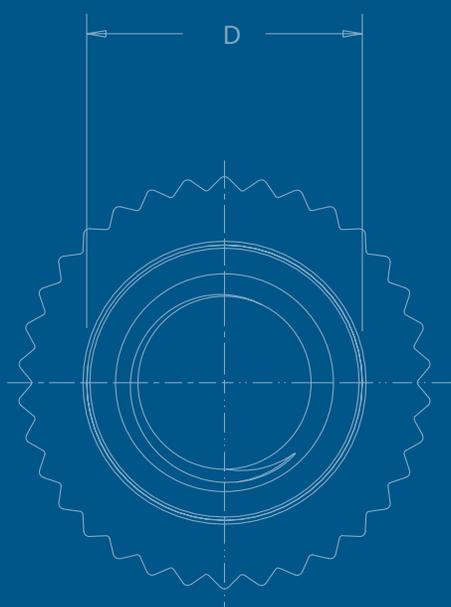




**FE<sup>TM</sup>**

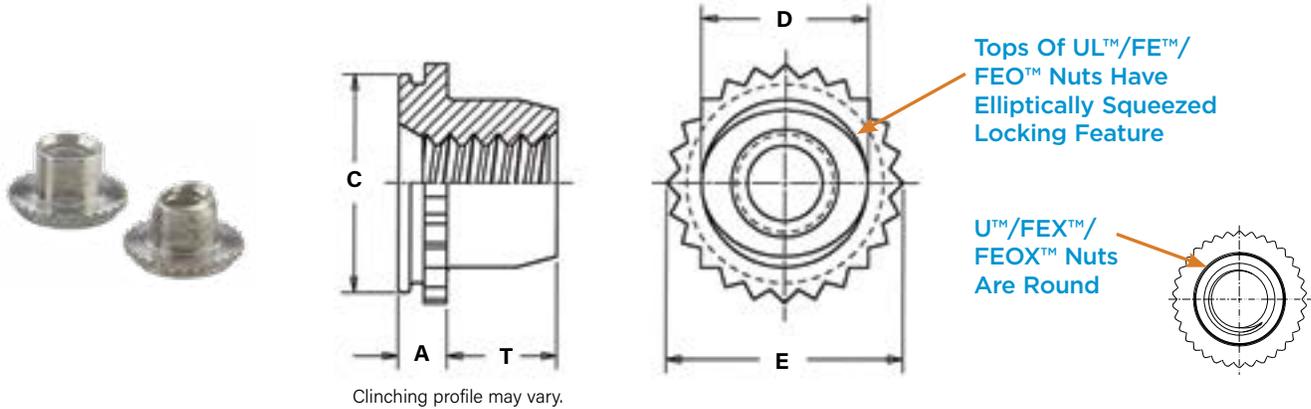
# MINIATURE SELF-CLINCHING FASTENERS



PEM<sup>®</sup> brand miniature fasteners fit into a minimal space and provide strong, reusable threads.



Specifications



All dimensions are in inches.

	Thread Size	Type		Thread Code	Shank Code (2)	A (Shank) Max.	Sheet Thickness (3)	Hole Size In Sheet +.003 -.000	C +.000 -.005	D Max.	E ±.005	T +.015 -.000	Min. Dist. Hole C/L to Edge (5)	Max. Hole In Attached Parts
		Non-locking(1)	Self-locking											
Unified	.060-80 (#0-80)	U	UL	080	0	.020	.019-.022	.110	.1095	.076	.125	.050	.09	.080
	.073-64 (#1-64)	U	UL	164	0	.020	.019-.022	.110	.1095	.090	.125	.050	.09	.093
	.086-56 (#2-56)	U	UL	256	0	.020	.019-.022	.144	.1435	.106	.160	.065	.11	.106
					1	.031	.030-.036							
	.112-40 (#4-40)	FEOX	FEO	440		.040	.039-.045	.172	.171	.145	.192	.065	.14	.132
						.060	.059-.070							
	.138-32 (#6-32)	FEOX	FEO	632		.040	.039-.045	.213	.212	.180	.244	.075	.17	.158
						.060	.059-.070							
	.164-32 (#8-32)	FEOX	FEO	832		.040	.039-.045	.290	.289	.215	.322	.090	.20	.184
						.060	.059-.070							
.190-32 (#10-32)	FEOX	FEO	032		.040	.039-.045	.290	.289	.245	.322	.110	.20	.210	
					.060	.059-.070								
1/4-20	FEX	FE	0420		.060	.059-.070	.344	.343	.318	.384	.120	.28	.270	
1/4-28			0428											

All dimensions are in millimeters.

