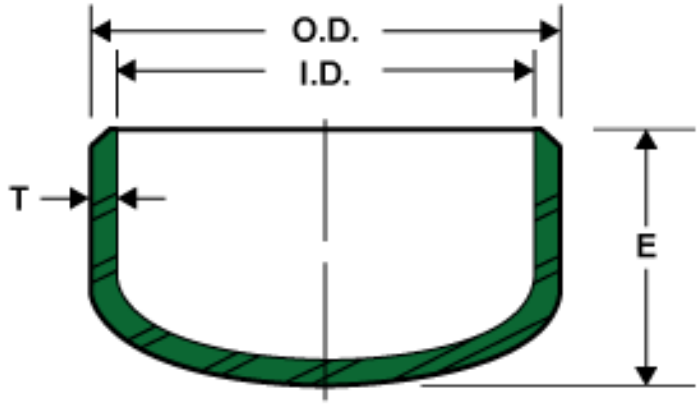



# Caps

## STANDARD WEIGHT

Inches / Pounds

For Metric Units >Click Here

| Nominal Pipe Size | Outside Diameter | Inside Diameter | Wall Thickness (T) | Length (E) | Pipe Schedule | Weight in Pounds |
|---|---|---|---|---|---|---|
| 1/2 | 0.84 | .622 | .109 | 1.00 | 40 | 0.08 |
| 3/4 | 1.05 | .824 | .113 | 1.25 | 40 | 0.14 |
| 1 | 1.32 | 1.049 | .133 | 1.50 | 40 | 0.21 |
| 1 1/4 | 1.66 | 1.380 | .140 | 1.50 | 40 | 0.33 |
| 1 1/2 | 1.90 | 1.610 | .145 | 1.50 | 40 | 0.54 |
| 2 | 2.38 | 2.067 | .154 | 1.50 | 40 | 0.8 |
| 2 1/2 | 2.88 | 2.469 | .203 | 1.50 | 40 | 1 |
| 3 | 3.50 | 3.068 | .216 | 2.00 | 40 | 1.7 |
| 3 1/2 | 4.00 | 3.548 | .226 | 2.50 | 40 | 2.3 |
| 4 | 4.50 | 4.026 | .237 | 2.50 | 40 | 2.8 |
| 5 | 5.56 | 5.047 | .258 | 3.00 | 40 | 4.6 |
| 6 | 6.62 | 6.065 | .280 | 3.50 | 40 | 6.9 |
| 8 | 8.62 | 7.981 | .322 | 4.00 | 40 | 11.8 |
| 10 | 10.75 | 10.02 | .365 | 5.00 | 40 | 20.8 |
| 12 | 12.75 | 12.00 | .375 | 6.00 | * | 30.3 |
| 14 | 14.00 | 13.25 | .375 | 6.50 | 30 | 36.5 |
| 16 | 16.00 | 15.25 | .375 | 7.00 | 30 | 43.5 |
| 18 | 18.00 | 17.25 | .375 | 8.00 | * | 57 |
| 20 | 20.00 | 19.25 | .375 | 9.00 | 20 | 75.7 |
| 24 | 24.00 | 23.25 | .375 | 10.50 | 20 | 101 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 30 | 30.00 | 29.24 | .380 | 10.50 | * | 137 |
| 36 | 36.00 | 35.24 | .380 | 10.50 | * | 175 |
| 42 | 42.00 | 41.24 | .380 | 12.00 | * | 229 |
| 48 | 48.00 | 47.24 | .380 | 13.50 | * | 350 |

Extra Strong >

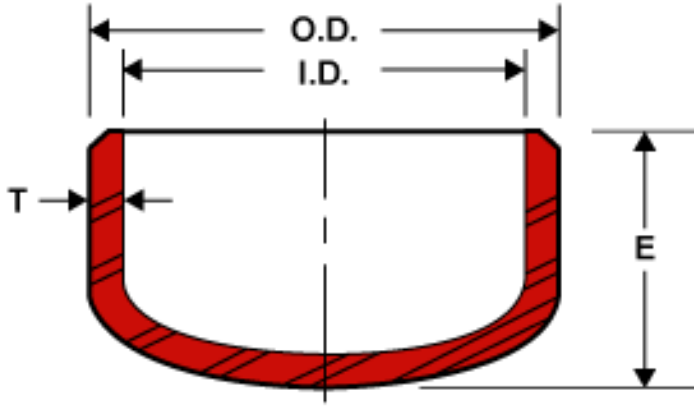
* This size and thickness does not correspond to any pipe schedule

1. Dimensions conform to ASME B16.9 & material conforms to ASTM A-234 Grade B
2. For bevel detail see page 50.
3. For dimensional tolerances see page 51.

# Caps

## EXTRA STRONG

Inches / Pounds




For Metric Units >Click Here

| Nominal Pipe Size | Outside Diameter | Inside Diameter | Wall Thickness (T) | Length (E) | Pipe Schedule | Weight in Pounds |
|---|---|---|---|---|---|---|
| 1/2 | .840 | .546 | .147 | 1.00 | 80 | 0.1 |
| 3/4 | 1.050 | .742 | .154 | 1.25 | 80 | 0.16 |
| 1 | 1.315 | .957 | .179 | 1.50 | 80 | 0.28 |
| 1 1/4 | 1.660 | 1.278 | .191 | 1.50 | 80 | 0.48 |
| 1 1/2 | 1.900 | 1.500 | .200 | 1.50 | 80 | 0.67 |
| 2 | 2.375 | 1.939 | .218 | 1.50 | 80 | 0.92 |
| 2 1/2 | 2.875 | 2.323 | .276 | 1.50 | 80 | 1.3 |
| 3 | 3.500 | 2.900 | .300 | 2.00 | 80 | 2.1 |
| 3 1/2 | 4.000 | 3.364 | .318 | 2.50 | 80 | 3 |
| 4 | 4.500 | 3.826 | .337 | 2.50 | 80 | 3.5 |
| 5 | 5.563 | 4.813 | .375 | 3.00 | 80 | 5.8 |
| 6 | 6.625 | 5.761 | .432 | 3.50 | 80 | 9.3 |
| 8 | 8.625 | 7.625 | .500 | 4.00 | 80 | 16 |
| 10 | 10.750 | 9.750 | .500 | 5.00 | 60 | 26 |
| 12 | 12.750 | 11.750 | .500 | 6.00 | * | 38 |
| 14 | 14.000 | 13.000 | .500 | 6.50 | * | 47 |
| 16 | 16.000 | 15.000 | .500 | 7.00 | 40 | 57 |
| 18 | 18.000 | 17.000 | .500 | 8.00 | * | 78 |
| 20 | 20.000 | 19.000 | .500 | 9.00 | 30 | 100 |
| 24 | 24.000 | 23.000 | .500 | 10.50 | * | 145 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 30 | 30.000 | 29.000 | .500 | 10.50 | 20 | 634 |
| 36 | 36.000 | 35.000 | .500 | 10.50 | 20 | 913 |
| 42 | 42.000 | 41.000 | .500 | 12.00 | * | 1,300 |
| 48 | 48.000 | 47.000 | .500 | 13.50 | * | 1,675 |

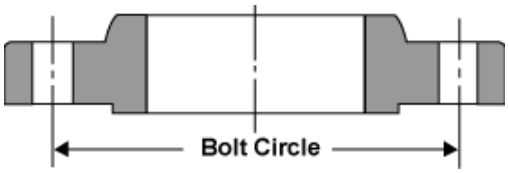
< Standard

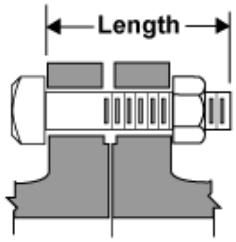
* This size and thickness does not correspond to any pipe schedule

1. Dimensions conform to ASME B16.9 & material conforms to ASTM A-234 Grade B
2. For bevel detail see page 50.
3. For dimensional tolerances see page 51.

