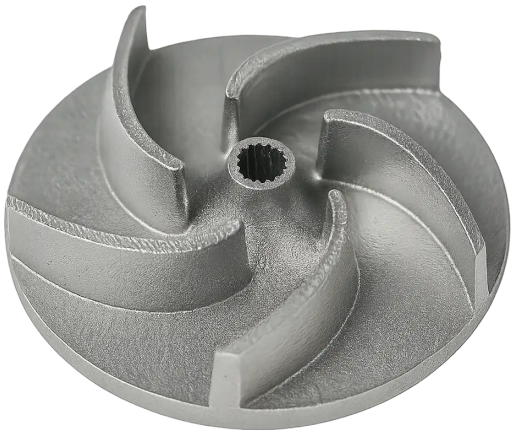
DIRECT METAL LASER SINTERING

Stainless Steel 17-4 PH

Precipitation Hardening Stainless Steel

Precipitation hardening stainless steel combining exceptional strength with good corrosion resistance. Ideal for high-performance applications requiring both mechanical properties and environmental durability.



SURFACE FINISHES



Standard Finish Natural

Supports are carefully removed and parts are shot peened to a uniform matte surface, which also helps relieve residual stresses. Critical features may receive light machining for tighter tolerances.



Machining & Polishing Enhanced

Precision machining and polishing enhance surface quality for critical applications, achieving tighter tolerances and a smooth, high-gloss metallic finish.



Performance Paint Premium

An automotive-grade coating that enhances aesthetics and durability. Each part is hand-finished with professional-grade equipment for exceptional adhesion, in matte to semi-gloss with custom colour matching.

BUILD VOLUME	LEAD TIME	LAYER HEIGHT	TOLERANCE
250 × 250 × 325 mm	From 4 business days	0.04 mm	±0.3% (min ±0.3 mm)

MECHANICAL PROPERTIES

Stainless Steel 17-4 PH delivers high strength and handles demanding load conditions. Its balanced mechanical profile keeps structural integrity under repetitive stress without turning brittle, which suits high-precision tooling and mechanical components, aerospace structural components and brackets, and high-performance automotive parts.

Read the H900 rows for parts that have been solution annealed and aged, which EOS requires for full hardness and strength; the as-built rows show the softer, more ductile state before heat treatment. Each strength row gives the horizontal (XY) and vertical (Z) values, so read the direction that carries load in the part.

PROPERTY	VALUE	TEST STANDARD
Tensile Strength, H900 (XY / Z)	**1335 / 1340 MPa**	EN ISO 6892-1
Yield Strength Rp0.2, H900 (XY / Z)	**1235 / 1250 MPa**	EN ISO 6892-1
Elongation at Break, H900 (XY / Z)	**14 / 13.5 %**	EN ISO 6892-1
Hardness, H900	**42 HRC**	EN ISO 6508
Tensile Strength, As Built (XY / Z)	**886 / 924 MPa**	ISO 6892 / ASTM E8M
Yield Strength Rp0.2, As Built (XY and Z)	**861 MPa**	ISO 6892 / ASTM E8M
Elongation at Break, As Built (XY and Z)	**20 %**	ISO 6892 / ASTM E8M
Hardness, As Built	**24 HRC**	EN ISO 6508
Modulus of Elasticity, H900	**196 GPa**	ATI 17-4 alloy data

THERMAL PROPERTIES

Stainless Steel 17-4 PH maintains dimensional stability through temperature swings, making it a reliable option for aerospace and automotive programs that see repeated thermal cycling. Design to the maximum service temperature, the point up to which the alloy keeps its high strength.

In wrought practice, aging between 482 and 621 °C (H900 to H1150) sets the balance of strength and toughness; the table shows H900, the highest-strength condition. Thermal conductivity rises with temperature, which matters for mold inserts that draw heat out of the part.

PROPERTY	VALUE	TEST STANDARD
Coefficient of Thermal Expansion (25–100 °C)	**10.4×10^{-6}/K**	ASTM E228
Coefficient of Thermal Expansion (25–200 °C)	**11.1×10^{-6}/K**	ASTM E228
Coefficient of Thermal Expansion (25–300 °C)	**11.4×10^{-6}/K**	ASTM E228
Coefficient of Thermal Expansion (25–400 °C)	**11.8×10^{-6}/K**	ASTM E228
Thermal Conductivity, H900 (21–100 °C)	**17.8 W/m·K**	ATI 17-4 alloy data
Thermal Conductivity, H900 (21–500 °C)	**22.7 W/m·K**	ATI 17-4 alloy data
Specific Heat (0–100 °C)	**0.46 kJ/kg·K**	AK Steel 17-4 PH bulletin
Maximum Service Temperature (high strength retained)	**316 °C**	ATI 17-4 alloy data

PHYSICAL PROPERTIES

Consistent density and surface quality keep critical features in tolerance and downstream finishing predictable. The defect percentage shows how little porosity remains in the printed metal, and the roughness rows describe shot-peened surfaces.

