Material Data Sheet

Co-Alloy CoCr28Mo6 / 2.4979 / F75[1]

General

Cobalt-chromium alloys are characterized by their especially high hardness as well as high ductility. Additionally, they are corrosion resistant. Due to their high bio-compatibility, cobalt-chromium alloys are among the standard alloys used in medical and dental technologies. They are used to produce dental as well as knee and hip prostheses. Their resistance to heat makes them well-suited for use in high-temperature areas, such as in jet are very hard, there are limitations when it comes engines. Since cobalt-chromium components to cutting processes. The SLM® process provides a comparatively economic and quick option to manufacture cobalt-chromium components.

Material Structure

SLM®-processed CoCr28Mo6 shows a homogenous, nearly void-free structure. The mechanical properties are within material specification. Through subsequent processing such as heat treatment (e.g. solution annealing), the components' properties can be adapted to meet specific requirements.

Chemical composition [Mass fraction in %][7]

Co	Cr	Mo	Mn	Si	Fe	Ni	C	Al	B	N	P
Balance	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

S	W	Ti
0.01	0.20	0.10

Powder properties

Particle size[7]	10 – 45 µm	Particle shape[8]	Sphärisch
Mass density[2]	8.47 g/cm³	Thermal conductivity	11 - 14 W/(m·K)

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Layer thickness 30 µm[3]	As-built

Aufbaurate[6]	[cm³/h]	11.0 cm³/h
Bauteildichte[7]	[%]	≥ 99.5 %

Tensile test[9]			M	SD
Tensile strength	R_m [MPa]	H	1269	13
		V	1177	32
Offset yield strength	$R_{p0,2}$ [MPa]	H	824	31
		V	639	28
Elongation at break	A [%]	H	13	2
		V	23	4
Reduction of area	Z [%]	H	10	4
		V	19	3
Young's modulus	E [GPa]	H	205	49
		V	190	16

Hardness test[10]		M	SD
Vickers hardness	HV10	385	6

Roughness measurement[10]		As-built		Corundum blasted		Glass-bead blasted	
		M	SD	M	SD	M	SD
Roughness average	Ra [µm]	16	3	7	1	6	1
Mean roughness depth	Rz [µm]	99	13	50	9	41	4

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Layer thickness 60 µm[4]		As-built
Aufbaurate[6]	[cm³/h]	11.0 cm³/h
Bauteildichte[7]	[%]	≥ 99.5 %

Tensile test[9]			M	SD
Tensile strength	R_m [MPa]	H	1247	9
		V	1155	25
Offset yield strength	$R_{p0,2}$ [MPa]	H	851	19
		V	667	13
Elongation at break	A [%]	H	18	1
		V	27	4
Reduction of area	Z [%]	H	14	5
		V	21	3
Young's modulus	E [GPa]	H	217	33
		V	199	8

Hardness test[10]		M	SD
Vickers hardness	HV10	377	5

Roughness measurement[11]		As-built		Corundum blasted		Glass-bead blasted	
		M	SD	M	SD	M	SD
Roughness average	Ra [µm]	15	4	7	2	6	1
Mean roughness depth	Rz [µm]	91	17	46	11	41	4

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The properties and mechanical characteristics apply to powder that is tested and sold by SLM Solutions, and that has been processed on SLM Solutions machines using the original SLM Solutions parameters in compliance with the applicable operating instructions (including installation conditions and maintenance). The part properties are determined based on specified procedures. More details about the procedures used by SLM Solutions are available upon request.

The specifications correspond to the most recent knowledge and experience available to us at the time of publication and do not form a sufficient basis for component design on their own. Certain properties of products or parts or the suitability of products or parts for specific applications are not guaranteed. The manufacturer of the products or parts is responsible for the qualified verification of the properties and their suitability for specific applications. The manufacturer of the products or parts is responsible for protecting any third-party proprietary rights as well as existing laws and regulations.

[1] Material according to ASTM F75.

[2] Material density varies within the range of possible chemical composition variations.

[3] Material data file: CoCr_SLM_MBP3.0_30_CE2_400W_Stripes_V1.0

[4] Material data file: CoCr_SLM_MBP3.0_60_CE2_400W_Stripes_V1.0

[5] Optical density determination by light microscopy.

[6] Theoretical build-up rate for each laser = layer thickness x scan speed x track distance.

[7] With respect to powder material.

[8] According to DIN EN ISO 3252:2001.

[9] Tensile test according to DIN EN ISO 6892-1:2017 B (DIN 50125:2016 – D6x30); orientation: 0°, 90°.

[10] Hardness testing according to DIN EN ISO 6507-1:2018.

[11] Roughness measurement according to DIN EN ISO 4288:1998; λc = 2,5 mm.

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SLM Solutions Group AG | 19217-CoCr28Mo6