet Thickness ⁽¹⁾	Hole Size in Sheet +.003 - .000	C Max.	E ±.010	T ±.010	Min. Dist Hole Φ to Edge
		Fastener Material									
		Hardened Alloy Steel									
	.250-20 (1/4-20)	SH	0420	1	.054	.056	.344	.343	.440	.170	.34
				2	.087	.090					
	.313-18 (5/16-18)	SH	0518	1	.054	.056	.413	.412	.500	.230	.38
				2	.087	.090					
	.375-16 (3/8-16)	SH	0616	1	.087	.090	.500	.499	.623	.270	.44

All dimensions are in millimeters.

METRIC	Thread Size	Type	Thread Code	Shank Code	A (Shank) Max.	Min. Sheet Thickness ⁽¹⁾	Hole Size in Sheet +0.08	C Max.	E ±0.25	T ±0.25	Min. Dist Hole Φ to Edge
		Fastener Material									
		Hardened Alloy Steel									
	M6 x 1	SH	M6	1	1.38	1.4	8.75	8.73	11.18	4.08	8.6
				2	2.21	2.29					
	M8 x 1.25	SH	M8	1	1.38	1.4	10.5	10.47	12.7	5.47	9.7
				2	2.21	2.29					
	M10 x 1.5	SH	M10	1	2.21	2.29	14	13.97	17.35	7.48	13.5

(1) For maximum performance, we recommend that you use the maximum shank length for your sheet thickness.

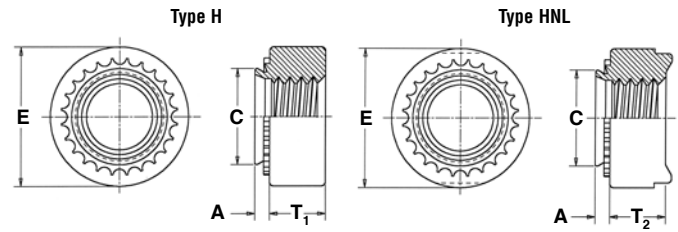
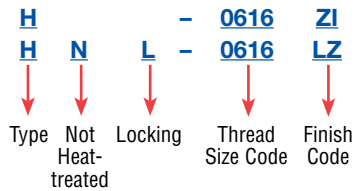


SELF-CLINCHING NUTS

STEEL, SELF-LOCKING AND NON-LOCKING NUTS - TYPES H/HNL

- Meets torque requirements for IFI 100/107 Grade B (unified) and ANSI B18.16.1M (metric) locknuts.
- Type H is recommended for use in sheets HRB 80 / HB 150 or less.
- Type HNL is recommended for use in sheets HRB 60 / HB 107 or less.

PART NUMBER DESIGNATION



Clinching profile may vary.

All dimensions are in inches.

UNIFIED	Thread Size	Type		Thread Code	A (Shank) Max.	Min. Sheet Thickness	Hole Size In Sheet +.005 -.000	C Max.	E ±.010	T ₁	T ₂	Min. Dist. Hole To Edge
		Non-Locking	Self-Locking (1)							Non-locking	Self-locking	
										±.005	±.010	
	.250-20 (1/4-20)	—	HNL	0420	.058	.058	.344	.343	.500	.189		.380
.313-18 (5/16-18)	—	HNL	0518	.058	.058	.413	.412	.575	.240		.420	
.375-16 (3/8-16)	H	HNL	0616	.058	.058	.500	.499	.650	.300		.480	

All dimensions are in millimeters.

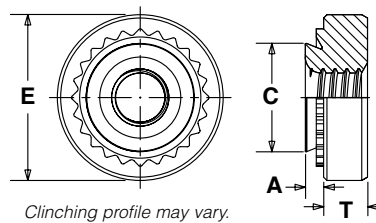
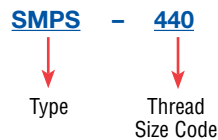
METRIC	Thread Size x Pitch	Type		Thread Code	A (Shank) Max.	Min. Sheet Thickness	Hole Size In Sheet +0.13	C Max.	E ±0.25	T ₁	T ₂	Min. Dist. Hole To Edge
		Non-Locking	Self-Locking (1)							Non-locking	Self-locking	
										±0.13	±0.25	
M6 x 1	—	HNL	M6	1.48	1.48	8.75	8.72	12.7	5	10		
M8 x 1.25	—	HNL	M8	1.48	1.48	10.5	10.47	14.6	6.3	11		
M10 x 1.5	H	HNL	M10	1.48	1.48	12.7	12.67	16.5	7.9	12		

(1) During installation, the projections on the heads of Type HNL self-locking nuts may be flattened. This is not detrimental in any way and will not affect self-locking or self-clinching performance.

NUTS FOR THINNER SHEET/CLOSE-TO-EDGE APPLICATIONS - TYPE SMPS™

- Installs into sheets as thin as .025" / 0.64 mm.
- Recommended for use in sheets HRB 70 / HB 125 or less.

PART NUMBER DESIGNATION



Clinching profile may vary.

Type SMPS nuts can be installed closer to the edge of a sheet than nuts on pages 4 and 5.

All dimensions are in inches.

UNIFIED	Thread Size	Type	Thread Code	A (Shank) Max.	Min. Sheet Thickness	Hole Size In Sheet +.003 -.000	C Max.	E ±.010	T ±.010	Min. Dist. Hole To Edge
	.086-56 (#2-56)	SMPS	256	.024	.025	.136	.135	.220	.065	.15
	.112-40 (#4-40)	SMPS	440	.024	.025	.166	.165	.220	.065	.17
	.138-32 (#6-32)	SMPS	632	.024	.025	.187	.186	.252	.065	.20

All dimensions are in millimeters.

