

Material Data Sheet - Stainless steel 1.4540 (PH1)

Material Description

Airbus APWorks' stainless steel 1.4540 is a pre alloyed stainless steel with the chemistry composition of DIN 1.4540 and UNS S15500 standards. This stainless steel prototyping material is tough and resistant to heat and oxidation, and in the precipitation hardened state is characterised by having good corrosion resistance and excellent mechanical properties. It is a very common material used in a variety of medical, aerospace, and other engineering applications which require high hardness, strength, and corrosion resistance. It is widely used in a variety of engineering applications such as functional metal prototypes, small series products, individualised products, and/or spare parts. Standard processing parameters use full melting of the entire geometry with a layer thickness of 20µm, but to increase the build speed it is also possible to use 40µm layer thickness.

When using standard parameters, the mechanical properties are fairly uniform in all directions. Parts made from Airbus APWorks' stainless steel 1.4540 can be machined, spark eroded, welded, micro shot peened, polished, and/or coated if required.

General Properties

Properties	Values
Density (g/cm ³)	7.8
Typical tolerance (µm)	± 50
Smallest wall thickness (mm)	1.0
Surface roughness, as built (µm) *	Ra 5 / Rz 28 *

Mechanical Properties

Properties	Values
Young's Modulus (GPa)	140
Yield Strength (MPa)	950
Ultimate Tensile Strength (MPa)	1000
Elongation at Break (%)	13
Hardness (HRC)	30

Values stated in the datasheet refer to the minimum properties that are reached using Additive Layer Manufacturing in the least strong direction of the material.

The values of the mechanical properties are generated from tests conducted at room temperature, according to DIN EN 2002-001 standards, from specimens that have been machined.

* The surface roughness values depend on the measurement method used and the orientation of the surface. The values quoted here give an indication of what can be achieved for certain surfaces.