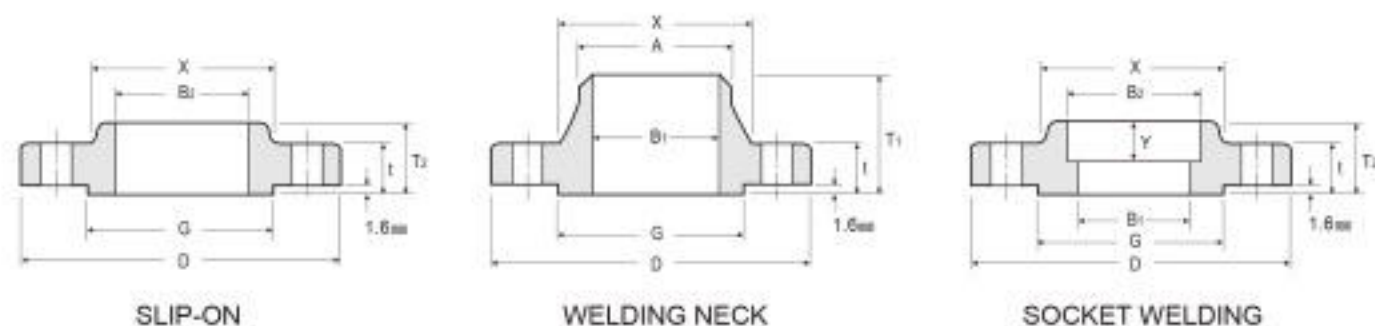




## CLASS 150 FLANGES

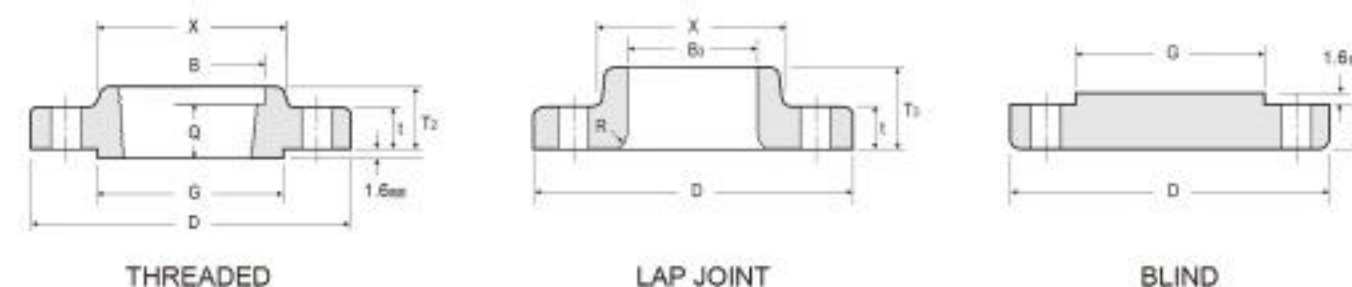
ANSI B16.5 FORGED FLANGES

Unit:mm

| Nominal Pipe Size | Outside Diam. | Diam. at Base of Hub | O.D. of Raised Face | Thick-ness | BORE                        |                        |           | LENGTH THRU HUB |                                 |           | Diam. of Hub at Bevel | Radius of Fillet | Thread Length |
|-------------------|---------------|----------------------|---------------------|------------|-----------------------------|------------------------|-----------|-----------------|---------------------------------|-----------|-----------------------|------------------|---------------|
|                   |               |                      |                     |            | Welding Neck Socket Welding | Slip-on Socket Welding | Lap Joint | Welding Neck    | Slip-on Threaded Socket Welding | Lap Joint |                       |                  |               |
|                   |               |                      |                     |            | B1                          | B2                     | B3        | T1              | T2                              | T3        |                       |                  |               |
| 1/2               | 88.9          | 30.2                 | 35.1                | 11.2       | 15.7                        | 22.4                   | 22.9      | 47.8            | 15.7                            | 15.7      | 21.3                  | 3.0              | 15.7          |
| 3/4               | 98.6          | 38.1                 | 42.9                | 12.7       | 20.8                        | 27.7                   | 28.2      | 52.3            | 15.7                            | 15.7      | 26.7                  | 3.0              | 15.7          |
| 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          |
| 1 1/4             | 117.3         | 58.7                 | 63.5                | 15.7       | 35.1                        | 43.2                   | 43.7      | 57.2            | 20.6                            | 20.6      | 42.2                  | 4.8              | 20.6          |
| 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          |
| 2                 | 152.4         | 77.7                 | 91.9                | 19.1       | 52.6                        | 62.0                   | 62.5      | 63.5            | 25.4                            | 25.4      | 60.5                  | 7.9              | 25.4          |
| 2 1/2             | 177.8         | 90.4                 | 104.6               | 22.4       | 62.7                        | 74.7                   | 75.4      | 69.9            | 28.4                            | 28.4      | 73.2                  | 7.9              | 28.4          |
| 3                 | 190.5         | 108.0                | 127.0               | 23.9       | 78.0                        | 90.7                   | 91.4      | 69.9            | 30.2                            | 30.2      | 88.9                  | 9.7              | 30.2          |
| 3 1/2             | 215.9         | 122.2                | 139.7               | 23.9       | 90.2                        | 103.4                  | 104.1     | 71.4            | 31.8                            | 31.8      | 101.6                 | 9.7              | 31.8          |
| 4                 | 228.6         | 134.9                | 157.2               | 23.9       | 102.4                       | 116.1                  | 116.8     | 76.2            | 33.3                            | 33.3      | 114.3                 | 11.2             | 33.3          |
| 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          |
| 6                 | 279.4         | 192.0                | 215.9               | 25.4       | 154.2                       | 170.7                  | 171.5     | 88.9            | 39.6                            | 39.6      | 168.4                 | 12.7             | 39.6          |
| 8                 | 342.9         | 246.1                | 269.7               | 28.4       | 202.7                       | 221.5                  | 222.3     | 101.6           | 44.5                            | 44.5      | 219.2                 | 12.7             | 44.5          |
| 10                | 406.4         | 304.8                | 323.9               | 30.2       | 254.5                       | 278.4                  | 277.4     | 101.6           | 49.3                            | 49.3      | 273.1                 | 12.7             | 49.3          |
| 12                | 482.6         | 365.3                | 381.0               | 31.8       | 304.8                       | 327.2                  | 328.2     | 114.3           | 55.6                            | 55.6      | 323.9                 | 12.7             | 55.6          |
| 14                | 533.4         | 400.1                | 412.8               | 35.1       | 336.6                       | 359.2                  | 360.2     | 127.0           | 57.2                            | 79.2      | 355.6                 | 12.7             | 57.2          |
| 16                | 596.9         | 457.2                | 469.9               | 36.6       | 387.4                       | 410.5                  | 411.2     | 127.0           | 63.5                            | 87.4      | 406.4                 | 12.7             | 63.5          |
| 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          |
| 20                | 698.5         | 558.8                | 584.2               | 42.9       | 489.0                       | 513.1                  | 514.4     | 144.5           | 73.2                            | 103.1     | 508.0                 | 12.7             | 73.2          |
| 24                | 812.8         | 663.4                | 692.2               | 47.8       | 590.6                       | 616.0                  | 616.0     | 152.4           | 82.6                            | 111.3     | 609.6                 | 12.7             | 82.6          |

## Notes:

- (1) For the 'Bore(B1)' other than Standard Wall Thickness, refer to page 83.  
 (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.



