# TECHNICAL CHARTS

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WOLSELEY Industrial

# API Trim Chart

| API Trim Family | API Trim No. | Material Type | Nominal Trim | Stem | Disc/Wedge Surface | Seat Surface | Acceptable API Trim Alternatives |
|---|---|---|---|---|---|---|---|
| Martensitic Stainless Steel | 1* | 13Cr | 410 | 410 SS | F6 | 410 SS | - |
| | 8 | | 410 Hardfaced | 410 SS | F6 | Stellite 6 | 5 |
| | 5 | | 410 Full Hardfaced | 410 SS | Stellite 6 | Stellite 6 | - |
| Austenitic Stainless Steel | 10 | 18Cr-8Ni-Mo | 316 | 316 SS | 316 SS | 316 SS | 12 or 16 |
| | 12 | | 316 Hardfaced | 316 SS | 316 SS | Stellite 6 | 16 |
| | 16 | | 316 Full Hardfaced | 316 SS | Stellite 6 | Stellite 6 | - |
| Monel™ | 9 | Ni-Cu Alloy | Monel | Monel | Monel | Monel | - |
| | 11 | | Monel Hardfaced | Monel | Monel | Stellite 6 | - |
| Alloy 20 | 13 | 19Cr-29Ni | Alloy 20 | Alloy 20 | Alloy 20 | Alloy 20 | 14 |
| | 14 | | Alloy 20 Hardfaced | Alloy 20 | Alloy 20 | Stellite 6 | - |
| | 18 | | Alloy 20 Full Hardfaced | Alloy 20 | Stellite 6 | Stellite 6 | - |

- *Trim 1 is listed as obsolete for API 600, and no longer included in API 602
- Trim 5A and 8A apply Ni-Cr alloy hardfacing instead of typical Co-Cr Stellite 6 hardfacing
- Trim materials noted are nominal, and data provided in this chart is for informational purposes only. Always consult API to verify information via current API publications and data

# Valve Seat Materials

| Seat Material | Approximate Operating Temperature | Typical ASME Class | Advantages & Distinguishing Features | Disadvantages & Incompatibilities |
|---|---|---|---|---|
| Virgin PTFE | -73°C to 204°C | CL150 to CL300 | -Polytetrafluoroethylene<br>-Very good chemical resistance (inert)<br>-Very soft material with low coefficient of friction resulting in low operating torques<br>-Non-contaminating and approved for food services | -Low stiffness, strength, hardness<br>-Limited toughness |
| RPTFE | -100°C to 232°C* | CL150 to CL300 | -Reinforced polytetrafluoroethylene<br>-Very good chemical resistance (inert)<br>-Very soft material with low coefficient of friction resulting in low operating torques<br>-Filled with Carbon, glass, graphite, $MoS_2$ or bronze | -Low stiffness, strength, hardness<br>-Limited toughness |
| Devlon® V-API | -50°C to 176°C | CL150 to CL1500 | -Polyamide with additives<br>-Harder than RPTFE, softer than PEEK<br>-Excellent machineability and surface finish<br>-Good abrasion, corrosion, and impact resistance<br>-Acceptable alternative to Nylon seats | -Not suitable for alcohols, amines, acids, or steam service |
| Viton™ | -40°C to 204°C | CL150 to CL600 | -Fluoropolymer elastomer<br>-Resistant to compression and weathering<br>-Good resistance to petroleum oils, silicone fluids, acids, and hydrocarbons | -Not suitable for steam, hot water, alcohols, or amine service<br>-Expensive |
| PEEK® | -56°C to 316°C | CL150 to CL2500 | -Polyetheretherketone polymer<br>-Most commonly used for high temperature and pressure applications<br>-Good corrosion resistance<br>-Very hard material | -Very expensive<br>-Not suitable for applications prone to thermal shock or rapid temperature fluctuations |
| Delrin® | -56°C to 82°C | CL150 to CL1500 | -Acetal homopolymer resin<br>-High stiffness and heat resistance<br>-Low friction<br>-Does not undergo cold flow | -Not suitable for acids or oxygen service |
| Nylon | -34°C to 93°C | CL150 to CL1500 | -Polyamide<br>-Typically used for higher pressure and lower temperature service<br>-Typically used for air, oil, and gas media | -Not suitable for strong oxidizing agents or water service<br>-Limited resistance to alkalies and acids |

- *Specific temperature range will depend on filler material and detailed design
- Chemical compatibility and pressure-temperature charts should be reviewed based on service conditions subject to valve and seat design
- Data provided in this chart is for informational purposes only

