

# COLD WORK STEELS

## Available Product Variants

Long Products\*

Plates

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

## Product Description

BÖHLER K497 MICROCLEAN is a cold work tool steel manufactured using powder metallurgy and belongs to the group of 9% vanadium steels. The high carbide content makes this steel highly resistant to wear. It has lower hardness and wear resistance than K294 MICROCLEAN (10% vanadium steel). Nevertheless, this material has better toughness. BÖHLER K497 MICROCLEAN is used in situations where wear resistance is the decisive factor and compressive strength is of secondary importance. This material is not only used in cold work applications, but is also popular at lower hardness levels as a wear resistant alternative in mold making.

## Process Melting

Powder metallurgy

## Properties

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

## Applications

- > Cold Forming
- > Fine Blanking, Stamping, Blanking
- > General Components for Mechanical Engineering

## Chemical composition (wt. %)

C	Si	Mn	Cr	Mo	V
1.85	0.85	0.50	5.30	1.30	9.00

Material characteristics

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

Delivery condition

<b>Annealed</b>	
Hardness (HB)	max. 277

## Heat treatment

### Soft annealing

Temperature	870 to 900 °C   1,598 to 1,652 °F	Neutral atmosphere. Protect steel from scaling and/or decarburization. Slow controlled cooling in furnace at a rate of 50 to 70°F/hr down to approx. 1000°F (540°C) then furnace or air cool to room temperature.
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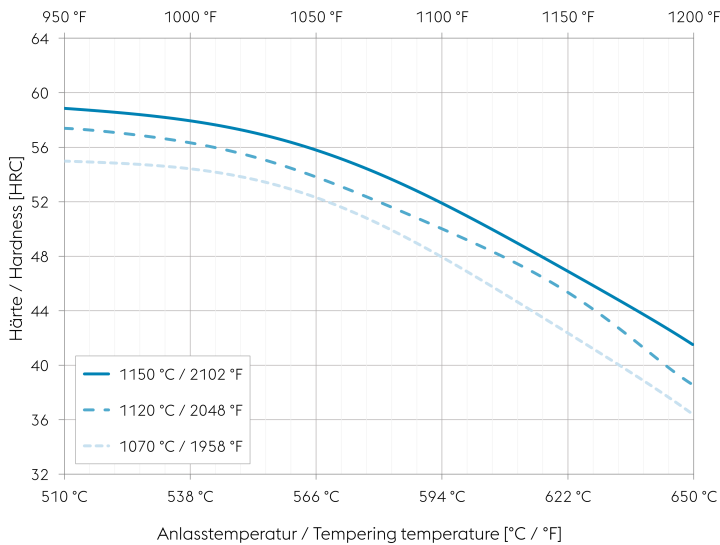
### Stress relieving

Temperature	595 to 700 °C   1,103 to 1,292 °F	After through heating, soak for 1 to 2 hours in neutral atmosphere followed by slow cooling in furnace. Cool slowly to 930°F (500°C), then air cool.
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### Hardening and Tempering

Temperature	1,040 to 1,150 °C   1,904 to 2,102 °F	Preheating: To minimize distortion during heating for hardening, two preheat steps are recommended. First preheat at 1200 °F (650 °C) and equalize. Second preheat at 1500-1550 °F (820-840 °C) and equalize. After hardening, tempering to the desired working hardness, see tempering chart.
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## Tempering chart



## Physical Properties

Temperature (°C   °F)	20   68
Density (kg/dm <sup>3</sup>   lb/in <sup>3</sup> )	7.4   0.27
Thermal conductivity (W/(m.K)   BTU/ft h °F)	-
Specific heat (kJ/kg K   BTU/lb °F)	-
Spec. electrical resistance (Ohm.mm <sup>2</sup> /m   10 <sup>-4</sup> Ohm.inch <sup>2</sup> /ft)	-
Modulus of elasticity (10 <sup>3</sup> N/mm <sup>2</sup>   10 <sup>3</sup> ksi)	221   32.05

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

Temperature (°C   °F)	100   212	200   392	300   572	400   752	650   1,202
Thermal expansion ( $10^{-6}$ m/(m.K)   $10^{-6}$ inch/inch.°F)	11.1   6.2	11.2   6.2	11.3   6.3	11.5   6.4	11.8   6.6

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

**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.

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