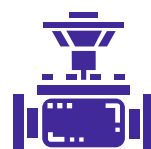


BUTTWELD

FITTINGS

GENERAL DIMENSIONS AND DATA



GOVAL

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MANUFACTURER & DISTRIBUTOR



GOVAL ITALY S.r.L

GOVAL ITALY established in 2009, a fast-growing company based in Milano Italy, specializes in the supply of valves, pipes, and pipe fittings to variety of industries such as Gas & Oil and Water.

Our policy is to provide high end products sourced from quality assessed manufacturers, whose products meet the EU standards.

Furthermore, we operate internationally and exports products to customers overseas. We make sure that we provide a streamlined process for all of our clients.

Our business model enables manufacturers to have full access to global trade, empowering them to focus on their core markets. We provide our retail partners with high demand products and offer direct to customer fulfillment to help build their extended aisle assortments.

Why US:

Privileges to work with us:

- We stock all of our products in warehouse located in Milano industrial area. We are ready to ship and fulfill your immediate needs.
- We carry a very wide range of valves, pipes and fittings, covering a wide range of corporate needs.
- We are constantly revamping logistics and supply chain processes, so as to keep costs down and our prices competitive.

Our Mission

We adopt the latest technology to guarantee excellent quality and services.

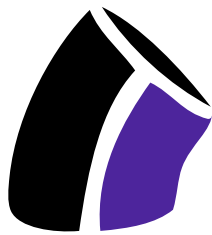
Our Vision

To make a difference through providing the technical solutions that appropriate to every customer's needs.

Types of Fittings

Manufacturing and Material Standards

Fittings covered in this booklet are only the most commonly used types, grades and sizes.



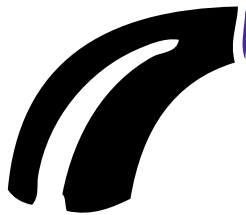
45° Elbows



90° Elbows



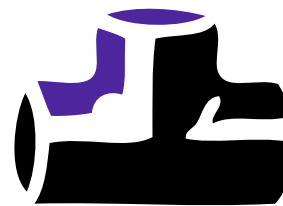
Caps



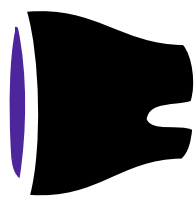
90° Reducing Elbows



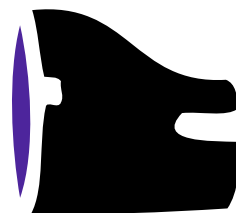
45° and 90° 3R Elbows



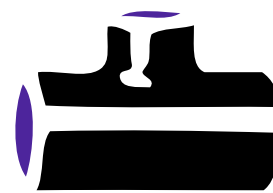
Tees Straight



Reducers Concentric



Reducers Eccentric



Tees Reducing

Dimensions:*** ANSI B36.10, ANSI B16.9, ANSI B16.28

** All dimensions are shown in inches.

Dimensions of Seamless and Welded Pipe

ASME B36.10 API Std. 5L

Nominal Wall Thickness for all Schedules with - 12.5% Values Number in () in Wall Thickness Column is Minimum Wall.

| Nom Size | Nom. OD | Sch.5 | | Sch.10 | | Gas Dist. | | Sch.20 | |
|----------|---------|--------|-------------|--------|------------|-----------|------------|--------|------------|
| | | ID | Wall | ID | Wall | ID | Wall | ID | Wall |
| 1/8 | .405 | ... | ... | ... | ... | ... | ... | ... | ... |
| 1/4 | .540 | ... | ... | ... | ... | ... | ... | ... | ... |
| 3/8 | .675 | ... | ... | ... | ... | ... | ... | ... | ... |
| 1/2 | .840 | ... | ... | ... | ... | ... | ... | ... | ... |
| 3/4 | 1.050 | .920 | .065(.057) | .884 | .083(.073) | ... | ... | ... | ... |
| 1 | 1.315 | 1.185 | .065(.057) | 1.097 | .109(.095) | ... | ... | ... | ... |
| 1 1/4 | 1.660 | 1.530 | .065 (.057) | 1.442 | .109(.095) | ... | ... | ... | ... |
| 1 1/2 | 1.900 | 1.770 | .065(.057) | 1.682 | .109(.095) | ... | ... | ... | ... |
| 2 | 2.375 | 2.245 | .065(.057) | 2.157 | .109(.095) | ... | ... | ... | ... |
| 2 1/2 | 2.875 | 2.709 | .083 (.073) | 2.635 | .120(.105) | ... | ... | ... | ... |
| 3 | 3.500 | 3.334 | .083(.073) | 3.260 | .120(.105) | ... | ... | ... | ... |
| 3 1/2 | 4.000 | 3.834 | .083(.073) | 3.760 | .120(.105) | ... | ... | ... | ... |
| 4 | 4.500 | 4.334 | .083(.073) | 4.260 | .120(.105) | 4.124 | .188(.164) | ... | ... |
| 5 | 5.563 | 5.345 | .109(.095) | 5.295 | .134(.117) | ... | ... | ... | ... |
| 6 | 6.625 | 6.407 | .109(.095) | 6.357 | .134(.117) | 6.187 | .219(.192) | ... | ... |
| 8 | 8.625 | 8.407 | .109(.095) | 8.329 | .148(.130) | 8.187 | .219(.192) | 8.125 | .250(.219) |
| 10 | 10.750 | 10.482 | .134(.117) | 10.420 | .165(.144) | 10.312 | .219(.192) | 10.250 | .250(.219) |
| 12 | 12.750 | 12.438 | .156(.136) | 12.390 | .180(.158) | 12.250 | .250(.192) | 12.250 | .250(.219) |
| 14 | 14.000 | ... | ... | 13.500 | .250(.219) | 13.500 | .250(.192) | 13.376 | .250(.219) |
| 16 | 16.000 | ... | ... | 15.500 | .250(.219) | 15.500 | .250(.192) | 15.376 | .312(.273) |
| 18 | 18.000 | ... | ... | 17.500 | .250(.219) | 17.500 | .250(.192) | 17.376 | .312(.273) |
| 20 | 20.000 | ... | ... | 19.500 | .250(.219) | 19.500 | .250(.192) | STD | |
| 22 | 22.000 | ... | ... | 21.500 | .250(.219) | ... | ... | STD | |
| 24 | 24.000 | ... | ... | 23.500 | .250(.219) | 23.500 | .250(.192) | STD | |
| 26 | 26.000 | ... | ... | 25.376 | .312(.273) | ... | ... | XS | |
| 28 | 28.000 | ... | ... | 27.376 | .312(.273) | ... | ... | XS | |
| 30 | 30.000 | ... | ... | 29.376 | .312(.273) | ... | ... | XS | |
| 32 | 32.000 | ... | ... | 31.376 | .312(.273) | ... | ... | XS | |
| 34 | 34.000 | ... | ... | 33.376 | .312(.273) | ... | ... | XS | |
| 36 | 36.000 | ... | ... | 35.376 | .312(.273) | ... | ... | XS | |
| 38 | 38.000 | ... | ... | ... | ... | ... | ... | ... | ... |
| 40 | 40.000 | ... | ... | ... | ... | ... | ... | ... | ... |
| 42 | 42.000 | ... | ... | ... | ... | ... | ... | ... | ... |
| 44 | 44.000 | ... | ... | ... | ... | ... | ... | ... | ... |
| 46 | 46.000 | ... | ... | ... | ... | ... | ... | ... | ... |
| 48 | 48.000 | ... | ... | ... | ... | ... | ... | ... | ... |

Dimensions of Seamless and Welded Pipe

ASME B36.10 API Std. 5L

Nominal Wall Thickness for all Schedules with - 12.5% Values Number in () in Wall Thickness Column is Minimum Wall.