METRIC	Thread Size x Pitch	Type	Thread Code	A (Shank) Max.	Min. Sheet Thickness	Hole Size In Sheet +0.08	C Max.	E ±0.25	T ±0.25	Min. Dist. Hole To Edge
	M2.5 x 0.45	SMPS	M2.5	0.61	0.64	3.8	3.79	5.6	1.4	3.7
	M3 x 0.5	SMPS	M3	0.61	0.64	4.24	4.22	5.6	1.4	4.3
	M3.5 x 0.6	SMPS	M3.5	0.61	0.64	4.75	4.73	6.4	1.4	5.1



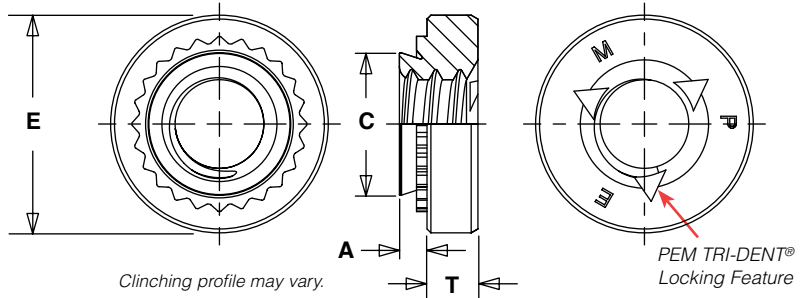
SELF-CLINCHING NUTS

TRI-DENT® LOCKNUTS - TYPE SL™

- 3 cycle locking performance. ⁽¹⁾
- Recommended for use in sheets HRB 80 / HB 150 or less.

PART NUMBER DESIGNATION

S **L** **-** **632** **1** **ZI**
 ↓ ↓ ↓ ↓ ↓
 Type Locking Thread Size Code Shank Code Finish Code



All dimensions are in inches.

UNIFIED	Thread Size	Type	Thread Code	Shank Code	A (Shank) Max.	Min. Sheet Thickness	Hole Size In Sheet +.003 - .000	C Max.	E ±.010	T ±.010	Min. Dist. Hole ϕ To Edge
	.112-40 (#4-40)	SL	440	1	.038	.040	.166	.165	.250	.070	.19
				2	.054	.056					
	.138-32 (#6-32)	SL	632	1	.038	.040	.1875	.187	.280	.070	.22
				2	.054	.056					
	.164-32 (#8-32)	SL	832	1	.038	.040	.213	.212	.310	.090	.27
				2	.054	.056					
	.190-32 (#10-32)	SL	032	1	.038	.040	.250	.249	.340	.090	.28
				2	.054	.056					
METRIC	.250-20 (1/4-20)	SL	0420	1	.054	.056	.344	.343	.440	.170	.34
				2	.087	.091					
	.313-18 (5/16-18)	SL	0518	1	.054	.056	.413	.412	.500	.230	.38
				2	.087	.091					
	.375-16 (3/8-16)	SL	0616	1	.087	.090	.500	.499	.625	.270	.44
				2	.120	.125					

All dimensions are in millimeters.

METRIC	Thread Size x Pitch	Type	Thread Code	Shank Code	A (Shank) Max.	Min. Sheet Thickness	Hole Size In Sheet +0.08	C Max.	E ±0.25	T ±0.25	Min. Dist. Hole ϕ To Edge
	M3 x 0.5	SL	M3	1	0.98	1	4.22	4.2	6.35	1.5	4.8
				2	1.38	1.4					
	M3.5 x 0.6	SL	M3.5	1	0.98	1	4.75	4.73	7.11	1.5	5.6
				2	1.38	1.4					
	M4 x 0.7	SL	M4	1	0.98	1	5.41	5.38	7.87	2	6.9
				2	1.38	1.4					
	M5 x 0.8	SL	M5	1	0.98	1	6.35	6.33	8.64	2	7.1
				2	1.38	1.4					
UNIFIED	M6 x 1	SL	M6	1	1.38	1.4	8.75	8.73	11.18	4.08	8.6
				2	2.21	2.3					
	M8 x 1.25	SL	M8	1	1.38	1.4	10.5	10.47	12.7	5.47	9.7
				2	2.21	2.3					
	M10 x 1.5	SL	M10	1	2.21	2.29	14	13.97	17.35	7.48	13.5
				2	3.05	3.18					

(1) Achieved using steel socket head cap screws, 180 ksi / property class 12.9 with standard finish of thermal oxide and light oil.

