

COLD WORK STEELS

Available Product Variants

Long Products*

Plates

Open Die Forgings

*) Presented data refer exclusively to long products. Please observe the detailed explanations at the end of the data sheet (pdf).

Product Description

BÖHLER K490 MICROCLEAN is a high-performance cold work tool steel with a balanced property profile, manufactured using powder metallurgy. This powder metallurgical tool steel offers an outstanding combination of high wear resistance, compressive strength, toughness and very good machinability. Thanks to the resulting flexibility, BÖHLER K490 MICROCLEAN is used in virtually all cold work applications, and in many cases this material is the first choice for newly developed tools. The commonly used hardening temperatures of BÖHLER K490 MICROCLEAN also enable shared heat treatment with popular cold work tool steels (1.2379, D2), making it very economical in terms of heat treatment.

Process Melting

Powder metallurgy

Properties

- > Toughness & Ductility : high
- > Wear Resistance : high
- > Compressive strength : high
- > Dimensional stability : very high

Applications

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

Chemical composition (wt. %)

C	Cr	Mo	V	W	Nb
1.40	6.40	1.50	3.70	3.50	+

Material characteristics

	Compressive strength	Dimensional stability during heat treatment	Toughness	Wear resistance abrasive	Wear resistance adhesive
BÖHLER K490 MICROCLEAN®	★★★★	★★★★★	★★★★	★★★★	★★★★
BÖHLER K100	★★	★★	★	★★★	★★
BÖHLER K105	★★	★★	★	★★	★★
BÖHLER K107	★★	★★	★	★★★	★★
BÖHLER K110	★★	★★★	★	★★★	★★
BÖHLER K190 MICROCLEAN®	★★★★	★★★★★	★★★★	★★★★	★★★★
BÖHLER K294 MICROCLEAN®	★★★★★	★★★★★	★★★	★★★★★	★★★★★
BÖHLER K340 ECOSTAR®	★★★	★★★	★★	★★	★★
BÖHLER K340 ISODUR®	★★★	★★★★	★★★	★★★	★★★★
BÖHLER K346	★★★	★★★	★★★	★★★★	★★
BÖHLER K353	★★	★★★	★★	★★	★★
BÖHLER K360 ISODUR®	★★★	★★★★	★★★	★★★★	★★★★
BÖHLER K390 MICROCLEAN®	★★★★★	★★★★★	★★★★	★★★★★	★★★★★
BÖHLER K497 MICROCLEAN®	★★★★★	★★★★★	★★★	★★★★★	★★★★★
BÖHLER K888 MATRIX	★★★★	★★★★★	★★★★★	★★	★★
BÖHLER K890 MICROCLEAN®	★★★★	★★★★★	★★★★★	★★★	★★★

Delivery condition

Annealed

Hardness (HB)	max. 280
---------------	----------

Heat treatment

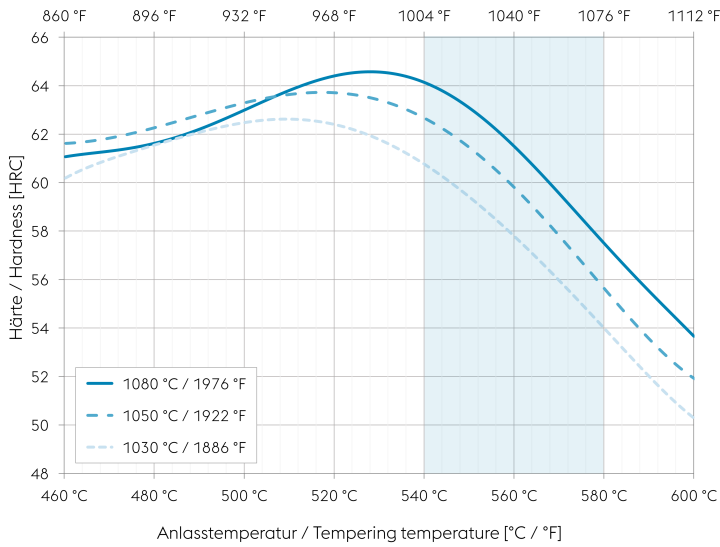
Stress relieving

Temperature	650 to 700 °C 1,202 to 1,292 °F	After through-heating, soak for 1 to 2 hours in a neutral atmosphere. Cool slowly in furnace.
-------------	-----------------------------------	---

