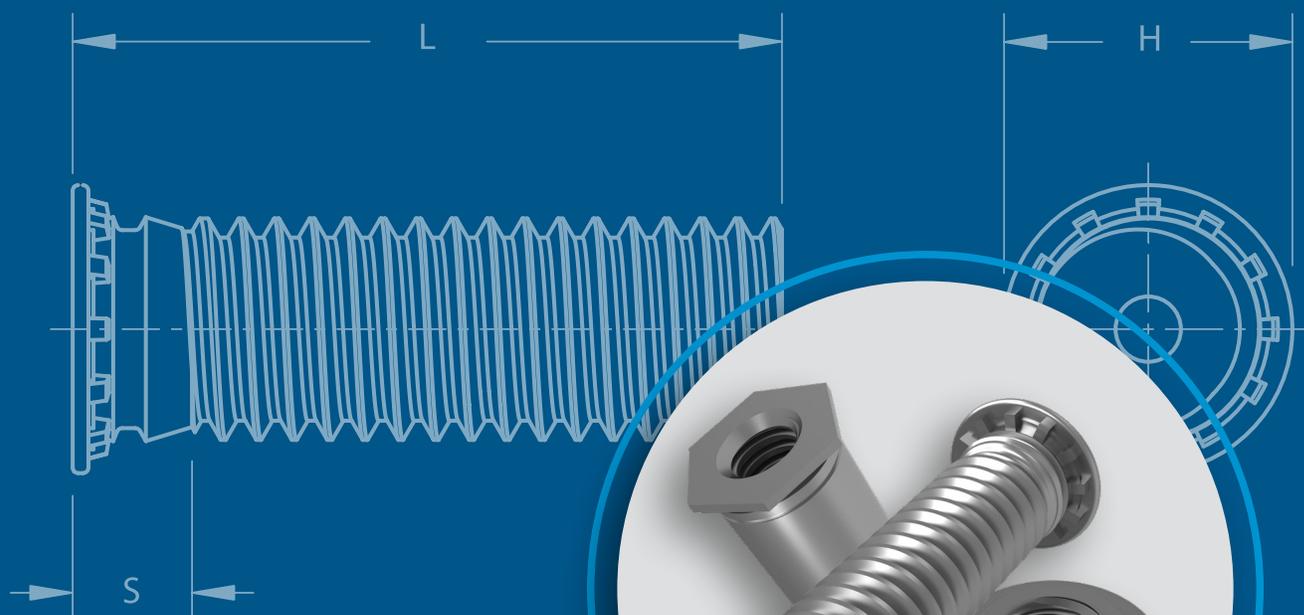




# INDEX

## QUICK PRODUCT LOCATOR



PEM® brand fasteners utilize self-clinching, broaching, flaring, surface mount, bonding or weld technology to provide strong, reusable, and permanent threads and mounting points in thin sheet metal, P.C. board or other rigid materials.

## PEM® Fastener Identification Marks

To help you identify genuine PEM® brand fasteners, most are marked by one of our trademarks or identifiers. Genuine PEM fasteners can only be purchased from one of our authorized worldwide distributors. For a complete listing of these distributors, check our web site: [www.pemnet.com](http://www.pemnet.com).

### Trademark PEM® Dimple

CFHA, CFHC, CHA, CHC, FH, FH4, FHA, FHL, FHLS, FHP, FHS, FHX, HF109, HFG8, HFE, HFH, HFHB, HFHS, HFLH, HSCB, KFH, KSSB, MPP, PF10, PF30, PF31, PF32, PF50, PF51, PF52, PF60, PF61, PF62, PF11, PF11M, PF11MF, PF11MW, PF11PM, PF12, PF12M, PF12MF, PF12MW, PF7M, PF7MF, PFC2, PFC2P, PFC4, PFHV, PFK, PFS2, PSHP, SCB, SCBJ, SCBR, SF, SFK, SFP, SFW, SGPC, SKC, SKC-F, SMTPFLSM, SMTSS, SMTSK SSA, SSC, SSS, T, T4, TFH, TFHS, THFE, TK4, TKA, TP4, TPS, TPXS, and TS fasteners