SELF-CLINCHING NUTS

MATERIAL AND FINISH SPECIFICATIONS

Type	Threads			Fastener Materials						Standard Finishes				Optional Finishes (1)	
	Internal ASME B1.1 2B/ASME B1.13M, 6H	Meets Torque Requirements for IFI 100/107 Grade B (unified) and ANSI B18.16.1M (metric) Locknuts	3 Cycle Locking Performance	Heat Treated Carbon Steel	300 Series Stainless Steel	Aluminum	Carbon Steel	Hardened Alloy Steel	Age Hardened A286 Stainless Steel	Passivated and/or Tested per ASTM A380	Zinc Plated, 5µm, Colorless (4)	Zinc Plated, 5µm, Colorless Plus Sealant/Lubricant (4)	No Finish (3)	Zinc Plated, 5µm, Yellow (4)	Cadmium Spec SAE AMS-QQ-P-416, Type I, Class 3, Plus Clear Chromate Passivation
S	•			•							•			•	
SS	•			•							•			•	
CLS	•				•					•					
CLSS	•				•					•					
CLA	•					•							• (2)		•
SH	•							•					• (5)		
SL	•		•	•							•				
SMPS	•				•					•					
SP	•								•	•					
H	•			•							•		•		
HNL	•	•					•					•			
Part number codes for finishes										None	ZI	LZ	X	ZC	CI

For Use in Sheet Hardness: (8)						
Type	HRB 90 / HB 192 or less (6) (7)	HRB 80 / HB 150 or less	HRB 70 / HB 125 or less	HRB 60 / HB 107 or less	HRB 50 / HB 82 or less	HRC 30 / HB 277 or less
S		•				
SS		•				
CLS			•			
CLSS			•			
CLA					•	
SH						•
SL		•				
SMPS			•			
SP	•					
H		•				
HNL				•		

(1) Special order with additional charge.

(2) Part numbers for aluminum nuts have no plating suffix.

(3) Unplated threads are sized to accept a basic go gauge after .00025" / 0.0064 mm plating.

(4) See PEM Technical Support section of our web site for related plating standards and specifications.

(5) With rust preventative oil.

(6) Panel material should be in the annealed condition.

(7) Fasteners should not be installed adjacent to bends or other highly cold-worked areas.

(8) HRB - Hardness Rockwell "B" Scale. HRC - Hardness Rockwell "C" Scale. HB - Hardness Brinell.



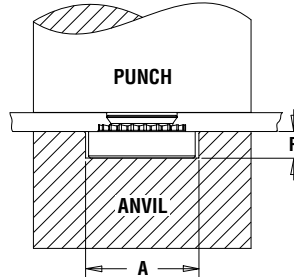
SELF-CLINCHING NUTS

INSTALLATION - TYPES S/SL/SMPS/SS/CLS/CLSS/CLA/H/HNL

1. Prepare properly sized mounting hole in sheet.
Do not perform any secondary operations such as deburring.
2. Place fastener into the anvil hole and place the mounting hole over the shank of the fastener as shown in diagram to the right.
3. With installation punch and anvil surfaces parallel, apply squeezing force until the head of the nut comes into contact with the sheet material.

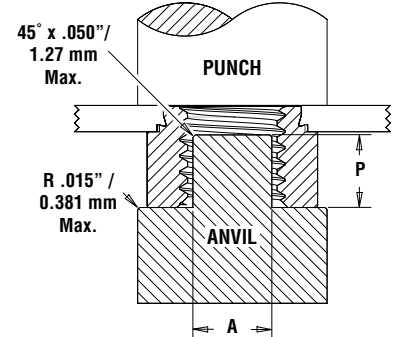
COUNTERBORE ANVIL

Thread Sizes #2-56 to 5/16
and M2 to M8



PROTRUSION ANVIL ⁽¹⁾

Types CLS/S Thread Sizes 3/8, 7/16, 1/2, M10 and M12
Types H/HNL Thread Sizes 5/16, 3/8, M8 and M10



PEMSERTER® Installation Tooling

CLS/CLSS/S/SS

UNIFIED	Thread Code	Anvil Dimensions (in.)		Anvil Part Number	Punch Part Number
		A ±.002	P ±.005		
	256/440	.267	.045	975200034	975200048
	632	.298	.045	975200035	975200048
	832	.330	.070	975200036	975200048
	032	.361	.070	975200037	975200048
	1224	.415	.080	975200786300	975200048
	0420	.454	.150	975200038	975200048
	0518	.517	.200	975200039	975200048
	0616	.280	.250	975200045 ⁽¹⁾	975200048
	0720	.338	.295	8020361 ⁽¹⁾	975200901400
	0813	.375	.345	975200900300 ⁽¹⁾	975200901400

METRIC	Thread Code	Anvil Dimensions (mm)		Anvil Part Number	Punch Part Number
		A ±0.05	P ±0.13		
	M2/M3	6.78	1.14	975200034	975200048
	M3.5	7.57	1.14	975200035	975200048
	M4	8.38	1.78	975200036	975200048
	M5	9.17	1.78	975200037	975200048
	M6	11.53	3.81	975200038	975200048
	M8	13.13	5.08	975200039	975200048
	M10	7.62	6.35	8005682 ⁽¹⁾	975200901400
	M12	9.53	8.76	975200900300 ⁽¹⁾	975200901400

CLA

UNIFIED	Thread Code	Anvil Dimensions (in.)		Anvil Part Number	Punch Part Number
		A ±.002	P ±.005		
	256/440	.267	.045	975200034	975200048
	632	.298	.045	975200035	975200048
	832	.330	.070	975200036	975200048
	024/032	.392	.140	975200782300	975200048
	0420	.454	.150	975200038	975200048

METRIC	Thread Code	Anvil Dimensions (mm)		Anvil Part Number	Punch Part Number
		A ±0.05	P ±0.13		
	M3	6.78	1.14	975200034	975200048
	M3.5	7.57	1.14	975200035	975200048
	M4	8.38	1.78	975200036	975200048
	M5	9.96	3.56	975200782300	975200048
	M6	11.53	3.81	975200038	975200048