# Valve Seal Materials

| Seal Material | Approximate Operating Temperature | Advantages & Distinguishing Features | Disadvantages & Incompatibilities |
|---|---|---|---|
| HNBR | -46°C to 160°C | Hydrogenated Acrylonitrile Butadiene Rubber<br>-Design varies based on Acrylonitrile (ACN) content<br>-Good balance of cost and performance<br>-Good resistance to abrasion, swelling, flex cracking, and compression set | -Not recommended for service involving ketones, esters, ethers, and aromatics<br>-Poor electrical properties and flame resistance |
| Viton™ | -40°C to 204°C | -Fluoropolymer elastomer (FKM)<br>-Excellent rapid gas decompression resistance<br>-Designed to withstand harsh chemicals at high temperature<br>-Good compression set resistance even at high temperatures<br>-Good resistance to petroleum oils, silicone fluids, acids, and aliphatic/aromatic hydrocarbons | -Not suitable for steam, hot water, alcohols, or amine service<br>-Expensive |
| Flexible Graphite | -240°C to 650°C | -Very good chemical resistance<br>-Chemically resistant to many organics and inorganics<br>-Suitable for high temperature applications and sealing elements for metal seated valves | -Not suitable for strong oxidizing agents or concentrated strong oxidizing mineral acids |
| PTFE Lip Seals | -268°C to 232°C | -Polytetrafluoroethylene<br>-Very good chemical resistance and suitable for sour service<br>-Low friction and torque<br>-Spring loaded with Elgiloy® spring<br>-Suitable for cryogenic applications | -Low stiffness, strength, hardness<br>-Limited toughness<br>-Very expensive |
| EPDM | -54°C to 150°C | -Ethylene-Propylene Diene Monomer<br>-Excellent abrasion, tear, and ozone resistance<br>-Good chemical resistance to weak acid and alkalines<br>-Commonly used for water, steam, and air<br>-Inexpensive | -Not recommended for petroleum oils, lubricants, hydrocarbons, alcohols, or concentrated acids and alkalines<br>-Should not be used on compressed air lines |
| Kalrez® | -42°C to 327°C | -Perfluoroelastomer (FFKM)<br>-Various grades available based on requirements of chemical environment, temperature, hardness, compression, and rapid gas decompression | -Many grades do not offer rapid gas decompression resistance<br>-Very expensive |

- Seal materials will vary based on design and specific material grades – Consult manufacturer data sheets
- Chemical compatibility and material data sheets should be reviewed with respect to service conditions
- Data provided in this chart is for informational purposes only

# ASME Class to Cold Working Pressure

| ASME Class | Group 1.1 Materials **A105, A216 WCB, A350 LF2** Cold Working Pressure (psig) | Group 1.2 Materials **A352 LCC** Cold Working Pressure (psig) | Group 2.2 Materials **A182 F316** Cold Working Pressure (psig) |
|---|---|---|---|
| CL150 | 285 | 290 | 275 |
| CL300 | 740 | 750 | 720 |
| CL400 | 985 | 1,000 | 960 |
| CL600 | 1,480 | 1,500 | 1,440 |
| CL800 | 1,975 | 2,000 | 1,920 |
| CL900 | 2,220 | 2,250 | 2,160 |
| CL1500 | 3,705 | 3,750 | 3,600 |
| CL2500 | 6,170 | 6,250 | 6,000 |

- Cold working pressures include -20°F to 100°F (-29°C to 38°C) – Refer to ASME B16.34 outside this range
- CL800 is an intermediate pressure class widely used for socket weld and threaded end connections, as per API 602.

# API Valve Specifications

| Standard | Title |
|---|---|
| API 6D | Specification for Pipeline and Piping Valves |
| API 594 | Check Valves: Flanged, Lug, Wafer, and Butt-welding |
| API 598 | Valve Inspection and Testing |
| API 600 | Steel Gate Valves – Flanged and Butt-welding Ends, Bolted Bonnets |
| API 602 | Gate, Globe, and Check Valves for Sizes DN 100 (NPS 4) and Smaller for the Petroleum and Natural Gas Industries |
| API 603 | Corrosion-resistant, Bolted Bonnet Gate Valves – Flanged and Butt-welding Ends |
| API 607 | Fire Test for Quarter-turn Valves and Valves Equipped with Non-Metallic Seats |
| API 608 | Metal Ball Valves-Flanged, Threaded and Welding Ends |
| API 609 | Butterfly Valves: Double-flanged, Lug and Wafer Type |
| API 622 | Type Testing of Process Valve Packing for Fugitive Emissions |
| API 623 | Steel Globe Valves – Flanged and Butt-welding Ends, Bolted Bonnets |
| API 624 | Type Testing of Rising Stem Valves Equipped with Graphite Packing for Fugitive Emissions |
| API 641 | Type Testing of Quarter-turn Valves for Fugitive Emissions |

