

## 13CRS (UNS S41426)

13CRS is a quenched and tempered martensitic stainless steel, used for downhole tubulars components, packers and other subsurface equipment in sweet (CO<sub>2</sub>) environments and mild sour (H<sub>2</sub>S) environments. NACE MR0175/ISO15156 Table A19 provides a recommended limit of 1.5 psi partial pressure H<sub>2</sub>S. API 5CRA/ISO13680 classifies it as Group 1, Category 13-5-2 alloy acceptable for sour service, in the 95 ksi yield strength condition.

### NOMINAL COMPOSITION

Chromium 12.5%    Nickel 5.5%    Molybdenum 2.2%    Iron Balance

### SPECIFIED MECHANICAL PROPERTIES - API 5CRA / ISO 13680 Group 1 Category 13-5-2

Grade	Yield Strength min. (ksi)	Yield Strength max. (ksi)	Tensile Strength min. (ksi)	Hardness max. (HRC)	NACE MR0175/ISO 15156 reference
95	95	105	105	27	Table A.19
110	110	140	115	32	not included

### TYPICAL MECHANICAL PROPERTIES

Grade	Yield Strength (ksi)	Tensile Strength (ksi)	Charpy V-Notch Toughness (ft-lbs at 14F)
95	102	118	130
110	115	124	140

### TYPICAL PHYSICAL PROPERTIES

		70°F	200°F	350°F
Density	lbs/in <sup>3</sup>	0.28	0.28	0.28
Thermal Expansion	X10 <sup>-6</sup> /deg F		5.9	5.9
Elastic Modulus	psi x 10 <sup>6</sup>	29.3	28.7	28.2
Poisson Ratio		0.3	0.3	0.3
Thermal Conductivity	Btu/ft h °F	9.1	9.7	10.7
Specific Heat	Btu/lb °F	0.10	0.11	0.12
Yield Strength De-Rating	%	100	91	87