SL

UNIFIED	Thread Code	Anvil Dimensions (in.)		Anvil Part Number	Punch Part Number
		A ±.002	P ±.005		
	440	.267	.045	975200034	975200048
	632	.298	.045	975200035	975200048
	832	.330	.070	975200036	975200048
	032	.361	.070	975200037	975200048
	0420	.454	.150	975200038	975200048
	0518	.515	.200	975200039	975200048
	0616	.280	.250	975200045 ⁽¹⁾	975200048

METRIC	Thread Code	Anvil Dimensions (mm)		Anvil Part Number	Punch Part Number
		A ±0.05	P ±0.13		
	M3	6.78	1.14	975200034	975200048
	M3.5	7.57	1.14	975200035	975200048
	M4	8.38	1.78	975200036	975200048
	M5	9.17	1.78	975200037	975200048
	M6	11.53	3.81	975200038	975200048
	M8	13.08	5.08	975200039	975200048
	M10	7.62	6.35	8005682 ⁽¹⁾	975200901400

SMPS

UNIFIED	Thread Code	Anvil Dimensions (in.)		Anvil Part Number	Punch Part Number
		A ±.002	P ±.005		
	256/440	.236	.045	975200904300	975200048
	632	.267	.045	975200034	975200048

METRIC	Thread Code	Anvil Dimensions (mm)		Anvil Part Number	Punch Part Number
		A ±0.05	P ±0.13		
	M2.5/M3	5.99	1.14	975200904300	975200048
	M3.5	6.78	1.14	975200034	975200048

H/HNL

UNIFIED	Thread Code	Anvil Dimensions (in.)		Anvil Part Number	Punch Part Number
		A ±.002	P ±.005		
	0420	.517	.200	975200039	975200048
	0518	.220	.250	975200783300 ⁽¹⁾	975200048
	0616	.280	.250	975201240 ⁽¹⁾	8003076

METRIC	Thread Code	Anvil Dimensions (mm)		Anvil Part Number	Punch Part Number
		A ±0.05	P ±0.13		
	M6	13.13	5.08	975200039	975200048
	M8	5.59	6.35	975200783300 ⁽¹⁾	975200048
	M10	7.62	6.35	8005682 ⁽¹⁾	8003076

(1) Large nut anvils use protrusion to locate part instead of counterbore.



SELF-CLINCHING NUTS

INSTALLATION - TYPE SP⁽¹⁾

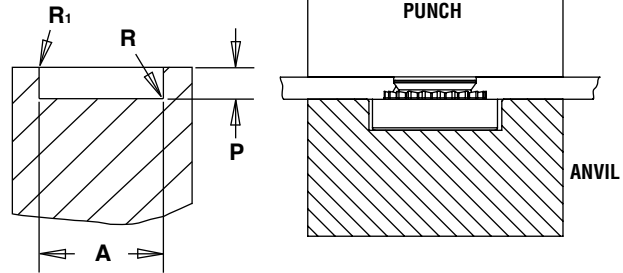
1. Prepare properly sized mounting hole in sheet. Do not perform any secondary operations such as deburring.
2. Place fastener into the recommended counterbore anvil hole and place the mounting hole over the shank of the fastener as shown in diagram.
3. With installation punch and anvil surfaces parallel, apply squeezing force until the head of the nut comes into contact with the sheet material.

PEMSERTER® Installation Tooling

UNIFIED	Thread Code	Anvil Dimensions (in.)				Anvil Part Number	Punch Part Number
		A ±.002	P +.000 -.001	R Max.	R ₁ +.005		
	440	.255	.064	.010	.005	8012821	975200048
	632	.286	.064	.010	.005	8012822	
	832	.317	.082	.010	.005	8012823	
	024/032	.348	.082	.010	.005	8012824	
	0420	.443	.163	.010	.005	8012825	
	0518	.505	.230	.010	.005	8015359	8003076
	0616/0624	.570	.263	.010	.005	8015863	

METRIC	Thread Code	Anvil Dimensions (mm)				Anvil Part Number	Punch Part Number
		A ±0.05	P -0.03	R Max.	R ₁ +0.13		
	M2.5-0	6.48	1.42	0.25	0.13	8019477	975200048
	M2.5-1,-2	6.48	1.63	0.25	0.13	8012821	
	M3	6.48	1.63	0.25	0.13	8012821	
	M3.5	7.26	1.63	0.25	0.13	8012822	
	M4	8.05	2.08	0.25	0.13	8012823	
	M5	8.84	2.08	0.25	0.13	8012824	8003076
	M6	11.25	4.14	0.25	0.13	8012825	
	M8	12.83	5.41	0.25	0.13	8015360	
	M10	17.58	7.47	0.25	0.13	8015886	

RECOMMENDED COUNTERBORE ANVIL



(1) For best results, we recommend using the installation punch and anvil shown. Deviations from recommended installation tooling may result in sheet distortion and reduced performance.

NOTE: Variations in hole preparation, installation tooling, installation force, and sheet material type, thickness, and hardness will affect both performance and tooling life.

INSTALLATION - TYPE SH

NEW

1. Prepare properly sized mounting hole in sheet. Do not perform any secondary operations such as deburring.
2. Place fastener into the anvil hole and place the mounting hole over the shank of the fastener as shown in diagram to the right.
3. With installation punch and anvil surfaces parallel, apply squeezing force until the head of the nut comes into contact with the sheet material.

