

Material Data Sheet

Stainless Steel - Grade 17-4 (UNS S17400)

Printer Process Specifications

Material	17-4 Stainless Steel (UNS17400, 1.4542)
Layer Thickness (µm)	30
Laser Power (W)	100
Additive Manufacturing System	XM200C
Print Parameters	17-4-C-30-210331

Material Description

Stainless Steel Grade 17-4 is the most widely used of the precipitation-hardening stainless steels. Its primary alloying elements are chromium (15-17.5%), nickel (3-5%), and copper (3-5%). 17-4 exhibits high toughness, strength, and corrosion resistance, making it useful for a range of applications. It has excellent processing flexibility, and can be hot or cold worked, and formed using all conventional means with relative ease.

Material Properties

- High toughness and strength
- Good corrosion resistance
- Precipitation hardening
- Versatile in processing

Applications

- Paper mill batch digesters
- Turbine blades
- Food processing equipment
- Marine applications

General Wrought Material Data ⁽¹⁾

Density [g/cc]	7.72
Thermal Conductivity [W/m*K]	17.9
Melting Range [°C]	1404-1440
Coefficient of Thermal Expansion (0 to 100 °C) [K ⁻¹]	1.08x10 ⁻⁵

⁽¹⁾ From AZO Materials

Chemical Composition ⁽²⁾

Element	Mass %
Fe	Balance
Cr	15.5 - 16.7
Ni	3.6 - 4.6
Cu	3.0 - 3.5
Si	0.50 - 1.00
Nb	0.15 - 0.40
Nb + Ta	0.15 - 0.45
Al	0.05 Max
C	0.06 Max
Co	0.40 Max
Mn	0.70 Max
Mo	0.50 Max
N	0.030 Max
O	0.040 Max
P	0.025 Max
S	0.025 Max

⁽²⁾ From Praxair Surface Technologies

Heat Treatment

Testing samples were precipitation hardened at 1040 °C for 30 minutes and air cooled, then aged at 460 °C for 1 hour and air cooled.

Mechanical Properties

	Mean Value	Standard Deviation
Component Density [g/cc]	7.69	--
Percentage of Theoretical density	99.66%	--
Ultimate Tensile Strength (UTS) - ASTM E8		
Horizontal (XY) [ksi (MPa)]	185 (1277)	2.47 (17)
Vertical (Z) [ksi (MPa)]	180 (1238)	3.48 (24)
Yield Strength - ASTM E8		
Horizontal (XY) [ksi (MPa)]	166 (1147)	1.45 (10)
Vertical (Z) [ksi (MPa)]	172 (1189)	3.48 (24)
Hardness (Rockwell) - ASTM E18	43.8 HRC	0.50 HRC



Powder Particle Size Distribution ⁽³⁾

Per ASTM B822 (Using Microtrac)	Min	Max
-16	0	2
d10 (microns)	10	25
d50 (microns)	20	35
d90 (microns)	40	55

⁽³⁾ From Praxair Surface Technologies

Xact Metal has spent significant effort to ensure the content of this Material Data Sheet is correct at the date of publication but makes no warranties or representations regarding the content. Xact Metal excludes liability for any inaccuracies in this document.

Feb - 2021