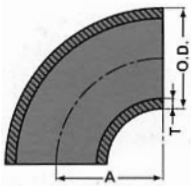
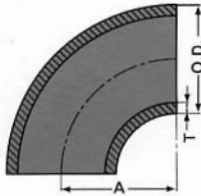


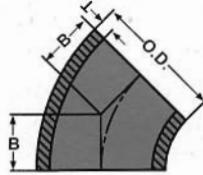
90° ELBOW  
LONG RADIUS



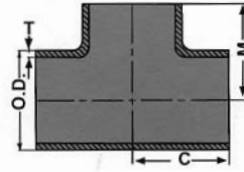
90° ELBOW  
SHORT RADIUS



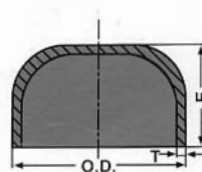
45° ELBOW  
LONG RADIUS



TEE



CAP

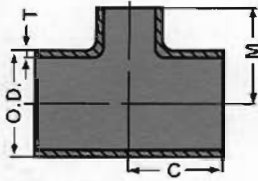


DIMENSION ANSI B16.9 (S/R ANSI B16.28)

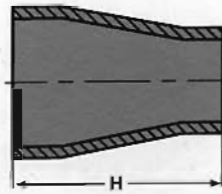
UNIT: INCH/mm

| NOMINAL<br>PIPE SIZE | OUTSIDE<br>DIAMETER | WALL THICKNESS<br>SCHEDULE |               |               |                | ELBOW          |               |              | TEE           | CAP          | NOMINAL<br>PIPE SIZE |
|----------------------|---------------------|----------------------------|---------------|---------------|----------------|----------------|---------------|--------------|---------------|--------------|----------------------|
|                      |                     |                            |               |               |                | 90°            |               | 45°          |               |              |                      |
|                      |                     | INCH                       | O.D.          | T             |                |                |               | L/R          | S/R           | L/R          |                      |
|                      |                     |                            |               | 5S            | 10S            | 40S            | 80S           | A            | A             | B            |                      |
| 1/2                  | 0.840<br>21.30      | 0.065<br>1.65              | 0.083<br>2.11 | 0.109<br>2.77 | 0.147<br>3.73  | 1.50<br>38.1   | —<br>—        | 0.62<br>16   | 1.00<br>25.4  | 1.00<br>25.4 | 1/2                  |
| 3/4                  | 1.050<br>26.70      | 0.065<br>1.65              | 0.083<br>2.11 | 0.113<br>2.87 | 0.154<br>3.91  | 1.12<br>28.5   | —<br>—        | 0.44<br>11   | 1.125<br>28.6 | 1.00<br>25.4 | 3/4                  |
|                      | 1                   | 1.315<br>33.40             | 0.065<br>1.65 | 0.109<br>2.77 | 0.133<br>3.38  | 0.179<br>4.55  | 1.50<br>38.1  | 1.00<br>25.4 | 0.88<br>22    | 1.50<br>38.1 |                      |
| 1 1/4                | 1.660<br>42.2       | 0.065<br>1.65              | 0.109<br>2.77 | 0.140<br>3.56 | 0.191<br>4.85  | 1.88<br>47.5   | 1.25<br>32    | 1.00<br>25   | 1.88<br>47.6  | 1.50<br>38   | 1 1/4                |
| 1 1/2                | 1.90<br>48.3        | 0.065<br>1.65              | 0.109<br>2.77 | 0.145<br>3.68 | 0.200<br>5.08  | 2.25<br>57.0   | 1.50<br>38    | 1.12<br>29   | 2.25<br>57.2  | 1.50<br>38   | 1 1/2                |