# Common Valve Materials

| Common Name | Nominal Designation | Forging | Casting | Temperature Range | Description |
|---|---|---|---|---|---|
| Carbon Steel | C–Si | A105 | A216 WCB | -20°F to 800°F | Carbon steel |
| Low Temperature Carbon Steel | C–Mn–Si | A350 LF2 | A352 LCC | LF2: -50°F to 800°F<br>LCC: -50°F to 650°F | Low temperature carbon steel |
| F11 | 1 ¼ Mo–½ Cr–Si | A182 F11 Cl. 2 | - | -20°F to 1100°F [1] | Moly-chrome alloy |
| WC6 | 1 ¼ Mo–½ Cr | - | A217 WC6 | -20°F to 1100°F [1] | Moly-chrome alloy |
| F22 or WC9 | 2 ¼ Cr –1 Mo | A182 F22 Cl. 3 | A217 WC9 | -20°F to 1100°F [1] | Moly-chrome alloy |
| F91 or C12A | 9Cr–1Mo–V | A182 F91 | A217 C12A | -20°F to 1200°F [1] | Moly-chrome alloy |
| 304 SS | 18Cr–8Ni | A182 F304 | A351 CF8 | -425°F to 1500°F [1,2] | Austenitic stainless steel |
| 304L SS | 18Cr–8Ni | A182 F304L | A351 CF3 | -425°F to 800°F | Austenitic stainless steel (low carbon) |
| 316 SS | 16Cr–12Ni–2Mo | A182 F316 | A351 CF8M | -325°F to 1500°F [1,2] | Austenitic stainless steel |
| 316L SS | 16Cr–12Ni–2Mo | A182 F316L | A351 CF3M | -425°F to 850°F | Austenitic stainless steel (low carbon) |
| 317 SS | 18Cr–13Ni–3Mo | A182 F317 | - | -325°F to 1500°F [2] | Austenitic stainless steel |
| | 19Cr–10Ni–3Mo | - | A351 CG8M | -325°F to 1000°F | Austenitic stainless steel |
| 321 SS | 18Cr–10Ni–Ti | A182 F321 | - | -325°F to 1000°F | Austenitic stainless steel |
| 347 SS | 18Cr–10Ni–Cb | A182 F347 | A351 CF8C | F347: -425°F to 1000°F<br>CF8C: -325°F to 1500°F [1,2] | Austenitic stainless steel |
| Alloy 20 | 35Ni-35Fe-20Cr-Cb | B462 N08020 | A351 CN7M | N08020: -325°F to 800°F<br>CN7M: -325°F to 600°F | Austenitic stainless steel |
| 22% Duplex SS | 22Cr–5Ni–3Mo–N | A182 F51 | A351 CD3MN | -60°F to 600°F | Austenitic/ferritic duplex stainless steel |
| Nitronic 50® | 22Cr–13Ni–5Mn | A182 FXM-19 | A351 CG6MMN | -325°F to 1200°F | Nitrogen strengthened austenitic stainless steel |
| 13% Chrome (410 SS) | 13Cr | A182 F6A | A217 CA15 | -20°F to 1200°F | Martensitic stainless steel |
| 17-4PH (630 SS) | 17Cr–4Ni | A564 F630 | A747 CB7Cu-1 | -320°F to 600°F [3] | Precipitation hardened martensitic stainless steel |
| Monel | 67Ni–30Cu | B564 N04400 | A494 M35 | -325°F to 900°F | Nickel copper alloy |

1—Flanged end valve ratings terminate at 1000°F for CL150 valves – consult ASME B16.34 for more information
2—At temperatures over 1000°F, use only when the carbon content is 0.04% or higher
3—Temperature range may vary based on material grade

