

High-Strength Self-Clinching Studs

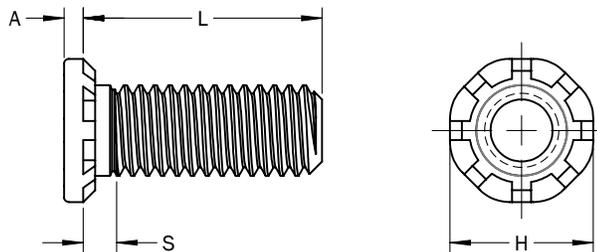
FEATURES

- Provide permanent high-strength male threads in sheets as thin as .050" (1.30 mm).
- Ribbed self-clinching design creates robust push-out and torque-out resistance.
- Available in a variety of materials including phosphor bronze which support electrical connections in copper sheets.



PART DESCRIPTION EXAMPLE

SDST — 1032 — 1.250 — Z
 T T T T
 Material Thread Length Finish
 Code Code Code Code



GENERAL

All dimensions in inches

| INCH | Thread | Thread Code | Sheet | | | Maximum Hole Size in Attached Parts | H ±.010 | S Max. (1) | T Max. |
|------|---------|-------------|-------------------|------------------------|--------------------------------------|-------------------------------------|---------|------------|--------|
| | | | Minimum Thickness | Hole Size +.005 -0.000 | Minimum Distance Hole Center to Edge | | | | |
| | 10-32 | 1032 | .050 | .190 | .415 | .252 | .300 | .105 | .040 |
| | 1/4-20 | 2520 | .060 | .250 | .460 | .312 | .380 | .125 | .050 |
| | 5/16-18 | 3118 | .075 | .312 | .500 | .374 | .480 | .140 | .070 |
| | 3/8-16 | 3716 | .090 | .375 | .530 | .437 | .580 | .155 | .085 |

All dimensions in millimeters

| METRIC | Thread | Thread Code | Sheet | | | Maximum Hole Size in Attached Parts | H ±0.25 | S Max. (1) | T Max. |
|--------|-----------|-------------|-------------------|-----------------------|--------------------------------------|-------------------------------------|---------|------------|--------|
| | | | Minimum Thickness | Hole Size +0.13 -0.00 | Minimum Distance Hole Center to Edge | | | | |
| | M5 x 0.8 | M5 | 1.30 | 5.00 | 10.70 | 6.40 | 7.80 | 2.70 | 1.14 |
| | M6 x 1 | M6 | 1.50 | 6.00 | 11.50 | 7.50 | 9.40 | 2.80 | 1.27 |
| | M8 x 1.25 | M8 | 2.00 | 8.00 | 12.70 | 9.50 | 12.50 | 3.50 | 1.78 |
| | M10 x 1.5 | M10 | 2.30 | 10.00 | 13.70 | 11.50 | 15.70 | 4.10 | 2.29 |

(1) Threads are gageable to within 2 pitches of the "S Max." dimension. A class 3B/5H maximum material commercial nut shall pass up to the "S Max." dimension.

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LENGTH

All dimensions in inches

| INCH | Thread Code | L (Length) ± .015 | | | | | | |
|------|-------------|-------------------|------|-------|-------|-------|-------|-------|
| | 1032 | .500 | .750 | 1.000 | 1.250 | 1.500 | 1.750 | 2.000 |
| | 2520 | .500 | .750 | 1.000 | 1.250 | 1.500 | 1.750 | 2.000 |
| | 3118 | .500 | .750 | 1.000 | 1.250 | 1.500 | 1.750 | 2.000 |
| | 3716 | - | .750 | 1.000 | 1.250 | 1.500 | 1.750 | 2.000 |

All dimensions in millimeters

| METRIC | Thread Code | L (Length) ± 0.40 | | | | | | |
|--------|-------------|-------------------|----|----|----|----|----|----|
| | M5 | 15 | 20 | 25 | 30 | 35 | 40 | 50 |
| | M6 | 15 | 20 | 25 | 30 | 35 | 40 | 50 |
| | M8 | 15 | 20 | 25 | 30 | 35 | 40 | 50 |
| | M10 | 15 | 20 | 25 | 30 | 35 | 40 | 50 |

