

# Shipbuilding

OSNA<sup>®</sup>-10 and OSNA<sup>®</sup>-30



Copper-Nickel Alloys for Seawater Piping Systems  
*(CuNi 90/10 and CuNi 70/30)*

KME Germany GmbH & Co. KG  
Shipbuilding - OSNA<sup>®</sup>-10 and OSNA<sup>®</sup>-30  
[GB]



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## KME - The Company

*KME as one of the largest manufacturers of copper and copper alloy products offers best possible product and engineering solutions in the various fields of industrial applications. As a leading supplier in the most diverse industries, KME serves the world's market with a broad spectrum of technologically leading copper and copper-alloy tubes, strips and sheets of outstanding production quality.*

### **Marine Applications**

KME's business unit Marine Applications is specialized in the production of copper-nickel alloys for piping systems in shipbuilding, offshore installations and other marine applications. The sea and its atmosphere is one of the most corrosive environments on the earth. Seagoing vessels need large amounts of seawater daily for

- fire water systems
- sprinkler systems
- cooling systems
- ballast systems

The materials used for seawater piping systems therefore must be highly resistant to pitting, crevice and erosion corrosion as well as stress corrosion cracking and macrofouling. Moreover such materials must satisfy high standards in terms of hot and cold working properties and weldability.



# The Material

## KME Alloys OSNA<sup>®</sup>-10 and OSNA<sup>®</sup>-30

For decades, seawater pipe systems made of copper-nickel alloys have been put to successful use on seagoing vessels and offshore production units like platforms, drilling rigs, semi-submersibles FPSOs etc.

The chemical composition of OSNA<sup>®</sup>-10 (CuNi 90/10) and OSNA<sup>®</sup>-30 (CuNi 70/30) copper-nickel alloys have been modified so that they meet the requirements of all the main international standards (see tables below). Reduced tolerance limits for certain impurities moreover provide for an enhanced cold workability and weldability of KME's alloy.

## Main Advantages of OSNA<sup>®</sup>-10 and OSNA<sup>®</sup>-30

Despite the rough conditions in marine service and the highly corrosive nature of seawater, the products provide well balanced combination of technical and economical advantages:

- Simple alloying system with good weldability
- Excellent ductility and toughness
- Good erosion corrosion resistance
- Resistant to uniform and localised corrosion
- No effect of ambient seawater temperatures
- No effect of seawater chlorination
- Resistant to biofouling
- Resistant to stress-corrosion cracking
- Low maintenance costs
- A lot of design experience

## Comparison of Standard Specifications for OSNA<sup>®</sup>-10 (CuNi 90/10)

|            | KME Alloy<br>OSNA <sup>®</sup> -10<br>(CuNi 90/10) | EN 1652/<br>12420/12449 <sup>1)</sup><br>CW352H | DIN 86019<br>WL 2.1972 | EEMUA<br>2016, 234/1-2<br>UNS C 7060 x | MIL-T-16420K<br>ASTM B 466 <sup>2)</sup> /467<br>C 70620 | JIS H 3300<br>C 7060 T |
|------------|--|---|------------------------|--|--|------------------------|
| Ni %       | 10.0 – 11.0  | 9.0 – 11.0                                      | 9.0 – 11.0             | 10.0 – 11.0                            | 9.0 – 11.0   | 9.0 – 11.0             |
| Fe %       | 1.5 – 1.8  | 1.0 – 2.0                                       | 1.5 – 1.8              | 1.5 – 2.0*                             | 1.0 – 1.8  | 1.0 – 1.8              |
| Mn %       | 0.6 – 1.0  | 0.5 – 1.0                                       | 0.5 – 1.0              | 0.5 – 1.0                              | max. 1.0   | 0.2 – 1.0              |
| C %        | max. 0.02  | max. 0.05                                       | max. 0.05              | max. 0.05                              | max. 0.05  | -                      |
| Pb %       | max. 0.01  | max. 0.02                                       | max. 0.01              | max. 0.01                              | max. 0.02  | max. 0.05              |
| S %        | max. 0.005   | max. 0.05                                       | max. 0.005             | max. 0.02                              | max. 0.02  | -                      |
| P %        | max. 0.02  | max. 0.02                                       | max. 0.02              | max. 0.02                              | max. 0.02  | -                      |
| Zn %       | max. 0.05  | max. 0.50                                       | max. 0.05              | max. 0.20                              | max. 0.50  | max. 0.50              |
| Sn %       |  | max. 0.03                                       | -                      | -                                      | -  | -                      |
| other imp. | max. 0.20  | max. 0.20                                       | max. 0.20              | max. 0.30                              | -  | -                      |
| Cu %       | rem.   | rem.  | rem.                   | rem.                                   | min. 86.5  | +Ni+Fe+Mn<br>min. 99.5 |

<sup>1)</sup> formerly BS 2871 Part 2

<sup>2)</sup> equal to C 70600 for subsequent welding

\* The iron content has been specified to improve corrosion resistance

## Comparison of Standard Specifications for OSNA<sup>®</sup>-30 (CuNi 70/30)

|            | KME Alloy<br>OSNA <sup>®</sup> -30<br>(CuNi 70/30) | EN 1652/<br>12420/12449 <sup>1)</sup><br>CW354H | MIL-T-16420K<br>ASTM B 466/467 <sup>2)</sup><br>C 71520 | JIS H 3300<br>C 7150 T |
|------------|--|---|---|------------------------|
| Ni %       | 30.0 – 32.0  | 30.0 – 32.0                                     | 29.0 – 33.0   | 29.0 – 33.0            |
| Fe %       | 0.6 – 1.0  | 0.4 – 1.0                                       | 0.4 – 1.0   | 0.4 – 1.0              |
| Mn %       | 0.5 – 1.0  | 0.5 – 1.5                                       | max. 1.0  | 0.2 – 1.0              |
| C %        | max. 0.04  | max. 0.05                                       | max. 0.05   |                        |
| Pb %       | max. 0.01  | max. 0.02                                       | max. 0.02   | max. 0.05              |
| S %        | max. 0.01  | max. 0.05                                       | max. 0.02   |                        |
| P %        | max. 0.01  | max. 0.02                                       | max. 0.02   |                        |
| Zn %       | max. 0.20  | max. 0.50                                       | max. 0.50   | max. 0.50              |
| Sn %       |  | max. 0.05                                       |   |                        |
| other imp. | max. 0.30  | max. 0.20                                       |   |                        |
| Cu %       | rem.   | rem.  | min. 65   | +Ni+Fe+Mn<br>min. 99.5 |

<sup>1)</sup> formerly BS 2871 Part 2

<sup>2)</sup> equal to C 71500 for subsequent welding

# Shipbuilding - Product Range

## OSNA®-10 and OSNA®-30 seawater pipes

- are manufactured in two configurations:
  - seamless
  - seamwelded

## OSNA®-10 (CuNi 90/10)

6-457 mm O.D.  
seamless,  
up to 1200 mm O.D.  
seam-welded

### *International Standards*

- EN 1652/12420/12449
- DIN 86019
- EEMUA 234/1-2
- ASTM-B-466/467
- MIL-T-16420 K
- JIS H 3300

## OSNA®-30 (CuNi 70/30)

6-323.9 mm O.D.  
seamless,  
up to 1200 mm O.D.  
seam-welded

### *International Standards*

- EN 1652/12420/12449 (CW354H)
- ASTM-B-466/467
- MIL-T-16420 K
- JIS H 3300

KME offers a comprehensive range of pipes and fittings in different sizes and dimensions for seawater piping systems in different applications.

*Furthermore, we are also offering sheets and plates in different sizes.*



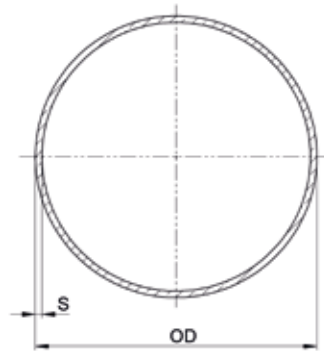
**Specifications:**

DIN 86019, DIN EN 12449 and similar\*.

**Material:**

OSNA®-10 (CuNi 90/10) and

OSNA®-30 (CuNi 70/30)



**Seamless Pipe**

| Size  |     |             | Wall Thickness |       |          |       |
|-------|-----|-------------|----------------|-------|----------|-------|
| DN    |     | OD          | Standard       |       | Special* |       |
| in    | mm  | mm          | S              | kg/m  | S        | kg/m  |
|       | 4   | 8           | 1              | 0.20  |          |       |
| 1/8   | 6   | 10          | 1              | 0.25  |          |       |
| 1/4   | 8   | 12          | 1              | 0.31  |          |       |
| 3/8   | 12  | 16          | 1              | 0.42  | 1.5      | 0.61  |
| 1/2   | 16  | 20          | 1              | 0.53  | 1.5      | 0.78  |
| 3/4   | 20  | 25          | 1.5            | 0.99  | 2        | 1.29  |
| 1     | 25  | 30          | 1.5            | 1.20  | 2        | 1.57  |
| 1 1/4 | 32  | 38          | 1.5            | 1.53  | 2        | 2.01  |
| 1 1/2 | 40  | 44.5        | 1.5            | 1.80  | 2        | 2.38  |
| 2     | 50  | 57          | 1.5            | 2.33  | 2        | 3.08  |
| 2 1/2 | 65  | 76          | 2              | 4.14  | 2.5      | 5.18  |
| 3     | 80  | 88.9 (89.0) | 2              | 4.87  | 2.5      | 6.09  |
| 4     | 100 | 108         | 2.5            | 7.37  | 3        | 8.84  |
| 5     | 125 | 133         | 2.5            | 9.12  | 3        | 10.94 |
| 6     | 150 | 159         | 2.5            | 10.93 | 3        | 13.08 |
| 7     | 175 | 194         | 3              | 16.01 |          |       |
| 8     | 200 | 219.1 (219) | 3              | 18.12 | 3.5      | 21.12 |
| 10    | 250 | 267         | 3              | 22.13 | 4        | 29.47 |
| 12    | 300 | 323.9 (324) | 4              | 35.80 | 5        | 44.75 |
| 14    | 350 | 368         | 4              | 40.70 | 5.5      | 55.96 |
| 16    | 400 | 419         | 4              | 46.40 | 6        | 69.60 |
| 18    | 450 | 457         | 4.5            | 57.48 |          |       |

For offshore wall thickness see separate catalogue.

**Seam welded Pipe**

|    |     |      |   |        |
|----|-----|------|---|--------|
| 20 | 500 | 508* | 5 | 70.32  |
| 24 | 600 | 610* | 5 | 84.56  |
| 28 | 700 | 711* | 6 | 118.28 |
| 32 | 800 | 813* | 6 | 135.38 |
| 36 | 900 | 914* | 8 | 202.66 |

Other dimensions on request.

\*) similar to

# Elbows

## Long radius 1.5 D

### Specification:

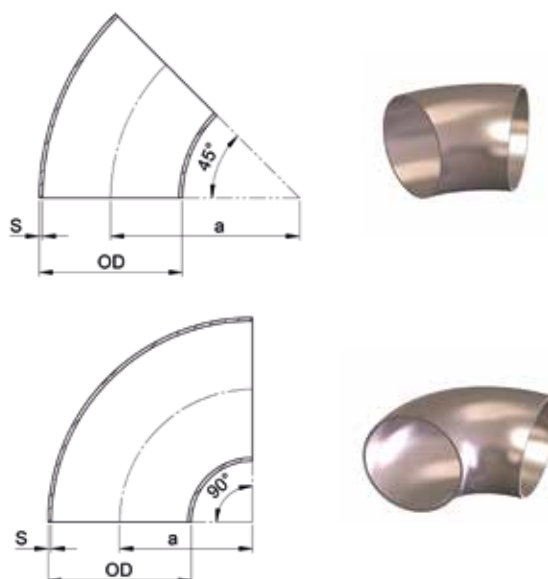
DIN 86090 and similar\*.

### Material:

OSNA<sup>®</sup>-10 - copper-nickel

### Type and Construction:

Elbows for pipes up to and including 14"/ 368 mm in size are normally supplied seamless. Elbows for larger diameter pipes are made from half shells, longitudinally welded. 45° and 90° elbows are available in all sizes.



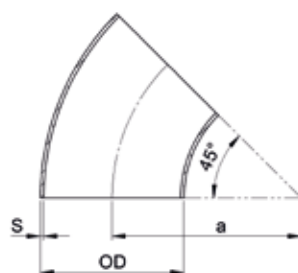
| Size            |          |          | Wall Thickness<br>S<br>mm | Radius<br>a<br>mm | ~ e<br>mm | Approx. Weight (~ kg) |        |
|-----------------|----------|----------|---------------------------|-------------------|-----------|-----------------------|--------|
| in              | DN<br>mm | OD<br>mm |                           |                   |           | 45°                   | 90°    |
| <b>Seamless</b> |          |          |                           |                   |           |                       |        |
| 1/2             | 16       | 20*      | 1                         | 25                | 10.4      | 0.013                 | 0.026  |
| 3/4             | 20       | 25*      | 1.5                       | 27.5              | 11.4      | 0.029                 | 0.058  |
| 1               | 25       | 30       | 1.5                       | 33.5              | 14        | 0.035                 | 0.07   |
| 1 1/4           | 32       | 38       | 1.5                       | 45                | 19        | 0.06                  | 0.12   |
| 1 1/2           | 40       | 44.5     | 1.5                       | 51                | 21        | 0.07                  | 0.15   |
| 2               | 50       | 57       | 1.5                       | 72                | 30        | 0.14                  | 0.29   |
| 2 1/2           | 65       | 76       | 2                         | 95                | 39        | 0.34                  | 0.69   |
| 3               | 80       | 89       | 2                         | 114.5             | 47        | 0.47                  | 0.95   |
| 4               | 100      | 108      | 2.5                       | 142.5             | 59        | 0.90                  | 1.80   |
| 5               | 125      | 133      | 2.5                       | 181               | 75        | 1.45                  | 2.90   |
| 6               | 150      | 159      | 2.5                       | 216               | 89        | 2.30                  | 4.60   |
| 7               | 175      | 194      | 3                         | 270               | 112       | 4.05                  | 8.10   |
| 8               | 200      | 219      | 3                         | 305               | 126       | 4.55                  | 9.10   |
| 10              | 250      | 267      | 3                         | 378               | 157       | 7.70                  | 15.40  |
| 12              | 300      | 324      | 4                         | 457               | 189       | 13.00                 | 26.00  |
| 14              | 350      | 368      | 4                         | 533.5             | 221       | 21.00                 | 42.00  |
| 16              | 400      | 419      | 4                         | 609.5             | 252       | 29.50                 | 59.00  |
| 18              | 450      | 457      | 4.5                       | 686               | 284       | 36.00                 | 72.00  |
| 20              | 500      | 508      | 5                         | 762               | 316       | 45.00                 | 90.00  |
| 24              | 600      | 610      | 5                         | 914               | 379       | 60.00                 | 120.00 |
| 28              | 700      | 711*     | 6                         | 1067              | 442       | 99.00                 | 198.00 |
| 32              | 800      | 813*     | 6                         | 1219              | 505       | 129.50                | 259.00 |
| 36              | 900      | 914*     | 8                         | 1372              | 568       | 218.50                | 437.00 |

Other dimensions on request.