# ASME/ASTM Bolting Specification

| Valve Body Material | ASTM Grade of Bolt | Recommended Nuts | Nominal Composition | Temperature Limits | NACE MR0175 | NACE MR0103 |
|---|---|---|---|---|---|---|
| A216 WCB | A193 B7 | A194 Grade 2H | Cr-Mo | -48°C to 538°C | | |
| A105 | A193 B7M | A194 Grade 2HM | Cr-1/5Mo | -48°C to 538°C | ✓ | ✓ |
| A350 LF2 | A320 L7 | A194 Grade 7 | Cr-Mo | -101°C to 538°C | | |
| A352 LCC | A320 L7M | A194 Grade 7M | Cr-1/5Mo | -73°C to 538°C | ✓ | ✓ |
| A351 CF8 A182 F304 | A193/A320 B8 CL. 1 | A194 Grade 8 | 18Cr-8Ni | -255°C to 816°C | ★ | ★ |
| | A193/A320 B8 CL. 2 | A194 Grade 8 | 18Cr-8Ni | -200°C to 538°C | | |
| | A193/A320 B8A CL. 1A | A194 Grade 8A | 18Cr-8Ni | -255°C to 816°C | ✓ | ✓ |
| A351 CF8M A182 F316 | A193/A320 B8M CL. 1 | A194 Grade 8M | 16Cr-12Ni-2Mo | -200°C to 816°C | ★ | ★ |
| | A193/A320 B8M CL. 2 | A194 Grade 8M | 16Cr-12Ni-2Mo | -200°C to 538°C | | |
| | A193/A320 B8MA CL. 1A | A194 Grade 8MA | 16Cr-12Ni-2Mo | -200°C to 816°C | ✓ | ✓ |

✓ Always certified to NACE MR0175/ISO 15156 and/or NACE MR0103/ISO 17945

★ Austenitic stainless steels, such as 304SS or 316SS, shall have a maximum hardness of 22 HRC for NACE compliance

API 6D states that carbon, alloy and stainless steel (except austenitic grades) for pressure-containing parts in valves with a specified design temperature below -29°C shall be impact tested

# Trunnion Ball Valve Types

| Valve Type | Seat 1 | Seat 2 |
|---|---|---|
| DBB | Single Piston Effect (SPE) | Single Piston Effect (SPE) |
| DIB-1 | Double Piston Effect (DPE) | Double Piston Effect (DPE) |
| DIB-2 | Single Piston Effect (SPE) | Double Piston Effect (DPE) |

# API 598 – Pressure Test Requirements

| Test | Size | ASME Class | Valve Type | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Gate | Globe and Parallel Slide Gate | Plug | Check | Floating Ball | Butterfly & Trunnion Mounted Ball |
| Shell | All | All | Required | Required | Required | Required | Required | Required |
| Backseat | All | All | Required | Required | N/A | N/A | N/A | N/A |
| Low-Pressure Closure | ≤ 4 NPS | ≤ CL1500 | Required | Optional | Required | Optional | Required | Required |
| | | > CL1500 | Optional | | Optional | | | Optional |
| | > 4 NPS | ≤ CL600 | Required | | Required | | | Required |
| | | > CL600 | Optional | | Optional | | | Optional |
| High Pressure Closure | ≤ 4 NPS | ≤ CL1500 | Optional | Required | Optional | Required | Optional | Optional |
| | | > CL1500 | Required | | Required | | | Required |
| | > 4 NPS | ≤ CL600 | Optional | | Optional | | | Optional |
| | | > CL600 | Required | | Required | | | Required |
| High-Pressure Pneumatic Shell Test | All | All | Optional – Must be specified in purchase order | | | | | |
| Any tests listed as optional and specified in the purchase order must be performed in addition to required tests | | | | | | | | |

# API 598 Testing – Pressure & Duration

| | | | | |
|---|---|---|---|---|
| Hydrostatic Shell Test (1.5x CWP) | ASME Class | Pressure – Gr. 1.1 A105, A216 WCB, A350 LF2 (psi) | Pressure – Gr. 1.2 A352 LCC (psi) | Pressure – Gr. 2.2 A182 F316 (psi) |
| | CL150 | 450 | 450 | 425 |
| | CL300 | 1,125 | 1,125 | 1,100 |
| | CL400 | 1,500 | 1,500 | 1,450 |
| | CL600 | 2,225 | 2,250 | 2,175 |
| | CL800 | 2,975 | 3,000 | 2,900 |
| | CL900 | 3,350 | 3,375 | 3,250 |
| | CL1500 | 5,575 | 5,625 | 5,400 |
| | CL2500 | 9,275 | 9,375 | 9,000 |
| High Pressure Hydrostatic Seat Test (1.1x CWP) | ASME Class | Pressure – Gr. 1.1 A105, A216 WCB, A350 LF2 (psi) | Pressure – Gr. 1.2 A352 LCC (psi) | Pressure – Gr. 2.2 A182 F316 (psi) |
| | CL150 | 314 | 319 | 303 |
| | CL300 | 814 | 825 | 792 |
| | CL400 | 1,085 | 1,100 | 1,056 |
| | CL600 | 1,628 | 1,650 | 1,584 |
| | CL800 | 2,171 | 2,200 | 2,112 |
| | CL900 | 2,442 | 2,475 | 2,376 |
| | CL1500 | 4,076 | 4,125 | 3,960 |
| | CL2500 | 6,787 | 6,875 | 6,600 |
| Low Pressure Pneumatic Seat Test | ASME Class | Pressure (psi) | | |
| | All | 80 ± 20 | | |