	Thread Size x Pitch	Type		Thread Code	Shank Code (2)	A (Shank) Max.	Sheet Thickness (3)	Hole Size In Sheet +0.08	C -0.13	D Max.	E ±0.13	T +0.4	Min. Dist. Hole C/L to Edge (5)	Max. Hole In Attached Parts
		Non-locking(4)	Self-locking											
Metric	M2 x 0.4	U	UL	M2	1	0.79	0.76-0.91	3.61	3.6	2.5	4.07	1.65	2.8	2.5
	M3 x 0.5	FEOX	FEO	M3		1.02	0.99-1.14	4.39	4.37	3.96	4.88	1.9	3.6	3.5
						1.53	1.5-1.78							
	M4 x 0.7	FEOX	FEO	M4		1.02	0.99-1.14	7.39	7.37	5.23	8.17	2.55	5.2	4.5
						1.53	1.5-1.78							
	M5 x 0.8	FEOX	FEO	M5		1.02	0.99-1.14	7.39	7.37	6.48	8.17	3.05	5.2	5.5
						1.53	1.5-1.78							
	M6 x 1	FEX	FE	M6		1.53	1.5-1.78	8.74	8.72	7.72	9.74	3.3	7.1	6.5

- (1) 2B Go Gauge may stop at barrel end but class 3A screw will pass thru with finger torque.
- (2) Shank code applicable only to U and UL fasteners.
- (3) In applications between the sheet thicknesses for your thread size, see last paragraph of installation data on page 4. Knurled collar may fracture if fastener is used in sheets thicker than the specified range and the screw is tightened beyond maximum tightening torque.
- (4) 6H Go Gauge may stop at barrel end but class 4h screw will pass thru with finger torque.
- (5) For more information on proximity to bends and distance to other clinch hardware, see [PEM® Tech Sheet C/L To Edge](#).

## Material And Finish Specifications

Type	Threads		Fastener Material	Standard Finishes			For Use In Sheet Hardness <sup>(1)</sup>			
	Internal, ASME B1.1, 2B / ASME B1.13M, 6H	Internal, UNJ Class 3B per ASME B1.15 / MJ Class 4H6H per ASME B1.21M (M6 thread 4H5H)		300 Series Stainless Steel	Passivated and/or Tested Per ASTM A380	Passivated Plus Clear Dry-film Lubricant		Black Dry-film Lubricant	HRB 70 / HB 125 or Less	Locking Temperature Limit
U	▪		▪	▪			▪			▪
UL		▪	▪		▪		▪	400° F / 204° C	▪	▪
FE		▪	▪	▪		▪	▪	400° F / 204° C	▪	▪
FEX	▪		▪	▪			▪			▪
FEO		▪	▪	▪		▪	▪	400° F / 204° C	▪	▪
FEOX	▪		▪	▪			▪			▪
Part number codes for finishes				None	CW <sup>(3)</sup>	MD <sup>(4)</sup>				

(1) HRB - Hardness Rockwell "B" Scale. HB - Hardness Brinell.

(2) To meet national aerospace standards and to obtain testing documentation, product must be ordered using appropriate NASM45938 part number. Check our web site for a complete Military Specification and National Aerospace Standards Reference Guide (Bulletin NASM).

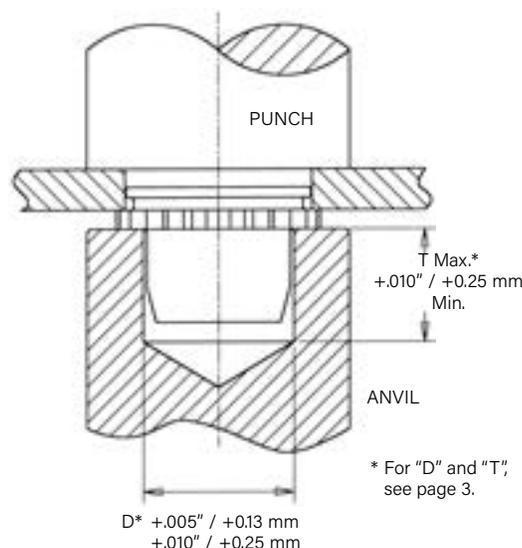
(3) See PEM Technical Support section of our web site for related plating standards and specifications.

(4) MD finish on stainless steel provides a minimum of 100 hours of salt spray resistance.

