

PennEngineering®

KEYHOLE® STANDOFFS AND FASTENERS



BULLETIN

**SK**



# KEYHOLE® STANDOFFS AND FASTENERS

PEM® KEYHOLE® Standoffs (Type SKC™) and sheet joining fasteners (Type SKC-F™) are designed so that a PC board or panel can be quickly slipped into place and then removed from an assembly by simply sliding the board sideways and lifting it off. PEM KEYHOLE fasteners can save valuable time and dramatically reduce the amount of loose hardware required. Type SKC can be used for spacing or mounting of replaceable components. Typically, several SKC standoffs are used with one standard PEM threaded standoff which accepts a screw to secure the board or component against any unwanted movement. Type SKC-F is designed so that two sheets can be quickly joined flat against each other. Typically, several Type SKC-F fasteners are used with one standard PEM® threaded Type F flush nut which accepts a screw to secure the sheets against any unwanted movement.

## Type SKC - Allows detachable spacing of two sheets

- Clinch feature mounts fastener permanently into metal sheet.
- Unique barrel design allows for quick attachment and detachment.
- Head is flush with one side of metal sheet.
- Makes horizontal or vertical component mounting possible.



## Type SKC-F - Allows detachable joining of two sheets

- Clinch feature mounts fastener permanently into metal sheet.
- Unique barrel design allows for quick “panel-on-panel” attachment and detachment.
- Head is flush or sub-flush with one side of metal sheet.
- Can be clinched into blind hole where concealed head is required.
- Makes horizontal or vertical component mounting possible.



Type SKC

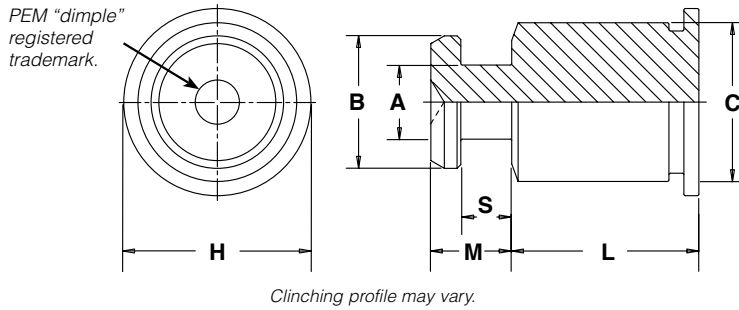


Type SKC-F

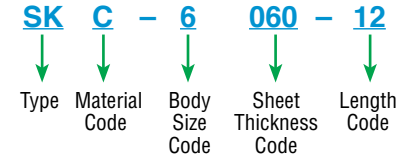


# KEYHOLE® STANDOFFS AND FASTENERS

## TYPE SKC DIMENSIONAL DATA



### PART NUMBER DESIGNATION



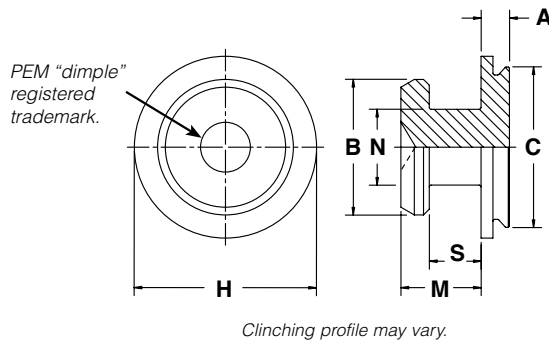
All dimensions are in inches.

| UNIFIED | Type                | Body Size - Sheet Code | Length "L" ± .005<br>(Length Code in 32nds of an inch) |      |      |      |      |      |      |      |      |      |      |      | A    | B      | C      | S    | M      | H    |      |
|---------|---------------------|------------------------|--|------|------|------|------|------|------|------|------|------|------|------|------|--------|--------|------|--------|------|------|
|         | Stainless Steel (1) |                        | .063   | .125 | .188 | .250 | .312 | .375 | .437 | .500 | .562 | .625 | .750 | .875 | 1.00 | ± .003 | ± .003 | Max. | ± .003 | Max. | Nom. |
|         | SKC                 | 6060                   | 2  | 4    | 6    | 8    | 10   | 12   | 14   | 16   | 18   | 20   | 24   | 28   | 32   | .099   | .177   | .212 | .068   | .108 | .250 |

