

Long Products Stainless Steel NAS 451	
ASTM Designation	EN Designation
410	
S41000	

DESCRIPTION

Type 410 is High Hardenability martensitic, 11.5 per cent chromium Stainless Steel, which is magnetic in all conditions. It provides good corrosion resistance properties. However, the corrosion resistance of grade 410 steels can be further enhanced by a series of processes such as hardening, tempering and polishing. Quenching and tempering can harden grade 410 steels. They are generally used for applications involving mild corrosion, heat resistance and high strength.

**CHEMICAL
COMPOSITION**

C	Si	Mn	P	S	Cr	Ni	Mo	Al	Cu	Sn	N
0.12 - 0.15	≤ 0.50	≤ 0.60	0.025	0.025	11.5-12.5	≤ 0.75	≤ 0.5	≤ 0.05	≤ 0.50	≤ 0.05	≤ 0.08

**NOMINAL
MECHANICAL
PROPERTIES IN
ANNELED CONDITION**

	Annealed and Cold Finished	Hardened and Tempered at 1700°F
UTS	70 - 150 ksi	180 - 250 ksi
0.2% YS	40 - 120 ksi	140 -250 ksi
Elongation	20%	10%
Reduction of Area	45%	30%
Hardness	223 HRB	39 HRC min.

HEAT TREATMENT

FULL ANNEALING: Metal should be heated to 1550 - 1650°F, held for 1/2 hour per inch of thickness and furnace cooled to 50°F per hour maximum to 1100°F, then cooled in air, water or oil.

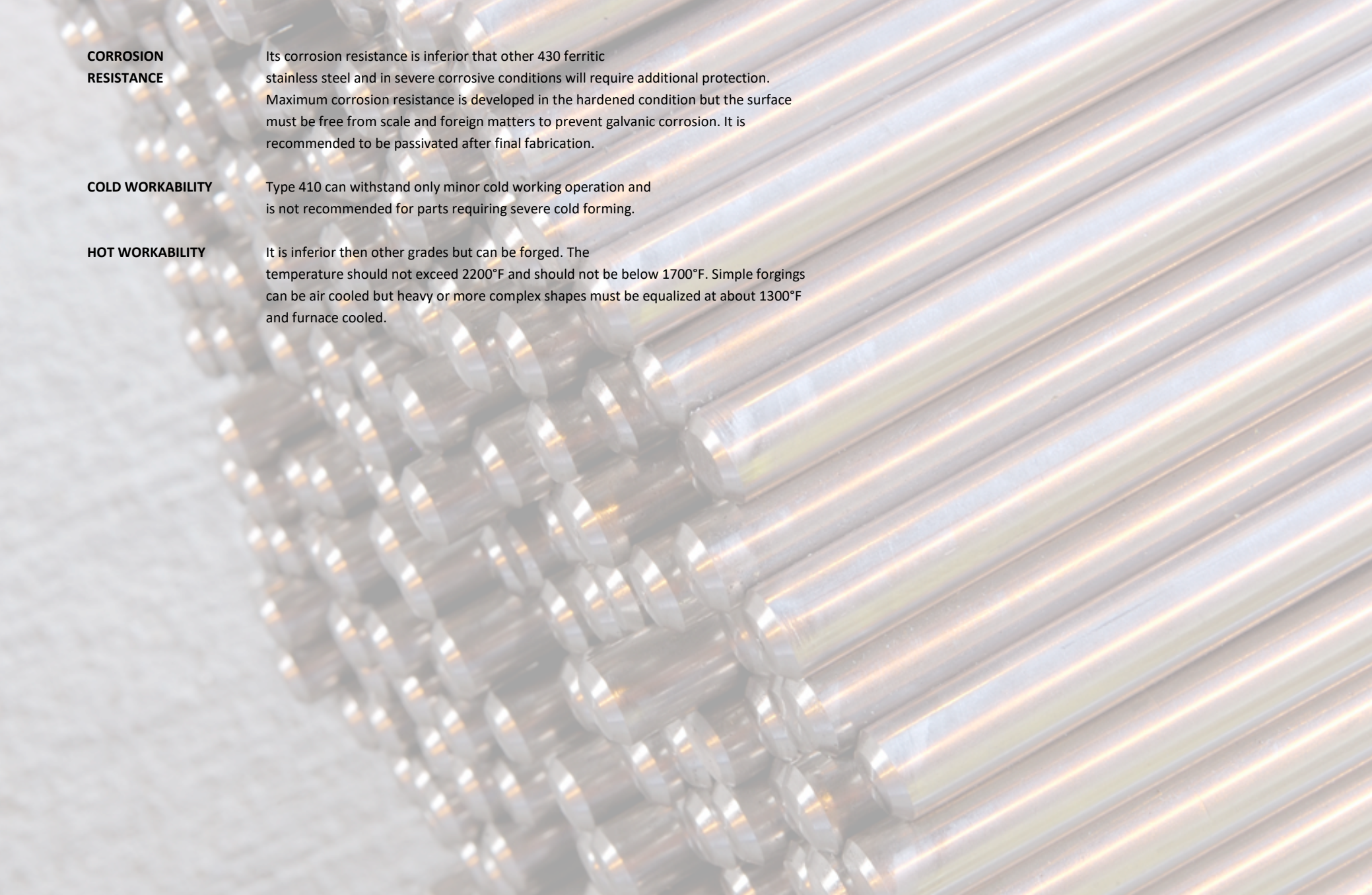
TEMPERING: After hardening, tempering in the range of 400 – 1400°F for from 1 to 4 hours will allow the steel to meet a wide range of mechanical properties. Tempering in the range of 750 – 1075°F is generally not recommended because of reduced corrosion resistance and impact strength.

HEAT RESISTANCE

Type 410 has fair resistance to scaling and is sometimes used for burner parts. Scaling temperature in air are 1400°F for intermittent use and 1250°F for continuous use.

HARDENABILITY

It can be hardened to Rockwell C 39 minimum by air cooling or oil quenching from 1750 - 1850°F. Oil quenching is preferred for better impact properties.



**CORROSION
RESISTANCE**

Its corrosion resistance is inferior that other 430 ferritic stainless steel and in severe corrosive conditions will require additional protection. Maximum corrosion resistance is developed in the hardened condition but the surface must be free from scale and foreign matters to prevent galvanic corrosion. It is recommended to be passivated after final fabrication.

COLD WORKABILITY

Type 410 can withstand only minor cold working operation and is not recommended for parts requiring severe cold forming.

HOT WORKABILITY

It is inferior then other grades but can be forged. The temperature should not exceed 2200°F and should not be below 1700°F. Simple forgings can be air cooled but heavy or more complex shapes must be equalized at about 1300°F and furnace cooled.