| Nom. Size | Nom. OD | STD. | | Sch 30 | | Sch. 40 | | XS | |
|-----------|---------|--------|------------|--------|------------|---------|------------|--------|------------|
| | | ID | Wall | ID | Wall | ID | Wall | ID | Wall |
| 1/8 | .405 | .269 | .068(.060) | ... | ... | STD | | .215 | .095(.083) |
| 1/4 | .540 | .364 | .088(.077) | ... | ... | STD | | .302 | .119(.104) |
| 3/8 | .675 | .493 | .091(.080) | ... | ... | STD | | .423 | .126(.110) |
| 1/2 | .840 | .622 | .109(.096) | ... | ... | STD | | .546 | .147(.129) |
| 3/4 | 1.050 | .824 | .113(.099) | ... | ... | STD | | .742 | .154(.135) |
| 1 | 1.315 | 1.049 | .133(.116) | ... | ... | STD | | .957 | .179(.157) |
| 1 1/4 | 1.660 | 1.380 | .140(.122) | ... | ... | STD | | 1.278 | .191(.167) |
| 1 1/2 | 1.900 | 1.610 | .145(.127) | ... | ... | STD | | 1.500 | .200(.175) |
| 2 | 2.375 | 2.067 | .154(.135) | ... | ... | STD | | 1.939 | .218(.191) |
| 2 1/2 | 2.875 | 2.469 | .203(.178) | ... | ... | STD | | 2.323 | .276(.242) |
| 3 | 3.500 | 3.068 | .216(.189) | ... | ... | STD | | 2.900 | .300(.262) |
| 3 1/2 | 4.000 | 3.548 | .226(.198) | ... | ... | STD | | 3.364 | .318(.278) |
| 4 | 4.500 | 4.026 | .237(.207) | ... | ... | STD | | 3.826 | .337(.295) |
| 5 | 5.563 | 5.047 | .258(.226) | ... | ... | STD | | 4.813 | .375(.328) |
| 6 | 6.625 | 6.065 | .280(.245) | ... | ... | STD | | 5.761 | .432(.378) |
| 8 | 8.625 | 7.981 | .322(.282) | 8.071 | .277(.242) | STD | | 7.625 | .500(.438) |
| 10 | 10.750 | 10.020 | .365(.319) | 10.136 | .307(.269) | STD | | 9.750 | .500(.438) |
| 12 | 12.750 | 12.000 | .315(.328) | 12.090 | .330(.289) | 11.938 | .406(.355) | 11.750 | .500(.438) |
| 14 | 14.000 | 13.250 | .375(.328) | STD | | 13.124 | .438(.383) | 13.000 | .500(.438) |
| 16 | 16.000 | 15.250 | .375(.328) | STD | | XS | | 15.000 | .500(.438) |
| 18 | 18.000 | 17.250 | .375(.328) | 17.124 | .438(.383) | 16.876 | .562(.492) | 17.000 | .500(.438) |
| 20 | 20.000 | 19.250 | .375(.328) | XS | | 18.812 | .594(.519) | 19.000 | .500(.438) |
| 22 | 22.000 | 21.250 | .375(.328) | XS | | ... | ... | 21.000 | .500(.438) |
| 24 | 24.000 | 23.250 | .375(.328) | 22.876 | .562(.492) | 22.624 | .688(.602) | 23.000 | .500(.438) |
| 26 | 26.000 | 25.250 | .375(.328) | ... | ... | ... | ... | 25.000 | .500(.438) |
| 28 | 28.000 | 27.250 | .375(.328) | 26.750 | .625(.547) | ... | ... | 27.000 | .500(.438) |
| 30 | 30.000 | 29.250 | .375(.328) | 28.750 | .625(.547) | ... | ... | 29.000 | .500(.438) |
| 32 | 32.000 | 31.250 | .375(.328) | 30.750 | .625(.547) | 30.624 | .688(.602) | 31.000 | .500(.438) |
| 34 | 34.000 | 33.250 | .375(.328) | 32.750 | .625(.547) | 32.624 | .688(.602) | 33.000 | .500(.438) |
| 36 | 36.000 | 35.250 | .375(.328) | 34.750 | .625(.547) | 34.500 | .750(.656) | 35.000 | .500(.438) |
| 38 | 38.000 | 37.250 | .375(.328) | ... | ... | ... | ... | ... | .500(.438) |
| 40 | 40.000 | 39.250 | .375(.328) | ... | ... | ... | ... | ... | .500(.438) |
| 42 | 42.000 | 41.250 | .375(.328) | 40.750 | .625(.547) | 40.500 | .750(.656) | 41.000 | .500(.438) |
| 44 | 44.000 | 43.250 | .375(.328) | ... | ... | ... | ... | 43.000 | .500(.438) |
| 46 | 46.000 | 45.250 | .375(.328) | ... | ... | ... | ... | 45.000 | .500(.438) |
| 48 | 48.000 | 47.250 | .375(.328) | ... | ... | ... | ... | 47.000 | .500(.438) |

Dimensions of Seamless and Welded Pipe

ASME B36.10 API Std. 5L

Nominal Wall Thickness for all Schedules with - 12.5% Values Number in () in Wall Thickness Column is Minimum Wall.

| Nom. Size | Nom. OD | Sch. 60 | | Sch. 80 | | Sch. 100 | | Sch. 120 | |
|-----------|---------|---------|------------|---------|--------------|----------|--------------|----------|--------------|
| | | ID | Wall | ID | Wall | ID | Wall | ID | Wall |
| 1/8 | .405 | ... | ... | XS | | ... | ... | ... | ... |
| 1/4 | .540 | ... | ... | XS | | ... | ... | ... | ... |
| 3/8 | .675 | ... | ... | XS | | ... | ... | ... | ... |
| 1/2 | .840 | ... | ... | XS | | ... | ... | ... | ... |
| 3/4 | 1.050 | ... | ... | XS | | ... | ... | ... | ... |
| 1 | 1.315 | ... | ... | XS | | ... | ... | ... | ... |
| 1 1/4 | 1.660 | ... | ... | XS | | ... | ... | ... | ... |
| 1 1/2 | 1.900 | ... | ... | XS | | ... | ... | ... | ... |
| 2 | 2.375 | ... | ... | XS | | ... | ... | ... | ... |
| 2 1/2 | 2.875 | ... | ... | XS | | ... | ... | ... | ... |
| 3 | 3.500 | ... | ... | XS | | ... | ... | ... | ... |
| 3 1/2 | 4.000 | ... | ... | XS | | ... | ... | ... | ... |
| 4 | 4.500 | ... | ... | XS | | ... | ... | 3.624 | .438(.383) |
| 5 | 5.563 | ... | ... | XS | | ... | ... | 4.563 | .500(.438) |
| 6 | 6.625 | ... | ... | XS | | ... | ... | 5.501 | .562(.492) |
| 8 | 8.625 | 7.813 | .406(.355) | XS | | 7.437 | .594 (.520) | 7.187 | .719(.629) |
| 10 | 10.750 | XS | | 9.562 | .594(.520) | .9312 | .719(.629) | 9.062 | .844(.739) |
| 12 | 12.750 | 11.626 | .562(.492) | 11.374 | .688(.602) | 11.062 | .844(.738) | 10.750 | 1.000(.875) |
| 14 | 14.000 | 12.812 | .594(.520) | 12.500 | .750(.656) | 12.124 | .938(.821) | 11.812 | 1.094(.957) |
| 16 | 16.000 | 14.688 | .656(.574) | 14.312 | .844(.739) | 13.938 | 1.031(.902) | 13.562 | 1.219(1.067) |
| 18 | 18.000 | 16.500 | .750(.656) | 16.124 | .938(.821) | 15.688 | 1.156(.984) | 15.250 | 1.375(1.203) |
| 20 | 20.000 | 18.376 | .812(.711) | 17.938 | 1.031(.902) | 17.438 | 1.281(1.121) | 17.000 | 1.500(1.312) |
| 22 | 22.000 | 20.250 | .875(.766) | 19.750 | 1.125(.984) | 19.250 | 1.375(1.203) | 18.750 | 1.625(1.422) |
| 24 | 24.000 | 22.062 | .969(.848) | 21.562 | 1.219(1.067) | 20.938 | 1.531(1.340) | 20.376 | 1.812(1.586) |
| 26 | 26.000 | | | | | 24.500 | .750(202.3) | 24.000 | 1.000(267.0) |
| 28 | 28.000 | | | | | 26.500 | .750(218.3) | 26.000 | 1.000(288.4) |
| 30 | 30.000 | | | | | 28.500 | .750(234.3) | 28.000 | 1.000(309.7) |
| 32 | 32.000 | | | | | 30.500 | .750(250.3) | 30.000 | 1.000(331.1) |
| 34 | 34.000 | | | | | 32.500 | .750(266.3) | 32.000 | 1.000(352.4) |
| 36 | 36.000 | | | | | 34.250 | .875(328.2) | 34.000 | 1.000(373.8) |
| 38 | 38.000 | | | | | | | | |
| 40 | 40.000 | | | | | | | | |
| 42 | 42.000 | | | | | 40.500 | .750(330.4) | 40.000 | 1.000(437.9) |
| 44 | 44.000 | | | | | | | | |
| 46 | 46.000 | | | | | | | | |
| 48 | 48.000 | | | | | 46.500 | .750(378.5) | 46.000 | 1.000(502.0) |

*Not in ANSI B36.10 **Not in API Common Non-Schedule Walls noted in red.

