



# WELDING STUDS

FOR SHORT CYCLE STUD WELDING



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## 1. Welding studs for short cycle stud welding

### 1.1 Technical information

#### Materials

We produce our welding studs from the following materials with excellent weldability:

| Material group/strength class | Norm       |
|-------------------------------|------------|
| Steel 4.8                     | ISO 898-1  |
| A2-50, A2-70<br>A5-50, A5-70  | ISO 3506-1 |

The material specifications conform with DIN EN ISO 13918 and DIN EN ISO 14555. For welding studs from other materials please send us your inquiry or contact us.

On demand, the material properties can be verified by an inspection document (test report, inspection certificate) according to DIN EN 10204.

We are pleased to inform you about weldability to different base materials and welding parameters.

#### Dimensions

Welding studs dimensions are given in the measurement tables (all dimensions in mm). All standardised welding studs conform to DIN EN ISO 13918. Not standardised welding studs are supplied according to DIN EN ISO 13918. Special welding elements, which are not described, are delivered upon request.

Dimensions that are not listed in the measurement tables are delivered upon request.

#### Surface protection

Standardly our welding studs made from steel 4.8 are supplied with an electrolytic copper plating of 4-8 µm (according to DIN EN ISO 4042) as corrosion protection. Other surface treatments are possible upon request.

#### Threads

The threads of the studs are cold rolled (tolerance limit 6g). For surface-treated studs the tolerance limit 6h can be reached. We deliver studs with special threads upon request.

#### Stud flange

Welding studs for short cycle stud welding have a closely tolerated cold formed flange. The diameter of the flange is always bigger than the external diameter of the welding element (see following drawings and measurement tables). The flange increases the surface area of the stud. Consequently, the stress at the point of weld is reduced and this results in a higher quality of the stud welded joint.

Upon request, it is possible to deliver welding studs with flange dimensions other than the ones listed and welding studs without flange. However, we can only recommend the limited use of welding studs without flange – depending on the welded joint requirements. Please contact us for this.

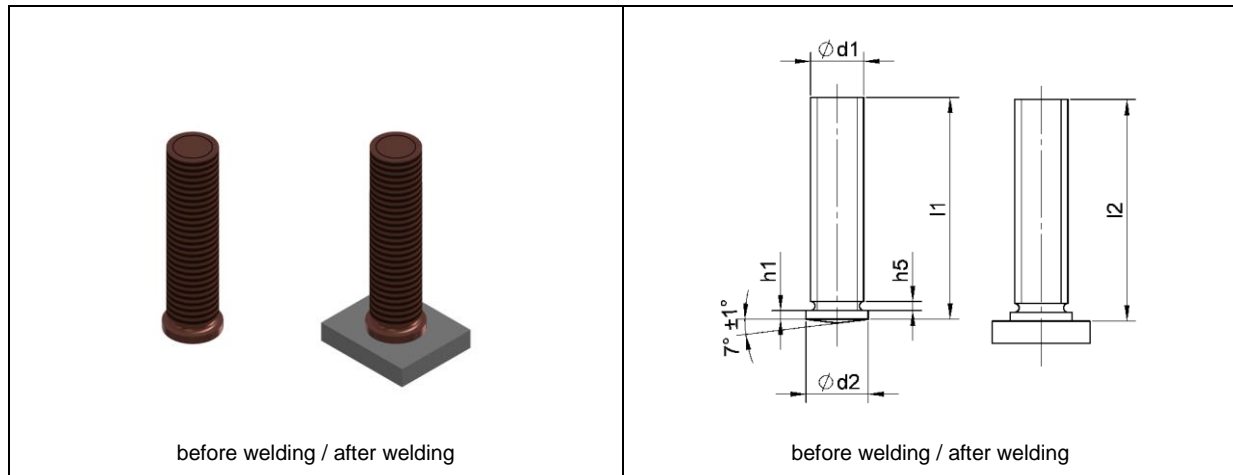
#### Welding face

Welding studs for short cycle stud welding have a cold formed conical welding face with dimensions closely controlled. The exact dimensions of the welding face are decisive for proper welding results.

#### Accessories for stud welding guns

Accessories for stud welding guns have to be adjusted to the welding element. The accessories which are to be used for the individual welding studs can be found in chapter 2.

