

COLD WORK TOOL STEELS

Application Segments

Cold Work

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 K720 corresponds to the material 1.2842 (90MnCrV8, ~O2). This material is suitable for simple heat treatment with low hardening temperatures and single tempering. However, this characteristic tempering behaviour limits the use of advanced coatings. The material has a good hardening response, but only moderate through hardenability. BÖHLER K720 is used for punching and cutting tools, plastic molds, thread cutting tools and machine knives in the wood, paper and recycling industries.

Process Melting

Airmelted

Properties

- > Toughness & Ductility : good
- > Grindability : good

Applications

- > Cold Forming
- > General Components for Mechanical Engineering
- > Fine Blanking, Stamping, Blanking
- > Tool Holders (milling, drilling, turning & chucks)
- > Standard Parts (Molds, Plates, Pins, Punches)

Technical data

Material designation		Standards	
1.2842	SEL	4957	EN ISO
90MnCrV8	EN		
~T31502	UNS		
~O2	AISI		

Chemical composition (wt. %)

C	Si	Mn	Cr	V
0.90	0.25	2.00	0.35	0.10

Material characteristics

	Compressive strength	Dimensional stability during heat treatment	Toughness	Wear resistance abrasive
BÖHLER K720	★★	★	★★★★★	★
BÖHLER K245	★★	★	★★★★★	★
BÖHLER K455	★★★	★	★★★★★	★
BÖHLER K460	★★★★	★	★★★★★	★★

Delivery condition

Annealed

Hardness (HB)	max. 229
---------------	----------

Heat treatment

Annealing

Temperature	680 to 720 °C	Slow controlled cooling in furnace at a rate of 10 to 20 °C/hr (18 to 36 °F/hr) down to approximately 600 °C (1112 °F) Further cooling in air.
-------------	---------------	---

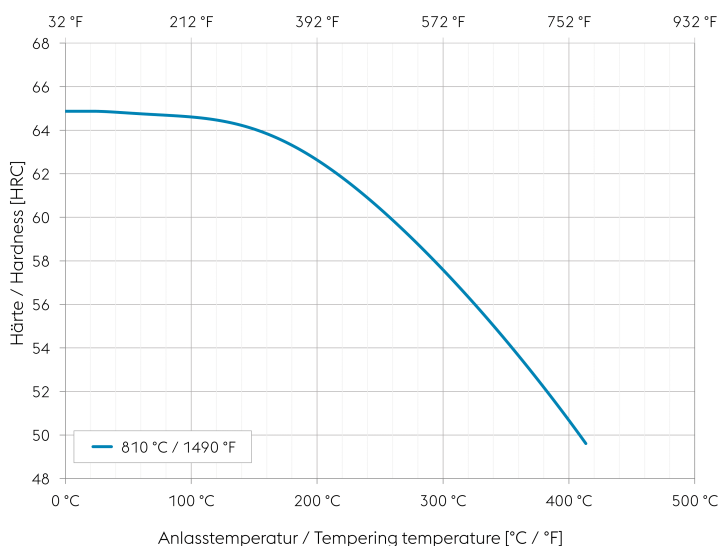
Stress relieving

Temperature	650 °C	After through heating, hold in neutral atmosphere for 1-2 hours. Slow cooling in furnace Intended to relieve stresses caused by extensive machining or in complex shapes.
-------------	--------	---

