3DLASERBW

Ein Unternehmen der BENSELER Gruppe

Datasheet
steel 1.2709
X3NiCoMoTi 18-9-5

Description

Tool steel 1.2709 is a martensite-hardenable steel. This type of steel is characterized by maximum strength combined with high toughness. The components are easy to machine after the construction process and can be easily hardened to over 50 HRC. Both in the constructed and hardened state, the components can be machined, wire and die-sunk, welded, micro-blasted, polished, and coated. Due to the layer structure, the components exhibit anisotropic properties. These can be reduced or eliminated by suitable thermal post-treatment.

Properties and Application

- Easy to machine, thermally hardenable to approx. 54 HCR, good thermal conductivity
- For Prototypes, series parts, automotive, aerospace, toolmaking (e.g. aluminium die casting)

Chemical Composition (in wt.-%)			
Fe	Remaining	**Ni**	17 -19
Co	8,5 - 9,5	**Mo**	4,5 - 5,2
Ti	0,6 - 0,8	**Al**	0,05 - 0,15
Cr	≤0,5	**C**	≤0,03
Mn, SI	each ≤0,1	**P, S**	each ≤0,1

Physical Properties	
Relative Density	approx. 100%
Desity	8,0 - 8,1 g/cm³

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Mechanical properties of components at 20°C

tensile strength[1]	**as built**
horizontal direction (XY)	typ. 1200 ± 100 MPa
vertical direction (Z)	typ. 1100 ± 150 MPa
yield strength [Rp 0.2 %][1]	
horizontal direction (XY)	typ. 1050 ± 100 MPa
vertical direction (Z)	typ. 1000 ± 150 MPa
elongation at break	
horizontal direction (XY)	typ. (12 ± 4) %
modulus of elasticity	
horizontal direction (XY)	typ. 150 ± 25 GPa
vertical direction (Z)	typ. 150 ± 25 GPa
Hardness [HRC][2]	typ. 33 - 37 HRC
[1]Mechanical strength tested in accordance with ISO 6892-1:2009 (B) annex D, proportional bars, sample diametre 5 mm, initial length 25 mm.	
[2]Hardness measurement according to EN ISO 6508-1 on polished surface. The measured hardness can vary greatly depending on the type of sample preparation.	

Thermal properties of the components

	as built	**after heat treatment**
Thermal conductivity	typ. 15 ± 0,8 W/m °C	typ. 20 ± 1 W/m °C
Specific heat capacity	typ. 450 ± 20 J/kg °C	typ. 450 ± 20 J/kg °C
Max. operating temperature		approx. 400 °C

Note:
The specified material properties depend on the machine, powder material, parameter settings, and other factors such as the anisotropy of the components.
They therefore do not provide a sufficient basis for component design. These specifications are for reference purposes only.

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