



COBALT CCM[®]

Austenitic Cobalt-Chromium-Molybdenum corrosion resistant alloy

Distinctive features & main attributes

This alloy of Cobalt-Chromium-Molybdenum for implants is the MicroMelt[®] Biodur[®] Carpenter CCM[®] alloy. It meets the strictest requirements regarding biocompatibility and corrosion resistance. It is produced by powder metallurgy and has an exceptionally fine microstructure. It is tough, ductile, hard, as well as fatigue and wear resistant. Its high cobalt content may impair its machinability. Its cold deformability is difficult. It is non-magnetic.

Use & application range

This alloy is especially applicable for medical implants (endoprosthesis and osteosynthesis) wherever high mechanical stress is expected. It is widely used in the watch making industry as well as other industries where hardness, toughness, ductility and corrosion resistance are required.

Material No. and norms

Material No.	CCM [®] MicroMelt [®]
DIN Abbreviation	CoCr28Mo
AFNOR	CoCr28Mo
AISI/SAE/ASTM	ASTM F1537 alloy 1
ISO	5832-12
Euro Standard EN	
Others	UNS R31537

Reference analysis %

C	Si	Mn	Cr	Mo	Ni	Fe	N	Co
max.	max.	max.	26.00	5.00	max.	max.	max.	balance
0.14	1.00	1.00	30.00	7.00	1.00	0.75	0.25	

Execution, delivery form, standard sizes and availability

- Execution : round bars 3 m
- Standard sizes on stock: [see delivery program](#)
- Other sizes on request

Tolerances

- ISO h6 – h9
- Narrowest tolerances (down to +/- 0.002 mm) on request

Mechanical properties

Typical properties at room temperature:	Warm deformed condition	ISO 5832-12
• Tensile strength (UTS/R _m):	up to 1400 MPa	≥ 1192 MPa
• Yield strength (R _{0.2}):	up to 1115 MPa	≥ 827 MPa
• Elongation 4D:	up to 28 %	≥ 12%
• Reduction of area:	up to 24%	
• Hardness:	up to 46 HRC	≥ 40HRC

Fatigue limit

- Fatigue limit: up to 895 MPa
- 6000 Rev/min rotating beam bending warm deformed condition

Heat treatment

- Solution annealing: 1075 – 1150 °C, 30 Min, air cooling, grain growth up to ASTM Nr 7, HRC 36-40 possible
- Warm deformation: 1120 – 1200 °C (grain growth!)

Density

- Density at 23°C: 8.29 g/cm³

Disclaimer: The information and data on this data sheet are informative only. They are not user instructions. The user of this material must define the application from case to case.

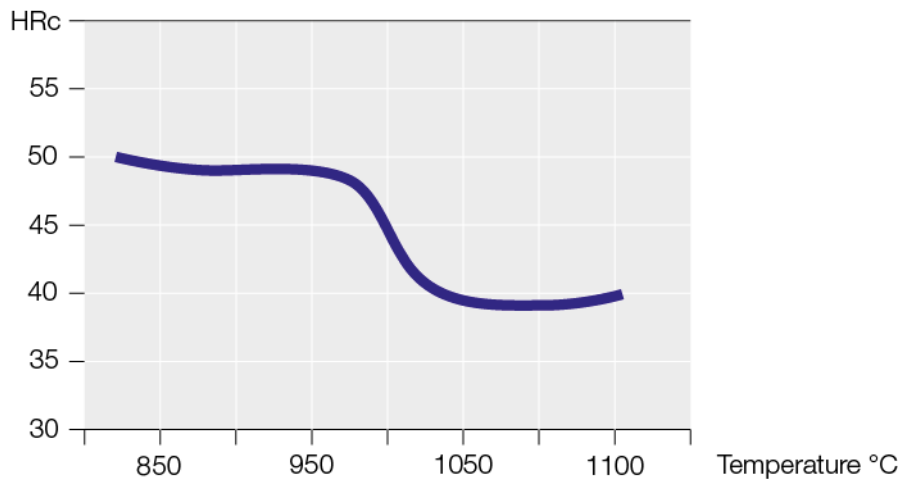


COBALT CCM[®]

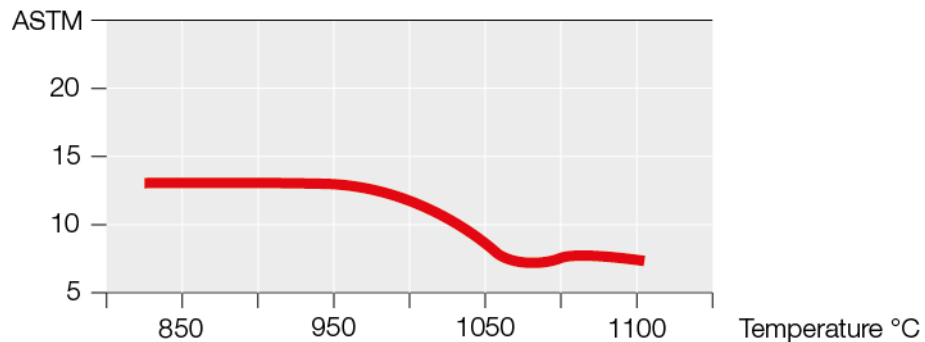
Austenitic Cobalt-Chromium-Molybdenum corrosion resistant alloy

Elastic physical properties	• Young modulus E:	241*10 ³ MPa
	• Shear modulus G:	92.4*10 ³ MPa
	• Poisson's ratio:	0.300
Thermal physical properties	• Coefficient of expansion 20–100°C:	13.2*10 ⁻⁶ cm/cm/°C
	• Thermal conductivity at 23°C:	12.66 W/m/K
	• Specific heat at 23°C:	0.4439 kJ/kg/K
Cutting rates	• Turning HB < 260:	Vc ~ 27.5 – 30.5 m/min, K30
	• Turning HB 260 – 340:	Vc ~ 21.5 – 27.5 m/min, K10-K30
	• Turning HB > 340:	Vc ~ 18.5 – 21.5 m/min, K10
Equivalence HRC vs Rm	• Rm (MPa) = (126 + (4.3 * (HRC - 25))) * 7.037	
	• UTS (ksi) = 126 + (4.3 * (HRC - 25))	

Annealing curve



Grain size ASTM No



More information

[Technical Datasheet](#)

The curves above have been established with given sections. They are only indicative. Their validities should be checked for each application, part design, size and risk of distortion. The diligent observance of the recommended temperature ranges helps to avoid the formation of cracks.

Disclaimer: The information and data on this data sheet are informative only. They are not user instructions. The user of this material must define the application from case to case.