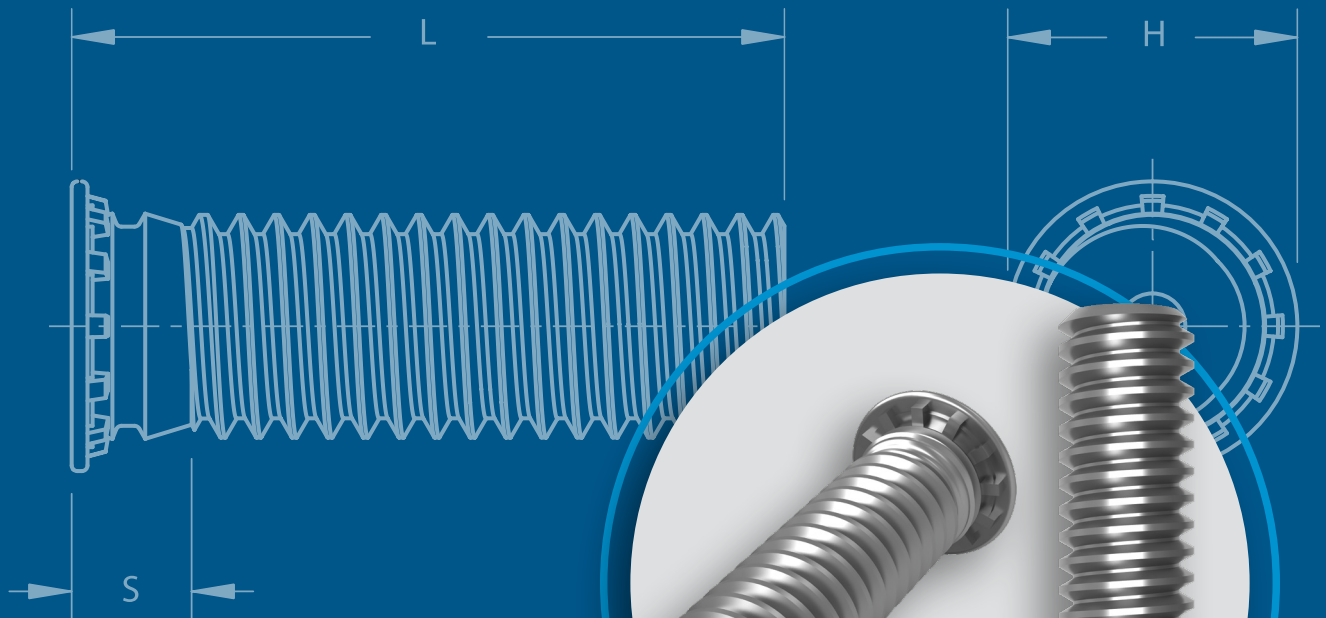




IPF™

PEM® INGRESS PROTECTION SELF-CLINCHING FASTENERS



New PEM® IFH™ ingress protection capable flush-head fastener, designed to create a sealed joint without the need for O-rings or sealants.

PEM® INGRESS PROTECTION SELF-CLINCHING, FLUSH-HEAD STUDS

Sealed joint without the need for O-rings or sealants

Introducing the PEM® IFH™ ingress protection capable flush-head fastener, designed to create a sealed joint without the need for O-rings or sealants. Unlike standard FH™ fasteners, the IFH™ features enhanced material interaction to provide ingress protection upon installation.

