

## 825 (UNS N08825)

Alloy 825 (UNS N08825), also referred to as 2242, is a cold hardened nickel-based alloy, intended for corrosion resistance in highly sour (H<sub>2</sub>S) environments with moderate chloride content, requiring high strength up to 350°F. 825 offers increased resistance to the effects of H<sub>2</sub>S relative to stainless steels allowing its use as downhole tubular components, packers, and other subsurface equipment in sour wells with high-pressure and high-temperature (HPHT) conditions and Acid Gas Injection (AGI) wells. However, all environmental factors, including H<sub>2</sub>S, CO<sub>2</sub>, temperature, pH, and chloride concentration, should be considered before final material selection.

The alloy is classified in MR0175/ISO15156 as a type 4c alloy, with no restrictions to a partial pressure of H<sub>2</sub>S below 270°F and resistant to 200 psi H<sub>2</sub>S at 350°F.

### NOMINAL COMPOSITION

Chromium 21%

Nickel 42%

Molybdenum 3%

Iron Balance

### SPECIFIED MECHANICAL PROPERTIES - API 5CRA / ISO 13680 Group 4 Category 21-42-3

Grade	Yield Strength min. (ksi)	Tensile Strength min. (ksi)	Elongation min. (%)	NACE MR0175/ISO 15156 Environmental Limits
110	110	115	11	Table A.14 Type 4c
125	125	130	10	Table A.14 Type 4c

### TYPICAL MECHANICAL PROPERTIES

Grade	Yield Strength (ksi)	Tensile Strength (ksi)	Charpy V-Notch Toughness (ft-lbs at 14F)
110	122	130	72
125	138	149	55

### TYPICAL PHYSICAL PROPERTIES

		70°F	200°F	400°F
Density	lbs/in <sup>3</sup>	0.29		
Thermal Expansion	X10 <sup>-6</sup> / °F	8	8	8.5
Elastic Modulus	psi x 10 <sup>6</sup>	28.3	27.9	27.1
Poisson Ratio		0.3	0.3	0.3
Thermal Conductivity	Btu/ft h °F	6.4	7.1	8.1
Specific Heat	Btu/lb °F	0.11	0.12	0.12

