

BLT-A160



Make Easier Manufacturing
Make a Better World

Metal Additive
Manufacturing Machine

BLT-A160/A160D

Small Parts Batch Production Platform



Double Lasers
Make Efficient
Production

High-accuracy
& Superior
Production

Equivalent to
Aviatic Quality
Level

Lower Cost for
Machine
Maintenance

24-hour
Unattended
Operation



Supporting Materials	Titanium Alloy, Stainless Steel, Superalloy, Aluminum Alloy, Cobalt Chromium Alloy
Build Dimension ⁽¹⁾	160mm×160mm×100mm (W×D×H)
Laser Power	200W; 200W×2
Wave Length	1060nm-1080nm
Layer Thickness	10μm-40μm
Maximum Scanning Speed	7m/s
Building Speed ⁽²⁾	Approx. 15cm ³ /h; Approx. 30cm ³ /h
Beam Quality	M ² <1.1
Optics System	F-theta Lens
Recoating	Variable Speed Recoating System
Minimum Oxygen Content	≤100ppm
Gas Requirement	Ar/N ₂
Power Requirement	≤2.5kW; ≤4kW
Supply Voltage	AC220V 1Ph/N/PE
Machine Dimension ⁽³⁾	2000mm×1000mm×1900mm (W×D×H) Height of Tri-color Indicator: Approx.380mm
Machine Weight	Approx. 800kg
Software	Magics; BLT-BP; BLT-MCS

Citations: (1) Excluding substrate thickness. (2) Dependent on part geometry, material and parameter set used.
(3) The dimension does not include the height of tri-color indicator and the height is remarked separately.



Aluminum Alloy

BLT-AlSi10Mg MATERIAL DATA SHEET

General Description

AlSi10Mg is an aluminum alloy widely manufactured by additive manufacturing, which has the advantages of excellent forming performance, good ductility and relative high strength. It can be strengthened by heat treatment. Because of its good strength, high hardness, high corrosion resistance, high thermal and electrical conductivity, it can be applied to manufacture the engineering parts that are used in aerospace, aviation and automotive industries, which requires a lightweight design and high loading capacity.

Main Characteristics

Low density

Good corrosion resistance

Good strength and hardness

Good thermal and electrical conductivity

Typical Applications

Aerospace & Aviation

Automotive

Powder Properties

The chemical composition of BLT AlSi10Mg powder is reported in the table below:

Element	Si	Mg	Mn	Ni	Ti	Fe
Wt./%	9.0-11.0	0.25-0.45	≤0.45	≤0.05	≤0.15	≤0.55
Element	Zn	Pb	Sn	Cu	Al	/
Wt./%	≤0.10	≤0.05	≤0.05	≤0.05	Bal.	/

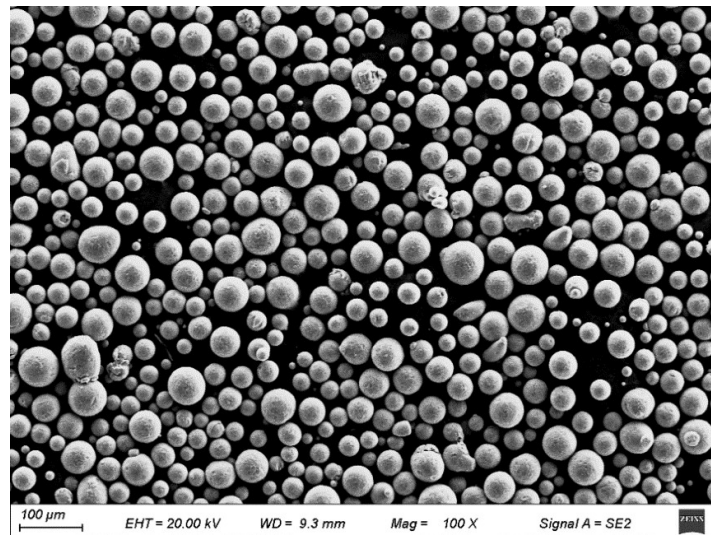
The particle size distribution of AlSi10Mg powder is shown as follows, which was tested by the laser particle size analyzer:

Particle size distribution	DV(10)	DV(50)	DV(90)
15μm-53μm	$15\mu\text{m} \leq \text{DV}(10) \leq 30\mu\text{m}$	$30\mu\text{m} \leq \text{DV}(50) \leq 45\mu\text{m}$	$45\mu\text{m} \leq \text{DV}(90) \leq 65\mu\text{m}$

Other physical properties

Properties	Sphericity
Technical requirement	≥ 0.85

SEM Micrograph of the Powders



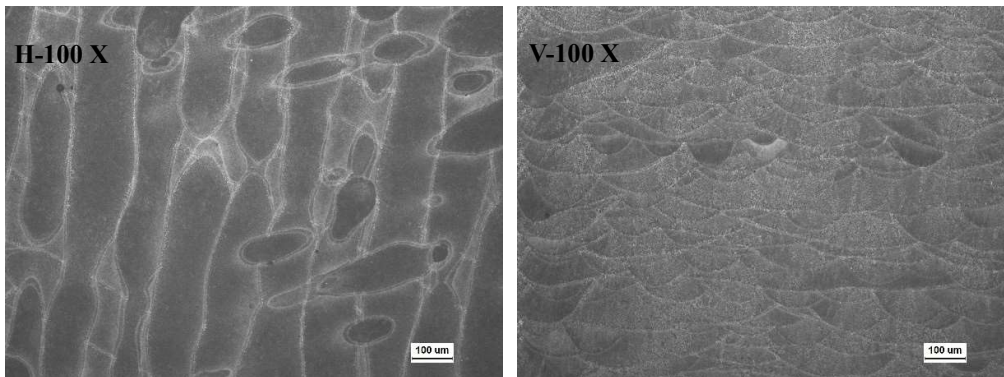
BLT-ALSi10Mg for BLT-A160 | 30μm

Process Information

System set-up	BLT-A160 (1 Laser)
Material	BLT-ALSi10Mg
Layer thickness	30μm
Inert gas	Argon
Spot configure	I
Volume rate	12.21 cm ³ /h

Properties in As-Manufactured Condition

Microstructure



Mechanical Properties

Condition	Temperature /°C	Direction	Ultimate tensile strength R _m /MPa	Yield strength R _{p0.2} /MPa	Elongation at break A/%	Number of samples
As-manufactured	Room temperature	Horizontal	460±20	275±20	10±3	4
		Vertical	470±20	240±20	7±3	4

Note: The standard of performance testing is ASTM E8/E8M.
Specimens subjected to testing are in the machined-state.

Part Surface Roughness

Condition	Detection type	Upper skin (45°)	Down skin (45°)	Vertical plane	Number of samples
As-manufactured	Ra/μm	2-6	18-22	2-6	2

Note: The standard of performance testing is ISO 4288.

Part Density

Condition	Detection type	Result	Number of samples
As-manufactured	Relative Density/%	≥ 99.95	2

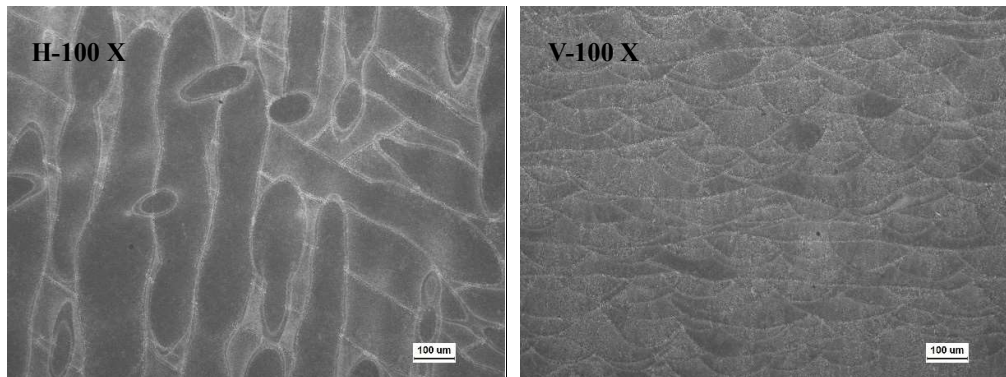
Note: The standard of performance testing is ISO 3369.

