ASTM A437 B4B

ASTM A437 B4B creep resistant martensitic stainless steels are high-alloy steels that exhibit better corrosion resistance than other steels, 12% Chromi um stainless steel used for thermal engine components in power plants, mainly turbine blades, Steam Turbine buckets, bolting fasteners, valves, and other miscellaneous components. Max temperature for continous operating is 580 °C.Chrome-nickel steel with an austenitic structure with carbides. Alloying additions of molybdenum, vanadium and tungsten increase the melting temperature, thus having a positive effect on creep resistance. acc.to B50A951 A1, A2, SIEMENS 10705BL/M, 10705BR, 10705BU. ASME SA-437 Grade B4B Alloy Steel Turbine-Type Bolting Material Specially Heat Treated for High-Temperature Service. ASTM A437 Grade B4B Stainless and Alloy-Steel Turbine-Type Bolting Specially Heat Treated for High-Temperature Service. ASTM A565 Grade 616 Martensitic Stainless Steel Bars for High-Temperature Service. JIS G4311 ***SUH 616*** Heat-resisting steel bars and wire rods. SAE J 775 ***SUH 616*** Engine poppet valve information report.

Melt Practice: **EAF+AOD+IC+ESR**

Chemical Composition

Grade	Chemical composition WT %														
	C	Si	Mn	P	S	Cr	Mo	Ni	V	W	Cu	Sn	Al	Co	Ti
ASTM A437 B4B	0.20-0.25	0.20-0.50	0.50-1.00	Max 0.025	Max 0.025	11.00-12.50	0.90-1.25	0.50-1.00	0.20-0.30	0.90-1.25	-	Max 0.04	Max 0.05		Max 0.050
ASTM A565 616	0.20-0.25	Max 0.50	0.50-1.00	Max 0.025	Max 0.025	11.00-12.50	0.90-1.25	0.50-1.00	0.20-0.30	0.90-1.25	-	-	-	-	-
EN 1.4935, X20CrMoWV12-1	0.17-0.24	0.10-0.50	0.30-0.80	Max 0.025	Max 0.015	11.0-12.5	0.80-1.20	0.3-0.8	0.25-0.35	0.4-0.6	-				
JIS SUH 616	0.20-0.25	Max 0.50	0.50-1.00	Max 0.040	Max 0.03	11.0-13.0	0.75-1.25	0.5-1.0	0.2-0.3	0.75-1.25	Max 0.3				
ASTM AISI 422, AISI 616, S42200	0.20-0.25	Max 0.75	Max 1.00	Max 0.040	Max 0.03	11.0-12.5	0.75-1.25	0.5-1.0	0.15-0.30	0.75-1.25	Max 0.5				

Mechanical Properties

B4B Mechanical properties acc. to ASTM A437 B4B

- Tensile strength KSI(MPa): Min 145(1000)
- Yield Strength 0.02%, Offset KSI(MPa): Min 105(720)
- Elong. In 2": Min 13 %
- RA: Min 30%
- Brinell Hardness, 3000Kg laod: 293-341(HRC31-37)
- Kv, Min at R.T. ft-lb(J): 10(14)

Physical Properties

Density: 7.7 g/cm3

Linear expansion coefficient: 10.5-12.5 *10-6m/(m*K)

Thermal conductivity: 24 W/(m*K)

Specific heat capacity: 460 J/(kg*K)

Young's modulus: 216 GPa

Electrical resistivity: 0.6 μΩ*m

Tensile strength Rm: > 600 MPa

Creep limit for max elongation 0.2% Rp0.2: Min 800 MPa

Creep-rupture strength Ru: Min 275 MPa; 500°C; 100000h

Heat Treatment

The material Grades B4B and B4C shall be heated to a temperature range of 1875 to 1925°F [1025 to 1050°C] and liquid quenched to below 600°F [316C. The material Grades B4B and B4C shall then be uniformly reheated for tempering at a tempering temperature at least 100°F [55°C] higher than the proposed operating temperature but not less than 1150°F[620°Cl.then air or furnace cooled to room temperature. The material shall be at the tempering temperature for a minimum of2h. Double tempering may be used to enhance properties.

Welding Properties

welding of this material is not straightfor- ward owing to its crack sensitivity.

Machining Properties

Machining