

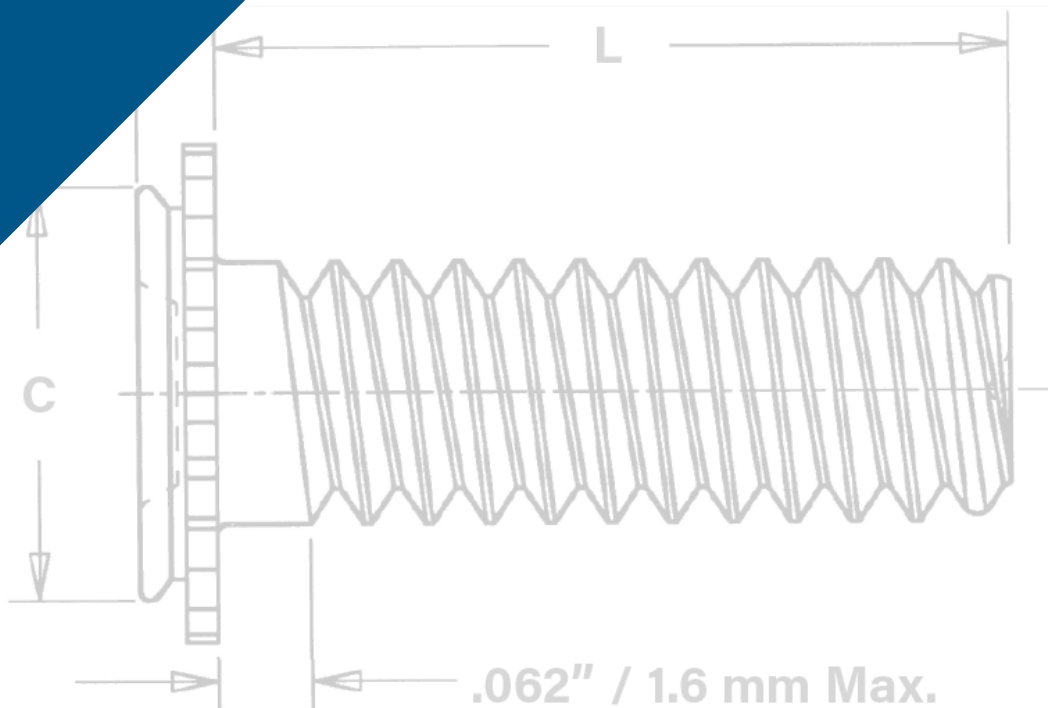


PEM® concealed-head self-clinching studs and standoffs install permanently and promote smooth designs.



**CH™**

**CONCEALED-HEAD  
SELF-CLINCHING  
STUDS AND STANDOFFS**

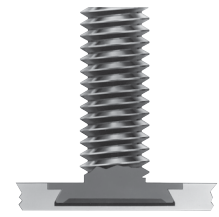


# CONCEALED-HEAD SELF-CLINCHING STUDS AND STANDOFFS

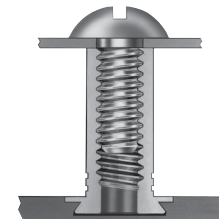
**Concealed-head self-clinching studs and standoffs install permanently and promote smooth designs:**

- Install permanently in steel or aluminum sheets as thin as .062" / 1.6 mm to provide strong and reusable threads for mating hardware in a wide range of assembly applications.
- Allow the side of the sheet opposite installation to remain smooth and unmarred.
- One side installation additionally serves to satisfy strict ingress protection (IP) requirements where the sheet must remain completely sealed from air, liquid, dust, gases or other potentially infiltrating elements.
- Only require a blind milled hole to the recommended size and minimum depth.
- Install using a PEMSERTER® press or other standard press.
- CFHC™ studs can be ordered to NAS63540/4 specifications.<sup>(1)</sup>

