

# Flanges

High Technology Valve & Fitting Series



 **SUPERLOK<sup>®</sup>**

 **BMT Co., Ltd.**  
[www.superlok.com](http://www.superlok.com)

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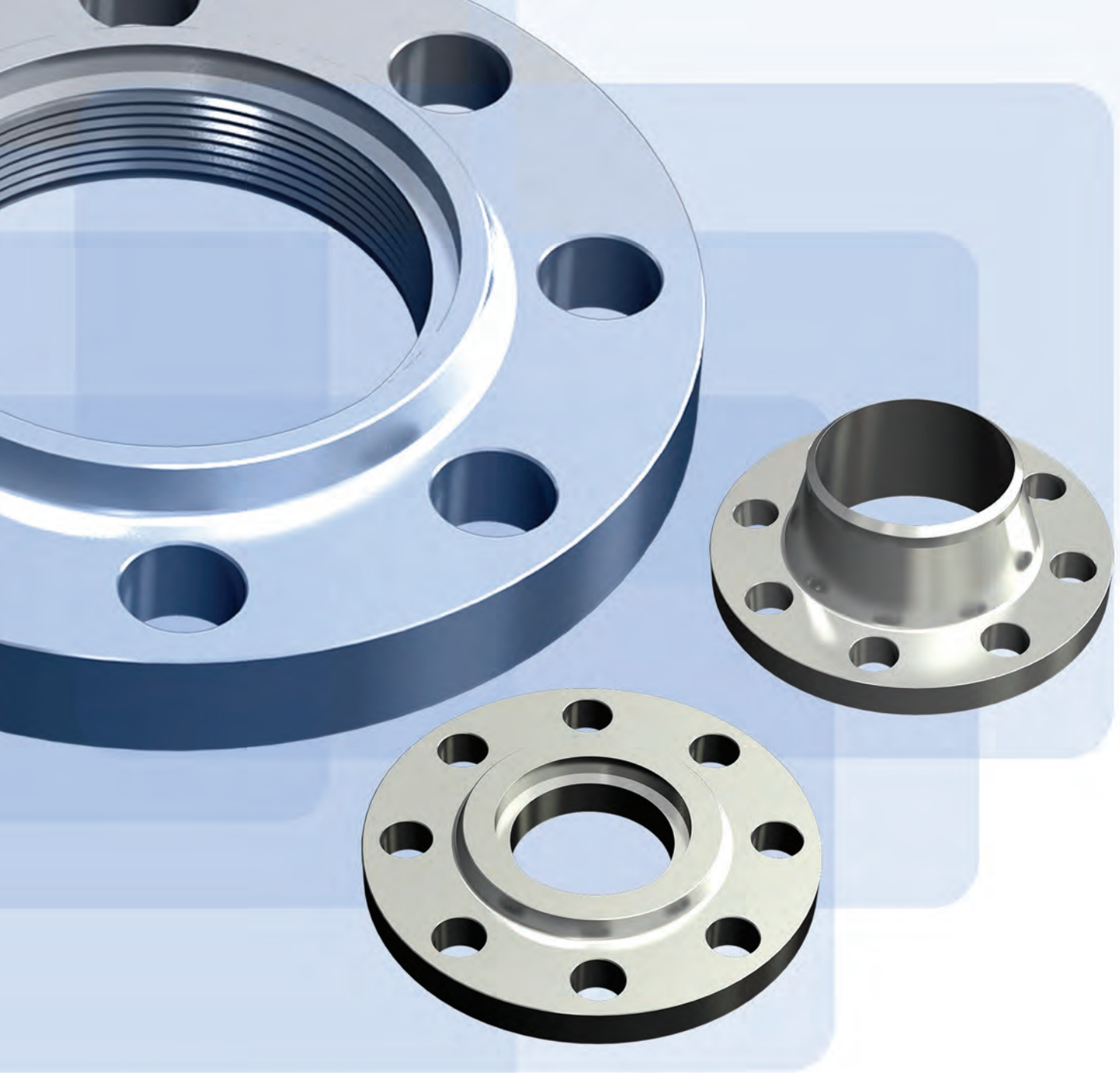
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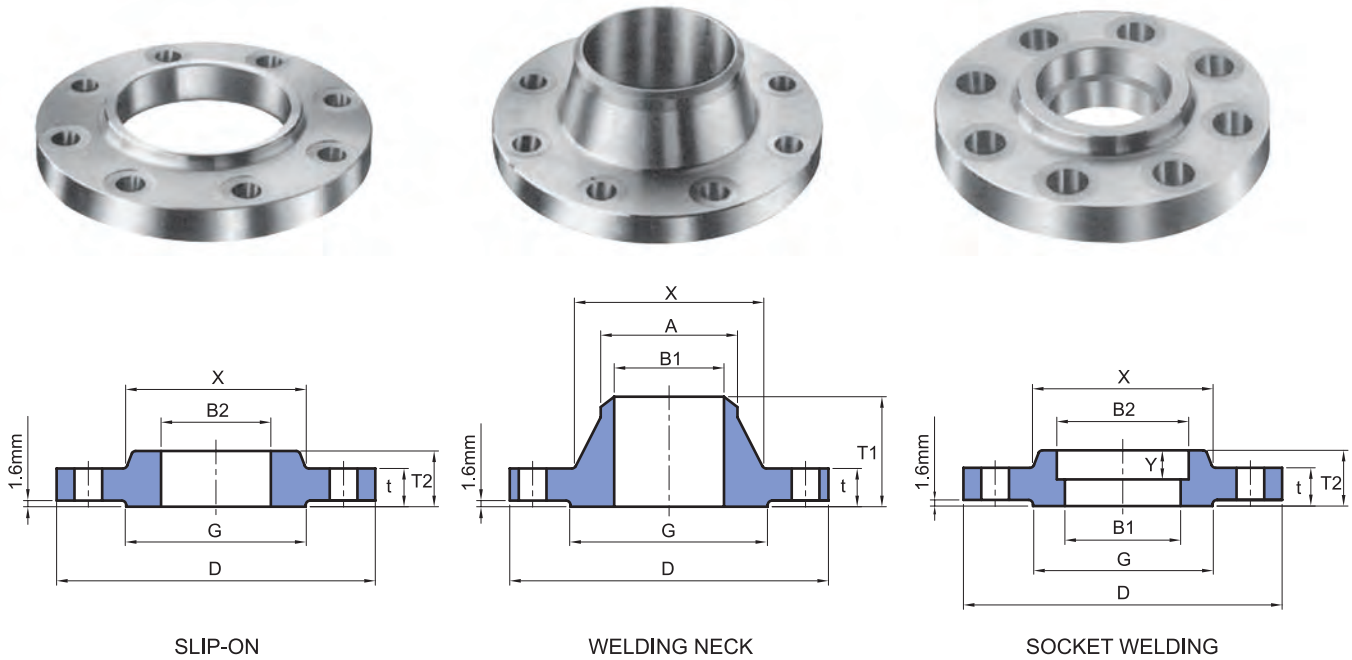


# ANSI FLANGES

- Class 150 Flanges
- Class 300 Flanges
- Class 400 Flanges
- Class 600 Flanges
- Class 900 Flanges
- Class 1500 Flanges
- Class 2500 Flanges

# ANSI FLANGES

## CLASS 150 FLANGES



SLIP-ON

WELDING NECK

SOCKET WELDING

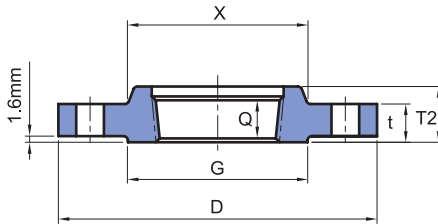
## ANSI B 16.5 Forged Flanges

Unit : mm

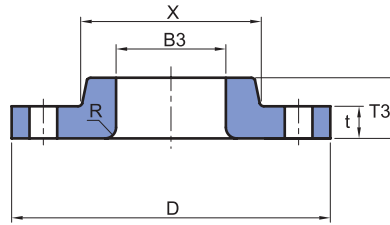
| Nominal Pipe Size | Outside Diam. | Diam. at Base of Hub | O.D of Raised Face | Thickness | BORE                        |                        |           | LENGTH THRU HUB |                                 |           | Diam. of Hub at Bevel | Radius of Fillet | Thread Length | Depth of Socket |
|-------------------|---------------|----------------------|--------------------|-----------|-----------------------------|------------------------|-----------|-----------------|---------------------------------|-----------|-----------------------|------------------|---------------|-----------------|
|                   |               |                      |                    |           | Welding Neck Socket Welding | Slip-on Socket Welding | Lap Joint | Welding Neck    | Slip-on Threaded Socket Welding | Lap Joint |                       |                  |               |                 |
|                   | D             | X                    | G                  | t         | B1                          | B2                     | B3        | T1              | T2                              | T3        | A                     | R                | Q             | Y               |
| 1/2               | 89            | 30.2                 | 35.1               | 11.2      | 15.8                        | 22.4                   | 22.9      | 47.8            | 15.7                            | 15.7      | 21.3                  | 3.0              | 15.7          | 9.7             |
| 3/4               | 99            | 38.1                 | 42.9               | 12.7      | 20.8                        | 27.7                   | 28.2      | 52.3            | 15.7                            | 15.7      | 26.7                  | 3.0              | 15.7          | 11.2            |
| 1                 | 108           | 49.3                 | 50.8               | 14.2      | 26.7                        | 34.5                   | 35.1      | 55.6            | 17.5                            | 17.5      | 33.5                  | 3.0              | 17.5          | 12.7            |
| 1 1/4             | 117           | 58.7                 | 63.5               | 15.7      | 35.1                        | 43.2                   | 43.7      | 57.2            | 20.6                            | 20.6      | 42.2                  | 4.8              | 20.6          | 14.2            |
| 1 1/2             | 127           | 65.0                 | 73.2               | 17.5      | 40.9                        | 49.5                   | 50.0      | 62.0            | 22.4                            | 22.4      | 48.3                  | 6.4              | 22.4          | 15.8            |
| 2                 | 152           | 77.7                 | 91.9               | 19.1      | 52.6                        | 62.0                   | 62.5      | 63.5            | 25.4                            | 25.4      | 60.5                  | 7.9              | 25.4          | 17.5            |
| 2 1/2             | 178           | 90.4                 | 104.6              | 22.4      | 62.7                        | 74.7                   | 75.4      | 69.9            | 28.4                            | 28.4      | 73.2                  | 7.9              | 28.4          | 19.1            |
| 3                 | 191           | 108.0                | 127.0              | 23.9      | 78.0                        | 90.7                   | 91.4      | 69.9            | 30.2                            | 30.2      | 88.9                  | 9.7              | 30.2          | 20.6            |
| 3 1/2             | 216           | 122.2                | 139.7              | 23.9      | 90.2                        | 103.4                  | 104.1     | 71.4            | 31.8                            | 31.8      | 101.6                 | 9.7              | 31.8          | 22.4            |
| 4                 | 229           | 134.9                | 157.2              | 23.9      | 102.4                       | 116.1                  | 116.8     | 76.2            | 33.3                            | 33.3      | 114.3                 | 11.2             | 33.3          | 23.9            |
| 5                 | 254           | 163.6                | 185.7              | 23.9      | 128.3                       | 143.8                  | 144.5     | 88.9            | 36.6                            | 36.6      | 141.2                 | 11.2             | 36.6          | 23.9            |
| 6                 | 279           | 192.0                | 215.9              | 25.4      | 154.2                       | 170.7                  | 171.5     | 88.9            | 39.6                            | 39.6      | 168.4                 | 12.7             | 39.6          | 26.9            |
| 8                 | 343           | 246.1                | 269.7              | 28.4      | 202.7                       | 221.5                  | 222.3     | 101.6           | 44.5                            | 44.5      | 219.2                 | 12.7             | 44.5          | 31.8            |
| 10                | 406           | 304.8                | 323.9              | 30.2      | 254.5                       | 276.4                  | 277.4     | 101.6           | 49.3                            | 49.3      | 273.1                 | 12.7             | 49.3          | 33.3            |
| 12                | 483           | 365.3                | 381.0              | 31.8      | 304.8                       | 327.2                  | 328.2     | 114.3           | 55.6                            | 55.6      | 323.9                 | 12.7             | 55.6          | 39.6            |
| 14                | 533           | 400.1                | 412.8              | 35.1      | 336.6                       | 359.2                  | 360.2     | 127.0           | 57.2                            | 79.2      | 355.6                 | 12.7             | 57.2          | 41.4            |
| 16                | 597           | 457.2                | 469.9              | 36.6      | 387.4                       | 410.5                  | 411.2     | 127.0           | 63.5                            | 87.4      | 406.4                 | 12.7             | 63.5          | 44.5            |
| 18                | 635           | 505.0                | 533.4              | 39.6      | 438.2                       | 461.8                  | 462.3     | 139.7           | 68.3                            | 96.8      | 457.2                 | 12.7             | 68.3          | 49.3            |
| 20                | 699           | 558.8                | 584.2              | 42.9      | 489.0                       | 513.1                  | 514.4     | 144.5           | 73.2                            | 103.1     | 508.0                 | 12.7             | 73.2          | 54.1            |
| 24                | 813           | 663.4                | 692.2              | 47.8      | 590.6                       | 616.0                  | 616.0     | 152.4           | 82.6                            | 111.3     | 609.6                 | 12.7             | 82.6          | 63.5            |

NOTE :

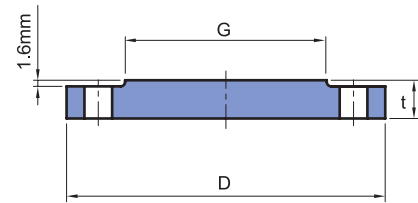
1. For the 'Bore' (B1) other Standard Wall Thickness, refer to page 46,47
2. Class 150 flanges except Lap Joint will be furnished with 0.06" (1.6mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub' (T1), (T2).
3. For Slip-on, Threaded, Socket Welding and Lap Joint Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.



THREADED



LAP JOINT



BLIND

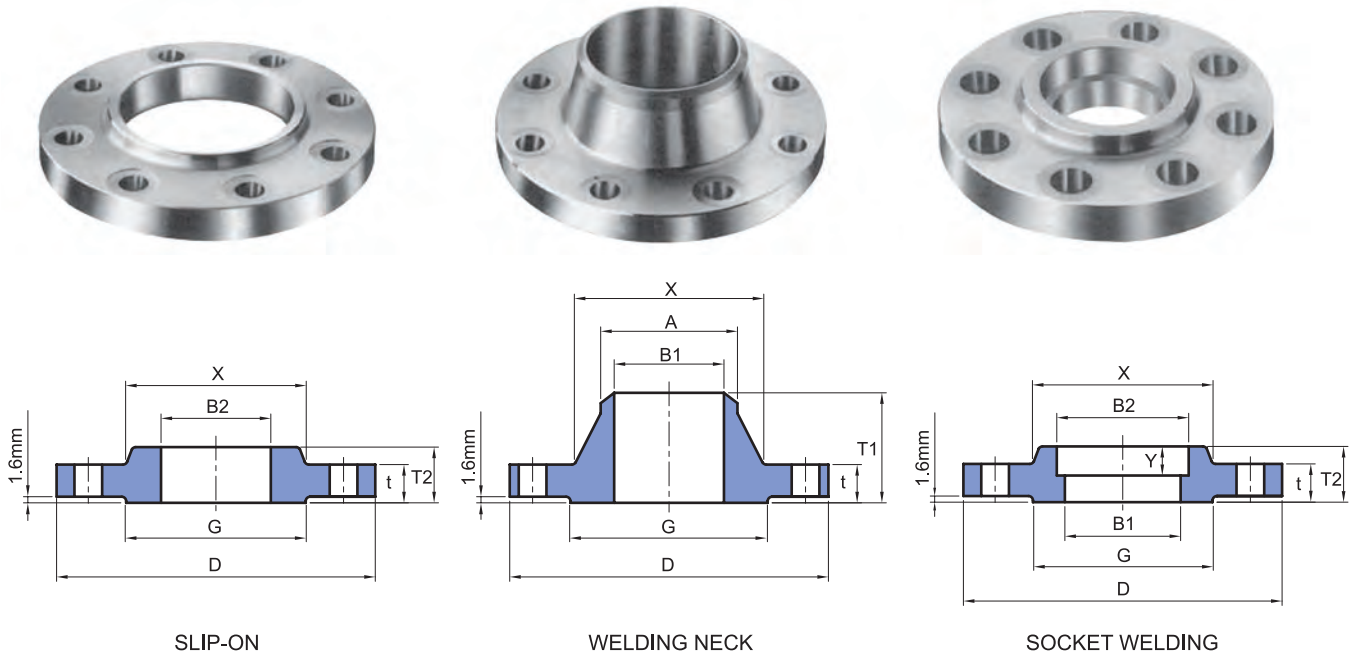
Unit : mm

| Nominal Pipe Size | DRILLING          |                 |                | BOLTING               |                     |                  |            | APPROXIMATE WEIGHT |        |                      |        |           |        |        |        |                |        |
|-------------------|-------------------|-----------------|----------------|-----------------------|---------------------|------------------|------------|--------------------|--------|----------------------|--------|-----------|--------|--------|--------|----------------|--------|
|                   | Bolt Circle Diam. | Number of Holes | Diam. of Holes | Diam. of Bolts (inch) | Machine Bolt Length | Stud Bolt Length |            | Welding Neck       |        | Slip-on and Threaded |        | Lap Joint |        | Blind  |        | Socket Welding |        |
|                   |                   |                 |                |                       |                     | Raised Face      | Ring Joint | Kg                 | lb     | Kg                   | lb     | Kg        | lb     | Kg     | lb     | Kg             | lb     |
| 1/2               | 60.5              | 4               | 15.9           | 1/2                   | 50.8                | 57.2             | -          | 0.51               | 1.10   | 0.47                 | 1.00   | 0.51      | 1.00   | 0.47   | 1.00   | 0.47           | 1.00   |
| 3/4               | 69.9              | 4               | 15.9           | 1/2                   | 50.8                | 63.5             | -          | 0.73               | 1.60   | 0.58                 | 1.30   | 0.64      | 1.40   | 0.63   | 1.40   | 0.59           | 1.30   |
| 1                 | 79.3              | 4               | 15.9           | 1/2                   | 57.2                | 63.5             | 76.2       | 1.07               | 2.40   | 0.86                 | 1.90   | 0.93      | 1.80   | 0.94   | 2.10   | 0.87           | 1.90   |
| 1 1/4             | 88.9              | 4               | 15.9           | 1/2                   | 57.2                | 69.9             | 82.6       | 1.40               | 3.10   | 1.08                 | 2.40   | 1.16      | 2.00   | 1.23   | 2.70   | 1.11           | 2.40   |
| 1 1/2             | 98.6              | 4               | 15.9           | 1/2                   | 63.5                | 69.9             | 82.6       | 1.81               | 4.00   | 1.41                 | 3.10   | 1.51      | 3.30   | 1.62   | 3.60   | 1.45           | 3.20   |
| 2                 | 120.7             | 4               | 19.1           | 5/8                   | 69.9                | 82.6             | 95.3       | 2.59               | 5.70   | 2.26                 | 5.00   | 2.38      | 5.20   | 2.64   | 5.80   | 2.33           | 5.00   |
| 2 1/2             | 139.7             | 4               | 19.1           | 5/8                   | 76.2                | 88.9             | 101.6      | 4.28               | 9.40   | 3.43                 | 7.60   | 3.60      | 7.90   | 4.06   | 9.00   | 3.55           | 7.80   |
| 3                 | 152.4             | 4               | 19.1           | 5/8                   | 76.2                | 88.9             | 101.6      | 5.18               | 11.40  | 3.87                 | 8.50   | 4.04      | 8.90   | 4.90   | 10.80  | 4.02           | 8.90   |
| 3 1/2             | 177.8             | 8               | 19.1           | 5/8                   | 76.2                | 88.9             | 101.6      | 5.45               | 12.00  | 4.99                 | 11.00  | 4.99      | 11.00  | 5.90   | 13.00  | 4.99           | 11.00  |
| 4                 | 190.5             | 8               | 19.1           | 5/8                   | 76.2                | 88.9             | 101.6      | 7.32               | 16.10  | 5.75                 | 12.70  | 5.96      | 13.00  | 7.41   | 16.30  | 5.99           | 13.20  |
| 5                 | 215.9             | 8               | 22.4           | 3/4                   | 82.6                | 95.3             | 108.0      | 8.91               | 19.60  | 6.22                 | 13.70  | 6.44      | 14.00  | 8.76   | 19.30  | 6.68           | 14.70  |
| 6                 | 241.3             | 8               | 22.4           | 3/4                   | 82.6                | 101.6            | 114.3      | 11.26              | 24.80  | 7.38                 | 16.30  | 7.59      | 16.70  | 11.31  | 24.90  | 7.99           | 17.60  |
| 8                 | 298.5             | 8               | 22.4           | 3/4                   | 88.9                | 108.0            | 120.7      | 17.68              | 39.00  | 12.36                | 27.30  | 12.66     | 27.90  | 19.92  | 43.90  | 13.29          | 29.30  |
| 10                | 362.0             | 12              | 25.4           | 7/8                   | 101.6               | 114.3            | 127.0      | 24.79              | 54.70  | 17.10                | 37.70  | 16.78     | 37.00  | 29.39  | 64.80  | 19.50          | 43.00  |
| 12                | 431.8             | 12              | 25.4           | 7/8                   | 101.6               | 120.7            | 133.4      | 38.98              | 85.90  | 27.68                | 61.00  | 28.30     | 62.40  | 43.70  | 96.30  | 29.03          | 64.00  |
| 14                | 476.3             | 12              | 28.5           | 1                     | 114.3               | 133.4            | 146.1      | 51.71              | 114.00 | 35.20                | 77.60  | 41.50     | 91.50  | 59.42  | 140.00 | 38.56          | 85.00  |
| 16                | 539.8             | 16              | 28.5           | 1                     | 114.3               | 133.4            | 146.1      | 64.41              | 142.00 | 42.18                | 93.00  | 52.98     | 116.80 | 77.11  | 170.00 | 44.49          | 98.00  |
| 18                | 577.9             | 16              | 31.8           | 1 1/8                 | 127.0               | 146.1            | 158.8      | 74.84              | 165.00 | 49.71                | 109.60 | 59.00     | 130.00 | 94.80  | 209.00 | 54.43          | 120.00 |
| 20                | 635.0             | 20              | 31.8           | 1 1/8                 | 139.7               | 158.8            | 171.5      | 89.36              | 197.00 | 65.50                | 140.00 | 72.12     | 159.00 | 123.38 | 272.00 | 70.31          | 155.00 |
| 24                | 749.3             | 20              | 35.1           | 1 1/4                 | 152.4               | 171.5            | 184.2      | 119.66             | 263.80 | 90.50                | 199.50 | 99.02     | 218.30 | 188.24 | 415.00 | 95.25          | 210.00 |

- Blind Flanges may be made with the same hub as that used for Slip-on Flanges or without hub.
- The gasket surface and backside (bearing surface for bolting) are made parallel within 1 degree. To accomplish parallelism, spot facing is carried out according to MSS SP-9, without reducing thickness (t).
- Depth of Socket (Y) is covered by ANSI B 16.5 only in sizes through 3 inch, over 3 inch is at the manufacturer's option.

# ANSI FLANGES

## CLASS 300 FLANGES



SLIP-ON

WELDING NECK

SOCKET WELDING

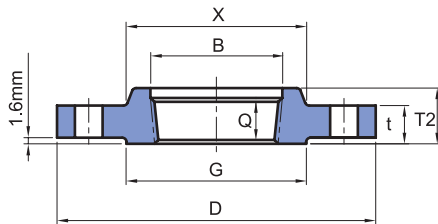
## ANSI B 16.5 Forged Flanges

Unit : mm

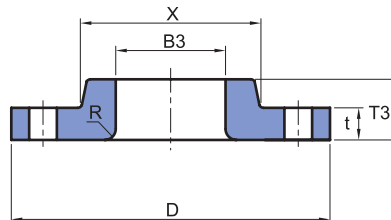
| Nominal Pipe Size | Outside Diam. | Diam. at Base of Hub | O.D of Raised Face | Thickness | BORE                        |                        |           |                   | LENGTH THRU HUB |                                 |           | Diam. of Hub at Bevel | Radius of Fillet | Thread Length | Depth of Socket |
|-------------------|---------------|----------------------|--------------------|-----------|-----------------------------|------------------------|-----------|-------------------|-----------------|---------------------------------|-----------|-----------------------|------------------|---------------|-----------------|
|                   |               |                      |                    |           | Welding Neck Socket Welding | Slip-on Socket Welding | Lap Joint | Counter Bore Min. | Welding Neck    | Slip-on Threaded Socket Welding | Lap Joint |                       |                  |               |                 |
|                   |               |                      |                    |           | B1                          | B2                     | B3        | B                 | T1              | T2                              | T3        |                       |                  |               |                 |
| 1/2               | 95            | 38.1                 | 35.1               | 14.3      | 15.7                        | 22.4                   | 22.9      | 23.6              | 52.3            | 22.4                            | 22.4      | 21.3                  | 3.0              | 15.7          | 9.7             |
| 3/4               | 115           | 47.8                 | 42.9               | 15.9      | 20.8                        | 27.7                   | 28.2      | 29.0              | 57.2            | 25.4                            | 25.4      | 26.7                  | 3.0              | 15.7          | 11.2            |
| 1                 | 125           | 53.8                 | 50.8               | 17.5      | 26.7                        | 34.5                   | 35.1      | 35.8              | 62.0            | 26.9                            | 26.9      | 33.5                  | 3.0              | 17.5          | 12.7            |
| 1 1/4             | 135           | 63.5                 | 63.5               | 19.1      | 35.1                        | 43.2                   | 43.7      | 44.5              | 65.0            | 26.9                            | 26.9      | 42.2                  | 4.8              | 20.6          | 14.2            |
| 1 1/2             | 155           | 69.9                 | 73.2               | 20.7      | 40.9                        | 49.5                   | 50.0      | 50.5              | 68.3            | 30.2                            | 30.2      | 48.3                  | 6.4              | 22.4          | 15.7            |
| 2                 | 165           | 84.1                 | 91.9               | 22.3      | 52.6                        | 62.0                   | 62.5      | 63.5              | 69.9            | 33.3                            | 33.3      | 60.5                  | 7.9              | 28.4          | 17.5            |
| 2 1/2             | 190           | 100.1                | 104.6              | 25.4      | 62.7                        | 74.7                   | 75.4      | 76.2              | 76.2            | 38.1                            | 38.1      | 73.2                  | 7.9              | 31.8          | 19.1            |
| 3                 | 210           | 117.3                | 127.0              | 28.6      | 78.0                        | 90.7                   | 91.4      | 92.2              | 79.2            | 42.9                            | 42.9      | 88.9                  | 9.7              | 31.8          | 20.6            |
| 3 1/2             | 230           | 133.4                | 139.7              | 30.2      | 90.2                        | 103.4                  | 104.1     | 104.9             | 81.0            | 44.5                            | 44.5      | 101.6                 | 9.7              | 36.6          | 22.4            |
| 4                 | 255           | 146.1                | 157.2              | 31.8      | 102.4                       | 116.1                  | 116.8     | 117.6             | 85.9            | 47.8                            | 47.8      | 114.3                 | 11.2             | 36.6          | 23.9            |
| 5                 | 280           | 177.8                | 185.7              | 35.0      | 128.3                       | 143.8                  | 144.5     | 144.5             | 98.6            | 50.8                            | 50.8      | 141.2                 | 11.2             | 42.9          | 23.9            |
| 6                 | 320           | 206.2                | 215.9              | 36.6      | 154.2                       | 170.7                  | 171.5     | 171.5             | 98.6            | 52.3                            | 52.3      | 168.4                 | 12.7             | 46.0          | 26.9            |
| 8                 | 380           | 260.4                | 269.7              | 41.3      | 202.7                       | 221.5                  | 222.3     | 222.3             | 111.3           | 62.0                            | 62.0      | 219.2                 | 12.7             | 50.8          | 31.8            |
| 10                | 445           | 320.5                | 323.9              | 47.7      | 254.5                       | 276.4                  | 277.4     | 276.4             | 117.3           | 66.5                            | 95.3      | 273.1                 | 12.7             | 55.6          | 33.3            |
| 12                | 520           | 374.7                | 381.0              | 50.8      | 304.8                       | 327.2                  | 328.2     | 328.7             | 130.0           | 73.2                            | 101.6     | 323.9                 | 12.7             | 60.5          | 39.6            |
| 14                | 585           | 425.5                | 412.8              | 54.0      | 336.6                       | 359.2                  | 360.2     | 360.4             | 142.7           | 76.2                            | 111.3     | 355.6                 | 12.7             | 63.5          | 41.4            |
| 16                | 650           | 482.6                | 469.9              | 57.2      | 387.4                       | 410.5                  | 411.2     | 411.2             | 146.1           | 82.6                            | 120.7     | 406.4                 | 12.7             | 68.3          | 44.5            |
| 18                | 710           | 533.4                | 533.4              | 60.4      | 438.2                       | 461.8                  | 462.3     | 462.0             | 158.8           | 88.9                            | 130.0     | 457.2                 | 12.7             | 69.9          | 49.3            |
| 20                | 775           | 587.2                | 584.2              | 63.5      | 489.0                       | 513.1                  | 514.4     | 512.8             | 162.1           | 95.3                            | 139.7     | 508.0                 | 12.7             | 73.2          | 54.1            |
| 24                | 915           | 701.5                | 692.2              | 69.9      | 590.6                       | 616.0                  | 616.0     | 614.4             | 168.1           | 106.4                           | 152.4     | 609.6                 | 12.7             | 82.6          | 63.5            |

NOTE :

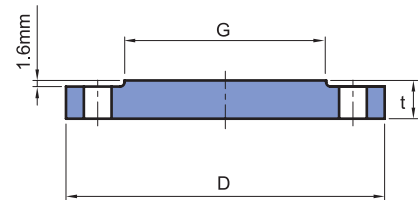
- For the 'Bore' (B1) other Standard Wall Thickness, refer to page 46,47
- Class 300 flanges except Lap Joint will be furnished with 0.06" (1.6mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub' (T1), (T2).
- For Slip-on, Threaded, Socket Welding and Lap Joint Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.



**THREADED**



**LAP JOINT**



**BLIND**

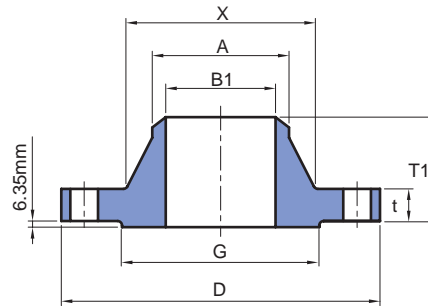
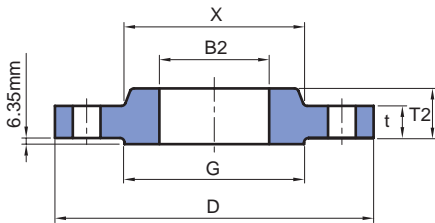
Unit : mm

| Nominal Pipe Size | DRILLING          |                 |                | BOLTING               |                     |                  |            | APPROXIMATE WEIGHT |        |                      |        |           |        |        |        |                |       |
|-------------------|-------------------|-----------------|----------------|-----------------------|---------------------|------------------|------------|--------------------|--------|----------------------|--------|-----------|--------|--------|--------|----------------|-------|
|                   | Bolt Circle Diam. | Number of Holes | Diam. of Holes | Diam. of Bolts (inch) | Machine Bolt Length | Stud Bolt Length |            | Welding Neck       |        | Slip-on and Threaded |        | Lap Joint |        | Blind  |        | Socket Welding |       |
|                   |                   |                 |                |                       |                     | Raised Face      | Ring Joint | Kg                 | lb     | Kg                   | lb     | Kg        | lb     | Kg     | lb     | Kg             | lb    |
| 1/2               | 66.7              | 4               | 15.9           | 1/2                   | 57.2                | 63.5             | 76.2       | 0.78               | 1.70   | 0.62                 | 1.40   | 0.61      | 1.30   | 0.62   | 1.40   | 0.62           | 1.40  |
| 3/4               | 82.6              | 4               | 19.1           | 5/8                   | 63.5                | 76.2             | 88.9       | 1.34               | 3.00   | 1.15                 | 2.50   | 1.15      | 2.50   | 1.16   | 2.50   | 1.19           | 2.60  |
| 1                 | 88.9              | 4               | 19.1           | 5/8                   | 63.5                | 76.2             | 88.9       | 1.64               | 3.60   | 1.39                 | 3.10   | 1.38      | 3.00   | 1.42   | 3.00   | 1.44           | 3.20  |
| 1 1/4             | 98.4              | 4               | 19.1           | 5/8                   | 69.9                | 82.6             | 95.3       | 2.06               | 4.50   | 1.67                 | 3.70   | 1.66      | 3.70   | 1.79   | 3.90   | 1.73           | 3.80  |
| 1 1/2             | 114.3             | 4               | 22.4           | 3/4                   | 76.2                | 88.9             | 101.6      | 3.06               | 6.70   | 2.53                 | 5.60   | 2.52      | 5.60   | 2.68   | 5.90   | 2.62           | 5.80  |
| 2                 | 127.0             | 8               | 19.1           | 5/8                   | 76.2                | 88.9             | 101.6      | 3.40               | 7.50   | 2.80                 | 6.20   | 2.79      | 6.20   | 3.09   | 6.80   | 2.94           | 6.50  |
| 2 1/2             | 149.2             | 8               | 22.4           | 3/4                   | 82.6                | 101.6            | 114.3      | 5.31               | 11.70  | 4.25                 | 9.40   | 4.22      | 9.30   | 4.75   | 10.50  | 4.49           | 9.90  |
| 3                 | 168.3             | 8               | 22.4           | 3/4                   | 88.9                | 108.0            | 120.7      | 7.32               | 16.10  | 5.81                 | 12.80  | 5.78      | 12.70  | 6.79   | 14.90  | 6.20           | 13.70 |
| 3 1/2             | 184.2             | 8               | 22.4           | 3/4                   | 95.3                | 108.0            | 127.0      | 8.17               | 18.00  | 7.72                 | 17.00  | 7.72      | 17.00  | 9.53   | 21.00  | -              | -     |
| 4                 | 200.0             | 8               | 22.4           | 3/4                   | 95.3                | 114.3            | 127.0      | 11.30              | 24.90  | 10.13                | 22.30  | 10.07     | 22.20  | 12.00  | 26.50  | -              | -     |
| 5                 | 235.0             | 8               | 22.4           | 3/4                   | 108.0               | 120.7            | 133.4      | 15.12              | 33.30  | 12.58                | 27.70  | 12.52     | 27.60  | 15.96  | 35.20  | -              | -     |
| 6                 | 269.9             | 12              | 22.4           | 3/4                   | 108.0               | 120.7            | 139.7      | 19.68              | 43.40  | 16.04                | 35.40  | 15.95     | 35.20  | 21.20  | 46.70  | -              | -     |
| 8                 | 330.2             | 12              | 25.4           | 7/8                   | 120.7               | 139.7            | 152.4      | 30.48              | 67.20  | 24.50                | 54.00  | 24.37     | 53.70  | 34.60  | 76.30  | -              | -     |
| 10                | 387.4             | 16              | 28.4           | 1                     | 139.7               | 158.8            | 171.5      | 43.74              | 96.40  | 34.16                | 75.30  | 39.92     | 88.00  | 55.34  | 122.00 | -              | -     |
| 12                | 450.8             | 16              | 31.8           | 1 1/8                 | 146.1               | 171.5            | 184.2      | 64.41              | 142.00 | 51.26                | 113.00 | 58.70     | 129.40 | 78.90  | 174.00 | -              | -     |
| 14                | 514.4             | 20              | 31.8           | 1 1/8                 | 158.8               | 177.8            | 190.5      | 88.30              | 194.70 | 72.12                | 159.00 | 83.46     | 184.00 | 107.05 | 236.00 | -              | -     |
| 16                | 571.5             | 20              | 35.1           | 1 1/4                 | 165.1               | 190.5            | 203.2      | 112.94             | 249.00 | 90.40                | 199.30 | 106.14    | 234.00 | 139.25 | 307.00 | -              | -     |
| 18                | 628.6             | 24              | 35.1           | 1 1/4                 | 171.5               | 196.9            | 209.6      | 138.34             | 305.00 | 109.00               | 240.30 | 133.95    | 295.30 | 176.90 | 396.00 | -              | -     |
| 20                | 685.8             | 24              | 35.1           | 1 1/4                 | 184.2               | 203.2            | 222.3      | 167.37             | 369.00 | 136.00               | 300.00 | 157.65    | 347.60 | 223.17 | 492.00 | -              | -     |
| 24                | 812.8             | 24              | 41.1           | 1 1/2                 | 203.2               | 228.6            | 254.0      | 235.41             | 519.00 | 204.00               | 449.70 | 240.40    | 530.00 | 342.00 | 754.00 | -              | -     |

- Blind Flanges may be made with the same hub as that used for Slip-on Flanges or without hub.
- The gasket surface and backside (bearing surface for bolting) are made parallel within 1 degree. To accomplish parallelism, spot facing is carried out according to MSS SP-9, without reducing thickness (t).
- Depth of Socket (Y) is covered by ANSI B 16.5 only in sizes through 3 inch, over 3 inch is at the manufacturer's option.

# ANSI FLANGES

## CLASS 400 FLANGES



SLIP-ON

WELDING NECK

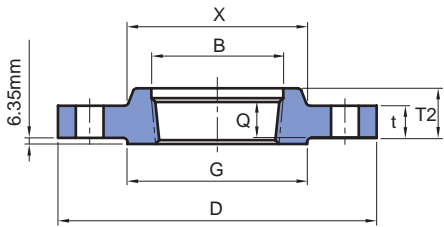
### ANSI B 16.5 Forged Flanges

Unit : mm

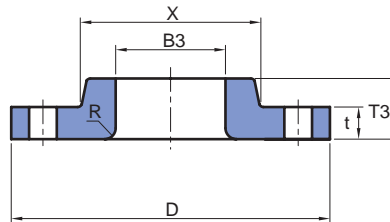
| Nominal Pipe Size | Outside Diam.<br>D | Diam. at Base of Hub<br>X | O.D of Raised Face<br>G | Thickness<br>t | BORE  |               |                 |                        | LENGTH THRU HUB    |                        |                 | Diam. of Hub at Bevel<br>A | Radius of Fillet<br>R | Thread Length<br>Q |
|-------------------|--------------------|---------------------------|-------------------------|----------------|---|---------------|-----------------|------------------------|--------------------|------------------------|-----------------|----------------------------|-----------------------|--------------------|
|                   |                    |                           |                         |                | Welding Neck<br>B1                            | Slip-on<br>B2 | Lap Joint<br>B3 | Counter Bore Min.<br>B | Welding Neck<br>T1 | Slip-on Threaded<br>T2 | Lap Joint<br>T3 |                            |                       |                    |
| 1/2               | 95                 | 38.1                      | 35.1                    | 14.3           | See Note (1)<br>To be specified by purchaser. | 22.4          | 22.9            | 23.6                   | 52.3               | 22.4                   | 22.4            | 21.3                       | 3.0                   | 15.7               |
| 3/4               | 115                | 47.8                      | 42.9                    | 15.9           |   | 27.7          | 28.2            | 29.0                   | 57.2               | 25.4                   | 25.4            | 26.7                       | 3.0                   | 15.7               |
| 1                 | 125                | 53.8                      | 50.8                    | 17.5           |   | 34.5          | 35.1            | 35.8                   | 62.0               | 26.9                   | 26.9            | 33.5                       | 3.0                   | 17.5               |
| 1 1/4             | 135                | 63.5                      | 63.5                    | 20.7           |   | 43.2          | 43.7            | 44.5                   | 66.5               | 28.4                   | 28.4            | 42.2                       | 4.8                   | 20.6               |
| 1 1/2             | 155                | 69.9                      | 73.2                    | 22.3           |   | 49.5          | 50.0            | 50.5                   | 69.9               | 31.8                   | 31.8            | 48.3                       | 6.4                   | 22.4               |
| 2                 | 165                | 84.1                      | 91.9                    | 25.4           |   | 62.0          | 62.5            | 63.5                   | 73.2               | 36.6                   | 36.6            | 60.5                       | 7.9                   | 28.4               |
| 2 1/2             | 190                | 100.1                     | 104.6                   | 28.6           |   | 74.7          | 75.4            | 76.2                   | 79.2               | 41.1                   | 41.1            | 73.2                       | 7.9                   | 31.8               |
| 3                 | 210                | 117.3                     | 127.0                   | 31.8           |   | 90.7          | 91.4            | 92.2                   | 82.6               | 46.0                   | 46.0            | 88.9                       | 9.7                   | 35.1               |
| 3 1/2             | 230                | 133.4                     | 139.7                   | 35.0           |   | 103.4         | 104.1           | 104.9                  | 85.9               | 49.3                   | 49.3            | 101.6                      | 9.7                   | 39.6               |
| 4                 | 255                | 146.1                     | 157.2                   | 35.0           |   | 116.1         | 116.8           | 117.6                  | 88.9               | 50.8                   | 50.8            | 114.3                      | 11.2                  | 36.6               |
| 5                 | 280                | 177.8                     | 185.7                   | 38.1           |   | 143.8         | 144.5           | 144.5                  | 101.6              | 53.8                   | 53.8            | 141.2                      | 11.2                  | 42.9               |
| 6                 | 320                | 206.2                     | 215.9                   | 41.3           |   | 170.7         | 171.5           | 171.5                  | 103.1              | 57.2                   | 57.2            | 168.4                      | 12.7                  | 46.0               |
| 8                 | 380                | 260.4                     | 269.7                   | 47.7           |   | 221.5         | 222.3           | 222.3                  | 117.3              | 68.3                   | 68.3            | 219.2                      | 12.7                  | 50.8               |
| 10                | 445                | 320.5                     | 323.9                   | 54.0           |   | 276.4         | 277.4           | 276.4                  | 124.0              | 73.2                   | 101.6           | 273.1                      | 12.7                  | 55.6               |
| 12                | 520                | 374.7                     | 381.0                   | 57.2           |   | 327.2         | 328.2           | 328.7                  | 136.7              | 79.2                   | 108.0           | 323.9                      | 12.7                  | 60.5               |
| 14                | 585                | 425.5                     | 412.8                   | 60.4           |   | 359.2         | 360.2           | 360.4                  | 149.4              | 84.1                   | 117.3           | 355.6                      | 12.7                  | 63.5               |
| 16                | 650                | 482.6                     | 469.9                   | 63.5           |   | 410.5         | 411.2           | 411.2                  | 152.4              | 93.7                   | 127.0           | 406.4                      | 12.7                  | 68.3               |
| 18                | 710                | 533.4                     | 533.4                   | 66.7           |   | 461.8         | 462.3           | 462.0                  | 165.1              | 98.6                   | 136.7           | 457.2                      | 12.7                  | 69.9               |
| 20                | 775                | 587.2                     | 584.2                   | 69.9           |   | 513.1         | 514.4           | 512.8                  | 168.1              | 101.6                  | 146.1           | 508.0                      | 12.7                  | 73.2               |
| 24                | 915                | 701.5                     | 692.2                   | 76.2           |   | 616.0         | 616.0           | 614.4                  | 174.8              | 114.3                  | 158.8           | 609.6                      | 12.7                  | 82.6               |

NOTE :

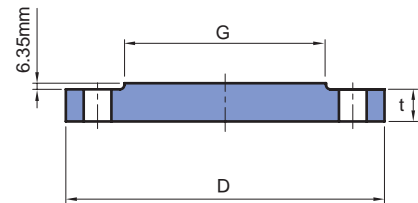
- For the 'Bore' (B1) other Standard Wall Thickness, refer to page 46,47
- Class 400 flanges except Lap Joint will be furnished with 0.25" (6.35mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub' (T1), (T2).
- For Slip-on, Threaded, Socket Welding and Lap Joint Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.