|                      | 2                   | 2.375<br>60.3              | 0.065<br>1.65 | 0.109<br>2.77 | 0.154<br>3.91  | 0.218<br>5.54  | 3.00<br>76.0  | 2.00<br>51   | 1.38<br>35    | 2.50<br>63.5 |                      |
| 2 1/2                | 2.875<br>73.0       | 0.083<br>2.11              | 0.120<br>3.05 | 0.203<br>5.16 | 0.276<br>7.01  | 3.75<br>95.0   | 2.50<br>63.5  | 1.75<br>45   | 3.00<br>76.2  | 1.50<br>38   | 2 1/2                |
| 3                    | 3.50<br>88.9        | 0.083<br>2.11              | 0.120<br>3.05 | 0.216<br>5.49 | 0.300<br>7.62  | 4.50<br>114.5  | 3.00<br>76    | 2.00<br>51   | 3.38<br>85.7  | 2.00<br>51   | 3                    |
|                      | 3 1/2               | 4.00<br>101.6              | 0.083<br>2.11 | 0.120<br>3.05 | 0.226<br>5.74  | 0.318<br>8.08  | 5.25<br>133.5 | 3.50<br>89   | 2.25<br>57    | 3.75<br>95.3 |                      |
| 4                    | 4.50<br>114.3       | 0.083<br>2.11              | 0.120<br>3.05 | 0.237<br>6.02 | 0.337<br>8.56  | 6.00<br>152.5  | 4.00<br>101.5 | 2.50<br>64   | 4.12<br>104.8 | 2.50<br>64   | 4                    |
| 5                    | 5.563<br>141.3      | 0.109<br>2.77              | 0.134<br>3.40 | 0.258<br>6.55 | 0.375<br>9.52  | 7.50<br>190.5  | 5.00<br>127   | 3.12<br>79   | 4.88<br>123.8 | 3.00<br>76   | 5                    |
| 6                    | 6.625<br>168.3      | 0.109<br>2.77              | 0.134<br>3.40 | 0.280<br>7.11 | 0.432<br>10.97 | 9.00<br>228.5  | 6.00<br>152.5 | 3.75<br>95   | 5.62<br>142.9 | 3.50<br>89   | 6                    |
| 8                    | 8.625<br>219.1      | 0.109<br>2.77              | 0.148<br>3.76 | 0.322<br>8.18 | 0.50<br>12.70  | 12.00<br>305   | 8.00<br>203   | 5.00<br>127  | 7.00<br>177.8 | 4.00<br>102  | 8                    |
| 10                   | 10.75<br>273        | 0.134<br>3.40              | 0.165<br>4.19 | 0.365<br>9.27 | 0.500<br>12.70 | 15.00<br>381   | 10.00<br>254  | 6.25<br>159  | 8.50<br>215.9 | 5.00<br>127  | 10                   |
|                      | 12                  | 12.75<br>323.9             | 0.156<br>3.96 | 0.180<br>4.57 | 0.375<br>9.52  | 0.500<br>12.70 | 18.00<br>457  | 12.00<br>305 | 7.50<br>191   | 10.00<br>254 |                      |

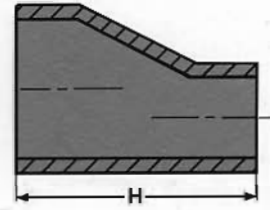
### REDUCING TEE



### CONCENTRIC REDUCER



### ECCENTRIC REDUCER



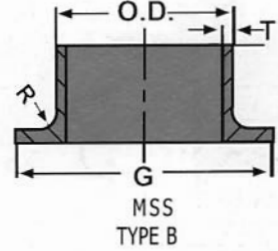
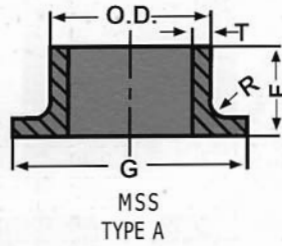
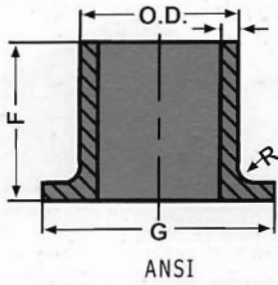
DIMENSION ANSI B16.9

