

## 13Cr Modified (13CRM & HP-1)

The Modified 13Cr alloys are quenched and tempered martensitic stainless steels, used for downhole tubulars components, packers and other subsurface equipment in sweet (CO<sub>2</sub>) environments. These alloys provide higher strength and improved corrosion resistance at higher temperatures and chloride concentration compared to 13Cr-L80. NACE MR0175/ISO15156 does not provide guidance for use of these alloys in sour service.

### NOMINAL COMPOSITION

<b>13CRM</b>	Chromium 12.5%	Nickel 5.0%	Molybdenum 0.7%	Iron Balance
<b>HP-1</b>	Chromium 13.0%	Nickel 4.0%	Molybdenum 1.15%	Iron Balance

### SPECIFIED MECHANICAL PROPERTIES

Grade	Yield Strength min. (ksi)	Yield Strength max. (ksi)	Tensile Strength min. (ksi)	Hardness max (HRC)
95	95	110	105	28
110	110	130	115	32

### TYPICAL PHYSICAL PROPERTIES

		70°F	250°F	350°F
<b>Density</b>	lbs/cu <sup>3</sup> .	0.28	0.28	0.28
<b>Thermal Expansion</b>	X10 <sup>-6</sup> /deg F	--	5.9	--
<b>Elastic Modulus</b>	psi x 10 <sup>6</sup>	29.6	29.3	28.9
<b>Poisson Ratio</b>		0.3	0.3	0.3
<b>Yield Strength De-Rating</b>	%	100	91	87