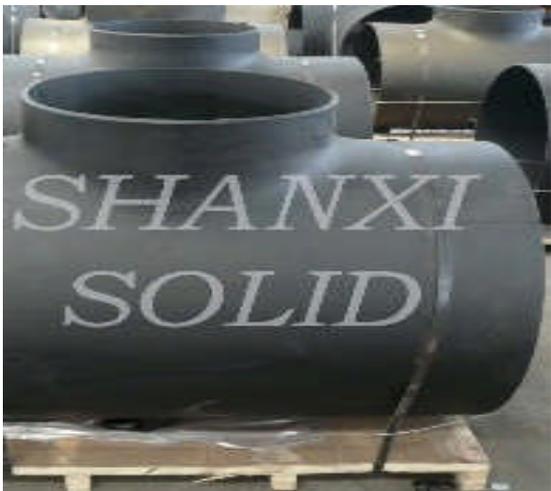


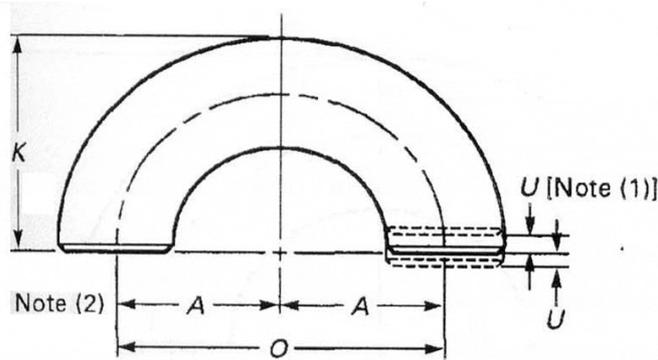
**Solid** 山西索立得工贸有限公司

**Shanxi Solid Industrial Co.,Ltd.**

**PIPELINE PRODUCTS**



**FACTORY-MADE WROUGHT BUTTWELDING FITTINGS**



**DIMENSIONS OF 180° RETURN**

| Nominal<br>Pip Size<br>(NPS) | DN          | Outside<br>Diameter at<br>Bevel | Center- to-Center D |              | Back-to-Face K |              |
|------------------------------|-------------|---------------------------------|---------------------|--------------|----------------|--------------|
|                              |             |                                 | Long Radius         | Short Radius | Long Radius    | Short Radius |
| 1/2                          | 15          | 21.3                            | 76                  |              | 48             |              |
| 3/4                          | 20[Note(3)] | 26.7                            | 76                  |              | 51             |              |
| 1                            | 25          | 33.4                            | 76                  | 51           | 56             | 41           |
| 1 1/4                        | 32          | 42.2                            | 95                  | 64           | 70             | 52           |
| 1 1/2                        | 40          | 48.3                            | 114                 | 76           | 83             | 62           |
| 2                            | 50          | 60.3                            | 152                 | 102          | 106            | 81           |
| 2 1/2                        | 65          | 73                              | 190                 | 127          | 132            | 100          |
| 3                            | 80          | 88.9                            | 229                 | 152          | 159            | 121          |
| 3 1/2                        | 90          | 101.6                           | 267                 | 178          | 184            | 140          |
| 4                            | 100         | 114.3                           | 305                 | 203          | 210            | 159          |
| 5                            | 125         | 141.3                           | 381                 | 254          | 262            | 197          |
| 6                            | 150         | 168.3                           | 457                 | 305          | 313            | 237          |
| 8                            | 200         | 219.1                           | 610                 | 406          | 414            | 313          |
| 10                           | 250         | 273                             | 762                 | 508          | 518            | 391          |
| 12                           | 300         | 323.8                           | 914                 | 610          | 619            | 467          |
| 14                           | 350         | 355.6                           | 1067                | 711          | 711            | 533          |
| 16                           | 400         | 406.4                           | 1219                | 813          | 813            | 610          |
| 18                           | 450         | 457                             | 1372                | 914          | 914            | 686          |
| 20                           | 500         | 508                             | 1524                | 1016         | 1016           | 762          |
| 22                           | 550         | 559                             | 1676                | 1118         | 1118           | 838          |
| 24                           | 600         | 610                             | 1829                | 1219         | 1219           | 914          |

**GENERAL NOTES:** All dimensions are in millimeters.

**NOTES:**

(1).See Table 2 for tolerances for alignment of ends U.

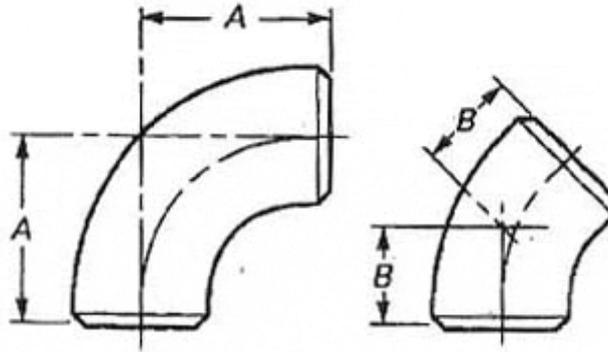
(2).Dimension A is equal to one-half of dimension O.

(3)O and K dimensions of 55mm and 43mm, respectively, may be furnished for NPS 3/4(DN20) at the manufacturer's option.



ASME B16.9-2001

**FACTORY-MADE WROUGHT BUTTWELDING FITTINGS**

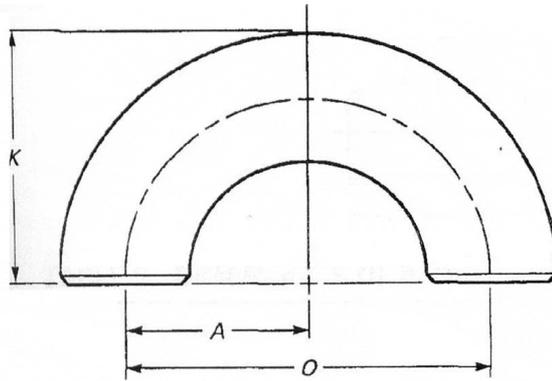


**DIMENSIONS OF SEAMLESS BUTTWELDING ELBOWS**

| Nominal Pip Size (NPS) | DN  | Outside Diameter at Bevel | Center- to-End |             |              |
|------------------------|-----|---------------------------|----------------|-------------|--------------|
|                        |     |                           | 45° Elbow B    | 90° Elbow A |              |
|                        |     |                           | Long Radius    | Long Radius | Short Radius |
| 1/2                    |     | 21.3                      | 16             | 38          |              |
| 3/4                    |     | 26.7                      | 19             | 38          |              |
| 1                      | 25  | 33.4                      | 22             | 38          | 25           |
| 1 1/4                  | 32  | 42.2                      | 25             | 48          | 32           |
| 1 1/2                  | 40  | 48.3                      | 28             | 57          | 38           |
| 2                      | 50  | 60.3                      | 35             | 76          | 51           |
| 2 1/2                  | 65  | 73                        | 45             | 95          | 64           |
| 3                      | 80  | 88.9                      | 51             | 114         | 76           |
| 3 1/2                  | 90  | 101.6                     | 57             | 133         | 89           |
| 4                      | 100 | 114.3                     | 64             | 152         | 102          |
| 5                      | 125 | 141.3                     | 79             | 191         | 127          |
| 6                      | 150 | 168.3                     | 95             | 229         | 152          |
| 8                      | 200 | 219.1                     | 127            | 305         | 203          |
| 10                     | 250 | 273                       | 159            | 381         | 254          |
| 12                     | 300 | 323.8                     | 191            | 457         | 305          |
| 14                     | 350 | 355.6                     | 222            | 533         | 356          |
| 16                     | 400 | 406.4                     | 254            | 610         | 406          |
| 18                     | 450 | 457                       | 286            | 686         | 457          |
| 20                     | 500 | 508                       | 318            | 762         | 508          |
| 22                     | 550 | 559                       | 343            | 838         | 559          |
| 24                     | 600 | 610                       | 381            | 914         | 610          |

**GENERAL NOTES: All dimensions are in millimeters.**

**FACTORY-MADE WROUGHT BUTTWELDING FITTINGS**



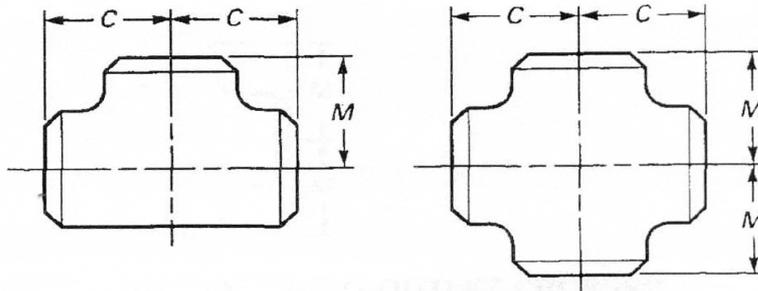
**DIMENSIONS OF SHORT RADIUS 180 deg RETURNS**

| Nominal Pip Size (NPS) | DN  | Outside Diameter at Bevel | Center- to-Center O | Back-to-Face K |
|------------------------|-----|---------------------------|---------------------|----------------|
| 1/2                    | 25  | 33.4                      | 51                  | 41             |
| 3/4                    | 32  | 42.2                      | 64                  | 52             |
| 1                      | 40  | 48.3                      | 76                  | 62             |
| 1 1/4                  | 50  | 60.3                      | 102                 | 81             |
| 1 1/2                  | 65  | 73                        | 127                 | 100            |
| 2                      | 80  | 88.9                      | 152                 | 121            |
| 2 1/2                  | 90  | 101.6                     | 178                 | 140            |
| 3                      | 100 | 114.3                     | 203                 | 159            |
| 3 1/2                  | 125 | 141.3                     | 254                 | 197            |
| 6                      | 150 | 168.3                     | 305                 | 237            |
| 8                      | 200 | 219.1                     | 406                 | 313            |
| 10                     | 250 | 273                       | 508                 | 391            |
| 12                     | 300 | 323.8                     | 610                 | 467            |
| 14                     | 350 | 355.6                     | 711                 | 533            |
| 16                     | 400 | 406.4                     | 813                 | 610            |
| 18                     | 450 | 457                       | 914                 | 686            |
| 20                     | 500 | 508                       | 1016                | 762            |
| 22                     | 550 | 559                       | 1118                | 838            |
| 24                     | 600 | 610                       | 1219                | 914            |

**GENERAL NOTES:**

- (a). All dimensions are in millimeters.
- (b). Dimension A is equal to one-half of dimension O.