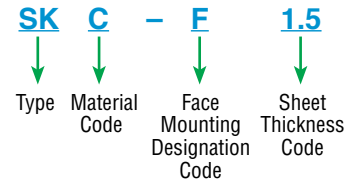
All dimensions are in millimeters.

| METRIC | Type                | Body Size - Sheet Code | Length "L" ± 0.13<br>(Length Code in millimeters) |   |   |   |    |    |    |    |    |    |    |    | A      | B      | C    | S      | M    | H    |
|--------|---------------------|------------------------|---|---|---|---|----|----|----|----|----|----|----|----|--------|--------|------|--------|------|------|
|        | Stainless Steel (1) |                        | 2   | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 25 | ± 0.08 | ± 0.08 | Max. | ± 0.08 | Max. | Nom. |
|        | SKC                 | 61.5                   | 2   | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 25 | 2.51   | 4.5    | 5.39 | 1.73   | 2.75 | 6.35 |

## TYPE SKC-F DIMENSIONAL DATA



### PART NUMBER DESIGNATION



All dimensions are in inches.

| UNIFIED | Type                | Face Mounting Designation Code | Sheet Thickness Code | A    | B      | C    | H    | M    | N      | S      |
|---------|---------------------|--------------------------------|----------------------|------|--------|------|------|------|--------|--------|
|         | Stainless Steel (1) |                                |                      | Max. | ± .003 | Max. | Nom. | Max. | ± .003 | ± .003 |
|         | SKC                 | F                              | 1.5                  | .039 | .177   | .212 | .237 | .108 | .099   | .068   |

All dimensions are in millimeters.

| METRIC | Type                | Face Mounting Designation Code | Sheet Thickness Code | A    | B      | C    | H    | M    | N      | S      |
|--------|---------------------|--------------------------------|----------------------|------|--------|------|------|------|--------|--------|
|        | Stainless Steel (1) |                                |                      | Max. | ± 0.08 | Max. | Nom. | Max. | ± 0.08 | ± 0.08 |
|        | SKC                 | F                              | 1.5                  | 1    | 4.5    | 5.39 | 6.02 | 2.75 | 2.5    | 1.73   |

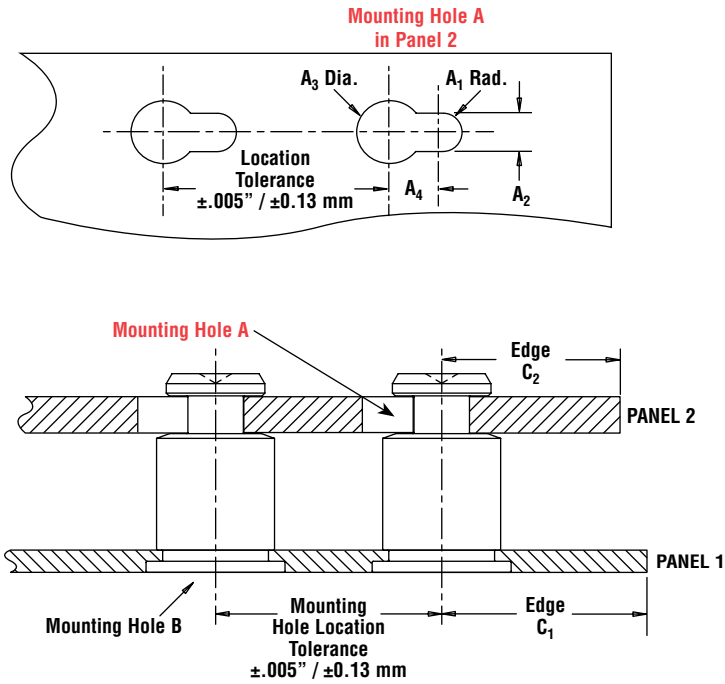
(1) 300 Series stainless steel. Passivated and/or tested per ASTM A380.