Dimensions of Seamless and Welded Pipe

ASME B36.10 API Std. 5L

Nominal Wall Thickness for all Schedules with - 12.5% Values Number in () in Wall Thickness Column is Minimum Wall.

| Nom. Size | Nom. OD | Sch. 140 | | Sch. 160 | | XXS | | API | |
|-----------|---------|----------|--------------|----------|--------------|----------|--------------|---------|------------|
| | | ID | Wall | ID | Wall | ID | Wall | ID | Wall |
| 1/8 | .405 | ... | ... | ... | ... | ... | ... | ... | ... |
| 1/4 | .540 | ... | ... | ... | ... | ... | ... | ... | ... |
| 3/8 | .675 | ... | ... | ... | ... | ... | ... | ... | ... |
| 1/2 | .840 | ... | ... | .464 | .188(.165) | .252 | .294(.257) | ... | ... |
| 3/4 | 1.050 | ... | ... | .612 | .219(.192) | .434 | .308(.270) | ... | ... |
| 1 | 1.315 | ... | ... | .815 | .250(.219) | .599 | .358(.313) | ... | ... |
| 1 1/4 | 1.660 | ... | ... | 1.160 | .250(.219) | .896 | .382(.334) | ... | ... |
| 1 1/2 | 1.900 | ... | ... | 1.338 | .281(.246) | 1.100 | .400(.350) | ... | ... |
| 2 | 2.375 | ... | ... | 1.687 | .344(.301) | 1.503 | .436(.382) | ... | ... |
| 2 1/2 | 2.875 | ... | ... | 2.125 | .375(.328) | 1.771 | .552(.483) | ... | ... |
| 3 | 3.500 | ... | ... | 2.624 | .438(.383) | 2.300 | .600(.525) | 3.250 | .125(.109) |
| 3 1/2 | 4.000 | ... | ... | ... | ... | 2.728* | .636(.557)* | ... | ... |
| 4 | 4.500 | ... | ... | 3.438 | .531(.465) | 3.152 | .674(.590) | 4.250 | .125(.109) |
| 5 | 5.563 | ... | ... | 4.313 | .625(.547) | 4.063 | .750(.656) | ... | ... |
| 6 | 6.625 | ... | ... | 5.187 | .719(.629) | 4.897 | .864(.756) | 6.313** | .156(.136) |
| 8 | 8.625 | .10.020 | .216(.189) | 6.813 | .906(.793) | 6.875 | .875(.766) | 8.281** | .172(.150) |
| 10 | 10.750 | 12.000 | .266(.198) | 8.500 | 1.125(.984) | SCH. 140 | | 10.374 | .188(.164) |
| 12 | 12.750 | 13.250 | .237(.207) | 10.126 | 1.312(1.148) | SCH. 120 | | 12.344 | .203(.178) |
| 14 | 14.000 | 15.250 | .258(.226) | 11.188 | 1.406(1.230) | ... | ... | ... | ... |
| 16 | 16.000 | 17.250 | .280(.245) | 12.812 | 1.594(1.395) | ... | ... | ... | ... |
| 18 | 18.000 | 19.250 | .322(.282) | 14.438 | 1.781(1.558) | ... | ... | ... | ... |
| 20 | 20.000 | 21.250 | .365(.319) | 16.062 | 1.969(1.723) | ... | ... | ... | ... |
| 22 | 22.000 | 23.250 | .375(.328) | 17.750 | 2.125(1.859) | ... | ... | ... | ... |
| 24 | 24.000 | 25.250 | .375(.328) | 19.312 | 2.344(2.051) | ... | ... | ... | ... |
| 26 | 26.000 | 23.500 | 1.250(330.4) | 23.000 | 1.500(392.5) | 22.000 | 2.000(512.6) | | |
| 28 | 28.000 | 25.500 | 1.250(357.1) | 25.000 | 1.500(424.5) | 24.000 | 2.000(555.4) | | |
| 30 | 30.000 | 27.500 | 1.250(383.8) | 27.000 | 1.500(456.6) | 26.000 | 2.000(598.1) | | |
| 32 | 32.000 | 29.500 | 1.250(410.5) | 29.000 | 1.500(488.6) | 28.000 | 2.000(640.8) | | |
| 34 | 34.000 | 31.500 | 1.250(437.2) | 31.000 | 1.500(520.7) | 30.000 | 2.000(683.5) | | |
| 36 | 36.000 | 33.500 | 1.250(463.9) | 33.000 | 1.500(552.7) | 32.000 | 2.000(726.2) | | |
| 38 | 38.000 | | | | | | | | |
| 40 | 40.000 | | | | | | | | |
| 42 | 42.000 | 39.500 | 1.250(544.0) | 39.000 | 1.500(648.8) | 38.000 | 2.000(854.4) | | |
| 44 | 44.000 | | | | | | | | |
| 46 | 46.000 | | | | | | | | |
| 48 | 48.000 | 45.500 | 1.250(624.1) | 45.000 | 1.500(744.9) | 44.000 | 2.000(982.6) | | |

*Not in ANSI B36.10 **Not in API Common Non-Schedule Walls noted in red.

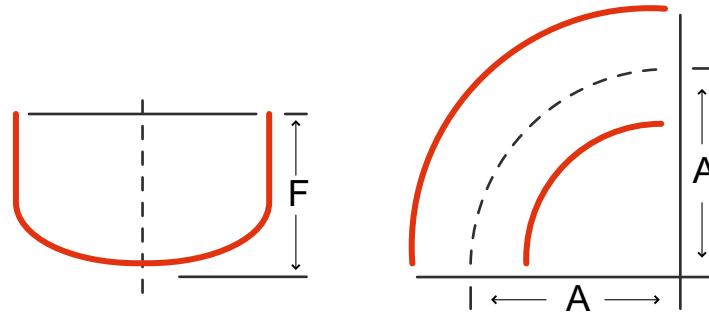
General Dimensions of Welding Fittings

ASME B16.9

ASME B36.10

ASME B16.28

Elbows & Caps



| Nom. Pipe Size | Outside Diameter | Nominal Wall Thickness (4x) | | | | A | B |
|----------------|------------------|-----------------------------|------|-------|-------|---------------|--------|
| | | Std | XS | 160 | XXS | | |
| 1/2 | 0.840 | .109 | .147 | .188 | .294 | 1 1/2 | 5/8 |
| 3/4 | 1.050 | .113 | .154 | .219 | .308 | 1 1/2 Options | 7/16 |
| 1 | 1.315 | .133 | .179 | .250 | .358 | 1 1/2 | 7/8 |
| 1 1/4 | 1.660 | .140 | .191 | .250 | .382 | 1 7/8 | 1 |
| 1 1/2 | 1.900 | .145 | .200 | .281 | .400 | 2 1/4 | 1 1/8 |
| 2 | 2.375 | .154 | .218 | .344 | .436 | 3 | 1 3/8 |
| 2 1/2 | 2.875 | .203 | .276 | .375 | .552 | 3 3/4 | 1 3/4 |
| 3 | 3.500 | .216 | .300 | .438 | .600 | 4 1/2 | 2 |
| 3 1/2 | 4.400 | .226 | .318 | ... | .636 | 5 1/4 | 2 1/4 |
| 4 | 4.500 | .237 | .337 | .531 | .674 | 6 | 2 1/2 |
| 5 | 5.563 | .258 | .375 | .625 | .750 | 7 1/2 | 3 1/8 |
| 6 | 6.625 | .280 | .432 | .719 | .864 | 9 | 3 3/4 |
| 8 | 8.625 | .322 | .500 | .906 | .875 | 12 | 5 |
| 10 | 10.750 | .365 | .500 | 1.125 | 1.000 | 15 | 6 1/4 |
| 12 | 12.750 | .375 | .500 | 1.312 | 1.000 | 18 | 7 1/2 |
| 14 | 14.000 | .375 | .500 | 1.406 | ... | 21 | 8 3/4 |
| 16 | 16.000 | .375 | .500 | 1.594 | ... | 24 | 10 |
| 18 | 18.000 | .375 | .500 | 1.781 | ... | 27 | 11 1/4 |
| 20 | 20.000 | .375 | .500 | 1.969 | ... | 30 | 12 1/2 |
| 22 | 22.000 | .375 | .500 | 2.125 | ... | 33 | 13 1/2 |
| 24 | 24.000 | .375 | .500 | 2.344 | ... | 36 | 15 |
| 26 | 26.000 | .375 | .500 | ... | ... | 39 | 16 |
| 28 | 28.000 | .375 | .500 | ... | ... | 42 | 17 1/4 |
| 30 | 30.000 | .375 | .500 | ... | ... | 45 | 18 1/2 |
| 32 | 32.000 | .375 | .500 | ... | ... | 48 | 19 3/4 |
| 34 | 34.000 | .375 | .500 | ... | ... | 51 | 21 |
| 36 | 36.000 | .375 | .500 | ... | ... | 54 | 22 1/4 |
| 38 | 38.000 | .375 | .500 | ... | ... | 57 | 23.62 |
| 40 | 40.000 | .375 | .500 | ... | ... | 60 | 24.88 |
| 42 | 42.000 | .375 | .500 | ... | ... | 63 | 26 |
| 44 | 44.000 | .375 | .500 | ... | ... | 66 | 27.38 |
| 46 | 46.000 | .375 | .500 | ... | ... | 69 | 28.62 |
| 48 | 48.000 | .375 | .500 | ... | ... | 72 | 29.88 |

