SLM SOLUTIONS

3D METALS

Discover the variety of Metal Powders

The range of our standard Metal Powders

Non-Ferrous, Light Alloys
Tool and Stainless Steel

SLM® – The Industrial Manufacturing Revolution

PIONEERS in metal-based 3D printing

SLM Solutions Group AG, headquartered in Lübeck, Germany, is a leading provider of metal-based additive manufacturing technology (also commonly referred to as "3D printing"). The company's shares are traded on the Prime Standard of the Frankfurt Stock Exchange. SLM Solutions focuses on development, assembly, and sales of both machines and integrated system solutions in the field of selective laser melting.

The properties of the metal powder utilized by SLM® machines - including its purity, fluidity, and bulk density - significantly affect the achievable results. For this reason, SLM Solutions has been active in the metal powder manufacturing area since 2016 to supply customers with materials that ideally fit SLM® machines for respective application cases.

SLM Solutions stands for technologically advanced, innovative, and highly efficient integrated system solutions.

Memberships for Industry Development:

AMUG ADDITIVE MANUFACTURING USERS GROUP

ISO

ASTM INTERNATIONAL

DIN

EPMA european powder metallurgy association

Metal Variety

From dental prostheses through to turbine blades

Customers from various sectors utilize our machines to produce complex metal parts for a large number of applications – from dental prostheses through to turbine blades. All of these products have one thing in common: they must meet the highest standards in terms of stability, surface structure, or biocompatibility. And the number of utilization scenarios is on the rise: almost all geometric forms are possible.

Aerospace

This air duct made of titanium is produced in high precision without major rework.

Automotive

Only two days pass from the flexible design to the real-time test for this shaft flange.

Dental prostheses

Individualized brackets and palatal plates are manufactured after a 3D scan. No dental impression or casting is needed.

Medical technology

The freedom of design for individual titanium implants allows for a better ingrowth, therefore benefitting the patients.

Mechanical engineering

Pump impellers made of aluminum and stainless steel with a streamlined shape geometry are made without molding costs.

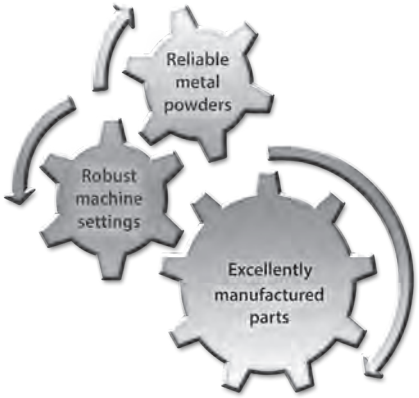
Universities and institutes

Modern engineers will find new solutions to the problems of traditional manufacturing on a daily basis.

Energy sector

Small stainless steel hydro wheels are innovative parts of a decentralized energy supply.

Core Competencies



- Special metal powder selection for our selective laser melting process
- Extended quality assurance
- Skilled technical staff for customer support
- Deep machine and process understanding

Al-Alloys

AlSi10Mg

SLM Solutions' AlSi10Mg is an aluminum-based alloy that is widely used in the additive manufacturing industry for production of functional parts as well as prototypes. AlSi10Mg is often used in applications requiring good mechanical properties and low weight.

Chemical composition (nominal), %

Material / Element	Al	Si	Fe	Cu	Mn	Mg	Zn	Ti	Ni	Pb	Sn	Others	Total others
AlSi10Mg 20-63 µm	Bal.	9.00-11.00	0.55	0.05	0.45	0.20 - 0.45	0.10	0.15	0.05	0.05	0.05	0.05	0.15

Mechanical data[1]	Formula symbol and unit	As-built[2]	Heat-treated[2]
Tensile strength	R_m [MPa]	450	260
Offset yield strength	$R_{p0,2}$ [MPa]	275	145
Elongation at break	A [%]	5	11
Reduction in area	Z [%]	5	30
Young's modulus	E [GPa]	75	55
Vickers hardness	HV5	125	80
Roughness average	Ra [µm]	10	10
Mean roughness depth	Rz [µm]	65	65

Material characteristics

- Very good corrosion resistance
- Good electrical conductivity
- High dynamic toughness
- Excellent thermal conductivity

Typical application areas

- Aerospace
- Automotive
- Engineering
- Heat exchangers

AlSi7Mg0.6

SLM Solutions' AlSi7Mg0.6 is an aluminum-based alloy, which is often used in applications requiring excellent thermal conductivity, good corrosion resistance, or tolerance to strain.

