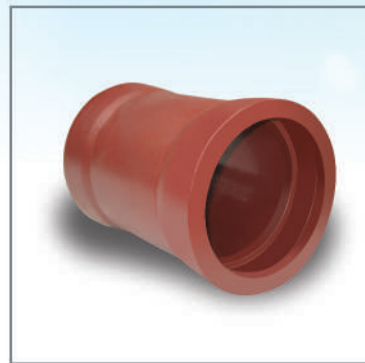


# DUCTILE IRON FITTINGS



 **ELECTROSTEEL CASTINGS LIMITED**





## Introduction



Electrosteel Castings Limited is one of the premier manufacturers of Ductile Iron Pipes and Fittings in India. The Ductile Iron Fittings are made in a state-of-the-art plant at Khardah and Haldia (in West Bengal), where the fittings are made with the most modern casting techniques like Vacuum Lost Foam Process (VLFP), High Pressure Moulding Process and 'No bake' Moulding Process. Both these plants are equipped with latest machineries, sophisticated finishing facilities and modern testing laboratories. These facilities are run by experienced engineers and backed by dedicated research and development wings. Since Electrosteel manufactures both pipes and fittings, it is a one stop shop for your pipeline requirement, offering excellent compatibility between pipes and fittings.



# Electrosteel- the preferred choice

- Quality as per International benchmarks.
- Catering to over 50 countries around the globe.
- Supplied fittings to over 15,000 projects across the world.
- Product certified by leading international certifying agencies like KITEMARK (UK), DVGW (Germany), ACS (France) etc.
- Most modern casting techniques resulting in high quality fittings.
- High dimensional accuracy leading to proper fitment.
- Varied options for coating and lining depending on external and internal conditions.
- Proven pre-sales and after-sales support.





## Product Range



Electrosteel produces fittings in the range DN 80 mm DN 1200 mm in accordance with the following standards.

- ISO 2531/EN 545 for Water
- ISO 7186/EN 598 for Sewerage
- IS 9523 for Water and Sewerage

## Range of fittings

Electrosteel produces comprehensive range of fittings and ancillaries like :

- Push on Joint Socketed Fittings
- Flanged Fittings
- Rotating Flange Fittings
- Mechanical Joint Fittings (Regular)
- Mechanical Joint Fittings (Express type)
- Bolted Restrained Joint Fittings
- Boltless Restrained Joint Fittings (Electrolock)

# Manufacturing Process

The 'Lost Foam' process used for manufacturing DI fittings is an advanced technique and it scores over other conventional processes.

## Lost Foam Technique

- First an exact replica of the fittings is made with Styrofoam popularly known as Thermocol.
- This replica, moulded in special machines, acts as a pattern for the casting. The patterns are then kept in mechanized moulding boxes and then packed with sand.
- When hot metal is poured, the Styrofoam pattern vaporizes and the metal takes the shape of the fittings by filling up the cavity.
- After cooling, castings are taken out, shot blasted, fettled and cleaned.
- After thorough inspection and fettling, the castings (fittings) are subjected to hydrostatic testing.
- Tested fitting are then Zinc coated, cement lined and a bituminous finishing coat is applied from outside. Alternatively fittings are shot blasted, Fusion Bonded Epoxy (FBE) coated and lined in our special FBE plant.

## Advantages of Lost Foam Technique

- There is no need of core setting. So no core displacement resulting in uneven thickness.
- Much lower chances of having pinhole, slag inclusion or blow hole.
- Maintains high dimensional tolerance, which is so vital for proper fitment.
- The castings have excellent finish, much better than sand moulded fittings.
- Higher productivity because casting process is much faster.

## Hydrostatic Testing

DI Fittings are tested at works at the following test pressure as specified in ISO/EN.

| Diameter (mm) | Works Test Pressure (Kg/cm <sup>2</sup> ) |
|---------------|-------------------------------------------|
| 80-300        | 25                                        |
| 350-600       | 16                                        |
| 700-1200      | 10                                        |

## Loose Flange Fittings

Electrosteel has also introduced fittings with Adjustable Flange or Loose Flange. Unlike 'As cast' Flanged Fittings, in this case, separately cast loose flanges are mounted on the fittings. A loose flanged fittings comprises of a flange ring (in two or more parts bolted together), which can be fixed on the fittings end. This loose flange can be freely rotated around the axis of the fittings.

### Advantages

- Since the flanges can be freely rotated, bolt hole alignment with the mating flange becomes easier.
- As it can be fixed and removed easily, dismantling of adjoining accessories becomes easier. Small angles can be adjusted.
- The PN rating of the Fittings can be changed at will, just by changing the loose flange.

### Special fittings

Apart from push-on joint and mechanical joint fittings, we also manufacture some special fittings, which are extremely useful for practical applications which would have same wall thickness, material and quality tests of standard fittings. Few of these are mentioned below:

- 4 way Crosses.
- Double Socket Branch Flanged Level Invert Tee (Scour Tee).
- Fittings with one side Flange and one side plain-ended/socketed of a particular length.
- Tees and Reducers with other non-standard DN x dn combinations.

Due to the immense flexibility of our manufacturing process by Lost Foam method, virtually any combination of socket/flange/plain-end is possible.



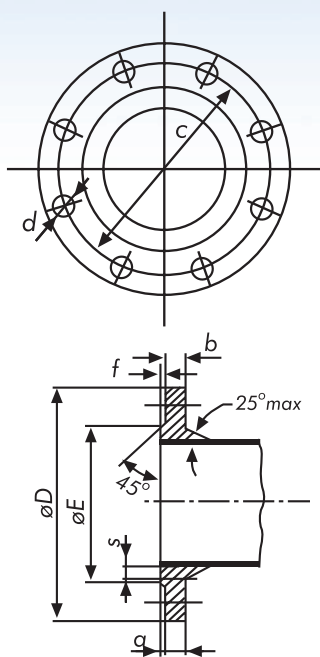
# Dimensions



**Dimensions of Push-on Joint and Mechanical Joint Fittings**

| DN   | External Diameter DE (mm) |           | Wall Thickness, e (mm) |           |
|------|---------------------------|-----------|------------------------|-----------|
|      | Nominal                   | Tolerance | K12                    | Tolerance |
| 80   | 98                        | +1/-2.7   | 7.0                    | -2.38     |
| 100  | 118                       | +1/-2.8   | 7.2                    | -2.40     |
| 125  | 144                       | +1/-2.8   | 7.5                    | -2.42     |
| 150  | 170                       | +1/-2.9   | 7.8                    | -2.45     |
| 200  | 222                       | +1/-3.0   | 8.4                    | -2.50     |
| 250  | 274                       | +1/-3.1   | 9.0                    | -2.55     |
| 300  | 326                       | +1/-3.3   | 9.6                    | -2.60     |
| 350  | 378                       | +1/-3.4   | 10.2                   | -2.65     |
| 400  | 429                       | +1/-3.5   | 10.8                   | -2.70     |
| 450  | 480                       | +1/-3.6   | 11.4                   | -2.75     |
| 500  | 532                       | +1/-3.8   | 12.0                   | -2.80     |
| 600  | 635                       | +1/-4.0   | 13.2                   | -2.90     |
| 700  | 738                       | +1/-4.3   | 14.4                   | -3.0      |
| 750  | 790                       | +1/-4.4   | 15.0                   | -3.05     |
| 800  | 842                       | +1/-4.5   | 15.6                   | -3.10     |
| 900  | 945                       | +1/-4.8   | 16.8                   | -3.20     |
| 1000 | 1048                      | +1/-5.0   | 18.0                   | -3.30     |
| 1100 | 1152                      | +1/-5.4   | 19.2                   | -3.40     |
| 1200 | 1255                      | +1/-5.8   | 20.4                   | -3.50     |

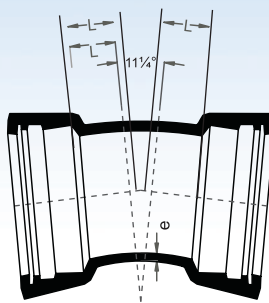
## Dimensions of Flange Drilling for Flange Fittings-PN 10



| All dimensions in millimeters |            |      |      |      |   |      |      |       |         |                  |
|-------------------------------|------------|------|------|------|---|------|------|-------|---------|------------------|
| Nominal Dia                   | Dimensions |      |      |      |   |      |      | Holes |         | Bolt size metric |
| DN                            | D          | E    | C    | b    | f | a    | s    | Nos   | Dia (d) |                  |
| 80                            | 200        | 132  | 160  | 16   | 3 | 19   | 15   | 4     | 19      | M16              |
| 100                           | 220        | 156  | 180  | 16   | 3 | 19   | 15   | 8     | 19      | M16              |
| 125                           | 250        | 184  | 210  | 16   | 3 | 19   | 15   | 8     | 19      | M16              |
| 150                           | 285        | 211  | 240  | 16   | 3 | 19   | 15   | 8     | 23      | M20              |
| 200                           | 340        | 266  | 295  | 17   | 3 | 20   | 15   | 8     | 23      | M20              |
| 250                           | 395        | 319  | 350  | 19   | 3 | 22   | 16   | 12    | 23      | M20              |
| 300                           | 445        | 370  | 400  | 20.5 | 4 | 24.5 | 17.5 | 12    | 23      | M20              |
| 350                           | 505        | 429  | 460  | 20.5 | 4 | 24.5 | 19.5 | 16    | 23      | M20              |
| 400                           | 565        | 480  | 515  | 20.5 | 4 | 24.5 | 19.5 | 16    | 28      | M24              |
| 450                           | 615        | 530  | 565  | 21   | 4 | 25.5 | 20   | 20    | 28      | M24              |
| 500                           | 670        | 582  | 620  | 22.5 | 4 | 26.5 | 21   | 20    | 28      | M24              |
| 600                           | 780        | 682  | 725  | 25   | 5 | 30   | 24   | 20    | 31      | M27              |
| 700                           | 895        | 794  | 840  | 27.5 | 5 | 32.5 | 24   | 24    | 31      | M27              |
| 750                           | 960        | 857  | 900  | 29   | 5 | 34   | 24   | 24    | 31      | M27              |
| 800                           | 1015       | 901  | 950  | 30   | 5 | 35   | 24.5 | 24    | 34      | M30              |
| 900                           | 1115       | 1001 | 1050 | 32.5 | 5 | 37.5 | 26.5 | 28    | 34      | M30              |
| 1000                          | 1230       | 1112 | 1160 | 35   | 5 | 40   | 28   | 28    | 37      | M33              |
| 1100                          | 1340       | 1231 | 1270 | 38   | 5 | 43   | 30   | 28    | 37      | M33              |
| 1200                          | 1455       | 1328 | 1380 | 40   | 5 | 45   | 31.5 | 32    | 40      | M36              |

## Dimensions of Flange Drilling for Flange Fittings-PN 16

| All dimensions in millimeters |            |      |      |      |   |      |      |       |         |                  |
|-------------------------------|------------|------|------|------|---|------|------|-------|---------|------------------|
| Nominal Dia                   | Dimensions |      |      |      |   |      |      | Holes |         | Bolt size metric |
| DN                            | D          | E    | C    | b    | f | a    | s    | Nos   | Dia (d) |                  |
| 80                            | 200        | 132  | 160  | 16   | 3 | 19   | 15   | 8     | 19      | M16              |
| 100                           | 220        | 156  | 180  | 16   | 3 | 19   | 15   | 8     | 19      | M16              |
| 125                           | 250        | 184  | 210  | 16   | 3 | 19   | 15   | 8     | 19      | M16              |
| 150                           | 285        | 211  | 240  | 16   | 3 | 19   | 15   | 8     | 23      | M20              |
| 200                           | 340        | 266  | 295  | 17   | 3 | 20   | 16   | 12    | 23      | M20              |
| 250                           | 400        | 319  | 355  | 19   | 3 | 22   | 17.5 | 12    | 28      | M24              |
| 300                           | 455        | 370  | 410  | 20.5 | 4 | 24.5 | 19.5 | 12    | 28      | M24              |
| 350                           | 520        | 429  | 470  | 22.5 | 4 | 26.5 | 21   | 16    | 28      | M24              |
| 400                           | 580        | 480  | 525  | 24   | 4 | 28   | 22.5 | 16    | 31      | M27              |
| 450                           | 640        | 548  | 585  | 26   | 4 | 30   | 24   | 20    | 31      | M27              |
| 500                           | 715        | 609  | 650  | 27.5 | 4 | 31.5 | 25   | 20    | 34      | M30              |
| 600                           | 840        | 720  | 770  | 31   | 5 | 36   | 27   | 20    | 37      | M33              |
| 700                           | 910        | 794  | 840  | 34.5 | 5 | 39.5 | 27.5 | 24    | 37      | M33              |
| 750                           | 970        | 857  | 900  | 36   | 5 | 41   | 28   | 24    | 37      | M33              |
| 800                           | 1025       | 901  | 950  | 38   | 5 | 43   | 30   | 24    | 40      | M36              |
| 900                           | 1125       | 1001 | 1050 | 41   | 5 | 46   | 32.5 | 28    | 40      | M36              |
| 1000                          | 1255       | 1112 | 1170 | 45   | 5 | 50   | 35   | 28    | 44      | M39              |
| 1100                          | 1355       | 1218 | 1270 | 48.5 | 5 | 53.5 | 37.5 | 32    | 43      | M39              |
| 1200                          | 1485       | 1328 | 1390 | 52   | 5 | 57   | 40   | 32    | 49      | M45              |

