

Cobalt Alloys

CoCr28Mo6

CoCr28Mo6 is a high temperature resistant Co-Alloy with versatile applications. This corrosion resistant and biocompatible material combines high hardness with high ductility, limiting many traditional processing manufacturing options. The SLM® process provides a comparatively economic and quick option to manufacture cobalt-chromium components.

Chemical Composition (nominal), %

Element / Material ¹	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	0.01	0.25	0.02	0.01	0.20	0.10

Chemistry according to ASTM F75

Mechanical Data ²	Formula Symbol and Unit	As-Built ³
Tensile strength	R _m [MPa]	1215
Offset yield strength	R _{p0.2} [MPa]	755
Elongation at break	A [%]	21
Reduction of area	Z [%]	15
Young's modulus	E [GPa]	205
Vickers hardness	HV10	385
Roughness average	Ra [µm]	15
Mean roughness depth	Rz [µm]	90

Material Characteristics

- Exceptional biocompatibility
- Heat resistant
- Resistance to thermal fatigue
- High ductility

Typical Application Areas

- Orthopedic implants
- Dental prostheses
- Energy engineering
- Jet engines

SLM® MediDent

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

Chemical Composition (nominal), %

Element / Material ¹	Co	Cr	Mo	W	Si	Fe	Mn	Ni	Pb	C	B	P	S	Be	Cd	Total Others
SLM® MediDent 10-45 µm	Bal.	22.70- 26.70	4.00 - 6.00	4.40 - 6.40	2.00	0.50	0.10	0.10	0.02	0.02	0.10	0.10	0.10	0.02	0.02	0.50

Mechanical Data ²	Formula Symbol and Unit	As-Built ³	Heat Treated
Tensile strength	R _m [MPa]	1140	1415
Offset yield strength	R _{p0.2} [MPa]	655	1185
Elongation at break	A [%]	14	4
Reduction of area	Z [%]	10	5
Young's modulus	E [GPa]	170	245
Vickers hardness	HV10	375	-
Roughness average	Ra [µm]	10	-
Mean roughness depth	Rz [µm]	75	-

Material Characteristics

- Biocompatible
- Corrosion resistant

Typical Application Areas

- Dental
- Medical

¹ Maximum values, unless stated otherwise as a range
² Process conditions and parameters according to SLM Solutions' standards
³ Rounded mean values of identified layer thicknesses and different orientations (elongations at break are not rounded)
Further information and data can be found in our material data sheets.

Copper Alloys

CuSn10

SLM Solutions' bronze CuSn10 is a copper-tin alloy with high elongation and medium hardness. Bronze is characterized by good wear properties, resistance to atmospheric corrosion. SLM®-processed CuSn10 components exhibit a homogeneous, nearly non-porous texture with targeted mechanical characteristics.

Chemical Composition (nominal) %

Element / Material ¹	Cu	Sn	Al	Fe	Mn	Ni	P	Pb	S	Sb	Si	Zn
Bronze CuSn10 20-63 µm	Bal.	9.00 - 11.00	0.01	0.20	0.10	2.00	0.20	1.00	0.05	0.20	0.02	0.50

Mechanical Data ²	Formula Symbol and Unit	As-Built ³
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Tensile strength	R _m [MPa]	505
Offset yield strength	R _{p0.2} [MPa]	380
Elongation at break	A [%]	19
Reduction of area	Z [%]	20
Young's modulus	E [GPa]	115
Vickers hardness	HV10	160
Roughness average	Ra [µm]	15
Mean roughness depth	Rz [µm]	90

Material Characteristics

- Good mechanical properties
- Good corrosion resistance
- Cavitation resistance in sea water
- Good thermal conductivity

Typical Application Areas

- Pump housings
- Hydraulic turbines
- Instrument panels
- Diffusers and impellers

CuNi2SiCr

The low-alloyed copper-alloy CuNi2SiCr is a thermally hardenable alloy with high stiffness, even at elevated temperatures. Due to the low additives, the properties of pure copper (strength, softening temperature) can be considerably improved, while other properties (electrical and thermal conductivity, corrosion resistance) are largely retained. Typical areas of application are toolmaking, conductive contacts in electrical engineering or valves.

Chemical composition (nominal), %

Material / Element ¹	Cu	Ni	Si	Cr	Fe	Mn	Pb	Total others
CuNi2SiCr 20-63 µm	Bal.	2.00 - 3.00	0.50 - 0.80	0.20 - 0.50	0.15	0.10	0.02	0.10

Mechanical Data ²	Formula Symbol and Unit	As-Built ³	Heat Treated
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Tensile strength	R _m [MPa]	300	645
Offset yield strength	R _{p0.2} [MPa]	245	565
Elongation at break	A [%]	37	20
Reduction of area	Z [%]	80	55
Young's modulus	E [GPa]	95	110
Vickers hardness	HV10	105	220
Roughness average	Ra [µm]	20	-
Mean roughness depth	Rz [µm]	105	-

Material characteristics

- Balanced combination of electrical and thermal conductivity
- High wear resistance
- High corrosion resistance, in particular to stress corrosion cracking

Typical application areas

- Welding technology
- Electrical engineering
- Tooling

¹ Maximum values, unless stated otherwise as a range

² Process conditions and parameters according to SLM Solutions' standards

³ Rounded mean values of identified layer thicknesses and different orientations (elongations at break are not rounded)

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