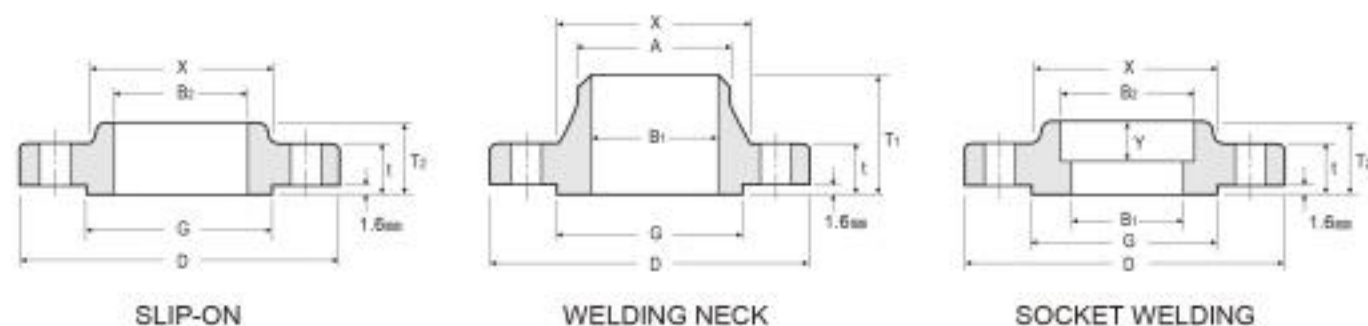
## CLASS 150 FLANGES

ANSI B16.5 FORGED FLANGES

Unit:mm

| Nominal Pipe Size | Depth of Socket | DRILLING         |                 |               | BOLTING             |                     |                  | APPROXIMATE WEIGHT |             |            |                      |           |       |                |
|-------------------|-----------------|------------------|-----------------|---------------|---------------------|---------------------|------------------|--------------------|-------------|------------|----------------------|-----------|-------|----------------|
|                   |                 | Bolt Circle Diam | Number of Holes | Diam of Holes | Diam of Bolt (inch) | Machine Bolt Length | Stud Bolt Length | Welding Neck       |             |            | Slip-on and Threaded | Lap Joint | Blind | Socket Welding |
|                   |                 |                  |                 |               |                     |                     |                  | Raised Face        | Raised Face | Ring Joint |                      |           |       |                |
| 1/2               | 9.7             | 60.5             | 4               | 15.7          | 1/2                 | 50.8                | 57.2             | —                  | 0.60        | 0.60       | 0.60                 | 0.47      | 0.51  | 0.47           |
| 3/4               | 11.2            | 69.9             | 4               | 15.7          | 1/2                 | 50.8                | 63.5             | —                  | 0.90        | 0.90       | 0.90                 | 0.58      | 0.64  | 0.59           |
| 1                 | 12.7            | 79.2             | 4               | 15.7          | 1/2                 | 57.2                | 63.5             | 76.2               | 1.14        | 1.18       | 1.24                 | 0.86      | 0.93  | 0.87           |
| 1 1/4             | 14.2            | 88.9             | 4               | 15.7          | 1/2                 | 57.2                | 69.9             | 82.6               | 1.41        | 1.48       | 1.54                 | 1.08      | 1.16  | 1.23           |
| 1 1/2             | 15.7            | 98.6             | 4               | 15.7          | 1/2                 | 63.5                | 69.9             | 82.6               | 1.81        | 1.90       | 2.01                 | 1.41      | 1.51  | 1.62           |
| 2                 | 17.5            | 120.7            | 4               | 19.1          | 5/8                 | 69.9                | 82.6             | 95.3               | 2.72        | 2.84       | 3.07                 | 2.26      | 2.38  | 2.64           |
| 2 1/2             | 19.1            | 139.7            | 4               | 19.1          | 5/8                 | 76.2                | 88.9             | 101.6              | 4.45        | 4.70       | 4.98                 | 3.43      | 3.6   | 4.07           |
| 3                 | 20.6            | 152.4            | 4               | 19.1          | 5/8                 | 76.2                | 88.9             | 101.6              | 5.22        | 5.54       | 5.90                 | 3.87      | 4.04  | 4.92           |
| 3 1/2             | 22.4            | 177.8            | 8               | 19.1          | 5/8                 | 76.2                | 88.9             | 101.6              | 6.40        | 6.76       | 7.46                 | 5.20      | 5.24  | 5.90           |
| 4                 | 23.9            | 190.5            | 8               | 19.1          | 5/8                 | 76.2                | 88.9             | 101.6              | 7.49        | 7.96       | 8.90                 | 5.75      | 5.96  | 7.41           |
| 5                 | 23.9            | 215.9            | 8               | 22.4          | 3/4                 | 82.6                | 95.3             | 108.0              | 9.53        | 10.54      | 12.04                | 6.26      | 6.44  | 8.76           |
| 6                 | 26.9            | 241.3            | 8               | 22.4          | 3/4                 | 82.6                | 101.6            | 114.3              | 11.80       | 13.12      | 15.11                | 7.38      | 7.65  | 11.40          |
| 8                 | 31.8            | 298.5            | 8               | 22.4          | 3/4                 | 88.9                | 108.0            | 120.7              | 19.10       | 21.34      | 25.84                | 12.36     | 12.66 | 20.10          |
| 10                | 33.3            | 362.0            | 12              | 25.4          | 7/8                 | 101.6               | 114.3            | 127.0              | 24.50       | 28.85      | 35.74                | 17.10     | 17.4  | 29.39          |
| 12                | 39.6            | 431.8            | 12              | 25.4          | 7/8                 | 101.6               | 120.7            | 133.4              | 39.90       | 46.80      | 58.01                | 27.68     | 28.3  | 43.80          |
| 14                | 41.4            | 476.3            | 12              | 28.4          | 1                   | 114.3               | 133.4            | 146.1              | 51.80       | 62.58      | 77.60                | 35.2      | 41.5  | 59.42          |
| 16                | 44.5            | 539.8            | 16              | 28.4          | 1                   | 114.3               | 133.4            | 146.1              | 64.50       | 79.42      | 98.82                | 45.5      | 52.98 | 77.40          |
| 18                | 49.3            | 577.9            | 16              | 31.8          | 1 1/8               | 127.0               | 146.1            | 158.8              | 74.90       | 97.63      | 124.32               | 49.71     | 59    | 94.8           |
| 20                | 54.1            | 635.0            | 20              | 31.8          | 1 1/8               | 139.7               | 158.8            | 171.5              | 89.40       | 120.44     | 154.18               | 66.5      | 72.12 | 123.4          |
| 24                | 63.5            | 749.3            | 20              | 35.1          | 1 1/4               | 152.4               | 171.5            | 184.2              | 121.70      | 169.37     | 223.92               | 90.5      | 99.42 | 188.24         |

- (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.  
 (6) Depth of Socket (Y) is covered by ANSI B16.5 only in sizes through 3 inch, over 3 inch is at the manufacture's option.



## CLASS 300 FLANGES

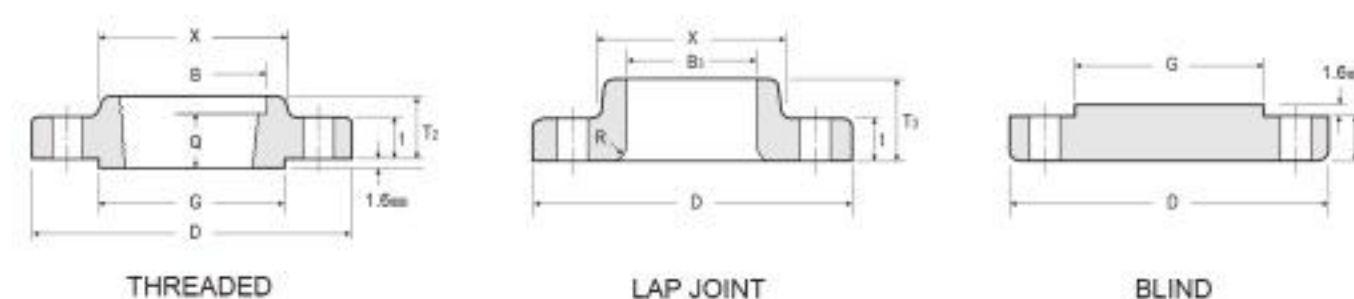
ANSI B16.5 FORGED FLANGES

Unit:mm

| Nominal Pipe Size | Outside Diam.<br>D | Diam. at Base of Hub<br>X | O.D. of Raised Face<br>G | Thick-ness<br>t | BORE                                          |                                          |                             |                                      | LENGTH THRU HUB                |                                                   |                             | Diam. of Hub at Bevel<br>A | Radius of Fillet<br>R | Thread Length<br>Q |
|-------------------|--------------------|---------------------------|--------------------------|-----------------|-----------------------------------------------|------------------------------------------|-----------------------------|--------------------------------------|--------------------------------|---------------------------------------------------|-----------------------------|----------------------------|-----------------------|--------------------|
|                   |                    |                           |                          |                 | Welding Neck Socket Welding<br>B <sub>1</sub> | Slip-on Socket Welding<br>B <sub>2</sub> | Lap Joint<br>B <sub>3</sub> | Counter Bore Min. Threaded Min.<br>B | Welding Neck<br>T <sub>1</sub> | Slip-on Threaded Socket Welding<br>T <sub>2</sub> | Lap Joint<br>T <sub>3</sub> |                            |                       |                    |
| 1/2               | 95.3               | 38.1                      | 35.1                     | 14.2            | 15.7                                          | 22.4                                     | 22.9                        | 23.6                                 | 52.3                           | 22.4                                              | 22.4                        | 21.3                       | 3.0                   | 15.7               |
| 3/4               | 117.3              | 47.8                      | 42.9                     | 15.7            | 20.8                                          | 27.7                                     | 28.2                        | 29.0                                 | 57.2                           | 25.4                                              | 25.4                        | 26.7                       | 3.0                   | 15.7               |
| 1                 | 124                | 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               |
| 1 1/4             | 133.4              | 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               |
| 1 1/2             | 155.4              | 69.9                      | 73.2                     | 20.6            | 40.9                                          | 49.5                                     | 50.0                        | 50.5                                 | 68.3                           | 30.2                                              | 30.2                        | 48.3                       | 6.4                   | 22.4               |
| 2                 | 165.1              | 84.1                      | 91.9                     | 22.4            | 52.6                                          | 62.0                                     | 62.5                        | 63.5                                 | 69.9                           | 33.3                                              | 33.3                        | 60.5                       | 7.9                   | 28.4               |
| 2 1/2             | 190.5              | 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               |
| 3                 | 209.6              | 117.3                     | 127.0                    | 28.4            | 78.0                                          | 90.7                                     | 91.4                        | 92.2                                 | 79.2                           | 42.9                                              | 42.9                        | 88.9                       | 9.7                   | 31.8               |
| 3 1/2             | 228.6              | 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               |
| 4                 | 254                | 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               |
| 5                 | 279.4              | 177.8                     | 185.7                    | 35.1            | 128.3                                         | 143.8                                    | 144.5                       | 144.5                                | 98.6                           | 50.8                                              | 50.8                        | 141.2                      | 11.2                  | 42.9               |
| 6                 | 317.5              | 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               |
| 8                 | 381                | 260.4                     | 269.7                    | 41.1            | 202.7                                         | 221.5                                    | 222.3                       | 222.3                                | 111.3                          | 62.0                                              | 62.0                        | 219.2                      | 12.7                  | 50.8               |
| 10                | 444.5              | 320.5                     | 323.9                    | 47.8            | 254.5                                         | 276.4                                    | 277.4                       | 276.4                                | 117.3                          | 66.5                                              | 95.3                        | 273.1                      | 12.7                  | 55.6               |
| 12                | 520.7              | 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               |
| 14                | 584.2              | 425.5                     | 412.8                    | 53.8            | 336.6                                         | 359.2                                    | 360.2                       | 360.4                                | 142.7                          | 76.2                                              | 111.3                       | 355.6                      | 12.7                  | 63.5               |
| 16                | 647.7              | 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               |
| 18                | 711.2              | 533.4                     | 533.4                    | 60.5            | 438.2                                         | 461.8                                    | 462.3                       | 462.0                                | 158.6                          | 88.9                                              | 130.0                       | 457.2                      | 12.7                  | 69.9               |
| 20                | 774.7              | 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               |
| 24                | 914.4              | 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               |

## Notes:

- (1) For the 'Bore(B)' other than Standard Wall Thickness, refer to page 83.  
 (2) 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' (T<sub>1</sub>, T<sub>2</sub>).  
 (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.