## FACTORY-MADE WROUGHT BUTTWELDING FITTINGS



**DIMENSIONS OF STRAIGHT TEES AND CROSSES**

| Nominal Pip Size<br>(NPS) | DN   | Outside Diameter at<br>Bevel | Center- to-End |                                |
|---------------------------|------|------------------------------|----------------|--------------------------------|
|                           |      |                              | Run.C          | Outlet. M[Notes(1) and<br>(2)] |
| 1/2                       | 15   | 21.3                         | 25             | 25                             |
| 3/4                       | 20   | 26.7                         | 29             | 29                             |
| 1                         | 25   | 33.4                         | 38             | 38                             |
| 1 1/4                     | 32   | 42.2                         | 48             | 48                             |
| 1 1/2                     | 40   | 48.3                         | 57             | 57                             |
| 2                         | 50   | 60.3                         | 64             | 64                             |
| 2 1/2                     | 65   | 73                           | 76             | 76                             |
| 3                         | 80   | 88.9                         | 86             | 86                             |
| 3 1/2                     | 90   | 101.6                        | 95             | 95                             |
| 4                         | 100  | 114.3                        | 105            | 105                            |
| 5                         | 125  | 141.3                        | 124            | 124                            |
| 6                         | 150  | 168.3                        | 143            | 143                            |
| 8                         | 200  | 219.1                        | 178            | 178                            |
| 10                        | 250  | 273                          | 216            | 216                            |
| 12                        | 300  | 323.8                        | 254            | 254                            |
| 14                        | 350  | 355.6                        | 279            | 279                            |
| 16                        | 400  | 406.4                        | 305            | 305                            |
| 18                        | 450  | 457                          | 343            | 343                            |
| 20                        | 500  | 508                          | 381            | 381                            |
| 22                        | 550  | 559                          | 419            | 419                            |
| 24                        | 600  | 610                          | 432            | 432                            |
| 26                        | 650  | 660                          | 495            | 495                            |
| 28                        | 700  | 711                          | 521            | 521                            |
| 30                        | 750  | 762                          | 559            | 559                            |
| 32                        | 800  | 813                          | 597            | 597                            |
| 34                        | 850  | 864                          | 635            | 635                            |
| 36                        | 900  | 914                          | 673            | 673                            |
| 38                        | 950  | 965                          | 711            | 711                            |
| 40                        | 1000 | 1016                         | 749            | 749                            |
| 42                        | 1050 | 1067                         | 762            | 711                            |
| 44                        | 1100 | 1118                         | 813            | 762                            |
| 46                        | 1150 | 1168                         | 851            | 800                            |
| 48                        | 1200 | 1219                         | 889            | 838                            |

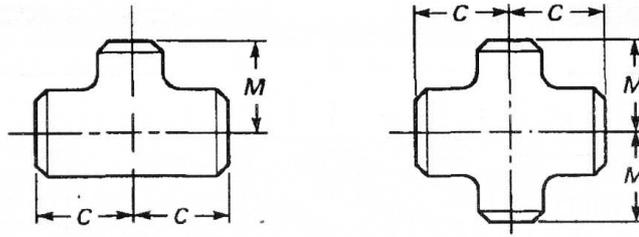
**GENERAL NOTES:** All dimensions are in millimeters.

(a). Outlet dimension M for NPS 26(DN 650) and large is recommended but not required.

(b). Dimensions applicable to crosses NPS 24(DN 600) and smaller.



**FACTORY-MADE WROUGHT BUTTWELDING FITTINGS**



**DIMENSIONS OF REDUCING OUTLET TEES AND REDUCING OUTLET CROSSES**

| Nominal Pip Size (NPS) | DN          | Outlet Diameter at Bevel |        | Center- to-End |                     |
|------------------------|-------------|--------------------------|--------|----------------|---------------------|
|                        |             | Run                      | Outlet | Run.C          | Outlet. M[Notes(1)] |
| 1/2*1/2*3/8            | 15*15*10    | 21.3                     | 17.3   | 25             | 25                  |
| 1/2*1/2*1/4            | 15*15*8     | 21.3                     | 13.7   | 25             | 25                  |
| 3/4*3/4*1/2            | 20*20*15    | 26.7                     | 21.3   | 29             | 29                  |
| 3/4*3/4*3/8            | 20*20*10    | 26.7                     | 17.3   | 29             | 29                  |
| 1*1*3/4                | 25*25*20    | 33.4                     | 26.7   | 38             | 38                  |
| 1*1*1/2                | 25*25*15    | 33.4                     | 21.3   | 38             | 38                  |
| 1-1/4*1-1/4*1          | 32*32*25    | 42.2                     | 33.4   | 48             | 48                  |
| 1-1/4*1-1/4*3/4        | 32*32*20    | 42.2                     | 26.7   | 48             | 48                  |
| 1-1/4*1-1/4*1/2        | 32*32*15    | 42.2                     | 21.3   | 48             | 48                  |
| 1/4                    | 40*40*32    | 48.3                     | 42.2   | 57             | 57                  |
| 1-1/2*1-1/2*1          | 40*40*25    | 48.3                     | 33.4   | 57             | 57                  |
| 1-1/2*1-1/2*3/4        | 40*40*20    | 48.3                     | 26.7   | 57             | 57                  |
| 1-1/2*1-1/2*1/2        | 40*40*15    | 48.3                     | 21.3   | 57             | 57                  |
| 2*2*1-1/2              | 50*50*40    | 60.3                     | 48.3   | 64             | 60                  |
| 2*2*1-1/4              | 50*50*32    | 60.3                     | 42.2   | 64             | 57                  |
| 2*2*1                  | 50*50*25    | 60.3                     | 33.4   | 64             | 51                  |
| 2*2*3/4                | 50*50*20    | 60.3                     | 73     | 64             | 44                  |
| 2-1/2*2-1/2*2          | 65*65*50    | 73                       | 60.3   | 76             | 70                  |
| 1/2                    | 65*65*40    | 73                       | 48.3   | 76             | 67                  |
| 1/4                    | 65*65*32    | 73                       | 42.2   | 76             | 64                  |
| 2-1/2*2-1/2*1          | 65*65*25    | 73                       | 88.9   | 76             | 57                  |
| 3*3*2-1/2              | 80*80*65    | 88.9                     | 73     | 86             | 83                  |
| 3*3*2                  | 80*80*50    | 88.9                     | 60.3   | 86             | 76                  |
| 3*3*1-1/2              | 80*80*40    | 88.9                     | 48.3   | 86             | 73                  |
| 3*3*1-1/4              | 80*80*32    | 88.9                     | 101.6  | 86             | 70                  |
| 3-1/2*3-1/2*3          | 90*90*80    | 101.6                    | 88.9   | 95             | 92                  |
| 1/2                    | 90*90*65    | 101.6                    | 73     | 95             | 89                  |
| 3-1/2*3-1/2*2          | 90*90*50    | 101.6                    | 60.3   | 95             | 83                  |
| 1/2                    | 90*90*40    | 101.6                    | 48.3   | 95             | 79                  |
| 4*4*3-1/2              | 100*100*90  | 114.3                    | 101.6  | 105            | 102                 |
| 4*4*3                  | 100*100*80  | 114.3                    | 88.9   | 105            | 98                  |
| 4*4*2-1/2              | 100*100*65  | 114.3                    | 73     | 105            | 95                  |
| 4*4*2                  | 100*100*50  | 114.3                    | 60.3   | 105            | 89                  |
| 4*4*1-1/2              | 100*100*40  | 114.3                    | 48.3   | 105            | 86                  |
| 5*5*4                  | 125*125*100 | 141.3                    | 114.3  | 124            | 117                 |
| 5*5*3-1/2              | 125*125*90  | 141.3                    | 101.6  | 124            | 114                 |
| 5*5*3                  | 125*125*80  | 141.3                    | 88.9   | 124            | 111                 |
| 5*5*2-1/2              | 125*125*65  | 141.3                    | 73.6   | 124            | 108                 |
| 5*5*2                  | 125*125*50  | 141.3                    | 60.3   | 124            | 105                 |