## Installation

1. Prepare properly sized mounting hole in sheet. Do not perform any secondary operations such as deburring.
2. Insert fastener into the anvil hole and place the mounting hole (preferably the punch side) over the shank of the fastener.
3. With installation punch and anvil surfaces parallel, apply squeezing force to the knurled collar until knurled collar is flush with top of the sheet for sheets .060"/1.5mm thick and up, or until shank is flush with the bottom of the sheet for sheets .040"/1mm to .060"/1.5mm thick for FE/FEO nuts.

PEM miniature fasteners must be installed by a force applied through parallel surfaces. Since force must not be applied to the barrel, a cavity must be used in either the punch or anvil so that the installation force is applied to the knurled collar. "D" dimensions for the punch or anvil cavity are given in the tables on page 3.



## Installation Tooling - U, UL, FE, FEO, FEX and FEOX Nuts

Type	Thread Code	HAEGER® Part Number		PEMSERTER® Part Number	
		Anvil	Punch	Anvil	Punch
U/UL	080	H-133-0L	H-108-0019L	8008451	975200048
U/UL	164	H-133-1L	H-108-0019L	970200300300	975200048
U/UL	256/M2	H-133-2L	H-108-0019L	975200020	975200048
FE/FEO/FEX/FEOX	440/M3	H-133-4L	H-108-0019L	975200021	975200048
FE/FEO/FEX/FEOX	632	H-133-6L	H-108-0019L	975200022	975200048
FE/FEO/FEX/FEOX	832/M4	H-133-8L	H-108-0019L	975200023	975200048
FE/FEO/FEX/FEOX	032/M5	H-133-10L	H-108-0019L	975200024	975200048
FE/FEO/FEX/FEOX	0420	H-133-04L	H-108-0019L	975200025	975200048
FE/FEO/FEX/FEOX	M6	—	—	8013143	975200048

## Installation Notes

- For best results we recommend using a HAEGER® or PEMSERTER® machine for installation of PEM® self-clinching fasteners. See our [website](#) for more information.
- Visit the [Animation Library](#) on our website to view the installation process.

### Installation Recommendation

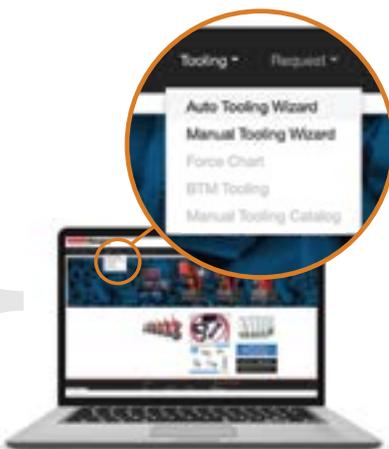
In applications for sheet thicknesses between the two ranges (see "Sheet Thickness" on page 3) use the fastener with the larger "A" dimension. For example, if you want a #4-40 thread and your sheet thickness is between .045"/1.14 mm and .059"/1.49 mm, you should use FE or FEX nuts. This is not recommended installation practice, but in this case if it is necessary, you should install the fastener so that the bottom of the shank is flush with the underside of the sheet (instead of having the top of the knurled collar flush with the top of the sheet). When this method is used, care must be taken to protect the fastener against crushing which would damage the threads. This method will also result in reduced pushout and torque-out values.

### For Additional HAEGER® and PEMSERTER® Tooling Information / Part Numbers

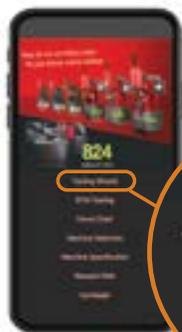


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Performance Data For U™/UL™ Fasteners<sup>(1)</sup>

Unified	Type	Thread Code	Shank Code	Test Sheet Material					
				5052-H34 Aluminum			Cold-rolled Steel		
				Installation (lbs.)	Pushout (lbs.)	Torque-out (in. lbs.)	Installation (lbs.)	Pushout (lbs.)	Torque-out (in. lbs.)
U/UL	080	0	0	750	20	2	1000	30	2
				750	20	3	1000	30	3
	256	0	1	1000	20	4	1300	30	4

Metric	Type	Thread Code	Shank Code	Test Sheet Material					
				5052-H34 Aluminum			Cold-rolled Steel		
				Installation (kN)	Pushout (N)	Torque-out (N-m)	Installation (kN)	Pushout (N)	Torque-out (N-m)
U/UL	M2		1	4	89	0.45	5.8	133	0.45