MATERIAL AND FINISH

| Material Code | Material Description | Finish Code | Finish Description | For Use in Sheet Hardness (1) | | |
|---------------|----------------------------|-------------|---|-------------------------------|-------------|-------------|
| | | | | HRB 55 Max. | HRB 70 Max. | HRB 85 Max. |
| PB | CDA 510 Phosphor Bronze | PLN | Plain (2) | • | | |
| SS | 300-Series Stainless Steel | P | Passivated and/or tested per ASTM A967 | | • | |
| ST | Heat Treated Carbon Steel | Z | Zinc (SC1) with Type III Clear Chromate per ASTM B633 | | | • |

- (1) Studs with material codes ST and SS are recommended for use in aluminum and carbon steel sheets, while studs with PB material code are recommended for use in copper sheets.
- (2) Phosphor bronze studs with plain finish may be special ordered with smaller pitch diameters to allow for post-plating.

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INSTALLATION

1. Prepare correct sized mounting hole in sheet. Do not deburr edges.
2. Insert stud through punch side of hole in sheet and into the anvil as shown.
3. Squeeze the sheet and stud head between parallel anvil and punch surfaces. Use only enough pressure to embed the stud head ribs into the sheet and make punch-sheet contact. Anvils and punches should be made from hardened tool steel.

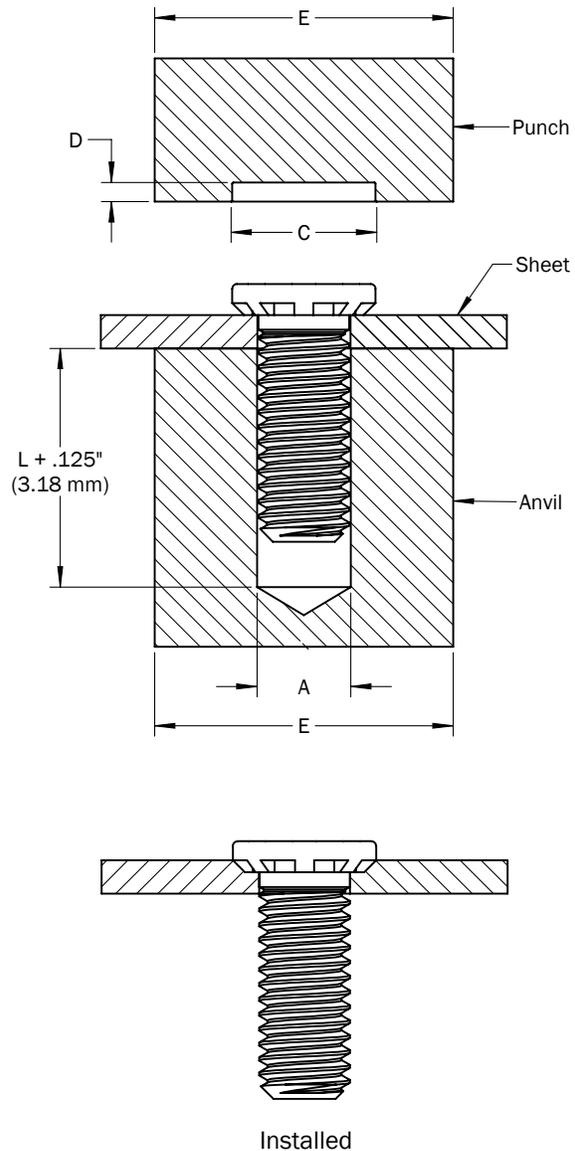
ANVIL AND PUNCH DIMENSIONS

| INCH | Thread Code | A | C | D | E |
|------|-------------|-------------|-----------|-----------|------|
| | 1032 | .194/.191 | .325/.315 | .036/.035 | .625 |
| | 2520 | .253/.250 | .405/.395 | .046/.045 | .750 |
| | 3118 | .3155/.3125 | .505/.495 | .064/.063 | .750 |
| | 3716 | .378/.375 | .605/.595 | .078/.077 | .938 |

