Alloy 825 is an austenitic nickel-iron-chromium alloy with additions of molybdenum, copper and titanium. It was developed to provide exceptional resistance to numerous corrosive environments, both oxidizing and reducing. Due to the nickel content, Alloy 825 is resistant to chloride stress corrosion cracking, and combined with molybdenum and copper, provides substantially improved corrosion resistance in reducing environments when compared to conventional austenitic stainless steels. Alloy 825 is also resistant to chloride pitting, as well as a variety of oxidizing atmospheres. The addition of titanium stabilizes the alloy against sensitization in the as-welded condition. This stabilization makes Alloy 825 resistant to intergranular attack after exposure in the temperature range which would typically sensitize un-stabilized stainless steels.

**Chemical Composition**

<table>
<thead>
<tr>
<th>MIN/Max</th>
<th>C</th>
<th>Mn</th>
<th>S</th>
<th>Si</th>
<th>Cr</th>
<th>Ni</th>
<th>Fe</th>
<th>Mo</th>
<th>Cu</th>
<th>Ti</th>
<th>Al</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.05 max</td>
<td>1.00 max</td>
<td>0.03 max</td>
<td>0.50 max</td>
<td>19.5-23.5</td>
<td>38-46</td>
<td>22 min</td>
<td>2.5-3.5</td>
<td>1.5-3</td>
<td>0.6-1.2</td>
<td>0.2 max</td>
</tr>
</tbody>
</table>

**Applications**

- **Air Pollution Control Scrubbers**
- **Injection Well Piping Systems**
- **Seawater Heat Exchangers**
- **Nuclear Fuel Reprocessing**
- **Petroleum Refining**
- **Air-cooled Heat Exchangers**
- **Copper Refining Equipment**
- **Chemical Processing Equipment**
- **Piping Systems & Sour Gas Components**

**Physical Properties**

<table>
<thead>
<tr>
<th>Density</th>
<th>Electrical Resistivity</th>
<th>Coefficient of Thermal Expansion</th>
<th>Thermal Conductivity</th>
<th>Modulus of Elasticity</th>
<th>Specific Heat Capacity</th>
<th>Melting Point</th>
<th>Specific Gravity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.294 lb/in³</td>
<td>678 Ohm-circ mil/ft (78°F)</td>
<td>7.8 x 10^{-6} in/in°F (200°F)</td>
<td>76.8 Btu-ft/hr-ft²°F (78°F)</td>
<td>28.3 psi x 10^6 (100°F)</td>
<td>0.105 Btu/lb-°F</td>
<td>2500-2550 °F</td>
<td>8.13</td>
</tr>
<tr>
<td>8.14 g/cm³</td>
<td>1.13 µ cm (26°C)</td>
<td>4 m/m°C (93°F)</td>
<td>11.1 W/m-k (26°C)</td>
<td>196 MPa (38°C)</td>
<td>440 J/kg-°K</td>
<td>1370-1400 °C</td>
<td>8.13</td>
</tr>
</tbody>
</table>

**Maximum Pressure Work**

\[ P = \text{Maximum work pressure} \]
\[ S = \text{Minimum tensile strength of material for a specific temper (it is the value of the tensile strength in psi from the Mechanical properties table)} \]
\[ D = \text{Exterior diameter of tube} \]
\[ T = \text{Wall thickness of tube} \]

**Non Destructive Tests**

- Eddy Current Testing
- Hydrostatic Testing
- Air Underwater Testing
- Ultrasonic Testing
- (PMI) Positive Material Identification

**Destructive Tests**

- Microstructure Test
- Tensile Test
- Expansion Test
- Optical Spectrometry Test