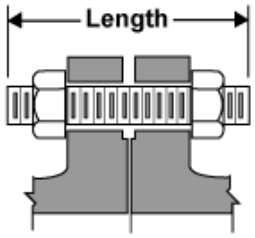
# Class 150 Steel Pipe Flanges

## Bolting Pattern and Bolt Lengths




Machine Bolt With Nut




Stud Bolt With Nuts

| Pipe Size | BOLTING PATTERN AND BOLT LENGTHS | | | | | |
|---|---|---|---|---|---|---|
| | Diameter of Bolt Circle | Diameter of Bolt Holes | Number of Bolts | Diameter of Bolts | Machine Bolts | Stud Bolts |
| | | | | | 0.006 in Raised Face | 0.006 in Raised Face |
| 1/2 | 2.38 | 0.62 | 4 | 0.50 | 2.00 | 2.50 |
| 3/4 | 2.75 | 0.62 | 4 | 0.50 | 2.25 | 2.50 |
| 1 | 3.12 | 0.62 | 4 | 0.50 | 2.25 | 2.75 |
| 1 1/4 | 3.50 | 0.62 | 4 | 0.50 | 2.50 | 2.75 |
| 1 1/2 | 3.88 | 0.62 | 4 | 0.50 | 2.50 | 3.0 |
| 2 | 4.75 | 0.75 | 4 | 0.62 | 2.75 | 3.25 |
| 2 1/2 | 5.50 | 0.75 | 4 | 0.62 | 3.00 | 3.50 |
| 3 | 6.00 | 0.75 | 4 | 0.62 | 3.25 | 3.75 |
| 3 1/2 | 7.00 | 0.75 | 8 | 0.62 | 3.25 | 3.75 |
| 4 | 7.50 | 0.75 | 8 | 0.62 | 3.25 | 3.75 |
| 5 | 8.50 | 0.88 | 8 | 0.75 | 3.25 | 4.00 |
| 6 | 9.50 | 0.88 | 8 | 0.75 | 3.50 | 4.00 |
| 8 | 11.75 | 0.88 | 8 | 0.75 | 3.75 | 4.25 |
| 10 | 14.25 | 1.00 | 12 | 0.88 | 4.25 | 4.75 |
| 12 | 17.00 | 1.00 | 12 | 0.88 | 4.25 | 4.75 |
| 14 | 18.75 | 1.12 | 12 | 1.00 | 4.50 | 5.25 |
| 16 | 21.25 | 1.12 | 16 | 1.00 | 4.75 | 5.50 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 18 | 22.75 | 1.25 | 16 | 1.12 | 5.00 | 6.00 |
| 20 | 25.00 | 1.25 | 20 | 1.12 | 5.50 | 6.25 |
| 24 | 29.50 | 1.38 | 20 | 1.25 | 6.00 | 7.00 |
| 30 | 36.00 | 1.38 | 28 | 1.25 | | |
| 36 | 42.75 | 1.62 | 32 | 1.50 | | |
| 42 | 49.50 | 1.62 | 36 | 1.50 | | |
| 48 | 56.00 | 1.62 | 44 | 1.50 | | |

< Class 150 Dimensional Specifications

Conforms to ASTM A 105; ANSI B16.5

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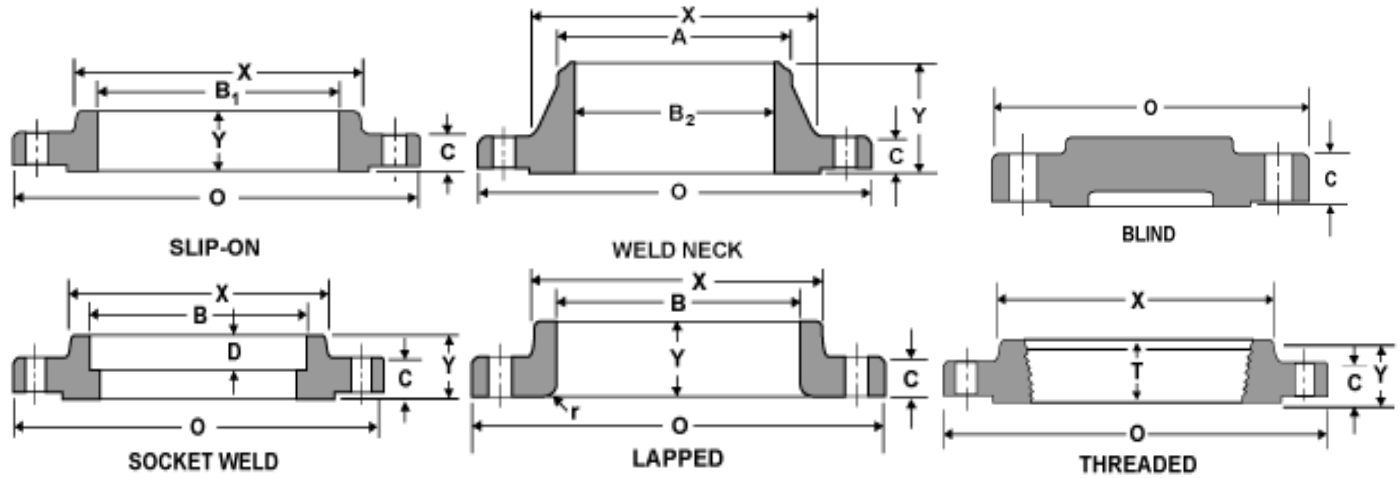
# Class 150 Steel Pipe Flanges

## DIMENSIONAL SPECIFICATION




| Pipe Size | O<br>Outside Diameter of Flange | C<br>* Thickness of Flange, Minimum | X<br>** Diameter of Hub | A<br>Diameter of Weld neck | Y<br>Threaded Slip-On | Y<br>Lap-Joint | Y<br>Weld Neck | T<br>Thread Length Threaded Flange, Minimum | B1<br>Slip-On, Minimum | B<br>Lap-Joint, Minimum | B2<br>Weld neck / Socket weld | r<br>Lap-Joint Flange Radius | D<br>Depth of Socket |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/2 | 3.50 | 0.44 | 1.19 | 0.84 | 0.62 | 0.62 | 1.88 | 0.62 | 0.88 | 0.90 | 0.62 | 0.12 | 0.38 |
| 3/4 | 3.88 | 0.50 | 1.50 | 1.05 | 0.62 | 0.62 | 2.06 | 0.62 | 1.09 | 1.11 | 0.82 | 0.12 | 0.44 |
| 1 | 4.25 | 0.56 | 1.94 | 1.32 | 0.69 | 0.69 | 2.19 | 0.69 | 1.36 | 1.38 | 1.05 | 0.12 | 0.50 |
| 1 1/4 | 4.62 | 0.62 | 2.31 | 1.66 | 0.81 | 0.81 | 2.25 | 0.81 | 1.70 | 1.72 | 1.38 | 0.19 | 0.56 |
| 1 1/2 | 5.00 | 0.69 | 2.56 | 1.90 | 0.88 | 0.88 | 2.44 | 0.88 | 1.95 | 1.97 | 1.61 | 0.25 | 0.62 |
| 2 | 6.00 | 0.75 | 3.06 | 2.38 | 1.00 | 1.00 | 2.50 | 1.00 | 2.44 | 2.46 | 2.07 | 0.31 | 0.69 |
| 2 1/2 | 7.00 | 0.88 | 3.56 | 2.88 | 1.12 | 1.12 | 2.75 | 1.12 | 2.94 | 2.97 | 2.47 | 0.31 | 0.75 |
| 3 | 7.50 | 0.94 | 4.25 | 3.50 | 1.19 | 1.19 | 2.75 | 1.19 | 3.57 | 3.60 | 3.07 | 0.38 | 0.81 |
| 3 1/2 | 8.50 | 0.94 | 4.81 | 4.00 | 1.25 | 1.25 | 2.81 | 1.25 | 4.07 | 4.10 | 3.55 | 0.38 | ... |
| 4 | 9.00 | 0.94 | 5.31 | 4.50 | 1.31 | 1.31 | 3.00 | 1.31 | 4.57 | 4.60 | 4.03 | 0.44 | ... |
| 5 | 10.00 | 0.94 | 6.44 | 5.56 | 1.44 | 1.44 | 3.50 | 1.44 | 5.66 | 5.69 | 5.05 | 0.44 | ... |
| 6 | 11.00 | 1.00 | 7.56 | 6.63 | 1.56 | 1.56 | 3.50 | 1.56 | 6.72 | 6.75 | 6.07 | 0.50 | ... |
| 8 | 13.50 | 1.12 | 9.69 | 8.63 | 1.75 | 1.75 | 4.00 | 1.75 | 8.72 | 8.75 | 7.98 | 0.50 | ... |
| 10 | 16.00 | 1.19 | 12.00 | 10.75 | 1.94 | 1.94 | 4.00 | 1.94 | 10.88 | 10.92 | 10.02 | 0.50 | ... |
| 12 | 19.00 | 1.25 | 14.38 | 12.75 | 2.19 | 2.19 | 4.50 | 2.19 | 12.88 | 12.92 | 12.00 | 0.50 | ... |
| 14 | 21.00 | 1.38 | 15.75 | 14.00 | 2.25 | 3.12 | 5.00 | 2.25 | 14.14 | 14.18 | 13.25 | 0.50 | ... |
| 16 | 23.50 | 1.44 | 18.00 | 16.00 | 2.50 | 3.44 | 5.00 | 2.50 | 16.16 | 16.19 | 15.25 | 0.50 | ... |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18 | 25.00 | 1.56 | 19.88 | 18.00 | 2.69 | 3.81 | 5.50 | 2.69 | 18.18 | 18.20 | 17.25 | 0.50 | ... |
| 20 | 27.50 | 1.69 | 22.00 | 20.00 | 2.88 | 4.06 | 5.69 | 2.88 | 20.20 | 20.25 | 19.25 | 0.50 | ... |
| 24 | 32.00 | 1.88 | 26.12 | 24.00 | 3.25 | 4.38 | 6.00 | 3.25 | 24.25 | 24.25 | 23.25 | 0.50 | ... |