All dimensions in inches

| METRIC | Thread Code | A | C | D | E |
|--------|-------------|-------------|-------------|-----------|-------|
| | M5 | 5.11/5.03 | 8.40/8.20 | 0.96/0.94 | 15.88 |
| | M6 | 6.11/6.03 | 10.00/9.80 | 1.16/1.14 | 19.00 |
| | M8 | 8.11/8.03 | 13.10/12.90 | 1.64/1.62 | 19.00 |
| | M10 | 10.11/10.03 | 16.30/16.10 | 2.12/2.10 | 23.80 |

All dimensions in millimeters



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PERFORMANCE

| | Thread Code | Stud Material Code | Recommended Nut Tightening Torque (in-lbs) (1) | Tensile Strength (psi, Min.) | Test Sheet | | | Installation (lbs) | Push-out (lbs) (2) | Torque-out (in-lbs) (2) |
|--------------|-------------|--------------------|--|------------------------------|----------------|----------------|----------------|--------------------|--------------------|-------------------------|
| | | | | | Material | Thickness (in) | Hardness (HRB) | | | |
| INCH | 1032 | PB | – | 60000 | CDA 110 Copper | .060-.070 | 25-35 | 2900-3900 | 130-175 | 2.5-3.3 |
| | | SS | 31.7 | 75000 | Aluminum | .050-.060 | 35-45 | 2550-3450 | 155-205 | 3.4-4.6 |
| | | | | | Carbon Steel | .055-.065 | 50-60 | 3850-5200 | 275-375 | 3.4-4.6 |
| | | ST | 36.0 | 120000 | Aluminum | .060-.070 | 35-45 | 2550-3450 | 155-205 | 3.4-4.6 |
| | | | | | Carbon Steel | .060-.070 | 60-70 | 5100-6900 | 320-430 | 4.3-5.8 |
| | | 2520 | PB | – | 60000 | CDA 110 Copper | .060-.070 | 25-35 | 5100-6900 | 325-435 |
| | SS | | 75.2 | 75000 | Aluminum | .060-.070 | 30-40 | 3400-4600 | 240-330 | 6.8-9.2 |
| | | | | | Carbon Steel | .070-.080 | 40-50 | 5550-7450 | 410-550 | 6.8-9.2 |
| | ST | | 76.0 | 120000 | Aluminum | .060-.070 | 40-50 | 4700-6300 | 240-330 | 9.3-13 |
| | | | | | Carbon Steel | .060-.070 | 55-65 | 5950-8050 | 410-550 | 9.3-13 |
| | 3118 | | PB | – | 60000 | CDA 110 Copper | .125-.135 | 30-40 | 6400-8650 | 425-575 |
| | | SS | 132 | 75000 | Aluminum | .085-.095 | 35-45 | 4700-6300 | 325-435 | 13-17 |
| Carbon Steel | | | | | .095-.105 | 40-50 | 6400-8650 | 500-680 | 13-17 | |
| ST | | 155 | 120000 | Aluminum | .090-.100 | 35-45 | 6800-9200 | 325-435 | 19-25 | |
| | | | | Carbon Steel | .090-.100 | 55-65 | 8500-11500 | 500-680 | 19-25 | |
| 3716 | | PB | – | 60000 | CDA 110 Copper | .125-.135 | 30-40 | 10200-13800 | 475-645 | 15-21 |
| | SS | 236 | 75000 | Aluminum | .120-.130 | 40-50 | 8500-11500 | 475-645 | 21-29 | |
| | | | | Carbon Steel | .095-.105 | 40-50 | 11100-14900 | 665-895 | 21-29 | |
| | ST | 276 | 120000 | Aluminum | .090-.100 | 35-45 | 10200-13800 | 470-635 | 21-29 | |
| | | | | Carbon Steel | .090-.100 | 55-65 | 13600-18400 | 665-895 | 31-41 | |

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- (1) Recommended tightening torque for carbon steel studs are based on theoretical calculations using a standard torque formula for carbon steel screws. Torque values for phosphor bronze and stainless steel threaded fasteners cannot be calculated accurately due to unpredictable elasticity of the material and changes in surface friction during installation. Stainless steel values shown are results of publicly available laboratory testing. Testing in the application is strongly encouraged to establish actual torques as values may vary depending on joint materials and mating fasteners. Consult PENCOM literature for additional recommendations on determining tightening torques.
- (2) Push-out and torque-out values are for studs only and not the mating fasteners.
- (3) Performance data are shown in ranges and should be used for general estimating purposes only as actual results may be affected by variations in installation and panel preparation equipment and procedures; and panel hardness, hole size, material and thickness. PENCOM strongly recommends testing in each application to determine actual loads.