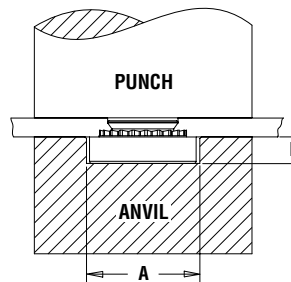
PEMSERTER® Installation Tooling

UNIFIED	Thread Code	Anvil Dimensions (in.)		Anvil Part Number	Punch Part Number
		A ±.002	P ±.005		
	0420	.454	.150	975200038	975200048
	0518	.517	.200	975200039	975200048
	0616	.280	.250	8020084 ⁽¹⁾	9752000901400

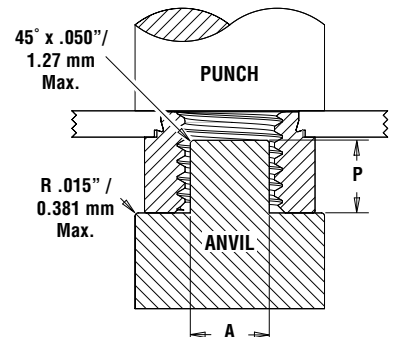
METRIC	Thread Code	Anvil Dimensions (mm)		Anvil Part Number	Punch Part Number
		A ±0.05	P ±0.13		
	M6	11.53	3.81	975200038	975200048
	M8	13.13	5.08	975200039	975200048
	M10	7.62	6.35	8005682 ⁽¹⁾	975200901400

(1) Large nut anvils use protrusion to locate part instead of counterbore.

COUNTERBORE ANVIL Thread Sizes 1/4-20 to 5/16 and M5 to M8



PROTRUSION ANVIL Thread Sizes 3/8 and M10



PEMSERTER® PRESSES

For best results we recommend using a PEMSERTER® press for either manual or automatic installation of PEM self-clinching nuts. For more information on our line of presses call 1-800-523-5321, or check our web site.



SELF-CLINCHING NUTS

PERFORMANCE DATA⁽¹⁾

TYPE S/CLS/CLSS

Type	Thread Code	Shank Code	Test Sheet Material	Installation (lbs.)	Pushout (lbs.)	Torque-out (in. lbs.)
S	256 348 440	0	5052-H34 Aluminum	1500-2000	63	8
		1			90	10
		2			170	13
		3			170	13
		0	Cold-rolled Steel	2500-3500	105	13
		1			125	15
		2			230	18
		3			230	18
		0	5052-H34 Aluminum	2500-3000	63	16
		1			95	17
		2			190	22
		3			190	22
S	632	0	5052-H34 Aluminum	2500-3000	110	16
		1			130	20
		2			275	28
		3			275	28
		0	Cold-rolled Steel	3000-6000	110	16
		1			130	20
		2			275	28
		3			275	28
		0	5052-H34 Aluminum	2500-3000	68	21
		1			105	23
		2			220	35
		3			220	35
S	832	0	5052-H34 Aluminum	2500-3000	110	26
		1			145	35
		2			285	45
		3			285	45
		0	Cold-rolled Steel	4000-6000	68	26
		1			110	32
		2			190	50
		3			225	50
		0	5052-H34 Aluminum	2500-3500	120	32
		1			180	40
		2			320	60
		3			320	60
SS	024 032	0	5052-H34 Aluminum	2500-3500	68	26
		1			110	32
		2			190	50
		3			225	50
		0	Cold-rolled Steel	4000-9000	120	32
		1			180	40
		2			320	60
		3			320	60
		0	5052-H34 Aluminum	2500-6500	120	63
		1			285	70
		2			285	70
		3			200	74
S	1224	0	5052-H34 Aluminum	2500-6500	350	80
		1			350	80
		2			350	80
		3			350	80
		0	Cold-rolled Steel	5000-6500	220	70
		1			360	90
		2			360	125
		3			315	115
		0	5052-H34 Aluminum	4000-7000	315	115
		1			400	150
		2			400	150
		3			400	150
S	0420	0	5052-H34 Aluminum	4000-7000	220	70
		1			360	90
		2			360	125
		3			315	115
		0	Cold-rolled Steel	6000-8000	315	115
		1			400	150
		2			400	150
		3			400	150
		0	5052-H34 Aluminum	4000-7000	380	120
		1			380	160
		2			380	160
		3			380	160
S	0518 0524	0	5052-H34 Aluminum	4000-7000	380	120
		1			380	160
		2			380	160
		3			380	160
		0	Cold-rolled Steel	6000-8000	420	180
		1			420	180
		2			420	180
		3			420	180
		0	5052-H34 Aluminum	5000-8000	400	270
		1			400	270
		2			400	270
		3			400	270
S	0616 0624	0	5052-H34 Aluminum	5000-8000	400	270
		1			400	270
		2			400	270
		3			400	270
		0	Cold-rolled Steel	7000-11000	460	320
		1			460	320
		2			460	320
		3			460	320
		0	Cold-rolled Steel	9000-13000	450	340
		1			450	340
		2			450	340
		3			450	340
S	0720	0	5052-H34 Aluminum	7000-9000	475	350
		1			475	350
		2			475	350
		3			475	350
		0	Cold-rolled Steel	10000-15000	1050	735
		1			1050	735
		2			1050	735
		3			1050	735