Chemical composition (nominal), %

Material / Element	Al	Cu	Fe	Mg	Mn	Si	Ti	Zn	Others	Total others
AlSi7Mg0.6 20-63 µm	Bal.	0.05	0.19	0.45 - 0.70	0.10	6.50 - 7.50	0.25	0.07	0.03	0.10

Mechanical data[1]	Formula symbol and unit	As-built[2]
Tensile strength	R_m [MPa]	375
Offset yield strength	$R_{p0,2}$ [MPa]	210
Elongation at break	A [%]	8
Reduction in area	Z [%]	10
Young's modulus	E [GPa]	60
Vickers hardness	HV10	110
Roughness average	Ra [µm]	5
Mean roughness depth	Rz [µm]	45

Material characteristics

- Good electrical conductivity
- Excellent SLM® processability
- Good corrosion resistance
- Good tolerance against strain
- Excellent thermal conductivity

Typical application areas

- Aerospace
- Automotive
- Heat exchangers
- Research
- Prototyping

[1] Process conditions and parameters according to SLM Solutions standards
[2] Rounded mean values of different layer thicknesses and orientations (exception: elongations at break are not rounded)

Further information and data can be found in our material data sheets.

AlSi9Cu3

SLM Solutions' AlSi9Cu3 is an aluminum-, silicon-, and copper-based alloy. AlSi9Cu3 is used in applications requiring good high temperature strength, low density, and good corrosion resistance.

Chemical composition (nominal), %

Material / Element	Al	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Pb	Sn	Ti
AlSi9Cu3 20-63 µm	Bal.	8.00 - 11.00	1.30	2.00 - 4.00	0.55	0.05 - 0.55	0.15	0.55	1.20	0.35	0.25	0.25

Mechanical data[1]	Formula symbol and unit	As-built[2]
Tensile strength	R_m [MPa]	415
Offset yield strength	$R_{p0,2}$ [MPa]	235
Elongation at break	A [%]	5
Reduction in area	Z [%]	10
Young's modulus	E [GPa]	55
Vickers hardness	HV10	130
Roughness average	Ra [µm]	5
Mean roughness depth	Rz [µm]	45

Material characteristics

- Excellent SLM® processability
- Good electrical conductivity
- Good high temperature strength
- High thermal conductivity

Typical application areas

- Aerospace
- Automotive
- Heat exchangers
- Research
- Prototyping

[1] Process conditions and parameters according to SLM Solutions standards
[2] Rounded mean values of different layer thicknesses and orientations (exception: elongations at break are not rounded)

Further information and data can be found in our material data sheets.

Ni-Alloys

HX

SLM Solutions' HX is a nickel-based alloy with high contents of chromium, molybdenum, and iron. HX is an important alloy for high temperature applications in corrosive environments for a number of industries.

Chemical Composition (nominal), %

Material / Element	Ni	Cr	Fe	Mo	Co	Si	W	Mn	C	P	S
HX 10-45 µm	Bal.	20.50 - 23.00	17.00 - 20.00	8.00 - 10.00	0.50 - 2.50	1.00	0.20 - 1.00	1.00	0.05 - 0.15	0.04	0.03

Mechanical data[1]	Formula symbol and unit	As-built[2]
Tensile strength	R_m [MPa]	720
Offset yield strength	$R_{p0,2}$ [MPa]	545
Elongation at break	A [%]	18
Reduction in area	Z [%]	20
Young's modulus	E [GPa]	155
Vickers hardness	HV10	245
Roughness average	Ra [µm]	10
Mean roughness depth	Rz [µm]	55

Material characteristics

- High strength
- Good ductility
- Excellent oxidation resistance at high temperatures
- High creep strength up to 850 °C

Typical application areas

- Aerospace
- Energy
- Chemical industry
- Turbine parts

IN625

SLM Solutions' IN625 is a precipitation-hardenable nickel-based material alloyed with chromium, molybdenum, and niobium. IN625 is a typical material for construction of aircraft engine components with service temperatures below 650 °C.