### Trademark PEM® Skirted Shoulder

PF11, PF11M, PF11MF, PF11MW, PF11PM, PF12, PF12M, PF12MF, PF12MW, PF7M, and PF7MF fasteners



### Trademark PEM® “Two Groove”

B, BS, BSO, BSON, BSOS, CSOS, CSS, DSO, DSOS, HSR, KF2, KFB3, KFE, KFS2, KFSE, PF7M, PF7MF, SMTSO, SMTSOB, SMTPFLSM, SO, SOA, SOAG, SON, SOS, SOSG, TSO, TSOA, and TSOS fasteners



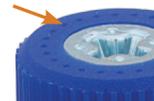
### Trademark PEM® Stamp

CLS, CLSS, H, HN, HNL, PSHP, S, SFN, SL, SMPP, SMPS, SS, and WN fasteners



### Trademark PEM® C.A.P.S.® Dot Pattern

PF11PM fastener



### Trademark PEM® “Single Groove”

A4, BSO4, LA4, MSO4, PFC4, SO4, SP (Select sizes), and TSO4 fasteners



### Trademark PEM® Double Notch

microPEM® SMTSO fastener



### Trademark PEM® “Double Squares”

A4, AC, AS, LA4, LAC, and LAS fasteners



### Trademark PEM® Blue Nylon Locking Element

PL, PLC and CFN fasteners



### Trademark PEM® Circle on Pedestal

RAS fastener



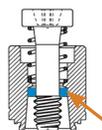
### Trademark PEM VM® Stamp

(Both Sides) VariMount™ Base Plates



### PEM® Blue Nylon Ring

PFC4, PFC2P, PFC2, PFS2, and PFK fasteners



### Trademark PEM® SH Stamp

SH fasteners



### PEM® RT Stamp

S-RT fasteners



### Trademark ATLAS® AE Stamp

MaxTite® and Plus+Tite® products



### Trademark PEM® SP Stamp

SP fasteners



### PEM® SMPP Stamp

SMPP fasteners



**SC** **Self-clinching** fasteners are pressed into sheet metal panels as thin as .016" / 0.4 mm.



**FM** **Flare Mounted** fasteners can be installed into almost any rigid type of panel.



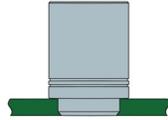
**B** **Broaching** fasteners are pressed into P.C. board or other plastic materials as thin as .060" / 1.53 mm.



**W** **Weld** nuts are designed specially to be welded into place.



**SM** **Surface Mounted** fasteners on tape and reel are soldered to a PC board in the same way as other surface mount components.



(Products are listed alphabetically by type. Refer to matching color square for mounting style)

**A4, AC, AS** [ALA Datasheet](#)

Nuts with load-bearing, non-locking threads that permits up to .030"/0.76mm adjustment for mating hole misalignment.



**SC**

**F, F4** [F Datasheet](#)

PEMSERT® flush fasteners are flush with both sides of the sheet.



**SC**

**B, BS** [B Datasheet](#)

Nuts used in applications requiring closed thread ends. Blind end limits screw penetration and excludes foreign matter.



**SC**

**FE, FEO, FEOX, FEX** [FE Datasheet](#)

Miniature nuts with strong threads. Available with locking or non-locking threads.



**SC**

**BSO, BSO4, BSOA, BSOS** [SO Datasheet](#)

Blind threaded standoffs installed with their heads flush with one surface of the mounting sheets.



**SC**

**FH, FH4, FHA, FHP, FHS** [FH Datasheet](#)

Flush-head studs with high pushout and torque-out resistances.



**SC**

**CDS** [MPF Datasheet](#)

The microPEM® ClampDisk® fastener is a removable fastener designed to replace screws, adhesive, rivets and other small fasteners.



