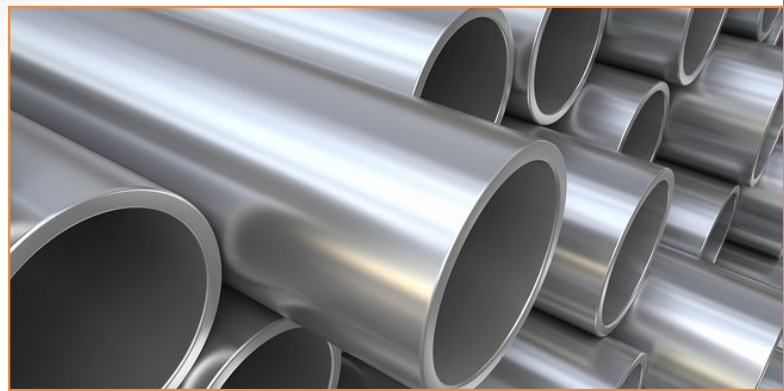




Fortune Steel & Alloys

Manufacturing Relationships. Distributing Quality



Manufacturing Relationships. Distributing Quality

- Stainless Steel
- Carbon Steel
- Alloy Steel
- Nickel Alloy
- Duplex
- Super Duplex
- Pipes & Tubes
- Butt weld Fittings
- Flanges
- Forged Fittings



About Us

We take immense pleasure to introduce ourselves as a manufacturer of pipe fittings, flanges and suppliers of pipes and tubes of Stainless Steel, Carbon Steel, Alloy Steel and Nickel Alloys.

Our large range of products across several grades and dimensions are intended to meet the various requirements of process industry under one roof. Usage of optimal quality raw materials, high end technology and latest manufacturing process make our products of high quality, durable and effective.

With years of experience and in depth understanding, we can manufacture the products complying with customer specifications, codes and standards.

We possess a well maintained wide stock of inventory which enables us to shorten delivery periods for our customers.

We also provide for IBR Certification and Third Party Inspection of our products helping our customers to meet their quality control as well as regulatory requirements.

We are committed to maintain world class quality standards and excellent after sale service.

We strive to build a cordial and positive relationship with our customers and are committed to customer satisfaction.





Quality Assurance

We are an ISO 9001-2008 Company

We are committed to quality control and incorporate it in all our activities.

We purchase our raw materials from well established and reputed manufacturers and suppliers. Further, after arrival at the manufacturing facility the raw material are tested by trained quality experts before taking them into production.

At each stage of manufacturing, products are checked for various chemical and mechanical properties with govt/govt. agencies certified equipments. They are checked on the following parameters.

1. Dimensional Accuracy
2. Chemical Composition
3. Ultrasonic and Spectro Test
4. Mechanical Properties
5. Finish and Appearance



Third Party Inspection





Pipes & Tubes



- Stainless Steel** : ASTM A 213 / 249 / 269 / 312 / 358 CL. I to V TYPE 304, 304L, 304H, 309, 309 S 310, 310S, 316, 316L, 316Ti, 317, 317L, 321, 321H, 347, 347H.
- Duplex & Super Duplex Steel** : ASTM A 789, 790 Grade UNS S32205, UNS S31803, UNS S32750, UNS S32760.
- Carbon Steel:** : ASTM A 53 Grade A, B; ASTM A 106 Grade A, B, C; ASTM A 179; ASTM A 210 Grade A1, ASTM A 333 Grade 1/6; IS1239.;
- EFW and SAW Pipes** : ASTM A 671 Gr. CC60/CC65/CC7, ASTM A672 Gr. B60/B65/B70/C55/C60/C65/C70; IS 3589
- API 5L Pipes** : Grade B, X42, X46, X52, X56, X60, X65, X70 PSL 1/2.
- Alloy Steel** : ASTM A 335 Grade P1, P2, P5, P9, P11, P12, P22, P91; ASTM A 213 Grade T2, T5, T11, T12, T22.
- Nickel Alloys** : Hastelloy, Inconel, Incoloy, Monel, Nickel 200/201, Titanium etc.

Buttweld Fittings



- Stainless Steel** : ASTM A403 TYPE 304, 304L, 304H, 309, 310S, 316, 316L, 316Ti, 317, 317L, 321, 321 H, 347, 347 H.
- Duplex & Super Duplex Steel** : ASTM A 815 Grade UNS S32205, UNS S31803, UNS S32750, UNS S32760,
- Carbon Steel** : ASTM A 234 Grade WPB, WPC; ASTM A 420 Grade WPL6, WPL3. ASTM A 860 Grade WPHY 42, WPHY 46, WPHY 52, WPHY 60, WPHY 65, WPHY 70.
- Alloy Steel** : ASTM A 234 Grade WP1, WP5, WP9, WP11, WP12, WP22, WP91.
- Nickel Alloys** : Hastelloy, Inconel, Incoloy, Monel, Nickel 200/201, Titanium etc.
- Forms** : Elbow-1D, 1.5D, 2D, 3D, 5D, Reducer-Eccentric & Concentric, Equal Tee, UnEqual Tee, Cross Tee, Reducing Tee, Short Bend, Long Bend, Short Stub End, Lap Joint Stub End, Long Stub End, End Cap, Union, Coupling, Nipple etc.
- Type** : Seamless / Welded / Fabricated
- Dimension Std** : ANSI B16.9, B16.28, MSS-SP-43
- Size** : ½" NB – 48" NB
- Thickness** : SCH 10 – SCH XXS