Chemical composition (nominal), %

Material / Element	Ni	Cr	Mo	Nb	Fe	Co	Si	Mn	Ti	Al	C	S	P
IN625 10-45 µm	Bal.	20-23	8-10	3.15-4.15	5.0	1.0	0.5	0.5	0.4	0.4	0.1	0.015	0.015

Mechanical data[1]	Formula symbol and unit	As-built[2]
Tensile strength	R_m [MPa]	925
Offset yield strength	$R_{p0,2}$ [MPa]	665
Elongation at break	A [%]	31
Reduction in area	Z [%]	45
Young's modulus	E [GPa]	175
Vickers hardness	HV10	280
Roughness average	Ra [µm]	10
Mean roughness depth	Rz [µm]	40

Material characteristics

- High strength
- Good ductility
- Excellent creep rupture strength below 700 °C
- Excellent corrosion resistance

Typical application areas

- Aerospace
- Energy
- Chemical industry
- Turbine parts

[1] Process conditions and parameters according to SLM Solutions standards
[2] Rounded mean values of different layer thicknesses and orientations (exception: elongations at break are not rounded)

Further information and data can be found in our material data sheets.

IN718

SLM Solutions' IN718 is a precipitation-hardenable nickel-chromium-alloy. With excellent tensile, fatigue, creep, and rupture strengths up to 700 °C, IN718 is an important alloy for production of components for aircraft engines, (gas) turbines, and other high temperature applications.

Chemical composition (nominal), %

Material / Element	Ni	Cr	Fe	Ta + Nb	Mo	Ti	Al	Cu	C	Si	Mn	B	Co	P	S
IN718 10-45 µm	50.00-55.00	17.00-21.00	Bal.	4.75-5.50	2.80-3.30	0.65-1.15	0.20-0.80	0.30	0.08	0.35	0.35	0.006	1.0	0.015	0.015

Mechanical data[1]	Formula symbol and unit	As built[2]
Tensile strength	R_m [MPa]	995
Offset yield strength	$R_{p0,2}$ [MPa]	695
Elongation at break	A [%]	27
Reduction in area	Z [%]	45
Young's modulus	E [GPa]	170
Vickers hardness	HV10	300
Roughness average	Ra [µm]	5
Mean roughness depth	Rz [µm]	35

Material characteristics

- High strength
- Good ductility
- Excellent mechanical properties up to 700 °C
- Excellent oxidation resistance

Typical application areas

- Aerospace
- Energy
- Chemical industry
- Turbine parts

IN939

SLM Solutions' IN939 is a highly alloyed material containing amounts of chromium, cobalt, titanium, tungsten, aluminum, tantalum, and niobium. Owing to IN939's high temperature mechanical properties, the alloy is widely used in turbine component construction.

Chemical composition (nominal), %

Material / Element	Ni	Cr	Co	Ti	W	Al	Ta	Nb	Mn	Si	C	Zr
IN939 10-45 µm	Bal.	22.00-23.00	18.00-20.00	3.00-4.50	1.00-3.00	1.00-3.00	1.00-1.80	0.50-1.50	0.50	0.50	0.15	0.10

Mechanical Data[1]	Formula symbol and unit	As-built[2]	Heat-treated[2]	Heat-treated + HIP[2]
Tensile strength	R_m [MPa]	970	1245	1350
Offset yield strength	$R_{p0,2}$ [MPa]	685	750	955
Elongation at break	A [%]	27	13	11
Reduction in area	Z [%]	35	10	10
Young's modulus	E [GPa]	165	200	195
Vickers hardness	HV10	305	-	-
Roughness average	Ra [µm]	5	-	-
Mean roughness depth	Rz [µm]	45	-	-

Material characteristics

- High strength
- Good ductility
- Excellent high temperature mechanical properties
- Excellent corrosion resistance

Typical application areas

- Aerospace
- Energy
- Chemical industry
- Turbine parts

[1] Process conditions and parameters according to SLM Solutions standards
[2] Rounded mean values of different layer thicknesses and orientations (exception: elongations at break are not rounded)

Further information and data can be found in our material data sheets.

Ti-Alloys

TiAl6V4 ELI (Grade 23)

SLM Solutions' titanium alloy TiAl6V4 ELI (Grade 23) is the high purity version of TiAl6V4 (Grade 5), the most widely used titanium-based alloy in the world. Due to its high strength, low density, and good corrosion resistance, TiAl6V4 is highly suited for production parts in the aerospace and automotive industries as well as in biomedical applications.