\*) similar to

# Elbows

## Short radius 1.0 D



| Size            |     |          | Wall Thickness<br>S<br>mm | Radius<br>a<br>mm | e<br>mm | Approx. Weight (~kg) |        |
|-----------------|-----|----------|---------------------------|-------------------|---------|----------------------|--------|
| DN<br>in        | mm  | OD<br>mm |                           |                   |         | 45°                  | 90°    |
| <b>Seamless</b> |     |          |                           |                   |         |                      |        |
| 1               | 25  | 30       | 1.5                       | 30                | 12      | 0.029                | 0.058  |
| 1¼              | 32  | 38       | 1.5                       | 32.5              | 14      | 0.039                | 0.078  |
| 1½              | 40  | 44.5     | 1.5                       | 40                | 17      | 0.057                | 0.144  |
| 2               | 50  | 57       | 1.5                       | 52.5              | 22      | 0.96                 | 0.192  |
| 2½              | 65  | 76       | 2                         | 70                | 29      | 0.23                 | 0.46   |
| 3               | 80  | 89       | 2                         | 82.5              | 34      | 0.32                 | 0.64   |
| 4               | 100 | 108      | 2.5                       | 100               | 41      | 0.58                 | 1.16   |
| 5               | 125 | 133      | 2.5                       | 125               | 52      | 0.90                 | 1.80   |
| 6               | 150 | 159      | 2.5                       | 150               | 62      | 1.30                 | 2.60   |
| 7               | 175 | 194      | 3                         | 180               | 75      | 2.27                 | 4.54   |
| 8               | 200 | 219      | 3                         | 210               | 87      | 2.99                 | 5.98   |
| 10              | 250 | 267      | 3                         | 255               | 106     | 4.44                 | 8.88   |
| 12              | 300 | 324      | 4                         | 305               | 126     | 8.57                 | 17.14  |
| 14              | 350 | 368      | 4                         | 352.5             | 146     | 11.30                | 22.60  |
| 16              | 400 | 419      | 4                         | 400               | 166     | 14.58                | 29.16  |
| 18              | 450 | 457      | 4.5                       | 457               | 189     | 20.45                | 40.90  |
| 20              | 500 | 508      | 5                         | 508               | 210     | 28.06                | 56.12  |
| 24              | 600 | 610      | 5                         | 610               | 253     | 40.50                | 81.00  |
| 28              | 700 | 711      | 6                         | 711               | 295     | 66.00                | 132.00 |
| 32              | 800 | 813      | 6                         | 813               | 337     | 86.50                | 173.00 |
| 36              | 900 | 914      | 8                         | 914               | 379     | 145.50               | 291.00 |

Other dimensions on request.



# Tee Pieces, equal

**Specification**

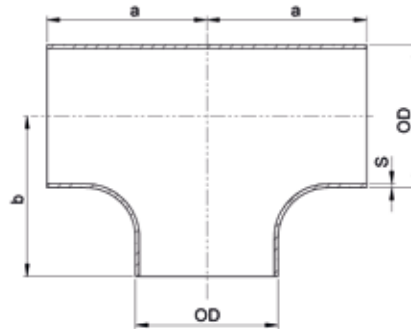
DIN 86088 and similar\*

**Material:**

OSNA®-10 – copper-nickel

**Type and Construction:**

Tees for pipes up to and including 8"/ 219 mm are normally supplied as one-piece and seamless.



| Size  |     |      | Wall Thickness<br>S | a   | b   | Approx.<br>Weight<br>kg /piece |
|-------|-----|------|---------------------|-----|-----|--------------------------------|
| in    | DN  | OD   |                     |     |     |                                |
| 1/2   | 16  | 20*  | 1                   | 25  | 25  | 0.11                           |
| 3/4   | 20  | 25*  | 1.5                 | 29  | 29  | 0.14                           |
| 1     | 25  | 30   | 1.5                 | 38  | 38  | 0.19                           |
| 1 1/4 | 32  | 38   | 1.5                 | 48  | 48  | 0.37                           |
| 1 1/2 | 40  | 44.5 | 1.5                 | 57  | 57  | 0.56                           |
| 2     | 50  | 57   | 1.5                 | 64  | 64  | 0.72                           |
| 2 1/2 | 65  | 76   | 2                   | 76  | 76  | 1.25                           |
| 3     | 80  | 89   | 2                   | 86  | 86  | 1.74                           |
| 4     | 100 | 108  | 2.5                 | 105 | 105 | 2.94                           |
| 5     | 125 | 133  | 2.5                 | 124 | 124 | 4.01                           |
| 6     | 150 | 159  | 2.5                 | 143 | 143 | 5.25                           |
| 8     | 200 | 219  | 3                   | 178 | 178 | 11.60                          |
| 10    | 250 | 267  | 3                   | 216 | 216 | 14.90                          |
| 12    | 300 | 324  | 4                   | 254 | 254 | 21.30                          |
| 14    | 350 | 368  | 4                   | 279 | 279 | 25.90                          |
| 16    | 400 | 419  | 4                   | 305 | 305 | 33.40                          |
| 18    | 450 | 457  | 4.5                 | 343 | 343 | 48.60                          |
| 20    | 500 | 508  | 5                   | 381 | 381 | 63.20                          |
| 24    | 600 | 610  | 5.5                 | 432 | 432 | 93.80                          |

Other dimensions on request.

\*) similar to

# Tee Pieces, reduced <sup>1)</sup>

## Specification

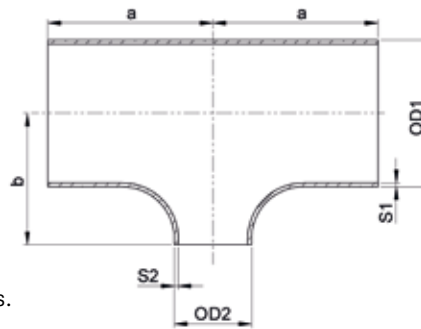
DIN 86088 and similar\*

## Material:

OSNA<sup>®</sup>-10 - copper-nickel

## Type and Construction:

Tees for pipes up to and including 8"/ 219 mm are normally supplied as one-piece and seamless.



<sup>1)</sup> final dimensions can be slightly different and can be provided on request.

| Size          |                 |                 | Wall Thickness |                | a   | b   | Approx. Weight<br>kg /piece |
|---------------|-----------------|-----------------|----------------|----------------|-----|-----|-----------------------------|
| DN            | OD <sub>1</sub> | OD <sub>2</sub> | S <sub>1</sub> | S <sub>2</sub> |     |     |                             |
| in            | mm              | mm              | mm             |                | mm  | mm  |                             |
| 3/4 x 1/2     | 20 x 16         | 25 x 20*        | 1.5 x 1.0      |                | 23  | 23  | 0.08                        |
| 1 x 1/2       | 25 x 16         | 30 x 20*        | 1.5 x 1.0      |                | 38  | 29  | 0.15                        |
| 1 x 3/4       | 25 x 20         | 30 x 25*        | 1.5 x 1.5      |                | 38  | 35  | 0.20                        |
| 1 1/4 x 1/2   | 32 x 16         | 38 x 20*        | 1.5 x 1.0      |                | 36  | 36  | 0.32                        |
| 1 1/4 x 3/4   | 32 x 20         | 38 x 25*        | 1.5 x 1.5      |                | 48  | 35  | 0.36                        |
| 1 1/4 x 1     | 32 x 25         | 38 x 30         | 1.5 x 1.5      |                | 48  | 42  | 0.38                        |
| 1 1/2 x 1/2   | 40 x 16         | 44.5 x 20*      | 1.5 x 1.0      |                | 36  | 36  | 0.42                        |
| 1 1/2 x 3/4   | 40 x 20         | 44.5 x 25*      | 1.5 x 1.5      |                | 57  | 40  | 0.48                        |
| 1 1/2 x 1     | 40 x 25         | 44.5 x 30       | 1.5 x 1.5      |                | 57  | 45  | 0.53                        |
| 1 1/2 x 1 1/4 | 40 x 32         | 44.5 x 38       | 1.5 x 1.5      |                | 57  | 51  | 0.59                        |
| 2 x 3/4       | 50 x 20         | 57 x 25*        | 1.5 x 1.5      |                | 64  | 47  | 0.60                        |
| 2 x 1         | 50 x 25         | 57 x 30         | 1.5 x 1.5      |                | 64  | 51  | 0.66                        |
| 2 x 1 1/4     | 50 x 32         | 57 x 38         | 1.5 x 1.5      |                | 64  | 57  | 0.74                        |
| 2 x 1 1/2     | 50 x 40         | 57 x 44.5       | 1.5 x 1.5      |                | 64  | 63  | 0.76                        |
| 2 1/2 x 1     | 65 x 25         | 76 x 30         | 2.0 x 1.5      |                | 76  | 56  | 1.01                        |
| 2 1/2 x 1 1/4 | 65 x 32         | 76 x 38         | 2.0 x 1.5      |                | 76  | 62  | 1.08                        |
| 2 1/2 x 1 1/2 | 65 x 40         | 76 x 44.5       | 2.0 x 1.5      |                | 76  | 71  | 1.12                        |
| 2 1/2 x 2     | 65 x 50         | 76 x 57         | 2.0 x 1.5      |                | 76  | 73  | 1.18                        |
| 3 x 1 1/4     | 80 x 32         | 89 x 38         | 2.0 x 1.5      |                | 86  | 73  | 1.32                        |
| 3 x 1 1/2     | 80 x 40         | 89 x 44.5       | 2.0 x 1.5      |                | 86  | 76  | 1.40                        |
| 3 x 2         | 80 x 50         | 89 x 57         | 2.0 x 1.5      |                | 86  | 80  | 1.44                        |
| 3 x 2 1/2     | 80 x 65         | 89 x 76         | 2.0 x 2.0      |                | 86  | 83  | 1.65                        |
| 4 x 1 1/2     | 100 x 40        | 108 x 44.5      | 2.5 x 1.5      |                | 105 | 89  | 2.40                        |
| 4 x 2         | 100 x 50        | 108 x 57        | 2.5 x 1.5      |                | 105 | 90  | 2.49                        |
| 4 x 2 1/2     | 100 x 65        | 108 x 76        | 2.5 x 2.0      |                | 105 | 92  | 2.43                        |
| 4 x 3         | 100 x 80        | 108 x 89        | 2.5 x 2.0      |                | 105 | 96  | 2.39                        |
| 5 x 2         | 125 x 50        | 133 x 57        | 2.5 x 1.5      |                | 124 | 98  | 3.66                        |
| 5 x 2 1/2     | 125 x 65        | 133 x 76        | 2.5 x 2.0      |                | 124 | 105 | 3.35                        |
| 5 x 3         | 125 x 80        | 133 x 89        | 2.5 x 2.0      |                | 124 | 108 | 3.36                        |
| 5 x 4         | 125 x 100       | 133 x 108       | 2.5 x 2.5      |                | 124 | 117 | 3.43                        |
| 6 x 2 1/2     | 150 x 65        | 159 x 76        | 2.5 x 2.0      |                | 143 | 118 | 4.51                        |
| 6 x 3         | 150 x 80        | 159 x 89        | 2.5 x 2.0      |                | 143 | 121 | 4.72                        |
| 6 x 4         | 150 x 100       | 159 x 108       | 2.5 x 2.5      |                | 143 | 130 | 4.92                        |
| 6 x 5         | 150 x 125       | 159 x 133       | 2.5 x 2.5      |                | 143 | 136 | 5.12                        |
| 8 x 4         | 200 x 100       | 219 x 108       | 3.0 x 2.5      |                | 178 | 156 | 8.97                        |
| 8 x 5         | 200 x 125       | 219 x 133       | 3.0 x 2.5      |                | 178 | 162 | 9.03                        |
| 8 x 6         | 200 x 150       | 219 x 159       | 3.0 x 2.5      |                | 178 | 168 | 9.03                        |

# Tee Pieces, reduced <sup>1)</sup>

| Size    |                 |                 | Wall Thickness |                | a   | b     | Approx. Weight<br>kg /piece |
|---------|-----------------|-----------------|----------------|----------------|-----|-------|-----------------------------|
| DN      | OD <sub>1</sub> | OD <sub>2</sub> | S <sub>1</sub> | S <sub>2</sub> |     |       |                             |
| in      | mm              | mm              | mm             | mm             | mm  | mm    |                             |
| 10 x 5  | 250 x 125       | 267 x 133       | 3 x 2.5        | 216            | 189 | 9.88  |                             |
| 10 x 6  | 250 x 150       | 267 x 159       | 3 x 2.5        | 216            | 194 | 10.40 |                             |
| 10 x 7  | 250 x 175       | 267 x 194       | 3 x 3          | 216            | 198 | 11.82 |                             |
| 10 x 8  | 250 x 200       | 267 x 219       | 3 x 3          | 216            | 203 | 13.85 |                             |
| 12 x 6  | 300 x 150       | 324 x 159       | 4 x 2.5        | 254            | 219 | 18.27 |                             |
| 12 x 7  | 300 x 175       | 324 x 194       | 4 x 3          | 254            | 222 | 19.0  |                             |
| 12 x 8  | 300 x 200       | 324 x 219       | 4 x 3          | 254            | 229 | 19.92 |                             |
| 12 x 10 | 300 x 250       | 324 x 267       | 4 x 3          | 254            | 241 | 20.31 |                             |
| 14 x 7  | 350 x 175       | 368 x 194       | 4 x 3          | 279            | 242 | 23.50 |                             |
| 14 x 8  | 350 x 200       | 368 x 219       | 4 x 3          | 279            | 248 | 24.10 |                             |
| 14 x 10 | 350 x 250       | 368 x 267       | 4 x 3          | 279            | 257 | 24.80 |                             |
| 14 x 12 | 350 x 300       | 368 x 324       | 4 x 4          | 279            | 270 | 25.40 |                             |
| 16 x 8  | 400 x 200       | 419 x 219       | 4 x 3          | 305            | 276 | 30.10 |                             |
| 16 x 10 | 400 x 250       | 419 x 267       | 4 x 3          | 305            | 283 | 30.50 |                             |
| 16 x 12 | 400 x 300       | 419 x 324       | 4 x 4          | 305            | 295 | 31.80 |                             |
| 16 x 14 | 400 x 350       | 419 x 368       | 4 x 4          | 305            | 305 | 32.50 |                             |
| 18 x 10 | 450 x 250       | 457 x 267       | 4.5 x 3        | 343            | 310 | 41.70 |                             |
| 18 x 12 | 450 x 300       | 457 x 324       | 4.5 x 4        | 343            | 321 | 43.20 |                             |
| 18 x 14 | 450 x 350       | 457 x 368       | 4.5 x 4        | 343            | 330 | 43.70 |                             |
| 18 x 16 | 450 x 400       | 457 x 419       | 4.5 x 4        | 343            | 330 | 46.20 |                             |
| 20 x 12 | 500 x 300       | 508 x 324       | 5 x 4          | 381            | 347 | 57.70 |                             |
| 20 x 14 | 500 x 350       | 508 x 368       | 5 x 4          | 381            | 356 | 58.40 |                             |
| 20 x 16 | 500 x 400       | 508 x 419       | 5 x 4          | 381            | 356 | 59.20 |                             |
| 20 x 18 | 500 x 450       | 508 x 457       | 5 x 4.5        | 381            | 368 | 60.70 |                             |
| 24 x 14 | 600 x 350       | 610 x 368       | 5 x 4          | 432            | 393 | 84.50 |                             |
| 24 x 16 | 600 x 400       | 610 x 419       | 5 x 4          | 432            | 406 | 85.50 |                             |
| 24 x 18 | 600 x 450       | 610 x 457       | 5 x 4.5        | 432            | 419 | 86.90 |                             |
| 24 x 20 | 600 x 500       | 610 x 508       | 5.5 x 5        | 432            | 432 | 89.40 |                             |

Other dimensions on request.

\*) similar to

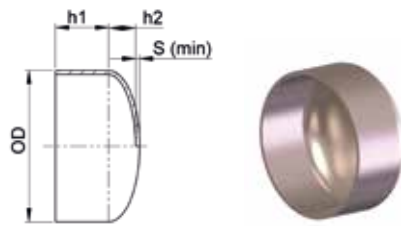
# End Caps

## Specification

DIN 28011

## Material:

OSNA®-10 - copper-nickel



| Size |     |       | S   | h <sub>1</sub> | h <sub>2</sub> | Approx. Weight |
|------|-----|-------|-----|----------------|----------------|----------------|
| in   | DN  | OD    |     |                |                |                |
| 1    | 25  | 30    | 1.5 | 15             | 5              | 0.03           |
| 1¼   | 32  | 38    | 1.5 | 15             | 7              | 0.05           |
| 1½   | 40  | 44.5  | 1.5 | 15             | 8              | 0.06           |
| 2    | 50  | 57    | 1.5 | 20             | 10             | 0.10           |
| 2½   | 65  | 76    | 2   | 20             | 14             | 0.20           |
| 3    | 80  | 89    | 2   | 20             | 16             | 0.26           |
| 4    | 100 | 108   | 2.5 | 20             | 20             | 0.45           |
| 5    | 125 | 133   | 2.5 | 20             | 25             | 0.63           |
| 6    | 150 | 159   | 2.5 | 20             | 29             | 0.85           |
| 7    | 175 | 194   | 3   | 20             | 36             | 1.45           |
| 8    | 200 | 219   | 3   | 20             | 41             | 1.79           |
| 10   | 250 | 267   | 3   | 20             | 50             | 2.56           |
| 12   | 300 | 324   | 4   | 20             | 61             | 4.82           |
| 14   | 350 | 368   | 4   | 20             | 69             | 6.15           |
| 16   | 400 | 419   | 4   | 20             | 79             | 7.83           |
| 18   | 450 | 457   | 4.5 | 20             | 86             | 10.36          |
| 20   | 500 | 508   | 5   | 20             | 96             | 14.05          |
| 24   | 600 | 610   | 5   | 20             | 116            | 19.89          |
| 28   | 700 | 711   | 6   | 25             | 135            | 32.65          |
| 32   | 800 | 813   | 6   | 25             | 155            | 42.16          |
| 36½  | 900 | 914.5 | 8   | 35             | 173            | 72.65          |

Other dimensions on request.

