

Alloy F55 - Technical Specification

1. Product Description:- Alloy F55, also known as UNS S32760, is a high-performance super duplex stainless steel with a dual-phase microstructure of ferrite and austenite. It offers exceptional strength, toughness, and corrosion resistance, particularly in aggressive environments containing chlorides and sulfides. F55 is widely used in oil & gas, chemical processing, and marine applications

2. Chemical Composition:-

Element	Percentage (%)
Chromium (Cr)	24.0–26.0
Nickel (Ni)	6.0–8.0
Molybdenum (Mo)	3.0–4.0
Copper (Cu)	0.5–1.0
Tungsten (W)	0.5–1.0
Nitrogen (N)	0.2–0.3
Manganese (Mn)	1.0 max
Silicon (Si)	1.0 max
Carbon (C)	0.03 max
Phosphorus (P)	0.03 max
Sulfur (S)	0.01 max
Iron (Fe)	Balance

3. Mechanical Properties:-

Property	Value
Tensile Strength	~116 ksi (800 MPa)
Yield Strength (0.2%)	~80 ksi (550 MPa)
Elongation	~15–25%
Hardness (Rockwell)	~C25–C32

4. Physical Properties:-

Property	Value
Density	7.8 g/cm ³
Melting Range	~1350°C (2462°F)
Thermal Conductivity	~14 W/m·K (at 20°C)
Electrical Resistivity	~0.85 μΩ·m (at 20°C)

5. Heat Treatment:-

- Solution Annealing: Heat to 1020–1100°C, hold, then water quench or air cool to maintain a 50:50 ferrite-austenite balance.
- Stress Relieving (Optional): Heat to 300–600°C, hold for 1–2 hours, then cool slowly.
- Avoid Intermetallic Phases: Avoid prolonged exposure to 600–1000°C to prevent sigma and chi phase formation.
- Post-Weld Heat Treatment: If needed, perform solution annealing followed by rapid cooling.
- Cooling: Use water quenching for best results, air cooling for smaller sections.

6. Applications:-

- Oil & Gas: Subsea components, piping systems, and heat exchangers.
- Marine Industry: Offshore platforms, seawater desalination plants, and subsea pumps.
- Chemical Processing: Storage tanks, pressure vessels, and agitators.
- Power Generation: Components exposed to high temperatures and corrosive media.

7. Corrosion Resistance:-

- Pitting and Crevice Corrosion: Exceptional resistance due to high chromium, molybdenum, and nitrogen content (PREN ≥ 42).
- Stress-Corrosion Cracking: Highly resistant, even in chloride and sulfide-rich environments.
- General Corrosion: Outstanding performance in acidic and alkaline environments, including sulfuric and phosphoric acids.