**GENERAL NOTE:** All dimensions are in millimeter.

**NOTE:** Outlet dimension M for run sizes NPS 14(DN350) and larger is recommended but not required.

## FACTORY-MADE WROUGHT BUTTWELDING FITTINGS

### DIMENSIONS OF REDUCING OUTLET TEES AND REDUCING OUTLET CROSSES(CONT'D)

| Nominal Pip<br>Size (NPS) | DN          | Outlet Diameter at Bevel |        | Center-to-End |                     |
|---------------------------|-------------|--------------------------|--------|---------------|---------------------|
|                           |             | Run                      | Outlet | Run.C         | Outlet. M[Notes(1)] |
| 6*6*5                     | 150*150*125 | 168.3                    | 114.3  | 143           | 137                 |
| 6*6*4                     | 150*150*100 | 168.3                    | 141.3  | 143           | 130                 |
| 6*6*3-1/2                 | 150*150*90  | 168.3                    | 101.6  | 143           | 127                 |
| 6*6*3                     | 150*150*80  | 168.3                    | 88.9   | 143           | 124                 |
| 6*6*2-1/2                 | 150*150*65  | 168.3                    | 73     | 143           | 121                 |
| 8*8*6                     | 200*200*150 | 219.1                    | 168.3  | 178           | 168                 |
| 8*8*5                     | 200*200*125 | 219.1                    | 141.3  | 178           | 162                 |
| 8*8*4                     | 200*200*100 | 219.1                    | 114.3  | 178           | 156                 |
| 8*8*3-1/2                 | 200*200*90  | 219.1                    | 101.6  | 178           | 152                 |
| 10*10*8                   | 250*250*200 | 273                      | 219.1  | 216           | 203                 |
| 10*10*6                   | 250*250*150 | 273                      | 168.3  | 216           | 194                 |
| 10*10*5                   | 250*250*125 | 273                      | 141.3  | 216           | 191                 |
| 10*10*4                   | 250*250*100 | 273                      | 114.3  | 216           | 184                 |
| 12*12*10                  | 300*300*250 | 323.8                    | 273    | 254           | 241                 |
| 12*12*8                   | 300*300*200 | 323.8                    | 219.1  | 254           | 229                 |
| 12*12*6                   | 300*300*150 | 323.8                    | 168.3  | 254           | 219                 |
| 12*12*5                   | 300*300*125 | 323.8                    | 141.3  | 254           | 216                 |
| 14*14*12                  | 350*350*300 | 355.6                    | 323.8  | 279           | 270                 |
| 14*14*10                  | 350*350*250 | 355.6                    | 273    | 279           | 257                 |
| 14*14*8                   | 350*350*200 | 355.6                    | 219.1  | 279           | 248                 |
| 14*14*6                   | 350*350*150 | 355.6                    | 168.3  | 279           | 238                 |
| 16*16*14                  | 400*400*350 | 406.4                    | 355.6  | 305           | 305                 |
| 16*16*12                  | 400*400*300 | 406.4                    | 323.8  | 305           | 295                 |
| 16*16*10                  | 400*400*250 | 406.4                    | 273    | 305           | 283                 |
| 16*16*8                   | 400*400*200 | 406.4                    | 219.1  | 305           | 273                 |
| 16*16*6                   | 400*400*150 | 406.4                    | 168.3  | 305           | 264                 |
| 18*18*16                  | 450*450*400 | 457                      | 406.4  | 343           | 330                 |
| 18*18*14                  | 450*450*350 | 457                      | 355.6  | 343           | 330                 |
| 18*18*12                  | 450*450*300 | 457                      | 323.8  | 343           | 321                 |
| 18*18*10                  | 450*450*250 | 457                      | 273    | 343           | 308                 |
| 18*18*8                   | 450*450*200 | 457                      | 219.1  | 343           | 298                 |
| 20*20*18                  | 500*500*450 | 508                      | 457    | 381           | 368                 |
| 20*20*16                  | 500*500*400 | 508                      | 406.4  | 381           | 356                 |
| 20*20*14                  | 500*500*350 | 508                      | 355.6  | 381           | 356                 |
| 20*20*12                  | 500*500*300 | 508                      | 323.8  | 381           | 346                 |
| 20*20*10                  | 500*500*250 | 508                      | 273    | 381           | 333                 |
| 20*20*8                   | 500*500*200 | 508                      | 219.1  | 381           | 324                 |
| 22*22*20                  | 550*550*500 | 559                      | 508    | 419           | 406                 |
| 22*22*18                  | 550*550*450 | 559                      | 457    | 419           | 394                 |
| 22*22*16                  | 550*550*400 | 559                      | 406.4  | 419           | 381                 |
| 22*22*14                  | 550*550*350 | 559                      | 355.6  | 419           | 381                 |
| 22*22*12                  | 550*550*300 | 559                      | 323.8  | 419           | 371                 |
| 22*22*10                  | 550*550*250 | 559                      | 273    | 419           | 359                 |

**GENERAL NOTE:** All dimensions are in millimeter.

**note:** Outlet dimension M for run sizes NPS 14(DN350) and larger is recommended but not required.



## FACTORY-MADE WROUGHT BUTTWELDING FITTINGS

DIMENSIONS OF REDUCING OUTLET TEES AND REDUCING OUTLET  
CROSSES(CONT'D)

| Nominal<br>Pip Size<br>(NPS) | DN          | Outlet Diameter at Bevel |        | Center-to-End |                        |
|------------------------------|-------------|--------------------------|--------|---------------|------------------------|
|                              |             | Run                      | Outlet | Run.C         | Outlet.<br>M[Notes(1)] |
| 24*24*22                     | 600*600*550 | 610                      | 559    | 432           | 432                    |
| 24*24*20                     | 600*600*500 | 610                      | 508    | 432           | 432                    |
| 24*24*18                     | 600*600*450 | 610                      | 457    | 432           | 419                    |
| 24*24*16                     | 600*600*400 | 610                      | 406.4  | 432           | 406                    |
| 24*24*14                     | 600*600*350 | 610                      | 355.6  | 432           | 406                    |
| 24*24*12                     | 600*600*300 | 610                      | 323.8  | 432           | 397                    |
| 24*24*10                     | 600*600*250 | 610                      | 273    | 432           | 384                    |
| 26*26*24                     | 650*650*600 | 660                      | 610    | 495           | 483                    |
| 26*26*22                     | 650*650*550 | 660                      | 559    | 495           | 470                    |
| 26*26*20                     | 650*650*500 | 660                      | 508    | 495           | 457                    |
| 26*26*18                     | 650*650*450 | 660                      | 457    | 495           | 444                    |
| 26*26*16                     | 650*650*400 | 660                      | 406.4  | 495           | 432                    |
| 26*26*14                     | 650*650*350 | 660                      | 355.6  | 495           | 432                    |
| 26*26*12                     | 650*650*300 | 660                      | 323.8  | 495           | 432                    |
| 28*28*26                     | 700*700*650 | 711                      | 660    | 521           | 422                    |
| 28*28*24                     | 700*700*600 | 711                      | 610    | 521           | 521                    |
| 28*28*22                     | 700*700*550 | 711                      | 559    | 521           | 508                    |
| 28*28*20                     | 700*700*500 | 711                      | 508    | 521           | 495                    |
| 28*28*18                     | 700*700*450 | 711                      | 457    | 521           | 483                    |
| 28*28*16                     | 700*700*400 | 711                      | 406.4  | 521           | 470                    |
| 28*28*14                     | 700*700*350 | 711                      | 355.6  | 521           | 457                    |
| 28*28*12                     | 700*700*300 | 711                      | 323.8  | 521           | 457                    |
| 30*30*28                     | 750*750*700 | 762                      | 711    | 559           | 448                    |
| 30*30*26                     | 750*750*650 | 762                      | 660    | 559           | 546                    |
| 30*30*24                     | 750*750*600 | 762                      | 610    | 559           | 546                    |
| 30*30*22                     | 750*750*550 | 762                      | 559    | 559           | 533                    |
| 30*30*20                     | 750*750*500 | 762                      | 508    | 559           | 521                    |
| 30*30*18                     | 750*750*450 | 762                      | 457    | 559           | 508                    |
| 30*30*16                     | 750*750*400 | 762                      | 406.4  | 559           | 495                    |
| 30*30*14                     | 750*750*350 | 762                      | 355.6  | 559           | 483                    |
| 30*30*12                     | 750*750*300 | 762                      | 323.8  | 559           | 473                    |
| 30*30*10                     | 750*750*250 | 762                      | 273    | 559           | 460                    |
| 32*32*30                     | 800*800*750 | 813                      | 762    | 597           | 584                    |
| 32*32*28                     | 800*800*700 | 813                      | 711    | 597           | 572                    |
| 32*32*26                     | 800*800*650 | 813                      | 660    | 597           | 572                    |
| 32*32*24                     | 800*800*600 | 813                      | 610    | 597           | 559                    |
| 32*32*22                     | 800*800*550 | 813                      | 559    | 597           | 546                    |
| 32*32*20                     | 800*800*500 | 813                      | 508    | 597           | 533                    |
| 32*32*18                     | 800*800*450 | 813                      | 457    | 597           | 521                    |
| 32*32*16                     | 800*800*400 | 813                      | 406.4  | 597           | 508                    |
| 32*32*14                     | 800*800*350 | 813                      | 355.6  | 597           | 508                    |
| 34*34*32                     | 850*850*800 | 813                      | 813    | 635           | 622                    |
| 34*34*30                     | 850*850*750 | 813                      | 762    | 635           | 610                    |
| 34*34*28                     | 850*850*700 | 813                      | 711    | 635           | 597                    |
| 34*34*26                     | 850*850*650 | 813                      | 660    | 635           | 597                    |
| 34*34*24                     | 850*850*600 | 813                      | 610    | 635           | 584                    |
| 34*34*22                     | 850*850*550 | 813                      | 559    | 635           | 572                    |
| 34*34*20                     | 850*850*500 | 813                      | 508    | 635           | 559                    |
| 34*34*18                     | 850*850*450 | 813                      | 457    | 635           | 546                    |

**GENERAL NOTE:** All dimensions are in millimeter.

note: Outlet dimension M for run sizes NPS 14(DN350) and larger is recommended but not required.