# Saddle Type Connections

**Specification:**

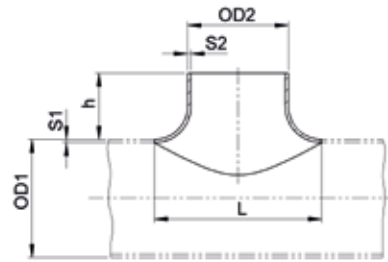
DIN 86087 and similar\*

**Material:**

OSNA®-10 – copper-nickel

**Dimensions:**

To suit appropriate header and branch pipe diameters and thicknesses.



**Type and Construction:**

Saddles for pipes up to and including 14"/ 368 mm are normally supplied as one-piece and seamless.

| Size          |                 |                 | Wall Thickness |                | Height | Length | Approx. Weight |
|---------------|-----------------|-----------------|----------------|----------------|--------|--------|----------------|
| DN            | OD <sub>1</sub> | OD <sub>2</sub> | S <sub>1</sub> | S <sub>2</sub> | h      | L      |                |
| in            | mm              | mm              | mm             |                | mm     | mm     | kg /piece      |
| 1/2 x 1/2     | 16 x 16         | 20 x 20*        | 1 x 1          |                | 20     | 32     | 0.05           |
| 3/4 x 1/2     | 20 x 16         | 25 x 20*        | 1.5 x 1        |                | 20     | 40     | 0.06           |
| 3/4 x 3/4     | 20 x 20         | 25 x 25*        | 1.5 x 1.5      |                | 22     | 40     | 0.07           |
| 1 x 3/4       | 25 x 20         | 30 x 25*        | 1.5 x 1.5      |                | 22     | 40     | 0.08           |
| 1 x 1         | 25 x 25         | 30 x 30*        | 1.5 x 1.5      |                | 30     | 50     | 0.09           |
| 1 1/4 x 1     | 32 x 25         | 38 x 30*        | 1.5 x 1.5      |                | 30     | 50     | 0.10           |
| 1 1/4 x 1 1/4 | 32 x 32         | 38 x 38         | 1.5 x 1.5      |                | 35     | 64     | 0.11           |
| 1 1/2 x 1 1/4 | 40 x 32         | 44.5 x 38       | 1.5 x 1.5      |                | 35     | 64     | 0.14           |
| 1 1/2 x 1 1/2 | 40 x 40         | 44.5 x 44.5     | 1.5 x 1.5      |                | 35     | 74     | 0.15           |
| 2 x 1 1/4     | 50 x 32         | 57 x 38         | 1.5 x 1.5      |                | 35     | 64     | 0.15           |
| 2 x 1 1/2     | 50 x 40         | 57 x 44.5       | 1.5 x 1.5      |                | 35     | 74     | 0.17           |
| 2 x 2         | 50 x 50         | 57 x 57         | 1.5 x 1.5      |                | 40     | 97     | 0.25           |
| 2 1/2 x 1 1/4 | 65 x 32         | 76 x 38         | 2 x 1.5        |                | 35     | 64     | 0.34           |
| 2 1/2 x 1 1/2 | 65 x 40         | 76 x 44.5       | 2 x 1.5        |                | 35     | 74     | 0.30           |
| 2 1/2 x 2     | 65 x 50         | 76 x 57         | 2 x 1.5        |                | 40     | 97     | 0.52           |
| 2 1/2 x 2 1/2 | 65 x 65         | 76 x 76         | 2 x 2          |                | 50     | 126    | 0.48           |
| 3 x 1 1/4     | 80 x 32         | 89 x 38         | 2 x 1.5        |                | 35     | 64     | 0.36           |
| 3 x 1 1/2     | 80 x 40         | 89 x 44.5       | 2 x 1.5        |                | 35     | 74     | 0.44           |
| 3 x 2         | 80 x 50         | 89 x 57         | 2 x 1.5        |                | 40     | 97     | 0.56           |
| 3 x 2 1/2     | 80 x 65         | 89 x 76         | 2 x 2          |                | 50     | 126    | 0.55           |
| 3 x 3         | 80 x 80         | 89 x 89         | 2 x 2          |                | 55     | 149    | 0.76           |
| 4 x 1 1/2     | 100 x 40        | 108 x 44.5      | 2.5 x 1.5      |                | 35     | 74     | 0.32           |
| 4 x 2         | 100 x 50        | 108 x 57        | 2.5 x 1.5      |                | 40     | 97     | 0.40           |
| 4 x 2 1/2     | 100 x 65        | 108 x 76        | 2.5 x 2        |                | 50     | 126    | 0.65           |
| 4 x 3         | 100 x 80        | 108 x 89        | 2.5 x 2        |                | 55     | 149    | 0.79           |
| 4 x 4         | 100 x 100       | 108 x 108       | 2.5 x 2.5      |                | 75     | 188    | 1.30           |

\*) similar to



# Saddle Type Connections *(continued)*

**Specification:**

DIN 86087 and similar\*

**Material:**

OSNA®-10 - copper-nickel

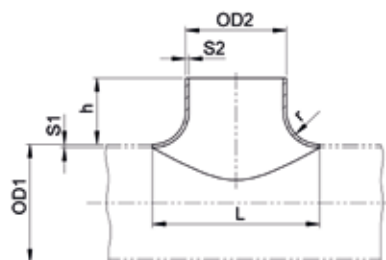
**Dimensions:**

To suit appropriate header and branch pipe diameters and thicknesses.

**Type and Construction:**

Saddles for pipes up to and including 14"/ 368 mm are normally supplied as one-piece and seamless.

| Size    |           |                                       | Wall Thickness |                | Height | Length | Approx. Weight |
|---------|-----------|---------------------------------------|----------------|----------------|--------|--------|----------------|
| in      | DN        | OD <sub>1</sub> OD <sub>2</sub><br>mm | S <sub>1</sub> | S <sub>2</sub> | h      | L      | kg /piece      |
|         | mm        |                                       | mm             |                | mm     | mm     |                |
| 5 x 2   | 125 x 50  | 133 x 57                              | 2.5 x 1.5      |                | 40     | 97     | 0.40           |
| 5 x 2½  | 125 x 65  | 133 x 76                              | 2.5 x 2        |                | 50     | 126    | 0.80           |
| 5 x 3   | 125 x 80  | 133 x 89                              | 2.5 x 2        |                | 55     | 149    | 1.00           |
| 5 x 4   | 125 x 100 | 133 x 108                             | 2.5 x 2.5      |                | 75     | 188    | 1.20           |
| 5 x 5   | 125 x 125 | 133 x 133                             | 2.5 x 2.5      |                | 85     | 233    | 1.70           |
| 6 x 2½  | 150 x 65  | 159 x 76                              | 2.5 x 2        |                | 50     | 126    | 0.65           |
| 6 x 3   | 150 x 80  | 159 x 89                              | 2.5 x 2        |                | 55     | 149    | 1.18           |
| 6 x 4   | 150 x 100 | 159 x 108                             | 2.5 x 2.5      |                | 75     | 188    | 1.20           |
| 6 x 5   | 150 x 125 | 159 x 133                             | 2.5 x 2.5      |                | 85     | 233    | 2.00           |
| 6 x 6   | 150 x 150 | 159 x 159                             | 2.5 x 2.5      |                | 95     | 279    | 2.60           |
| 7 x 2½  | 175 x 65  | 194 x 76*                             | 3 x 2          |                | 50     | 126    | 1.20           |
| 7 x 3   | 175 x 80  | 194 x 89                              | 3 x 2          |                | 55     | 149    | 1.35           |
| 7 x 4   | 175 x 100 | 194 x 108                             | 3 x 2.5        |                | 75     | 188    | 1.42           |
| 7 x 5   | 175 x 125 | 194 x 133                             | 3 x 2.5        |                | 85     | 233    | 1.90           |
| 7 x 6   | 175 x 150 | 194 x 159                             | 3 x 2.5        |                | 95     | 279    | 2.55           |
| 7 x 7   | 175 x 175 | 194 x 194                             | 3 x 3          |                | 110    | 334    | 3.25           |
| 8 x 3   | 200 x 80  | 219 x 89                              | 3 x 2          |                | 55     | 149    | 1.32           |
| 8 x 4   | 200 x 100 | 219 x 108                             | 3 x 2.5        |                | 75     | 188    | 1.80           |
| 8 x 5   | 200 x 125 | 219 x 133                             | 3 x 2.5        |                | 85     | 233    | 2.70           |
| 8 x 6   | 200 x 150 | 219 x 159                             | 3 x 2.5        |                | 95     | 279    | 3.80           |
| 8 x 7   | 200 x 175 | 219 x 194                             | 3 x 3          |                | 110    | 334    | 4.50           |
| 8 x 8   | 200 x 200 | 219 x 219                             | 3 x 3          |                | 125    | 379    | 5.70           |
| 10 x 4  | 250 x 100 | 267 x 108                             | 3 x 2.5        |                | 75     | 188    | 1.85           |
| 10 x 5  | 250 x 125 | 267 x 133                             | 3 x 2.5        |                | 85     | 233    | 2.35           |
| 10 x 6  | 250 x 150 | 267 x 159                             | 3 x 2.5        |                | 95     | 279    | 3.70           |
| 10 x 7  | 250 x 175 | 267 x 194                             | 3 x 3          |                | 110    | 334    | 4.70           |
| 10 x 8  | 250 x 200 | 267 x 219                             | 3 x 3          |                | 125    | 379    | 6.10           |
| 10 x 10 | 250 x 250 | 267 x 267                             | 3 x 3          |                | 155    | 447    | 7.90           |
| 12 x 5  | 300 x 125 | 324 x 133                             | 4 x 2.5        |                | 85     | 233    | 2.60           |
| 12 x 6  | 300 x 150 | 324 x 159                             | 4 x 2.5        |                | 95     | 279    | 3.80           |
| 12 x 7  | 300 x 175 | 324 x 194                             | 4 x 3          |                | 110    | 334    | 4.90           |
| 12 x 8  | 300 x 200 | 324 x 219                             | 4 x 3          |                | 125    | 379    | 5.80           |
| 12 x 10 | 300 x 250 | 324 x 267                             | 4 x 3          |                | 155    | 447    | 10.30          |
| 12 x 12 | 300 x 300 | 324 x 324                             | 4 x 4          |                | 185    | 560    | 16.50          |



| Size    |    |           | Wall Thickness  |                 | Height | Length | Approx. Weight |
|---------|----|-----------|-----------------|-----------------|--------|--------|----------------|
| in      | DN | mm        | OD <sub>1</sub> | OD <sub>2</sub> | h      | L      | kg /piece      |
|         |    |           | mm              |                 | mm     | mm     |                |
|         |    |           | S <sub>1</sub>  | S <sub>2</sub>  |        |        |                |
|         |    |           | mm              |                 |        |        |                |
| 14 x 6  |    | 350 x 150 | 368             | x 159           | 95     | 279    | 3.60           |
| 14 x 7  |    | 350 x 175 | 368             | x 194           | 110    | 334    | 4.90           |
| 14 x 8  |    | 350 x 200 | 368             | x 219           | 125    | 379    | 5.80           |
| 14 x 10 |    | 350 x 250 | 368             | x 267           | 155    | 447    | 9.70           |
| 14 x 12 |    | 350 x 300 | 368             | x 324           | 185    | 560    | 16.80          |
| 14 x 14 |    | 350 x 350 | 368             | x 368           | 200    | 613    | 25.0           |
| 16 x 6  |    | 400 x 150 | 419             | x 159*          | 95     | 279    | 3.65           |
| 16 x 7  |    | 400 x 175 | 419             | x 194           | 110    | 334    | 4.90           |
| 16 x 8  |    | 400 x 200 | 419             | x 219           | 125    | 379    | 5.80           |
| 16 x 10 |    | 400 x 250 | 419             | x 267           | 155    | 447    | 9.70           |
| 16 x 12 |    | 400 x 300 | 419             | x 324           | 185    | 560    | 16.80          |
| 16 x 14 |    | 400 x 350 | 419             | x 368           | 200    | 613    | 25.0           |
| 16 x 16 |    | 400 x 400 | 419             | x 419           | 225    | 680    | 33.0           |
| 18 x 6  |    | 450 x 150 | 457             | x 159*          | 95     | 279    | 3.60           |
| 18 x 7  |    | 450 x 175 | 457             | x 194*          | 110    | 334    | 4.90           |
| 18 x 8  |    | 450 x 200 | 457             | x 219           | 125    | 379    | 5.80           |
| 18 x 10 |    | 450 x 250 | 457             | x 267           | 155    | 447    | 9.70           |
| 18 x 12 |    | 450 x 300 | 457             | x 324           | 185    | 560    | 16.80          |
| 18 x 14 |    | 450 x 350 | 457             | x 368           | 200    | 613    | 25.0           |
| 18 x 16 |    | 450 x 400 | 457             | x 419           | 225    | 680    | 33.0           |
| 18 x 18 |    | 450 x 450 | 457             | x 457           | 250    | 800    | 41.0           |
| 20 x 6  |    | 500 x 150 | 508             | x 159*          | 95     | 279    | 5.40           |
| 20 x 7  |    | 500 x 175 | 508             | x 194*          | 110    | 334    | 6.50           |
| 20 x 8  |    | 500 x 200 | 508             | x 219*          | 125    | 379    | 7.70           |
| 20 x 10 |    | 500 x 250 | 508             | x 267           | 155    | 447    | 9.70           |
| 20 x 12 |    | 500 x 300 | 508             | x 324           | 185    | 560    | 16.80          |
| 20 x 14 |    | 500 x 350 | 508             | x 368           | 200    | 613    | 25.0           |
| 20 x 16 |    | 500 x 400 | 508             | x 419           | 225    | 680    | 33.0           |
| 20 x 18 |    | 500 x 450 | 508             | x 457           | 250    | 800    | 41.0           |
| 20 x 20 |    | 500 x 500 | 508             | x 508           | 275    | 880    | 55.0           |
| 24 x 12 |    | 600 x 300 | 610             | x 324           | 185    | 560    | 16.80          |
| 24 x 14 |    | 600 x 350 | 610             | x 368           | 200    | 613    | 25.0           |
| 24 x 16 |    | 600 x 400 | 610             | x 419           | 225    | 680    | 33.0           |
| 24 x 18 |    | 600 x 450 | 610             | x 457           | 250    | 800    | 41.5           |

Other dimensions on request.

\*) similar to

**Specification:**

DIN 86089 and similar\*

**Material:**

OSNA®-10 – copper-nickel

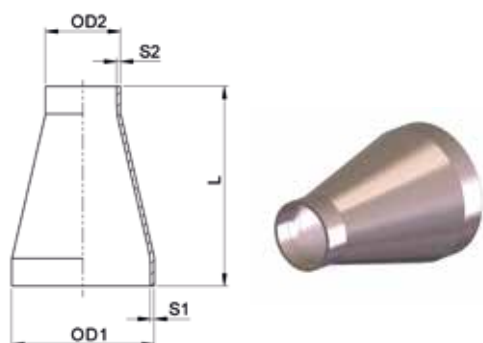
**Type and Construction:**

*Concentric* reducers up to and including 14"/368mm are normally supplied as one-piece and seamless.