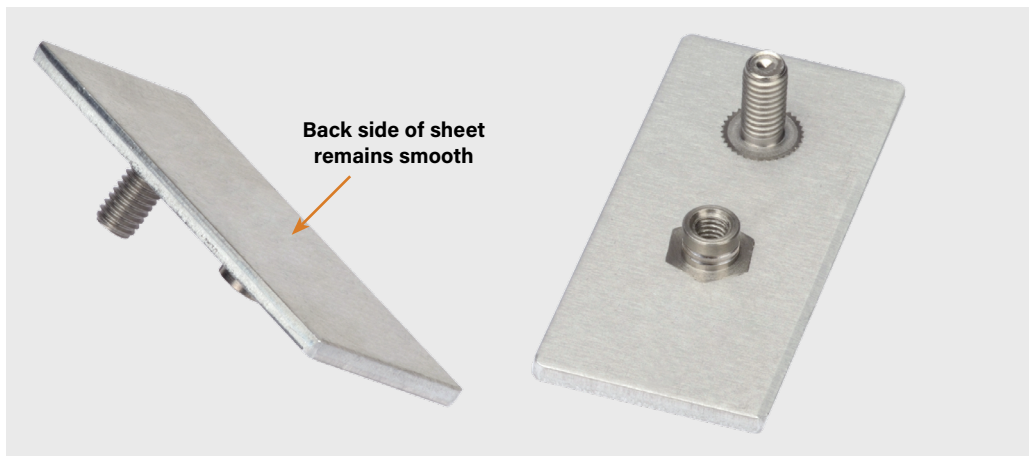
*(1) To meet national aerospace standards and to obtain testing documentation, Type CFHC studs must be ordered using appropriate NAS63540/4 part number. Check our web site for a complete Military Specification and National Aerospace Standards Reference Guide (Bulletin NASM).*



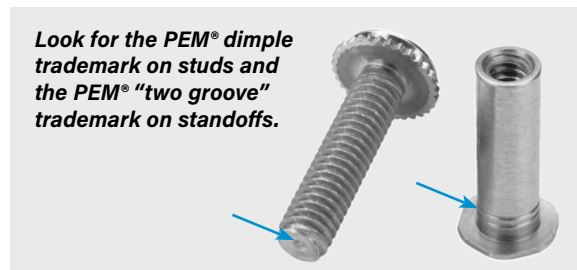
Concealed-head Stud



Concealed-head Standoff



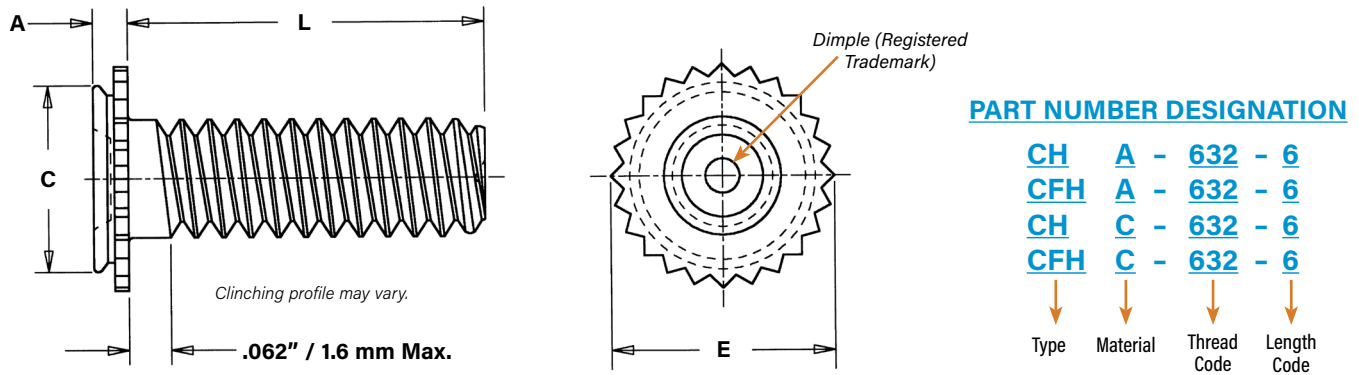
Fastener drawings and models are available at [www.pemnet.com](http://www.pemnet.com)



**Look for the PEM® dimple trademark on studs and the PEM® "two groove" trademark on standoffs.**

# CONCEALED-HEAD SELF-CLINCHING STUDS AND STANDOFFS

## CHA™, CFHA™, CHC™ AND CFHC™ ALUMINUM AND STAINLESS STEEL STUDS



All dimensions are in inches.