## 1.2 Threaded stud (type PS acc. to DIN EN ISO 13918)



| Dimensions |               |                    |               |         | Material (item number)     |           |            |
|------------|---------------|--------------------|---------------|---------|----------------------------|-----------|------------|
| $d_1$      | $l_1$<br>+0,6 | $d_2$<br>$\pm 0,2$ | $h_5$<br>max. | $h_1$   | Steel 4.8<br>copper-plated | A2-50     | A5-50      |
| M3         | 6-30          | 4                  | 0,6           | 0,7-1,4 | 17-03-XXX                  | 18-03-XXX | 181-03-XXX |
| M4         | 6-40          | 5                  | 0,6           | 0,7-1,4 | 17-04-XXX                  | 18-04-XXX | 181-04-XXX |
| M5         | 6-45          | 6                  | 1,0           | 0,7-1,4 | 17-05-XXX                  | 18-05-XXX | 181-05-XXX |
| M6         | 8-60          | 7                  | 1,0           | 0,7-1,4 | 17-06-XXX                  | 18-06-XXX | 181-06-XXX |
| M8         | 10-60         | 9                  | 1,5           | 0,8-1,4 | 17-08-XXX                  | 18-08-XXX | 181-08-XXX |
| M10        | 15-60         | 11                 | 2,0           | 0,8-1,4 | 17-10-XXX                  | 18-10-XXX | 181-10-XXX |

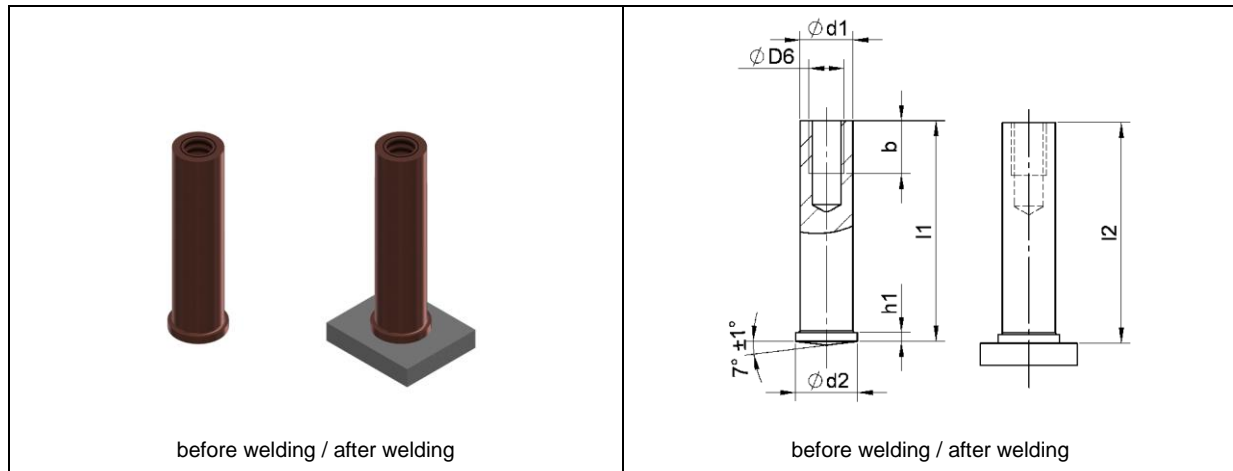
\* $l_2$  (length after welding) depends on  $l_1$  and the welding energy.

In the item number **XXX** has to be replaced by the respective welding element length  $l_1$  (e.g. 030 for 30 mm).

Explanations to the used materials can be found in chapter 1.1.