Heat treatment changes dimensions only slightly, so parts meet specifications after aging and assemblies fit and finish without secondary rework. The composition rows are the EOS powder limits, which match ASTM A564 Type 630.

PROPERTY	VALUE	TEST STANDARD
Part Density	**≥ 7.79 g/cm³**	EN ISO 3369
Average Defect Percentage	**0.03 %**	EOS cross-section method
Surface Roughness, Shot Peened (Horizontal)	**Ra 3.5–5.9 µm**	ISO 4287
Surface Roughness, Shot Peened (Vertical)	**Ra 3.4–5.5 µm**	ISO 4287
Dimensional Change after Heat Treatment	**+0.2 %**	EOS PDS
Chromium (Cr)	**15.00–17.50 wt%**	EOS powder specification
Nickel (Ni)	**3.00–5.00 wt%**	EOS powder specification
Copper (Cu)	**3.00–5.00 wt%**	EOS powder specification
Niobium + Tantalum (Nb + Ta)	**0.15–0.45 wt%**	EOS powder specification
Carbon (C)	**≤ 0.07 wt%**	EOS powder specification
Manganese (Mn)	**≤ 1.00 wt%**	EOS powder specification
Silicon (Si)	**≤ 1.00 wt%**	EOS powder specification
Phosphorus (P)	**≤ 0.040 wt%**	EOS powder specification
Sulfur (S)	**≤ 0.030 wt%**	EOS powder specification

ELECTRICAL PROPERTIES

Stainless Steel 17-4 PH conducts electricity, so it suits conductive housings, grounded fixtures and functional prototypes that interact with electrical systems, though its resistivity is far higher than aluminum or copper.

It is strongly ferromagnetic in every condition, so it holds on magnetic fixtures and can be used with magnetic sensors, but it is not a choice for non-magnetic hardware.

PROPERTY	VALUE	TEST STANDARD
Electrical Resistivity, H900	**7.7×10^{-7} Ω·m**	ATI 17-4 alloy data
Electrical Conductivity, H900	**1.30 MS/m**	Calculated from ATI resistivity
Magnetic Response	**Strongly ferromagnetic in all conditions**	ATI 17-4 alloy data

CHEMICAL PROPERTIES

The table gives AK Steel immersion corrosion rates for wrought 17-4 PH bar across the H925, H1025 and H1150 aged conditions, beside annealed Type 304. Lower is better. Where the range is wide, H1150 sits at the high end in sulfuric and hydrochloric acid and H925 in nitric acid. Use the rates for screening before application testing. Overall, its corrosion resistance is comparable to Type 304 in most media, better than the hardenable 400-series stainless steels and below 316L.

It resists rural and mild industrial atmospheres in every aged condition, while seacoast exposure brings light rusting and pitting and stagnant sea water causes crevice attack, so 316L is the better choice for marine parts.

CHEMICAL	17-4 PH, H925 TO H1150 (MM/A)	TYPE 304 ANNEALED (MM/A)
Sulfuric acid 1%, 35 °C	**< 0.03**	**0.71**
Sulfuric acid 5%, 35 °C	**0.10–0.23**	**6.1**
Hydrochloric acid 0.5%, 35 °C	**0.05–0.41**	**0.84**
Nitric acid 25%, boiling	**0.15–0.36**	**0.05**
Nitric acid 65%, boiling	**2.0–3.2**	**0.25**
Formic acid 10%, 80 °C	**0.05–0.13**	**2.5**
Acetic acid 33%, boiling	**0.10–0.15**	**7.6**
Phosphoric acid 20%, boiling	**0.03–0.05**	**0.05**
Sodium hydroxide 30%, 80 °C	**0.13–0.20**	**< 0.03**
Ammonium hydroxide 10%, boiling	**< 0.03**	**< 0.03**
Cola soft drink syrup, 35 °C	**< 0.03**	**< 0.03**
Salt, sugar and vinegar, boiling	**< 0.03**	**< 0.03**

BIOCOMPATIBILITY AND COMPLIANCE

EOS states that part chemistry complies with ASTM A564 Type 630 and ASTM F899, the specification for wrought stainless steels for surgical instruments. EOS certifies each powder lot with an EN 10204 type 3.1 mill test certificate.

In EOS testing, as-built 17-4PH test cubes passed ISO 10993-5 cytotoxicity, a strong starting point for instrument and fixture reviews. EOS does not develop or certify the powder as a medical device, so the device maker qualifies each part for its use.

STANDARD	STATUS
ASTM A564/A564M-13 (Type 630, UNS S17400) Part chemistry complies; heat-treated tensile results exceed the H900 minimums (1310 MPa UTS, 1170 MPa yield, 10% elongation) by over 3 sigma	EOS tested
ASTM F899-12b Part chemistry complies with the specification for wrought stainless steels for surgical instruments	EOS stated
ISO 10993-5 (Cytotoxicity) No leachables released in cytotoxic concentrations from as-built parts; the powder is not developed or certified as a medical device	EOS tested

MANUFACTURING

Heat treatment	**Solution annealing and aging, with HIP available**