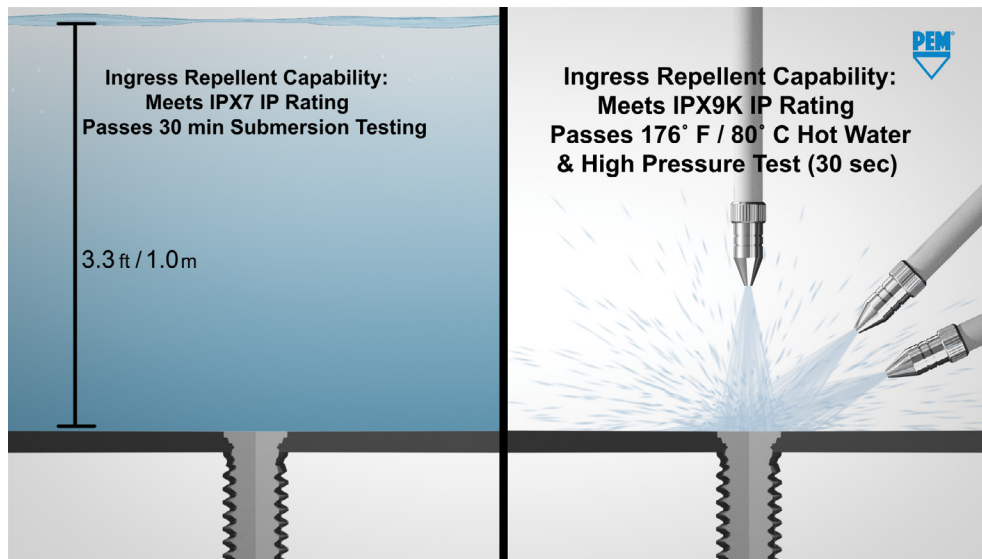
Key benefits include:

- Instant Sealing – No curing time required
- Long-Term Reliability – No perishable O-rings or additional sealing components.
- Proven Performance – Meets ISO:20653-2014 standards, including IPX7 & IPX9K ratings.
- Versatile Applications – Tested in CR4, 6082-T6, and 304 stainless materials.



PEM® IFH™ ingress protection capable flush-head studs provide a reliable and efficient solution for ingress protection, eliminating the need for additional sealing components.

PEM® ingress capable studs are available in steel (Type IFH™), stainless steel (Type IFHS™), aluminum (Type IFHA™) and A286 stainless steel (Type IFHP™).

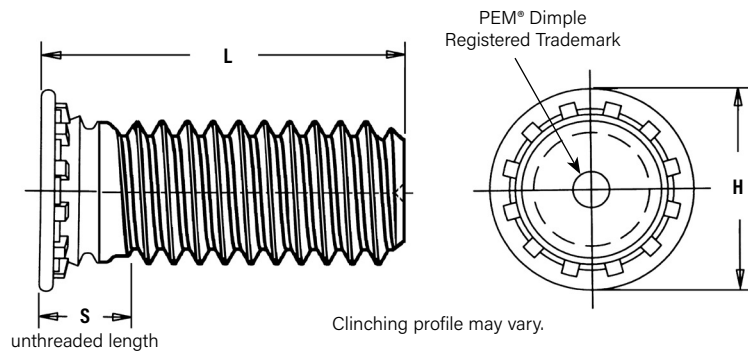


Application Details

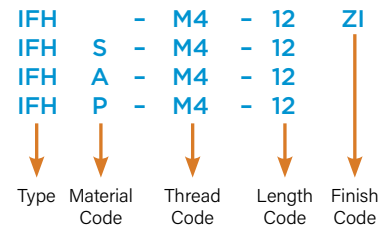
- Sheet hardness must be consistently below maximum panel hardness published for the fastener type.
- Published minimum centerline to edge distance must be maintained on all sides.
- Secondary operations such as sheet bending after fastener installation should be avoided, as they may cause deformed material to be pulled out of the joint, leading to a leak path
- For more information on proximity to bends and distance to other clinch hardware, see [PEM® Tech Sheet C/L To Edge](#).