## FACTORY-MADE WROUGHT BUTTWELDING FITTINGS

### DIMENSIONS OF REDUCING OUTLET TEES AND REDUCING OUTLET CROSSES(CONT'D)

| Nominal<br>Pip Size<br>(NPS) | DN             | Outlet Diameter at Bevel |        | Center-to-End |                        |
|------------------------------|----------------|--------------------------|--------|---------------|------------------------|
|                              |                | Run                      | Outlet | Run.C         | Outlet.<br>M[Notes(1)] |
| 36*36*34                     | 900*900*850    | 914                      | 864    | 673           | 660                    |
| 36*36*32                     | 900*900*800    | 914                      | 813    | 673           | 648                    |
| 36*36*30                     | 900*900*750    | 914                      | 762    | 673           | 635                    |
| 36*36*28                     | 900*900*700    | 914                      | 711    | 673           | 622                    |
| 36*36*26                     | 900*900*650    | 914                      | 660    | 673           | 622                    |
| 36*36*24                     | 900*900*600    | 914                      | 610    | 673           | 610                    |
| 36*36*22                     | 900*900*550    | 914                      | 559    | 673           | 597                    |
| 36*36*20                     | 900*900*500    | 914                      | 508    | 673           | 584                    |
| 36*36*18                     | 900*900*450    | 914                      | 457    | 673           | 572                    |
| 36*36*16                     | 900*900*400    | 914                      | 406.4  | 673           | 559                    |
| 38*38*36                     | 950*950*900    | 965                      | 914    | 711           | 711                    |
| 38*38*34                     | 950*950*850    | 965                      | 864    | 711           | 698                    |
| 38*38*32                     | 950*950*800    | 965                      | 813    | 711           | 686                    |
| 38*38*30                     | 950*950*750    | 965                      | 762    | 711           | 673                    |
| 38*38*28                     | 950*950*700    | 965                      | 711    | 711           | 648                    |
| 38*38*26                     | 950*950*650    | 965                      | 660    | 711           | 648                    |
| 38*38*24                     | 950*950*600    | 965                      | 610    | 711           | 635                    |
| 38*38*22                     | 950*950*550    | 965                      | 559    | 711           | 622                    |
| 38*38*20                     | 950*950*500    | 965                      | 508    | 711           | 610                    |
| 38*38*18                     | 950*950*450    | 965                      | 457    | 711           | 597                    |
| 40*40*38                     | 1000*1000*950  | 1016                     | 965    | 749           | 749                    |
| 40*40*36                     | 1000*1000*900  | 1016                     | 914    | 749           | 737                    |
| 40*40*34                     | 1000*1000*850  | 1016                     | 864    | 749           | 724                    |
| 40*40*32                     | 1000*1000*800  | 1016                     | 813    | 749           | 711                    |
| 40*40*30                     | 1000*1000*750  | 1016                     | 762    | 749           | 698                    |
| 40*40*28                     | 1000*1000*700  | 1016                     | 711    | 749           | 673                    |
| 40*40*26                     | 1000*1000*650  | 1016                     | 660    | 749           | 673                    |
| 40*40*24                     | 1000*1000*600  | 1016                     | 610    | 749           | 660                    |
| 40*40*22                     | 1000*1000*550  | 1016                     | 559    | 749           | 648                    |
| 40*40*20                     | 1000*1000*500  | 1016                     | 508    | 749           | 635                    |
| 40*40*18                     | 1000*1000*450  | 1016                     | 457    | 749           | 622                    |
| 42*42*40                     | 1050*1050*1000 | 1067                     | 1016   | 762           | 711                    |
| 42*42*38                     | 1050*1050*950  | 1067                     | 968    | 762           | 711                    |
| 42*42*36                     | 1050*1050*900  | 1067                     | 914    | 762           | 711                    |
| 42*42*34                     | 1050*1050*850  | 1067                     | 864    | 762           | 711                    |
| 42*42*32                     | 1050*1050*800  | 1067                     | 813    | 762           | 711                    |
| 42*42*30                     | 1050*1050*750  | 1067                     | 762    | 762           | 711                    |
| 42*42*28                     | 1050*1050*700  | 1067                     | 711    | 762           | 698                    |
| 42*42*26                     | 1050*1050*650  | 1067                     | 660    | 762           | 698                    |
| 42*42*24                     | 1050*1050*600  | 1067                     | 610    | 762           | 660                    |
| 42*42*22                     | 1050*1050*550  | 1067                     | 559    | 762           | 660                    |
| 42*42*20                     | 1050*1050*500  | 1067                     | 508    | 762           | 660                    |
| 42*42*18                     | 1050*1050*450  | 1067                     | 457    | 762           | 648                    |
| 42*42*16                     | 1050*1050*400  | 1067                     | 406.4  | 762           | 635                    |

**GENERAL NOTE:** All dimensions are in millimeter.

**note:** Outlet dimension M for run sizes NPS 14(DN350) and larger is recommended but not required.

## FACTORY-MADE WROUGHT BUTTWELDING FITTINGS

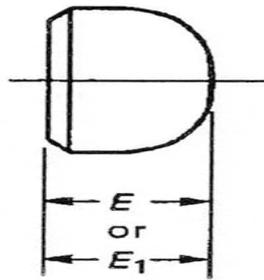
### DIMENSIONS OF REDUCING OUTLET TEES AND REDUCING OUTLET CROSSES(CONT'D)

| Nominal Pip<br>Size (NPS) | DN             | Outlet Diameter at Bevel |        | Center-to-End |                     |
|---------------------------|----------------|--------------------------|--------|---------------|---------------------|
|                           |                | Run                      | Outlet | Run.C         | Outlet. M[Notes(1)] |
| 44*44*42                  | 1100*1100*1050 | 1118                     | 1067   | 813           | 762                 |
| 44*44*40                  | 1100*1100*1000 | 1118                     | 1016   | 813           | 749                 |
| 44*44*38                  | 1100*1100*950  | 1118                     | 965    | 813           | 737                 |
| 44*44*36                  | 1100*1100*900  | 1118                     | 914    | 813           | 724                 |
| 44*44*34                  | 1100*1100*850  | 1118                     | 864    | 813           | 724                 |
| 44*44*32                  | 1100*1100*800  | 1118                     | 813    | 813           | 711                 |
| 44*44*30                  | 1100*1100*750  | 1118                     | 762    | 813           | 711                 |
| 44*44*28                  | 1100*1100*700  | 1118                     | 711    | 813           | 698                 |
| 44*44*26                  | 1100*1100*650  | 1118                     | 660    | 813           | 698                 |
| 44*44*24                  | 1100*1100*600  | 1118                     | 610    | 813           | 698                 |
| 44*44*22                  | 1100*1100*550  | 1118                     | 559    | 813           | 686                 |
| 44*44*20                  | 1100*1100*500  | 1118                     | 508    | 813           | 686                 |
| 46*46*44                  | 1150*1150*1100 | 1168                     | 1118   | 851           | 800                 |
| 46*46*42                  | 1150*1150*1050 | 1168                     | 1067   | 851           | 787                 |
| 46*46*40                  | 1150*1150*1000 | 1168                     | 1016   | 851           | 775                 |
| 46*46*38                  | 1150*1150*950  | 1168                     | 965    | 851           | 762                 |
| 46*46*36                  | 1150*1150*900  | 1168                     | 914    | 851           | 762                 |
| 46*46*34                  | 1150*1150*850  | 1168                     | 864    | 851           | 749                 |
| 46*46*32                  | 1150*1150*800  | 1168                     | 813    | 851           | 749                 |
| 46*46*30                  | 1150*1150*750  | 1168                     | 762    | 851           | 737                 |
| 46*46*28                  | 1150*1150*700  | 1168                     | 711    | 851           | 737                 |
| 46*46*26                  | 1150*1150*650  | 1168                     | 660    | 851           | 737                 |
| 46*46*24                  | 1150*1150*600  | 1168                     | 610    | 851           | 724                 |
| 46*46*22                  | 1150*1150*550  | 1168                     | 559    | 851           | 724                 |
| 48*48*46                  | 1200*1200*1150 | 1219                     | 1168   | 889           | 838                 |
| 48*48*44                  | 1200*1200*1100 | 1219                     | 1118   | 889           | 838                 |
| 48*48*42                  | 1200*1200*1050 | 1219                     | 1067   | 889           | 813                 |
| 48*48*40                  | 1200*1200*1000 | 1219                     | 1016   | 889           | 813                 |
| 48*48*38                  | 1200*1200*950  | 1219                     | 965    | 889           | 813                 |
| 48*48*36                  | 1200*1200*900  | 1219                     | 914    | 889           | 787                 |
| 48*48*34                  | 1200*1200*850  | 1219                     | 864    | 889           | 787                 |
| 48*48*32                  | 1200*1200*800  | 1219                     | 813    | 889           | 787                 |
| 48*48*30                  | 1200*1200*750  | 1219                     | 762    | 889           | 762                 |
| 48*48*28                  | 1200*1200*700  | 1219                     | 711    | 889           | 762                 |
| 48*48*26                  | 1200*1200*650  | 1219                     | 660    | 889           | 762                 |
| 48*48*24                  | 1200*1200*600  | 1219                     | 610    | 889           | 737                 |
| 48*48*22                  | 1200*1200*550  | 1219                     | 559    | 889           | 737                 |

