Self-Clinching Fastener Hole Size Chart

Find required mounting-hole sizes for PEM-style self-clinching nuts and studs, including sheet thickness and edge-distance requirements.

How to Read the Chart

A self-clinching fastener is not selected by thread size alone. The same M4 thread can have different mounting-hole dimensions depending on whether the part is a nut, stud, standoff, locking nut, thin-sheet series, hard-panel series, or stainless-panel series.

COLUMN	MEANING
Thread Size	Internal thread for nuts or external thread for studs
Fastener Series	Exact PEM-style family covered by the row
Hole Size in Sheet	Nominal mounting-hole diameter before installation
Hole Tolerance	Permitted hole-size tolerance
Minimum Sheet Thickness	Minimum panel thickness for the stated shank code
Minimum C/L to Edge	Minimum centerline distance from the mounting hole to a free sheet edge

PEM specifies that self-clinching nuts are installed by placing them in properly sized sheet holes and applying a parallel squeezing force; the surrounding sheet material must be able to cold-flow into the fastener's undercut.

Self-Clinching Nut Chart

PEM S / CLS / SS / CLSS / SP Metric Nut Hole Sizes

This table applies to PEM S, CLS, SS, CLSS, and SP metric self-clinching nut families. The hole diameter is determined by thread size, while the usable panel thickness depends on the selected shank code.

THREAD SIZE	TYPICAL SERIES	HOLE SIZE IN SHEET	HOLE TOLERANCE	SHANK CODE	MIN SHEET THIC
M2 × 0.4	S / CLS / SP	4.22 mm	+0.08 / -0.00 mm	0	0.80 mm
M2 × 0.4	S / CLS / SP	4.22 mm	+0.08 / -0.00 mm	1	1.00 mm
M2 × 0.4	S / CLS / SP	4.22 mm	+0.08 / -0.00 mm	2	1.40 mm
M2.5 × 0.45	S / CLS / SP	4.22 mm	+0.08 / -0.00 mm	0	0.80 mm
M2.5 × 0.45	S / CLS / SP	4.22 mm	+0.08 / -0.00 mm	1	1.00 mm
M2.5 × 0.45	S / CLS / SP	4.22 mm	+0.08 / -0.00 mm	2	1.40 mm
M3 × 0.5	S / CLS / SP	4.22 mm	+0.08 / -0.00 mm	0	0.80 mm
M3 × 0.5	S / CLS / SP	4.22 mm	+0.08 / -0.00 mm	1	1.00 mm
M3 × 0.5	S / CLS / SP	4.22 mm	+0.08 / -0.00 mm	2	1.40 mm
M3.5 × 0.6	S / CLS	4.75 mm	+0.08 / -0.00 mm	0	0.80 mm
M3.5 × 0.6	S / CLS	4.75 mm	+0.08 / -0.00 mm	1	1.00 mm
M3.5 × 0.6	S / CLS	4.75 mm	+0.08 / -0.00 mm	2	1.40 mm
M4 × 0.7	S / CLS / SP	5.41 mm	+0.08 / -0.00 mm	0	0.80 mm
M4 × 0.7	S / CLS / SP	5.41 mm	+0.08 / -0.00 mm	1	1.00 mm
M4 × 0.7	S / CLS / SP	5.41 mm	+0.08 / -0.00 mm	2	1.40 mm
M5 × 0.8	SS / CLSS / SP	6.35 mm	+0.08 / -0.00 mm	0	0.80 mm
M5 × 0.8	SS / CLSS / SP	6.35 mm	+0.08 / -0.00 mm	1	1.00 mm
M5 × 0.8	SS / CLSS / SP	6.35 mm	+0.08 / -0.00 mm	2	1.40 mm
M6 × 1.0	S / CLS / SP	8.75 mm	+0.08 / -0.00 mm	00	0.92 mm
M6 × 1.0	S / CLS / SP	8.75 mm	+0.08 / -0.00 mm	0	1.20 mm
M6 × 1.0	S / CLS / SP	8.75 mm	+0.08 / -0.00 mm	1	1.40 mm
M6 × 1.0	S / CLS / SP	8.75 mm	+0.08 / -0.00 mm	2	2.29 mm
M8 × 1.25	S / CLS / SP	10.50 mm	+0.08 / -0.00 mm	1	1.40 mm
M8 × 1.25	S / CLS / SP	10.50 mm	+0.08 / -0.00 mm	2	2.29 mm
M10 × 1.5	S / CLS / SP	14.00 mm	+0.08 / -0.00 mm	1	2.29 mm
M10 × 1.5	S / CLS / SP	14.00 mm	+0.08 / -0.00 mm	2	3.18 mm
M12 × 1.75	S only	17.00 mm	+0.08 / -0.00 mm	1	3.18 mm

Note: These values are from PEM's metric S/CLS/SS/CLSS/SP nut table. Not every material family is available for every thread size: M3.5 is listed for S/CLS but not SP, while M5 uses SS/CLSS/SP families.

Nut Selection Notes

- **S / SS:** Suitable for steel or aluminum sheets within the stated hardness limit.
- **CLS / CLSS:** Similar function, but intended for softer sheet materials than S / SS.
- **SP:** Designed for compatible stainless-steel panel applications.
- **Shank code matters:** It determines the minimum compatible sheet thickness and must match the actual panel thickness.
- **Do not call out only "M4 PEM nut":** A complete part number includes the fastener family, thread size, shank code, and material/finish.

