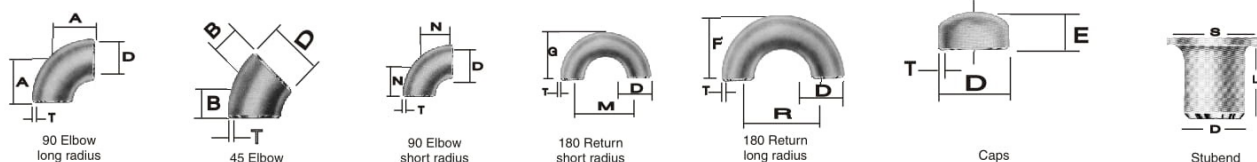




## BUTT WELDING PIPE FITTING DIMENSIONAL STANDARD ANSI B-16.9, B-16.28 & MS SS P43



| Nominal Pipe Size |     | Outside Diameter | Center to Face |       |       | Back to Face |        |       |        | Center to Center |       |       | Length 'L' MS SS P43 |
|-------------------|-----|------------------|----------------|-------|-------|--------------|--------|-------|--------|------------------|-------|-------|----------------------|
| Inch.             | mm  | D                | A              | B     | N     | E            | F      | G     | R      | M                | S     | L     | L                    |
| 1/2               | 15  | 21.3             | 38.00          | 16.0  | —     | 25.0         | 48.0   | —     | 76.0   | —                | 35.0  | 50.8  | 76.2                 |
| 3/4               | 20  | 26.7             | 29.00          | 11.0  | —     | 25.0         | 43.0   | —     | 57.0   | —                | 43.0  | 50.8  | 76.2                 |
| 1                 | 25  | 33.4             | 38.00          | 22.0  | 25.0  | 38.0         | 56.0   | 41.0  | 76.0   | 51.0             | 51.0  | 50.8  | 101.6                |
| 1 1/4             | 32  | 42.2             | 48.00          | 25.0  | 32.0  | 38.0         | 70.0   | 52.0  | 95.0   | 64.0             | 64.0  | 50.8  | 101.6                |
| 1 1/2             | 40  | 48.3             | 57.15          | 29.0  | 38.0  | 38.0         | 83.0   | 62.0  | 114.0  | 76.0             | 73.0  | 50.8  | 101.6                |
| 2                 | 50  | 60.3             | 76.00          | 35.0  | 51.0  | 38.0         | 106.0  | 81.0  | 152.0  | 102.0            | 93.0  | 63.5  | 152.4                |
| 2 1/2             | 65  | 73               | 95.25          | 44.0  | 64.0  | 38.0         | 132.0  | 100.0 | 191.0  | 127.0            | 105.0 | 63.5  | 152.4                |
| 3                 | 80  | 88.9             | 114.30         | 51.0  | 76.0  | 51.0         | 159.0  | 121.0 | 229.0  | 152.0            | 127.0 | 63.5  | 152.4                |
| 3 1/2             | 90  | 101.6            | 133.35         | 57.0  | 89.0  | 64.0         | 184.0  | 140.0 | 267.0  | 178.0            | 140.0 | 76.2  | 152.4                |
| 4                 | 100 | 114.3            | 152.0          | 63.0  | 102.0 | 64.0         | 210.0  | 159.0 | 305.0  | 203.0            | 157.0 | 76.2  | 152.4                |
| 5                 | 125 | 141.3            | 190.0          | 79.0  | 127.0 | 76.0         | 262.0  | 197.0 | 381.0  | 254.0            | 186.0 | 76.2  | 203.2                |
| 6                 | 150 | 168.3            | 229.0          | 95.0  | 152.0 | 89.0         | 313.0  | 237.0 | 457.0  | 305.0            | 216.0 | 88.9  | 203.2                |
| 8                 | 200 | 219.1            | 305.0          | 127.0 | 203.0 | 102.0        | 414.0  | 313.0 | 610.0  | 406.0            | 270.0 | 101.6 | 203.2                |
| 10                | 250 | 273.1            | 381.0          | 159.0 | 254.0 | 127.0        | 515.0  | 391.0 | 762.0  | 508.0            | 324.0 | 127   | 254                  |
| 12                | 300 | 323.9            | 457.0          | 190.0 | 303.0 | 152.0        | 619.0  | 467.0 | 914.0  | 610.0            | 381.0 | 152.4 | 254                  |
| 14                | 350 | 355.6            | 533.0          | 222.0 | 356.0 | 165.0        | 711.0  | 533.0 | 1067.0 | 711.0            | 413.0 | 152.4 | 305.0                |
| 16                | 400 | 406.4            | 610.0          | 254.0 | 406.0 | 178.0        | 813.0  | 610.0 | 1219.0 | 813.0            | 470.0 | 152.4 | 305.0                |
| 18                | 450 | 457.2            | 686.0          | 286.0 | 457.0 | 203.0        | 914.0  | 686.0 | 1372.0 | 914.0            | 533.0 | 152.4 | 305.0                |
| 20                | 500 | 508              | 762.0          | 318.0 | 508.0 | 229.0        | 1016.0 | 762.0 | 1524.0 | 1016.0           | 584.0 | 152.4 | 305.0                |
| 22                | 550 | 559              | 838.0          | 343.0 | 559.0 | 254.0        | 1118.0 | 838.0 | 1676.0 | 1118.0           | 614.4 | 152.4 | 305.0                |
| 24                | 600 | 610              | 914.0          | 381.0 | 610.0 | 267.0        | 1219.0 | 914.0 | 1829.0 | 1219.0           | 692.0 | 152.4 | 305.0                |



## COMMONLY USED AISI GRADES - CHEMICAL COMPOSITION %

| Grade   | C<br>(Max.) | Si<br>(Max.) | Mn<br>(Max.) | P<br>(Max.) | S<br>(Max.) | Ni          | Cr            | Others             |
|---------|-------------|--------------|--------------|-------------|-------------|-------------|---------------|--------------------|
| TP 301  | 0.150       | 0.75         | 2.00         | 0.045       | 0.030       | 06 ~ 08.0   | 16.0 ~ 18.0   | -                  |
| TP 304  | 0.080       | 0.75         | 2.00         | 0.045       | 0.030       | 08 ~ 10.5   | 18.0 ~ 20.0   | -                  |
| TP 304L | 0.030       | 0.75         | 2.00         | 0.045       | 0.030       | 08.0 ~ 12.0 | 18.0 ~ 20.0   | -                  |
| TP 309S | 0.080       | 0.75         | 2.00         | 0.045       | 0.030       | 12.0 ~ 15.0 | 22.0 ~ 24.0   | -                  |
| TP 310S | 0.080       | 1.50         | 2.00         | 0.045       | 0.030       | 19.0 ~ 22.0 | 24.0 ~ 26.0   | -                  |
| TP 316  | 0.080       | 1.50         | 2.00         | 0.045       | 0.030       | 10.0 ~ 14.0 | 16.0 ~ 18.0   | Mo:2. ~ 03.0       |
| TP 316L | 0.030       | 0.75         | 2.00         | 0.045       | 0.030       | 10.0 ~ 14.0 | 16.0 ~ 18.0   | Mo:2. ~ 03.0       |
| TP 317  | 0.080       | 0.75         | 2.00         | 0.045       | 0.030       | 11.0 ~ 15.0 | 18.0 ~ 20.0   | Mo:3. ~ 04.0       |
| TP 321  | 0.080       | 0.75         | 2.00         | 0.045       | 0.030       | 9.0 ~ 12.0  | 17.0 ~ 19.0   | Ti: 5x (C+N) ~ 0.7 |
| TP 409L | 0.030       | 1.00         | 1.00         | 0.045       | 0.030       | < 0.50      | 10.50 ~ 11.75 | Ti: 6x C ~ 0.75    |
| TP 410  | 0.150       | 1.00         | 1.00         | 0.040       | 0.030       | < 0.75      | 11.50 ~ 13.50 | -                  |
| TP 430  | 0.120       | 1.00         | 1.00         | 0.040       | 0.030       | < 0.75      | 16.00 ~ 18.00 | -                  |

## EQUIVALENT SPECIFICATIONS

| USA<br>AISI | Italy<br>UNI       | Germany<br>DIN 17440 | France<br>AFNOR | Japan<br>JIS | Sweden<br>SIS | UNS      | British<br>BSI |
|-------------|--------------------|----------------------|-----------------|--------------|---------------|----------|----------------|
| 301         | X 12 CrNi 177      | 1.4310               | Z 12 CN 17-8    | SUS 301      | 14 23 31      | S 30100  | 304 S21        |
| 304         | X 5 CrNi 18 10     | 1.4301               | Z 6 CN 18-09    | SUS 304      | 14 23 33      | S 30400  | 304 S15        |
| 304L        | X 2 CrNi 18 11     | 1.4306               | Z 2 CN 18-10    | SUS 304L     | 14 23 52      | S 30403  | 304 S11        |
| 316         | X 5 CrNi Mo.1712 2 | 1.4401               | Z 6 CND 17-11   | SUS 316      | 14 23 47      | SS 31600 | 316 S31        |
| 316         | X 5 CrNi Mo.1712 3 | 1.4436               | Z 6 CND 17-12   | SUS 316      | 14 23 43      | -        | 316 S33        |
| 316L        | X 2 CrNi Mo.1713 2 | 1.4404               | Z 2 CND 17-12   | SUS 316L     | 14 23 48      | S 31603  | 316 S11        |
| 316L        | X 2 CrNi Mo.1814 3 | 1.4435               | Z 2 CND 17-13   | -            | 14 23 53      | -        | 316 S13        |
| 310S        | X 12 CrNi 2521     | 1.4845               | Z 12 CN 25 -20  | SUS 310S     | 14 23 61      | S 31008  | -              |
| 321         | X 6 CrNiTi 18 9    | 1.4878               | Z 6 CNT 18-12   | SUS 321      | 14 23 37      | S 32100  | 321 S31        |
| 409         | X 6 CrTi 12        | 1.4512               | Z 5 CT 12       | SUS 409      | -             | S 40900  | 409 S17        |
| 410         | X 10 Cr 13         | 1.4006               | Z 12 C 13       | SUS 410      | 14 23 02      | S 41000  | 410 S21        |
| 430         | X 6 Cr 17          | 1.4016               | Z 8 C 17        | SUS 430      | 14 23 20      | S 43000  | 430 S17        |



## WEIGHT OF STAINLESS STEEL SHEETS / PLATES

| Thickness in mm | Weight Kg/m <sup>2</sup> | Weight Kg/ft. | Thickness in mm | Weight Kg/m <sup>2</sup> | Weight Kg/ft. |
|-----------------|--------------------------|---------------|-----------------|--------------------------|---------------|
| 0.18            | 1.44                     | 0.134         | 1.75            | 14.00                    | 1.301         |
| 0.20            | 1.60                     | 0.149         | 2.00            | 16.00                    | 1.487         |
| 0.22            | 1.76                     | 0.164         | 2.25            | 18.00                    | 1.673         |
| 0.24            | 1.92                     | 0.178         | 2.50            | 20.00                    | 1.859         |
| 0.27            | 2.16                     | 0.201         | 2.75            | 22.00                    | 2.045         |
| 0.28            | 2.24                     | 0.208         | 3.00            | 24.00                    | 2.231         |
| 0.32            | 2.56                     | 0.238         | 3.25            | 26.00                    | 2.417         |
| 0.38            | 3.04                     | 0.282         | 3.50            | 28.00                    | 2.603         |
| 0.44            | 3.52                     | 0.327         | 3.75            | 30.00                    | 2.788         |
| 0.50            | 4.00                     | 0.372         | 4.00            | 32.00                    | 2.788         |
| 0.56            | 4.48                     | 0.416         | 4.25            | 34.00                    | 3.160         |
| 0.63            | 5.04                     | 0.468         | 4.50            | 36.00                    | 3.346         |
| 0.75            | 6.00                     | 0.558         | 5.00            | 40.00                    | 3.718         |
| 0.88            | 7.04                     | 0.654         | 5.50            | 44.00                    | 4.090         |
| 1.00            | 8.00                     | 0.744         | 6.00            | 48.00                    | 4.462         |
| 1.13            | 9.04                     | 0.840         | 6.50            | 52.00                    | 4.833         |
| 1.25            | 10.00                    | 0.929         | 7.00            | 56.00                    | 5.205         |
| 1.38            | 11.04                    | 1.026         | 7.50            | 60.00                    | 5.577         |
| 1.50            | 12.00                    | 1.115         | 8.00            | 64.00                    | 5.949         |