UNIT: INCH/mm

| NOMINAL PIPE SIZE INCH | REDUCING TEE    |               | REDUCERS CONCENTRIC ECCENTRIC |
|------------------------|-----------------|---------------|-------------------------------|
|                        | C               | M             | H                             |
| 3/4 x 1/2              | 1.125<br>28.6   | 1.125<br>28.6 | 1.500<br>38.1                 |
| 1 x 3/4                | 1.500<br>38.1   | 1.500<br>38.1 | 2.000<br>50.80                |
|                        |                 | 1.500<br>38.1 |                               |
| 1 1/4 x 3/4            | 1.875<br>47.6   | 1.875<br>47.6 | 2.000<br>50.8                 |
|                        |                 | 1.875<br>47.6 |                               |
| 1 1/2 x 1              | 2.250<br>57.2   | 2.250<br>57.2 | 2.500<br>63.5                 |
|                        |                 | 2.250<br>57.2 |                               |
| 2 x 1                  | 2.500<br>63.5   | 2.375<br>60.3 | 3.000<br>76.2                 |
|                        |                 | 2.250<br>57.2 |                               |
| 2 1/2 x 1 1/4          | 3.000<br>76.2   | 2.000<br>50.8 | 3.500<br>88.9                 |
|                        |                 | 1.752<br>44.5 |                               |
| 3 x 1 1/2              | 3.375<br>85.7   | 2.750<br>69.9 | 3.500<br>88.9                 |
|                        |                 | 2.625<br>66.7 |                               |
| 3 1/2 x 2 1/2          | 3.752<br>95.3   | 2.500<br>63.5 | 4.000<br>101.6                |
|                        |                 | 2.250<br>57.2 |                               |
| 4 x 3                  | 4.126<br>104.8  | 3.250<br>82.6 | 4.000<br>101.6                |
|                        |                 | 3.000<br>76.2 |                               |
| 4 1/2 x 3 1/2          | 4.500<br>114.3  | 2.875<br>73.0 | 4.000<br>101.6                |
|                        |                 | 2.752<br>69.9 |                               |
| 5 x 3 1/2              | 4.874<br>123.8  | 2.626<br>66.7 | 4.000<br>101.6                |
|                        |                 | 2.500<br>63.5 |                               |
| 5 1/2 x 3              | 5.250<br>133.0  | 2.375<br>60.3 | 4.000<br>101.6                |
|                        |                 | 2.250<br>57.2 |                               |
| 6 x 3                  | 5.626<br>142.9  | 2.125<br>53.3 | 4.000<br>101.6                |
|                        |                 | 1.875<br>47.6 |                               |
| 6 1/2 x 2 1/2          | 6.000<br>152.4  | 1.875<br>47.6 | 4.000<br>101.6                |
|                        |                 | 1.625<br>41.3 |                               |
| 7 x 2 1/2              | 6.375<br>162.9  | 1.625<br>41.3 | 4.000<br>101.6                |
|                        |                 | 1.375<br>34.9 |                               |
| 7 1/2 x 2              | 6.750<br>171.5  | 1.375<br>34.9 | 4.000<br>101.6                |
|                        |                 | 1.125<br>28.6 |                               |
| 8 x 2                  | 7.126<br>180.1  | 1.125<br>28.6 | 4.000<br>101.6                |
|                        |                 | 0.875<br>22.1 |                               |
| 8 1/2 x 1 1/2          | 7.500<br>190.5  | 0.875<br>22.1 | 4.000<br>101.6                |
|                        |                 | 0.625<br>15.9 |                               |
| 9 x 1 1/2              | 7.875<br>200.0  | 0.625<br>15.9 | 4.000<br>101.6                |
|                        |                 | 0.375<br>9.5  |                               |
| 9 1/2 x 1 1/4          | 8.250<br>209.5  | 0.375<br>9.5  | 4.000<br>101.6                |
|                        |                 | 0.125<br>3.2  |                               |
| 10 x 1 1/4             | 8.626<br>218.0  | 0.125<br>3.2  | 4.000<br>101.6                |
|                        |                 | 0.000<br>0.0  |                               |
| 10 1/2 x 1 1/2         | 9.000<br>228.6  | 0.000<br>0.0  | 4.000<br>101.6                |
|                        |                 | 0.000<br>0.0  |                               |
| 11 x 1 1/2             | 9.375<br>238.1  | 0.000<br>0.0  | 4.000<br>101.6                |
|                        |                 | 0.000<br>0.0  |                               |
| 11 1/2 x 1 1/4         | 9.750<br>247.7  | 0.000<br>0.0  | 4.000<br>101.6                |
|                        |                 | 0.000<br>0.0  |                               |
| 12 x 1 1/4             | 10.126<br>256.2 | 0.000<br>0.0  | 4.000<br>101.6                |
|                        |                 | 0.000<br>0.0  |                               |