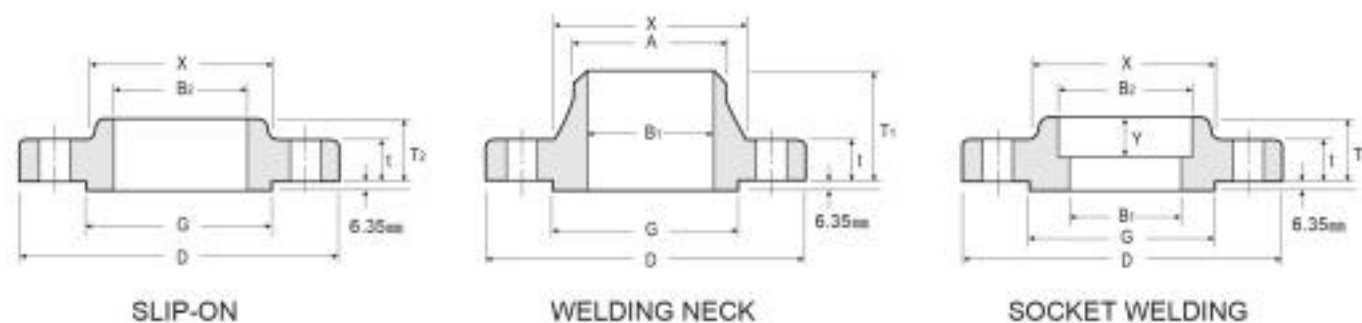
## CLASS 300 FLANGES

ANSI B16.5 FORGED FLANGES

Unit:mm

| Nominal Pipe Size | Depth of Socket<br>Y | DRILLING         |                 |               | BOLTING             |                                    |                                               | APPROXIMATE WEIGHT |        |        |                      |           |        |                |
|-------------------|----------------------|------------------|-----------------|---------------|---------------------|------------------------------------|-----------------------------------------------|--------------------|--------|--------|----------------------|-----------|--------|----------------|
|                   |                      | Bolt Circle Diam | Number of Holes | Diam of Holes | Diam of Bolt (inch) | Machine Bolt Length<br>Raised Face | Stud Bolt Length<br>Raised Face<br>Ring Joint | Welding Neck       |        |        | Slip-on and Threaded | Lap Joint | Blind  | Socket Welding |
|                   |                      |                  |                 |               |                     |                                    |                                               | SCH40              | SCH80  | SCH160 |                      |           |        |                |
| 1/2               | 9.7                  | 66.5             | 4               | 15.7          | 1/2                 | 57.2                               | 63.5                                          | 76.2               | 0.91   | 0.91   | 0.91                 | 0.63      | 0.63   | 0.63           |
| 3/4               | 11.2                 | 82.6             | 4               | 19.1          | 5/8                 | 63.5                               | 76.2                                          | 88.9               | 1.36   | 1.36   | 1.36                 | 1.16      | 1.16   | 1.19           |
| 1                 | 12.7                 | 88.9             | 4               | 19.1          | 5/8                 | 63.5                               | 76.2                                          | 88.9               | 1.82   | 1.87   | 1.93                 | 1.39      | 1.39   | 1.42           |
| 1 1/4             | 14.2                 | 98.6             | 4               | 19.1          | 5/8                 | 69.9                               | 82.6                                          | 95.3               | 2.27   | 2.35   | 2.41                 | 1.75      | 1.75   | 1.88           |
| 1 1/2             | 15.7                 | 114.3            | 4               | 22.4          | 3/4                 | 76.2                               | 88.9                                          | 101.6              | 3.18   | 3.28   | 3.40                 | 2.53      | 2.53   | 2.68           |
| 2                 | 17.5                 | 127.0            | 8               | 19.1          | 5/8                 | 76.2                               | 88.9                                          | 101.6              | 3.36   | 3.49   | 3.75                 | 2.90      | 2.91   | 3.22           |
| 2 1/2             | 19.1                 | 149.4            | 8               | 22.4          | 3/4                 | 82.6                               | 101.6                                         | 114.3              | 5.45   | 5.72   | 6.02                 | 4.25      | 4.25   | 4.49           |
| 3                 | 20.6                 | 168.1            | 8               | 22.4          | 3/4                 | 88.9                               | 108.0                                         | 120.7              | 7.32   | 7.52   | 8.94                 | 5.92      | 5.94   | 6.89           |
| 3 1/2             | 22.4                 | 184.2            | 8               | 22.4          | 3/4                 | 95.3                               | 108.0                                         | 127.0              | 8.93   | 9.31   | 10.10                | 7.72      | 7.74   | 9.53           |
| 4                 | 23.9                 | 200.2            | 8               | 22.4          | 3/4                 | 95.3                               | 114.3                                         | 127.0              | 12.10  | 12.62  | 13.69                | 10.13     | 10.15  | 11.2           |
| 5                 | 23.9                 | 235.0            | 8               | 22.4          | 3/4                 | 108.0                              | 120.7                                         | 133.4              | 16.30  | 17.42  | 19.08                | 12.58     | 12.6   | 15.96          |
| 6                 | 26.9                 | 269.7            | 12              | 22.4          | 3/4                 | 108.0                              | 120.7                                         | 139.7              | 20.40  | 21.86  | 24.07                | 16.04     | 16.05  | 21.40          |
| 8                 | 31.8                 | 330.2            | 12              | 25.4          | 7/8                 | 120.7                              | 139.7                                         | 152.4              | 31.30  | 33.75  | 38.69                | 24.5      | 24.53  | 34.6           |
| 10                | 33.3                 | 387.4            | 16              | 28.4          | 1                   | 139.7                              | 158.8                                         | 171.5              | 45.40  | 50.43  | 58.38                | 34.16     | 39.92  | 53.50          |
| 12                | 39.6                 | 450.9            | 16              | 31.8          | 1 1/8               | 146.1                              | 171.5                                         | 184.2              | 64.50  | 72.35  | 85.10                | 51.26     | 58.7   | 78.9           |
| 14                | 41.4                 | 514.4            | 20              | 31.8          | 1 1/8               | 158.8                              | 177.8                                         | 190.5              | 93.50  | 105.61 | 122.49               | 72.12     | 83.46  | 107.5          |
| 16                | 44.5                 | 571.5            | 20              | 35.1          | 1 1/4               | 165.1                              | 190.5                                         | 203.2              | 113.10 | 130.25 | 152.56               | 90.4      | 106.14 | 139.25         |
| 18                | 49.3                 | 628.7            | 24              | 35.1          | 1 1/4               | 171.5                              | 196.9                                         | 209.6              | 138.90 | 164.74 | 195.07               | 109       | 133.95 | 176.9          |
| 20                | 54.1                 | 685.8            | 24              | 35.1          | 1 1/4               | 184.2                              | 203.2                                         | 222.3              | 167.70 | 202.32 | 240.17               | 136       | 157.65 | 223.17         |
| 24                | 63.5                 | 812.8            | 24              | 41.1          | 1 1/2               | 203.2                              | 228.6                                         | 254.0              | 238.68 | 288.15 | 348.28               | 204       | 240.4  | 342            |

- (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) Depth of Socket (Y) is covered by ANSI B16.5 only in sizes through 3 inch, over 3 inch is at the manufacture's option.