| UNIFIED          | Thread Size | Type     |                 | Thread Code | Length Code "L" ±.015<br>(Length code is in 16ths of an inch) |      |      |      |      |      | Min. Sheet Thickness | Blind Mounting Hole Dia. +.003 - .000 | Min. Depth of Blind Hole (1) | A (Shank) Max. | E ±.010 | C Max. | Min. Dist. Hole To Edge | Max. Hole In Attached Parts |
|------------------|-------------|----------|-----------------|-------------|---|------|------|------|------|------|----------------------|---------------------------------------|------------------------------|----------------|---------|--------|-------------------------|-----------------------------|
|                  |             | Aluminum | Stainless Steel |             | .250  | .375 | .500 | .625 | .750 | 1.00 |                      |                                       |                              |                |         |        |                         |                             |
|                  |             |          |                 |             |   |      |      |      |      |      |                      |                                       |                              |                |         |        |                         |                             |
| .112-40 (#4-40)  | CHA         | CHC      | 440             | 4           | 6   | 8    | 10   | 12   | —    | .062 | .172                 | .043                                  | .041                         | .205           | .171    | .156   | .135                    |                             |
|                  | CFHA        | CFHC     |                 | .093        | .075  | .071 |      |      |      |      |                      |                                       |                              |                |         |        |                         |                             |
| .138-32 (#6-32)  | CHA         | CHC      | 632             | 4           | 6   | 8    | 10   | 12   | 16   | .062 | .213                 | .043                                  | .041                         | .250           | .212    | .188   | .160                    |                             |
|                  | CFHA        | CFHC     |                 | .093        | .075  | .071 |      |      |      |      |                      |                                       |                              |                |         |        |                         |                             |
| .164-32 (#8-32)  | CHA         | CHC      | 832             | 4           | 6   | 8    | 10   | 12   | 16   | .062 | .290                 | .043                                  | .041                         | .328           | .289    | .219   | .185                    |                             |
|                  | CFHA        | CFHC     |                 | .093        | .075  | .071 |      |      |      |      |                      |                                       |                              |                |         |        |                         |                             |
| .190-32 (#10-32) | CHA         | CHC      | 032             | —           | 6   | 8    | 10   | 12   | 16   | .062 | .312                 | .043                                  | .041                         | .350           | .311    | .250   | .210                    |                             |
|                  | CFHA        | CFHC     |                 | .093        | .075  | .071 |      |      |      |      |                      |                                       |                              |                |         |        |                         |                             |

All dimensions are in millimeters.

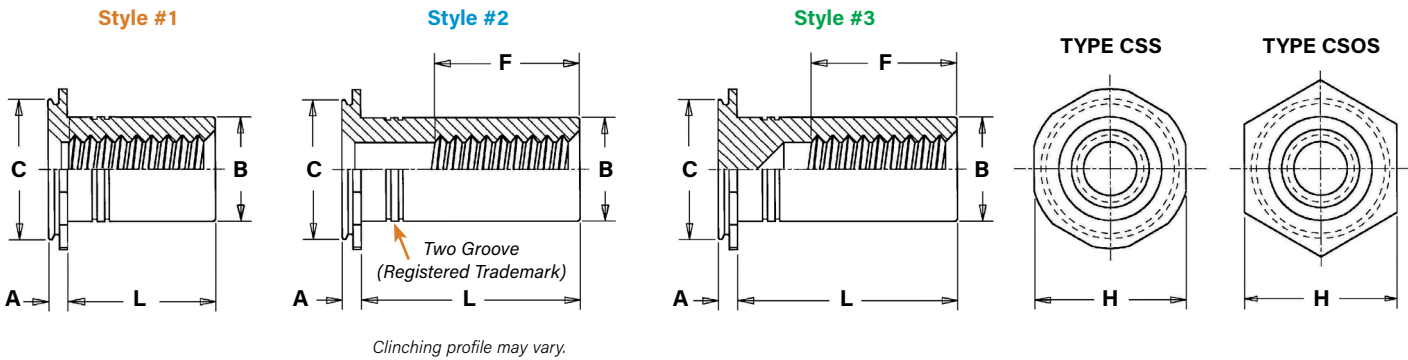
| METRIC   | Thread Size x Pitch | Type     |                 | Thread Code | Length Code "L" ±0.4<br>(Length code is in millimeters) |     |    |    |    |    | Min. Sheet Thickness | Blind Mounting Hole Dia. +0.08 | Min. Depth of Blind Hole (1) | A (Shank) Max. | E ±0.25 | C Max. | Min. Dist. Hole To Edge | Max. Hole In Attached Parts |    |
|----------|---------------------|----------|-----------------|-------------|---|-----|----|----|----|----|----------------------|--------------------------------|------------------------------|----------------|---------|--------|-------------------------|-----------------------------|----|
|          |                     | Aluminum | Stainless Steel |             | 6   | 8   | 10 | 12 | 16 | 20 |                      |                                |                              |                |         |        |                         |                             | 25 |
|          |                     |          |                 |             |   |     |    |    |    |    |                      |                                |                              |                |         |        |                         |                             |    |
| M3 x 0.5 | CHA                 | CHC      | M3              | 6           | 8   | 10  | 12 | 16 | 20 | —  | 1.6                  | 4.37                           | 1.1                          | 1.04           | 5.21    | 4.35   | 4                       | 3.6                         |    |
|          | CFHA                | CFHC     |                 | 2.4         | 1.91  | 1.8 |    |    |    |    |                      |                                |                              |                |         |        |                         |                             |    |
| M4 x 0.7 | CHA                 | CHC      | M4              | 6           | 8   | 10  | 12 | 16 | 20 | 25 | 1.6                  | 7.37                           | 1.1                          | 1.04           | 8.33    | 7.35   | 5.6                     | 4.6                         |    |
|          | CFHA                | CFHC     |                 | 2.4         | 1.91  | 1.8 |    |    |    |    |                      |                                |                              |                |         |        |                         |                             |    |
| M5 x 0.8 | CHA                 | CHC      | M5              | —           | —   | 10  | 12 | 16 | 20 | 25 | 1.6                  | 7.93                           | 1.1                          | 1.04           | 8.89    | 7.9    | 6.4                     | 5.6                         |    |
|          | CFHA                | CFHC     |                 | 2.4         | 1.91  | 1.8 |    |    |    |    |                      |                                |                              |                |         |        |                         |                             |    |