Heat Treatment Process

Annealing: Heat up to 280°C at a rate of 10°C/min, then hold for 2 hours followed by air cooling.

Properties in Heat Treated Condition

Microstructure



Mechanical Properties

Condition	Temperature /°C	Direction	Ultimate tensile strength R_m /MPa	Yield strength $R_{p0.2}$ /MPa	Elongation at break A/%	Number of samples
Heat treated	Room temperature	Horizontal	300±20	195±20	14±3	4
		Vertical	305±20	195±20	13±3	4

Note: The standard of performance testing is ASTM E8/E8M.

Specimens subjected to testing are in the machined-state.

Part Hardness

Condition	Detection type	Direction	Result	Number of samples
Heat treated	Hardness/HV	Horizontal	95±10	2
		Vertical	95±10	2

Note: The standard of performance testing is ASTM E92.

BLT-A1AF357 (AlSi7Mg)

MATERIAL DATA SHEET

General Description

AlF357 alloy is widely used in aerospace, automotive, medical industry and other applications due to its advantages of low density, high specific strength, good corrosion resistance and low cost. AlF357 alloy crystallization temperature range is small, Si crystallization latent heat is large, so that the alloy has good fluidity. Because of the small volume shrinkage of Si element, the alloy shrinkage rate is low, so it can reduce the shrinkage and hot cracking tendency of the alloy. With these advantages, AlF357 alloy produced by additive manufacturing has a wide range of applications.

Main Characteristics

Low density

Good corrosion resistance

High specific strength

Typical Applications

Aerospace & Aviation

Automotive industry

High-strength structural parts

Powder Properties

The chemical composition of BLT A1AF357 powder is reported in the table below:

Element	Al	Si	Mg	Ti	Fe
Wt./%	Bal.	6.5-7.5	0.4-0.7	0.04-0.20	≤0.10
Element	Zn	Cu	Be	Mn	/
Wt./%	≤0.10	≤0.20	≤0.002	≤0.10	/

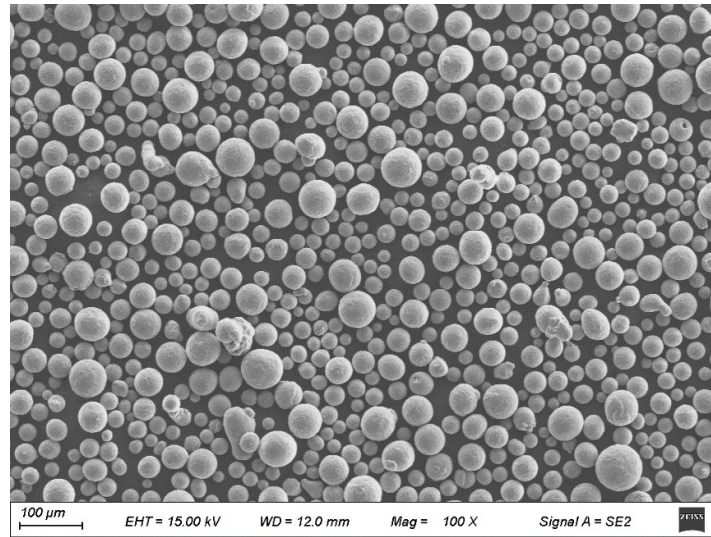
The particle size distribution of BLT A1AF357 powder is shown as follows, which was tested by the laser particle size analyzer:

Particle size distribution	DV(10)	DV(50)	DV(90)
15μm-53μm	$15\mu\text{m} \leq \text{DV}(10) \leq 30\mu\text{m}$	$30\mu\text{m} \leq \text{DV}(50) \leq 45\mu\text{m}$	$45\mu\text{m} \leq \text{DV}(90) \leq 65\mu\text{m}$

Other physical properties

Properties	Sphericity
Technical requirement	≥ 0.85

SEM Micrograph of the Powders



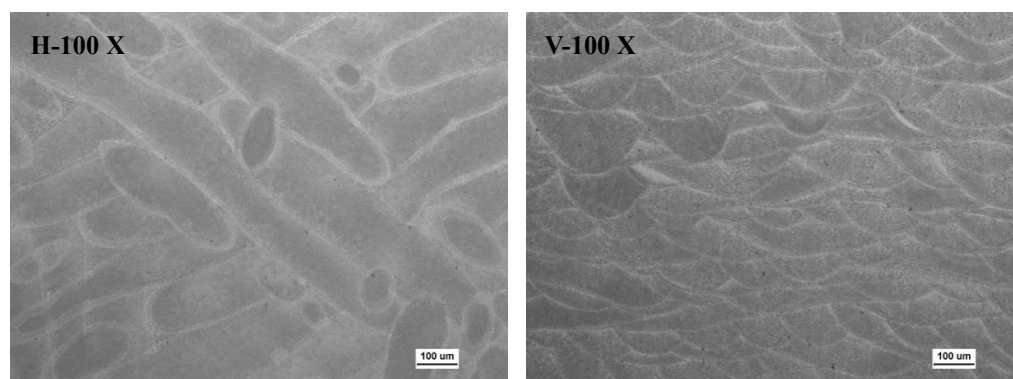
BLT-A1AF357 for BLT-A160 | 30μm

Process Information

System set-up	BLT-A160 (1 Laser)
Material	BLT-A1AF357
Layer thickness	30μm
Inert gas	Argon
Spot configure	I
Volume rate	12.21 cm ³ /h

Properties in As-Manufactured Condition

Microstructure



Mechanical Properties

Condition	Temperature /°C	Direction	Ultimate tensile strength R _m /MPa	Yield strength R _{p0.2} /MPa	Elongation at break A/%	Number of samples
As-manufactured	Room temperature	Horizontal	400±20	250±20	11±3	4
		Vertical	410±20	220±20	8±3	4

Note: The standard of performance testing is ASTM E8/E8M.
Specimens subjected to testing are in the machined-state.

Part Surface Roughness

Condition	Detection type	Upper skin (45°)	Down skin (45°)	Vertical plane	Number of samples
As-manufactured	Ra/μm	2-6	18-22	2-6	2

Note: The standard of performance testing is ISO 4288.

Part Density

Condition	Detection type	Result	Number of samples
As-manufactured	Relative Density/%	≥ 99.95	2

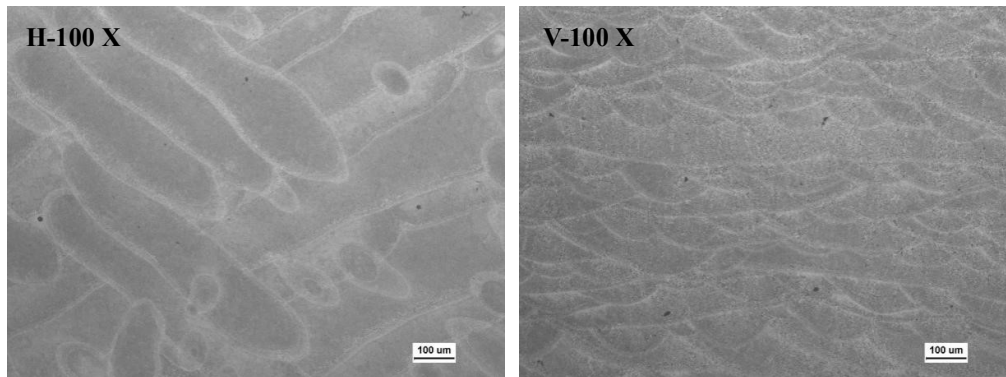
Note: The standard of performance testing is ISO 3369.