**Not listed dimensions and materials available upon request.**

### 1.3 Internally threaded stud (type IS acc. to DIN EN ISO 13918)



| Dimensions         |   |       |                     |                    |         | Material (item number)     |           |
|--------------------|---|-------|---------------------|--------------------|---------|----------------------------|-----------|
| $d_1$<br>$\pm 0,1$ | $l_1$<br>$+0,6$   | $D_6$ | $b$<br>min. $+2P^1$ | $d_2$<br>$\pm 0,2$ | $h_1$   | Steel 4.8<br>copper-plated | A2-50     |
| 5                  | 6<br>$7 \leq l_2 < 10$<br>$l_2 \geq 10$                   | M3    | 3,5<br>4,5<br>5     | 6,0                | 0,7-1,4 | 37-35-XXX                  | 38-35-XXX |
| 6                  | $l_2 \geq 8$  | M3    | 5                   | 7,0                | 0,7-1,4 | 37-46-XXX                  | 38-46-XXX |
| 6                  | $8 \leq l_2 < 10$<br>$l_2 \geq 10$                        | M4    | 5,5<br>6            | 7,0                | 0,7-1,4 | 37-46-XXX                  | 38-46-XXX |
| 7,1                | $10 \leq l_2 < 15$<br>$l_2 \geq 15$                       | M5    | 6<br>7,5            | 9,0                | 0,8-1,4 | 37-57-XXX                  | 38-57-XXX |
| 8                  | $10 \leq l_2 < 15$<br>$l_2 \geq 15$                       | M5    | 6<br>7,5            | 9,0                | 0,8-1,4 | 37-68-XXX                  | 38-68-XXX |
| 8                  | $10 \leq l_2 < 12$<br>$12 \leq l_2 < 15$<br>$l_2 \geq 15$ | M6    | 6<br>7<br>9         | 9,0                | 0,8-1,4 | 37-68-XXX                  | 38-68-XXX |

<sup>1</sup>P = thread pitch acc. to DIN 13-1

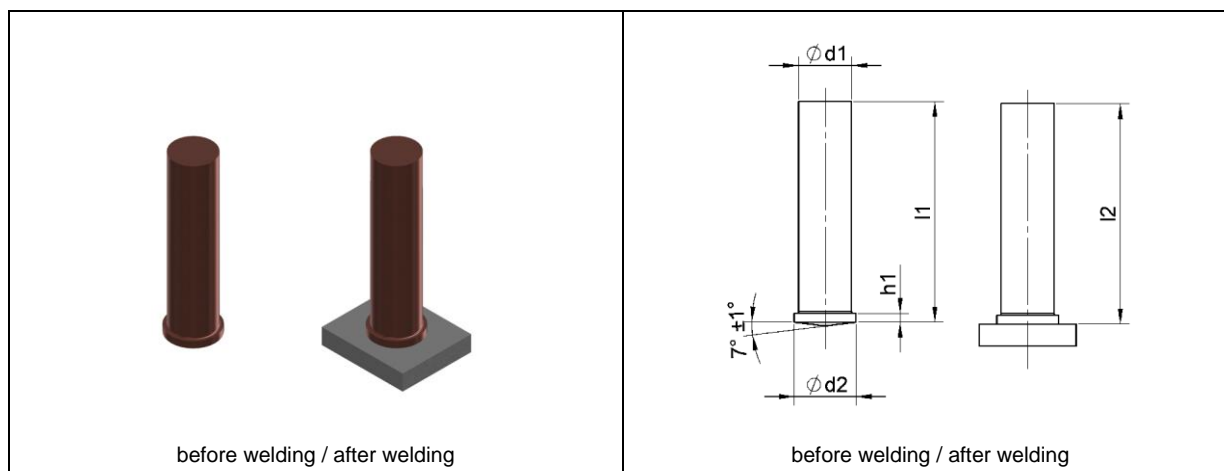
\* $l_2$  (length after welding) depends on  $l_1$  and the welding energy.

In the item number XXX has to be replaced by the respective welding element length  $l_1$  (e.g. 030 for 30 mm).

Explanations to the used materials can be found in chapter 1.1.

**Not listed dimensions and materials available upon request.**

#### 1.4 Non-threaded stud (type US acc. to DIN EN ISO 13918)



| Dimensions |               |               |         | Material (item number)     |           |            |
|------------|---------------|---------------|---------|----------------------------|-----------|------------|
| $d_1$      | $l_1$<br>+0,6 | $d_2$<br>±0,2 | $h_1$   | Steel 4.8<br>copper-plated | A2-50     | A5-50      |
| 3          | 6-30          | 4             | 0,7-1,4 | 27-03-XXX                  | 28-03-XXX | 281-03-XXX |
| 4          | 6-40          | 5             | 0,7-1,4 | 27-04-XXX                  | 28-04-XXX | 281-04-XXX |
| 5          | 6-45          | 6             | 0,7-1,4 | 27-05-XXX                  | 28-05-XXX | 281-05-XXX |
| 6          | 8-60          | 7             | 0,7-1,4 | 27-06-XXX                  | 28-06-XXX | 281-06-XXX |
| 7,1        | 10-60         | 9             | 0,8-1,4 | 27-07-XXX                  | 28-07-XXX | 281-07-XXX |
| 8          | 15-60         | 9             | 0,8-1,4 | 27-08-XXX                  | 28-08-XXX | 281-08-XXX |

\* $l_2$  (length after welding) depends on  $l_1$  and the welding energy.