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

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



Part Number Designation



IFH™, IFHS™ and IFHA™ Fastener Dimensional Data

Metric	Thread Size x Pitch	Type			Thread Code	Length Code "L" ±0.4 (Length code is in millimeters)								Min. Sheet Thickness	Hole Size in Sheet +0.08	H ±0.4	S Max.	Max. Hole in Attached Parts	Min. Dist. Hole C/L to Edge
		Fastener Material																	
		Steel	Stainless Steel	Aluminum															
M2.5 x 0.45	IFH	IFHS	IFHA	M2.5	10	12	15	18	—	—	—	—	1.5	2.5	4.1	1.95	3.1	5.4	
M3 x 0.5	IFH	IFHS	IFHA	M3	10	12	15	18	20	25	—	—	1.5	3	4.6	2.1	3.6	5.6	
M4 x 0.7	IFH	IFHS	IFHA	M4	10	12	15	18	20	25	30	35	1.5	4	5.9	2.4	4.6	7.2	
M5 x 0.8	IFH	IFHS	IFHA	M5	10	12	15	18	20	25	30	35	1.5	5	6.5	2.7	5.6	7.2	
M6 x 1	IFH	IFHS	IFHA	M6	10	12	15	18	20	25	30	35	1.6	6	8.2	3	6.6	7.9	

IFHP™ Fastener Dimensional Data

Metric	Thread Size x Pitch	Type		Thread Code	Length Code "L" ±0.4 (Length code in millimeters)								Sheet Thickness	Hole Size in Sheet +0.08	H ±0.4	S Max.	Max. Hole in Attached Parts	Min. Dist. Hole C/L to Edge
		Fastener Material																
		A286 Stainless Steel																
M3 x 0.5	IFHP	M3	10	12	15	18	20	25	—	—	1.5 - 2.4	3	4.6	2.1	3.3	5.6		
M4 x 0.7	IFHP	M4	10	12	15	18	20	25	30	35	1.5 - 2.4	4	5.9	2.4	4.7	7.2		
M5 x 0.8	IFHP	M5	10	12	15	18	20	25	30	35	1.5 - 2.4	5	6.5	2.7	5.3	7.2		

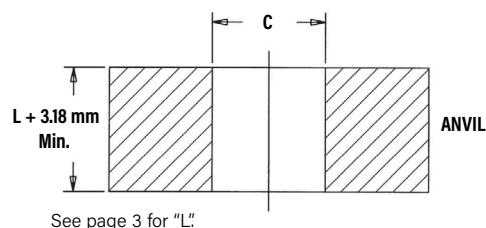
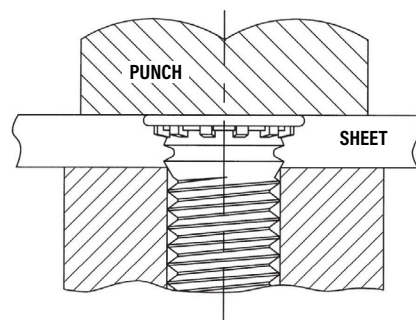
Material and Finish Specifications

Type	Threads ⁽¹⁾	Fastener Materials				Standard Finishes			For Use in Sheet Hardness: ⁽²⁾			
	External, ASME B1.1, 2A / ASME B1.13M, 6g	Hardened Carbon Steel	300 Series Stainless Steel	Aluminum (Plain Finish)	Aged Hardened A286 Stainless Steel	No Finish	Zinc plated per ASTM B633, SC1 (5µm), Type III, Colorless ⁽³⁾	Passivated and/or Tested per ASTM A380	HRB 50 / HB 82 or less	HRB 70 / HB 125 or less	HRB 80 / HB 150 or less	HRB 92 / HB 192 or less
IFH	▪	▪					▪				▪	
IFHS	▪		▪					▪			▪	
IFHA	▪			▪		▪			▪			
IFHP	▪				▪			▪				▪
Part Number Code for Finishes							ZI	None				

(1) For plated studs, Class 2A/6g, the maximum major and pitch diameter, after plating, may equal basic sizes and be gauged to Class 3A/4h. Per ASME B1.1, Section 7, Paragraph 7.2 and ASME B1.13M, Section 8, paragraph 8.2.
 (2) HRB - Hardness Rockwell "B" Scale. HB - Hardness Brinell.
 (3) See PEM Technical Support section of our web site for related plating standards and specifications.

