

Material Information



Stainless Steel 17-4 PH

Introduction

Stainless Steel 17-4 PH, also known as UNS S17400 or Type 630, is a martensitic precipitation-hardening stainless steel containing chromium, nickel, and copper. It offers a strong combination of high strength, hardness, toughness, corrosion resistance, and dimensional stability, making it suitable for CNC machined components used in demanding mechanical applications.

Advantages

High strength, good toughness, good corrosion resistance, and good dimensional stability. Stainless Steel 17-4 PH can be precipitation hardened through relatively simple heat treatments, allowing different aging conditions to provide different combinations of strength, hardness, and toughness.

Disadvantages

Stainless Steel 17-4 PH is more difficult to machine than common stainless steels such as 303 and 304, particularly after precipitation hardening. Its machining characteristics also vary with the heat-treatment condition, and harder conditions can increase cutting forces and tool wear.

Tolerance

3DSPRO can manufacture and inspect to tight tolerances, including sub +/- 0.001" tolerances, per your drawing specifications and GD&T callouts.

Recommendation

The combination of high strength, toughness, corrosion resistance, and machinability makes Stainless Steel 17-4 PH suitable for CNC machined components used in aerospace, industrial, energy, chemical processing, and medical applications. It is particularly appropriate for parts that require high mechanical strength while maintaining good corrosion resistance.

Material Specifications (For reference only.)	
Tensile strength	1379MPa
Shear modulus	77GPa
Elongation at Break	7%
Hardness	419 HB

Density	7.8 g/cm ³
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Attention

Stainless Steel 17-4 PH is available in multiple aging conditions, including H900, H925, H1025, H1075, H1100, and H1150, and the resulting mechanical properties vary significantly between conditions. The selected heat-treatment condition should therefore be specified according to the required balance of strength, hardness, toughness, and corrosion performance. Heat treatment can also cause predictable dimensional changes that should be considered when machining parts to close tolerances.

Applications

3DSPRO finds people using Stainless Steel 17-4 PH to make functional parts and prototypes in the following industries and applications.

Aerospace components:

Aircraft fittings, structural components, shafts, brackets, fasteners, and other high-strength precision parts.

Industrial equipment:

Valves, pumps, gears, shafts, tooling components, fittings, and other mechanical parts requiring high strength and corrosion resistance.

Energy and chemical processing:

Pump components, valve bodies, manifolds, fasteners, and other components exposed to demanding operating environments.

Medical and precision equipment:

Surgical instruments, medical device components, precision tooling, and other parts requiring high strength, corrosion resistance, and dimensional stability.