East China Alloys

Cobalt alloy

Alloy L605

Description

Alloy L605, also known as Haynes 25, is a solution strengthened cobalt-chromium-tungsten-nickel superalloy. It was developed to overcome the insufficient high-temperature creep, oxidation and sulfidation resistance of early nickel-base superalloys used in gas turbine hot sections. Many early nickel alloys lost strength rapidly above 760°C and suffered severe scaling and corrosion in sulfur-containing hot flue gas.

It is designed for continuous high-temperature service under combined thermal load, oxidation, sulfidation, friction and mechanical stress. Its key strengths include excellent high-temperature tensile and creep strength, outstanding oxidation resistance up to 1093°C, good wear and galling resistance, sulfidation resistance, non-magnetic property and biocompatibility. Its strength can be greatly improved by cold working.

Grade: UNS R30605, Haynes® 25, W.Nr. 2.4964

Chemical Composition (wt%)

Element	Co	Cr	W	Ni	Mn	C	Si	Fe	P	S
Content	Balance	19.0 – 21.0	14.0 – 16.0	9.0 – 11.0	1.0 – 2.0	0.05 – 0.15	⩽ 0.40	⩽ 3.0	⩽ 0.04	⩽ 0.03

Disclaimer: Data is typical for reference only.

sales@ecalloys.com

Technical standards

Technical Standards	Specification
AMS 5537	Cobalt Alloy, Corrosion- and Heat-Resistant, Sheet, Strip, Foil, and Plate ,52Co - 20Cr - 10Ni - 15W
AMS 5759	Cobalt Alloy, Corrosion and Heat-Resistant, Bars, Forging Stock, Forgings, and Rings， 52Co - 20Cr - 10Ni - 15W
AMS 5796	Cobalt Alloy, Corrosion- and Heat-Resistant, Welding Wire， 52Co - 20Cr - 10Ni - 15W
ASTM F90	Standard specification for wrought Cobalt-20Chromium-15Tungsten-10Nickel Alloy for surgical implant application(UNS R30605)

Physical Properties

Room-Temperature Constant Parameters

Item	Typical Value
Density	9.13 g/cm³
Poisson's ratio	0.3
Electrical Resistivity	88 μΩ·cm @20℃
Magnetic property	Non-magnetic

Modulus of Elasticity

θ/°C	E/GPa
25	231
200	217
425	199
540	196
650	181
870	162
980	148

Shear Modulus

θ/°C	G/GPa
25	89
200	83
425	76
650	68
870	61

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Coefficient of thermal expansion

θ/℃	α/10⁻⁶ /℃
20-200	12.9
20-400	13.8
20-500	14.2
20-600	14.6
20-700	15.1
20-800	15.7
20-900	16.3
20-1000	17
20-1100	17.8

Machinability as annealed

Item	Typical Value(Room temperature)
Tensile Strength	900–1100 MPa
0.2% Yield Strength	380–520 MPa
Elongation	⩾35%
Hardness (HRB)	85–98

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