## WEIGHTS OF ROUND, SQUARE & HEXAGON BAR - (in kg. per meter)

| Size | Round  | Square | Hexagon |
|------|--------|--------|---------|
| 5    | 0.154  | 0.196  | 0.170   |
| 6    | 0.222  | 0.283  | 0.245   |
| 7    | 0.302  | 0.385  | 0.333   |
| 8    | 0.395  | 0.502  | 0.435   |
| 9    | 0.499  | 0.636  | 0.551   |
| 10   | 0.617  | 0.785  | 0.680   |
| 11   | 0.746  | 0.950  | 0.823   |
| 12   | 0.888  | 1.130  | 0.979   |
| 13   | 1.042  | 1.327  | 1.149   |
| 14   | 1.208  | 1.539  | 1.332   |
| 15   | 1.387  | 1.766  | 1.530   |
| 16   | 1.578  | 2.010  | 1.740   |
| 17   | 1.782  | 2.269  | 1.965   |
| 18   | 1.998  | 2.543  | 2.203   |
| 19   | 2.226  | 2.834  | 2.454   |
| 20   | 2.466  | 3.140  | 2.719   |
| 21   | 2.719  | 3.462  | 2.866   |
| 22   | 2.984  | 3.799  | 3.290   |
| 23   | 3.261  | 4.153  | 3.596   |
| 24   | 3.551  | 4.522  | 3.916   |
| 25   | 3.853  | 4.906  | 4.249   |
| 26   | 4.168  | 5.307  | 4.596   |
| 27   | 4.495  | 5.723  | 4.956   |
| 28   | 4.834  | 6.154  | 5.330   |
| 29   | 5.185  | 6.602  | 5.717   |
| 30   | 5.549  | 7.065  | 6.118   |
| 31   | 5.925  | 7.544  | 6.533   |
| 32   | 6.313  | 8.038  | 6.961   |
| 33   | 6.714  | 8.549  | 7.403   |
| 34   | 7.127  | 9.075  | 7.859   |
| 35   | 7.553  | 9.616  | 8.328   |
| 36   | 7.990  | 10.174 | 8.810   |
| 37   | 8.440  | 10.747 | 9.307   |
| 38   | 8.903  | 11.335 | 9.817   |
| 39   | 9.378  | 11.940 | 10.340  |
| 40   | 9.865  | 12.560 | 10.877  |
| 41   | 10.364 | 13.196 | 11.428  |
| 42   | 10.876 | 13.847 | 11.992  |
| 43   | 11.400 | 14.515 | 12.570  |
| 44   | 11.936 | 15.198 | 13.161  |
| 45   | 12.485 | 15.896 | 13.766  |
| 46   | 13.046 | 16.611 | 14.385  |
| 47   | 13.619 | 17.341 | 15.017  |
| 48   | 14.205 | 18.086 | 15.663  |
| 49   | 14.803 | 18.848 | 16.322  |
| 50   | 15.413 | 19.625 | 16.996  |
| 51   | 16.04  | 20.42  | 17.682  |
| 52   | 16.67  | 21.23  | 18.382  |
| 53   | 17.32  | 22.05  | 19.096  |
| 54   | 17.98  | 22.89  | 19.823  |
| 55   | 18.65  | 23.75  | 20.564  |
| 56   | 19.34  | 24.62  | 21.319  |

| Size | Round  | Square |
|------|--------|--------|
| 57   | 20.03  | 25.51  |
| 58   | 20.74  | 26.41  |
| 59   | 21.46  | 27.33  |
| 60   | 22.20  | 28.26  |
| 61   | 22.94  | 29.21  |
| 62   | 23.70  | 30.18  |
| 63   | 24.47  | 31.16  |
| 64   | 25.25  | 32.15  |
| 65   | 26.05  | 33.17  |
| 66   | 26.86  | 34.20  |
| 67   | 27.68  | 35.24  |
| 68   | 28.51  | 36.30  |
| 69   | 29.35  | 37.37  |
| 70   | 30.21  | 38.47  |
| 71   | 31.08  | 39.57  |
| 72   | 31.96  | 40.69  |
| 73   | 32.86  | 41.83  |
| 74   | 33.76  | 42.99  |
| 75   | 34.68  | 44.16  |
| 76   | 35.61  | 45.34  |
| 77   | 36.56  | 46.54  |
| 78   | 37.51  | 47.76  |
| 79   | 38.48  | 48.99  |
| 80   | 39.46  | 50.24  |
| 81   | 40.45  | 51.50  |
| 82   | 41.46  | 52.78  |
| 83   | 42.47  | 54.08  |
| 84   | 43.50  | 55.39  |
| 85   | 44.55  | 56.72  |
| 86   | 45.60  | 58.06  |
| 87   | 46.67  | 59.42  |
| 88   | 47.75  | 60.79  |
| 89   | 48.84  | 62.18  |
| 90   | 49.94  | 63.59  |
| 91   | 51.06  | 65.01  |
| 92   | 52.18  | 66.44  |
| 93   | 53.32  | 67.90  |
| 94   | 54.48  | 69.36  |
| 95   | 55.64  | 70.85  |
| 96   | 56.82  | 72.35  |
| 97   | 58.01  | 73.86  |
| 98   | 59.21  | 75.39  |
| 99   | 60.43  | 76.94  |
| 100  | 61.65  | 78.50  |
| 105  | 67.97  | 86.55  |
| 110  | 74.60  | 94.99  |
| 115  | 81.54  | 103.82 |
| 120  | 89.78  | 113.04 |
| 125  | 96.33  | 122.66 |
| 130  | 104.19 | 132.67 |
| 135  | 112.36 | 143.07 |
| 140  | 120.84 | 153.86 |

| Size | Round   | Square  |
|------|---------|---------|
| 145  | 129.63  | 165.05  |
| 150  | 138.72  | 176.63  |
| 155  | 148.12  | 188.60  |
| 160  | 157.83  | 200.96  |
| 165  | 167.85  | 213.72  |
| 170  | 178.18  | 226.87  |
| 175  | 188.81  | 240.41  |
| 180  | 199.76  | 254.34  |
| 185  | 211.01  | 268.67  |
| 190  | 222.57  | 283.39  |
| 195  | 234.44  | 298.50  |
| 200  | 246.61  | 314.00  |
| 205  | 259.10  | 329.90  |
| 210  | 271.89  | 346.19  |
| 215  | 284.99  | 362.87  |
| 220  | 298.40  | 379.94  |
| 225  | 312.12  | 397.41  |
| 230  | 326.13  | 415.27  |
| 235  | 340.48  | 433.52  |
| 240  | 355.13  | 452.16  |
| 245  | 370.08  | 471.20  |
| 250  | 385.34  | 490.63  |
| 255  | 400.90  | 510.45  |
| 260  | 416.78  | 530.66  |
| 265  | 432.96  | 551.27  |
| 270  | 445.46  | 572.27  |
| 275  | 466.26  | 593.66  |
| 280  | 483.37  | 615.44  |
| 285  | 500.78  | 637.62  |
| 290  | 518.51  | 660.19  |
| 295  | 536.54  | 683.15  |
| 300  | 554.88  | 706.50  |
| 310  | 592.49  | 754.39  |
| 320  | 631.33  | 803.84  |
| 330  | 671.41  | 854.87  |
| 340  | 712.72  | 907.46  |
| 350  | 755.26  | 961.63  |
| 360  | 799.03  | 1017.36 |
| 370  | 844.04  | 1074.67 |
| 380  | 890.28  | 1133.54 |
| 390  | 937.75  | 1193.99 |
| 400  | 986.46  | 1256.00 |
| 410  | 1036.40 | 1319.59 |
| 420  | 1087.57 | 1384.74 |
| 430  | 1139.98 | 1451.47 |
| 440  | 1193.62 | 1519.76 |
| 450  | 1248.49 | 1589.63 |
| 460  | 1304.59 | 1661.06 |
| 470  | 1361.93 | 1734.07 |
| 480  | 1420.50 | 1808.64 |
| 490  | 1480.31 | 1884.79 |
| 500  | 1541.34 | 1962.50 |





## STAINLESS STEEL PIPE DIMENSION AS PER ASTM & WEIGHT-KG. PER MTR. (ANSI B36.19)

| Nominal Bore |       | Outside Diameter | Schedule 5S |                | Schedule 10S |                | Schedule 40S |                | Schedule 80S |                | Schedule 160S |                | Schedule XXS |                |
|--------------|-------|------------------|-------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|---------------|----------------|--------------|----------------|
| mm           | INCH  | mm               | Wt mm       | Weight (Kg/mt) | Wt mm        | Weight (Kg/mt) | Wt mm        | Weight (Kg/mt) | Wt mm        | Weight (Kg/mt) | Wt mm         | Weight (Kg/mt) | Wt mm        | Weight (Kg/mt) |
| 3            | 1/8   | 10.3             | 1.24        | 0.276          | 1.24         | 0.28           | 1.73         | 0.37           | 2.41         | 0.47           | -             | -              | -            | -              |
| 6            | 1/4   | 13.7             | 1.24        | 0.390          | 1.65         | 0.49           | 2.24         | 0.631          | 3.02         | 0.80           | -             | -              | -            | -              |
| 10           | 3/8   | 17.1             | 1.24        | 0.490          | 1.65         | 0.63           | 2.31         | 0.845          | 3.20         | 1.10           | -             | -              | -            | -              |
| 15           | 1/2   | 21.3             | 1.65        | 0.800          | 2.11         | 1.00           | 2.77         | 1.27           | 3.75         | 1.62           | 4.75          | 1.94           | 7.47         | 2.55           |
| 20           | 3/4   | 26.7             | 1.65        | 1.03           | 2.11         | 1.28           | 2.87         | 1.68           | 3.91         | 2.20           | 5.54          | 2.89           | 7.82         | 3.63           |
| 25           | 1     | 33.4             | 1.65        | 1.30           | 2.77         | 2.09           | 3.38         | 2.50           | 4.55         | 3.24           | 6.35          | 4.24           | 9.09         | 5.45           |
| 32           | 1 1/4 | 42.2             | 1.65        | 1.65           | 2.77         | 2.70           | 3.56         | 3.38           | 4.85         | 4.47           | 6.35          | 5.61           | 9.70         | 7.77           |
| 40           | 1 1/2 | 48.3             | 1.65        | 1.91           | 2.77         | 3.11           | 3.68         | 4.05           | 5.08         | 5.41           | 7.14          | 7.25           | 10.16        | 9.54           |
| 50           | 2     | 60.3             | 1.65        | 2.40           | 2.77         | 3.93           | 3.91         | 5.44           | 5.54         | 7.48           | 8.74          | 11.1           | 11.07        | 13.44          |
| 65           | 2 1/2 | 73.0             | 2.11        | 3.69           | 3.05         | 5.26           | 5.16         | 8.63           | 7.01         | 11.4           | 9.53          | 14.9           | 14.2         | 20.39          |
| 80           | 3     | 88.9             | 2.11        | 4.51           | 3.05         | 6.45           | 5.49         | 11.30          | 7.62         | 15.2           | 11.1          | 21.3           | 15.24        | 27.65          |
| 100          | 4     | 114.3            | 2.11        | 5.84           | 3.05         | 8.36           | 6.02         | 16.07          | 8.56         | 22.3           | 13.49         | 33.54          | 17.12        | 41.03          |
| 125          | 5     | 141.3            | 2.77        | 9.47           | 3.40         | 11.57          | 6.55         | 21.8           | 9.53         | 31.97          | 15.88         | 49.11          | 19.05        | 57.43          |
| 150          | 6     | 168.3            | 2.77        | 11.32          | 3.40         | 13.84          | 7.11         | 28.3           | 10.97        | 42.7           | 18.2          | 67.56          | 21.95        | 79.22          |
| 200          | 8     | 219.1            | 2.77        | 14.79          | 3.76         | 19.96          | 8.18         | 42.6           | 12.7         | 64.6           | 23.0          | 111.2          | 22.23        | 107.8          |
| 250          | 10    | 273.1            | 3.40        | 22.63          | 4.19         | 27.78          | 9.27         | 60.5           | 12.7         | 96.0           | 28.6          | 172.4          | 25.40        | 155.15         |
| 300          | 12    | 323.9            | 3.96        | 31.25          | 4.57         | 36.00          | 9.52         | 73.88          | 12.7         | 132.0          | 33.32         | 238.76         | 25.40        | 186.97         |
| 350          | 14    | 355.6            | 3.96        | 34.36          | 4.78         | 41.3           | 11.13        | 94.59          | 19.05        | 158.08         | 35.71         | 281.70         | -            | -              |
| 400          | 16    | 406.4            | 4.19        | 41.56          | 4.78         | 47.29          | 12.7         | 123.30         | 21.41        | 203.33         | 40.46         | 365.11         | -            | -              |
| 450          | 18    | 457.2            | 4.19        | 46.80          | 4.78         | 53.42          | 14.27        | 155.80         | 23.8         | 254.36         | 45.71         | 466.40         | -            | -              |
| 500          | 20    | 508.0            | 4.78        | 59.25          | 5.54         | 68.71          | 15.09        | 183.42         | 26.19        | 311.2          | 49.99         | 564.68         | -            | -              |
| 600          | 24    | 609.6            | 5.54        | 82.47          | 6.35         | 94.45          | 17.48        | 255.41         | 30.96        | 442.08         | 59.54         | 808.22         | -            | -              |

Formula - Pipe Weight Kg / Mtr. • OD - Thick x Thick x 0.0248 = Kg Per Mtr.