**THREADED**



**LAP JOINT**



**BLIND**

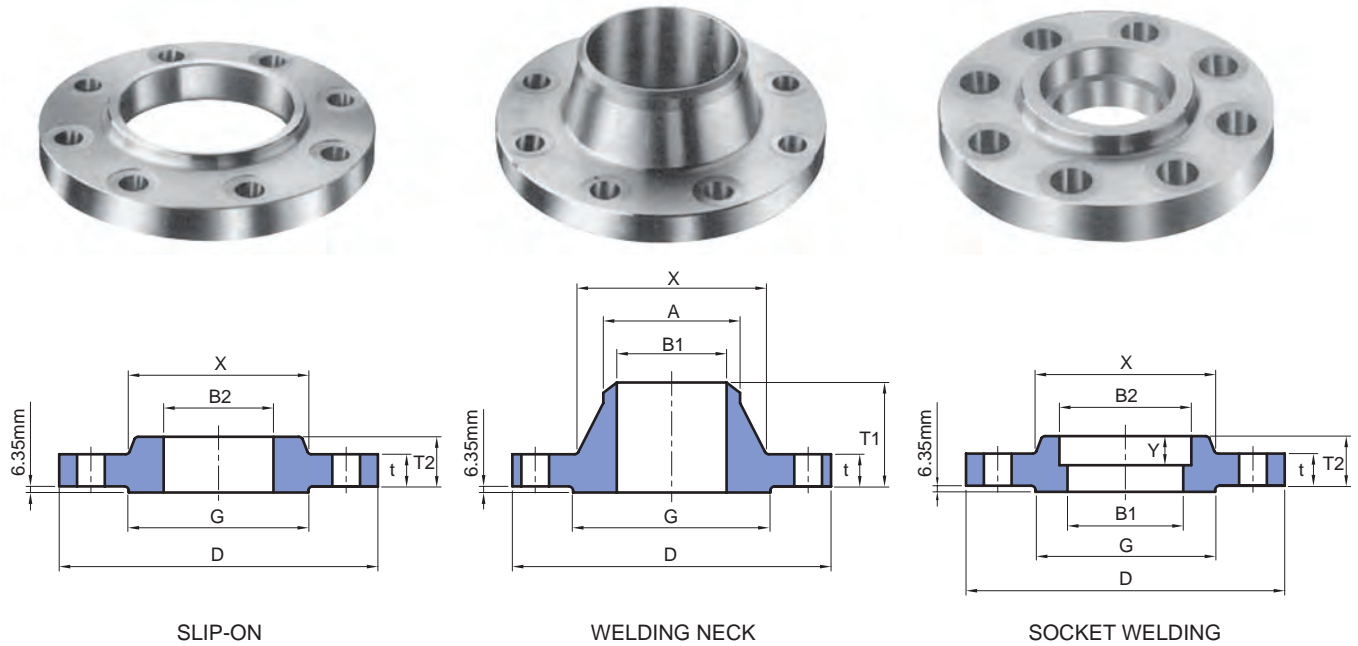
Unit : mm

| Nominal Pipe Size | DRILLING          |                 |                | BOLTING               |                   |                           | APPROXIMATE WEIGHT |              |        |                      |        |           |        |        |        |
|-------------------|-------------------|-----------------|----------------|-----------------------|-------------------|---------------------------|--------------------|--------------|--------|----------------------|--------|-----------|--------|--------|--------|
|                   | Bolt Circle Diam. | Number of Holes | Diam. of Holes | Diam. of Bolts (inch) | Stud Bolt Length  |                           |                    | Welding Neck |        | Slip-on and Threaded |        | Lap Joint |        | Blind  |        |
|                   |                   |                 |                |                       | 0.25" Raised Face | Male-Female Tongue-Groove | Ring Joint         |              |        |                      |        |           |        |        |        |
| Kg                | lb                | Kg              | lb             | Kg                    | lb                | Kg                        | lb                 | Kg           | lb     |                      |        |           |        |        |        |
| 1/2               | 66.7              | 4               | 15.9           | 1/2                   | 76.2              | 69.9                      | 76.2               | 1.36         | 3.00   | 0.91                 | 2.00   | 0.80      | 1.80   | 0.91   | 2.00   |
| 3/4               | 82.6              | 4               | 19.1           | 5/8                   | 88.9              | 82.6                      | 88.9               | 1.59         | 3.50   | 1.36                 | 3.00   | 1.36      | 3.00   | 1.40   | 3.00   |
| 1                 | 88.9              | 4               | 19.1           | 5/8                   | 88.9              | 82.6                      | 88.9               | 1.81         | 4.00   | 1.59                 | 3.50   | 1.59      | 3.50   | 1.70   | 3.80   |
| 1 1/4             | 98.4              | 4               | 19.1           | 5/8                   | 95.3              | 88.9                      | 95.3               | 2.50         | 5.50   | 2.10                 | 4.60   | 2.04      | 4.50   | 2.27   | 5.00   |
| 1 1/2             | 114.3             | 4               | 22.4           | 3/4                   | 108.0             | 101.6                     | 108.0              | 3.63         | 8.00   | 3.10                 | 6.80   | 2.95      | 6.50   | 3.40   | 7.50   |
| 2                 | 127.0             | 8               | 19.1           | 5/8                   | 108.0             | 101.6                     | 108.0              | 4.54         | 10.00  | 3.63                 | 8.00   | 3.63      | 8.00   | 4.40   | 9.70   |
| 2 1/2             | 149.2             | 8               | 22.4           | 3/4                   | 120.7             | 114.3                     | 120.7              | 6.35         | 14.00  | 5.44                 | 12.00  | 4.99      | 11.00  | 6.80   | 15.00  |
| 3                 | 168.3             | 8               | 22.4           | 3/4                   | 127.0             | 120.7                     | 127.0              | 8.17         | 18.00  | 7.26                 | 16.00  | 6.35      | 14.00  | 8.90   | 19.60  |
| 3 1/2             | 184.2             | 8               | 25.4           | 7/8                   | 139.7             | 133.4                     | 139.7              | 11.80        | 26.00  | 9.53                 | 21.00  | 9.08      | 20.00  | 13.17  | 29.00  |
| 4                 | 200.0             | 8               | 25.4           | 7/8                   | 139.7             | 133.4                     | 139.7              | 13.61        | 30.00  | 10.89                | 24.00  | 9.98      | 22.00  | 14.40  | 31.70  |
| 5                 | 235.0             | 8               | 25.4           | 7/8                   | 146.1             | 139.7                     | 146.1              | 17.69        | 39.00  | 14.07                | 31.00  | 13.15     | 29.00  | 19.50  | 43.00  |
| 6                 | 269.9             | 12              | 25.4           | 7/8                   | 152.4             | 146.1                     | 152.4              | 22.23        | 49.00  | 19.98                | 44.00  | 16.78     | 37.00  | 27.67  | 61.00  |
| 8                 | 330.0             | 12              | 28.4           | 1                     | 171.5             | 165.1                     | 171.5              | 35.38        | 78.00  | 30.40                | 67.00  | 26.16     | 59.00  | 45.36  | 100.00 |
| 10                | 387.4             | 16              | 31.8           | 1 1/8                 | 190.5             | 184.2                     | 190.5              | 49.89        | 110.00 | 41.28                | 91.00  | 43.09     | 95.00  | 68.00  | 150.00 |
| 12                | 450.8             | 16              | 35.1           | 1 1/4                 | 203.2             | 196.9                     | 203.2              | 72.57        | 160.00 | 59.02                | 130.00 | 68.95     | 152.00 | 98.00  | 216.00 |
| 14                | 514.4             | 20              | 35.1           | 1 1/4                 | 209.6             | 203.2                     | 209.6              | 105.69       | 233.00 | 81.72                | 180.00 | 95.25     | 210.00 | 131.66 | 290.00 |
| 16                | 571.5             | 20              | 38.1           | 1 3/8                 | 222.3             | 215.9                     | 222.3              | 133.30       | 294.00 | 106.69               | 235.00 | 127.00    | 280.00 | 167.00 | 368.00 |
| 18                | 628.6             | 24              | 38.1           | 1 3/8                 | 228.6             | 222.3                     | 228.6              | 158.90       | 350.30 | 129.39               | 285.30 | 156.49    | 345.00 | 206.57 | 455.40 |
| 20                | 685.8             | 24              | 41.1           | 1 1/2                 | 241.3             | 235.0                     | 247.7              | 193.00       | 425.50 | 152.00               | 335.00 | 190.51    | 420.00 | 261.00 | 575.40 |
| 24                | 812.8             | 24              | 47.8           | 1 3/4                 | 266.7             | 260.4                     | 279.4              | 281.48       | 620.50 | 231.54               | 510.50 | 278.96    | 615.00 | 395.00 | 870.80 |

- Blind Flanges may be made with the same hub as that used for Slip-on Flanges or without hub.
- The gasket surface and backside (bearing surface for bolting) are made parallel within 1 degree. To accomplish parallelism, spot facing is carried out according to MSS SP-9, without reducing thickness (t).
- Dimensions of size 1/2" through 3 1/2" are the same as for Class 600 Flanges.

# ANSI FLANGES

## CLASS 600 FLANGES



SLIP-ON

WELDING NECK

SOCKET WELDING

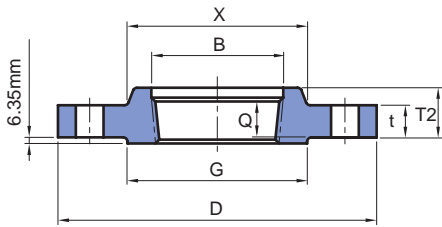
## ANSI B 16.5 Forged Flanges

Unit : mm

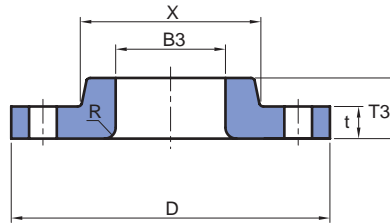
| Nominal Pipe Size | Outside Diam.<br>D | Diam. at Base of Hub<br>X | O.D. of Raised Face<br>G | Thickness<br>t | BORE                              |                              |                 |                        | LENGTH THRU HUB    |                                       |                 | Diam. of Hub at Bevel<br>A | Radius of Fillet<br>R | Thread Length<br>Q | Depth of Socket<br>Y |
|-------------------|--------------------|---------------------------|--------------------------|----------------|-----------------------------------|------------------------------|-----------------|------------------------|--------------------|---------------------------------------|-----------------|----------------------------|-----------------------|--------------------|----------------------|
|                   |                    |                           |                          |                | Welding Neck Socket Welding<br>B1 | Slip-on Socket Welding<br>B2 | Lap Joint<br>B3 | Counter Bore Min.<br>B | Welding Neck<br>T1 | Slip-on Threaded Socket Welding<br>T2 | Lap Joint<br>T3 |                            |                       |                    |                      |
|                   |                    |                           |                          |                |                                   |                              |                 |                        |                    |                                       |                 |                            |                       |                    |                      |
| 1/2               | 95                 | 38.1                      | 35.1                     | 14.3           |                                   | 22.4                         | 22.9            | 23.6                   | 52.3               | 22.4                                  | 22.4            | 21.3                       | 3.0                   | 15.7               | 9.7                  |
| 3/4               | 115                | 47.8                      | 42.9                     | 15.9           |                                   | 27.7                         | 28.2            | 29.0                   | 57.2               | 25.4                                  | 25.4            | 26.7                       | 3.0                   | 15.7               | 11.2                 |
| 1                 | 125                | 53.8                      | 50.8                     | 17.5           |                                   | 34.5                         | 35.1            | 35.8                   | 62.0               | 26.9                                  | 26.9            | 33.5                       | 3.0                   | 17.5               | 12.7                 |
| 1 1/4             | 135                | 63.5                      | 63.5                     | 20.7           |                                   | 43.2                         | 43.7            | 44.5                   | 66.5               | 28.4                                  | 28.4            | 42.2                       | 4.8                   | 20.6               | 14.2                 |
| 1 1/2             | 155                | 69.9                      | 73.2                     | 22.3           |                                   | 49.5                         | 50.0            | 50.5                   | 69.9               | 31.8                                  | 31.8            | 48.3                       | 6.4                   | 22.4               | 15.7                 |
| 2                 | 165                | 84.1                      | 91.9                     | 25.4           |                                   | 62.0                         | 62.5            | 63.5                   | 73.2               | 36.6                                  | 36.6            | 60.5                       | 7.9                   | 28.4               | 17.5                 |
| 2 1/2             | 190                | 100.1                     | 104.6                    | 28.6           |                                   | 74.7                         | 75.4            | 76.2                   | 79.2               | 41.1                                  | 41.1            | 73.2                       | 7.9                   | 31.8               | 19.1                 |
| 3                 | 210                | 117.3                     | 127.0                    | 31.8           |                                   | 90.7                         | 91.4            | 92.2                   | 82.6               | 46.0                                  | 46.0            | 88.9                       | 9.7                   | 35.1               | 20.6                 |
| 3 1/2             | 230                | 133.4                     | 139.7                    | 35.0           |                                   | 103.4                        | 104.1           | 104.9                  | 85.9               | 49.3                                  | 49.3            | 101.6                      | 9.7                   | 39.6               | 22.4                 |
| 4                 | 275                | 152.4                     | 157.2                    | 38.1           |                                   | 116.1                        | 116.8           | 117.6                  | 101.6              | 53.8                                  | 53.8            | 114.3                      | 11.2                  | 41.1               | 23.9                 |
| 5                 | 330                | 189.0                     | 185.7                    | 44.5           |                                   | 143.8                        | 144.5           | 144.5                  | 114.3              | 60.5                                  | 60.5            | 141.2                      | 11.2                  | 47.8               | 23.9                 |
| 6                 | 355                | 222.3                     | 215.9                    | 47.7           |                                   | 170.7                        | 171.5           | 171.5                  | 117.3              | 66.5                                  | 66.5            | 168.4                      | 12.7                  | 50.8               | 26.9                 |
| 8                 | 420                | 273.1                     | 269.7                    | 55.6           |                                   | 221.5                        | 222.3           | 222.3                  | 133.4              | 76.2                                  | 76.2            | 219.2                      | 12.7                  | 57.2               | 31.8                 |
| 10                | 510                | 342.9                     | 323.9                    | 63.5           |                                   | 276.4                        | 277.4           | 276.4                  | 152.4              | 85.9                                  | 111.3           | 273.1                      | 12.7                  | 65.0               | 33.3                 |
| 12                | 560                | 400.1                     | 381.0                    | 66.7           |                                   | 327.2                        | 328.2           | 328.7                  | 155.4              | 91.9                                  | 117.3           | 323.9                      | 12.7                  | 69.9               | 39.6                 |
| 14                | 605                | 431.8                     | 412.8                    | 69.9           |                                   | 359.2                        | 360.2           | 360.4                  | 165.1              | 93.7                                  | 127.0           | 355.6                      | 12.7                  | 73.2               | 41.4                 |
| 16                | 685                | 495.3                     | 469.9                    | 76.2           |                                   | 410.5                        | 411.2           | 411.2                  | 177.8              | 106.4                                 | 139.7           | 406.4                      | 12.7                  | 77.7               | 44.5                 |
| 18                | 745                | 546.1                     | 533.4                    | 82.6           |                                   | 461.8                        | 462.3           | 462.0                  | 184.2              | 117.3                                 | 152.4           | 457.2                      | 12.7                  | 79.2               | 49.3                 |
| 20                | 815                | 609.6                     | 584.2                    | 88.9           |                                   | 513.1                        | 514.4           | 512.8                  | 190.5              | 127.0                                 | 165.1           | 508.0                      | 12.7                  | 82.6               | 54.1                 |
| 24                | 940                | 717.6                     | 692.2                    | 101.6          |                                   | 616.0                        | 616.0           | 614.4                  | 203.2              | 139.7                                 | 184.2           | 609.6                      | 12.7                  | 91.9               | 63.5                 |

NOTE :

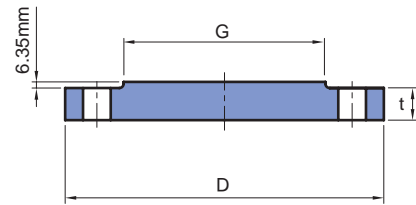
- For the 'Bore' (B1) other Standard Wall Thickness, refer to page 46,47
- Class 600 flanges except Lap Joint will be furnished with 0.25" (6.35mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub' (T1), (T2).
- For Slip-on, Threaded, Socket Welding and Lap Joint Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.



THREADED



LAP JOINT



BLIND

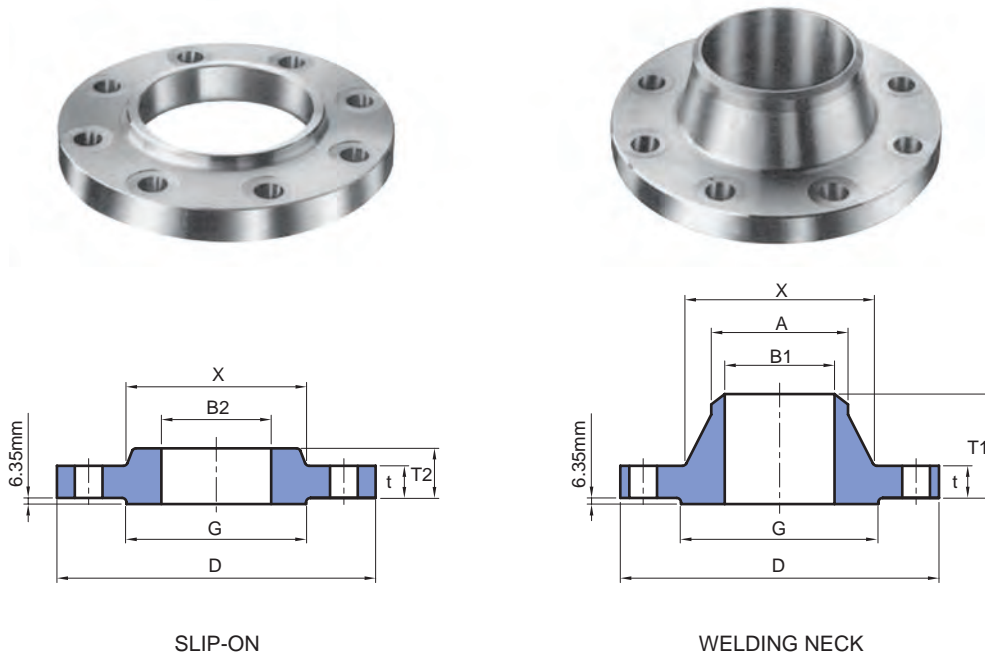
Unit : mm

| Nominal Pipe Size | DRILLING          |                 |                | BOLTING               |                   |                             |            | APPROXIMATE WEIGHT |        |                      |        |           |        |        |         |                |       |
|-------------------|-------------------|-----------------|----------------|-----------------------|-------------------|-----------------------------|------------|--------------------|--------|----------------------|--------|-----------|--------|--------|---------|----------------|-------|
|                   | Bolt Circle Diam. | Number of Holes | Diam. of Holes | Diam. of Bolts (inch) | STUD BOLT LENGTH  |                             |            | Welding Neck       |        | Slip-on and Threaded |        | Lap Joint |        | Blind  |         | Socket Welding |       |
|                   |                   |                 |                |                       | 0.25" Raised Face | Male - Female Tongue-Groove | Ring Joint | Kg                 | lb     | Kg                   | lb     | Kg        | lb     | Kg     | lb      | Kg             | lb    |
| 1/2               | 66.7              | 4               | 15.9           | 1/2                   | 76.2              | 69.9                        | 76.2       | 0.90               | 2.00   | 0.91                 | 2.00   | 0.80      | 1.80   | 0.91   | 2.00    | 0.91           | 2.00  |
| 3/4               | 82.6              | 4               | 19.1           | 5/8                   | 88.9              | 82.6                        | 88.9       | 1.59               | 3.50   | 1.40                 | 3.00   | 1.36      | 3.00   | 1.40   | 3.00    | 1.36           | 3.00  |
| 1                 | 88.9              | 4               | 19.1           | 5/8                   | 88.9              | 82.6                        | 88.9       | 1.90               | 4.00   | 1.70                 | 3.70   | 1.59      | 3.50   | 1.81   | 4.00    | 1.81           | 4.00  |
| 1 1/4             | 98.4              | 4               | 19.1           | 5/8                   | 95.3              | 88.9                        | 95.3       | 2.49               | 5.50   | 2.27                 | 5.00   | 2.04      | 4.50   | 2.40   | 5.30    | 2.60           | 5.70  |
| 1 1/2             | 114.3             | 4               | 22.4           | 3/4                   | 108.0             | 101.6                       | 108.0      | 3.63               | 8.00   | 3.10                 | 6.80   | 2.95      | 6.50   | 3.40   | 7.50    | 3.18           | 7.00  |
| 2                 | 127.0             | 8               | 19.1           | 5/8                   | 108.0             | 101.6                       | 108.0      | 4.54               | 10.00  | 3.63                 | 8.00   | 3.63      | 8.00   | 4.40   | 9.70    | 3.90           | 8.60  |
| 2 1/2             | 149.2             | 8               | 22.4           | 3/4                   | 120.7             | 114.3                       | 120.7      | 6.35               | 14.00  | 5.44                 | 12.00  | 4.99      | 11.00  | 6.80   | 15.00   | 5.90           | 13.00 |
| 3                 | 168.3             | 8               | 22.4           | 3/4                   | 127.0             | 120.7                       | 127.0      | 8.16               | 18.00  | 7.26                 | 16.00  | 6.35      | 14.00  | 8.90   | 19.60   | 7.40           | 16.30 |
| 3 1/2             | 184.2             | 8               | 25.4           | 7/8                   | 139.7             | 133.4                       | 139.7      | 11.80              | 26.00  | 9.53                 | 21.00  | 9.08      | 20.00  | 13.17  | 29.00   | -              | -     |
| 4                 | 215.9             | 8               | 25.4           | 7/8                   | 146.1             | 139.7                       | 146.1      | 16.78              | 37.00  | 14.97                | 33.00  | 14.06     | 31.00  | 18.60  | 41.00   | -              | -     |
| 5                 | 266.7             | 8               | 28.4           | 1                     | 165.1             | 158.8                       | 165.1      | 30.87              | 68.00  | 28.50                | 62.80  | 27.50     | 60.60  | 30.84  | 68.00   | -              | -     |
| 6                 | 292.1             | 12              | 28.4           | 1                     | 171.5             | 165.1                       | 171.5      | 36.77              | 80.00  | 36.32                | 80.00  | 35.38     | 78.00  | 38.00  | 83.80   | -              | -     |
| 8                 | 349.2             | 12              | 31.8           | 1 1/8                 | 190.5             | 184.2                       | 196.9      | 50.80              | 112.00 | 44.00                | 97.00  | 50.80     | 112.00 | 62.20  | 137.00  | -              | -     |
| 10                | 431.8             | 16              | 35.1           | 1 1/4                 | 215.9             | 209.6                       | 215.9      | 86.26              | 190.00 | 76.20                | 168.00 | 74.00     | 163.00 | 102.00 | 224.90  | -              | -     |
| 12                | 489.0             | 20              | 35.1           | 1 1/4                 | 222.3             | 215.9                       | 222.3      | 102.51             | 226.00 | 97.52                | 215.00 | 108.86    | 240.00 | 132.00 | 291.00  | -              | -     |
| 14                | 527.0             | 20              | 38.1           | 1 3/8                 | 235.0             | 228.6                       | 235.0      | 121.56             | 268.00 | 102.00               | 224.80 | 111.00    | 244.70 | 158.00 | 348.30  | -              | -     |
| 16                | 603.2             | 20              | 41.1           | 1 1/2                 | 254.0             | 247.7                       | 254.0      | 177.06             | 290.00 | 149.82               | 330.20 | 165.71    | 365.30 | 224.73 | 495.40  | -              | -     |
| 18                | 654.0             | 20              | 44.5           | 1 5/8                 | 273.1             | 266.7                       | 273.1      | 215.65             | 475.40 | 180.10               | 412.30 | 194.00    | 427.70 | 285.00 | 628.30  | -              | -     |
| 20                | 723.9             | 24              | 44.5           | 1 5/8                 | 285.8             | 279.4                       | 292.1      | 267.86             | 590.50 | 231.54               | 510.50 | 258.78    | 570.50 | 365.00 | 804.70  | -              | -     |
| 24                | 838.2             | 24              | 50.8           | 1 7/8                 | 330.2             | 323.9                       | 336.6      | 372.00             | 820.00 | 330.00               | 725.50 | 362.00    | 798.00 | 533.45 | 1176.00 | -              | -     |

- Blind Flanges may be made with the same hub as that used for Slip-on Flanges or without hub.
- The gasket surface and backside (bearing surface for bolting) are made parallel within 1 degree. To accomplish parallelism, spot facing is carried out according to MSS SP-9, without reducing thickness (t).
- Dimensions of sizes 1/2" through 3 1/2" are the same as for Class 400 Flanges.
- Depth of Socket (Y) is covered by ANSI B 16.5 only in sizes through 3 inch, over 3 inch is at the manufacturer's option.

# ANSI FLANGES

## CLASS 900 FLANGES



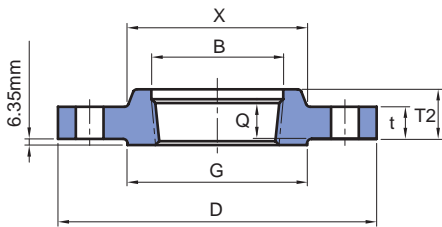
## ANSI B 16.5 Forged Flanges

Unit : mm

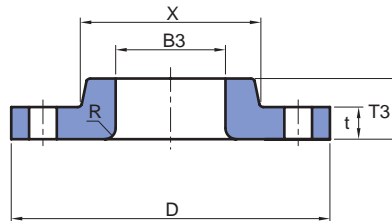
| Nominal Pipe Size | Outside Diam. | Diam. at Base of Hub | O.D of Raised Face | Thickness | BORE  |         |           |                   | LENGTH THRU HUB |                  |           | Diam. of Hub at Bevel | Radius of Fillet | Thread Length |
|-------------------|---------------|----------------------|--------------------|-----------|---|---------|-----------|-------------------|-----------------|------------------|-----------|-----------------------|------------------|---------------|
|                   |               |                      |                    |           | Welding Neck                                  | Slip-on | Lap Joint | Counter Bore Min. | Welding Neck    | Slip-on Threaded | Lap Joint |                       |                  |               |
|                   |               |                      |                    |           | B1  | B2      | B3        | B                 | T1              | T2               | T3        |                       |                  |               |
| 1/2               | 120           | 38.1                 | 35.1               | 22.3      | See Note (1)<br>To be specified by purchaser. | 22.4    | 22.9      | 23.6              | 60.5            | 31.8             | 31.8      | 21.3                  | 3.0              | 22.4          |
| 3/4               | 130           | 44.5                 | 42.9               | 25.4      |   | 27.7    | 28.2      | 29.0              | 69.9            | 35.1             | 35.1      | 26.7                  | 3.0              | 25.4          |
| 1                 | 150           | 52.3                 | 50.8               | 28.6      |   | 34.5    | 35.1      | 35.8              | 73.2            | 41.1             | 41.1      | 33.5                  | 3.0              | 28.4          |
| 1 1/4             | 160           | 63.5                 | 63.5               | 28.6      |   | 43.2    | 43.7      | 44.5              | 73.2            | 41.1             | 41.1      | 42.2                  | 4.8              | 30.2          |
| 1 1/2             | 180           | 69.9                 | 73.2               | 31.8      |   | 49.5    | 50.0      | 50.5              | 82.6            | 44.5             | 44.5      | 48.3                  | 6.4              | 31.8          |
| 2                 | 215           | 104.6                | 91.9               | 38.1      |   | 62.0    | 62.5      | 63.5              | 101.6           | 57.2             | 57.2      | 60.5                  | 7.9              | 38.1          |
| 2 1/2             | 245           | 124.0                | 104.6              | 41.3      |   | 74.7    | 75.4      | 76.2              | 104.6           | 63.5             | 63.5      | 73.2                  | 7.9              | 47.8          |
| 3                 | 240           | 127.0                | 127.0              | 38.1      |   | 90.7    | 91.4      | 92.2              | 101.6           | 53.8             | 53.8      | 88.9                  | 9.7              | 41.1          |
| 4                 | 290           | 158.8                | 157.2              | 44.5      |   | 116.1   | 116.8     | 117.6             | 114.3           | 69.9             | 69.9      | 114.3                 | 11.2             | 47.8          |
| 5                 | 350           | 190.5                | 185.7              | 50.8      |   | 143.8   | 144.5     | 144.5             | 127.0           | 79.2             | 79.2      | 141.2                 | 11.2             | 53.8          |
| 6                 | 380           | 235.0                | 215.9              | 55.6      |   | 170.7   | 171.5     | 171.5             | 139.7           | 85.9             | 85.9      | 168.4                 | 12.7             | 57.2          |
| 8                 | 470           | 298.5                | 269.7              | 63.5      |   | 221.5   | 222.3     | 222.3             | 162.1           | 101.6            | 114.3     | 219.2                 | 12.7             | 63.5          |
| 10                | 545           | 368.3                | 323.9              | 69.9      |   | 276.4   | 277.4     | 276.4             | 184.2           | 108.0            | 127.0     | 273.1                 | 12.7             | 71.4          |
| 12                | 610           | 419.1                | 381.0              | 79.4      |   | 327.2   | 328.2     | 328.7             | 200.2           | 117.3            | 142.7     | 323.9                 | 12.7             | 76.2          |
| 14                | 640           | 450.9                | 412.8              | 85.8      |   | 359.2   | 360.2     | 360.4             | 212.9           | 130.0            | 155.4     | 355.6                 | 12.7             | 82.6          |
| 16                | 705           | 508.0                | 469.9              | 88.9      |   | 410.5   | 411.2     | 411.2             | 215.9           | 133.4            | 165.1     | 406.4                 | 12.7             | 85.9          |
| 18                | 785           | 565.2                | 533.4              | 101.6     | 461.8   | 462.3   | 462.0     | 228.6             | 152.4           | 190.5            | 457.2     | 12.7                  | 88.9             |               |
| 20                | 855           | 622.3                | 584.2              | 108.0     | 513.1   | 514.4   | 512.8     | 247.7             | 158.8           | 209.6            | 508.0     | 12.7                  | 91.9             |               |
| 24                | 1040          | 749.3                | 692.2              | 139.7     | 616.0   | 616.0   | 614.4     | 292.1             | 203.2           | 266.7            | 609.6     | 12.7                  | 101.6            |               |

NOTE :

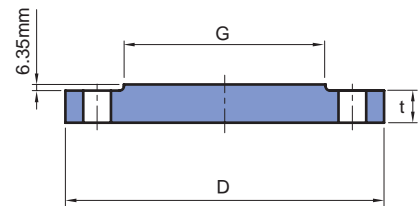
1. For the 'Bore' (B1) other Standard Wall Thickness, refer to page 46,47
2. Class 900 flanges except Lap Joint will be furnished with 0.25" (6.35mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub' (T1), (T2).
3. For Slip-on, Threaded, Socket Welding and Lap Joint Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.



**THREADED**



**LAP JOINT**



**BLIND**

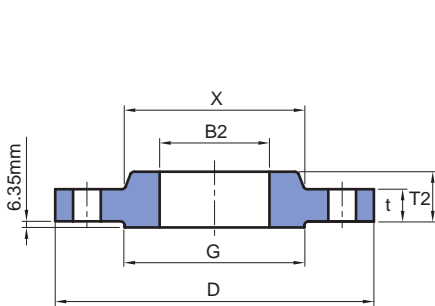
Unit : mm

| Nominal Pipe Size | DRILLING          |                 |                | BOLTING               |                   |                               |            | APPROXIMATE WEIGHT |         |                      |         |           |         |        |         |
|-------------------|-------------------|-----------------|----------------|-----------------------|-------------------|-------------------------------|------------|--------------------|---------|----------------------|---------|-----------|---------|--------|---------|
|                   | Bolt Circle Diam. | Number of Holes | Diam. of Holes | Diam. of Bolts (inch) | STUD BOLT LENGTH  |                               |            | Welding Neck       |         | Slip-on and Threaded |         | Lap Joint |         | Blind  |         |
|                   |                   |                 |                |                       | 0.25" Raised Face | Male - Female Tongue - Groove | Ring Joint | Kg                 | lb      | Kg                   | lb      | Kg        | lb      | Kg     | lb      |
| 1/2               | 82.6              | 4               | 22.4           | 3/4                   | 108.0             | 101.6                         | 108.0      | 2.10               | 4.60    | 1.81                 | 4.00    | 1.81      | 4.00    | 1.90   | 4.20    |
| 3/4               | 88.9              | 4               | 22.4           | 3/4                   | 114.3             | 108.0                         | 114.3      | 2.72               | 6.00    | 2.40                 | 5.30    | 2.30      | 5.00    | 2.70   | 6.00    |
| 1                 | 101.6             | 4               | 25.4           | 7/8                   | 127.0             | 120.7                         | 127.0      | 3.86               | 8.50    | 3.41                 | 7.50    | 3.40      | 7.50    | 4.09   | 9.00    |
| 1 1/4             | 111.1             | 4               | 25.4           | 7/8                   | 127.0             | 120.7                         | 127.0      | 4.54               | 10.00   | 4.10                 | 9.00    | 4.09      | 9.00    | 4.54   | 10.00   |
| 1 1/2             | 123.8             | 4               | 28.4           | 1                     | 139.7             | 133.4                         | 139.7      | 5.90               | 13.00   | 5.45                 | 12.00   | 5.40      | 11.90   | 5.90   | 13.00   |
| 2                 | 165.1             | 8               | 25.4           | 7/8                   | 146.1             | 139.7                         | 146.1      | 10.89              | 24.00   | 9.98                 | 22.00   | 9.53      | 21.00   | 11.34  | 25.00   |
| 2 1/2             | 190.5             | 8               | 28.4           | 1                     | 158.8             | 152.4                         | 158.8      | 16.33              | 36.00   | 15.80                | 34.80   | 13.15     | 29.00   | 16.00  | 35.30   |
| 3                 | 190.5             | 8               | 25.4           | 7/8                   | 146.1             | 139.7                         | 146.1      | 15.00              | 33.00   | 11.80                | 26.00   | 11.34     | 25.00   | 13.17  | 29.00   |
| 4                 | 235.0             | 8               | 31.8           | 1 1/8                 | 171.5             | 165.1                         | 171.5      | 23.13              | 51.00   | 23.20                | 51.00   | 22.60     | 48.50   | 24.50  | 54.00   |
| 5                 | 279.4             | 8               | 35.1           | 1 1/4                 | 190.5             | 184.2                         | 190.5      | 38.50              | 84.90   | 37.65                | 83.00   | 36.74     | 81.00   | 39.46  | 87.00   |
| 6                 | 317.5             | 12              | 31.8           | 1 1/8                 | 190.5             | 184.2                         | 196.9      | 49.89              | 110.00  | 48.30                | 106.50  | 47.50     | 104.70  | 51.50  | 113.50  |
| 8                 | 393.7             | 12              | 38.1           | 1 3/8                 | 222.3             | 215.9                         | 222.3      | 79.45              | 175.00  | 75.00                | 166.30  | 86.00     | 189.60  | 89.00  | 106.20  |
| 10                | 469.9             | 16              | 38.1           | 1 3/8                 | 235.0             | 228.6                         | 235.0      | 118.04             | 260.00  | 111.13               | 245.00  | 125.64    | 277.00  | 131.54 | 290.00  |
| 12                | 533.4             | 20              | 38.1           | 1 3/8                 | 254.0             | 247.7                         | 254.0      | 157.00             | 346.00  | 146.00               | 321.80  | 167.00    | 368.00  | 187.00 | 412.30  |
| 14                | 558.8             | 20              | 41.1           | 1 1/2                 | 273.1             | 266.7                         | 279.4      | 181.60             | 400.40  | 172.36               | 380.00  | 180.07    | 397.00  | 224.07 | 494.00  |
| 16                | 616.0             | 20              | 44.5           | 1 5/8                 | 285.8             | 279.4                         | 292.1      | 224.73             | 495.50  | 192.95               | 425.40  | 211.11    | 465.40  | 272.40 | 600.50  |
| 18                | 685.8             | 20              | 50.8           | 1 7/8                 | 323.9             | 317.5                         | 336.6      | 308.72             | 680.60  | 272.40               | 600.50  | 295.10    | 650.60  | 385.90 | 850.80  |
| 20                | 749.3             | 20              | 53.8           | 2                     | 349.3             | 342.9                         | 362.0      | 376.82             | 830.70  | 331.42               | 730.60  | 367.74    | 810.70  | 488.00 | 1076.00 |
| 24                | 901.7             | 20              | 66.5           | 2 1/2                 | 438.2             | 431.8                         | 457.2      | 685.00             | 1510.00 | 632.00               | 1393.30 | 700.00    | 1543.00 | 905.00 | 1995.00 |

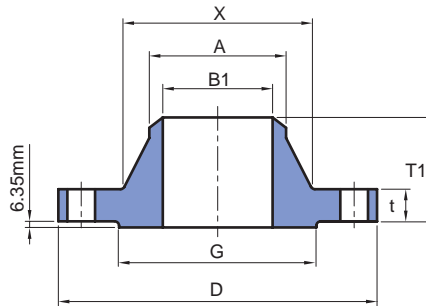
4. Blind Flanges may be made with the same hub as that used for Slip-on Flanges or without hub.
5. The gasket surface and backside (bearing surface for bolting) are made parallel within 1 degree. To accomplish parallelism, spot facing is carried out according to MSS SP-9, without reducing thickness (t).
6. Dimensions of size 1/2" through 2 1/2" are the same as for Class 1500 Flanges.

# ANSI FLANGES

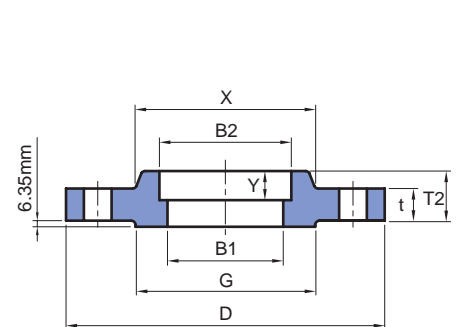
## CLASS 1500 FLANGES



SLIP-ON



WELDING NECK



SOCKET WELDING

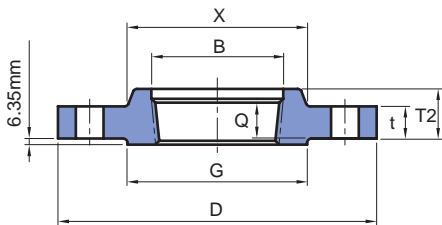
## ANSI B 16.5 Forged Flanges

Unit : mm

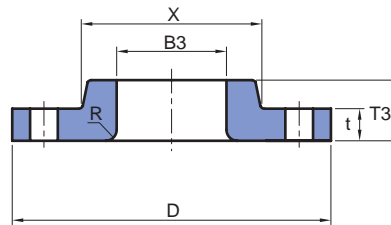
| Nominal Pipe Size | Outside Diam. | Diam. at Base of Hub | O.D of Raised Face | Thickness | BORE  |                        |           |                   | LENGTH THRU HUB |                                 |           | Diam. of Hub at Bevel | Radius of Fillet | Thread Length | Depth of Socket |
|-------------------|---------------|----------------------|--------------------|-----------|---|------------------------|-----------|-------------------|-----------------|---------------------------------|-----------|-----------------------|------------------|---------------|-----------------|
|                   |               |                      |                    |           | Welding Neck Socket Welding                   | Slip-on Socket Welding | Lap Joint | Counter Bore Min. | Welding Neck    | Slip-on Threaded Socket Welding | Lap Joint |                       |                  |               |                 |
|                   |               |                      |                    |           | B1  | B2                     | B3        | B                 | T1              | T2                              | T3        |                       |                  |               |                 |
| 1/2               | 120           | 38.1                 | 35.1               | 22.3      | See Note (1)<br>To be specified by purchaser. | 22.4                   | 22.9      | 23.6              | 60.5            | 31.8                            | 31.8      | 21.3                  | 3.0              | 22.4          | 9.7             |
| 3/4               | 130           | 44.5                 | 42.9               | 25.4      |   | 27.7                   | 28.2      | 29.0              | 69.9            | 35.1                            | 35.1      | 26.7                  | 3.0              | 25.4          | 11.2            |
| 1                 | 150           | 52.3                 | 50.8               | 28.6      |   | 34.5                   | 35.1      | 35.8              | 73.2            | 41.1                            | 41.1      | 33.5                  | 3.0              | 28.4          | 12.7            |
| 1 1/4             | 160           | 63.5                 | 63.5               | 28.6      |   | 43.2                   | 43.7      | 44.5              | 73.2            | 41.1                            | 41.1      | 42.2                  | 4.8              | 30.2          | 14.2            |
| 1 1/2             | 180           | 69.9                 | 73.2               | 31.8      |   | 49.5                   | 50.0      | 50.5              | 82.6            | 44.5                            | 44.5      | 48.3                  | 6.4              | 31.8          | 15.7            |
| 2                 | 215           | 104.6                | 91.9               | 38.1      |   | 62.0                   | 62.5      | 63.5              | 101.6           | 57.2                            | 57.2      | 60.5                  | 7.9              | 38.1          | 17.5            |
| 2 1/2             | 245           | 124.0                | 104.6              | 41.3      |   | 74.7                   | 75.4      | 76.2              | 104.6           | 63.5                            | 63.5      | 73.2                  | 7.9              | 47.8          | 19.1            |
| 3                 | 265           | 133.4                | 127.0              | 47.7      |   | 90.7                   | 91.4      | 92.2              | 117.3           | 73.2                            | 73.2      | 88.9                  | 9.7              | 50.8          | 20.6            |
| 4                 | 310           | 162.1                | 157.2              | 54.0      |   | 116.1                  | 116.8     | 117.6             | 124.0           | 90.4                            | 90.4      | 114.3                 | 11.2             | 57.2          | 23.9            |
| 5                 | 375           | 196.9                | 185.7              | 73.1      |   | 143.8                  | 144.5     | 144.5             | 155.4           | 104.6                           | 104.6     | 141.2                 | 11.2             | 63.5          | 23.9            |
| 6                 | 395           | 228.6                | 215.9              | 82.6      |   | 170.7                  | 171.5     | 171.5             | 171.5           | 119.1                           | 119.1     | 168.4                 | 12.7             | 69.9          | 26.9            |
| 8                 | 485           | 292.1                | 269.7              | 92.1      |   | 221.5                  | 222.3     | 222.3             | 212.9           | 142.7                           | 142.7     | 219.2                 | 12.7             | 76.2          | 31.8            |
| 10                | 585           | 368.3                | 323.9              | 108.0     |   | 276.4                  | 277.4     | 276.4             | 254.0           | 158.8                           | 177.8     | 273.1                 | 12.7             | 84.1          | 33.3            |
| 12                | 675           | 450.9                | 381.0              | 123.9     |   | 327.1                  | 328.2     | 328.7             | 282.4           | 180.8                           | 218.9     | 323.9                 | 12.7             | 91.9          | 39.6            |
| 14                | 750           | 495.3                | 412.8              | 133.4     |   | 359.2                  | 360.2     | 360.4             | 298.5           | -                               | 241.3     | 355.6                 | 12.7             | -             | 41.4            |
| 16                | 825           | 552.5                | 469.9              | 146.1     |   | 410.5                  | 411.2     | 411.2             | 311.2           | -                               | 260.4     | 406.4                 | 12.7             | -             | 44.5            |
| 18                | 915           | 596.9                | 533.4              | 162.0     |   | 461.8                  | 462.3     | 462.0             | 327.2           | -                               | 276.4     | 457.2                 | 12.7             | -             | 49.3            |
| 20                | 985           | 641.4                | 584.2              | 177.8     |   | 513.1                  | 514.4     | 512.8             | 355.6           | -                               | 292.1     | 508.0                 | 12.7             | -             | 54.1            |
| 24                | 1170          | 762.0                | 692.2              | 203.2     |   | 616.0                  | 616.0     | 614.4             | 406.4           | -                               | 330.2     | 609.6                 | 12.7             | -             | 63.5            |

NOTE :

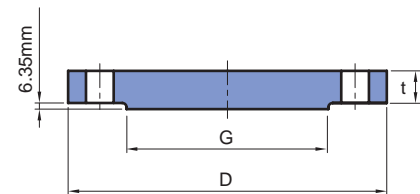
- For the 'Bore' (B1) other Standard Wall Thickness, refer to page 46,47
- Class 1500 flanges except Lap Joint will be furnished with 0.25" (6.35mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub' (T1), (T2).
- For Slip-on, Threaded, Socket Welding and Lap Joint Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.