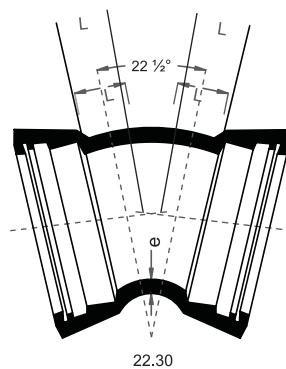


**Double Socket 11 1/4° Bend**

| Nominal Size | e    | L   |
|--------------|------|-----|
| mm           | mm   | mm  |
| 80           | 7.0  | 30  |
| 100          | 7.2  | 30  |
| 150          | 7.8  | 35  |
| 200          | 8.4  | 40  |
| 250          | 9.0  | 50  |
| 300          | 9.6  | 55  |
| 350          | 10.2 | 60  |
| 400          | 10.8 | 65  |
| 450          | 11.4 | 70  |
| 500          | 12.0 | 75  |
| 600          | 13.2 | 85  |
| 700          | 14.4 | 95  |
| 800          | 15.6 | 110 |
| 900          | 16.8 | 120 |
| 1000         | 18.0 | 130 |
| 1100         | 19.2 | 140 |
| 1200         | 20.4 | 150 |

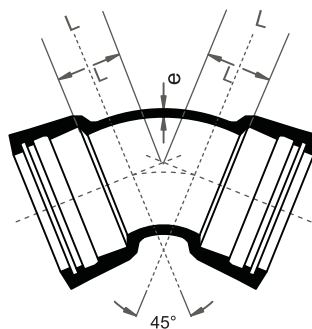
**Double Socket 22 1/2° Bend**

| Nominal Size | e    | L   |
|--------------|------|-----|
| mm           | mm   | mm  |
| 80           | 7.0  | 40  |
| 100          | 7.2  | 40  |
| 150          | 7.8  | 55  |
| 200          | 8.4  | 65  |
| 250          | 9.0  | 75  |
| 300          | 9.6  | 85  |
| 350          | 10.2 | 95  |
| 400          | 10.8 | 110 |
| 450          | 11.4 | 120 |
| 500          | 12.0 | 130 |
| 600          | 13.2 | 150 |
| 700          | 14.4 | 175 |
| 800          | 15.6 | 195 |
| 900          | 16.8 | 220 |
| 1000         | 18.0 | 240 |
| 1100         | 19.2 | 260 |
| 1200         | 20.4 | 285 |



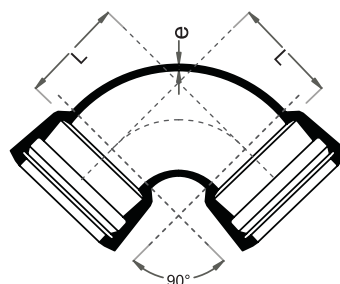
**Double Socket 45° Bend**

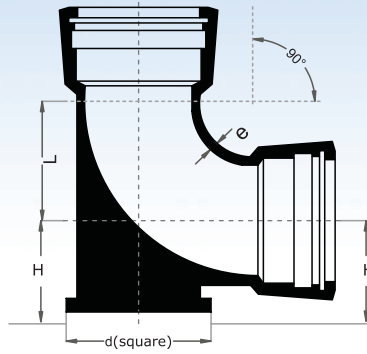
| Nominal Size | e    | L   |
|--------------|------|-----|
| mm           | mm   | mm  |
| 80           | 7.0  | 55  |
| 100          | 7.2  | 65  |
| 150          | 7.8  | 85  |
| 200          | 8.4  | 110 |
| 250          | 9.0  | 130 |
| 300          | 9.6  | 150 |
| 350          | 10.2 | 175 |
| 400          | 10.8 | 195 |
| 450          | 11.4 | 220 |
| 500          | 12.0 | 240 |
| 600          | 13.2 | 285 |
| 700          | 14.4 | 330 |
| 800          | 15.6 | 370 |
| 900          | 16.8 | 415 |
| 1000         | 18.0 | 460 |
| 1100         | 19.2 | 505 |
| 1200         | 20.4 | 550 |



**Double Socket 90° Bend**

| Nominal Size | e    | L    |
|--------------|------|------|
| mm           | mm   | mm   |
| 80           | 7.0  | 100  |
| 100          | 7.2  | 120  |
| 150          | 7.8  | 170  |
| 200          | 8.4  | 220  |
| 250          | 9.0  | 270  |
| 300          | 9.6  | 320  |
| 350          | 10.2 | 370  |
| 400          | 10.8 | 420  |
| 450          | 11.4 | 470  |
| 500          | 12.0 | 520  |
| 600          | 13.2 | 620  |
| 700          | 14.4 | 720  |
| 800          | 15.6 | 820  |
| 900          | 16.8 | 920  |
| 1000         | 18.0 | 1020 |
| 1100         | 19.2 | 1130 |
| 1200         | 20.4 | 1230 |



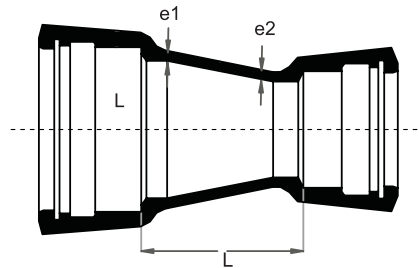


Double Socket 90° Duck Foot Bend

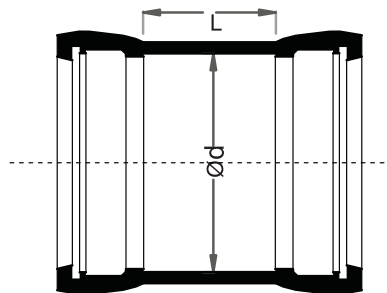
| Nominal Size | e    | L    | H   | D    |
|--------------|------|------|-----|------|
| mm           | mm   | mm   | mm  | mm   |
| 80           | 7.0  | 110  | 110 | 180  |
| 100          | 7.2  | 130  | 125 | 200  |
| 150          | 7.8  | 180  | 160 | 250  |
| 200          | 8.4  | 230  | 190 | 300  |
| 250          | 9.0  | 280  | 225 | 350  |
| 300          | 9.6  | 325  | 255 | 400  |
| 350          | 10.2 | 380  | 290 | 450  |
| 400          | 10.8 | 430  | 320 | 500  |
| 450          | 11.4 | 480  | 355 | 550  |
| 500          | 12.0 | 530  | 385 | 600  |
| 600          | 13.2 | 630  | 450 | 700  |
| 700          | 14.4 | 730  | 515 | 800  |
| 800          | 15.6 | 830  | 580 | 900  |
| 900          | 16.8 | 930  | 645 | 1000 |
| 1000         | 18.0 | 1030 | 710 | 1100 |
| 1100         | 19.2 | 1130 | 775 | 1200 |
| 1200         | 20.4 | 1230 | 840 | 1300 |

| Nominal Diameter (DN) |             | e <sub>1</sub> | e <sub>2</sub> | L   |
|-----------------------|-------------|----------------|----------------|-----|
| Larger End            | Smaller End |                |                |     |
| mm                    | mm          | mm             | mm             | mm  |
| 100                   | 80          | 7.2            | 7.0            | 90  |
| 150                   | 80          | 7.8            | 7.0            | 190 |
| 150                   | 100         | 7.8            | 7.2            | 150 |
| 200                   | 100         | 8.4            | 7.2            | 250 |
| 200                   | 150         | 8.4            | 7.8            | 150 |
| 250                   | 150         | 9.0            | 7.8            | 250 |
| 250                   | 200         | 9.0            | 8.4            | 150 |
| 300                   | 150         | 9.6            | 7.8            | 350 |
| 300                   | 200         | 9.6            | 8.4            | 250 |
| 300                   | 250         | 9.6            | 9.0            | 150 |
| 350                   | 200         | 10.2           | 8.4            | 360 |
| 350                   | 250         | 10.2           | 9.0            | 260 |
| 350                   | 300         | 10.2           | 9.6            | 160 |
| 400                   | 250         | 10.8           | 9.0            | 360 |
| 400                   | 300         | 10.8           | 9.6            | 260 |
| 400                   | 350         | 10.8           | 10.2           | 160 |
| 450                   | 350         | 11.4           | 10.2           | 260 |
| 450                   | 400         | 11.4           | 10.8           | 160 |
| 500                   | 350         | 12.0           | 10.2           | 360 |
| 500                   | 400         | 12.0           | 10.8           | 260 |
| 600                   | 400         | 13.2           | 10.8           | 460 |
| 600                   | 500         | 13.2           | 12.0           | 260 |
| 700                   | 500         | 14.4           | 12.0           | 480 |
| 700                   | 600         | 14.4           | 13.2           | 280 |
| 800                   | 600         | 15.6           | 13.2           | 480 |
| 800                   | 700         | 15.6           | 14.4           | 280 |
| 900                   | 700         | 16.8           | 14.4           | 480 |
| 900                   | 800         | 16.8           | 15.6           | 280 |
| 1000                  | 800         | 18.0           | 15.6           | 480 |
| 1000                  | 900         | 18.0           | 16.8           | 280 |
| 1100                  | 1000        | 19.2           | 18.0           | 280 |
| 1200                  | 1000        | 20.4           | 18.0           | 480 |

Double Socket Concentric Reducer

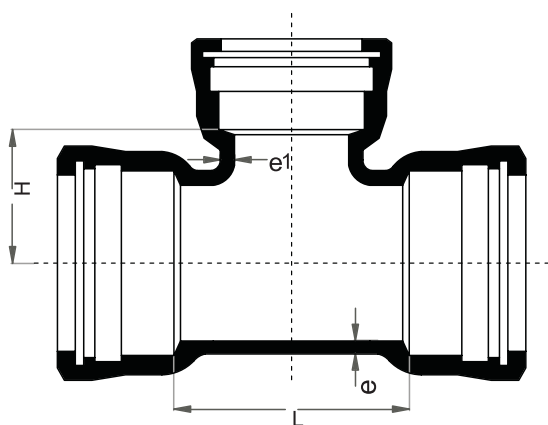


Note : We can make Eccentric and Paddle Reducers of same size



Double Socket Collar

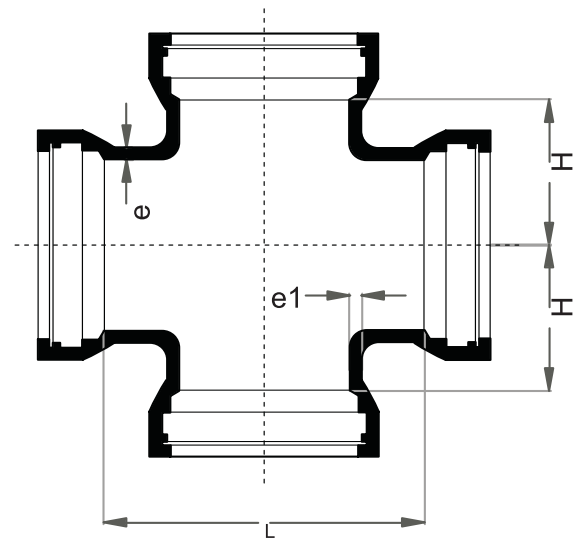
| Nominal Dia (DN) | e    | L   | d    |
|------------------|------|-----|------|
| mm               | mm   | mm  | mm   |
| 80               | 7.0  | 160 | 109  |
| 100              | 7.2  | 160 | 130  |
| 150              | 7.8  | 165 | 183  |
| 200              | 8.4  | 170 | 235  |
| 250              | 9.0  | 175 | 288  |
| 300              | 9.6  | 180 | 340  |
| 350              | 10.2 | 185 | 393  |
| 400              | 10.8 | 190 | 445  |
| 450              | 11.4 | 195 | 498  |
| 500              | 12.0 | 200 | 550  |
| 600              | 13.2 | 210 | 655  |
| 700              | 14.4 | 220 | 760  |
| 800              | 15.6 | 230 | 865  |
| 900              | 16.8 | 240 | 970  |
| 1000             | 18.0 | 250 | 1075 |
| 1100             | 19.2 | 260 | 1180 |
| 1200             | 20.4 | 270 | 1285 |