## WEIGHT & THICKNESS OF S.S GAUGE PIPES

| DIMENSION   |          | 10G (3.25)     | 12G (2.64) | 14G (2.03) | 16G (1.62) | 18G (1.21) | 20G (0.91) | 22G (0.71) |
|-------------|----------|----------------|------------|------------|------------|------------|------------|------------|
| Size inches | OD IN MM | (0.128")       | (0.104")   | (0.080")   | (0.064")   | (0.048")   | (0.036")   | (0.028")   |
|             |          | WALL THICKNESS |            |            |            |            |            |            |
| 1/4"        | 6/35     | 0.075          | 0.070      | 0.065      | 0.058      | 0.046      | 0.037      | 0.030      |
| 5/16"       | 7.93     | 0.114          | 0.105      | 0.089      | 0.079      | 0.060      | 0.048      | 0.038      |
| 3/8"        | 9.52     | 0.152          | 0.135      | 0.113      | 0.097      | 0.080      | 0.058      | 0.046      |
| 1/2"        | 12.7     | 0.226          | 0.200      | 0.157      | 0.134      | 0.105      | 0.079      | 0.063      |
| 3/4"        | 19.05    | 0.386          | 0.326      | 0.256      | 0.215      | 0.161      | 0.124      | 0.097      |
| 1"          | 25.4     | 0.541          | 0.450      | 0.351      | 0.294      | 0.218      | 0.057      | 0.131      |
| 1 1/4"      | 31.750   | 0.696          | 0.580      | 0.448      | 0.575      | 0.275      | 0.200      | 0.162      |
| 1 1/2"      | 38.1     | 0.851          | 0.700      | 0.542      | 0.452      | 0.332      | 0.250      | 0.196      |
| 1 3/4"      | 44.45    | 1.020          | 0.832      | 0.646      | 0.530      | 0.390      | 0.294      | 0.230      |
| 2"          | 50.8     | 1.161          | 0.960      | 0.733      | 0.607      | 0.447      | 0.336      | 0.263      |
| 2 1/4"      | 57.15    | 1.315          | 1.085      | 0.828      | 0.687      | 0.504      | -          | -          |
| 2 1/2"      | 63.5     | 1.472          | 1.210      | 0.924      | 0.792      | 0.562      | -          | -          |
| 2 3/4"      | 69.85    | 1.630          | 1.338      | 1.022      | 0.847      | 0.619      | -          | -          |
| 3"          | 76.2     | 1.782          | 1.460      | 1.115      | 0.924      | 0.676      | -          | -          |
| 3 1/2"      | 88.9     | 1.092          | 1.718      | 1.306      | 1.082      | 0.791      | -          | -          |
| 4"          | 101.6    | 2.403          | 1.971      | 1.497      | 1.239      | 0.905      | -          | -          |
| 4 1/2"      | 114.3    | 2.713          | 2.224      | 1.608      | 1.397      | 1.020      | -          | -          |
| 5"          | 127.0    | 3.023          | 2.466      | 1.879      | 1.584      | 1.134      | -          | -          |
| 5 1/2"      | 139.7    | 3.336          | 2.730      | 2.070      | 1.713      | 1.250      | -          | -          |
| 6"          | 152.4    | 3.654          | 2.983      | 2.264      | 1.875      | 1.364      | -          | -          |
| 6 1/2"      | 165.1    | 3.975          | 3.256      | 2.452      | 2.028      | 1.478      | -          | -          |





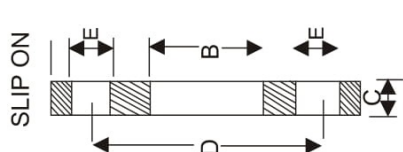
## CARBON STEEL SEAMLESS PIPE DIMENSION & WEIGHT - KG. PER MTR. (ANSI B 36.10)

| Nominal Pipe size |      | O/D   | Schedule 10 |       | Schedule 20 |       | Schedule 30 |        | Schedule STD |       | Schedule 40 |       | Schedule 60 |       | Schedule Extra Strong (XS) |                                          | Schedule 80 |        | Schedule 100 |       | Schedule 120 |       | Schedule 140 |        | Schedule 160 |        | Schedule Double Extra Strong (XXS) |       |  |
|-------------------|------|-------|-------------|-------|-------------|-------|-------------|--------|--------------|-------|-------------|-------|-------------|-------|----------------------------|------------------------------------------|-------------|--------|--------------|-------|--------------|-------|--------------|--------|--------------|--------|------------------------------------|-------|--|
| mm                | inch | mm    | mm          | kg/m  | mm          | kg/m  | mm          | kg/m   | wall         | wt.   | wall        | wt.   | wall        | wt.   | wall                       | wt.                                      | wall        | wt.    | wall         | wt.   | wall         | wt.   | wall         | wt.    | wall         | wt.    | wall                               | wt.   |  |
| 3                 | 1/8  | 10.3  |             |       |             |       |             |        | 1.73         | 0.37  | 1.73        | 0.37  |             |       | 2.41                       | 0.47                                     | 2.41        | 0.47   |              |       |              |       |              |        |              |        |                                    |       |  |
| 6                 | 1/4  | 13.7  |             |       |             |       |             |        | 2.24         | 0.63  | 2.24        | 0.63  |             |       | 3.02                       | 0.80                                     | 3.02        | 0.80   |              |       |              |       |              |        |              |        |                                    |       |  |
| 10                | 3/8  | 17.1  |             |       |             |       |             |        | 2.31         | 0.84  | 2.31        | 0.84  |             |       | 3.20                       | 1.10                                     | 3.20        | 1.10   |              |       |              |       |              |        |              |        |                                    |       |  |
| 15                | 1/2  | 21.3  |             |       |             |       |             |        | 2.77         | 1.27  | 2.77        | 1.27  |             |       | 3.73                       | 1.62                                     | 3.73        | 1.62   |              |       |              |       |              |        | 4.78         | 1.95   | 7.5                                | 2.5   |  |
| 20                | 3/4  | 26.7  |             |       |             |       |             |        | 2.87         | 1.69  | 2.87        | 1.69  |             |       | 3.91                       | 2.20                                     | 3.91        | 2.20   |              |       |              |       |              |        | 5.6          | 2.90   | 7.82                               | 3.64  |  |
| 25                | 1    | 33.4  |             |       |             |       |             |        | 3.38         | 2.50  | 3.38        | 2.50  |             |       | 4.55                       | 3.24                                     | 4.55        | 3.24   |              |       |              |       |              |        | 6.35         | 4.24   | 9.1                                | 5.45  |  |
| 32                | 1¼   | 42.2  |             |       |             |       |             |        | 3.56         | 3.39  | 3.56        | 3.39  |             |       | 4.85                       | 4.47                                     | 4.85        | 4.47   |              |       |              |       |              |        | 6.35         | 5.61   | 9.7                                | 7.77  |  |
| 40                | 1½   | 48.3  |             |       |             |       |             |        | 3.68         | 4.05  | 3.68        | 4.05  |             |       | 5.08                       | 5.41                                     | 5.08        | 5.41   |              |       |              |       |              |        | 7.14         | 7.25   | 10.2                               | 9.56  |  |
| 50                | 2    | 60.3  |             |       |             |       |             |        | 3.91         | 5.44  | 3.91        | 5.44  |             |       | 5.54                       | 7.48                                     | 5.54        | 7.48   |              |       |              |       |              |        | 8.74         | 11.11  | 11.07                              | 13.4  |  |
| 65                | 2½   | 73.0  |             |       |             |       |             |        | 5.16         | 8.63  | 5.16        | 8.63  |             |       | 7.01                       | 11.41                                    | 7.01        | 11.41  |              |       |              |       |              |        | 9.53         | 14.92  | 14.0                               | 20.4  |  |
| 80                | 3    | 88.9  |             |       |             |       |             |        | 5.49         | 11.3  | 5.49        | 11.3  |             |       | 7.62                       | 15.27                                    | 7.62        | 15.3   |              |       |              |       |              |        | 11.13        | 21.35  | 15.24                              | 27.7  |  |
| 90                | 3½   | 101.6 |             |       |             |       |             |        | 5.74         | 13.57 | 5.74        | 13.57 |             |       | 8.08                       | 18.63                                    | 8.08        | 18.63  |              |       |              |       |              |        |              |        | 16.2                               | 34.1  |  |
| 100               | 4    | 114.3 |             |       |             |       |             |        | 6.02         | 16.07 | 6.02        | 16.07 |             |       | 8.56                       | 22.3                                     | 8.56        | 22.3   |              |       | 11.13        | 28.32 |              |        | 13.5         | 33.5   | 17.12                              | 41.03 |  |
| 125               | 5    | 141.3 |             |       |             |       |             |        | 6.55         | 21.77 | 6.55        | 21.77 |             |       | 9.53                       | 30.9                                     | 9.53        | 30.9   |              |       | 12.7         | 40.2  |              |        | 15.9         | 49.11  | 19.0                               | 57.4  |  |
| 150               | 6    | 168.3 |             |       |             |       |             |        | 7.11         | 28.26 | 7.11        | 28.26 |             |       | 10.97                      | 42.5                                     | 10.97       | 42.5   |              |       | 14.3         | 54.2  |              |        | 18.3         | 67.5   | 21.95                              | 79.22 |  |
| 200               | 8    | 219.1 |             |       | 6.35        | 33.3  | 7.0         | 36.8   | 8.18         | 42.5  | 8.18        | 42.55 | 10.31       | 53.10 | 12.7                       | 64.6                                     | 12.7        | 64.5   | 15.1         | 75.92 | 18.3         | 90.4  | 20.6         | 100.9  | 23.0         | 111.27 | 22.23                              | 108.0 |  |
| 250               | 10   | 273.0 |             |       | 6.35        | 41.7  | 7.8         | 51.3   | 9.27         | 60.3  | 9.27        | 60.31 | 12.70       | 81.50 | 12.7                       | 81.5                                     | 15.1        | 96.0   | 18.3         | 114.7 | 21.44        | 133.0 | 25.4         | 155    | 28.6         | 172.3  | 25.4                               | 155.0 |  |
| 300               | 12   | 323.9 |             |       | 6.35        | 49.7  | 8.4         | 65.2   | 9.53         | 73.8  | 10.31       | 79.73 | 14.30       | 109.0 | 12.7                       | 97.4                                     | 17.5        | 132.0  | 21.4         | 160.0 | 25.4         | 187.0 | 28.6         | 208    | 33.3         | 238.7  | 25.4                               | 187.0 |  |
| 350               | 14   | 355.6 | 6.35        | 54.6  | 7.92        | 67.9  | 9.53        | 81.3   | 9.53         | 81.3  | 11.13       | 94.55 | 15.10       | 126.4 | 12.7                       | 107.4                                    | 19.0        | 158.0  | 23.8         | 195.0 | 27.8         | 224.0 | 31.8         | 253.5  | 35.7         | 281.7  |                                    |       |  |
| 400               | 16   | 406.4 | 6.35        | 62.6  | 7.92        | 77.9  | 9.53        | 93.3   | 9.53         | 93.3  | 12.7        | 123.3 | 16.70       | 160.0 | 12.7                       | 123.3                                    | 21.44       | 203.5  | 26.2         | 245.5 | 30.9         | 286.6 | 36.53        | 333    | 40.5         | 365.4  |                                    |       |  |
| 450               | 18   | 457.0 | 6.35        | 70.5  | 7.92        | 87.7  | 11.13       | 122.4  | 9.53         | 105.0 | 14.27       | 156.0 | 19.05       | 206.0 | 12.7                       | 139.0                                    | 23.8        | 254.6  | 29.36        | 309.6 | 34.9         | 363.6 | 39.7         | 408.3  | 45.2         | 459.4  |                                    |       |  |
| 500               | 20   | 508.0 | 6.35        | 78.5  | 9.53        | 117.2 | 12.7        | 155.1  | 9.53         | 117.2 | 15.09       | 183.4 | 20.62       | 248.5 | 12.7                       | 155.1                                    | 26.2        | 311.2  | 32.54        | 381.5 | 38.1         | 441.5 | 44.4         | 508    | 50.0         | 564.8  |                                    |       |  |
| 550               | 22   | 559.0 | 6.35        | 86.5  | 9.53        | 129.0 | 12.7        | 171.0  | 9.53         | 129.0 |             |       | 22.20       | 294.0 | 12.7                       | 171.0                                    | 28.6        | 373.8  | 34.9         | 451.4 | 41.3         | 527.0 | 47.6         | 600    | 54.0         | 672.0  |                                    |       |  |
| 600               | 24   | 610.0 | 6.35        | 94.5  | 9.53        | 141.0 | 14.3        | 209.7  | 9.53         | 141.0 | 17.48       | 255.4 | 24.61       | 355.0 | 12.7                       | 187.0                                    | 30.96       | 442.08 | 38.89        | 547.7 | 46.0         | 640.0 | 52.4         | 720.15 | 59.5         | 808.22 |                                    |       |  |
| 650               | 26   | 660.0 | 7.92        | 127.0 | 12.7        | 203.0 |             |        | 9.53         | 153.0 |             |       |             |       | 12.7                       | 202.7                                    |             |        |              |       |              |       |              |        |              |        |                                    |       |  |
| 700               | 28   | 711.0 | 7.92        | 137.4 | 12.7        | 218.7 | 15.88       | 271.2  | 9.53         | 165.0 |             |       |             |       | 12.7                       | 218.7                                    |             |        |              |       |              |       |              |        |              |        |                                    |       |  |
| 750               | 30   | 762.0 | 7.92        | 147.3 | 12.7        | 234.6 | 15.88       | 292.18 | 9.53         | 176.8 |             |       |             |       | 12.7                       | 234.7                                    |             |        |              |       |              |       |              |        |              |        |                                    |       |  |
| 800               | 32   | 813.0 | 7.92        | 157.0 | 12.7        | 250.6 | 15.88       | 312.0  | 9.53         | 188.2 | 17.48       | 342.9 |             |       | 12.7                       | 250.6                                    |             |        |              |       |              |       |              |        |              |        |                                    |       |  |
| 850               | 34   | 864.0 | 7.92        | 167.0 | 12.7        | 266.6 | 15.88       | 332.1  | 9.53         | 200.3 | 17.48       | 364.9 |             |       | 12.7                       | 266.6                                    |             |        |              |       |              |       |              |        |              |        |                                    |       |  |
| 900               | 36   | 914.4 | 7.92        | 176.9 | 12.7        | 282.3 | 15.88       | 351.7  | 9.53         | 212.5 | 19.05       | 420.4 |             |       | 12.7                       | 282.2                                    |             |        |              |       |              |       |              |        |              |        |                                    |       |  |
|                   |      |       |             |       |             |       |             |        |              |       |             |       |             |       |                            | A 106 Gr B ( )                           |             |        |              |       |              |       |              |        |              |        |                                    |       |  |
|                   |      |       |             |       |             |       |             |        |              |       |             |       |             |       |                            | We also supply pipes API - 5L - Gr B ( ) |             |        |              |       |              |       |              |        |              |        |                                    |       |  |
|                   |      |       |             |       |             |       |             |        |              |       |             |       |             |       |                            | A 333 Gr 6 ( )                           |             |        |              |       |              |       |              |        |              |        |                                    |       |  |
|                   |      |       |             |       |             |       |             |        |              |       |             |       |             |       |                            | A 335 P 5 ( )                            |             |        |              |       |              |       |              |        |              |        |                                    |       |  |