Performance Data For FE™/FEO™/FEX™/FEOX™ Fasteners<sup>(1)(2)</sup>

Unified	Type	Thread Code	Test Sheet Material					
			5052-H34 Aluminum			Cold-rolled Steel		
			Installation (lbs.)	Pushout (lbs.)	Torque-out (in. lbs.)	Installation (lbs.)	Pushout (lbs.)	Torque-out (in. lbs.)
Unified	FEO/FEOX	440	900	88	12	1500	140	12
	FE/FEX			135			210	
	FEO/FEOX	632	1200	105	20	2100	185	20
	FE/FEX			1300			255	
	FEO/FEOX	832	1500	155	48	2500	260	48
	FE/FEX			255			360	
	FEO/FEOX	032	1500	155	48	2500	260	48
	FE/FEX			255			360	
	FE/FEX	0420	2100	320	110	3500	420	110
		0428						

Metric	Type	Thread Code	Test Sheet Material					
			5052-H34 Aluminum			Cold-rolled Steel		
			Installation (kN)	Pushout (N)	Torque-out (N-m)	Installation (kN)	Pushout (N)	Torque-out (N-m)
Metric	FEO/FEOX	M3	4	391	1.35	6.7	622	1.35
	FE/FEX			600			934	
	FEO/FEOX	M4	6.7	689	5.42	11.1	1156	5.42
	FE/FEX			1134			1601	
	FEO/FEOX	M5	6.7	689	5.42	11.1	1156	5.42
	FE/FEX			1134			1601	
	FE/FEX	M6	9.4	1423	12.43	15.6	1868	12.43

(1) Published installation forces are for general reference. Actual set-up and confirmation of complete installation should be made by observing proper seating of fastener as described in the installation steps. Other performance values reported are averages when all proper installation parameters and procedures are followed. Variations in mounting hole size, sheet material, and installation procedure may affect performance. Performance testing this product in your application is recommended. We will be happy to provide technical assistance and/or samples for this purpose.

(2) For FE and FEO fasteners, thread locking performance is equivalent to applicable NASM25027 specifications. Consult technical sheet PEM-REF/NASM25027 on our web site for details.

## Axial Strength And Tightening Torque Comparison

Unified	Thread Code	Increasing Axial Strength →					
		U-0/UL-0/FE0X/FE0 Nuts			U-1/UL-1/FE1/FE Nuts		
		Locknut Min. Axial Strength (lbs.) (1)	Mating Screw		Locknut Min. Axial Strength (lbs.) (1)	Mating Screw	
	Strength Level (ksi) (2)	Tightening Torque (in. lbs.) (3)		Strength Level (ksi) (2)	Tightening Torque (in. lbs.) (3)		
080	125	69	1.0	—	—	—	
164	125	49	1.2	—	—	—	
256	169	46	1.9	316	85	3.5	
440	465	77	6.8	705	117	10.3	
632	546	60	9.8	847	93	15.2	
832	779	56	16.6	1,213	87	25.9	
032	779	39	19.2	1,213	61	30.0	
0420	—	—	—	1,412	44	45.9	

Metric	Thread Code	Increasing Axial Strength →					
		U-0/UL-0/FE0X/FE0 Nuts			U-1/UL-1/FE1/FE Nuts		
		Locknut Min. Axial Strength (kN) (1)	Mating Screw		Locknut Min. Axial Strength (kN) (1)	Mating Screw	
	Strength Level (MPa) (2)	Tightening Torque (N-m) (3)		Strength Level (MPa) (2)	Tightening Torque (N-m) (3)		
M2	—	—	—	1.39	432	0.36	
M3	2.08	267	0.81	3.16	405	1.23	
M4	3.48	255	1.81	5.42	398	2.82	
M5	3.48	158	2.26	5.42	246	3.52	
M6	—	—	—	6.28	201	4.9	

- (1) Axial strength for nuts is limited by knurled ring strength.
- (2) Screw strength level shown is the minimum needed to develop full nut strength, higher strength screws may be used.
- (3) Tightening torque shown will induce preload of 65% of locknut minimum axial strength with K or nut factor is equal to 0.20. In some applications tightening torque may need to be adjusted based on the actual K value. If screw strength is less than the value shown, tightening torque should be proportionately reduced by multiplying the torque shown by the actual screw strength over the screw strength shown. If higher strength screws are used, torque is not adjusted upward because assemble strength is still limited by locknut strength.



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Custom sizes are available on special order. [Contact us](#) for more information.

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Regulatory [compliance information](#) is available in Technical Support section of our website. Specifications subject to change without notice. See our website for the most current version of this bulletin.



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