Chemical composition (nominal), %

Material / Element	Ti	Al	V	C	O	N	Fe	H	Others	Total others
TiAl6V4 ELI (Grade 23) 20-63 µm	Bal.	5.50-6.50	3.50-4.50	0.08	0.13	0.03	0.25	0.0125	0.10	0.40

Chemistry acc. to ASTM F136, B348

Mechanical data[1]	Formula symbol and unit	As-built[2]	Heat-treated[2]	HIP[2]
Tensile strength	R_m [MPa]	1280	965	1010
Offset yield strength	$R_{p0,2}$ [MPa]	1135	880	895
Elongation at break	A [%]	8	14	15
Reduction in area	Z [%]	20	50	40
Young's modulus	E [GPa]	115	120	125
Vickers hardness	HV10	360	305	315
Impact energy	KV [J]	15	30	20
Roughness average	Ra [µm]	10	-	-
Mean roughness depth	Rz [µm]	70	-	-

Material characteristics

- Good corrosion resistance
- High specific strength
- High cycle fatigue strength
- High toughness

Typical application areas

- Aerospace
- Automotive
- Medical
- Energy

Ti (Grade 2)

SLM Solutions' Ti (Grade 2) is a commercially pure titanium grade with excellent biocompatibility and good mechanical properties. Ti (Grade 2) is widely used in many different applications that require excellent corrosion resistance, strength, ductility, and low density.

Chemical composition (nominal), %

Material / Element	Ti	Fe	C	N	O	H	Others	Total Others
Ti (Grade 2) 20-63 µm	Bal.	0.30	0.08	0.03	0.25	0.015	0.10	0.40

Chemistry acc. to ASTM F6, B348

Mechanical data[1]	Formula symbol and unit	As-built[2]
Tensile strength	R_m [MPa]	700
Offset yield strength	$R_{p0,2}$ [MPa]	585
Elongation at break	A [%]	25
Reduction in area	Z [%]	65
Young's modulus	E [GPa]	115
Vickers hardness	HV10	225
Roughness average	Ra [µm]	15
Mean roughness depth	Rz [µm]	80

Material characteristics

- Excellent biocompatibility
- Excellent corrosion resistance to sea water
- Good ductility
- Moderate strength

Typical application areas

- Medical
- Aerospace
- Energy
- Chemical / Petrochemical
- Heat exchangers

[1] Process conditions and parameters according to SLM Solutions standards
[2] Rounded mean values of different layer thicknesses and orientations (exception: elongations at break are not rounded)

Further information and data can be found in our material data sheets.

Co-Alloys

CoCr28Mo6

SLM Solutions' CoCr28Mo6 is a cobalt, chromium, and molybdenum alloy with versatile applications. Owing to its exceptional biocompatibility, CoCr28Mo6 is used in the medical industry for the production of implants and prostheses. The material is also used to produce components for applications in high temperature environments such as jet-engines.

Chemical composition (nominal), %

Material / Element	Co	Cr	Mo	Mn	Si	Fe	Ni	C	Al	B	N	P	S	W	Ti
CoCr28Mo6 10-45 µm	Bal.	27.00-30.00	5.00-7.00	1.00	1.00	0.75	0.50	0.35	0.10	0.010	0.25	0.02	0.01	0.20	0.10

Chemistry acc. to ASTM F75

Mechanical data[1]	Formula symbol and unit	As-built[2]
Tensile strength	R_m [MPa]	1070
Offset yield strength	$R_{p0,2}$ [MPa]	715
Elongation at break	A [%]	10
Reduction in area	Z [%]	10
Young's modulus	E [GPa]	195
Vickers hardness	HV10	375
Roughness average	Ra [µm]	10
Mean roughness depth	Rz [µm]	65

Material characteristics

- Exceptional biocompatibility
- Heat resistant
- Resistance to thermal fatigue
- Oxidation resistance

Typical application areas

- Medical
- Aerospace
- Energy
- Turbine parts

SLM® MediDent

SLM Solutions' SLM® MediDent is a cobalt, chromium, molybdenum, and tungsten alloy especially designed for application in the dental industry. SLM® MediDent is used primarily for the production of biocompatible dental implants and prostheses.

