X-750 is a precipitation-hardenable nickel-chromium alloy known for its corrosion and oxidation resistance as well as its high strength at temperatures up to 1300°F. While many benefits of precipitation hardenable grades diminish at temperatures above 1300°F, X-750 when aged, retains useful strength up to 1800°F. Additionally, X-750 exhibits excellent properties even at cryogenic temperatures. Due to its high strength and corrosion resistance, X-750 finds use in critical applications within the aerospace, defense, land-based turbine, and nuclear industries.

Chemistry

	Cr	Ni	Fe	Ti	C	Mn	Si	Cu	Al	Nb	S	Co
Min	14.0	70.0	5.0	2.25	-	-	-	-	0.40	0.70	-	-
Max	17.0	-	9.0	2.75	0.08	1.0	0.50	0.50	1.0	1.20	0.01	1.0

Specifications

UNS: N07750

W. Nr./EN: 2.4669

AMS: 5542, 5598

NACE: MR0175, MR0103

Physical Properties

Density	0.299 lb/in^3
Melting Range	2540-2600°F
Poisson Ratio	0.3
Electrical Resistivity	48 $\mu\Omega$ • in
Coefficient of Thermal Expansion (68°F - 212°F)	6.7 μin/in •°F
Thermal Conductivity (68°F)	7.42 BTU/(hr•ft•°F)
Modulus of Elasticity (68°F)	31.0 •10^6 psi

Heat Treatment

Condition A	Aged	
AMS 5542, 5598	AMS 5542	AMS 5598
1800°F for a time commensurate with thickness and rapidly air or water cooled	1300°F/20 hr, air cooled	1350°F/8hr, furnance cool to 1150°F at 100°F/hr, hold at 1150°F for 18hr and air cooled

Mechanical Properties

Specification	AMS 5542			AMS 5598		AMS 5542	AMS 5598
Condition	Annealed			Annealed		Aged	Aged
Thickness, in	0.010 - 0.024, incl.	Over 0.024 - 0.125, incl	Over 0.125 - 0.1874, incl	0.010 - 0.024, incl	Over 0.024 - 0.1874, incl	0.010 - 0.1874, incl	0.010 - 0.1874, incl
Ultimate Tensile Strength, ksi	140 Max	130 Max	130 Max	135 Max	135 Max	165	170
0.2% Yield Strength, ksi	-	60 Max	65 Max	75 Max	75 Max	105	115
Elongation, %	30	40	40	30	35	20	18
Hardness, HRC	-	-	-	-	-	32	32

**Minimum values unless otherwise stated*

Features

- Good strength at temperatures up to 1600°F
- Good resistance to combustion gas environments
- Good formability

Applications

- Gas Turbine Rotor Blades
- Hot Air Ducting
- Rocket Engine Thrust Chambers
- Nuclear Components

Mechanical Properties, continued

Typical Tensile (Annealed), Sheet

Temperature, °F	68	200	400	600	800	900	1000	1200	1350	1500	1600
Ultimate Tensile Strength, ksi	110.0	-	-	-	-	100.5	91.0	83.0	77.0	57.0	35.0
0.2% Yield Strength, ksi	46.5	-	-	-	-	35.0	35.0	54.5	67.5	32.0	27.5
Elongation, %	51.0	-	-	-	-	55.0	55.0	23.0	6.0	11.0	45.0

Typical Tensile (AMS 5542 Aged), Sheet

Temperature, °F	68	200	400	600	800	900	1000	1100	1200	1300	1500
Ultimate Tensile Strength, ksi	177.0	-	167.0	-	151.0	-	154.0	135.0	123.0	110.0	80.3
0.2% Yield Strength, ksi	122.5	-	112.0	-	107.0	-	112.0	105.5	105.5	100.0	76.4
Elongation, %	27.0	-	30.0	-	33.0	-	26.0	10.5	6.0	3.5	11.0

Typical Tensile (AMS 5598 Aged), Sheet

Temperature, °F	68	200	400	600	800	900	1000	1100	1200	1300	1500
Ultimate Tensile Strength, ksi	186.5	-	176.5	-	162.0	-	155.0	145.0	132.5	115.0	82.0
0.2% Yield Strength, ksi	132.0	-	123.0	-	120.0	-	116.0	116.5	113.0	103.5	77.2
Elongation, %	25.0	-	25.0	-	29.5	-	25.0	9.0	4.2	3.0	12.0

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- Weld Wire Wizard
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- Forming Tips
- Cast vs Wrought Comparison

Technical Library

- Environmental Based Information
- Alloy Performance Guide
- Case Histories & Papers
- Blogs