**SC**

**FHL, FHLS** [FH Datasheet](#)

Low-displacement head studs can be installed close to the edge of a sheet without causing the edge to bulge.



**SC**

**CFN** [LN Datasheet](#)

Broaching, nylon insert, self-locking nuts for use in thinner sheet, close-to-edge applications.



**B**

**FHX** [FH Datasheet](#)

Flush-head studs with X-Press™ thread profile are typically used with push-on or other plastic fasteners.



**SC**

**CFHA, CFHC, CHA, CHC** [CH Datasheet](#)

Concealed-head studs installed into a blind milled hole where surface opposite stud must remain unmarred.



**SC**

**H, HNL** [CL Datasheet](#)

Nuts with self-locking or non-locking threads that provide high pushout and torque-out resistances.



**SC**

**CLA, CLS, CLSS** [CL Datasheet](#)

Nuts that provide load-bearing threads in thin sheets with high pushout and torque-out resistances.



**SC**

**HF109** [FH Datasheet](#)

Property class 10.9 high tensile strength studs meeting 1040 MPa minimum.



**SC**

**CSOS, CSS** [CH Datasheet](#)

Concealed-head standoffs installed into a blind milled hole where surface opposite standoff must remain unmarred.



**SC**

**HFE** [FH Datasheet](#)

Studs designed with an enlarged head diameter to provide high-strength in thin sheets.



**SC**

**DSO, DSOS** [SO Datasheet](#)

Threaded standoffs for use in close-to-edge applications.



**SC**

**HFG8** [FH Datasheet](#)

Grade 8 high tensile strength studs meeting 150 ksi minimum.



**SC**

**HFH, HFHB, HFHS** [FH Datasheet](#)  
 Studs for high-strength applications with high pull through resistance.



SC

**HFLH** [FH Datasheet](#)  
 Studs are for installation into thin, harder, high-strength materials.



SC

**HSCB** [PF Datasheet](#)  
 Heat sink mounting system.  
 HSCB (screw), HSR (nut) and HSL (spring).



SC B

**KF2, KFS2** [K Datasheet](#)  
 Nuts, internally threaded, for mounting on P.C. boards.



B

**KFB3** [K Datasheet](#)  
 Flare-mounted standoffs for mounting on P.C. boards with greater pullout performance.



B

**KFE, KFSE** [K Datasheet](#)  
 Threaded or unthreaded standoffs mounted on P.C. boards for stacking or spacing.



B

**KFH** [K Datasheet](#)  
 Threaded studs for use as solderable connectors or as permanently mounted studs on P.C. boards.



B

**KSSB** [SSA Datasheet](#)  
 SNAP-TOP® standoffs featuring a spring action to hold a P.C. Board securely without screws or threaded hardware.



SC

**LA4, LAC, LAS** [ALA Datasheet](#)  
 Nuts with load-bearing, self-locking threads that permits up to .030" / 0.76 mm adjustment for mating hole misalignment.



SC

**LK, LKA, LKS** [LN Datasheet](#)  
 Nuts with a unique PEMFLEX® self-locking feature permitting repeated use and effective prevailing locking torque.



SC

**MPP** [MPF Datasheet](#)  
 microPEM® pins that can be installed into sheets as thin as 0.5 mm.



SC

**MSIB** [MPF Datasheet](#)  
 microPEM® symmetrical designed thru-threaded inserts for plastics for use in straight or tapered holes.



Inserts

**MSO4** [MPF Datasheet](#)  
 microPEM® standoffs that can be installed into sheets as thin as .016" / 0.4 mm.



SC

**MSOFS** [MPF Datasheet](#)  
 microPEM® flaring standoffs attached permanently in panels as thin as .008" / 0.2 mm of any hardness including stainless steel.



FM

**PEM C.A.P.S.®** [PF Datasheet](#)  
 Colored Access Panel Screws with plastic cap. Key features include Phillips drive and MATHread® anti-cross threading feature.