THREADED



LAP JOINT



BLIND

Unit : mm

| Nominal Pipe Size | DRILLING          |                 |                | BOLTING               |                   |                               |            | APPROXIMATE WEIGHT |         |                      |        |           |         |         |         |                |       |
|-------------------|-------------------|-----------------|----------------|-----------------------|-------------------|-------------------------------|------------|--------------------|---------|----------------------|--------|-----------|---------|---------|---------|----------------|-------|
|                   | Bolt Circle Diam. | Number of Holes | Diam. of Holes | Diam. of Bolts (inch) | STUD BOLT LENGTH  |                               |            | Welding Neck       |         | Slip-on and Threaded |        | Lap Joint |         | Blind   |         | Socket Welding |       |
|                   |                   |                 |                |                       | 0.25" Raised Face | Male - Female Tongue - Groove | Ring Joint | Kg                 | lb      | Kg                   | lb     | Kg        | lb      | Kg      | lb      | Kg             | lb    |
| 1/2               | 82.6              | 4               | 22.4           | 3/4                   | 108.0             | 101.6                         | 108.0      | 2.10               | 4.60    | 1.80                 | 4.00   | 1.80      | 4.00    | 1.90    | 4.00    | 1.81           | 4.00  |
| 3/4               | 88.9              | 4               | 22.4           | 3/4                   | 114.3             | 108.0                         | 114.3      | 2.72               | 6.00    | 2.27                 | 5.00   | 2.27      | 5.00    | 2.72    | 6.00    | 2.81           | 6.20  |
| 1                 | 101.6             | 4               | 25.4           | 7/8                   | 127.0             | 120.7                         | 127.0      | 3.86               | 8.50    | 3.40                 | 7.50   | 3.40      | 7.50    | 4.08    | 9.00    | 3.61           | 8.00  |
| 1 1/4             | 111.1             | 4               | 25.4           | 7/8                   | 127.0             | 120.7                         | 127.0      | 4.54               | 10.00   | 4.10                 | 9.00   | 4.09      | 10.80   | 4.30    | 9.50    | 4.99           | 11.00 |
| 1 1/2             | 123.8             | 4               | 28.4           | 1                     | 139.7             | 133.4                         | 139.7      | 5.90               | 13.00   | 5.45                 | 12.00  | 5.40      | 11.90   | 5.90    | 13.00   | 6.76           | 14.90 |
| 2                 | 165.1             | 8               | 25.4           | 7/8                   | 146.1             | 139.7                         | 146.1      | 10.89              | 24.00   | 10.50                | 23.00  | 9.53      | 21.00   | 11.30   | 25.00   | 10.89          | 24.00 |
| 2 1/2             | 190.5             | 8               | 28.4           | 1                     | 158.8             | 152.4                         | 158.8      | 16.34              | 36.00   | 15.80                | 34.80  | 13.15     | 29.00   | 16.00   | 35.30   | 16.34          | 36.00 |
| 3                 | 203.2             | 8               | 31.8           | 1 1/8                 | 177.8             | 171.5                         | 177.8      | 21.79              | 48.00   | 21.77                | 48.00  | 17.24     | 38.00   | 21.79   | 48.00   | -              | -     |
| 4                 | 241.3             | 8               | 35.1           | 1 1/4                 | 196.9             | 190.5                         | 196.9      | 31.30              | 69.00   | 31.00                | 68.40  | 29.00     | 63.90   | 33.11   | 73.00   | -              | -     |
| 5                 | 292.1             | 8               | 41.1           | 1 1/2                 | 247.7             | 241.3                         | 247.7      | 59.02              | 130.00  | 58.80                | 129.60 | 54.00     | 119.00  | 60.00   | 132.30  | -              | -     |
| 6                 | 317.5             | 12              | 38.1           | 1 3/8                 | 260.4             | 254.0                         | 266.7      | 74.91              | 165.00  | 74.00                | 163.00 | 62.00     | 136.70  | 75.00   | 165.30  | -              | -     |
| 8                 | 393.7             | 12              | 44.5           | 1 5/8                 | 292.1             | 285.8                         | 323.9      | 123.83             | 273.00  | 117.73               | 258.00 | 129.73    | 236.00  | 136.98  | 302.00  | -              | -     |
| 10                | 482.6             | 12              | 50.8           | 1 7/8                 | 336.6             | 330.2                         | 342.9      | 205.93             | 454.00  | 197.49               | 435.40 | 220.19    | 485.40  | 229.97  | 507.00  | -              | -     |
| 12                | 571.5             | 16              | 53.8           | 2                     | 374.7             | 368.3                         | 387.4      | 306.00             | 674.60  | 264.00               | 582.00 | 286.02    | 630.60  | 316.00  | 696.70  | -              | -     |
| 14                | 635.0             | 16              | 60.5           | 2 1/4                 | 406.4             | 400.1                         | 425.5      | 416.00             | 917.00  | -                    | -      | 404.06    | 890.80  | 421.00  | 928.00  | -              | -     |
| 16                | 704.8             | 16              | 66.5           | 2 1/2                 | 444.5             | 438.2                         | 469.9      | 567.50             | 1250.00 | -                    | -      | 522.10    | 1151.00 | 559.00  | 1232.70 | -              | -     |
| 18                | 774.7             | 16              | 73.2           | 2 3/4                 | 495.3             | 489.0                         | 527.1      | 736.00             | 1622.60 | -                    | -      | 669.65    | 1476.30 | 761.00  | 1677.70 | -              | -     |
| 20                | 831.8             | 16              | 79.2           | 3                     | 539.8             | 533.4                         | 565.2      | 929.00             | 2048.00 | -                    | -      | 805.85    | 1776.60 | 967.00  | 2131.80 | -              | -     |
| 24                | 990.6             | 16              | 91.9           | 3 1/2                 | 616.0             | 609.6                         | 647.7      | 1504.00            | 3315.70 | -                    | -      | 1285.55   | 2834.00 | 1568.00 | 3456.80 | -              | -     |

4. Blind Flanges may be made with the same hub as that used for Slip-on Flanges or without hub.

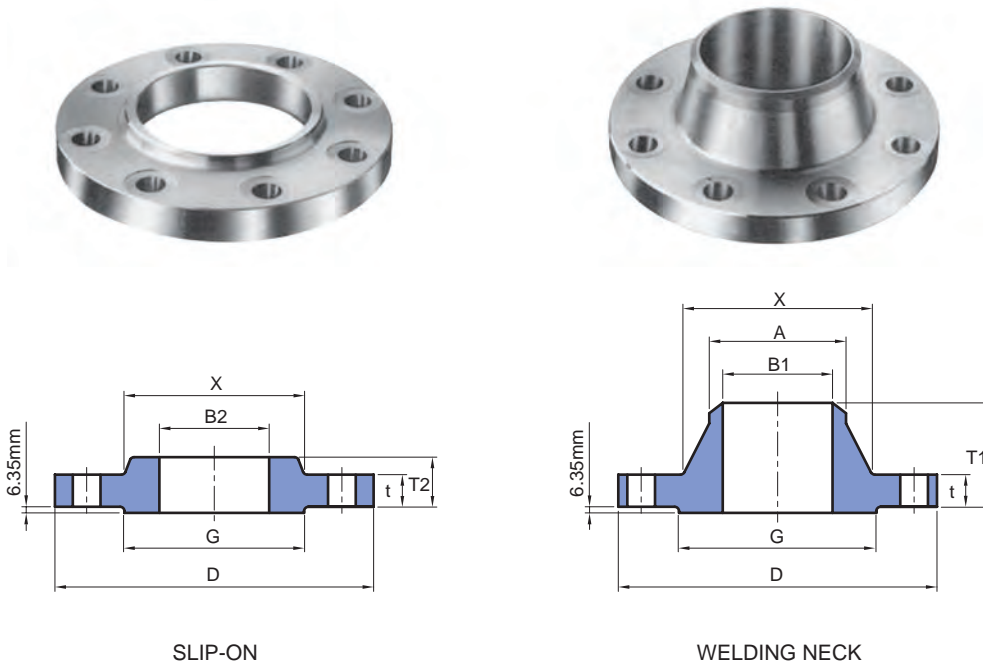
5. The gasket surface and backside (bearing surface for bolting) are made parallel within 1 degree. To accomplish parallelism, spot facing is carried out according to MSS SP-9, without reducing thickness (t).

6 Dimensions of sizes 1/2" through 2 1/2" are the same as for Class 900 Flanges.

7. Depth of Socket (Y) is covered by ANSI B 16.5 only in sizes through 2 1/2 inch, over 2 1/2 inch is at the manufacturer's option.

# ANSI FLANGES

## CLASS 2500 FLANGES



SLIP-ON

WELDING NECK

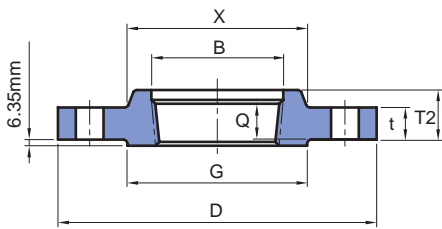
## ANSI B 16.5 Forged Flanges

Unit : mm

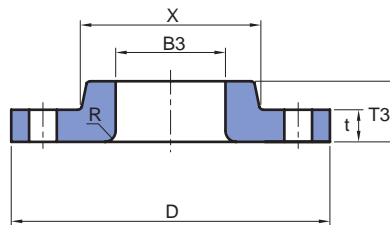
| Nominal Pipe Size | Outside Diam. | Diam. at Base of Hub | O.D of Raised Face | Thickness | Welding Neck                  | BORE    |           |                   |              | LENGTH THRU HUB  |           |       | Diam. of Hub at Bevel | Radius of Fillet | Thread Length |
|-------------------|---------------|----------------------|--------------------|-----------|-------------------------------|---------|-----------|-------------------|--------------|------------------|-----------|-------|-----------------------|------------------|---------------|
|                   |               |                      |                    |           |                               | Slip-on | Lap Joint | Counter Bore Min. | Welding Neck | Slip-on Threaded | Lap Joint |       |                       |                  |               |
|                   | D             | X                    | G                  | t         | B1                            | B2      | B3        | B                 | T1           | T2               | T3        | A     | R                     | Q                |               |
| 1/2               | 135           | 42.9                 | 35.1               | 30.2      | To be specified by purchaser. | 22.4    | 22.9      | 23.6              | 73.2         | 39.6             | 39.6      | 21.3  | 3.0                   | 28.4             |               |
| 3/4               | 140           | 50.8                 | 42.9               | 31.8      |                               | 27.7    | 28.2      | 29.0              | 79.2         | 42.9             | 42.9      | 26.7  | 3.0                   | 31.8             |               |
| 1                 | 160           | 57.2                 | 50.8               | 35.0      |                               | 34.5    | 35.1      | 35.8              | 88.9         | 47.8             | 47.8      | 33.5  | 3.0                   | 35.1             |               |
| 1 1/4             | 185           | 73.2                 | 63.5               | 38.1      |                               | 43.2    | 43.7      | 44.5              | 95.3         | 52.3             | 52.3      | 42.2  | 4.8                   | 38.1             |               |
| 1 1/2             | 205           | 79.2                 | 73.2               | 44.5      |                               | 49.5    | 50.0      | 50.5              | 111.3        | 60.5             | 60.5      | 48.3  | 6.4                   | 44.5             |               |
| 2                 | 235           | 95.3                 | 91.9               | 50.9      |                               | 62.0    | 62.5      | 63.5              | 127.0        | 69.9             | 69.9      | 60.5  | 7.9                   | 50.8             |               |
| 2 1/2             | 265           | 114.3                | 104.6              | 57.2      |                               | 74.7    | 75.4      | 76.2              | 142.7        | 79.2             | 79.2      | 73.2  | 7.9                   | 57.2             |               |
| 3                 | 305           | 133.4                | 127.0              | 66.7      |                               | 90.7    | 91.4      | 92.2              | 168.1        | 91.9             | 91.9      | 88.9  | 9.7                   | 63.5             |               |
| 4                 | 355           | 165.1                | 157.2              | 76.2      |                               | 116.1   | 116.8     | 117.6             | 190.5        | 108.0            | 108.0     | 114.3 | 11.2                  | 69.9             |               |
| 5                 | 420           | 203.2                | 185.7              | 92.1      |                               | 143.8   | 144.5     | 144.5             | 228.6        | 130.0            | 130.0     | 141.2 | 11.2                  | 76.2             |               |
| 6                 | 485           | 235.0                | 215.9              | 108.0     |                               | 170.7   | 171.5     | 171.5             | 273.1        | 152.4            | 152.4     | 168.4 | 12.7                  | 82.6             |               |
| 8                 | 550           | 304.8                | 269.7              | 127.0     |                               | 221.5   | 222.3     | 222.3             | 317.5        | 177.8            | 177.8     | 219.2 | 12.7                  | 95.3             |               |
| 10                | 675           | 374.7                | 323.9              | 165.1     | 276.4                         | 277.4   | 276.4     | 419.1             | 228.6        | 228.6            | 273.1     | 12.7  | 108.0                 |                  |               |
| 12                | 760           | 441.5                | 381.0              | 184.2     | 327.2                         | 328.2   | 328.7     | 463.6             | 254.0        | 254.0            | 323.9     | 12.7  | 120.7                 |                  |               |

NOTE :

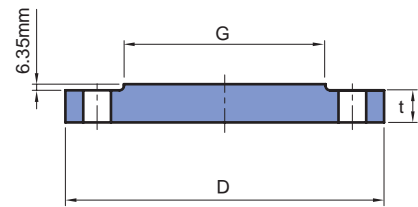
1. For the 'Bore' (B1) other Standard Wall Thickness, refer to page 46,47
2. Class 2500 flanges except Lap Joint will be furnished with 0.25" (6.35mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub' (T1), (T2).
3. For Slip-on, Threaded, Socket Welding and Lap Joint Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.



THREADED



LAP JOINT

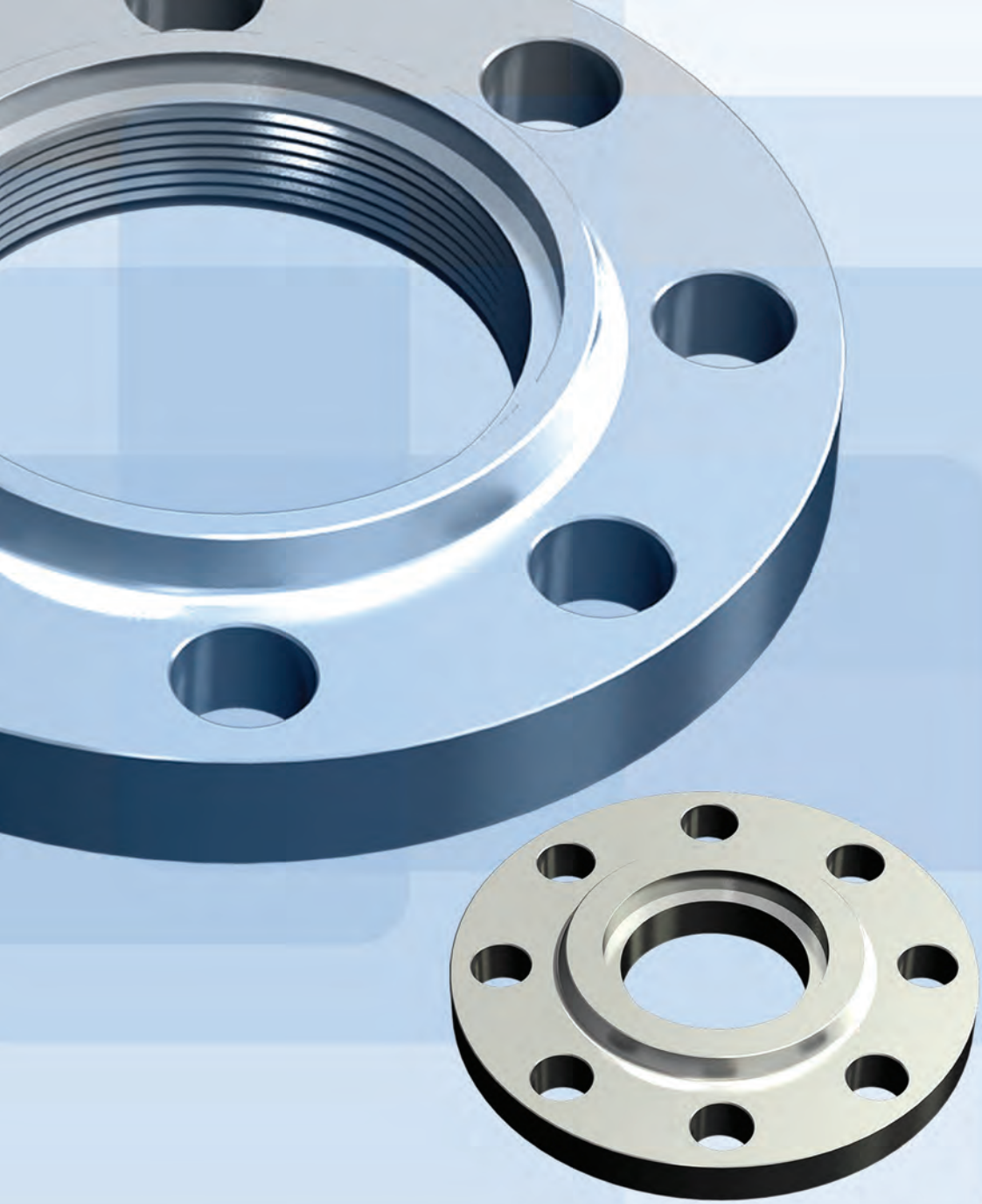


BLIND

Unit : mm

| Nominal Pipe Size | DRILLING          |                 |                | BOLTING               |                   |                               |            | APPROXIMATE WEIGHT |         |                      |         |           |         |        |         |
|-------------------|-------------------|-----------------|----------------|-----------------------|-------------------|-------------------------------|------------|--------------------|---------|----------------------|---------|-----------|---------|--------|---------|
|                   | Bolt Circle Diam. | Number of Holes | Diam. of Holes | Diam. of Bolts (inch) | STUD BOLT LENGTH  |                               |            | Welding Neck       |         | Slip-on and Threaded |         | Lap Joint |         | Blind  |         |
|                   |                   |                 |                |                       | 0.25" Raised Face | Male - Female Tongue - Groove | Ring Joint | Kg                 | lb      | Kg                   | lb      | Kg        | lb      | Kg     | lb      |
| 1/2               | 88.9              | 4               | 22.4           | 3/4                   | 120.7             | 114.3                         | 120.7      | 3.18               | 7.00    | 3.18                 | 7.00    | 3.00      | 6.60    | 3.18   | 7.00    |
| 3/4               | 95.2              | 4               | 22.4           | 3/4                   | 127.0             | 120.7                         | 127.0      | 4.08               | 9.00    | 4.08                 | 9.00    | 3.63      | 8.00    | 4.54   | 10.00   |
| 1                 | 108.0             | 4               | 25.4           | 7/8                   | 139.7             | 133.4                         | 139.7      | 5.45               | 12.00   | 5.44                 | 12.00   | 4.99      | 11.00   | 5.44   | 12.00   |
| 1 1/4             | 130.2             | 4               | 28.4           | 1                     | 152.4             | 146.1                         | 152.4      | 9.07               | 20.00   | 8.16                 | 18.00   | 7.26      | 16.00   | 8.16   | 18.00   |
| 1 1/2             | 146.0             | 4               | 31.8           | 1 1/8                 | 171.5             | 165.1                         | 171.5      | 11.35              | 25.00   | 11.00                | 24.30   | 9.99      | 22.00   | 10.44  | 23.00   |
| 2                 | 171.4             | 8               | 28.4           | 1                     | 177.8             | 171.5                         | 177.8      | 19.07              | 42.00   | 17.25                | 38.00   | 16.80     | 37.00   | 17.71  | 39.00   |
| 2 1/2             | 196.8             | 8               | 31.8           | 1 1/8                 | 196.9             | 190.5                         | 203.2      | 23.61              | 52.00   | 24.97                | 55.00   | 24.06     | 53.00   | 25.42  | 56.00   |
| 3                 | 228.6             | 8               | 35.1           | 1 1/4                 | 222.3             | 215.9                         | 228.6      | 42.68              | 94.00   | 37.68                | 83.00   | 36.32     | 80.00   | 39.04  | 86.00   |
| 4                 | 273.0             | 8               | 41.1           | 1 1/2                 | 254.0             | 247.7                         | 260.4      | 64.00              | 141.00  | 58.00                | 127.90  | 54.48     | 120.00  | 60.38  | 133.00  |
| 5                 | 323.8             | 8               | 47.8           | 1 3/4                 | 298.5             | 292.1                         | 311.2      | 110.68             | 244.00  | 95.25                | 210.00  | 92.53     | 204.00  | 101.15 | 223.00  |
| 6                 | 368.3             | 8               | 53.8           | 2                     | 342.9             | 336.6                         | 355.6      | 176.46             | 378.00  | 146.51               | 323.00  | 143.01    | 315.30  | 156.63 | 345.30  |
| 8                 | 438.2             | 12              | 53.8           | 2                     | 381.0             | 374.7                         | 393.7      | 261.27             | 576.00  | 219.99               | 485.00  | 213.38    | 470.40  | 240.62 | 530.50  |
| 10                | 539.8             | 12              | 66.5           | 2 1/2                 | 489.0             | 482.6                         | 508.0      | 484.43             | 1068.00 | 419.57               | 925.00  | 408.60    | 900.80  | 465.36 | 1026.00 |
| 12                | 619.1             | 12              | 73.2           | 2 3/4                 | 539.8             | 533.4                         | 558.8      | 692.35             | 1526.30 | 590.20               | 1301.00 | 572.95    | 1263.00 | 664.06 | 1464.00 |

4. Blind Flanges may be made with the same hub as that used for Slip-on Flanges or without hub.
5. The gasket surface and backside (bearing surface for bolting) are made parallel within 1 degree. To accomplish parallelism, spot facing is carried out according to MSS SP-9, without reducing thickness (t).
7. Class 2500 Slip-on Flanges are not covered by ANSI B16.5, slip-on flanges are at the manufacture's option.



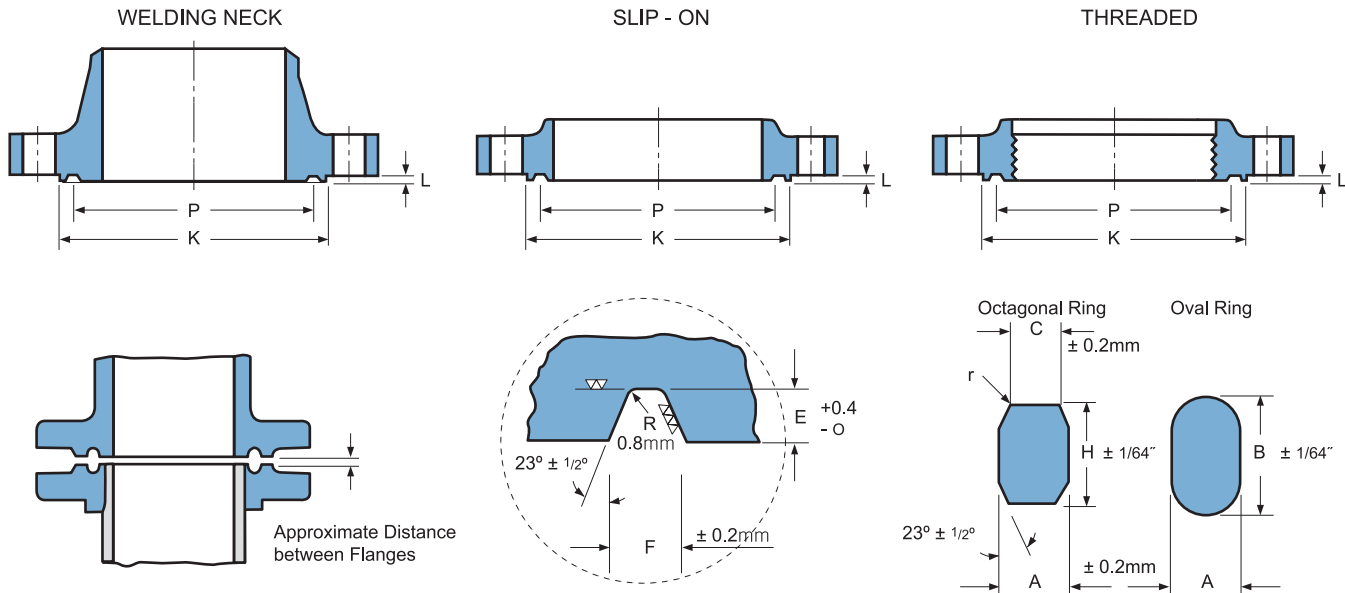
 **SUPERLOK<sup>®</sup>**

# RING JOINT FLANGES

- Class 150 Flanges
- Class 300 / 400 / 600 Flanges
- Class 900 Flanges
- Class 1500 Flanges
- Class 2500 Flanges

# CLASS 150 FLANGES

## Ring Joint Flanges Facing Dimensions



## ANSI B 16.5 Forged Flanges

Unit : mm

| Nominal Pipe Size | Pitch Diam. of Ring and Groove | Width of Ring | HEIGHT OF RING |           | Width of Flat on Octagonal Rings | Width of Groove | Depth of Groove | Diameter of Raised Face for Ring Joint or Lapped | Ring Number | Approximate Distance Between Flange of Ring Joints When Ring is Compressed |
|-------------------|--------------------------------|---------------|----------------|-----------|----------------------------------|-----------------|-----------------|--|-------------|--|
|                   |                                |               | Oval           | Octagonal |                                  |                 |                 |  |             |  |
|                   | P                              | A             | B              | H         | C                                | F               | E(L*)           | K(Min)   |             |  |
| 1                 | 47.6                           | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 63.5   | R15         | 4.1  |
| 1 1/4             | 57.2                           | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 73.2   | R17         | 4.1  |
| 1 1/2             | 65.1                           | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 82.6   | R19         | 4.1  |
| 2                 | 82.6                           | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 101.6  | R22         | 4.1  |
| 2 1/2             | 101.6                          | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 120.7  | R25         | 4.1  |
| 3                 | 114.3                          | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 133.4  | R29         | 4.1  |
| 3 1/2             | 131.8                          | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 153.9  | R33         | 4.1  |
| 4                 | 149.2                          | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 171.5  | R36         | 4.1  |
| 5                 | 171.5                          | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 193.5  | R40         | 4.1  |
| 6                 | 193.7                          | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 218.9  | R43         | 4.1  |
| 8                 | 247.7                          | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 273.1  | R48         | 4.1  |
| 10                | 304.8                          | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 330.2  | R52         | 4.1  |
| 12                | 381.0                          | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 406.4  | R56         | 4.1  |
| 14                | 396.9                          | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 425.5  | R59         | 3.0  |
| 16                | 454.0                          | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 482.6  | R64         | 3.0  |
| 18                | 517.5                          | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 546.1  | R68         | 3.0  |
| 20                | 558.8                          | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 596.9  | R72         | 3.0  |
| 24                | 673.1                          | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 711.2  | R76         | 3.0  |

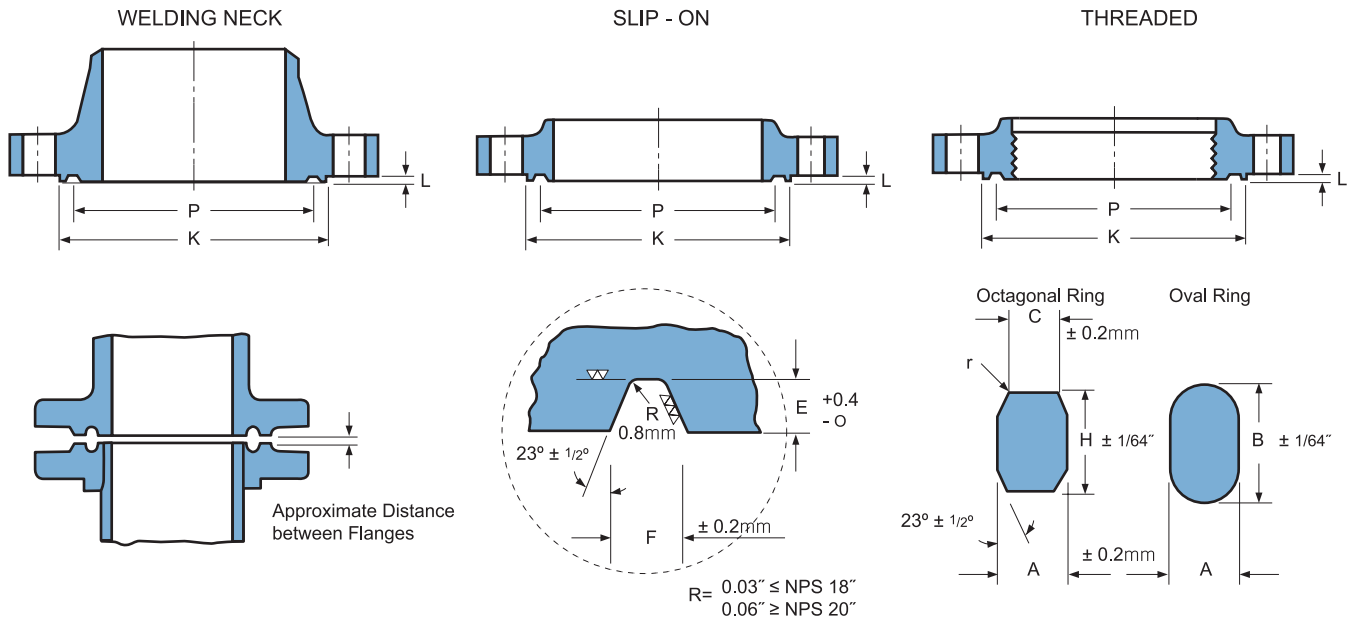
NOTE :

1. Unless other wise specified by the customer, Ring Type Joint Flanges will be furnished in accordance with these details.
2. The depth of groove is added to the minimum flange thickness.  
 \* Raised face " L " is equal to groove dimension " E " but is not subject to tolerances for " E "  
 \* A plus tolerance of 3/64 in, for heights B and H is permitted providing the variation in the height of any given ring does not exceed 1/64 in, throughout its entire circumference.
3. Dimension " R " is max.
4. Radius " r " is 1/16" for ring widths 7/8" and less and 3/32" for ring widths 1"(25.4mm) and over.

# RING JOINT FLANGES

## CLASS 300 / 400 / 600 FLANGES

### Ring Joint Flanges Facing Dimensions



## ANSI B 16.5 Forged Flanges

Unit : mm

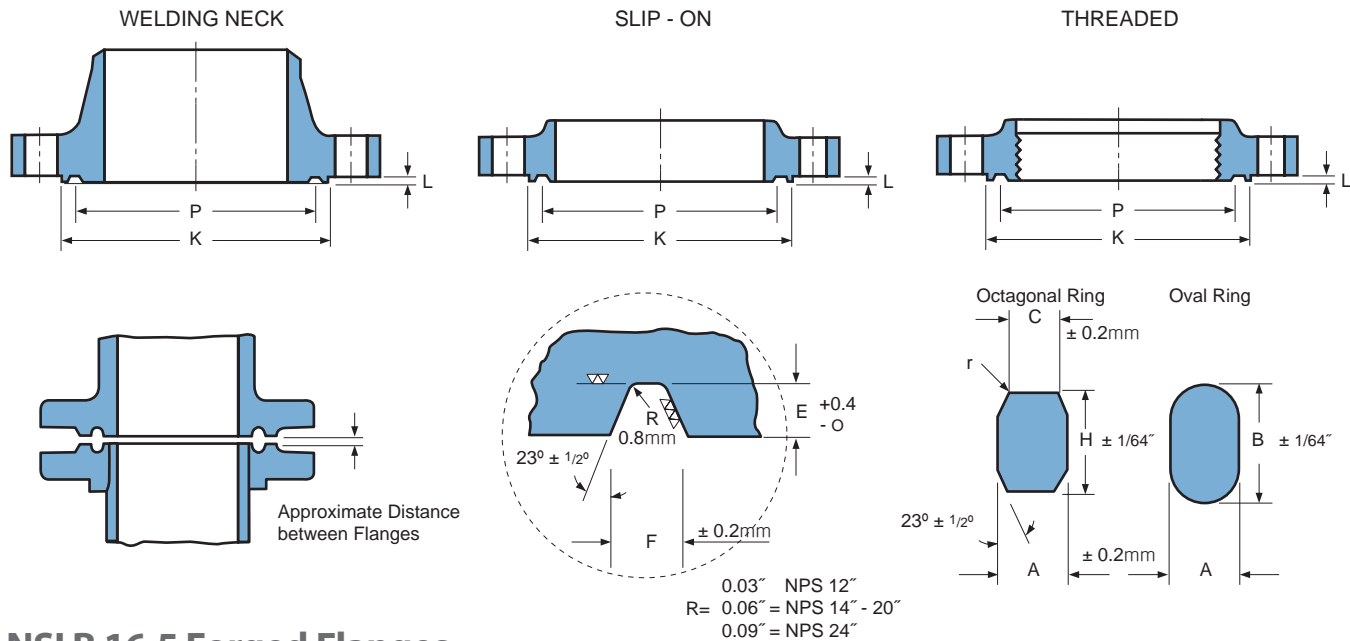
| Nominal Pipe Size | Pitch Diam. of Ring and Groove | Width of Ring | HEIGHT OF RING |           | Width of Flat on Octagonal Rings | Width of Groove | Depth of Groove | Diameter of Raised Face for Ring Joint or Lapped | Ring Number | Approximate Distance Between Flange of Ring Joints When Ring is Compressed |           |           |
|-------------------|--------------------------------|---------------|----------------|-----------|----------------------------------|-----------------|-----------------|--|-------------|--|-----------|-----------|
|                   |                                |               | Oval           | Octagonal |                                  |                 |                 |  |             | Class 300  | Class 400 | Class 600 |
|                   | P                              | A             | B              | H         | C                                | F               | E(L*)           | K(Min)   |             |  |           |           |
| 1/2               | 34.1                           | 6.4           | 11.1           | 9.5       | 4.3                              | 7.1             | 5.6             | 50.8   | R11         | 3.0  | -         | 3.0       |
| 3/4               | 42.9                           | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 63.5   | R13         | 4.1  | -         | 4.1       |
| 1                 | 50.8                           | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 69.9   | R16         | 4.1  | -         | 4.1       |
| 1 1/4             | 60.3                           | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 79.5   | R18         | 4.1  | -         | 4.1       |
| 1 1/2             | 68.3                           | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 90.4   | R20         | 4.1  | -         | 4.1       |
| 2                 | 82.6                           | 11.1          | 17.5           | 15.9      | 7.7                              | 11.9            | 7.9             | 108.0  | R23         | 5.6  | -         | 4.8       |
| 2 1/2             | 101.6                          | 11.1          | 17.5           | 15.9      | 7.7                              | 11.9            | 7.9             | 127.0  | R26         | 5.6  | -         | 4.8       |
| 3                 | 123.8                          | 11.1          | 17.5           | 15.9      | 7.7                              | 11.9            | 7.9             | 146.1  | R31         | 5.6  | -         | 4.8       |
| 3 1/2             | 131.8                          | 11.1          | 17.5           | 15.9      | 7.7                              | 11.9            | 7.9             | 158.8  | R34         | 5.6  | -         | 4.8       |
| 4                 | 149.2                          | 11.1          | 17.5           | 15.9      | 7.7                              | 11.9            | 7.9             | 174.8  | R37         | 5.6  | 5.6       | 4.8       |
| 5                 | 181.0                          | 11.1          | 17.5           | 15.9      | 7.7                              | 11.9            | 7.9             | 209.6  | R41         | 5.6  | 5.6       | 4.8       |
| 6                 | 211.2                          | 11.1          | 17.5           | 15.9      | 7.7                              | 11.9            | 7.9             | 241.3  | R45         | 5.6  | 5.6       | 4.8       |
| 8                 | 269.9                          | 11.1          | 17.5           | 15.9      | 7.7                              | 11.9            | 7.9             | 301.8  | R49         | 5.6  | 5.6       | 4.8       |
| 10                | 323.9                          | 11.1          | 17.5           | 15.9      | 7.7                              | 11.9            | 7.9             | 355.6  | R53         | 5.6  | 5.6       | 4.8       |
| 12                | 381.0                          | 11.1          | 17.5           | 15.9      | 7.7                              | 11.9            | 7.9             | 412.8  | R57         | 5.6  | 5.6       | 4.8       |
| 14                | 419.1                          | 11.1          | 17.5           | 15.9      | 7.7                              | 11.9            | 7.9             | 457.2  | R61         | 5.6  | 5.6       | 4.8       |
| 16                | 469.9                          | 11.1          | 17.5           | 15.9      | 7.7                              | 11.9            | 7.9             | 508.0  | R65         | 5.6  | 5.6       | 4.8       |
| 18                | 533.4                          | 11.1          | 17.5           | 15.9      | 7.7                              | 11.9            | 7.9             | 574.8  | R69         | 5.6  | 5.6       | 4.8       |
| 20                | 584.2                          | 12.7          | 19.1           | 17.5      | 8.7                              | 13.5            | 9.5             | 635.0  | R73         | 5.6  | 5.6       | 4.8       |
| 24                | 692.2                          | 15.9          | 22.2           | 20.7      | 10.5                             | 16.7            | 11.1            | 749.3  | R77         | 6.4  | 6.4       | 5.6       |

NOTE :

- Unless other wise specified by the customer, Ring Type Joint Flanges will be furnished in accordance with these details.
- The depth of groove is added to the minimum flange thickness.
  - \* Raised face " L " is equal to groove dimension " E " but is not subject to tolerances for " E "
  - \* A plus tolerance of 3/64 in, for heights B and H is permitted providing the variation in the height of any given ring does not exceed 1/64 in, throughout its entire circumference.
- Dimension " R " is max.
- Radius " r " is 1/16" for ring widths 7/8" and less and 3/32" for ring widths 1"(25.4mm) and over.

# CLASS 900 FLANGES

## Ring Joint Flanges Facing Dimensions



## ANSI B 16.5 Forged Flanges

Unit : mm

| Nominal Pipe Size | Pitch Diam. of Ring and Groove | Width of Ring | HEIGHT OF RING |           | Width of Flat on Octagonal Rings | Width of Groove | Depth of Groove | Diameter of Raised Face for Ring Joint or Lapped | Ring Number | Approximate Distance Between Flange of Ring Joints When Ring is Compressed |
|-------------------|--------------------------------|---------------|----------------|-----------|----------------------------------|-----------------|-----------------|--|-------------|--|
|                   |                                |               | Oval           | Octagonal |                                  |                 |                 |  |             |  |
|                   | P                              | A             | B              | H         | C                                | F               | E(L*)           | K(Min)   |             |  |

For size 2 1/2 and smaller, use Class 1500 Ring Joint Flanges

|    |       |      |      |      |      |      |      |       |     |     |
|----|-------|------|------|------|------|------|------|-------|-----|-----|
| 3  | 123.8 | 11.1 | 17.5 | 15.9 | 7.7  | 11.9 | 7.9  | 155.4 | R31 | 4.1 |
| 4  | 149.2 | 11.1 | 17.5 | 15.9 | 7.7  | 11.9 | 7.9  | 180.8 | R37 | 4.1 |
| 5  | 181.0 | 11.1 | 17.5 | 15.9 | 7.7  | 11.9 | 7.9  | 215.9 | R41 | 4.1 |
| 6  | 211.2 | 11.1 | 17.5 | 15.9 | 7.7  | 11.9 | 7.9  | 241.3 | R45 | 4.1 |
| 8  | 269.9 | 11.1 | 17.5 | 15.9 | 7.7  | 11.9 | 7.9  | 307.8 | R49 | 4.1 |
| 10 | 323.9 | 11.1 | 17.5 | 15.9 | 7.7  | 11.9 | 7.9  | 362.0 | R53 | 4.1 |
| 12 | 381.0 | 11.1 | 17.5 | 15.9 | 7.7  | 11.9 | 7.9  | 419.1 | R57 | 4.1 |
| 14 | 419.1 | 15.9 | 22.2 | 20.7 | 10.5 | 16.7 | 11.1 | 466.9 | R62 | 4.1 |
| 16 | 469.9 | 15.9 | 22.2 | 20.7 | 10.5 | 16.7 | 11.1 | 523.7 | R66 | 4.1 |
| 18 | 533.4 | 19.1 | 25.4 | 23.8 | 11.1 | 19.8 | 12.7 | 593.9 | R70 | 4.8 |
| 20 | 584.2 | 19.1 | 25.4 | 23.8 | 12.3 | 19.8 | 12.7 | 647.7 | R74 | 4.8 |
| 24 | 692.2 | 25.4 | 33.4 | 31.8 | 17.3 | 27.0 | 15.9 | 771.7 | R78 | 5.6 |

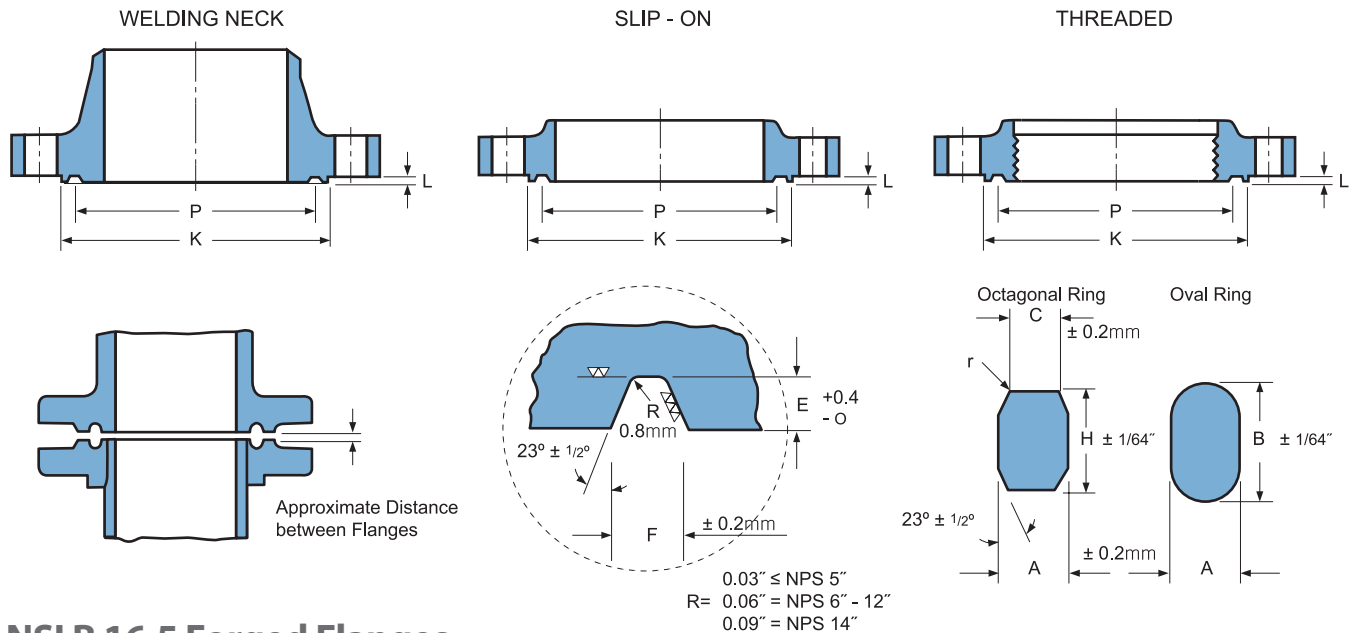
NOTE :

- Unless other wise specified by the customer, Ring Type Joint Flanges will be furnished in accordance with these details.
- The depth of groove is added to the minimum flange thickness.
  - \* Raised face " L " is equal to groove dimension " E " but is not subject to tolerances for " E "
  - \* A plus tolerance of 3/64 in, for heights B and H is permitted providing the variation in the height of any given ring does not exceed 1/64 in, throughout its entire circumference.
- Dimension " R " is max.
- Radius " r " is 1/16" for ring widths 7/8" and less and 3/32" for ring widths 1"(25.4mm) and over.