**GENERAL NOTE:** All dimensions are in millimeter.

**note:** Outlet dimension M for run sizes NPS 14(DN350) and larger is recommended but not required.

**FACTORY-MADE WROUGHT BUTTWELDING FITTINGS**



**DIMENSIONS OF CAPS**

| Nominal Pip Size (NPS) | DN   | Outside Diameter at Bevel | Length .E [Note(1)] | Limiting Wall Thickness for Length. E | Length.E[Note(2)] |
|------------------------|------|---------------------------|---------------------|---------------------------------------|-------------------|
| 1/2                    | 15   | 21.3                      | 25                  | 4.57                                  | 25                |
| 3/4                    | 20   | 26.7                      | 25                  | 3.81                                  | 25                |
| 1                      | 25   | 33.4                      | 38                  | 4.57                                  | 38                |
| 1 1/4                  | 32   | 42.2                      | 38                  | 4.83                                  | 38                |
| 1 1/2                  | 40   | 48.3                      | 38                  | 5.08                                  | 38                |
| 2                      | 50   | 60.3                      | 38                  | 5.59                                  | 44                |
| 2 1/2                  | 65   | 73                        | 38                  | 7.11                                  | 51                |
| 3                      | 80   | 88.9                      | 51                  | 7.62                                  | 64                |
| 3 1/2                  | 90   | 101.6                     | 64                  | 8.13                                  | 76                |
| 4                      | 100  | 114.3                     | 64                  | 8.64                                  | 76                |
| 5                      | 125  | 141.3                     | 76                  | 9.65                                  | 89                |
| 6                      | 150  | 168.3                     | 89                  | 10.92                                 | 102               |
| 8                      | 200  | 219.1                     | 102                 | 12.7                                  | 127               |
| 10                     | 250  | 273                       | 127                 | 12.7                                  | 152               |
| 12                     | 300  | 323.8                     | 152                 | 12.7                                  | 178               |
| 14                     | 350  | 355.6                     | 165                 | 12.7                                  | 191               |
| 16                     | 400  | 406.4                     | 178                 | 12.7                                  | 203               |
| 18                     | 450  | 457                       | 203                 | 12.7                                  | 229               |
| 20                     | 500  | 508                       | 229                 | 12.7                                  | 254               |
| 22                     | 550  | 559                       | 254                 | 12.7                                  | 254               |
| 24                     | 600  | 610                       | 267                 | 12.7                                  | 305               |
| 26                     | 650  | 660                       | 267                 | 12.7                                  | 305               |
| 28                     | 700  | 711                       | 267                 | ...                                   | ...               |
| 30                     | 750  | 762                       | 267                 | ...                                   | ...               |
| 32                     | 800  | 813                       | 267                 | ...                                   | ...               |
| 34                     | 850  | 864                       | 267                 | ...                                   | ...               |
| 36                     | 900  | 914                       | 267                 | ...                                   | ...               |
| 38                     | 950  | 965                       | 305                 | ...                                   | ...               |
| 40                     | 1000 | 1016                      | 305                 | ...                                   | ...               |
| 42                     | 1050 | 1067                      | 305                 | ...                                   | ...               |
| 44                     | 1100 | 1118                      | 343                 | ...                                   | ...               |
| 46                     | 1150 | 1168                      | 343                 | ...                                   | ...               |
| 48                     | 1200 | 1219                      | 343                 | ...                                   | ...               |

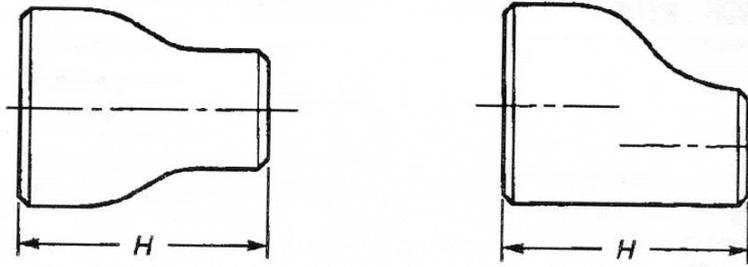
**GENERAL NOTES:**

- (a). All dimensions are in millimeters.
- (b). The shape of these caps shall be ellipsoidal and shall conform to the shape requirements as given in the ASME Boiler and Pressure Vessel Code.

**NOTES:**

(1). Length E applies for thickness greater than given in column "Limiting Wall Thickness" for NPS 24 (DN600) and smaller. For NPS 26(DN 65) and larger Length E ,shall be by agreement between manufacture and purchaser.

**FACTORY-MADE WROUGHT BUTTWELDING FITTINGS**



Note (1)

**DIMENSIONS OF REDUCERS**

| Nominal Pipe Size<br>(NPS) | DN     | Outside Diameter at Bevel |           | End-to-End,H |
|----------------------------|--------|---------------------------|-----------|--------------|
|                            |        | Large End                 | Small End |              |
| 3/4*1/2                    | 20*15  | 26.7                      | 21.3      | 38           |
| 3/4*3/8                    | 20*10  | 26.7                      | 17.3      | 38           |
| 1*3/4                      | 25*20  | 33.4                      | 26.7      | 51           |
| 1*1/2                      | 25*15  | 33.4                      | 21.3      | 51           |
| 1-1/4*1                    | 32*25  | 42.2                      | 33.4      | 51           |
| 1-1/4*3/4                  | 32*20  | 42.2                      | 26.7      | 51           |
| 1-1/4*1/2                  | 32*10  | 42.2                      | 21.3      | 51           |
| 1-1/2*1-1/4                | 40*32  | 48.3                      | 42.2      | 64           |
| 1-1/2*1                    | 40*25  | 48.3                      | 33.4      | 64           |
| 1-1/2*3/4                  | 40*20  | 48.3                      | 26.7      | 64           |
| 1-1/2*1/2                  | 40*15  | 48.3                      | 21.3      | 64           |
| 2*1-1/2                    | 50*40  | 60.3                      | 48.3      | 76           |
| 2*1-1/4                    | 50*32  | 60.3                      | 42.2      | 76           |
| 2*1                        | 50*25  | 60.3                      | 33.4      | 76           |
| 2*3/4                      | 50*20  | 60.3                      | 26.7      | 76           |
| 2-1/2*2                    | 65*50  | 73                        | 60.3      | 89           |
| 2-1/2*1-1/2                | 65*40  | 73                        | 48.3      | 89           |
| 2-1/2*1-1/4                | 65*32  | 73                        | 42.2      | 89           |
| 2-1/2*1                    | 65*25  | 73                        | 33.4      | 89           |
| 3*2-1/2                    | 80*65  | 88.9                      | 73        | 89           |
| 3*2                        | 80*50  | 88.9                      | 60.3      | 89           |
| 3*1-1/2                    | 80*40  | 88.9                      | 48.3      | 89           |
| 3*1-1/4                    | 80*32  | 88.9                      | 42.2      | 89           |
| 3-1/2*3                    | 90*80  | 101.6                     | 88.9      | 102          |
| 3-1/2*2-1/2                | 90*65  | 101.6                     | 73        | 102          |
| 3-1/2*2                    | 90*50  | 101.6                     | 60.3      | 102          |
| 3-1/2*1-1/2                | 90*40  | 101.6                     | 48.3      | 102          |
| 3-1/2*1-1/4                | 90*32  | 101.6                     | 42.2      | 102          |
| 4*3-1/2                    | 100*90 | 114.3                     | 101.6     | 102          |

|         |         |       |       |     |
|---------|---------|-------|-------|-----|
| 4*3     | 100*80  | 114.3 | 88.9  | 102 |
| 4*2-1/2 | 100*65  | 114.3 | 73    | 102 |
| 4*2     | 100*50  | 114.3 | 60.3  | 102 |
| 4*1-1/2 | 100*40  | 114.3 | 48.3  | 102 |
| 5*4     | 125*100 | 143.3 | 114.3 | 127 |
| 5*3-1/2 | 125*90  | 141.3 | 101.6 | 127 |
| 5*3     | 125*80  | 141.3 | 88.9  | 127 |
| 5*2-1/2 | 125*65  | 141.3 | 73    | 127 |
| 5*2     | 125*50  | 141.3 | 60.3  | 127 |
| 6*5     | 150*125 | 168.3 | 141.3 | 140 |
| 6*4     | 150*100 | 168.3 | 114.3 | 140 |
| 6*3-1/2 | 150*90  | 168.3 | 101.6 | 140 |
| 6*3     | 150*80  | 168.3 | 88.9  | 140 |
| 6*2-1/2 | 150*65  | 168.3 | 73    | 140 |
| 8*6     | 200*150 | 219.1 | 168.3 | 152 |
| 8*5     | 200*125 | 219.1 | 141.3 | 152 |
| 8*4     | 200*100 | 219.1 | 114.3 | 152 |
| 8*3-1/2 | 200*90  | 219.1 | 101.6 | 152 |
| 10*8    | 250*200 | 273   | 219.1 | 178 |
| 10*6    | 250*150 | 273   | 168.3 | 178 |
| 10*5    | 250*125 | 273   | 141.3 | 178 |
| 10*4    | 250*100 | 273   | 114.3 | 178 |
| 12*10   | 300*250 | 323.8 | 273   | 203 |
| 12*8    | 300*200 | 323.8 | 219.1 | 203 |
| 12*6    | 300*150 | 323.8 | 168.3 | 203 |
| 12*5    | 300*125 | 323.8 | 141.3 | 203 |
| 14*12   | 350*300 | 355.6 | 323.8 | 330 |
| 14*10   | 350*250 | 355.6 | 273   | 330 |
| 14*8    | 350*200 | 355.6 | 219.1 | 330 |
| 14*6    | 350*150 | 355.6 | 168.3 | 330 |
| 16*14   | 400*350 | 406.4 | 355.6 | 356 |
| 16*12   | 400*300 | 406.4 | 323.8 | 356 |
| 16*10   | 400*250 | 406.4 | 273   | 356 |
| 16*8    | 400*200 | 406.4 | 219.1 | 356 |
| 18*16   | 450*400 | 457   | 406.4 | 381 |
| 18*14   | 450*350 | 457   | 355.6 | 381 |
| 18*12   | 450*300 | 457   | 323.8 | 381 |
| 18*10   | 450*250 | 457   | 273   | 381 |

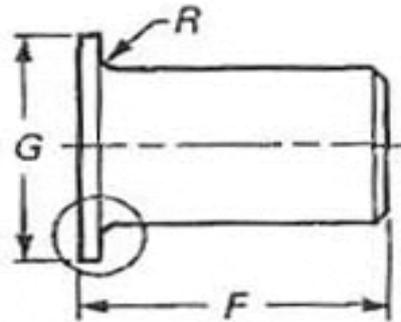
**GENERAL NOTES:**

All dimensions are in millimeters.