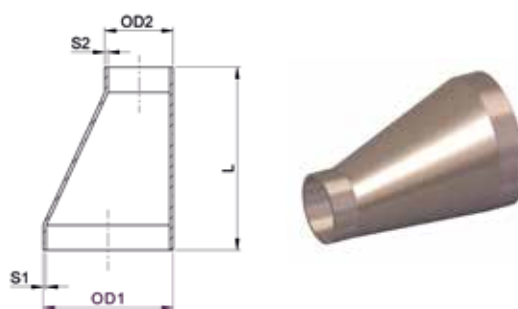
*Eccentric* reducers up to and including 14"/368mm are normally supplied as one-piece and seamless.

| Size          |          |                 | Wall Thickness  |                | Length         | Approx. Weight |           |
|---------------|----------|-----------------|-----------------|----------------|----------------|----------------|-----------|
| DN            |          | OD <sub>1</sub> | OD <sub>2</sub> | S <sub>1</sub> | S <sub>2</sub> | L              | kg /piece |
| in            | mm       | mm              |                 | mm             |                | mm             |           |
| 1/2 x 3/8     | 16 x 12  | 20 x 16*        |                 | 1 x 1          |                | 30             | 0.01      |
| 3/4 x 3/8     | 20 x 12  | 25 x 16*        |                 | 1.5 x 1        |                | 30             | 0.02      |
| 3/4 x 1/2     | 20 x 16  | 25 x 20*        |                 | 1.5 x 1        |                | 30             | 0.03      |
| 1 x 3/8       | 25 x 12  | 30 x 16*        |                 | 1.5 x 1        |                | 35             | 0.03      |
| 1 x 1/2       | 25 x 16  | 30 x 20*        |                 | 1.5 x 1        |                | 35             | 0.04      |
| 1 x 3/4       | 25 x 20  | 30 x 25         |                 | 1.5 x 1.5      |                | 35             | 0.06      |
| 1 1/4 x 3/8   | 32 x 12  | 38 x 16*        |                 | 1.5 x 1        |                | 50             | 0.05      |
| 1 1/4 x 1/2   | 32 x 16  | 38 x 20*        |                 | 1.5 x 1        |                | 50             | 0.06      |
| 1 1/4 x 3/4   | 32 x 20  | 38 x 25         |                 | 1.5 x 1.5      |                | 50             | 0.08      |
| 1 1/4 x 1     | 32 x 25  | 38 x 30         |                 | 1.5 x 1.5      |                | 50             | 0.10      |
| 1 1/2 x 1/2   | 40 x 16  | 44.5 x 20*      |                 | 1.5 x 1        |                | 80             | 0.09      |
| 1 1/2 x 3/4   | 40 x 20  | 44.5 x 25       |                 | 1.5 x 1.5      |                | 80             | 0.15      |
| 1 1/2 x 1     | 40 x 25  | 44.5 x 30       |                 | 1.5 x 1.5      |                | 80             | 0.16      |
| 1 1/2 x 1 1/4 | 40 x 32  | 44.5 x 38       |                 | 1.5 x 1.5      |                | 80             | 0.17      |
| 2 x 3/4       | 50 x 20  | 57 x 25         |                 | 1.5 x 1.5      |                | 80             | 0.17      |
| 2 x 1         | 50 x 25  | 57 x 30         |                 | 1.5 x 1.5      |                | 80             | 0.18      |
| 2 x 1 1/4     | 50 x 32  | 57 x 38         |                 | 1.5 x 1.5      |                | 80             | 0.19      |
| 2 x 1 1/2     | 50 x 40  | 57 x 44.5       |                 | 1.5 x 1.5      |                | 80             | 0.21      |
| 2 1/2 x 1     | 65 x 25  | 76 x 30         |                 | 2 x 1.5        |                | 90             | 0.28      |
| 2 1/2 x 1 1/4 | 65 x 32  | 76 x 38         |                 | 2 x 1.5        |                | 90             | 0.29      |
| 2 1/2 x 1 1/2 | 65 x 40  | 76 x 44.5       |                 | 2 x 1.5        |                | 90             | 0.30      |
| 2 1/2 x 2     | 65 x 50  | 76 x 57         |                 | 2 x 1.5        |                | 90             | 0.31      |
| 3 x 1 1/4     | 80 x 32  | 89 x 38         |                 | 2 x 1.5        |                | 90             | 0.33      |
| 3 x 1 1/2     | 80 x 40  | 89 x 44.5       |                 | 2 x 1.5        |                | 90             | 0.35      |
| 3 x 2         | 80 x 50  | 89 x 57         |                 | 2 x 1.5        |                | 90             | 0.37      |
| 3 x 2 1/2     | 80 x 65  | 89 x 76         |                 | 2 x 2          |                | 90             | 0.39      |
| 4 x 1 1/2     | 100 x 40 | 108 x 44.5      |                 | 2.5 x 1.5      |                | 100            | 0.59      |
| 4 x 2         | 100 x 50 | 108 x 57        |                 | 2.5 x 1.5      |                | 100            | 0.61      |
| 4 x 2 1/2     | 100 x 65 | 108 x 76        |                 | 2.5 x 2        |                | 100            | 0.63      |
| 4 x 3         | 100 x 80 | 108 x 89        |                 | 2.5 x 2        |                | 100            | 0.65      |

concentric



eccentric

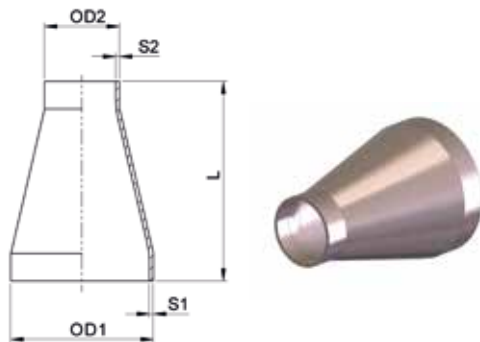


| Size    |                 |                 | Wall Thickness |                | Length<br>L | Approx.<br>Weight<br>kg /piece |
|---------|-----------------|-----------------|----------------|----------------|-------------|--------------------------------|
| DN      | OD <sub>1</sub> | OD <sub>2</sub> | S <sub>1</sub> | S <sub>2</sub> |             |                                |
| in      | mm              | mm              | mm             |                | mm          |                                |
| 5 x 2   | 125 x 50        | 133 x 57        | 2.5 x 1.5      |                | 140         | 1.22                           |
| 5 x 2½  | 125 x 65        | 133 x 76        | 2.5 x 2        |                | 140         | 1.25                           |
| 5 x 3   | 125 x 80        | 133 x 89        | 2.5 x 2        |                | 140         | 1.29                           |
| 5 x 4   | 125 x 100       | 133 x 108       | 2.5 x 2.5      |                | 140         | 1.45                           |
| 6 x 2½  | 150 x 65        | 159 x 76        | 2.5 x 2        |                | 150         | 1.53                           |
| 6 x 3   | 150 x 80        | 159 x 89        | 2.5 x 2        |                | 150         | 1.57                           |
| 6 x 4   | 150 x 100       | 159 x 108       | 2.5 x 2.5      |                | 150         | 1.76                           |
| 6 x 5   | 150 x 125       | 159 x 133       | 2.5 x 2.5      |                | 150         | 1.89                           |
| 7 x 3   | 175 x 80        | 194 x 89*       | 3 x 2          |                | 155         | 1.94                           |
| 7 x 4   | 175 x 100       | 194 x 108       | 3 x 2.5        |                | 155         | 2.60                           |
| 7 x 5   | 175 x 125       | 194 x 133       | 3 x 2.5        |                | 155         | 2.71                           |
| 7 x 6   | 175 x 150       | 194 x 159       | 3 x 2.5        |                | 155         | 2.86                           |
| 8 x 4   | 200 x 100       | 219 x 108       | 3 x 2.5        |                | 155         | 2.65                           |
| 8 x 5   | 200 x 125       | 219 x 133       | 3 x 2.5        |                | 155         | 2.75                           |
| 8 x 6   | 200 x 150       | 219 x 159       | 3 x 2.5        |                | 155         | 2.96                           |
| 8 x 7   | 200 x 175       | 219 x 194       | 3 x 3          |                | 155         | 3.00                           |
| 10 x 5  | 250 x 125       | 267 x 133       | 3 x 2.5        |                | 210         | 5.10                           |
| 10 x 6  | 250 x 150       | 267 x 159       | 3 x 2.5        |                | 210         | 5.30                           |
| 10 x 7  | 250 x 175       | 267 x 194       | 3 x 3          |                | 210         | 5.56                           |
| 10 x 8  | 250 x 200       | 267 x 219       | 3 x 3          |                | 210         | 6.00                           |
| 12 x 5  | 300 x 125       | 324 x 133*      | 4 x 2.5        |                | 210         | 6.85                           |
| 12 x 6  | 300 x 150       | 324 x 159       | 4 x 2.5        |                | 210         | 7.02                           |
| 12 x 7  | 300 x 175       | 324 x 194       | 4 x 3          |                | 210         | 7.28                           |
| 12 x 8  | 300 x 200       | 324 x 219       | 4 x 3          |                | 210         | 7.40                           |
| 12 x 10 | 300 x 250       | 324 x 267       | 4 x 3          |                | 210         | 7.55                           |

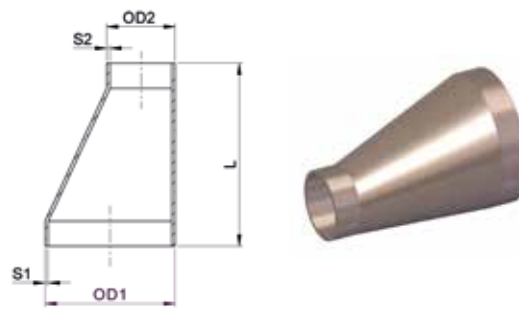
\*) similar to

# Reducers (continued)

concentric



eccentric



| Size    |    |           | Wall Thickness  |                 | Length         | Approx. Weight |     |           |
|---------|----|-----------|-----------------|-----------------|----------------|----------------|-----|-----------|
| in      | DN | mm        | OD <sub>1</sub> | OD <sub>2</sub> | S <sub>1</sub> | S <sub>2</sub> | L   | kg /piece |
|         |    |           | mm              |                 | mm             |                | mm  |           |
| 14 x 6  |    | 350 x 150 | 368             | 159*            | 4 x 2.5        |                | 300 | 10.75     |
| 14 x 7  |    | 350 x 175 | 368             | 194             | 4 x 3          |                | 300 | 10.95     |
| 14 x 8  |    | 350 x 200 | 368             | 219             | 4 x 3          |                | 300 | 11.10     |
| 14 x 10 |    | 350 x 250 | 368             | 267             | 4 x 3          |                | 300 | 11.80     |
| 14 x 12 |    | 350 x 300 | 368             | 324             | 4 x 4          |                | 300 | 12.20     |
| 16 x 7  |    | 400 x 175 | 419             | 194*            | 4 x 3          |                | 325 | 14.80     |
| 16 x 8  |    | 400 x 200 | 419             | 219             | 4 x 3          |                | 325 | 15.31     |
| 16 x 10 |    | 400 x 250 | 419             | 267             | 4 x 3          |                | 325 | 15.93     |
| 16 x 12 |    | 400 x 300 | 419             | 324             | 4 x 4          |                | 325 | 16.77     |
| 16 x 14 |    | 400 x 350 | 419             | 368             | 4 x 4          |                | 325 | 17.68     |
| 18 x 8  |    | 450 x 200 | 457             | 219*            | 4.5 x 3        |                | 350 | 21.40     |
| 18 x 10 |    | 450 x 250 | 457             | 267             | 4.5 x 3        |                | 350 | 21.90     |
| 18 x 12 |    | 450 x 300 | 457             | 324             | 4.5 x 3        |                | 350 | 22.70     |
| 18 x 14 |    | 450 x 350 | 457             | 368             | 4.5 x 4        |                | 350 | 23.20     |
| 18 x 16 |    | 450 x 400 | 457             | 419             | 4.5 x 4        |                | 350 | 23.70     |
| 20 x 10 |    | 500 x 250 | 508             | 267*            | 5 x 3          |                | 375 | 28.70     |
| 20 x 12 |    | 500 x 300 | 508             | 324             | 5 x 4          |                | 375 | 29.50     |
| 20 x 14 |    | 500 x 350 | 508             | 368             | 5 x 4          |                | 375 | 29.70     |
| 20 x 16 |    | 500 x 400 | 508             | 419             | 5 x 4          |                | 375 | 30.10     |
| 20 x 18 |    | 500 x 450 | 508             | 457             | 5 x 4.5        |                | 375 | 30.90     |
| 24 x 14 |    | 600 x 350 | 610             | 368             | 5 x 4          |                | 400 | 45.70     |
| 24 x 16 |    | 600 x 400 | 610             | 419             | 5 x 4          |                | 400 | 46.50     |
| 24 x 18 |    | 600 x 450 | 610             | 457             | 5 x 4.5        |                | 400 | 47.40     |
| 24 x 20 |    | 600 x 500 | 610             | 508             | 5 x 5          |                | 400 | 48.20     |

Other dimensions on request.

\*) similar to



# Welding Necks

**Specification:**

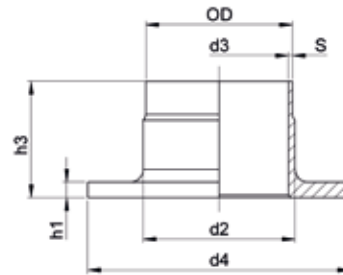
DIN 86037 -2 compatible  
with Outer Flanges PN 10, 16

**Material:**

OSNA®-10 – copper-nickel

**Type and Construction:**

Weld neck flanges up to and including  
12"/ 324 mm are normally supplied as  
one-piece and seamless.



| Size |      |      | Wall Thickness |                |                |                |                |                |           | Approx. Weight |
|------|------|------|----------------|----------------|----------------|----------------|----------------|----------------|-----------|----------------|
| in   | DN   | OD   | S              | d <sub>2</sub> | d <sub>3</sub> | d <sub>4</sub> | h <sub>1</sub> | h <sub>3</sub> | kg /piece |                |
|      | mm   | mm   | mm             | mm             | mm             | mm             | mm             | mm             |           |                |
| ¾    | 20   | 25   | 1.5            | 27             | 22             | 58             | 5              | 40             | 0.15      |                |
| ¾    | 20   | 25   | 2              | 27             | 21             | 58             | 5              | 40             | 0.16      |                |
| 1    | 25   | 30   | 1.5            | 32             | 27             | 68             | 5              | 40             | 0.20      |                |
| 1    | 25   | 30   | 2              | 32             | 26             | 68             | 5              | 40             | 0.21      |                |
| 1¼   | 32   | 38   | 1.5            | 40             | 35             | 78             | 5              | 40             | 0.25      |                |
| 1¼   | 32   | 38   | 2              | 40             | 34             | 78             | 5              | 40             | 0.27      |                |
| 1½   | 40   | 44.5 | 1.5            | 46.5           | 41.5           | 88             | 6              | 45             | 0.36      |                |
| 1½   | 40   | 44.5 | 2              | 46.5           | 40.5           | 88             | 6              | 45             | 0.38      |                |
| 2    | 50   | 57   | 1.5            | 59             | 54             | 102            | 6              | 45             | 0.45      |                |
| 2    | 50   | 57   | 2              | 59             | 53             | 102            | 6              | 45             | 0.48      |                |
| 2½   | 65   | 76   | 2              | 78             | 72             | 122            | 6              | 45             | 0.62      |                |
| 3    | 80   | 89   | 2              | 91             | 85             | 138            | 7              | 50             | 0.86      |                |
| 4    | 100  | 108  | 2.5            | 110            | 103            | 158            | 7              | 50             | 1.10      |                |
| 5    | 125  | 133  | 2.5            | 135.5          | 128            | 188            | 7              | 50             | 1.50      |                |
| 6    | 150  | 159  | 2.5            | 161.5          | 154            | 212            | 9              | 50             | 2.00      |                |
| 7    | 175  | 194  | 3              | 197            | 188            | 242            | 9              | 50             | 2.40      |                |
| 8    | 200  | 219  | 3              | 222            | 213            | 268            | 9              | 50             | 2.70      |                |
| 10   | 250  | 267  | 3              | 270            | 261            | 320            | 9              | 50             | 3.40      |                |
| 12   | 300  | 324  | 4              | 327            | 316            | 370            | 11             | 50             | 4.60      |                |
| 14   | 350  | 368  | 4              | 371            | 360            | 430            | 11             | 50             | 6.30      |                |
| 16   | 400  | 419  | 4              | 422            | 411            | 482            | 12             | 50             | 7.50      |                |
| 18   | 450  | 457  | 4              | 460            | 449            | 530            | 12             | 50             | 9.00      |                |
| 20   | 500  | 508  | 4.5            | 511            | 499            | 585            | 12             | 50             | 11.00     |                |
| 24   | 600  | 610  | 4.5            | 613            | 601            | 685            | 14             | 60             | 15.00     |                |
| 28   | 700  | 711  | 6              | 714            | 699            | 800            | 14             | 60             | 21.00     |                |
| 32   | 800  | 813  | 6              | 816            | 801            | 905            | 14             | 60             | 24.00     |                |
| 36   | 900  | 914  | 8              | 918            | 898            | 1000           | 14             | 60             | 29.00     |                |
| 40   | 1000 | 1016 | 8              | 1018           | 1000           | 1110           | 14             | 60             | 34.00     |                |
| 48   | 1200 | 1220 | 8              | 1223.5         | 1204           | 1335           | 14             | 60             | 46.00     |                |

Other dimensions on request.