SC FM

**PF10** [PF Datasheet](#)  
 Flush-mounted panel screw components.  
 N10 (nut), PR10 (retainer) and PS10 (screw).



SC

**PF11, PF11M** [PF Datasheet](#)  
 Panel fastener assembly with knurled cap and universal slot/Phillips recess. Available with anti cross-thread feature.



SC

**PF11MF** [PF Datasheet](#)  
 Flare-mounted captive screw assembly with anti cross-thread feature.



FM

**PF11MW** [PF Datasheet](#)  
 Floating captive screw assembly allows for mating hole misalignment.



FM

**PF12, PF12M** [PF Datasheet](#)  
 Panel fastener assembly with smooth cap and universal slot/Phillips recess. Available with anti cross-thread feature.



SC

**PF12MF** [PF Datasheet](#)  
 Flare-mounted captive screw assembly with anti cross-thread feature.



FM

**PF12MW** [PF Datasheet](#)  
 Floating captive screw assembly allows for mating hole misalignment.



FM

**PF30, PF31, PF32** [PF Datasheet](#)  
 Low-profile panel fastener assembly with large knurled head for tool or hand operation.



SC

**PF50** [PF Datasheet](#)  
 Low-profile panel fastener assembly with large knurled cap and Phillips recess for tool or hand operation.



SC

**PF60** [PF Datasheet](#)  
 Low-profile panel fastener assembly with large smooth cap and Phillips recess for tool or hand operation.



SC

**PF7M** [PF Datasheet](#)  
 Small, compact, and low-profile self-clinching captive panel screws designed for limited access areas.



SC

**PF7MF** [PF Datasheet](#)

Small, compact, and low-profile flaring captive panel screws designed for limited access areas.



FM

**PFC2, PFS2** [PF Datasheet](#)

Spring-loaded panel fastener assembly for tool or hand operation.



SC

**PFC2P** [PF Datasheet](#)

Panel fastener assembly with Phillips recess for tool only operation.



SC

**PFC4** [PF Datasheet](#)

Panel fastener assembly for installation into stainless steel sheets with Phillips recess for tool only operation.



SC

**PFHV** [PF Datasheet](#)

Low-cost panel fastener assembly with universal slot/Phillips recess for tool or hand operation.



SC

**PFK** [PF Datasheet](#)

Panel fastener assembly for mounting on P.C. boards.



B

**PL, PLC** [LN Datasheet](#)

PEMHEX® self-locking nuts with a nylon hexagonal element to provide a reusable prevailing torque thread lock.



SC

**PSHP** [K Datasheet](#)

Surface mount panel fastener screw that is used with Type SMTPR retainer.



SM

**PSL2, PTL2** [PF Datasheet](#)

Spring-loaded plunger assembly. Quick lockout feature on Type PTL2 holds plunger in retracted position.



SC

**RAA** [RA Datasheet](#)

Self-tapping R'ANGLE® fasteners provide strong right angle attachment points in thin sheets.



SC

**RAS** [RA Datasheet](#)

Threaded R'ANGLE® fasteners provide strong right angle attachment points in thin sheets.



SC

**S, SS** [CL Datasheet](#)

Nuts that provide load-bearing threads in thin sheets with high pushout and torque-out resistances.



SC

**S-RT** [CL Datasheet](#)

Free-running locknuts with a thread form that creates a lock when clamp load is applied.



SC

**SCB** [PF Datasheet](#)

The spinning clinch bolt with axial float installs captive in panel and still spins freely.



SC

**SCBJ** [PF Datasheet](#)

The spinning clinch bolt with jacking feature installs captive in panel and still spins freely.



SC

**SCBR** [PF Datasheet](#)

The spinning clinch bolt with axial float utilizes self-retracting spring.



SC

**SF, SFP** [SF Datasheet](#)

SpotFast® self-clinching fasteners create a permanent, flush joining of two sheets of metal.



SC

**SFK** [SF Datasheet](#)

SpotFast® self-clinching fasteners create a permanent, flush joining of metal to PCB or plastic panels.



