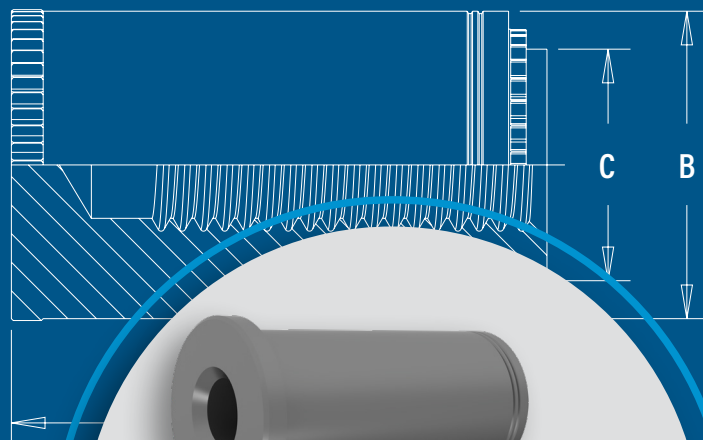
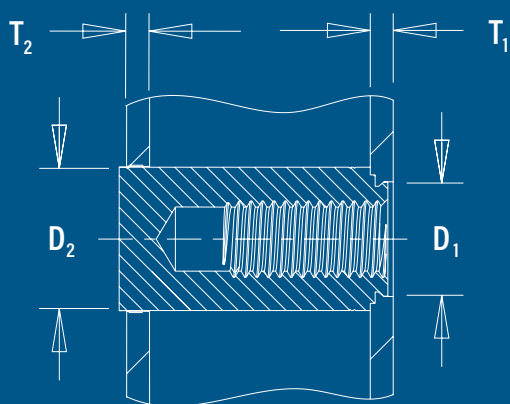


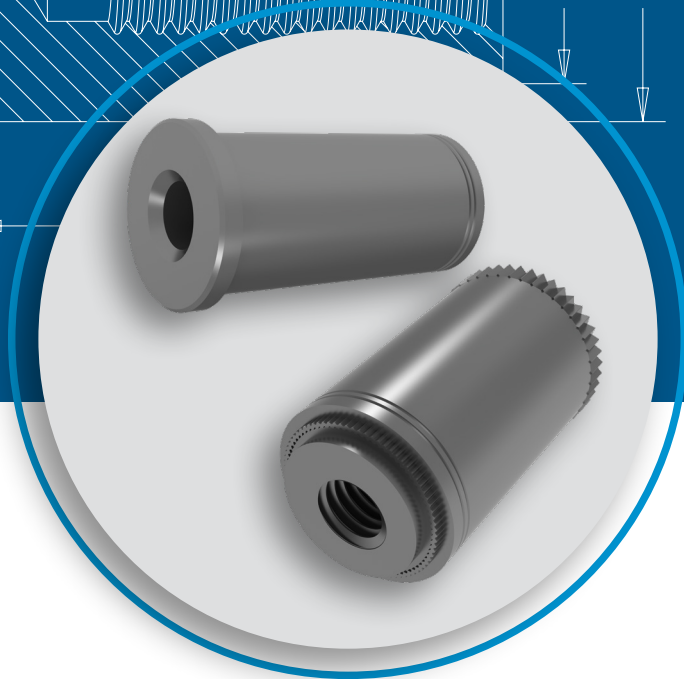


# TB™

## PEM® SELF CLINCHING TUBE BUSHING



High strength, threaded fastener designed  
for aluminum extrusions

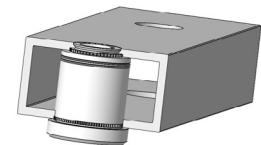
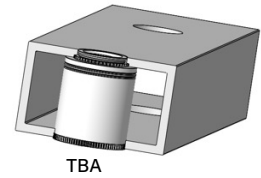
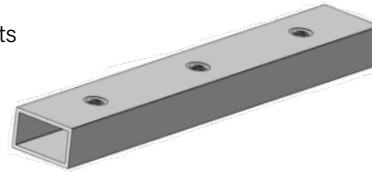


## PEM® TUBE BUSHING

### High strength, threaded fastener for aluminum tubing

Designed with a double clinch feature on both ends, TBA™ and TBFA™ (flange style) fasteners firmly lock into place in the aluminum tube during installation.