Installation - IFH™/IFHS™/IFHA™ Threaded Studs

1. Prepare properly sized mounting hole in sheet. Do not perform any secondary operations such as deburring.
2. Insert stud through mounting hole (punch side) of sheet and into anvil hole.
3. With punch and anvil surfaces parallel, apply squeezing force to embed the head of the stud flush in the sheet.



Installation Tooling

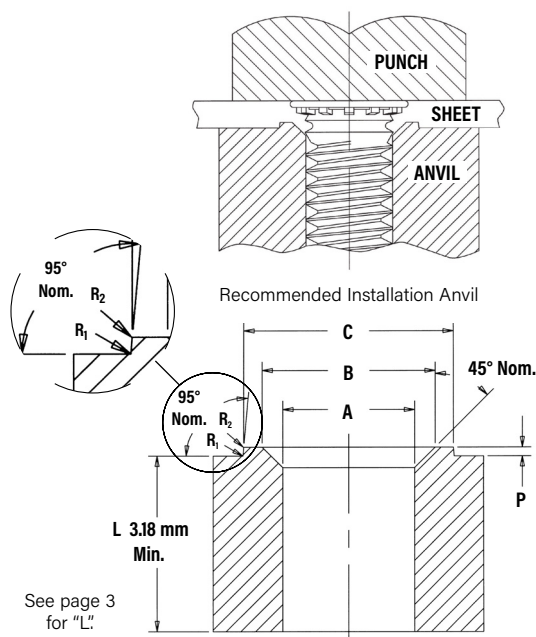
Metric	Thread Code	HAEGER® Part Number		PEMSERTER® Part Number		Anvil Dimensions (in.)	
		Anvil	Punch	Anvil	Punch	A +0.1	C ±0.08
	M2.5	H-103-M2.5L	H-108-0020L	970200300300	975200048	3.1	2.53
M3	H-103-M3L	H-108-0020L	970200229300	975200048	3.6	3.03	
M4	H-103-M4L	H-108-0020L	970200019300	975200048	4.6	4.03	
M5	H-103-M5L	H-108-0020L	970200020300	975200048	5.6	5.03	
M6	H-103-M6L	H-108-0020L	970200230300	975200048	6.6	6.03	

Installation - IFHP™ Studs For Stainless Steel Sheets

1. Prepare properly sized mounting hole in sheet. Do not perform any secondary operations such as deburring.
2. Insert stud through mounting hole (punch side) of sheet and into anvil hole.
3. With punch and anvil surfaces parallel, apply squeezing force to embed the head of the stud flush in the sheet.

For IFHP studs, a special anvil with a raised ring is required to create a proper installation. The raised ring acts as a second displacer of the stainless sheet material, thereby ensuring that the annular groove is filled. Please see page 3 for recommended sheet thickness range.

The special anvils are available from PEM stock or can be machined from suitable tool steel. A hardness of HRC 55 / HB 547 minimum is required to provide long anvil life. We recommend measuring the "P" dimension every 5000 installations to ensure that the anvil remains within specification.



Installation Tooling

Metric	Thread Code	HAEGER® Part Number		PEMSERTER® Part Number		Anvil Dimensions (mm)					
		Anvil	Punch	Anvil	Punch	A ±0.08	B ±0.05	C ±0.05	P ±0.025	R ₁ Max.	R ₂ Max.
	M3	H-181-M3L	H-108-0020L	8001678	975200048	3.05	3.81	4.57	0.25	0.08	0.13
M4	H-181-M4L	H-108-0020L	8001677	975200048	4.04	4.95	5.82	0.25	0.08	0.13	
M5	H-181-M5L	H-108-0020L	8001676	975200048	5.08	6.15	7.16	0.25	0.08	0.13	
M6	H-181-M6L	H-108-0020L	8002536	975200048	6.05	7.87	8.79	0.51	0.08	0.13	

Installation Details

- Any contaminations of the sheet or fastener could lead to insufficient material flow movement, leading to a leak point.
- Lubricants on the panel could leave leak paths after they evaporate.
- Installation in the punch side on minimum diameter punched holes is preferred. Punch to die clearance can follow industry standards.
- Ingress protection joint is formed directly after proper installation – no secondary sealing is required.

