

## Recommended Standard Specifications for Valve Materials Pressure-Containing Castings

<p>1 Carbon Steel ASTM A216 Grade WCB</p> <p>Temp. range = -20°F to 1000°F Composition (Percent)</p> <p>C 0.30 max Mn 1.00 max P 0.05 max S 0.06 max Si 0.60 max</p>	<p>2 Carbon Steel ASTM A352 Grade LCB</p> <p>Temp. range = -50°F to 650°F Composition: same as ASTM A216 Grade WCB</p>	<p>11 Cast Iron ASTM A126 Class B</p> <p>Temp. range = -150°F to 450°F Composition (Percent)</p> <p>P 0.75 max S 0.12 max</p>	<p>12 Cast Iron ASTM A126 Class C</p> <p>Temp. range = -150°F to 450°F Composition (Percent)</p> <p>P 0.75 max S 0.12 max</p>
<p>3 Chrome Moly Steel ASTM A217 Grade C5</p> <p>Temp. range = -20°F to 1100°F Composition (Percent)</p> <p>C 0.20 max Mn 0.40 to 0.70 P 0.05 max S 0.06 max Si 0.75 max Cr 4.00 to 6.50 Mo 0.45 to 0.65</p>	<p>4 Carbon Moly Steel ASTM A217 Grade WC1</p> <p>Temp. range = -20°F to 850°F Composition (Percent)</p> <p>C 0.25 Mn 0.50 to 0.80 P 0.05 max S 0.06 max Si 0.60 max Mo 0.45 to 0.65</p>	<p>13 Ductile Iron ASTM A395 Type 60-45-15</p> <p>Temp. range = -20°F to 650°F Composition (Percent)</p> <p>C 3.00 min Si 2.75 max P 0.08 max</p>	<p>14 Ductile Ni-Resist<sup>®</sup> Iron ASTM A439 Type D-2B</p> <p>Temp. range = -20°F to 750°F Composition (Percent)</p> <p>C 3.00 max Si 1.50 to 3.00 Mn 0.70 to 1.25 P 0.08 max Ni 18.00 to 22.00 Cr 2.75 to 4.00</p>
<p>5 Chrome Moly Steel ASTM A217 Grade WC6</p> <p>Temp. range = -20°F to 1000°F Composition (Percent)</p> <p>C 0.20 max Mn 0.50 to 0.80 P 0.05 max S 0.06 max Si 0.60 max Cr 1.00 to 1.50 Mo 0.45 to 0.65</p>	<p>6 Chrome Moly Steel ASTM A217 Grade WC9</p> <p>Temp. range = -20°F to 1050°F Composition (Percent)</p> <p>C 0.18 max Mn 0.40 to 0.70 P 0.05 max Si 0.60 max Cr 2.00 to 2.75 Mo 0.90 to 1.20</p>	<p>15 Standard Valve Bronze ASTM B62</p> <p>Temp. range = -325°F to 450°F Composition (Percent)</p> <p>Cu 84.00 to 86.00 Sn 4.00 to 6.00 Pb 4.00 to 6.00 Zn 4.00 to 6.00 Ni 1.00 max Fe 0.30 max P 0.05 max</p>	<p>16 Tin Bronze ASTM B143 Alloy 1A</p> <p>Temp. range = -325°F to 400°F Composition (Percent)</p> <p>Cu 86.00 to 89.00 Sn 9.00 to 11.00 Pb 0.30 max Zn 1.00 to 3.00 Ni 1.00 max Fe 0.15 max P 0.05 max</p>
<p>7 3<sup>1</sup>/<sub>2</sub>% Nickel Steel ASTM A352 Grade LC3</p> <p>Temp. range = -150°F to 650°F Composition (Percent)</p> <p>C 0.15 max Mn 0.50 to 0.80 P 0.05 max S 0.05 max Si 0.60 max Ni 3.00 to 4.00</p>	<p>8 Chrome Moly Steel ASTM A217 Grade C12</p> <p>Temp. range = -20°F to 1100°F Composition (Percent)</p> <p>C 0.20 max Si 1.00 max Mn 0.35 to 0.65 Cr 8.00 to 10.00 Mo 0.90 to 1.20 P 0.05 max S 0.06 max</p>	<p>17 Manganese Bronze ASTM B147 Alloy 8A</p> <p>Temp. range = -325°F to 350°F Composition (Percent)</p> <p>Cu 55.00 to 60.00 Sn 1.00 max Pb 0.40 max Ni 0.50 max Fe 0.40 to 2.00 Al 0.50 to 1.50 Mn 1.50 max Zn Remainder</p>	<p>18 Aluminum Bronze ASTM B148 Alloy 9C</p> <p>Temp. range = -325°F to 500°F Composition (Percent)</p> <p>Cu 83.00 min Al 10.00 to 11.50 Fe 3.00 to 5.00 Mn 0.50 Ni 2.50 max Min. total named elements = 99.5</p>
<p>9 Type 304 Stainless Steel ASTM A351 Grade CF-8</p> <p>Temp. range = -425°F to 1500°F Composition (Percent)</p> <p>C 0.08 max Mn 1.50 max Si 2.00 max S 0.04 max P 0.04 max Cr 18.00 to 21.00 Ni 8.00 to 11.00</p>	<p>10 Type 316 Stainless Steel ASTM A351 Grade CF-8M</p> <p>Temp. range = -425°F to 1500°F Composition (Percent)</p> <p>C 0.08 max Mn 1.50 max Si 2.00 max P 0.04 max S 0.04 max Cr 18.00 to 21.00 Ni 9.00 to 12.00 Mo 2.00 to 3.00</p>	<p>19 Mondel<sup>®</sup> Alloy 411 (Weldable Grade)</p> <p>Temp. range = -325°F to 900°F Composition (Percent)</p> <p>Ni 60.00 min Cu 26.00 to 33.00 C 0.30 max Mn 1.50 max Fe 3.50 max S 0.015 max Si 1.00 to 2.00 Nb 1.00 to 3.00</p>	<p>20 Nickel-Moly Alloy "B" ASTM A494 (Hastelloy "B" <sup>†</sup>)</p> <p>Temp. range = -325°F to 700°F Composition (Percent)</p> <p>Cr 1.00 max Fe 4.00 to 6.00 C 0.12 max Si 1.00 max Co 2.50 max Mn 1.00 max V 0.20 to 0.60 Mo 26.00 to 30.00 P 0.04 max S 0.03 max Ni Remainder</p>