

# CRA 2550E

## NOMINAL COMPOSITION

Chromium 25% Nickel 50% Molybdenum 6% Tungsten 1.5% Iron Balance

## CORROSION RESISTANCE

CRA 2550E (UNS N06255) is a premium melted, cold worked nickel-based alloy meeting the severe challenges of wells containing high chlorides, H<sub>2</sub>S and temperature. With a typical Pitting Resistance Equivalent Number of 52 it is highly resistant to pitting corrosion and chloride-induced stress corrosion cracking. For sour service applications, it is classified in MR0175/ISO15156 as a type 4d alloy, with no restrictions to partial pressure of H<sub>2</sub>S below 300F and resistant to 300 psi H<sub>2</sub>S at 425°F.

CRA 2550E-140 C-rings tested at 100% AYS in 15.5 ppg ZnBr<sub>2</sub>/CaBr<sub>2</sub>/CaCl<sub>2</sub> brine exhibited no evidence of cracking. Tests were performed under three conditions:

- 1.5 psi H<sub>2</sub>S / 500 psi CO<sub>2</sub> / 350F
- O<sub>2</sub> saturated / 425F
- 500 psi CO<sub>2</sub> / 425F.

CRA 2550E has excellent hydrogen embrittlement resistance at all standard strength levels.

### Hydrogen Embrittlement SSRT Testing (-1.1V<sub>sce</sub> in 3.5 wt % NaCl)

Grade	Elongation Ratio	RA Ratio	TTF Ratio
2550E-110	1.00	0.98	0.98
2550E-125	1.00	0.98	0.95
2550E-140	0.98	1.00	1.00

## SPECIFIED MECHANICAL PROPERTIES - API 5CRA / ISO 13680 Group 4 Category 25-50-6

Yield Strength min. (ksi)	Yield Strength max. (ksi)	Tensile Strength min. (ksi)	Elongation min. (%)	NACE MR0175/ISO 15156 Compliant
110	140	115	11	YES
125	150	130	10	YES
140	160	145	9	NO*

\*NACE MR0175/ISO 15156 limits maximum yield strength to 150 ksi

## TYPICAL ROOM TEMPERATURE LONGITUDINAL TENSILE PROPERTIES

Grade	Yield Strength ksi (MPa)	Tensile Strength ksi (MPa)	Elongation (%)
2550E-110	128 (883)	136 (938)	21
2550E-125	135 (931)	142 (979)	19
2550E-140	151 (1041)	166 (1145)	18

## TYPICAL ELEVATED TEMPERATURE TENSILE PROPERTIES OF 2550E-125

Temperature	Longitudinal		Transverse	
	Yield Strength ksi (MPa)	Tensile Strength ksi (MPa)	Yield Strength ksi (MPa)	Tensile Strength ksi (MPa)
70°F	134 (924)	139 (958)	123 (848)	140 (965)
250°F	118 (814)	122 (841)	116 (800)	130 (896)
350°F	117 (807)	120 (827)	114 (786)	127 (876)
450°F	116 (800)	119 (820)	113 (779)	126 (869)
550°F	112 (772)	117 (807)	112 (772)	122 (841)

## TYPICAL CHARPY V-NOTCH IMPACT TOUGHNESS

Grade	Temperature	Orientation	Ft-lbs (Joules)
2550E-110	14°F (-10°C)	Transverse (C-L)	131 (97)
2550E-125	14°F (-10°C)	Transverse (C-L)	124 (91)
2550E-125	-75°F (-60°C)	Transverse (C-L)	117 (87)
2550E-140	14°F (-10°C)	Transverse (C-L)	99 (73)

## TYPICAL PHYSICAL PROPERTIES

		70°F	250°F	350°F	450°F
Density	lbs/cu <sup>3</sup> .	0.297	0.296	0.295	0.294
Thermal Expansion	X10 <sup>-6</sup> /deg F	-	7.2	7.4	7.7
Elastic Modulus	psi x 10 <sup>6</sup>	28.5	27.9	27.8	27.6
Poisson Ratio		0.29	0.29	0.29	0.3
Thermal Conductivity	W/ft deg F	1.5	1.8	2.0	2.2
Specific Heat	BTU/lb deg F	0.09	0.10	0.10	0.11