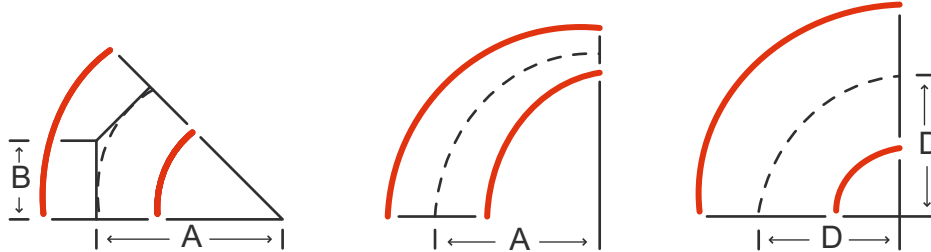
General Dimensions of Welding Fittings

ASME B16.9

ASME B36.10

ASME B16.28

Elbows



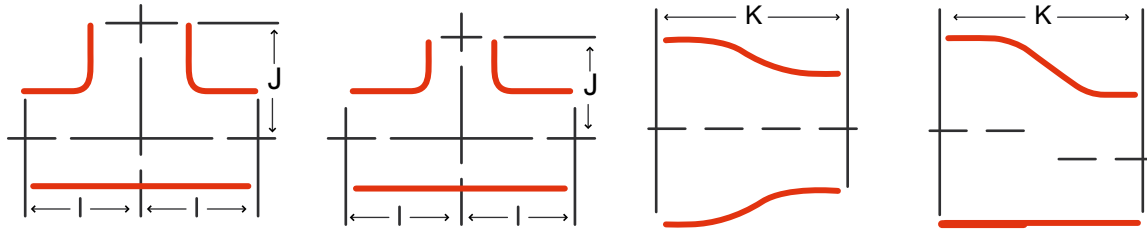
| D | | For "XS" Wall Thickness & Less | For Wall Thickness Greater than "XS" | | | Nom. Pipe Size |
|-----|--|--------------------------------|--------------------------------------|--|--|----------------|
| ... | | 1 | 1 | | | ½ |
| ... | | 1 | 1 | | | ¾ |
| 1 | | 1 ½ | 1 ½ | | | 1 |
| 1 ¼ | | 1 ½ | 1 ½ | | | 1 ¼ |
| 1 ½ | | 1 ½ | 1 ½ | | | 1 ½ |
| 2 | | 1 ½ | 1 ¾ | | | 2 |
| 2 ½ | | 1 ½ | 2 | | | 2 ½ |
| 3 | | 2 | 2 ½ | | | 3 |
| 3 ½ | | 2 ½ | 3 | | | 3 ½ |
| 4 | | 2 ½ | 3 | | | 4 |
| 5 | | 3 | 3 ½ | | | 5 |
| 6 | | 3 ½ | 4 | | | 6 |
| 8 | | 4 | 5 | | | 8 |
| 10 | | 5 | 6 | | | 10 |
| 12 | | 6 | 7 | | | 12 |
| 14 | | 6 ½ | 7 ½ | | | 14 |
| 16 | | 7 | 8 | | | 16 |
| 18 | | 8 | 9 | | | 18 |
| 20 | | 9 | 10 | | | 20 |
| 22 | | 10 | 10 | | | 22 |
| 24 | | 10 ½ | 12 | | | 24 |
| ... | | 10 ½ | ... | | | 26 |
| 28 | | 10 ½ | ... | | | 28 |
| 30 | | 10 ½ | ... | | | 30 |
| 32 | | 10 ½ | ... | | | 32 |
| 34 | | 10 ½ | ... | | | 34 |
| 36 | | 10 ½ | ... | | | 36 |
| 38 | | 12 | ... | | | 38 |
| 40 | | 12 | ... | | | 40 |
| ... | | 12 | ... | | | 42 |
| 44 | | 13 ½ | ... | | | 44 |
| 46 | | 13 ½ | ... | | | 46 |
| 48 | | 13 ½ | ... | | | 48 |

General Dimensions of Welding Fittings

ASME B36.10

ASME B16.9

Tees & Reducers



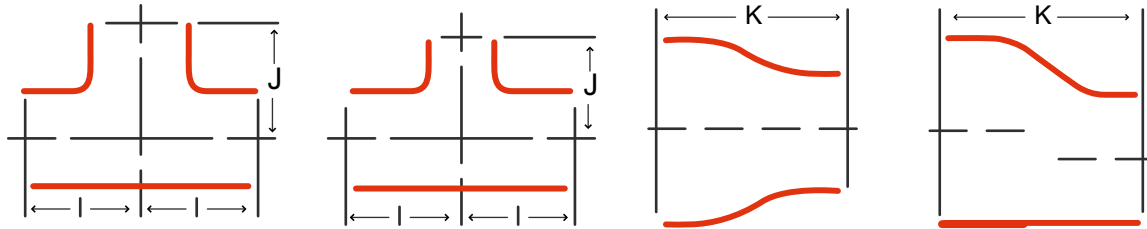
| Nom Pipe Size | Outlet | Outside Diam. | Nominal Wall Thickness | | | | l | J | K |
|---------------|--------|---------------|------------------------|------|------|------|-----|-----|-----|
| | | | STD | XS | 160 | XXS | | | |
| ½ | ½ | .840 | .109 | .147 | .188 | .294 | 1 | 1 | ... |
| | ¾ | .675 | .091 | .126 | ... | ... | 1 | 1 | ... |
| ¾ | ¾ | 1.050 | .113 | .154 | .219 | .308 | 1 ⅞ | 1 ⅞ | ... |
| | ½ | .840 | .109 | .147 | .188 | .294 | 1 ⅞ | 1 ⅞ | ½ |
| 1 | 1 | 1.315 | .133 | .179 | .250 | .358 | 1 ½ | 1 ½ | ... |
| | ¾ | 1.050 | .113 | .154 | .219 | .308 | 1 ½ | 1 ½ | 2 |
| | ½ | .840 | .109 | .147 | .188 | .294 | 1 ½ | 1 ½ | 2 |
| 1 ¼ | 1 ¼ | 1.660 | .140 | .191 | .250 | .382 | 1 ⅞ | 1 ⅞ | ... |
| | 1 | 1.315 | .133 | .179 | .250 | .358 | 1 ⅞ | 1 ⅞ | 2 |
| | ¾ | 1.050 | .113 | .154 | .219 | .308 | 1 ⅞ | 1 ⅞ | 2 |
| | ½ | .840 | .109 | .147 | .188 | .294 | 1 ⅞ | 1 ⅞ | 2 |
| 1 ½ | 1 ½ | 1.900 | .145 | .200 | .281 | .400 | 2 ¼ | 2 ¼ | ... |
| | 1 ¼ | 1.660 | .140 | .191 | .250 | .382 | 2 ¼ | 2 ¼ | 2 ½ |
| | 1 | 1.315 | .133 | .179 | .250 | .358 | 2 ¼ | 2 ¼ | 2 ½ |
| | ¾ | 1.050 | .133 | .154 | .219 | .308 | 2 ¼ | 2 ¼ | 2 ½ |
| | ½ | .840 | .109 | .147 | .188 | .294 | 2 ¼ | 2 ¼ | 2 ½ |
| 2 | 2 | 2.375 | .154 | .218 | .344 | .436 | 2 ½ | 2 ½ | ... |
| | 1 ½ | 1.900 | .145 | .200 | .281 | .400 | 2 ½ | 2 ¾ | 3 |
| | 1 ¼ | 1.660 | .140 | .191 | .250 | .382 | 2 ½ | 2 ¼ | 3 |
| | 1 | 1.315 | .133 | .179 | .250 | .358 | 2 ½ | 2 | 3 |
| | ¾ | 1.050 | .113 | .154 | .219 | .308 | 2 ½ | 1 ¾ | 3 |
| 2 ½ | 2 ½ | 2.875 | .203 | .276 | .375 | .552 | 3 | 3 | ... |
| | 2 | 2.375 | .154 | .218 | .344 | .436 | 3 | 2 ¾ | 3 ½ |
| | 1 ½ | 1.900 | .145 | .200 | .281 | .400 | 3 | 2 ⅝ | 3 ½ |
| | 1 ¼ | 1.660 | .140 | .191 | .250 | .382 | .3 | 2 ½ | 3 ½ |
| | 1 | 1.315 | .133 | .179 | .250 | .358 | 3 | 2 ¼ | 3 ½ |