# Outer Flanges

**Specification:**

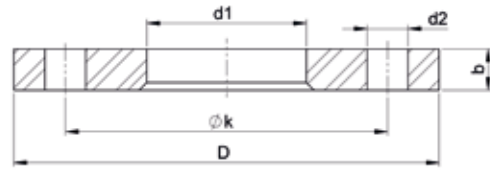
DIN 86037, EN 1092-3 (Type 04) PN10, 16

**Material:**

S235JR

**Note:**

Steel flanges will be supplied hot-dip galvanized.



**PN 10**

| Size  |      |      | D    | d <sub>1</sub> | b  | k    | d <sub>2</sub> | Bolt Holes | Approx. Weight<br>kg /piece |
|-------|------|------|------|----------------|----|------|----------------|------------|-----------------------------|
| DN    | OD   |      |      |                |    |      |                |            |                             |
| in    | mm   | mm   | mm   | mm             | mm | mm   | mm             |            |                             |
| 3/4   | 20   | 25   | 105  | 28             | 14 | 75   | 14             | 4          | 0.81                        |
| 1     | 25   | 30   | 115  | 33             | 16 | 85   | 14             | 4          | 1.11                        |
| 1 1/4 | 32   | 38   | 140  | 41             | 16 | 100  | 18             | 4          | 1.64                        |
| 1 1/2 | 40   | 44.5 | 150  | 48             | 16 | 115  | 18             | 4          | 1.86                        |
| 2     | 50   | 57   | 165  | 62             | 16 | 125  | 18             | 4          | 2.20                        |
| 2 1/2 | 65   | 76   | 185  | 81             | 16 | 145  | 18             | 4          | 2.62                        |
| 3     | 80   | 89   | 200  | 94             | 18 | 160  | 18             | 8          | 3.32                        |
| 4     | 100  | 108  | 220  | 113            | 18 | 180  | 18             | 8          | 3.67                        |
| 5     | 125  | 133  | 250  | 138            | 18 | 210  | 18             | 8          | 4.54                        |
| 6     | 150  | 159  | 285  | 164            | 18 | 240  | 22             | 8          | 5.60                        |
| 7     | 175  | 194  | 315  | 200            | 22 | 270  | 22             | 8          | 6.50                        |
| 8     | 200  | 219  | 340  | 225            | 20 | 295  | 22             | 8          | 7.46                        |
| 10    | 250  | 267  | 395  | 278            | 22 | 350  | 22             | 12         | 10.30                       |
| 12    | 300  | 324  | 445  | 331            | 24 | 400  | 22             | 12         | 12.10                       |
| 14    | 350  | 368  | 505  | 375            | 24 | 460  | 22             | 16         | 15.70                       |
| 16    | 400  | 419  | 565  | 426            | 26 | 515  | 26             | 16         | 20.10                       |
| 18    | 450  | 457  | 615  | 465            | 28 | 565  | 26             | 20         | 25.40                       |
| 20    | 500  | 508  | 670  | 517            | 30 | 620  | 26             | 20         | 30.80                       |
| 24    | 600  | 610  | 780  | 618            | 32 | 725  | 30             | 20         | 40.50                       |
| 28    | 700  | 711  | 895  | 720            | 34 | 840  | 30             | 24         | 54.00                       |
| 32    | 800  | 813  | 1015 | 822            | 38 | 950  | 33             | 24         | 76.00                       |
| 36    | 900  | 914  | 1115 | 923            | 42 | 1050 | 33             | 28         | 92.00                       |
| 40    | 1000 | 1016 | 1230 | 1025           | 46 | 1160 | 36             | 28         | 120.00                      |
| 48    | 1200 | 1220 | 1455 | 1230           | 50 | 1380 | 39             | 32         | 170.00                      |

**PN 16**

| 3/4 - 6 | 20 - 150 | 25 - 159 | see PN 10 |     |    |     |    |    |      |
|---------|----------|----------|-----------|-----|----|-----|----|----|------|
| 7       | 175      | 194      | 315       | 200 | 22 | 270 | 22 | 8  | 7.5  |
| 8       | 200      | 219      | 340       | 225 | 22 | 295 | 22 | 12 | 8.0  |
| 10      | 250      | 267      | 405       | 273 | 24 | 355 | 26 | 12 | 15.0 |
| 12      | 300      | 324      | 460       | 330 | 28 | 410 | 26 | 12 | 16.1 |
| 14      | 350      | 368      | 520       | 374 | 32 | 470 | 26 | 16 | 23.4 |
| 16      | 400      | 419      | 580       | 426 | 36 | 525 | 30 | 16 | 30.9 |

Other dimensions on request.

# Blind Flanges

**Specification:**

EN 1092-3 (Type 05-C) PN 10, 16

**Material:**

OSNA®-10 – copper-nickel

**Material:**

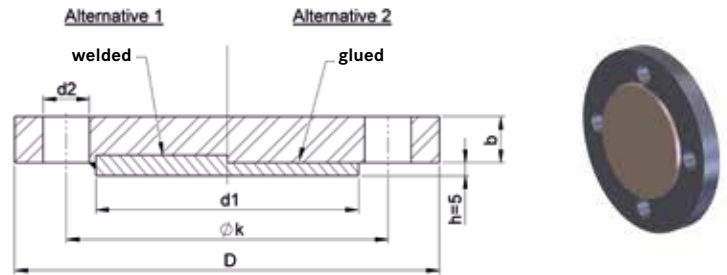
A105/P245GH (flanges)

**Note:**

Steel flanges will be supplied readily hot-dip galvanized.

DN 10 - DN 175 PN 16

DN 200 - DN 500 PN 10



| Size  |     |      | D   | b  | k   | d <sub>1</sub> | d <sub>2</sub> | Bolt Holes | Approx. Weight<br>kg /piece |
|-------|-----|------|-----|----|-----|----------------|----------------|------------|-----------------------------|
| DN    | OD  |      |     |    |     |                |                |            |                             |
| in    | mm  | mm   | mm  | mm | mm  | mm             | mm             |            |                             |
| 3/8   | 10  | 15   | 90  | 14 | 60  | 41             | 14             | 4          | 0.69                        |
| 1/2   | 15  | 18   | 95  | 14 | 65  | 46             | 14             | 4          | 0.78                        |
| 3/4   | 20  | 25   | 105 | 14 | 75  | 56             | 14             | 4          | 0.99                        |
| 1     | 25  | 30   | 115 | 16 | 85  | 65             | 14             | 4          | 1.38                        |
| 1 1/4 | 32  | 38   | 140 | 16 | 100 | 76             | 18             | 4          | 1.99                        |
| 1 1/2 | 40  | 44.5 | 150 | 16 | 115 | 84             | 18             | 4          | 2.32                        |
| 2     | 50  | 57   | 165 | 16 | 125 | 99             | 18             | 4          | 2.89                        |
| 2 1/2 | 65  | 76   | 185 | 16 | 145 | 118            | 18             | 4          | 3.72                        |
| 3     | 80  | 89   | 200 | 18 | 160 | 132            | 18             | 8          | 4.76                        |
| 4     | 100 | 108  | 220 | 18 | 180 | 156            | 18             | 8          | 5.94                        |
| 5     | 125 | 133  | 250 | 18 | 210 | 184            | 18             | 8          | 7.83                        |
| 6     | 150 | 159  | 285 | 18 | 240 | 211            | 22             | 8          | 10.15                       |
| 7     | 175 | 194  | 315 | 22 | 270 | 242            | 22             | 8          | 14.97                       |
| 8     | 200 | 219  | 340 | 22 | 295 | 266            | 22             | 12         | 17.37                       |
| 10    | 250 | 267  | 405 | 24 | 350 | 319            | 26             | 12         | 26.64                       |
| 12    | 300 | 324  | 460 | 28 | 400 | 370            | 26             | 12         | 39.93                       |
| 14    | 350 | 368  | 520 | 30 | 460 | 429            | 26             | 16         | 54.47                       |
| 16    | 400 | 419  | 580 | 36 | 515 | 480            | 30             | 16         | 79.52                       |
| 20    | 500 | 508  | 715 | 36 | 650 | 606            | 33             | 20         | 121.51                      |

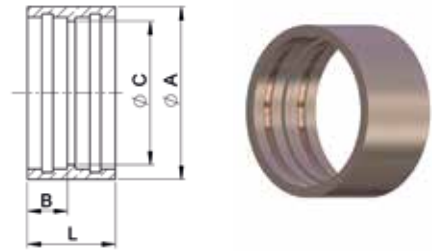
Other dimensions on request.

# Couplings, straight

with silver solder  
capillary x capillary end

PN up to 63

**Material:**  
OSNA<sup>®</sup>-10 – copper-nickel



| Size  |     |      | A   | C    | L  | B  | Approx. Weight |
|-------|-----|------|-----|------|----|----|----------------|
| in    | DN  | OD   |     |      |    |    |                |
|       | mm  | mm   | mm  | mm   | mm | mm | kg /piece      |
|       | 4   | 8    | 12  | 6    | 20 | 9  | 0.01           |
| 1/8   | 6   | 10   | 15  | 8    | 20 | 9  | 0.015          |
| 1/4   | 8   | 12   | 17  | 10   | 20 | 9  | 0.02           |
| 1/4   | 10  | 14   | 20  | 12   | 22 | 10 | 0.025          |
| 3/8   | 12  | 16   | 22  | 14   | 22 | 10 | 0.03           |
| 1/2   | 16  | 20   | 27  | 18   | 22 | 10 | 0.045          |
| 3/4   | 20  | 25   | 32  | 22   | 22 | 10 | 0.055          |
| 1     | 25  | 30   | 37  | 27   | 24 | 11 | 0.07           |
| 1 1/4 | 32  | 38   | 45  | 35   | 32 | 15 | 0.12           |
| 1 1/4 | 40  | 44.5 | 52  | 41.5 | 33 | 15 | 0.17           |
| 2     | 50  | 57   | 65  | 54   | 33 | 15 | 0.22           |
| 2 1/2 | 65  | 76   | 84  | 72   | 45 | 20 | 0.40           |
| 3     | 80  | 89   | 100 | 85   | 55 | 25 | 0.57           |
| 4     | 100 | 108  | 120 | 103  | 65 | 30 | 0.69           |

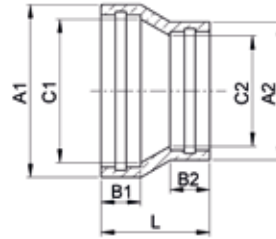
Other dimensions on request.

# Couplings, reduced

with silver solder  
capillary x capillary end

PN up to 63

**Material:**  
OSNA®-10 – copper-nickel



| Size          |              | A <sub>1</sub><br>mm | A <sub>2</sub><br>mm | C <sub>1</sub><br>mm | C <sub>2</sub><br>mm | B <sub>1</sub><br>mm | B <sub>2</sub><br>mm | L<br>mm | Approx.<br>Weight<br>kg /piece |
|---------------|--------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------|--------------------------------|
| nominal<br>in | actual<br>mm |                      |                      |                      |                      |                      |                      |         |                                |
|               | 10 x 8       | 15                   | 12                   | 8                    | 6                    | 9                    | 9                    | 22      | 0.03                           |
|               | 12 x 8       | 17                   | 12                   | 10                   | 6                    | 9                    | 9                    | 25      | 0.03                           |
| ¼ x ⅛         | 12 x 10      | 17                   | 15                   | 10                   | 8                    | 9                    | 9                    | 21      | 0.04                           |
|               | 14 x 8       | 20                   | 12                   | 12                   | 6                    | 10                   | 9                    | 30      | 0.04                           |
| ¼ x ⅛         | 14 x 10      | 20                   | 15                   | 12                   | 8                    | 10                   | 9                    | 26      | 0.04                           |
| ⅜ x ⅛         | 16 x 10      | 22                   | 15                   | 14                   | 8                    | 10                   | 9                    | 28      | 0.05                           |
| ⅜ x ¼         | 16 x 12      | 22                   | 17                   | 14                   | 10                   | 10                   | 9                    | 27      | 0.06                           |
| ½ x ¼         | 20 x 12      | 27                   | 17                   | 18                   | 10                   | 10                   | 9                    | 33      | 0.06                           |
| ½ x ⅜         | 20 x 16      | 27                   | 22                   | 18                   | 14                   | 10                   | 10                   | 27      | 0.08                           |
| ¾ x ⅜         | 25 x 16      | 32                   | 22                   | 22                   | 14                   | 10                   | 10                   | 33      | 0.07                           |
| ¾ x ½         | 25 x 20      | 32                   | 27                   | 22                   | 18                   | 10                   | 10                   | 27      | 0.09                           |
| 1 x ⅜         | 30 x 16      | 37                   | 22                   | 27                   | 14                   | 11                   | 10                   | 35      | 0.10                           |
| 1 x ½         | 30 x 20      | 37                   | 27                   | 27                   | 18                   | 11                   | 10                   | 31      | 0.10                           |
| 1 x ¾         | 30 x 25      | 37                   | 32                   | 27                   | 22                   | 11                   | 10                   | 28      | 0.18                           |
| 1¼ x ⅜        | 38 x 16      | 45                   | 22                   | 35                   | 14                   | 15                   | 10                   | 45      | 0.17                           |
| 1¼ x ½        | 38 x 20      | 45                   | 27                   | 35                   | 18                   | 15                   | 10                   | 41      | 0.16                           |
| 1¼ x ¾        | 38 x 25      | 45                   | 32                   | 35                   | 22                   | 15                   | 10                   | 36      | 0.13                           |
| 1¼ x 1        | 38 x 30      | 45                   | 37                   | 35                   | 27                   | 15                   | 11                   | 33      | 0.21                           |
| 1½ x ⅜        | 44.5 x 16    | 52                   | 22                   | 41.5                 | 14                   | 15                   | 10                   | 51      | 0.21                           |
| 1½ x ½        | 44.5 x 20    | 52                   | 27                   | 41.5                 | 18                   | 15                   | 10                   | 47      | 0.21                           |
| 1½ x ¾        | 44.5 x 25    | 52                   | 32                   | 41.5                 | 22                   | 15                   | 10                   | 42      | 0.18                           |
| 1½ x 1        | 44.5 x 30    | 52                   | 37                   | 41.5                 | 27                   | 15                   | 11                   | 39      | 0.24                           |
| 1½ x 1¼       | 44.5 x 38    | 52                   | 45                   | 41.5                 | 24                   | 15                   | 15                   | 36      | 0.23                           |
| 2 x ⅜         | 57 x 16      | 65                   | 22                   | 54                   | 14                   | 15                   | 10                   | 62      | 0.28                           |
| 2 x ½         | 57 x 20      | 65                   | 27                   | 54                   | 18                   | 15                   | 10                   | 58      | 0.29                           |
| 2 x ¾         | 57 x 25      | 65                   | 32                   | 54                   | 22                   | 15                   | 10                   | 54      | 0.29                           |
| 2 x 1         | 57 x 30      | 65                   | 37                   | 54                   | 27                   | 15                   | 11                   | 50      | 0.31                           |
| 2 x 1¼        | 57 x 38      | 65                   | 45                   | 54                   | 35                   | 15                   | 15                   | 47      | 0.28                           |
| 2 x 1½        | 57 x 44.5    | 65                   | 52                   | 54                   | 41.5                 | 15                   | 15                   | 41      | 0.28                           |

Other dimensions on request.