| | | | | | |
|---|---|---|---|---|---|
| Testing Duration | Valve Size | Minimum Test Duration | | | |
| | NPS | Shell (sec) | Backseat (sec) | Closure Test – Check Valves (sec) | Closure Test – Gate Globe, Ball, Plug & Butterfly Valves (sec) |
| | ≤ 2 | 15 | 15 | 60 | 15 |
| | 2 ½ to 6 | 60 | 60 | 60 | 60 |
| | 8 to 12 | 120 | 60 | 120 | 120 |
| | ≥ 14 | 300 | 60 | 120 | 120 |
| | Note: When testing butterfly valves, the test pressure should be selected to the disc material, not the body material | | | | |

# Hydrostatic Shell Test – CSA Z245.15 & API 6D

| CSA Z245.15 | | API 6D (1.5x CWP) | | | |
|---|---|---|---|---|---|
| Pressure Nominale | Pressure (kPa) | ASME Class | Pressure – Group 1.1 **A105, A216 WCB, A350 LF2** (psi) | Pressure – Group 1.2 **A352 LCC** (psi) | Pressure – Group 2.2 **A182 F316** (psi) |
| PN 20 | 2,850 | CL150 | 428 | 435 | 413 |
| PN 50 | 7,440 | CL300 | 1,110 | 1,125 | 1,080 |
| PN 68 | 9,930 | CL400 | 1,480 | 1,500 | 1,440 |
| PN 100 | 14,900 | CL600 | 2,220 | 2,250 | 2,160 |
| PN 130 | 19,860 | CL800 | 2,963 | 3,000 | 2,880 |
| PN 150 | 22,340 | CL900 | 3,330 | 3,375 | 3,240 |
| PN 250 | 37,230 | CL1500 | 5,558 | 5,625 | 5,400 |
| PN 420 | 62,060 | CL2500 | 9,255 | 9,375 | 9,000 |

| NPS | Minutes | NPS | Minutes |
|---|---|---|---|
| 2 – 4 | 2 | ≤4 | 2 |
| 6 – 10 | 5 | 6 – 10 | 5 |
| 12 – 18 | 15 | 12 – 18 | 15 |
| 20 – 36 | 30 | ≥20 | 30 |
| > 36 | 120 | | |

# Hydrostatic Seat Test – CSA Z245.15 & API 6D

| CSA Z245.15 | | API 6D (1.1x CWP) | | | |
|---|---|---|---|---|---|
| Pressure Nominale | Pressure (kPa) | ASME Class | Pressure – Group 1.1 **A105, A216 WCB, A350 LF2** (psi) | Pressure – Group 1.2 **A352 LCC** (psi) | Pressure – Group 2.2 **A182 F316** (psi) |
| PN 20 | 2,090 | CL150 | 314 | 319 | 303 |
| PN 50 | 5,460 | CL300 | 814 | 825 | 792 |
| PN 68 | 7,280 | CL400 | 1,085 | 1,100 | 1,056 |
| PN 100 | 10,920 | CL600 | 1,628 | 1,650 | 1,584 |
| PN 130 | 14,560 | CL800 | 2,171 | 2,200 | 2,112 |
| PN 150 | 16,380 | CL900 | 2,442 | 2,475 | 2,376 |
| PN 250 | 27,300 | CL1500 | 4,076 | 4,125 | 3,960 |
| PN 420 | 45,510 | CL2500 | 6,787 | 6,875 | 6,600 |
| | | | | | |
| NPS | Minutes | NPS | Minutes | | |
| 2 – 4 | 2 | ½ – 4 | 2 | | |
| 6 – 36 | 5 | 6 – 18 | 5 | | |
| > 36 | 10 | ≥20 | 10 | | |