General Dimensions of Welding Fittings

ASME B36.10

ASME B16.9

Tees & Reducers



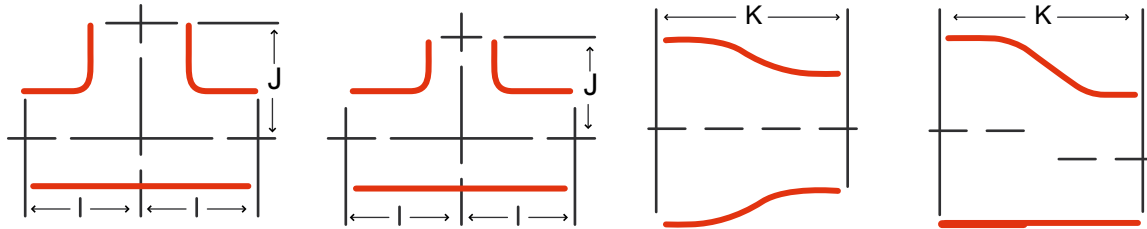
| Nom. Pipe Size | Outlet | Outside Diameter | Nominal Wall Thickness | | | | I | J | K |
|----------------|--------|------------------|------------------------|------|------|-------|-------|-------|-------|
| | | | STD | XS | 160 | XXS | | | |
| 3 | 3 | 3.500 | .216 | .300 | .438 | .600 | 3 3/8 | 3 3/8 | ... |
| | 2 1/2 | 2.875 | .203 | .276 | .375 | .552 | 3 3/8 | 3 1/4 | 3 1/2 |
| | 2 | 2.375 | .154 | .218 | .344 | .436 | 3 3/8 | 3 | 3 1/2 |
| | 1 1/2 | 1.900 | .145 | .200 | .281 | .400 | 3 3/8 | 2 7/8 | 3 1/2 |
| | 1 1/4 | 1.660 | .140 | .191 | .250 | .382 | 3 3/8 | 2 3/4 | 3 1/2 |
| 3 1/2 | 3 1/2 | 4.000 | .226 | .318 | ... | .636† | 3 3/4 | 3 3/4 | ... |
| | 3 | 3.500 | .216 | .300 | .438 | .600 | 3 3/4 | 3 5/8 | 4 |
| | 2 1/2 | 2.875 | .203 | .276 | .375 | .552 | 3 3/4 | 3 1/2 | 4 |
| | 2 | 2.375 | .154 | .218 | .344 | .436 | 3 3/4 | 3 1/4 | 4 |
| | 1 1/2 | 1.900 | .145 | .200 | .281 | .400 | 3 3/4 | 3 1/8 | 4 |
| 4 | 4 | 4.500 | .237 | .337 | .531 | .674 | 4 1/8 | 4 1/8 | ... |
| | 3 1/2 | 4.000 | .226 | .318 | ... | .636† | 4 1/8 | 4 | 4 |
| | 3 | 3.500 | .216 | .300 | .438 | .600 | 4 1/8 | 3 7/8 | 4 |
| | 2 1/2 | 2.875 | .203 | .276 | .375 | .552 | 4 1/8 | 3 3/4 | 4 |
| | 2 | 2.375 | .154 | .218 | .344 | .436 | 4 1/8 | 3 1/2 | 4 |
| | 1 1/2 | 1.900 | .145 | .200 | .281 | .400 | 4 1/8 | 3 3/8 | 4 |
| 5 | 5 | 5.563 | .258 | .375 | .625 | .750 | 4 7/8 | 4 7/8 | ... |
| | 4 | 4.500 | .237 | .337 | .531 | .674 | 4 7/8 | 4 5/8 | 5 |
| | 3 1/2 | 4.000 | .226 | .318 | ... | .636† | 4 7/8 | 4 1/2 | 5 |
| | 3 | 3.500 | .216 | .300 | .438 | .600 | 4 7/8 | 4 3/8 | 5 |
| | 2 1/2 | 2.875 | .203 | .276 | .375 | .552 | 4 7/8 | 4 1/4 | 5 |
| | 2 | 2.375 | .154 | .218 | .344 | .436 | 4 7/8 | 4 1/8 | 5 |
| | 1 1/2 | 1.900 | .145 | .200 | .281 | .400 | 4 7/8 | 3 3/8 | 5 |
| 6 | 6 | 6.625 | .280 | .432 | .719 | .864 | 5 5/8 | 5 5/8 | ... |
| | 5 | 5.563 | .258 | .375 | .625 | .750 | 5 5/8 | 5 3/8 | 5 1/2 |
| | 4 | 4.500 | .237 | .337 | .531 | .674 | 5 5/8 | 5 1/8 | 5 1/2 |
| | 3 1/2 | 4.000 | .226 | .318 | ... | .636† | 5 5/8 | 5 | 5 1/2 |
| | 3 | 3.500 | .216 | .300 | .438 | .600 | 5 5/8 | 4 7/8 | 5 1/2 |
| | 2 1/2 | 2.875 | .203 | .276 | .375 | .552 | 5 5/8 | 4 3/4 | 5 1/2 |

General Dimensions of Welding Fittings

ASME B36.10

ASME B16.9

Tees & Reducers



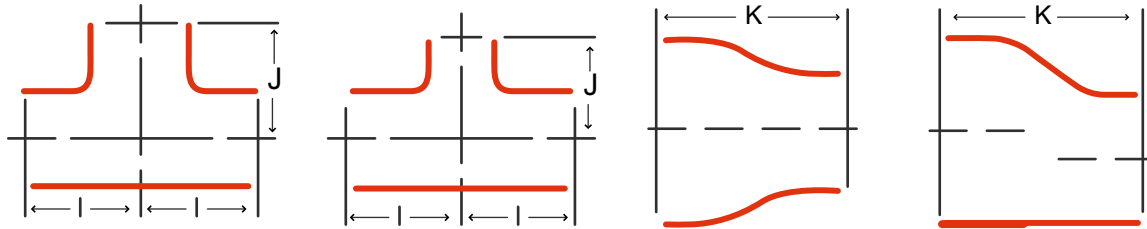
| Nom. Pipe Size | Outlet | Outside Diam. | Nominal Wall Thickness | | | | I | J | K |
|----------------|--------|---------------|------------------------|------|-------|-------|--------|--------|-----|
| | | | STD | XS | 160 | XXS | | | |
| 8 | 8 | 8.625 | .322 | .500 | .906 | .875 | 7 | 7 | ... |
| | 6 | 6.625 | .280 | .432 | .719 | .864 | 7 | 6 5/8 | 6 |
| | 5 | 5.563 | .258 | .375 | .625 | .750 | 7 | 6 3/8 | 6 |
| | 4 | 4.500 | .237 | .337 | .531 | .674 | 7 | 6 1/8 | 6 |
| | 3 1/2 | 4.000 | .226 | .318 | ... | .636 | 7 | 6 | 6 |
| 10 | 10 | 10.750 | .365 | .500 | 1.125 | 1.000 | 8 1/2 | 8 1/2 | ... |
| | 8 | 8.625 | .322 | .500 | .906 | .875 | 8 1/2 | 8 | 7 |
| | 6 | 6.625 | .280 | .432 | .719 | .864 | 8 1/2 | 7 5/8 | 7 |
| | 5 | 5.563 | .258 | .375 | .625 | .750 | 8 1/2 | 7 1/2 | 7 |
| | 4 | 4.500 | .237 | .337 | .531 | .674 | 8 1/2 | 7 1/4 | 7 |
| 12 | 12 | 12.750 | .375 | .500 | 1.312 | 1.000 | 10 | 10 | ... |
| | 10 | 10.750 | .365 | .500 | 1.125 | 1.000 | 10 | 9 1/2 | 8 |
| | 8 | 8.625 | .322 | .500 | .906 | .875 | 10 | 9 | 8 |
| | 6 | 6.625 | .280 | .432 | .719 | .864 | 10 | 8 5/8 | 8 |
| | 5 | 5.563 | .258 | .375 | .625 | .750 | 10 | 8 1/2 | 8 |
| 14 | 14 | 14.000 | .375 | .500 | 1.406 | ... | 11 | 11 | ... |
| | 12 | 12.750 | .375 | .500 | 1.312 | ... | 11 | 10 5/8 | 13 |
| | 10 | 10.750 | .365 | .500 | 1.125 | ... | 11 | 10 1/8 | 13 |
| | 8 | 8.625 | .322 | .500 | .906 | ... | 11 | 9 3/4 | 13 |
| | 6 | 6.625 | .280 | .432 | .719 | ... | 11 | 9 3/8 | 13 |
| 16 | 16 | 16.000 | .375 | .500 | 1.594 | ... | 12 | 12 | ... |
| | 14 | 14.000 | .375 | .500 | 1.406 | ... | 12 | 13 | 14 |
| | 12 | 12.750 | .375 | .500 | 1.312 | ... | 12 | 11 5/8 | 14 |
| | 10 | 10.750 | .365 | .500 | 1.125 | ... | 12 | 11 1/8 | 14 |
| | 8 | 8.625 | .322 | .500 | .906 | ... | 12 | 10 3/4 | 14 |
| | 6 | 6.625 | .280 | .432 | .719 | ... | 12 | 10 3/8 | 14 |
| 18 | 18 | 18.000 | .375 | .500 | ... | ... | 13 1/2 | 13 1/2 | ... |
| | 16 | 16.000 | .375 | .500 | 1.594 | ... | 13 1/2 | 13 | 15 |
| | 14 | 14.000 | .375 | .500 | ... | ... | 13 1/2 | 13 | 15 |
| | 12 | 12.750 | .375 | .500 | ... | ... | 13 1/2 | 12 5/8 | 15 |
| | 10 | 10.750 | .365 | .500 | ... | ... | 13 1/2 | 12 1/8 | 15 |
| | 8 | 8.625 | .322 | .500 | ... | ... | 13 1/2 | 11 3/4 | 15 |
| 20 | 20 | 20.000 | .375 | .500 | ... | ... | 15 | 15 | ... |
| | 18 | 18.000 | .375 | .500 | ... | ... | 15 | 14 1/2 | 20 |
| | 16 | 16.000 | .375 | .500 | ... | ... | 15 | 14 | 20 |
| | 14 | 14.000 | .375 | .500 | ... | ... | 15 | 14 | 20 |
| | 12 | 12.750 | .375 | .500 | ... | ... | 15 | 13 5/8 | 20 |
| | 10 | 10.750 | .365 | .500 | ... | ... | 15 | 13 1/8 | 20 |
| | 8 | 8.625 | .322 | .500 | ... | ... | 15 | 12 3/4 | 20 |
| 22 | 22 | 22.000 | .375 | .500 | ... | ... | 16 1/2 | 16 1/2 | ... |
| | 20 | 20.000 | .375 | .500 | ... | ... | 16 1/2 | 16 | 20 |
| | 18 | 18.000 | .375 | .500 | ... | ... | 16 1/2 | 15 1/2 | 20 |
| | 16 | 16.000 | .375 | .500 | ... | ... | 16 1/2 | 15 | 20 |