PEM recommends S/SS nuts for steel or aluminum sheets up to HRB 80 / HB 150, CLS/CLSS nuts for sheets up to HRB 70 / HB 125, and SP nuts for stainless sheets up to HRB 90 / HB 192.

Self-Clinching Stud Chart

PEM FH / FHS / FHA Metric Flush-Head Stud Hole Sizes

This table applies only to PEM FH, FHS, and FHA metric flush-head studs used in compatible steel or aluminum sheets. These studs have a mounting-hole diameter equal to the nominal metric thread size, with a +0.08 mm / -0.00 mm hole tolerance.

THREAD SIZE	FASTENER SERIES	HOLE SIZE IN SHEET	HOLE TOLERANCE	MIN SHEET THICKNESS	MIN
M2.5 × 0.45	FH / FHS / FHA	2.50 mm	+0.08 / -0.00 mm	1.0 mm	5.4 r
M3 × 0.50	FH / FHS / FHA	3.00 mm	+0.08 / -0.00 mm	1.0 mm	5.6 r
M3.5 × 0.60	FH / FHS / FHA	3.50 mm	+0.08 / -0.00 mm	1.0 mm	6.4 r
M4 × 0.70	FH / FHS / FHA	4.00 mm	+0.08 / -0.00 mm	1.0 mm	7.2 r
M5 × 0.80	FH / FHS / FHA	5.00 mm	+0.08 / -0.00 mm	1.0 mm	7.2 r
M6 × 1.00	FH / FHS / FHA	6.00 mm	+0.08 / -0.00 mm	1.6 mm	7.9 r
M8 × 1.25	FH / FHS	8.00 mm	+0.08 / -0.00 mm	2.4 mm	9.6 r

PEM specifies FH/FHS/FHA flush-head studs for steel or aluminum sheets from 1.0 mm thickness for M2.5 through M5, 1.6 mm for M6, and 2.4 mm for M8. Their required minimum centerline-to-edge distance varies by thread size.

Stud Material Notes

SERIES	TYPICAL USE	RECOMMENDED PANEL MATERIAL LIMIT
FH	Standard flush-head stud	Steel or aluminum up to HRB 80 / HB 150
FHS	Corrosion-resistant stainless stud	Steel or aluminum up to HRB 70 / HB 125
FHA	Aluminum stud	Aluminum up to HRB 50 / HB 82

For stainless-steel panels, do not automatically use a standard FH or FHS stud. PEM offers dedicated FH4 and FHP series for compatible stainless-sheet applications, with their own thickness ranges and material requirements.

Why Nut and Stud Hole Sizes Differ

An M4 self-clinching nut and an M4 self-clinching stud do not use the same mounting hole:

FASTENER	EXAMPLE SERIES	M4 HOLE SIZE
Self-clinching nut	S / CLS / SP	5.41 mm
Flush-head self-clinching stud	FH / FHS / FHA	4.00 mm

The nut requires a larger hole because its clinching shank must accommodate the internal thread. The flush-head stud uses a different clinching geometry, so its mounting-hole size follows a different product-family requirement.

Installation Requirements

Prepare the Correct Hole

Punch, laser cut, or machine the mounting hole to the specified diameter and tolerance. An oversized hole can reduce torque-out and push-out performance; an undersized hole can prevent seating, distort the sheet, or damage the fastener during installation.

Do Not Deburr the Clinching Side

Avoid countersinking, chamfering, or aggressive deburring around the clinching side of the hole. These secondary operations remove material that the fastener needs for clinching engagement.

PEM explicitly instructs users to prepare the correctly sized mounting hole and not perform secondary operations such as deburring before installation.

Use Parallel Squeezing Force

Install self-clinching fasteners with a press and suitable punch/anvil tooling. The installation punch and anvil should remain parallel while force is applied until the fastener head seats against the panel.

Select the Correct Shank Code

For self-clinching nuts, select a shank code that suits the actual panel thickness. Choosing too short a shank can reduce joint performance; choosing an incompatible shank can cause poor seating or distortion.

PEM recommends using the maximum suitable shank length for the actual sheet thickness to achieve the best performance.

Edge and Bend Clearance

The listed minimum edge distance is measured from the centerline of the mounting hole to the free edge of the sheet. It is not the distance from the outside of the fastener head to the edge.

For features near bends, do not rely only on the free-edge figure. Consider:

- Bend radius and bend direction
- Material thickness and strain zone
- Press-brake tooling clearance
- Fastener head diameter and installation-tool access
- Nearby hardware, slots, embosses, welds, and formed features
- Whether the fastener is installed before or after bending

DFM rule: Keep self-clinching hardware outside the bend deformation zone whenever possible. If the hardware is close to a bend, request a part-specific DFM review rather than applying a generic clearance value.

Material Compatibility

Carbon Steel and Aluminum Panels

S, SS, CLS, CLSS, FH, FHS, and FHA families may be suitable for steel or aluminum panels when their respective panel-hardness limits are met. The fastener must be harder than the panel material to allow proper clinching.

Stainless-Steel Panels

Stainless sheet requires a compatible fastener family and appropriate panel hardness. For nuts, SP is one PEM option intended for compatible stainless sheets. For studs, PEM lists FH4 and FHP products for stainless sheets; standard FH/FHS/FHA series should not be assumed suitable for every stainless grade or temper.

Galvanic Corrosion

For aluminum enclosures used in humid, marine, or corrosive environments, hardware material and finish must be selected with galvanic compatibility in mind. Stainless hardware can be suitable in many cases, but the entire assembly environment, coating system, and electrical-contact requirement should be evaluated.