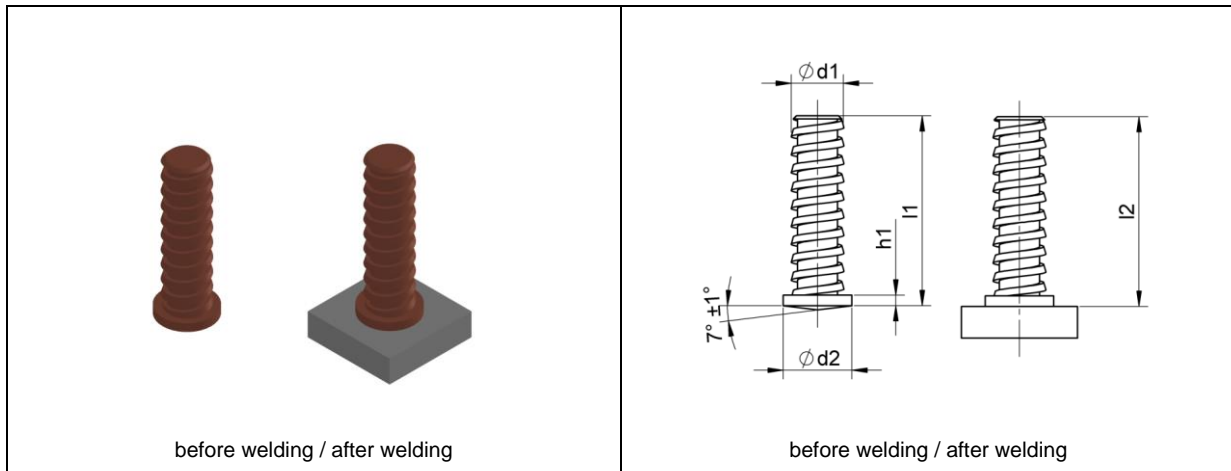
In the item number **XXX** has to be replaced by the respective welding element length  $l_1$  (e.g. 030 for 30 mm).

Explanations to the used materials can be found in chapter 1.1.

**Not listed dimensions and materials available upon request.**



## 1.5 Fir tree stud



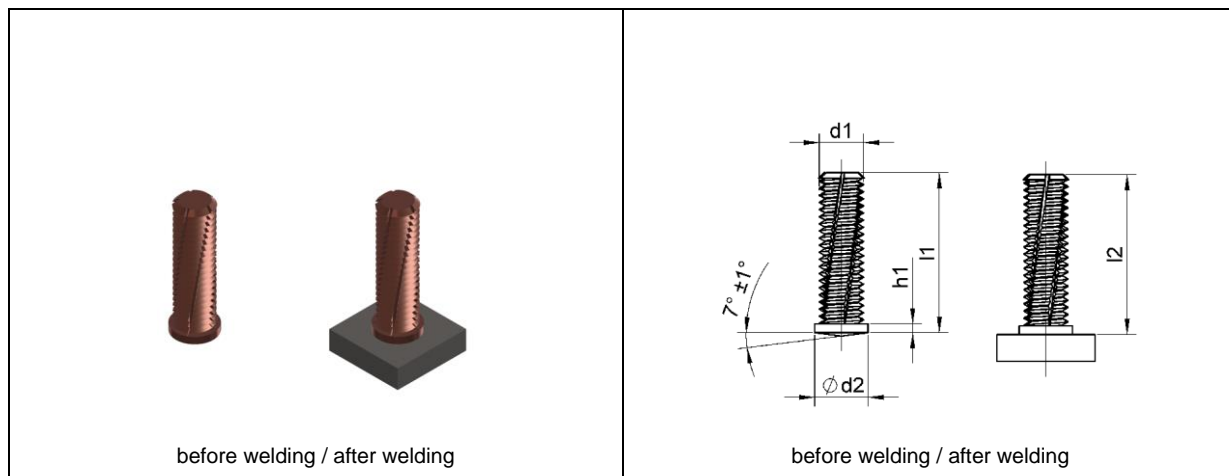
| Dimensions |               |                    |         | Material (item number)     |             |
|------------|---------------|--------------------|---------|----------------------------|-------------|
| $d_1$      | $l_1$<br>+0,6 | $d_2$<br>$\pm 0,2$ | $h_1$   | Steel 4.8<br>copper-plated | A2-50       |
| 5          | 9             | 6                  | 0,7-1,4 | 07-05-009                  | 08-05-009   |
| 5          | 14,2          | 6                  | 0,7-1,4 | 07-05-014,2                | 08-05-014,2 |
| 5          | 18            | 6                  | 0,7-1,4 | 07-05-018                  | 08-05-018   |
| 5          | 25            | 6                  | 0,7-1,4 | 07-05-025                  | 08-05-025   |