## CLASS 600 FLANGES

ANSI B16.5 FORGED FLANGES

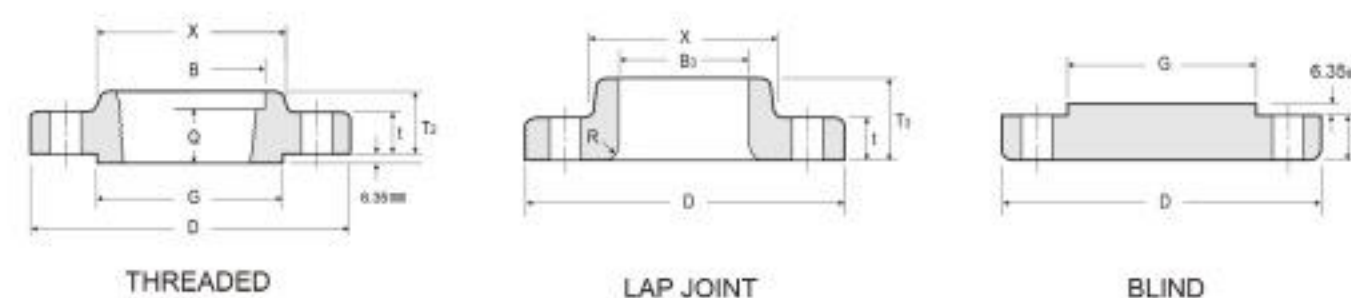
Unit:mm

| Nominal<br>Pipe<br>Size | Outside<br>Diam.<br>D | Diam.<br>at Base<br>of Hub<br>X | O.D of<br>Raised<br>Face<br>G | Thick-<br>ness<br>t | BORE                                       |                                    |                    |                              | LENGTH THRU HUB       |                                                |                    | Diam. of<br>Hub at<br>Bevel<br>A | Radius<br>of<br>Fillet<br>R | Thread<br>Length<br>Q |
|-------------------------|-----------------------|---------------------------------|-------------------------------|---------------------|--------------------------------------------|------------------------------------|--------------------|------------------------------|-----------------------|------------------------------------------------|--------------------|----------------------------------|-----------------------------|-----------------------|
|                         |                       |                                 |                               |                     | Welding<br>Neck<br>Socket<br>Welding<br>B1 | Slip-on<br>Socket<br>Welding<br>B2 | Lap<br>Joint<br>B3 | Counter<br>Bore<br>Min.<br>B | Welding<br>Neck<br>T1 | Slip-on<br>Threaded<br>Socket<br>Welding<br>T2 | Lap<br>Joint<br>T3 |                                  |                             |                       |
|                         |                       |                                 |                               |                     |                                            |                                    |                    |                              |                       |                                                |                    |                                  |                             |                       |
| 1/2                     | 95.3                  | 38.1                            | 35.1                          | 14.2                |                                            | 22.4                               | 22.9               | 23.6                         | 52.3                  | 22.4                                           | 22.4               | 21.3                             | 3.0                         | 15.7                  |
| 3/4                     | 117.3                 | 47.8                            | 42.9                          | 15.7                |                                            | 27.7                               | 28.2               | 29.0                         | 57.2                  | 25.4                                           | 25.4               | 26.7                             | 3.0                         | 15.7                  |
| 1                       | 124                   | 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                   | 133.4                 | 63.5                            | 63.5                          | 20.6                |                                            | 43.2                               | 43.7               | 44.5                         | 66.5                  | 28.4                                           | 28.4               | 42.2                             | 4.8                         | 20.6                  |
| 1 1/2                   | 155.4                 | 69.9                            | 73.2                          | 22.4                |                                            | 49.5                               | 50.0               | 50.5                         | 69.9                  | 31.8                                           | 31.8               | 48.3                             | 6.4                         | 22.4                  |
| 2                       | 165.1                 | 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                   | 190.5                 | 100.1                           | 104.6                         | 28.4                |                                            | 74.7                               | 75.4               | 76.2                         | 79.2                  | 41.1                                           | 41.1               | 73.2                             | 7.9                         | 31.8                  |
| 3                       | 209.6                 | 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                   | 228.6                 | 133.4                           | 139.7                         | 35.1                |                                            | 103.4                              | 104.1              | 104.9                        | 85.9                  | 49.3                                           | 49.3               | 101.6                            | 9.7                         | 39.6                  |
| 4                       | 273.1                 | 152.4                           | 157.2                         | 38.1                |                                            | 116.1                              | 116.8              | 117.6                        | 101.6                 | 53.8                                           | 53.8               | 114.3                            | 11.2                        | 41.1                  |
| 5                       | 330.2                 | 189.0                           | 185.7                         | 44.5                |                                            | 143.8                              | 144.5              | 144.5                        | 114.3                 | 60.5                                           | 60.5               | 141.2                            | 11.2                        | 47.8                  |
| 6                       | 355.6                 | 222.3                           | 215.9                         | 47.8                |                                            | 170.7                              | 171.5              | 171.5                        | 117.3                 | 66.5                                           | 66.5               | 168.4                            | 12.7                        | 50.8                  |
| 8                       | 419.1                 | 273.1                           | 269.7                         | 55.6                |                                            | 221.5                              | 222.3              | 222.3                        | 133.4                 | 76.2                                           | 76.2               | 219.2                            | 12.7                        | 57.2                  |
| 10                      | 508                   | 342.9                           | 323.9                         | 63.5                |                                            | 276.4                              | 277.4              | 276.4                        | 152.4                 | 85.9                                           | 111.3              | 273.1                            | 12.7                        | 65.0                  |
| 12                      | 558.8                 | 400.1                           | 381.0                         | 66.5                |                                            | 327.2                              | 328.2              | 328.7                        | 155.4                 | 91.9                                           | 117.3              | 323.9                            | 12.7                        | 69.9                  |
| 14                      | 603.3                 | 431.8                           | 412.8                         | 69.9                |                                            | 359.2                              | 360.2              | 360.4                        | 165.1                 | 93.7                                           | 127.0              | 355.6                            | 12.7                        | 73.2                  |
| 16                      | 685.8                 | 495.3                           | 489.9                         | 76.2                |                                            | 410.5                              | 411.2              | 411.2                        | 177.8                 | 106.4                                          | 139.7              | 406.4                            | 12.7                        | 77.7                  |
| 18                      | 743                   | 546.1                           | 533.4                         | 82.6                |                                            | 461.8                              | 462.3              | 462.0                        | 184.2                 | 117.3                                          | 152.4              | 457.2                            | 12.7                        | 79.2                  |
| 20                      | 812.8                 | 609.6                           | 584.2                         | 88.9                |                                            | 513.1                              | 514.4              | 512.8                        | 190.5                 | 127.0                                          | 165.1              | 508.0                            | 12.7                        | 82.6                  |
| 24                      | 939.8                 | 717.6                           | 692.2                         | 101.6               |                                            | 616.0                              | 616.0              | 614.4                        | 203.2                 | 139.7                                          | 184.2              | 609.6                            | 12.7                        | 91.9                  |

To be specified by purchaser

## Notes:

- (1) For the inside diameter of pipes (corresponding to 'Bore' (B1) of Welding Neck Flanges), refer to page 83.  
 (2) 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).  
 (3) For Slip-on, Threaded and Lap joint Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits of 7 degrees.



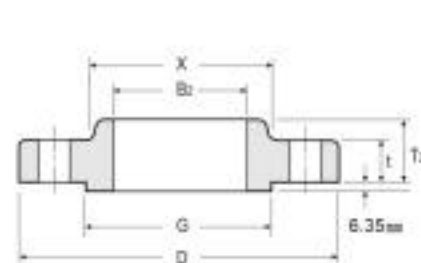
## CLASS 600 FLANGES

ANSI B16.5 FORGED FLANGES

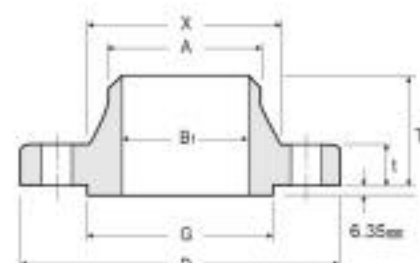
Unit:mm

| Nominal<br>Pipe<br>Size | Depth<br>of<br>Socket   | DRILLING               |                       |                     | BOLTING                       |                                      |               |       | APPROXIMATE WEIGHT |        |        |                            |              |        |                |
|-------------------------|-------------------------|------------------------|-----------------------|---------------------|-------------------------------|--------------------------------------|---------------|-------|--------------------|--------|--------|----------------------------|--------------|--------|----------------|
|                         |                         | Bolt<br>Circle<br>Diam | Number<br>of<br>Holes | Diam<br>of<br>Holes | Diam<br>of<br>Bolts<br>(inch) | Stud Bolt Length                     |               |       | Welding<br>Neck    |        |        | Slip-on<br>and<br>Threaded | Lap<br>Joint | Blind  | Socket<br>Weld |
|                         | 0.25"<br>Raised<br>Face |                        |                       |                     |                               | Male-<br>Female<br>Tongue-<br>Groove | Ring<br>Joint | SCH40 |                    |        |        |                            |              |        |                |
| 1/2                     | 9.7                     | 66.5                   | 4                     | 15.7                | 1/2                           | 76.2                                 | 69.9          | 76.2  | 1.36               | 1.36   | 1.36   | 0.91                       | 0.91         | 0.91   | 0.91           |
| 3/4                     | 11.2                    | 82.6                   | 4                     | 19.1                | 5/8                           | 88.9                                 | 82.6          | 88.9  | 1.59               | 1.63   | 1.67   | 1.4                        | 1.4          | 1.4    | 1.36           |
| 1                       | 12.7                    | 88.9                   | 4                     | 19.1                | 5/8                           | 88.9                                 | 82.6          | 88.9  | 1.82               | 1.87   | 1.94   | 1.7                        | 1.7          | 1.81   | 1.81           |
| 1 1/4                   | 14.2                    | 98.6                   | 4                     | 19.1                | 5/8                           | 95.3                                 | 88.9          | 95.3  | 2.50               | 2.59   | 2.66   | 2.27                       | 2.27         | 2.4    | 2.6            |
| 1 1/2                   | 15.7                    | 114.3                  | 4                     | 22.4                | 3/4                           | 108.0                                | 101.6         | 108.0 | 3.63               | 3.74   | 3.88   | 3.1                        | 3.1          | 3.4    | 3.18           |
| 2                       | 17.5                    | 127.0                  | 8                     | 19.1                | 5/8                           | 108.0                                | 101.6         | 108.0 | 4.54               | 4.69   | 4.98   | 3.71                       | 3.85         | 4.4    | 3.9            |
| 2 1/2                   | 19.1                    | 149.4                  | 8                     | 22.4                | 3/4                           | 120.7                                | 114.3         | 120.7 | 6.36               | 6.66   | 7.00   | 5.44                       | 5.44         | 6.8    | 5.9            |
| 3                       | 20.6                    | 168.1                  | 8                     | 22.4                | 3/4                           | 127.0                                | 120.7         | 127.0 | 8.17               | 8.58   | 9.04   | 7.26                       | 7.26         | 8.9    | 7.4            |
| 3 1/2                   | 22.4                    | 184.2                  | 8                     | 25.4                | 7/8                           | 139.7                                | 133.4         | 139.7 | 12.00              | 12.44  | 13.28  | 9.53                       | 9.53         | 13.17  |                |
| 4                       | 23.9                    | 215.9                  | 8                     | 25.4                | 7/8                           | 146.1                                | 139.7         | 146.1 | 16.80              | 17.46  | 18.79  | 14.97                      | 15.40        | 18.6   |                |
| 5                       | 23.9                    | 266.7                  | 8                     | 28.4                | 1                             | 165.1                                | 158.8         | 165.1 | 30.90              | 32.27  | 34.30  | 28.5                       | 29           | 30.64  |                |
| 6                       | 26.9                    | 292.1                  | 12                    | 28.4                | 1                             | 171.5                                | 165.1         | 171.5 | 36.77              | 34.93  | 37.69  | 36.32                      | 36.5         | 33.80  |                |
| 8                       | 31.8                    | 349.3                  | 12                    | 31.8                | 1 1/8                         | 190.5                                | 184.2         | 196.9 | 50.90              | 53.98  | 60.16  | 44                         | 50.8         | 62.2   |                |
| 10                      | 33.3                    | 431.8                  | 16                    | 35.1                | 1 1/4                         | 215.9                                | 209.6         | 215.9 | 86.26              | 92.59  | 103.34 | 76.2                       | 82           | 102    |                |
| 12                      | 39.6                    | 489.0                  | 20                    | 35.1                | 1 1/4                         | 222.3                                | 215.9         | 222.3 | 102.60             | 112.36 | 128.19 | 97.52                      | 108.86       | 132    |                |
| 14                      | 41.4                    | 527.1                  | 20                    | 38.1                | 1 3/8                         | 235.0                                | 228.6         | 235.0 | 121.60             | 136.13 | 156.38 | 102                        | 111.20       | 158    |                |
| 16                      | 44.5                    | 603.3                  | 20                    | 41.1                | 1 1/2                         | 254.0                                | 247.7         | 254.0 | 177.10             | 198.70 | 226.80 | 149.82                     | 165.71       | 224.13 |                |
| 18                      | 49.3                    | 654.1                  | 20                    | 44.5                | 1 5/8                         | 273.1                                | 266.7         | 273.1 | 215.70             | 246.66 | 283.01 | 180.1                      | 219.4        | 265    |                |
| 20                      | 54.1                    | 723.9                  | 24                    | 44.5                | 1 5/8                         | 285.8                                | 279.4         | 292.1 | 268.00             | 310.23 | 356.13 | 231.54                     | 258.8        | 365    |                |
| 24                      | 63.5                    | 838.2                  | 24                    | 50.8                | 1 7/8                         | 330.2                                | 323.9         | 336.6 | 372.00             | 495.71 | 512.38 | 330                        | 362          | 536.80 |                |