- Designed for square or rectangular aluminum tubing
- Connects two sides of the tubing
- High strength thread (meets Class 10 proof load requirements when the effective thread depth is greater than 1.5 times the major diameter), and high torque resistance
- Improve the strength and Noise, Vibration, and Hardness (NVH) performance
- Installs into round holes



TBFA (Flange Style)

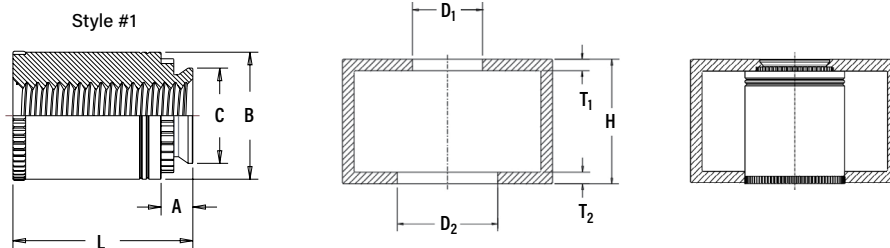
This datasheet showcases custom-designed parts developed for square and rectangular aluminum tubing. Samples of these solutions are available from stock.

The datasheet illustrates PennEngineering's expertise in creating strong, reliable threads in tubing applications. Since dimensions may vary with tube size and wall thickness, our engineering team can help tailor the design to your specific needs. [Contact us](#) to explore the best solution for your application.

### TBA Fastener Dimensional Data



PEM® "two groove"  
(registered trademark)



All dimensions are in millimeters.

Metric	Fastener Information <sup>(1)</sup>										Tube Information			
	Thread Size x Pitch	Type	Fastener Material	Thread Code	Shank Code	Length Code	A Max.	B Max.	C Max.	L Ref.	Thickness T <sub>1</sub> = T <sub>2</sub> Min.	Hole Size D <sub>1</sub> +0.1	Hole Size D <sub>2</sub> +0.1	Overall Height H Ref.
			Aluminum											
	M6 x 1	TB	A	M6	30	170	3	12	9	17	3	9	12	17
	M8 x 1.25	TB	A	M8	25	120	2.5	14.5	11	12	2.5	11	14.5	12
	M10 x 1.5	TB	A	M10	25	270	2.5	21.5	15	27	2.5	15	21.5	27

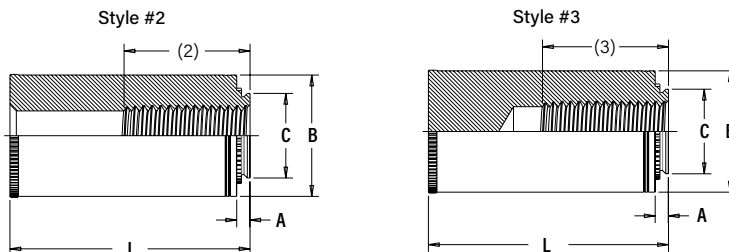
(1) Additional sizes available on special order. Contact us for availability.

#### Optional Styles

Style #1 - Thru-threaded, as shown above.

Style #2 - Screw might not pass through unthreaded end. Tapped to minimum full thread depth shown. Incomplete threads on tap may allow screw to pass through.

Style #3 - Blind threaded hole.