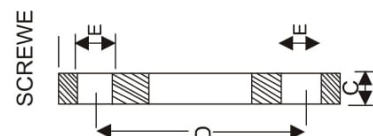


## STAINLESS STEEL SHEETS PLATES CHEMICAL COMPOSITION & PHYSICAL PROPERTIES

|                  | Chemical Composition |       |        |        |       |       |             |             |           |                                          | Tensile Test         |                    |                    |                    |                 | Hardness Test |                      | Bend Test                                 |      |
|------------------|----------------------|-------|--------|--------|-------|-------|-------------|-------------|-----------|------------------------------------------|----------------------|--------------------|--------------------|--------------------|-----------------|---------------|----------------------|-------------------------------------------|------|
| Grade            | ASTM A240            | C max | Si max | Mn max | P max | S max | Ni          | Cr          | Mo        | Others                                   | Tensile Strength min |                    | Yield Strength min |                    | Elonga-<br>tion | HB max        | H <sub>R</sub> B max | Degree Inside Radius                      |      |
|                  |                      |       |        |        |       |       |             |             |           |                                          | ksi                  | kg/mm <sup>2</sup> | ksi                | kg/mm <sup>2</sup> |                 |               |                      |                                           | min% |
| Austenitic Grade | TP302                | 0.15  | 0.75   | 2.00   | 0.045 | 0.030 | 8.00/10.00  | 17.00/19.00 | -         | N <sub>≤</sub> 0.10                      | 75                   | (53)               | 30                 | (21)               | 40              | 202           | 92                   | NR NR                                     |      |
|                  | TP304                | 0.08  | 0.75   | 2.00   | 0.045 | 0.030 | 8.00/10.50  | 18.00/20.00 | -         | N <sub>≤</sub> 0.10                      | 75                   | (53)               | 30                 | (21)               | 40              | 202           | 92                   | NR NR                                     |      |
|                  | TP304L               | 0.035 | 0.75   | 2.00   | 0.045 | 0.030 | 8.00/12.00  | 18.00/20.00 | -         | N <sub>≤</sub> 0.10                      | 70                   | (49)               | 25                 | (18)               | 40              | 183           | 88                   | NR NR                                     |      |
|                  | TP309S               | 0.08  | 0.75   | 2.00   | 0.045 | 0.030 | 12.00/15.00 | 22.00/24.00 | -         | -                                        | 75                   | (53)               | 30                 | (21)               | 40              | 217           | 95                   | NR NR                                     |      |
|                  | TP310S               | 0.08  | 0.75   | 2.00   | 0.045 | 0.030 | 19.00/22.00 | 24.00/26.00 | -         | -                                        | 75                   | (53)               | 30                 | (21)               | 40              | 217           | 95                   | NR NR                                     |      |
|                  | TP316                | 0.08  | 0.75   | 2.00   | 0.045 | 0.030 | 10.00/14.00 | 16.00/18.00 | 2.00/3.00 | N <sub>≤</sub> 0.10                      | 75                   | (53)               | 30                 | (21)               | 40              | 217           | 95                   | NR NR                                     |      |
|                  | TP316L               | 0.035 | 0.75   | 2.00   | 0.045 | 0.030 | 10.00/14.00 | 16.00/18.00 | 2.00/3.00 | N <sub>≤</sub> 0.10                      | 70                   | (49)               | 25                 | (18)               | 40              | 217           | 95                   | NR NR                                     |      |
|                  | TP316Ti              | 0.08  | 0.75   | 2.00   | 0.045 | 0.030 | 10.00/14.00 | 16.00/18.00 | 2.00/3.00 | N <sub>≤</sub> 0.10<br>Ti5X(C+N)Min/0.70 | 75                   | -                  | 30                 | -                  | 40              | 217           | 95                   | NR NR                                     |      |
|                  | TP317                | 0.08  | 0.75   | 2.00   | 0.045 | 0.030 | 11.00/15.00 | 18.00/20.00 | 3.00/4.00 | N <sub>≤</sub> 0.10                      | 75                   | (53)               | 30                 | (21)               | 35              | 217           | 95                   | NR NR                                     |      |
|                  | TP317L               | 0.035 | 0.75   | 2.00   | 0.045 | 0.030 | 11.00/15.00 | 18.00/20.00 | 3.00/4.00 | N <sub>≤</sub> 0.10                      | 75                   | (53)               | 30                 | (21)               | 40              | 217           | 95                   | NR NR                                     |      |
|                  | TP321                | 0.08  | 0.75   | 2.00   | 0.045 | 0.030 | 9.00/12.00  | 17.00/19.00 | -         | N <sub>≤</sub> 0.10<br>Ti5X(C+N)/0.70    | 75                   | (53)               | 30                 | (21)               | 40              | 217           | 95                   | NR NR                                     |      |
|                  | Tp347                | 0.08  | 0.75   | 2.00   | 0.045 | 0.030 | 9.00/13.00  | 17.00/19.00 | -         | Cb+Ta<br>10XC/1.10                       | 75                   | (53)               | 30                 | (21)               | 40              | 202           | 92                   | NR NR                                     |      |
|                  | Tp430                | 0.12  | 1.00   | 1.00   | 0.040 | 0.030 | 0.75        | 16.00/18.00 | -         | -                                        | 65                   | (46)               | 30                 | (21)               | 22              | 183           | 88                   | 180°<br>T/2 for T<3/8"<br>T for T>3/8"≤1" |      |
|                  | TP410                | 0.15  | 1.00   | 1.00   | 0.040 | 0.030 | 0.75        | 11.50/13.50 | -         | -                                        | 65                   | (46)               | 30                 | (21)               | 20              | 217           | 95                   | 180°<br>T/2 for T<3/8"                    |      |



BS 10 Pipes



BS 10 Pipes

| N.B. Size | Table | Dia of Flange A | Bore of Slip-on B | Thickness of Flange C | Pitch circle Dia D | Dia of Bolt Holes E | No. of Bolts |
|-----------|-------|-----------------|-------------------|-----------------------|--------------------|---------------------|--------------|
| 1/2"      | D     | 3 3/4           | 0.88              | 3/16                  | 2 5/8              | 9/16                | 4            |
|           | E     | 3 3/4           | 0.88              | 1/4                   | 2 7/8              | 9/16                | 4            |
|           | F     | 3 3/4           | 0.88              | 3/8                   | 2 5/8              | 9/16                | 4            |
|           | H     | 4 1/2           | 0.88              | 1/2                   | 3 1/4              | 11/16               | 4            |
| 3/4"      | D     | 4               | 1.09              | 3/16                  | 2 7/8              | 9/16                | 4            |
|           | E     | 4               | 1.09              | 1/4                   | 2 7/8              | 9/16                | 4            |
|           | F     | 4               | 1.09              | 3/8                   | 2 7/8              | 9/16                | 4            |
|           | H     | 4 1/2           | 1.09              | 1/2                   | 3 1/4              | 11/16               | 4            |
| 1"        | D     | 4 1/2           | 1.36              | 3/16                  | 3 1/4              | 9/16                | 4            |
|           | E     | 4 1/2           | 1.36              | 9/32                  | 3 1/4              | 9/16                | 4            |
|           | F     | 4 3/4           | 1.36              | 3/8                   | 3 7/16             | 11/16               | 4            |
|           | H     | 4 3/4           | 1.36              | 9/16                  | 3 7/16             | 11/16               | 4            |
| 1 1/4"    | D     | 4 3/4           | 1.70              | 1/4                   | 3 7/16             | 9/16                | 4            |
|           | E     | 4 3/4           | 1.70              | 5/16                  | 3 7/16             | 9/16                | 4            |
|           | F     | 5 1/4           | 1.70              | 1/2                   | 3 7/8              | 11/16               | 4            |
|           | H     | 5 1/4           | 1.70              | 11/16                 | 3 7/8              | 11/16               | 4            |
| 1 1/2"    | D     | 5 1/4           | 1.95              | 1/4                   | 3 7/8              | 9/16                | 4            |
|           | E     | 5 1/4           | 1.95              | 11/32                 | 3 7/8              | 9/16                | 4            |
|           | F     | 5 1/2           | 1.95              | 1/2                   | 4 1/8              | 11/16               | 4            |
|           | H     | 5 1/2           | 1.95              | 11/16                 | 4 1/8              | 11/16               | 4            |
| 2"        | D     | 6               | 2.44              | 5/16                  | 4 1/2              | 11/16               | 4            |
|           | E     | 6               | 2.44              | 3/8                   | 4 1/2              | 11/16               | 4            |
|           | F     | 6 1/2           | 2.44              | 5/8                   | 5                  | 11/16               | 4            |
|           | H     | 6 1/2           | 2.44              | 3/4                   | 5                  | 11/16               | 4            |
| 2 1/2"    | D     | 6 1/2           | 2.94              | 5/16                  | 5                  | 11/16               | 4            |
|           | E     | 6 1/2           | 2.94              | 13/32                 | 5                  | 11/16               | 4            |
|           | F     | 7 1/4           | 2.94              | 5/8                   | 5 3/4              | 11/16               | 8            |
|           | H     | 7 1/4           | 2.94              | 3/4                   | 5 3/4              | 11/16               | 8            |
| 3"        | D     | 7 1/4           | 3.57              | 3/8                   | 5 3/4              | 11/16               | 4            |
|           | E     | 7 1/4           | 3.57              | 7/16                  | 5 3/4              | 11/16               | 4            |
|           | F     | 8               | 3.57              | 5/8                   | 6 1/2              | 11/16               | 8            |
|           | H     | 8               | 3.57              | 7/8                   | 6 1/2              | 11/16               | 8            |
| 3 1/2"    | D     | 8               | 4.07              | 3/8                   | 6 1/2              | 11/16               | 4            |
|           | E     | 8               | 4.07              | 15/32                 | 6 1/2              | 11/16               | 8            |
|           | F     | 8 1/2           | 4.07              | 3/4                   | 7                  | 11/16               | 8            |
|           | H     | 8 1/2           | 4.07              | 7/8                   | 7                  | 11/16               | 8            |
| 4"        | D     | 8 1/2           | 4.57              | 3/8                   | 7                  | 11/16               | 4            |
|           | E     | 8 1/2           | 4.57              | 1/2                   | 7                  | 11/16               | 8            |
|           | F     | 9               | 4.57              | 3/4                   | 7 1/2              | 11/16               | 8            |
|           | H     | 9               | 4.57              | 1                     | 7 1/2              | 11/16               | 8            |
| 5"        | D     | 10              | 5.56              | 1/2                   | 8 1/4              | 11/16               | 8            |
|           | E     | 10              | 5.66              | 9/16                  | 8 1/4              | 11/16               | 8            |
|           | F     | 11              | 5.66              | 7/8                   | 9 1/4              | 7/8                 | 8            |
|           | H     | 11              | 5.66              | 1 1/8                 | 9 1/4              | 7/8                 | 8            |

| N.B. Size | Table | Dia of Flange A | Bore of Slip-on B | Thickness of Flange C | Pitch circle Dia D | Dia of Bolt Holes E | No. of Bolts |
|-----------|-------|-----------------|-------------------|-----------------------|--------------------|---------------------|--------------|
| 6"        | D     | 11              | 6.72              | 1/2                   | 9 1/4              | 11/16               | 8            |
|           | E     | 11              | 6.72              | 11/16                 | 9 1/4              | 7/8                 | 8            |
|           | F     | 12              | 6.72              | 7/8                   | 10 1/4             | 7/8                 | 12           |
|           | H     | 12              | 6.72              | 1 1/8                 | 10 1/4             | 7/8                 | 12           |
| 8"        | D     | 13 1/4          | 8.72              | 1/2                   | 11 1/2             | 11/16               | 8            |
|           | E     | 13 1/4          | 8.72              | 3/4                   | 11 1/2             | 7/8                 | 8            |
|           | F     | 14 1/4          | 8.72              | 1                     | 12 3/4             | 7/8                 | 12           |
|           | H     | 14 1/2          | 8.72              | 1 1/4                 | 12 3/4             | 7/8                 | 12           |
| 10"       | D     | 16              | 10.88             | 5/8                   | 14                 | 7/8                 | 8            |
|           | E     | 16              | 10.88             | 7/8                   | 14                 | 7/8                 | 12           |
|           | F     | 17              | 10.88             | 1 1/8                 | 15                 | 1                   | 12           |
|           | H     | 17              | 10.88             | 1 3/8                 | 15                 | 1                   | 12           |
| 12"       | D     | 18              | 12.88             | 3/4                   | 16                 | 7/8                 | 12           |
|           | E     | 18              | 12.88             | 1                     | 16                 | 1                   | 12           |
|           | F     | 19 1/4          | 12.88             | 1 1/4                 | 17 1/4             | 1                   | 16           |
|           | H     | 19 1/4          | 12.88             | 1 5/8                 | 17 1/4             | 1                   | 16           |
| 14"       | D     | 20 3/4          | 14.14             | 7/8                   | 18 1/2             | 1                   | 12           |
|           | E     | 20 3/4          | 14.14             | 1 1/8                 | 18 1/2             | 1                   | 12           |
|           | F     | 21 3/4          | 14.14             | 1 3/4                 | 19 1/2             | 1 1/8               | 16           |
|           | H     | 21 3/4          | 14.14             | 1 7/8                 | 19 1/2             | 1 1/8               | 16           |
| 16"       | D     | 22 3/4          | 16.16             | 7/8                   | 20 1/2             | 1                   | 12           |
|           | E     | 22 3/4          | 16.16             | 1 1/4                 | 20 1/2             | 1                   | 12           |
|           | F     | 24              | 16.16             | 1 5/8                 | 21 3/4             | 1 1/8               | 20           |
|           | H     | 26 1/2          | 18.18             | 2 3/4                 | 24                 | 1 1/4               | 20           |
| 18"       | D     | 25 1/4          | 18.18             | 1                     | 23                 | 1                   | 12           |
|           | E     | 25 1/4          | 18.18             | 1 3/8                 | 23                 | 1                   | 16           |
|           | F     | 26 1/2          | 18.18             | 1 3/4                 | 24                 | 1 1/4               | 20           |
|           | H     | 26 1/4          | 18.18             | 2 3/8                 | 24                 | 1 1/4               | 20           |
| 20"       | D     | 27 3/4          | 20.20             | 1 1/8                 | 25 1/4             | 1                   | 16           |
|           | E     | 27 3/4          | 20.20             | 1 1/2                 | 25 1/4             | 1                   | 16           |
|           | F     | 29              | 20.20             | 2                     | 26 1/2             | 1 1/4               | 24           |
|           | H     | 29              | 20.20             | 2 5/8                 | 26 1/2             | 1 1/4               | 24           |
| 22"       | D     | 30              | 22.22             | 1 1/8                 | 27 1/2             | 1 1/8               | 16           |
|           | E     | 30              | 22.22             | 1 3/4                 | 27 1/2             | 1 1/8               | 16           |
|           | F     | 31              | 22.22             | 2 1/8                 | 28 1/2             | 1 1/4               | 24           |
|           | H     | 31              | 22.22             | 2 3/8                 | 28 1/2             | 1 1/4               | 24           |
| 24"       | D     | 32 1/2          | 24.25             | 1 1/4                 | 29 3/4             | 1 1/8               | 16           |
|           | E     | 32 1/2          | 24.25             | 1 7/8                 | 29 3/4             | 1 1/4               | 16           |
|           | F     | 33 1/2          | 24.25             | 2 1/4                 | 30 3/4             | 1 3/8               | 24           |
|           | H     | 33 1/2          | 24.25             | 3                     | 30 3/4             | 1 3/8               | 24           |