# RING JOINT FLANGES

## CLASS 1500 FLANGES

### Ring Joint Flanges Facing Dimensions



## ANSI B 16.5 Forged Flanges

Unit : mm

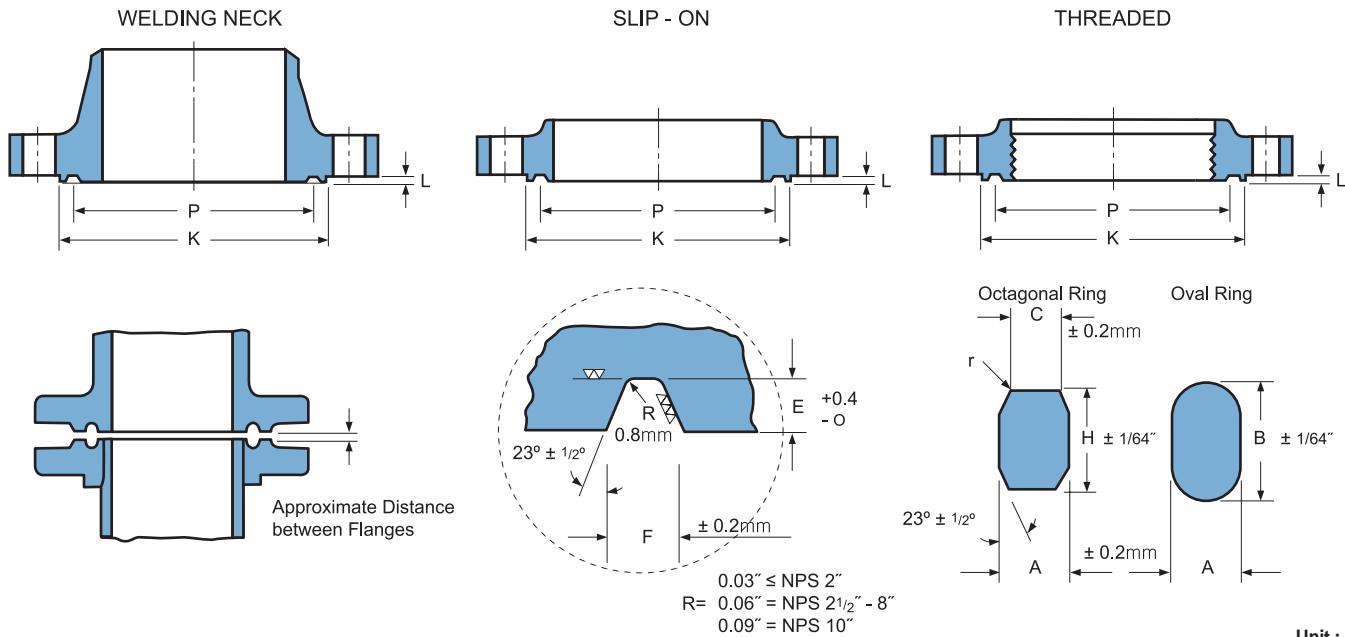
| Nominal Pipe Size | Pitch Diam. of Ring and Groove | Width of Ring | HEIGHT OF RING |           | Width of Flat on Octagonal Rings | Width of Groove | Depth of Groove | Diameter of Raised Face for Ring Joint or Lapped | Ring Number | Approximate Distance Between Flange of Ring Joints When Ring is Compressed |
|-------------------|--------------------------------|---------------|----------------|-----------|----------------------------------|-----------------|-----------------|--|-------------|--|
|                   |                                |               | Oval           | Octagonal |                                  |                 |                 |  |             |  |
|                   | P                              | A             | B              | H         | C                                | F               | E(L*)           | K(Min)   |             |  |
| 1/2               | 39.7                           | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 60.5   | R12         | 4.1  |
| 3/4               | 44.5                           | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 66.8   | R14         | 4.1  |
| 1                 | 50.8                           | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 71.4   | R16         | 4.1  |
| 1 1/4             | 60.3                           | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 81.0   | R18         | 4.1  |
| 1 1/2             | 68.3                           | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 92.2   | R20         | 4.1  |
| 2                 | 95.3                           | 11.1          | 17.5           | 15.9      | 7.7                              | 11.9            | 7.9             | 124.0  | R24         | 3.0  |
| 2 1/2             | 108.0                          | 11.1          | 17.5           | 15.9      | 7.7                              | 11.9            | 7.9             | 136.7  | R27         | 3.0  |
| 3                 | 136.5                          | 11.1          | 17.5           | 15.9      | 7.7                              | 11.9            | 7.9             | 168.4  | R35         | 3.0  |
| 4                 | 161.9                          | 11.1          | 17.5           | 15.9      | 7.7                              | 11.9            | 7.9             | 193.8  | R39         | 3.0  |
| 5                 | 193.7                          | 11.1          | 17.5           | 15.9      | 7.7                              | 11.9            | 7.9             | 228.6  | R44         | 3.0  |
| 6                 | 211.2                          | 12.7          | 19.1           | 17.5      | 8.7                              | 13.5            | 9.5             | 247.7  | R46         | 3.0  |
| 8                 | 269.9                          | 15.9          | 22.2           | 20.7      | 10.5                             | 16.7            | 11.1            | 317.5  | R50         | 4.1  |
| 10                | 323.9                          | 15.9          | 22.2           | 20.7      | 10.5                             | 16.7            | 11.1            | 371.6  | R54         | 4.1  |
| 12                | 381.0                          | 22.2          | 28.6           | 27.0      | 14.8                             | 23.0            | 14.3            | 438.2  | R58         | 4.8  |
| 14                | 419.1                          | 25.4          | 33.4           | 31.8      | 17.3                             | 27.0            | 15.9            | 489.0  | R64         | 5.6  |
| 16                | 469.9                          | 28.6          | 36.5           | 34.9      | 19.8                             | 30.2            | 17.5            | 546.1  | R67         | 7.9  |
| 18                | 533.4                          | 28.6          | 36.5           | 34.9      | 19.8                             | 30.2            | 17.5            | 612.9  | R71         | 7.9  |
| 20                | 584.2                          | 31.8          | 39.7           | 38.1      | 22.3                             | 33.4            | 17.5            | 673.1  | R75         | 9.7  |
| 24                | 692.2                          | 34.9          | 44.5           | 41.3      | 24.8                             | 36.5            | 20.6            | 793.8  | R79         | 11.2   |

NOTE :

- Unless other wise specified by the customer, Ring Type Joint Flanges will be furnished in accordance with these details.
- The depth of groove is added to the minimum flange thickness.
  - \* Raised face " L " is equal to groove dimension " E " but is not subject to tolerances for " E "
  - \* A plus tolerance of 3/64 in, for heights B and H is permitted providing the variation in the height of any given ring does not exceed 1/64 in, throughout its entire circumference.
- Dimension " R " is max.
- Radius " r " is 1/16" for ring widths 7/8" and less and 3/32" for ring widths 1"(25.4mm) and over.

# CLASS 2500 FLANGES

## Ring Joint Flanges Facing Dimensions

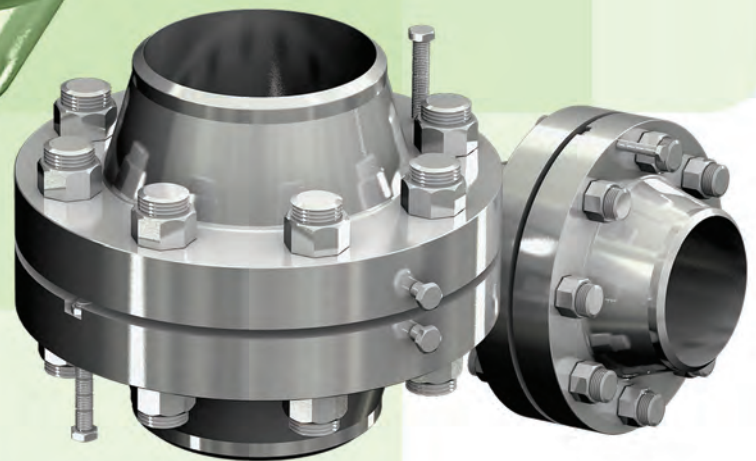


Unit : mm

| Nominal Pipe Size | Pitch Diam. of Ring and Groove | Width of Ring | HEIGHT OF RING |           | Width of Flat on Octagonal Rings | Width of Groove | Depth of Groove | Diameter of Raised Face for Ring Joint or Lapped | Ring Number | Approximate Distance Between Flange of Ring Joints When Ring is Compressed |
|-------------------|--------------------------------|---------------|----------------|-----------|----------------------------------|-----------------|-----------------|--|-------------|--|
|                   |                                |               | Oval           | Octagonal |                                  |                 |                 |  |             |  |
|                   | P                              | A             | B              | H         | C                                | F               | E(L*)           | K(Min)   |             |  |
| 1/2               | 42.9                           | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 65.0   | R13         | 4.1  |
| 3/4               | 50.8                           | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 73.2   | R16         | 4.1  |
| 1                 | 60.3                           | 8.0           | 14.3           | 12.7      | 5.2                              | 8.7             | 6.4             | 82.6   | R18         | 4.1  |
| 1 1/4             | 72.2                           | 11.1          | 17.5           | 15.9      | 7.7                              | 11.9            | 7.9             | 101.6  | R21         | 3.0  |
| 1 1/2             | 82.6                           | 11.1          | 17.5           | 15.9      | 7.7                              | 11.9            | 7.9             | 114.3  | R23         | 3.0  |
| 2                 | 101.6                          | 11.1          | 17.5           | 15.9      | 7.7                              | 11.9            | 7.9             | 133.4  | R26         | 3.0  |
| 2 1/2             | 111.1                          | 12.7          | 19.1           | 17.5      | 8.7                              | 13.5            | 9.5             | 149.4  | R28         | 3.0  |
| 3                 | 127.0                          | 12.7          | 19.1           | 17.5      | 8.7                              | 13.5            | 9.5             | 168.4  | R32         | 3.0  |
| 4                 | 157.2                          | 15.9          | 22.2           | 20.7      | 10.5                             | 16.7            | 11.1            | 203.2  | R38         | 4.1  |
| 5                 | 190.5                          | 19.1          | 25.4           | 23.8      | 12.3                             | 19.8            | 12.7            | 241.3  | R42         | 4.1  |
| 6                 | 228.6                          | 19.1          | 25.4           | 23.8      | 12.3                             | 19.8            | 12.7            | 279.4  | R47         | 4.1  |
| 8                 | 279.4                          | 22.2          | 28.6           | 27.0      | 14.8                             | 23.0            | 14.3            | 339.9  | R51         | 4.8  |
| 10                | 342.9                          | 28.6          | 36.5           | 34.9      | 19.8                             | 30.2            | 17.5            | 425.5  | R55         | 6.4  |
| 12                | 406.4                          | 31.8          | 39.7           | 38.1      | 22.3                             | 33.4            | 17.5            | 495.3  | R60         | 7.9  |

**NOTE :**

1. Unless other wise specified by the customer, Ring Type Joint Flanges will be furnished in accordance with these details.
2. The depth of groove is added to the minimum flange thickness.
  - \* Raised face " L " is equal to groove dimension " E " but is not subject to tolerances for " E "
  - \* A plus tolerance of 3/64 in, for heights B and H is permitted providing the variation in the height of any given ring does not exceed 1/64 in, throughout its entire circumference.
3. Dimension " R " is max.
4. Radius " r " is 1/16" for ring widths 7/8" and less and 3/32" for ring widths 1"(25.4mm) and over.



# ORIFICE FLANGES

- ANSI Orifice Flanges
- Class 300 Flanges
- Class 400 Flanges
- Class 600 Flanges
- Class 900 Flanges
- Class 1500 Flanges
- Class 2500 Flanges

# ANSI ORIFICE FLANGES

## (ANSI B16.36) Forged Flanges

ORIFICE FLANGES are widely used in conjunction with orifice meters for measuring the rate of flow of liquids and gases. They are basically the same as standard welding neck, slip-on and screwed flanges except for the provision of radial, tapped holes in the flange ring for meter connections and additional bolts to act as jack screws to facilitate separating the flanges for inspection or replacement of the orifice plate.

### NOTES :

#### ■ JACK SCREW PROVISION

- (1) Each Flange shall have a machine bolt mounted in a hole drilled on the flange centerline at 90 deg. from the pressure taps, for use as a jackscrew, Machine bolt shall be regular, with one heavy hex, nut.
- (2) A slot shall be provided in the flange 0.06 in. (1.6mm) wider than the width across flats of the nut. The depth of the slot shall admit the nut so that there is no interference with the joining of the flanges when bolted together without orifice plate.

#### ■ PRESSURE TAPS

- (1) Each orifice flange is provided with two pressure tap holes extending radially from the outside diameter of the flange to the inside diameter of the flange. Corner taps may be used on NPS 1 1/2 and smaller if space permits.  
Each pressure tap hole shall be equipped with a pipe plug.
- (2) The 0.94 in. (23.8) locating dimension for raised face and 0.75 in. (19.1mm) for ring joint shall be measured at the bore.
- (3) Each pressure tap hole shall be equipped with a pipe plug.

#### ■ FACING

The finish of Contact Faces Shall Conform to the Requirements of ASME / ANSI B 16.5

#### ■ FLANGE THREADS

- (1) Threaded flanges shall have an American Notional Standard taper pipe thread conforming to ANSI B 2.1
- (2) The thread shall be concentric with the axis of the flange and variations in alignment shall not exceed 0.06 in (1.6mm) per foot.
- (3) The flanges are made with counterbored at the back of the flange and the threads shall be chamfered to the diameter of the counterbore at an angle of approximately 45 degrees with the axis of the thread to afford easy entrance in making a joint.  
The chamfer shall be concentric with the thread.
- (4) In order to permit the pipe to be inserted to the flange, the threads should have full root diameters through to the face of the flange, or shall have a counterbore at the face of the flange.
- (5) The gaging notch of the working gage shall come flush with the bottom of the chamber in all threaded flanges and shall be considered as being the intersection of the chamber cone and the pitch cone of the thread.  
This depth of chamfer is approximately equal to 1/2 of the pitch of the thread.
- (6) The maximum allowable thread variation is one turn large or small from the gaging notch.

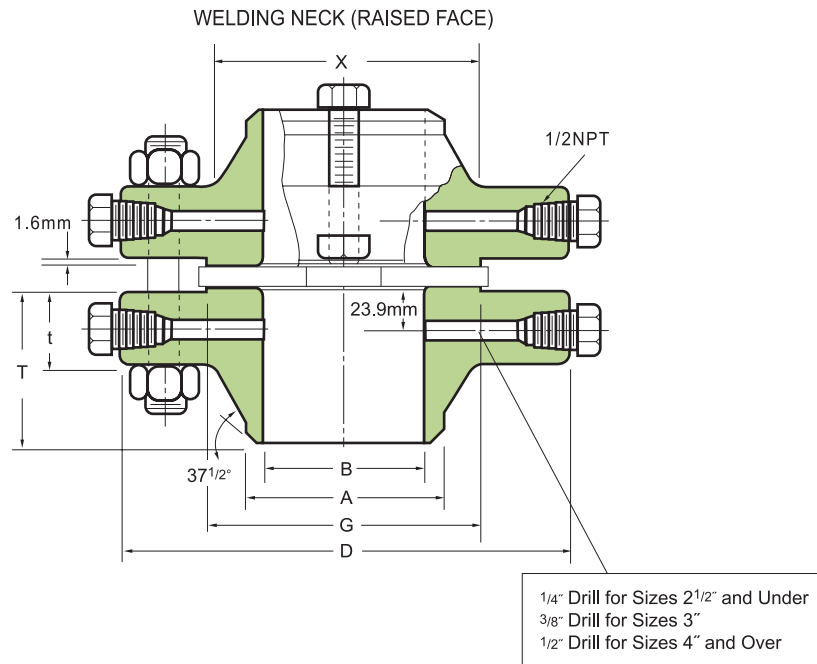
#### ■ TOLERANCES

Tolerances on all dimensions shall be as shown ANSI B16.5 except for those shown below.

- (1) Tolerance on location of center of pressure tap hole from flange face shall be :
  - a. Flanges smaller than nominal size  $4 \pm 0.02$  in (0.5mm)
  - b. Flanges nominal size 4 and larger  $\pm 0.03$  in (0.8mm)
- (2) Bore diameter tolerance (welding neck flanges only) is  $\pm 0.5\%$  of nominal value.

# ORIFICE FLANGES

## CLASS 300 ORIFICE FLANGES



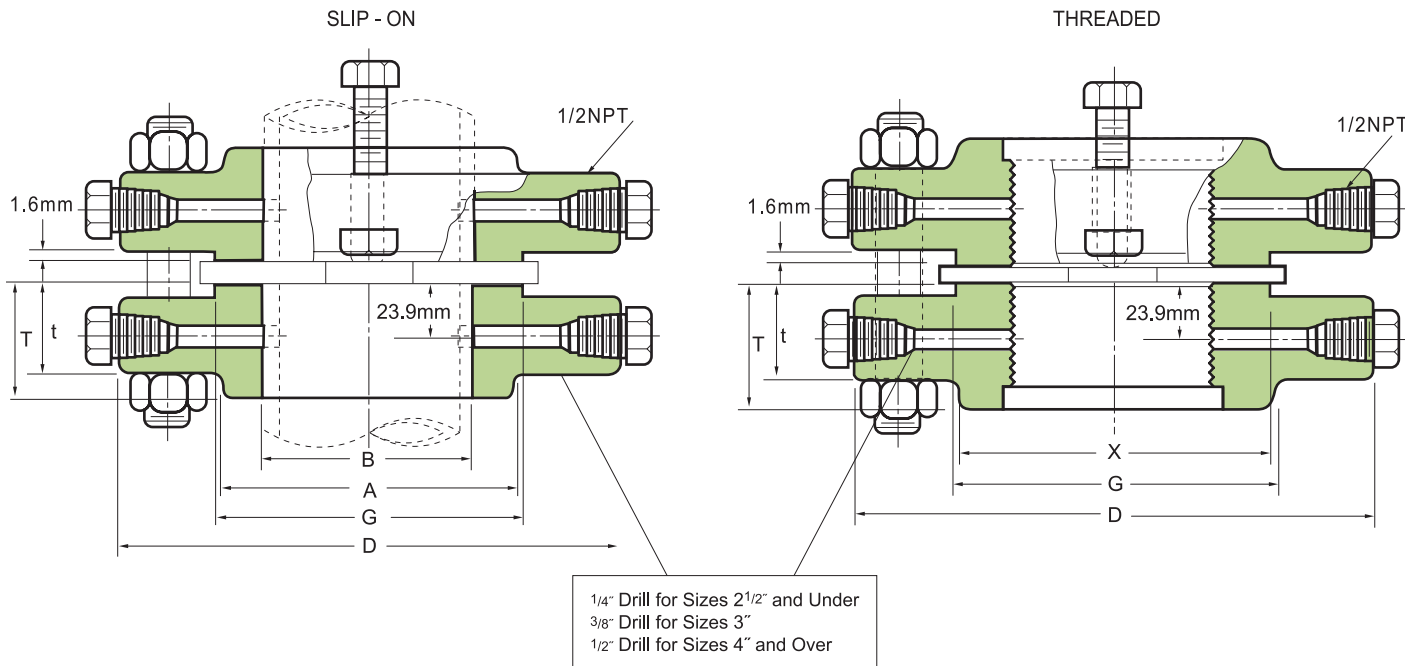
## ANSI B 16.36 Forged Flanges

Unit : mm

| Nominal Pipe Size | Outside Diam. of Flange<br>D | THICKNESS OF FLANGE (t) | Diam. of Hub at Base<br>X | Diam. of Raised Base<br>G | Diam. of Hub of Bevel<br>A | LENGTH THRU HUB (T) |                    | BORE (B)     |         |
|-------------------|------------------------------|-------------------------|---------------------------|---------------------------|----------------------------|---------------------|--------------------|--------------|---------|
|                   |                              |                         |                           |                           |                            | Welding Neck        | Slip-on & Threaded | Welding Neck | Slip-on |
|                   |                              | Raised Face             |                           |                           |                            | Raised Face         | Raised Face        | Raised Face  |         |
| 1                 | 124                          | 38.1                    | 53.8                      | 50.8                      | 33.5                       | 82.6                | 47.8               | 26.7         | 34.5    |
| 1 1/4             | 133                          | 38.1                    | 63.5                      | 63.5                      | 42.2                       | 84.1                | 46.0               | 35.1         | 43.2    |
| 1 1/2             | 155                          | 38.1                    | 69.9                      | 73.2                      | 48.3                       | 85.9                | 47.8               | 40.9         | 49.5    |
| 2                 | 165                          | 38.1                    | 84.1                      | 91.9                      | 60.5                       | 85.9                | 49.3               | 52.6         | 62.0    |
| 2 1/2             | 191                          | 38.1                    | 100.1                     | 104.6                     | 73.2                       | 88.9                | 50.8               | 62.7         | 74.7    |
| 3                 | 210                          | 38.1                    | 117.3                     | 127.0                     | 88.9                       | 88.9                | 52.3               | 78.0         | 90.7    |
| 4                 | 254                          | 38.1                    | 146.1                     | 157.2                     | 114.3                      | 91.9                | 53.8               | 102.4        | 116.1   |
| 5                 | 279                          | 38.1                    | 177.8                     | 185.7                     | 141.2                      | 101.6               | 53.8               | 128.3        | 143.8   |
| 6                 | 318                          | 38.1                    | 206.2                     | 215.9                     | 168.4                      | 100.1               | 53.8               | 154.2        | 170.7   |
| 8                 | 381                          | 41.1                    | 260.4                     | 269.7                     | 219.2                      | 111.3               | 62.0               | 202.7        | 221.5   |
| 10                | 445                          | 47.8                    | 320.5                     | 323.9                     | 273.1                      | 117.3               | 66.5               | 254.5        | 276.4   |
| 12                | 521                          | 50.8                    | 374.7                     | 381.0                     | 323.9                      | 130.0               | 73.2               | 304.8        | 327.2   |
| 14                | 584                          | 53.8                    | 425.5                     | 412.8                     | 355.6                      | 142.7               | 76.2               | 336.6        | 359.2   |
| 16                | 648                          | 57.2                    | 482.6                     | 469.9                     | 406.4                      | 146.1               | 82.6               | 387.4        | 410.5   |
| 18                | 711                          | 60.5                    | 533.4                     | 533.4                     | 457.2                      | 158.8               | 88.9               | 438.2        | 461.8   |
| 20                | 775                          | 63.5                    | 587.2                     | 584.2                     | 508.0                      | 162.1               | 95.3               | 489.0        | 513.1   |
| 24                | 914                          | 69.9                    | 701.5                     | 692.2                     | 609.6                      | 168.1               | 106.4              | 590.6        | 616.0   |

NOTE :

1. For the 'Bore' (B) of Welding Neck Flanges other than Standard Wall Thickness, refer to 46,47
2. Class 300 Welding Neck Flanges of sizes 24" (609.6mm) and smaller will be bored to match Standard Wall Pipe unless otherwise specified.
3. Class 300 Orifice Flanges will be furnished with 0.06" (1.6mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub' (T)
4. Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 0.25" (6.4mm) for NPS 1-12 and 0.38" (9.7mm) for sizes 14-24



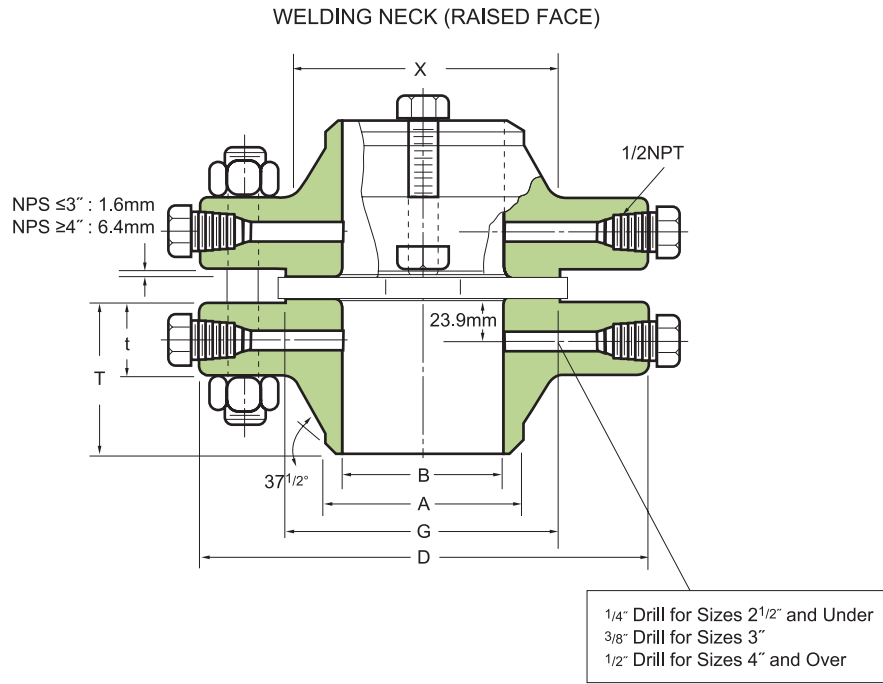
Unit : mm

| Nominal Pipe Size | Pitch Diam. of Ring and Groove<br><b>P</b> | Ring Number | DEPTH OF JACK SCREW SLOT |             | JACK SCREW SIZE   | DRILLING TEMPLATE    |                 |                            |                      |                      |
|-------------------|--|-------------|--------------------------|-------------|---|----------------------|-----------------|----------------------------|----------------------|----------------------|
|                   |  |             | Raised Face              | Raised Face |   | Diam. of Bolt Circle | Number of Bolts | Diam. of Stud Bolts (inch) | Diam. of Bolts Holes | Length of Stud Bolts |
|                   |  |             |                          |             |   |                      |                 |                            |                      | Raised Face          |
| 1                 | 50.8                                       | R16         | 9.7                      |             | Jack screw size for 1 thru 24 are those shown for length and diameter of bolts. | 88.9                 | 4               | 5/8                        | 17.5                 | 139.7                |
| 1 1/4             | 60.3                                       | R18         | 9.7                      | 98.6        |   | 4                    | 5/8             | 17.5                       | 152.4                |                      |
| 1 1/2             | 68.3                                       | R20         | 12.7                     | 114.3       |   | 4                    | 3/4             | 20.6                       | 152.4                |                      |
| 2                 | 82.6                                       | R23         | 9.7                      | 127.0       |   | 8                    | 5/8             | 17.5                       | 152.4                |                      |
| 2 1/2             | 101.6                                      | R26         | 12.7                     | 149.4       |   | 8                    | 3/4             | 20.6                       | 152.4                |                      |
| 3                 | 123.8                                      | R31         | 12.7                     | 168.1       |   | 8                    | 3/4             | 20.6                       | 152.4                |                      |
| 4                 | 149.2                                      | R37         | 12.7                     | 200.2       |   | 8                    | 3/4             | 20.6                       | 152.4                |                      |
| 5                 | 181.0                                      | R41         | 12.7                     | 235.0       |   | 8                    | 3/4             | 22.4                       | 152.4                |                      |
| 6                 | 211.1                                      | R45         | 12.7                     | 269.7       |   | 12                   | 3/4             | 22.4                       | 152.4                |                      |
| 8                 | 269.9                                      | R49         | 15.7                     | 330.2       |   | 12                   | 7/8             | 25.4                       | 158.8                |                      |
| 10                | 323.9                                      | R53         | 19.1                     | 387.4       |   | 16                   | 1               | 28.4                       | 165.1                |                      |
| 12                | 381.0                                      | R57         | 22.4                     | 450.9       |   | 16                   | 1 1/8           | 31.8                       | 177.8                |                      |
| 14                | 419.1                                      | R61         | 22.4                     | 514.4       |   | 20                   | 1 1/8           | 31.8                       | 184.2                |                      |
| 16                | 469.9                                      | R65         | 25.4                     | 571.5       |   | 20                   | 1 1/4           | 35.1                       | 196.9                |                      |
| 18                | 533.4                                      | R69         | 25.4                     | 628.7       |   | 24                   | 1 1/4           | 35.1                       | 203.2                |                      |
| 20                | 584.2                                      | R73         | 25.4                     | 685.8       |   | 24                   | 1 1/4           | 35.1                       | 215.9                |                      |
| 24                | 692.2                                      | R77         | 31.8                     | 812.8       |   | 24                   | 1 1/2           | 41.1                       | 241.3                |                      |

**NOTE :**

5. Unless otherwise specified, unions of 1 (25.4mm) thru 24 (609.6mm) furnished with carbon steel regular square headed bolts with semi finished American Standard heavy series hex nuts.

## CLASS 400 ORIFICE FLANGES



### ANSI B 16.36 Forged Flanges

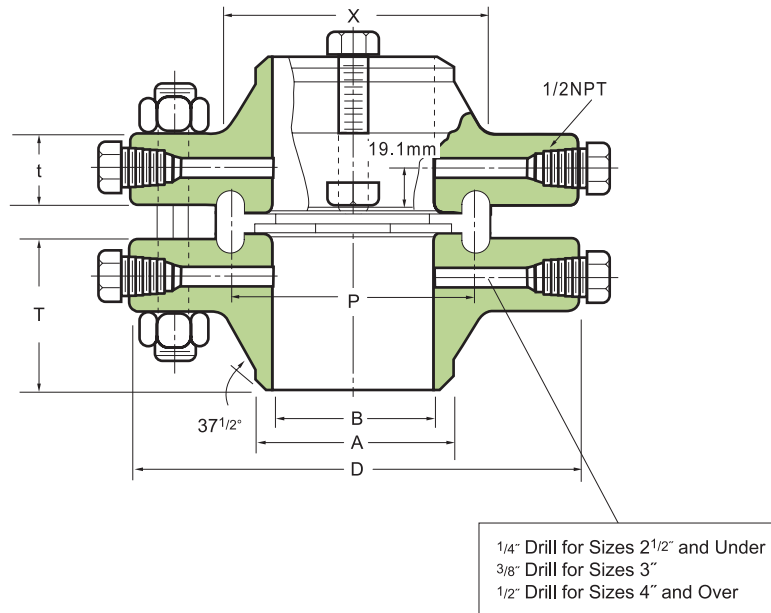
Unit : mm

| Nominal Pipe Size | Outside Diam. of Flange<br>D | THICKNESS OF FLANGE (t) |            | Diam. of Hub at Base<br>X | Diam. of Raised Base<br>G | Diam. of Hub of Bevel<br>A | LENGTH THRU HUB (T) |            |                    |            | BORE (B)                                    |         |
|-------------------|------------------------------|-------------------------|------------|---------------------------|---------------------------|----------------------------|---------------------|------------|--------------------|------------|---|---------|
|                   |                              | Raised Face             | Ring Joint |                           |                           |                            | Welding Neck        |            | Slip-on & Threaded |            | Welding Neck                                | Slip-on |
|                   |                              |                         |            |                           |                           |                            | Raised Face         | Ring Joint | Raised Face        | Ring Joint |   |         |
| 1                 | 124                          | 38.1                    | 31.8       | 53.8                      | 50.8                      | 33.5                       | 82.6                | 76.2       | 47.8               | 41.1       | See Note 1.<br>To be specified by purchaser | 34.5    |
| 1 1/4             | 133                          | 38.1                    | 31.8       | 63.5                      | 63.5                      | 42.2                       | 84.1                | 77.7       | 46.0               | 39.6       |   | 43.2    |
| 1 1/2             | 155                          | 38.1                    | 31.8       | 69.9                      | 73.2                      | 48.3                       | 85.9                | 79.2       | 47.8               | 41.1       |   | 49.5    |
| 2                 | 165                          | 38.1                    | 31.8       | 84.1                      | 91.9                      | 60.5                       | 85.9                | 79.2       | 49.3               | 42.9       |   | 62.0    |
| 2 1/2             | 191                          | 38.1                    | 31.8       | 100.1                     | 104.6                     | 73.2                       | 88.9                | 82.6       | 50.8               | 44.5       |   | 74.7    |
| 3                 | 210                          | 38.1                    | 31.8       | 117.3                     | 127.0                     | 88.9                       | 88.9                | 82.6       | 52.3               | 46.0       |   | 90.7    |
| 4                 | 254                          | 35.1                    | 35.1       | 146.1                     | 157.2                     | 114.3                      | 88.9                | 88.9       | 50.8               | 50.8       |   | 116.1   |
| 5                 | 279                          | 38.1                    | 38.1       | 177.8                     | 185.7                     | 141.2                      | 101.6               | 101.6      | 53.8               | 53.8       |   | 143.8   |
| 6                 | 318                          | 41.1                    | 41.1       | 206.2                     | 215.9                     | 168.4                      | 103.1               | 103.1      | 57.2               | 57.2       |   | 170.7   |
| 8                 | 381                          | 47.8                    | 47.8       | 260.4                     | 269.7                     | 219.2                      | 117.3               | 117.3      | 68.3               | 68.3       |   | 221.5   |
| 10                | 445                          | 53.8                    | 53.8       | 320.5                     | 323.9                     | 273.1                      | 124.0               | 124.0      | 73.2               | 73.2       |   | 276.4   |
| 12                | 521                          | 57.2                    | 57.2       | 374.7                     | 381.0                     | 323.9                      | 136.7               | 136.7      | 79.2               | 79.2       |   | 327.2   |
| 14                | 584                          | 60.7                    | 60.7       | 425.5                     | 412.8                     | 355.6                      | 149.4               | 149.4      | -                  | -          |   | 359.2   |
| 16                | 648                          | 63.5                    | 63.5       | 482.6                     | 469.9                     | 406.4                      | 152.4               | 152.4      | -                  | -          |   | 410.5   |
| 18                | 711                          | 66.5                    | 66.5       | 533.4                     | 533.4                     | 457.2                      | 165.1               | 165.1      | -                  | -          |   | 461.8   |
| 20                | 775                          | 69.9                    | 69.9       | 587.2                     | 584.2                     | 508.0                      | 168.1               | 168.1      | -                  | -          |   | 513.1   |
| 24                | 914                          | 76.2                    | 76.2       | 701.5                     | 692.2                     | 609.6                      | 174.8               | 174.8      | -                  | -          |   | 564.4   |

**NOTE :**

- For the inside diameter of pipes (corresponding to 'Bore' (B) of Welding Neck Flanges), refer to page 46,47
- Class 400 Flanges of sizes 3" and smaller will be furnished with 0.06" (1.6mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub' (T)  
The 0.25" (6.35mm) raised face for sizes 4" and larger is not included in (t) and (T)
- Each union includes two carbon steel jack screw bolts with hex nuts.

WELDING NECK (RING-TYPE JOINT)



Unit : mm

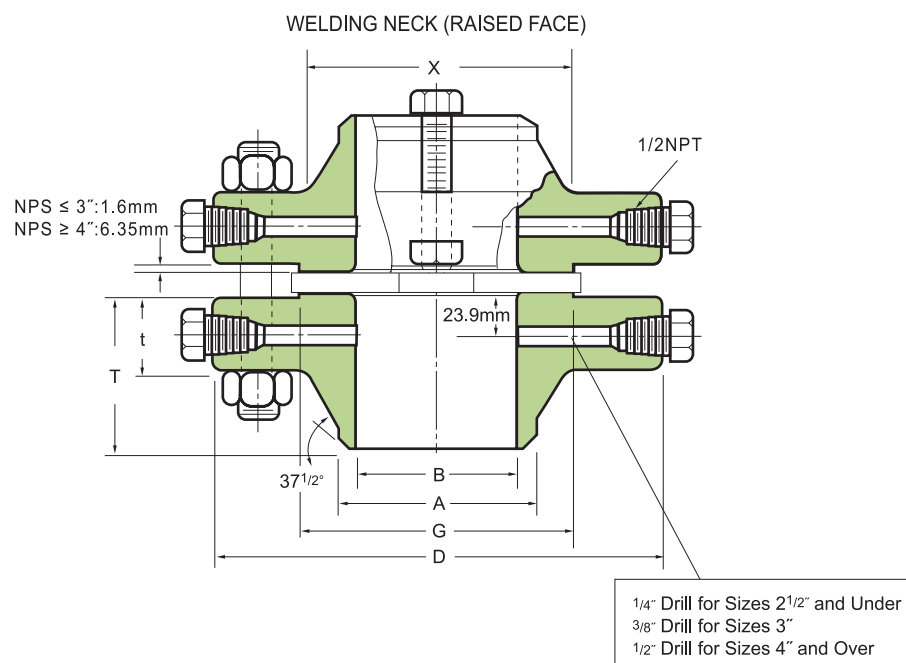
| Nominal Pipe Size | Pitch Diam. of Ring and Groove<br>P | Ring Number | DEPTH OF JACK SCREW SLOT |            | JACK SCREW SIZE    |                   | DRILLING TEMPLATE    |                 |                            |                      |                      |            |
|-------------------|-------------------------------------|-------------|--------------------------|------------|--------------------|-------------------|----------------------|-----------------|----------------------------|----------------------|----------------------|------------|
|                   |                                     |             | Raised Face              | Ring Joint | Raised Face (inch) | Ring Joint (inch) | Diam. of Bolt Circle | Number of Bolts | Diam. of Stud Bolts (inch) | Diam. of Bolts Holes | Length of Stud Bolts |            |
|                   |                                     |             |                          |            |                    |                   |                      |                 |                            |                      | Raised Face          | Ring Joint |
| 1                 | 50.8                                | R16         | 9.7                      | 6.4        | 5/8X4.00           | 5/8X4.75          | 88.9                 | 4               | 5/8                        | 17.5                 | 127.0                | 146.1      |
| 1 1/4             | 60.3                                | R18         | 9.7                      | 6.4        | 5/8X4.00           | 5/8X4.75          | 98.6                 | 4               | 5/8                        | 17.5                 | 127.0                | 120.7      |
| 1 1/2             | 68.3                                | R20         | 12.7                     | 6.4        | 3/4X4.25           | 3/4X5.00          | 114.3                | 4               | 3/4                        | 21.0                 | 133.4                | 152.4      |
| 2                 | 82.6                                | R23         | 9.7                      | 6.4        | 5/8X4.00           | 5/8X4.75          | 127.0                | 8               | 5/8                        | 17.5                 | 127.0                | 152.4      |
| 2 1/2             | 101.6                               | R26         | 12.7                     | 6.4        | 3/4X4.25           | 3/4X5.00          | 149.4                | 8               | 3/4                        | 20.6                 | 133.4                | 158.8      |
| 3                 | 123.8                               | R31         | 12.7                     | 6.4        | 3/4X4.25           | 3/4X5.00          | 168.1                | 8               | 3/4                        | 20.6                 | 133.4                | 158.8      |
| 4                 | 149.2                               | R37         | 6.4                      | 15.7       | 3/4X3.00           | 3/4X4.00          | 200.2                | 8               | 7/8                        | 25.4                 | 139.7                | 152.4      |
| 5                 | 181.0                               | R41         | 6.4                      | 15.7       | 3/4X3.00           | 3/4X4.00          | 235.0                | 8               | 7/8                        | 25.4                 | 146.1                | 158.8      |
| 6                 | 211.1                               | R45         | 12.7                     | 22.4       | 1X3.50             | 1X4.00            | 269.7                | 12              | 7/8                        | 25.4                 | 158.8                | 165.1      |
| 8                 | 269.9                               | R49         | 12.7                     | 22.4       | 1X3.50             | 1X4.50            | 330.2                | 12              | 1                          | 28.4                 | 171.5                | 184.2      |
| 10                | 323.9                               | R53         | 12.7                     | 22.4       | 1X4.00             | 1X4.50            | 387.4                | 16              | 1 1/8                      | 31.8                 | 190.5                | 203.2      |
| 12                | 381.0                               | R57         | 12.7                     | 22.4       | 1X4.00             | 1X5.00            | 450.9                | 16              | 1 1/4                      | 35.1                 | 203.2                | 215.9      |
| 14                | 419.1                               | R61         | 12.7                     | 22.4       | 1X4.25             | 1X5.00            | 514.4                | 20              | 1 1/4                      | 35.1                 | 209.6                | 228.6      |
| 16                | 469.9                               | R65         | 12.7                     | 22.4       | 1X4.25             | 1X5.00            | 571.5                | 20              | 1 3/8                      | 38.1                 | 222.3                | 235.0      |
| 18                | 533.4                               | R69         | 12.7                     | 22.4       | 1X4.50             | 1X5.00            | 628.7                | 24              | 1 3/8                      | 38.1                 | 235.0                | 241.3      |
| 20                | 584.2                               | R73         | 12.7                     | 22.4       | 1X4.75             | 1X5.50            | 685.8                | 24              | 1 1/2                      | 41.1                 | 247.7                | 260.4      |
| 24                | 692.2                               | R77         | 12.7                     | 22.4       | 1X5.00             | 1X6.00            | 812.8                | 24              | 1 3/4                      | 47.8                 | 279.4                | 285.8      |

NOTE :

- Unless otherwise specified, raised face unions are furnished with alloy bolt studs per ASTM A193 Grade B7 with American Standard heavy series hex nuts ASTM A194 Class 2H.
- On ring joint flanges having a groove depth 0.375" (9.5mm) and less, the distance from the center line of the tap hole to the flange face is 0.750" (19.1mm). When the depth of groove is 0.438" (11.1mm) or greater, changes in drill size or method of drilling are necessary.
- Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 0.25" (6.4mm) for sizes 4-12 and 0.38" (9.7mm) for sizes 14-24. Bolt lengths for ring type joint flanges include allowance of 0.62" (15.7mm) for sizes 4-10, 0.75" (19.1mm) for sizes 12-18 and 0.88" (22.4mm) for size 20.