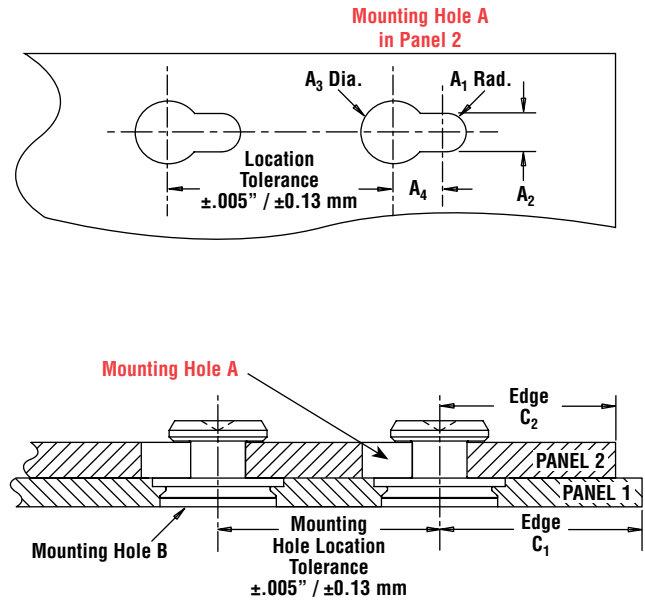
# KEYHOLE® STANDOFFS AND FASTENERS

## APPLICATION DATA

### TYPE SKC



### TYPE SKC-F



All dimensions are in inches.

| UNIFIED | Type | PANEL 1                                    |                               |                      |                                      | PANEL 2                |                          |                          |                        |             |                 |                                      |
|---------|------|--|-------------------------------|----------------------|--------------------------------------|------------------------|--------------------------|--------------------------|------------------------|-------------|-----------------|--------------------------------------|
|         |      | Bottom Mounting Hole B<br>+ .003<br>- .000 | Sheet Hardness<br>Max.<br>(1) | Min. Sheet Thickness | Edge Distance<br>C <sub>1</sub> Min. | Top Mounting Hole A    |                          |                          |                        | Material    | Thickness Range | Edge Distance<br>C <sub>2</sub> Min. |
|         |      |  |                               |                      |                                      | A <sub>1</sub><br>Nom. | A <sub>2</sub><br>± .003 | A <sub>3</sub><br>± .003 | A <sub>4</sub><br>Min. |             |                 |                                      |
| SKC     | .213 | HRB 70 / HB 125                            | .040                          | .260                 | .059                                 | .118                   | .197                     | .148                     | ANY                    | .057 - .064 | .160            |                                      |
| SKC-F   | .213 | HRB 70 / HB 125                            | .039 <sup>(2)</sup>           | .150                 | .059                                 | .118                   | .197                     | .148                     | ANY                    | .057 - .064 | .160            |                                      |

All dimensions are in millimeters.

| METRIC | Type | PANEL 1                         |                               |                      |                                      | PANEL 2                |                          |                          |                        |             |                 |                                      |
|--------|------|---------------------------------|-------------------------------|----------------------|--------------------------------------|------------------------|--------------------------|--------------------------|------------------------|-------------|-----------------|--------------------------------------|
|        |      | Bottom Mounting Hole B<br>+0.08 | Sheet Hardness<br>Max.<br>(1) | Min. Sheet Thickness | Edge Distance<br>C <sub>1</sub> Min. | Top Mounting Hole A    |                          |                          |                        | Material    | Thickness Range | Edge Distance<br>C <sub>2</sub> Min. |
|        |      |                                 |                               |                      |                                      | A <sub>1</sub><br>Nom. | A <sub>2</sub><br>± 0.08 | A <sub>3</sub><br>± 0.08 | A <sub>4</sub><br>Min. |             |                 |                                      |
| SKC    | 5.41 | HRB 70 / HB 125                 | 1.02                          | 6.6                  | 1.5                                  | 3                      | 5                        | 3.75                     | ANY                    | 1.45 - 1.62 | 4.1             |                                      |
| SKC-F  | 5.41 | HRB 70 / HB 125                 | 1 <sup>(2)</sup>              | 3.8                  | 1.5                                  | 3                      | 5                        | 3.75                     | ANY                    | 1.45 - 1.62 | 4.1             |                                      |

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

(2) Type SKC-F may also be installed into a .043" / 1.1 mm deep blind milled hole in a .062" / 1.6 mm minimum sheet thickness.