**NOTES:**

(1). While the figure illustrates a "bell shaped" reducer, the use of conical reducer is not prohibited.

**FACTORY-MADE WROUGHT BUTTWELDING FITTINGS**

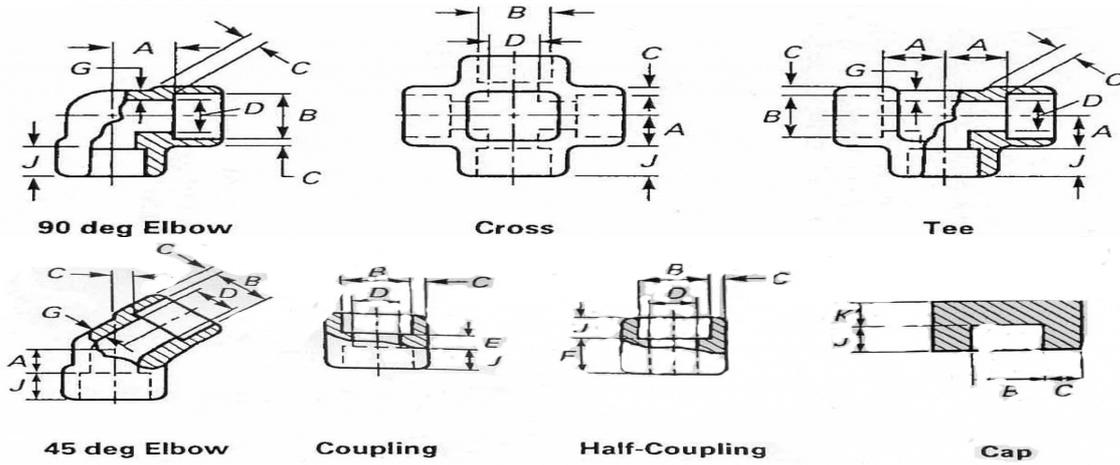


**DIMENSIONS OF LAP JOINT STUB ENDS**

| Nominal<br>Pip Size<br>(NPS) | Outside Diameter at<br>Bevel |       | Long<br>Pattern | Short<br>Pattern | Radius of<br>Fillet | Diameter of<br>Lap |
|------------------------------|------------------------------|-------|-----------------|------------------|---------------------|--------------------|
|                              | Max                          | Min   | F               | F                | R                   | G                  |
| 1/2                          | 22.8                         | 20.5  | 76              | 51               | 3                   | 35                 |
| 3/4                          | 28.1                         | 25.9  | 76              | 51               | 3                   | 43                 |
| 1                            | 35                           | 32.6  | 102             | 51               | 3                   | 51                 |
| 1 1/4                        | 43.6                         | 41.4  | 102             | 51               | 5                   | 64                 |
| 1 1/2                        | 49.9                         | 47.5  | 102             | 51               | 6                   | 73                 |
| 2                            | 62.4                         | 59.5  | 152             | 64               | 8                   | 92                 |
| 2 1/2                        | 75.3                         | 72.2  | 152             | 64               | 8                   | 105                |
| 3                            | 91.3                         | 88.1  | 152             | 64               | 10                  | 127                |
| 3 1/2                        | 104                          | 100.8 | 152             | 76               | 10                  | 140                |
| 4                            | 116.7                        | 113.5 | 152             | 76               | 11                  | 157                |
| 5                            | 144.3                        | 140.5 | 203             | 76               | 11                  | 186                |
| 6                            | 171.3                        | 167.5 | 203             | 89               | 13                  | 216                |
| 8                            | 222.1                        | 218.3 | 203             | 102              | 13                  | 270                |
| 10                           | 277.2                        | 272.3 | 254             | 127              | 13                  | 324                |
| 12                           | 328                          | 323.1 | 254             | 152              | 13                  | 381                |
| 14                           | 359.5                        | 354.8 | 305             | 152              | 13                  | 413                |
| 16                           | 411                          | 405.6 | 305             | 152              | 13                  | 470                |
| 18                           | 462                          | 456   | 305             | 152              | 13                  | 533                |
| 20                           | 514                          | 507   | 305             | 152              | 13                  | 584                |
| 22                           | 565                          | 558   | 305             | 152              | 13                  | 641                |
| 24                           | 616                          | 609   | 305             | 152              | 13                  | 692                |

**GENERAL NOTES:** All dimensions are in millimeters.

**Solid** ASME B16.11-2001  
**FORGED FITTINGS SOCKET-WELDING AND THREADED**



**SOCKET-WELDING FITTINGS**

(90 deg Elbow, Cross, Tee, 45 deg Elbow, Coupling, Half-Coupling, Cap)