(1) Blind holes may be deeper than minimums except where sheet material is at or near minimum thickness. Fasteners should always be installed so the flange is flush with the surface of the sheet.



# CONCEALED-HEAD SELF-CLINCHING STUDS AND STANDOFFS

## CSS™ AND CSOS™ STAINLESS STEEL STANDOFFS



All dimensions are in inches.

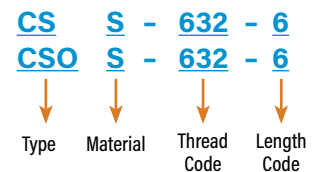
| UNIFIED          | Thread Size | Type            | Thread Code      | Length Code "L" +.002 -.005<br>(Length code is in 16ths of an inch) |                  |                  |                  |                   |                   |                   | Min. Sheet Thickness | Blind Mounting Hole Dia. +.003 -.000 | Min. Depth of Blind Hole (4) | Min. Depth Full Thread F | A (Shank) Max. | B Max. (5) | C Max. | H Nom. | Min. Dist. Hole $\varnothing$ To Edge |
|------------------|-------------|-----------------|------------------|---|------------------|------------------|------------------|-------------------|-------------------|-------------------|----------------------|--------------------------------------|------------------------------|--------------------------|----------------|------------|--------|--------|---------------------------------------|
|                  |             | Stainless Steel |                  |   |                  |                  |                  |                   |                   |                   |                      |                                      |                              |                          |                |            |        |        |                                       |
|                  | .187        | .250            | .312             | .375  | .500             | .625             | .750             | 1.00              |                   |                   |                      |                                      |                              |                          |                |            |        |        |                                       |
| .112-40 (#4-40)  | CSS         | 440             | 3 <sup>(1)</sup> | 4 <sup>(2)</sup>  | 5 <sup>(2)</sup> | 6 <sup>(2)</sup> | 8 <sup>(3)</sup> | 10 <sup>(3)</sup> | 12 <sup>(3)</sup> | 16 <sup>(3)</sup> | .062                 | .213                                 | .043                         | .188                     | .041           | .165       | .212   | .250   | .188                                  |
|                  | CSOS        |                 | .093             | .075  | .072             |                  |                  |                   |                   |                   |                      |                                      |                              |                          |                |            |        |        |                                       |
| .138-32 (#6-32)  | CSS         | 632             | 3 <sup>(1)</sup> | 4 <sup>(1)</sup>  | 5 <sup>(2)</sup> | 6 <sup>(2)</sup> | 8 <sup>(3)</sup> | 10 <sup>(3)</sup> | 12 <sup>(3)</sup> | 16 <sup>(3)</sup> | .062                 | .290                                 | .043                         | .250                     | .041           | .213       | .289   | .312   | .219                                  |
|                  | CSOS        |                 | .093             | .075  | .072             |                  |                  |                   |                   |                   |                      |                                      |                              |                          |                |            |        |        |                                       |
| .164-32 (#8-32)  | CSS         | 832             | 3 <sup>(1)</sup> | 4 <sup>(1)</sup>  | 5 <sup>(2)</sup> | 6 <sup>(2)</sup> | 8 <sup>(3)</sup> | 10 <sup>(3)</sup> | 12 <sup>(3)</sup> | 16 <sup>(3)</sup> | .062                 | .312                                 | .043                         | .250                     | .041           | .245       | .311   | .344   | .250                                  |
|                  | CSOS        |                 | .093             | .075  | .072             |                  |                  |                   |                   |                   |                      |                                      |                              |                          |                |            |        |        |                                       |
| .190-32 (#10-32) | CSS         | 032             | 3 <sup>(1)</sup> | 4 <sup>(1)</sup>  | 5 <sup>(1)</sup> | 6 <sup>(1)</sup> | 8 <sup>(2)</sup> | 10 <sup>(3)</sup> | 12 <sup>(3)</sup> | 16 <sup>(3)</sup> | .062                 | .344                                 | .043                         | .375                     | .041           | .290       | .343   | .375   | .281                                  |
|                  | CSOS        |                 | .093             | .075  | .072             |                  |                  |                   |                   |                   |                      |                                      |                              |                          |                |            |        |        |                                       |
| .250-20 (1/4-20) | CSS         | 0420            | 3 <sup>(1)</sup> | 4 <sup>(1)</sup>  | 5 <sup>(1)</sup> | 6 <sup>(1)</sup> | 8 <sup>(2)</sup> | 10 <sup>(2)</sup> | 12 <sup>(3)</sup> | 16 <sup>(3)</sup> | .062                 | .390                                 | .043                         | .375                     | .041           | .354       | .389   | .438   | .375                                  |
|                  | CSOS        |                 | .093             | .075  | .072             |                  |                  |                   |                   |                   |                      |                                      |                              |                          |                |            |        |        |                                       |