## ASTM SPECIFICATION & TOLERANCE FOR TUBING & PIPING

| Specification                                                                       | Allowable Outside Diameter Variation in mm |       |       | Allowable Wall Thickness Variation                    |        | Exact Length Tolerance in mm        |       | Testing                                                                                                        |
|-------------------------------------------------------------------------------------|--------------------------------------------|-------|-------|-------------------------------------------------------|--------|-------------------------------------|-------|----------------------------------------------------------------------------------------------------------------|
| ASTM-A213<br>Seamless Boiler<br>Superheater and<br>Heat Exchanger<br>Tubes          | Nominal Diameter                           | Over  | Under | %Over                                                 | %Under | Over                                | Under | Flattening Test<br>Tension Test<br>Flare Test<br>Hardness Test<br>100% Hydrostatic test<br>Refer to ASTM A-450 |
|                                                                                     | Under 25.4                                 | .1016 | .1016 | +20                                                   | -0     | 3.175                               | 0     |                                                                                                                |
|                                                                                     | 25.4-38.1 incl                             | .1524 | .1524 | +22                                                   | -0     | 3.175                               | 0     |                                                                                                                |
|                                                                                     | 38.1-50.8 excl                             | .2032 | .2032 | +22                                                   | -0     | 3.176                               | 0     |                                                                                                                |
|                                                                                     | 50.8-63.5 excl                             | .254  | .254  | +2                                                    | -0     | 4.46                                | 0     |                                                                                                                |
|                                                                                     | 63.5-76.2 excl                             | .3048 | .3048 | +22                                                   | -0     | 4.76                                | 0     |                                                                                                                |
| 76.2-101.6 incl                                                                     | .381                                       | .381  | +22   | -0                                                    | 4.76   | 0                                   |       |                                                                                                                |
| ASTM-A249<br>Welded Boiler<br>Superheater, Heat<br>Exchanger And<br>Condenser Tubes | Under 25.4                                 | .1016 | .1016 | +10                                                   | -10    | 3.175                               | 0     | Tension Test                                                                                                   |
|                                                                                     | 25.4-38.1 incl                             | .1524 | .1524 | +10                                                   | -10    | 3.175                               | 0     | Flattening Test                                                                                                |
|                                                                                     | 38.1-50.8 Excl                             | .2032 | .2032 | +10                                                   | -10    | 3.175                               | 0     | Flange Test                                                                                                    |
|                                                                                     | 50.0-63.5 excl                             | .254  | .254  | +10                                                   | -10    | 4.762                               | 0     | Reverse Bend Test                                                                                              |
|                                                                                     | 63.5-76.2 excl                             | .3848 | .3048 | +10                                                   | -10    | 4.762                               | 0     | Hardness Test                                                                                                  |
|                                                                                     | 76.2-101.6 incl                            | .381  | .381  | +10                                                   | -10    | 4.762                               | 0     | 100% Hydrostatic Test<br>Refer to ASTM A-450                                                                   |
|                                                                                     |                                            |       |       | Minimum Wall tubes<br>+ 18% 0 available<br>On request |        |                                     |       |                                                                                                                |
| ASTM-A269<br>Seamless & Welded<br>Tubing for General<br>Service                     | Untp 12.7                                  | .13   | .13   | +15                                                   | -15    | 3.2                                 | 0     | Flare Test (Seamless Only)                                                                                     |
|                                                                                     | 12.7-38.1 excl                             | .13   | .13   | +10                                                   | -10    | 3.2                                 | 0     | Flange Test (Welded Only)                                                                                      |
|                                                                                     | 38.1-88.9 excl                             | .25   | .25   | +10                                                   | -10    | 4.8                                 | 0     | Hardness Test                                                                                                  |
|                                                                                     | 88.9-139.7 excl                            | .38   | .38   | +10                                                   | -10    | 4.8                                 | 0     | Reverse Flattening Test                                                                                        |
|                                                                                     | 139.7-203.2 excl                           | .76   | .76   | +10                                                   | -10    | 4.8                                 | 0     | (Welded only)<br>100% Hydrostatic Test<br>Refer to ASTM-A269                                                   |
| ASTM-A270<br>Seamless & Welded<br>Sanitary Tubing                                   | 25.4                                       | .05   | .20   | +10.0                                                 | -10.0  | 3.2                                 | 0     | Reverse flattening Test                                                                                        |
|                                                                                     | 38.1                                       | .05   | .20   | +10.0                                                 | -10.0  | 3.2                                 | 0     | 100% Hydrostatic Test                                                                                          |
|                                                                                     | 50.8                                       | .05   | .28   | +10.0                                                 | -10.0  | 3.2                                 | 0     | External' polish on all tubes                                                                                  |
|                                                                                     | 60.5                                       | .05   | .28   | +10.0                                                 | -10.0  | 3.2                                 | 0     | Refer to ASTM A-270                                                                                            |
|                                                                                     | 76.2                                       | .08   | .30   | +10.0                                                 | -10.0  | 3.2                                 | 0     |                                                                                                                |
|                                                                                     | 101.6                                      | .08   | .38   | +10.0                                                 | -10.0  | 4.8                                 | 0     |                                                                                                                |
| ASTM-A312<br>Seemless & Welded<br>pipe                                              | 3.175-38.1 incl                            | .4    | .79   | Minimum Wall                                          |        | 6.4                                 | 0     | Tension Test                                                                                                   |
|                                                                                     | 38.1-1016 incl                             | .79   | .79   | 12.5% under                                           |        | 6.4                                 | 0     | Flattening Test                                                                                                |
|                                                                                     | 101.6-203.2 imcl                           | 1.59  | .79   | nominal wall<br>Specified                             |        | 6.4                                 | 0     | 100% Hydrostatic Test<br>Refer to ASTM A-530                                                                   |
|                                                                                     |                                            |       |       |                                                       |        | (Normally Random<br>Lengths ordered |       |                                                                                                                |
| ASTM A-358<br>Welded pipe                                                           | 219.08-750mm<br>or 0.01 inch               | +0.5% |       | -0.3                                                  |        | 6.0                                 |       | Refer to ASTM A-530                                                                                            |

## DIMENSIONS AND WEIGHTS OF STEEL TUBES N ACCORDANCE WITH IS 1239 : 1964 METRIC UNITS

| Nominal Bore              |     |       | Outside Diameters of Black Tube |       |                |       | Thickness |        |       | Weight per mtr. of Black Tube |        |       | Ordinary Socket       |             |
|---------------------------|-----|-------|---------------------------------|-------|----------------|-------|-----------|--------|-------|-------------------------------|--------|-------|-----------------------|-------------|
|                           |     |       | Light                           |       | Medium & Heavy |       |           |        |       | Pain Ends                     |        |       |                       |             |
| Approximate Outside Diam. |     |       | Max.                            | Min.  | Max.           | Min.  | Light     | Medium | Heavy | Light                         | Medium | Heavy | Approx. Outside Diam. | Min. Length |
| in                        | mm  | mm    | mm                              | mm    | mm             | mm    | mm        | mm     | mm    | kg                            | kg     | kg    | mm                    | mm          |
| 1/8                       | 6   | 10.2  | 10.1                            | 9.7   | 10.6           | 9.8   | 1.8       | 2.0    | 2.65  | 0.378                         | 0.410  | 0.493 | 15                    | 17          |
| 1/4                       | 8   | 13.5  | 13.6                            | 13.2  | 14.0           | 13.2  | 1.8       | 2.35   | 2.9   | 0.52/2                        | 0.659  | 0.762 | 19                    | 25          |
| 3/8                       | 10  | 17.2  | 17.1                            | 16.7  | 17.5           | 16.7  | 1.8       | 2.35   | 2.9   | 0.68/8                        | 0.850  | 1.03  | 21.3                  | 26          |
| 1/2                       | 15  | 21.3  | 21.4                            | 21.0  | 21.8           | 21.0  | 2.0       | 2.65   | 3.25  | 0.96                          | 1.21   | 1.44  | 26.9                  | 34          |
| 3/4                       | 20  | 26.9  | 26.9                            | 26.9  | 26.4           | 27.4  | 2.65      | 2.35   | 2.65  | 3.25                          | 1.41   | 1.57  | 1.89                  | 33.7        |
| 1                         | 25  | 33.7  | 33.8                            | 33.2  | 34.2           | 33.3  | 2.65      | 3.25   | 4.05  | 2.01                          | 2.42   | 2.95  | 42.6                  | 43          |
| 1 1/4                     | 32  | 42.4  | 42.5                            | 41.9  | 42.9           | 42.0  | 2.65      | 3.25   | 4.05  | 2.57                          | 3.11   | 3.81  | 51                    | 48          |
| 1 1/2                     | 40  | 48.3  | 48.4                            | 47.8  | 48.8           | 42.9  | 2.9       | 3.25   | 4.05  | 3.27                          | 3.59   | 4.41  | 57                    | 48          |
| 2                         | 50  | 60.3  | 60.2                            | 59.6  | 60.8           | 59.7  | 2.9       | 3.26   | 4.5   | 4.14                          | 5.07   | 6.17  | 70                    | 56          |
| 2 1/2                     | 65  | 76.1  | 76.0                            | 75.2  | 76.6           | 75.3  | 3.25      | 3.65   | 4.5   | 5.80                          | 6.49   | 7.92  | 88.9                  | 65          |
| 3                         | 80  | 88.9  | 88.7                            | 87.9  | 89.5           | 88.0  | 3.25      | .05    | 4.50  | 6.81                          | 8.43   | 10.10 | 101.6                 | 71          |
| 3 1/2                     | 90  | 101.6 | 101.2                           | 100.3 | 102.1          | 100.4 | 3.65      | 4.05   | 4.85  | 8.76                          | 9.70   | 11.90 | 114.3                 | 75          |
| 4                         | 100 | 114.3 | 113.9                           | 113.0 | 115.0          | 113.1 | 3.65      | 4.5    | 5.4   | 9.90                          | 12.10  | 14.50 | 127                   | 83          |
| 5                         | 125 | 139.7 | -                               | -     | 140.8          | 138.5 | -         | 4.85   | 5.4   | -                             | 16.60  | 17.90 | 159                   | 92          |
| 6                         | 150 | 165.1 | -                               | -     | 166.5          | 163.9 | -         | 4.85   | 5.4   | -                             | 19.70  | 21.20 | 177.8                 | 92          |



# **BUTT WELDING PIPE FITTING DIMENSIONAL STANDARD** **ANSI B-16.9, B-16.28 & MS SS P43**

| Nominal Pipe Size |     | Outside Diameter | Center to Face |       |       | Back to Face |        |       |        | Center to Center |       |       | Length 'L' MS SS P43 |
|-------------------|-----|------------------|----------------|-------|-------|--------------|--------|-------|--------|------------------|-------|-------|----------------------|
| Inch.             | mm  | D                | A              | B     | N     | E            | F      | G     | R      | M                | S     | L     | L                    |
| 1/2               | 15  | 21.3             | 38.00          | 16.0  | —     | 25.0         | 48.0   | —     | 76.0   | —                | 35.0  | 50.8  | 76.2                 |
| 3/4               | 20  | 26.7             | 29.00          | 11.0  | —     | 25.0         | 43.0   | —     | 57.0   | —                | 43.0  | 50.8  | 76.2                 |
| 1                 | 25  | 33.4             | 38.00          | 22.0  | 25.0  | 38.0         | 56.0   | 41.0  | 76.0   | 51.0             | 51.0  | 50.8  | 101.6                |
| 1 1/4             | 32  | 42.2             | 48.00          | 25.0  | 32.0  | 38.0         | 70.0   | 52.0  | 95.0   | 64.0             | 64.0  | 50.8  | 101.6                |
| 1 1/2             | 40  | 48.3             | 57.15          | 29.0  | 38.0  | 38.0         | 83.0   | 62.0  | 114.0  | 76.0             | 73.0  | 50.8  | 101.6                |
| 2                 | 50  | 60.3             | 76.00          | 35.0  | 51.0  | 38.0         | 106.0  | 81.0  | 152.0  | 102.0            | 93.0  | 63.5  | 152.4                |
| 2 1/2             | 65  | 73               | 95.25          | 44.0  | 64.0  | 38.0         | 132.0  | 100.0 | 191.0  | 127.0            | 105.0 | 63.5  | 152.4                |
| 3                 | 80  | 88.9             | 114.30         | 51.0  | 76.0  | 51.0         | 159.0  | 121.0 | 229.0  | 152.0            | 127.0 | 63.5  | 152.4                |
| 3 1/2             | 90  | 101.6            | 133.35         | 57.0  | 89.0  | 64.0         | 184.0  | 140.0 | 267.0  | 178.0            | 140.0 | 76.2  | 152.4                |
| 4                 | 100 | 114.3            | 152.0          | 63.0  | 102.0 | 64.0         | 210.0  | 159.0 | 305.0  | 203.0            | 157.0 | 76.2  | 152.4                |
| 5                 | 125 | 141.3            | 190.0          | 79.0  | 127.0 | 76.0         | 262.0  | 197.0 | 381.0  | 254.0            | 186.0 | 76.2  | 203.2                |
| 6                 | 150 | 168.3            | 229.0          | 95.0  | 152.0 | 89.0         | 313.0  | 237.0 | 457.0  | 305.0            | 216.0 | 88.9  | 203.2                |
| 8                 | 200 | 219.1            | 305.0          | 127.0 | 203.0 | 102.0        | 414.0  | 313.0 | 610.0  | 406.0            | 270.0 | 101.6 | 203.2                |
| 10                | 250 | 273.1            | 381.0          | 159.0 | 254.0 | 127.0        | 515.0  | 391.0 | 762.0  | 508.0            | 324.0 | 127   | 254                  |
| 12                | 300 | 323.9            | 457.0          | 190.0 | 303.0 | 152.0        | 619.0  | 467.0 | 914.0  | 610.0            | 381.0 | 152.4 | 254                  |
| 14                | 350 | 355.6            | 533.0          | 222.0 | 356.0 | 165.0        | 711.0  | 533.0 | 1067.0 | 711.0            | 413.0 | 152.4 | 305.0                |
| 16                | 400 | 406.4            | 610.0          | 254.0 | 406.0 | 178.0        | 813.0  | 610.0 | 1219.0 | 813.0            | 470.0 | 152.4 | 305.0                |
| 18                | 450 | 457.2            | 686.0          | 286.0 | 457.0 | 203.0        | 914.0  | 686.0 | 1372.0 | 914.0            | 533.0 | 152.4 | 305.0                |
| 20                | 500 | 508              | 762.0          | 318.0 | 508.0 | 229.0        | 1016.0 | 762.0 | 1524.0 | 1016.0           | 584.0 | 152.4 | 305.0                |
| 22                | 550 | 559              | 838.0          | 343.0 | 559.0 | 254.0        | 1118.0 | 838.0 | 1676.0 | 1118.0           | 614.4 | 152.4 | 305.0                |
| 24                | 600 | 610              | 914.0          | 381.0 | 610.0 | 267.0        | 1219.0 | 914.0 | 1829.0 | 1219.0           | 692.0 | 152.4 | 305.0                |