Heat Treatment Process

Annealing: Heat up to 165°C at a rate of 10°C/min, then hold for 6 hours followed by air cooling.

Properties in Heat Treated Condition

Microstructure



Mechanical Properties

Condition	Temperature /°C	Direction	Ultimate tensile strength R_m /MPa	Yield strength $R_{p0.2}$ /MPa	Elongation at break A/%	Number of samples
Heat treated	Room temperature	Horizontal	425±20	300±20	11±3	4
		Vertical	445±20	280±20	7±3	4

Note: The standard of performance testing is ASTM E8/E8M.

Specimens subjected to testing are in the machined-state.

Part Hardness

Condition	Detection type	Direction	Result	Number of samples
Heat treated	Hardness/HV	Horizontal	125±10	2
		Vertical	125±10	2

Note: The standard of performance testing is ASTM E92.

Tool Steel

BLT-18Ni300 MATERIAL DATA SHEET

General Description

18Ni300 is a Maraging steel with ultra-low carbon content, which is an ultra-high strength steel with high toughness after aging treatment. It has good machinability and good formability.

Main Characteristics

High Strength and High Hardness

Excellent Machinability

Excellent Heat Dissipation

Typical Applications

Engine Shell

Shaft Parts

Powder Properties

The chemical composition of BLT 18Ni300 powder is reported in the table below:

Element	C	Mo	Ni	Co	Ti	Al
Wt./%	≤0.03	4.70-5.20	18.00-19.00	8.50-9.50	0.50-0.80	0.05-0.15
Element	Mn	Si	P	S	Fe	/
Wt./%	≤0.10	≤0.10	≤0.01	≤0.01	Bal.	/

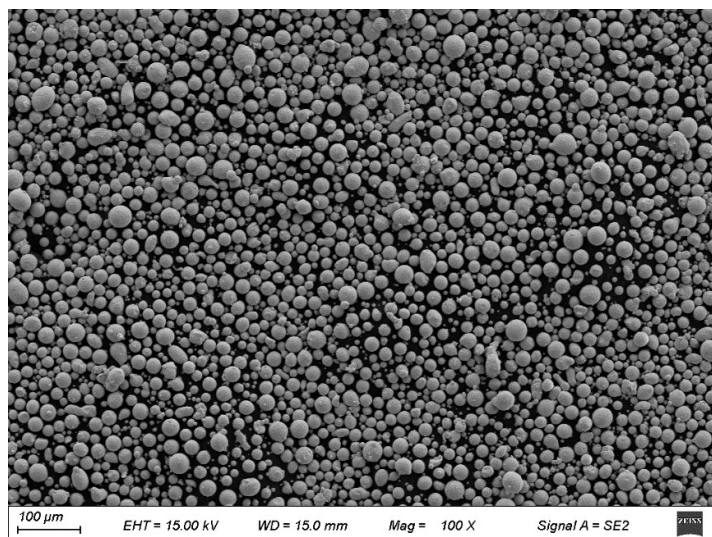
The particle size distribution of BLT 18Ni300 powder is shown as follows, which was tested by the laser particle size analyzer:

Particle size distribution	DV(10)	DV(50)	DV(90)
15μm-53μm	15μm≤DV(10)≤30μm	30μm≤DV(50)≤45μm	45μm≤DV(90)≤65μm

