

Alloy 105

Precipitation-hardenable nickel-cobalt-chromium grade, Alloy 105 is ideal for high temperature service.

With the addition of molybdenum for solid-solution strengthening, Alloy 105 offers superior strength and heat resistance. The alloy has high creep-rupture properties at temperature up to 950°C.

PRODUCT FORMS

PRODUCT FORM	SIZE RANGE FROM	SIZE RANGE TO
Alloy 105 round bar	12.7 mm	203.2 mm

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CHEMICAL ANALYSIS

%	NI	CO	CR	MO	MN	CU	SI	C	S	P
Min	-	18	14	4.50	-	-	-	-	-	-
Max	Balance	22	15.7	5.50	1	0.20	0.1	0.17	0.01	-

APPLICATIONS

- Turbine blades
- Turbine discs
- Turbine shafts
- Forgings
- Rolled rings
- Bolts and fasteners

ABOUT ALLOY 105

Alloy 105 has excellent heat resistant properties, high strength and excellent oxidation resistance. The high creep-rupture properties of Alloy 105 makes the alloy perfect for critical gas turbine applications. Alloy 105 can be heat treated as followed; For optimum long term creep and ductility at 850-950°C: 4 hours at 1150°C, 16 hours at 1050-1065 °C and 16 hours at 850°C with air cooling after all heat treatment operations. Where tensile strength, elongation and impact strength are more critical at temperature up to 700°C: 4 hours at 1125°C and 16 hours at 850°C with air cooling after all heat treatment operations.

PROPERTIES

Density:	8 g/cm ³
Melting range:	Liquidus 1345°C & Solidus 1290°C
Hardness:	HRB
Specific Heat Capacity:	419 J/kg.°C
Electrical Resistivity:	1.31 μΩ.m
Curie Temperature:	°C

MECHANICAL & PHYSICAL PROPERTIES

MECHANICAL & PHYSICAL PROPERTIES	21.1°C	93.3°C	148.9°C	204.4°C	315.6°C	371.1°C	426.7°C	537.8°C	648.9°C	750°C	815°C	870°C	982°C	1093°C	1204°C
Ultimate Tensile Strength /MPa	1140	1123	1123	1084	1091	1101	1101	1064	1038	-	-	-	175	-	-
0.2% Yield Strength /MPa	776	762	762	735	735	743	743	740	720	-	-	-	152	-	-
Reduction of area %	31	31	31	38	30	39	39	37	38	-	-	-	73	-	-
Elongation %	22	20	20	21	20	24	24	23	25	-	-	-	42	-	-
Minimum Creep 0.0001% per hr	-	-	-	-	-	-	-	-	428	232	93	54	-	-	-
10,000 hr Rupture Strength	-	-	-	-	-	-	-	-	471	263	135	65	12	-	-
Coefficient of Thermal Expansion /μm/m°C	12.2	12.2	12.2	12.8	13.1	13.4	13.4	13.7	14	-	-	-	18	-	-
Thermal Conductivity /kcal/(hr.m.°C)	9.363	10.41	10.41	11.67	12.89	14.04	14.04	15.2	16.02	-	-	-	22.54	-	-
Modulus of Elasticity / GPa	188	184	184	179	174	168	168	161	154	-	-	-	110	-	-

SPECIFICATIONS

W.Nr.Number:	2.4634
Standards:	ASTM B637, MSRR 7004, 7022, 7063, 7070, 7162, 7193, 7952, BS: HR 203, 3HR1, HR2, HR3, HR4, BS4HR 601