

Material Information



Stainless Steel 15-5 PH

Introduction

Stainless Steel 15-5 PH, also known as UNS S15500 or XM-12, is a martensitic precipitation-hardening stainless steel containing chromium, nickel, copper, and niobium. It offers a strong combination of high strength, toughness, corrosion resistance, and dimensional stability, making it suitable for CNC machined components used in demanding applications.

Advantages

High strength, good toughness, good corrosion resistance, and good dimensional stability during precipitation hardening. Stainless Steel 15-5 PH can also be supplied in different aged conditions to achieve different combinations of strength, ductility, and toughness, making it versatile for high-performance CNC machined parts.

Disadvantages

Stainless Steel 15-5 PH is more expensive and generally more difficult to machine than common stainless steels such as 303 and 304. Its final mechanical properties also depend strongly on the selected heat-treatment condition, so material condition should be specified when strength and toughness are critical.

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 dimensional stability makes Stainless Steel 15-5 PH suitable for CNC machined components used in aerospace, chemical processing, petrochemical, and other high-performance applications. It is particularly appropriate for structural and mechanical parts that require high strength while maintaining good corrosion resistance.

Material Specifications (For reference only.)	
Tensile strength	1280MPa
Shear modulus	77GPa

Elongation at Break	10%
Hardness	388 HB
Density	7.8 g/cm ³

Attention

Stainless Steel 15-5 PH is precipitation hardenable, and its mechanical properties vary significantly with the aging condition. Common conditions include H900, H1025, H1075, and H1150, with different balances of strength, hardness, ductility, and toughness. The required heat-treatment condition should therefore be specified for the intended application.

Applications

3DSPRO finds people using Stainless Steel 15-5 PH to make functional parts and prototypes in the following industries and applications.

Aerospace components:

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

Chemical and petrochemical equipment:

Valves, fittings, pumps, shafts, and other components requiring a combination of strength and corrosion resistance.

Industrial equipment:

Precision mechanical components, high-load brackets, machine parts, fasteners, and other CNC machined hardware.

Food and processing equipment:

Processing equipment components, fittings, shafts, and other parts requiring high strength and corrosion resistance.