Other physical properties

Properties	Flowability s/50g	Sphericity
Technical requirement	≤30	≥0.85

SEM Micrograph of the Powders



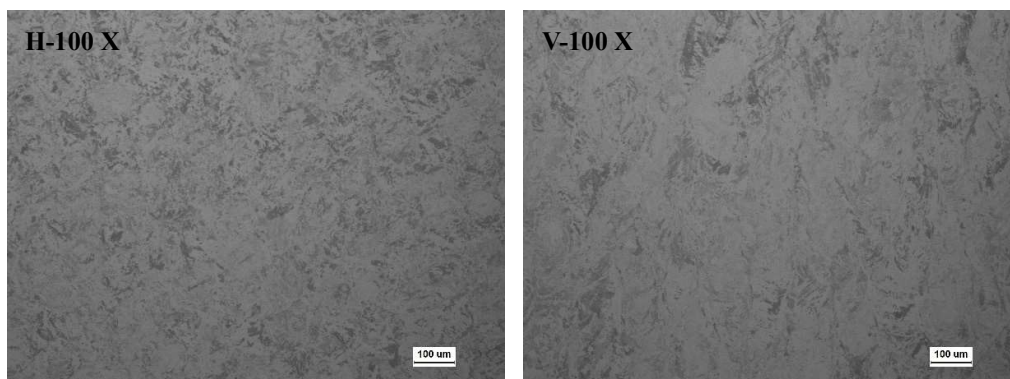
BLT-18Ni300 for BLT-A160 | 20μm

Process Information

System set-up	BLT-A160 (1 Laser)
Material	BLT-18Ni300
Layer thickness	20μm
Inert gas	Argon
Spot configure	I
Volume rate	4.27 cm ³ /h

Properties in As-Manufactured Condition

Microstructure



Mechanical Properties

Condition	Temperature /°C	Direction	Ultimate tensile strength R _m /MPa	Yield strength R _{p0.2} /MPa	Elongation at break A/%	Number of samples
As-manufactured	Room temperature	Horizontal	1170±30	1050±30	12±4	4
		Vertical	1050±30	920±30	10±4	4

Note: The standard of performance testing is ASTM E8/E8M.
Specimens subjected to testing are in the machined-state.

Part Hardness

Condition	Detection type	Direction	Result	Number of samples
As-manufactured	Hardness/HRC	Horizontal	35±1	2
		Vertical	35±1	2

Note: The standard of performance testing is ASTM E18.

Part Surface Roughness

Condition	Detection type	Upper skin (45°)	Down skin (45°)	Vertical plane	Number of samples
As-manufactured	Ra/ μm	5-7	14-18	5-7	2

Note: The standard of performance testing is ISO 4288.

Part Density

Condition	Detection type	Result	Number of samples
As-manufactured	Relative Density/%	≥ 99.95	2

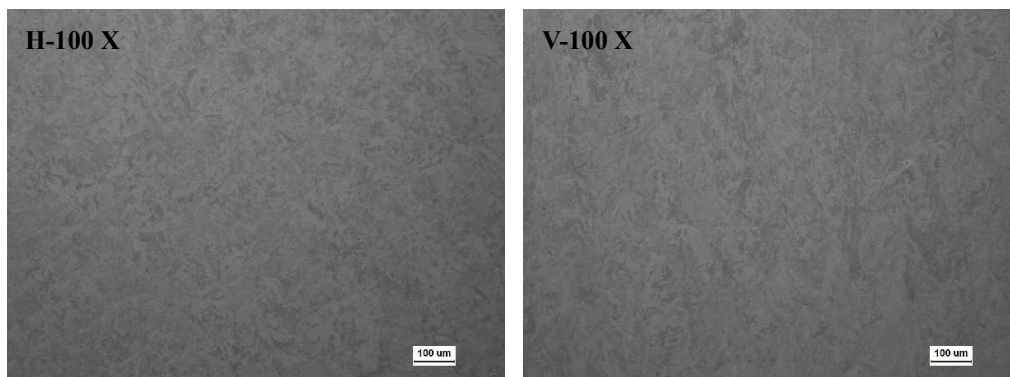
Note: The standard of performance testing is ISO 3369.