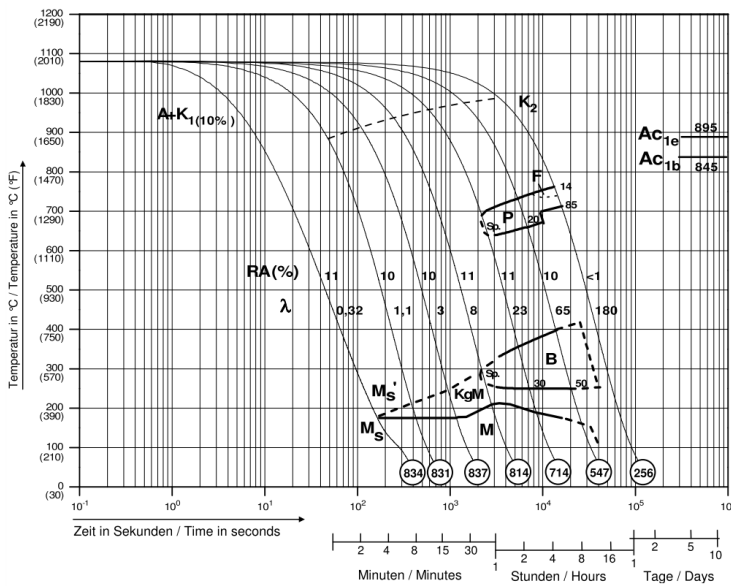
Hardening and Tempering

Temperature	1,030 to 1,080 °C 1,886 to 1,976 °F	Oil, N ₂ . Following temperature equalisation: 20 - 30 minutes for a hardening temperature of 1030 - 1080 °C (1885 - 1980 °F). After hardening, tempering to the desired working hardness, see tempering chart.
-------------	---------------------------------------	--

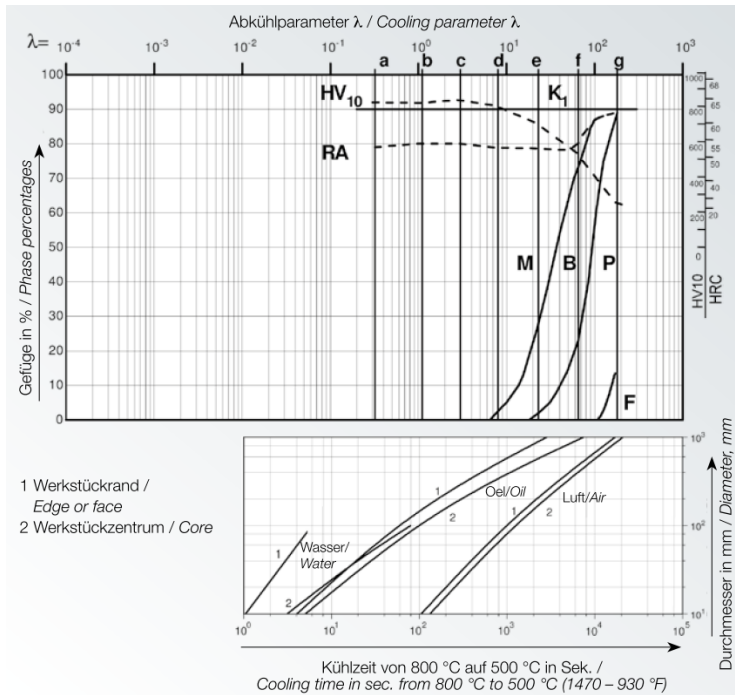
Tempering chart



Continuous cooling CCT curves



Quantitative phase diagram



Physical Properties

Temperature (°C °F)	20 68
Density (kg/dm ³ lb/in ³)	7.79 0.28
Thermal conductivity (W/(m.K) BTU/ft h °F)	19.6 11.32
Specific heat (kJ/kg K BTU/lb °F)	0.45 0.1075
Spec. electrical resistance (Ohm.mm ² /m 10 ⁻⁴ Ohm.inch ² /ft)	0.55 2.6
Modulus of elasticity (10 ³ N/mm ² 10 ³ ksi)	223 32.34

Thermal Expansions between 20°C | 68°F and ...

Temperature (°C °F)	100 212	200 392	300 572	400 752	500 932	600 1,112	700 1,292
Thermal expansion (10 ⁻⁶ m/(m.K) 10 ⁻⁶ inch/inch. °F)	10.6 5.9	11.1 6.2	11.6 6.4	11.9 6.6	12.3 6.8	12.6 7	12.8 7.1

Long Products: For additional specifications and technical requirements, please contact our regional voestalpine BÖHLER sales companies.

Open Die Forgings: Product Variant may differ in terms of melting process, technical data, delivery, and surface condition as well as available product dimensions. Please contact the business unit Open Die Forgings of voestalpine BÖHLER Edelstahl GmbH & Co KG.

Sheet & Plates: Product Variant may differ in terms of melting process, technical data, delivery, and surface condition as well as available product dimensions. Please contact voestalpine BÖHLER Bleche GmbH & Co KG.

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.