### Part Number Designation

**TB**   **A**   -   **M6**   -   **30**   -   **170**

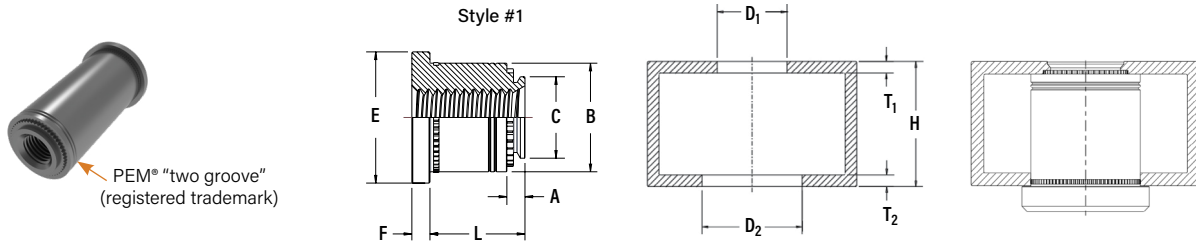
↓   ↓   ↓   ↓   ↓

Type   Material Code   Thread Size Code   Shank Code   Length Code

(2) Threads are designed with a depth of at least 2.0 times the major diameter when space allows. We can also customize the thread depth to suit your application.

(3) The thread depth will be designed to a minimum of 2.0 times the major diameter, provided the drill hole depth is sufficient.

## TBFA Fastener Dimensional Data



All dimensions are in millimeters.

Metric	Fastener Information <sup>(1)</sup>												Tube Information			
	Thread Size x Pitch	Type	Fastener Material	Thread Code	Shank Code	Length Code	A Max.	B Max.	C Max.	E ±0.5	F ±0.25	L Ref.	Thickness T <sub>1</sub> = T <sub>2</sub> Min.	Hole Size D <sub>1</sub> +0.1	Hole Size D <sub>2</sub> +0.1	Overall Height H Ref.
			Aluminum													
	M6 x 1	TBF	A	M6	20	105	2	12	9	14.5	2	10.5	2	9	12	10.5
	M8 x 1.25	TBF	A	M8	25	250	2.5	16	11	18.5	3	25	2.5	11	16	25
	M10 x 1.5	TBF	A	M10	25	240	2.5	21.5	15	25	5	24	2.5	15	21.5	24

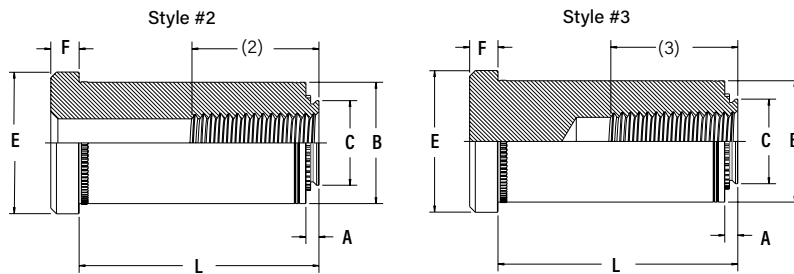
(1) Additional sizes available on special order. Contact us for availability.

### Optional Styles

Style #1 - Thru-threaded, as shown above.

Style #2 - Screw might not pass through unthreaded end. Tapped to minimum full thread depth shown. Incomplete threads on tap may allow screw to pass through.

Style #3 - Blind threaded hole.



(2) Threads are designed with a depth of at least 2.0 times the major diameter when space allows. We can also customize the thread depth to suit your application.

(3) The thread depth will be designed to a minimum of 2.0 times the major diameter, provided the drill hole depth is sufficient.

### Part Number Designation

TB	F	A	-	M6	-	20	-	105
Type	Flange	Material Code		Thread Size Code		Shank Code		Length Code

## Material and Finish Specifications

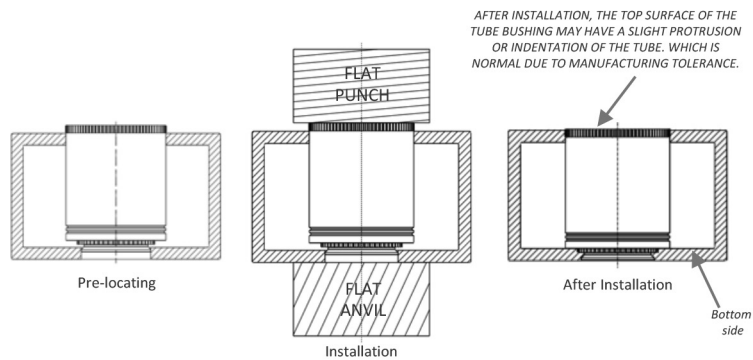
	Threads	Fastener Material	Standard Finish	For Use in Sheet Hardness: <sup>(4)</sup>
Type	Internal, ASME B1.1, 2B / ASME B1.13M, 6H	7000 Series Aluminum	No Finish (Plain)	HRB 55 / HB 96 or less
TBA	▪	▪	▪	▪
TBFA	▪	▪	▪	▪
Part Number Code for Finishes			None	