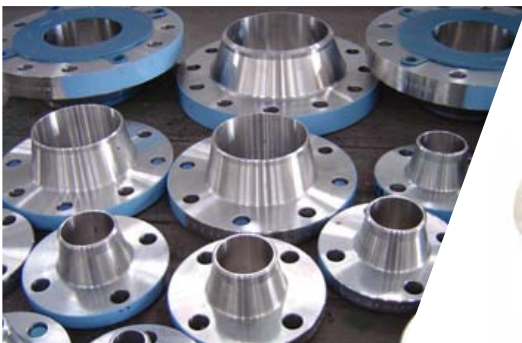


Forged Fittings



- Stainless Steel** : ASTM A 182 TYPE 304, 304L, 304H, 309H, 310, 316, 316L, 316Ti, 317, 317L, 321, 321H, 347, 347H.
- Duplex/ Super Duplex Steel** : ASTM A 182 Grade UNS S32205, UNS S31803, UNS S32750, UNS S32760.
- Carbon Steel** : ASTM A 105 Grade 70, ATSM A 350 Grade LF1, LF2, LF3.
ASTM A 694 Grade F42, F46, F48, F50, F52, F56, F60, F65, F70.
- Alloy Steel** : ASTM A 182 Grade F1, F2, F5, F9, F11, F12, F22, F91.
- Nickel Alloys** : Hastelloy, Inconel, Incoloy, Monel, Nickel 200/201, Titanium etc.
- Forms** : Elbow 45°, Elbow 90°, Equal Tee, Unequal Tee, Cross Tee, Union, Concentric Reducer, Eccentric Reducer, Full Coupling, Half Coupling, Reducing Coupling, Hex Plug, Squared Plug, Hex Nipple, Weldolet, Sockolet, Threadolet, Elbolet, Nipolet, Latrolet, Concentric Swage Nipple, Eccentric Swage Nipple etc.
- Type** : Socket Weld (S/W) & SCREWED (SCRD) – NPT, BSP, BSPT, Threaded Fitting
- Dimension Std** : ANSI B16.11, MSS SP-79, 83, 95, 97, BS 3799
- Size** : ½" NB – 4" NB
- Pressure** : 2000LBS, 3000LBS, 6000LBS, 9000LBS, etc
- Testing** : NACE MR0175 , NACE TM0284 , HIC TEST , H2 SERVICE , ETC

Flanges



- Stainless Steel** : ASTM A 182 & 240 TYPE 304, 304L, 304H, 309H, 310, 316, 316L, 316Ti, 317, 317L, 321, 321H, 347, 347H.
- Duplex/ Super Duplex Steel** : ASTM A 182 Grade UNS S32205, UNS S31803, UNS S32750, UNS S32760,
- Carbon Steel** : ASTM A 105 Grade 70, ASTM A 516 Grade 60, 70; ATSM A 350 -LF1/LF2/ LF3; ASTM A 694 Grade F42, F50, F52, F56, F60, F65, F70. ASTM A516 Grade 60/70, IS 2062 Grade A/B , ASTM A266 Grade 1, 2, 3, 4 etc.
- Alloy Steel** : ASTM 182 Grade F1, F2, F5, F9, F11, F12, F22, F91, F92.
- Nickel Alloys** : Hastelloy, Inconel, Incoloy, Monel, Nickel 200/201, Titanium etc.
- Type** : Blind Flanges, Reducing Flanges, Ring Type Flanges, Spectacle Flanges, Weld Neck Flanges, High Hub Flanges, Threaded Flanges, Lap Joint Flanges, Long weld Neck Flanges, Slip-On Flanges, Socket Weld Flanges, Orifice Flanges
- Dimension Std.** : ANSI B16.5, ANSI B16.47 Series A & B, MSS SP44, ASA, API-605, DIN, BS-10, EN 1092, AWWA, Custom Drawings
- Size** : ½" NB - 48"NB
- Class** : 150#, 300#, 600#, 900#, 1500#, 2500#, etc
- Pressure** : DIN PN6, PN10, PN16, PN25, PN40, PN64, PN100, PN160, etc
- Testing** : NACE MR0175 , NACE TM0284 , HIC TEST , H2 SERVICE , ETC