# Pipe Schedule (Inches)

| NPS | OD | SCH10 | | SCH20 | | SCH30 | | STD / SCH40S | | SCH40 | | SCH60 | | XH (XS) / SCH80S | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Wall | lb/ft | Wall | lb/ft | Wall | lb/ft | Wall | lb/ft | Wall | lb/ft | Wall | lb/ft | Wall | lb/ft |
| 1/8 | 0.405 | 0.049 | 0.186 | - | - | - | - | 0.068 | 0.245 | 0.068 | 0.245 | - | - | 0.095 | 0.315 |
| 1/4 | 0.540 | 0.065 | 0.330 | - | - | - | - | 0.088 | 0.425 | 0.088 | 0.425 | - | - | 0.119 | 0.535 |
| 3/8 | 0.675 | 0.065 | 0.424 | - | - | - | - | 0.091 | 0.568 | 0.091 | 0.568 | - | - | 0.126 | 0.739 |
| 1/2 | 0.840 | 0.083 | 0.671 | - | - | - | - | 0.109 | 0.851 | 0.109 | 0.851 | - | - | 0.147 | 1.088 |
| 3/4 | 1.050 | 0.083 | 0.857 | - | - | - | - | 0.113 | 1.131 | 0.113 | 1.131 | - | - | 0.154 | 1.474 |
| 1 | 1.315 | 0.109 | 1.404 | - | - | - | - | 0.133 | 1.679 | 0.133 | 1.679 | - | - | 0.179 | 2.172 |
| 1-1/4 | 1.660 | 0.109 | 1.806 | - | - | - | - | 0.140 | 2.273 | 0.140 | 2.273 | - | - | 0.191 | 2.997 |
| 1-1/2 | 1.900 | 0.109 | 2.085 | - | - | - | - | 0.145 | 2.718 | 0.145 | 2.718 | - | - | 0.200 | 3.631 |
| 2 | 2.375 | 0.109 | 2.638 | - | - | - | - | 0.154 | 3.653 | 0.154 | 3.653 | - | - | 0.218 | 5.022 |
| 2-1/2 | 2.875 | 0.120 | 3.531 | - | - | - | - | 0.203 | 5.793 | 0.203 | 5.793 | - | - | 0.276 | 7.661 |
| 3 | 3.500 | 0.120 | 4.332 | - | - | - | - | 0.216 | 7.576 | 0.216 | 7.576 | - | - | 0.300 | 10.25 |
| 3-1/2 | 4.000 | 0.120 | 4.973 | - | - | - | - | 0.226 | 9.109 | 0.226 | 9.109 | - | - | 0.318 | 12.50 |
| 4 | 4.500 | 0.120 | 5.613 | - | - | - | - | 0.237 | 10.79 | 0.237 | 10.79 | - | - | 0.337 | 14.98 |
| 5 | 5.563 | 0.134 | 7.770 | - | - | - | - | 0.258 | 14.62 | 0.258 | 14.62 | - | - | 0.375 | 20.78 |
| 6 | 6.625 | 0.134 | 9.289 | - | - | - | - | 0.280 | 18.97 | 0.280 | 18.97 | - | - | 0.432 | 28.57 |
| 8 | 8.625 | 0.148 | 13.40 | 0.250 | 22.36 | 0.277 | 24.70 | 0.322 | 28.55 | 0.322 | 28.55 | 0.406 | 35.64 | 0.500 | 43.39 |
| 10 | 10.75 | 0.165 | 18.65 | 0.250 | 28.04 | 0.307 | 34.24 | 0.365 | 40.48 | 0.365 | 40.48 | 0.500 | 54.74 | 0.500 | 54.74 |