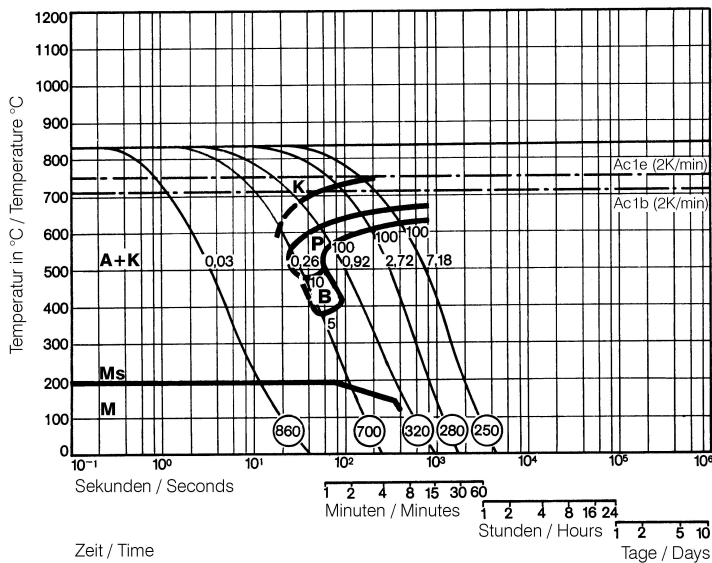
Hardening and Tempering

Temperature	790 to 820 °C	Quenching: Oil, salt bath (200 to 250 °C 392 - 482 °F) up to 20 mm (0,787 inch) thickness. Holding time after temperature equalization: 15 to 30 minutes. After hardening, tempering to the desired working hardness according to the tempering chart.
-------------	---------------	--

Tempering chart



Continuous cooling CCT curves



Austenitising temperature: 820 °C (1508 °F)

Holding time: 15 minutes

O Vickers hardness

5...100 phase percentages

0.03...7.18 cooling parameter λ , i.e. duration of cooling from 800 to 500 °C (1472 to 932 °F) in s x 10⁻²