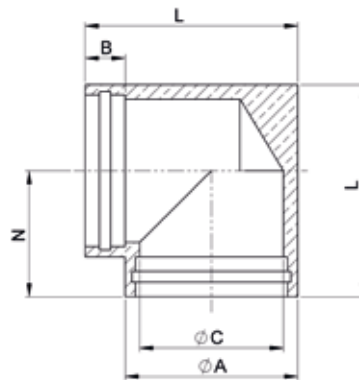


# Elbows

with silver solder  
capillary x capillary end

PN up to 63

**Material:**  
OSNA®-10 – copper-nickel



| Size  |    |      | A  | B  | C    | L  | N    | Approx. Weight |
|-------|----|------|----|----|------|----|------|----------------|
| in    | DN | OD   |    |    |      |    |      |                |
|       | mm | mm   | mm | mm | mm   | mm | mm   | kg /piece      |
|       | 4  | 8    | 12 | 9  | 6    | 24 | 16.5 | 0.035          |
| 1/8   | 6  | 10   | 15 | 9  | 8    | 24 | 16.5 | 0.040          |
| 1/4   | 8  | 12   | 17 | 9  | 10   | 26 | 17.5 | 0.045          |
| 1/4   | 10 | 14   | 20 | 10 | 12   | 31 | 21   | 0.068          |
| 3/8   | 13 | 16   | 22 | 10 | 14   | 31 | 21   | 0.090          |
| 1/2   | 16 | 20   | 27 | 10 | 18   | 37 | 23.5 | 0.130          |
| 3/4   | 20 | 25   | 32 | 10 | 22   | 42 | 26   | 0.185          |
| 1     | 25 | 30   | 37 | 11 | 27   | 48 | 29.5 | 0.260          |
| 1 1/4 | 32 | 38   | 45 | 15 | 35   | 60 | 36.5 | 0.370          |
| 1 1/4 | 40 | 44.5 | 52 | 15 | 41.5 | 67 | 41   | 0.520          |
| 2     | 50 | 57   | 65 | 15 | 54   | 80 | 47.5 | 0.870          |

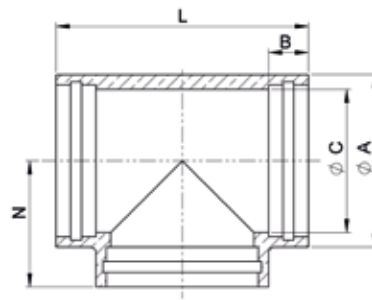
Other dimensions on request.

# Tee Pieces, equal

with silver solder  
capillary x capillary ends

PN up to 63

**Material:**  
OSNA®-10 – copper-nickel



| Size  |    |          | A    | B  | C  | L    | N  | Approx. Weight<br>kg /piece |      |
|-------|----|----------|------|----|----|------|----|-----------------------------|------|
| in    | DN | OD<br>mm |      |    |    |      |    |                             |      |
|       |    | 4        | 8    | 15 | 9  | 6    | 33 | 16.5                        | 0.02 |
| 1/8   |    | 6        | 10   | 15 | 9  | 8    | 33 | 16.5                        | 0.03 |
| 1/4   |    | 8        | 12   | 17 | 9  | 10   | 35 | 17.5                        | 0.04 |
| 1/4   |    | 10       | 14   | 22 | 10 | 12   | 42 | 21                          | 0.06 |
| 3/8   |    | 13       | 16   | 22 | 10 | 14   | 42 | 21                          | 0.08 |
| 1/2   |    | 16       | 20   | 27 | 10 | 18   | 47 | 23.5                        | 0.12 |
| 3/4   |    | 20       | 25   | 32 | 10 | 22   | 52 | 26                          | 0.19 |
| 1     |    | 25       | 30   | 37 | 11 | 27   | 57 | 28.5                        | 0.25 |
| 1 1/4 |    | 32       | 38   | 45 | 15 | 35   | 73 | 36.5                        | 0.47 |
| 1 1/4 |    | 40       | 44.5 | 52 | 15 | 41.5 | 82 | 41                          | 0.57 |
| 2     |    | 50       | 57   | 65 | 15 | 54   | 95 | 47.5                        | 0.86 |

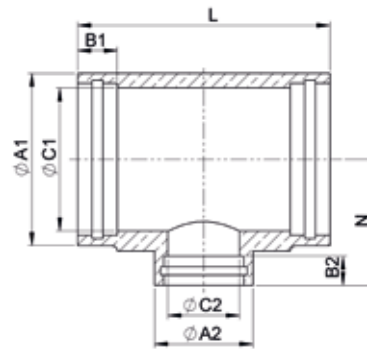
Other dimensions on request.

# Tee Pieces, reduced

with silver solder  
capillary x capillary ends

PN up to 63

**Material:**  
OSNA®-10 – copper-nickel



| Size          |   |           | A <sub>1</sub><br>mm | A <sub>2</sub><br>mm | C <sub>1</sub><br>mm | C <sub>2</sub><br>mm | B <sub>1</sub><br>mm | B <sub>2</sub><br>mm | N<br>mm | L<br>mm | Approx.<br>Weight<br>kg /piece |
|---------------|---|-----------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------|---------|--------------------------------|
| DN            | OD <sub>1</sub> x OD <sub>2</sub><br>mm | mm        |                      |                      |                      |                      |                      |                      |         |         |                                |
| 1/8           | 6 x 4                                   | 10 x 8    | 15                   | 15                   | 8                    | 6                    | 9                    | 9                    | 16.5    | 33      | 0.03                           |
| 1/4           | 8 x 4                                   | 12 x 8    | 17                   | 12                   | 10                   | 6                    | 9                    | 9                    | 17.5    | 35      | 0.03                           |
| 1/4 x 1/8     | 8 x 6                                   | 12 x 10   | 17                   | 15                   | 10                   | 8                    | 9                    | 9                    | 17.5    | 35      | 0.04                           |
| 1/4           | 10 x 4                                  | 14 x 8    | 22                   | 12                   | 12                   | 6                    | 10                   | 9                    | 21      | 42      | 0.05                           |
| 1/4 x 1/8     | 10 x 6                                  | 14 x 10   | 22                   | 15                   | 12                   | 8                    | 10                   | 9                    | 21      | 42      | 0.06                           |
| 3/8 x 1/8     | 12 x 6                                  | 16 x 10   | 22                   | 15                   | 14                   | 8                    | 10                   | 9                    | 21      | 42      | 0.07                           |
| 3/8 x 1/4     | 12 x 8                                  | 16 x 12   | 22                   | 17                   | 14                   | 10                   | 10                   | 9                    | 21      | 42      | 0.08                           |
| 1/2 x 1/4     | 16 x 8                                  | 20 x 12   | 27                   | 17                   | 18                   | 10                   | 10                   | 9                    | 23.5    | 47      | 0.09                           |
| 1/2 x 3/8     | 16 x 12                                 | 20 x 16   | 27                   | 22                   | 18                   | 14                   | 10                   | 10                   | 23.5    | 47      | 0.12                           |
| 3/4 x 3/8     | 20 x 12                                 | 25 x 16   | 32                   | 22                   | 22                   | 14                   | 10                   | 10                   | 26      | 52      | 0.14                           |
| 3/4 x 1/2     | 20 x 16                                 | 25 x 20   | 32                   | 27                   | 22                   | 18                   | 10                   | 10                   | 26      | 52      | 0.16                           |
| 1 x 3/8       | 25 x 12                                 | 30 x 16   | 37                   | 22                   | 27                   | 14                   | 11                   | 10                   | 28.5    | 57      | 0.20                           |
| 1 x 1/2       | 25 x 16                                 | 30 x 20   | 37                   | 27                   | 27                   | 18                   | 11                   | 10                   | 28.5    | 57      | 0.25                           |
| 1 x 3/4       | 25 x 20                                 | 30 x 25   | 37                   | 32                   | 27                   | 22                   | 11                   | 10                   | 28.5    | 57      | 0.30                           |
| 1 1/4 x 3/8   | 32 x 12                                 | 38 x 16   | 45                   | 22                   | 35                   | 14                   | 15                   | 10                   | 36.5    | 73      | 0.40                           |
| 1 1/4 x 1/2   | 32 x 16                                 | 38 x 20   | 45                   | 27                   | 35                   | 18                   | 15                   | 10                   | 36.5    | 73      | 0.43                           |
| 1 1/4 x 3/4   | 32 x 20                                 | 38 x 25   | 45                   | 32                   | 35                   | 22                   | 15                   | 10                   | 36.5    | 73      | 0.43                           |
| 1 1/4 x 1     | 32 x 25                                 | 38 x 30   | 45                   | 37                   | 35                   | 27                   | 15                   | 11                   | 36.5    | 73      | 0.43                           |
| 1 1/2 x 3/8   | 40 x 12                                 | 44.5 x 16 | 52                   | 22                   | 41.5                 | 14                   | 15                   | 10                   | 41      | 82      | 0.51                           |
| 1 1/2 x 1/2   | 40 x 16                                 | 44.5 x 20 | 52                   | 27                   | 41.5                 | 18                   | 15                   | 10                   | 41      | 82      | 0.53                           |
| 1 1/2 x 3/4   | 40 x 20                                 | 44.5 x 25 | 52                   | 32                   | 41.5                 | 22                   | 15                   | 10                   | 41      | 82      | 0.54                           |
| 1 1/2 x 1     | 40 x 25                                 | 44.5 x 30 | 52                   | 37                   | 41.5                 | 27                   | 15                   | 11                   | 41      | 82      | 0.57                           |
| 1 1/2 x 1 1/4 | 40 x 32                                 | 44.5 x 38 | 52                   | 45                   | 41.5                 | 35                   | 15                   | 15                   | 41      | 82      | 0.59                           |
| 2 x 1/2       | 50 x 16                                 | 57 x 20   | 65                   | 27                   | 54                   | 18                   | 15                   | 10                   | 47.5    | 95      | 0.65                           |
| 2 x 3/4       | 50 x 20                                 | 57 x 25   | 65                   | 32                   | 54                   | 22                   | 15                   | 10                   | 47.5    | 95      | 0.70                           |
| 2 x 1         | 50 x 25                                 | 57 x 30   | 65                   | 37                   | 54                   | 27                   | 15                   | 11                   | 47.5    | 95      | 0.75                           |
| 2 x 1 1/4     | 50 x 32                                 | 57 x 38   | 65                   | 45                   | 54                   | 35                   | 15                   | 15                   | 47.5    | 95      | 0.80                           |
| 2 x 1 1/2     | 50 x 40                                 | 57 x 44.5 | 65                   | 52                   | 54                   | 41.5                 | 15                   | 15                   | 47.5    | 95      | 0.86                           |

Other dimensions on request.

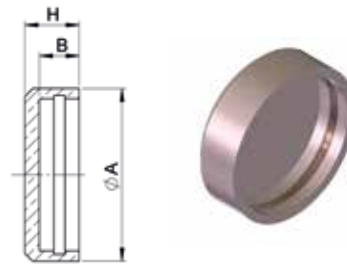
# End Caps

with silver solder  
capillary end

PN up to 63

**Material:**

OSNA<sup>®</sup>-10 – copper-nickel



| Size  |    |      | A  | B  | H    | Approx. Weight |
|-------|----|------|----|----|------|----------------|
| in    | DN | OD   |    |    |      |                |
|       | mm | mm   | mm | mm | mm   | kg /piece      |
|       | 4  | 8    | 12 | 9  | 12   | 0.010          |
| 1/8   | 6  | 10   | 15 | 9  | 12.5 | 0.020          |
| 1/4   | 8  | 12   | 17 | 9  | 12.5 | 0.020          |
| 1/4   | 10 | 14   | 20 | 10 | 14   | 0.030          |
| 3/8   | 12 | 16   | 22 | 10 | 14   | 0.040          |
| 1/2   | 16 | 20   | 27 | 10 | 14.5 | 0.055          |
| 3/4   | 20 | 25   | 32 | 10 | 15   | 0.070          |
| 1     | 25 | 30   | 37 | 11 | 16   | 0.085          |
| 1 1/4 | 32 | 38   | 45 | 15 | 20   | 0.135          |
| 1 1/4 | 40 | 44.5 | 52 | 15 | 20.5 | 0.195          |
| 2     | 50 | 57   | 65 | 15 | 20.5 | 0.225          |

Other dimensions on request.

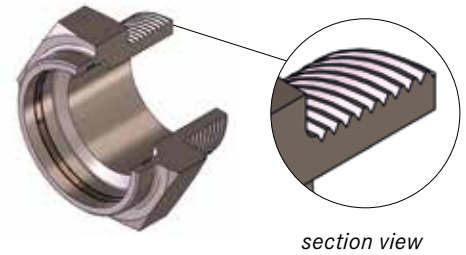
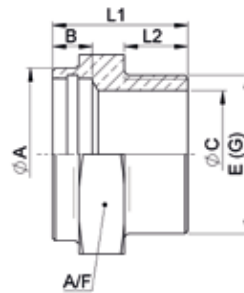
# Straight Male Connectors

