

SIQUAL 6368 – Development of a High-Strength, Nickel-Enhanced Steel for Pressure Vessel Applications

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This work presents the rapid development and industrial production of SIQUAL 6368, a high-strength steel grade (15NiCuMoNb5-6-4), designed for demanding pressure vessel applications requiring superior mechanical properties at elevated temperatures and pressures.

The steel exhibits enhanced tensile strength, creep resistance up to 600°C, and improved toughness, achieved through a high nickel content combined with an optimized chemical composition and heat treatment. The chemical composition was carefully balanced to meet strict mechanical requirements which also enable reduction of plate thickness, leading to material savings and lower component weight, while maintaining all safety standards in energy and chemical industries.

A key challenge was fulfilling an urgent order for nearly 300 tons of steel heavy quarto plates within a two-month timeframe. The interdisciplinary team optimized chemical composition, rolling schedules, and heat treatment parameters using Thermo-Calc simulations and extensive laboratory testing. The chemical composition was controlled well below EN 10028-2 standard limits, minimizing raw material usage and energy consumption without compromising mechanical performance.