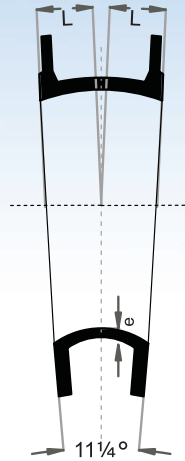
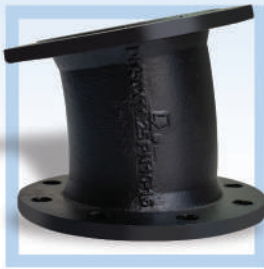


|                | Nominal Diameter (DN) |              | e<br>mm | e <sub>1</sub><br>mm | L<br>mm | H<br>mm |
|----------------|-----------------------|--------------|---------|----------------------|---------|---------|
|                | Body<br>mm            | Branch<br>mm |         |                      |         |         |
| All Socket Tee | 80                    | 80           | 7.0     | 7.0                  | 170     | 85      |
|                | 100                   | 80           | 7.2     | 7.0                  | 170     | 95      |
|                | 100                   | 100          | 7.2     | 7.2                  | 190     | 95      |
|                | 150                   | 100          | 7.8     | 7.2                  | 195     | 120     |
|                | 150                   | 150          | 7.8     | 7.8                  | 255     | 125     |
|                | 200                   | 80           | 8.4     | 7.0                  | 175     | 145     |
|                | 200                   | 100          | 8.4     | 7.2                  | 200     | 145     |
|                | 200                   | 150          | 8.4     | 7.8                  | 255     | 150     |
|                | 200                   | 200          | 8.4     | 8.4                  | 315     | 155     |
|                | 250                   | 80           | 9.0     | 7.0                  | 180     | 170     |
|                | 250                   | 100          | 9.0     | 7.2                  | 200     | 170     |
|                | 250                   | 150          | 9.0     | 7.8                  | 260     | 175     |
|                | 250                   | 200          | 9.0     | 8.4                  | 315     | 180     |
|                | 250                   | 250          | 9.0     | 9.0                  | 375     | 190     |
|                | 300                   | 100          | 9.6     | 7.2                  | 205     | 195     |
|                | 300                   | 150          | 9.6     | 7.8                  | 260     | 200     |
|                | 300                   | 200          | 9.6     | 8.4                  | 320     | 205     |
|                | 300                   | 250          | 9.6     | 9.0                  | 380     | 215     |
|                | 300                   | 300          | 9.6     | 9.6                  | 435     | 220     |
|                | 350                   | 100          | 10.2    | 7.2                  | 205     | 220     |
|                | 350                   | 150          | 10.2    | 7.8                  | 265     | 225     |
|                | 350                   | 200          | 10.2    | 8.4                  | 325     | 230     |
|                | 350                   | 250          | 10.2    | 9.0                  | 380     | 240     |
|                | 350                   | 300          | 10.2    | 9.6                  | 440     | 245     |
|                | 350                   | 350          | 10.2    | 10.2                 | 495     | 250     |
|                | 400                   | 80           | 10.8    | 7.0                  | 185     | 245     |
|                | 400                   | 100          | 10.8    | 7.2                  | 210     | 245     |
|                | 400                   | 150          | 10.8    | 7.8                  | 270     | 250     |
|                | 400                   | 200          | 10.8    | 8.4                  | 325     | 255     |
|                | 400                   | 300          | 10.8    | 9.6                  | 440     | 270     |
|                | 400                   | 400          | 10.8    | 10.8                 | 560     | 280     |
|                | 450                   | 100          | 11.4    | 7.2                  | 215     | 270     |
|                | 450                   | 250          | 11.4    | 9.0                  | 385     | 290     |
|                | 450                   | 450          | 11.4    | 11.4                 | 620     | 310     |
|                | 500                   | 100          | 12.0    | 7.2                  | 215     | 295     |
|                | 500                   | 200          | 12.0    | 8.4                  | 330     | 305     |
|                | 500                   | 400          | 12.0    | 10.8                 | 565     | 330     |
|                | 500                   | 500          | 12.0    | 12.0                 | 680     | 340     |
|                | 600                   | 200          | 13.2    | 8.4                  | 340     | 355     |
|                | 600                   | 400          | 13.2    | 10.8                 | 570     | 380     |
|                | 600                   | 600          | 13.2    | 13.2                 | 800     | 400     |
|                | 700                   | 200          | 14.4    | 8.4                  | 345     | 405     |
|                | 700                   | 400          | 14.4    | 10.8                 | 575     | 430     |
|                | 700                   | 700          | 14.4    | 14.4                 | 910     | 460     |
|                | 800                   | 200          | 15.6    | 8.4                  | 350     | 455     |
|                | 800                   | 400          | 15.6    | 10.8                 | 580     | 480     |
|                | 800                   | 600          | 15.6    | 13.2                 | 785     | 500     |
|                | 800                   | 800          | 15.6    | 15.6                 | 990     | 510     |
|                | 900                   | 200          | 16.8    | 8.4                  | 355     | 505     |
|                | 900                   | 400          | 16.8    | 10.8                 | 580     | 530     |
|                | 900                   | 600          | 16.8    | 13.2                 | 785     | 550     |
|                | 900                   | 900          | 16.8    | 16.8                 | 1095    | 565     |
|                | 1000                  | 200          | 18.0    | 8.4                  | 360     | 555     |
|                | 1000                  | 400          | 18.0    | 10.8                 | 580     | 580     |
|                | 1000                  | 600          | 18.0    | 13.2                 | 785     | 600     |
|                | 1000                  | 1000         | 18.0    | 18.0                 | 1200    | 615     |
|                | 1100                  | 400          | 19.2    | 10.8                 | 600     | 630     |
|                | 1100                  | 600          | 19.2    | 13.2                 | 830     | 650     |
|                | 1200                  | 600          | 20.4    | 13.2                 | 840     | 700     |
|                | 1200                  | 800          | 20.4    | 15.6                 | 1070    | 725     |
|                | 1200                  | 1000         | 20.4    | 18.0                 | 1300    | 745     |
|                | 1200                  | 1200         | 20.4    | 20.4                 | 1535    | 765     |

All Socket Cross

| SIZE | Body | Branch | e     | e <sub>1</sub> | L    | H   |
|------|------|--------|-------|----------------|------|-----|
|      | mm   | mm     | mm    | mm             | mm   | mm  |
| 80   | 80   | 80     | 7.0   | 7.0            | 170  | 85  |
| 100  | 80   | 80     | 7.2   | 7.0            | 170  | 95  |
| 100  | 100  | 100    | 7.2   | 7.2            | 190  | 95  |
| 150  | 150  | 150    | 7.8   | 7.8            | 255  | 125 |
| 200  | 80   | 80     | 8.4   | 7.0            | 175  | 145 |
| 200  | 100  | 100    | 8.4   | 7.2            | 200  | 145 |
| 200  | 150  | 150    | 8.4   | 7.8            | 255  | 150 |
| 200  | 200  | 200    | 8.4   | 8.4            | 315  | 155 |
| 250  | 80   | 80     | 9.0   | 7.0            | 180  | 170 |
| 250  | 100  | 100    | 9.0   | 7.2            | 200  | 170 |
| 250  | 150  | 150    | 9.0   | 7.8            | 260  | 175 |
| 250  | 200  | 200    | 9.0   | 8.4            | 315  | 180 |
| 250  | 250  | 250    | 9.0   | 9.0            | 375  | 190 |
| 300  | 80   | 80     | 9.6   | 7.0            | 180  | 195 |
| 300  | 100  | 100    | 9.6   | 7.2            | 205  | 195 |
| 300  | 150  | 150    | 9.6   | 7.8            | 260  | 200 |
| 300  | 200  | 200    | 9.6   | 8.4            | 320  | 205 |
| 300  | 250  | 250    | 9.6   | 9.0            | 380  | 215 |
| 300  | 300  | 300    | 9.6   | 9.6            | 435  | 220 |
| 350  | 100  | 100    | 10.2  | 7.2            | 205  | 220 |
| 350  | 150  | 150    | 10.2  | 7.8            | 265  | 225 |
| 350  | 200  | 200    | 10.2  | 8.4            | 325  | 230 |
| 350  | 250  | 250    | 10.2  | 9.0            | 380  | 240 |
| 350  | 300  | 300    | 10.2  | 9.6            | 440  | 245 |
| 350  | 350  | 350    | 10.2  | 10.2           | 495  | 250 |
| 400  | 100  | 100    | 10.8  | 7.2            | 210  | 245 |
| 400  | 150  | 150    | 10.8  | 7.8            | 270  | 250 |
| 400  | 200  | 200    | 10.8  | 8.4            | 325  | 255 |
| 400  | 250  | 250    | 10.8  | 9.0            | 385  | 265 |
| 400  | 300  | 300    | 10.8  | 9.6            | 440  | 270 |
| 400  | 400  | 400    | 10.8  | 10.8           | 560  | 280 |
| 500  | 100  | 100    | 12.0  | 7.2            | 215  | 295 |
| 500  | 150  | 150    | 12.0  | 7.8            | 275  | 300 |
| 500  | 200  | 200    | 12.0  | 8.4            | 330  | 305 |
| 500  | 250  | 250    | 12.0  | 9.0            | 390  | 315 |
| 500  | 300  | 300    | 12.0  | 9.6            | 450  | 320 |
| 500  | 400  | 400    | 12.0  | 10.8           | 565  | 330 |
| 500  | 500  | 500    | 12.0  | 12.0           | 680  | 340 |
| 600  | 200  | 200    | 13.2  | 8.4            | 340  | 355 |
| 600  | 400  | 400    | 13.2  | 10.8           | 570  | 380 |
| 600  | 600  | 600    | 13.2  | 13.2           | 800  | 400 |
| 1100 | 400  | 400    | 19.20 | 10.80          | 600  | 630 |
| 1100 | 600  | 600    | 19.20 | 13.20          | 830  | 650 |
| 1100 | 800  | 800    | 19.20 | 15.60          | 1065 | 675 |
| 1100 | 1000 | 1000   | 19.20 | 18.00          | 1295 | 695 |
| 1100 | 1100 | 1100   | 19.20 | 19.20          | 1410 | 705 |
| 1200 | 600  | 600    | 20.40 | 13.20          | 840  | 700 |
| 1200 | 800  | 800    | 20.40 | 15.60          | 1070 | 725 |
| 1200 | 1000 | 1000   | 20.40 | 18.00          | 1300 | 745 |
| 1200 | 1200 | 1200   | 20.40 | 20.40          | 1535 | 765 |



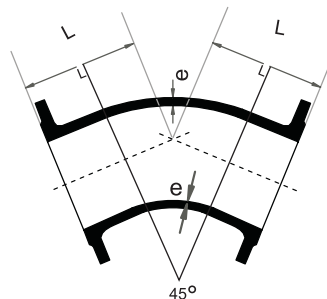
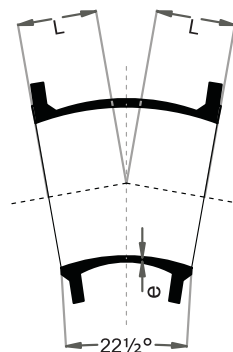


Double Flanged 11 1/4° Bend

| Nominal Size (DN) | e    | L   |
|-------------------|------|-----|
| mm                | mm   | mm  |
| 80                | 7.0  | 113 |
| 100               | 7.2  | 115 |
| 150               | 7.8  | 113 |
| 200               | 8.4  | 132 |
| 250               | 9.0  | 165 |
| 300               | 9.6  | 175 |
| 350               | 10.2 | 191 |
| 400               | 10.8 | 205 |
| 450               | 11.4 | 349 |
| 500               | 12.0 | 375 |
| 600               | 13.2 | 426 |
| 700               | 14.4 | 235 |
| 800               | 15.6 | 265 |
| 900               | 16.8 | 290 |
| 1000              | 18.0 | 310 |
| 1100              | 19.2 | 265 |
| 1200              | 20.4 | 275 |

Double Flanged 22 1/2° Bend

| Nominal Size (DN) | e    | L   |
|-------------------|------|-----|
| mm                | mm   | mm  |
| 80                | 7.0  | 105 |
| 100               | 7.2  | 110 |
| 150               | 7.8  | 109 |
| 200               | 8.4  | 131 |
| 250               | 9.0  | 190 |
| 300               | 9.6  | 210 |
| 350               | 10.2 | 210 |
| 400               | 10.8 | 239 |
| 450               | 11.4 | 349 |
| 500               | 12.0 | 375 |
| 600               | 13.2 | 426 |
| 700               | 14.4 | 315 |
| 800               | 15.6 | 350 |
| 900               | 16.8 | 380 |
| 1000              | 18.0 | 400 |
| 1100              | 19.2 | 380 |
| 1200              | 20.4 | 410 |

