Penn Stainless inventory now includes Alloy 304/304L (UNS S30400 / S30403), in sheet, sheet coil, plate, plate coil, round bar, processed flat bar and tubular products. Alloy 304/304L is ideally suited for home and commercial applications.

**GENERAL PROPERTIES**

Alloy 304 / 304L is a T-300 series stainless steel austenitic, which has a minimum of 18% chromium and 8% nickel. Type 304 has a maximum carbon of 0.07% while Type 304L carbon maximum is 0.030. It is the standard “18/8 stainless” that is commonly found in pans and cooking tools. Alloys 304 & 304L are the most versatile and widely used alloy in the stainless steel family. Ideal for a wide variety of home and commercial applications, Alloys 304 & 304L exhibits excellent corrosion resistance and has a high ease of fabrication, outstanding formability. The austenitic stainless steels are also considered to be the most weldable of the high-alloy steels and can be welded by all fusion and resistance welding processes.

**APPLICATIONS**

Alloy 304/304L Stainless Steel is used in a wide variety of home and commercial applications, including:

- Food processing equipment, particularly in beer brewing, milk processing, and wine making
- Kitchen benches, sinks, troughs, equipment, and appliances
- Architectural trim and molding
- Automotive and aerospace structural use
- Construction material in large buildings
- Chemical containers, including for transport
- Heat exchangers
- Nuts, bolts, screws, and other fasteners in the marine environment
- Dyeing industry
- Woven or welded screens for mining, quarrying & water filtration

**STANDARDS 304 / 304L**

- ASTM/ASME ..............UNS S30400 / S30403
- Euronorm ................1.4301 / 1.4303
- AFNOR....................Z5 CN 18.09 / Z2 CN 18.10
- DIN ..........................X5 CrNi 18 10 / X2 CrNi 19 11

Penn Stainless can provide you with custom cut, sized and processed stainless product through any of our available processing methods:

- Shear Cutting
- Plasma Cutting
- HQ Plasma Cutting
- Dynamic Water Jet Cutting
- Laser Cutting
- Saw Cutting
- Gauger Processing
- Machine Cutting

**INVENTORY:**

- Sheet
- Plate
- Perforated
- Flat & Expanded
- Round bar
- Square bar
- Hex bar
- Rolled Flat bar
- S/E Processed bar
- Threaded rod
- Half round
- Tubular products (welded & seamless)
- Structurals

www.pennstainless.com • www.pipeandtubes.com
sales@pennstainless.com • Emergency 24/7 Service Available
**CORROSION RESISTANCE**
- Resistance to corrosion in oxidizing environments is a result of the 18 to 19% chromium that the 304 alloys contain.
- Resistance to moderately aggressive organic acids is a result of the 9 to 11% nickel that the 304 alloys contain.
- At times, alloy 304L may show a lower corrosion rate than the higher carbon Alloy 304; otherwise, the 304, 304L, and 304H may be considered to perform uniformly in most corrosive environments.
- Alloy 304L is preferred for use in environments sufficiently corrosive to cause intergranular corrosion of welds and heat-affected zones on susceptible alloys.

**HEAT RESISTANCE**
- Good oxidation resistance in intermittent service to 1600°F and in continuous service to 1690°F.
- Continuous use of 304 in the 800-1580°F range is not recommended if subsequent aqueous corrosion resistance is important.
- Grade 304L is more resistant to carbide precipitation and can be heated into the above temperature range.
- Grade 304H has higher strength at elevated temperatures, so it is often used for structural and pressure-containing applications at temperatures above about 930°F and up to about 1470°F.

**WELDING CHARACTERISTICS**
- Excellent welding properties; post-weld annealing is not required when welding thin sections. Two important considerations in producing weld joints in the austenitic stainless steels are:
  1) preservation of corrosion resistance
  2) avoidance of cracking

**PROCESSING / HOT FORMING**
- To forge, heat uniformity to 2100 / 2300 °F.
- Do not forge below 1700 °F.
- Forging can be air cooled without danger of cracking

**PROCESSING / COLD FORMING**
- Its austenitic structure allows it to be deep-drawn without intermediate annealing, Making this the stainless steel grade of choice in the manufacturing of sinks, hollow-ware and saucepans.
- These grades work harden rapidly. To relieve stresses produced in severe forming or spinning, parts should be full annealed or stress relief annealed as soon as possible after forming.

**MACHINABILITY**
- The use of chip breakers is advised since the chips can be stringy. Stainless steel work harden rapidly, heavy positive feeds, sharp tooling, and a rigid set-up should be used.of cut below the work-hardened layer resulting from the previous passes.

**CHEMICAL PROPERTIES**

<table>
<thead>
<tr>
<th></th>
<th>C</th>
<th>Mn</th>
<th>Si</th>
<th>P</th>
<th>S</th>
<th>Cr</th>
<th>Ni</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>304</td>
<td>0.07 max</td>
<td>2.0 max</td>
<td>0.75 max</td>
<td>0.045 max</td>
<td>0.03 max</td>
<td>min: 18.0 max: 20.0</td>
<td>min: 8.0 max: 10.5</td>
<td>–</td>
</tr>
<tr>
<td>304L</td>
<td>0.030 max</td>
<td>2.0 max</td>
<td>0.75 max</td>
<td>0.045 max</td>
<td>0.03 max</td>
<td>min: 18.0 max: 20.0</td>
<td>min: 8.0 max: 12.0</td>
<td>0.10 max</td>
</tr>
</tbody>
</table>

**MECHANICAL PROPERTIES**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Tensile Strength ksi (min)</th>
<th>Yield Strength 0.2% ksi (min)</th>
<th>Elongation %</th>
<th>Hardness Brinell (max)</th>
<th>Hardness Rockwell B (max)</th>
</tr>
</thead>
<tbody>
<tr>
<td>304</td>
<td>75</td>
<td>30</td>
<td>40</td>
<td>201</td>
<td>92</td>
</tr>
<tr>
<td>304L</td>
<td>70</td>
<td>25</td>
<td>40</td>
<td>201</td>
<td>92</td>
</tr>
</tbody>
</table>

**PHYSICAL PROPERTIES**

<table>
<thead>
<tr>
<th>Density (lb/in³)</th>
<th>Thermal Conductivity (BTU/hr·ft·°F)</th>
<th>Electrical Resistivity (in x 10⁶)</th>
<th>Modulus of Elasticity (psi x 10⁶)</th>
<th>Coefficient of Thermal Expansion (in/in°F x 10⁶)</th>
<th>Specific Heat (BTU/lb/°F)</th>
<th>Melting Range (°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>at 68°F: 0.285</td>
<td>9.4 at 212 °F</td>
<td>28.3 at 68 °F</td>
<td>28</td>
<td>9.4 at 32 - 212°F</td>
<td>0.120 at 68°F to 212°F</td>
<td>2,550 to 2,590</td>
</tr>
<tr>
<td>12.4 at 932 °F</td>
<td>39.4 at 752 °F</td>
<td>10.2 at 32 - 1000°F</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>49.6 at 1652 °F</td>
<td></td>
<td>10.4 at 32 - 1200°F</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>