Class 150 Series A The flanges below, from 30" - 48", conform to ASME B16.47

| Nominal Pipe Size | Outside Diameter of Flange | Minimum Thickness Of Flange | | Length Through Hub | Diameter of Hub | Hub Diameter Top | Raised Face Diameter | Minimum Fillet Radius r1 |
|---|---|---|---|---|---|---|---|---|
| | | Weldneck | Blind | | | | | |
| 30 | 38.75 | 2.94 | 2.94 | 5.38 | 30.75 | 30.00 | 33.75 | 0.44 |
| 36 | 46.00 | 3.56 | 3.56 | 6.19 | 36.75 | 36.00 | 40.25 | 0.50 |
| 42 | 53.00 | 3.81 | 3.81 | 6.75 | 43.00 | 42.00 | 47.00 | 0.50 |
| 48 | 59.50 | 4.25 | 4.25 | 7.56 | 49.12 | 48.00 | 53.50 | 0.50 |

Class 150 Bolt Patterns & Bolt Lengths >

* Should flanges be required with flat face, shipments may be either the full thickness, or a thickness with raised face removed. (Removal of the raised face produces a non-standard length through the hub.)
** A taper shall not exceed 7 degrees on threaded, slip-on, and lap-joint flanges.

## WELDBEND NOTES:

1. All dimensions are in inches.
2. Calculated flange weights on page 47.
3. Dimensional tolerances on page 70.
4. Standard flange facings on pages 72 & 73.
5. Welding end bevel information on pages 74 & 75.
6. Thread standards on page 76 & 77.
7. Blind flanges may be produced with or without hubs.

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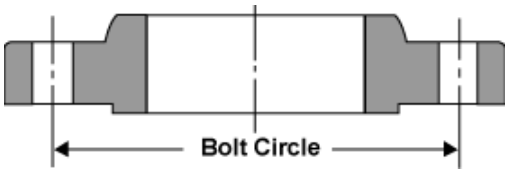
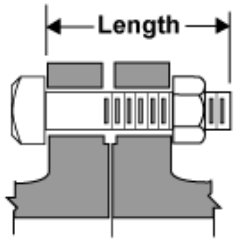
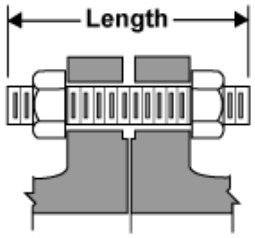
# Class 300 Steel Pipe Flanges

## BOLTING PATTERN AND BOLT LENGTHS




Machine Bolt With Nut




Stud Bolt With Nuts

| Pipe Size | BOLTING PATTERN AND BOLT LENGTHS | | | | | |
|---|---|---|---|---|---|---|
| | Diameter of Bolt Circle | Diameter of Bolt Holes | Number of Bolts | Diameter of Bolts | Machine Bolts | Stud Bolts |
| | | | | | 0.006 in Raised Face | 0.006 in Raised Face |
| 1/2 | 2.62 | 0.62 | 4 | 0.50 | 2.25 | 2.75 |
| 3/4 | 3.25 | 0.75 | 4 | 0.62 | 2.50 | 3.00 |
| 1 | 3.50 | 0.75 | 4 | 0.62 | 2.75 | 3.25 |
| 1 1/4 | 3.88 | 0.75 | 4 | 0.62 | 2.75 | 3.25 |
| 1 1/2 | 4.50 | 0.88 | 4 | 0.75 | 3.00 | 3.75 |
| 2 | 5.00 | 0.75 | 8 | 0.62 | 3.00 | 3.50 |
| 2 1/2 | 5.88 | 0.88 | 8 | 0.75 | 3.50 | 4.00 |
| 3 | 6.62 | 0.88 | 8 | 0.75 | 3.75 | 4.25 |
| 3 1/2 | 7.25 | 0.88 | 8 | 0.75 | 3.75 | 4.50 |
| 4 | 7.88 | 0.88 | 8 | 0.75 | 4.00 | 4.50 |
| 5 | 9.25 | 0.88 | 8 | 0.75 | 4.25 | 4.75 |
| 6 | 10.62 | 0.88 | 12 | 0.75 | 4.25 | 5.00 |
| 8 | 13.00 | 1.00 | 12 | 0.88 | 4.75 | 5.50 |
| 10 | 15.25 | 1.12 | 16 | 1.00 | 5.50 | 6.25 |
| 12 | 17.75 | 1.25 | 16 | 1.12 | 6.00 | 6.75 |
| 14 | 20.25 | 1.25 | 20 | 1.12 | 6.25 | 7.00 |
| 16 | 22.50 | 1.38 | 20 | 1.25 | 6.50 | 7.50 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 18 | 24.75 | 1.38 | 24 | 1.25 | 6.75 | 7.75 |
| 20 | 27.00 | 1.38 | 24 | 1.25 | 7.25 | 8.25 |
| 24 | 32.00 | 1.62 | 24 | 1.50 | 8.00 | 9.25 |
| 30 | 39.25 | 1.88 | 28 | 1.75 | | |
| 36 | 46.00 | 2.12 | 32 | 2.00 | | |
| 42 | 47.50 | 1.75 | 32 | 1.62 | | |
| 48 | 54.00 | 2.00 | 32 | 1.88 | | |