## DIMENSIONAL TOLERANCES

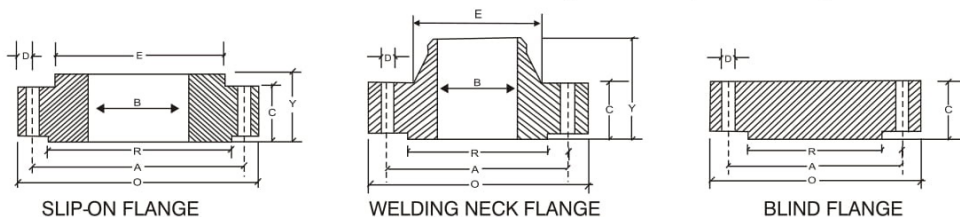
| Threaded, Socket-Welding, Slip-on, Lap Joint and Blind |                                                    |                                                                               |
|--------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------------------------------|
| Outside Diameter                                       | When O.D. is 24" or less                           | $\pm 1/16"$ (16mm)                                                            |
|                                                        | When O.D. is Over 24"                              | $\pm 1/8"$ (3.2mm)                                                            |
| Inside Diameter                                        | Threaded                                           | Within limits on boring guage                                                 |
|                                                        | Socket-Welding, Slip-on and Lap joint              | 10" & Smaller<br>+ 1/32" (0.8mm) - 0"<br>12" & Larger<br>+ 1/16" (1.6mm) - 0" |
| Outside Diameter of Hub                                | 12" and Smaller                                    | + 1/32" (0.8mm)<br>- 1/16" (1.6mm)                                            |
|                                                        | 14" and Larger                                     | $\pm 1/8"$ (3.2mm)                                                            |
| Diameter of Contact Face                               | 1/16" Raised Face                                  | $\pm 1/32"$ (0.8mm)                                                           |
|                                                        | 1/4" Raised Face Tongue & Groove Male, Female      | $\pm 1/64"$ (0.4mm)                                                           |
| Diameter of Counterbore                                | Same as for Inside Diameter                        |                                                                               |
| Drilling                                               | Bolt Circle                                        | $\pm 1/16"$ (1.6mm)                                                           |
|                                                        | Bolt hole Spacing                                  | $\pm 1/32"$ (0.8mm)                                                           |
|                                                        | Eccentricity of Both Circle with Respect to Facing | 21/2" & Smaller<br>1/32" (0.8mm) max<br>3" & Larger<br>1/16" (1.6mm) max      |
|                                                        | Eccentricity of Both Circle with Respect to Bore   | 1/32" (0.8mm) max                                                             |
|                                                        | Eccentricity of Facing with Respect to Bore        | 1/32" (0.8mm) max                                                             |
| Thickness                                              | 18" and Smaller                                    | + 1/8" (3.2mm) - 0"                                                           |
|                                                        | 20" and Larger                                     | + 3/16" (4.8mm) - 0"                                                          |
| Length                                                 | 10" and Smaller                                    | $\pm 1/16"$ (1.6mm)                                                           |
| Thru Hub                                               | 12" and Larger                                     | $\pm 1/8"$ (3.2mm)                                                            |

| Welding Neck                        |                                                    |                                                                          |
|-------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------|
| Outside Diameter                    | When O.D. is 24" or less                           | $\pm 1/6"$ (16mm)                                                        |
|                                     | When O.D. is over 24"                              | $\pm 1/18"$ (3.2mm)                                                      |
| Inside Diameter                     | 10" and Smaller                                    | + 1/32" (0.8mm)                                                          |
|                                     | 12" thru 18"                                       | + 1/16" (1.6mm)                                                          |
|                                     | 20" and Larger                                     | + 1/8" (3.2mm)<br>- 1/16" (1.6mm)                                        |
| Diameter of Contact Face            | 1/16" Raised Face                                  | + 1/32" (0.8mm)                                                          |
|                                     | 1/4" Raised Face Tongue & Groove Male, Female      | + 1/64" (0.4mm)                                                          |
| Diameter of Hub at Base             | When Hub Base is 24" or Smaller                    | = 1/16" (1.6mm)                                                          |
|                                     | When Hub Base is Over 24"                          | - 1/8" (3.2mm)                                                           |
| Diameter of Hub at Point of Welding | 5" and Smaller                                     | + 3/32" (2.4mm)<br>- 1/32" (0.8mm)                                       |
|                                     | 6" and Larger                                      | + 5/32" (4.0mm)<br>- 1/32" (0.8mm)                                       |
| Drilling                            | Bolt Circle                                        | + 1/16" (1.6mm)                                                          |
|                                     | Bolt hole spacing                                  | + 1/32" (0.8mm)                                                          |
|                                     | Eccentricity of Bolt Circle with Respect to Facing | 21/2" & Smaller<br>1/32" (0.8mm) max<br>3" & Larger<br>1/16" (1.6mm) max |
|                                     | Eccentricity of Bolt Circle with Respect to Bore   | 1/32" (0.8mm) max                                                        |
|                                     | Eccentricity of Facing with Respect to Bore        | 1/32" (0.8mm) max                                                        |
| Thickness                           | 18" and Smaller                                    | + 1/8" (3.2mm)-0"                                                        |
|                                     | 20" and Larger                                     | + 3/16" (4.8mm)-0"                                                       |
| Length                              | 10" and Smaller                                    | + 1/16" (1.6mm)                                                          |
| Thru Hub                            | 12" and Larger                                     | + 1/8" (3.2mm)                                                           |





## FORGED FLANGES TO ANSI B 16.5 (ASA 150 / 300 LBS)



150 LBS

| Nominal Pipe Size<br>(MM) (INCH.) |       | Flange Dia<br>O | Dia of Bolt Circle<br>A | Dia of Bolt Holes<br>D | No. of Holes | Thk. of Flange<br>C | Dia of Hub<br>E | Length through Hub |          |          | Dia of Bore    |          | Dia of R/F<br>R | Depth of Socket<br>F |
|-----------------------------------|-------|-----------------|-------------------------|------------------------|--------------|---------------------|-----------------|--------------------|----------|----------|----------------|----------|-----------------|----------------------|
|                                   |       |                 |                         |                        |              |                     |                 | S/O & S/W<br>Y     | W/N<br>Y | L/J<br>Y | S/O & S/W<br>B | L/J<br>B |                 |                      |
| 15                                | 1/2   | 88.9            | 60.3                    | 15.9                   | 4            | 11.1                | 30.2            | 15.9               | 47.6     | 15.9     | 22.3           | 22.9     | 34.9            | 9.5                  |
| 20                                | 3/4   | 98.4            | 69.8                    | 15.9                   | 4            | 12.7                | 38.1            | 15.9               | 52.4     | 15.9     | 27.7           | 28.2     | 42.9            | 11.1                 |
| 25                                | 1     | 107.9           | 79.4                    | 15.9                   | 4            | 14.3                | 49.2            | 17.5               | 55.6     | 17.5     | 34.5           | 35.0     | 50.8            | 12.7                 |
| 32                                | 1 1/4 | 117.5           | 88.9                    | 15.9                   | 4            | 15.9                | 58.7            | 20.6               | 57.1     | 20.6     | 43.2           | 43.7     | 63.5            | 14.3                 |
| 40                                | 1 1/2 | 127.0           | 98.4                    | 15.9                   | 4            | 17.5                | 65.1            | 22.2               | 61.9     | 22.2     | 49.5           | 50.0     | 73.0            | 15.9                 |
| 50                                | 2     | 152.4           | 120.6                   | 19.0                   | 4            | 19.0                | 77.8            | 25.4               | 63.5     | 25.4     | 62.0           | 62.5     | 92.1            | 17.5                 |
| 65                                | 2 1/2 | 177.8           | 139.7                   | 19.0                   | 4            | 22.2                | 90.5            | 28.6               | 69.8     | 28.6     | 74.7           | 75.4     | 104.8           | 19.0                 |
| 80                                | 3     | 190.5           | 152.4                   | 19.0                   | 4            | 23.8                | 107.9           | 30.2               | 69.8     | 30.2     | 90.7           | 91.4     | 127.0           | 20.6                 |
| 100                               | 4     | 228.6           | 190.5                   | 19.0                   | 8            | 23.8                | 134.9           | 33.3               | 76.2     | 33.3     | 116.1          | 116.8    | 157.2           | 23.8                 |
| 125                               | 5     | 254.0           | 215.9                   | 22.2                   | 8            | 23.8                | 163.5           | 36.5               | 88.9     | 36.5     | 143.8          | 144.5    | 185.7           | 23.8                 |
| 150                               | 6     | 279.4           | 241.3                   | 22.2                   | 8            | 25.4                | 192.1           | 39.7               | 88.9     | 39.7     | 170.7          | 171.4    | 215.9           | 27.0                 |
| 200                               | 8     | 342.9           | 298.4                   | 22.2                   | 8            | 28.6                | 246.1           | 44.4               | 101.6    | 44.4     | 221.5          | 222.2    | 269.9           | 31.7                 |
| 250                               | 10    | 406.4           | 361.9                   | 25.4                   | 12           | 30.2                | 304.8           | 49.2               | 101.6    | 49.2     | 276.3          | 277.4    | 323.8           | 33.3                 |
| 300                               | 12    | 482.6           | 431.8                   | 25.4                   | 12           | 31.8                | 365.1           | 55.6               | 114.3    | 55.6     | 327.1          | 328.2    | 381.0           | 39.7                 |
| 350                               | 14    | 533.4           | 476.2                   | 28.6                   | 12           | 34.9                | 400.0           | 57.1               | 127.0    | 79.4     | 359.1          | 360.2    | 412.7           | 41.3                 |
| 400                               | 16    | 596.9           | 539.7                   | 28.6                   | 16           | 36.5                | 457.2           | 63.5               | 127.0    | 87.3     | 410.5          | 411.2    | 469.9           | 44.4                 |
| 450                               | 18    | 635.0           | 577.8                   | 31.7                   | 16           | 39.7                | 504.8           | 68.3               | 139.7    | 96.8     | 461.8          | 462.3    | 533.4           | 49.2                 |
| 500                               | 20    | 698.5           | 635.0                   | 31.7                   | 20           | 42.9                | 558.8           | 73.0               | 144.5    | 103.2    | 513.1          | 514.3    | 584.2           | 54.0                 |
| 600                               | 24    | 812.8           | 749.3                   | 34.9                   | 20           | 47.6                | 663.6           | 82.5               | 152.4    | 111.1    | 615.9          | 615.9    | 692.1           | 63.5                 |