## INSTALLATION

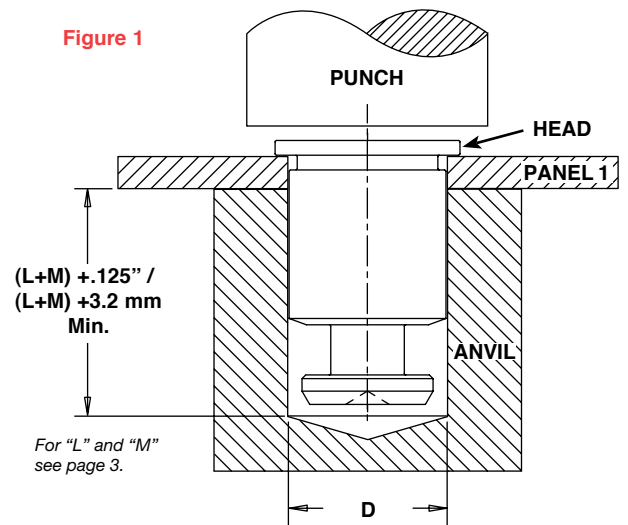
### TYPE SKC

1. Prepare properly sized mounting hole in Panel 1.
2. Place the barrel of the fastener through (punched side of) mounting hole and into anvil as shown in figure 1.
3. With installation punch and anvil surfaces parallel, apply only enough squeezing force to embed the head flush with the panel.

### PEMSERTER® Installation Tooling

| UNIFIED | Body Size Sheet Code | Anvil Dimension (in.) |               | Anvil Part Number | Punch Part Number |
|---------|----------------------|-----------------------|---------------|-------------------|-------------------|
|         | 6060                 | D                     | + .003 - .000 |                   |                   |
|         |                      | .216                  |               | 970200012300      | 975200048         |

| METRIC | Body Size Sheet Code | Anvil Dimension (mm) |       | Anvil Part Number | Punch Part Number |
|--------|----------------------|----------------------|-------|-------------------|-------------------|
|        | 61.5                 | D                    | +0.08 |                   |                   |
|        |                      | 5.49                 |       | 970200012300      | 975200048         |



### TYPE SKC-F

#### Through Hole Installation Procedure

1. Prepare properly sized mounting hole in Panel 1.
2. Place the fastener into anvil hole as shown in Figure 2.
3. Place the (punch side of) mounting hole over the shank of the fastener.
4. With installation punch and anvil surfaces parallel, apply only enough squeezing force until flange is flush with panel.

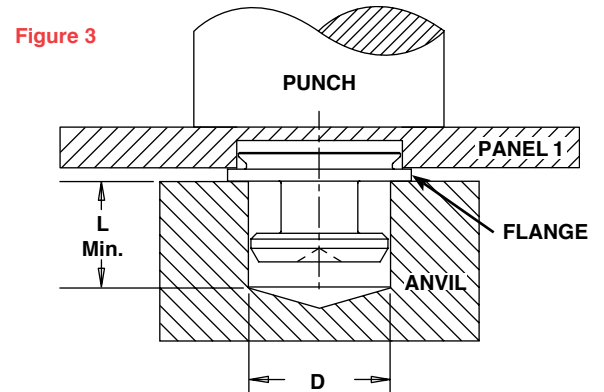
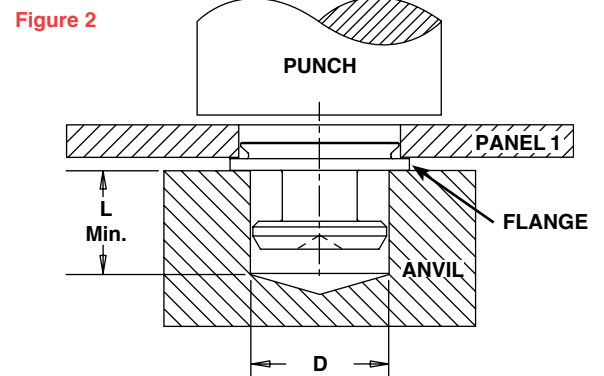
#### Blind Hole Installation Procedure