< Class 300 Dimensional Specifications

Conforms to ASTM A 105; ANSI B16.5

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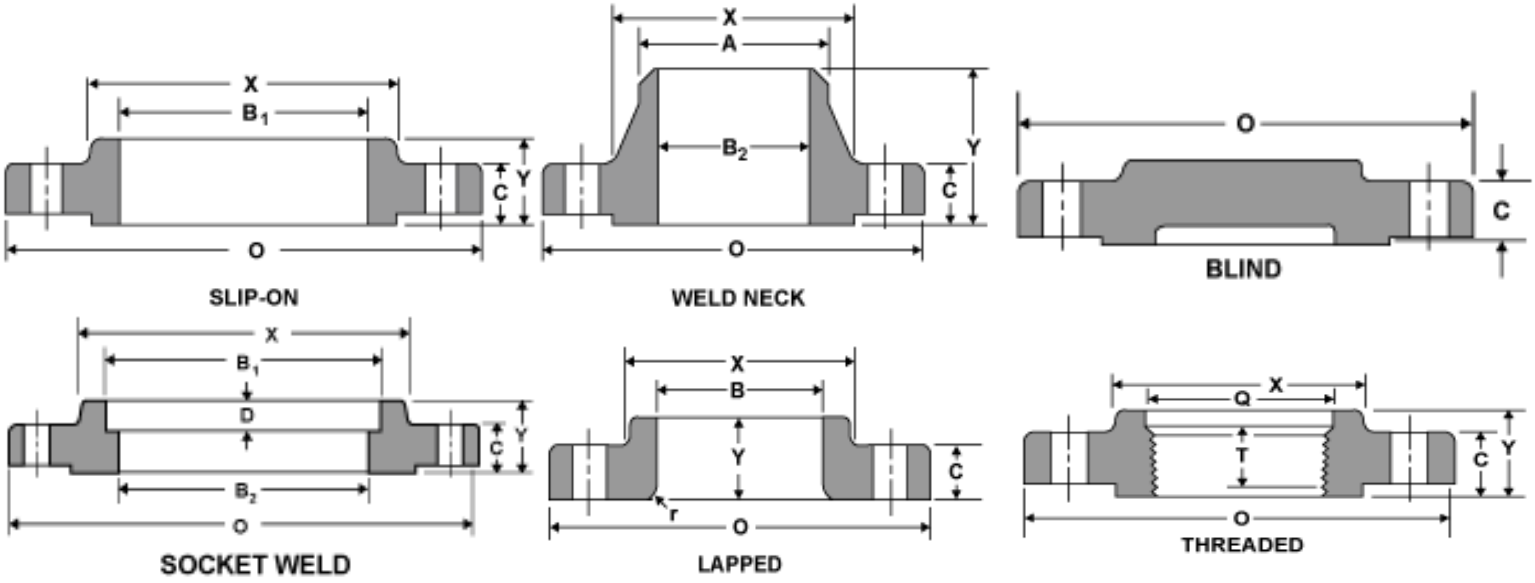
# Class 300 Steel Pipe Flanges

## DIMENSIONAL SPECIFICATIONS




| Pipe Size | O | C | X | A | Y | Y | Y | T | B1 | B | B2 | r | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Outside Diameter of Flange | * Thickness of Flange, Minimum | ** Diameter of Hub | Diameter of Weld Neck | Threaded Slip-On | Lap-Joint | Weld Neck | Thread Length Threaded Flange, Minimum | Slip-On, Minimum | Lap-Joint, Minimum | Weld Neck / Socket Weld | Lap-Joint Flange Radius | Counter-bore Threaded Flange, Minimum |
| 1/2 | 3.75 | 0.56 | 1.50 | 0.84 | 0.88 | 0.88 | 2.06 | 0.62 | 0.88 | 0.90 | 0.62 | 0.12 | 0.91 |
| 3/4 | 4.62 | 0.62 | 1.88 | 1.05 | 1.00 | 1.00 | 2.25 | 0.62 | 1.09 | 1.11 | 0.82 | 0.12 | 1.14 |
| 1 | 4.88 | 0.69 | 2.12 | 1.32 | 1.06 | 1.06 | 2.44 | 0.69 | 1.36 | 1.38 | 1.05 | 0.12 | 1.41 |
| 1 1/4 | 5.25 | 0.75 | 2.50 | 1.66 | 1.06 | 1.06 | 2.56 | 0.81 | 1.70 | 1.72 | 1.38 | 0.19 | 1.75 |
| 1 1/2 | 6.12 | 0.81 | 2.75 | 1.90 | 1.19 | 1.19 | 2.69 | 0.88 | 1.95 | 1.97 | 1.61 | 0.25 | 1.99 |
| 2 | 6.50 | 0.88 | 3.31 | 2.38 | 1.31 | 1.31 | 2.75 | 1.12 | 2.44 | 2.46 | 2.07 | 0.31 | 2.50 |
| 2 1/2 | 7.50 | 1.00 | 3.94 | 2.88 | 1.50 | 1.50 | 3.00 | 1.25 | 2.94 | 2.97 | 2.47 | 0.31 | 3.00 |
| 3 | 8.25 | 1.12 | 4.62 | 3.50 | 1.69 | 1.69 | 3.12 | 1.25 | 3.57 | 3.60 | 3.07 | 0.38 | 3.63 |
| 3 1/2 | 9.00 | 1.19 | 5.25 | 4.00 | 1.75 | 1.75 | 3.19 | 1.44 | 4.07 | 4.10 | 3.55 | 0.38 | 4.13 |
| 4 | 10.00 | 1.25 | 5.75 | 4.50 | 1.88 | 1.88 | 3.38 | 1.44 | 4.57 | 4.60 | 4.03 | 0.44 | 4.63 |
| 5 | 11.00 | 1.38 | 7.00 | 5.56 | 2.00 | 2.00 | 3.88 | 1.69 | 5.66 | 5.69 | 5.05 | 0.44 | 5.69 |
| 6 | 12.50 | 1.44 | 8.12 | 6.63 | 2.06 | 2.06 | 3.88 | 1.81 | 6.72 | 6.75 | 6.07 | 0.50 | 6.75 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 15.00 | 1.62 | 10.25 | 8.63 | 2.44 | 2.44 | 4.38 | 2.00 | 8.72 | 8.75 | 7.98 | 0.50 | 8.75 |
| 10 | 17.50 | 1.88 | 12.62 | 10.75 | 2.62 | 3.75 | 4.62 | 2.19 | 10.88 | 10.92 | 10.02 | 0.50 | 10.88 |
| 12 | 20.50 | 2.00 | 14.75 | 12.75 | 2.88 | 4.00 | 5.12 | 2.38 | 12.88 | 12.92 | 12.00 | 0.50 | 12.94 |
| 14 | 23.00 | 2.12 | 16.75 | 14.00 | 3.00 | 4.38 | 5.62 | 2.50 | 14.14 | 14.18 | 13.25 | 0.50 | 14.19 |
| 16 | 25.50 | 2.25 | 19.00 | 16.00 | 3.25 | 4.75 | 5.75 | 2.69 | 16.16 | 16.19 | 15.25 | 0.50 | 16.19 |
| 18 | 28.00 | 2.38 | 21.00 | 18.00 | 3.50 | 5.12 | 6.25 | 2.75 | 18.18 | 18.20 | 17.25 | 0.50 | 18.19 |
| 20 | 30.50 | 2.50 | 23.12 | 20.00 | 3.75 | 5.50 | 6.38 | 2.88 | 20.20 | 20.25 | 19.25 | 0.50 | 20.19 |
| 24 | 36.00 | 2.75 | 27.62 | 24.00 | 4.19 | 6.00 | 6.62 | 3.25 | 24.25 | 24.25 | 23.25 | 0.50 | 24.19 |

Class 300 Series A The flanges below from 30" - 48" conform to ASTM B16.47

| Nominal Pipe Size | Outside Diameter of Flange | Minimum Thickness Of Flange | | Length Through Hub | Diameter of Hub | Hub Diameter Top | Raised Face Diameter | Minimum Fillet Radius r1 |
|---|---|---|---|---|---|---|---|---|
| | | Weld Neck | Blind | | | | | |
| 30 | 43.00 | 3.62 | 3.75 | 8.25 | 32.56 | 30.00 | 33.75 | 0.44 |
| 36 | 50.00 | 4.12 | 4.38 | 9.50 | 39.00 | 36.00 | 40.25 | 0.50 |
| 42 | 50.75 | 4.69 | 4.69 | 7.88 | 43.25 | 42.00 | 44.75 | 0.50 |
| 48 | 57.75 | 5.25 | 5.25 | 8.81 | 49.38 | 48.00 | 51.25 | 0.50 |

Class 300 Bolt Patterns & Bolt Lengths >

* Should flanges be required with flat face, shipments may be either the full thickness, or a thickness with raised face removed. (Removal of the raised face produces a non-standard length through the hub.)
** A taper shall not exceed 7 degrees on threaded, slip-on, and lap-joint flanges.

