28 Chrome (UNS N08028)

28 Chrome (UNS N08028), or Alloy 28, is a cold hardened nickel-based alloy intended for corrosion resistance in highly sour (H_2S) environments with moderate chloride content, requiring high strength up to 350°F. 28 Chrome offers increased resistance to the effects of H_2S 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. In addition, it has a high resistance to pitting and crevice corrosion in the presence of chlorides. However, all environmental factors, including H_2S, CO_2, 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_2S below 270°F and resistant to 200 psi H_2S at 350°F.

NOMINAL COMPOSITION

Chromium 27% Nickel 31% Molybdenum 3.5% Iron Balance

SPECIFIED MECHANICAL PROPERTIES - API 5CRA / ISO 13680 Group 3 Category 27-31-4

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	110
125	132	142	83

TYPICAL PHYSICAL PROPERTIES

		70°F	200°F	400°F
Density	lbs/in^3	0.29		
Thermal Expansion	X10^{-6}/ °F	8	8	8.5
Elastic Modulus	psi x 10^6	28.3	27.6	26.3
Poisson Ratio		0.3		
Thermal Conductivity	Btu/ft h °F	5.5	7	8.5
Specific Heat	Btu/lb °F	0.11	0.12	0.12