# ORIFICE FLANGES

## CLASS 600 ORIFICE FLANGES



## ANSI B 16.36 Forged Flanges

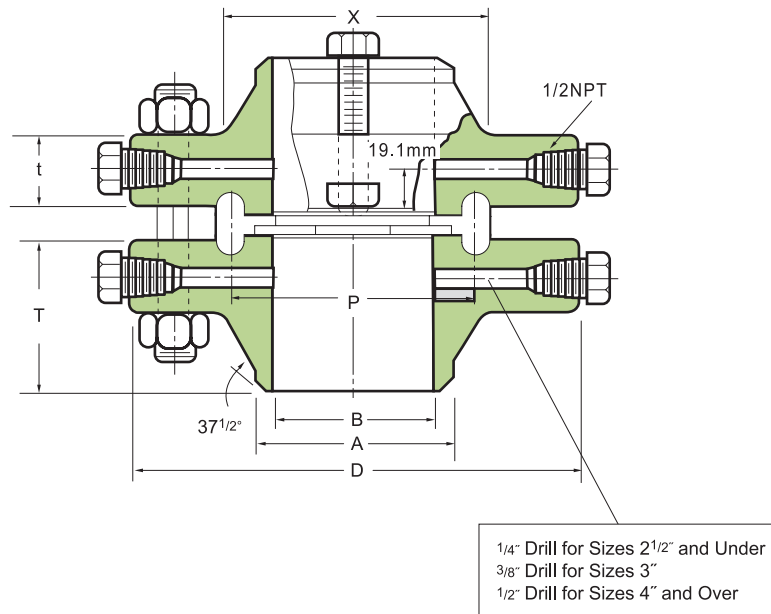
Unit : mm

| Nominal Pipe Size | Outside Diam. of Flange<br>D | THICKNESS OF FLANGE (t) |            | Diam. of Hub at Base<br>X | Diam. of Raised Base<br>G | Diam. of Hub of Bevel<br>A | LENGTH THRU HUB (T) |            |                    |            | BORE (B)                                    |         |
|-------------------|------------------------------|-------------------------|------------|---------------------------|---------------------------|----------------------------|---------------------|------------|--------------------|------------|---|---------|
|                   |                              | Raised Face             | Ring Joint |                           |                           |                            | Welding Neck        |            | Slip-on & Threaded |            | Welding Neck                                | Slip-on |
|                   |                              |                         |            |                           |                           |                            | Raised Face         | Ring Joint | Raised Face        | Ring Joint |   |         |
| 1                 | 124                          | 38.1                    | 31.8       | 53.8                      | 50.8                      | 33.5                       | 82.6                | 76.2       | 47.8               | 41.1       | See Note 1.<br>To be specified by purchaser | 34.5    |
| 1 1/4             | 133                          | 38.1                    | 31.8       | 63.5                      | 63.5                      | 42.2                       | 84.1                | 77.7       | 46.0               | 39.6       |   | 43.2    |
| 1 1/2             | 155                          | 38.1                    | 31.8       | 69.9                      | 73.2                      | 48.3                       | 85.9                | 79.2       | 47.8               | 41.1       |   | 49.5    |
| 2                 | 165                          | 38.1                    | 31.8       | 84.1                      | 91.9                      | 60.5                       | 85.9                | 79.2       | 49.3               | 42.9       |   | 62.0    |
| 2 1/2             | 191                          | 38.1                    | 31.8       | 100.1                     | 104.6                     | 73.2                       | 88.9                | 82.6       | 50.8               | 44.5       |   | 74.7    |
| 3                 | 210                          | 38.1                    | 31.8       | 117.3                     | 127.0                     | 88.9                       | 88.9                | 82.6       | 52.3               | 46.0       |   | 90.7    |
| 4                 | 273                          | 38.1                    | 38.1       | 152.4                     | 157.2                     | 114.3                      | 101.6               | 101.6      | 53.8               | 53.8       |   | 116.1   |
| 5                 | 330                          | 44.5                    | 44.5       | 189.0                     | 185.7                     | 141.2                      | 114.3               | 114.3      | 60.5               | 60.5       |   | 143.8   |
| 6                 | 356                          | 47.8                    | 47.8       | 222.3                     | 215.9                     | 168.4                      | 117.3               | 117.3      | 66.5               | 66.5       |   | 170.7   |
| 8                 | 419                          | 55.6                    | 55.6       | 273.1                     | 269.7                     | 219.2                      | 133.4               | 133.4      | 76.5               | 76.2       |   | 221.5   |
| 10                | 508                          | 63.5                    | 63.5       | 342.9                     | 323.9                     | 273.1                      | 152.4               | 152.4      | 85.9               | 85.9       |   | 276.4   |
| 12                | 559                          | 66.5                    | 66.5       | 400.1                     | 381.0                     | 323.9                      | 155.4               | 155.4      | 91.9               | 91.9       |   | 327.2   |
| 14                | 603                          | 69.9                    | 69.9       | 431.8                     | 412.8                     | 355.6                      | 165.4               | 165.1      | -                  | -          |   | -       |
| 16                | 686                          | 76.2                    | 76.2       | 495.3                     | 469.9                     | 406.4                      | 177.8               | 177.8      | -                  | -          |   | -       |
| 18                | 743                          | 82.6                    | 82.6       | 546.1                     | 533.4                     | 457.2                      | 184.2               | 184.2      | -                  | -          |   | -       |
| 20                | 813                          | 88.9                    | 88.9       | 609.6                     | 584.2                     | 508.0                      | 190.5               | 190.5      | -                  | -          |   | -       |
| 24                | 940                          | 101.6                   | 101.6      | 717.6                     | 692.2                     | 609.6                      | 203.2               | 203.2      | -                  | -          |   | -       |

**NOTE :**

- For the inside diameter of pipes (corresponding to 'Bore' (B) of Welding Neck Flanges), refer to page 46,47
- Class 600 Flanges of sizes 3" and smaller will be furnished with 0.06" (1.6mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub' (T)  
The 0.25" (6.35mm) raised face for sizes 4" and larger is not included in (t) and (T)
- Each union includes two carbon steel jack screw bolts with hex nuts.
- Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 0.25" (6.4mm) for sizes 1-12 and 0.38" (9.7mm) for sizes 14-24.  
Bolt lengths for ring type joint flanges include allowance of 0.62" (15.7mm) for sizes 1-10, 0.75" (19.1mm) for sizes 12-18 and 0.88" (22.4mm) for size 20.

WELDING NECK (RING-TYPE JOINT)



Unit : mm

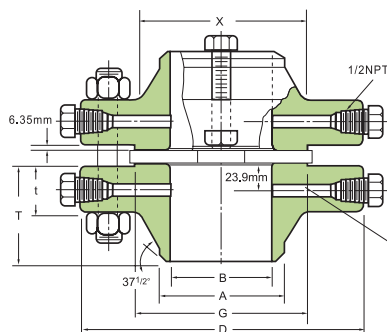
| Nominal Pipe Size | Pitch Diam. of Ring and Groove<br>P | Ring Number | DEPTH OF JACK SCREW SLOT |            | JACK SCREW SIZE    |                   | DRILLING TEMPLATE    |                 |                            |                           |      |                      |            |
|-------------------|-------------------------------------|-------------|--------------------------|------------|--------------------|-------------------|----------------------|-----------------|----------------------------|---------------------------|------|----------------------|------------|
|                   |                                     |             | Raised Face              | Ring Joint | Raised Face (inch) | Ring Joint (inch) | Diam. of Bolt Circle | Number of Bolts | Diam. of Stud Bolts (inch) | Diam. of Stud Bolts Holes |      | Length of Stud Bolts |            |
|                   |                                     |             |                          |            |                    |                   |                      |                 |                            | RF                        | RTJ  | Raised Face          | Ring Joint |
| 1                 | 50.8                                | R16         | 9.7                      | 6.4        | 5/8X4.00           | 5/8X4.75          | 88.9                 | 4               | 5/8                        | 17.5                      | 19.1 | 127.0                | 146.1      |
| 1 1/4             | 60.3                                | R18         | 9.7                      | 6.4        | 5/8X4.00           | 5/8X4.75          | 98.6                 | 4               | 5/8                        | 17.5                      | -    | 127.0                | 120.7      |
| 1 1/2             | 68.3                                | R20         | 12.7                     | 6.4        | 3/4X4.25           | 3/4X5.00          | 114.3                | 4               | 3/4                        | 20.6                      | 22.4 | 133.4                | 152.4      |
| 2                 | 82.6                                | R23         | 9.7                      | 6.4        | 5/8X4.00           | 5/8X4.75          | 127.0                | 8               | 5/8                        | 17.5                      | 19.7 | 127.0                | 152.4      |
| 2 1/2             | 101.6                               | R26         | 12.7                     | 6.4        | 3/4X4.25           | 3/4X5.00          | 149.4                | 8               | 3/4                        | 20.6                      | 22.4 | 133.4                | 158.8      |
| 3                 | 123.8                               | R31         | 12.7                     | 6.4        | 3/4X4.25           | 3/4X5.00          | 168.1                | 8               | 3/4                        | 20.6                      | 22.4 | 133.4                | 158.8      |
| 4                 | 149.2                               | R37         | 6.4                      | 15.7       | 3/4X3.00           | 3/4X4.00          | 215.9                | 8               | 7/8                        | 25.4                      | 25.4 | 152.4                | 165.1      |
| 5                 | 181.0                               | R41         | 6.4                      | 15.7       | 3/4X3.50           | 3/4X4.50          | 266.7                | 8               | 1                          | 28.4                      | 28.4 | 139.7                | 177.8      |
| 6                 | 211.1                               | R45         | 12.7                     | 22.4       | 1X4.00             | 1X4.50            | 292.1                | 12              | 1                          | 28.4                      | 28.4 | 177.8                | 190.5      |
| 8                 | 269.9                               | R49         | 12.7                     | 22.4       | 1X4.00             | 1X4.75            | 349.3                | 12              | 1 1/8                      | 31.8                      | 31.8 | 196.9                | 209.6      |
| 10                | 323.9                               | R53         | 12.7                     | 22.4       | 1X4.00             | 1X5.00            | 431.8                | 16              | 1 1/4                      | 35.1                      | 35.1 | 222.3                | 235.0      |
| 12                | 381.0                               | R57         | 12.7                     | 22.4       | 1X4.50             | 1X5.00            | 489.0                | 20              | 1 1/4                      | 35.1                      | 35.1 | 228.6                | 241.3      |
| 14                | 419.1                               | R61         | 12.7                     | 22.4       | 1X5.00             | 1X5.50            | 527.1                | 20              | 1 3/8                      | 38.1                      | 38.1 | 241.3                | 254.0      |
| 16                | 469.9                               | R65         | 12.7                     | 22.4       | 1X5.00             | 1X5.50            | 603.3                | 20              | 1 1/2                      | 41.1                      | 41.1 | 260.4                | 273.1      |
| 18                | 533.4                               | R69         | 12.7                     | 22.4       | 1X5.00             | 1X5.75            | 654.1                | 20              | 1 5/8                      | 44.5                      | 44.5 | 297.4                | 292.1      |
| 20                | 584.2                               | R73         | 12.7                     | 22.4       | 1X6.00             | 1X6.25            | 723.9                | 24              | 1 5/8                      | 44.5                      | 44.5 | 298.5                | 317.5      |
| 24                | 692.2                               | R77         | 12.7                     | 22.4       | 1X6.00             | 1X7.00            | 838.2                | 24              | 1 7/8                      | 50.8                      | 50.8 | 336.6                | 342.9      |

NOTE :

- Unless otherwise specified, raised face unions are furnished with alloy bolt studs per ASTM A193 Grade B7 with American Standard heavy series hex nuts ASTM A194 Class 2H.
- On ring joint flanges having a groove depth 0.375" (9.5mm) and less, the distance from the center line of the tap hole to the flange face is 0.750" (19.1mm). When the depth of groove is 0.438" (11.1mm) or greater, changes in drill size or method of drilling are necessary.

## CLASS 900 / 1500 ORIFICE FLANGES

WELDING NECK  
(RAISED FACE)



1/4" Drill for Sizes 2 1/2" and Under  
3/8" Drill for Sizes 3"  
1/2" Drill for Sizes 4" and Over

### ANSI B 16.36 Forged Flanges

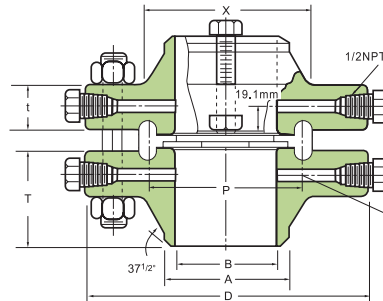
Unit : mm

| Nominal Pipe Size | Outside Diam. of Flange<br>D | THICKNESS OF FLANGE (t) |            | Diam. of Hub at Base<br>X | Diam. of Raised Base<br>G | Diam. of Hub of Bevel<br>A | LENGTH THRU HUB (T) |            |                    |            | BORE (B)                     |         |
|-------------------|------------------------------|-------------------------|------------|---------------------------|---------------------------|----------------------------|---------------------|------------|--------------------|------------|------------------------------|---------|
|                   |                              | Raised Face             | Ring Joint |                           |                           |                            | Welding Neck        |            | Slip-on & Threaded |            | Welding Neck                 | Slip-on |
|                   |                              |                         |            |                           |                           |                            | Raised Face         | Ring Joint | Raised Face        | Ring Joint |                              |         |
| <b>CLASS 900</b>  |                              |                         |            |                           |                           |                            |                     |            |                    |            |                              |         |
| 3                 | 241                          | 38.1                    | 38.1       | 127.0                     | 127.0                     | 88.9                       | 101.6               | 101.6      | 53.8               | 53.8       | To be specified by purchaser | 90.7    |
| 4                 | 292                          | 44.5                    | 44.5       | 158.8                     | 157.2                     | 114.3                      | 114.3               | 114.3      | 69.9               | 69.9       |                              | 116.1   |
| 5                 | 349                          | 50.8                    | 50.8       | 190.5                     | 185.7                     | 141.2                      | 127.0               | 127.0      | 79.2               | 79.2       |                              | 143.8   |
| 6                 | 381                          | 55.6                    | 55.6       | 235.0                     | 215.9                     | 168.4                      | 139.7               | 139.7      | 85.9               | 85.9       |                              | 170.7   |
| 8                 | 470                          | 63.5                    | 63.5       | 298.5                     | 269.7                     | 219.2                      | 162.1               | 162.1      | 101.6              | 101.6      |                              | 221.5   |
| 10                | 546                          | 69.9                    | 69.9       | 368.3                     | 323.9                     | 273.1                      | 184.2               | 184.2      | 108.0              | 108.0      |                              | 276.4   |
| 12                | 610                          | 79.2                    | 79.2       | 419.1                     | 381.0                     | 323.9                      | 200.2               | 200.2      | 117.3              | 117.3      |                              | 327.2   |
| 14                | 641                          | 85.9                    | -          | 450.9                     | 412.8                     | 355.6                      | 212.9               | -          | -                  | -          |                              | -       |
| 16                | 705                          | 88.9                    | -          | 508.0                     | 469.9                     | 406.4                      | 215.9               | -          | -                  | -          |                              | -       |
| 18                | 787                          | 101.6                   | -          | 565.2                     | 533.4                     | 457.2                      | 228.6               | -          | -                  | -          |                              | -       |
| 20                | 857                          | 108.0                   | -          | 622.3                     | 584.2                     | 508.0                      | 247.7               | -          | -                  | -          | -                            |         |
| 24                | 1041                         | 139.7                   | -          | 749.3                     | 692.2                     | 609.6                      | 292.1               | -          | -                  | -          | -                            |         |
| <b>CLASS 1500</b> |                              |                         |            |                           |                           |                            |                     |            |                    |            |                              |         |
| 1                 | 149                          | 38.1                    | 38.1       | 52.3                      | 50.8                      | 33.5                       | 82.6                | 82.6       | 47.8               | 44.5       | To be specified by purchaser | 34.5    |
| 1 1/4             | 158                          | 35.1                    | 35.1       | 63.5                      | 63.5                      | 42.2                       | 73.2                | 73.2       | 47.8               | 44.5       |                              | 43.2    |
| 1 1/2             | 178                          | 38.1                    | 38.1       | 69.9                      | 73.2                      | 48.3                       | 88.9                | 88.9       | 47.8               | 44.5       |                              | 49.5    |
| 2                 | 216                          | 38.1                    | 38.1       | 104.6                     | 91.9                      | 60.5                       | 101.6               | 101.6      | 57.2               | 57.2       |                              | 62.0    |
| 2 1/2             | 244                          | 41.1                    | 41.1       | 124.0                     | 104.6                     | 73.2                       | 104.6               | 104.6      | 63.5               | 63.5       |                              | 74.7    |
| 3                 | 267                          | 47.8                    | 47.8       | 133.4                     | 127.0                     | 88.9                       | 117.3               | 117.3      | 73.2               | 73.2       |                              | 90.7    |
| 4                 | 311                          | 53.8                    | 53.8       | 162.1                     | 157.2                     | 114.3                      | 124.0               | 124.0      | 90.4               | 90.4       |                              | 116.1   |
| 5                 | 375                          | 73.2                    | 73.2       | 196.9                     | 185.7                     | 141.2                      | 155.4               | 104.6      | 104.6              | 104.6      |                              | 143.8   |
| 6                 | 394                          | 82.6                    | 82.6       | 228.6                     | 215.9                     | 168.4                      | 171.5               | 171.5      | 119.1              | 119.1      |                              | 170.7   |
| 8                 | 483                          | 91.9                    | 91.9       | 292.1                     | 269.7                     | 219.2                      | 212.9               | 212.9      | 142.7              | 142.7      |                              | 221.5   |
| 10                | 584                          | 108.0                   | 108.0      | 368.3                     | 323.9                     | 273.1                      | 254.0               | 254.0      | 158.8              | 158.5      |                              | 276.4   |
| 12                | 673                          | 124.0                   | 124.0      | 450.9                     | 381.0                     | 323.9                      | 282.4               | 282.4      | 180.8              | 180.8      |                              | 327.2   |
| 14                | 749                          | 133.4                   | -          | 495.3                     | 412.8                     | 355.6                      | 298.5               | -          | -                  | -          |                              | -       |
| 16                | 826                          | 146.1                   | -          | 552.5                     | 469.9                     | 406.4                      | 311.2               | -          | -                  | -          |                              | -       |
| 18                | 914                          | 162.1                   | -          | 596.9                     | 533.4                     | 457.2                      | 327.2               | -          | -                  | -          |                              | -       |
| 20                | 984                          | 177.8                   | -          | 641.4                     | 584.2                     | 508.0                      | 355.6               | -          | -                  | -          |                              | -       |
| 24                | 1168                         | 203.2                   | -          | 762.0                     | 692.2                     | 609.6                      | 406.4               | -          | -                  | -          | -                            |         |

**NOTE :**

1. For the inside diameter of pipes (corresponding to 'Bore' (B) of Welding Neck Flanges), refer to page 46,47
2. Class 900 Flanges of sizes 1" (25.4mm) through 2 1/2" are the same as for Class 1500.
3. Class 900 and 1500 is not included in "thickness' (t) and 'Length through Hub' (t).
4. Each union includes two carbon steel jack screw bolts with hex nuts.

WELDING NECK  
(RING-TYPE JOINT)



1/4" Drill for Sizes 2 1/2" and Under  
3/8" Drill for Sizes 3"  
1/2" Drill for Sizes 4" and Over

Unit : mm

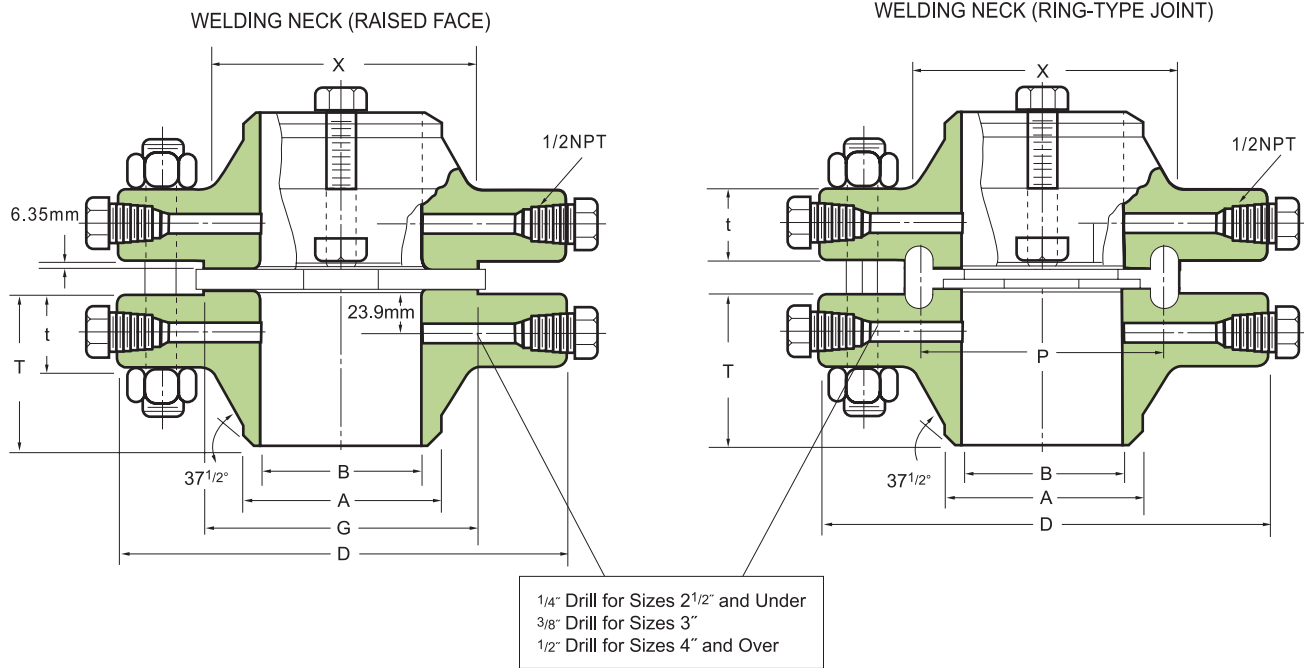
| Nominal Pipe Size | Pitch Diam. of Ring and Groove<br><br>P | Ring Number | DEPTH OF JACK SCREW SLOT |            | JACK SCREW SIZE    |                   | DRILLING TEMPLATE    |                 |                            |                      |                      |            |
|-------------------|---|-------------|--------------------------|------------|--------------------|-------------------|----------------------|-----------------|----------------------------|----------------------|----------------------|------------|
|                   |   |             | Raised Face              | Ring Joint | Raised Face (inch) | Ring Joint (inch) | Diam. of Bolt Circle | Number of Bolts | Diam. of Stud Bolts (inch) | Diam. of Bolts Holes | Length of Stud Bolts |            |
|                   |   |             |                          |            |                    |                   |                      |                 |                            |                      | Raised Face          | Ring Joint |
| <b>CLASS 900</b>  |   |             |                          |            |                    |                   |                      |                 |                            |                      |                      |            |
| 3                 | 123.8                                   | R31         | 9.7                      | 15.7       | 3/4X3.50           | 3/4X4.00          | 190.5                | 8               | 7/8                        | 25.4                 | 152.4                | 165.1      |
| 4                 | 149.2                                   | R37         | 9.7                      | 15.7       | 3/4X3.50           | 3/4X4.50          | 235.0                | 8               | 1 1/8                      | 31.8                 | 177.8                | 190.5      |
| 5                 | 181.0                                   | R41         | 9.7                      | 15.7       | 3/4X3.50           | 3/4X4.50          | 279.4                | 8               | 1 1/4                      | 35.1                 | 190.5                | 203.2      |
| 6                 | 211.1                                   | R45         | 15.7                     | 22.4       | 1X4.50             | 1X4.75            | 317.5                | 12              | 1 1/8                      | 31.8                 | 196.9                | 209.6      |
| 8                 | 269.9                                   | R49         | 15.7                     | 22.4       | 1X4.50             | 1X5.00            | 393.7                | 12              | 1 3/8                      | 38.1                 | 228.6                | 241.3      |
| 10                | 323.9                                   | R53         | 15.7                     | 22.4       | 1X4.50             | 1X5.25            | 469.9                | 16              | 1 3/8                      | 38.1                 | 241.3                | 254.0      |
| 12                | 381.0                                   | R57         | 15.7                     | 22.4       | 1X4.50             | 1X5.50            | 533.4                | 20              | 1 3/8                      | 38.1                 | 260.4                | 273.1      |
| 14                | -                                       | -           | -                        | -          | -                  | -                 | 558.8                | 20              | 1 1/2                      | 41.1                 | 279.4                | -          |
| 16                | -                                       | -           | -                        | -          | -                  | -                 | 616.0                | 20              | 1 5/8                      | 44.5                 | 292.1                | -          |
| 18                | -                                       | -           | -                        | -          | -                  | -                 | 685.8                | 20              | 1 7/8                      | 50.8                 | 330.2                | -          |
| 20                | -                                       | -           | -                        | -          | -                  | -                 | 749.3                | 20              | 2                          | 53.8                 | 355.6                | -          |
| 24                | -                                       | -           | -                        | -          | -                  | -                 | 901.7                | 20              | 2 1/2                      | 66.5                 | 444.5                | -          |
| <b>CLASS 1500</b> |   |             |                          |            |                    |                   |                      |                 |                            |                      |                      |            |
| 1                 | 50.8                                    | R16         | 6.4                      | 12.7       | 5/8X3.00           | 5/8X3.50          | 101.6                | 4               | 7/8                        | 25.4                 | 152.4                | 158.8      |
| 1 1/4             | 60.3                                    | R18         | 6.4                      | 12.7       | 5/8X3.00           | 5/8X3.50          | 111.3                | 4               | 7/8                        | 25.4                 | 139.7                | 146.1      |
| 1 1/2             | 68.3                                    | R20         | 6.4                      | 12.7       | 5/8X3.00           | 5/8X3.50          | 124.0                | 4               | 1                          | 28.4                 | 158.8                | 165.1      |
| 2                 | 95.3                                    | R24         | 6.4                      | 12.7       | 5/8X3.00           | 5/8X4.00          | 165.1                | 8               | 7/8                        | 25.4                 | 152.4                | 165.1      |
| 2 1/2             | 108.0                                   | R27         | 6.4                      | 12.7       | 5/8X3.00           | 5/8X4.00          | 190.5                | 8               | 1                          | 28.4                 | 165.1                | 177.8      |
| 3                 | 136.5                                   | R35         | 9.7                      | 15.7       | 5/8X3.50           | 3/4X4.50          | 203.2                | 8               | 1 1/8                      | 31.8                 | 184.2                | 196.9      |
| 4                 | 161.9                                   | R39         | 9.7                      | 15.7       | 5/8X3.50           | 3/4X4.50          | 241.3                | 8               | 1 1/4                      | 35.1                 | 203.2                | 215.9      |
| 5                 | 193.7                                   | R44         | 9.7                      | 15.7       | 5/8X3.50           | 3/4X4.50          | 292.1                | 8               | 1 1/2                      | 41.1                 | 247.7                | 260.4      |
| 6                 | 211.1                                   | R46         | 15.8                     | 22.4       | 1X6.00             | 1X6.50            | 317.5                | 12              | 1 3/8                      | 38.1                 | 266.7                | 279.4      |
| 8                 | 269.9                                   | R50         | 15.7                     | 22.4       | 1X6.50             | 1X6.50            | 393.7                | 12              | 1 5/8                      | 44.5                 | 298.5                | 317.5      |
| 10                | 323.9                                   | R54         | 15.7                     | 22.4       | 1X6.50             | 1X7.00            | 482.6                | 12              | 1 7/8                      | 50.8                 | 342.9                | 362.0      |
| 12                | 381.0                                   | R58         | 15.7                     | 22.4       | 1X6.50             | 1X8.00            | 571.5                | 16              | 2                          | 53.8                 | 381.0                | 406.4      |
| 14                | -                                       | -           | -                        | -          | -                  | -                 | 635.0                | 16              | 2 1/4                      | 60.5                 | 412.8                | -          |
| 16                | -                                       | -           | -                        | -          | -                  | -                 | 704.9                | 16              | 2 1/2                      | 66.5                 | 450.9                | -          |
| 18                | -                                       | -           | -                        | -          | -                  | -                 | 774.7                | 16              | 2 3/4                      | 73.2                 | 501.7                | -          |
| 20                | -                                       | -           | -                        | -          | -                  | -                 | 831.9                | 16              | 3                          | 79.2                 | 546.1                | -          |
| 24                | -                                       | -           | -                        | -          | -                  | -                 | 990.6                | 16              | 3 1/2                      | 91.9                 | 622.3                | -          |

NOTE :

- Unless otherwise specified, raised face unions are furnished with alloy bolt studs per ASTM A193 Grade B7 with American Standard heavy series hex nuts ASTM A194 Class 2H.
- On ring joint flanges having a groove depth 0.375" (9.5mm) and less, the distance from the center line of the tap hole to the flange face is 0.750" (19.1mm). When the depth of groove is 0.438" (11.1mm) or greater, changes in drill size or method of drilling are necessary.
- Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 0.25" (6.4mm) for sizes 3-12 and 0.38" (9.7mm) for sizes 14-24. Bolt lengths for ring type joint flanges include allowance of 0.62" (15.7mm) for sizes 3-10, 0.75" (19.1mm) for sizes 12-18 and 0.88" (22.4mm) for size 20.

# ORIFICE FLANGES

## CLASS 2500 ORIFICE FLANGES



### ANSI B 16.36 Forged Flanges

Unit : mm

| Nominal Pipe Size | O.D. of Flange Face | O.D. of Raised Flange | THK'S of Hub Min | Length Thru | Diam. of Hub | Diam. of Hub at Bevel | Bore  | Ring Type Joing |             | DRILLING TEMPLATE |                 |                |                       | LENGTH OF STUD BOLTS |            |
|-------------------|---------------------|-----------------------|------------------|-------------|--------------|-----------------------|---|-----------------|-------------|-------------------|-----------------|----------------|-----------------------|----------------------|------------|
|                   |                     |                       |                  |             |              |                       |   | Pitch Diam.     | Ring Number | Diam. Bolt Circle | Number of Holes | Diam. of Holes | Diam. of Bolts (inch) | Raised Face          | Ring Joint |
|                   |                     |                       |                  |             |              |                       |   |                 |             |                   |                 |                |                       |                      |            |
| 1                 | 159                 | 50.8                  | 38.1             | 91.9        | 57.2         | 33.5                  | See Note 1.<br>To be specified by purchaser | 60.3            | R18         | 108.0             | 4               | 25.4           | 7/8                   | 152.4                | 158.8      |
| 1 1/2             | 203                 | 73.2                  | 44.5             | 111.3       | 79.2         | 48.3                  |   | 82.6            | R23         | 146.1             | 4               | 31.8           | 1 1/8                 | 177.8                | 190.5      |
| 2                 | 235                 | 91.9                  | 50.8             | 127.0       | 95.3         | 60.5                  |   | 101.6           | R26         | 171.5             | 8               | 28.4           | 1                     | 184.2                | 196.9      |
| 2 1/2             | 267                 | 104.6                 | 57.2             | 142.7       | 114.3        | 73.2                  |   | 111.1           | R28         | 196.9             | 8               | 31.8           | 1 1/8                 | 203.2                | 215.9      |
| 3                 | 305                 | 127.0                 | 66.5             | 168.1       | 133.4        | 88.9                  |   | 127.0           | R32         | 228.6             | 8               | 35.1           | 1 1/4                 | 228.6                | 241.3      |
| 4                 | 356                 | 157.2                 | 76.2             | 190.5       | 165.1        | 114.3                 |   | -               | -           | 273.1             | 8               | 41.1           | 1 1/2                 | 260.4                | -          |
| 6                 | 483                 | 215.9                 | 108.0            | 273.1       | 235.0        | 168.4                 |   | -               | -           | 368.3             | 8               | 53.8           | 2                     | 349.3                | -          |
| 8                 | 552                 | 269.7                 | 127.0            | 317.5       | 304.8        | 219.2                 |   | -               | -           | 438.2             | 12              | 53.8           | 2                     | 387.4                | -          |
| 10                | 673                 | 323.9                 | 165.1            | 419.1       | 374.7        | 273.1                 |   | -               | -           | 539.8             | 12              | 66.5           | 2 1/2                 | 489.0                | -          |
| 12                | 762                 | 381.0                 | 184.2            | 463.6       | 441.5        | 323.9                 |   | -               | -           | 619.3             | 12              | 73.2           | 2 3/4                 | 539.8                | -          |

**NOTE :**

- For the inside diameter of pipes (corresponding to 'Bore' (B) of Welding Neck Flanges), refer to page 46,47
- Class 2500 Flanges will be furnished with 0.25" (6.4mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub' (T)
- Each union includes two carbon steel jack screw bolts with hex nuts.
- Unless otherwise specified, raised face unions are furnished with alloy bolt studs per ASTM A193 Grade B7 with American Standard heavy series hex nuts ASTM A194 Class 2H.
- On ring joint flanges having a groove depth 0.375" (9.5mm) and less, the distance from the center line of the tap hole to the flange face is 0.750" (19.1mm). When the depth of groove is 0.438" (11.1mm) or greater, changes in drill size or method of drilling are necessary.
- Class 2500 Slip-on flanges are not covered by ANSI B16.5.
- Bolt lengths for raised face flanges include allowance for orifice and gasket thickness of 0.25" (6.4mm) for sizes 1-12 and 0.38" (9.7mm) for sizes 14-24. Bolt lengths for ring type joint flanges include allowance of 0.62" (15.7mm) for sizes 1-6.



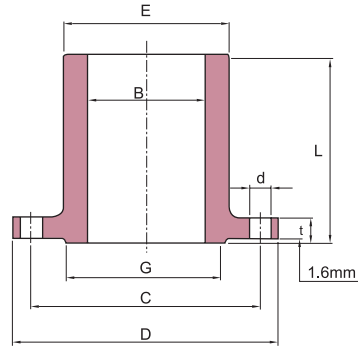
 **SUPERLOK<sup>®</sup>**

# LONG WELDING NECK FLANGES

- Class 150 Flanges
- Class 300 Flanges
- Class 400 Flanges
- Class 600 Flanges
- Class 900 Flanges
- Class 1500 Flanges
- Class 2500 Flanges

# LONG WELDING NECK FLANGES

## CLASS 150 FLANGES



Unit : mm

| Nominal Pipe Size | Outside Diam. | O.D of Raised Face | Hub Diameter of Bevel | Diameter of Bore | Thickness of Flange Min | Length Through Hub | DRILLING                |                 |                   |
|-------------------|---------------|--------------------|-----------------------|------------------|-------------------------|--------------------|-------------------------|-----------------|-------------------|
|                   |               |                    |                       |                  |                         |                    | Diameter of Bolt Circle | Number of Holes | Diameter of Holes |
|                   | D             | G                  | E                     | B                | t                       | L                  | C                       |                 | d                 |
| 1/2               | 89            | 34.9               | 30.2                  | 12.7             | 11.2                    | 228.6              | 60.5                    | 4               | 15.7              |
| 3/4               | 99            | 42.9               | 38.1                  | 19.1             | 12.7                    | 228.6              | 69.9                    | 4               | 15.7              |
| 1                 | 108           | 50.8               | 50.8                  | 25.4             | 14.2                    | 228.6              | 79.2                    | 4               | 15.7              |
| 1 1/4             | 117           | 63.5               | 60.5                  | 31.8             | 15.7                    | 228.6              | 88.9                    | 4               | 15.7              |
| 1 1/2             | 127           | 73.0               | 66.5                  | 38.1             | 17.5                    | 228.6              | 98.6                    | 4               | 15.7              |
| 2                 | 152           | 91.9               | 82.6                  | 50.8             | 19.1                    | 228.6              | 120.7                   | 4               | 19.1              |
| 2 1/2             | 178           | 104.6              | 95.3                  | 63.5             | 22.4                    | 228.6              | 139.7                   | 4               | 19.1              |
| 3                 | 191           | 127.0              | 108.0                 | 76.2             | 23.9                    | 228.6              | 152.4                   | 4               | 19.1              |
| 3 1/2             | 216           | 139.7              | 124.0                 | 88.9             | 23.9                    | 228.6              | 177.8                   | 8               | 19.1              |
| 4                 | 229           | 157.2              | 139.7                 | 101.6            | 23.9                    | 304.8              | 190.5                   | 8               | 19.1              |
| 5                 | 254           | 185.7              | 165.1                 | 127.0            | 23.9                    | 304.8              | 215.9                   | 8               | 22.4              |
| 6                 | 279           | 215.9              | 196.9                 | 152.4            | 25.4                    | 304.8              | 241.3                   | 8               | 22.4              |
| 8                 | 343           | 269.7              | 247.7                 | 203.2            | 28.4                    | 304.8              | 298.5                   | 8               | 22.4              |
| 10                | 406           | 323.9              | 304.8                 | 254.0            | 30.2                    | 304.8              | 362.0                   | 12              | 25.4              |
| 12                | 483           | 381.0              | 365.3                 | 304.8            | 31.8                    | 304.8              | 431.8                   | 12              | 25.4              |
| 14                | 533           | 412.8              | 406.4                 | 355.6            | 35.1                    | 304.8              | 476.3                   | 12              | 28.4              |
| 16                | 597           | 469.9              | 457.2                 | 406.4            | 36.6                    | 304.8              | 539.8                   | 16              | 28.4              |
| 18                | 635           | 533.4              | 508.0                 | 457.2            | 39.6                    | 304.8              | 577.9                   | 16              | 31.8              |
| 20                | 699           | 584.2              | 558.8                 | 508.0            | 42.9                    | 304.8              | 635.0                   | 20              | 31.8              |
| 24                | 813           | 692.2              | 666.8                 | 609.6            | 47.8                    | 304.8              | 749.3                   | 20              | 35.1              |

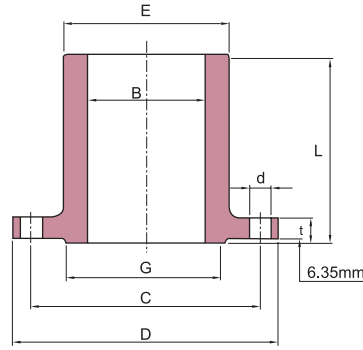
## CLASS 300 FLANGES

Unit : mm

| Nominal Pipe Size | Outside Diam. | O.D of Raised Face | Hub Diameter of Bevel | Diameter of Bore | Thickness of Flange Min | Length Through Hub | DRILLING                |                 |                   |
|-------------------|---------------|--------------------|-----------------------|------------------|-------------------------|--------------------|-------------------------|-----------------|-------------------|
|                   |               |                    |                       |                  |                         |                    | Diameter of Bolt Circle | Number of Holes | Diameter of Holes |
|                   | D             | G                  | E                     | B                | t                       | L                  | C                       |                 | d                 |
| 1/2               | 95            | 35.1               | 38.1                  | 12.7             | 14.2                    | 228.6              | 66.5                    | 4               | 15.7              |
| 3/4               | 117           | 42.9               | 47.8                  | 19.1             | 15.7                    | 228.6              | 82.6                    | 4               | 19.1              |
| 1                 | 124           | 50.8               | 53.8                  | 25.4             | 17.5                    | 228.6              | 88.9                    | 4               | 19.1              |
| 1 1/4             | 133           | 63.5               | 63.5                  | 31.8             | 19.1                    | 228.6              | 98.6                    | 4               | 19.1              |
| 1 1/2             | 155           | 73.2               | 69.9                  | 38.1             | 20.6                    | 228.6              | 114.3                   | 4               | 22.4              |
| 2                 | 165           | 91.9               | 84.1                  | 50.8             | 22.4                    | 228.6              | 127.0                   | 8               | 19.1              |
| 2 1/2             | 191           | 104.6              | 100.1                 | 63.5             | 25.4                    | 228.6              | 149.4                   | 8               | 22.4              |
| 3                 | 210           | 127.0              | 117.3                 | 76.2             | 28.4                    | 228.6              | 168.1                   | 8               | 22.4              |
| 3 1/2             | 229           | 139.7              | 133.4                 | 88.9             | 30.2                    | 228.6              | 184.2                   | 8               | 22.4              |
| 4                 | 254           | 157.2              | 146.1                 | 101.6            | 31.8                    | 304.8              | 200.2                   | 8               | 22.4              |
| 5                 | 279           | 185.7              | 177.8                 | 127.0            | 35.1                    | 304.8              | 235.0                   | 8               | 22.4              |
| 6                 | 318           | 215.9              | 206.2                 | 152.4            | 36.6                    | 304.8              | 269.7                   | 12              | 22.4              |
| 8                 | 381           | 269.7              | 260.4                 | 203.2            | 41.1                    | 304.8              | 330.2                   | 12              | 25.4              |
| 10                | 445           | 323.9              | 320.5                 | 254.0            | 47.8                    | 304.8              | 387.4                   | 16              | 28.4              |
| 12                | 521           | 381.0              | 374.7                 | 304.8            | 50.8                    | 304.8              | 450.9                   | 16              | 31.8              |
| 14                | 584           | 412.8              | 425.5                 | 355.6            | 53.8                    | 304.8              | 514.4                   | 20              | 31.8              |
| 16                | 648           | 469.9              | 482.6                 | 406.4            | 57.2                    | 304.8              | 571.5                   | 20              | 35.1              |
| 18                | 711           | 533.4              | 533.4                 | 457.2            | 60.5                    | 304.8              | 628.7                   | 24              | 35.1              |
| 20                | 775           | 584.2              | 587.2                 | 508.0            | 63.5                    | 304.8              | 685.8                   | 24              | 35.1              |
| 24                | 914           | 692.2              | 701.5                 | 609.6            | 69.9                    | 304.8              | 812.8                   | 24              | 41.1              |

NOTE : 1. Bore (B) is the same as nominal pipe size.  
2. Welding necks longer than listed are available in all sizes on special order.

# CLASS 400 FLANGES



Unit : mm

| Nominal Pipe Size | Outside Diam.<br>D | O.D of Raised Face<br>G | Hub Diameter of Bevel<br>E | Diameter of Bore<br>B | Thickness of Flange Min<br>t | Length Thru Hub<br>L | DRILLING                     |                 |                        |
|-------------------|--------------------|-------------------------|----------------------------|-----------------------|------------------------------|----------------------|------------------------------|-----------------|------------------------|
|                   |                    |                         |                            |                       |                              |                      | Diameter of Bolt Circle<br>C | Number of Holes | Diameter of Holes<br>d |
| 1/2               |                    |                         |                            |                       |                              |                      |                              |                 |                        |
| 3/4               |                    |                         |                            |                       |                              |                      |                              |                 |                        |
| 1                 |                    |                         |                            |                       |                              |                      |                              |                 |                        |
| 1 1/4             |                    |                         |                            |                       |                              |                      |                              |                 |                        |
| 1 1/2             |                    |                         |                            |                       |                              |                      |                              |                 |                        |
| 2                 |                    |                         |                            |                       |                              |                      |                              |                 |                        |
| 2 1/2             |                    |                         |                            |                       |                              |                      |                              |                 |                        |
| 3                 |                    |                         |                            |                       |                              |                      |                              |                 |                        |
| 3 1/2             |                    |                         |                            |                       |                              |                      |                              |                 |                        |
| 4                 | 254                | 157.2                   | 146.1                      | 101.6                 | 35.1                         | 304.8                | 200.2                        | 8               | 25.4                   |
| 5                 | 279                | 185.7                   | 177.8                      | 127.0                 | 38.1                         | 304.8                | 235.0                        | 8               | 25.4                   |
| 6                 | 318                | 215.9                   | 206.2                      | 152.4                 | 41.1                         | 304.8                | 269.7                        | 12              | 25.4                   |
| 8                 | 381                | 269.7                   | 260.4                      | 203.2                 | 47.8                         | 304.8                | 330.2                        | 12              | 28.4                   |
| 10                | 445                | 323.9                   | 320.5                      | 254.0                 | 53.8                         | 304.8                | 387.4                        | 16              | 31.8                   |
| 12                | 521                | 381.0                   | 374.7                      | 304.8                 | 57.2                         | 304.8                | 450.9                        | 16              | 35.1                   |
| 14                | 584                | 412.8                   | 425.5                      | 355.6                 | 60.5                         | 304.8                | 514.4                        | 20              | 35.1                   |
| 16                | 648                | 469.9                   | 482.6                      | 406.4                 | 63.5                         | 304.8                | 571.5                        | 20              | 38.1                   |
| 18                | 711                | 533.4                   | 533.4                      | 457.2                 | 66.5                         | 304.8                | 628.7                        | 24              | 38.1                   |
| 20                | 775                | 584.2                   | 587.2                      | 508.0                 | 69.9                         | 304.8                | 685.8                        | 24              | 41.1                   |
| 24                | 914                | 692.2                   | 701.5                      | 609.6                 | 76.2                         | 304.8                | 812.8                        | 24              | 47.8                   |

Use Class 600 dimensions in these sizes.