| NOMINAL PIPE SIZE INCH | REDUCING TEE   |                | REDUCERS CONCENTRIC ECCENTRIC |
|------------------------|----------------|----------------|-------------------------------|
|                        | C              | M              | H                             |
| x 3 1/2                | 4.126<br>104.8 | 4.00<br>101.6  | 4.000<br>101.6                |
|                        |                | 3.875<br>98.4  |                               |
| 4 x 2 1/2              | 4.126<br>104.8 | 3.750<br>95.3  | 4.000<br>101.6                |
|                        |                | 3.500<br>88.9  |                               |
| 4 x 2                  | 4.126<br>104.8 | 3.374<br>85.7  | 4.000<br>101.6                |
|                        |                | 3.126<br>79.4  |                               |
| 5 x 3 1/2              | 4.874<br>123.8 | 4.626<br>117.5 | 5.000<br>127.0                |
|                        |                | 4.50<br>114.3  |                               |
| 5 x 3                  | 4.874<br>123.8 | 4.374<br>111.1 | 5.000<br>127.0                |
|                        |                | 4.252<br>108.0 |                               |
| 5 x 2 1/2              | 4.874<br>123.8 | 4.126<br>104.8 | 5.000<br>127.0                |
|                        |                | 3.875<br>98.4  |                               |
| 6 x 3 1/2              | 5.626<br>142.9 | 5.374<br>136.5 | 5.500<br>139.7                |
|                        |                | 5.122<br>130.1 |                               |
| 6 x 3                  | 5.626<br>142.9 | 5.00<br>127.0  | 5.500<br>139.7                |
|                        |                | 4.874<br>123.8 |                               |
| 6 x 2 1/2              | 5.626<br>142.9 | 4.752<br>120.7 | 5.500<br>139.7                |
|                        |                | 4.625<br>117.5 |                               |
| 8 x 3 1/2              | 7.000<br>178   | 6.625<br>168   | 6.000<br>152                  |
|                        |                | 6.375<br>162   |                               |
| 8 x 3                  | 7.000<br>178   | 6.125<br>155   | 6.000<br>152                  |
|                        |                | 6.000<br>152   |                               |
| 10 x 2 1/2             | 8.500<br>216   | 5.87<br>149.1  | 7.000<br>178                  |
|                        |                | 5.625<br>142.9 |                               |
| 10 x 2                 | 8.500<br>216   | 8.000<br>203   | 7.000<br>178                  |
|                        |                | 7.625<br>194   |                               |
| 12 x 1 1/2             | 10.000<br>254  | 7.500<br>191   | 8.000<br>203                  |
|                        |                | 7.250<br>184   |                               |
| 12 x 1 1/4             | 10.000<br>254  | 9.500<br>241   | 8.000<br>203                  |
|                        |                | 9.000<br>229   |                               |
| 12 x 1 1/2             | 10.000<br>254  | 8.625<br>219   | 8.000<br>203                  |
|                        |                | 8.500<br>216   |                               |

