420

This grade has good ductility in the annealed condition but is capable of being hardened up to 50 Rc... the highest hardness of the 12 per cent chromium grades. Best corrosion resistance for this grade is achieved when the metal is hardened, surface ground, or polished.

Corrosion Resistance: Good resistance in the hardened condition to the atmosphere, foods, fresh water, and mild alkalies or acids. Corrosion resistance is very low in the annealed condition.

Heat Resistance: Not recommended for use in temperatures above 700^{0}F.

Heat Treatment: Annealing – Heat to 1550 - 1650^{0}F , slow furnace cool to 1100^{0}F and then air cool. Sub-critical Anneal – Heat to 1350 - 1450^{0}F and air cool. Hardening – Heat to 1800 - 1900^{0}F and air or oil cool. Oil quenching is necessary for heavy sections. Temper to obtain a wide variety of hardness values and mechanical properties as indicated in the accompanying table and graph.
Note: The tempering range 800 to 1100^{0}F should be avoided.

Welding: Pre-heat at 300 - 600^{0}F and post-heat at 1125 - 1400^{0}F. Type **420** coated welding rods recommended for high strength joints. Types 309 and 310 can be used if ductile weld required.

Typical Applications:

- cutlery
- needle valves
- knife blades
- shear blades
- surgical instruments

A.I.S.I. Analysis	C	Mn	P	S	Si	Cr
	.15 max	1.0 max	.040 max	.030 max	1.0 max	12.0 to 14.0

Typical Mechanical Properties - Annealed	Yield Strength .2% Offset psi	Ultimate Strength psi	Elongation % in 2"	Hardness		Impact Charpy ft. – lbs.	Modules of Elasticity in Tension - psi
				Rb	BHN		
	50,000	95,000	25	92	192	31	29.0 x 10^5

Other Properties	Creep Strength 1% Flow in 10,000 hrs at 1,000^{0}F psi	Coefficient of Thermal Expansion (In/In/^{0}F x 10^{-6}) 32^0 - 212^{0}F	Electrical Resistivity Microhm – Cm at 68^{0}F	Thermal Conductivity BTU/Ft.2/Hr./^{0}F/Ft	
				at 212^{0}F	at 932^{0}F
	11,400	5.7	55	14.4	16.8