## E (male BSP thread)

capillary end x male thread

### Material:

OSNA®-10 - copper-nickel



section view

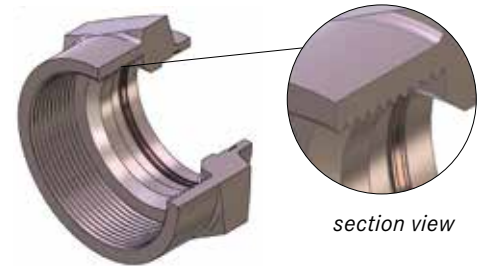
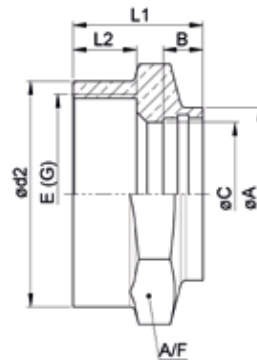
| Outside Diameter of Pipe |                   | A<br>mm | B<br>mm | C<br>mm | L <sub>1</sub><br>mm | L <sub>2</sub><br>mm | A/F<br>mm | Approx.<br>Weight<br>kg /piece |
|--------------------------|-------------------|---------|---------|---------|----------------------|----------------------|-----------|--------------------------------|
| nominal<br>in            | actual<br>mm x E" |         |         |         |                      |                      |           |                                |
| 1/8 x 1/2                | 10 x 1/2          | 15      | 9       | 8       | 30                   | 18                   | 22        | 0.06                           |
| 1/8 x 3/4                | 10 x 3/4          | 15      | 9       | 8       | 33                   | 18                   | 30        | 0.12                           |
| 1/4 x 1/2                | 12 x 1/2          | 17      | 9       | 10      | 30                   | 18                   | 22        | 0.06                           |
| 1/4 x 3/4                | 12 x 3/4          | 17      | 9       | 10      | 33                   | 18                   | 30        | 0.12                           |
| 1/4 x 1/2                | 14 x 1/2          | 20      | 10      | 12      | 30                   | 18                   | 22        | 0.06                           |
| 1/4 x 3/4                | 14 x 3/4          | 20      | 10      | 12      | 33                   | 18                   | 30        | 0.12                           |
| 1/4 x 1                  | 14 x 1            | 20      | 10      | 12      | 38                   | 21                   | 36        | 0.16                           |
| 3/8 x 3/8                | 16 x 3/8          | 22      | 10      | 14      | 29                   | 15                   | 22        | 0.05                           |
| 3/8 x 1/2                | 16 x 1/2          | 22      | 10      | 14      | 30                   | 18                   | 22        | 0.06                           |
| 3/8 x 3/4                | 16 x 3/4          | 22      | 10      | 14      | 33                   | 18                   | 30        | 0.12                           |
| 3/8 x 1                  | 16 x 1            | 22      | 10      | 14      | 38                   | 21                   | 36        | 0.06                           |
| 1/2 x 1/2                | 20 x 1/2          | 27      | 10      | 18      | 33                   | 18                   | 27        | 0.09                           |
| 1/2 x 3/4                | 20 x 3/4          | 27      | 10      | 18      | 34                   | 18                   | 30        | 0.13                           |
| 1/2 x 1                  | 20 x 1            | 27      | 10      | 18      | 39                   | 21                   | 36        | 0.23                           |
| 1/2 x 1 1/4              | 20 x 1 1/4        | 27      | 10      | 18      | 43                   | 22                   | 46        | 0.39                           |
| 3/4 x 3/4                | 25 x 3/4          | 32      | 10      | 22      | 35                   | 18                   | 32        | 0.13                           |
| 3/4 x 1                  | 25 x 1            | 32      | 10      | 22      | 39                   | 21                   | 36        | 0.20                           |
| 3/4 x 1 1/4              | 25 x 1 1/4        | 32      | 10      | 22      | 43                   | 22                   | 46        | 0.41                           |
| 3/4 x 1 1/2              | 25 x 1 1/2        | 32      | 10      | 22      | 44                   | 22                   | 50        | 0.49                           |
| 1 x 3/4                  | 30 x 3/4          | 37      | 11      | 27      | 38                   | 18                   | 41        | 0.19                           |
| 1 x 1                    | 30 x 1            | 37      | 11      | 27      | 41                   | 21                   | 41        | 0.29                           |
| 1 x 1 1/4                | 30 x 1 1/4        | 37      | 11      | 27      | 44                   | 22                   | 46        | 0.24                           |
| 1 x 1 1/2                | 30 x 1 1/2        | 37      | 11      | 27      | 45                   | 22                   | 50        | 0.25                           |
| 1 1/4 x 3/4              | 38 x 3/4          | 45      | 15      | 35      | 44                   | 18                   | 46        | 0.26                           |
| 1 1/4 x 1                | 38 x 1            | 45      | 15      | 35      | 44                   | 21                   | 46        | 0.26                           |
| 1 1/4 x 1 1/4            | 38 x 1 1/4        | 45      | 15      | 35      | 45                   | 22                   | 46        | 0.41                           |
| 1 1/4 x 1 1/2            | 38 x 1 1/2        | 45      | 15      | 35      | 46                   | 22                   | 50        | 0.45                           |
| 1 1/2 x 1                | 44.5 x 1          | 52      | 15      | 41.5    | 47                   | 21                   | 55        | 0.49                           |
| 1 1/2 x 1 1/4            | 44.5 x 1 1/4      | 52      | 15      | 41.5    | 48                   | 22                   | 55        | 0.56                           |
| 1 1/2 x 1 1/2            | 44.5 x 1 1/2      | 52      | 15      | 41.5    | 48                   | 22                   | 55        | 0.60                           |
| 1 1/2 x 2                | 44.5 x 2          | 52      | 15      | 41.5    | 51                   | 22                   | 65        | 0.93                           |
| 2 x 1 1/4                | 57 x 1 1/4        | 65      | 15      | 54      | 51                   | 22                   | 65        | 0.77                           |
| 2 x 1 1/2                | 57 x 1 1/2        | 65      | 15      | 54      | 51                   | 22                   | 65        | 0.80                           |
| 2 x 2                    | 57 x 2            | 65      | 15      | 54      | 51                   | 22                   | 65        | 0.96                           |
| 2 x 2 1/2                | 57 x 2 1/2        | 65      | 15      | 54      | 60                   | 28                   | 75        | 1.57                           |

Other dimensions on request.

# Straight Female Connectors

**E (male BSP thread)**  
capillary end x female thread

**Material:**  
OSNA®-10 – copper-nickel



## Outside Diameter of Pipe

| nominal<br>in | actual<br>mm x E" | A  |    | B    |      | C  |    | d <sub>2</sub> | L <sub>1</sub> | L <sub>2</sub> | A/F       | Approx.<br>Weight |
|---------------|-------------------|----|----|------|------|----|----|----------------|----------------|----------------|-----------|-------------------|
|               |                   | mm | mm | mm   | mm   | mm | mm | mm             | mm             | mm             | kg /piece |                   |
| 1/8 x 1/2     | 10 x 1/2          | 15 | 9  | 8    | 27   | 32 | 14 | 27             | 0.04           |                |           |                   |
| 1/8 x 3/4     | 10 x 3/4          | 15 | 9  | 8    | 32   | 34 | 14 | 32             | 0.07           |                |           |                   |
| 1/4 x 1/2     | 12 x 1/2          | 17 | 9  | 10   | 27   | 32 | 14 | 27             | 0.05           |                |           |                   |
| 1/4 x 3/4     | 12 x 3/4          | 17 | 9  | 10   | 32   | 33 | 14 | 32             | 0.08           |                |           |                   |
| 1/4 x 1/2     | 14 x 1/2          | 20 | 10 | 12   | 27   | 32 | 14 | 27             | 0.06           |                |           |                   |
| 1/4 x 3/4     | 14 x 3/4          | 20 | 10 | 12   | 32   | 34 | 14 | 32             | 0.09           |                |           |                   |
| 1/4 x 1       | 14 x 1            | 20 | 10 | 12   | 40   | 38 | 17 | 41             | 0.16           |                |           |                   |
| 3/8 x 3/8     | 16 x 3/8          | 22 | 10 | 14   | 21.5 | 28 | 11 | 22             | 0.05           |                |           |                   |
| 3/8 x 1/2     | 16 x 1/2          | 22 | 10 | 14   | 27   | 31 | 14 | 27             | 0.07           |                |           |                   |
| 3/8 x 3/4     | 16 x 3/4          | 22 | 10 | 14   | 32   | 33 | 14 | 32             | 0.10           |                |           |                   |
| 3/8 x 1       | 16 x 1            | 22 | 10 | 14   | 40   | 38 | 17 | 41             | 0.17           |                |           |                   |
| 1/2 x 1/2     | 20 x 1/2          | 27 | 10 | 18   | 27   | 28 | 14 | 27             | 0.08           |                |           |                   |
| 1/2 x 3/4     | 20 x 3/4          | 27 | 10 | 18   | 32   | 32 | 14 | 32             | 0.11           |                |           |                   |
| 1/2 x 1       | 20 x 1            | 27 | 10 | 18   | 40   | 37 | 17 | 41             | 0.18           |                |           |                   |
| 1/2 x 1 1/4   | 20 x 1 1/4        | 27 | 10 | 18   | 49   | 40 | 18 | 50             | 0.25           |                |           |                   |
| 3/4 x 3/4     | 25 x 3/4          | 32 | 10 | 22   | 32   | 31 | 14 | 32             | 0.10           |                |           |                   |
| 3/4 x 1       | 25 x 1            | 32 | 10 | 22   | 40   | 35 | 17 | 41             | 0.20           |                |           |                   |
| 3/4 x 1 1/4   | 25 x 1 1/4        | 32 | 10 | 22   | 49   | 39 | 18 | 50             | 0.27           |                |           |                   |
| 3/4 x 1 1/2   | 25 x 1 1/2        | 32 | 10 | 22   | 55   | 41 | 18 | 55             | 0.33           |                |           |                   |
| 1 x 3/4       | 30 x 3/4          | 37 | 11 | 27   | 32   | 31 | 14 | 41             | 0.17           |                |           |                   |
| 1 x 1         | 30 x 1            | 37 | 11 | 27   | 40   | 35 | 17 | 41             | 0.20           |                |           |                   |
| 1 x 1 1/4     | 30 x 1 1/4        | 37 | 11 | 27   | 49   | 38 | 18 | 50             | 0.22           |                |           |                   |
| 1 x 1 1/2     | 30 x 1 1/2        | 37 | 11 | 27   | 55   | 40 | 18 | 55             | 0.35           |                |           |                   |
| 1 1/4 x 3/4   | 38 x 3/4          | 45 | 15 | 35   | 32   | 39 | 14 | 46             | 0.28           |                |           |                   |
| 1 1/4 x 1     | 38 x 1            | 45 | 15 | 35   | 40   | 39 | 17 | 46             | 0.31           |                |           |                   |
| 1 1/4 x 1 1/4 | 38 x 1 1/4        | 45 | 15 | 35   | 49   | 40 | 18 | 50             | 0.36           |                |           |                   |
| 1 1/4 x 1 1/2 | 38 x 1 1/2        | 45 | 15 | 35   | 55   | 42 | 18 | 55             | 0.37           |                |           |                   |
| 1 1/2 x 1     | 44.5 x 1          | 52 | 15 | 41.5 | 40   | 43 | 17 | 55             | 0.35           |                |           |                   |
| 1 1/2 x 1 1/4 | 44.5 x 1 1/4      | 52 | 15 | 41.5 | 49   | 39 | 18 | 55             | 0.40           |                |           |                   |
| 1 1/2 x 1 1/2 | 44.5 x 1 1/2      | 52 | 15 | 41.5 | 55   | 40 | 18 | 55             | 0.43           |                |           |                   |
| 1 1/2 x 2     | 44.5 x 2          | 52 | 15 | 41.5 | 70   | 43 | 18 | 70             | 0.60           |                |           |                   |
| 2 x 1 1/4     | 57 x 1 1/4        | 65 | 15 | 54   | 49   | 45 | 18 | 65             | 0.50           |                |           |                   |
| 2 x 1 1/2     | 57 x 1 1/2        | 65 | 15 | 54   | 55   | 40 | 18 | 65             | 0.55           |                |           |                   |
| 2 x 2         | 57 x 2            | 65 | 15 | 54   | 70   | 40 | 18 | 70             | 0.65           |                |           |                   |
| 2 x 2 1/2     | 57 x 2 1/2        | 65 | 15 | 54   | 85   | 49 | 24 | 85             | 0.80           |                |           |                   |

Other dimensions on request.

# Hexagon Head Screw Plugs

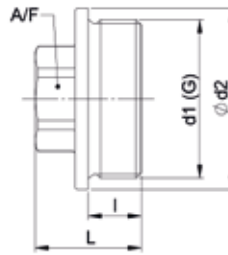
Miscellaneous

**Specification:**

DIN 910

**Material:**

OSNA®-10 – copper-nickel



| Size                    |                |    |    |     |  | Approx. Weight |
|-------------------------|----------------|----|----|-----|--|----------------|
| d <sub>1</sub> (thread) | d <sub>2</sub> | l  | L  | A/F |  | kg /piece      |
| G*                      | mm             | mm | mm | mm  |  |                |
| G 1/8                   | 14             | 8  | 17 | 10  |  | 0.014          |
| G 1/4                   | 18             | 8  | 17 | 13  |  | 0.023          |
| G 1/4                   | 18             | 12 | 21 | 13  |  | 0.027          |
| G 3/8                   | 22             | 8  | 17 | 17  |  | 0.037          |
| G 3/8                   | 22             | 12 | 21 | 17  |  | 0.043          |
| G 1/2                   | 26             | 10 | 22 | 19  |  | 0.066          |
| G 1/2                   | 26             | 14 | 26 | 19  |  | 0.076          |
| G 3/4                   | 32             | 12 | 26 | 24  |  | 0.124          |
| G 3/4                   | 32             | 16 | 30 | 24  |  | 0.144          |
| G 1                     | 39             | 16 | 32 | 27  |  | 0.221          |
| G 1 1/8                 | 44             | 16 | 32 | 27  |  | 0.270          |
| G 1 1/4                 | 49             | 16 | 33 | 30  |  | 0.340          |
| G 1 1/2                 | 55             | 16 | 33 | 30  |  | 0.425          |
| G 1 3/4                 | 62             | 20 | 40 | 36  |  | 0.649          |
| G 2                     | 68             | 20 | 40 | 36  |  | 0.788          |

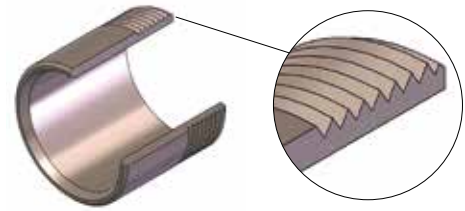
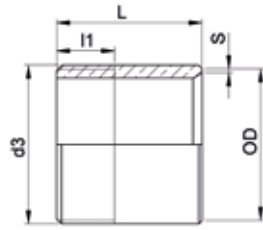
Other dimensions on request.

# Welding Ends

Miscellaneous

**Material:**

OSNA®-10 – copper-nickel



section view

| Size  |          |          | S   | d <sub>3</sub><br>(thread) G | L  | l <sub>1</sub> | Approx.<br>Weight<br>kg /piece |
|-------|----------|----------|-----|------------------------------|----|----------------|--------------------------------|
| in    | DN<br>mm | OD<br>mm |     |                              |    |                |                                |
|       | 4        | 8        | 1   | G 1/8                        | 30 | 10             | 0.01                           |
| 1/8   | 6        | 10       | 1   | G 1/4                        | 30 | 12             | 0.02                           |
| 1/4   | 8        | 12       | 1   | G 3/8                        | 30 | 13             | 0.02                           |
| 1/2   | 16       | 20       | 1   | G 1/2                        | 35 | 15             | 0.03                           |
| 3/4   | 20       | 25       | 1.5 | G 3/4                        | 40 | 15             | 0.05                           |
| 1     | 25       | 30       | 1.5 | G 1                          | 40 | 19             | 0.10                           |
| 1 1/4 | 32       | 38       | 1.5 | G 1 1/4                      | 50 | 20             | 0.19                           |
| 1 1/2 | 40       | 44.5     | 1.5 | G 1 1/2                      | 50 | 20             | 0.21                           |
| 2     | 50       | 57       | 1.5 | G 2                          | 55 | 22             | 0.29                           |
| 2 1/2 | 65       | 76       | 2   | G 2 1/2                      | 60 | 27             | 0.38                           |
| 3     | 80       | 89       | 2   | G 3                          | 65 | 28             | 0.50                           |

Other dimensions on request.



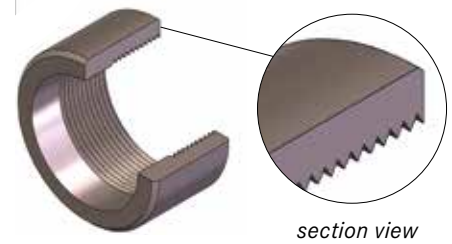
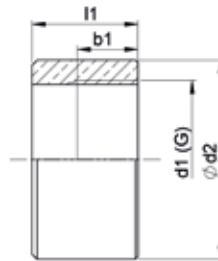
with Whitworth thread

**Specification:**

DIN 86103 PN 40 up to 225°C

**Material:**

OSNA®-10 – copper-nickel



| Size                    |                |                |                | Approx. Weight |
|-------------------------|----------------|----------------|----------------|----------------|
| d <sub>1</sub> (thread) | d <sub>2</sub> | b <sub>1</sub> | l <sub>1</sub> | kg /piece      |
| in                      | mm             | mm             | mm             |                |
| G ¼                     | 20             | 12             | 20             | 0.030          |
| G ⅛                     | 25             | 12             | 20             | 0.050          |
| G ½                     | 30             | 14             | 25             | 0.080          |
| G ½                     | 30             | 14             | 50             | 0.170          |
| G ½                     | 30             | 14             | 75             | 0.255          |
| G ½                     | 30             | 14             | 100            | 0.380          |
| G ½                     | 30             | 14             | 125            | 0.470          |
| G ¾                     | 38             | 16             | 25             | 0.140          |
| G ¾                     | 38             | 16             | 50             | 0.280          |
| G ¾                     | 38             | 16             | 75             | 0.445          |
| G ¾                     | 38             | 16             | 100            | 0.550          |
| G ¾                     | 38             | 16             | 125            | 0.700          |
| G 1                     | 45             | 18             | 28             | 0.190          |
| G 1                     | 45             | 18             | 50             | 0.350          |
| G 1                     | 45             | 18             | 75             | 0.545          |
| G 1                     | 45             | 18             | 100            | 0.700          |
| G 1                     | 45             | 18             | 125            | 0.950          |
| G 1¼                    | 55             | 20             | 30             | 0.290          |
| G 1½                    | 60             | 22             | 32             | 0.370          |
| G 2                     | 75             | 23             | 40             | 0.680          |

Other dimensions on request.

