



Nickel Alloy K500

DIRECT METAL LASER MELTING MATERIAL SPECIFICATIONS

Highlights

- Liquid Oxygen (LOX) Compatible
- Corrosion resistant
- Ti, Al precipitates create high strength

Heat Treatment Options

- HIP Hot Isostatic Press & Age Hardenable

Applications

- Liquid Rocket Engine Components
- LOX Manifolds and Injectors
- Parts requiring ductility and high strength
- Parts requiring high corrosion resistance

TYPICAL PHYSICAL PROPERTIES

MECHANICAL PROPERTIES	TYPICAL WROUGHT Hot Finished Annealed	DMLM (AS BUILT)	DMLM (HIP)	DMLM (ANNEALED)
0.02% Yield (ksi)	40-60	53.3	69	127
Ultimate Tensile (ksi)	90-110	70.5	121	77.8
Elongation (%)	45-25	40.2	28.8	27.6
Reduction of Area (%)	70-80	76	50	42
Hardness (HRB)	75-90	85	85	90

HIP – Hot Isostatic Press, 2125F at 14.75ksi for 240 min; SHT – Solution Heat Treat, 1850F for 30 minutes Air quench; PHT – Precipitation Heat Treat, 1100F for 8hrs, cool to 900F at 25F/hour, air cool below 900F

PROMOTED COMBUSTION PROPERTIES NASA-STD-6001B, ASTM G124	TYPICAL WROUGHT	DMLM AS BUILT, HIP, ANNEALED & AGE
Threshold Pressure (psi)	> 10,000	> 10,000
Burn Length (in)	-	0.22

NICKEL ALLOY K500 COMPOSITION

ELEMENT	TYPICAL PERCENTAGE
Nickel (Ni)	Balance
Carbon (C)	0.25 max
Manganese (Mn)	1.5 max
Sulfur (S)	0.01 max
Silicon (Si)	0.5 max
Iron (Fe)	2.0 max
Aluminum (Al)	2.3 – 3.1
Copper (Cu)	27.0 – 33.0
Titanium (Ti)	0.35 – 0.85

The information presented represents typical values intended for reference and comparison purposes only. It should not be used for design specifications or quality control purposes. End-use material performance can be impacted (+/-) by, but not limited to, part design, end-use conditions, test conditions, color etc. Actual values will vary with build conditions. Product specifications are subject to change without notice. *Chemical analysis for specific lots available upon request.

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