Chemical composition (nominal), %

Material / Element	Co	Cr	Mo	W	Si	Fe	Mn	Ni	Pb	C	B	P	S	Be	Cd	Others	Total others
SLM® MediDent 10-45 µm	Bal.	22.7-26.7	4.0-6.0	4.4-6.4	2.0	0.50	0.10	0.10	0.02	0.02	0.10	0.10	0.10	0.02	0.02	0.50	0.50

Mechanical data[1]	Formula symbol and unit	As-built[2]
Tensile strength	R_m [MPa]	1060
Offset yield strength	$R_{p0,2}$ [MPa]	320
Elongation at break	A [%]	-
Reduction in area	Z [%]	-
Young's modulus	E [GPa]	115
Vickers hardness	HV10	-
Roughness average	Ra [µm]	5
Mean roughness depth	Rz [µm]	45

Material characteristics

- Biocompatible
- Corrosion resistant

Typical application areas

- Dental
- Medical

[1] Process conditions and parameters according to SLM Solutions standards
[2] Rounded mean values of different layer thicknesses and orientations (exception: elongations at break are not rounded)

Further information and data can be found in our material data sheets.

Tool and Stainless Steel

316L (1.4404)

SLM Solutions' Stainless Steel 316L is an austenitic high chromium steel with excellent processability on SLM Solutions' additive manufacturing machines. 316L is often used in applications requiring good mechanical properties and excellent corrosion resistance, especially in chloride environments.

Chemical composition (nominal), %

Material / Element	Fe	Cr	Ni	Mo	Mn	Si	P	S	C	N	O
316L (1.4404) 10-45 µm	Bal.	16.00-18.00	10.00-14.00	2.00-3.00	2.00	1.00	0.045	0.030	0.030	0.10	0.10

Mechanical data[1]	Formula symbol and unit	As-built[2]	Heat-treated[2]
Tensile strength	R_m [MPa]	620	575
Offset yield strength	$R_{p0,2}$ [MPa]	505	345
Elongation at break	A [%]	43	52
Reduction in area	Z [%]	65	65
Young's modulus	E [GPa]	180	180
Vickers hardness	HV10	210	170
Roughness average	Ra [µm]	10	-
Mean roughness depth	Rz [µm]	70	-

Material characteristics

- Very good corrosion resistance
- High strength under elevated temperatures
- High ductility

Typical application areas

- Aerospace /Automotive
- Surgical instruments
- Food industry
- Offshore installations

15-5PH (1.4545)

SLM Solutions' 15-5PH is a martensitic precipitation-hardening stainless steel that has excellent processability on SLM Solutions' additive manufacturing machines. 15-5PH is suitable for applications requiring high strength and hardness combined with moderate corrosion resistance. The alloy is the ferrite-free version of 17-4PH.

Chemical composition (nominal), %

Material / Element	Fe	Cr	Ni	Cu	Nb + Ta	Mn	Si	P	S	C	N	O
15-5PH (1.4545) 10-45 µm	Bal.	14.50-15.50	3.50-5.50	2.50-4.50	0.15-0.45	1.00	1.00	0.04	0.03	0.07	0.10	0.10

Mechanical data[1]	Formula symbol and unit	As-built[2]	Heat-treated[2]
Tensile strength	R_m [MPa]	1190	1410
Offset yield strength	$R_{p0,2}$ [MPa]	805	1265
Elongation at break	A [%]	9	8
Reduction in area	Z [%]	30	20
Young's modulus	E [GPa]	155	190
Vickers hardness	HV10	360	-
Roughness average	Ra [µm]	10	-
Mean roughness depth	Rz [µm]	65	-

Material characteristics

- Precipitation-hardenable
- Excellent tensile strength
- Moderate corrosion resistance

Typical application areas

- Aerospace
- Medical
- Chemical / Petrochemical
- Paper / Metalworking industries

[1] Process conditions and parameters according to SLM Solutions standards
[2] Rounded mean values of different layer thicknesses and orientations (exception: elongations at break are not rounded)

Further information and data can be found in our material data sheets.

17-4PH (1.4542)

SLM Solutions' 17-4PH is a martensitic precipitation-hardening stainless steel. 17-4PH is suitable for applications requiring high strength and hardness combined with moderate corrosion resistance.