## WELDBEND NOTES:

1. All dimensions are in inches.
2. Calculated flange weights on page 47.
3. Dimensional tolerances on page 70.
4. Standard flange facings on pages 72 & 73.
5. Welding end bevel information on pages 74 & 75.
6. Thread standards on page 76 & 77.
7. Blind flanges may be produced with or without hubs.

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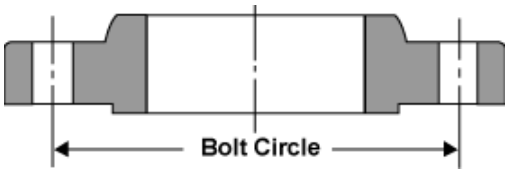
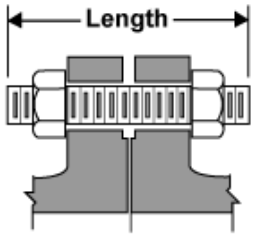
# Class 600 Steel Pipe Flanges
## BOLTING PATTERNS & BOLT LENGTHS




Stud Bolt With Nuts

| Pipe Size | BOLTING PATTERN AND BOLT LENGTHS | | | | |
|---|---|---|---|---|---|
| | Diameter of Bolt Circle | Diameter of Bolt Holes | Number of Bolts | Diameter of Bolts | Stud Bolts 0.25 in Raised Face |
| | | | | | |
| 1/2 | 2.62 | 0.62 | 4 | 0.50 | 3.25 |
| 3/4 | 3.25 | 0.75 | 4 | 0.62 | 3.50 |
| 1 | 3.50 | 0.75 | 4 | 0.62 | 3.75 |
| 1 1/4 | 3.88 | 0.75 | 4 | 0.62 | 4.00 |
| 1 1/2 | 4.50 | 0.88 | 4 | 0.75 | 4.25 |
| 2 | 5.00 | 0.75 | 8 | 0.62 | 4.25 |
| 2 1/2 | 5.88 | 0.88 | 8 | 0.75 | 4.75 |
| 3 | 6.62 | 0.88 | 8 | 0.75 | 5.00 |
| 3 1/2 | 7.25 | 1.00 | 8 | 0.88 | 5.50 |
| 4 | 8.50 | 1.00 | 8 | 0.88 | 5.75 |
| 5 | 10.50 | 1.12 | 8 | 1.00 | 6.50 |
| 6 | 11.50 | 1.12 | 12 | 1.00 | 6.75 |
| 8 | 13.75 | 1.25 | 12 | 1.12 | 7.75 |
| 10 | 17.00 | 1.38 | 16 | 1.25 | 8.50 |
| 12 | 19.25 | 1.38 | 20 | 1.25 | 8.75 |
| 14 | 20.75 | 1.50 | 20 | 1.38 | 9.25 |
| 16 | 23.75 | 1.62 | 20 | 1.50 | 10.00 |
| 18 | 25.75 | 1.75 | 20 | 1.62 | 10.75 |
| 20 | 28.50 | 1.75 | 24 | 1.62 | 11.50 |

| | | | | | |
|---|---|---|---|---|---|
| 24 | 33.00 | 2.00 | 24 | 1.88 | 13.00 |
| 30 | 40.25 | 2.12 | 28 | 2.00 | |
| 36 | 47.00 | 2.62 | 28 | 2.50 | |
| 42 | 50.50 | 2.62 | 28 | 2.50 | |
| 48 | 57.50 | 2.88 | 32 | 2.75 | |

< Class 600 Dimension Specifications

Conforms to ASTM A 105; ANSI B16.5

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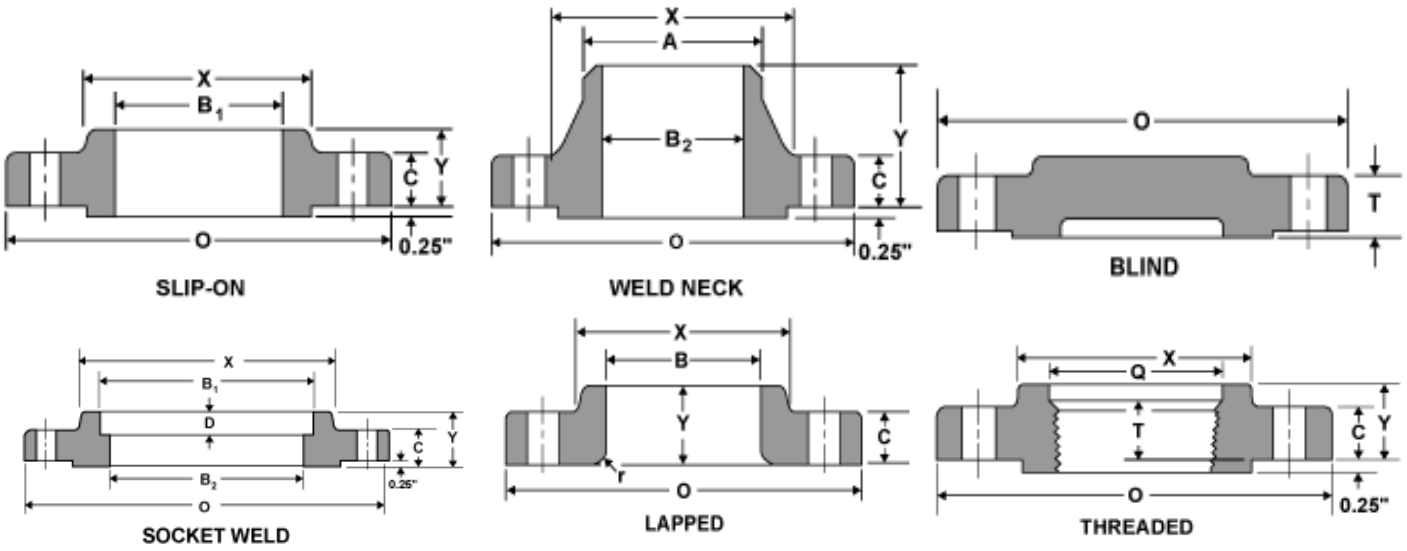
# Class 600 Steel Pipe Flanges
## DIMENSIONAL SPECIFICATIONS