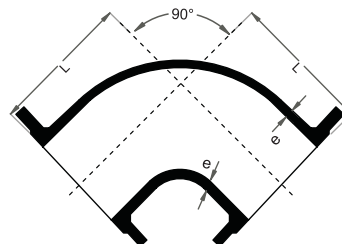


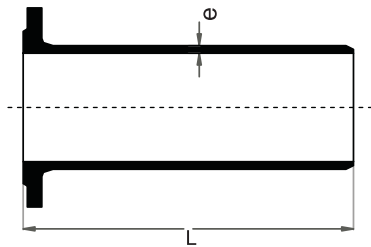
Double Flanged 45° Bend

| Nominal Size (DN) | e    | L   |
|-------------------|------|-----|
| mm                | mm   | mm  |
| 80                | 7.0  | 130 |
| 100               | 7.2  | 140 |
| 150               | 7.8  | 160 |
| 200               | 8.4  | 180 |
| 250               | 9.0  | 350 |
| 300               | 9.6  | 400 |
| 350               | 10.2 | 298 |
| 400               | 10.8 | 324 |
| 450               | 11.4 | 350 |
| 500               | 12.0 | 375 |
| 600               | 13.2 | 426 |
| 700               | 14.4 | 478 |
| 800               | 15.6 | 529 |
| 900               | 16.8 | 581 |
| 1000              | 18.0 | 650 |
| 1100              | 19.2 | 694 |
| 1200              | 20.4 | 750 |

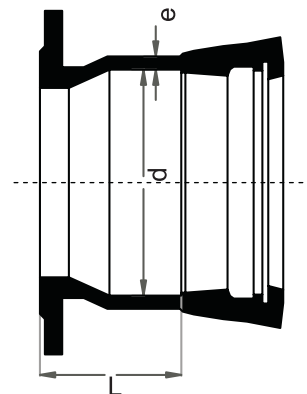
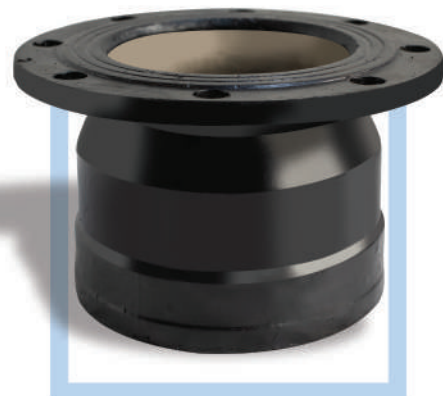
Double Flanged 90° Bend

| Nominal Size (DN) | e    | L    |
|-------------------|------|------|
| mm                | mm   | mm   |
| 80                | 7.0  | 165  |
| 100               | 7.2  | 180  |
| 150               | 7.8  | 220  |
| 200               | 8.4  | 260  |
| 250               | 9.0  | 350  |
| 300               | 9.6  | 400  |
| 350               | 10.2 | 450  |
| 400               | 10.8 | 500  |
| 450               | 11.4 | 550  |
| 500               | 12.0 | 600  |
| 600               | 13.2 | 700  |
| 700               | 14.4 | 800  |
| 800               | 15.6 | 900  |
| 900               | 16.8 | 1000 |
| 1000              | 18.0 | 1100 |
| 1100              | 19.2 | 1235 |
| 1200              | 20.4 | 1340 |

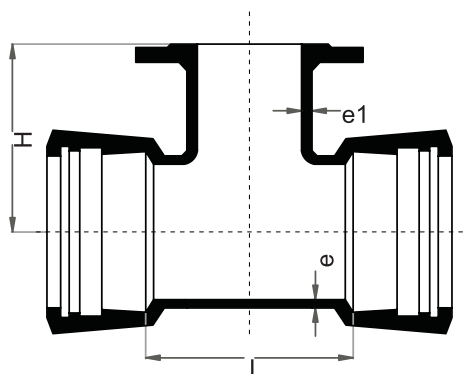




| Flanged Spigot | Nominal Dia (DN) | DE   | e    | L   |
|----------------|------------------|------|------|-----|
|                | mm               | mm   | mm   | mm  |
|                | 80               | 98   | 7.0  | 350 |
|                | 100              | 118  | 7.2  | 360 |
|                | 150              | 170  | 7.8  | 380 |
|                | 200              | 222  | 8.4  | 400 |
|                | 250              | 274  | 9.0  | 420 |
|                | 300              | 326  | 9.6  | 440 |
|                | 350              | 378  | 10.2 | 460 |
|                | 400              | 429  | 10.8 | 480 |
|                | 450              | 480  | 11.4 | 500 |
|                | 500              | 532  | 12.0 | 520 |
|                | 600              | 635  | 13.2 | 560 |
|                | 700              | 738  | 14.4 | 600 |
|                | 800              | 842  | 15.6 | 600 |
|                | 900              | 945  | 16.8 | 600 |
|                | 1000             | 1048 | 18.0 | 600 |
|                | 1100             | 1152 | 19.2 | 600 |
|                | 1200             | 1255 | 20.4 | 600 |



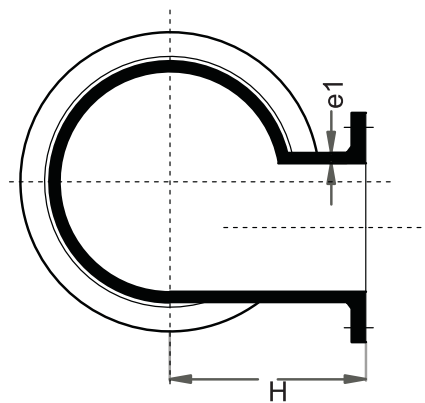
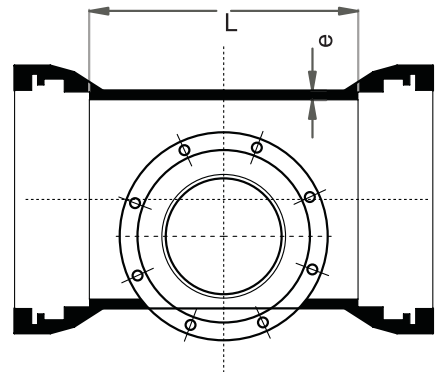
| Flanged Socket | Nominal Dia (DN) | e    | L   | d    |
|----------------|------------------|------|-----|------|
|                | mm               | mm   | mm  | mm   |
|                | 80               | 7.0  | 130 | 109  |
|                | 100              | 7.2  | 130 | 130  |
|                | 150              | 7.8  | 135 | 183  |
|                | 200              | 8.4  | 140 | 235  |
|                | 250              | 9.0  | 145 | 288  |
|                | 300              | 9.6  | 150 | 340  |
|                | 350              | 10.2 | 155 | 393  |
|                | 400              | 10.8 | 160 | 445  |
|                | 450              | 11.4 | 165 | 498  |
|                | 500              | 12.0 | 170 | 550  |
|                | 600              | 13.2 | 180 | 655  |
|                | 700              | 14.4 | 190 | 760  |
|                | 800              | 15.6 | 200 | 865  |
|                | 900              | 16.8 | 210 | 970  |
|                | 1000             | 18.0 | 220 | 1075 |
|                | 1100             | 19.2 | 230 | 1180 |
|                | 1200             | 20.4 | 240 | 1285 |

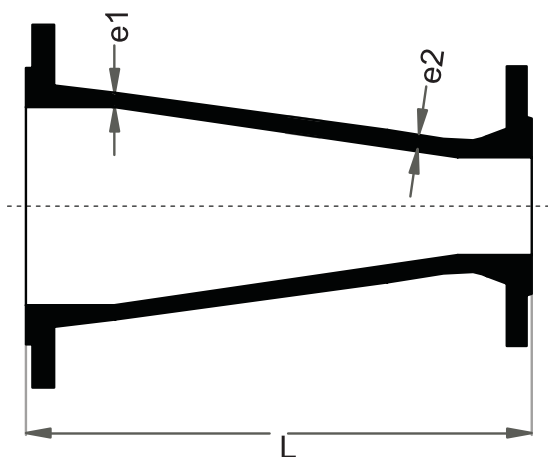


| Double Socket Flanged Branch Tee | Nominal Diameter (DN) |        | e    | e <sub>1</sub> | L    | H   |
|----------------------------------|-----------------------|--------|------|----------------|------|-----|
|                                  | Body                  | Branch |      |                |      |     |
|                                  | mm                    | mm     | mm   | mm             | mm   | mm  |
|                                  | 80                    | 80     | 7.0  | 7.0            | 170  | 165 |
|                                  | 100                   | 80     | 7.2  | 7.0            | 170  | 175 |
|                                  | 100                   | 100    | 7.2  | 7.2            | 190  | 180 |
|                                  | 150                   | 80     | 7.8  | 7.0            | 170  | 205 |
|                                  | 150                   | 100    | 7.8  | 7.2            | 195  | 210 |
|                                  | 150                   | 150    | 7.8  | 7.8            | 255  | 220 |
|                                  | 200                   | 80     | 8.4  | 7.0            | 175  | 235 |
|                                  | 200                   | 100    | 8.4  | 7.2            | 200  | 240 |
|                                  | 200                   | 150    | 8.4  | 7.8            | 255  | 250 |
|                                  | 200                   | 200    | 8.4  | 8.4            | 315  | 260 |
|                                  | 250                   | 80     | 9.0  | 7.0            | 180  | 265 |
|                                  | 250                   | 100    | 9.0  | 7.2            | 200  | 270 |
|                                  | 250                   | 150    | 9.0  | 7.8            | 260  | 280 |
|                                  | 250                   | 200    | 9.0  | 8.4            | 315  | 290 |
|                                  | 250                   | 250    | 9.0  | 9.0            | 375  | 300 |
|                                  | 300                   | 100    | 9.6  | 7.2            | 205  | 300 |
|                                  | 300                   | 200    | 9.6  | 8.4            | 320  | 320 |
|                                  | 300                   | 250    | 9.6  | 9.0            | 380  | 330 |
|                                  | 300                   | 300    | 9.6  | 9.6            | 435  | 340 |
|                                  | 350                   | 100    | 10.2 | 7.2            | 205  | 330 |
|                                  | 350                   | 200    | 10.2 | 8.4            | 325  | 350 |
|                                  | 350                   | 350    | 10.2 | 10.2           | 495  | 380 |
|                                  | 400                   | 80     | 10.8 | 7.0            | 185  | 355 |
|                                  | 400                   | 100    | 10.8 | 7.2            | 210  | 360 |
|                                  | 400                   | 150    | 10.8 | 7.8            | 270  | 370 |
|                                  | 400                   | 200    | 10.8 | 8.4            | 325  | 380 |
|                                  | 400                   | 300    | 10.8 | 9.6            | 440  | 400 |
|                                  | 400                   | 400    | 10.8 | 10.8           | 560  | 420 |
|                                  | 450                   | 100    | 11.4 | 7.2            | 215  | 390 |
|                                  | 450                   | 250    | 11.4 | 9.0            | 385  | 420 |
|                                  | 450                   | 450    | 11.4 | 11.4           | 620  | 460 |
|                                  | 500                   | 100    | 12.0 | 7.2            | 215  | 420 |
|                                  | 500                   | 400    | 12.0 | 10.8           | 565  | 480 |
|                                  | 500                   | 500    | 12.0 | 12.0           | 680  | 500 |
|                                  | 600                   | 200    | 13.2 | 8.4            | 340  | 500 |
|                                  | 600                   | 400    | 13.2 | 10.8           | 570  | 540 |
|                                  | 600                   | 600    | 13.2 | 13.2           | 800  | 580 |
|                                  | 700                   | 200    | 14.4 | 8.4            | 345  | 525 |
|                                  | 700                   | 400    | 14.4 | 10.8           | 575  | 555 |
|                                  | 700                   | 700    | 14.4 | 14.4           | 925  | 600 |
|                                  | 800                   | 200    | 15.6 | 8.4            | 350  | 585 |
|                                  | 800                   | 400    | 15.6 | 10.8           | 580  | 615 |
|                                  | 800                   | 600    | 15.6 | 13.2           | 1045 | 645 |
|                                  | 800                   | 800    | 15.6 | 15.6           | 1045 | 675 |
|                                  | 900                   | 200    | 16.8 | 8.4            | 355  | 645 |
|                                  | 900                   | 400    | 16.8 | 10.8           | 590  | 675 |
|                                  | 900                   | 600    | 16.8 | 13.2           | 1170 | 705 |
|                                  | 900                   | 900    | 16.8 | 16.8           | 1170 | 750 |
|                                  | 1000                  | 200    | 18.0 | 8.4            | 360  | 705 |
|                                  | 1000                  | 400    | 18.0 | 10.8           | 595  | 735 |
|                                  | 1000                  | 600    | 18.0 | 13.2           | 1290 | 765 |
|                                  | 1000                  | 1000   | 18.0 | 18.0           | 1290 | 825 |
|                                  | 1100                  | 400    | 19.2 | 10.8           | 600  | 795 |
|                                  | 1100                  | 600    | 19.2 | 13.2           | 830  | 825 |
|                                  | 1100                  | 1000   | 19.2 | 18.0           | 1295 | 885 |
|                                  | 1200                  | 600    | 20.4 | 13.2           | 840  | 885 |
|                                  | 1200                  | 800    | 20.4 | 15.6           | 1070 | 915 |
|                                  | 1200                  | 1000   | 20.4 | 18.0           | 1300 | 945 |