Chemical Composition (nominal), %

Material / Element	Fe	Cr	Ni	Cu	Mn	Si	Nb + Ta	C	N	O	P	S
17-4 PH (1.4542) 10-45 µm	Bal.	15.00-17.50	3.00-5.00	3.00-5.00	1.00	1.00	0.15-0.45	0.07	0.10	0.10	0.04	0.03

Mechanical data[1]	Formula symbol and unit	As-built[2]
Tensile strength	R_m [MPa]	830
Yield strength	R_e [MPa]	570
Elongation at break	A [%]	31
Reduction in area	Z [%]	55
Young's modulus	E [GPa]	155
Vickers hardness	HV10	220
Roughness average	Ra [µm]	10
Mean roughness depth	Rz [µm]	55

Material characteristics

- Precipitation-hardenable
- Excellent tensile strength
- Moderate corrosion resistance

Typical application areas

- Aerospace
- Medical
- Chemical / Petrochemical
- Paper / Metalworking industries

1.2709

SLM Solutions' 1.2709 is a maraging tool steel with a high content of alloyed nickel and some molybdenum. 1.2709 is suitable for many tooling and high performance applications that require both high strength and toughness.

Chemical composition (nominal), %

Material / Element	Fe	Ni	Co	Mo	Ti	Al	Mn	Si	P	S	C
1.2709 10-45 µm	Bal.	18.00-19.00	8.50-9.50	4.70-5.20	0.50-0.80	0.05-0.15	0.10	0.10	0.01	0.01	0.03

Mechanical data[1]	Formula symbol and unit	As-built[2]	Heat-treated[2]
Tensile strength	R_m [MPa]	1155	2020
Offset yield strength	$R_{P0,2}$ [MPa]	960	1935
Elongation at break	A [%]	11	5
Reduction in area	Z [%]	55	20
Young's modulus	E [GPa]	175	195
Vickers hardness	HV10	350	580
Roughness average	R_a [µm]	10	-
Mean roughness depth	R_z [µm]	60	-

Material Characteristics

- Martensitic hardening
- High toughness
- High tensile strength
- Good properties up to ca. 400 °C

Typical application areas

- Injection moulding
- Engineering parts
- Automotive
- Aerospace

[1] Process conditions and parameters according to SLM Solutions standards
[2] Rounded mean values of different layer thicknesses and orientations (exception: elongations at break are not rounded)

Further information and data can be found in our material data sheets.

H13 (1.2344)

SLM Solutions' H13 (1.2344) is a chromium containing martensitic tool steel. This material is used in tooling applications that require exceptional strength and toughness.

Chemical composition (nominal), %

Material / Element	Fe	C	Cr	Mn	Mo	Ni + Cu	P	S	Si	V
H13 10-45 µm	Bal.	0.32-0.45	4.75-5.50	0.20-0.60	1.10-1.75	0.75	0.03	0.03	0.80-1.25	0.80-1.20

Mechanical data[1]	Formula symbol and unit	As-built[2]	Heat-treated[2]
Tensile strength	R_m [MPa]	1375	1775
Offset yield strength	$R_{p0,2}$ [MPa]	1245	1590
Elongation at break	A [%]	2	7
Reduction in area	Z [%]	5	15
Young's modulus	E [GPa]	210	255
Vickers hardness	HV10	-	-
Roughness average	Ra [µm]	-	-
Mean roughness depth	Rz [µm]	-	-

Material characteristics

- High tensile strength
- Moderate corrosion resistance
- Resistant to thermal fatigue cracking

Typical application areas

- Injection moulding
- Tooling

Invar 36®

SLM Solutions' Fe-alloy Invar 36® is a high nickel containing steel that has a uniquely low coefficient of thermal expansion below its Curie temperature of 280 °C. Invar 36® is used in components that require a high dimensional stability over a wide range of temperatures.

Chemical composition (nominal), %

Material / Element	Fe	N	Cr	Mn	Si	C	Others	Total others
Fe-Alloy Invar 36® 10-45 µm	Bal.	35.00-37.00	0.50	0.50	0.50	0.10	0.20	0.50

Mechanical data[1]	Formula symbol and unit	As-built[2]	Heat-treated[2]
Tensile strength	R_m [MPa]	480	480
Offset yield strength	$R_{p0,2}$ [MPa]	385	375
Elongation at break	A [%]	35	35
Reduction in area	Z [%]	74	74
Young's modulus	E [GPa]	135	140
Vickers hardness	HV10	150	-
Roughness average	Ra [µm]	15	-
Mean roughness depth	Rz [µm]	80	-

Material characteristics

- Low coefficient of thermal expansion below its Curie temperature of 280 °C
- Excellent mechnical properties at cryogenic temperatures
- Low tendency to fatigue at low temperatures

Typical application areas

- Aerospace
- Valves in engines
- Precision instruments

[1] Process conditions and parameters according to SLM Solutions standards
[2] Rounded mean values of different layer thicknesses and orientations (exception: elongations at break are not rounded)

Further information and data can be found in our material data sheets.

