



GENERAL PROPERTIES

Type 410 is a hardenable, straight chromium stainless steel which combines superior wear resistance of high carbon alloys with the excellent corrosion resistance of chromium stainless steels. Oil quenching this alloy from temperatures between 1800°F to 1950°F (982-1066°C) produces the highest strength and/or wear resistance as well as corrosion resistance. Type 410 is used where strength, hardness, and/ or wear resistance must be combined with corrosion resistance.

APPLICATIONS

A major use for these grades of heat treatable stainless steels is in cutlery. Depending on the customer's end-use requirements, cutlery alloys are usually selected with respect to heat treating response, mechanical properties and fabricating characteristics.

CHEMICAL COMPOSITION

Chemistries represented by ASTM A240

| Element | Percent by Weight Maximum Unless Range is Specified |
|------------|--|
| Carbon | 0.08-0.15 |
| Manganese | 1.00 maximum |
| Phosphorus | 0.040 maximum |
| Sulfur | 0.030 maximum |
| Silicon | 1.00 maximum |
| Chromium | 11.5-13.5 |
| Iron | Balance |

RESISTANCE TO CORROSION

Type 410 exhibits good corrosion resistance to atmospheric corrosion, potable water, and to mildly corrosive chemical environments because of their ability to form a tightly adherent oxide film which protects their surfaces from further attack.

Exposure to chlorides in everyday type activities (e.g., food preparation, sport activities...) is generally satisfactory when proper cleaning is performed after exposure to use.

PHYSICAL PROPERTIES

| Property | Type 410 |
|--|--|
| Specific Gravity | 7.65 |
| Density | Lbs/iin ³ g/cm ³ 0.276 7.64 |
| Modulus of Elasticity | Psi GPa 29 x 10 ⁶ 200 |
| Specific Heat Btu/lb. • °F | .11 |
| Thermal Conductivity at 212°F (100°C) | Btu/(hr • ft • °F) W/m•K 14.4 24.9 |
| Electrical Resistivity Microhm-cm 68°F (20°C) | 56 |
| Coefficient of Thermal Expansion | 68 - 392°F, in/in°F 20-200°C, cm/cm/°C 5.9 x 10 ⁻⁶ 10.5 x 10 ⁻⁶ |
| | 68-1112°F, in/in°F 20-600°C, cm/cm/°C 6.5 x 10 ⁻⁶ 11.6 x 10 ⁻⁶ |
| Melting Range | 2700-2790°F 1482-1532°C |

MECHANICAL PROPERTIES

Typical compositions, annealed mechanical properties and hardening response for Type 410 martensitic stainless steel are presented below.

| Typical Annealed Properties for Type 410 | |
|--|----------|
| Hardness | B 82 |
| Tensile Strength Ksi (MPa) | 74 (510) |
| 0.2% Offset Yield Strength Ksi (MPa) | 42 (290) |
| Elongation Percent in 2" (51mm) | 34% |
| Hardening Response | C 38-45 |