| Pipe Size | O | C | X | A | Y | Y | Y | T | B1 | B | B2 | r | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Outside Diameter of Flange | * Thickness of Flange, Minimum | ** Diameter of Hub | Diameter of Weld Neck | Threaded Slip-On | Lap-Joint | Weld Neck | Thread Length Threaded Flange, Minimum | Slip-On, Minimum | Lap-Joint, Minimum | Weld Neck / Socket Weld | Lap-Joint Flange Radius | Counter-bore Threaded Flange, Minimum |
| | | | | | | | | | | | | | |
| 1/2 | 3.75 | 0.56 | 1.50 | 0.84 | 0.88 | 0.88 | 2.06 | 0.62 | 0.88 | 0.90 | .546 | 0.12 | 0.93 |
| 3/4 | 4.62 | 0.62 | 1.88 | 1.05 | 1.00 | 1.00 | 2.25 | 0.62 | 1.09 | 1.11 | .742 | 0.12 | 1.14 |
| 1 | 4.88 | 0.69 | 2.12 | 1.32 | 1.06 | 1.06 | 2.44 | 0.69 | 1.36 | 1.38 | .957 | 0.12 | 1.41 |
| 1 1/4 | 5.25 | 0.81 | 2.50 | 1.66 | 1.12 | 1.12 | 2.62 | 0.81 | 1.70 | 1.72 | 1.28 | 0.19 | 1.75 |
| 1 1/2 | 6.12 | 0.88 | 2.75 | 1.90 | 1.25 | 1.25 | 2.75 | 0.88 | 1.95 | 1.97 | 1.50 | 0.25 | 1.99 |
| 2 | 6.50 | 1.00 | 3.31 | 2.38 | 1.44 | 1.44 | 2.88 | 1.12 | 2.44 | 2.46 | 1.94 | 0.31 | 2.50 |
| 2 1/2 | 7.50 | 1.12 | 3.94 | 2.88 | 1.62 | 1.62 | 3.12 | 1.25 | 2.94 | 2.97 | 2.32 | 0.31 | 3.00 |
| 3 | 8.25 | 1.25 | 4.62 | 3.50 | 1.81 | 1.81 | 3.25 | 1.38 | 3.57 | 3.60 | 2.90 | 0.38 | 3.63 |
| 3 1/2 | 9.00 | 1.38 | 5.25 | 4.00 | 1.94 | 1.94 | 3.38 | 1.56 | 4.07 | 4.10 | 3.36 | 0.38 | 4.13 |
| 4 | 10.75 | 1.50 | 6.00 | 4.50 | 2.12 | 2.12 | 4.00 | 1.62 | 4.57 | 4.60 | 3.83 | 0.44 | 4.63 |
| 5 | 13.00 | 1.75 | 7.44 | 5.56 | 2.38 | 2.38 | 4.50 | 1.88 | 5.66 | 5.69 | 4.81 | 0.44 | 5.69 |
| 6 | 14.00 | 1.88 | 8.75 | 6.63 | 2.62 | 2.62 | 4.62 | 2.00 | 6.72 | 6.75 | 5.76 | 0.50 | 6.75 |
| 8 | 16.50 | 2.19 | 10.75 | 8.63 | 3.00 | 3.00 | 5.25 | 2.25 | 8.72 | 8.75 | 7.63 | 0.50 | 8.75 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 20.00 | 2.50 | 13.50 | 10.75 | 3.38 | 4.38 | 6.00 | 2.56 | 10.88 | 10.92 | 9.75 | 0.50 | 10.88 |
| 12 | 22.00 | 2.62 | 15.75 | 12.75 | 3.62 | 4.62 | 6.12 | 2.75 | 12.88 | 12.92 | 11.75 | 0.50 | 12.94 |
| 14 | 23.75 | 2.75 | 17.00 | 14.00 | 3.69 | 5.00 | 6.50 | 2.88 | 14.14 | 14.18 | 13.00 | 0.50 | 14.19 |
| 16 | 27.00 | 3.00 | 19.50 | 16.00 | 4.19 | 5.50 | 7.00 | 3.06 | 16.16 | 16.19 | 15.00 | 0.50 | 16.19 |
| 18 | 29.25 | 3.25 | 21.50 | 18.00 | 4.62 | 6.00 | 7.25 | 3.12 | 18.18 | 18.20 | 17.00 | 0.50 | 18.19 |
| 20 | 32.00 | 3.50 | 24.00 | 20.00 | 5.00 | 6.50 | 7.50 | 3.25 | 20.20 | 20.25 | 19.00 | 0.50 | 20.19 |
| 24 | 37.00 | 4.00 | 28.25 | 24.00 | 5.50 | 7.25 | 8.00 | 3.62 | 24.25 | 24.25 | 23.00 | 0.50 | 24.19 |

Class 600 Series A The flanges below from 30" - 48" conform to ASTM B16.47

| Nominal Pipe Size | Outside Diameter of Flange | Minimum Thickness Of Flange | | Length Through Hub | Diameter of Hub | Hub Diameter Top | Raised Face Diameter | Minimum Fillet Radius r1 |
|---|---|---|---|---|---|---|---|---|
| | | Weld Neck | Blind | | | | | |
| 30 | 44.50 | 4.50 | 5.50 | 9.75 | 33.94 | 30.00 | 33.75 | 0.50 |
| 36 | 51.75 | 4.88 | 6.38 | 11.12 | 40.62 | 36.00 | 40.25 | 0.56 |
| 42 | 55.25 | 6.62 | 6.75 | 11.00 | 44.38 | 42.00 | 46.00 | 0.56 |
| 48 | 62.75 | 7.44 | 7.69 | 12.44 | 50.75 | 48.00 | 52.50 | 0.56 |

Class 600 Bolt Patterns & Bolt Lengths >

* Should flanges be required with flat face, shipments may be either the full thickness, or a thickness with raised face removed. (Removal of the raised face produces a non-standard length through the hub.)
** A taper shall not exceed 7 degrees on threaded, slip-on, and lap-joint flanges.

## WELDBEND NOTES:

1. All dimensions are in inches.
2. Calculated flange weights on page 47.
3. Dimensional tolerances on page 70.
4. Standard flange facings on pages 72 & 73.
5. Welding end bevel information on pages 74 & 75.
6. Thread standards on page 76 & 77.
7. Blind flanges may be produced with or without hubs.

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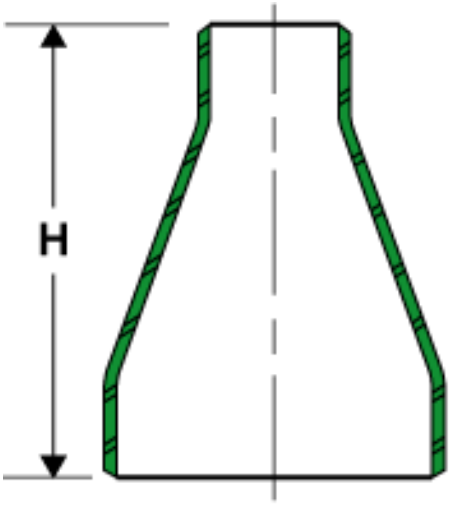
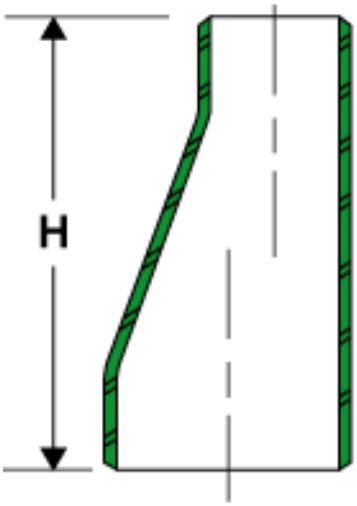
# Concentric & Eccentric Reducers

## STANDARD WEIGHT




Concentric




Eccentric

For Metric Conversion >Click Here

| Nominal Pipe Size | Length (H) | Weight in Pounds |
|---|---|---|
| | | |
| 1 1/4 x 1/2 | 2 | 0.42 |
| 1 x 3/4 | 2 | 0.36 |
| 1 x 1/2 | 2 | 0.36 |
| 3/4 x 1 1/2 | 1 | 0.21 |
| 1 1/2 x 1 1/4 | 2.5 | 0.65 |
| 1 1/2 x 1 | 2.5 | 0.57 |
| 1 1/2 x 3/4 | 2.5 | 0.56 |
| 1 1/2 x 1/2 | 2.5 | 0.56 |
| 1 1/4 x 1 | 2 | 0.48 |
| 1 1/4 x 3/4 | 2 | 0.42 |
| 1 1/4 x 1/2 | 2 | 0.42 |
| 2 1/2 x 2 | 3.5 | 1.6 |
| 2 1/2 x 1 1/2 | 3.5 | 1.5 |
| 2 1/2 x 1 1/4 | 3.5 | 1.4 |

| | | |
|---|---|---|
| 2 1/2 x 1 | 3.5 | 1.3 |
| 2 x 1 1/2 | 3 | 0.94 |
| 2 x 1 1/4 | 3 | 0.88 |
| 2 x 1 | 3 | 0.81 |
| 2 x 3/4 | 3 | 0.74 |
| 3 1/2 x 3 | 4 | 2.8 |
| 3 1/2 x 2 1/2 | 4 | 2.7 |
| 3 1/2 x 2 | 4 | 2.6 |
| 3 1/2 x 1 1/2 | 4 | 2.6 |
| 3 1/2 x 1 1/4 | 4 | 2.5 |
| 3 x 2 1/2 | 3.5 | 2.2 |
| 3 x 2 | 3.5 | 2.0 |
| 3 x 1 1/2 | 3.5 | 1.9 |
| 3 x 1 1/4 | 3.5 | 1.8 |
| 3 x 1 | 3.5 | 1.7 |
| 4 x 3 1/2 | 4 | 3.5 |
| 4 x 3 | 4 | 3.3 |
| 4 x 2 1/2 | 4 | 3.2 |
| 4 x 2 | 4 | 3.1 |
| 4 x 1 1/2 | 4 | 3 |
| 4 x 1 1/4 | 4 | 3 |
| 4 x 1 | 4 | 2.8 |
| 5 x 4 | 5 | 5.5 |
| 5 x 3 1/2 | 5 | 5.3 |
| 5 x 3 | 5 | 5.1 |
| 5 x 2 1/2 | 5 | 4.8 |
| 5 x 2 | 5 | 4.7 |

Next >

* This Size and thickness does not correspond to any pipe schedule number.