Cu-Alloys

CuSn10

SLM Solutions' bronze CuSn10 is a copper-tin alloy with a high elongation and medium hardness. Bronze is characterized by good wear properties and resistance to atmospheric corrosion and cavitation in sea water. Typical applications include components and housings for devices in marine environments.

Chemical composition (nominal), %

Material / Element	Cu	Sn	Al	Fe	Mn	Ni	P	Pb	S	Sb	Si	Zn
CuSn10 20-63 µm	Bal.	9.0-11.00	0.01	0.2	0.1	2.0	0.2	1.0	0.05	0.2	0.02	0.5

Mechanical data	Formula symbol and unit	As-built[2]
Tensile strength	R_m [MPa]	505
Offset yield strength	$R_{p0,2}$ [MPa]	380
Elongation at break	A [%]	19
Reduction in area	Z [%]	20
Young's modulus	E [GPa]	115
Vickers hardness	HV10	160
Roughness average	Ra [µm]	10
Mean roughness depth	Rz [µm]	65

Material characteristics

- Good mechanical properties
- Resistance to cavitation in sea water
- Good corrosion resistance
- Good thermal conductivity

Typical application areas

- Maritime
- Heat exchangers

[1] Process conditions and parameters according to SLM Solutions standards
[2] Rounded mean values of different layer thicknesses and orientations (exception: elongations at break are not rounded)

Further information and data can be found in our material data sheets.

SLM® Machines

SLM®125

The Selective Laser Melting Machine SLM®125 offers a build envelope of **125 x 125 x 125 mm³**. The **flexibly applicable machine with high productivity** is equipped with a single fiber laser (1x 400 W) and produces high-quality metal parts.

The **precise and economical** SLM®125 was designed for quick results in the research and development sector as well as for the **production of smaller metal parts.**

SLM®280 2.0

The Selective Laser Melting Machine SLM®280 2.0 provides a **280 x 280 x 365 mm³** build envelope and a **patented multi-beam technology**. During the build process up to two fiber lasers expose the build field via a 3D scan optic.

The **high-performance machine** is available in several configurations, providing single optics (1x 400 W or 1x 700 W), dual optics (1x 700 W and 1x 1000 W) and twin optics (2x 400 W or 2x 700 W). Depending on the arrangement of parts, an up to 80% higher build rate can be achieved. In addition, the **patented bidirectional powder coating** helps to reduce the manufacturing time of individually manufactured metal parts.

SLM®500

The Selective Laser Melting Machine SLM®500 provides a large build envelope of **500 x 280 x 365 mm³** and the **patented multi-beam technology.** In the high-performance machine, four fiber lasers (4x 400 W or 4x 700 W) are in action simultaneously, increasing the build-up rate by up to 90 % compared to the twin configuration (2x 400 W or 2x 700 W). The versatile usable machine with **high productivity** is perfectly suited for **series production of complex metal parts** and specifically designed for use in the production environment. An extremely comprehensive basic configuration and the large choice of options enable an application-oriented machine configuration.

With a three times higher gas flow, the robust SLM® machine produces parts with the highest density and surface quality. Soot is removed from the process chamber efficiently and reliably, even for the longest-lasting builds.

About SLM Solutions

The Lübeck-based SLM Solutions Group AG is a leading provider of metal-based additive manufacturing technology. SLM Solutions focuses on the development, assembly, and sales of machines as well as integrated system solutions in the field of selective laser melting.

SLM® technology offers diverse options in the metal-based additive manufacturing of parts, such as a new design and geometric freedom, lightweight construction through the reduction of metal part weight, significant advantages in terms of production speed and the possibility of manufacturing internal undercut parts in low quantities.

Our products are utilized globally by customers from the most varied sectors, particularly in the aerospace, automotive, tooling, energy, and healthcare industries, as well as in research and education.

They particularly value the following advantages of our technology partnership:

- Highest **productivity** using patented multi-laser technology
- Highest material density and **part quality** through our innovative gas stream management
- Completely closed **powder management** in an inert gas atmosphere
- Cutting-edge process monitoring using various **quality control modules**
- Multilingual open **software architecture** with customer adaptability
- Ultracompact **modular design**
- Long-term and **confidential customer relationships**
- **A technological leader and pioneer** in metal-based additive manufacturing with decades of market experience

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