# Alloy 2550 (UNS N06255)

Alloy 2550 (UNS N06255) is a cold-hardened nickel-based alloy intended for corrosion resistance to highly sour ($H_2S$) environments with high chloride content, requiring high strength up to 400°F. The high nickel and molybdenum content of 2550 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 $H_2S$, $CO_2$, 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 $H_2S$ below 300°F and resistant to 300 psi $H_2S$ at 425°F.

## NOMINAL COMPOSITION

Chromium 25% Nickel 50% Molybdenum 6% 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 Environmental Limits |
|---|---|---|---|---|
| 110 | 140 | 115 | 11 | Table A.14 Type 4d |
| 125 | 150 | 130 | 10 | Table A.14 Type 4d |
| 140 | 160 | 145 | 9 | 140 Grade not recommended for sour service* |

*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 | $psi \times 10^6$ | 28.5 | 27.9 | 27.8 | 27.6 |
| Poisson Ratio | | 0.29 | 0.29 | 0.29 | 0.30 |
| Thermal Conductivity | W/ft h °F | 1.5 | 1.8 | 2.0 | 2.2 |
| Specific Heat | Btu/lb °F | 0.09 | 0.10 | 0.10 | 0.11 |



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