Heat Treatment Process

Aging: Heat up to 490°C at a rate of 10°C/min, then hold for 6 hours followed by air cooling.

Properties in Heat Treated Condition

Microstructure



Mechanical Properties

Condition	Temperature /°C	Direction	Ultimate tensile strength R_m /MPa	Yield strength $R_{p0.2}$ /MPa	Elongation at break A/%	Number of samples
Heat treated	Room temperature	Horizontal	1980 \pm 30	1900 \pm 30	6 \pm 2	4
		Vertical	2040 \pm 30	1970 \pm 30	5 \pm 2	4

Note: The standard of performance testing is ASTM E8/E8M.

Specimens subjected to testing are in the machined-state.

Part Hardness

Condition	Detection type	Direction	Result	Number of samples
Heat treated	Hardness/HRC	Horizontal	53±1	2
		Vertical	53±1	2

Note: The standard of performance testing is ASTM E18.

BLT-420 MATERIAL DATA SHEET

General Description

420 is a Maraging stainless steel with 12%~14% chromium, and it contains high carbon elements. The alloy has high hardness and excellent corrosion resistance. At the same time, it has excellent red hardness, certain toughness and good processing ability. It can maintain high strength and creep resistance at high temperatures.

Main Characteristics

High Strength and High Hardness

Great Corrosion Resistance

Good Polishing

Typical Applications

Cutter Manufacturing

Valves and Pumps

Decorative Applications

Powder Properties

The chemical composition of BLT 420 powder is reported in the table below:

Element	C	Cr	Mn	Si	P	S	Fe
Wt./%	≥0.15	12.00-14.00	≤1.00	≤1.00	≤0.040	≤0.030	Bal.

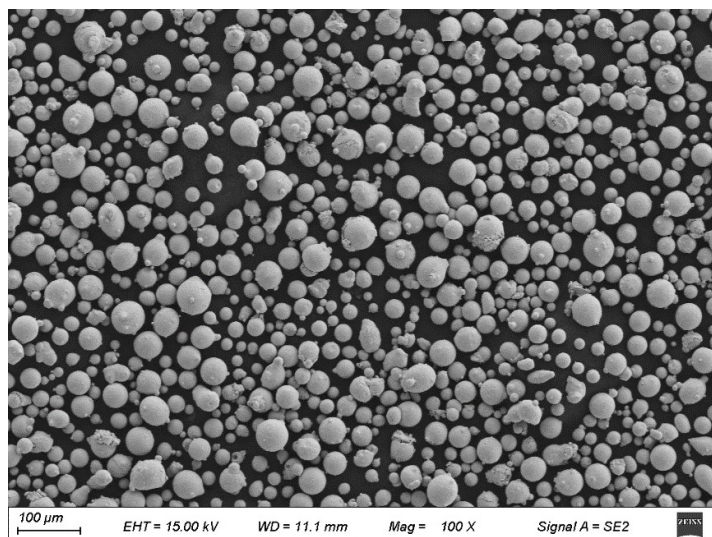
The particle size distribution of BLT 420 powder is shown as follows, which was tested by the laser particle size analyzer:

Particle size distribution	DV(10)	DV(50)	DV(90)
15μm-53μm	15μm≤DV(10)≤30μm	30μm≤DV(50)≤45μm	45μm≤DV(90)≤65μm