- (4) Blind Flanges may 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 3 1/2" are the same as for Class 400 Flanges.  
 (7) Depth of Socket (Y) is covered by ANSI B16.5 only in sizes through 3 inch, over 3 inch is at the manufacture's option.



SLIP-ON



WELDING NECK

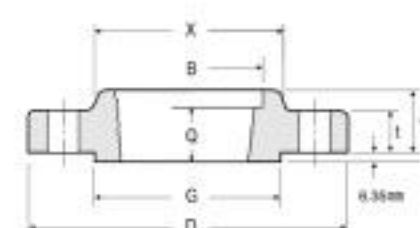
## CLASS 900 FLANGES

ANSI B16.5 FORGED FLANGES

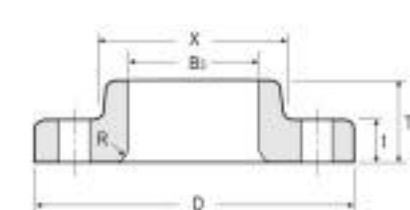
|                         |                  |                            |                          |                |                                             |         |              |                         |                 |                                          |              | Unit:mm                     |
|-------------------------|------------------|----------------------------|--------------------------|----------------|---------------------------------------------|---------|--------------|-------------------------|-----------------|------------------------------------------|--------------|-----------------------------|
| Nominal<br>Pipe<br>Size | Outside<br>Diam. | Diam.<br>at Base<br>of Hub | O.D of<br>Raised<br>Face | Thick-<br>ness | BORE                                        |         |              |                         | LENGTH THRU HUB |                                          |              | Diam. of<br>Hub at<br>Bevel |
|                         |                  |                            |                          |                | Welding<br>Neck                             | Slip-on | Lap<br>Joint | Counter<br>Bore<br>Min. | Welding<br>Neck | Slip-on<br>Threaded<br>Socket<br>Welding | Lap<br>Joint |                             |
|                         | D                | X                          | G                        | t              | B1                                          | B2      | B3           | B                       | T1              | T2                                       | T3           |                             |
| 1/2                     | 120.7            | 38.1                       | 35.1                     | 22.4           | See Note(1)<br>To be specified by purchaser | 22.4    | 22.9         | 23.6                    | 60.5            | 31.8                                     | 31.8         | 21.3                        |
| 3/4                     | 130              | 44.5                       | 42.9                     | 25.4           |                                             | 27.7    | 28.2         | 29.0                    | 69.9            | 35.1                                     | 35.1         | 26.7                        |
| 1                       | 149.4            | 52.3                       | 50.8                     | 28.4           |                                             | 34.5    | 35.1         | 35.8                    | 73.2            | 41.1                                     | 41.1         | 33.5                        |
| 1 1/4                   | 158.8            | 63.5                       | 63.5                     | 28.4           |                                             | 43.2    | 43.7         | 44.5                    | 73.2            | 41.1                                     | 41.1         | 42.2                        |
| 1 1/2                   | 177.8            | 69.9                       | 73.2                     | 31.8           |                                             | 49.5    | 50.0         | 50.5                    | 82.6            | 44.5                                     | 44.5         | 48.3                        |
| 2                       | 215.9            | 104.6                      | 91.9                     | 38.1           |                                             | 62.0    | 62.5         | 63.5                    | 101.6           | 57.2                                     | 57.2         | 60.5                        |
| 2 1/2                   | 244.3            | 124.0                      | 104.6                    | 41.1           |                                             | 74.7    | 75.4         | 76.2                    | 104.6           | 63.5                                     | 63.5         | 73.2                        |
| 3                       | 241.3            | 127.0                      | 127.0                    | 38.1           |                                             | 90.7    | 91.4         | 92.2                    | 101.6           | 53.8                                     | 53.8         | 88.9                        |
| 4                       | 292.1            | 158.8                      | 157.2                    | 44.5           |                                             | 116.1   | 116.8        | 117.6                   | 114.3           | 69.9                                     | 69.9         | 114.3                       |
| 5                       | 349.3            | 190.5                      | 185.7                    | 50.8           |                                             | 143.8   | 144.5        | 144.5                   | 127.0           | 79.2                                     | 79.2         | 141.2                       |
| 6                       | 381              | 235.0                      | 215.9                    | 55.6           |                                             | 170.7   | 171.5        | 171.5                   | 139.7           | 85.9                                     | 85.9         | 168.4                       |
| 8                       | 469.9            | 298.5                      | 269.7                    | 63.5           |                                             | 221.5   | 222.3        | 222.3                   | 162.1           | 101.6                                    | 114.3        | 219.2                       |
| 10                      | 546.1            | 368.3                      | 323.9                    | 69.9           |                                             | 276.4   | 277.4        | 276.4                   | 184.2           | 108.0                                    | 127.0        | 273.1                       |
| 12                      | 609.6            | 419.1                      | 381.0                    | 79.2           |                                             | 327.2   | 328.2        | 328.7                   | 200.2           | 117.3                                    | 142.7        | 323.9                       |
| 14                      | 641.4            | 450.9                      | 412.8                    | 85.9           |                                             | 359.2   | 360.4        | 360.4                   | 212.9           | 130                                      | 155.4        | 355.6                       |
| 16                      | 704.9            | 506.0                      | 469.9                    | 88.9           |                                             | 410.5   | 411.2        | 411.2                   | 215.9           | 133.4                                    | 165.1        | 406.4                       |
| 18                      | 787.4            | 565.2                      | 533.4                    | 101.6          | 461.8                                       | 462.3   | 462.0        | 228.6                   | 152.4           | 190.5                                    | 457.2        |                             |
| 20                      | 857.3            | 622.3                      | 584.2                    | 108.0          | 513.1                                       | 514.4   | 512.8        | 247.7                   | 158.8           | 209.6                                    | 508.0        |                             |
| 24                      | 1041.4           | 749.3                      | 692.2                    | 139.7          | 616.0                                       | 616.0   | 614.4        | 292.1                   | 203.2           | 266.7                                    | 609.6        |                             |

## Notes:

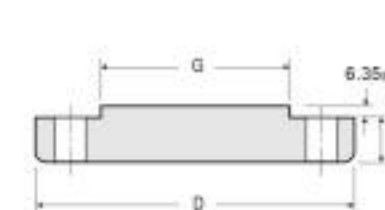
- (1) For the inside diameter of pipes (corresponding to 'Bore' (B1) of Welding Neck Flanges), refer to page 83.  
 (2) Class 900 flanges except Lap Joint will be furnished with 0.25" (6.35mm) raised face, which is included in 'Thickness' (t) and 'Length through Hub' (T1, T2).  
 (3) For Slip-on, Threaded, 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