SC B

**SFN** [SFN Datasheet](#)

Spinning flare nut is a one-piece, flanged hex nut that is permanently captive and still spins freely in the sheet.



FM

**SH** [CL Datasheet](#)

Nuts are for installation into thin, harder, high-strength materials.



SC

**SFW** [SF Datasheet](#)

SpotFast® self-clinching fasteners create a permanent, flush joining of two sheets of metal. The washer allows for consistent pivoting of the two metal panels.



SC

**SGPC** [FH Datasheet](#)

Install into most panel material, provide strong torque-out resistance and are suitable for close centerline-to-edge situations.



FM

**SKC/SK4** [SK Datasheet](#)

KEYHOLE® standoffs designed for a board to be quickly slipped into place and removed by sliding it sideways and lifting it off.



SC

**SKC-F/SK4-F** [SK Datasheet](#)

KEYHOLE® sheet joining fasteners designed to quickly join two sheets flat against each other and then can be removed.



SC

**SL** [CL Datasheet](#)

Locknuts designed with a unique TRI-DENT® locking feature, which meets demanding locking performance requirements.



SC

**SMPS, SMPP** [CL Datasheet](#)

Nuts that feature a lower profile and can be mounted closer to the edge of a sheet than standard self-clinching nuts.



SC

**SMTPLSM** [K Datasheet](#) **SM**

Surface mount spring-loaded captive panel screws.



**SMTPR** [K Datasheet](#) **SM**

Surface mount panel fastener retainer that is used with Type PSHP screw.



**SMTRA** [K Datasheet](#) **SM**

Surface mount R'ANGLE® fasteners provide strong re-usable threads at right angle to PC board.



**SMTSK** [K Datasheet](#) **SM**

Surface mount KEYHOLE® standoffs that eliminate the need for attaching screws.



**SMTSO, SMTSOB** [K Datasheet](#) **SM**

Surface mount spacers and nuts are available threaded and unthreaded.



**SMTSS** [K Datasheet](#) **SM**

Surface mount standoffs that eliminate the need for attaching screws.



**SO, SO4, SOA, SOS** [SO Datasheet](#) **SC**

Thru-hole threaded and unthreaded standoffs installed with their heads flush with one surface of the mounting sheets.



**SOAG, SOSG** [SO Datasheet](#) **SC**

Grounding standoffs for clinching into metal chassis with "gripping teeth" at opposite end to firmly contact mating board.



**SP** [CL Datasheet](#) **SC**

Specially hardened self-clinching nuts for installation into stainless steel sheets.



**SSA, SSC, SSS** [SSA Datasheet](#) **SC**

SNAP-TOP® standoffs featuring a spring action to hold a P.C. board securely without screws or threaded hardware.



**T, T4** [MPF Datasheet](#) **SC**

microPEM® TackPin® fasteners for compact electronic assemblies enable sheet-to-sheet attachment.



**TDS** [Bulletin TD](#) **SC**

TY-D® self-clinching tie-mounts provide secure attachment points for mounting wires to electronic chassis or enclosure.



**TFA** [MPF Datasheet](#) **SC**

Bellville washer shaped head of the microPEM® FlexTack™ fastener draws panels together to adapt to panel tolerance variations.



**TFH, TFHS** [FH Datasheet](#) **SC**

Non-flush studs for sheets as thin as .020" / 0.51 mm.



**THFE** [FH Datasheet](#) **SC**

Heavy-duty studs for sheets as thin as .031" / 0.8 mm.



**TK4, TKA** [FH Datasheet](#) **B**

microPEM® TackSert® pins designed to hold a top panel to a bottom panel by broaching into the bottom panel.



**TPS, TP4** [FH Datasheet](#) **SC**

Flush-mounted pilot pins with chamfered end to make mating hole location easy.



**TPXS** [FH Datasheet](#) **SC**

Alignment pin for ATCA® faceplate fastening solutions.



**TS** [MPF Datasheet](#) **SC**

TackScrew® fasteners enable cost-effective sheet-to-sheet attachment by simply pressing into place. Can be removed by simply unscrewing.