MATERIAL SPECIFICATION FOR OF STAINLESS STEEL, ALLOY STEEL, CARBON STEEL & MILD STEEL. PIPE & TUBES ASTM

| PIPE SPECIFICATION | CHEMICAL PROPERTIES | | | | | | | MECHANICAL PROPERTIES | | | | | OTHERS |
|------------------------|---------------------|-----------|----------|----------|------------|-----------|-----------|-----------------------|----------------|--------------|------|-------------------------------------------------------------|--------|
| | C% | Mn% | P% (Max) | S% (Max) | Cr% | Ni% | Mo% | U.T.S. (Min) Mpa | Y.S. (Min) Mpa | ELONG. (Min) | | | |
| | | | | | | | | | | L | T | | |
| ASTMA 312 Gr. TP 304 | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 18.0-20.0 | 8.0-11.0 | - | 515 | 205 | 35 | 25 | - | |
| ASTMA 312 Gr. TP 304L | 0.035 Max | 2.00 Max | 0.045 | 0.030 | 18.0-20.0 | 8.0-13.0 | - | 485 | 170 | 35 | 25 | - | |
| ASTMA 312 Gr. TP 304H | 0.04-0.10 | 2.00 Max | 0.045 | 0.030 | 18.0-20.0 | 8.0-11.0 | - | 515 | 205 | 35 | 25 | - | |
| ASTMA 312 Gr. TP 304LN | 0.035 Max | 2.00 Max | 0.045 | 0.030 | 18.0-20.0 | 8.0-12.0 | - | 515 | 205 | 35 | 25 | N%=0.10-0.16 | |
| ASTMA 312 Gr. TP 309S | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 22.0-24.0 | 12.0-15.0 | 0.75 Max | 515 | 205 | 35 | 25 | - | |
| ASTMA 312 Gr. TP 310S | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 24.0-26.0 | 19.0-22.0 | 0.75 Max | 515 | 205 | 35 | 25 | - | |
| ASTMA 312 Gr. TP 316 | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 16.0-18.0 | 11.0-14.0 | 2.00-3.00 | 485 | 170 | 35 | 25 | - | |
| ASTMA 312 Gr. TP 316L | 0.035 Max | 2.00 Max | 0.045 | 0.030 | 16.0-18.0 | 10.0-14.0 | 2.00-3.00 | 485 | 170 | 35 | 25 | - | |
| ASTMA 312 Gr. TP 316H | 0.04-0.10 | 2.00 Max | 0.045 | 0.030 | 16.0-18.0 | 11.0-14.0 | 2.00-3.00 | 515 | 205 | 35 | 25 | - | |
| ASTMA 312 Gr. TP 316LN | 0.035 Max | 2.00 Max | 0.045 | 0.030 | 16.0-18.0 | 11.0-14.0 | 2.00-3.00 | 515 | 205 | 35 | 25 | N%=0.10-0.16 | |
| ASTMA 312 Gr. TP 317 | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 18.0-20.0 | 11.0-14.0 | 3.00-4.00 | 515 | 205 | 35 | 25 | - | |
| ASTMA 312 Gr. TP 317L | 0.035 Max | 2.00 Max | 0.045 | 0.030 | 18.0-20.0 | 11.0-15.0 | 3.00-4.00 | 515 | 205 | 35 | 25 | - | |
| ASTMA 312 Gr. TP 321 | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 17.0-19.0 | 9.0-12.0 | - | 515 | 205 | 35 | 25 | Ti%=(5XC)-0.70 | |
| ASTMA 312 Gr. TP 321H | 0.04-0.10 | 2.00 Max | 0.045 | 0.030 | 17.0-19.0 | 9.0-12.0 | - | 515 | 205 | 35 | 25 | Ti%=(4XC)-0.60 | |
| ASTMA 312 Gr. TP 347 | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 17.0-19.0 | 9.0-13.0 | - | 515 | 205 | 35 | 25 | Cb%=(10XC)-1.00 | |
| ASTMA 312 Gr. TP 347H | 0.04-0.10 | 2.00 Max | 0.045 | 0.030 | 17.0-19.0 | 9.0-13.0 | - | 515 | 205 | 35 | 25 | Cb%=(8XC)-1.10 | |
| ASTMA 358 Gr. TP 304 | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 18.0-20.0 | 8.0-12.0 | - | 485 | 170 | 40 | 40 | N%=0.10 Max, HRB=92 Max | |
| ASTMA 358 Gr. TP 304L | 0.035 Max | 2.00 Max | 0.045 | 0.030 | 18.0-20.0 | 8.0-12.0 | - | 485 | 170 | 40 | 40 | N%=0.10 Max, HRB=92 Max | |
| ASTMA 358 Gr. TP 309S | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 22.0-24.0 | 12.0-15.0 | - | 515 | 205 | 40 | 40 | HRB=95 Max | |
| ASTMA 358 Gr. TP 310S | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 24.0-26.0 | 19.0-22.0 | - | 515 | 205 | 40 | 40 | HRB=95 Max | |