\* $l_2$  (length after welding) depends on  $l_1$  and the welding energy.

Explanations to the used materials can be found in chapter 1.1.

**Not listed dimensions and materials available upon request.**

## 1.6 Colour groove stud



| Dimensions     |                        |                        |                | Material (item number)     |              |
|----------------|------------------------|------------------------|----------------|----------------------------|--------------|
| d <sub>1</sub> | l <sub>1</sub><br>+0,6 | d <sub>2</sub><br>±0,2 | h <sub>1</sub> | Steel 4.8<br>copper-plated | A2-50        |
| M4             | upon request           | 5                      | 0,7-1,4        | 17-LN-04-XXX               | 18-LN-04-XXX |
| M5             | upon request           | 6                      | 0,7-1,4        | 17-LN-05-XXX               | 18-LN-05-XXX |
| M6             | upon request           | 7                      | 0,7-1,4        | 17-LN-06-XXX               | 18-LN-06-XXX |
| M8             | upon request           | 9                      | 0,8-1,4        | 17-LN-08-XXX               | 18-LN-08-XXX |

\*l<sub>2</sub> (length after welding) depends on l<sub>1</sub> and the welding energy.

In the item number **XXX** has to be replaced by the respective welding element length l<sub>1</sub> (e.g. 030 for 30 mm).

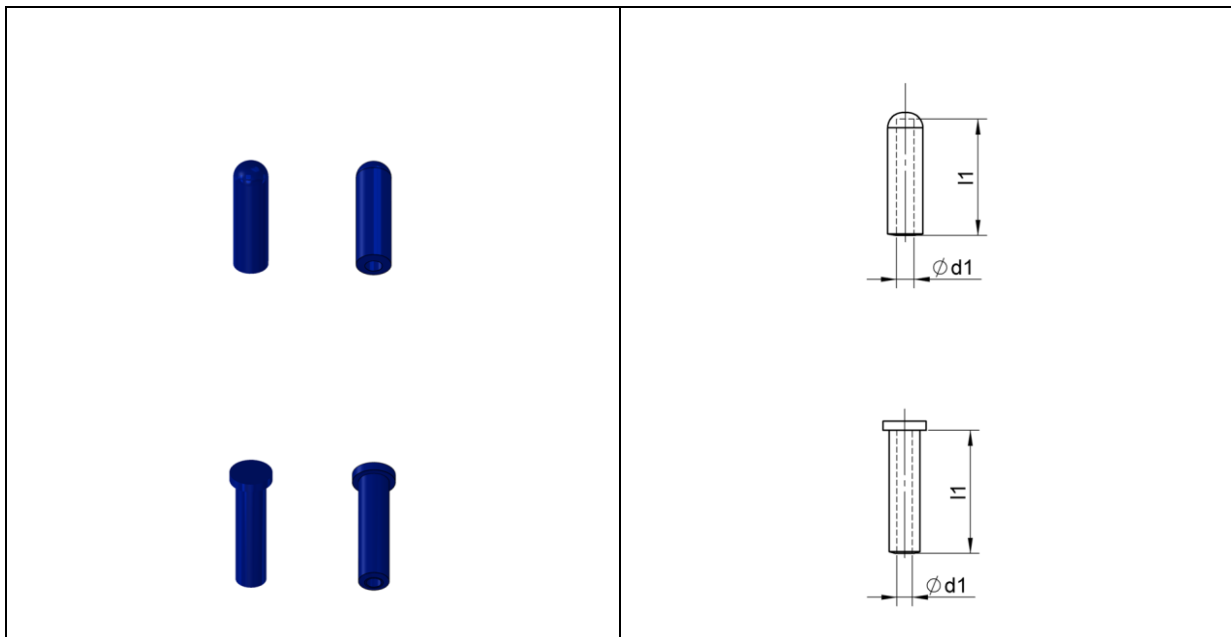
Explanations to the used materials can be found in chapter 1.1.