1. Mill a properly sized blind hole to .043" / 1.1 mm minimum depth.
2. Place the fastener into anvil hole as shown in Figure 3.
3. Place the panel mounting hole over the shank of the fastener.
4. With installation punch and anvil surfaces parallel, apply only enough squeezing force to embed the flange flush with the panel.

### PEMSERTER® Installation Tooling

| UNIFIED | Sheet Thickness Code | Anvil Dimensions (in.) |                | Anvil Part Number | Punch Part Number |
|---------|----------------------|------------------------|----------------|-------------------|-------------------|
|         |                      | L Min.                 | D +.003 - .000 |                   |                   |
|         | 1.5                  | .233                   | .184           | 8012608           | 975200048         |

| METRIC | Sheet Thickness Code | Anvil Dimensions (mm) |         | Anvil Part Number | Punch Part Number |
|--------|----------------------|-----------------------|---------|-------------------|-------------------|
|        |                      | L Min.                | D +0.08 |                   |                   |
|        | 1.5                  | 5.95                  | 4.67    | 8012608           | 975200048         |



#### 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.

| Fastener Type | Required Size End Mill | PEM Part No. |
|---------------|------------------------|--------------|
| SKC-F         | .213"                  | CHM-213      |

**PEMSERTER® PRESSES**

For best results we recommend using a PEMSERTER® press for installation of PEM Types SKC and SKC-F fasteners. Please check our website for more information.

# KEYHOLE® STANDOFFS AND FASTENERS

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

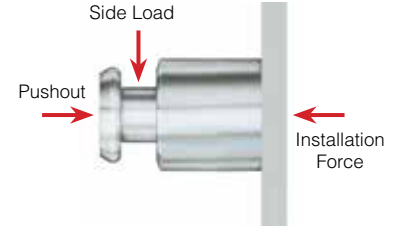
### TYPE SKC

#### Installation and Pushout

| Test Sheet Material → |                        | .060" 5052-H34 Aluminum |                |                     | .060" Cold-Rolled Steel |                     |                |
|-----------------------|------------------------|-------------------------|----------------|---------------------|-------------------------|---------------------|----------------|
| UNIFIED               | Body Size - Sheet Code | Installation (lbs.)     | Pushout (lbs.) | Installation (lbs.) | Pushout (lbs.)          | Installation (lbs.) | Pushout (lbs.) |
|                       |                        | 6060                    | 1600           | 250                 | 3200                    | 600                 |                |

| Test Sheet Material → |                        | 1.52 mm 5052-H34 Aluminum |             |                   | 1.52 mm Cold-Rolled Steel |                   |             |
|-----------------------|------------------------|---------------------------|-------------|-------------------|---------------------------|-------------------|-------------|
| METRIC                | Body Size - Sheet Code | Installation (kN)         | Pushout (N) | Installation (kN) | Pushout (N)               | Installation (kN) | Pushout (N) |
|                       |                        | 61.5                      | 7.1         | 1100              | 14.2                      | 2600              |             |



#### Side-Load

| Test Sheet Material → |                        | 5052-H34 Aluminum           |    |       |    |     |     |     |     |     |     |     | Cold-Rolled Steel           |     |       |     |     |     |     |     |     |     |     |
|-----------------------|------------------------|-----------------------------|----|-------|----|-----|-----|-----|-----|-----|-----|-----|-----------------------------|-----|-------|-----|-----|-----|-----|-----|-----|-----|-----|
| Test Sheet Thick. →   |                        | .040" <sup>(2)</sup>        |    | .060" |    |     |     |     |     |     |     |     | .040" <sup>(2)</sup>        |     | .060" |     |     |     |     |     |     |     |     |
| UNIFIED               | Body Size - Sheet Code | Length Codes                |    |       |    |     |     |     |     |     |     |     | Length Codes                |     |       |     |     |     |     |     |     |     |     |
|                       |                        | -2                          | -4 | -6    | -8 | -10 | -12 | -14 | -16 | -20 | -24 | -32 | -2                          | -4  | -6    | -8  | -10 | -12 | -14 | -16 | -20 | -24 | -32 |
|                       |                        | Side-Load Force Max. (lbs.) |    |       |    |     |     |     |     |     |     |     | Side-Load Force Max. (lbs.) |     |       |     |     |     |     |     |     |     |     |
|                       | 6060                   | 130                         | 95 | 82    | 63 | 52  | 44  | 38  | 34  | 27  | 22  | 17  | 185                         | 120 | 197   | 153 | 126 | 106 | 92  | 81  | 66  | 55  | 42  |