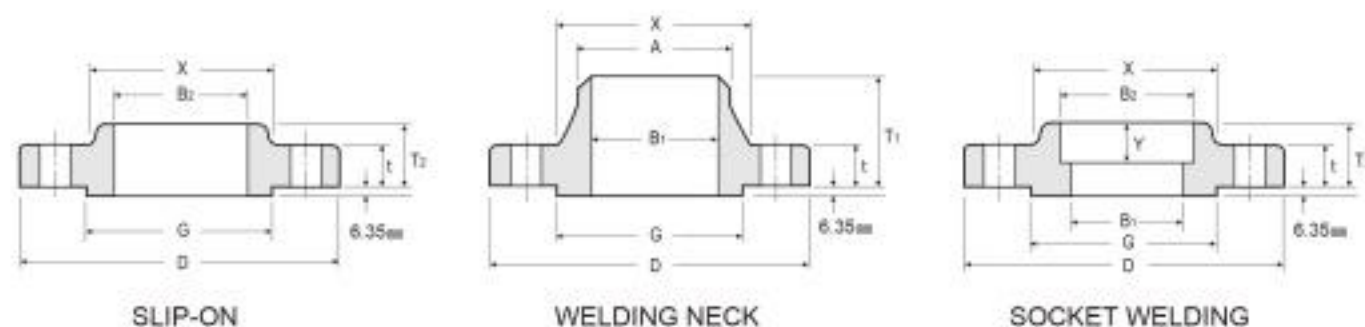
## CLASS 900 FLANGES

ANSI B16.5 FORGED FLANGES

Unit:mm

| Nominal<br>Pipe<br>Size | Radius<br>of<br>fillet | Thread<br>Length | DRILLING               |                       |                     | BOLTING                       |                         |                                      |               | APPROXIMATE WEIGHT |        |        |                            |              |        |
|-------------------------|------------------------|------------------|------------------------|-----------------------|---------------------|-------------------------------|-------------------------|--------------------------------------|---------------|--------------------|--------|--------|----------------------------|--------------|--------|
|                         |                        |                  | Bolt<br>Circle<br>Diam | Number<br>of<br>Holes | Diam<br>of<br>Holes | Diam<br>of<br>Bolts<br>(inch) | Stud Bolt Length        |                                      |               | Welding<br>Neck    |        |        | Slip-on<br>and<br>Threaded | Lap<br>Joint | Blind  |
|                         |                        |                  |                        |                       |                     |                               | 0.25"<br>Raised<br>Face | Male-<br>Female<br>Tongue-<br>Groove | Ring<br>Joint |                    |        |        |                            |              |        |
|                         | R                      | Q                | SCH40                  | SCH80                 | SCH160              |                               |                         |                                      |               |                    |        |        |                            |              |        |
| 1/2                     | 3.0                    | 22.4             | 82.6                   | 4                     | 22.4                | 3/4                           | 108.0                   | 101.6                                | 108.0         | 3.10               | 3.10   | 3.10   | 1.81                       | 1.8          | 1.9    |
| 3/4                     | 3.0                    | 25.4             | 88.9                   | 4                     | 22.4                | 3/4                           | 114.3                   | 108.0                                | 114.3         | 3.18               | 3.18   | 3.18   | 2.4                        | 2.4          | 2.7    |
| 1                       | 3.0                    | 28.4             | 101.6                  | 4                     | 25.4                | 7/8                           | 127.0                   | 120.7                                | 127.0         | 3.86               | 3.92   | 4.00   | 3.50                       | 3.60         | 4.09   |
| 1 1/4                   | 4.8                    | 30.2             | 111.3                  | 4                     | 25.4                | 7/8                           | 127.0                   | 120.7                                | 127.0         | 4.54               | 4.64   | 4.71   | 4.1                        | 4.1          | 4.54   |
| 1 1/2                   | 6.4                    | 31.8             | 124.0                  | 4                     | 28.4                | 1                             | 139.7                   | 133.4                                | 139.7         | 6.36               | 6.49   | 6.65   | 5.52                       | 5.55         | 5.93   |
| 2                       | 7.9                    | 38.1             | 165.1                  | 8                     | 25.4                | 7/8                           | 146.1                   | 139.7                                | 146.1         | 10.90              | 11.10  | 11.50  | 9.98                       | 9.98         | 11.34  |
| 2 1/2                   | 7.9                    | 47.8             | 190.5                  | 8                     | 28.4                | 1                             | 158.8                   | 152.4                                | 158.8         | 16.30              | 16.69  | 17.14  | 15.8                       | 15.8         | 16.00  |
| 3                       | 9.7                    | 41.1             | 190.5                  | 8                     | 25.4                | 7/8                           | 146.1                   | 139.7                                | 146.1         | 15.00              | 15.50  | 16.10  | 11.8                       | 11.8         | 13.17  |
| 4                       | 11.2                   | 47.8             | 235.0                  | 8                     | 31.8                | 1 1/8                         | 171.5                   | 165.1                                | 171.5         | 23.20              | 23.94  | 25.43  | 23.2                       | 23.2         | 24.5   |
| 5                       | 11.2                   | 53.8             | 279.4                  | 8                     | 35.1                | 1 1/4                         | 190.5                   | 184.2                                | 190.5         | 39.10              | 40.62  | 42.86  | 37.65                      | 36.74        | 39.46  |
| 6                       | 12.7                   | 57.2             | 317.5                  | 12                    | 31.8                | 1 1/8                         | 190.5                   | 184.2                                | 196.9         | 49.90              | 52.06  | 55.33  | 48.3                       | 49           | 51.5   |
| 8                       | 12.7                   | 63.5             | 393.7                  | 12                    | 38.1                | 1 3/8                         | 222.3                   | 215.9                                | 222.3         | 84.90              | 88.61  | 96.09  | 75                         | 86           | 89     |
| 10                      | 12.7                   | 71.4             | 469.9                  | 16                    | 38.1                | 1 3/8                         | 235.0                   | 228.6                                | 235.0         | 121.70             | 129.87 | 142.79 | 111.3                      | 125.64       | 131.54 |
| 12                      | 12.7                   | 76.2             | 533.4                  | 20                    | 38.1                | 1 3/8                         | 254.0                   | 247.7                                | 254.0         | 157.00             | 169.48 | 189.74 | 146                        | 167.00       | 187    |
| 14                      | 12.7                   | 82.6             | 558.8                  | 20                    | 41.1                | 1 1/2                         | 273.1                   | 266.7                                | 292.1         | 181.00             | 199.62 | 225.55 | 172.36                     | 180.07       | 224.07 |
| 16                      | 12.7                   | 85.9             | 616.0                  | 20                    | 44.5                | 1 5/8                         | 285.8                   | 279.4                                | 298.5         | 225.00             | 251.11 | 285.08 | 192.95                     | 211.10       | 272.4  |
| 18                      | 12.7                   | 88.9             | 685.8                  | 20                    | 50.8                | 1 7/8                         | 323.9                   | 317.5                                | 333.6         | 309.00             | 347.24 | 392.13 | 272.4                      | 295.10       | 385.9  |
| 20                      | 12.7                   | 91.9             | 749.3                  | 20                    | 53.8                | 2                             | 349.3                   | 342.9                                | 362.0         | 377.00             | 431.59 | 490.91 | 331.42                     | 367.70       | 488    |
| 24                      | 12.7                   | 101.6            | 901.7                  | 20                    | 66.5                | 2 1/2                         | 438.2                   | 431.8                                | 457.2         | 685.00             | 778.36 | 885.21 | 632                        | 703.70       | 905    |

- (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 1500 Flanges.