# Unions

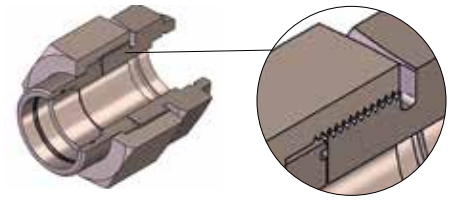
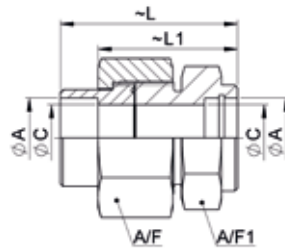
Miscellaneous

with silver solder capillary x capillary ends  
equiped with sealing ring

PN up to 63

**Material:**

OSNA®-10 – copper-nickel



section view

| Outside Diameter of Pipe |                  | A<br>mm | C<br>mm | ~L<br>mm | ~L <sub>1</sub><br>mm | A/F<br>mm | A/F <sub>1</sub><br>mm | Approx.<br>Weight<br>kg /piece |
|--------------------------|------------------|---------|---------|----------|-----------------------|-----------|------------------------|--------------------------------|
| nominal<br>in            | actual<br>mm xG" |         |         |          |                       |           |                        |                                |
|                          | <b>8</b>         | 12      | 6       | 37       | 19                    | 22        | 13                     | 0.05                           |
| 1/8                      | <b>10</b>        | 15      | 8       | 41       | 23                    | 27        | 17                     | 0.09                           |
| 1/4                      | <b>12</b>        | 17      | 10      | 41       | 23                    | 27        | 19                     | 0.11                           |
| 1/4                      | <b>14</b>        | 20      | 12      | 50       | 30                    | 32        | 22                     | 0.18                           |
| 3/8                      | <b>16</b>        | 22      | 14      | 51       | 31                    | 36        | 24                     | 0.24                           |
| 1/2                      | <b>20</b>        | 27      | 18      | 56       | 36                    | 41        | 27                     | 0.31                           |
| 3/4                      | <b>25</b>        | 32      | 22      | 58.5     | 38.5                  | 46        | 32                     | 0.44                           |
| <b>1</b>                 | <b>30</b>        | 37      | 27      | 61.5     | 39.5                  | 50        | 36                     | 0.45                           |
| 1 1/4                    | <b>38</b>        | 45      | 35      | 72       | 42                    | 60        | 46                     | 0.73                           |
| 1 1/2                    | <b>44.5</b>      | 52      | 41.5    | 76       | 46                    | 70        | 55                     | 1.08                           |
| <b>2</b>                 | <b>57</b>        | 65      | 54      | 81       | 51                    | 85        | 65                     | 1.54                           |

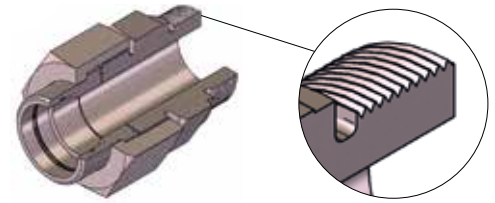
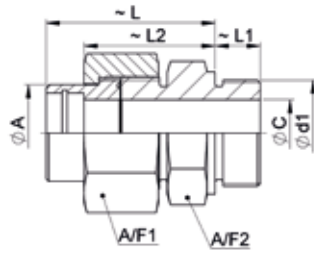
Other dimensions on request.

# Male Unions

with silver solder  
capillary x male thread  
equipped with sealing ring

PN up to 63

**Material:**  
OSNA®-10 – copper-nickel



section view

| Outside Diameter of Pipe |                  | A<br>mm | C<br>mm | d <sub>1</sub><br>(Thread)<br>G" | ~L<br>mm | ~L <sub>1</sub><br>mm | ~L <sub>2</sub><br>mm | A/F <sub>1</sub><br>mm | A/F <sub>2</sub><br>mm | Approx.<br>Weight<br>kg /piece |
|--------------------------|------------------|---------|---------|----------------------------------|----------|-----------------------|-----------------------|------------------------|------------------------|--------------------------------|
| nominal<br>in            | actual<br>mm xG" |         |         |                                  |          |                       |                       |                        |                        |                                |
|                          | 8 x ¼            | 12      | 6       | G ¼                              | 40       | 12                    | 30                    | 22                     | 19                     | 0.09                           |
| ⅛                        | 10 x ⅜           | 15      | 8       | G ⅜                              | 40       | 12                    | 32                    | 27                     | 22                     | 0.14                           |
| ¼                        | 12 x ½           | 17      | 10      | G ½                              | 43       | 14                    | 34                    | 27                     | 27                     | 0.18                           |
| ¼                        | 14 x ⅝           | 20      | 12      | G ⅝                              | 49       | 14                    | 39                    | 32                     | 32                     | 0.25                           |
| ⅜                        | 16 x ¾           | 22      | 14      | G ¾                              | 50       | 16                    | 40                    | 36                     | 32                     | 0.35                           |
| ½                        | 20 x 1           | 27      | 18      | G 1                              | 56       | 18                    | 46                    | 41                     | 41                     | 0.72                           |
| ¾                        | 25 x 1           | 32      | 22      | G 1                              | 57       | 18                    | 47                    | 46                     | 41                     | 0.53                           |
| 1                        | 30 x 1 ¼         | 37      | 27      | G 1¼                             | 63       | 20                    | 52                    | 50                     | 50                     | 0.78                           |
| 1¼                       | 38 x 1½          | 45      | 35      | G 1½                             | 71       | 22                    | 56                    | 60                     | 55                     | 0.90                           |
| 1½                       | 44.5 x 1¾        | 52      | 41      | G 1¾                             | 76       | 24                    | 61                    | 70                     | 65                     | 1.15                           |
| 2                        | 57 x 2½          | 65      | 54      | G 2½                             | 87       | 30                    | 72                    | 85                     | 85                     | 1.36                           |

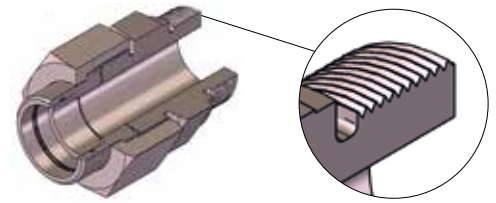
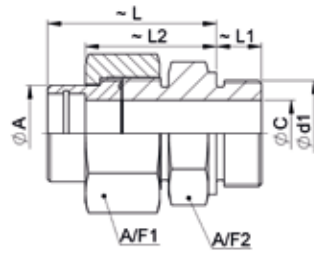
Other dimensions on request.

# Male Unions, reduced

with silver solder  
capillary x male thread  
equipped with sealing ring

PN up to 63

**Material:**  
OSNA®-10 – copper-nickel



section view

| Outside Diameter of Pipe |                  | A<br>mm | C<br>mm | d <sub>1</sub><br>(Thread)<br>G" | ~L<br>mm | ~L <sub>1</sub><br>mm | ~L <sub>2</sub><br>mm | A/F <sub>1</sub><br>mm | A/F <sub>2</sub><br>mm | Approx.<br>Weight<br>kg /piece |
|--------------------------|------------------|---------|---------|----------------------------------|----------|-----------------------|-----------------------|------------------------|------------------------|--------------------------------|
| nominal<br>in            | actual<br>mm xG" |         |         |                                  |          |                       |                       |                        |                        |                                |
|                          | 8 x 1/8          | 12      | 4       | Gx 1/2                           | 39       | 8                     | 30                    | 22                     | 17                     |                                |
|                          | 8 x 3/8          | 12      | 6       | Gx 3/8                           | 40       | 12                    | 30                    | 22                     | 22                     |                                |
|                          | 8 x 1/2          | 12      | 6       | Gx 1/2                           | 42       | 14                    | 33                    | 22                     | 27                     |                                |
| 1/8                      | 10 x 1/4         | 15      | 6       | Gx 1/4                           | 40       | 12                    | 32                    | 27                     | 22                     |                                |
| 1/8                      | 10 x 1/2         | 15      | 8       | Gx 1/2                           | 43       | 14                    | 34                    | 27                     | 27                     | 0.19                           |
| 1/8                      | 10 x 5/8         | 15      | 8       | Gx 5/8                           | 45       | 14                    | 36                    | 27                     | 32                     |                                |
| 1/4                      | 12 x 1/4         | 17      | 6       | Gx 1/4                           | 41       | 12                    | 32                    | 27                     | 24                     |                                |
| 1/4                      | 12 x 3/8         | 17      | 8       | Gx 3/8                           | 41       | 12                    | 32                    | 27                     | 24                     | 0.15                           |
| 1/4                      | 12 x 5/8         | 17      | 10      | Gx 5/8                           | 45       | 14                    | 36                    | 27                     | 32                     |                                |
| 1/4                      | 12 x 3/4         | 17      | 10      | Gx 3/4                           | 45       | 16                    | 36                    | 27                     | 32                     |                                |
| 1/4                      | 14 x 3/8         | 20      | 12      | Gx 3/8                           | 47       | 12                    | 36                    | 32                     | 27                     |                                |
| 1/4                      | 14 x 1/2         | 20      | 12      | Gx 1/2                           | 47       | 14                    | 37                    | 32                     | 27                     | 0.24                           |
| 1/4                      | 14 x 3/4         | 20      | 12      | Gx 3/4                           | 49       | 16                    | 39                    | 32                     | 32                     |                                |
| 1/4                      | 14 x 1           | 20      | 12      | Gx 1                             | 52       | 18                    | 42                    | 32                     | 41                     |                                |
| 3/8                      | 16 x 1/2         | 22      | 10      | Gx 1/2                           | 50       | 14                    | 40                    | 36                     | 32                     | 0.31                           |
| 3/8                      | 16 x 5/8         | 22      | 12      | Gx 5/8                           | 50       | 14                    | 40                    | 36                     | 32                     |                                |
| 3/8                      | 16 x 1 3/4       | 22      | 14      | Gx 1                             | 53       | 18                    | 43                    | 36                     | 41                     |                                |
| 3/8                      | 16 x 1 1/4       | 22      | 14      | Gx 1 1/4                         | 56       | 20                    | 46                    | 36                     | 50                     |                                |
| 1/2                      | 20 x 5/8         | 27      | 12      | Gx 5/8                           | 54       | 14                    | 44                    | 41                     | 36                     |                                |
| 1/2                      | 20 x 3/4         | 27      | 14      | Gx 3/4                           | 54       | 16                    | 44                    | 41                     | 36                     | 0.45                           |
| 1/2                      | 20 x 1 1/4       | 27      | 18      | Gx 1 1/4                         | 59       | 20                    | 49                    | 41                     | 50                     |                                |
| 1/2                      | 20 x 1 1/2       | 27      | 18      | Gx 1 1/2                         | 61       | 22                    | 51                    | 41                     | 55                     |                                |
| 3/4                      | 25 x 5/8         | 32      | 12      | Gx 5/8                           | 56       | 14                    | 46                    | 46                     | 41                     |                                |
| 3/4                      | 25 x 3/4         | 32      | 14      | Gx 3/4                           | 56       | 16                    | 46                    | 46                     | 41                     | 0.59                           |
| 3/4                      | 25 x 1 1/4       | 32      | 22      | Gx 1 1/4                         | 60       | 20                    | 50                    | 46                     | 50                     |                                |
| 3/4                      | 25 x 1 1/2       | 32      | 22      | Gx 1 1/2                         | 62       | 22                    | 52                    | 46                     | 55                     |                                |

Other dimensions on request.

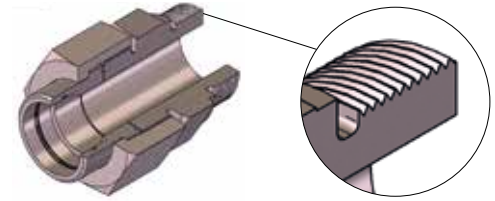
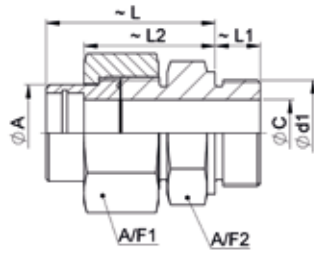
# Male Unions, reduced (continued)

with silver solder  
capillary x male thread  
equipped with sealing ring

PN up to 63

**Material:**

OSNA®-10 – copper-nickel



section view

| Outside Diameter of Pipe |                  | A<br>mm | C<br>mm | d <sub>1</sub><br>(Thread)<br>G" | ~L<br>mm | ~L <sub>1</sub><br>mm | ~L <sub>2</sub><br>mm | A/F <sub>1</sub><br>mm | A/F <sub>2</sub><br>mm | Approx.<br>Weight<br>kg /piece |
|--------------------------|------------------|---------|---------|----------------------------------|----------|-----------------------|-----------------------|------------------------|------------------------|--------------------------------|
| nominal<br>in            | actual<br>mm xG" |         |         |                                  |          |                       |                       |                        |                        |                                |
| 1                        | 30 x ¾           | 37      | 14      | G x ¾                            | 61       | 16                    | 50                    | 50                     | 46                     |                                |
| 1                        | 30 x 1           | 37      | 22      | G x 1                            | 62       | 18                    | 51                    | 50                     | 46                     | 0.72                           |
| 1                        | 30 x 1½          | 37      | 27      | G x 1½                           | 65       | 22                    | 54                    | 50                     | 55                     |                                |
| 1                        | 30 x 1¾          | 37      | 27      | G x 1¾                           | 68       | 24                    | 57                    | 50                     | 65                     |                                |
| 1¼                       | 38 x ¾           | 45      | 14      | G x ¾                            | 70       | 16                    | 55                    | 60                     | 55                     |                                |
| 1¼                       | 38 x 1           | 45      | 22      | G x 1                            | 71       | 18                    | 56                    | 60                     | 55                     | 1.00                           |
| 1¼                       | 38 x 1¼          | 45      | 27      | G x 1¼                           | 71       | 20                    | 56                    | 60                     | 55                     | 1.07                           |
| 1¼                       | 38 x 1¾          | 45      | 35      | G x 1¾                           | 74       | 24                    | 59                    | 60                     | 65                     |                                |
| 1½                       | 44.5 x 1         | 52      | 22      | G x 1                            | 74       | 18                    | 59                    | 70                     | 60                     |                                |
| 1½                       | 44.5 x 1¼        | 52      | 27      | G x 1¼                           | 74       | 20                    | 59                    | 70                     | 60                     |                                |
| 1½                       | 44.5 x 1½        | 52      | 35      | G x 1½                           | 74       | 22                    | 59                    | 70                     | 60                     | 1.23                           |
| 1½                       | 44.5 x 2         | 52      | 41      | G x 2                            | 77       | 24                    | 62                    | 70                     | 70                     | 1.57                           |
| 2                        | 57 x 1¼          | 65      | 27      | G x 1¼                           | 83       | 20                    | 69                    | 85                     | 80                     |                                |
| 2                        | 57 x 1½          | 65      | 35      | G x 1½                           | 83       | 22                    | 69                    | 85                     | 80                     |                                |
| 2                        | 57 x 1¾          | 65      | 41      | G x 1¾                           | 83       | 24                    | 69                    | 85                     | 80                     |                                |
| 2                        | 57 x 2           | 65      | 48      | G x 2                            | 83       | 24                    | 69                    | 85                     | 80                     | 2.05                           |







# KME Quality Management

KME is committed to the continuous improvement of all our business and production processes in terms of efficiency, effectiveness and reliability as regards their organisation, technological aspects and staff management.

The aim of our commitment is to increase the satisfaction of all stakeholders.

We are constantly engaged in:

- creating products of outstanding quality
- preventing errors and defects
- minimising the costs associated with errors and inefficiencies
- preventing the waste of resources
- establishing safe production conditions to protect both our employees and the environment

We aim for excellence by means of transparent management systems designed to satisfy the requirements of our clients together with the demands of the market and technology.

The quality management systems implemented throughout the KME Group are fully compliant with the provisions of ISO 9001 as well as, in the case of our automotive industry clients, ISO TS 16 949, and our staff is strongly committed to their implementation at all levels.





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1116.000.0108