All dimensions are in millimeters.

| METRIC   | Thread Size x Pitch | Type             | Thread Code      | Length Code "L" +0.05 -0.13<br>(Length code is in millimeters) |                   |                   |                   |                   |                   |                   | Min. Sheet Thickness | Blind Mounting Hole Diameter +0.08 | Min. Depth of Blind Hole (4) | Min. Depth Full Thread F | A (Shank) Max. | B Max. (5) | C Max. | H Nom. | Min. Dist. Hole $\varnothing$ To Edge |
|----------|---------------------|------------------|------------------|--|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------------|------------------------------------|------------------------------|--------------------------|----------------|------------|--------|--------|---------------------------------------|
|          |                     | Stainless Steel  |                  |  |                   |                   |                   |                   |                   |                   |                      |                                    |                              |                          |                |            |        |        |                                       |
|          | 4 <sup>(1)</sup>    | 6 <sup>(1)</sup> | 8 <sup>(2)</sup> | 10 <sup>(3)</sup>  | 12 <sup>(3)</sup> | 16 <sup>(3)</sup> | 20 <sup>(3)</sup> | 25 <sup>(3)</sup> |                   |                   |                      |                                    |                              |                          |                |            |        |        |                                       |
| M3 x 0.5 | CSS                 | M3               | 4 <sup>(1)</sup> | 6 <sup>(1)</sup>   | 8 <sup>(2)</sup>  | 10 <sup>(3)</sup> | 12 <sup>(3)</sup> | 16 <sup>(3)</sup> | 20 <sup>(3)</sup> | 25 <sup>(3)</sup> | 1.6                  | 5.41                               | 1.1                          | 5                        | 1.04           | 4.2        | 5.39   | 6.35   | 4.8                                   |
|          | CSOS                |                  | 2.4              | 1.91   | 1.83              |                   |                   |                   |                   |                   |                      |                                    |                              |                          |                |            |        |        |                                       |
| M4 x 0.7 | CSS                 | M4               | 4 <sup>(1)</sup> | 6 <sup>(1)</sup>   | 8 <sup>(2)</sup>  | 10 <sup>(2)</sup> | 12 <sup>(3)</sup> | 16 <sup>(3)</sup> | 20 <sup>(3)</sup> | 25 <sup>(3)</sup> | 1.6                  | 7.92                               | 1.1                          | 6.5                      | 1.04           | 6.23       | 7.9    | 8.74   | 6.4                                   |
|          | CSOS                |                  | 2.4              | 1.91   | 1.83              |                   |                   |                   |                   |                   |                      |                                    |                              |                          |                |            |        |        |                                       |
| M5 x 0.8 | CSS                 | M5               | 4 <sup>(1)</sup> | 6 <sup>(1)</sup>   | 8 <sup>(1)</sup>  | 10 <sup>(2)</sup> | 12 <sup>(2)</sup> | 16 <sup>(3)</sup> | 20 <sup>(3)</sup> | 25 <sup>(3)</sup> | 1.6                  | 8.74                               | 1.1                          | 9.6                      | 1.04           | 7.37       | 8.72   | 9.53   | 7.2                                   |
|          | CSOS                |                  | 2.4              | 1.91   | 1.83              |                   |                   |                   |                   |                   |                      |                                    |                              |                          |                |            |        |        |                                       |
| M6 x 1   | CSOS                | M6               | 4 <sup>(1)</sup> | 6 <sup>(1)</sup>   | 8 <sup>(1)</sup>  | 10 <sup>(2)</sup> | 12 <sup>(2)</sup> | 16 <sup>(3)</sup> | 20 <sup>(3)</sup> | 25 <sup>(3)</sup> | 2.4                  | 9.9                                | 1.91                         | 9.6                      | 1.83           | 9          | 9.89   | 11.11  | 9.5                                   |

- Style #1.** Minimum thread length is equal to barrel length "L". Screw might not pass through shank end. Screws with lengths exceeding "L" should not be used or they may cause "jacking-out" of standoff from the sheet.
- Style #2.** Screw might not pass through unthreaded end. Screws with lengths exceeding "L" should not be used or they may cause "jacking-out" of standoff from the sheet.
- Style #3.** Blind.
- Blind mounting holes may be deeper than minimums except where sheet material is at or near minimum thickness. Fasteners should always be installed so the flange is flush with the surface of the sheet.
- If standoff is used as a bushing, the hole in attached part must not exceed "B" plus .020" / 0.51 mm.