## CLASS 1500 FLANGES

ANSI B16.5 FORGED FLANGES

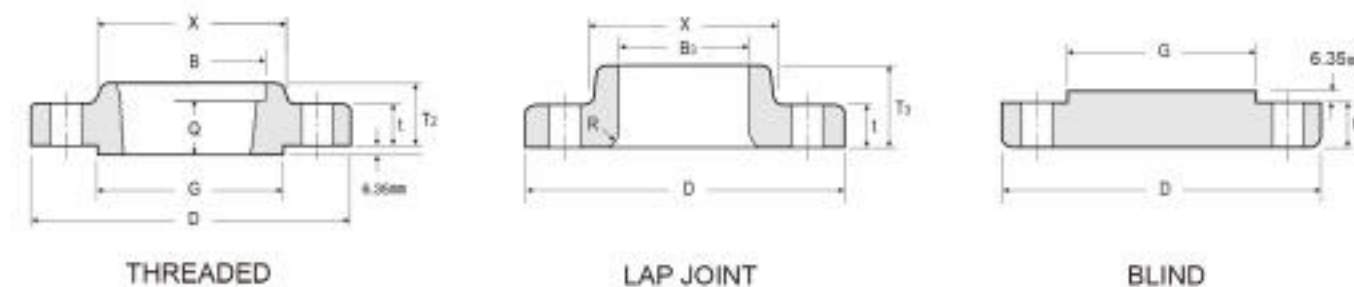
Unit:mm

| Nominal<br>Pipe<br>Size | Outside<br>Diam.<br>D | Diam.<br>at Base<br>of Hub<br>X | O.D of<br>Raised<br>Face<br>G | Thick-<br>ness<br>t | BORE                                       |                                    |                    |                                                  | LENGTH THRU HUB       |                                                |                    | Diam. of<br>Hub at<br>Bevel<br>A | Radius<br>of<br>Fillet<br>R | Thread<br>Length<br>Q |
|-------------------------|-----------------------|---------------------------------|-------------------------------|---------------------|--------------------------------------------|------------------------------------|--------------------|--------------------------------------------------|-----------------------|------------------------------------------------|--------------------|----------------------------------|-----------------------------|-----------------------|
|                         |                       |                                 |                               |                     | Welding<br>Neck<br>Socket<br>Welding<br>B1 | Slip-on<br>Socket<br>Welding<br>B2 | Lap<br>Joint<br>B3 | Counter<br>Bore<br>Min.<br>Threaded<br>Min.<br>B | Welding<br>Neck<br>T1 | Slip-on<br>Threaded<br>Socket<br>Welding<br>T2 | Lap<br>Joint<br>T3 |                                  |                             |                       |
|                         |                       |                                 |                               |                     |                                            |                                    |                    |                                                  |                       |                                                |                    |                                  |                             |                       |
| 1/2                     | 120.7                 | 38.1                            | 35.1                          | 22.4                |                                            | 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                       | 149.4                 | 52.3                            | 50.8                          | 28.4                |                                            | 34.5                               | 35.1               | 35.8                                             | 73.2                  | 41.1                                           | 41.4               | 33.5                             | 3.0                         | 28.4                  |
| 1 1/4                   | 158.8                 | 63.5                            | 63.5                          | 28.4                |                                            | 43.2                               | 43.7               | 44.5                                             | 73.2                  | 41.1                                           | 41.1               | 42.2                             | 4.8                         | 30.2                  |
| 1 1/2                   | 177.8                 | 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                       | 215.9                 | 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                   | 244.3                 | 124.0                           | 104.6                         | 41.1                |                                            | 74.7                               | 75.4               | 76.2                                             | 104.6                 | 63.5                                           | 63.5               | 73.2                             | 7.9                         | 47.8                  |
| 3                       | 266.7                 | 133.4                           | 127.0                         | 47.8                |                                            | 90.7                               | 91.4               | 92.2                                             | 117.3                 | 73.2                                           | 73.2               | 88.9                             | 9.7                         | 50.8                  |
| 4                       | 311.2                 | 162.1                           | 157.2                         | 53.8                |                                            | 116.1                              | 116.8              | 117.6                                            | 124.0                 | 90.4                                           | 90.4               | 114.3                            | 11.2                        | 57.2                  |
| 5                       | 374.7                 | 196.9                           | 185.7                         | 73.2                |                                            | 143.8                              | 144.5              | 144.5                                            | 155.4                 | 104.6                                          | 104.6              | 141.2                            | 11.2                        | 63.5                  |
| 6                       | 393.7                 | 228.6                           | 215.9                         | 82.6                |                                            | 170.7                              | 171.5              | 171.5                                            | 171.5                 | 119.1                                          | 119.1              | 168.4                            | 12.7                        | 69.9                  |
| 8                       | 482.6                 | 292.1                           | 269.7                         | 91.9                |                                            | 221.5                              | 222.3              | 222.3                                            | 212.9                 | 142.7                                          | 142.7              | 219.2                            | 12.7                        | 76.2                  |
| 10                      | 584.2                 | 368.3                           | 323.9                         | 108.0               |                                            | 276.4                              | 277.4              | 276.4                                            | 254.0                 | 158.8                                          | 177.8              | 273.1                            | 12.7                        | 84.1                  |
| 12                      | 673.1                 | 450.9                           | 381.0                         | 124.0               |                                            | 327.2                              | 328.2              | 328.7                                            | 282.4                 | 180.8                                          | 218.9              | 323.9                            | 12.7                        | 91.9                  |
| 14                      | 749.3                 | 495.3                           | 412.8                         | 133.4               |                                            | 359.2                              | 360.2              | 360.4                                            | 298.5                 | -                                              | 241.3              | 355.6                            | 12.7                        | -                     |
| 16                      | 825.5                 | 552.5                           | 469.9                         | 146.1               |                                            | 410.5                              | 411.2              | 411.2                                            | 311.2                 | -                                              | 260.4              | 406.4                            | 12.7                        | -                     |
| 18                      | 914.4                 | 596.9                           | 533.4                         | 162.1               |                                            | 461.8                              | 462.3              | 462.0                                            | 327.2                 | -                                              | 276.4              | 457.2                            | 12.7                        | -                     |
| 20                      | 984.3                 | 641.4                           | 584.2                         | 177.8               |                                            | 513.1                              | 514.4              | 512.8                                            | 355.6                 | -                                              | 292.1              | 508.0                            | 12.7                        | -                     |
| 24                      | 1168.4                | 762.0                           | 692.2                         | 203.2               |                                            | 616.0                              | 616.0              | 614.4                                            | 406.4                 | -                                              | 330.2              | 609.6                            | 12.7                        | -                     |

See Note(1)  
To be specified by purchaser

## Notes:

- (1) For the inside diameter of pipes (corresponding to 'Bore' (B1) of Welding Neck Flanges), refer to page 83.  
 (2) Class 1500 flanges except Lap Joint will be furnished with 0.25" (6.35mm) raised face, which is not included in 'Thickness' (t) and 'Length through Hub' (T1), (T2).  
 (3) For Slip-on, Threaded Lap Joint and Socket Welding Flanges, the hubs can be shaped either vertical from base to top or tapered within the limits 7 degrees.



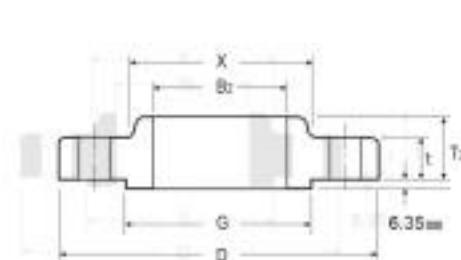
## CLASS 1500 FLANGES

ANSI B16.5 FORGED FLANGES

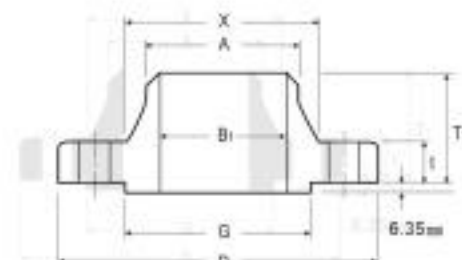
Unit:mm

| Nominal<br>Pipe<br>Size | Depth<br>of<br>Socket<br><br>Y | DRILLING               |                       |                     | BOLTING                       |                         |                                      |               | APPROXIMATE WEIGHT |         |         |                            |              |        |                   |
|-------------------------|--------------------------------|------------------------|-----------------------|---------------------|-------------------------------|-------------------------|--------------------------------------|---------------|--------------------|---------|---------|----------------------------|--------------|--------|-------------------|
|                         |                                | Bolt<br>Circle<br>Diam | Number<br>of<br>Holes | Diam<br>of<br>Holes | Diam<br>of<br>Bolts<br>(inch) | Stud Bolt Length        |                                      |               | Welding<br>Neck    |         |         | Slip-on<br>and<br>Threaded | Lap<br>Joint | Blind  | Socket<br>Welding |
|                         |                                |                        |                       |                     |                               | 0.25"<br>Raised<br>Face | Male-<br>Female<br>Tongue-<br>Groove | Ring<br>Joint |                    |         |         |                            |              |        |                   |
|                         |                                |                        |                       |                     |                               | SCH40                   | SCH80                                | SCH160        |                    |         |         |                            |              |        |                   |
| 1/2                     | 9.7                            | 82.6                   | 4                     | 22.4                | 3/4                           | 108.0                   | 101.6                                | 108.0         | 3.10               | 3.10    | 3.10    | 1.8                        | 1.9          | 1.9    | 1.81              |
| 3/4                     | 11.2                           | 88.9                   | 4                     | 22.4                | 3/4                           | 114.3                   | 108.0                                | 114.3         | 3.18               | 3.18    | 3.18    | 2.35                       | 2.35         | 2.72   | 2.81              |
| 1                       | 12.7                           | 101.6                  | 4                     | 25.4                | 7/8                           | 127.0                   | 120.7                                | 127.0         | 3.86               | 3.82    | 4.00    | 3.50                       | 3.60         | 4.08   | 3.61              |
| 1 1/4                   | 14.21                          | 11.3                   | 4                     | 25.4                | 7/8                           | 127.0                   | 120.7                                | 127.0         | 4.54               | 4.64    | 4.71    | 4.1                        | 4.10         | 4.3    | 4.99              |
| 1 1/2                   | 15.71                          | 24.0                   | 4                     | 28.4                | 1                             | 139.7                   | 133.4                                | 139.7         | 6.36               | 6.49    | 6.65    | 5.45                       | 5.45         | 5.9    | 6.76              |
| 2                       | 17.5                           | 165.1                  | 8                     | 25.4                | 7/8                           | 146.1                   | 139.7                                | 146.1         | 10.90              | 11.10   | 11.50   | 10.5                       | 10.45        | 11.3   | 10.89             |
| 2 1/2                   | 19.1                           | 190.5                  | 8                     | 28.4                | 1                             | 158.8                   | 152.4                                | 158.8         | 16.34              | 16.69   | 17.14   | 15.8                       | 15.8         | 16     | 16.34             |
| 3                       | 20.6                           | 203.2                  | 8                     | 31.8                | 1 1/8                         | 177.8                   | 171.5                                | 177.8         | 21.80              | 22.37   | 23.01   | 21.80                      | 21.80        | 21.79  |                   |
| 4                       | 23.9                           | 241.3                  | 8                     | 35.1                | 1 1/4                         | 196.9                   | 190.5                                | 196.9         | 31.30              | 32.10   | 33.71   | 33.10                      | 34.10        | 33.11  |                   |
| 5                       | 23.9                           | 292.1                  | 8                     | 41.1                | 1 1/2                         | 247.7                   | 241.3                                | 247.7         | 59.90              | 61.75   | 64.47   | 59.00                      | 63.60        | 60     |                   |
| 6                       | 26.9                           | 317.5                  | 12                    | 38.1                | 1 3/8                         | 260.4                   | 254.0                                | 266.7         | 74.19              | 77.13   | 81.12   | 74                         | 77           | 75     |                   |
| 8                       | 31.8                           | 393.7                  | 12                    | 44.5                | 1 5/8                         | 292.1                   | 285.8                                | 323.9         | 124.00             | 128.83  | 138.56  | 117.73                     | 129.73       | 136.98 |                   |
| 10                      | 33.3                           | 482.6                  | 12                    | 50.8                | 1 7/8                         | 336.6                   | 330.2                                | 342.9         | 206.00             | 217.16  | 234.82  | 197.50                     | 220.19       | 229.97 |                   |
| 12                      | 39.6                           | 571.5                  | 16                    | 53.8                | 2                             | 374.7                   | 368.3                                | 387.4         | 306                | 330.75  | 359.07  | 264                        | 286.00       | 316.40 |                   |
| 14                      | 41.4                           | 635.0                  | 16                    | 60.5                | 2 1/4                         | 406.4                   | 400.1                                | 425.5         | 416                | 431.88  | 467.94  |                            | 404.10       | 421    |                   |
| 16                      | 44.5                           | 704.9                  | 16                    | 66.5                | 2 1/2                         | 444.5                   | 438.2                                | 469.9         | 567                | 562.30  | 610.84  |                            | 522.10       | 559    |                   |
| 18                      | 49.3                           | 774.7                  | 16                    | 73.2                | 2 3/4                         | 495.3                   | 489.0                                | 527.1         | 736                | 741.28  | 790.00  |                            | 670.00       | 761.60 |                   |
| 20                      | 54.1                           | 831.9                  | 16                    | 79.2                | 3                             | 539.8                   | 533.4                                | 565.2         | 929                | 892.00  | 980.00  |                            | 806.00       | 967    |                   |
| 24                      | 63.5                           | 990.6                  | 16                    | 91.9                | 3 1/2                         | 616.0                   | 609.6                                | 647.7         | 1504               | 1430.00 | 1580.00 |                            | 1285.5       | 1568   |                   |