| ASTMA 358 Gr. TP 316 | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 16.0-18.0 | 10.0-14.0 | 2.00-3.00 | 515 | 205 | 40 | 40 | N%=0.10 Max, HRB=95 Max | |
| ASTMA 358 Gr. TP 316L | 0.035 Max | 2.00 Max | 0.045 | 0.030 | 16.0-18.0 | 10.0-14.0 | 2.00-3.00 | 485 | 170 | 40 | 40 | N%=0.10 Max, Ti%=(5XC)-0.70, HRB=95 Max | |
| ASTMA 358 Gr. TP 321 | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 17.0-19.0 | 9.0-12.0 | - | 515 | 205 | 40 | 40 | Cb%=(10XC)-1.00, HRB=92 Max | |
| ASTMA 358 Gr. TP 347 | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 17.0-19.0 | 9.0-13.0 | - | 515 | 205 | 40 | 40 | Cb%=(10XC)-1.00, HRB=92 Max | |
| ASTMA 106 Gr. A | 0.25 Max | 0.27-0.93 | 0.035 | 0.035 | 0.40 Max | 0.40 Max | 0.15 Max | 330 | 205 | 35 | 25 | Cu%:0.40 Max, Va%: 0.08 | |
| ASTMA 106 Gr. B | 0.30 Max | 0.29-1.06 | 0.035 | 0.035 | 0.40 Max | 0.40 Max | 0.15 Max | 415 | 240 | 30 | 16.5 | Cu%:0.40 Max, Va%: 0.08 | |
| ASTMA 106 Gr. C | 0.35 Max | 0.29-1.06 | 0.035 | 0.035 | 0.40 Max | 0.40 Max | 0.15 Max | 485 | 275 | 30 | 16.5 | Cu%:0.40 Max, Va%: 0.08 | |
| ASTMA 53 Gr. A | 0.25 Max | 0.95 Max | 0.050 | 0.045 | 0.40 Max | 0.40 Max | 0.15 Max | 330 | 205 | 30 | 16.5 | Cu%:0.40 Max, Va%: 0.08 | |
| ASTMA 53 Gr. B | 0.30 Max | 1.20 Max | 0.050 | 0.045 | 0.40 Max | 0.40 Max | 0.15 Max | 415 | 240 | 30 | 16.5 | Cu%:0.40 Max, Va%: 0.08 | |
| ASTMA 333 Gr. 1 | 0.30 Max | 0.40-1.06 | 0.025 | 0.025 | - | - | - | 380 | 205 | 35 | 25 | Impact Test= -45°C, J=18 Min, HRB=85 Max | |
| ASTMA 333 Gr. 6 | 0.30 Max | 0.29-1.06 | 0.025 | 0.025 | - | - | - | 415 | 240 | 30 | 16.5 | Impact Test= -45°C, J=18 Min, HRB=85 Max | |
| ASTMA 335 Gr. P1 | 0.10-0.20 | 0.30-0.80 | 0.025 | 0.025 | - | - | 0.44-0.65 | 380 | 205 | 30 | 20 | - | |
| ASTMA 335 Gr. P2 | 0.10-0.20 | 0.30-0.61 | 0.025 | 0.025 | 0.50-0.81 | - | 0.44-0.65 | 380 | 205 | 30 | 20 | - | |
| ASTMA 335 Gr. P5 | 0.15 Max | 0.30-0.60 | 0.025 | 0.025 | 4.00-6.00 | - | 0.45-0.65 | 415 | 205 | 30 | 20 | - | |
| ASTMA 335 Gr. P9 | 0.15 Max | 0.30-0.60 | 0.025 | 0.025 | 8.00-10.00 | - | 0.90-1.10 | 415 | 205 | 30 | 20 | - | |
| ASTMA 335 Gr. P11 | 0.05-0.15 | 0.30-0.60 | 0.025 | 0.025 | 1.00-1.50 | - | 0.44-0.65 | 415 | 205 | 30 | 20 | - | |
| ASTMA 335 Gr. P12 | 0.05-0.15 | 0.30-0.61 | 0.025 | 0.025 | 0.80-1.25 | - | 0.44-0.65 | 415 | 220 | 30 | 20 | - | |
| ASTMA 335 Gr. P22 | 0.05-0.15 | 0.30-0.60 | 0.025 | 0.025 | 1.90-2.60 | - | 0.87-1.13 | 415 | 205 | 30 | 20 | - | |
| ASTMA 335 Gr. P91 | 0.08-0.12 | 0.30-0.60 | 0.020 | 0.010 | 8.00-9.50 | 0.40 Max | 0.85-1.05 | 620 | 440 | 20 | - | V%=0.15-0.25, N%=0.030-0.070, AV%=0.02 Max, Cb%=(0.06)-0.10 | |
| ASTMA 213 Gr. T2 | 0.10-0.20 | 0.30-0.61 | 0.025 | 0.025 | 0.50-0.81 | - | 0.44-0.65 | 415 | 205 | 30 | 30 | HRB=85 Max | |
| ASTMA 213 Gr. T5 | 0.15 Max | 0.30-0.60 | 0.025 | 0.025 | 4.00-6.00 | - | 0.45-0.65 | 415 | 205 | 30 | 30 | HRB=85 Max | |
| ASTMA 213 Gr. T11 | 0.05-0.15 | 0.30-0.60 | 0.025 | 0.025 | 1.00-1.50 | - | 0.44-0.65 | 415 | 205 | 30 | 30 | HRB=85 Max | |
| ASTMA 213 Gr. T12 | 0.05-0.15 | 0.30-0.61 | 0.025 | 0.025 | 0.80-1.25 | - | 0.44-0.65 | 415 | 220 | 30 | 30 | HRB=85 Max | |
| ASTMA 213 Gr. T22 | 0.05-0.15 | 0.30-0.60 | 0.025 | 0.025 | 1.90-2.60 | - | 0.87-1.13 | 415 | 205 | 30 | 30 | HRB=85 Max | |
| ASTMA 179 | 0.06-0.18 | 0.27-0.63 | 0.035 | 0.035 | - | - | - | 325 | 180 | 35 | 35 | HRB=72 Max | |
| ASTMA 210 Gr. A1 | 0.27 Max | 0.93 Max | 0.035 | 0.035 | 0.10 Min | - | - | 415 | 255 | 30 | 30 | HRB=79 Max | |



