PIPESEARCH®
A CRA AFFILIATE

MODIFIED 13 CHROME

13CRM • HP-1

The Modified 13 Chrome alloys, 13CRM & HP-1, are quenched and tempered martensitic stainless steels intended for corrosion resistance in sweet (CO_2) environments containing chlorides up to 350°F. Relative to 13 Chrome, the Modified 13 Chromes provide increased strength and corrosion resistance at higher temperatures and chloride concentrations. Their higher strength and temperature resistance allow for use in deeper wells with higher pressure and temperatures, as downhole tubular components, packers, and other subsurface equipment.

While Modified 13 Chrome grades provide improved resistance to pitting corrosion relative to 13Cr L80, they are vulnerable to localized corrosion, SCC (stress corrosion cracking), and SSC (Sulfide Stress Cracking), so higher grades should be utilized for sour service or high chloride environments.

NOMINAL COMPOSITION

13CRM	Chromium 12.5%	Nickel 5.0%	Molybdenum 0.7%	Iron Balance
HP-1	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
Density	lbs/in^3	0.28	0.28	0.28
Thermal Expansion	$X10^{-6}/°F$	-	5.9	-
Elastic Modulus	psi x 10^6	29.6	29.3	28.9
Poisson Ratio		0.3	0.3	0.3
Yield Strength De-Rating	%	100	91	87

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