### PART NUMBER DESIGNATION



# CONCEALED-HEAD SELF-CLINCHING STUDS AND STANDOFFS

## MATERIAL AND FINISH SPECIFICATIONS

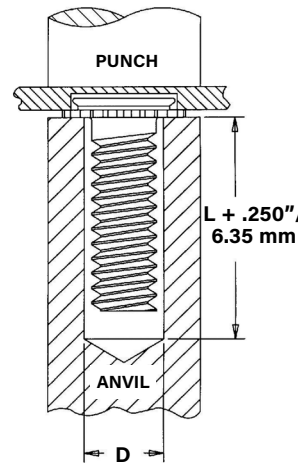
| Type | Threads                                  |  | Fastener Materials |                            | Finish    |  | For Use In Sheet Hardness (1) |                        |
|------|--|--|--------------------|----------------------------|-----------|--|-------------------------------|------------------------|
|      | External, ASME B1.1 2A / ASME B1.13M, 6g | Internal, ASME B1.1 2B / ASME B1.13M, 6H | Aluminum           | 300 Series Stainless Steel | No Finish | Passivated and/or tested per ASTM A380 | HRB 70 / HB 125 or Less       | HRB 50 / HB 89 or Less |
| CHA  | ■  |  | ■                  |                            | ■         |  |                               | ■                      |
| CFHA | ■  |  | ■                  |                            | ■         |  |                               | ■                      |
| CHC  | ■  |  |                    | ■                          |           | ■                                      | ■                             |                        |
| CFHC | ■  |  |                    | ■                          |           | ■                                      | ■                             |                        |
| CSS  |  | ■  |                    | ■                          |           | ■                                      | ■                             |                        |
| CSOS |  | ■  |                    | ■                          |           | ■                                      | ■                             |                        |

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

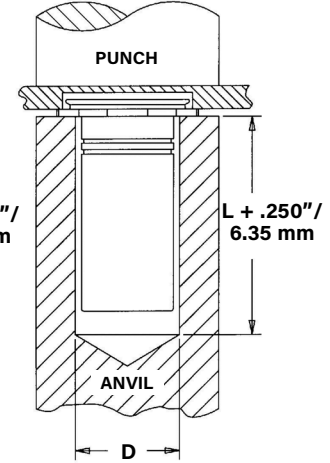
## INSTALLATION

1. Mill a round blind hole to the correct minimum depth. End mills available from PennEngineering. See chart.
2. Place fastener into anvil hole.
3. Place the mounting hole over the shank of the fastener.
4. With punch and anvil surfaces parallel, apply squeezing force until the flange is flush with the mounting sheet.

CFHA, CFHC, CHC, CHA  
Concealed-head studs



CSOS, CSS  
Concealed-head standoffs



## Installation Tooling

| UNIFIED                 | Type                    | Thread Code    | HAEGER® Part Number |              | PEMSERTER® Part Number |           | D<br>+.003 -.000 |
|-------------------------|-------------------------|----------------|---------------------|--------------|------------------------|-----------|------------------|
|                         |                         |                | Anvil               | Punch        | Anvil                  | Punch     |                  |
|                         | CHA / CHC / CFHA / CFHC | 440            | H-103-4L            | H-108-0020L  | 970200006300           | 975200048 | .127             |
| CHA / CHC / CFHA / CFHC | 632                     | H-103-6L       | H-108-0020L         | 970200007300 | 975200048              | .139      |                  |
| CHA / CHC / CFHA / CFHC | 832                     | H-103-8L       | H-108-0020L         | 970200008300 | 975200048              | .179      |                  |
| CHA / CHC / CFHA / CFHC | 032                     | H-103-10       | H-108-0020L         | 970200009300 | 975200048              | .205      |                  |
| CSS / CSOS              | 440                     | H-109-4/M3L    | H-108-0020L         | 970200014300 | 975200048              | .170      |                  |
| CSS / CSOS              | 632                     | H-109-6/M3.5L  | H-108-0020L         | 970200015300 | 975200048              | .218      |                  |
| CSS / CSOS              | 832                     | H-109-8-10/M5L | H-108-0020L         | 970200016300 | 975200048              | .250      |                  |
| CSS / CSOS              | 032                     | H-109-8-10/M5L | H-108-0020L         | 970200017300 | 975200048              | .295      |                  |
| CSS / CSOS              | 0420                    | —              | —                   | 970200018300 | 975200048              | .358      |                  |