Type	Thread Code	Shank Code	Test Sheet Material	Installation (kN)	Pushout (N)	Torque-out (N•m)
S	M2 M2.5 M3	0	5052-H34 Aluminum	6.7-8.9	280	0.9
		1			400	1.13
		2			750	1.47
		3			470	1.47
		0	Cold-rolled Steel	11.2-15.6	550	1.7
		1			1010	2.03
		2			280	1.8
		3			400	1.92
		0	5052-H34 Aluminum	11.2-13.5	840	2.5
		1			480	1.8
		2			570	2.3
		3			1210	2.3
S	M3.5	0	5052-H34 Aluminum	11.2-13.5	300	2.37
		1			470	2.6
		2			970	4
		3			490	2.95
		0	Cold-rolled Steel	13.4-26.7	645	4
		1			1250	5.1
		2			300	3
		3			480	3.6
		0	5052-H34 Aluminum	11.2-15.6	845	5.7
		1			530	3.6
		2			800	4.5
		3			1112	6.8
SS	M5	0	5052-H34 Aluminum	11.2-15.6	750	6.5
		1			970	7.9
		2			1580	10.2
		3			900	14.1
		0	Cold-rolled Steel	18-38	1380	10
		1			1760	13
		2			1760	17
		3			1760	17
		0	5052-H34 Aluminum	18-32	1570	13.6
		1			1870	18.1
		2			1870	18.7
		3			1870	20.3
S	M6	0	5052-H34 Aluminum	18-32	1570	13.6
		1			1870	18.1
		2			1870	18.7
		3			1870	20.3
		0	Cold-rolled Steel	27-36	1760	13
		1			1760	17
		2			1760	17
		3			1760	17
		0	5052-H34 Aluminum	22-36	1760	32.7
		1			2020	36.2
		2			2020	36.2
		3			2020	36.2
S	M8	0	5052-H34 Aluminum	22-36	1760	32.7
		1			2020	36.2
		2			2020	36.2
		3			2020	36.2
		0	Cold-rolled Steel	32-50	2113	39.5
		1			2113	39.5
		2			2113	39.5
		3			2113	39.5
		0	5052-H34 Aluminum	31-40	2113	39.5
		1			2113	39.5
		2			2113	39.5
		3			2113	39.5
S	M10	0	5052-H34 Aluminum	31-40	2113	39.5
		1			2113	39.5
		2			2113	39.5
		3			2113	39.5
		0	Cold-rolled Steel	44-67	4670	83.1
		1			4670	83.1
		2			4670	83.1
		3			4670	83.1

TYPE CLA

Type	Thread Code	Shank Code	Test Sheet Material	Installation (lbs.)	Pushout (lbs.)	Torque-out (in. lbs.)
------	-------------	------------	---------------------	---------------------	----------------	-----------------------

SELF-CLINCHING NUTS

PERFORMANCE DATA

TYPE SH

UNIFIED	Thread Code	Shank Code	Test Sheet Thickness and Material (in.)	Sheet Hardness HRC	Installation (lbs.)	Pushout (lbs.)	Torque-out (in. lbs.)
	0420	1	.098" S700MC	23	11700	950	150
		2	.098" S700MC	23	12900	1000	170
	0518	1	.098" S700MC	23	12600	1050	265
		2	.098" S700MC	23	12900	1100	265
	0616	1	.098" S700MC	23	15300	1200	500

METRIC	Thread Code	Shank Code	Test Sheet Thickness and Material (mm)	Sheet Hardness HRC	Installation (kN)	Pushout (N)	Torque-out (N•m)
	M6	1	2.5 mm S700MC	23	52.1	4200	17
		2	2.5 mm S700MC	23	57.4	4500	19
	M8	1	2.5 mm S700MC	23	56.1	4600	30
		2	2.5 mm S700MC	23	57.4	4900	30
	M10	1	2.5 mm S700MC	23	71.2	5400	56

TYPE H

UNIFIED	Type	Thread Code	Test Sheet Thickness and Sheet Material	Installation (lbs.)	Pushout (lbs.)	Torque-out (in. lbs.)
	H	0616	.090" 5052-H34 Aluminum	4900	380	190
			.088" Cold-rolled Steel	7400	460	240

METRIC	Type	Thread Code	Test Sheet Thickness and Sheet Material	Installation (kN)	Pushout (N)	Torque-out (N•m)
	H	M10	2.29 mm 5052-H34 Aluminum	22	1760	21.5
			2.24 mm Cold-rolled Steel	33	2020	27.1

TYPE SP

UNIFIED	Type	Thread Code	Shank Code	Test Sheet Material	Installation (lbs.)	Pushout (lbs.)	Torque-out (in. lbs.)
	SP	256	0	304 Stainless Steel	8000	130	14
			1		9000	165	17
			2		10000	290	18
	SP	440	0	304 Stainless Steel	8000	130	14
			1		9000	165	17
			2		10000	290	18
	SP	632	0	304 Stainless Steel	8500	140	18
			1		9500	170	24
			2		10500	340	28
	SP	832	0	304 Stainless Steel	9000	145	30
			1		10000	180	37
			2		11000	360	45
	SP	024/032	0	304 Stainless Steel	9500	180	35
			1		10500	230	45
			2		11500	400	60
	SP	0420	1	304 Stainless Steel	13500	450	150
			2		13500	600	170
	SP	0518	1	304 Stainless Steel	14800	470	170
			2		14800	750	250
	SP	0524	1	304 Stainless Steel	14800	470	170
			2		14800	470	170
	SP	0616/0624	1	304 Stainless Steel	16000	600	300
			2		20000	700	370