| 12 | 12.75 | 0.180 | 24.16 | 0.250 | 33.38 | 0.330 | 43.77 | 0.375 | 49.56 | 0.406 | 53.52 | 0.562 | 73.15 | 0.500 | 65.42 |
| 14 | 14.00 | 0.250 | 36.71 | 0.312 | 45.61 | 0.375 | 54.57 | 0.375 | 54.57 | 0.438 | 63.44 | 0.594 | 85.05 | 0.500 | 72.09 |
| 16 | 16.00 | 0.250 | 42.05 | 0.312 | 52.27 | 0.375 | 62.58 | 0.375 | 62.58 | 0.500 | 82.77 | 0.656 | 107.50 | 0.500 | 82.77 |
| 18 | 18.00 | 0.250 | 47.39 | 0.312 | 58.94 | 0.438 | 82.15 | 0.375 | 70.59 | 0.562 | 104.67 | 0.750 | 138.17 | 0.500 | 93.45 |
| 20 | 20.00 | 0.250 | 52.73 | 0.375 | 78.60 | 0.500 | 104.13 | 0.375 | 78.60 | 0.594 | 123.11 | 0.812 | 166.40 | 0.500 | 104.13 |
| 22 | 22.00 | 0.250 | 58.07 | 0.375 | 86.61 | 0.500 | 114.81 | 0.375 | 86.61 | - | - | 0.875 | 197.41 | 0.500 | 114.81 |
| 24 | 24.00 | 0.250 | 63.41 | 0.375 | 94.62 | 0.562 | 140.68 | 0.375 | 94.62 | 0.688 | 171.29 | 0.969 | 238.35 | 0.500 | 125.49 |
| 26 | 26.00 | 0.312 | 85.60 | 0.500 | 136.17 | - | - | 0.375 | 102.63 | - | - | - | - | 0.500 | 136.17 |
| 28 | 28.00 | 0.312 | 92.26 | 0.500 | 146.85 | 0.625 | 182.73 | 0.375 | 110.64 | - | - | - | - | 0.500 | 146.85 |
| 30 | 30.00 | 0.312 | 98.93 | 0.500 | 157.53 | 0.625 | 196.08 | 0.375 | 118.65 | - | - | - | - | 0.500 | 157.53 |
| 32 | 32.00 | 0.312 | 105.59 | 0.500 | 168.21 | 0.625 | 209.43 | 0.375 | 126.66 | 0.688 | 230.08 | - | - | 0.500 | 168.21 |
| 34 | 34.00 | 0.312 | 112.25 | 0.500 | 178.89 | 0.625 | 222.79 | 0.375 | 134.67 | 0.688 | 244.77 | - | - | 0.500 | 178.89 |
| 36 | 36.00 | 0.312 | 118.92 | 0.500 | 189.57 | 0.625 | 236.13 | 0.375 | 142.68 | 0.750 | 282.35 | - | - | 0.500 | 189.57 |
| 38 | 38.00 | - | - | - | - | - | - | 0.375 | 150.69 | - | - | - | - | 0.500 | 200.25 |
| 40 | 40.00 | - | - | - | - | - | - | 0.375 | 158.70 | - | - | - | - | 0.500 | 210.93 |
| 42 | 42.00 | - | - | - | - | - | - | 0.375 | 166.71 | - | - | - | - | 0.500 | 221.61 |
| 44 | 44.00 | - | - | - | - | - | - | 0.375 | 174.72 | - | - | - | - | 0.500 | 232.29 |
| 46 | 46.00 | - | - | - | - | - | - | 0.375 | 182.73 | - | - | - | - | 0.500 | 242.97 |
| 48 | 48.00 | - | - | - | - | - | - | 0.375 | 190.74 | - | - | - | - | 0.500 | 253.65 |