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

## Installation

### TBA Fastener

- 1) Mill/Drill two properly sized holes into the tube while ensuring that the concentricity of the two holes is within the range of 0.1 MMC (Maximum Material Condition).
- 2) Insert the tube bushing into the tube while ensuring that the shank of the tube bushing is seated into the hole of the bottom side.
- 3) With punch and anvil surfaces parallel, apply squeezing force until the shoulder of the tube bushing contacts the bottom side of the tube.

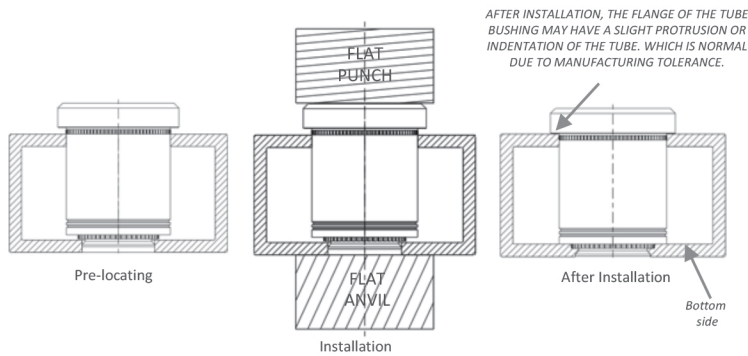


Thread Code	HAEGGER® Part Number	
	Anvil	Punch
M6		
M8		
M10		

## Installation

### TBFA Fastener

- 1) Mill/Drill two properly sized holes into the tube while ensuring that the concentricity of the two holes is within the range of 0.1 MMC (Maximum Material Condition).
- 2) Insert the tube bushing into the tube while ensuring that the shank of the tube bushing is seated into the hole of the bottom side.
- 3) With punch and anvil surfaces parallel, apply squeezing force until the shoulder of the tube bushing contacts the bottom side of the tube or the flange of tube bushing contacts the top side of the tube.



Thread Code	HAEGER® Part Number	
	Anvil	Punch
M6		
M8		
M10		



For Additional HAEGER® Tooling Information/  
Part Numbers visit our [tooling wizard](#)

## Performance Data<sup>(1) (2)</sup>

### TBA™ Fastener

Metric	Type	Thread Code	Shank Code	Test Tube Material	Installation (kN)	Pushout (N)	Torque-out (N-m)
	TB	M6	30	6000 Series Aluminum HRB 45-55	35-45	1500	15
	TB	M8	25	6000 Series Aluminum HRB 45-55	40-55	2000	30
	TB	M10	25	6000 Series Aluminum HRB 45-55	50-65	2500	60

### TBFA™ Fastener

Metric	Type	Thread Code	Shank Code	Test Tube Material	Installation (kN)	Pushout (N)	Torque-out (N-m)
	TBF	M6	20	6000 Series Aluminum HRB 45-55	35-45	1200	12
	TBF	M8	25	6000 Series Aluminum HRB 45-55	40-55	2000	30
	TBF	M10	25	6000 Series Aluminum HRB 45-55	50-65	2500	60

(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. Installation force, pushout, and torque-out 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) TBA™ and TBFA™ fasteners meet Class 10 proof load requirements when the effective thread depth is greater than 1.5 times the major diameter.



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

All PEM® products meet our stringent quality standards. If you require additional industry or other specific [quality certifications](#), special procedures and/or part numbers are required. Please contact your local sales office or representative for further information.

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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