## STUB ENDS



DIMENSION B16.9, MSS SP-43

UNIT: INCH/mm

| NOMINAL<br>PIPE SIZE | OUTSIDE<br>DIAMETER | STUB END |       |       |      |             |       | NOMINAL<br>PIPE SIZE |
|----------------------|---------------------|----------|-------|-------|------|-------------|-------|----------------------|
|                      |                     | G        | ANSI  |       | MSS  |             | INCH  |                      |
|                      |                     |          | F     | R     | F    | TYPE A<br>R |       |                      |
| INCH                 | O.D.                |          |       |       |      |             |       |                      |
| 1/2                  | 0.840               | 1.38     | 3.00  | 0.125 | 2.00 | 0.125       | 0.031 | 1/2                  |
|                      | 21.30               | 35       | 76    | 3     | 51   | 3           | 0.8   |                      |
| 3/4                  | 1.050               | 1.69     | 3.00  | 0.125 | 2.00 | 0.125       | 0.031 | 3/4                  |
|                      | 26.70               | 43       | 76    | 3     | 51   | 3           | 0.8   |                      |
| 1                    | 1.315               | 2.00     | 4.00  | 0.125 | 2.00 | 0.125       | 0.031 | 1                    |
|                      | 33.40               | 51       | 102   | 3     | 51   | 3           | 0.8   |                      |
| 1 1/4                | 1.660               | 2.50     | 4.00  | 0.188 | 2.00 | 0.187       | 0.031 | 1 1/4                |
|                      | 42.2                | 64       | 102   | 5     | 51   | 5           | 0.8   |                      |
| 1 1/2                | 1.90                | 2.88     | 4.00  | 0.250 | 2.00 | 0.250       | 0.031 | 1 1/2                |
|                      | 48.3                | 73       | 102   | 6     | 51   | 6           | 0.8   |                      |
| 2                    | 2.375               | 3.62     | 6.00  | 0.313 | 2.50 | 0.313       | 0.031 | 2                    |
|                      | 60.3                | 92       | 152   | 8     | 64   | 8           | 0.8   |                      |
| 2 1/2                | 2.875               | 4.12     | 6.00  | 0.313 | 2.50 | 0.313       | 0.031 | 2 1/2                |
|                      | 73.0                | 105      | 152   | 8     | 64   | 8           | 0.8   |                      |
| 3                    | 3.50                | 5.00     | 6.00  | 0.375 | 2.50 | 0.375       | 0.031 | 3                    |
|                      | 88.9                | 127      | 152   | 10    | 64   | 10          | 0.8   |                      |
| 3 1/2                | 4.00                | 5.50     | 6.00  | 0.375 | 3.00 | 0.375       | 0.031 | 3 1/2                |
|                      | 101.6               | 140      | 152   | 10    | 76   | 10          | 0.8   |                      |
| 4                    | 4.50                | 6.19     | 6.00  | 0.438 | 3.00 | 0.438       | 0.063 | 4                    |
|                      | 114.3               | 157      | 152   | 11    | 76   | 11          | 1.6   |                      |
| 5                    | 5.563               | 7.31     | 8.00  | 0.438 | 3.00 | 0.438       | 0.063 | 5                    |
|                      | 141.3               | 186      | 203   | 11    | 76   | 11          | 1.6   |                      |
| 6                    | 6.625               | 8.50     | 8.00  | 0.5   | 3.50 | 0.500       | 0.063 | 6                    |
|                      | 168.3               | 216      | 203   | 13    | 89   | 13          | 1.6   |                      |
| 8                    | 8.625               | 10.625   | 8.00  | 0.5   | 4.0  | 0.500       | 0.063 | 8                    |
|                      | 219.1               | 270      | 203   | 13    | 102  | 13          | 1.6   |                      |
| 10                   | 10.75               | 12.75    | 10.00 | 0.5   | 5.0  | 0.500       | 0.063 | 10                   |
|                      | 273                 | 324      | 254   | 13    | 127  | 13          | 1.6   |                      |
| 12                   | 12.75               | 15.00    | 10.00 | 0.5   | 6.0  | 0.500       | 0.063 | 12                   |
|                      | 323.9               | 381      | 254   | 13    | 152  | 13          | 1.6   |                      |