Double Socket Level Invert Tee with Flanged Branch

| Nominal Diameter (DN) |        | e    | e <sub>1</sub> | L   | H   |
|-----------------------|--------|------|----------------|-----|-----|
| Body                  | Branch |      |                |     |     |
| mm                    | mm     | mm   | mm             | mm  | mm  |
| 100                   | 80     | 7.2  | 7.0            | 170 | 175 |
| 150                   | 80     | 7.8  | 7.0            | 170 | 205 |
| 150                   | 100    | 7.8  | 7.2            | 195 | 210 |
| 200                   | 80     | 8.4  | 7.0            | 175 | 235 |
| 200                   | 100    | 8.4  | 7.2            | 200 | 240 |
| 200                   | 150    | 8.4  | 7.8            | 255 | 250 |
| 250                   | 80     | 9.0  | 7.0            | 180 | 265 |
| 250                   | 100    | 9.0  | 7.2            | 200 | 270 |
| 250                   | 150    | 9.0  | 7.8            | 260 | 280 |
| 250                   | 200    | 9.0  | 8.4            | 315 | 290 |
| 300                   | 80     | 9.6  | 7.0            | 180 | 295 |
| 300                   | 100    | 9.6  | 7.2            | 205 | 300 |
| 300                   | 150    | 9.6  | 7.8            | 260 | 310 |
| 300                   | 200    | 9.6  | 8.4            | 320 | 320 |
| 300                   | 250    | 9.6  | 9.0            | 380 | 330 |
| 350                   | 80     | 10.2 | 7.0            | 185 | 325 |
| 350                   | 100    | 10.2 | 7.2            | 205 | 330 |
| 350                   | 150    | 10.2 | 7.8            | 265 | 340 |
| 350                   | 200    | 10.2 | 8.4            | 325 | 350 |
| 350                   | 250    | 10.2 | 9.0            | 380 | 360 |
| 400                   | 80     | 10.8 | 7.0            | 185 | 355 |
| 400                   | 100    | 10.8 | 7.2            | 210 | 360 |
| 400                   | 150    | 10.8 | 7.8            | 270 | 370 |
| 400                   | 200    | 10.8 | 8.4            | 325 | 380 |
| 400                   | 250    | 10.8 | 9.0            | 385 | 390 |
| 400                   | 300    | 10.8 | 9.6            | 440 | 400 |
| 450                   | 80     | 11.4 | 7.0            | 190 | 385 |
| 450                   | 100    | 11.4 | 7.2            | 215 | 390 |
| 450                   | 150    | 11.4 | 7.8            | 270 | 400 |
| 450                   | 200    | 11.4 | 8.4            | 330 | 410 |
| 450                   | 250    | 11.4 | 9.0            | 385 | 420 |
| 450                   | 300    | 11.4 | 9.6            | 445 | 430 |
| 450                   | 400    | 11.4 | 10.8           | 560 | 450 |
| 500                   | 80     | 12.0 | 7.0            | 195 | 415 |
| 500                   | 100    | 12.0 | 7.2            | 215 | 420 |
| 500                   | 150    | 12.0 | 7.8            | 275 | 430 |
| 500                   | 200    | 12.0 | 8.4            | 330 | 440 |
| 500                   | 250    | 12.0 | 9.0            | 390 | 450 |
| 500                   | 300    | 12.0 | 9.6            | 450 | 460 |
| 500                   | 350    | 12.0 | 10.2           | 505 | 470 |
| 500                   | 400    | 12.0 | 10.8           | 565 | 480 |
| 500                   | 450    | 12.0 | 11.4           | 620 | 490 |
| 600                   | 80     | 13.2 | 7.0            | 200 | 475 |
| 600                   | 100    | 13.2 | 7.2            | 220 | 480 |
| 600                   | 150    | 13.2 | 7.8            | 280 | 490 |
| 600                   | 200    | 13.2 | 8.4            | 340 | 500 |
| 600                   | 250    | 13.2 | 9.0            | 395 | 510 |
| 600                   | 300    | 13.2 | 9.6            | 455 | 520 |
| 600                   | 350    | 13.2 | 10.2           | 510 | 530 |
| 600                   | 400    | 13.2 | 10.8           | 570 | 540 |
| 600                   | 450    | 13.2 | 11.4           | 630 | 550 |
| 600                   | 500    | 13.2 | 12.0           | 685 | 560 |
| 700                   | 80     | 14.4 | 7.0            | 205 | 505 |
| 700                   | 100    | 14.4 | 7.2            | 230 | 510 |
| 700                   | 150    | 14.4 | 7.8            | 285 | 520 |
| 700                   | 200    | 14.4 | 8.4            | 345 | 525 |
| 800                   | 150    | 15.6 | 7.8            | 290 | 580 |
| 800                   | 200    | 15.6 | 8.4            | 350 | 585 |
| 900                   | 150    | 16.8 | 7.8            | 300 | 640 |
| 900                   | 200    | 16.8 | 8.4            | 355 | 645 |
| 1000                  | 150    | 18.0 | 7.8            | 305 | 700 |
| 1000                  | 200    | 18.0 | 8.4            | 360 | 705 |
| 1100                  | 150    | 19.2 | 7.8            | 310 | 760 |
| 1100                  | 200    | 19.2 | 8.4            | 370 | 765 |
| 1200                  | 150    | 20.4 | 7.8            | 315 | 820 |
| 1200                  | 200    | 20.4 | 8.4            | 375 | 825 |



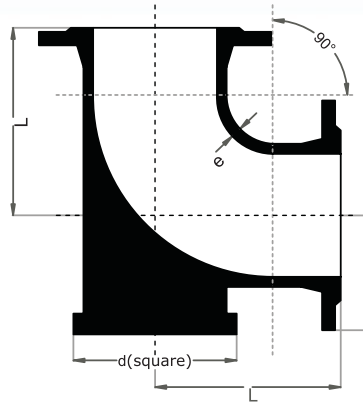


| Double Flanged Concentric Reducers | Nominal Diameter (DN) |                  | e <sub>1</sub> | e <sub>2</sub> | L   |
|------------------------------------|-----------------------|------------------|----------------|----------------|-----|
|                                    | Larger End Body       | Smaller End Body |                |                |     |
|                                    | mm                    | mm               | mm             | mm             | mm  |
|                                    | 100                   | 80               | 7.2            | 7.0            | 200 |
|                                    | 150                   | 80               | 7.8            | 7.0            | 230 |
|                                    | 150                   | 100              | 7.8            | 7.2            | 300 |
|                                    | 200                   | 80               | 8.4            | 7.0            | 335 |
|                                    | 200                   | 100              | 8.4            | 7.2            | 290 |
|                                    | 200                   | 150              | 8.4            | 7.8            | 300 |
|                                    | 250                   | 80               | 9.0            | 7.0            | 440 |
|                                    | 250                   | 100              | 9.0            | 7.2            | 400 |
|                                    | 250                   | 150              | 9.0            | 7.8            | 295 |
|                                    | 250                   | 200              | 9.0            | 8.4            | 300 |
|                                    | 300                   | 80               | 9.6            | 7.0            | 550 |
|                                    | 300                   | 100              | 9.6            | 7.2            | 510 |
|                                    | 300                   | 150              | 9.6            | 7.8            | 405 |
|                                    | 300                   | 200              | 9.6            | 8.4            | 300 |
|                                    | 300                   | 250              | 9.6            | 9.0            | 300 |
|                                    | 350                   | 80               | 10.2           | 7.0            | 655 |
|                                    | 350                   | 100              | 10.2           | 7.2            | 615 |
|                                    | 350                   | 150              | 10.2           | 7.8            | 510 |
|                                    | 350                   | 200              | 10.2           | 8.4            | 410 |
|                                    | 350                   | 250              | 10.2           | 9.0            | 305 |
|                                    | 350                   | 300              | 10.2           | 9.6            | 300 |
|                                    | 400                   | 100              | 10.8           | 7.2            | 720 |
|                                    | 400                   | 150              | 10.8           | 7.8            | 615 |
|                                    | 400                   | 200              | 10.8           | 8.4            | 510 |
|                                    | 400                   | 250              | 10.8           | 9.0            | 410 |
|                                    | 400                   | 300              | 10.8           | 9.6            | 300 |
|                                    | 400                   | 350              | 10.8           | 10.2           | 300 |
|                                    | 450                   | 150              | 11.4           | 7.8            | 715 |
|                                    | 450                   | 200              | 11.4           | 8.4            | 610 |
|                                    | 450                   | 250              | 11.4           | 9.0            | 510 |
|                                    | 450                   | 300              | 11.4           | 9.6            | 410 |
|                                    | 450                   | 350              | 11.4           | 10.2           | 305 |
|                                    | 450                   | 400              | 11.4           | 10.8           | 300 |
|                                    | 500                   | 200              | 12.0           | 8.4            | 725 |
|                                    | 500                   | 250              | 12.0           | 9.0            | 625 |
|                                    | 500                   | 300              | 12.0           | 9.6            | 520 |
|                                    | 500                   | 350              | 12.0           | 10.2           | 420 |
|                                    | 500                   | 400              | 12.0           | 10.8           | 600 |
|                                    | 600                   | 300              | 13.2           | 9.6            | 730 |
|                                    | 600                   | 350              | 13.2           | 10.2           | 625 |
|                                    | 600                   | 400              | 13.2           | 10.8           | 525 |
|                                    | 600                   | 500              | 13.2           | 12.0           | 600 |
|                                    | 700                   | 600              | 14.4           | 13.2           | 600 |
|                                    | 800                   | 700              | 15.6           | 14.4           | 600 |
|                                    | 900                   | 800              | 16.8           | 15.6           | 600 |
|                                    | 1000                  | 900              | 18.0           | 16.8           | 600 |
|                                    | 1100                  | 1000             | 19.2           | 18.0           | 600 |
|                                    | 1200                  | 1000             | 20.4           | 18.0           | 790 |

Note : We can also make Ecentric and Paddle Reducers of same size

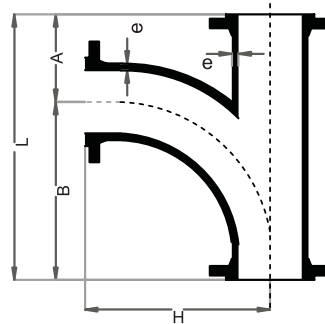
Double Flanged 90° Duck-Foot Bend

| Nominal Size (DN) | e    | L    | H   | D    |
|-------------------|------|------|-----|------|
| mm                | mm   | mm   | mm  | mm   |
| 80                | 7.0  | 165  | 110 | 180  |
| 100               | 7.2  | 180  | 125 | 200  |
| 150               | 7.8  | 220  | 160 | 250  |
| 200               | 8.4  | 260  | 190 | 300  |
| 250               | 9.0  | 350  | 225 | 350  |
| 300               | 9.6  | 400  | 255 | 400  |
| 350               | 10.2 | 450  | 290 | 450  |
| 400               | 10.8 | 500  | 320 | 500  |
| 450               | 11.4 | 550  | 355 | 550  |
| 500               | 12.0 | 600  | 385 | 600  |
| 600               | 13.2 | 700  | 450 | 700  |
| 700               | 14.4 | 800  | 515 | 800  |
| 800               | 15.6 | 900  | 580 | 900  |
| 900               | 16.8 | 1000 | 645 | 1000 |
| 1000              | 18.0 | 1100 | 710 | 1100 |
| 1100              | 19.2 | 1235 | 775 | 1200 |
| 1200              | 20.4 | 1340 | 840 | 1300 |



All Flanged Radial Tee

| SIZE | Body Branch | e    | A    | B    | H    | L    |
|------|-------------|------|------|------|------|------|
| mm   | mm          | mm   | mm   | mm   | mm   | mm   |
| 80   | 80          | 7.0  | 165  | 380  | 380  | 545  |
| 100  | 100         | 7.2  | 180  | 400  | 400  | 580  |
| 150  | 150         | 7.8  | 220  | 450  | 450  | 670  |
| 200  | 200         | 8.4  | 260  | 500  | 500  | 760  |
| 250  | 250         | 9.0  | 350  | 550  | 550  | 900  |
| 300  | 300         | 9.6  | 400  | 600  | 600  | 1000 |
| 1100 | 1100        | 19.2 | 1200 | 1400 | 1400 | 2600 |
| 1200 | 1200        | 20.4 | 1300 | 1500 | 1500 | 2800 |