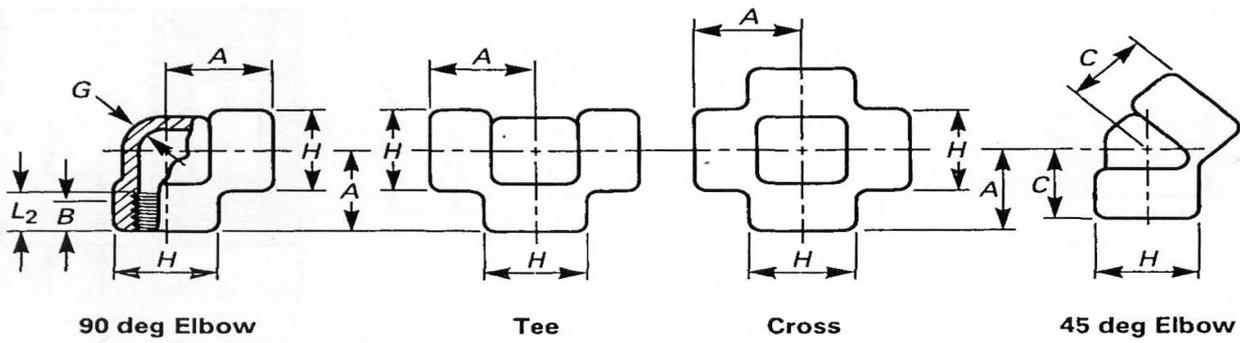
| DN  | Nominal Pipe Size | Socket Bore Diameter, B [Note(1)] | Bore Diameter of Fitting, D [Note(1)] |      |      | Socket Wall Thickness, C [Note(2)] |      |      |      |      |      | Min. Depth of Socket, J | Center to Bottom of Socket, A |      |      |             |      |      | Laying Length |              | End Wall Thickness, Kmin. |      |      |
|-----|-------------------|-----------------------------------|---------------------------------------|------|------|------------------------------------|------|------|------|------|------|-------------------------|-------------------------------|------|------|-------------|------|------|---------------|--------------|---------------------------|------|------|
|     |                   |                                   | Class Designation                     |      |      | Class Designation                  |      |      |      |      |      |                         | 90Deg Elbows, Tees,           |      |      | 45Deg Elbow |      |      | Couplings, E  | Couplings, F | Class Designation         |      |      |
|     |                   |                                   | 3000                                  | 6000 | 9000 | 3000                               |      | 6000 |      | 9000 |      |                         | Class Designation             |      |      | 3000        | 6000 | 9000 |               |              | 3000                      | 6000 | 9000 |
|     |                   |                                   | Avg.                                  | Min. | ...  | Avg.                               | Min. | Avg. | Min. | Avg. | Min. |                         | 3000                          | 6000 | 9000 |             |      |      | 3000          | 6000         |                           |      |      |
| 6   | 1/8               | 11.2                              | 7.6                                   | 4.8  | ...  | 3.2                                | 3.2  | 4    | 3.4  | ...  | ...  | 9.5                     | 11                            | 11   | ...  | 8           | 8    | ...  | 6.5           | 16           | 4.8                       | 6.4  | ...  |
|     |                   | 10.8                              | 6.1                                   | 3.2  | ...  | 3.2                                | 3.2  | 4    | 3.4  | ...  | ...  | 9.5                     | 11                            | 11   | ...  | 8           | 8    | ...  | 6.5           | 16           | 4.8                       | 6.4  | ...  |
| 8   | 1/4               | 14.6                              | 10                                    | 7.1  | ...  | 3.8                                | 3.3  | 4.6  | 4    | ...  | ...  | 9.5                     | 11                            | 13.5 | ...  | 8           | 8    | ...  | 6.5           | 16           | 4.8                       | 6.4  | ...  |
|     |                   | 14.2                              | 8.5                                   | 5.6  | ...  | 3.8                                | 3.3  | 4.6  | 4    | ...  | ...  | 9.5                     | 11                            | 13.5 | ...  | 8           | 8    | ...  | 6.5           | 16           | 4.8                       | 6.4  | ...  |
| 10  | 3/8               | 18                                | 13.3                                  | 9.9  | ...  | 4                                  | 3.5  | 5    | 4.4  | ...  | ...  | 9.5                     | 13.5                          | 15.5 | ...  | 8           | 11   | ...  | 6.5           | 17.5         | 4.8                       | 6.4  | ...  |
|     |                   | 17.6                              | 11.8                                  | 8.4  | ...  | 4                                  | 3.5  | 5    | 4.4  | ...  | ...  | 9.5                     | 13.5                          | 15.5 | ...  | 8           | 11   | ...  | 6.5           | 17.5         | 4.8                       | 6.4  | ...  |
| 15  | 1/2               | 22.2                              | 16.5                                  | 12.5 | 7.2  | 4.7                                | 4.1  | 6    | 5.2  | 9.4  | 8.2  | 9.5                     | 15.5                          | 19   | 25.5 | 11          | 12.5 | 15.5 | 9.5           | 22.5         | 6.4                       | 7.9  | 11.2 |
|     |                   | 21.8                              | 15                                    | 11   | 5.6  | 4.7                                | 4.1  | 6    | 5.2  | 9.4  | 8.2  | 9.5                     | 15.5                          | 19   | 25.5 | 11          | 12.5 | 15.5 | 9.5           | 22.5         | 6.4                       | 7.9  | 11.2 |
| 20  | 3/4               | 27.6                              | 21.7                                  | 16.3 | 11.8 | 4.9                                | 4.3  | 7    | 6    | 9.8  | 8.6  | 12.5                    | 19                            | 22.5 | 28.5 | 13          | 14   | 19   | 9.5           | 24           | 6.4                       | 7.9  | 12.7 |
|     |                   | 27.2                              | 20.2                                  | 14.8 | 10.3 | 4.9                                | 4.3  | 7    | 6    | 9.8  | 8.6  | 12.5                    | 19                            | 22.5 | 28.5 | 13          | 14   | 19   | 9.5           | 24           | 6.4                       | 7.9  | 12.7 |
| 25  | 1                 | 34.3                              | 27.4                                  | 21.5 | 16   | 5.7                                | 5    | 7.9  | 6.9  | 11   | 10   | 12.5                    | 22.5                          | 27   | 32   | 14          | 17.5 | 20.5 | 12.5          | 28.5         | 9.6                       | 11.2 | 14.2 |
|     |                   | 33.9                              | 25.9                                  | 19.9 | 14.4 | 5.7                                | 5    | 7.9  | 6.9  | 11   | 10   | 12.5                    | 22.5                          | 27   | 32   | 14          | 17.5 | 20.5 | 12.5          | 28.5         | 9.6                       | 11.2 | 14.2 |
| 32  | 1 1/4             | 43.1                              | 35.8                                  | 30.2 | 23.5 | 6.1                                | 5.3  | 7.9  | 6.9  | 12   | 11   | 12.5                    | 27                            | 32   | 35   | 17.5        | 20.5 | 22.5 | 12.5          | 30           | 9.6                       | 11.2 | 14.2 |
|     |                   | 42.7                              | 34.3                                  | 28.7 | 22   | 6.1                                | 5.3  | 7.9  | 6.9  | 12   | 11   | 12.5                    | 27                            | 32   | 35   | 17.5        | 20.5 | 22.5 | 12.5          | 30           | 9.6                       | 11.2 | 14.2 |
| 40  | 1 1/2             | 49.2                              | 41.6                                  | 34.7 | 28.7 | 6.4                                | 5.5  | 8.9  | 7.8  | 13   | 11   | 12.5                    | 32                            | 38   | 38   | 20.5        | 25.5 | 25.5 | 12.5          | 32           | 11.2                      | 12.7 | 15.7 |
|     |                   | 48.8                              | 40.1                                  | 33.2 | 27.2 | 6.4                                | 5.5  | 8.9  | 7.8  | 13   | 11   | 12.5                    | 32                            | 38   | 38   | 20.5        | 25.5 | 25.5 | 12.5          | 32           | 11.2                      | 12.7 | 15.7 |
| 50  | 2                 | 61.7                              | 53.3                                  | 43.6 | 38.9 | 6.9                                | 6    | 11   | 9.5  | 14   | 12   | 16                      | 38                            | 41   | 54   | 25.5        | 28.5 | 28.5 | 19            | 41           | 12.7                      | 15.7 | 19   |
|     |                   | 61.2                              | 51.7                                  | 42.1 | 37.4 | 6.9                                | 6    | 11   | 9.5  | 14   | 12   | 16                      | 38                            | 41   | 54   | 25.5        | 28.5 | 28.5 | 19            | 41           | 12.7                      | 15.7 | 19   |
| 65  | 2 1/2             | 74.4                              | 64.2                                  | ...  | ...  | 8.8                                | 7.7  | ...  | ...  | ...  | ...  | 16                      | 41                            | ...  | ...  | 28.5        | ...  | ...  | 19            | 43           | 15.7                      | 19   | ...  |
|     |                   | 73.9                              | 61.2                                  | ...  | ...  | 8.8                                | 7.7  | ...  | ...  | ...  | ...  | 16                      | 41                            | ...  | ...  | 28.5        | ...  | ...  | 19            | 43           | 15.7                      | 19   | ...  |
| 80  | 3                 | 90.3                              | 79.4                                  | ...  | ...  | 9.5                                | 8.3  | ...  | ...  | ...  | ...  | 16                      | 57                            | ...  | ...  | 32          | ...  | ...  | 19            | 44.5         | 19                        | 22.4 | ...  |
|     |                   | 89.8                              | 76.4                                  | ...  | ...  | 9.5                                | 8.3  | ...  | ...  | ...  | ...  | 16                      | 57                            | ...  | ...  | 32          | ...  | ...  | 19            | 44.5         | 19                        | 22.4 | ...  |
| 100 | 4                 | 116                               | 104                                   | ...  | ...  | 11                                 | 9.4  | ...  | ...  | ...  | ...  | 16                      | 66.5                          | ...  | ...  | 41          | ...  | ...  | 19            | 48           | 22.4                      | 28.4 | ...  |
|     |                   | 115                               | 101                                   | ...  | ...  | 11                                 | 9.4  | ...  | ...  | ...  | ...  | 16                      | 66.5                          | ...  | ...  | 41          | ...  | ...  | 19            | 48           | 22.4                      | 28.4 | ...  |

**GENERAL NOTES:**Dimensions are in millimeters.

**NOTES:** (1).Upper and lower values for each size are the respective maximum and minimum dimensions.

(2).Average of socket wall thickness around periphery shall be no less than listed values.The minimum values are permitted in localized areas.

**FORGED FITTINGS , SOCKET-WELDING AND THREADED**



**FORGED THREADED FITTINGS**

(90 deg Elbow, Tee , Cross , 45 deg Elbow)

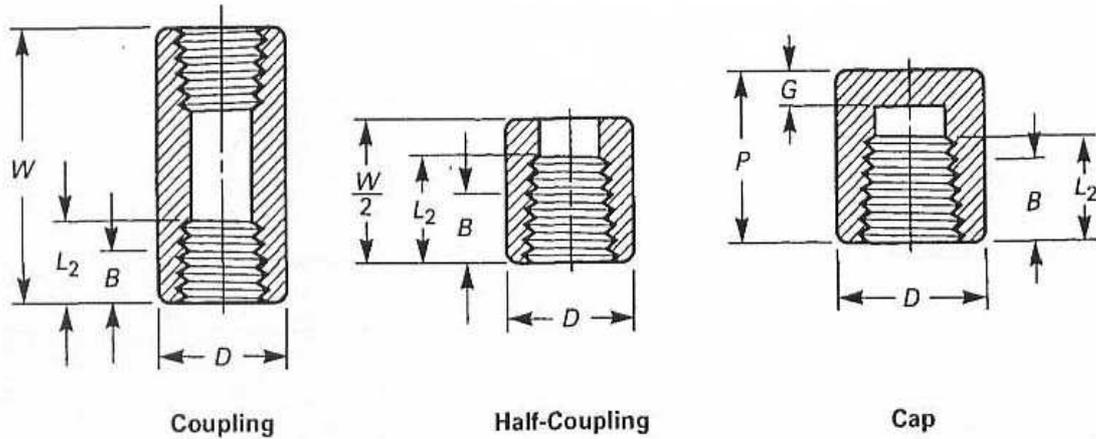
| DN  | Nominal Pipe Size | Center-to-End Elbows, Tees, Crosses, A |      |      | Center-to-End 45Deg Elbow, C |      |      | Outside Diameter of Band, H |      |      | Min. Wall thickness, G |       |       | Min. Length of Thread [Note(1)] |      |
|-----|-------------------|--|------|------|------------------------------|------|------|-----------------------------|------|------|------------------------|-------|-------|---------------------------------|------|
|     |                   | 2000                                   | 3000 | 6000 | 2000                         | 3000 | 6000 | 2000                        | 3000 | 6000 | 2000                   | 3000  | 6000  | B                               | L2   |
| 6   | 1/8               | 21                                     | 21   | 25   | 17                           | 17   | 19   | 22                          | 22   | 25   | 3.18                   | 3.18  | 6.35  | 6.4                             | 6.7  |
| 8   | 1/4               | 21                                     | 25   | 28   | 17                           | 19   | 22   | 22                          | 25   | 33   | 3.18                   | 3.3   | 6.6   | 8.1                             | 10.2 |
| 10  | 3/8               | 25                                     | 28   | 33   | 19                           | 22   | 25   | 25                          | 33   | 38   | 3.18                   | 3.51  | 6.98  | 9.1                             | 10.4 |
| 15  | 1/2               | 28                                     | 33   | 38   | 22                           | 25   | 28   | 33                          | 38   | 46   | 3.18                   | 4.09  | 8.15  | 10.9                            | 13.6 |
| 20  | 3/4               | 33                                     | 38   | 44   | 25                           | 28   | 33   | 38                          | 46   | 56   | 3.18                   | 4.32  | 8.53  | 12.7                            | 13.9 |
| 25  | 1                 | 38                                     | 44   | 51   | 28                           | 33   | 35   | 46                          | 56   | 62   | 3.68                   | 4.98  | 9.93  | 14.7                            | 17.3 |
| 32  | 1 1/4             | 44                                     | 51   | 60   | 33                           | 35   | 43   | 56                          | 62   | 75   | 3.89                   | 5.28  | 10.59 | 17                              | 18   |
| 40  | 1 1/2             | 51                                     | 60   | 64   | 35                           | 43   | 44   | 62                          | 75   | 84   | 4.01                   | 5.56  | 11.07 | 17.8                            | 18.4 |
| 50  | 2                 | 60                                     | 64   | 83   | 43                           | 44   | 52   | 75                          | 84   | 102  | 4.27                   | 7.14  | 12.09 | 19                              | 19.2 |
| 65  | 2 1/2             | 76                                     | 83   | 95   | 52                           | 52   | 64   | 92                          | 102  | 121  | 5.61                   | 7.65  | 15.29 | 23.6                            | 28.9 |
| 80  | 3                 | 86                                     | 95   | 106  | 64                           | 64   | 79   | 109                         | 121  | 146  | 5.99                   | 8.84  | 16.64 | 25.9                            | 30.5 |
| 100 | 4                 | 106                                    | 114  | 114  | 79                           | 79   | 79   | 146                         | 152  | 152  | 6.55                   | 11.18 | 18.67 | 27.7                            | 33   |