300 LBS

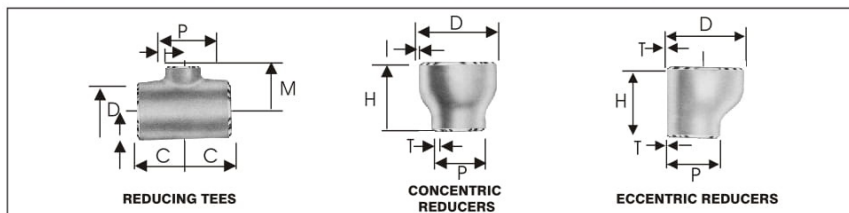
| Nominal Pipe Size<br>(MM) (INCH.) |       | Flange Dia<br>O | Dia of Bolt Circle<br>A | Dia of Bolt Holes<br>D | No. of Holes | Thk. of Flange<br>C | Dia of Hub<br>E | Length through Hub |          |          | Dia of Bore    |          | Dia of R/F<br>R | Depth of Socket<br>F |
|-----------------------------------|-------|-----------------|-------------------------|------------------------|--------------|---------------------|-----------------|--------------------|----------|----------|----------------|----------|-----------------|----------------------|
|                                   |       |                 |                         |                        |              |                     |                 | S/O & S/W<br>Y     | W/N<br>Y | L/J<br>Y | S/O & S/W<br>B | L/J<br>B |                 |                      |
| 15                                | 1/2   | 95.2            | 66.7                    | 15.9                   | 4            | 14.3                | 38.1            | 22.2               | 52.4     | 22.2     | 22.3           | 22.9     | 34.9            | 9.5                  |
| 20                                | 3/4   | 117.5           | 82.5                    | 19.0                   | 4            | 15.9                | 47.6            | 25.4               | 57.1     | 25.4     | 27.7           | 28.2     | 42.9            | 11.1                 |
| 25                                | 1     | 123.8           | 88.9                    | 19.0                   | 4            | 17.5                | 54.0            | 27.0               | 61.9     | 27.0     | 34.5           | 35.0     | 50.8            | 12.7                 |
| 32                                | 1 1/4 | 133.3           | 98.4                    | 19.0                   | 4            | 19.0                | 63.5            | 27.0               | 65.1     | 27.0     | 43.2           | 43.7     | 63.5            | 14.3                 |
| 40                                | 1 1/2 | 155.6           | 114.3                   | 22.2                   | 4            | 20.6                | 69.8            | 30.2               | 68.3     | 30.2     | 49.5           | 50.0     | 73.0            | 15.9                 |
| 50                                | 2     | 165.1           | 127.0                   | 19.0                   | 8            | 22.2                | 84.1            | 33.3               | 69.8     | 33.3     | 62.0           | 62.5     | 92.1            | 17.5                 |
| 65                                | 2 1/2 | 190.5           | 149.2                   | 22.2                   | 8            | 25.4                | 100.0           | 38.1               | 76.2     | 38.1     | 74.7           | 75.4     | 104.8           | 19.0                 |
| 80                                | 3     | 209.5           | 168.3                   | 22.2                   | 8            | 28.6                | 117.5           | 42.9               | 79.4     | 42.9     | 90.7           | 91.4     | 127.0           | 20.6                 |
| 100                               | 4     | 254.0           | 200.0                   | 22.2                   | 8            | 31.8                | 146.0           | 47.6               | 85.7     | 47.6     | 116.1          | 116.8    | 157.2           | 23.8                 |
| 125                               | 5     | 279.4           | 234.9                   | 22.2                   | 8            | 34.9                | 177.8           | 50.8               | 98.4     | 50.8     | 143.8          | 144.5    | 185.7           | -                    |
| 150                               | 6     | 317.5           | 269.9                   | 22.2                   | 12           | 36.5                | 206.4           | 52.4               | 98.4     | 52.4     | 170.7          | 171.4    | 215.9           | -                    |
| 200                               | 8     | 381.0           | 330.2                   | 25.4                   | 12           | 41.3                | 260.3           | 61.9               | 111.1    | 61.9     | 221.5          | 222.2    | 269.9           | -                    |
| 250                               | 10    | 444.5           | 387.3                   | 28.6                   | 16           | 47.6                | 320.7           | 66.7               | 117.5    | 95.2     | 276.3          | 277.4    | 323.8           | -                    |
| 300                               | 12    | 520.7           | 450.8                   | 31.7                   | 16           | 50.8                | 374.6           | 73.0               | 130.2    | 101.6    | 327.1          | 328.2    | 381.0           | -                    |
| 350                               | 14    | 584.2           | 514.3                   | 31.7                   | 20           | 54.0                | 425.4           | 76.2               | 142.9    | 111.1    | 359.1          | 360.2    | 412.7           | -                    |
| 400                               | 16    | 647.7           | 571.5                   | 34.9                   | 20           | 57.2                | 482.6           | 82.5               | 146.0    | 120.6    | 410.5          | 411.2    | 469.9           | -                    |
| 450                               | 18    | 711.2           | 628.5                   | 34.9                   | 24           | 60.3                | 533.4           | 88.9               | 158.7    | 130.2    | 461.8          | 462.3    | 533.4           | -                    |
| 500                               | 20    | 774.7           | 685.8                   | 34.9                   | 24           | 63.5                | 587.4           | 95.2               | 161.9    | 139.7    | 513.1          | 514.3    | 584.2           | -                    |
| 600                               | 24    | 914.4           | 812.8                   | 41.3                   | 24           | 69.8                | 701.7           | 106.4              | 168.3    | 152.4    | 615.9          | 615.9    | 692.1           | -                    |

All Dimensions are in Millimeters • Flanges except Lap Joint will be furnished with (1.6) Raised Face, which is included in "Thickness(C)" and "Length through Hub(Y)"

• 600, 900, 1500, 2500 class flange are also available on request.



## BUTT - WELDING PIPE FITTINGS ANSI B 16.9 AND B 16.28



| 11/4 x 1    | 32 x 25   | 42.2  | 33.4  | 48  | 48  | 51  |
|-------------|-----------|-------|-------|-----|-----|-----|
| 11/4 x 3/4  | 32 x 20   | 42.2  | 26.7  | 48  | 48  | 51  |
| 11/4 x 1/2  | 32 x 15   | 42.2  | 21.3  | 48  | 48  | 51  |
| 11/2 x 11/2 | 40 x 32   | 48.3  | 42.2  | 57  | 57  | 64  |
| 11/2 x 1    | 40 x 25   | 48.3  | 33.4  | 57  | 57  | 64  |
| 11/2 x 3/4  | 40 x 20   | 48.3  | 26.7  | 57  | 57  | 64  |
| 11/2 x 1/2  | 40 x 15   | 48.3  | 21.3  | 57  | 57  | 64  |
| 2 x 11/2    | 50 x 40   | 60.3  | 48.2  | 64  | 60  | 76  |
| 2 x 11/4    | 50 x 32   | 60.3  | 42.2  | 64  | 57  | 76  |
| 2 x 1       | 50 x 25   | 60.3  | 33.4  | 64  | 51  | 76  |
| 2 x 3/4     | 50 x 20   | 60.3  | 26.7  | 64  | 44  | 76  |
| 21/2 x 2    | 65 x 50   | 73.0  | 60.3  | 76  | 70  | 89  |
| 21/2 x 11/2 | 65 x 40   | 73.0  | 48.3  | 76  | 67  | 89  |
| 21/2 x 11/4 | 65 x 32   | 73.0  | 42.2  | 76  | 64  | 89  |
| 21/2 x 1    | 65 x 25   | 73.0  | 33.4  | 76  | 57  | 89  |
| 3 x 21/2    | 80 x 65   | 88.9  | 73.0  | 86  | 83  | 89  |
| 3 x 2       | 80 x 50   | 88.9  | 60.3  | 86  | 76  | 89  |
| 3 x 11/2    | 80 x 40   | 88.9  | 48.3  | 86  | 73  | 89  |
| 3 x 11/4    | 80 x 32   | 88.9  | 42.2  | 86  | 70  | 89  |
| 4 x 31/2    | 100 x 90  | 114.3 | 101.6 | 105 | 102 | 102 |
| 4 x 3       | 100 x 80  | 114.3 | 88.9  | 105 | 98  | 102 |
| 4 x 21/2    | 100 x 65  | 114.3 | 73.0  | 105 | 95  | 102 |
| 4 x 2       | 100 x 50  | 114.3 | 60.3  | 105 | 89  | 102 |
| 4 x 11/2    | 100 x 40  | 114.3 | 48.3  | 105 | 86  | 102 |
| 5 x 4       | 125 x 100 | 141.3 | 114.3 | 124 | 117 | 127 |
| 5 x 31/2    | 125 x 90  | 141.3 | 101.6 | 124 | 114 | 127 |
| 5 x 3       | 125 x 80  | 141.3 | 88.9  | 124 | 111 | 127 |
| 5 x 21/2    | 125 x 65  | 141.3 | 73.0  | 124 | 108 | 127 |
| 5 x 2       | 125 x 50  | 141.3 | 60.3  | 124 | 105 | 127 |
| 6 x 5       | 150 x 125 | 168.3 | 141.3 | 143 | 137 | 140 |
| 6 x 4       | 150 x 100 | 168.3 | 114.3 | 143 | 130 | 140 |
| 6 x 31/2    | 150 x 90  | 168.3 | 101.6 | 143 | 127 | 140 |
| 6 x 3       | 150 x 80  | 168.3 | 88.9  | 143 | 124 | 140 |
| 6 x 21/2    | 150 x 65  | 168.3 | 73.0  | 143 | 121 | 140 |

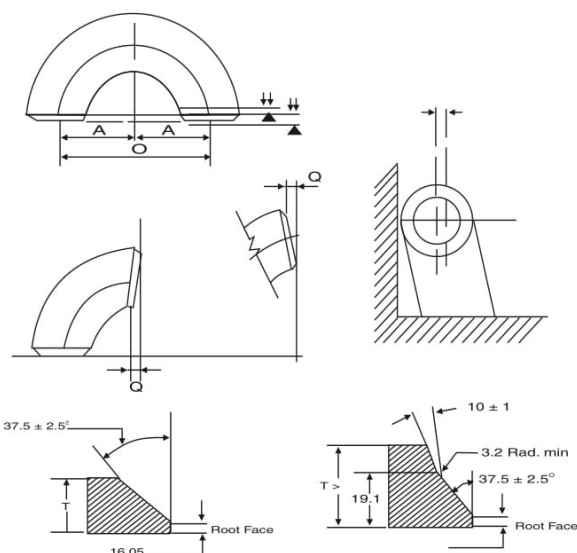
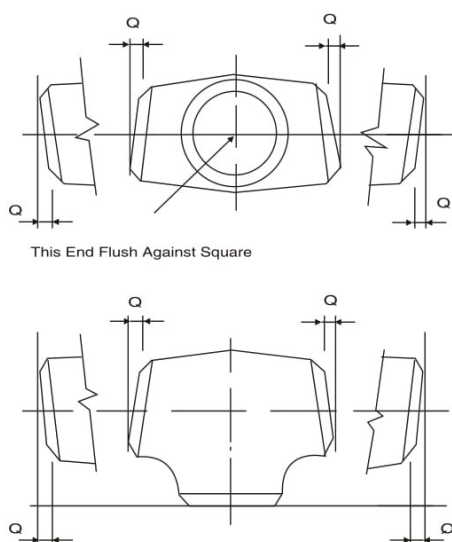
| Nominal Pipe Size |           | Outside Diameter |       | Center to End |     | Length |
|-------------------|-----------|------------------|-------|---------------|-----|--------|
| Inch.             | mm        | D                | P     | C             | M   | H      |
| 8 x 6             | 200 x 150 | 219.1            | 168.3 | 178           | 168 | 152    |
| 8 x 5             | 200 x 125 | 219.1            | 141.3 | 178           | 162 | 152    |
| 8 x 4             | 200 x 100 | 219.1            | 114.3 | 178           | 156 | 152    |
| 8 x 31/2          | 200 x 90  | 219.1            | 101.6 | 178           | 152 | 152    |
| 10 x 8            | 250 x 200 | 273.1            | 219.1 | 216           | 203 | 178    |
| 10 x 6            | 250 x 150 | 273.1            | 168.1 | 216           | 194 | 178    |
| 10 x 5            | 250 x 125 | 273.1            | 141.3 | 216           | 191 | 178    |
| 10 x 4            | 250 x 100 | 273.1            | 114.3 | 216           | 184 | 178    |
| 12 x 10           | 300 x 250 | 323.9            | 273.1 | 254           | 241 | 203    |
| 12 x 8            | 300 x 200 | 323.9            | 219.1 | 254           | 229 | 203    |
| 12 x 6            | 300 x 150 | 323.9            | 168.3 | 254           | 219 | 203    |
| 12 x 5            | 300 x 125 | 323.9            | 141.3 | 254           | 216 | 203    |
| 14 x 12           | 350 x 300 | 355.6            | 323.9 | 279           | 270 | 330    |
| 14 x 10           | 350 x 250 | 355.6            | 273.1 | 279           | 257 | 330    |
| 14 x 8            | 350 x 200 | 355.6            | 219.1 | 279           | 248 | 330    |
| 14 x 6            | 350 x 150 | 355.6            | 168.3 | 279           | 238 | 330    |
| 16 x 14           | 400 x 350 | 406.4            | 355.6 | 305           | 305 | 356    |
| 16 x 12           | 400 x 300 | 406.4            | 323.9 | 305           | 295 | 356    |
| 16 x 10           | 400 x 250 | 406.4            | 273.1 | 305           | 283 | 356    |
| 16 x 8            | 400 x 200 | 406.4            | 219.1 | 305           | 273 | 356    |
| 16 x 6            | 400 x 150 | 406.4            | 168.3 | 305           | 264 | -      |
| 18 x 16           | 450 x 400 | 457.0            | 406.4 | 343           | 330 | 381    |
| 18 x 14           | 450 x 350 | 457.0            | 355.6 | 343           | 330 | 381    |
| 18 x 12           | 450 x 300 | 457.0            | 323.9 | 343           | 321 | 381    |
| 18 x 10           | 450 x 250 | 457.0            | 273.1 | 343           | 308 | 381    |
| 18 x 8            | 450 x 200 | 457.0            | 219.1 | 343           | 298 | -      |
| 20 x 18           | 500 x 450 | 508.0            | 457.0 | 381           | 368 | 508    |
| 20 x 16           | 500 x 400 | 508.0            | 406.4 | 381           | 356 | 508    |
| 20 x 14           | 500 x 350 | 508.0            | 355.6 | 381           | 356 | 508    |
| 20 x 12           | 500 x 300 | 508.0            | 323.9 | 381           | 346 | 508    |
| 20 x 10           | 500 x 250 | 508.0            | 273.1 | 381           | 333 | -      |
| 20 x 8            | 500 x 200 | 508.0            | 219.1 | 381           | 324 | -      |
| 24 x 22           | 600 x 550 | 610.0            | 559.0 | 432           | 432 | 508    |
| 24 x 20           | 600 x 500 | 610.0            | 508.0 | 432           | 432 | 508    |
| 24 x 18           | 600 x 450 | 610.0            | 457.0 | 432           | 419 | 508    |
| 24 x 16           | 600 x 400 | 610.0            | 406.4 | 432           | 406 | 508    |
| 24 x 14           | 600 x 350 | 610.0            | 355.6 | 432           | 406 | -      |
| 24 x 12           | 600 x 300 | 610.0            | 323.9 | 432           | 397 | -      |
| 24 x 10           | 600 x 250 | 610.0            | 273.1 | 432           | 384 | -      |





