

G2 (UNS N06975)

Alloy G-2 (UNS N06975) is a cold hardened nickel-based alloy intended for corrosion resistance to highly sour (H₂S) environments with high chloride content, requiring high strength up to 400°F. The high nickel and molybdenum content of G-2 extends the sour service limits of nickel alloys while also providing excellent resistance to chlorides and dissolved oxygen. It is therefore used for downhole tubular components, packers, and other subsurface equipment in severely sour wells with high-pressure and high-temperature (HPHT) conditions, 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.

For sour service applications, it is classified in MR0175/ISO15156 as a type 4d alloy, with no restrictions to a partial pressure of H₂S below 300°F and resistant to 300 psi H₂S at 425°F.

NOMINAL COMPOSITION

Chromium 25% Nickel 50% Molybdenum 6% Copper 1.0% Titanium 1.1% Iron Balance

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 PHYSICAL PROPERTIES

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