| METRIC                  | Type                    | Thread Code    | HAEGER® Part Number |              | PEMSERTER® Part Number |           | D<br>+0.08 |
|-------------------------|-------------------------|----------------|---------------------|--------------|------------------------|-----------|------------|
|                         |                         |                | Anvil               | Punch        | Anvil                  | Punch     |            |
|                         | CHA / CHC / CFHA / CFHC | M3             | H-103-3L            | H-108-0020L  | 970200229300           | 975200048 | 3.4        |
| CHA / CHC / CFHA / CFHC | M4                      | H-103-4L       | H-108-0020L         | 970200019300 | 975200048              | 4.4       |            |
| CHA / CHC / CFHA / CFHC | M5                      | H-103-5L       | H-108-0020L         | 970200020300 | 975200048              | 5.4       |            |
| CSS / CSOS              | M3                      | H-109-4-M3L    | H-108-0020L         | 970200014300 | 975200048              | 4.33      |            |
| CSS / CSOS              | M4                      | H-109-8-10/M5L | H-108-0020L         | 970200016300 | 975200048              | 6.36      |            |
| CSS / CSOS              | M5                      | H-109-8-10/M5L | H-108-0020L         | 970200017300 | 975200048              | 7.5       |            |
| CSS / CSOS              | M6                      | —              | —                   | 970200018300 | 975200048              | 9.13      |            |

## 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.



# CONCEALED-HEAD SELF-CLINCHING STUDS AND STANDOFFS

## END MILL INFORMATION

Double-ended, two-flute H.S.S. center-cutting end mills are available from stock.

PennEngineering does not manufacture center-cutting end mills, but we do keep a supply in stock for your convenience.



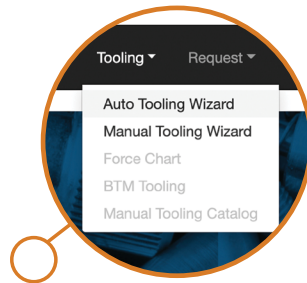
| Thread Code | Fastener Type              | Required Size End Mill | PEM Part No. |
|-------------|----------------------------|------------------------|--------------|
| 440, M3     | CFHC, CHC, CFHA, CHA Studs | .172"                  | CHM-172      |
|             | CSOS, CSS Standoffs        | .213"                  | CHM-213      |
| 632         | CFHC, CHC, CFHA, CHA Studs | .213"                  | CHM-213      |
|             | CSOS, CSS Standoffs        | .290"                  | CHM-290      |
| 832, M4     | CFHC, CHC, CFHA, CHA Studs | .290"                  | CHM-290      |
|             | CSOS, CSS Standoffs        | .312"                  | CHM-312      |
| 032, M5     | CFHC, CHC, CFHA, CHA Studs | .312"                  | CHM-312      |
|             | CSOS, CSS Standoffs        | .344"                  | CHM-344      |
| 0420, M6    | CSOS Standoffs             | .390"                  | CHM-390      |

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

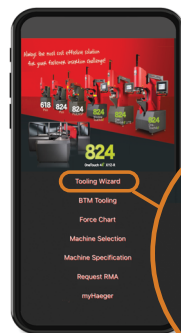


HAEGER® MANUAL TOOLING CATALOG

HAEGER® AUTO TOOLING CATALOG



Go to [haeger.com](http://haeger.com) to access the Auto and Manual Tooling Wizards