METRIC	Type	Thread Code	Shank Code	Test Sheet Material	Installation (kN)	Pushout (N)	Torque-out (N•m)
	SP	M2.5	0	304 Stainless Steel	35.6	575	1.58
			1		40	725	1.92
			2		44.5	1290	2.03
	SP	M3	0	304 Stainless Steel	35.6	575	1.58
			1		40	725	1.92
			2		44.5	1290	2.03
	SP	M4	0	304 Stainless Steel	40	645	3.38
			1		44.5	800	4.18
			2		49	1600	5.08
	SP	M5	0	304 Stainless Steel	42.3	800	3.95
			1		46.7	1025	5.08
			2		51.2	1775	6.77
	SP	M6	1	304 Stainless Steel	60	2000	17
			2		60	2600	19
	SP	M8	1	304 Stainless Steel	66	2100	19
			2		80	4500	23
	SP	M10	1	304 Stainless Steel	80	2150	38

TYPE SMPS

UNIFIED	Type	Thread Code	Test Sheet Material		
			Cold-rolled Steel		
			Installation (lbs.)	Pushout (lbs.)	Torque-out (in. lbs.)
	SMPS	256	1500	35	8
	SMPS	440	1800	60	12

METRIC	Type	Thread Code	Test Sheet Material		
			Cold-rolled Steel		
			Installation (kN)	Pushout (N)	Torque-out (N•m)
	SMPS	M2.5	6.7	156	1.13
	SMPS	M3	8	267	1.35



SELF-CLINCHING NUTS

PERFORMANCE DATA

TYPE SL

UNIFIED	Thread Code	Shank Code	Thread Locking Specifications (1)		Test Sheet Material					
			Max. Torque (1st thru 3rd) (in. lbs.)	Min. Torque (1st thru 3rd) (in. lbs.)	5052-H34 Aluminum			Cold-rolled Steel		
					Installation (lbs.)	Pushout (lbs.)	Torque-out (in. lbs.)	Installation (lbs.)	Pushout (lbs.)	Torque-out (in. lbs.)
	440	1	5.75	0.4	1500 - 2000	90	10	2500 - 3500	125	15
		2				170	13		230	18
	632	1	10.5	0.8	2500 - 3000	95	17	3000 - 6000	130	20
		2				190	22		275	28
	832	1	18	1.2	2500 - 3000	105	23	4000 - 6000	145	35
		2				220	35		285	45
	032	1	21	1.65	2500 - 3000	110	32	4000 - 9000	180	40
		2				190	50		250	60
	0420	1	35	3.75	4000 - 7000	360	90	6000 - 9000	400	150
		2				360	125		400	150
	0518	1	53	4.75	4000 - 7000	380	120	6000 - 8000	420	165
		2				380	160		420	180
	0616	1	95	6.3	5000 - 8000	400	270	7000 - 11000	460	320
		2				400	270		460	320

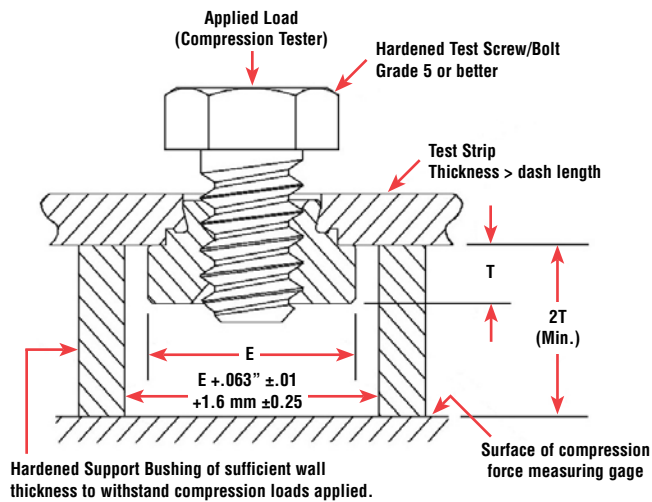
METRIC	Thread Code	Shank Code	Thread Locking Specifications (1)		Test Sheet Material					
			Max. Torque (1st thru 3rd) (N•m)	Min. Torque (1st thru 3rd) (N•m)	5052-H34 Aluminum			Cold-rolled Steel		
					Installation (kN)	Pushout (N)	Torque-out (N•m)	Installation (kN)	Pushout (N)	Torque-out (N•m)
	M3	1	0.67	0.04	6.7 - 8.9	400	1.13	11.2 - 15.6	550	1.7
		2				750	1.47		1010	2.03
	M3.5	1	1.2	0.08	11.2 - 13.5	400	1.92	13.4 - 26.7	570	2.3
		2				840	2.5		1210	2.3
	M4	1	2.1	0.13	11.2 - 13.4	470	2.6	18 - 27	645	4
		2				970	4		1250	5.1
	M5	1	2.4	0.18	11.2 - 15.6	480	3.6	18 - 38	800	4.5
		2				845	5.7		1112	6.8
	M6	1	4	0.3	18 - 32	1580	10.2	27 - 36	1760	17
		2				1580	14.1		1760	17
	M8	1	6	0.5	18 - 32	1570	13.6	27 - 36	1870	18.7
		2				1570	18.1		1870	20.3
	M10	1	12	0.8	22 - 36	1760	32.7	32 - 50	2020	36.2
		2				1760	32.7		2020	36.2

(1) 3 cycle locking performance. Max. on / Min. off torque for 1st through 3rd cycles.

