

C276 (UNS N10276)

C276 (UNS N10276) is a cold hardened nickel-based alloy intended for the most extreme well conditions up to 450°F. In addition to its exceptional corrosion resistance under the most severe conditions, higher strengths may be achieved with C276 than other nickel alloys. It is therefore used for downhole tubular components, packers, and other subsurface equipment under the most extreme environmental conditions found in high-pressure, high-temperature (HPHT) wells, saltwater Injection wells, and Acid Gas Injection (AGI) wells. However, all environmental factors, including H₂S, CO₂, temperature, pH, and chloride concentration, should be considered before final material selection.

The alloy is classified in MR0175/ISO15156 as a type 4e alloy, with no restrictions to a partial pressure of H₂S below 400°F and resistant to 1000 psi H₂S at 450°F.

NOMINAL COMPOSITION

Chromium 15% Molybdenum 16% Iron 5% Nickel Balance

SPECIFIED MECHANICAL PROPERTIES - API 5CRA / ISO 13680 Group 4 Category 15-60-16

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 4e
125	125	130	10	Table A.14 Type 4e
140	140	145	9	Table A.14 Type 4e

TYPICAL MECHANICAL PROPERTIES

Grade	Yield Strength (ksi)	Tensile Strength (ksi)	Charpy V-Notch Toughness (ft-lbs at 14F)
110	125	138	120
125	140	150	110
140	154	162	160

TYPICAL PHYSICAL PROPERTIES

		70°F	200°F	400°F
Density	lbs/in ³	0.32		
Thermal Expansion	X10 ⁻⁶ / °F	6.0	6.2	6.7
Elastic Modulus	psi x 10 ⁶	29.8	29.0	28.3
Poisson Ratio		0.3		
Thermal Conductivity	Btu/ft h °F	5.9	6.4	7.5
Specific Heat	Btu/lb °F	0.10	0.10	0.10