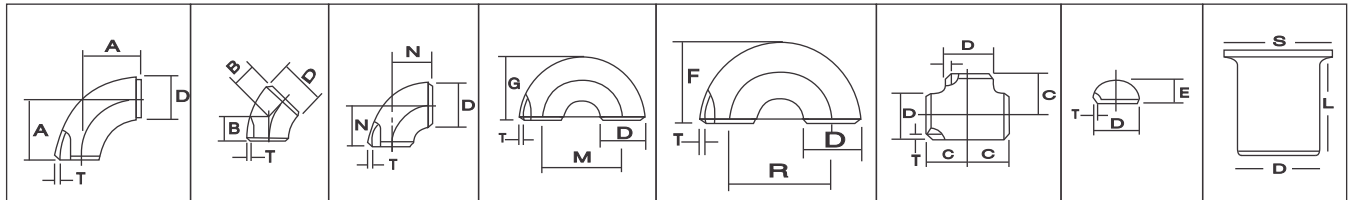
BUTT-WELDING FITTING ASTM

MATERIAL SPECIFICATION FOR SEAMLESS / WELDED BUTT-WELDING PIPE FITTINGS

| SPECIFICATION (ASTM-2002) | CHEMICAL PROPERTIES | | | | | MECHANICAL PROPERTIES | | | | | OTHERS | | | |
|-------------------------------------|---------------------|-----------|----------|----------|-----------|-----------------------|-----------|------------------|----------------|----------------|--------|--------------------|-----------------|----------------------------------------------------------------------------|
| | C% | Mn% | P% (Max) | S% (Max) | Cr% | Mo% | Ni% | U.T.S. (Min) Mpa | Y.S. (Min) Mpa | ELONG. (Min) L | | Hardness (Max) BHN | | |
| STAINLESS STEEL | | | | | | | | | | | | | | |
| A 403 Gr. WP 304 | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 18.0-20.0 | - | 8.0-11.0 | 515 | 205 | 28 | 20 | - | |
| A 403 Gr. WP 304L | 0.030 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 18.0-20.0 | - | 8.0-12.0 | 485 | 170 | 28 | 20 | - | |
| A 403 Gr. WP 304H | 0.04-0.10 | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 18.0-20.0 | - | 8.0-11.0 | 515 | 205 | 28 | 20 | - | |
| A 403 Gr. WP 304LN | 0.030 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 18.0-20.0 | - | 8.0-11.0 | 515 | 205 | 28 | 20 | N%=0.10-0.16 | |
| A 403 Gr. WP 309 | 0.20 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 22.0-24.0 | - | 12.0-15.0 | 515 | 205 | 28 | 20 | - | |
| A 403 Gr. WP 310S | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 24.0-26.0 | - | 19.0-22.0 | 515 | 205 | 28 | 20 | - | |
| A 403 Gr. WP 316 | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 16.0-18.0 | 2.0-3.0 | 10.0-14.0 | 515 | 205 | 28 | 20 | - | |
| A 403 Gr. WP 316L | 0.030 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 16.0-18.0 | 2.0-3.0 | 10.0-14.0 | 485 | 170 | 28 | 20 | - | |
| A 403 Gr. WP 316H | 0.04-0.10 | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 16.0-18.0 | 2.0-3.0 | 10.0-14.0 | 515 | 205 | 28 | 20 | - | |
| A 403 Gr. WP 316LN | 0.030 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 16.0-18.0 | 2.0-3.0 | 10.0-13.0 | 515 | 205 | 28 | 20 | N%=0.10-0.16 | |
| A 403 Gr. WP 317 | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 18.0-20.0 | 3.0-4.0 | 11.0-15.0 | 515 | 205 | 28 | 20 | - | |
| A 403 Gr. WP 317L | 0.030 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 18.0-20.0 | 3.0-4.0 | 11.0-15.0 | 515 | 205 | 28 | 20 | - | |
| A 403 Gr. WP 321 | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 17.0-19.0 | - | 9.0-12.0 | 515 | 205 | 28 | 20 | TT%=(5XC)-0.70 | |
| A 403 Gr. WP 321H | 0.04-0.10 | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 17.0-19.0 | - | 9.0-12.0 | 515 | 205 | 28 | 20 | TT%=(4XC)-0.70 | |
| A 403 Gr. WP 347 | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 17.0-19.0 | - | 9.0-12.0 | 515 | 205 | 28 | 20 | Cb%=(10XC)-1.10 | |
| A 403 Gr. WP 347H | 0.04-0.10 | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 17.0-19.0 | - | 9.0-12.0 | 515 | 205 | 28 | 20 | Cb%=(8XC)-1.10 | |
| CARBON STEEL | | | | | | | | | | | | | | |
| A 284 Gr. WPB | 0.30 Max | 0.29-1.06 | 0.050 | 0.058 | 0.10 Min | 0.40 Max | 0.15 Max | 0.40 Max | 415-655 | 240 | 30 | 20 | 197 | Cu%≤0.40 Max, Va%≤0.08 Max, Cb%≤0.02 Max |
| A 284 Gr. WPC | 0.35 Max | 0.29-1.06 | 0.050 | 0.058 | 0.10 Min | 0.40 Max | 0.15 Max | 0.40 Max | 485-655 | 275 | 30 | 20 | 197 | Cu%≤0.40 Max, Va%≤0.08 Max, Cb%≤0.02 Max |
| LOW TEMPERATURE CARBON STEEL | | | | | | | | | | | | | | |
| A 420 Gr. WPL6 | 0.30 Max | 0.50-1.35 | 0.035 | 0.040 | 0.15-0.40 | 0.30 Max | 0.12 Max | 0.40 Max | 415-655 | 240 | 30 | 16.5 | 197 | Cu%≤0.40 Max, Va%≤0.08 Max, Cb%≤0.02 Max Impact Test=-45°C, J=17.3;19.6 |
| A 420 Gr. WPL 3 | 0.20 Max | 0.31-0.64 | 0.050 | 0.050 | 0.13-0.37 | - | - | 3.20-3.80 | 450-620 | 240 | 30 | 20 | 197 | Impact Test=-45°C, J=17.3;19.6 |
| ALLOY STEEL | | | | | | | | | | | | | | |
| A 284 Gr. WP 1 | 0.28 Max | 0.30-0.90 | 0.045 | 0.045 | 0.10-0.50 | - | 0.44-0.65 | - | 380-550 | 205 | 30 | 20 | 197 | - |
| A 284 Gr. WP 5 | 0.15 Max | 0.30-0.60 | 0.040 | 0.030 | 0.50 Max | 4.0-6.0 | 0.44-0.65 | - | 415-585 | 205 | 30 | 20 | 217 | - |
| A 284 Gr. WP 9 | 0.15 Max | 0.30-0.60 | 0.030 | 0.030 | 1.00 Max | 8.0-10.0 | 0.90-1.10 | - | 415-585 | 205 | 30 | 20 | 217 | - |
| A 284 Gr. WP 11 CL1 | 0.05-0.15 | 0.30-0.60 | 0.030 | 0.030 | 0.50-1.0 | 1.0-1.5 | 0.44-0.65 | - | 415-585 | 205 | 30 | 20 | 197 | - |
| A 284 Gr. WP 11 CL2 | 0.05-0.20 | 0.30-0.80 | 0.040 | 0.040 | 0.50-1.0 | 1.0-1.5 | 0.44-0.65 | - | 485-655 | 275 | 30 | 20 | 197 | - |
| A 284 Gr. WP 11 CL3 | 0.05-0.20 | 0.30-0.80 | 0.040 | 0.040 | 0.50-1.0 | 1.0-1.5 | 0.44-0.65 | - | 520-690 | 310 | 30 | 20 | 197 | - |
| A 284 Gr. WP 12 CL1 | 0.05-0.20 | 0.30-0.80 | 0.045 | 0.045 | 0.60 Max | 0.80-1.25 | 0.44-0.65 | - | 415-585 | 220 | 30 | 20 | 197 | - |
| A 284 Gr. WP 12 CL2 | 0.05-0.20 | 0.30-0.80 | 0.045 | 0.045 | 0.60 Max | 0.80-1.25 | 0.44-0.65 | - | 485-655 | 275 | 30 | 20 | 197 | - |
| A 284 Gr. WP 22 CL1 | 0.05-0.15 | 0.30-0.60 | 0.040 | 0.040 | 0.50 Max | 1.90-2.60 | 0.87-1.13 | - | 415-585 | 205 | 30 | 20 | 197 | - |
| A 284 Gr. WP 22 CL3 | 0.05-0.15 | 0.30-0.60 | 0.040 | 0.040 | 0.50 Max | 1.90-2.60 | 0.87-1.13 | - | 520-690 | 310 | 30 | 20 | 197 | - |
| A 284 Gr. WP 91 | 0.08-0.12 | 0.30-0.60 | 0.020 | 0.010 | 0.20-0.50 | 8.0-9.5 | 0.85-1.05 | 0.40 Max | 585-760 | 415 | 20 | - | 248 | Va%≤0.18-0.25, Cb%≤0.06-0.10, Ni%≤0.03-0.07, Al%≤0.04 Max |