# CLASS 600 FLANGES

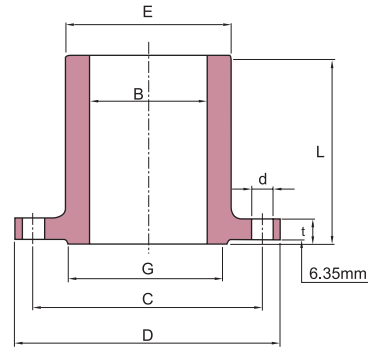
Unit : mm

| Nominal Pipe Size | Outside Diam.<br>D | O.D of Raised Face<br>G | Hub Diameter of Bevel<br>E | Diameter of Bore<br>B | Thickness of Flange Min<br>t | Length Thru Hub<br>L | DRILLING                     |                 |                        |
|-------------------|--------------------|-------------------------|----------------------------|-----------------------|------------------------------|----------------------|------------------------------|-----------------|------------------------|
|                   |                    |                         |                            |                       |                              |                      | Diameter of Bolt Circle<br>C | Number of Holes | Diameter of Holes<br>d |
| 1                 | 124                | 50.8                    | 53.8                       | 25.4                  | 17.5                         | 228.6                | 88.9                         | 4               | 19.1                   |
| 1 1/4             | 133                | 63.5                    | 63.5                       | 31.8                  | 20.6                         | 228.6                | 98.6                         | 4               | 19.1                   |
| 1 1/2             | 155                | 73.2                    | 69.9                       | 38.1                  | 22.4                         | 228.6                | 114.3                        | 4               | 22.4                   |
| 2                 | 165                | 91.9                    | 84.1                       | 50.8                  | 25.4                         | 228.6                | 127.0                        | 8               | 19.1                   |
| 2 1/2             | 191                | 104.6                   | 100.1                      | 63.5                  | 28.4                         | 228.6                | 149.4                        | 8               | 22.4                   |
| 3                 | 210                | 127.0                   | 117.3                      | 76.2                  | 31.8                         | 228.6                | 168.1                        | 8               | 22.4                   |
| 3 1/2             | 229                | 139.7                   | 133.4                      | 88.9                  | 35.1                         | 228.6                | 184.2                        | 8               | 25.4                   |
| 4                 | 273                | 157.2                   | 152.4                      | 101.6                 | 38.1                         | 304.8                | 215.9                        | 8               | 25.4                   |
| 5                 | 330                | 185.7                   | 190.5                      | 127.0                 | 44.5                         | 304.8                | 266.7                        | 8               | 28.4                   |
| 6                 | 356                | 215.9                   | 222.3                      | 152.4                 | 47.8                         | 304.8                | 292.1                        | 12              | 28.4                   |
| 8                 | 419                | 269.7                   | 273.1                      | 203.2                 | 55.6                         | 304.8                | 349.3                        | 12              | 31.8                   |
| 10                | 508                | 323.9                   | 342.9                      | 254.0                 | 63.5                         | 304.8                | 431.8                        | 16              | 35.1                   |
| 12                | 559                | 381.0                   | 400.1                      | 304.8                 | 66.5                         | 304.8                | 489.0                        | 16              | 35.1                   |
| 14                | 603                | 412.8                   | 431.8                      | 355.6                 | 69.9                         | 304.8                | 527.1                        | 20              | 38.1                   |
| 16                | 686                | 469.9                   | 495.3                      | 406.4                 | 76.2                         | 304.8                | 603.3                        | 20              | 41.1                   |
| 18                | 743                | 533.4                   | 546.1                      | 457.2                 | 82.6                         | 304.8                | 654.1                        | 20              | 44.5                   |
| 20                | 813                | 584.2                   | 609.6                      | 508.0                 | 88.9                         | 304.8                | 723.9                        | 24              | 44.5                   |
| 24                | 940                | 692.2                   | 717.6                      | 609.6                 | 101.6                        | 304.8                | 838.2                        | 24              | 50.8                   |

NOTE : 1. Bore (B) is the same as nominal pipe size.  
2. Welding necks longer than listed are available in all sizes on special order.

# LONG WELDING NECK FLANGES

## CLASS 900 FLANGES



Unit : mm

| Nominal Pipe Size | Outside Diam. | O.D of Raised Face | Hub Diameter of Bevel | Diameter of Bore | Thickness of Flange Min | Length Through Hub            | DRILLING                |                 |                   |
|-------------------|---------------|--------------------|-----------------------|------------------|-------------------------|-------------------------------|-------------------------|-----------------|-------------------|
|                   |               |                    |                       |                  |                         |                               | Diameter of Bolt Circle | Number of Holes | Diameter of Holes |
|                   | D             | G                  | E                     | B                | t                       | L                             | C                       |                 | d                 |
| 1                 |               |                    |                       |                  |                         |                               |                         |                 |                   |
| 1 1/4             |               |                    |                       |                  |                         |                               |                         |                 |                   |
| 1 1/2             |               |                    |                       |                  |                         |                               |                         |                 |                   |
| 2                 |               |                    |                       |                  |                         |                               |                         |                 |                   |
| 2 1/2             |               |                    |                       |                  |                         |                               |                         |                 |                   |
| 3                 | 241           | 127.0              | 127.0                 | 76.2             | 38.1                    | 304.8                         | 190.5                   | 8               | 22.4              |
| 4                 | 292           | 157.2              | 158.8                 | 101.6            | 44.5                    | 304.8                         | 235.0                   | 8               | 31.8              |
| 5                 | 349           | 185.7              | 190.5                 | 127.0            | 50.8                    | 304.8                         | 279.4                   | 8               | 35.1              |
| 6                 | 381           | 215.9              | 235.0                 | 152.4            | 55.6                    | 304.8                         | 317.5                   | 12              | 31.8              |
| 8                 | 470           | 269.7              | 298.5                 | 203.2            | 63.5                    | 304.8                         | 393.7                   | 12              | 38.1              |
| 10                | 546           | 323.9              | 368.3                 | 254.0            | 69.9                    | 406.4                         | 469.9                   | 16              | 38.1              |
| 12                | 610           | 381.0              | 419.1                 | 304.8            | 79.2                    | 406.4                         | 533.4                   | 20              | 38.1              |
| 14                | 641           | 412.8              | 450.9                 | 355.6            | 85.9                    |                               | 558.8                   | 20              | 41.1              |
| 16                | 705           | 469.9              | 508.0                 | 406.4            | 88.9                    | To be specified by Purchaser. | 616.0                   | 20              | 44.5              |
| 18                | 787           | 533.4              | 565.2                 | 457.2            | 101.6                   |                               | 685.8                   | 20              | 50.8              |
| 20                | 857           | 584.2              | 622.3                 | 508.0            | 108.0                   |                               | 749.3                   | 20              | 53.8              |
| 24                | 1041          | 692.2              | 749.3                 | 609.6            | 139.7                   |                               | 901.7                   | 20              | 66.5              |

Use Class 1500 dimensions in these sizes.

## CLASS 1500 FLANGES

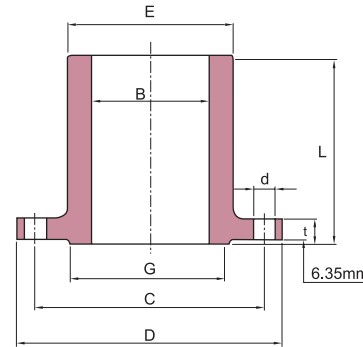
Unit : mm

| Nominal Pipe Size | Outside Diam. | O.D of Raised Face | Hub Diameter of Bevel | Diameter of Bore | Thickness of Flange Min | Length Through Hub            | DRILLING                |                 |                   |
|-------------------|---------------|--------------------|-----------------------|------------------|-------------------------|-------------------------------|-------------------------|-----------------|-------------------|
|                   |               |                    |                       |                  |                         |                               | Diameter of Bolt Circle | Number of Holes | Diameter of Holes |
|                   | D             | G                  | E                     | B                | t                       | L                             | C                       |                 | d                 |
| 1                 | 149           | 50.8               | 52.4                  | 25.4             | 28.4                    | 228.6                         | 101.6                   | 4               | 25.4              |
| 1 1/4             | 159           | 63.5               | 63.5                  | 31.8             | 28.4                    | 228.6                         | 111.3                   | 4               | 25.4              |
| 1 1/2             | 178           | 73.2               | 69.9                  | 38.1             | 31.8                    | 228.6                         | 124.0                   | 4               | 28.4              |
| 2                 | 216           | 91.9               | 104.6                 | 50.8             | 38.1                    | 228.6                         | 165.1                   | 8               | 25.4              |
| 2 1/2             | 244           | 104.6              | 124.0                 | 63.5             | 41.1                    | 304.8                         | 190.5                   | 8               | 28.4              |
| 3                 | 267           | 127.0              | 133.4                 | 76.2             | 47.8                    | 304.8                         | 203.2                   | 8               | 31.8              |
| 4                 | 311           | 157.2              | 162.1                 | 101.6            | 53.8                    | 304.8                         | 241.3                   | 8               | 35.1              |
| 5                 | 375           | 185.7              | 196.9                 | 127.0            | 73.2                    | 304.8                         | 292.1                   | 8               | 41.1              |
| 6                 | 394           | 215.9              | 228.6                 | 152.4            | 82.6                    | 304.8                         | 317.5                   | 12              | 38.1              |
| 8                 | 483           | 269.7              | 292.1                 | 203.2            | 91.9                    | 304.8                         | 393.7                   | 12              | 44.5              |
| 10                | 584           | 323.9              | 368.3                 | 254.0            | 108.0                   | 406.4                         | 482.6                   | 12              | 50.8              |
| 12                | 673           | 381.0              | 450.9                 | 304.8            | 124.0                   | 406.4                         | 571.5                   | 16              | 53.8              |
| 14                | 749           | 412.8              | 495.3                 | 355.6            | 133.4                   |                               | 635.0                   | 16              | 60.5              |
| 16                | 826           | 469.9              | 552.5                 | 406.4            | 146.1                   | To be specified by Purchaser. | 704.9                   | 16              | 66.5              |
| 18                | 914           | 533.4              | 596.9                 | 457.2            | 162.1                   |                               | 774.7                   | 16              | 73.2              |
| 20                | 984           | 584.2              | 641.4                 | 508.0            | 177.8                   |                               | 831.9                   | 16              | 79.2              |
| 24                | 1168          | 692.2              | 762.0                 | 609.6            | 203.2                   |                               | 990.6                   | 16              | 91.9              |

NOTE : 1. Bore (B) is the same as nominal pipe size.

2. Welding necks longer than listed are available in all sizes on special order.

# CLASS 2500 FLANGES



Unit : mm

| Nominal Pipe Size | Outside Diam. | O.D of Raised Face | Hub Diameter of Bevel | Diameter of Bore | Thickness of Flange Min | Length Through Hub | DRILLING                |                 |                   |
|-------------------|---------------|--------------------|-----------------------|------------------|-------------------------|--------------------|-------------------------|-----------------|-------------------|
|                   |               |                    |                       |                  |                         |                    | Diameter of Bolt Circle | Number of Holes | Diameter of Holes |
|                   | D             | G                  | E                     | B                | t                       | L                  | C                       |                 | d                 |
| 1                 | 159           | 50.8               | 57.2                  | 25.4             | 35.1                    | 228.6              | 108.0                   | 4               | 25.4              |
| 1 1/4             | 184           | 63.5               | 73.2                  | 31.8             | 38.1                    | 228.6              | 130.0                   | 4               | 28.4              |
| 1 1/2             | 203           | 73.2               | 79.2                  | 38.1             | 44.5                    | 228.6              | 146.1                   | 4               | 31.8              |
| 2                 | 235           | 91.9               | 95.3                  | 50.8             | 50.8                    | 228.6              | 171.5                   | 8               | 28.4              |
| 2 1/2             | 267           | 104.6              | 114.3                 | 63.5             | 57.2                    | 304.8              | 196.9                   | 8               | 31.8              |
| 3                 | 305           | 127.0              | 133.4                 | 76.2             | 66.5                    | 304.8              | 228.6                   | 8               | 35.1              |
| 4                 | 356           | 157.2              | 165.1                 | 101.6            | 76.2                    | 304.8              | 273.1                   | 8               | 41.1              |
| 5                 | 419           | 185.7              | 203.2                 | 127.0            | 91.9                    | 304.8              | 323.9                   | 8               | 47.8              |
| 6                 | 483           | 215.9              | 235.0                 | 152.4            | 108.0                   | 304.8              | 368.3                   | 8               | 53.8              |
| 8                 | 552           | 269.7              | 304.8                 | 203.2            | 127.0                   | 304.8              | 438.2                   | 12              | 53.8              |
| 10                | 673           | 323.9              | 374.7                 | 254.0            | 165.1                   | 406.4              | 539.8                   | 12              | 66.5              |
| 12                | 762           | 381.0              | 441.5                 | 304.8            | 184.2                   | 406.4              | 619.3                   | 16              | 73.2              |

## GUIDE TO MATERIAL LAYOUT & SPECIFICATIONS

| Pipe           | Weld Fittings | Screwed & Socket Fittings | Flanges                   | Valves                   |
|----------------|---------------|---------------------------|---------------------------|--------------------------|
| A-53           | A-234 WPB     | A-105, A-181 Gr. 60 or 70 | A-105, A-181 Gr. 60 or 70 | A-105<br>A-216 WCB       |
| A-106B         | A-234 WPB     | A-105, Gr. 60 or 70       | A-105, Gr. 60 or 70       | A-105<br>A-216 WCB       |
| A-312 T304     | A-403 WP-304  | A-182 F-304               | A-182 F-304               | A-182<br>F-304 CMO       |
| A-312 T316     | A-403 WP-316  | A-182 F-316               | A-182 F-316               | A-182<br>F-316 CM 8MO    |
| A-333 Gr. 1or6 | A-420 WPL 1&6 | A-350 LF-1                | A-350 LF-1                | A-350 LF-1<br>A-352 LCB  |
| A-333 Gr. 3    | A-420 WPL-3   | A-350 LF-3                | A-350 LF-3                | A-350 LF-3<br>A-352 LC3  |
| A-335 P-1      | A-234 WP-1    | A-182 F-1                 | A-182 F-1                 | A-217 WC-6               |
| A-335 P-11     | A-234 WP-11   | A-182 F-11                | A-182 F-11                | A-182 F-11<br>A-217 WC-6 |
| A-335 P-12     | A-234 WP-12   | A-182 F-12                | A-182 F-12                | A-217 WC-6               |
| A-335 P-22     | A-234 WP-22   | A-182 F-22                | A-182 F-22                | A-182 F-22<br>A-217 WC-9 |
| A-335 P-5      | A-234 WP-5    | A-182 F-5                 | A-182 F-5                 | A-182 F-5<br>A-216 WC-5  |
| A-335 P-7      | A-234 WP-7    | A-182 F-7                 | A-182 F-7                 | A-182 F-7<br>A-217 WC-12 |
| A-335 P-9      | A-234 WP-9    | A-182 F-9                 | A-182 F-9                 | A-182 F-9<br>A-217 WC-12 |

NOTE : 1. Bore (B) is the same as nominal pipe size.  
2. Welding necks longer than listed are available in all sizes on special order.

## REDUCING FLANGES

### Threaded and Slip-on Types

#### ■ HUB

For hub diameter (X) and height of hub above the back of the flange (N) refer to the list of standard flange specification of the same type and pressure and use the dimensions of a flange one nominal pipe size smaller than the nominal pipe size from which the reduction is being made.

#### ■ FLANGE O.D., DRILLING TEMPLATE AND THICKNESS

Outside diameter, drilling template and flange thickness Q(See note on FACINGS) agree with the dimensions of a standard flange of the nominal pipe size from which the reduction is being made.

#### ■ FACING

Facing dimensions also agree with the dimensions of a standard flange of the nominal pipe size from which the reduction is being made.

150 lb. and 300 lb. forged steel Threaded, Slip-On, Welding Neck and Blind flanges are furnished with American Standard 1/16" raised face which is included in flange thickness. Q. 400 lb., 600 lb., 900 lb., 1500 lb. and 2500 lb. flange are supplied with American Standard 1/4" raised face which is not included in flange thickness (Q)

#### ■ BORE OR TAPPING

The bore or tapping is machined to accept a pipe of the nominal pipe size to which the reduction is being made. For reduction to size smaller than shown, BLIND FLANGE are tapped or bored to specified nominal pipe size.

#### EXAMPLE :

A 300 lb. threaded flange used in reducing from a 6" (152.4mm) to 3"(76.2mm) nominal pipe size should be specified as a 3" (76.2mm) x 12 1/2" - 300 lb. Threaded Reducing Flange. It would have the following dimensional characteristics :

Diameter of Hub (X) - 7"(177.8mm).

Height of Hub (N) - 5/8".

Hub dimensions are those of a 5"(127.0mm), 300lb, Standard flange.

Outside Diameter - 12 1/2"

Thickness (Q) - 1 7/16"

Raised face - 1/16".

O.D., Flange Thickness Q, Raised Face and Drilling Template are those of a 6"(152.4mm), 300lb. Standard Flange.

Tapping - 3"(76.2mm) I.P.S.

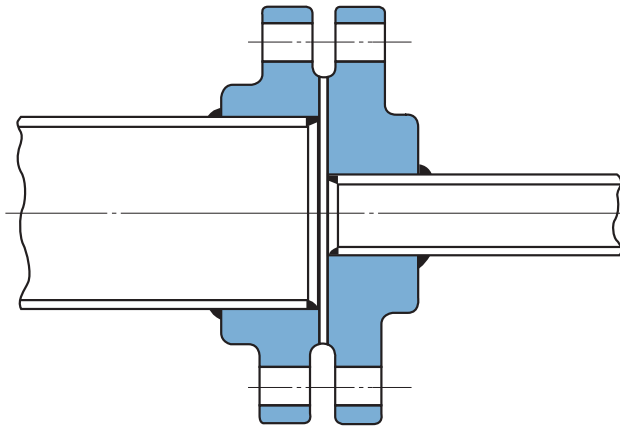
Flange is tapped to the nominal pipe size to which reduction is being made.

#### WELDING NECK TYPES

On Reducing Welding Neck Flanges, which are made only on special order, the hub dimensions agree with the hub dimensions of standard flanges of the size to which reduction is being made. Other flange dimensions, including the drilling template, agree with the standard dimensions of the size from which the reduction is being made.

# REDUCING FLANGES

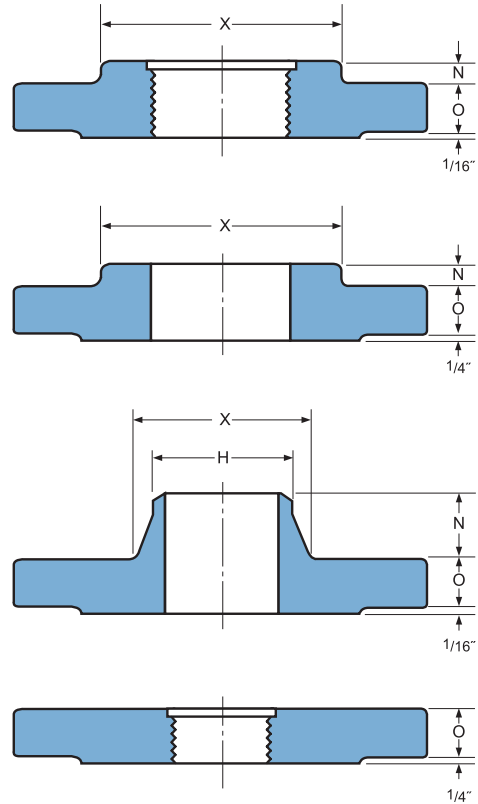
Threaded-Slip-on-Welding neck



In ordering Reducing Flanges : specify (1) nominal pipe size of the tapping or bore to which the reduction is being made.  
 (2) the outside diameter of the flange from which the reduction is being made and (3) pressure rating.

**EXAMPLE :**

A 300 lb. Reducing flange for reducing from a 6" (152.4mm) to a 3"(76.2mm) nominal pipe size should be designated as a 3" (76.2mm) x 12 1/2" - 300 lb. Reducing Flange. Whether Threaded, Slip-On, or Welding Neck type is desired must also be specified.



## ANSI B 16.5 Forged Flanges

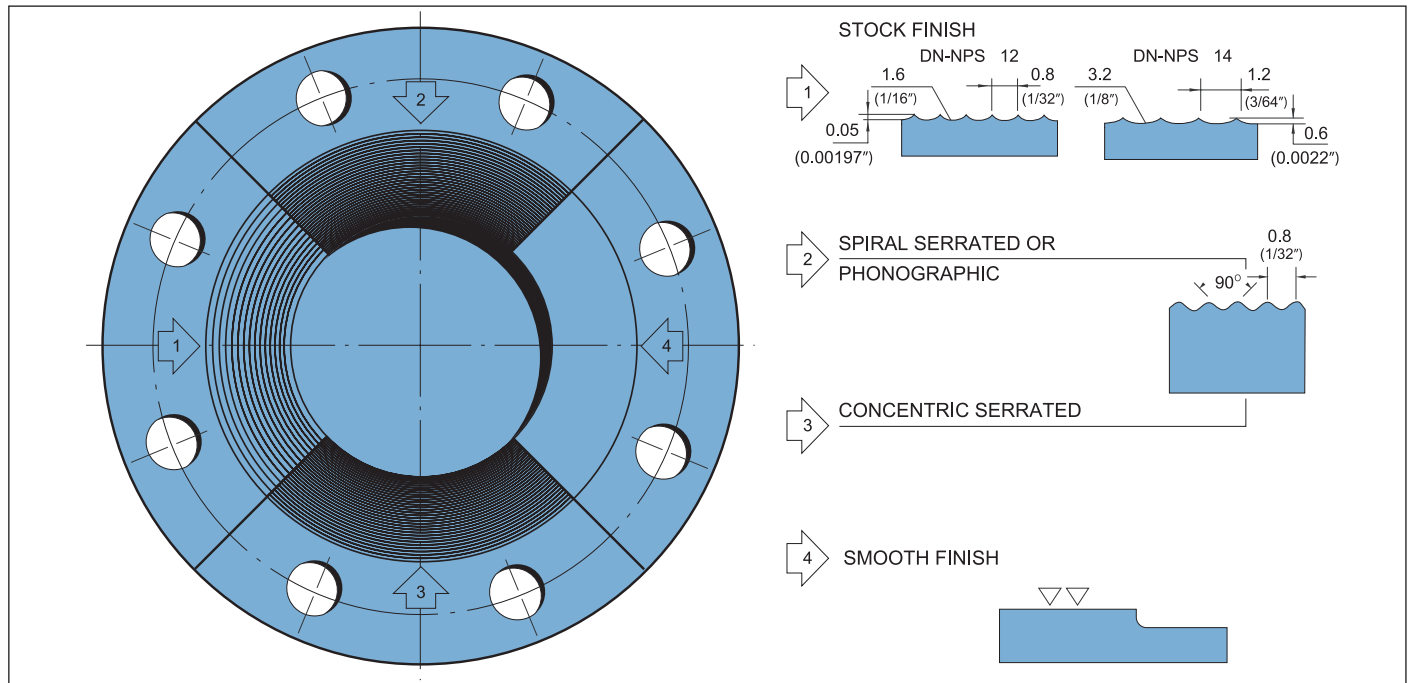
Dimensions inches.

| Nominal Flange | OUTSIDE DIAMETER OF FLANGE FROM WHICH REDUCTION IS BEING MADE |                  |                  |                  |                  |                   |                   | Smallest Size Bore or Tapping Requiring Hub Flange |
|----------------|---|------------------|------------------|------------------|------------------|-------------------|-------------------|--|
|                | 150 lb. Standard  | 300 lb. Standard | 400 lb. Standard | 600 lb. Standard | 900 lb. Standard | 1500 lb. Standard | 2500 lb. Standard |  |
| 3/4            | 3 7/8   | 4 5/8            | 4 5/8            | 4 5/8            | 5 1/8            | 5 1/8             | 5 1/2             | 1/2  |
| 1              | 4 1/4   | 4 7/8            | 4 7/8            | 4 7/8            | 5 7/8            | 5 7/8             | 6 1/4             | 1/2  |
| 1 1/4          | 4 5/8   | 5 1/4            | 5 1/4            | 5 1/4            | 6 1/4            | 6 1/4             | 7 1/4             | 1/2  |
| 1 1/2          | 5   | 6 1/8            | 6 1/8            | 6 1/8            | 7                | 7                 | 8                 | 1/2  |
| 2              | 6   | 6 1/2            | 6 1/2            | 6 1/2            | 8 1/2            | 8 1/2             | 9 1/4             | 1  |
| 2 1/2          | 7   | 7 1/2            | 7 1/2            | 7 1/2            | 9 5/8            | 9 5/8             | 10 1/2            | 1 1/4  |
| 3              | 7 1/2   | 8 1/4            | 8 1/4            | 8 1/4            | 9 1/2            | 10 1/2            | 12                | 1 1/4  |
| 3 1/2          | 8 1/2   | 9                | 9                | 9                | -                | -                 | -                 | 1 1/2  |
| 4              | 9   | 10               | 10               | 10 3/4           | 11 1/2           | 12 1/4            | 14                | 1 1/2  |
| 5              | 10  | 11               | 11               | 13               | 13 3/4           | 14 3/4            | 16 1/2            | 1 1/2  |
| 6              | 11  | 12 1/2           | 12 1/2           | 14               | 15               | 15 1/2            | 19                | 2 1/2  |
| 8              | 13 1/2  | 15               | 15               | 16 1/2           | 18 1/2           | 19                | 21 3/4            | 3  |
| 10             | 16  | 17 1/2           | 17 1/2           | 20               | 21 1/2           | 23                | 26 1/2            | 3 1/2  |
| 12             | 19  | 20 1/2           | 20 1/2           | 22               | 24               | 26 1/2            | 30                | 3 1/2  |
| 14             | 21  | 23               | 23               | 23 3/4           | 25 1/4           | -                 | -                 | 3 1/2  |
| 16             | 23 1/2  | 25 1/2           | 25 1/2           | 27               | 27 3/4           | -                 | -                 | 4  |
| 18             | 25  | 28               | 28               | 29 1/4           | 31               | -                 | -                 | 4  |
| 20             | 27 1/2  | 30 1/2           | 30 1/2           | 32               | 33 3/4           | -                 | -                 | 4  |
| 24             | 32  | 36               | 36               | 37               | 41               | -                 | -                 | 4  |

NOTE :  
 For reductions to size smaller than shown, blind flange are tapped or bored for specified nominal pipe size.

## STANDARD FINISH

### Standard Finishes for Face of Flange(ANSI B16.5)



**STOCK FINISH:** The most widely used of any gasket finish, because, practically, is suitable for all ordinary service conditions. This is a continuous spiral groove. Flanges sizes 12" (304.8mm) and smaller, are produced with a 1/16" round nosed tool at a feed of 1/32" per revolution. For sizes 14" (355.6mm) and larger, the finish is made with 1/8" round-nosed tool at a feed of 3/64" per revolution.

**SPIRAL SERRATED OR PHONOGRAPHIC:** This finish is produced by using a 90° round nosed tool.

**CONCENTRIC SERRATED:** This finish is produced by using a 90° round nosed tool.

**SMOOTH FINISH:** The cutting tool employed shall have an approximate 0.06" radius. The resultant surface finish shall have a 125  $\mu$  inch to 250  $\mu$  inch (ANSI B 16.5 para 6, 4, 4)

#### ■ RAISED FACE, AND LARGE MALE AND FEMALE

Either a serrated-concentric or serrated-spiral finish having from 45 to 55 grooves per inch is used. The cutting tool employed has an approximate 0.06 in, radius. The resultant surface finish shall have a 125  $\mu$  inch (3.2 $\mu$ m), to 250  $\mu$  inch (6.4 $\mu$ m) approximate roughness.

#### ■ TONGUE AND GROOVE, AND SMALL MALE AND FEMALE

The gasket contact surface does not exceed 125  $\mu$  in (3.2 $\mu$ m) roughness.

#### ■ RING JOINT

The inside wall surface of gasket groove does not exceed 63  $\mu$  in (1.6 $\mu$ m) roughness.

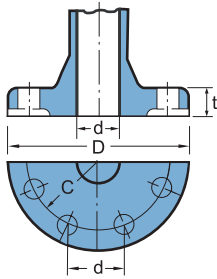
#### ■ BLIND

Blind flanges need not be faced in the center if, when this center part is raised, its diameter is at least 1 in smaller than the inside diameter of fittings of the corresponding pressure class. When the center part is depressed, its diameter is not greater than the inside diameter of the corresponding pressure class fittings. Maching of the depressed center is not required.

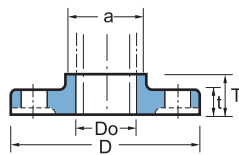
# TOLERANCE

## ANSI B16.5 Forged Flanges

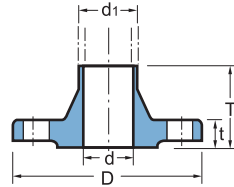
SOLID FLANGE



SLIP-ON FLANGE

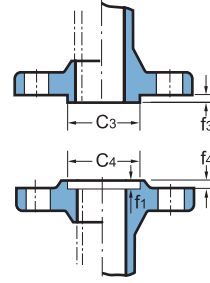


WELDING NECK FLANGE

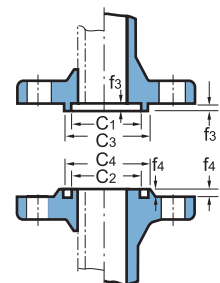


TYPE OF GASKET SURFACE

MALE & FEMALE TYPE



TONGUE & GROOVE TYPE



### THREADED, SOCKET-WELDING, SLIP-ON, LAP JOINT AND BLIND

|   |  |   |                      |
|---|--|---|----------------------|
| Outside Diameter                            | When O.D. is 24" or less                           | $\pm 1/16"$ (1.6mm)*  |                      |
|   | When O.D. is Over 24"                              | $\pm 1/8"$ (3.2mm)*   |                      |
| Inside Diameter                             | Threaded   | Within limits on boring gauge   |                      |
|   | Socket-Welding, Slip-on and Lap joint              | 10" & Smaller<br>$+1/32"$ (0.8mm), $-0"$<br>12" & Larger<br>$+1/16"$ (1.6mm), $-0"$ |                      |
| Outside Diameter of Hub                     | 5" and Smaller                                     | $+3/32"$ (2.4mm)*<br>$-1/32"$ (0.8mm)   |                      |
|   | 6" and Larger                                      | $+5/32"$ (4.0mm)<br>$-1/32"$ (0.8mm)  |                      |
| Diameter of Contact Face                    | 1/16" Raised Face                                  | $+1/32"$ (0.8mm)  |                      |
|   | 1/4" Raised Face Tongue & Groove Male, Female      | $+1/64"$ (0.4mm)  |                      |
| Diameter of Counterbore                     | Same as for Inside Diameter                        |   |                      |
| Drilling                                    | Bolt Circle  | $\pm 1/16"$ (1.6mm)   |                      |
|   | Bolt Hole Spacing                                  | $\pm 1/32"$ (0.8mm)   |                      |
|   | Eccentricity of Bolt Circle with Respect to Facing | 2 1/2" & Smaller  | $1/32"$ (0.8mm) Max. |
|   |  | 3" & Larger   | $1/16"$ (1.6mm) Max. |
|   | Eccentricity of Bolt Circle with Respect to Bore   | $1/32"$ (0.8mm) Max.*   |                      |
| Eccentricity of Facing with Respect to Bore | $1/32"$ (0.8mm) Max.*                              |   |                      |
| Thickness                                   | 18" and Smaller                                    | $+1/8"$ (3.2mm), $-0"$  |                      |
|   | 20" and Larger                                     | $+3/16"$ (4.8mm), $-0"$   |                      |
| Length Thru Hub                             | 10" and Smaller                                    | $\pm 1/16"$ (1.6mm)   |                      |
|   | 12" and Larger                                     | $\pm 1/8"$ (3.2mm)  |                      |

NOTE : \* This tolerance is not covered in ANSI B16.5, but maker's option

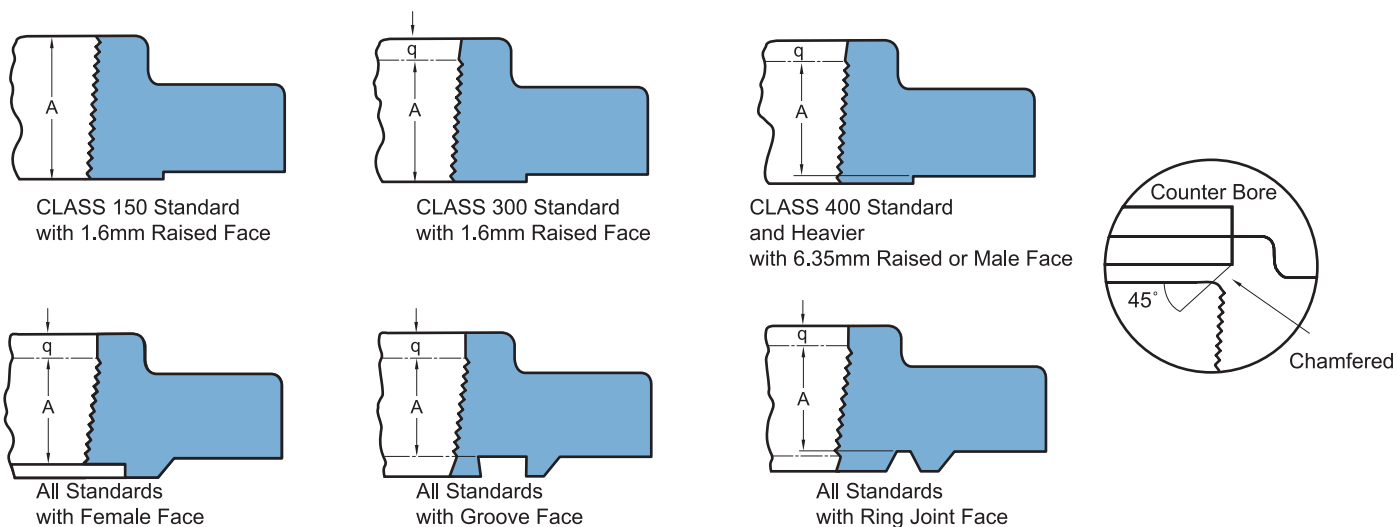
### WELDING NECK

|   |  |                                      |                      |
|---|--|--------------------------------------|----------------------|
| Outside Diameter                            | When O.D. is 24" or less                           | $\pm 1/16"$ (1.6mm)*                 |                      |
|   | When O.D. is Over 24"                              | $\pm 1/8"$ (3.2mm)*                  |                      |
| Inside Diameter                             | 10" and Smaller                                    | $\pm 1/32"$ (0.8mm)                  |                      |
|   | 12" thru 18"                                       | $\pm 1/16"$ (1.6mm)                  |                      |
|   | 20" and Larger                                     | $+1/8"$ (3.2mm)<br>$-1/16"$ (1.6mm)  |                      |
| Diameter of Contact Face                    | 1/16" Raised Face                                  | $\pm 1/32"$ (0.8mm)                  |                      |
|   | 1/4" Raised Face Tongue & Groove Male, Female      | $+1/64"$ (0.4mm)                     |                      |
| Diameter of Hub at Base                     | When Hub Base is 24" or Smaller                    | $\pm 1/16"$ (1.6mm)                  |                      |
|   | When Hub Base is Over 24"                          | $\pm 1/8"$ (3.2mm)                   |                      |
| Diameter of Hub at Point of Welding         | 5" and Smaller                                     | $+3/32"$ (2.4mm)<br>$-1/32"$ (0.8mm) |                      |
|   | 6" and Larger                                      | $+5/32"$ (4.0mm)<br>$-1/32"$ (0.8mm) |                      |
| Drilling                                    | Bolt Circle  | $\pm 1/16"$ (1.6mm)                  |                      |
|   | Bolt Hole Spacing                                  | $\pm 1/32"$ (0.8mm)                  |                      |
|   | Eccentricity of Bolt Circle with Respect to Facing | 2 1/2" & Smaller                     | $1/32"$ (0.8mm) Max. |
|   |  | 3" & Larger                          | $1/16"$ (1.6mm) Max. |
|   | Eccentricity of Bolt Circle with Respect to Bore   | $1/32"$ (0.8mm) Max.*                |                      |
| Eccentricity of Facing with Respect to Bore | $1/32"$ (0.8mm) Max.*                              |                                      |                      |
| Thickness                                   | 18" and Smaller                                    | $+1/8"$ (3.2mm), $-0"$               |                      |
|   | 20" and Larger                                     | $+3/16"$ (4.8mm), $-0"$              |                      |
| Length Thru Hub                             | 4" and Smaller                                     | $\pm 1/16"$ (1.6mm)                  |                      |
|   | 5" ~ 10"   | $+1.6$ ~ $3.0$ mm                    |                      |
|   | 12" and Larger                                     | $+3.0$ ~ $5.0$ mm                    |                      |

NOTE : \* This tolerance is not covered in ANSI B16.5, but maker's option

## THREAD

### Thread and Standards for ANSI Flanges (ANSI B2.1)



### ANSI B 16.5 Forged Flanges

Unit : mm

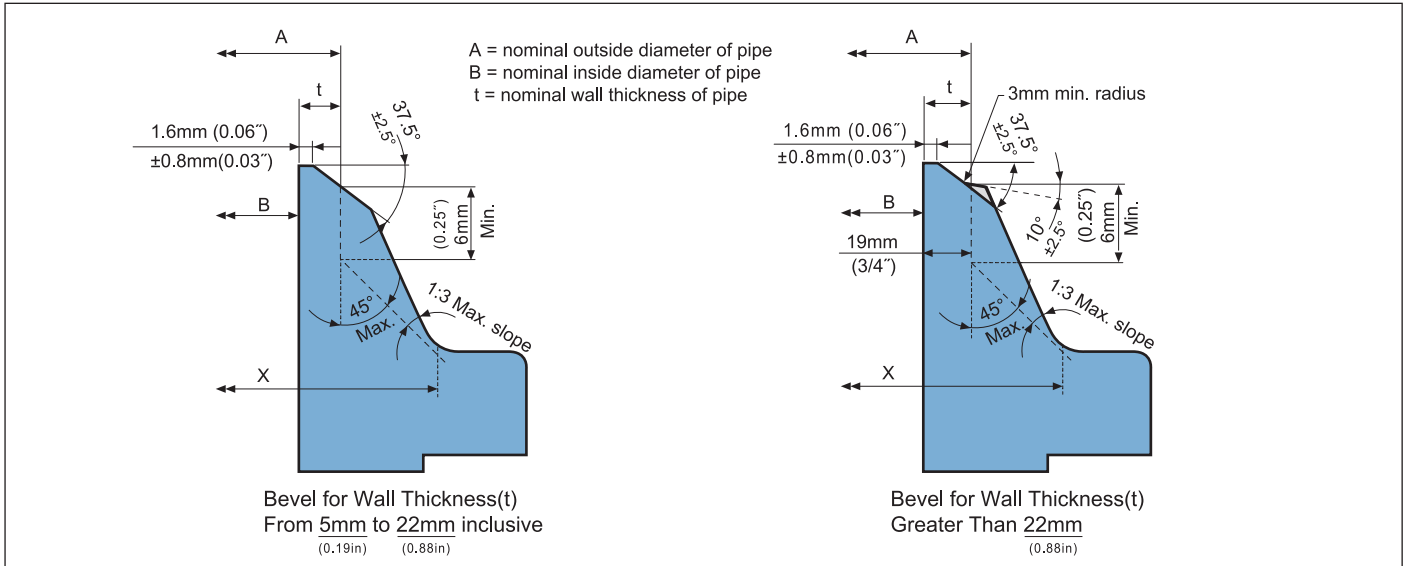
| Nominal Pipe Size | A-THREAD LENGTHS |           |           |           |           |            |            |
|-------------------|------------------|-----------|-----------|-----------|-----------|------------|------------|
|                   | Class 150        | Class 300 | Class 400 | Class 600 | Class 900 | Class 1500 | Class 2500 |
| 1/2               | 15.9             | 15.9      | 15.9      | 15.9      | 22.2      | 22.2       | 28.6       |
| 3/4               | 15.9             | 15.9      | 15.9      | 15.9      | 25.4      | 25.4       | 31.8       |
| 1                 | 17.5             | 17.5      | 17.5      | 17.5      | 28.6      | 28.6       | 34.9       |
| 1 1/4             | 20.7             | 20.7      | 20.7      | 20.7      | 30.2      | 30.2       | 38.1       |
| 1 1/2             | 22.2             | 22.2      | 22.2      | 22.2      | 31.8      | 31.8       | 44.5       |
| 2                 | 25.4             | 28.6      | 28.6      | 28.6      | 38.1      | 38.1       | 50.8       |
| 2 1/2             | 28.6             | 31.8      | 31.8      | 31.8      | 47.6      | 47.6       | 57.2       |
| 3                 | 30.1             | 31.8      | 34.9      | 34.9      | 41.3      | 50.8       | 63.5       |
| 3 1/2             | 31.8             | 36.5      | 39.7      | 39.7      | -         | -          | -          |
| 4                 | 33.4             | 36.5      | 36.5      | 41.3      | 47.6      | 57.2       | 69.9       |
| 5                 | 36.5             | 42.9      | 42.9      | 47.6      | 54.0      | 63.5       | 76.2       |
| 6                 | 39.7             | 46.1      | 46.1      | 50.8      | 57.2      | 69.9       | 82.6       |
| 8                 | 44.5             | 50.8      | 50.8      | 60.3      | 63.5      | 76.2       | 95.3       |
| 10                | 49.2             | 55.6      | 55.6      | 65.1      | 71.5      | 84.2       | 108.0      |
| 12                | 55.6             | 60.3      | 60.3      | 69.9      | 76.2      | 92.1       | 120.7      |
| 14                | 57.2             | 63.5      | 63.5      | 73.0      | 82.6      | -          | -          |
| 16                | 63.5             | 68.3      | 68.3      | 77.8      | 85.7      | -          | -          |
| 18                | 68.3             | 69.9      | 69.9      | 79.4      | 88.9      | -          | -          |
| 20                | 69.9             | 73.0      | 73.0      | 82.6      | 92.1      | -          | -          |
| 24                | 82.6             | 82.6      | 82.6      | 92.1      | 101.6     | -          | -          |

**NOTE :**

- Except flanges with Small Male / Female face (on pipe end), threaded flanges, have an American National Standard taper pipe thread conforming to ANSI B2.1
- The thread is concentric with the axis of the flange and variations in alignment do not exceed 0.06"(1.6mm)in, per foot (05. percent).
- Class 150 flanges are made without counterbore. The threads are chamfered approximately to the major diameter of the thread at the back of the flange at an angle of approximately 45 degrees with the axis of the thread. The chamfer is concentric with the thread and included in the measurement of the thread length.
- Class 300 and higher pressure flanges are made with a counterbore at the back of the flange. The threads are chamfered to the diameter of the counterbore at an angle of approximately 45 degrees with the axis of the thread. The counterbore and chamfer are concentric with the thread.
- The minimum length of effective thread in reducing flanges is at least equal to dimension Q of the corresponding class of threaded flange as c in the above table. Threads do not necessarily extend to the face to the flange.