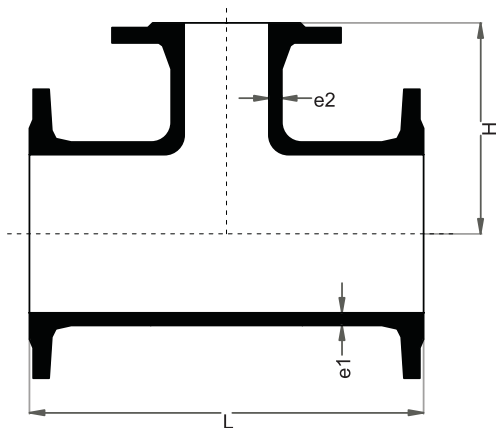


$b = 10 + 0.035DN$  with a minimum value of 16

Reducing Flanges

| Nominal Dia (DN) | Larger End |      |    | Smaller End      |    |    |
|------------------|------------|------|----|------------------|----|----|
|                  | D          | b    | C1 | Nominal Dia (DN) | c2 | a  |
|                  | mm         | mm   | mm | mm               | mm | mm |
| 200              | 340        | 17.0 | 3  | 80               | 3  | 40 |
| 200              | 340        | 17.0 | 3  | 100              | 3  | 40 |
| 350              | 520        | 22.5 | 4  | 250              | 3  | 54 |
| 400              | 580        | 24.0 | 4  | 250              | 3  | 54 |
| 400              | 580        | 24.0 | 4  | 300              | 4  | 55 |
| 700              | 910        | 34.5 | 5  | 500              | 4  | 67 |
| 900              | 1125       | 41.5 | 5  | 700              | 5  | 73 |
| 1000             | 1255       | 45.0 | 5  | 700              | 5  | 73 |
| 1000             | 1255       | 45.0 | 5  | 800              | 5  | 77 |



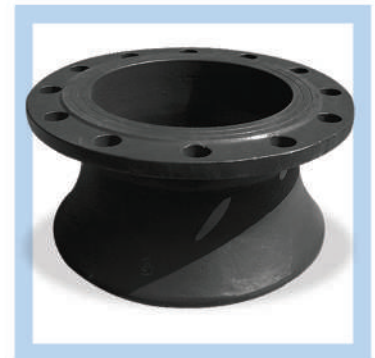
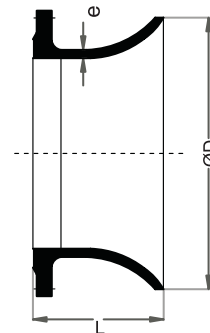
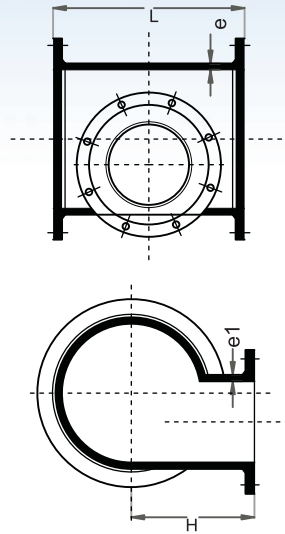


**All Flanged Tees**

| Nominal Diameter |        | e    | e <sub>1</sub> | L    | H   |
|------------------|--------|------|----------------|------|-----|
| Body             | Branch |      |                |      |     |
| mm               | mm     | mm   | mm             | mm   | mm  |
| 80               | 80     | 7.0  | 7.0            | 330  | 165 |
| 100              | 80     | 7.2  | 7.0            | 360  | 175 |
| 100              | 100    | 7.2  | 7.2            | 360  | 180 |
| 150              | 80     | 7.8  | 7.0            | 440  | 205 |
| 150              | 100    | 7.8  | 7.2            | 440  | 210 |
| 150              | 150    | 7.8  | 7.8            | 440  | 220 |
| 200              | 80     | 8.4  | 7.0            | 520  | 235 |
| 200              | 100    | 8.4  | 7.2            | 520  | 240 |
| 200              | 150    | 8.4  | 7.8            | 520  | 250 |
| 200              | 200    | 8.4  | 8.4            | 520  | 260 |
| 250              | 80     | 9.0  | 7.0            | 700  | 265 |
| 250              | 100    | 9.0  | 7.2            | 700  | 275 |
| 250              | 150    | 9.0  | 7.8            | 700  | 300 |
| 250              | 200    | 9.0  | 8.4            | 700  | 325 |
| 250              | 250    | 9.0  | 9.0            | 700  | 350 |
| 300              | 80     | 9.6  | 7.0            | 800  | 290 |
| 300              | 100    | 9.6  | 7.2            | 800  | 300 |
| 300              | 150    | 9.6  | 7.8            | 800  | 325 |
| 300              | 200    | 9.6  | 8.4            | 800  | 350 |
| 300              | 250    | 9.6  | 9.0            | 800  | 375 |
| 300              | 300    | 9.6  | 9.6            | 800  | 400 |
| 350              | 80     | 10.2 | 7.0            | 850  | 325 |
| 350              | 100    | 10.2 | 7.2            | 850  | 325 |
| 350              | 150    | 10.2 | 7.8            | 850  | 325 |
| 350              | 200    | 10.2 | 8.4            | 850  | 325 |
| 350              | 250    | 10.2 | 9.0            | 850  | 325 |
| 350              | 300    | 10.2 | 9.6            | 850  | 425 |
| 350              | 350    | 10.2 | 10.2           | 850  | 425 |
| 400              | 80     | 10.8 | 7.0            | 900  | 350 |
| 400              | 100    | 10.8 | 7.2            | 900  | 350 |
| 400              | 150    | 10.8 | 7.8            | 900  | 350 |
| 400              | 200    | 10.8 | 8.4            | 900  | 350 |
| 400              | 250    | 10.8 | 9.0            | 900  | 350 |
| 400              | 300    | 10.8 | 9.6            | 900  | 450 |
| 400              | 400    | 10.8 | 10.8           | 900  | 450 |
| 450              | 100    | 11.4 | 7.2            | 950  | 375 |
| 450              | 150    | 11.4 | 7.8            | 950  | 375 |
| 450              | 200    | 11.4 | 8.4            | 950  | 375 |
| 450              | 250    | 11.4 | 9.0            | 950  | 375 |
| 450              | 300    | 11.4 | 9.6            | 950  | 475 |
| 450              | 350    | 11.4 | 10.2           | 950  | 475 |
| 450              | 400    | 11.4 | 10.8           | 950  | 475 |
| 450              | 450    | 11.4 | 11.4           | 950  | 475 |
| 500              | 100    | 12.0 | 7.2            | 1000 | 400 |
| 500              | 150    | 12.0 | 7.8            | 1000 | 400 |
| 500              | 200    | 12.0 | 8.4            | 1000 | 400 |
| 500              | 250    | 12.0 | 9.0            | 1000 | 400 |
| 500              | 300    | 12.0 | 9.6            | 1000 | 500 |
| 500              | 350    | 12.0 | 10.2           | 1000 | 500 |
| 500              | 400    | 12.0 | 10.8           | 1000 | 500 |
| 500              | 500    | 12.0 | 12.0           | 1000 | 500 |
| 600              | 100    | 13.2 | 7.2            | 1100 | 450 |
| 600              | 150    | 13.2 | 7.8            | 1100 | 450 |
| 600              | 200    | 13.2 | 8.4            | 1100 | 450 |
| 600              | 250    | 13.2 | 9.0            | 1100 | 450 |
| 600              | 300    | 13.2 | 9.6            | 1100 | 550 |
| 600              | 350    | 13.2 | 10.2           | 1100 | 550 |
| 600              | 400    | 13.2 | 10.8           | 1100 | 550 |
| 600              | 450    | 13.2 | 11.4           | 1100 | 550 |
| 600              | 500    | 13.2 | 12.0           | 1100 | 550 |
| 600              | 600    | 13.2 | 13.2           | 1100 | 550 |
| 700              | 200    | 14.4 | 8.4            | 650  | 525 |
| 700              | 400    | 14.4 | 10.8           | 870  | 555 |
| 700              | 700    | 14.4 | 14.4           | 1200 | 600 |
| 800              | 200    | 15.6 | 8.4            | 690  | 585 |
| 800              | 400    | 15.6 | 10.8           | 910  | 615 |
| 800              | 600    | 15.6 | 13.2           | 1350 | 645 |
| 800              | 800    | 15.6 | 15.6           | 1350 | 675 |
| 900              | 200    | 16.8 | 8.4            | 730  | 645 |
| 900              | 400    | 16.8 | 10.8           | 950  | 675 |
| 900              | 600    | 16.8 | 13.2           | 1500 | 705 |
| 900              | 900    | 16.8 | 16.8           | 1500 | 750 |
| 1000             | 200    | 18.0 | 8.4            | 770  | 705 |
| 1000             | 400    | 18.0 | 10.8           | 990  | 735 |
| 1000             | 600    | 18.0 | 13.2           | 1650 | 765 |
| 1000             | 1000   | 18.0 | 18.0           | 1675 | 825 |
| 1100             | 400    | 19.2 | 10.8           | 980  | 795 |
| 1100             | 600    | 19.2 | 13.2           | 1210 | 825 |
| 1200             | 1000   | 20.4 | 18.0           | 1700 | 945 |
| 1200             | 1200   | 20.4 | 20.4           | 1950 | 975 |

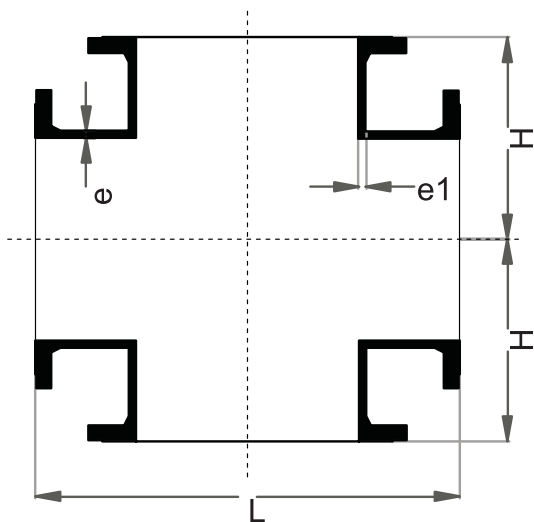
All Flanged Level Invert Tees

| Nominal Diameter |        | e    | e <sub>1</sub> | L    | H   |
|------------------|--------|------|----------------|------|-----|
| Body             | Branch |      |                |      |     |
| mm               | mm     | mm   | mm             | mm   | mm  |
| 80               | 80     | 7.0  | 7.0            | 330  | 165 |
| 100              | 80     | 7.2  | 7.0            | 360  | 175 |
| 150              | 80     | 7.8  | 7.0            | 440  | 205 |
| 150              | 100    | 7.8  | 7.2            | 440  | 210 |
| 200              | 80     | 8.4  | 7.0            | 520  | 235 |
| 200              | 100    | 8.4  | 7.2            | 520  | 240 |
| 200              | 150    | 8.4  | 7.8            | 520  | 250 |
| 250              | 80     | 9.0  | 7.0            | 700  | 265 |
| 250              | 100    | 9.0  | 7.2            | 700  | 275 |
| 250              | 150    | 9.0  | 7.8            | 700  | 300 |
| 250              | 200    | 9.0  | 8.4            | 700  | 325 |
| 300              | 80     | 9.6  | 7.0            | 800  | 290 |
| 300              | 100    | 9.6  | 7.2            | 800  | 300 |
| 300              | 150    | 9.6  | 7.8            | 800  | 325 |
| 300              | 200    | 9.6  | 8.4            | 800  | 350 |
| 300              | 250    | 9.6  | 9.0            | 800  | 375 |
| 350              | 80     | 10.2 | 7.0            | 850  | 325 |
| 350              | 100    | 10.2 | 7.2            | 850  | 325 |
| 350              | 150    | 10.2 | 7.8            | 850  | 325 |
| 350              | 200    | 10.2 | 8.4            | 850  | 325 |
| 350              | 250    | 10.2 | 9.0            | 850  | 325 |
| 350              | 300    | 10.2 | 9.6            | 850  | 425 |
| 400              | 80     | 10.8 | 7.0            | 900  | 350 |
| 400              | 100    | 10.8 | 7.2            | 900  | 350 |
| 400              | 150    | 10.8 | 7.8            | 900  | 350 |
| 400              | 200    | 10.8 | 8.4            | 900  | 350 |
| 400              | 250    | 10.8 | 9.0            | 900  | 350 |
| 400              | 300    | 10.8 | 9.6            | 900  | 450 |
| 450              | 100    | 11.4 | 7.2            | 950  | 375 |
| 450              | 150    | 11.4 | 7.8            | 950  | 375 |
| 450              | 200    | 11.4 | 8.4            | 950  | 375 |
| 450              | 250    | 11.4 | 9.0            | 950  | 375 |
| 450              | 300    | 11.4 | 9.6            | 950  | 475 |
| 450              | 350    | 11.4 | 10.2           | 950  | 475 |
| 450              | 400    | 11.4 | 10.8           | 950  | 475 |
| 500              | 80     | 12.0 | 7.0            | 1000 | 400 |
| 500              | 100    | 12.0 | 7.2            | 1000 | 400 |
| 500              | 150    | 12.0 | 7.8            | 1000 | 400 |
| 500              | 200    | 12.0 | 8.4            | 1000 | 400 |
| 500              | 250    | 12.0 | 9.0            | 1000 | 400 |
| 500              | 300    | 12.0 | 9.6            | 1000 | 500 |
| 500              | 350    | 12.0 | 10.2           | 1000 | 500 |
| 500              | 400    | 12.0 | 10.8           | 1000 | 500 |
| 500              | 450    | 12.0 | 11.4           | 1000 | 500 |
| 600              | 80     | 13.2 | 7.0            | 1100 | 450 |
| 600              | 100    | 13.2 | 7.2            | 1100 | 450 |
| 600              | 150    | 13.2 | 7.8            | 1100 | 450 |
| 600              | 200    | 13.2 | 8.4            | 1100 | 450 |
| 600              | 250    | 13.2 | 9.0            | 1100 | 450 |
| 600              | 300    | 13.2 | 9.6            | 1100 | 550 |
| 600              | 350    | 13.2 | 10.2           | 1100 | 550 |
| 600              | 400    | 13.2 | 10.8           | 1100 | 550 |
| 600              | 450    | 13.2 | 11.4           | 1100 | 550 |
| 600              | 500    | 13.2 | 12.0           | 1100 | 550 |
| 700              | 200    | 14.4 | 8.4            | 650  | 525 |
| 800              | 200    | 15.6 | 8.4            | 690  | 585 |
| 900              | 200    | 16.8 | 8.4            | 730  | 645 |
| 1000             | 300    | 18.0 | 9.6            | 880  | 720 |
| 1100             | 400    | 19.2 | 10.8           | 980  | 795 |
| 1100             | 600    | 19.2 | 13.2           | 1210 | 825 |
| 1200             | 800    | 20.4 | 15.6           | 1470 | 915 |
| 1200             | 1000   | 20.4 | 18.0           | 1700 | 945 |