**TSO4** [SO Datasheet](#) **SC**

Standoffs for installation into ultra-thin stainless steel sheets as thin as .025" / 0.63 mm.



**TSO, TSOA, TSOS** [SO Datasheet](#) **SC**

Standoffs provide permanent threads in ultra-thin sheets.



**U, UL** [FE Datasheet](#) **SC**

Miniature nuts with strong threads. Available with locking or non-locking threads.



**WN, WNS** [WN Datasheet](#) **W**

Self-locating projection weld nuts. The engineered projections prevent burn-outs in thin sheets.



## Self-Clinching Fastener Installation Dos And Don'ts

### “DOS”

- DO** provide mounting hole of specified size for each fastener.
- DO** install fastener into punch side of sheet.
- DO** make certain that shank (or pilot) is within hole before applying installation force.
- DO** apply squeezing force between parallel surfaces.
- DO** apply sufficient force to totally embed clinching ring around entire circumference and to bring shoulder squarely in contact with sheet. For some fasteners, installation will be complete when the head is flush with the panel surface.

### “DON'TS”

- DON'T** attempt to install a 300 series stainless steel 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.

## How Can We Help?

PennEngineering offers a wide range of technical support assistance. Let us put our expertise to work for you. We can provide:

### Training

- ▶ On customer site group or individual training by a technical representative and/or PEM® factory personnel
- ▶ Tutorial materials on website

### Global Network of Engineering Representatives to:

- ▶ Provide local company liaison
- ▶ Provide application review/product selection
- ▶ Provide technical materials
- ▶ Provide on-site product training and new product updates
- ▶ Assist with quotations
- ▶ The representative nearest you can be found on our website: [rep/distributor locator](#)

### Application Engineering Services and Online Tools

- ▶ Application analysis/review
- ▶ Custom solutions
- ▶ Online technical papers
- ▶ Get answers to technical questions at [techsupport@pemnet.com](mailto:techsupport@pemnet.com)
- ▶ Customer assist performance testing
- ▶ Cost Savings Investigation (CSI)
- ▶ Custom design and product development
- ▶ Customer drawings
- ▶ Finite Element Analysis (FEA)
- ▶ Free samples on standard (catalog) products
- ▶ 3D Models (download or direct insert free on website)
- ▶ Free design PEMspec™ APP
- ▶ Instructional videos and animations

**Stay connected to PennEngineering**

Now you can follow us for the latest news releases, new products, bulletin updates, tech tips, videos and more.



**Technical Lab Services** - Complete testing in accordance with NASM 25027, 45938 and ASTM as well as PEM® fastener test specs and customer parameters.

- |  |   |
|--|---|
| ▶ Mechanical testing                               | ▶ Tensile strength                          |
| ▶ Compression                                      | ▶ In sheet performance                      |
| ▶ Micro hardness (Knoop, Rockwell and superficial) | ▶ Thermal Cycling                           |
| ▶ Image analysis                                   | ▶ Corrosion and plating issues and analysis |

**Prototype Development Center** - Shop equipped with latest CNC equipment to provide prototype or short run samples and necessary installation tooling. Capabilities include:

- |           |            |            |               |                |
|-----------|------------|------------|---------------|----------------|
| ▶ Turning | ▶ Milling  | ▶ Drilling | ▶ 3D Printing | ▶ Installation |
| ▶ Reaming | ▶ Punching | ▶ Grinding | ▶ Assembly    |                |

### Installation Equipment

We can assess your application and recommend equipment that helps you achieve your lowest installed cost. PEMSERTER® and HAEGER® systems can be developed to handle multiple fastener types simultaneously or even in-die equipment to address challenging component handling and fastener installation. For more information call us at 800-523-5321 (USA only) or 215-766-8853 or visit us at [www.pemnet.com](http://www.pemnet.com).



HAEGER® 824  
OneTouch 4e



PEMSERTER®  
In-Die System

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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