- (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, and 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 B16.5 only in sizes through 2 1/2 inch, over 2 1/2 inch is at the manufacturer's option.



SLIP-ON



WELDING NECK

## CLASS 2500 FLANGES

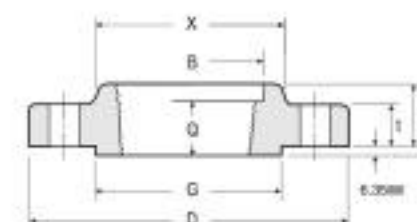
ANSI B16.5 FORGED FLANGES

Unit:mm

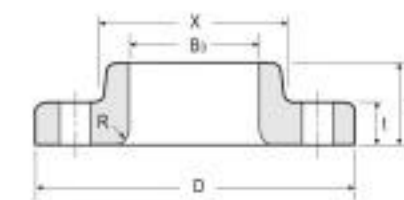
| Nominal Pipe Size | Outside Diam.<br>D | Diam. at Base of Hub<br>X | O.D of Raised Face<br>G | Thick-ness<br>t | BORE                              |                              |                 |                                    | LENGTH THRU HUB    |                                       |                 | Diam. of Hub at Bevel<br>A | Radius of Fillet<br>R | Thread Length<br>Q |
|-------------------|--------------------|---------------------------|-------------------------|-----------------|-----------------------------------|------------------------------|-----------------|------------------------------------|--------------------|---------------------------------------|-----------------|----------------------------|-----------------------|--------------------|
|                   |                    |                           |                         |                 | Welding Neck Socket Welding<br>B1 | Slip-on Socket Welding<br>B2 | Lap Joint<br>B3 | Counter Bore Min Threaded Min<br>B | Welding Neck<br>T1 | Slip-on Threaded Socket Welding<br>T2 | Lap Joint<br>T3 |                            |                       |                    |
| 1/2               | 133.4              | 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               | 139.7              | 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                 | 158.8              | 57.2                      | 50.8                    | 35.1            |                                   | 34.5                         | 35.1            | 35.8                               | 88.9               | 47.8                                  | 47.8            | 33.5                       | 3.0                   | 35.1               |
| 1 1/4             | 184.2              | 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             | 203.2              | 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                    | 50.8            |                                   | 62.0                         | 62.5            | 63.5                               | 127.0              | 69.9                                  | 69.9            | 60.5                       | 7.9                   | 50.8               |
| 2 1/2             | 266.7              | 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                 | 304.8              | 133.4                     | 127.0                   | 66.5            |                                   | 90.7                         | 91.4            | 92.2                               | 168.1              | 91.9                                  | 91.9            | 88.9                       | 9.7                   | 63.5               |
| 4                 | 355.6              | 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                 | 419.1              | 203.2                     | 185.7                   | 91.9            |                                   | 143.8                        | 144.5           | 144.5                              | 228.6              | 130.0                                 | 130.0           | 141.2                      | 11.2                  | 76.2               |
| 6                 | 482.6              | 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                 | 552.5              | 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                | 673.1              | 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                | 762                | 441.5                     | 381.0                   | 184.2           |                                   | 327.2                        | 328.2           | 328.7                              | 463.6              | 254.0                                 | 254.0           | 232.9                      | 12.7                  | 120.7              |

## Notes:

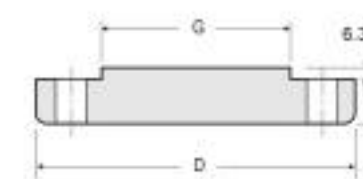
- (1) For the inside diameter of pipes (corresponding to "Bore" (B1) of Welding Neck Flanges.), refer to page 83.  
 (2) Class 2500 flanges except Lap Joint will be furnished with 0.25" (6.35mm) raised face, which is included in Thickness (t) and "Length through Hub" (T1), (T2).  
 (3) For Slip-on, Threaded 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

## CLASS 2500 FLANGES

ANSI B16.5 FORGED FLANGES

Unit:mm

| Nominal<br>Pipe<br>Size | DRILLING               |                       |                     | BOLTING                       |                         |                                      |               | APPROXIMATE WEIGHT |                            |              |        |
|-------------------------|------------------------|-----------------------|---------------------|-------------------------------|-------------------------|--------------------------------------|---------------|--------------------|----------------------------|--------------|--------|
|                         | Bolt<br>Circle<br>Diam | Number<br>of<br>Holes | Diam<br>of<br>Holes | Diam<br>of<br>Bolts<br>(inch) | Stud Bolt Length        |                                      |               | Welding<br>Neck    | Slip-on<br>and<br>Threaded | Lap<br>Joint | Blind  |
|                         |                        |                       |                     |                               | 0.25"<br>Raised<br>Face | Male-<br>Female<br>Tongue-<br>Groove | Ring<br>Joint |                    |                            |              |        |
| 1/2                     | 88.9                   | 4                     | 22.4                | 3/4                           | 120.7                   | 114.3                                | 120.7         | 3.63               | 3.20                       | 3.20         | 3.11   |
| 3/4                     | 95.3                   | 4                     | 22.4                | 3/4                           | 127.0                   | 120.7                                | 127.0         | 4.09               | 4.08                       | 4.08         | 4.54   |
| 1                       | 108.0                  | 4                     | 25.4                | 7/8                           | 139.7                   | 133.4                                | 139.7         | 5.90               | 5.44                       | 5.44         | 5.44   |
| 1 1/4                   | 130.0                  | 4                     | 28.4                | 1                             | 152.4                   | 146.1                                | 152.4         | 9.08               | 8.16                       | 8.16         | 8.16   |
| 1 1/2                   | 146.1                  | 4                     | 31.8                | 1 1/8                         | 171.5                   | 165.1                                | 171.5         | 12.70              | 11.00                      | 11.00        | 10.44  |
| 2                       | 171.5                  | 8                     | 28.4                | 1                             | 177.8                   | 171.5                                | 177.8         | 19.10              | 17.25                      | 17.25        | 17.71  |
| 2 1/2                   | 196.9                  | 8                     | 31.8                | 1 1/8                         | 196.9                   | 190.5                                | 203.2         | 23.60              | 25.00                      | 25.00        | 25.42  |
| 3                       | 228.6                  | 8                     | 35.1                | 1 1/4                         | 222.3                   | 215.9                                | 228.6         | 42.70              | 37.70                      | 37.70        | 39.04  |
| 4                       | 273.1                  | 8                     | 41.1                | 1 1/2                         | 254.0                   | 247.7                                | 260.4         | 66.30              | 58.00                      | 58.00        | 60.38  |
| 5                       | 323.9                  | 8                     | 47.8                | 1 3/4                         | 298.5                   | 292.1                                | 311.2         | 110.80             | 95.30                      | 95.30        | 101.15 |
| 6                       | 368.3                  | 8                     | 53.8                | 2                             | 342.9                   | 336.6                                | 355.6         | 176.46             | 146.51                     | 147.00       | 156.63 |
| 8                       | 438.2                  | 12                    | 53.8                | 2                             | 381.0                   | 374.7                                | 393.7         | 261.50             | 220.00                     | 220.00       | 240.62 |
| 10                      | 539.8                  | 12                    | 66.5                | 2 1/2                         | 489.0                   | 482.6                                | 508.0         | 484.50             | 421.00                     | 421.00       | 465.36 |
| 12                      | 619.3                  | 12                    | 73.2                | 2 3/4                         | 539.8                   | 533.4                                | 558.8         | 730.00             | 590.00                     | 590.00       | 664.1  |

- (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) Class 2500 Slip-on Flanges are not covered by ANSI B16.5, slip-on flanges are at the manufacturer's option.