General Dimensions of Welding Fittings

ASME B36.10

ASME B16.9

Tees & Reducers



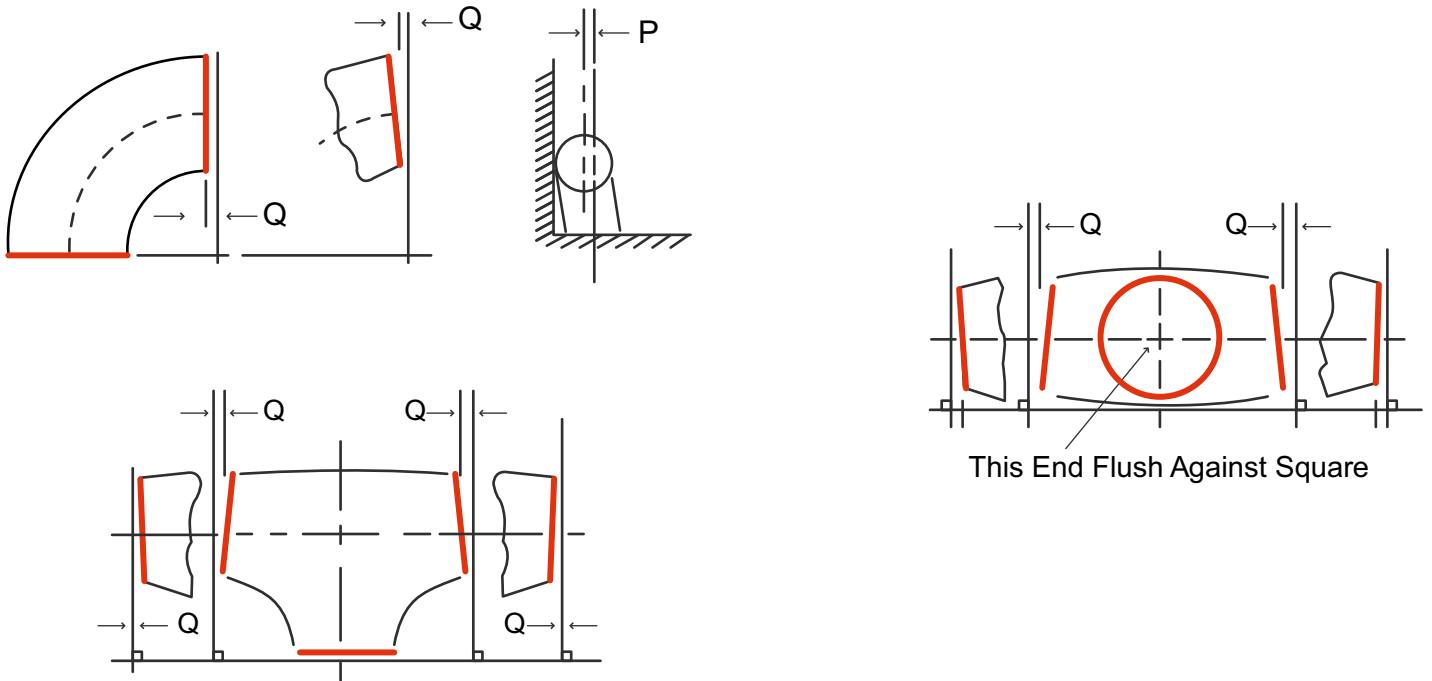
| Nom. Pipe Size | Outlet | Outside Diam. | Nominal Wall Thickness | | | | I | J | K |
|----------------|--------|---------------|------------------------|------|-----|-----|-------|--------|-------|
| | | | STD | XS | 160 | XXS | | | |
| 22 | 14 | 14.000 | .375 | .500 | ... | ... | 16 ½ | 15 | 20 |
| | 12 | 12.750 | .375 | .500 | ... | ... | 16 ½ | 14 ¾ | ... |
| | 10 | 10.750 | .365 | .500 | ... | ... | 16 ½ | 14 ¾ | ... |
| 24 | 24 | 24.000 | .375 | .500 | ... | ... | 17 | 17 | ... |
| | 22 | 22.000 | .375 | .500 | ... | ... | 17 | 17 | 20 |
| | 20 | 20.000 | .375 | .500 | ... | ... | 17 | 17 | 20 |
| | 18 | 18.000 | .375 | .500 | ... | ... | 17 | 16 ½ | 20 |
| | 16 | 16.000 | .375 | .500 | ... | ... | 17 | 16 | 20 |
| | 14 | 14.000 | .375 | .500 | ... | ... | 17 | 16 | 20 |
| | 12 | 12.750 | .375 | .500 | ... | ... | 17 | 15 ¾ | 20 |
| 26 | 10 | 10.750 | .365 | .500 | ... | ... | 17 | 15 ¾ | 20 |
| | 26 | 26.000 | .375 | .500 | ... | ... | 19.50 | 19.50 | ... |
| | 24 | 24.000 | .375 | .500 | ... | ... | 19.50 | 19.00 | 24.00 |
| | 22 | 22.000 | .375 | .500 | ... | ... | 19.50 | 18.50 | 24.00 |
| | 20 | 20.000 | .375 | .500 | ... | ... | 19.50 | 18.00 | 24.00 |
| | 18 | 18.000 | .375 | .500 | ... | ... | 19.50 | 17.50 | 24.00 |
| | 16 | 16.000 | .375 | .500 | ... | ... | 19.50 | 17.00 | ... |
| 28 | 14 | 14.000 | .375 | .500 | ... | ... | 19.50 | 17.00 | ... |
| | 12 | 12.750 | .375 | .500 | ... | ... | 19.50 | 16.62 | ... |
| | 28 | 28.000 | .375 | .500 | ... | ... | 20.50 | 20.50 | ... |
| | 26 | 26.000 | .375 | .500 | ... | ... | 20.50 | 20.50 | 24 |
| | 24 | 24.000 | .375 | .500 | ... | ... | 20.50 | 20.00 | 24 |
| | 22 | 22.000 | .375 | .500 | ... | ... | 20.50 | 19.50 | 24 |
| | 20 | 20.000 | .375 | .500 | ... | ... | 20.50 | 19.00 | 24 |
| 30 | 18 | 18.000 | .375 | .500 | ... | ... | 20.50 | 18.50 | ... |
| | 16 | 16.000 | .375 | .500 | ... | ... | 20.50 | 18.00 | ... |
| | 14 | 14.000 | .375 | .500 | ... | ... | 20.50 | 18.00 | ... |
| | 12 | 12.750 | .375 | .500 | ... | ... | 20.50 | 17.62 | ... |
| | 30 | 30.000 | .375 | .500 | ... | ... | 22 | 22 | ... |
| | 24 | 24.000 | .375 | .500 | ... | ... | 22 | 21 | 24 |
| 32 | 22 | 22.000 | .375 | .500 | ... | ... | 22 | 20 ½ | 24 |
| | 20 | 20.000 | .375 | .500 | ... | ... | 22 | 20 | 24 |
| | 18 | 18.000 | .375 | .500 | ... | ... | 22 | 19 ½ | ... |
| | 16 | 16.000 | .375 | .500 | ... | ... | 22 | 19 | ... |
| | 32 | 32.000 | .375 | .500 | ... | ... | 23.50 | 23.50 | ... |
| | 30 | 30.000 | .375 | .500 | ... | ... | 23.50 | 23.00 | 24.00 |
| | 28 | 28.000 | .375 | .500 | ... | ... | 23.50 | 22.50 | 24.00 |
| | 26 | 26.000 | .375 | .500 | ... | ... | 23.50 | 22.50 | 24.00 |
| 32 | 24 | 24.000 | .375 | .500 | ... | ... | 23.50 | 22.00 | 24.00 |
| | 22 | 22.000 | .375 | .500 | ... | ... | 23.50 | 21.50 | ... |
| | 20 | 20.000 | .375 | .500 | ... | ... | 23.50 | 21.00 | ... |
| | 18 | 18.000 | .375 | .500 | ... | ... | 23.50 | 20.50 | ... |
| | 16 | 16.000 | .375 | .500 | ... | ... | 23.50 | 20.00 | ... |
| | 14 | 14.000 | .375 | .500 | ... | ... | 23.50 | 220.00 | ... |