DIMENSIONS OF BUTT-WELDING FITTING ANSI B-16.9 / B-16.28 / MSS SP 43



90 Elbow
Long Radius

45 Elbow

90 Elbow
Short Radius

180 Return
Short Radius

180 Return
Long Radius

Tee Equal Tee

Caps

Stub-End

| Nominal Pipe Size | | Outside Diameter D | Center to Face | | | | Back to Face | | | Center to Center | | | Length 'L' | |
|-------------------|-----|-----------------------|----------------|-------|-------|-----------|--------------|--------|-------|------------------|--------|-------|------------|--------|
| INCH | MM | | A R=1.5D | B | C | N R=1D | E | F | G | R | M | S | Short L | Long L |
| 1/2 | 15 | 21.3 | 38.00 | 16.0 | 25.0 | - | 25.0 | 48.0 | - | 76.0 | | 35.0 | 50.8 | 76.2 |
| 3/4 | 20 | 26.7 | 29.00 | 11.0 | 29.0 | - | 25.0 | 43.0 | - | 57.0 | | 43.0 | 50.8 | 76.2 |
| 1 | 25 | 33.4 | 38.00 | 22.0 | 38.0 | 25.0 | 38.0 | 56.0 | 41.0 | 76.0 | 51.0 | 51.0 | 50.8 | 101.6 |
| 1.1/4 | 32 | 42.2 | 48.00 | 25.0 | 48.0 | 32.0 | 38.0 | 70.0 | 52.0 | 95.0 | 64.0 | 64.0 | 50.8 | 101.6 |
| 1.1/2 | 40 | 48.3 | 57.15 | 29.0 | 57.0 | 38.0 | 38.0 | 83.0 | 62.0 | 114.0 | 76.0 | 73.0 | 50.8 | 101.6 |
| 2 | 50 | 60.3 | 76.00 | 35.0 | 64.0 | 51.0 | 38.0 | 106.0 | 81.0 | 152.0 | 102.0 | 93.0 | 63.5 | 152.4 |
| 2.1/2 | 65 | 73.0 | 95.25 | 44.0 | 76.0 | 64.0 | 38.0 | 132.0 | 100.0 | 191.0 | 127.0 | 105.0 | 63.5 | 152.4 |
| 3 | 80 | 88.9 | 114.30 | 51.0 | 86.0 | 76.0 | 51.0 | 159.0 | 121.0 | 229.0 | 152.0 | 127.0 | 63.5 | 152.4 |
| 3.1/2 | 90 | 101.6 | 133.35 | 57.0 | 95.0 | 89.0 | 64.0 | 184.0 | 140.0 | 267.0 | 178.0 | 140.0 | 76.2 | 152.4 |
| 4 | 100 | 114.3 | 152.0 | 64.0 | 105.0 | 102.0 | 64.0 | 210.0 | 159.0 | 305.0 | 203.0 | 157.0 | 76.2 | 152.4 |
| 5 | 125 | 141.3 | 190.0 | 79.0 | 123.0 | 127.0 | 76.0 | 262.0 | 197.0 | 381.0 | 254.0 | 186.0 | 76.2 | 203.2 |
| 6 | 150 | 168.3 | 229.0 | 95.0 | 143.0 | 152.0 | 89.0 | 313.0 | 237.0 | 457.0 | 305.0 | 218.0 | 88.9 | 203.2 |
| 8 | 200 | 219.1 | 305.0 | 127.0 | 178.0 | 203.0 | 102.0 | 414.0 | 313.0 | 610.0 | 406.0 | 270.0 | 101.6 | 203.2 |
| 10 | 250 | 273.1 | 381.0 | 159.0 | 216.0 | 254.0 | 127.0 | 515.0 | 391.0 | 762.0 | 508.0 | 324.0 | 127.0 | 254.0 |
| 12 | 300 | 323.8 | 457.0 | 190.0 | 254.0 | 305.0 | 152.0 | 619.0 | 467.0 | 914.0 | 610.0 | 381.0 | 152.4 | 254.0 |
| 14 | 350 | 355.6 | 533.0 | 222.0 | 279.0 | 356.0 | 165.0 | 711.0 | 533.0 | 1067.0 | 711.0 | 413.0 | 152.4 | 305.0 |
| 16 | 400 | 406.4 | 610.0 | 254.0 | 305.0 | 406.0 | 178.0 | 813.0 | 610.0 | 1219.0 | 813.0 | 470.0 | 152.4 | 305.0 |
| 18 | 450 | 457.2 | 686.0 | 286.0 | 343.0 | 457.0 | 203.0 | 914.0 | 686.0 | 1372.0 | 914.0 | 533.0 | 152.4 | 305.0 |
| 20 | 500 | 508.0 | 762.0 | 318.0 | 381.0 | 508.0 | 229.0 | 1016.0 | 762.0 | 1524.0 | 1016.0 | 584.0 | 152.4 | 305.0 |
| 22 | 550 | 559.0 | 838.0 | 343.0 | 419.0 | 559.0 | 254.0 | 1118.0 | 838.0 | 1676.0 | 1118.0 | 614.4 | 152.4 | 305.0 |
| 24 | 600 | 610.0 | 914.0 | 381.0 | 432.0 | 610.0 | 267.0 | 1219.0 | 914.0 | 1829.0 | 1219.0 | 692.0 | 152.4 | 305.0 |
| 26 | 650 | 660.0 | 991.0 | 405.0 | 495.0 | 660.0 | 267.0 | | | | | | | |
| 28 | 700 | 711.0 | 1067.0 | 438.0 | 521.0 | 771.0 | 267.0 | | | | | | | |
| 30 | 750 | 762.0 | 1143.0 | 470.0 | 559.0 | 762.0 | 267.0 | | | | | | | |
| 32 | 800 | 813.0 | 1219.0 | 502.0 | 597.0 | 813.0 | 267.0 | | | | | | | |
| 34 | 850 | 864.0 | 1295.0 | 533.0 | 635.0 | 864.0 | 267.0 | | | | | | | |
| 36 | 900 | 914.4 | 1372.0 | 565.0 | 673.0 | 914.0 | 267.0 | | | | | | | |