| Test Sheet Material → |                        | 5052-H34 Aluminum        |     |        |     |     |     |     |     |     |     |     | Cold-Rolled Steel        |     |        |     |     |     |     |     |     |     |     |     |     |
|-----------------------|------------------------|--------------------------|-----|--------|-----|-----|-----|-----|-----|-----|-----|-----|--------------------------|-----|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Test Sheet Thick. →   |                        | 1 mm <sup>(2)</sup>      |     | 1.5 mm |     |     |     |     |     |     |     |     | 1 mm <sup>(2)</sup>      |     | 1.5 mm |     |     |     |     |     |     |     |     |     |     |
| METRIC                | Body Size - Sheet Code | Length Codes             |     |        |     |     |     |     |     |     |     |     | Length Codes             |     |        |     |     |     |     |     |     |     |     |     |     |
|                       |                        | -2                       | -4  | -6     | -8  | -10 | -12 | -14 | -16 | -18 | -20 | -22 | -25                      | -2  | -4     | -6  | -8  | -10 | -12 | -14 | -16 | -18 | -20 | -22 | -25 |
|                       |                        | Side-Load Force Max. (N) |     |        |     |     |     |     |     |     |     |     | Side-Load Force Max. (N) |     |        |     |     |     |     |     |     |     |     |     |     |
|                       | 61.5                   | 545                      | 370 | 296    | 228 | 184 | 156 | 136 | 116 | 104 | 96  | 88  | 76                       | 735 | 490    | 696 | 540 | 440 | 372 | 320 | 280 | 252 | 228 | 208 | 184 |

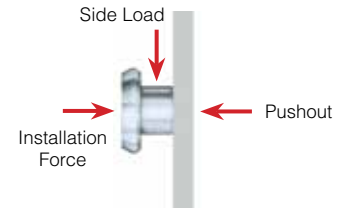
### TYPE SKC-F

#### Installation, Pushout and Side-Load

| Test Sheet Material → |      | .060" 5052-H34 Aluminum |                |                             | .060" Cold-Rolled Steel |                |                             |
|-----------------------|------|-------------------------|----------------|-----------------------------|-------------------------|----------------|-----------------------------|
| UNIFIED               | Type | Installation (lbs.)     | Pushout (lbs.) | Side-Load Force Max. (lbs.) | Installation (lbs.)     | Pushout (lbs.) | Side-Load Force Max. (lbs.) |
|                       |      | SKC-F                   | 1100           | 120                         | 120                     | 2100           | 160                         |

| Test Sheet Material → |      | 1.52 mm 5052-H34 Aluminum |             |                          | 1.52 mm Cold-Rolled Steel |             |                          |
|-----------------------|------|---------------------------|-------------|--------------------------|---------------------------|-------------|--------------------------|
| METRIC                | Type | Installation (kN)         | Pushout (N) | Side-Load Force Max. (N) | Installation (kN)         | Pushout (N) | Side-Load Force Max. (N) |
|                       |      | SKC-F                     | 4.9         | 533                      | 533                       | 9.3         | 711                      |



- (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) .040" / 1 mm test sheet material thickness was used for the -2 and -4 SKC standoffs due to the short length of the parts.

Regulatory compliance information is available in Technical Support section of our website. © 2016 PennEngineering.

Specifications subject to change without notice. See our website for the most current version of this bulletin.

**PennEngineering®**



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