## PRODUCT MANUAL



Seamless Ferritic Alloy Steel Pipe for High Temperature Service

## Standard & Material

ASTM A335/A335M ASME SA335 P91

It covers nominal wall and minimum wall seamless ferritic alloy steel pipe intended for high temperature service. Pipe ordered to ASTM A335/A335M shall be suitable for bending, flanging (vanstoning), and similar forming operations, and for fusion welding. Selection will depend upon design, service conditions, mechanical properties, and high temperature characteristics.

## **Chemistry Composition**

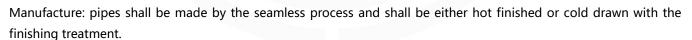
C, % 0.08-0.12 Mn, % 0.30-0.60 P, % 0.020 max S, % 0.010 max Si, % 0.20-0.50 Ni, % 0.40 max Cr, % 8.00-9.50 Mo, % 0.85-1.05 V, % 0.18-0.25 Nb, % 0.06-0.10 N, % 0.03-0.07 Al, % 0.02 max Ti, % 0.01 max Zr, % 0.01 max



Tensile Strength, MPa 585 min Yield Strength, MPa 415 min Elongation, % 20 min Hardness, HBW 190-250 or HV 196-265 or HRB 90-HRC 25

Wall Thickness: min wall thickness or average wall thickness

Developed Length: max 30 meters each length, +10mm/-0mm



Heat Treatment: the tubes are heat treated by normalize and temper, or quench and temper at temperatures of 1040-1080°C or 730-800°C.

Inspection & Test: chemistry composition analysis, tensile test, hardness test, flattening test, flaring test, NDT, surface inspection and dimension check.

Further Process: U bending tubes, fin tubes, studded tubes