Dimensional Tolerances for Welding Fittings

Butt Welding Fittings

The tolerances shown are in accordance with the dimensional tolerances approved by the American National Standards Institute(ASME B16.9)

for all carbon and alloy fittings, except Short Radius Elbows and Returns. Those are governed by ASME B16.28.



| Nominal Pipe Size (NPS) | All Fittings | | | 90 Deg. and 45 Deg. Elbows and Tees | Reducers and Lap Joint Stub Ends | Caps |
|-------------------------|-----------------------------|--------------------------|--|-------------------------------------|----------------------------------|------------------|
| | Outside 1 Diameter at Bevel | Inside 1 Diameter at End | Wall 2 Thickness t | Center-to-End Dimension A, D, J | Overall Length K | Overall Length F |
| ½ to 2½ | +0.06 -0.03 | ±0.03 | Not less than 87.5% of nominal thickness | ± 0.06 | ± 0.06 | ± 0.12 |
| 3 to 3½ | ±0.06 | ±0.06 | | ± 0.06 | ± 0.06 | ± 0.12 |
| 4 | ±0.06 | ±0.06 | | ± 0.06 | ± 0.06 | ± 0.12 |
| 5 to 8 | +0.09 -0.06 | ±0.06 | | ± 0.06 | ± 0.06 | ± 0.25 |
| 10 to 18 | +0.16 -0.12 | ±0.12 | | ± 0.09 | ± 0.09 | ± 0.25 |
| 20 to 24 | +0.25 -0.19 | ±0.19 | | ± 0.09 | ± 0.09 | ± 0.25 |
| 26 to 30 | +0.25 -0.19 | ±0.19 | | ± 0.12 | ± 0.19 | ± 0.38 |
| 32 to 40 | +0.25 -0.19 | +0.19 | | +0.19 | +0.19 | +0.38 |

| Nominal Pipe Size | Angularity Tol. | |
|-------------------|-----------------|-------------|
| | Off Angle Q | Off Plane P |
| ½ to 4 | 0.03 | 0.06 |
| 5 to 8 | 0.06 | 0.12 |
| 10 to 12 | 0.09 | 0.19 |
| 14 to 16 | 0.09 | 0.25 |
| 18 to 24 | 0.12 | 0.38 |
| 26 to 30 | 0.19 | 0.38 |
| 32 to 42 | 0.19 | 0.50 |
| 44 to 48 | 0.19 | 0.75 |

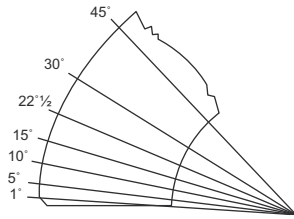
All dimensions are in inches.

1 Out-of-round is the sum of absolute values of plus and minus tolerance.

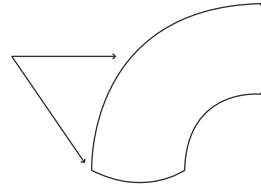
2 The inside diameter at ends and the nominal wall thicknesses are to be specified by the purchaser.

How to Cut Segments from Elbows

Long Radius



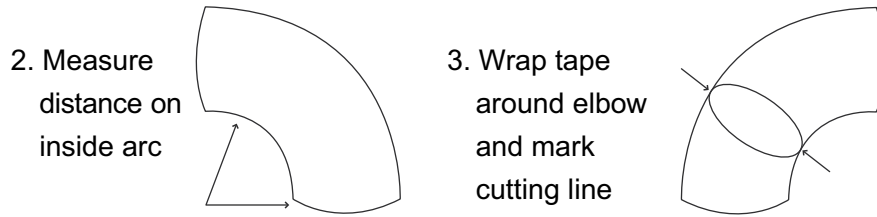
1. Measure distance on outside arc



| Nom. Pipe Size | "Outside Arc Length" | | | | | | |
|----------------|----------------------|---------|----------|----------|----------|----------|----------|
| | 1° | 5° | 10° | 15° | 22 ½° | 30° | 45° |
| 2" | 5/16 | 3/8 | 23/32 | 1 3/32 | 1 2 1/2 | 2 3/16 | 3 9/32 |
| 2 1/2" | 3/32 | 7/16 | 29/32 | 1 1 1/2 | 2 1/2 | 2 23/32 | 4 5/64 |
| 3" | 7/64 | 9/16 | 1 3/32 | 1 5/8 | 2 15/32 | 3 9/32 | 4 29/32 |
| 3" | 1/8 | 5/8 | 1 9/32 | 1 29/32 | 2 27/32 | 3 13/16 | 5 11/16 |
| 4" | 9/64 | 23/32 | 1 7/16 | 2 5/32 | 3 1/4 | 4 5/16 | 6 15/32 |
| 5" | 3/16 | 29/32 | 1 25/32 | 2 1/16 | 4 1/2 | 5 3/8 | 8 1/16 |
| 6" | 7/32 | 1 1/16 | 2 5/32 | 3 7/32 | 4 27/32 | 6 7/16 | 9 11/16 |
| 8" | 9/32 | 1 7/16 | 2 27/32 | 4 9/32 | 6 13/32 | 8 17/32 | 12 13/16 |
| 10" | 1 1/2 | 1 25/32 | 3 9/16 | 5 1 1/2 | 8 | 10 2 1/2 | 16 |
| 12" | 7/16 | 2 1/8 | 4 1/4 | 6 3/8 | 9 9/16 | 12 3/4 | 19 5/32 |
| 14" | 1/2 | 2 7/16 | 4 7/8 | 7 5/16 | 11 | 14 2 1/2 | 22 |
| 16" | 9/16 | 2 25/32 | 5 19/32 | 8 3/8 | 12 9/16 | 16 3/4 | 25 1/8 |
| 18" | 5/8 | 3 5/32 | 6 9/32 | 9 7/16 | 14 1/8 | 18 27/32 | 28 9/32 |
| 20" | 11/16 | 3 1/2 | 7 | 10 15/32 | 15 23/32 | 20 15/16 | 31 13/32 |
| 22" | 25/32 | 3 27/32 | 7 11/16 | 11 17/32 | 17 9/32 | 23 1/2 | 34 9/16 |
| 24" | 27/32 | 4 3/16 | 8 3/8 | 12 9/16 | 18 27/32 | 25 1/8 | 37 11/16 |
| 26" | 29/32 | 4 17/32 | 9 3/32 | 13 5/8 | 20 13/32 | 27 7/32 | 40 27/32 |
| 28" | 1 | 4 29/32 | 9 25/32 | 14 2 1/2 | 22 | 29 1 1/2 | 44 |
| 30" | 1 1/16 | 5 1/4 | 10 15/32 | 15 23/32 | 23 9/16 | 31 13/32 | 47 1/8 |
| 32" | 1 1/8 | 5 19/32 | 11 3/16 | 17 3/4 | 25 1/8 | 33 1/2 | 50 9/32 |
| 34" | 1 3/16 | 5 15/16 | 11 7/8 | 17 13/16 | 26 23/32 | 35 19/32 | 53 13/32 |
| 36" | 1 1/4 | 6 9/32 | 12 9/16 | 18 27/32 | 28 9/32 | 37 11/16 | 56 9/16 |
| 38" | 1 1 1/2 | 6 5/8 | 13 9/32 | 19 29/32 | 29 27/32 | 39 13/16 | 59 11/16 |
| 40" | 1 13/32 | 7 | 13 3 1/2 | 20 15/16 | 31 13/32 | 41 29/32 | 62 27/32 |
| 42" | 1 15/32 | 7 1 1/2 | 14 2 1/2 | 22 | 33 | 44 | 66 |
| 44" | 1 17/32 | 7 11/16 | 15 3/8 | 23 1/16 | 34 9/16 | 46 3/32 | 69 1/8 |
| 46" | 1 5/8 | 8 1/2 | 16 1/16 | 24 3/32 | 36 1/8 | 48 3/16 | 72 1/4 |
| 48" | 1 11/16 | 8 3/8 | 16 3/4 | 25 5/32 | 37 23/32 | 50 9/32 | 75 13/32 |