All Dimensions in Millimeters



FORGED FITTINGS & FLANGES ASTM

MATERIAL SPECIFICATION FOR FORGED FITTINGS & FLANGES

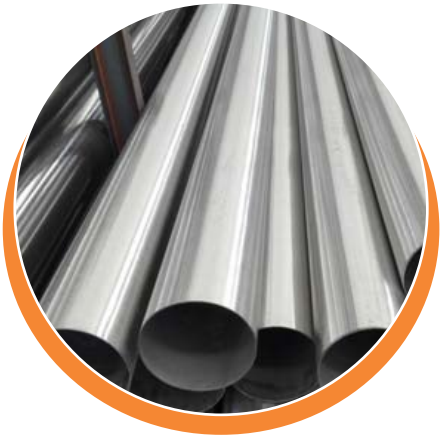
| SPECIFICATION (ASTM-2002) | CHEMICAL PROPERTIES | | | | | | MECHANICAL PROPERTIES | | | | | | OTHERS |
|-------------------------------------|---------------------|-----------|-------------|-------------|-----------|-----------|-----------------------|-----------|------------------------|----------------------|----------------------|-------------------|-----------------|
| | C% | Mn% | P% (Max) | S% (Max) | Si% | Cr% | Ni% | Mo% | U.T.S. (Min) Mpa | Y.S. (Min) Mpa | ELONG. (Min) % | RED. AREA % | |
| STAINLESS STEEL | | | | | | | | | | | | | |
| A 182 Gr. F 304 | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 18.0-20.0 | 8.0-11.0 | - | 515 | 205 | 30 | 50 | - |
| A 182 Gr. F 304L | 0.030 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 18.0-20.0 | 8.0-13.0 | - | 485 | 170 | 30 | 50 | - |
| A 182 Gr. F 304H | 0.04-0.10 | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 18.0-20.0 | 8.0-11.0 | - | 515 | 205 | 30 | 50 | - |
| A 182 Gr. F 304LN | 0.030 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 22.0-24.0 | 8.0-10.5 | - | 515 | 205 | 30 | 50 | N%=0.10-0.16 |
| A 182 Gr. F 309H | 0.04-0.10 | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 24.0-26.0 | 19.0-22.0 | - | 515 | 205 | 30 | 50 | - |
| A 182 Gr. F 310 | 0.25 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 16.0-18.0 | 10.0-14.0 | 2.0-3.0 | 515 | 205 | 30 | 50 | - |
| A 182 Gr. F 316 | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 16.0-18.0 | 10.0-15.0 | 2.0-3.0 | 485 | 170 | 30 | 50 | - |
| A 182 Gr. F 316L | 0.030 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 16.0-18.0 | 10.0-14.0 | 2.0-3.0 | 515 | 205 | 30 | 50 | - |
| A 182 Gr. F 316H | 0.04-0.10 | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 16.0-18.0 | 11.0-15.0 | 3.0-4.0 | 515 | 205 | 30 | 50 | - |
| A 182 Gr. F 316LN | 0.030 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 17.0-19.0 | 9.0-12.0 | - | 515 | 205 | 30 | 50 | Ti%=(5xC)-0.70 |
| A 182 Gr. F 317 | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 17.0-19.0 | 9.0-12.0 | - | 515 | 205 | 30 | 50 | Ti%=(4xC)-0.70 |
| A 182 Gr. F 317L | 0.030 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 17.0-19.0 | 9.0-13.0 | - | 515 | 205 | 30 | 50 | Cb%=(10xC)-1.10 |
| A 182 Gr. F 321 | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 17.0-20.0 | 9.0-13.0 | - | 515 | 205 | 30 | 50 | Cb%=(8xC)-1.10 |
| A 182 Gr. F 321H | 0.04-0.10 | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 0.30 Max | 0.40 Max | 0.12 Max | 485 | 250 | 22 | 30 | 187 |
| A 182 Gr. F 347 | 0.080 Max | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 0.30 Max | 0.40 Max | 0.12 Max | 415-585 | 205 | 25 | 38 | 197 |
| A 182 Gr. F 347H | 0.04-0.10 | 2.00 Max | 0.045 | 0.030 | 1.00 Max | 0.30 Max | 0.40 Max | 0.12 Max | 485-655 | 250 | 22 | 30 | 197 |
| A 105 | 0.35 Max | 0.60-1.05 | 0.035 | 0.040 | 0.10-0.35 | 0.30 Max | 0.40 Max | 0.12 Max | 485-655 | 260 | 22 | 35 | 197 |
| CARBON STEEL | | | | | | | | | | | | | |
| LOW TEMPERATURE CARBON STEEL | | | | | | | | | | | | | |
| A 350 Gr. LF 1 | 0.35 Max | 0.60-1.35 | 0.035 | 0.040 | 0.15-0.30 | 0.30 Max | 0.40 Max | 0.12 Max | 415-585 | 205 | 25 | 38 | 197 |
| A 350 Gr. LF 2 | 0.30 Max | 0.60-1.35 | 0.035 | 0.040 | 0.15-0.30 | 0.30 Max | 0.40 Max | 0.12 Max | 485-655 | 250 | 22 | 30 | 197 |
| A 350 Gr. LF 3 | 0.20 Max | 0.90 Max | 0.035 | 0.040 | 0.20-0.35 | 0.30 Max | 0.40 Max | 0.12 Max | 485-655 | 260 | 22 | 35 | 197 |
| ALLOY STEEL | | | | | | | | | | | | | |
| A 182 Gr. F 1 | 0.28 max | 0.60-0.90 | 0.045 | 0.045 | 0.15-0.35 | - | - | 0.44-0.65 | 485 | 275 | 20 | 30 | 143-192 |
| A 182 Gr. F 2 | 0.05-0.21 | 0.30-0.80 | 0.040 | 0.040 | 0.10-0.60 | 0.50-0.81 | - | 0.44-0.65 | 485 | 275 | 20 | 30 | 143-192 |
| A 182 Gr. F 5 | 0.15 max | 0.30-0.60 | 0.030 | 0.030 | 0.50 Max | 4.0-6.0 | 0.5 Max | 0.44-0.65 | 485 | 275 | 20 | 35 | 143-217 |
| A 182 Gr. F 9 | 0.15 max | 0.30-0.60 | 0.030 | 0.030 | 0.50-1.00 | 8.0-10.0 | - | 0.90-1.10 | 585 | 380 | 20 | 40 | 179-217 |
| A 182 Gr. F 11 CL1 | 0.05-0.15 | 0.30-0.60 | 0.030 | 0.030 | 0.50-1.00 | 1.0-1.50 | - | 0.44-0.65 | 415 | 205 | 20 | 45 | 121-174 |
| A 182 Gr. F 11 CL2 | 0.10-0.20 | 0.30-0.80 | 0.040 | 0.040 | 0.50-1.0 | 1.0-1.50 | - | 0.40-0.65 | 485 | 275 | 20 | 30 | 143-207 |
| A 182 Gr. F 11 CL3 | 0.10-0.20 | 0.30-0.80 | 0.040 | 0.040 | 0.50-1.0 | 1.0-1.50 | - | 0.44-0.65 | 515 | 310 | 20 | 30 | 156-207 |
| A 182 Gr. F 12 CL1 | 0.05-0.15 | 0.30-0.60 | 0.045 | 0.045 | 0.50 Max | 0.80-1.25 | - | 0.44-0.65 | 415 | 220 | 20 | 45 | 121-174 |
| A 182 Gr. F 12 CL2 | 0.10-0.20 | 0.30-0.80 | 0.040 | 0.040 | 0.10-0.60 | 0.80-1.25 | - | 0.44-0.65 | 485 | 275 | 20 | 30 | 143-207 |
| A 182 Gr. F 22 CL1 | 0.05-0.15 | 0.30-0.60 | 0.040 | 0.040 | 0.50 Max | 2.0-2.5 | - | 0.87-1.13 | 415 | 205 | 20 | 35 | 170 |
| A 182 Gr. F 22 CL3 | 0.05-0.15 | 0.30-0.60 | 0.040 | 0.040 | 0.50 Max | 2.0-2.50 | - | 0.87-1.13 | 515 | 310 | 20 | 30 | 156-207 |
| A 182 Gr. F 91 | 0.08-0.12 | 0.30-0.60 | 0.020 | 0.010 | 0.20-0.50 | 8.0-9.5 | 0.40 Max | 0.85-1.05 | 585 | 415 | 20 | 40 | 248 |