1. Dimensions conform to ASME B16.9 & material conforms to ASTM A-234 Grade B
2. For bevel detail see page 50.
3. For dimensional tolerances see page 51.

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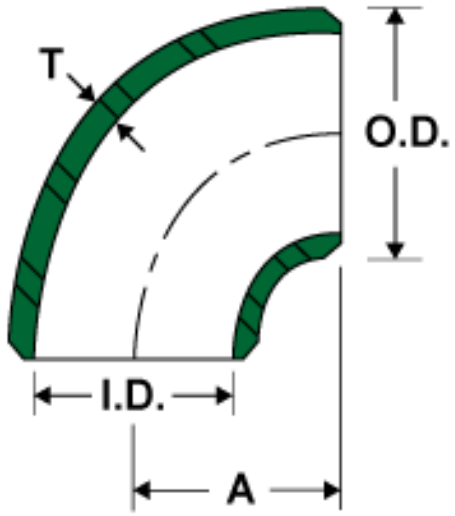


# Short Radius 90º Elbows

## STANDARD WEIGHT

Inches / Pounds

For Metric Units >Click Here

| Nominal Pipe Size | Outside Diameter | Inside Diameter | Wall Thickness (T) | Center To End (A) | Pipe Schedule | Weight In Pounds |
|---|---|---|---|---|---|---|
| 1 | 1.32 | 1.05 | .133 | 1.00 | 40 | 0.25 |
| 1 1/4 | 1.66 | 1.38 | .140 | 1.25 | 40 | 0.39 |
| 1 1/2 | 1.90 | 1.61 | .145 | 1.50 | 40 | 0.53 |
| 2 | 2.38 | 2.07 | .154 | 2.00 | 40 | 0.97 |
| 2 1/2 | 2.88 | 2.47 | .203 | 2.50 | 40 | 2 |
| 3 | 3.50 | 3.07 | .216 | 3.00 | 40 | 3 |
| 3 1/2 | 4.00 | 3.55 | .226 | 3.50 | 40 | 4.3 |
| 4 | 4.50 | 4.03 | .237 | 4.00 | 40 | 6.1 |
| 5 | 5.56 | 5.05 | .258 | 5.00 | 40 | 9.7 |
| 6 | 6.63 | 6.07 | .280 | 6.00 | 40 | 16.7 |
| 8 | 8.63 | 7.98 | .322 | 8.00 | 40 | 32.4 |
| 10 | 10.75 | 10.02 | .365 | 10.00 | 40 | 56.3 |
| 12 | 12.75 | 12.00 | .375 | 12.00 | * | 79.4 |
| 14 | 14.00 | 13.25 | .375 | 14.00 | 30 | 104 |
| 16 | 16.00 | 15.25 | .375 | 16.00 | 30 | 129 |
| 18 | 18.00 | 17.25 | .375 | 18.00 | * | 163 |
| 20 | 20.00 | 19.25 | .375 | 20.00 | 20 | 210 |
| 24 | 24.00 | 23.25 | .375 | 24.00 | 20 | 297 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 30 | 30.00 | 29.25 | .375 | 30.00 | * | 480 |
| 36 | 36.00 | 35.25 | .375 | 36.00 | * | 692 |
| 42 | 42.00 | 41.25 | .375 | 42.00 | * | 967 |
| 48 | 48.00 | 47.25 | .375 | 48.00 | * | 1,340 |

Extra Strong >

* This Size and thickness does not correspond to any pipe schedule number.

1. Dimensions conform to ASME B16.9 & material conforms to ASTM A-234 Grade B
2. For bevel detail see page 50.
3. For dimensional tolerances see page 51.

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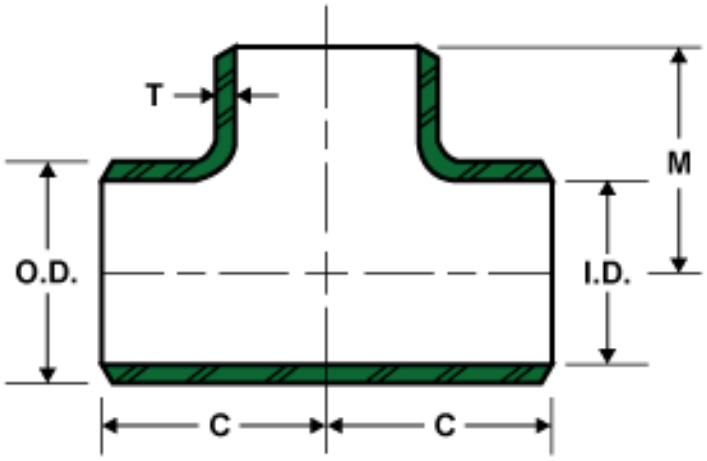
# Straight Tees

## STANDARD WEIGHT

Inches / Pounds




For Metric Units >Click Here

| Nominal Pipe Size | Outside Diameter | Inside Diameter | Wall Thickness (T) | Center To End (C) | Center To End (M) | Pipe Schedule | Weight in Pounds |
|---|---|---|---|---|---|---|---|
| 1/2 | .84 | .622 | .109 | 1.00 | 1.00 | 40 | .35 |
| 3/4 | 1.05 | .824 | .113 | 1.12 | 1.12 | 40 | .50 |
| 1 | 1.32 | 1.049 | .133 | 1.50 | 1.50 | 40 | .75 |
| 1 1/4 | 1.66 | 1.380 | .140 | 1.88 | 1.88 | 40 | 1.3 |
| 1 1/2 | 1.90 | 1.610 | .145 | 2.25 | 2.25 | 40 | 1.9 |
| 2 | 2.38 | 2.067 | .154 | 2.50 | 2.50 | 40 | 3.2 |
| 2 1/2 | 2.88 | 2.469 | .203 | 3.00 | 3.00 | 40 | 5.8 |
| 3 | 3.50 | 3.068 | .216 | 3.38 | 3.38 | 40 | 7.2 |
| 3 1/2 | 4.00 | 3.548 | .226 | 3.75 | 3.75 | 40 | 9.5 |
| 4 | 4.50 | 4.026 | .237 | 4.12 | 4.12 | 40 | 12.7 |
| 5 | 5.56 | 5.047 | .258 | 4.88 | 4.88 | 40 | 20.8 |
| 6 | 6.62 | 6.065 | .280 | 5.62 | 5.62 | 40 | 33.1 |
| 8 | 8.62 | 7.981 | .322 | 7.00 | 7.00 | 40 | 56.5 |
| 10 | 10.75 | 10.020 | .365 | 8.50 | 8.50 | 40 | 90.9 |
| 12 | 12.75 | 12.000 | .375 | 10.00 | 10.00 | * | 136 |
| 14 | 14.00 | 13.250 | .375 | 11.00 | 11.00 | 30 | 162 |
| 16 | 16.00 | 15.250 | .375 | 12.00 | 12.00 | 30 | 206 |
| 18 | 18.00 | 17.250 | .375 | 13.50 | 13.50 | * | 272 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 20 | 20.00 | 19.250 | .375 | 15.00 | 15.00 | 20 | 350 |
| 24 | 24.00 | 23.250 | .375 | 17.00 | 17.00 | 20 | 508 |
| 30 | 30.00 | 29.240 | .380 | 22.00 | 22.00 | * | 835 |
| 36 | 36.00 | 35.240 | .380 | 26.50 | 26.50 | * | 1,294 |
| 42 | 42.00 | 41.240 | .380 | 30.00 | 28.00 | * | 1,495 |
| 48 | 48.00 | 47.240 | .380 | 35.00 | 33.00 | * | 2,300 |

Extra Strong >

* This Size and thickness does not correspond to any pipe schedule number.