# WELDING ENDS

## ANSI B16.5 Forged Flanges

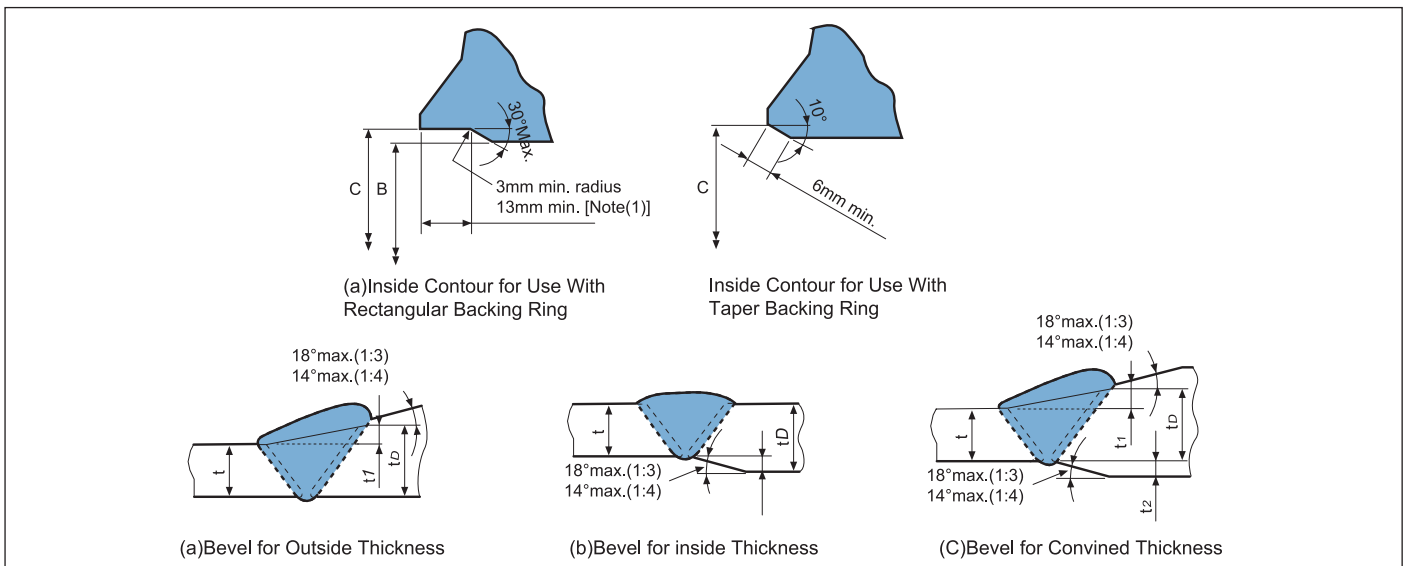


**Notes :**

When the thickness of the hub at the bevel is greater than that of the pipe to which the flange is joined and the additional thickness is provided on the outside diameter, a taper weld having a slope not exceeding 1 to 3 may be employed or, alternatively, the greater outside diameter may be tapered, at the same maximum slope or less, from a point on the welding bevel equal the O.D. at the mating pipe. Similarly, when the greater thickness is provided on the inside of the flange, it shall be taper-bored from the welding end at a slope not exceeding 1 to 3

When flanges covered by this standard are intended for services with light wall, higher strength pipe, the thickness of the hub at the bevel may be greater than that of the pipe to which the flange is joined. Under these conditions a single taper hub may be provided and the outside diameter of the hub at the base (Dimension X) may also be modified.

The additional thickness may be provided on either inside or outside or partially on each side, but the total additional thickness shall not exceed on-half times the nominal wall thickness of intended mating pipe



**Notes :**

- (1) When the materials joined have equal minimum specified yield strength, there shall be no restriction on the minimum slope.
- (2) Neither t1, t2, t3 nor their sum (t1 + t2) shall exceed 0.5t
- (3) When the minimum specified yield strengths of the sections to be joined are unequal, the value of t shall at least equal t time the ratio of minimum specified yield strength of the pipe to minimum specified yield strength of the flange.

## PIPE&FITTINGS WALL THICKNESS SCHEDULES DIMENSION

| Nominal Pipe Size |       | Outside Diam. | Wall I.D. | Nominal Wall Thickness (Stainless steel) |        |        |        |        | Nominal Wall Thickness (Carbon & Low Alloy Steel) |        |        |        |
|-------------------|-------|---------------|-----------|--|--------|--------|--------|--------|---|--------|--------|--------|
| A                 | B     |               |           | S5S*                                     | S10S*  | S20S   | S40S   | S80S   | S5  | S10    | S20    | S30    |
| 6                 | 1/8   | 10.3          | W.T       | -  | 1.24   | -      | 1.73   | 2.41   | -   | 1.24   | -      | 1.45   |
|                   |       |               | I.D       | -  | 7.82   | -      | 6.84   | 5.48   | -   | 7.82   | -      | 7.40   |
| 8                 | 1/4   | 13.7          | W.T       | -  | 1.65   | -      | 2.24   | 3.02   | -   | 1.65   | -      | 1.85   |
|                   |       |               | I.D       | -  | 10.40  | -      | 9.22   | 7.66   | -   | 10.40  | -      | 10.00  |
| 10                | 3/8   | 17.1          | W.T       | -  | 1.65   | -      | 2.31   | 3.20   | -   | 1.65   | -      | 1.85   |
|                   |       |               | I.D       | -  | 13.80  | -      | 12.48  | 10.70  | -   | 13.80  | -      | 13.40  |
| 15                | 1/2   | 21.3          | W.T       | 1.65                                     | 2.11   | -      | 2.77   | 3.73   | 1.65  | 2.11   | -      | 2.41   |
|                   |       |               | I.D       | 18.00                                    | 17.08  | -      | 15.76  | 13.84  | 18.00   | 17.08  | -      | 16.48  |
| 20                | 3/4   | 26.7          | W.T       | 1.65                                     | 2.11   | -      | 2.87   | 3.91   | 1.65  | 2.11   | -      | 2.41   |
|                   |       |               | I.D       | 23.40                                    | 22.48  | -      | 20.96  | 18.88  | 23.40   | 22.48  | -      | 21.88  |
| 25                | 1     | 33.4          | W.T       | 1.65                                     | 2.77   | -      | 3.38   | 4.55   | 1.65  | 2.77   | -      | 2.90   |
|                   |       |               | I.D       | 30.10                                    | 27.86  | -      | 26.64  | 24.30  | 30.10   | 27.86  | -      | 27.60  |
| 32                | 1 1/4 | 42.2          | W.T       | 1.65                                     | 2.77   | -      | 3.56   | 4.85   | 1.65  | 2.77   | -      | 2.97   |
|                   |       |               | I.D       | 38.90                                    | 36.66  | -      | 35.08  | 32.50  | 38.90   | 36.66  | -      | 36.26  |
| 40                | 1 1/2 | 48.3          | W.T       | 1.65                                     | 2.77   | -      | 3.68   | 5.08   | 1.65  | 2.77   | -      | 3.18   |
|                   |       |               | I.D       | 45.00                                    | 42.76  | -      | 40.94  | 38.14  | 45.00   | 42.76  | -      | 41.94  |
| 50                | 2     | 60.3          | W.T       | 1.65                                     | 2.77   | -      | 3.91   | 5.54   | 1.65  | 2.77   | -      | 3.18   |
|                   |       |               | I.D       | 57.00                                    | 54.76  | -      | 52.48  | 49.22  | 57.00   | 54.76  | -      | 53.94  |
| 65                | 2 1/2 | 73.0          | W.T       | 2.11                                     | 3.05   | -      | 5.16   | 7.01   | 2.11  | 3.05   | -      | 4.78   |
|                   |       |               | I.D       | 68.78                                    | 66.90  | -      | 62.68  | 58.98  | 68.78   | 66.90  | -      | 63.44  |
| 80                | 3     | 88.9          | W.T       | 2.11                                     | 3.05   | -      | 5.49   | 7.62   | 2.11  | 3.05   | -      | 4.78   |
|                   |       |               | I.D       | 84.68                                    | 82.80  | -      | 77.92  | 73.66  | 84.68   | 82.80  | -      | 79.34  |
| 90                | 3 1/2 | 101.6         | W.T       | 2.11                                     | 3.05   | -      | 5.74   | 8.08   | 2.11  | 3.05   | -      | 4.78   |
|                   |       |               | I.D       | 97.38                                    | 95.50  | -      | 90.12  | 85.44  | 97.38   | 95.50  | -      | 92.04  |
| 100               | 4     | 114.3         | W.T       | 2.11                                     | 3.05   | -      | 6.02   | 8.56   | 2.11  | 3.05   | -      | 4.78   |
|                   |       |               | I.D       | 110.08                                   | 108.20 | -      | 102.26 | 97.18  | 110.08  | 108.20 | -      | 104.74 |
| 125               | 5     | 141.3         | W.T       | 2.77                                     | 3.40   | -      | 6.55   | 9.53   | 2.77  | 3.40   | -      | -      |
|                   |       |               | I.D       | 135.76                                   | 134.50 | -      | 128.20 | 122.24 | 135.76  | 134.50 | -      | -      |
| 150               | 6     | 168.3         | W.T       | 2.77                                     | 3.40   | -      | 7.11   | 10.97  | 2.77  | 3.40   | -      | -      |
|                   |       |               | I.D       | 162.76                                   | 161.50 | -      | 154.08 | 146.36 | 162.76  | 161.50 | -      | -      |
| 200               | 8     | 219.1         | W.T       | 2.77                                     | 3.76   | -      | 8.18   | 12.70  | 2.77  | 3.76   | 6.35   | 7.04   |
|                   |       |               | I.D       | 213.56                                   | 211.58 | -      | 202.74 | 193.70 | 213.56  | 211.58 | 20.640 | 205.02 |
| 250               | 10    | 273.1         | W.T       | 3.40                                     | 4.19   | -      | 9.27   | 12.70  | 3.40  | 4.19   | 6.35   | 7.80   |
|                   |       |               | I.D       | 266.30                                   | 264.72 | -      | 254.56 | 247.70 | 266.30  | 264.72 | 260.40 | 257.50 |
| 300               | 12    | 323.9         | W.T       | 3.96                                     | 4.57   | -      | 9.53   | 12.70  | 3.96  | 4.57   | 6.35   | 8.38   |
|                   |       |               | I.D       | 315.98                                   | 314.76 | -      | 304.84 | 298.50 | 315.98  | 314.76 | 311.20 | 307.14 |
| 350               | 14    | 355.6         | W.T       | 3.96                                     | 4.78   | -      | 9.53   | 12.70  | 3.96  | 6.35   | 7.92   | 9.53   |
|                   |       |               | I.D       | 347.68                                   | 346.04 | -      | 336.54 | 330.20 | 347.68  | 342.90 | 339.76 | 336.54 |
| 400               | 16    | 406.4         | W.T       | 4.19                                     | 4.78   | -      | 9.53   | 12.70  | 4.19  | 6.35   | 7.92   | 9.53   |
|                   |       |               | I.D       | 398.02                                   | 396.84 | -      | 387.34 | 381.00 | 398.02  | 393.70 | 390.56 | 387.34 |
| 450               | 18    | 457.0         | W.T       | 4.19                                     | 4.78   | -      | 9.53   | 12.70  | 4.19  | 6.35   | 7.92   | 11.13  |
|                   |       |               | I.D       | 448.62                                   | 447.44 | -      | 437.94 | 431.60 | 448.62  | 444.30 | 441.16 | 434.74 |
| 500               | 20    | 508.0         | W.T       | 4.78                                     | 5.54   | 7.90   | 9.53   | 12.70  | 4.78  | 6.35   | 9.53   | 12.70  |
|                   |       |               | I.D       | 498.44                                   | 496.62 | 492.20 | 488.94 | 482.60 | 498.44  | 495.30 | 488.94 | 482.60 |
| 550               | 22    | 559.0         | W.T       | 4.78                                     | 5.54   | -      | -      | -      | 4.78  | 6.35   | 9.53   | 12.70  |
|                   |       |               | I.D       | 549.44                                   | 547.92 | -      | -      | -      | 549.44  | 546.30 | 539.34 | 533.60 |
| 600               | 24    | 610.0         | W.T       | 5.54                                     | 6.35   | -      | 9.53   | 12.70  | 5.54  | 6.35   | 9.53   | 14.27  |
|                   |       |               | I.D       | 598.92                                   | 597.30 | -      | 590.94 | 584.60 | 598.92  | 597.30 | 590.94 | 581.46 |

● Carbon & Low Alloy Steel (B36.10M)

The wall thickness shown represent nominal or average wall dimensions which are subject to a-12 1/2% mill tolerance.

Note that schedule 40 in. size 12" (304.8mm) and larger and that schedule 80 in. size 10" (254mm) and larger do not agree with schedules 40S and 80S of ANSI B36.19 nor with standard weight and extra strong respectively.

# ASME B36.10M & ASME B36.19M - 2004

| -Nominal Wall Thickness (Carbon & Low Alloy Steel)- |        |        |        |        |        |        |        |        |        | Outside Diam. | Nominal Pipe Size |       |
|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------------|-------------------|-------|
| STD   | S40    | S60    | XS     | S80    | S100   | S120   | S140   | S160   | XXS    |               | A                 | B     |
| 1.73  | 1.73   | -      | 2.41   | 2.41   | -      | -      | -      | -      | -      | 10.3          | 6                 | 1/8   |
| 6.84  | 6.84   | -      | 5.48   | 5.48   | -      | -      | -      | -      | -      |               |                   |       |
| 2.24  | 2.24   | -      | 3.02   | 3.02   | -      | -      | -      | -      | -      | 13.7          | 8                 | 1/4   |
| 9.22  | 9.22   | -      | 7.66   | 7.66   | -      | -      | -      | -      | -      |               |                   |       |
| 2.31  | 2.31   | -      | 3.20   | 3.20   | -      | -      | -      | -      | -      | 17.1          | 10                | 3/8   |
| 12.48   | 12.48  | -      | 10.70  | 10.70  | -      | -      | -      | -      | -      |               |                   |       |
| 2.77  | 2.77   | -      | 3.73   | 3.73   | -      | -      | -      | 4.78   | 7.47   | 21.3          | 15                | 1/2   |
| 15.76   | 15.76  | -      | 13.84  | 13.84  | -      | -      | -      | 11.74  | 6.36   |               |                   |       |
| 2.87  | 2.87   | -      | 3.91   | 3.91   | -      | -      | -      | 5.56   | 7.82   | 26.7          | 20                | 3/4   |
| 20.96   | 20.96  | -      | 18.88  | 18.88  | -      | -      | -      | 15.58  | 11.06  |               |                   |       |
| 3.38  | 3.38   | -      | 4.55   | 4.55   | -      | -      | -      | 6.35   | 9.09   | 33.4          | 25                | 1     |
| 26.64   | 26.64  | -      | 24.30  | 24.30  | -      | -      | -      | 20.70  | 15.22  |               |                   |       |
| 3.56  | 3.56   | -      | 4.85   | 4.85   | -      | -      | -      | 6.35   | 9.70   | 42.2          | 32                | 1 1/4 |
| 35.08   | 35.08  | -      | 32.50  | 32.50  | -      | -      | -      | 29.50  | 22.80  |               |                   |       |
| 3.68  | 3.68   | -      | 5.08   | 5.08   | -      | -      | -      | 7.14   | 10.15  | 48.3          | 40                | 1 1/2 |
| 40.94   | 40.94  | -      | 38.14  | 38.14  | -      | -      | -      | 34.02  | 28.00  |               |                   |       |
| 3.91  | 3.91   | -      | 5.54   | 5.54   | -      | -      | -      | 8.74   | 11.07  | 60.3          | 50                | 2     |
| 52.46   | 52.48  | -      | 49.22  | 49.22  | -      | -      | -      | 42.82  | 38.16  |               |                   |       |
| 5.16  | 5.16   | -      | 7.01   | 7.01   | -      | -      | -      | 9.53   | 14.02  | 73.0          | 65                | 2 1/2 |
| 62.68   | 62.68  | -      | 58.98  | 58.98  | -      | -      | -      | 53.94  | 44.96  |               |                   |       |
| 5.49  | 5.49   | -      | 7.62   | 7.62   | -      | -      | -      | 11.13  | 15.24  | 88.9          | 80                | 3     |
| 77.92   | 77.92  | -      | 73.66  | 73.66  | -      | -      | -      | 66.64  | 58.24  |               |                   |       |
| 5.74  | 5.74   | -      | 8.08   | 8.08   | -      | -      | -      | 12.70  | -      | 101.6         | 90                | 3 1/2 |
| 90.12   | 90.12  | -      | 85.44  | 85.44  | -      | -      | -      | 76.20  | -      |               |                   |       |
| 6.02  | 6.02   | -      | 8.56   | 8.56   | -      | 11.13  | -      | 13.49  | 17.12  | 114.3         | 100               | 4     |
| 102.26  | 102.26 | -      | 97.18  | 97.18  | -      | 92.04  | -      | 87.32  | 80.06  |               |                   |       |
| 6.55  | 6.55   | -      | 9.53   | 9.53   | -      | 12.70  | -      | 15.88  | 19.05  | 141.3         | 125               | 5     |
| 128.20  | 128.20 | -      | 122.24 | 122.24 | -      | 115.90 | -      | 109.54 | 103.20 |               |                   |       |
| 7.11  | 7.11   | -      | 10.97  | 10.97  | -      | 14.27  | -      | 18.26  | 21.95  | 168.3         | 150               | 6     |
| 154.08  | 154.08 | -      | 146.36 | 146.36 | -      | 139.76 | -      | 131.78 | 124.40 |               |                   |       |
| 8.18  | 8.18   | 10.31  | 12.70  | 12.70  | 15.09  | 18.26  | 20.62  | 23.01  | 22.23  | 219.1         | 200               | 8     |
| 202.74  | 202.74 | 198.48 | 193.70 | 193.70 | 188.92 | 182.58 | 177.86 | 173.08 | 174.63 |               |                   |       |
| 9.27  | 9.27   | 12.70  | 12.70  | 15.09  | 18.26  | 21.44  | 25.40  | 28.58  | 25.40  | 273.1         | 250               | 10    |
| 254.56  | 254.56 | 247.70 | 247.70 | 242.92 | 236.58 | 230.22 | 222.30 | 215.94 | 222.30 |               |                   |       |
| 9.53  | 10.31  | 14.27  | 12.70  | 17.48  | 21.44  | 25.40  | 28.58  | 33.32  | 25.40  | 323.9         | 300               | 12    |
| 304.84  | 303.28 | 295.36 | 298.50 | 288.94 | 281.02 | 273.10 | 266.74 | 257.26 | 273.10 |               |                   |       |
| 9.53  | 11.13  | 15.09  | 12.70  | 19.05  | 23.83  | 27.79  | 31.75  | 35.71  | -      | 355.6         | 350               | 14    |
| 336.54  | 333.34 | 325.42 | 330.20 | 317.50 | 307.94 | 300.02 | 292.10 | 284.18 | -      |               |                   |       |
| 9.53  | 12.70  | 16.66  | 12.70  | 21.44  | 26.19  | 30.96  | 36.53  | 40.49  | -      | 406.4         | 400               | 16    |
| 387.34  | 381.00 | 373.08 | 381.00 | 363.52 | 354.02 | 344.48 | 333.34 | 325.42 | -      |               |                   |       |
| 9.53  | 14.27  | 19.05  | 12.70  | 23.83  | 29.36  | 34.93  | 39.67  | 45.24  | -      | 457.0         | 450               | 18    |
| 437.94  | 428.46 | 418.90 | 431.60 | 409.34 | 398.28 | 387.14 | 377.66 | 366.52 | -      |               |                   |       |
| 9.53  | 15.09  | 20.62  | 12.70  | 26.19  | 32.54  | 38.10  | 44.45  | 50.01  | -      | 508.0         | 500               | 20    |
| 488.94  | 477.82 | 466.76 | 482.60 | 455.62 | 442.92 | 431.80 | 419.10 | 407.98 | -      |               |                   |       |
| 9.53  | -      | 22.23  | 12.70  | 28.58  | 34.93  | 41.28  | 47.63  | 53.98  | -      | 559.0         | 550               | 22    |
| 539.94  | -      | 514.54 | 533.60 | 501.84 | 489.14 | 476.44 | 463.74 | 451.04 | -      |               |                   |       |
| 9.53  | 17.48  | 24.61  | 12.70  | 30.96  | 38.89  | 46.02  | 52.37  | 59.54  | -      | 610.0         | 600               | 24    |
| 590.94  | 575.04 | 560.78 | 584.60 | 548.08 | 532.22 | 517.96 | 505.26 | 490.92 | -      |               |                   |       |

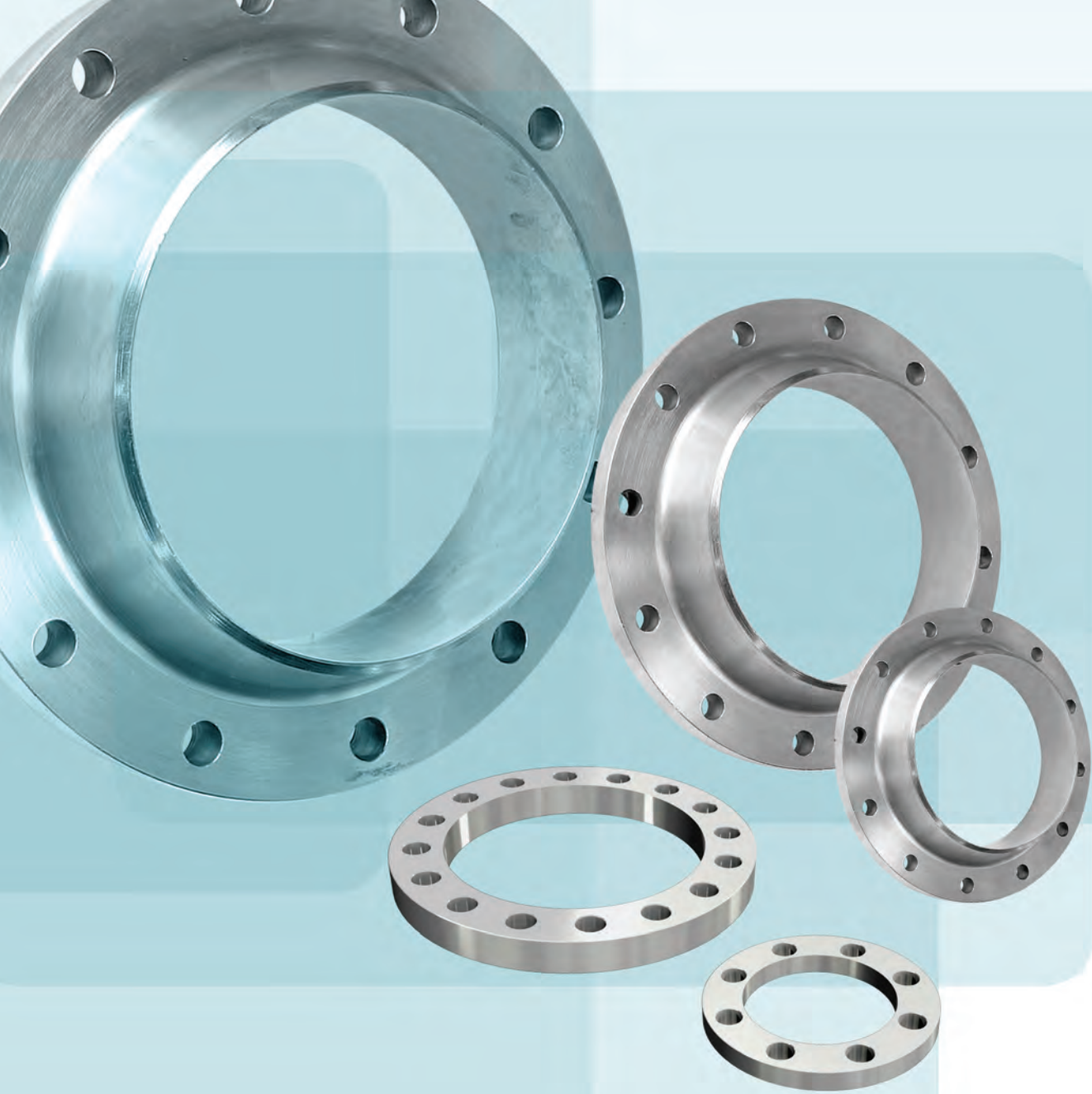
• **Stainless steel (B36.19M)**

The wall thickness shown represent nominal or average wall dimensions which are subject to a-12 1/2% mill tolerance.

+Size 14"(355.6mm) through 30"(762.0mm) are not at publication data covered in B36.19, and dimensions listed are those commonly used in the industry.

\*Schedules 5S and 10S wall thicknesses do not permit threading in accordance with ASME B2 1.

\*\*Note that schedule 40S and schedule 80S in these sizes do not agree with schedule 40 and schedule 80 of ASME B36.10.and that they are identical to standard weight and extra strong respectively of ASME B36.10.

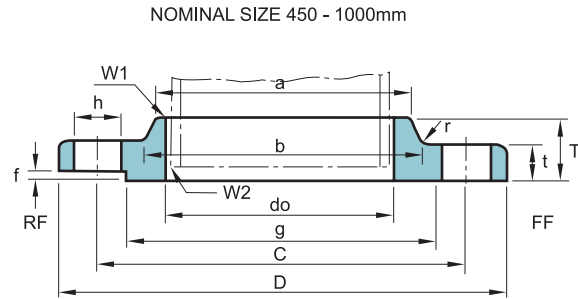
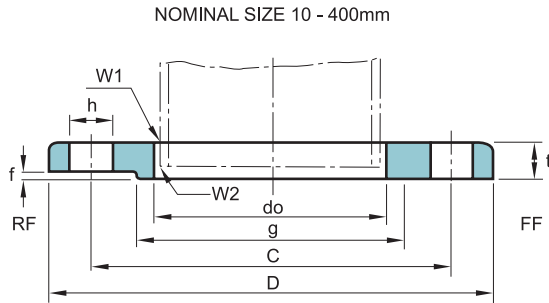


 **SUPERLOK®**

# JIS / KS FLANGES

- Class 5K Flanges
- Class 10K Flanges
- Class 16K Flanges
- Class 20K Flanges
- Class 30K Flanges
- Class 40K Flanges
- Class 210Kgf/cm<sup>2</sup> Flanges for Oil Pressure
- Class 280Kgf/cm<sup>2</sup> Flanges for Oil Pressure
- Class 350Kgf/cm<sup>2</sup> Flanges for Oil Pressure
- Tolerance for pipe Flanges

# 5K KS B1503 / JIS B2220



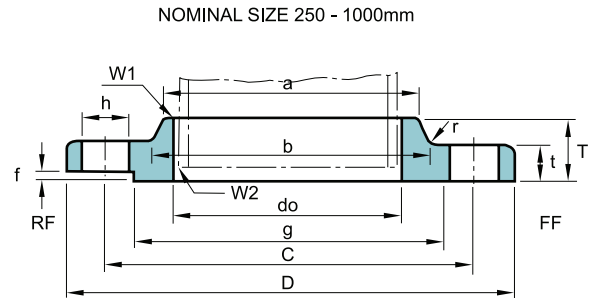
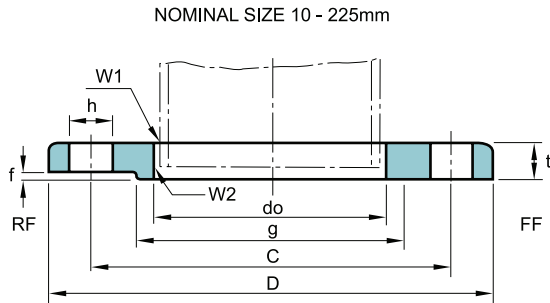
Unit : mm

| Nominal Bore of Flange | Outside Dia. of Appli-Cable pipe | Inside Dia. of Flange<br>do | Outside Dia. of Flange<br>D | SECTIONAL DIMENSIONS OF FLANGE |    |             |      |             |                  |                          | DIA. OF BOLT             |                      |                | Welding           |      | Weight (kg) |       |
|------------------------|----------------------------------|-----------------------------|-----------------------------|--------------------------------|----|-------------|------|-------------|------------------|--------------------------|--------------------------|----------------------|----------------|-------------------|------|-------------|-------|
|                        |                                  |                             |                             | t                              | T  | Dia. of Hub |      | Radius<br>r | Raised Face<br>f | Dia. of Raised Face<br>g | Dia. of Bolt Circle<br>C | Number of Bolt Holes | Hole Dia.<br>h | Nominal Bolt Size | W1   |             | W2    |
|                        |                                  |                             |                             |                                |    | a           | b    |             |                  |                          |                          |                      |                |                   |      |             |       |
| (10)                   | 17.3                             | 17.8                        | 75                          | 9                              | -  | -           | -    | -           | 1                | 39                       | 55                       | 4                    | 12             | M10               | 5.0  | 2.5         | 0.27  |
| 15                     | 21.7                             | 22.2                        | 80                          | 9                              | -  | -           | -    | -           | 1                | 44                       | 60                       | 4                    | 12             | M10               | 5.0  | 3.0         | 0.30  |
| (20)                   | 27.2                             | 27.7                        | 85                          | 10                             | -  | -           | -    | -           | 1                | 49                       | 65                       | 4                    | 12             | M10               | 5.0  | 3.0         | 0.37  |
| 25                     | 34.0                             | 34.5                        | 95                          | 10                             | -  | -           | -    | -           | 1                | 59                       | 75                       | 4                    | 12             | M10               | 5.0  | 3.0         | 0.45  |
| (32)                   | 42.7                             | 43.2                        | 115                         | 12                             | -  | -           | -    | -           | 2                | 70                       | 90                       | 4                    | 15             | M12               | 6.0  | 3.0         | 0.78  |
| 40                     | 48.6                             | 49.1                        | 120                         | 12                             | -  | -           | -    | -           | 2                | 75                       | 95                       | 4                    | 15             | M12               | 6.0  | 3.0         | 0.83  |
| 50                     | 60.5                             | 61.1                        | 130                         | 14                             | -  | -           | -    | -           | 2                | 85                       | 105                      | 4                    | 15             | M12               | 6.0  | 3.0         | 1.07  |
| 65                     | 76.3                             | 77.1                        | 155                         | 14                             | -  | -           | -    | -           | 2                | 110                      | 130                      | 4                    | 15             | M12               | 6.0  | 4.0         | 1.49  |
| 80                     | 89.1                             | 90.0                        | 180                         | 14                             | -  | -           | -    | -           | 2                | 121                      | 145                      | 4                    | 19             | M16               | 6.0  | 4.0         | 1.99  |
| (90)                   | 101.6                            | 102.6                       | 190                         | 14                             | -  | -           | -    | -           | 2                | 131                      | 155                      | 4                    | 19             | M16               | 6.0  | 4.0         | 2.09  |
| 100                    | 114.3                            | 115.4                       | 200                         | 16                             | -  | -           | -    | -           | 2                | 141                      | 165                      | 8                    | 19             | M16               | 7.0  | 4.0         | 2.39  |
| 125                    | 139.8                            | 141.2                       | 235                         | 16                             | -  | -           | -    | -           | 2                | 176                      | 200                      | 8                    | 19             | M16               | 7.0  | 4.0         | 3.23  |
| 150                    | 165.2                            | 166.6                       | 265                         | 18                             | -  | -           | -    | -           | 2                | 206                      | 230                      | 8                    | 19             | M16               | 7.0  | 5.0         | 4.41  |
| (175)                  | 190.7                            | 192.1                       | 300                         | 18                             | -  | -           | -    | -           | 2                | 232                      | 260                      | 8                    | 23             | M20               | 7.5  | 5.0         | 5.51  |
| 200                    | 216.3                            | 218.0                       | 320                         | 20                             | -  | -           | -    | -           | 2                | 252                      | 280                      | 8                    | 23             | M20               | 8.5  | 6.0         | 6.33  |
| (225)                  | 241.8                            | 243.7                       | 345                         | 20                             | -  | -           | -    | -           | 2                | 277                      | 305                      | 12                   | 23             | M20               | 9.0  | 6.0         | 6.64  |
| 250                    | 267.4                            | 269.5                       | 385                         | 22                             | -  | -           | -    | -           | 2                | 317                      | 345                      | 12                   | 23             | M20               | 10.0 | 6.0         | 9.45  |
| 300                    | 318.5                            | 321.0                       | 430                         | 22                             | -  | -           | -    | -           | 3                | 360                      | 390                      | 12                   | 23             | M20               | 10.0 | 6.0         | 10.30 |
| 350                    | 355.6                            | 358.1                       | 480                         | 24                             | -  | -           | -    | -           | 3                | 403                      | 435                      | 12                   | 25             | M22               | 12.0 | 7.0         | 14.00 |
| 400                    | 406.4                            | 409.0                       | 540                         | 24                             | -  | -           | -    | -           | 3                | 463                      | 495                      | 16                   | 25             | M22               | 12.0 | 7.0         | 16.90 |
| 450                    | 457.2                            | 460.0                       | 605                         | 24                             | 40 | 495         | 500  | 5           | 3                | 523                      | 555                      | 16                   | 25             | M22               | 12.0 | 7.0         | 24.80 |
| 500                    | 508.0                            | 511.0                       | 655                         | 24                             | 40 | 546         | 552  | 5           | 3                | 573                      | 605                      | 20                   | 25             | M22               | 12.0 | 7.0         | 26.90 |
| 550                    | 558.8                            | 562.0                       | 720                         | 26                             | 42 | 597         | 603  | 5           | 3                | 630                      | 665                      | 20                   | 27             | M24               | 12.0 | 7.0         | 34.10 |
| 600                    | 609.6                            | 613.0                       | 770                         | 26                             | 44 | 648         | 654  | 5           | 3                | 680                      | 715                      | 20                   | 27             | M24               | 12.0 | 7.0         | 37.50 |
| 650                    | 660.4                            | 664.0                       | 825                         | 26                             | 48 | 702         | 708  | 5           | 3                | 735                      | 770                      | 24                   | 27             | M24               | 12.0 | 7.0         | 42.80 |
| 700                    | 711.2                            | 715.0                       | 875                         | 26                             | 48 | 751         | 758  | 5           | 3                | 785                      | 820                      | 24                   | 27             | M24               | 12.0 | 7.0         | 45.40 |
| 750                    | 762.0                            | 766.0                       | 945                         | 28                             | 52 | 802         | 810  | 5           | 3                | 840                      | 880                      | 24                   | 33             | M30               | 12.0 | 7.0         | 57.40 |
| 800                    | 812.8                            | 817.0                       | 995                         | 28                             | 52 | 854         | 862  | 5           | 3                | 890                      | 930                      | 24                   | 33             | M30               | 13.0 | 8.0         | 60.80 |
| 850                    | 863.6                            | 868.0                       | 1045                        | 28                             | 54 | 904         | 912  | 5           | 3                | 940                      | 980                      | 24                   | 33             | M30               | 13.0 | 8.0         | 63.50 |
| 900                    | 914.4                            | 919.0                       | 1095                        | 30                             | 56 | 956         | 964  | 5           | 3                | 990                      | 1030                     | 24                   | 33             | M30               | 13.0 | 8.0         | 75.30 |
| 1000                   | 1016.0                           | 1021.0                      | 1195                        | 32                             | 60 | 1058        | 1066 | 5           | 3                | 1090                     | 1130                     | 28                   | 33             | M30               | 14.0 | 9.0         | 88.50 |
| *(1100)                | 1117.6                           | 1123.0                      | 1305                        | 32                             | -  | -           | -    | -           | 3                | 1200                     | 1240                     | 28                   | 33             | M30               | -    | -           | -     |
| *1200                  | 1219.2                           | 1225.0                      | 1420                        | 34                             | -  | -           | -    | -           | 3                | 1305                     | 1350                     | 32                   | 33             | M30               | -    | -           | -     |
| *1350                  | 1371.6                           | -                           | 1575                        | 34                             | -  | -           | -    | -           | 3                | 1460                     | 1505                     | 32                   | 33             | M30               | -    | -           | -     |
| *1500                  | 1524.0                           | -                           | 1730                        | 36                             | -  | -           | -    | -           | 3                | 1615                     | 1660                     | 36                   | 33             | M30               | -    | -           | -     |

**Notes**

1. Flanges of parenthesized nominal diameter had letter not be used.
2. The facing of flanges shall conform to KS B1519 (JIS B2202) 1987.
3. Nominal diameter over 1000 is manufacturer's standard (\*)

## 10K KS B1503 / JIS B2220



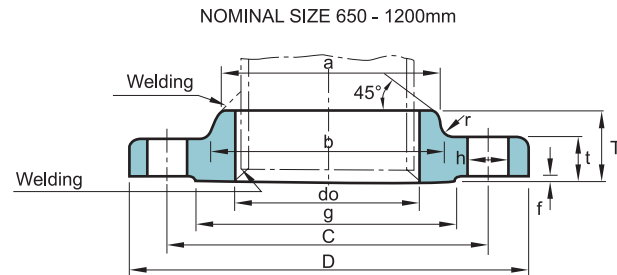
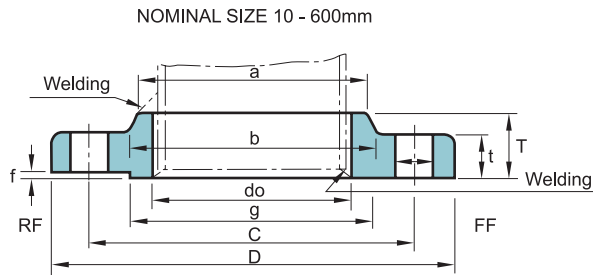
Unit : mm

| Nominal Bore of Flange | Outside Dia. of Appli-Cable pipe | Inside Dia. of Flange | Outside Dia. of Flange | SECTIONAL DIMENSIONS OF FLANGE |    |             |      |        |             |                     | DIA. OF BOLT        |                      |           | Welding           |      | Weight (kg) |        |
|------------------------|----------------------------------|-----------------------|------------------------|--------------------------------|----|-------------|------|--------|-------------|---------------------|---------------------|----------------------|-----------|-------------------|------|-------------|--------|
|                        |                                  |                       |                        | t                              | T  | Dia. of Hub |      | Radius | Raised Face | Dia. of Raised Face | Dia. of Bolt Circle | Number of Bolt Holes | Hole Dia. | Nominal Bolt Size | W1   |             | W2     |
|                        |                                  |                       |                        |                                |    | a           | b    |        |             |                     |                     |                      |           |                   |      |             |        |
| 10                     | 17.3                             | 17.8                  | 90                     | 12                             | -  | -           | -    | -      | 1           | 46                  | 65                  | 4                    | 15        | M12               | 5.0  | 2.5         | 0.52   |
| 15                     | 21.7                             | 22.2                  | 95                     | 12                             | -  | -           | -    | -      | 1           | 51                  | 70                  | 4                    | 15        | M12               | 5.0  | 3.0         | 0.57   |
| 20                     | 27.2                             | 27.7                  | 100                    | 14                             | -  | -           | -    | -      | 1           | 56                  | 75                  | 4                    | 15        | M12               | 5.0  | 3.0         | 0.73   |
| 25                     | 34.0                             | 34.5                  | 125                    | 14                             | -  | -           | -    | -      | 1           | 67                  | 90                  | 4                    | 19        | M16               | 5.0  | 3.0         | 1.13   |
| 32                     | 42.7                             | 43.2                  | 135                    | 16                             | -  | -           | -    | -      | 2           | 76                  | 100                 | 4                    | 19        | M16               | 6.0  | 3.0         | 1.48   |
| 40                     | 48.6                             | 49.1                  | 140                    | 16                             | -  | -           | -    | -      | 2           | 81                  | 105                 | 4                    | 19        | M16               | 6.0  | 3.0         | 1.56   |
| 50                     | 60.5                             | 61.1                  | 155                    | 16                             | -  | -           | -    | -      | 2           | 96                  | 120                 | 4                    | 19        | M16               | 6.0  | 3.0         | 1.88   |
| 65                     | 76.3                             | 77.1                  | 175                    | 18                             | -  | -           | -    | -      | 2           | 116                 | 140                 | 4                    | 19        | M16               | 6.5  | 4.0         | 2.60   |
| 80                     | 89.1                             | 90.0                  | 185                    | 18                             | -  | -           | -    | -      | 2           | 126                 | 150                 | 8                    | 19        | M16               | 6.5  | 4.0         | 2.61   |
| (90)                   | 101.6                            | 102.6                 | 195                    | 18                             | -  | -           | -    | -      | 2           | 136                 | 160                 | 8                    | 19        | M16               | 6.5  | 4.0         | 2.76   |
| 100                    | 114.3                            | 115.4                 | 210                    | 18                             | -  | -           | -    | -      | 2           | 151                 | 175                 | 8                    | 19        | M16               | 7.0  | 4.0         | 3.14   |
| 125                    | 139.8                            | 141.2                 | 250                    | 20                             | -  | -           | -    | -      | 2           | 182                 | 210                 | 8                    | 23        | M20               | 7.5  | 4.0         | 4.77   |
| 150                    | 165.2                            | 166.6                 | 280                    | 22                             | -  | -           | -    | -      | 2           | 212                 | 240                 | 8                    | 23        | M20               | 8.0  | 5.0         | 6.34   |
| (175)                  | 190.7                            | 192.1                 | 305                    | 22                             | -  | -           | -    | -      | 2           | 237                 | 265                 | 12                   | 23        | M20               | 9.0  | 5.0         | 6.82   |
| 200                    | 216.3                            | 218.0                 | 330                    | 22                             | -  | -           | -    | -      | 2           | 262                 | 290                 | 12                   | 23        | M20               | 9.0  | 6.0         | 7.53   |
| (225)                  | 241.8                            | 243.7                 | 350                    | 22                             | -  | -           | -    | -      | 2           | 282                 | 310                 | 12                   | 23        | M20               | 9.0  | 6.0         | 7.74   |
| 250                    | 267.4                            | 269.5                 | 400                    | 24                             | 36 | 288         | 292  | 6      | 2           | 324                 | 355                 | 12                   | 25        | M22               | 10.0 | 6.0         | 12.70  |
| 300                    | 318.5                            | 321.0                 | 445                    | 24                             | 38 | 340         | 346  | 6      | 3           | 368                 | 400                 | 16                   | 25        | M22               | 10.0 | 6.0         | 13.80  |
| 350                    | 355.6                            | 358.1                 | 490                    | 26                             | 42 | 380         | 386  | 6      | 3           | 413                 | 445                 | 16                   | 25        | M22               | 12.0 | 7.0         | 18.20  |
| 400                    | 406.4                            | 409.0                 | 560                    | 28                             | 44 | 436         | 442  | 6      | 3           | 475                 | 510                 | 16                   | 27        | M24               | 12.0 | 7.0         | 25.20  |
| 450                    | 457.2                            | 460.0                 | 620                    | 30                             | 48 | 496         | 502  | 6      | 3           | 530                 | 565                 | 20                   | 27        | M24               | 14.0 | 8.0         | 33.00  |
| 500                    | 508.0                            | 511.0                 | 675                    | 30                             | 48 | 548         | 554  | 6      | 3           | 585                 | 620                 | 20                   | 27        | M24               | 14.0 | 8.0         | 37.60  |
| 550                    | 558.8                            | 562.0                 | 745                    | 32                             | 52 | 604         | 610  | 6      | 3           | 640                 | 680                 | 20                   | 33        | M30               | 15.0 | 9.0         | 49.70  |
| 600                    | 609.6                            | 613.0                 | 795                    | 32                             | 52 | 656         | 662  | 6      | 3           | 690                 | 730                 | 24                   | 33        | M30               | 16.0 | 10.0        | 52.60  |
| 650                    | 660.4                            | 664.0                 | 845                    | 34                             | 56 | 706         | 712  | 6      | 3           | 740                 | 780                 | 24                   | 33        | M30               | 16.0 | 10.0        | 60.60  |
| 700                    | 711.2                            | 715.0                 | 905                    | 34                             | 58 | 762         | 770  | 6      | 3           | 800                 | 840                 | 24                   | 33        | M30               | 17.0 | 10.0        | 70.60  |
| 750                    | 762.0                            | 766.0                 | 970                    | 36                             | 62 | 816         | 824  | 6      | 3           | 855                 | 900                 | 24                   | 33        | M30               | 18.0 | 11.0        | 85.80  |
| 800                    | 812.8                            | 817.0                 | 1020                   | 36                             | 64 | 868         | 876  | 6      | 3           | 905                 | 950                 | 28                   | 33        | M30               | 19.0 | 12.0        | 91.20  |
| (850)                  | 863.6                            | 868.0                 | 1070                   | 36                             | 66 | 920         | 928  | 6      | 3           | 955                 | 1000                | 28                   | 33        | M30               | 19.0 | 12.0        | 98.60  |
| 900                    | 914.4                            | 919.0                 | 1120                   | 38                             | 70 | 971         | 979  | 6      | 3           | 1005                | 1050                | 28                   | 33        | M30               | 22.0 | 14.0        | 109.00 |
| 1000                   | 1016.0                           | 1021.0                | 1235                   | 40                             | 74 | 1073        | 1081 | 6      | 3           | 1110                | 1160                | 28                   | 39        | M36               | 22.0 | 14.0        | 133.00 |
| *(1100)                | 1117.6                           | 1123.0                | 1345                   | 42                             | 76 | -           | -    | -      | 3           | 1220                | 1270                | 28                   | 39        | M36               | -    | -           | -      |
| *1200                  | 1219.2                           | 1225.0                | 1465                   | 44                             | 78 | -           | -    | -      | 3           | 1325                | 1380                | 32                   | 39        | M36               | -    | -           | -      |
| *1350                  | 1371.6                           | -                     | 1630                   | 48                             | 82 | -           | -    | -      | 3           | 1480                | 1540                | 36                   | 45        | M42               | -    | -           | -      |
| *1500                  | 1524.0                           | -                     | 1795                   | 50                             | 90 | -           | -    | -      | 3           | 1635                | 1700                | 40                   | 45        | M42               | -    | -           | -      |

