

Material Data Sheet - Stainless steel 1.4542 (GP1)

Material Description

Stainless steel 1.4542 is a pre alloyed stainless steel with its composition corresponding to US classification 17-4 and European 1.4542. It has very good corrosion resistance, mechanical properties, excellent ductility in laser processed state, and 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 a building style such as skin & core. When using standard parameters, the mechanical properties are fairly uniform in all directions. Parts made from Airbus APWorks' stainless steel 1.4542 can be machined, spark eroded, welded, micro shot peened, polished, and/or coated if required. The layer wise building method gives the parts a certain anisotropy, which can be reduced or removed by using appropriate heat treatment methods.

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)	580
Ultimate Tensile Strength (MPa)	850
Elongation at Break (%)	25
Hardness (HV)	210

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.