1. Dimensions conform to ASME B16.9 & material conforms to ASTM A-234 Grade B
2. For bevel detail see page 50.
3. For dimensional tolerances see page 51.

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# Fitting Summary Data Sheet

Even with all the advances in technology today, the wholly welded piping system has for decades remained the best choice for use in high pressure and high temperature application. Many piping jobs in schools, industrial plants, refineries and factories have benefited from the inherent advantages of a completely welded system. It becomes a closed container joining pipes, valves, fittings, and flanges. A welded joint actually becomes part of the pipe, minimizing leak potential. This provides greater margins of safety, especially under conditions of high internal pressures. Additionally, welding fittings form a continuous metal structure with the pipe, adding forged-in strength to any piping system. Furthermore, smooth forged fittings simplify insulation and take up less space.

## ASTM A 234

## Scope

This standard covers wrought carbon steel fittings of seamless and welded construction which are manufactured to the dimensional specifications of ASME B16.9 and B16.28. These fittings are primarily for use in pressure piping and in pressure vessel fabrication for service at moderate and elevated temperatures.

## Materials

The starting material for fittings shall consist of killed steel, forgings, bars, plates, seamless or fusion-welded tubular products with filler metal added and shall conform to the the chemical requirements of ASTM A 234. Unless otherwise specified, carbon steel plates may be either coarse grain or fine grain practice.

## Manufacture

Forging or shaping operations are performed by hammering, pressing, piercing, extruding, upsetting, rolling, bending, machining, or by a combination of two or more of these operations. The forming process shall be applied so that it will not produce injurious imperfections in the fittings.

## Heat Treatment

Hot-formed WPB fittings, upon which the final forming operation is completed at a temperature above 1150ºF and below 1800ºF, need not be heat treated. Cold-Formed WPB fittings, upon which the final forming operation is completed at a temperature below 1150ºF, shall be normalized, or shall be stress relieved at 1100ºF to 1275ºF.

## Chemical requirements (in %):

| Carbon | Manganese | Phosphorus (max) | Sulfur (max) |
|---|---|---|---|
| .30 max | .29-1.06 | .050 | .058 |

| Silicon | Chromium | Molybdenum | Nickel | Copper |
|---|---|---|---|---|
| .10 min | .40 max | .15 max | .40 max | .40 max |

| Vanadium | Columbium |
|---|---|
| .08 max | .02 max |

## Mechanical requirements:

| | | |
|---|---|---|
| Tensile Strength | | 60,000-85,000 psi |
| Yield Strength (min) | | 35,000 psi |
| Elongation | - Longitudinal: | 22% |
| | - Transverse: | 14% |

## Dimensions

Butt-welding fittings and butt-welding short radius elbows and returns purchased in accordance with this specification shall conform to the dimensions and tolerances given in the latest revision of ANSI B16.9 and B16.28, respectively.

## Certification

When requested by the purchaser, the manufacturer shall provide a certificate of compliance to this specification. If requested to provide test reports, the manufacturer shall also provide the following where applicable:

* Chemical analysis results. When the amount of an element is less than .02%, the analysis for that element is reported as "<0.02%."
* Tensile property results, report the yield strength and ultimate strength in ksi [or MPa] and elongation in percent,
* Hardness acceptable in accordance with Section 10 of ASTM A-234,
* Seamless or Welded,
* Type of Heat Treatment, if any,
* Starting material, specifically pipe, plate, etc.,
* Statement regarding radiographic or ultrasonic examination.
* Any supplemental testing required by the purchase order.

## Product Marking

All fittings shall have the prescribed information stamped or otherwise suitable marked on each fitting in accordance with ASTM A 234/MSS SP-25. A Weldbend fitting is marked as follows: Weldbend's Name, Nominal Pipe Size, Pipe Wall Thickness Designation, Material Grade (WPB/WPC) and Heat Identification Number.

Note: All information contained in this document, and for a complete description of all requirements, refer to ASTM A 105. Sheets are subject to change without notice.

# Flange Summary Data Sheet

Even with all the advances in technology today, the wholly welded piping system has for decades remained the best choice for use in high pressure and high temperature application. Many piping jobs in schools, industrial plants, refineries, and factories have benefited from the inherent advantages of a completely welded system. It becomes a closed container joining pipes, valves, fittings, and flanges. A welded joint actually becomes part of the pipe, minimizing leak potential. This provides greater margins of safety, especially under conditions of high internal pressures. Additionally, welding fittings form a continuous metal structure with the pipe, adding forged-in strength to any piping system. Furthermore, smooth forged flanges simplify insulation and take up less space.

## ASTM A 105

### Scope

This standard covers forged carbon steel piping components for ambient- and higher-temperature service in pressure systems. Flanges are ordered either to dimensions specified by the purchaser or to dimensional specifications such as ASME 16.5 and API 6A. Forgings made to ASTM A 105 are normally limited to a maximum weight of 10,000 lb.

### Materials

Weldbend flanges are made by hammering, pressing, rolling and/or machining cast or forged bars, billets or slabs. These adhere to the extent described in the following sections.

### Manufacture

ASTM A 105 covers the requirements for forged steel components as finished products only.
The requirements for raw materials are covered by the standards specified in Section 2: Referenced Documents of ASTM A 105.

### Heat Treatment

Heat treatment is not a mandatory requirement of this specification except for the following piping components:
* Flanges above Class 300,
* Flanges of special design where the design pressure at the design temperature exceeds the pressure-temperature ratings of Class 300, Group 1.1,
* Flanges of special design where the design pressure or design temperature is not known.

Heat treatment, when required by the above, shall be annealing, normalizing, normalizing and tempering, or quenching and tempering in accordance with ASTM A 961.

### Chemical requirements (in %):

| Carbon | Manganese | Phosphorus (max) | Sulfur (max) |
|---|---|---|---|
| .35 max | .60-1.05 | .035 | .040 |

| Silicon | Copper | Nickel | Chromium |
|---|---|---|---|
| .10-.35 | .40 max | .40 max | .30 max |

| Molybdenum | Vanadium | Columbium |
|---|---|---|
| .12 max | .08 max | .02 max |

### Mechanical requirements:

| | |
|---|---|
| Tensile Strength (min) | 70,000 psi |
| Yield Strength (min) | 36,000 psi |
| Basic minimum elongation for walls 5/16 in. and over in thickness, strip tests. | 30% |
| Reduction of area (min) | 30% |
| Hardness, HB (max) | 187 |

### Dimensions

Weldbend flanges are manufactured in accordance with ASME B 16.5 (24" NPS and smaller) and ASME B 16.47 (26" - 60" NPS).

### Certification

For forgings made to specified dimensions agreed upon by the purchaser, and for forgings made to dimensional standards, the application of identification marks, as required by ASTM A 961, shall be the certification that the forgings have been furnished in accordance with the requirements of this standard. The specification designation included on test reports shall include the year of issue and revision letter, if any.
Test Reports: When test reports are required, Weldbend will also provide the following, if applicable:
*Type of heat treatment,
*Tensile property results, i.e., yield strength and ultimate strength in ksi, elongation and reduction in area, in percent,
*Chemical analysis results,
*Hardness results, and,
*Any supplementary testing required by the purchase order.

### Product Marking

All flanges shall have the prescribed information stamped or otherwise suitable marked on each flange in accordance with the Standard/MSS SP-25. A Weldbend flange is marked as follows:
Weldbend's Name, Nominal Pipe Size, A105/SA105, Bore Designation, Heat Identification Number and manufacture date.

Note: All information contained in this document, and for a complete description of all requirements, refer to ASTM A 105. Sheets are subject to change without notice.