Or download the HAEGER WIZZARD Phone App

Tooling Wizard

BTM Tooling



PEMSERTER® MANUAL TOOLING CATALOG

PEMSERTER® AUTO TOOLING CATALOG

# CONCEALED-HEAD SELF-CLINCHING STUDS AND STANDOFFS

## PERFORMANCE DATA<sup>(1)</sup>

| Type                            | Thread Code | Max. Tightening Torque Ref. (in. lbs.) | Test Sheet Material |                |                     |                |
|---------------------------------|-------------|--|---------------------|----------------|---------------------|----------------|
|                                 |             |  | Cold-rolled Steel   |                | 5052-H34 Aluminum   |                |
|                                 |             |  | Installation (lbs.) | Pullout (lbs.) | Installation (lbs.) | Pullout (lbs.) |
| <b>Concealed-head Standoffs</b> |             |  |                     |                |                     |                |
| CSS                             | 440         | 4.75                                   | 4,000               | 300            | 2,800               | 200            |
|                                 | 632         | 8.75                                   | 4,500               | 350            | 3,000               | 240            |
|                                 | 832         | 18                                     | 4,800               | 400            | 4,000               | 270            |
|                                 | 032         | 32                                     | 5,500               | 450            | 5,000               | 290            |
| CSOS                            | 440         | 4.75                                   | 4,300               | 330            | 2,900               | 220            |
|                                 | 632         | 8.75                                   | 5,000               | 360            | 3,200               | 240            |
|                                 | 832         | 18                                     | 5,300               | 440            | 4,000               | 300            |
|                                 | 032         | 32                                     | 6,000               | 600            | 5,000               | 400            |
|                                 | 0420        | 64                                     | 6,500               | 650            | 5,500               | 430            |
| <b>Concealed-head Studs</b>     |             |  |                     |                |                     |                |
| CHC                             | 440         | 4.75                                   | 1,800               | 240            | 1,400               | 130            |
|                                 | 632         | 8.75                                   | 2,500               | 260            | 1,800               | 160            |
|                                 | 832         | 18                                     | 4,000               | 270            | 2,800               | 180            |
|                                 | 032         | 32                                     | 5,000               | 290            | 4,000               | 210            |
| CFHC                            | 440         | 4.75                                   | 2,000               | 240            | 1,500               | 200            |
|                                 | 632         | 8.75                                   | 2,700               | 350            | 2,500               | 260            |
|                                 | 832         | 18                                     | 3,300               | 440            | 3,000               | 310            |
|                                 | 032         | 32                                     | 4,000               | 680            | 3,500               | 360            |
| CHA                             | 440         | 2.85                                   | (2)                 | (2)            | 1,400               | 125            |
|                                 | 632         | 5.4                                    | (2)                 | (2)            | 1,800               | 135            |
|                                 | 832         | 10.8                                   | (2)                 | (2)            | 2,800               | 145            |
|                                 | 032         | 19.2                                   | (2)                 | (2)            | 4,000               | 170            |
| CFHA                            | 440         | 2.85                                   | (2)                 | (2)            | 1,500               | 190            |
|                                 | 632         | 5.4                                    | (2)                 | (2)            | 2,500               | 220            |
|                                 | 832         | 10.8                                   | (2)                 | (2)            | 3,000               | 240            |
|                                 | 032         | 19.2                                   | (2)                 | (2)            | 3,500               | 300            |

| Type                            | Thread Code | Max. Tightening Torque Ref. (N-m) | Test Sheet Material |             |                   |             |
|---------------------------------|-------------|-----------------------------------|---------------------|-------------|-------------------|-------------|
|                                 |             |                                   | Cold-rolled steel   |             | 5052-H34 Aluminum |             |
|                                 |             |                                   | Installation (kN)   | Pullout (N) | Installation (kN) | Pullout (N) |
| <b>Concealed-head Standoffs</b> |             |                                   |                     |             |                   |             |
| CSS                             | M3          | 0.55                              | 17.8                | 1330        | 12.5              | 890         |
|                                 | M4          | 2                                 | 21.3                | 1775        | 17.8              | 1200        |
|                                 | M5          | 3.6                               | 24.5                | 2000        | 22.2              | 1290        |
| CSOS                            | M3          | .55                               | 19.2                | 1465        | 12.9              | 975         |
|                                 | M4          | 2                                 | 23.6                | 1955        | 17.8              | 1335        |
|                                 | M5          | 3.6                               | 26.7                | 2665        | 22.2              | 1775        |
|                                 | M6          | 7.2                               | 28.9                | 2860        | 24.4              | 1915        |
| <b>Concealed-head Studs</b>     |             |                                   |                     |             |                   |             |
| CHC                             | M3          | 0.55                              | 8                   | 1065        | 6.2               | 575         |
|                                 | M4          | 2                                 | 17.8                | 1200        | 12.5              | 800         |
|                                 | M5          | 3.6                               | 22.2                | 1290        | 17.8              | 930         |
| CFHC                            | M3          | 0.55                              | 8.9                 | 1065        | 6.7               | 890         |
|                                 | M4          | 2                                 | 14.7                | 1955        | 13.3              | 1375        |
|                                 | M5          | 3.6                               | 17.8                | 3020        | 15.6              | 1600        |
| CHA                             | M3          | 0.3                               | (2)                 | (2)         | 6.2               | 555         |
|                                 | M4          | 1.2                               | (2)                 | (2)         | 12.5              | 645         |
|                                 | M5          | 2.16                              | (2)                 | (2)         | 17.8              | 755         |
| CFHA                            | M3          | 0.3                               | (2)                 | (2)         | 6.7               | 845         |
|                                 | M4          | 1.2                               | (2)                 | (2)         | 13.3              | 1065        |
|                                 | M5          | 2.16                              | (2)                 | (2)         | 15.6              | 1330        |

- (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) Not recommended.



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