**Notes**

1. Flanges of parenthesized nominal diameter had letter not be used.
2. The facing of flanges shall conform to KS B1519 (JIS B2202) 1987.
3. Nominal diameter over 1000 is manufacturer's standard (\*)

# 16K KS B1503 / JIS B2220



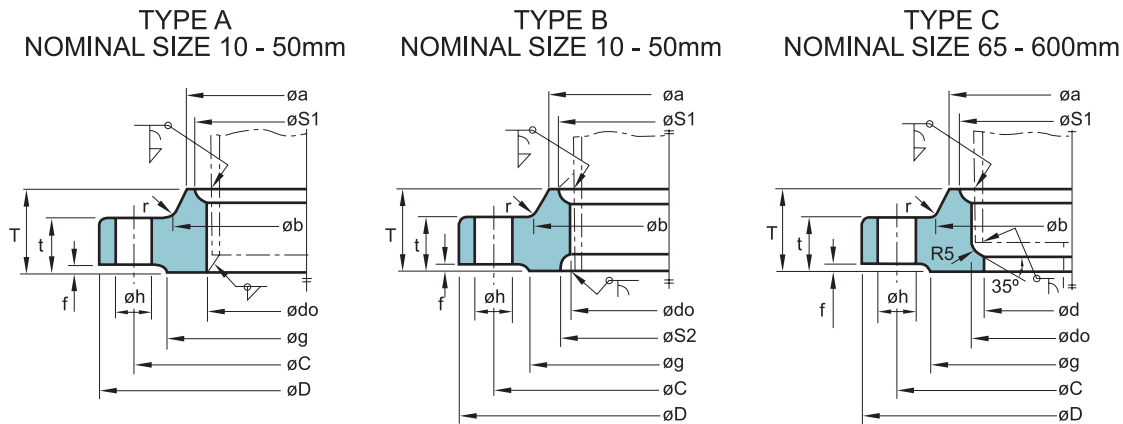
Unit : mm

| Nominal Bore of Flange | Outside Dia. of Steel pipe | Inside Dia. of Flange | Outside Dia. of Flange | SECTIONAL DIMENSIONS OF FLANGE |     |             |      |        |   |      | DIA. OF BOLT     |                      |           | Nominal Bolt Size | Weight (kg) |
|------------------------|----------------------------|-----------------------|------------------------|--------------------------------|-----|-------------|------|--------|---|------|------------------|----------------------|-----------|-------------------|-------------|
|                        |                            |                       |                        | t                              | T   | Dia. of Hub |      | Radius | f | g    | Bolt Circle Dia. | Number of Bolt Holes | Hole Dia. |                   |             |
|                        |                            |                       |                        |                                |     | a           | b    |        |   |      |                  |                      |           |                   |             |
| 10                     | 17.3                       | 17.8                  | 90                     | 12                             | 16  | 26          | 28   | 4      | 1 | 46   | 65               | 4                    | 15        | M12               | 0.52        |
| 15                     | 21.7                       | 22.2                  | 95                     | 12                             | 16  | 30          | 32   | 4      | 1 | 51   | 70               | 4                    | 15        | M12               | 0.58        |
| 20                     | 27.2                       | 27.7                  | 100                    | 14                             | 20  | 38          | 42   | 4      | 1 | 56   | 75               | 4                    | 15        | M12               | 0.75        |
| 25                     | 34.0                       | 34.5                  | 125                    | 14                             | 20  | 46          | 50   | 4      | 1 | 67   | 90               | 4                    | 19        | M16               | 1.16        |
| 32                     | 42.7                       | 43.2                  | 135                    | 16                             | 22  | 56          | 60   | 5      | 2 | 76   | 100              | 4                    | 19        | M16               | 1.53        |
| 40                     | 48.6                       | 49.1                  | 140                    | 16                             | 24  | 62          | 66   | 5      | 2 | 81   | 105              | 4                    | 19        | M16               | 1.64        |
| 50                     | 60.5                       | 61.1                  | 155                    | 16                             | 24  | 76          | 80   | 5      | 2 | 96   | 120              | 8                    | 19        | M16               | 1.83        |
| 65                     | 76.3                       | 77.1                  | 175                    | 18                             | 26  | 94          | 98   | 5      | 2 | 116  | 140              | 8                    | 19        | M16               | 2.58        |
| 80                     | 89.1                       | 90.0                  | 200                    | 20                             | 28  | 108         | 112  | 6      | 2 | 132  | 160              | 8                    | 23        | M20               | 3.66        |
| (90)                   | 101.6                      | 102.6                 | 210                    | 20                             | 30  | 120         | 124  | 6      | 2 | 145  | 170              | 8                    | 23        | M20               | 3.95        |
| 100                    | 114.3                      | 115.4                 | 225                    | 22                             | 34  | 134         | 138  | 6      | 2 | 160  | 185              | 8                    | 23        | M20               | 4.94        |
| 125                    | 139.8                      | 141.2                 | 270                    | 22                             | 34  | 164         | 170  | 6      | 2 | 195  | 225              | 8                    | 25        | M22               | 7.00        |
| 150                    | 165.2                      | 166.6                 | 305                    | 24                             | 38  | 196         | 202  | 6      | 2 | 230  | 260              | 12                   | 25        | M22               | 9.62        |
| 200                    | 216.3                      | 218.0                 | 350                    | 26                             | 40  | 244         | 252  | 6      | 2 | 275  | 305              | 12                   | 25        | M22               | 12.10       |
| 250                    | 267.4                      | 269.5                 | 430                    | 28                             | 44  | 304         | 312  | 6      | 2 | 345  | 380              | 12                   | 27        | M24               | 20.00       |
| 300                    | 318.5                      | 321.0                 | 480                    | 30                             | 48  | 354         | 364  | 8      | 3 | 395  | 430              | 16                   | 27        | M24               | 24.40       |
| 350                    | 355.6                      | 358.1                 | 540                    | 34                             | 52  | 398         | 408  | 8      | 3 | 440  | 480              | 16                   | 33        | M30X3             | 35.00       |
| 400                    | 406.4                      | 409.0                 | 605                    | 38                             | 60  | 446         | 456  | 10     | 3 | 495  | 540              | 16                   | 33        | M30X3             | 46.20       |
| 450                    | 457.2                      | 460.0                 | 675                    | 40                             | 64  | 504         | 514  | 10     | 3 | 560  | 605              | 20                   | 33        | M30X3             | 61.90       |
| 500                    | 508.0                      | 511.0                 | 730                    | 42                             | 68  | 558         | 568  | 10     | 3 | 615  | 660              | 20                   | 33        | M30X3             | 73.25       |
| (550)                  | 558.8                      | 562.0                 | 795                    | 44                             | 70  | 612         | 622  | 10     | 3 | 670  | 720              | 20                   | 39        | M36X3             | 88.10       |
| 600                    | 609.6                      | 613.0                 | 845                    | 46                             | 74  | 666         | 676  | 10     | 3 | 720  | 770              | 24                   | 39        | M36X3             | 98.80       |
| (650)                  | 660.4                      | 664.0                 | 895                    | 48                             | 77  | 704         | 726  | 10     | 5 | 770  | 820              | 24                   | 39        | M36X3             | 101.00      |
| 700                    | 711.2                      | 715.0                 | 960                    | 50                             | 80  | 754         | 776  | 10     | 5 | 820  | 875              | 24                   | 42        | M39X3             | 120.00      |
| (750)                  | 762.0                      | 766.0                 | 1020                   | 52                             | 83  | 806         | 832  | 10     | 5 | 880  | 935              | 24                   | 42        | M39X3             | 141.00      |
| 800                    | 812.8                      | 817.0                 | 1085                   | 54                             | 86  | 865         | 885  | 10     | 5 | 930  | 990              | 24                   | 48        | M45X3             | 161.00      |
| (850)                  | 863.6                      | 868.0                 | 1135                   | 56                             | 89  | 916         | 936  | 10     | 5 | 980  | 1040             | 24                   | 48        | M45X3             | 177.00      |
| 900                    | 914.4                      | 919.0                 | 1185                   | 58                             | 93  | 968         | 986  | 10     | 5 | 1030 | 1090             | 28                   | 48        | M45X3             | 191.00      |
| 1000                   | 1016.0                     | 1021.0                | 1320                   | 62                             | 99  | 1070        | 1098 | 12     | 5 | 1140 | 1210             | 28                   | 56        | M52X3             | 230.00      |
| (1100)                 | 1117.6                     | 1123.0                | 1420                   | 66                             | 105 | 1180        | 1200 | 12     | 5 | 1240 | 1310             | 32                   | 56        | M52X3             | 289.00      |
| 1200                   | 1219.2                     | 1225.0                | 1530                   | 70                             | 112 | 1282        | 1302 | 12     | 5 | 1350 | 1420             | 32                   | 56        | M52X3             | 348.00      |

**Notes**

1. Flanges of parenthesized nominal diameter had letter not be used.
2. The facing of flanges shall conform to KS B1519 (JIS B2202) 1987.
3. The dimension of flange of 650A and larger in nominal sizes excluding 850A, are in accordance with the nominal pressure 25 BAR specified in ISO2084-1974

## 20K KS B1503 / JIS B2220



Unit : mm

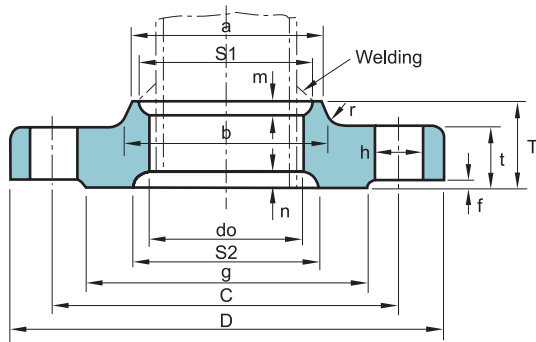
| Nominal Bore of Flange | Outside Dia. of Steel pipe | Inside Dia. of Flange<br>$\phi o$ | Outside Dia. of Flange<br>$D$ | SECTIONAL DIMENSIONS OF FLANGE |     |             |     |               |     |      | BOLT HOLE |                         |                      |                  | REFERENCE         |      |     |      |     | Weight (kg) |        |
|------------------------|----------------------------|-----------------------------------|-------------------------------|--------------------------------|-----|-------------|-----|---------------|-----|------|-----------|-------------------------|----------------------|------------------|-------------------|------|-----|------|-----|-------------|--------|
|                        |                            |                                   |                               | $t$                            | $T$ | Dia. of Hub |     | Radius<br>$r$ | $f$ | $g$  | $d$       | Bolt Circle Dia.<br>$C$ | Number of Bolt Holes | Hole Dia.<br>$h$ | Nominal Bolt Size | $S1$ | $m$ | $S2$ | $n$ |             | $l$    |
|                        |                            |                                   |                               |                                |     | $a$         | $b$ |               |     |      |           |                         |                      |                  |                   |      |     |      |     |             |        |
| 10                     | 17.3                       | 17.8                              | 90                            | 14                             | 20  | 30          | 32  | 4             | 1   | 46   | -         | 65                      | 4                    | 15               | M12               | 27   | 4   | 27   | 4   | -           | 0.59   |
| 15                     | 21.7                       | 22.2                              | 95                            | 14                             | 20  | 34          | 36  | 4             | 1   | 51   | -         | 70                      | 4                    | 15               | M12               | 31   | 4   | 31   | 4   | -           | 0.65   |
| 20                     | 27.2                       | 27.7                              | 100                           | 16                             | 22  | 40          | 42  | 4             | 1   | 56   | -         | 75                      | 4                    | 15               | M12               | 37   | 4   | 37   | 4   | -           | 0.81   |
| 25                     | 34.0                       | 34.5                              | 125                           | 16                             | 24  | 48          | 50  | 4             | 1   | 67   | -         | 90                      | 4                    | 19               | M16               | 44   | 4   | 44   | 4.5 | -           | 1.29   |
| 32                     | 42.7                       | 43.2                              | 135                           | 18                             | 26  | 56          | 60  | 5             | 2   | 76   | -         | 100                     | 4                    | 19               | M16               | 52   | 4   | 53   | 5   | -           | 1.60   |
| 40                     | 48.6                       | 49.1                              | 140                           | 18                             | 26  | 62          | 66  | 5             | 2   | 81   | -         | 105                     | 4                    | 19               | M16               | 58   | 4   | 59   | 5.5 | -           | 1.69   |
| 50                     | 60.5                       | 61.1                              | 155                           | 18                             | 26  | 76          | 80  | 5             | 2   | 96   | -         | 120                     | 8                    | 19               | M16               | 70   | 4   | 72   | 5.5 | -           | 1.89   |
| 65                     | 76.3                       | 77.7                              | 175                           | 20                             | 30  | 100         | 104 | 5             | 2   | 116  | 65.9      | 140                     | 8                    | 19               | M16               | 94   | 6   | -    | -   | 6           | 2.60   |
| 80                     | 89.1                       | 90.0                              | 200                           | 22                             | 34  | 113         | 117 | 6             | 2   | 132  | 78.1      | 160                     | 8                    | 23               | M20               | 107  | 6   | -    | -   | 6           | 3.93   |
| (90)                   | 101.6                      | 102.6                             | 210                           | 24                             | 36  | 126         | 130 | 6             | 2   | 145  | 90.2      | 170                     | 8                    | 23               | M20               | 120  | 6   | -    | -   | 6           | 4.56   |
| 100                    | 114.3                      | 115.4                             | 225                           | 24                             | 36  | 138         | 142 | 6             | 2   | 160  | 102.3     | 185                     | 8                    | 23               | M20               | 132  | 6   | -    | -   | 6           | 5.13   |
| 125                    | 139.8                      | 141.2                             | 270                           | 26                             | 40  | 166         | 172 | 6             | 2   | 195  | 126.6     | 225                     | 8                    | 25               | M22               | 160  | 7   | -    | -   | 6           | 8.30   |
| 150                    | 165.2                      | 166.6                             | 305                           | 28                             | 42  | 196         | 202 | 6             | 2   | 230  | 151.0     | 260                     | 12                   | 25               | M22               | 186  | 8   | -    | -   | 6           | 10.60  |
| 200                    | 216.3                      | 218.0                             | 350                           | 30                             | 46  | 244         | 252 | 6             | 2   | 275  | 199.9     | 305                     | 12                   | 25               | M22               | 237  | 9   | -    | -   | 6           | 13.30  |
| 250                    | 267.4                      | 269.5                             | 430                           | 34                             | 52  | 304         | 312 | 6             | 2   | 345  | 248.8     | 380                     | 12                   | 27               | M24               | 290  | 10  | -    | -   | 6           | 23.40  |
| 300                    | 318.5                      | 321.0                             | 480                           | 36                             | 56  | 354         | 364 | 8             | 3   | 395  | 297.9     | 430                     | 16                   | 27               | M24               | 345  | 11  | -    | -   | 6           | 27.70  |
| 350                    | 355.6                      | 358.1                             | 540                           | 40                             | 62  | 398         | 408 | 8             | 3   | 440  | 333.4     | 480                     | 16                   | 33               | M30X3             | 384  | 12  | -    | -   | 6           | 39.20  |
| 400                    | 406.4                      | 409.0                             | 605                           | 46                             | 70  | 446         | 456 | 10            | 3   | 495  | 381.0     | 540                     | 16                   | 33               | M30X3             | 437  | 13  | -    | -   | 7           | 54.20  |
| 450                    | 457.2                      | 460.0                             | 675                           | 48                             | 78  | 504         | 514 | 10            | 3   | 560  | 431.8     | 605                     | 20                   | 33               | M30X3             | 490  | 15  | -    | -   | 7           | 71.70  |
| 500                    | 508.0                      | 511.0                             | 730                           | 50                             | 84  | 558         | 568 | 10            | 3   | 615  | 482.6     | 660                     | 20                   | 33               | M30X3             | 544  | 16  | -    | -   | 7           | 86.20  |
| (550)                  | 558.8                      | 562.0                             | 795                           | 52                             | 90  | 612         | 622 | 10            | 3   | 670  | 533.4     | 720                     | 20                   | 39               | M36X3             | 595  | 16  | -    | -   | 7           | 105.00 |
| 600                    | 609.6                      | 613.0                             | 845                           | 54                             | 96  | 666         | 676 | 10            | 3   | 720  | 584.2     | 770                     | 24                   | 39               | M36X3             | 646  | 18  | -    | -   | 7           | 119.00 |
| *650                   | 660.4                      | 664.0                             | 945                           | 60                             | -   | -           | -   | -             | 5   | 790  | -         | 850                     | 24                   | 48               | M45X3             | -    | -   | -    | -   | -           | -      |
| *700                   | 711.2                      | 715.0                             | 995                           | 64                             | -   | -           | -   | -             | 5   | 840  | -         | 900                     | 24                   | 48               | M45X3             | -    | -   | -    | -   | -           | -      |
| *750                   | 762.0                      | 766.0                             | 1080                          | 68                             | -   | -           | -   | -             | 5   | 900  | -         | 970                     | 24                   | 56               | M52X3             | -    | -   | -    | -   | -           | -      |
| *800                   | 812.8                      | 817.0                             | 1140                          | 72                             | -   | -           | -   | -             | 5   | 960  | -         | 1030                    | 24                   | 56               | M52X3             | -    | -   | -    | -   | -           | -      |
| *850                   | 863.6                      | 868.0                             | 1200                          | 74                             | -   | -           | -   | -             | 5   | 1020 | -         | 1090                    | 24                   | 56               | M52X3             | -    | -   | -    | -   | -           | -      |
| *900                   | 914.4                      | 919.0                             | 1250                          | 76                             | -   | -           | -   | -             | 5   | 1070 | -         | 1140                    | 28                   | 56               | M52X3             | -    | -   | -    | -   | -           | -      |

### Notes

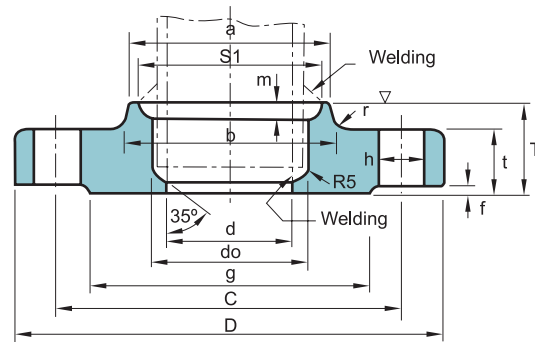
- Flanges of parenthesized nominal diameter had letter not be used.
- "d" is an example of pipe thickness for schedule 40 for nominal diameter 400 and under, and for schedule 12.7 mm for 450 through 600 of KS D3562 and KS D3507 (JIS G3454, JIS G3456)
- The dimension of the notch ( $m$ ,  $n$ ,  $S1$ ,  $S2$ ) for welding can be decided by concerned parties.
- Nominal diameter over 600 is manufacturer's standard (\*)

# 30K KS B1503 / JIS B2220

NOMINAL SIZE 10 - 50mm (TYPE B)



NOMINAL SIZE 65 - 400mm (TYPE C)



Unit : mm

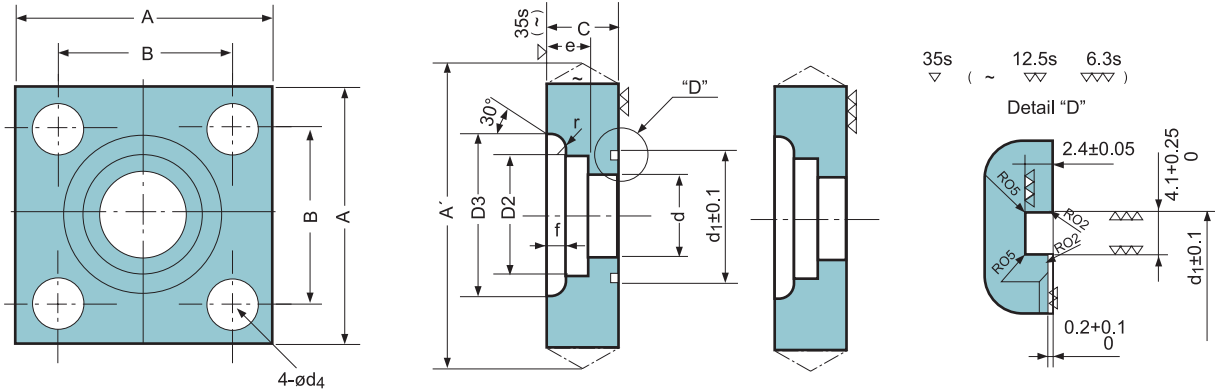
| Nominal Bore of Flange | Outside Dia. of Steel pipe | Inside Dia. of Flange | Outside Dia. of Flange | SECTIONAL DIMENSIONS OF FLANGE |    |     |     |        |   |     |       | BOLT HOLE |                    |                      | Nominal Bolt Size | REFERENCE   |      |    |    |   | Weight (kg) |
|------------------------|----------------------------|-----------------------|------------------------|--------------------------------|----|-----|-----|--------|---|-----|-------|-----------|--------------------|----------------------|-------------------|-------------|------|----|----|---|-------------|
|                        |                            |                       |                        | t                              | T  | a   | b   | Radius | r | f   | g     | d         | Bolt Circle Dia. C | Number of Bolt Holes |                   | Hole Dia. h | S1   | m  | S2 | n |             |
| 10                     | 17.3                       | 17.8                  | 110                    | 16                             | 24 | 30  | 34  | 4      | 1 | 52  | -     | 75        | 4                  | 19                   | M16               | -           | -    | -  | -  | - | 0.99        |
| 15                     | 21.7                       | 22.2                  | 115                    | 18                             | 26 | 36  | 40  | 5      | 1 | 55  | -     | 80        | 4                  | 19                   | M16               | 31          | 4.0  | 40 | 5  | - | 1.23        |
| 20                     | 27.2                       | 27.7                  | 120                    | 18                             | 28 | 42  | 46  | 5      | 1 | 60  | -     | 85        | 4                  | 19                   | M16               | 37          | 5.0  | 44 | 5  | - | 1.34        |
| 25                     | 34.0                       | 34.5                  | 130                    | 20                             | 30 | 50  | 54  | 5      | 1 | 70  | -     | 95        | 4                  | 19                   | M16               | 55          | 6.0  | 52 | 5  | - | 1.76        |
| 32                     | 42.7                       | 43.2                  | 140                    | 22                             | 32 | 60  | 64  | 6      | 2 | 80  | -     | 105       | 4                  | 19                   | M16               | 52          | 6.0  | 60 | 5  | - | 2.15        |
| 40                     | 48.6                       | 49.1                  | 160                    | 22                             | 34 | 66  | 70  | 6      | 2 | 90  | -     | 120       | 4                  | 23                   | M20               | 58          | 6.0  | 66 | 5  | - | 2.82        |
| 50                     | 60.5                       | 61.1                  | 165                    | 22                             | 36 | 82  | 86  | 6      | 2 | 105 | -     | 130       | 8                  | 19                   | M16               | 70          | 6.5  | 78 | 5  | - | 2.89        |
| 65                     | 76.3                       | 77.1                  | 200                    | 26                             | 40 | 102 | 106 | 8      | 2 | 130 | 65.9  | 160       | 8                  | 23                   | M20               | 96          | 9.5  | 94 | 5  | 6 | 4.70        |
| 80                     | 89.1                       | 90.0                  | 210                    | 28                             | 44 | 115 | 121 | 8      | 2 | 140 | 78.1  | 170       | 8                  | 23                   | M20               | 109         | 9.5  | -  | -  | 6 | 5.36        |
| (90)                   | 101.6                      | 102.6                 | 230                    | 30                             | 46 | 128 | 134 | 8      | 2 | 150 | 90.2  | 185       | 8                  | 25                   | M22               | 122         | 9.5  | -  | -  | 6 | 6.85        |
| 100                    | 114.3                      | 115.4                 | 240                    | 32                             | 48 | 141 | 147 | 8      | 2 | 160 | 102.3 | 195       | 8                  | 25                   | M22               | 135         | 9.5  | -  | -  | 6 | 7.89        |
| 125                    | 139.8                      | 141.2                 | 275                    | 36                             | 54 | 166 | 172 | 8      | 2 | 195 | 126.6 | 230       | 8                  | 25                   | M22               | 160         | 9.5  | -  | -  | 6 | 11.40       |
| 150                    | 165.2                      | 166.6                 | 325                    | 38                             | 58 | 196 | 204 | 8      | 2 | 235 | 151.0 | 275       | 12                 | 27                   | M24               | 186         | 9.5  | -  | -  | 6 | 16.70       |
| 200                    | 216.3                      | 218.0                 | 370                    | 42                             | 64 | 248 | 256 | 8      | 2 | 280 | 199.9 | 320       | 12                 | 27                   | M24               | 237         | 9.5  | -  | -  | 6 | 20.60       |
| 250                    | 267.4                      | 269.5                 | 450                    | 48                             | 72 | 306 | 314 | 10     | 2 | 345 | 248.8 | 390       | 12                 | 22                   | M30               | 290         | 10.0 | -  | -  | 6 | 36.10       |
| 300                    | 318.5                      | 321.0                 | 515                    | 52                             | 78 | 360 | 370 | 10     | 3 | 405 | 297.9 | 450       | 16                 | 33                   | M30               | 345         | 12.0 | -  | -  | 6 | 49.90       |
| 350                    | 355.6                      | 358.1                 | 560                    | 54                             | 84 | 402 | 412 | 12     | 3 | 450 | 333.4 | 495       | 16                 | 33                   | M30               | 383         | 13.0 | -  | -  | 6 | 61.20       |
| 400                    | 406.4                      | 409.0                 | 630                    | 60                             | 92 | 456 | 468 | 15     | 3 | 510 | 381.0 | 560       | 16                 | 39                   | M36               | 435         | 14.0 | -  | -  | 7 | 85.20       |

**Notes**

- Flanges of parenthesized nominal diameter had letter not be used.
- "d" is an example of pipe thickness for schedule 40 of KS D3562 and KS D3507 (JIS G3454, JIS G3456). if required, purchaser can specify for other pipe wall thickness.
- This dimension of bolt holes (h) shall be in accordance with Class 3 of KS B1007 (Grade 3 of JIS B1001) where the nominal designation of screw thread of bolt is not more than M16, and in accordance with Class 2 of KS B1007 (Grade 2 of JIS B1001) where the nominal designation of screw thread of bolt is not less than M30 × 3.
- The dimension of the notch (m, n, S1, S2) for welding can decided between concerned parties agreement between parties concerned.

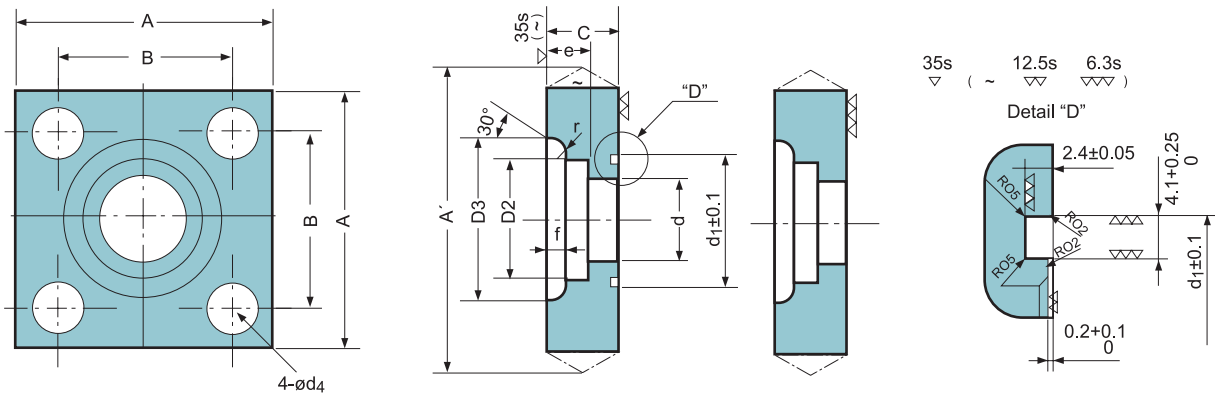
## 210Kg/cm<sup>2</sup> (JIS B2291 SQUARE FLANGES)

Flange for Oil Pressure



Unit : mm

| Nominal Bore | A   |      | A' (Max) | B   |      | C    |      | d    | d1   | d2   |      | e    | d3   | d4  | f    | r   | Weight (kg) | G 계열 O 링 |     |     |
|--------------|-----|------|----------|-----|------|------|------|------|------|------|------|------|------|-----|------|-----|-------------|----------|-----|-----|
|              |     | ±    |          |     |      |      |      |      |      |      |      |      |      |     |      |     |             |          |     |     |
| 15           | 63  | ±1.0 | 67       | 40  | ±0.2 | 22   | 0    | 16.0 | 30   | ±0.1 | 22.2 | +0.2 | 11   | 32  | 11   | 3.5 | 5           | 0.6      | G25 |     |
| 20           | 68  |      | 72       | 45  |      | 22   | -1   | 20.0 | 35   |      | 27.7 | 0    | 12   | 38  | 11   | 4.0 | 5           | 0.7      | G30 |     |
| 25           | 80  |      | 85       | 53  |      | 28   | 0    | 25.0 | 40   |      | 34.5 | +0.3 | 14   | 45  | 13   | 4.0 | 5           | 1.2      | G35 |     |
| 32           | 90  | ±1.2 | 95       | 63  | 28   | -1.5 | 31.5 | 45   | 43.2 | 16   | 56   |      | 13   | 6.0 | 5    | 1.5 | G40         |          |     |     |
| 40           | 100 | ±1.5 | 106      | 70  | 36   | 0    | 37.5 | 55   | 49.1 | 18   | 63   |      | 18   | 7.0 | 5    | 2.4 | G50         |          |     |     |
| 50           | 112 | ±1.5 | 118      | 80  | ±0.4 | 36   | 0    | 47.5 | 65   | ±0.1 | 61.1 | +0.4 | 20   | 75  | 18   | 7.0 | 5           | 2.8      | G60 |     |
| 65           | 140 |      | ±2.0     | 148 |      | 100  | 45   | -2   | 60.0 |      | 80   |      | 77.1 | 22  | 95   | 22  | 9.5         | 6        | 5.3 | G75 |
| 80           | 155 |      | 163      | 112 |      | 45   | 71.0 | 90   | 90.0 |      | 25   |      | 108  | 24  | 11.0 | 6   | 6.2         | G85      |     |     |



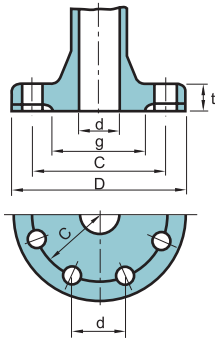
Unit : mm

| Nominal Bore | A   |      | A' (Max) | B   |      | C    |      | d    | d1   | d2   |      | e    | d3   | d4  | f    | r   | Weight (kg) | G 계열 O 링 |     |  |
|--------------|-----|------|----------|-----|------|------|------|------|------|------|------|------|------|-----|------|-----|-------------|----------|-----|--|
|              |     | ±    |          |     |      |      |      |      |      |      |      |      |      |     |      |     |             |          |     |  |
| 15           | 54  | ±1.0 | 58       | 36  | ±0.2 | 22   | 0    | 16.0 | 30   | ±0.1 | 22.2 | +0.2 | 11   | 32  | 11   | 3.5 | 5           | 0.5      |     |  |
| 20           | 58  |      | 62       | 40  |      | 22   | -1   | 20.0 | 35   |      | 27.7 | 0    | 12   | 38  | 11   | 4.0 | 5           | 0.6      |     |  |
| 25           | 68  |      | 73       | 48  |      | 28   | 0    | 25.0 | 40   |      | 34.5 | +0.3 | 14   | 45  | 13   | 4.0 | 5           | 0.8      |     |  |
| 32           | 76  | ±1.2 | 81       | 56  | 28   | -1.5 | 31.5 | 45   | 43.2 | 16   | 56   |      | 13   | 6.0 | 5    | 1.0 |             |          |     |  |
| 40           | 92  | ±1.5 | 98       | 65  | 36   | 0    | 37.5 | 55   | 49.1 | 18   | 63   |      | 18   | 7.0 | 5    | 1.9 |             |          |     |  |
| 50           | 100 | ±1.5 | 106      | 73  | ±0.4 | 36   | 0    | 47.5 | 65   | ±0.1 | 61.1 | +0.4 | 20   | 75  | 18   | 7.0 | 5           | 2.0      |     |  |
| 65           | 128 |      | ±2.0     | 136 |      | 92   | 45   | -2   | 60.0 |      | 80   |      | 77.1 | 22  | 95   | 22  | 9.5         | 6        | 4.1 |  |
| 80           | 140 |      | 148      | 103 |      | 45   | 71.0 | 90   | 90.0 |      | 25   |      | 108  | 24  | 11.0 | 6   | 4.7         |          |     |  |

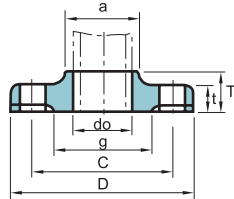
# TOLERANCE FOR PIPE FLANGES

KS B1502 / JIS B2203

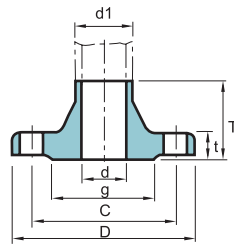
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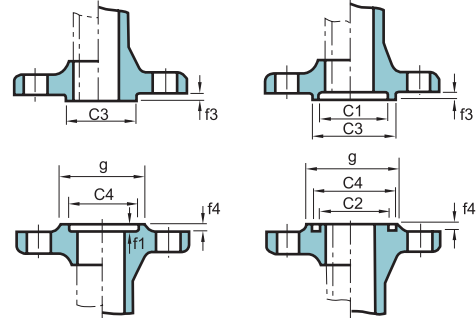
SLIP - ON



WELDING NECK



TYPE OF GASKET SURFACE



| Flange Section        |                    | Surface Condition  | Basic Size          | Dimensional Tolerance |
|-----------------------|--------------------|--------------------|---------------------|-----------------------|
| Outside Dia.<br>D     |                    | As Forged (1)      | 300 & below         | +not specified        |
|                       |                    |                    | over 300 thru 600   | -2.0                  |
|                       |                    |                    | over 600 thru 1000  |                       |
|                       |                    | Finish             | over 1000 thru 1500 | +not specified        |
|                       |                    |                    | over 1500           | -3.0                  |
|                       |                    |                    |                     |                       |
| Inside Dia.           | Solid Flange d(2)  | As Forged (1)      | 16 & below          | ±1                    |
|                       |                    |                    | over 16 thru 63     | ±1.5                  |
|                       |                    |                    | over 63 thru 125    | ±2                    |
|                       |                    |                    | over 125 thru 150   | ±2.5                  |
|                       |                    |                    | over 250 thru 500   | ±3                    |
|                       |                    |                    | over 500 thru 1000  | ±4                    |
|                       | Slip-on Flange do  | Finish             | 100 & below         | +0.5, 0               |
|                       |                    |                    | over 100 thru 400   | +1, 0                 |
|                       |                    |                    | over 400 thru 600   | +1.5, 0               |
|                       |                    |                    | over 600 thru 800   | +2.0, 0               |
|                       |                    |                    | over 800 thru 1000  | +2.5, 0               |
|                       |                    |                    | over 1000           | +3, 0                 |
| Welding Neck Flange d | Finish             | 100 & below        | 0, -0.5             |                       |
|                       |                    | over 100 thru 400  | 0, -1               |                       |
|                       |                    | over 400 thru 600  | 0, -1.5             |                       |
|                       |                    | over 600 thru 800  | 0, -2               |                       |
|                       |                    | over 800 thru 1000 | 0, -2.5             |                       |
|                       |                    | over 1000          | 0, -3               |                       |
| Bolt Hole             | Bolt Circle Dia. c |                    | 250 & below         | ±0.5                  |
|                       |                    |                    | over 250 thru 550   | ±0.6                  |
|                       |                    |                    | over 550 thru 950   | ±0.8                  |
|                       |                    |                    | over 950 thru 1350  | ±1                    |
|                       |                    |                    | over 1350           | ±1.5                  |

| Flange Section |   | Surface Condition | Basic Size          | Dimensional Tolerance |
|----------------|---|-------------------|---------------------|-----------------------|
| Bolt Hole      | Pitch of Hole P                                 | Drilling Hole     |                     | ±0.5                  |
| Dia. of Hub    | Slip-on Flange (a) and Welding Neck Flange (d1) | As Forged (1)     | 220 & below         | +2, 0                 |
|                |   |                   | over 220 thru 450   | +3, 0                 |
|                |   |                   | over 450 thru 650   | +4, 0                 |
|                |   |                   | over 650 thru 850   | +6, 0                 |
|                |   |                   | over 850 thru 1000  | +7, 0                 |
|                |   | Finish            | over 1000           | +8, 0                 |
|                |   |                   | 220 & below         | +1, 0                 |
|                |   |                   | over 220 thru 450   | +1.5, 0               |
|                |   |                   | over 450 thru 650   | +2, 0                 |
|                |   |                   | over 650 thru 850   | +2.5, 0               |
| Gasket Seat    | C1, C2, C3, C4                                  | Finish            | 500 & below         | ±0.3                  |
|                |   |                   | over 500 thru 1000  | ±0.35                 |
|                |   |                   | over 1000 thru 1500 | ±0.4                  |
|                |   |                   | over 1500           | ±0.5                  |
|                | f3, f4  | Finish            | 8 & below           | ±0.2                  |
|                |   |                   | over 8              | ±0.25                 |
|                | g   | Finish            | 200 & below         | ±0.8                  |
|                |   |                   | over 200 thru 650   | ±0.9                  |
|                |   |                   | over 650 thru 1000  | ±1                    |
|                |   |                   | over 1000           | ±1.2                  |
| Thickness      | One-side Finish                                 | 20 & below        | +1.5, 0             |                       |
|                |   | over 20 thru 50   | +2, 0               |                       |
|                |   | over 50 thru 100  | +3, 0               |                       |
|                | Bolt-side Finish                                | 20 & below        | +1, 0               |                       |
|                |   | over 20 thru 50   | +1.5, 0             |                       |
|                |   | over 50 thru 100  | +2, 0               |                       |
| Hub Height T   | Flange with pipe Inserted                       | Finish            | 50 & below          | ±1                    |
|                |   |                   | over 50 thru 100    | ±1.5                  |
|                | Flange with Butt-Welded Pipe                    | Finish            | over 100 thru 200   | ±2                    |
|                |   |                   | over 200 & below    | +2, 0                 |
|                |   |                   | over 200 thru 300   | +3, 0                 |

**Notes**

1. This dimensional tolerance applies to the machined surface, as required.
2. This dimension d has been specified only for the flange, of which the bore part is cylindrical in shape.

**Remarks**

1. The dimensions d of bore part of the solid flanges with surface, as forged of valves, pumps, etc. are allowed up to plus 100% of the above dimensional tolerance. Provided that the required thickness shall be free from its influence.
2. The thickness of flange of valve and the like, of which the dimension between flange faces is limited to a fixed value, are allowed up to plus 100% of the above dimensional tolerance in the column of thickness.
3. In the case of spot facing of the single surface finishing, the thickness of spot facing is allowed up to 70% of the dimensional tolerance in the above column of thickness in negative side.
4. The chain double-lines in the figures of solid flange and socket welding type flange illustrate the cases of large raised face flange.

## Valve Series

- Key Operation Ball Valves
- Key Operation Needle Valves
- Ball Valves
- Integral Bonnet Needle Valves
- Union Bonnet Needle Valves
- Check Valves
- High Pressure Check Valves
- High Pressure Needle Valves
- Plug Valves
- Manifold Valves
- Vacuum Clamps
- Water Regulators
- Flexible Hoses
- Double Block & Bleed Valves
- Swing-Out Ball Valves
- Toggle Valves
- Bleed & Purge Valves
- Quick Connectors
- High Pressure Ball Valves
- Hydraulic Ball Valves
- Trunnion Ball Valves
- Rising Plug Valves
- Relief Valves
- Cryogenic Needle Valves
- Cryogenic Ball Valves
- Micron in-Line Filters
- Gauge Root Valves
- Hydraulic Flange and Components

## Fitting Series

- Integration Tube Fittings
- Tube Fittings (Compression Type)
- Instrument Thread Fittings
- Forged Fittings
- Bite Type Tube Fittings (DIN2353)
- Bite Type Tube Fittings (JIS B2351)
- 37 Flared Tube Fittings (SAE J514)
- O-Ring Face Seal Fittings
- Hose Connectors & Push-On Hose Fittings

## Electric Equipment

- MCPD(Molded Case Power Distributor)
- SPIDER
- Smart Eye Module

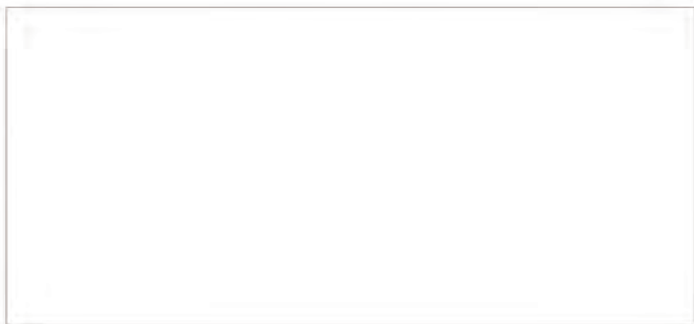


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