17-4 PH

Precipitation-hardening stainless steel (1.4542)

Printer **One Click Metal MPRINT**

Layer height **40 µm**

OVERVIEW

17-4 PH is a high-strength, corrosion-resistant stainless steel. Its copper content lets it be hardened by heat treatment and age hardening, so strength can be tuned to the application.

Niobium combined with low carbon makes it highly processable without giving up hardness.

KEY BENEFITS

- High strength and toughness
- Can be hardened by heat treatment
- Good corrosion resistance
- Magnetic

MECHANICAL PROPERTIES

Property	Test method	40 µm · vertical (Z) · as built
Yield strength ($R_{p0.2}$)	ISO 6892-1	605 MPa 87.7 ksi · ± 21
Tensile strength (R_m)	ISO 6892-1	1,220 MPa 176.9 ksi · ± 5
Elongation at break (A)	ISO 6892-1	16% ± 2%
Reduction of area (Z)	ISO 6892-1	53% ± 9%

Averages, with standard deviation (±). Typical values, not guaranteed minimums. Design with margin.

PHYSICAL PROPERTIES & SURFACE FINISH

Property · surface measured along Z axis	40 µm
Average defect (porosity)	< 0.1%
Surface roughness R_a, as built	5 µm 197 µin
Surface roughness R_z, as built	24 µm 945 µin
Surface roughness R_a, blasted	2 µm 79 µin
Surface roughness R_z, blasted	11 µm 433 µin

DIMENSIONAL TOLERANCES

Direction	First inch (25 mm)	Each additional inch (25 mm)
XY (horizontal)	± 0.003–0.005 in ± 0.08–0.13 mm	+ 0.002 in + 0.05 mm
Z (vertical)	± 0.010 in ± 0.25 mm	+ 0.002 in + 0.05 mm

Typical IA3D tolerances; results depend on part size and geometry. For tighter fits, **talk to an engineer**.

POWDER CHEMICAL COMPOSITION

Element	Min. (wt.%)	Max. (wt.%)
Fe	Balance	
Cr	15.0	17.0
Ni	3.0	5.0
Cu	3.5	5.0

Element	Min. (wt.%)	Max. (wt.%)
Nb	5 × C	0.45
C	—	0.07
Si	—	1.0
Mn	—	1.0

TYPICAL APPLICATIONS

- Defense and firearm components
- Aerospace and aviation hardware
- Tooling, molds and wear parts
- Food, chemical and process equipment
- Energy-sector components

GOOD TO KNOW

- **Operating temperature:** Recommended maximum operating temperature of 300 °C (572 °F). Above this, behavior depends on the heat treatment used.
- **Surface:** as-built and blasted roughness is shown on page 1.

TEST CONDITIONS & SOURCE

Source: One Click Metal Material Data Sheet, Stainless Steel 1.4542 / 17-4 PH, 40 µm parameter (version 2023.06). Mechanical values are One Click Metal averages from tensile testing to ISO 6892-1 on vertically built specimens, as built, printed on the **One Click Metal MPRINT** with OCM's standard 40 µm parameter set. Surface roughness was measured along the Z axis.

Disclaimer: Material properties are provided as a general reference to help with material selection. Actual part properties depend on geometry, orientation, wall thickness, build position, heat treatment, post-processing and service conditions, and may differ from the values shown. This sheet does not guarantee specific properties or suitability for a particular application. Validate critical parts under real operating conditions.

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