Flanged Bell-mouth

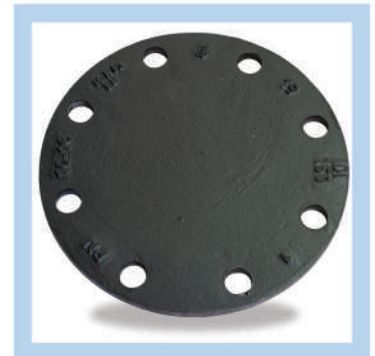
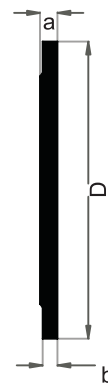
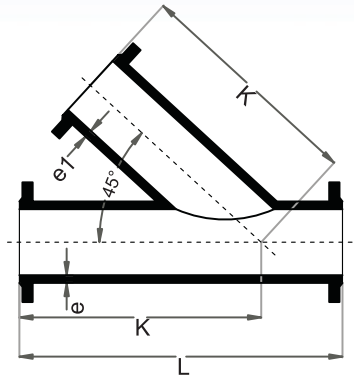
| Nominal Size | e    | L   | D    |
|--------------|------|-----|------|
| mm           | mm   | mm  | mm   |
| 80           | 7.0  | 135 | 160  |
| 100          | 7.2  | 140 | 185  |
| 150          | 7.8  | 155 | 245  |
| 200          | 8.4  | 170 | 310  |
| 250          | 9.0  | 190 | 370  |
| 300          | 9.6  | 210 | 435  |
| 350          | 10.2 | 225 | 495  |
| 400          | 10.8 | 245 | 560  |
| 450          | 11.4 | 260 | 620  |
| 500          | 12.0 | 280 | 685  |
| 600          | 13.2 | 300 | 810  |
| 1100         | 19.2 | 465 | 1400 |
| 1200         | 20.4 | 490 | 1515 |



| All Flanged Cross | Nominal Diameter |        | e     | e <sub>1</sub> | L    | H   |
|-------------------|------------------|--------|-------|----------------|------|-----|
|                   | Body             | Branch |       |                |      |     |
|                   | mm               | mm     | mm    | mm             | mm   | mm  |
|                   | 80               | 80     | 7.0   | 7.0            | 330  | 165 |
|                   | 100              | 80     | 7.2   | 7.0            | 360  | 175 |
|                   | 100              | 100    | 7.2   | 7.2            | 360  | 180 |
|                   | 150              | 80     | 7.8   | 7.0            | 440  | 205 |
|                   | 150              | 100    | 7.8   | 7.2            | 440  | 210 |
|                   | 150              | 150    | 7.8   | 7.8            | 440  | 220 |
|                   | 200              | 80     | 8.4   | 7.0            | 520  | 235 |
|                   | 200              | 100    | 8.4   | 7.2            | 520  | 240 |
|                   | 200              | 150    | 8.4   | 7.8            | 520  | 250 |
|                   | 200              | 200    | 8.4   | 8.4            | 520  | 260 |
|                   | 250              | 80     | 9.0   | 7.0            | 700  | 265 |
|                   | 250              | 100    | 9.0   | 7.2            | 700  | 275 |
|                   | 250              | 150    | 9.0   | 7.8            | 700  | 300 |
|                   | 250              | 200    | 9.0   | 8.4            | 700  | 325 |
|                   | 250              | 250    | 9.0   | 9.0            | 700  | 350 |
|                   | 300              | 80     | 9.6   | 7.0            | 800  | 290 |
|                   | 300              | 100    | 9.6   | 7.2            | 800  | 300 |
|                   | 300              | 150    | 9.6   | 7.8            | 800  | 325 |
|                   | 300              | 200    | 9.6   | 8.4            | 800  | 350 |
|                   | 300              | 250    | 9.6   | 9.0            | 800  | 375 |
|                   | 300              | 300    | 9.6   | 9.6            | 800  | 400 |
|                   | 350              | 100    | 10.2  | 7.2            | 850  | 325 |
|                   | 350              | 150    | 10.2  | 7.8            | 850  | 325 |
|                   | 350              | 200    | 10.2  | 8.4            | 850  | 325 |
|                   | 350              | 250    | 10.2  | 9.0            | 850  | 325 |
|                   | 350              | 300    | 10.2  | 9.6            | 850  | 425 |
|                   | 350              | 350    | 10.2  | 10.2           | 850  | 425 |
|                   | 400              | 100    | 10.8  | 7.2            | 900  | 350 |
|                   | 400              | 150    | 10.8  | 7.8            | 900  | 350 |
|                   | 400              | 200    | 10.8  | 8.4            | 900  | 350 |
|                   | 400              | 250    | 10.8  | 9.0            | 900  | 350 |
|                   | 400              | 300    | 10.8  | 9.6            | 900  | 450 |
|                   | 400              | 350    | 10.8  | 10.2           | 900  | 450 |
|                   | 400              | 400    | 10.8  | 10.8           | 900  | 450 |
|                   | 450              | 100    | 11.4  | 7.2            | 950  | 375 |
|                   | 450              | 150    | 11.4  | 7.8            | 950  | 375 |
|                   | 450              | 200    | 11.4  | 8.4            | 950  | 375 |
|                   | 450              | 250    | 11.4  | 9.0            | 950  | 375 |
|                   | 450              | 300    | 11.4  | 9.6            | 950  | 475 |
|                   | 450              | 350    | 11.4  | 10.2           | 950  | 475 |
|                   | 450              | 400    | 11.4  | 10.8           | 950  | 475 |
|                   | 450              | 450    | 11.4  | 11.4           | 950  | 475 |
|                   | 500              | 100    | 12.0  | 7.2            | 1000 | 400 |
|                   | 500              | 150    | 12.0  | 7.8            | 1000 | 400 |
|                   | 500              | 200    | 12.0  | 8.4            | 1000 | 400 |
|                   | 500              | 250    | 12.0  | 9.0            | 1000 | 400 |
|                   | 500              | 300    | 12.0  | 9.6            | 1000 | 500 |
|                   | 500              | 350    | 12.0  | 10.2           | 1000 | 500 |
|                   | 500              | 400    | 12.0  | 10.8           | 1000 | 500 |
|                   | 500              | 450    | 12.0  | 11.4           | 1000 | 500 |
|                   | 500              | 500    | 12.0  | 12.0           | 1000 | 500 |
|                   | 600              | 100    | 13.2  | 7.2            | 1100 | 450 |
|                   | 600              | 150    | 13.2  | 7.8            | 1100 | 450 |
|                   | 600              | 200    | 13.2  | 8.4            | 1100 | 450 |
|                   | 600              | 250    | 13.2  | 9.0            | 1100 | 450 |
|                   | 600              | 300    | 13.2  | 9.6            | 1100 | 550 |
|                   | 600              | 350    | 13.2  | 10.2           | 1100 | 550 |
|                   | 600              | 400    | 13.2  | 10.8           | 1100 | 550 |
|                   | 600              | 450    | 13.2  | 11.4           | 1100 | 550 |
|                   | 600              | 500    | 13.2  | 12.0           | 1100 | 550 |
|                   | 600              | 600    | 13.2  | 13.2           | 1100 | 550 |
|                   | 700              | 700    | 14.4  | 14.4           | 1200 | 600 |
|                   | 800              | 800    | 15.6  | 15.6           | 1350 | 675 |
|                   | 900              | 900    | 16.8  | 16.8           | 1500 | 750 |
|                   | 1000             | 1000   | 18.0  | 18.0           | 1650 | 825 |
|                   | 1100             | 1100   | 19.20 | 19.20          | 1780 | 890 |
|                   | 1200             | 1200   | 20.40 | 20.40          | 1950 | 975 |

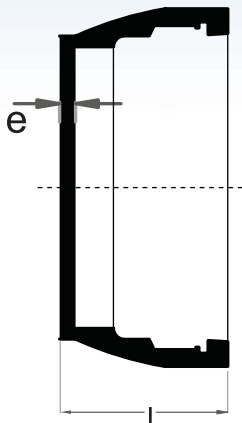
All Flanged 45° Angle Branch

| Nominal Diameter<br>Body Branch | mm  | e    | e <sub>1</sub> | K    | L    |
|---------------------------------|-----|------|----------------|------|------|
| 80                              | 80  | 7.0  | 7.0            | 375  | 500  |
| 100                             | 80  | 7.2  | 7.0            | 390  | 500  |
| 100                             | 100 | 7.2  | 7.2            | 405  | 540  |
| 150                             | 80  | 7.8  | 7.0            | 480  | 590  |
| 150                             | 100 | 7.8  | 7.2            | 480  | 640  |
| 150                             | 150 | 7.8  | 7.8            | 480  | 640  |
| 200                             | 80  | 8.4  | 7.0            | 535  | 635  |
| 200                             | 100 | 8.4  | 7.2            | 535  | 635  |
| 200                             | 150 | 8.4  | 7.8            | 560  | 735  |
| 200                             | 200 | 8.4  | 8.4            | 560  | 735  |
| 250                             | 80  | 9.0  | 7.0            | 585  | 660  |
| 250                             | 100 | 9.0  | 7.2            | 610  | 710  |
| 250                             | 150 | 9.0  | 7.8            | 640  | 830  |
| 250                             | 200 | 9.0  | 8.4            | 640  | 830  |
| 250                             | 250 | 9.0  | 9.0            | 640  | 830  |
| 300                             | 80  | 9.6  | 7.0            | 610  | 685  |
| 300                             | 100 | 9.6  | 7.2            | 610  | 685  |
| 300                             | 150 | 9.6  | 7.8            | 660  | 790  |
| 300                             | 200 | 9.6  | 8.4            | 685  | 865  |
| 300                             | 250 | 9.6  | 9.0            | 715  | 930  |
| 300                             | 300 | 9.6  | 9.6            | 715  | 930  |
| 350                             | 100 | 10.2 | 7.2            | 635  | 685  |
| 350                             | 150 | 10.2 | 7.8            | 660  | 740  |
| 350                             | 200 | 10.2 | 8.4            | 710  | 840  |
| 350                             | 250 | 10.2 | 9.0            | 740  | 880  |
| 350                             | 300 | 10.2 | 9.6            | 790  | 940  |
| 350                             | 350 | 10.2 | 10.2           | 790  | 970  |
| 400                             | 100 | 10.8 | 7.2            | 710  | 760  |
| 400                             | 150 | 10.8 | 7.8            | 740  | 815  |
| 400                             | 200 | 10.8 | 8.4            | 760  | 865  |
| 400                             | 250 | 10.8 | 9.0            | 820  | 970  |
| 400                             | 300 | 10.8 | 9.6            | 870  | 1000 |
| 400                             | 350 | 10.8 | 10.2           | 870  | 1030 |
| 400                             | 400 | 10.8 | 10.8           | 870  | 1070 |
| 450                             | 100 | 11.4 | 7.2            | 710  | 740  |
| 450                             | 150 | 11.4 | 7.8            | 760  | 840  |
| 450                             | 200 | 11.4 | 8.4            | 790  | 890  |
| 450                             | 250 | 11.4 | 9.0            | 820  | 990  |
| 450                             | 300 | 11.4 | 9.6            | 900  | 1040 |
| 450                             | 350 | 11.4 | 10.2           | 950  | 1090 |
| 500                             | 150 | 12.0 | 7.8            | 765  | 790  |
| 500                             | 200 | 12.0 | 8.4            | 810  | 890  |
| 500                             | 250 | 12.0 | 9.0            | 840  | 940  |
| 500                             | 300 | 12.0 | 9.6            | 865  | 990  |
| 500                             | 350 | 12.0 | 10.2           | 950  | 1065 |
| 600                             | 150 | 13.2 | 7.8            | 840  | 890  |
| 600                             | 200 | 13.2 | 8.4            | 890  | 940  |
| 600                             | 250 | 13.2 | 9.0            | 915  | 990  |
| 600                             | 300 | 13.2 | 9.6            | 965  | 1090 |
| 700                             | 300 | 14.4 | 9.6            | 1090 | 1170 |
| 800                             | 300 | 15.6 | 9.6            | 1170 | 1200 |
| 900                             | 400 | 16.8 | 10.8           | 1315 | 1410 |
| 1000                            | 400 | 18.0 | 10.8           | 1415 | 1485 |
| 1100                            | 400 | 19.2 | 10.8           | 1515 | 1560 |
| 1100                            | 450 | 19.2 | 11.4           | 1550 | 1625 |
| 1200                            | 450 | 20.4 | 11.4           | 1700 | 1780 |
| 1200                            | 500 | 20.4 | 12.0           | 1750 | 1880 |