ASME B16.25 includes dimensions and tolerances of butt-weld end connections of piping components

# Pipe Schedule (Inches)

| NPS | OD | SCH80 | | SCH100 | | SCH120 | | SCH140 | | SCH160 | | XXH (XXS) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Wall | lb/ft | Wall | lb/ft | Wall | lb/ft | Wall | lb/ft | Wall | lb/ft | Wall | lb/ft |
| 1/8 | 0.405 | 0.095 | 0.315 | - | - | - | - | - | - | - | - | - | - |
| 1/4 | 0.540 | 0.119 | 0.535 | - | - | - | - | - | - | - | - | - | - |
| 3/8 | 0.675 | 0.126 | 0.739 | - | - | - | - | - | - | - | - | - | - |
| 1/2 | 0.840 | 0.147 | 1.088 | - | - | - | - | - | - | 0.187 | 1.304 | 0.294 | 1.714 |
| 3/4 | 1.050 | 0.154 | 1.474 | - | - | - | - | - | - | 0.219 | 1.944 | 0.308 | 2.441 |
| 1 | 1.315 | 0.179 | 2.172 | - | - | - | - | - | - | 0.250 | 2.844 | 0.358 | 3.659 |
| 1-1/4 | 1.660 | 0.191 | 2.997 | - | - | - | - | - | - | 0.250 | 3.765 | 0.382 | 5.214 |
| 1-1/2 | 1.900 | 0.200 | 3.631 | - | - | - | - | - | - | 0.281 | 4.859 | 0.400 | 6.408 |
| 2 | 2.375 | 0.218 | 5.022 | - | - | - | - | - | - | 0.344 | 7.462 | 0.436 | 9.029 |
| 2-1/2 | 2.875 | 0.276 | 7.661 | - | - | - | - | - | - | 0.375 | 10.01 | 0.552 | 13.69 |
| 3 | 3.500 | 0.300 | 10.25 | - | - | - | - | - | - | 0.438 | 14.32 | 0.600 | 18.58 |
| 3-1/2 | 4.000 | 0.318 | 12.50 | - | - | - | - | - | - | - | - | 0.636 | 22.85 |
| 4 | 4.500 | 0.337 | 14.98 | - | - | 0.438 | 19.00 | - | - | 0.531 | 22.51 | 0.674 | 27.54 |
| 5 | 5.563 | 0.375 | 20.78 | - | - | 0.500 | 27.04 | - | - | 0.625 | 32.96 | 0.750 | 38.55 |
| 6 | 6.625 | 0.432 | 28.57 | - | - | 0.562 | 36.39 | - | - | 0.719 | 45.35 | 0.864 | 53.16 |
| 8 | 8.625 | 0.500 | 43.39 | 0.594 | 50.95 | 0.719 | 60.71 | 0.812 | 67.76 | 0.906 | 74.69 | 0.875 | 72.42 |
| 10 | 10.75 | 0.594 | 64.43 | 0.719 | 77.03 | 0.844 | 89.29 | 1.000 | 104.13 | 1.125 | 115.64 | 1.000 | 104.13 |
| 12 | 12.75 | 0.688 | 88.63 | 0.844 | 107.32 | 1.000 | 125.49 | 1.125 | 139.67 | 1.312 | 160.27 | 1.000 | 125.49 |
| 14 | 14.00 | 0.750 | 106.13 | 0.938 | 130.85 | 1.094 | 150.79 | 1.250 | 170.21 | 1.406 | 189.11 | - | - |
| 16 | 16.00 | 0.844 | 136.61 | 1.031 | 164.82 | 1.219 | 192.43 | 1.438 | 223.64 | 1.594 | 245.25 | - | - |
| 18 | 18.00 | 0.938 | 170.92 | 1.156 | 207.96 | 1.375 | 244.14 | 1.562 | 274.22 | 1.781 | 308.50 | - | - |
| 20 | 20.00 | 1.031 | 208.87 | 1.281 | 256.10 | 1.500 | 296.37 | 1.750 | 341.09 | 1.969 | 379.17 | - | - |
| 22 | 22.00 | 1.125 | 250.81 | 1.375 | 302.88 | 1.625 | 353.61 | 1.875 | 403.00 | 2.125 | 451.06 | - | - |
| 24 | 24.00 | 1.219 | 296.58 | 1.531 | 367.39 | 1.812 | 429.39 | 2.062 | 483.12 | 2.344 | 542.13 | - | - |
| 26 | 26.00 | - | - | - | - | - | - | - | - | - | - | - | - |
| 28 | 28.00 | - | - | - | - | - | - | - | - | - | - | - | - |
| 30 | 30.00 | - | - | - | - | - | - | - | - | - | - | - | - |
| 32 | 32.00 | - | - | - | - | - | - | - | - | - | - | - | - |
| 34 | 34.00 | - | - | - | - | - | - | - | - | - | - | - | - |
| 36 | 36.00 | - | - | - | - | - | - | - | - | - | - | - | - |
| 38 | 38.00 | - | - | - | - | - | - | - | - | - | - | - | - |
| 40 | 40.00 | - | - | - | - | - | - | - | - | - | - | - | - |
| 42 | 42.00 | - | - | - | - | - | - | - | - | - | - | - | - |
| 44 | 44.00 | - | - | - | - | - | - | - | - | - | - | - | - |
| 46 | 46.00 | - | - | - | - | - | - | - | - | - | - | - | - |
| 48 | 48.00 | - | - | - | - | - | - | - | - | - | - | - | - |

ASME B16.25 includes dimensions and tolerances of butt-weld end connections of piping components

# NPS to DN to OD

| NPS | DN | OD (mm) | OD (in) |
|---|---|---|---|
| 1/8 | 6 | 10.3 | 0.404 |
| 1/4 | 8 | 13.7 | 0.540 |
| 3/8 | 10 | 17.1 | 0.675 |
| 1/2 | 15 | 21.3 | 0.840 |
| 3/4 | 20 | 26.7 | 1.050 |
| 1 | 25 | 33.4 | 1.315 |
| 1-1/4 | 32 | 42.2 | 1.660 |
| 1-1/2 | 40 | 48.3 | 1.900 |
| 2 | 50 | 60.3 | 2.375 |
| 2-1/2 | 65 | 73.0 | 2.875 |
| 3 | 80 | 88.9 | 3.500 |
| 3-1/2 | 90 | 101.6 | 4.000 |
| 4 | 100 | 114.3 | 4.500 |
| 5 | 125 | 141.3 | 5.563 |
| 6 | 150 | 168.3 | 6.625 |
| 8 | 200 | 219.1 | 8.625 |
| 10 | 250 | 273.1 | 10.75 |
| 12 | 300 | 323.9 | 12.75 |
| 14 | 350 | 355.6 | 14.00 |
| 16 | 400 | 406.4 | 16.00 |
| 18 | 450 | 457.2 | 18.00 |
| 20 | 500 | 508.0 | 20.00 |
| 22 | 550 | 558.8 | 22.00 |
| 24 | 600 | 609.6 | 24.00 |

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