**Not listed dimensions and materials available upon request.**

## 1.7 Silicone cover caps

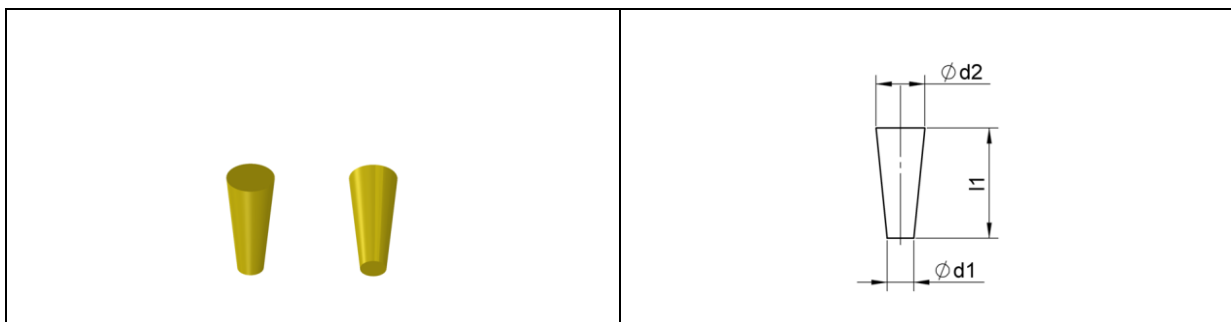
Silicone cover caps protect the mechanical important areas of the welding elements during painting and powder coating as well as during the burning-in process (permanent temperature  $\leq 210^{\circ}\text{C}$ , short temperature  $\leq 300^{\circ}\text{C}$ ).

### 1.7.1 Silicone cover caps for threaded studs and non-threaded studs



Available dimensions upon request.

### 1.7.2 Silicone cover caps for internally threaded studs



Available dimensions upon request.



## Annex: Accessories and wear parts for stud welding guns

### 2. Accessories and wear parts for stud welding guns

#### 2.1 Threaded stud (type PS), internally threaded stud (type IS), non-threaded stud (type US), fir tree stud, colour groove stud

For stud welding guns PHM-10, GD 12sc, PHM-1A:

| Stud dimensions |   | Gun accessories     |
|-----------------|---|---------------------|
| d <sub>1</sub>  | l <sub>2</sub>  | Chuck (item number) |
| M3 / 3          | l <sub>2</sub> ≤ 40<br>l <sub>2</sub> > 40 <sup>1</sup> | 82-50-003           |
| M4 / 4          | l <sub>2</sub> ≤ 40<br>l <sub>2</sub> > 40 <sup>1</sup> | 82-50-004           |
| M5 / 5          | l <sub>2</sub> ≤ 40<br>l <sub>2</sub> > 40 <sup>1</sup> | 82-50-005           |
| M6 / 6          | l <sub>2</sub> ≤ 40<br>l <sub>2</sub> > 40 <sup>1</sup> | 82-50-006           |
| 7,1             | l <sub>2</sub> ≤ 40<br>l <sub>2</sub> > 40 <sup>1</sup> | 82-50-071           |
| M8 / 8          | l <sub>2</sub> ≤ 40<br>l <sub>2</sub> > 40 <sup>1</sup> | 82-50-008           |
| M10             | l <sub>2</sub> ≤ 15 <sup>1</sup>                        | 82-50-010           |

<sup>1</sup>Besides chucks additional special accessories are necessary (for M3-M8 resp. Ø3-8 for lengths > 40 mm, for M10 for all lengths). Please contact us for this.







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