Other physical properties

Properties	Flowability s/50g	Sphericity
Technical requirement	≤30	≥0.85

SEM Micrograph of the Powders



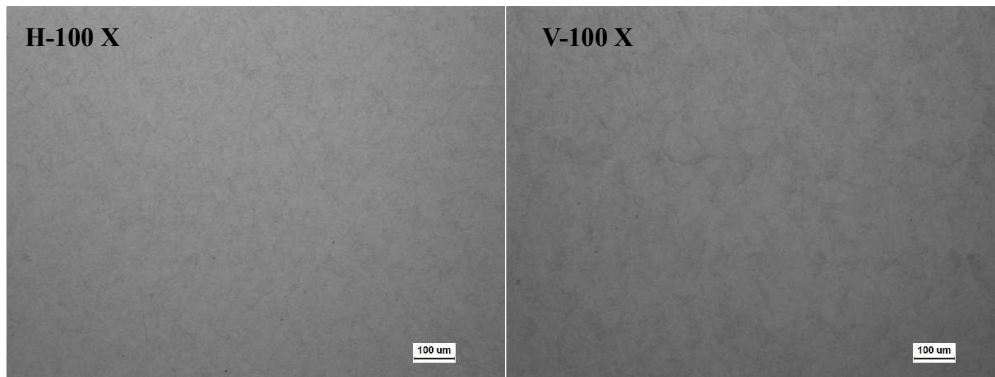
BLT-420 for BLT-A160 | 20μm

Process Information

System set-up	BLT-A160 (1 Laser)
Material	BLT-420
Layer thickness	20μm
Inert gas	Argon
Spot configure	I
Volume rate	4.27 cm ³ /h

Properties in As-Manufactured Condition

Microstructure



Part Hardness

Condition	Detection type	Direction	Result	Number of samples
As-manufactured	Hardness/HRC	Horizontal	45±2	2
		Vertical	45±2	2

Note: The standard of performance testing is ASTM E18.

Part Surface Roughness

Condition	Detection type	Upper skin (45°)	Down skin (45°)	Vertical plane	Number of samples
As-manufactured	Ra/μm	5-7	14-18	5-7	2

Note: The standard of performance testing is ISO 4288.

Part Density

Condition	Detection type	Result	Number of samples
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As-manufactured	Relative Density/%	≥ 99.95	2
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Note: The standard of performance testing is ISO 3369.

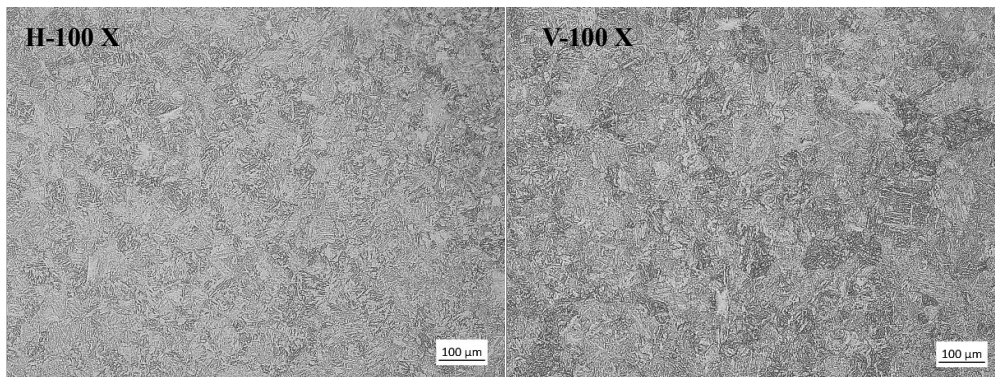
Heat Treatment Process

Solution: Heat up to 1100°C at a rate of 10°C/min, then hold for 1 hour followed by argon cooling.

Aging: Heat up to 200°C at a rate of 10°C/min, then hold for 4 hours followed by air cooling.

Properties in Heat Treated Condition

Microstructure



Part Hardness

Condition	Detection type	Direction	Result	Number of samples
Heat treated	Hardness/HRC	Horizontal	50±2	2
		Vertical	48±2	2

Note: The standard of performance testing is ASTM E18.