How to Cut Segments from Elbows

Long Radius



| Nom. Pipe Size | "Outside Arc Length" | | | | | | |
|----------------|----------------------|----------|----------|----------|----------|-----------|----------|
| | 1° | 5° | 10° | 15° | 22 °½ | 30° | 45° |
| 2" | 1/32 | 5/32 | 5/16 | 15/32 | 23/32 | 15/16 | 1 7/16 |
| 2 1/2" | 3/64 | 3/16 | 13/32 | 19/32 | 29/32 | 1 7/32 | 1 13/16 |
| 3" | 3/64 | 1/4 | 15/32 | 23/32 | 1 3/32 | 1 7/16 | 2 5/32 |
| 3" | 1/16 | 9/32 | 9/16 | 27/32 | 1 9/32 | 1 11/16 | 2 9/16 |
| 4" | 1/16 | 5/16 | 2 1/32 | 3 1/32 | 1 15/32 | 1 31/32 | 2 15/16 |
| 5" | 5/64 | 13/32 | 13/16 | 1 1/4 | 1 27/32 | 2 15/32 | 3 23/32 |
| 6" | 3/32 | 1/2 | 1 | 1 1/2 | 2 7/32 | 2 31/32 | 4 15/16 |
| 8" | 1/8 | 2 1/32 | 1 11/32 | 2 | 3 1/32 | 4 1/32 | 6 1/32 |
| 10" | 5/32 | 27/32 | 1 11/16 | 2 17/32 | 3 25/32 | 5 1/32 | 7 9/16 |
| 12" | 3/16 | 1 1/64 | 2 1/32 | 3 1/16 | 4 9/16 | 6 3/32 | 9 1/8 |
| 14" | 1/4 | 1 7/32 | 2 7/16 | 3 2 1/32 | 5 1/2 | 7 1 1/32 | 11 |
| 16" | 9/32 | 1 13/32 | 2 25/32 | 4 3/16 | 6 9/32 | 8 3/8 | 12 9/16 |
| 18" | 5/16 | 1 9/16 | 3 1/8 | 4 23/32 | 7 1/16 | 9 7/16 | 14 1/8 |
| 20" | 1 1/32 | 1 1/2 | 3 1/2 | 5 1/4 | 7 27/32 | 10 15/32 | 15 23/32 |
| 22" | 3/8 | 1 29/32 | 3 27/32 | 5 3/4 | 8 5/8 | 11 17/32 | 17 9/32 |
| 24" | 13/32 | 2 3/32 | 4 3/16 | 6 9/32 | 9 7/16 | 12 9/16 | 18 27/32 |
| 26" | 15/32 | 2 9/32 | 4 17/32 | 6 13/16 | 10 7/32 | 13 5/8 | 20 13/32 |
| 28" | 1/2 | 2 7/16 | 4 29/32 | 7 1 1/32 | 11 | 14 2 1/32 | 22 |
| 30" | 17/32 | 2 5/8 | 5 1/4 | 7 27/32 | 11 25/32 | 15 23/32 | 23 9/16 |
| 32" | 9/16 | 2 13/16 | 5 19/32 | 8 3/8 | 12 9/16 | 16 3/4 | 25 1/8 |
| 34" | 19/32 | 2 3 1/32 | 5 15/16 | 8 29/32 | 13 3/8 | 17 13/16 | 26 23/32 |
| 36" | 5/8 | 3 5/32 | 6 9/32 | 9 7/16 | 14 1/8 | 18 27/32 | 28 9/32 |
| 38" | 11/16 | 3 5/16 | 6 5/8 | 9 3 1/32 | 14 15/16 | 19 29/32 | 29 27/32 |
| 40" | 23/32 | 3 1/2 | 7 | 10 15/32 | 15 23/32 | 20 15/16 | 31 13/32 |
| 42" | 3/4 | 3 2 1/32 | 7 1 1/32 | 11 | 16 1/2 | 22 | 33 |
| 44" | 25/32 | 3 27/32 | 7 11/16 | 11 17/32 | 17 9/32 | 23 1/2 | 34 9/16 |
| 46" | 13/16 | 4 1/32 | 8 1/32 | 12 1/16 | 18 1/6 | 24 3/32 | 36 1/8 |
| 48" | 27/32 | 4 3/16 | 8 3/8 | 12 9/16 | 18 27/32 | 25 1/8 | 37 23/32 |

Decimal Equivalents

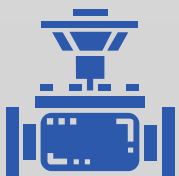
Equivalents of One Inch

| | |
|----------------------------|----------------------------|
| $\frac{1}{64}$. = 015625 | $\frac{33}{64}$. = 515625 |
| $\frac{1}{32}$. = 03125 | $\frac{17}{32}$. = 53125 |
| $\frac{3}{64}$. = 046875 | $\frac{35}{64}$. = 546875 |
| $\frac{1}{16}$. = 0625 | $\frac{9}{16}$. = 5625 |
| $\frac{5}{64}$. = 178125 | $\frac{37}{64}$. = 578125 |
| $\frac{3}{32}$. = 09375 | $\frac{19}{32}$. = 59375 |
| $\frac{7}{64}$. = 109375 | $\frac{39}{64}$. = 609375 |
| $\frac{1}{8}$. = 125 | $\frac{5}{8}$. = 625 |
| $\frac{9}{64}$. = 140625 | $\frac{41}{64}$. = 640625 |
| $\frac{5}{32}$. = 15625 | $2\frac{1}{32}$. = 65625 |
| $\frac{11}{64}$. = 171875 | $\frac{43}{64}$. = 671875 |
| $\frac{3}{16}$. = 1875 | $\frac{11}{16}$. = 6875 |
| $\frac{13}{64}$. = 203125 | $\frac{45}{64}$. = 703125 |
| $\frac{7}{32}$. = 21875 | $\frac{23}{32}$. = 71875 |
| $\frac{15}{64}$. = 234375 | $\frac{47}{64}$. = 734375 |
| $\frac{1}{4}$. = 25 | $\frac{3}{4}$. = 75 |
| $\frac{17}{64}$. = 265625 | $\frac{49}{64}$. = 765625 |
| $\frac{9}{32}$. = 28125 | $\frac{25}{32}$. = 78125 |
| $\frac{19}{64}$. = 296875 | $\frac{51}{64}$. = 796875 |
| $\frac{5}{16}$. = 3125 | $\frac{13}{16}$. = 8125 |
| $\frac{21}{64}$. = 328125 | $\frac{53}{64}$. = 828125 |
| $1\frac{1}{32}$. = 34375 | $\frac{27}{32}$. = 84375 |
| $\frac{23}{64}$. = 359375 | $\frac{55}{64}$. = 859375 |
| $\frac{3}{8}$. = 375 | $\frac{7}{8}$. = 875 |
| $\frac{25}{64}$. = 390625 | $\frac{57}{64}$. = 890625 |
| $\frac{13}{32}$. = 40625 | $\frac{29}{32}$. = 90625 |
| $\frac{27}{64}$. = 421875 | $\frac{59}{64}$. = 921875 |
| $\frac{7}{16}$. = 4375 | $\frac{15}{16}$. = 9375 |
| $\frac{29}{64}$. = 453125 | $\frac{61}{64}$. = 953125 |
| $\frac{15}{32}$. = 46875 | $3\frac{1}{32}$. = 96875 |
| $\frac{31}{64}$. = 484375 | $\frac{63}{64}$. = 984375 |
| $\frac{1}{2}$. = 5 | 1 = 1 |

■ The manufacturer does not accept any responsibility for any typing or printing errors in this catalog. It also reserves the right to make any alterations or modifications deemed necessary at any time, without altering or interfering with the basic functions of the apparatus.



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