

Metal Binder Jetting

Metal Materials Portfolio

Description

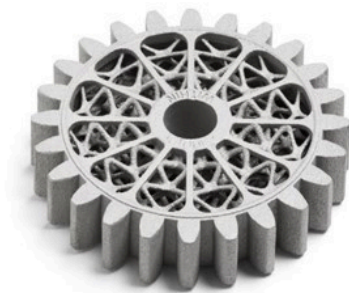
Metal Binder Jetting is a rapidly evolving technology that utilizes powdered metal materials to create accurate, complex, and finely detailed parts. This efficient process brings to life innovative designs enabled for lightweight and highly customizable parts.

It finds its application in various industries such as robotics, automotive, aerospace, medical, and more, where the demand for lightweight, durable, and customizable metal parts is high.

Materials

Stainless Steel 17-4PH- A martensitic precipitation hardening stainless steel used in applications that require a combination of high strength and mechanical properties with good corrosion and wear resistance. Properties can be tailored through heat treatment, making this versatile material valuable for a wide range of applications.

Stainless Steel 316L- A non-magnetic austenitic stainless steel used in applications requiring extremely high corrosion resistance, excellent elongation, ductility, and strength at elevated temperatures.



Data courtesy of Autodesk Netfabb

Benefits

- Extreme resistance to corrosion and high temperature
- High strength and wear resistance
- Reusability
- Eco-friendly process
- Lower cost

Applications

- Fasteners
- Jigs & Fixtures
- Surgical Instruments
- Oil and Chemical Industries
- Heat Exchangers
- Turbine Blades
- Mounting Brackets
- Consumer Goods (Jewelry)
- Marine
- Automotive Industries

Stainless Steel 17-4PH Material Properties

Material Properties		Test Method	HP Metal Jet (H900)	Benchmark MPIF (H900)
Ultimate Tensile Strength (MPa)	XYZ	ASTM E8	$\mu\text{m} = 1277$ (min = 1261)	≥ 1070
Yield Strength (PPa)	XYZ		$\mu\text{m} = 1152$ (min = 1136)	≥ 970
Elongation (%)	XYZ		$\mu\text{m} = 6\%$ (min = 4%)	$\geq 4\%$
Surface Roughness	XYZ		7.8 μm (Typical)	
Hardness (HRC)		ASTM E18	$\mu\text{m} = 40$ (min = 33)	35 (Typical)
Density	g/cc %	ASTM B311	$\mu\text{m} = 7.65$ (min = 7.63) >96%	7.5 (Typical)

Chemical Composition (wt. %)											
	Fe	Ni	Cr	C	Cu	Nb + Ta	Mn	SI	P	S	Total other
Min	Bal	3.0%	15.5%	-	3.0%	.15%	-	-	-	-	-
Max		5.0%	17.5%	.07%	5.0%	.45%	1.0%	1.0%	.04%	.03%	1.0%

Stainless Steel 316L Material Properties

Material Properties		Test Method	HP Metal Jet (H900)	Benchmark MPIF (H900)
Ultimate Tensile Strength (MPa)	XYZ	ASTM E8	$\mu\text{m} = 561$ (min = 557)	≥ 450
Yield Strength (PPa)	XYZ		$\mu\text{m} = 227$ (min = 216)	≥ 140
Elongation (%)	XYZ		$\mu\text{m} = 61\%$ (min = 59%)	$\geq 40\%$
Surface Roughness	XYZ		7.7 μm (Typical)	
Hardness (HRC)		ASTM E18	$\mu\text{m} = 65$ (min = 56)	67 (Typical)
Density	g/cc %	ASTM B311	$\mu\text{m} = 7.86$ (min = 7.63) $\geq 96\%$	7.6 (Typical)

Chemical Composition (wt. %)											
	Fe	Ni	Cr	C	Mo	Mn	SI	S	N	O	Total other
Min	Bal	10.0%	16.0%	-	2.0%	-	-	-	-	-	-
Max		14.0%	18.0%	.03%	3.0%	2.0%	1.0%	.030%	.10%	.20%	1.0%