## DIMENSIONAL TOLERANCES AS PER ANSI B 16.9 / B 16.28 / MSS SP -43 BUTT WELD FITTING

| ALL FITTINGS                    |                                 |                |                        | 90°/60°/45°<br>/30°<br>ELBOWS<br>& TEES |                          | REDUCERS                         |              | 180° RETURNS                     |                                 |                  |             |                               |             | CAPS                              |             | ANGULARITY TOLERANCE |             |                            |                         |                         |              |
|---------------------------------|---------------------------------|----------------|------------------------|-----------------------------------------|--------------------------|----------------------------------|--------------|----------------------------------|---------------------------------|------------------|-------------|-------------------------------|-------------|-----------------------------------|-------------|----------------------|-------------|----------------------------|-------------------------|-------------------------|--------------|
| Nominal<br>Pipe Size<br>Inch/mm | Outside<br>Diameter<br>at Level |                | Inside<br>Dia<br>meter | Wall<br>Thickness<br>at End             |                          | Centre<br>to End                 |              | Overall<br>Length<br>Dimensions  |                                 | Centre<br>to End |             | Back to<br>Face<br>Dimensions |             | Alignment<br>of End<br>Dimensions |             | Overall length       |             | Nominal<br>Pipe Size       | Off<br>Angle<br>Inch/mm |                         | Off<br>Plane |
|                                 | D                               |                |                        | T                                       |                          | A,B,C,M                          |              | H                                |                                 | O                |             | K                             |             | U                                 |             | E                    |             |                            | Q                       |                         | P            |
|                                 | (1)<br>B16.9                    | MSS<br>SP43    | (2)<br>B16.9           | B16.9                                   | MSS<br>SP43              | B16.9                            | MSS<br>SP43  | B16.9                            | MSS<br>SP43                     | B16.9            | MSS<br>SP43 | B16.9                         | MSS<br>SP43 | B16.9                             | MSS<br>SP43 | B16.9                | MSS<br>SP43 |                            | B16.9                   | MSS<br>SP43             | B16.9        |
| 1/2" TO<br>2 1/2"<br>15 TO 65   | ±1.0                            |                | ±0.8                   |                                         |                          | FROM<br>1/2" TO 10"<br>15 TO 250 | FROM<br>3/4" | FROM<br>1/2" TO 10"<br>15 TO 250 | FROM<br>1/2" TO 8"<br>15 TO 200 |                  |             |                               |             |                                   |             | ±4                   | ±3.17       | 1/2" TO 4"<br>15 TO 100    | 1                       |                         | 1            |
| 3" TO 3 1/2"<br>80 TO 90        |                                 | ±0.79          |                        |                                         |                          |                                  |              |                                  |                                 |                  |             |                               |             |                                   |             |                      |             | 5" TO 8"<br>125 TO 200     | 2                       |                         | 4            |
| 4"<br>100                       | +2<br>-1                        |                | ±1.6                   |                                         |                          | ±2                               | ±1.59        | ±2                               | ±1.59                           | ±7               | ±6.35       | ±7                            | ±6.35       | ±1.0                              | ±0.79       |                      |             | 10" TO 12"<br>250 TO 300   | 3                       |                         | 5            |
| 5" TO 6"<br>125 TO 150          | +3<br>-1                        | +1.59          |                        |                                         |                          |                                  |              |                                  |                                 |                  |             |                               |             |                                   |             | ±7                   | ±6.35       | 14" TO 16"<br>350 TO 400   | 3                       | 16" TO<br>24"           | 7            |
| 8"<br>200                       | ±2                              | -0.79          |                        | Not<br>Less<br>Than                     | Not<br>Less<br>Than      |                                  |              |                                  |                                 |                  |             |                               |             |                                   |             |                      |             | 18" TO 24"<br>450 TO 600   | 4                       | 400 TO<br>600<br>1.6    | 10           |
| 10" TO 18"<br>250 TO 450        | +4<br>-3                        | +2.38<br>-0.79 | ±3.2                   | 87.5%<br>Nominal<br>Thk.                | 87.5%<br>Nominal<br>Thk. | FROM<br>12" TO 30"<br>±3         | ±2.38        | FROM<br>12" TO 30"<br>±3         | 10" TO 24"<br>+2.38             |                  |             |                               |             |                                   |             |                      |             | 26" TO 30"<br>650 TO 750   | 5                       | 26" TO<br>36"<br>650 TO | 10           |
| 20" TO 24"<br>500 TO 600        | +6<br>-5                        | 3.17<br>0.79   |                        |                                         |                          | 300 TO 750                       |              | 300 TO<br>750                    | 250 TO<br>600                   | ±10"             | ±9.53       |                               |             | ±2.0"                             | ±1.59       |                      |             | 32" TO 42"<br>800 TO 1050  | 5                       | 900<br>2.4              | 13           |
| 26" TO 30"<br>650 TO 750        | +7<br>-5                        |                | ±4.8                   |                                         |                          |                                  |              |                                  |                                 |                  |             |                               |             |                                   |             | ±10                  |             | 44" TO 48"<br>1100 TO 1200 | 5                       | 38" TO<br>48"           | 20           |
| 32" TO 48"<br>800 TO<br>1200    | +7<br>-5                        |                |                        |                                         |                          | ±5                               |              |                                  |                                 |                  |             |                               |             |                                   |             |                      |             | 42" TO 48"<br>1050 TO 1200 | ±5                      | 950 TO<br>1200<br>3.2   | ±20          |



1. Out of round is the sum of absolute values of plus and minus tolerance.
2. The inside diameter at ends and the nominal wall thickness are to be specified by the purchaser.
3. Out of roundness tolerances shall be the difference between the Max. dia measured on any radial cross-section.
4. All dimensions are in millimeters except nominal pipe sizes which are in inches.

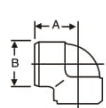
## WELDING BEVEL STANDARDS ANSI B 16.25



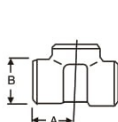


## FORGED SCREWED FITTING TO ANSI B-16.11 3000/6000 LBS. THREADED TO ASA B 2.1

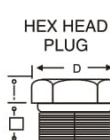
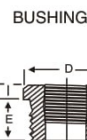
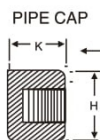
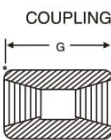
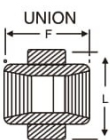
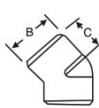
90° ELBOWS



TEE



45° ELBOW



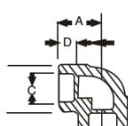
(DIMENSIONS IN MM)

HALF COUPLING = G/2

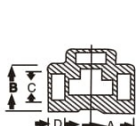
| NOM<br>BORE | PIPE<br>O.D. | 3000 LBS |     |    |     |     |    | COMMON FACTORS |    |     |    |    |     | 6000 LBS |     |    |     |     |    |
|-------------|--------------|----------|-----|----|-----|-----|----|----------------|----|-----|----|----|-----|----------|-----|----|-----|-----|----|
|             |              | A        | B   | C  | G   | H   | K  | D              | E  | F   | I  | J  | L   | A        | B   | C  | G   | H   | K  |
| 1/8"        | 10.3         | 21       | 22  | 17 | 32  | 16  | 19 | 11             | 10 | 40  | -  | 6  | -   | 25       | 25  | 19 | 32  | 22  | -  |
| 1/4"        | 13.7         | 25       | 25  | 19 | 35  | 19  | 25 | 16             | 11 | 43  | 3  | 6  | 32  | 29       | 33  | 22 | 35  | 25  | 27 |
| 3/8"        | 17.2         | 29       | 33  | 22 | 38  | 22  | 25 | 17.5           | 13 | 48  | 4  | 8  | 38  | 33       | 38  | 25 | 38  | 32  | 27 |
| 1/2"        | 21.3         | 33       | 38  | 25 | 48  | 29  | 32 | 22             | 15 | 51  | 5  | 8  | 46  | 38       | 46  | 29 | 48  | 38  | 33 |
| 3/4"        | 26.7         | 38       | 46  | 29 | 51  | 35  | 37 | 27             | 16 | 57  | 6  | 10 | 51  | 44       | 56  | 33 | 51  | 44  | 38 |
| 1"          | 33.4         | 44       | 56  | 33 | 60  | 44  | 41 | 35             | 19 | 64  | 6  | 10 | 60  | 51       | 62  | 35 | 60  | 57  | 43 |
| 1 1/4"      | 42.2         | 51       | 62  | 35 | 67  | 57  | 44 | 44.5           | 21 | 70  | 7  | 14 | 72  | 60       | 75  | 43 | 67  | 64  | 46 |
| 1 1/2"      | 48.3         | 60       | 75  | 43 | 79  | 64  | 44 | 51             | 21 | 79  | 8  | 16 | 80  | 64       | 84  | 44 | 79  | 76  | 48 |
| 2"          | 60.3         | 64       | 84  | 45 | 86  | 76  | 48 | 63.5           | 22 | 88  | 9  | 17 | 94  | 83       | 102 | 52 | 86  | 92  | 51 |
| 2 1/2"      | 73.02        | 83       | 102 | 52 | 92  | 92  | 60 | 76             | 27 | 118 | 10 | 21 | 122 | 95       | 121 | 64 | 92  | 108 | 64 |
| 3"          | 89.0         | 95       | 121 | 64 | 108 | 108 | 65 | 89             | 29 | 121 | 10 | 65 | 140 | 106      | 146 | 79 | 108 | 127 | 68 |
| 4"          | 114.5        | 114      | 152 | 79 | 121 | 140 | 68 | 117.5          | 32 | 150 | 13 | 25 | 180 | 114      | 152 | 79 | 121 | 159 | 75 |

## SOCKET WELD FITTING TO ANSI B-16.11

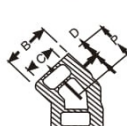
90° ELBOWS



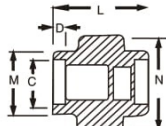
TEE



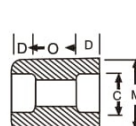
45° ELBOW



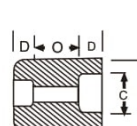
UNION



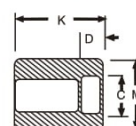
COUPLING



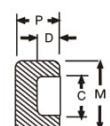
REDUCER



HALF COUPLING



CAP



| NOM<br>BORE | PIPE<br>O.D. | 3000 LBS. |           |    |    |     |       |     |      |    | COMMON FACTORS |           |           |           | 6000 LBS. |     |    |    |     |
|-------------|--------------|-----------|-----------|----|----|-----|-------|-----|------|----|----------------|-----------|-----------|-----------|-----------|-----|----|----|-----|
|             |              | A<br>max. | B<br>max. | K  | J  | L   | M     | N   | P    | Q  | C<br>min.      | D<br>min. | O<br>min. | O<br>max. | A         | B   | M  | K  | N   |
| 1/8"        | 10.3         | 22        | 18.5      | 26 | 16 | 40  | 17.3  | 32  | 17.5 | 10 | 10.7           | 10        | 5         | 8         | 22        | 22  | 20 | 25 | 46  |
| 1/4"        | 13.7         | 22        | 22        | 26 | 18 | 43  | 21.2  | 32  | 17.5 | 10 | 14.1           | 10        | 5         | 8         | 27        | 25  | 24 | 25 | 51  |
| 3/8"        | 17.2         | 25        | 25        | 26 | 19 | 48  | 25.4  | 36  | 19   | 10 | 17.6           | 10        | 3         | 9         | 27        | 28  | 28 | 26 | 60  |
| 1/2"        | 21.3         | 27        | 32        | 30 | 21 | 51  | 31    | 43  | 22   | 10 | 21.7           | 10        | 6         | 13        | 31        | 34  | 34 | 31 | 72  |
| 3/4"        | 26.7         | 34        | 38        | 36 | 24 | 57  | 37    | 50  | 25   | 13 | 27             | 13        | 6         | 13        | 37        | 42  | 41 | 35 | 80  |
| 1"          | 33.4         | 37        | 46        | 40 | 25 | 64  | 45.2  | 60  | 27   | 13 | 33.8           | 13        | 9         | 17        | 42        | 50  | 50 | 40 | 94  |
| 1 1/4"      | 42.2         | 42        | 56        | 40 | 29 | 70  | 55    | 70  | 30   | 13 | 42.6           | 13        | 9         | 17        | 47        | 59  | 58 | 41 | 100 |
| 1 1/2"      | 48.3         | 47        | 62        | 40 | 30 | 79  | 61.4  | 78  | 32   | 13 | 48.7           | 13        | 9         | 17        | 53        | 67  | 66 | 43 | 122 |
| 2"          | 60.3         | 56        | 75        | 52 | 37 | 89  | 75    | 95  | 38   | 13 | 61.2           | 16        | 15        | 23        | 59        | 84  | 83 | 55 |     |
| 2 1/2"      | 73.02        | 60        | 92        | 52 | 48 | 114 | 91.3  | 125 | 38   | 16 | 73.8           | 16        | 14        | 24        |           | 102 |    | 56 |     |
| 3"          | 89.00        | 76        | 110       | 52 | 51 | 127 | 108.8 | 140 | 44   | 16 | 89.8           | 16        | 14        | 24        |           | 121 |    | 58 |     |
| 4"          | 114.50       | 88        | 137       | 58 |    | 150 | 136.9 |     | 48   | 19 | 115.5          | 19        | 14        | 24        |           | 152 |    | 64 |     |

DIMENSIONS AND OTHERS SPECIFICATIONS AS PER CUSTOMERS REQUIREMENTS ARE AVAILABLE ON REQUEST