

COLD WORK STEELS

Available Product Shapes

Flat Bar	Ground Flat	Long Products	Open Die Forgings	Plates
Round Bar	Round Ground Bar			

Product Description

BÖHLER K890 MICROCLEAN – This powder-metallurgical cold-working steel has good toughness, very good compressive strength, and excellent fatigue strength.

Properties

- > Toughness & Ductility: very high
- > Good toughness means safety against cracking of the molds in use: very high
- > Uniformly high strength and toughness, even with large dimensions: very high
- > Wear Resistance: good
- > Compressive strength: high
- > Dimensional stability: very high
- > Excellent homogeneity and isotropy: very high
- > Fine carbide structure: very high
- > Homogeneous microstructure: very high

Applications

- > Machine knife (for producers)
- > Coining
- > General Components for Mechanical Engineering
- > Fine Blanking, Stamping, Blanking
- > Rolling
- > Powder Pressing
- > Components for Recycling Industry
- > Cold Forming
- > Wear parts
- > Pill punching dies

Chemical composition (wt. %)

C	Si	Mn	Cr	Mo	V	W	Co
0.85	0.55	0.4	4.35	2.8	2.1	2.55	4.5

Material characteristics

	Compressive strength	Dimensional stability during heat treatment	Toughness	Wear resistance abrasive	Wear resistance adhesive
BÖHLER K890 MICROCLEAN®	★★★★	★★★★★	★★★★★	★★★	★★★
BÖHLER K100	★★	★★	★	★★★	★★
BÖHLER K105	★★	★★	★	★★	★★
BÖHLER K107	★★	★★	★	★★★	★★
BÖHLER K110	★★	★★★	★	★★★	★★
BÖHLER K190 MICROCLEAN®	★★★★	★★★★★	★★★★	★★★★	★★★★
BÖHLER K294 MICROCLEAN®	★★★★★	★★★★★	★★★	★★★★★	★★★★★
BÖHLER K340 ISODUR®	★★★	★★★★	★★★	★★★	★★★★
BÖHLER K340 ECOSTAR®	★★★	★★★	★★	★★	★★
BÖHLER K360 ISODUR®	★★★	★★★★	★★★	★★★★	★★★★
BÖHLER K346	★★★	★★★	★★★	★★★★	★★
BÖHLER K353	★★	★★★	★★	★★	★★
BÖHLER K390 MICROCLEAN®	★★★★★	★★★★★	★★★★	★★★★★	★★★★★
BÖHLER K490 MICROCLEAN®	★★★★	★★★★★	★★★★	★★★★	★★★★
BÖHLER K497 MICROCLEAN®	★★★★★	★★★★★	★★★	★★★★★	★★★★★

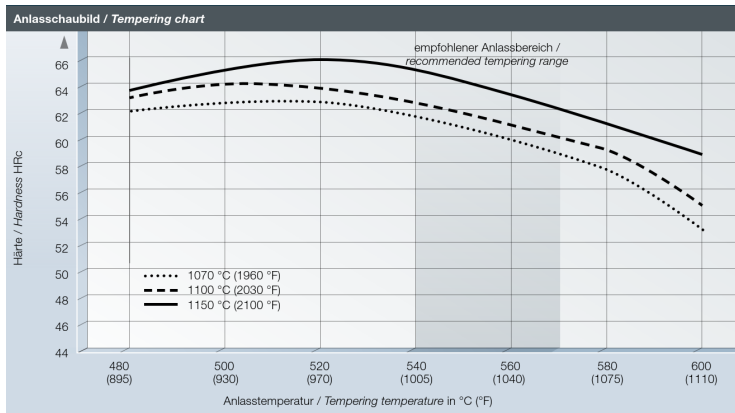
Delivery condition

Annealed	
Hardness	max. 280 HB

Heat treatment

Soft annealing		
Temperature (°C °F)	650 1202 to 700 1292	Depending on the application, hardness can be adjusted by using specialized annealing treatment.
Stress relieving		
Temperature (°C °F)	650 1202 to 700 1292	After through-heating, soak for 1 to 2 hours in a neutral atmosphere. Slow cooling in furnace.
Hardening and Tempering		
Temperature (°C °F)	1070 1958 to 1150 2102	Following temperature equalisation: 20-30 minutes for a hardening temperature of 1070 - 1100 °C (1960 - 2010 °F) 6 minutes for a hardening temperature of 1150 °C (2100 °F) After hardening, tempering to the desired working hardness, see tempering chart.

Tempering chart



Tempering:

Hardening temperature:
 ••• 1070°C/1960°F
 - - - 1100°C/2030°F
 ——— 1150°C/2100°F

Slow heating to tempering temperature immediately after hardening.

Dwell time in the oven 1 hour per 20 mm workpiece thickness, but at least 2 hours.

Slow cooling to room temperature after each tempering step is recommended.

Tempering at 540-570 °C at least three times is recommended.

Please refer to the tempering diagram for guide values for the achievable hardness after tempering. Tempering for stress relieving 30 to 50°C below the highest tempering temperature.

Physical Properties

Temperature (°C °F)	20 68
Density (kg/dm ³ lb/in ³)	7.85 0.28
Thermal conductivity (W/(m.K) BTU (IT) ft/hr/ft ² /F)	22.5 13
Specific heat (J/(kg.K) BTU (IT) lb/F)	450 107.48
Spec. electrical resistance (Ohm.mm ² /m 10 ⁻⁴ Ohm.inch ² /ft)	0.5 2.36
Modulus of elasticity (10 ³ N/mm ² 10 ³ ksi)	218 31.56

Thermal Expansions

Temperature (°C °F)	100 212	200 392	300 572	400 752	500 932	600 1112	700 1292
Thermal expansion (10 ⁻⁶ m/(m.K) 10 ⁻⁶ inch/(inch.F))	10.5 5.833	11 6.111	11.3 6.278	11.7 6.5	12.1 6.722	12.4 6.889	12.9 7.167

For more information see www.voestalpine.com/boehler-edelstahl

The data contained in this brochure is merely for general information and therefore shall not be binding on the company. We may be bound only through a contract explicitly stipulating such data as binding. Measurement data are laboratory values and can deviate from practical analyses. The manufacture of our products does not involve the use of substances detrimental to health or to the ozone layer.

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ONE STEP AHEAD.