SELF-CLINCHING NUTS

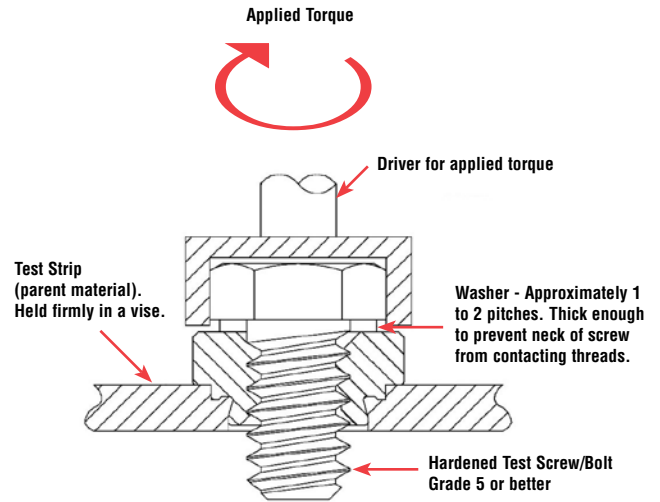
PUSHOUT TEST

Pushout tests shall be performed from the grip or shank side of the installed fastener. An axial load shall be applied to the fastener as shown using a hardened test screw, while evenly supporting the test strip around the fastener. The typical position rate is .25" / 6.35 mm per minute. Dimensions are identified per PEM Bulletins where "E" equals head diameter and "T" (or "L") equals head height. The pushout force is measured using a force or compression tester with a range that will cover the expected forces.



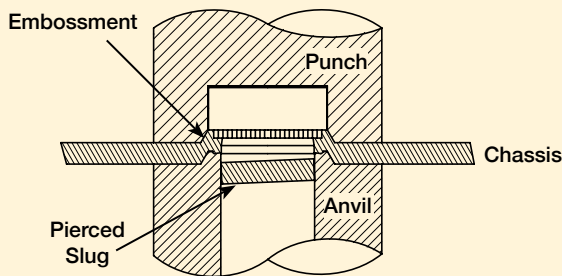
TORQUE-OUT TEST

Torque-out tests shall be performed from the shoulder or head side of the installed fastener. Torque shall be applied to the fastener in the manner illustrated, using a hardened test screw and washer, while firmly holding the test strip. Test screws should be of sufficient tensile strength to resist thread stripping. A minimum of two screw threads must extend beyond the fastener.



SELF-PIERCING, SELF-CLINCHING TOOLING

Specialized PEMSERTER® tooling allows installation of Type S self-clinching nuts into aluminum sheets (sizes 1/4-20, 5/16-18, M6, and M8) in one pierce/press operation.



For more information, see our web site for Tech Sheet PEM® - Ref / Self-piercing, self-clinching tooling. To locate, simply type "self-piercing" in site search box.

SELF-CLINCHING NUTS

SELF-CLINCHING NUT INSTALLATION DOS AND DON'TS

“Dos”

- DO** select the proper fastener material to meet corrosion requirements.
- DO** make certain that panel material is in the annealed condition.
- DO** make certain that hole punch is kept sharp to minimize work hardening around hole.
- DO** provide mounting hole of specified size for each fastener.
- DO** maintain the hole punch diameter to no greater than $+.001"/.025$ mm over the minimum recommended mounting hole for type SP nuts into stainless steel sheets.
- DO** install fastener into hole punch side of sheet.
- DO** make certain that shank (or pilot) is within hole before applying installation force.
- DO** make certain that fastener is not installed adjacent to bends or other highly cold-worked areas.
- DO** apply squeezing force between parallel surfaces.
- DO** utilize recommended installation tooling when installing fasteners.
- DO** apply sufficient force to totally embed clinching ring around entire circumference and to bring shoulder squarely in contact with sheet.

“Don'ts”

- DON'T** attempt to install any self-clinching nut other than a type SP fastener into a stainless steel sheet.
- DON'T** install steel or stainless steel fasteners in aluminum panels before anodizing or finishing.
- DON'T** deburr mounting holes on either side of sheet before installing fasteners – deburring will remove metal required for clinching fastener into sheet.
- DON'T** install fastener closer to edge of sheet than minimum edge distance indicated by manufacturer – unless a special fixture is used to restrict bulging of sheet edge.
- DON'T** over-squeeze. It will crush the head, distort threads, and buckle the sheet. Approximate installation forces are listed in performance data tables. Use this info as a guide. Be certain to determine optimum installation force by test prior to production runs.
- DON'T** attempt to insert fastener with a hammer blow – under any circumstances. A hammer blow won't permit the sheet metal to flow and develop an interlock with the fastener's contour.
- DON'T** install screw in the head side of fastener. Install from opposite side so that the fastener load is toward sheet. The clinching force is designed only to hold the fastener during handling and to resist torque during assembly.
- DON'T** install fastener on pre-painted side of panel.

Regulatory compliance information is available in Technical Support section of our website. © 2014 PennEngineering.

Specifications subject to change without notice.
See our website for the most current version of this bulletin.

PennEngineering®



North America: Danboro, PA USA • E-mail: info@pemnet.com • Tel: +1-215-766-8853 • Fax: +1-215-766-0143 • 800-237-4736 (USA Only)
Europe: Galway, Ireland • E-mail: europe@pemnet.com • Tel: +353-91-751714 • Fax: +353-91-753541
Asia/Pacific: Singapore • E-mail: singapore@pemnet.com • Tel: +65-6-745-0660 • Fax: +65-6-745-2400
Shanghai, China • E-mail: china@pemnet.com • Tel: +86-21-5868-3688 • Fax: +86-21-5868-3988

Visit our PEMNET™ Resource Center at www.pemnet.com

Technical support e-mail: techsupport@pemnet.com