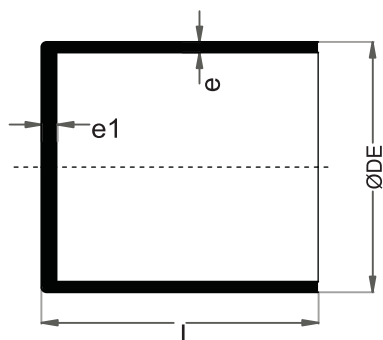
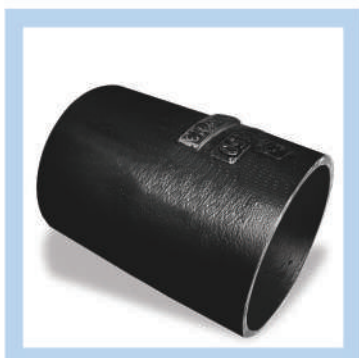


Blank Flanges Type PN 16

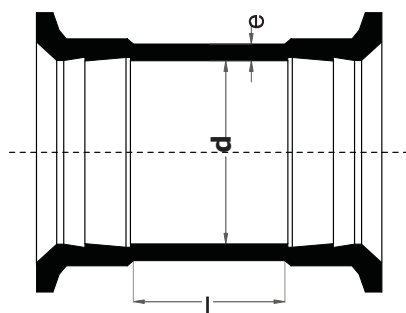
| (DN)<br>mm | D<br>mm | a<br>mm | b<br>mm | c<br>mm |
|------------|---------|---------|---------|---------|
| 80         | 200     | 19.0    | 16.0    | 3       |
| 100        | 220     | 19.0    | 16.0    | 3       |
| 150        | 285     | 19.0    | 16.0    | 3       |
| 200        | 340     | 20.0    | 17.0    | 3       |
| 250        | 400     | 22.0    | 19.0    | 3       |
| 300        | 455     | 24.5    | 20.5    | 4       |
| 350        | 520     | 26.5    | 22.5    | 4       |
| 400        | 580     | 28.0    | 24.0    | 4       |
| 450        | 640     | 30.0    | 26.0    | 4       |
| 500        | 715     | 31.5    | 27.5    | 4       |
| 600        | 840     | 36.0    | 31.0    | 5       |
| 700        | 910     | 39.5    | 34.5    | 5       |
| 800        | 1025    | 43.0    | 38.0    | 5       |
| 900        | 1125    | 46.5    | 41.5    | 5       |
| 1000       | 1255    | 50.0    | 45.0    | 5       |
| 1100       | 1355    | 53.5    | 48.5    | 5       |
| 1200       | 1485    | 57.0    | 52.0    | 5       |



| End Caps | SIZE<br>Body (DN) | e  | L   |
|----------|-------------------|----|-----|
|          | mm                | mm | mm  |
|          | 80                | 18 | 128 |
|          | 100               | 18 | 128 |
|          | 150               | 18 | 128 |
|          | 200               | 18 | 138 |
|          | 250               | 20 | 146 |
|          | 300               | 23 | 156 |
|          | 350               | 24 | 158 |
|          | 400               | 25 | 163 |
|          | 450               | 26 | 167 |
|          | 500               | 27 | 173 |
|          | 600               | 30 | 184 |
|          | 700               | 31 | 221 |
|          | 800               | 33 | 236 |
|          | 900               | 35 | 258 |
|          | 1000              | 37 | 270 |
|          | 1100              | 39 | 277 |
|          | 1200              | 41 | 306 |



| Plug | Body(DN) | DE   | e    | e1   | L   |
|------|----------|------|------|------|-----|
|      | mm       | mm   | mm   | mm   | mm  |
|      | 80       | 98   | 7.0  | 18   | 200 |
|      | 100      | 118  | 7.2  | 18   | 200 |
|      | 150      | 170  | 7.8  | 18   | 225 |
|      | 200      | 222  | 8.4  | 18   | 250 |
|      | 250      | 274  | 9.0  | 19.5 | 250 |
|      | 300      | 326  | 9.6  | 23   | 275 |
|      | 350      | 378  | 10.2 | 24   | 275 |
|      | 400      | 429  | 10.8 | 25   | 275 |
|      | 450      | 480  | 11.4 | 26   | 275 |
|      | 500      | 532  | 12.0 | 27   | 275 |
|      | 600      | 635  | 13.2 | 29.5 | 300 |
|      | 700      | 738  | 14.4 | 31   | 350 |
|      | 800      | 842  | 15.6 | 33   | 380 |
|      | 900      | 945  | 16.8 | 35   | 400 |
|      | 1000     | 1048 | 18.0 | 37   | 435 |
|      | 1100     | 1152 | 19.2 | 39   | 375 |
|      | 1200     | 1255 | 20.4 | 41   | 400 |



| MJ Collar | Nominal<br>Dia (DN) | e    | L   | d    |
|-----------|---------------------|------|-----|------|
|           | mm                  | mm   | mm  | mm   |
|           | 80                  | 7.0  | 160 | 109  |
|           | 100                 | 7.2  | 160 | 130  |
|           | 150                 | 7.8  | 165 | 183  |
|           | 200                 | 8.4  | 170 | 235  |
|           | 250                 | 9.0  | 175 | 288  |
|           | 300                 | 9.6  | 180 | 340  |
|           | 350                 | 10.2 | 185 | 393  |
|           | 400                 | 10.8 | 190 | 445  |
|           | 450                 | 11.4 | 195 | 498  |
|           | 500                 | 12.0 | 200 | 550  |
|           | 600                 | 13.2 | 210 | 655  |
|           | 700                 | 14.4 | 220 | 760  |
|           | 800                 | 15.6 | 230 | 865  |
|           | 900                 | 16.8 | 240 | 970  |
|           | 1000                | 18.0 | 250 | 1075 |
|           | 1100                | 19.2 | 260 | 1180 |
|           | 1200                | 20.4 | 270 | 1285 |

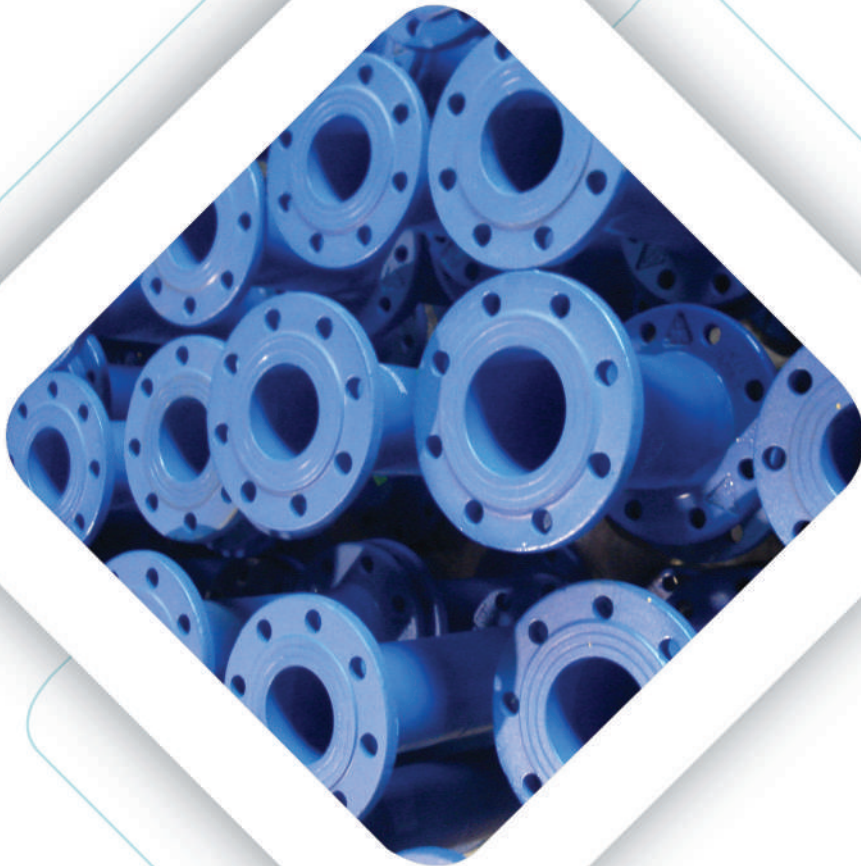
# External Protection

## Fusion Bonded Epoxy (FBE) Coating and Lining

FBE coating and Lining is applied to the interior and exterior of the Ductile Iron fittings, in a state-of-the-art automated facility, which covers the DI Fittings with powdered epoxy by fusion bonding process. FBE Coating is applied as per EN:14901 with a mean film thickness of 250 micron. Higher film thickness (above 250 micron) can also be applied as per customer requirements. Internal FBE Lining eliminates the need for internal Cement Mortar lining and offers a more stable protection.

## Advantages of Fusion Bonded Epoxy Coating

- It provides a chemically inert barrier coating with good chemical resistance.
- Much better resistance to external galvanic/ soil corrosion in aggressive soil.
- High abrasion and scratch resistance.
- Works perfectly for a wide range of liquid parameters.
- Gives glossy and smooth coatings with excellent adhesion.
- A choice of Blue, Black or Red colour for water or sewage applications is available.



# Internal Protection



**a) Cement Mortar Lining**

As per specification, any of the following cement mortar lining may be applied depending on the type of liquid transported.

- Blast furnace slag cement mortar
- Sulphate resistant cement mortar
- High alumina cement mortar

Fittings with bituminous or epoxy seal coat over cement mortar lining is also available.



**b) Fusion Bonded Epoxy**

Normally, fusion bonded epoxy is applied both on the outer and inner surface of the fittings.

**c) Ceramic Epoxy**

Ceramic epoxy lining is also applied inside fittings which are to be used with ceramic epoxy lined pipes.



All material coming in contact with potable water are certified by various approving agencies like WRAS, DWI, WRc, DVGW etc.

**Head Office:**

G K Tower, 19, Camac Street, Kolkata - 700017, India

Ph : +91 33 2283 9990/ 7103 4400

**Production Units:****KHARDAH**

30, B. T. Road, Khardah, P.O. - Sukchar,  
Dist.- 24 Parganas (N), West Bengal, India. Pin - 700115

Ph : +91 33 7101 4300 / 4450

**BANSBERIA**

Vill - Chak Bansberia, Saptagram Panchayat,  
P.O. - Adconagar, Dist. - Hooghly, West Bengal, India. Pin - 712121

Ph : +91 6292219270

**HALDIA**

Vill - Kasberia, P.O. - Shibramnagar, Haldia,  
Dist. - Purba Medinipur, West Bengal, India. Pin - 721635

Ph : +91 9083280640 / 9434095385

**ELAVUR**

12/72 GNT Road, P.O.- Elavur, Taluk - Gummidipondi,  
Dist. - Tiruvallur, Tamil Nadu, India. Pin - 601201

Ph : +91 44 - 67911800

**SRIKALAHASTHI**

Vill - Rachagunneri, Mandal-Srikalahasthi  
District - Tirupati, Andhra Pradesh , India. Pin - 517641

Ph : +91 8578 286650 - 55

**Branch Office****NORTH****Electrosteel Castings Limited**

B-47, 2nd Floor, Shiv Mahal, Connaught Place, New Delhi - 110 001

Ph. No. +91 (011) 23412838

**WEST****Electrosteel Castings Limited**

B-707, Mahavir Icon, Plot No.89-90, Sector 15, CBD Belapur

Navi Mumbai - 400 614

Ph. No. 022 - 2756 1334

**SOUTH****Electrosteel Castings Limited**

148/150, Luz Church Road, Mylapore, Chennai - 600 004, Tamil Nadu

Ph. No. 044 - 2467 4900, Fax: 044 - 2499 5229

[www.electrosteel.com](http://www.electrosteel.com)

Follow us on





 **ELECTROSTEEL CASTINGS LIMITED**

[www.electrosteel.com](http://www.electrosteel.com)

Follow us on     