PERFORMANCE (Continued)

| METRIC | Thread Code | Stud Material Code | Recommended Nut Tightening Torque (N-m) (1) | Tensile Strength (MPa, Min.) | Test Sheet | | | Installation (kN) | Push-out (N) (2) | Torque-out (N-m) (2) |
|--------------|-------------|--------------------|---|------------------------------|----------------|----------------|----------------|-------------------|------------------|----------------------|
| | | | | | Material | Thickness (mm) | Hardness (HRB) | | | |
| METRIC | M5 | PB | – | 413 | CDA 110 Copper | 1.50-1.75 | 25-35 | 13.3-17.9 | 950-1280 | 2.89-3.91 |
| | | SS | 5.10 | 517 | Aluminum | 1.60-1.85 | 30-40 | 10.5-14.3 | 680-920 | 4.59-6.2 |
| | | | | | Carbon Steel | 1.45-1.75 | 50-60 | 18.4-25.0 | 1280-1720 | 5.4-7.4 |
| | | ST | 4.80 | 900 | Aluminum | 1.50-1.75 | 35-45 | 11.0-14.9 | 680-920 | 4.59-6.2 |
| | | | | | Carbon Steel | 1.50-1.75 | 60-70 | 22.1-29.9 | 1280-1720 | 6.5-8.7 |
| | | M6 | PB | – | 413 | CDA 110 Copper | 1.50-1.75 | 25-35 | 21.5-29.1 | 1360-1840 |
| | SS | | 8.70 | 517 | Aluminum | 1.60-1.85 | 30-40 | 13.1-17.7 | 1080-1460 | 9.3-13 |
| | | | | | Carbon Steel | 1.60-1.85 | 40-50 | 20.9-28.3 | 1490-2010 | 9.3-13 |
| | ST | | 8.15 | 900 | Aluminum | 1.50-1.75 | 40-50 | 24.6-33.3 | 1080-1460 | 12-16 |
| | | | | | Carbon Steel | 1.50-1.75 | 55-65 | 28.1-37.9 | 1490-2010 | 12-16 |
| | M8 | | PB | – | 413 | CDA 110 Copper | 3.20-3.45 | 30-40 | 28.1-37.9 | 1910-2590 |
| | | SS | 21.2 | 517 | Aluminum | 2.20-2.45 | 40-50 | 20.7-28.1 | 1450-1950 | 17-23 |
| Carbon Steel | | | | | 2.45-2.70 | 40-50 | 32.1-43.5 | 1790-2420 | 17-23 | |
| ST | | 19.8 | 900 | Aluminum | 2.30-2.55 | 35-45 | 30.3-40.9 | 1450-1950 | 26-35 | |
| | | | | Carbon Steel | 2.30-2.55 | 55-65 | 37.8-51.2 | 1870-2530 | 26-35 | |
| M10 | | PB | – | 413 | CDA 110 Copper | 3.20-3.45 | 30-40 | 45.3-61.3 | 2130-2880 | 21-29 |
| | SS | 42.0 | 517 | Aluminum | 2.30-2.55 | 40-50 | 37.7-51.1 | 2080-2810 | 31-41 | |
| | | | | Carbon Steel | 2.30-2.55 | 40-50 | 49.0-66.4 | 2950-3990 | 31-41 | |
| | ST | 39.2 | 900 | Aluminum | 2.30-2.55 | 35-45 | 45.3-61.3 | 2080-2810 | 31-41 | |
| | | | | Carbon Steel | 2.30-2.55 | 55-65 | 60.5-81.9 | 2950-3990 | 42-56 | |

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