Dimensions of Socket-welding Fittings ANSI B 16.11

| Nominal Pipe Size | NB INCH | Socket Bore Diameter Note 1 | Bore Diameter of Fitting D [Note(1)] | | | Socket Wall Thickness, C [Note (2)] | | | Body wall G | | | Min. Depth of Socket J | Center to Bottom of Socket, A | | | Laying Lengths | | | Tolerances | | | End Wall Thickness K Min. Class Designation | | | | |
|-------------------|---------|-----------------------------|--------------------------------------|------|------|-------------------------------------|------|------|-------------------|------|------|------------------------|-------------------------------|-------|------|----------------|------|------|-------------|------------------|-----|---------------------------------------------|-----|------|------|------|
| | | | Class Designation | | | Class Designation | | | Class Designation | | | | 90° Elbows, Tees & Crosses | | | 45° Elbows, | | | Couplings E | Half Couplings F | A | E | F | 3000 | 6000 | 9000 |
| | | | 3000 | 6000 | 9000 | Avg. | Min. | Avg. | Min. | Avg. | Min. | | 3000 | 6000 | 9000 | 3000 | 6000 | 9000 | | | | | | | | |
| 6 | 1/8 | 11.2 | 7.6 | 4.8 | ... | 3.18 | 3.18 | 3.96 | 3.43 | ... | 9.5 | 11.0 | 11.0 | ... | 8.0 | 8.0 | ... | 6.5 | 16.0 | 1.0 | 1.5 | 1.0 | 4.8 | 6.4 | ... | |
| 8 | 1/4 | 10.8 | 6.1 | 3.2 | ... | ... | 3.78 | 3.30 | 4.60 | 4.01 | ... | 9.5 | 11.0 | 13.5 | ... | 8.0 | 8.0 | ... | 6.5 | 16.0 | 1.0 | 1.5 | 1.0 | 4.8 | 6.4 | ... |
| 10 | 3/8 | 14.6 | 10.0 | 7.1 | ... | ... | ... | ... | ... | ... | ... | 9.5 | 13.5 | 15.5 | ... | 8.0 | 11.0 | ... | 6.5 | 17.5 | 1.5 | 3.0 | 1.5 | 4.8 | 6.4 | ... |
| 15 | 1/2 | 14.2 | 8.5 | 5.6 | ... | ... | ... | ... | ... | ... | ... | 9.5 | 15.5 | 19.5 | ... | 11.0 | 12.5 | 15.5 | 9.5 | 22.5 | 1.5 | 3.0 | 1.5 | 6.4 | 7.9 | 11.2 |
| 20 | 3/4 | 17.6 | 11.8 | 8.4 | ... | ... | ... | ... | ... | ... | ... | 9.5 | 19.5 | 25.5 | ... | 11.0 | 12.5 | 15.5 | 9.5 | 22.5 | 1.5 | 3.0 | 1.5 | 6.4 | 7.9 | 11.2 |
| 25 | 1 | 21.8 | 15.0 | 11.0 | 5.6 | ... | ... | ... | ... | ... | ... | 12.5 | 21.8 | 27.8 | ... | 14.0 | 15.5 | 19.0 | 9.5 | 24.0 | 1.5 | 3.0 | 1.5 | 6.4 | 7.9 | 12.7 |
| 32 | 1 1/4 | 27.2 | 20.2 | 14.8 | 10.3 | ... | ... | ... | ... | ... | ... | 12.5 | 27.2 | 33.2 | ... | 17.5 | 20.5 | 22.5 | 12.5 | 28.5 | 2.0 | 4.0 | 2.0 | 9.6 | 11.2 | 14.2 |
| 40 | 1 1/2 | 34.3 | 27.4 | 21.5 | 16.0 | ... | ... | ... | ... | ... | ... | 12.5 | 34.3 | 40.3 | ... | 20.5 | 22.5 | 25.5 | 12.5 | 30.0 | 2.0 | 4.0 | 2.0 | 9.6 | 11.2 | 14.2 |
| 50 | 2 | 33.9 | 35.8 | 30.2 | 23.5 | ... | ... | ... | ... | ... | ... | 12.5 | 35.8 | 41.8 | ... | 22.5 | 25.5 | 28.5 | 12.5 | 32.0 | 2.0 | 4.0 | 2.0 | 9.6 | 11.2 | 14.2 |
| 65 | 2 1/2 | 42.7 | 41.6 | 34.7 | 28.7 | ... | ... | ... | ... | ... | ... | 12.5 | 42.7 | 48.7 | ... | 25.5 | 28.5 | 31.5 | 12.5 | 35.0 | 2.0 | 4.0 | 2.0 | 9.6 | 11.2 | 14.2 |
| 80 | 3 | 48.8 | 40.1 | 33.2 | 27.2 | ... | ... | ... | ... | ... | ... | 12.5 | 48.8 | 54.8 | ... | 28.5 | 31.5 | 34.5 | 12.5 | 38.0 | 2.0 | 4.0 | 2.0 | 11.2 | 12.7 | 15.7 |
| 100 | 4 | 53.3 | 53.3 | 43.6 | 38.9 | ... | ... | ... | ... | ... | ... | 16.0 | 53.3 | 59.3 | ... | 32.0 | 35.0 | 38.0 | 16.0 | 41.0 | 2.0 | 4.0 | 2.0 | 12.7 | 15.7 | 19.0 |
| | | 61.2 | 51.7 | 42.1 | 37.4 | ... | ... | ... | ... | ... | ... | 16.0 | 61.2 | 67.2 | ... | 35.0 | 38.0 | 41.0 | 16.0 | 44.0 | 2.0 | 4.0 | 2.0 | 12.7 | 15.7 | 19.0 |
| | | 74.4 | 64.2 | ... | ... | ... | ... | ... | ... | ... | ... | 16.0 | 74.4 | 80.4 | ... | 38.0 | 41.0 | 44.0 | 16.0 | 47.0 | 2.0 | 4.0 | 2.0 | 15.7 | 19.0 | ... |
| | | 73.9 | 61.2 | ... | ... | ... | ... | ... | ... | ... | ... | 16.0 | 73.9 | 79.9 | ... | 41.0 | 44.0 | 47.0 | 16.0 | 50.0 | 2.0 | 4.0 | 2.0 | 15.7 | 19.0 | ... |
| | | 90.3 | 79.4 | ... | ... | ... | ... | ... | ... | ... | ... | 16.0 | 90.3 | 96.3 | ... | 44.0 | 47.0 | 50.0 | 16.0 | 53.0 | 2.0 | 4.0 | 2.0 | 19.0 | 22.4 | ... |
| | | 89.8 | 76.4 | ... | ... | ... | ... | ... | ... | ... | ... | 16.0 | 89.8 | 95.8 | ... | 47.0 | 50.0 | 53.0 | 16.0 | 56.0 | 2.0 | 4.0 | 2.0 | 19.0 | 22.4 | ... |
| | | 115.7 | 103.8 | ... | ... | ... | ... | ... | ... | ... | ... | 19.0 | 115.7 | 121.7 | ... | 50.0 | 53.0 | 56.0 | 19.0 | 59.0 | 2.0 | 4.0 | 2.0 | 22.4 | 28.4 | ... |
| | | 115.2 | 100.7 | ... | ... | ... | ... | ... | ... | ... | ... | 19.0 | 115.2 | 121.2 | ... | 53.0 | 56.0 | 59.0 | 19.0 | 62.0 | 2.0 | 4.0 | 2.0 | 22.4 | 28.4 | ... |

(1) All Dimensions Are In Millimeters
 (2) Upper and lower values for each size are the respective maximum and minimum dimensions.
 (3) Average of socket wall thickness around periphery shall be no less than listed values. The minimum values are permitted in localized areas.



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