**GENERAL NOTES:** Dimensions are in millimeters.

**NOTES:**

formed roots and flat crests) shall not be less than L2(effective length of external thread) required by American National Standard for Pipe Threads.

**FORGED FITTINGS, SOCKET-WELDING AND THREADED**



**FORGED THREADED FITTINGS**  
(Coupling, Half-Coupling, Cap)

| DN  | Nominal Pipe Size | End-to-End Couplings, W | End-to-End Caps, P |      | Outside Diameter, D |      | Min.Wall thickness, G |      | Min.Length of Thread [Note(1)] |      |
|-----|-------------------|-------------------------|--------------------|------|---------------------|------|-----------------------|------|--------------------------------|------|
|     |                   | 3000 and 6000           | 3000               | 6000 | 3000                | 6000 | 3000                  | 6000 | B                              | L2   |
| 6   | 1/8               | 32                      | 19                 | ...  | 16                  | 22   | 4.8                   | ...  | 6.4                            | 6.7  |
| 8   | 1/4               | 35                      | 25                 | 27   | 19                  | 25   | 4.8                   | 6.4  | 8.1                            | 10.2 |
| 10  | 3/8               | 38                      | 25                 | 27   | 22                  | 32   | 4.8                   | 6.4  | 9.1                            | 10.4 |
| 15  | 1/2               | 48                      | 32                 | 33   | 28                  | 38   | 6.4                   | 7.9  | 10.9                           | 13.6 |
| 20  | 3/4               | 51                      | 37                 | 38   | 35                  | 44   | 6.4                   | 7.9  | 12.7                           | 13.9 |
| 25  | 1                 | 60                      | 41                 | 43   | 44                  | 57   | 9.7                   | 11.2 | 14.7                           | 17.3 |
| 32  | 1 1/4             | 67                      | 44                 | 46   | 57                  | 64   | 9.7                   | 11.2 | 17                             | 18   |
| 40  | 1 1/2             | 79                      | 44                 | 48   | 64                  | 76   | 11.2                  | 12.7 | 17.8                           | 18.4 |
| 50  | 2                 | 86                      | 48                 | 51   | 76                  | 92   | 12.7                  | 15.7 | 19                             | 19.2 |
| 65  | 2 1/2             | 92                      | 60                 | 64   | 92                  | 108  | 15.7                  | 19   | 23.6                           | 28.9 |
| 80  | 3                 | 108                     | 65                 | 68   | 108                 | 127  | 19                    | 22.4 | 25.9                           | 30.5 |
| 100 | 4                 | 121                     | 68                 | 75   | 140                 | 159  | 22.4                  | 28.4 | 27.7                           | 33   |

**GENERAL NOTES:**

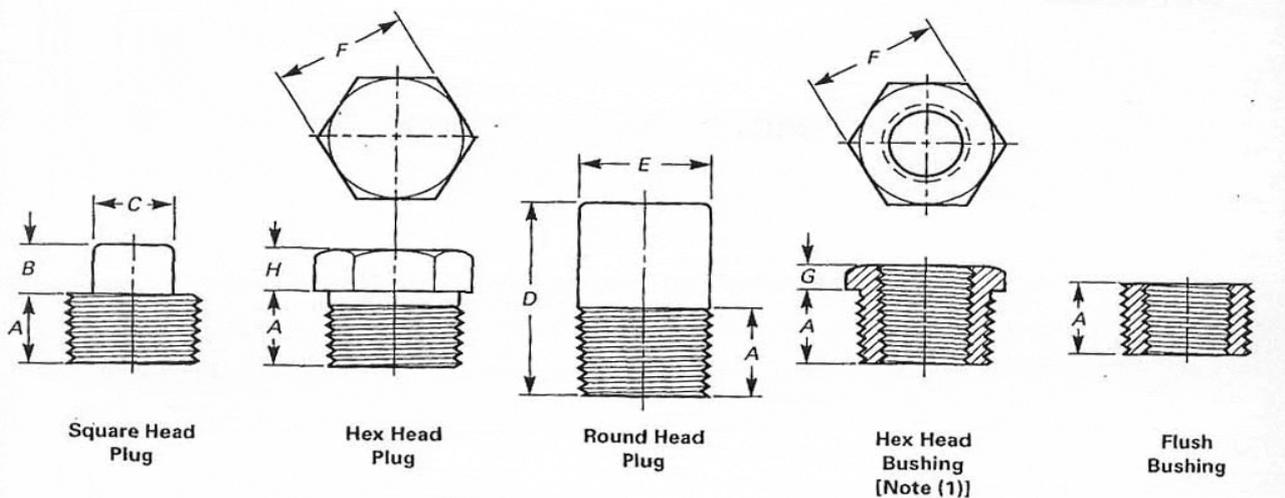
(a).Dimensions are in millimeters.

(b). Class 2000 and Class 6000 couplings,half couplings,and not included in this Standaaed.

**NOTES:**

(1).D imension B is minimum length of perfect thread.The length of useful thread(B plus threads with fully formed roots and flat crests) shall not be less than L2(effective length of external thread)required by American National Standard for Pipe Threads.

**FORGED FITTINGS, SOCKET-WELDING AND THREADED**



**PLUGS AND BUSHINGS**

(Square Head Plug, Hex Head Plug, Round Head Plug, Hex Head Bushing, Flush Bushing)

| DN  | Nominal Pipe Size | Min. Length, A | Square Head Plugs     |                     | Round Head Plugs         |                | Hex Plugs and Bushings |                |          |
|-----|-------------------|----------------|-----------------------|---------------------|--------------------------|----------------|------------------------|----------------|----------|
|     |                   |                | Min. Square Height, B | Min. Width Flats, C | Nominal Head Diameter, E | Min. Length, D | Nominal Width Flats, E | Min.Hex Height |          |
|     |                   |                |                       |                     |                          |                |                        | Bushing, G     | Plugs, H |
| 6   | 1/8               | 10             | 6                     | 7                   | 10                       | 35             | 11                     | ...            | 6        |
| 8   | 1/4               | 11             | 6                     | 10                  | 14                       | 41             | 16                     | 3              | 6        |
| 10  | 3/8               | 13             | 8                     | 11                  | 18                       | 41             | 18                     | 4              | 8        |
| 15  | 1/2               | 14             | 10                    | 14                  | 21                       | 44             | 22                     | 5              | 8        |
| 20  | 3/4               | 16             | 11                    | 16                  | 27                       | 44             | 27                     | 6              | 10       |
| 25  | 1                 | 19             | 13                    | 21                  | 33                       | 51             | 36                     | 6              | 10       |
| 32  | 1 1/4             | 21             | 14                    | 24                  | 43                       | 51             | 46                     | 7              | 14       |
| 40  | 1 1/2             | 21             | 16                    | 28                  | 48                       | 51             | 50                     | 8              | 16       |
| 50  | 2                 | 22             | 18                    | 32                  | 60                       | 64             | 65                     | 9              | 18       |
| 65  | 2 1/2             | 27             | 19                    | 36                  | 73                       | 70             | 75                     | 10             | 19       |
| 80  | 3                 | 28             | 21                    | 41                  | 89                       | 70             | 90                     | 10             | 21       |
| 100 | 4                 | 32             | 25                    | 65                  | 114                      | 76             | 115                    | 13             | 25       |

**GENERAL NOTES:**Dimensions are in millimeters.

**NOTES:**

(1).Cautionary Note Regarding Hex Bushings;Hex head bushings of one-size reduction should not be used in services where they might be subject to harmful load and forces other than internal pressure.

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