Performance Data (1) - IFH™, IFHS™ and IFHA™

Metric	Thread Code	Rec. Nut Tightening Torque (N-m) (2)	Type	Test Sheet Thickness & Material	Sheet Hardness HRB	Installation (kN)	Pushout (N)	Torque-out (N-m)	Pull Thru (N)
	M2.5	0.78	IFH	1.6mm Aluminum	29	8.9	465	1.0	2600
		0.48	IFHS	1.6mm Aluminum	29	11.6	465	0.8	1820
		0.84	IFH	1.5mm Steel	59	11.1	740	1.0	2800
		0.48	IFHS	1.5mm Steel	59	13.8	740	0.8	1820
	M3	1.1	IFH	1.6mm Aluminum	29	12.9	600	1.7	3150
		0.81	IFHS	1.6mm Aluminum	29	12.9	600	1.3	2570
		1.4	IFH	1.5mm Steel	59	14.7	820	10.7	3840
		0.77	IFHS	1.5mm Steel	59	14.7	820	1.3	2440
	M3.5	1.6	IFH	1.6mm Aluminum	29	15.6	800	1.7	3780
1.3		IFHS	1.6mm Aluminum	29	15.6	800	1.7	3445	
1.6		IFH	1.5mm Steel	59	22.3	1335	2.8	3780	
1.3		IFHS	1.5mm Steel	59	22.3	1335	2.0	3445	
M4	2.1	IFH	1.6mm Aluminum	29	20	975	2.9	4448	
	1.8	IFHS	1.6mm Aluminum	29	22.3	975	2.9	4180	
	2.7	IFH	1.5mm Steel	59	28.9	1780	4.2	5650	
	2	IFHS	1.5mm Steel	59	26.7	1780	2.9	4775	
M5	3.1	IFH	1.6mm Aluminum	29	24.5	1070	3.5	5170	
	2.5	IFHS	1.6mm Aluminum	29	24.5	1070	3.5	4760	
	3.8	IFH	1.5mm Steel	59	33.4	2000	6.5	6270	
	3.2	IFHS	1.5mm Steel	59	32.5	2000	6.3	6000	
M6	7.3	IFH	2.4mm Aluminum	28	28.9	1660	7.3	10200	
	5.7	IFHS	2.4 Aluminum	28	28.9	1660	7.3	9090	
	8.1	IFH	2.4mm Steel	46	44.5	2560	11.3	11300	
	6.7	IFHS	2.4mm Steel	46	44.5	2560	10.1	10600	

Performance Data (3) - IFHP™

Metric	Thread Code	Rec. Nut Tightening Torque (N-m) (2)	Test Sheet Thickness & Material (4)	Sheet Hardness HRB	Installation (kN)	Pushout (N)	Torque-out (N-m)	Pull Thru (N)
	M3	1.3	2mm Stainless Steel	86	40	2500	1.6	3500
	M4	2.9	1.5mm Stainless Steel	86	50	3000	3.9	6000
	M5	4.4	1.5mm Stainless Steel	86	53	3560	7.35	7320

- (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 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) Tightening torque shown is a theoretical value calculated to induce a load of 75% of minimum axial yield strength of the stud with an assumed K value or nut factor equal to 0.20. In some applications tightening torque may need to be adjusted based on the actual K value.
- (3) Performance values shown are typical for fasteners properly installed using raised ring tooling in good condition. We recommend replacing installation tooling when the height of the "P" falls out of tolerance (see page 4). Reductions in performance may occur as the height of the protrusion wears. Variations in hole preparation, installation force, and sheet material type, thickness, and hardness will affect both performance and tooling life.
- (4) Performance may be reduced for studs installed into thicker sheets.

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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