2 K/min... cooling rate in the 1472 to 932°F (800 to 500°C) range

A... Austenite

K... Carbide

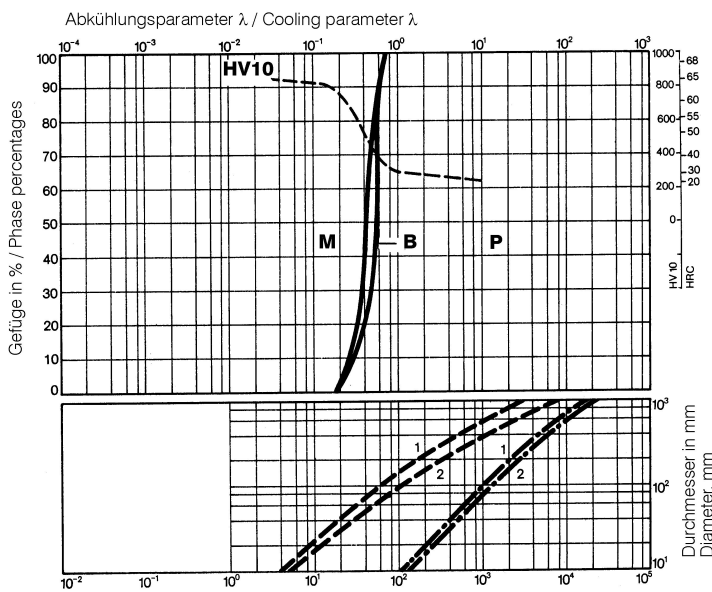
P... Pearlite

B... Bainite

M... Martensite

Ms... Martensite starting temperature

Quantitative phase diagram



HV10... Vickers Hardness

M... Martensite

B... Bainite

P... Pearlite

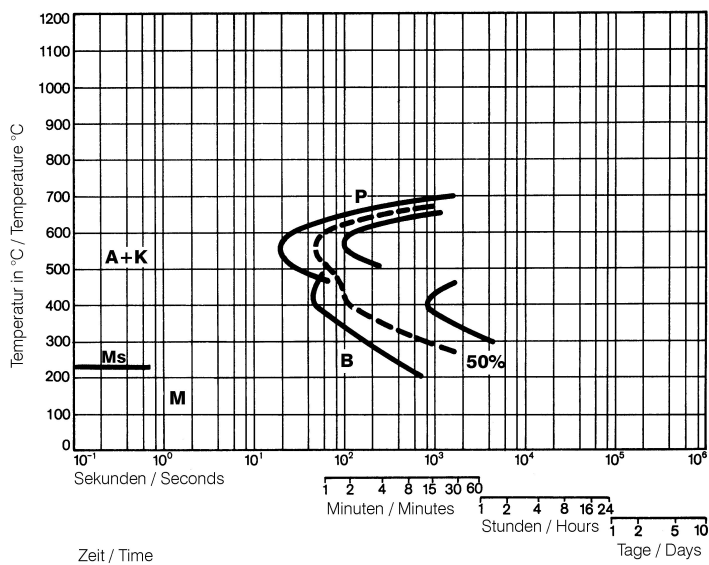
--- Oil cooling

- - - Air cooling

1... Edge or face

2... Core

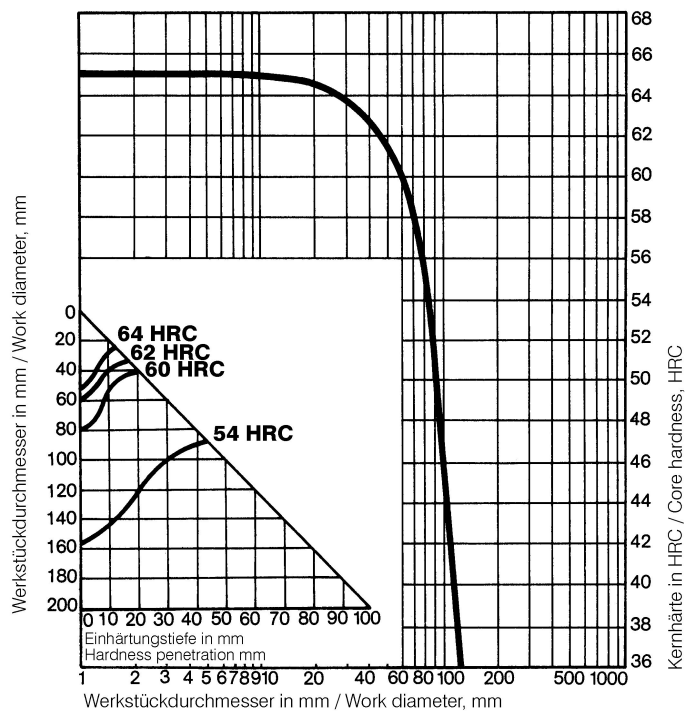
Isothermal TTT curves



Austenitising temperature: 820 °C / 1508 °F
Holding time: 15 minutes

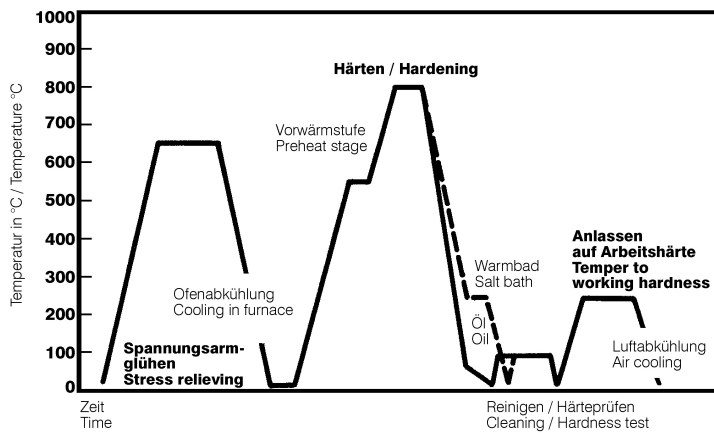
A... Austenite
K... Carbide
P... Pearlite
B... Bainite
M... Martensite
Ms... Martensite starting temperature

Influence of work diameter on core hardness and hardness penetration



Quenched from: 820 °C / 1508 °F
Quenchant: Oil

Heat treatment sequence



Physical Properties

Temperature (°C)	20
Density (kg/dm ³)	7.85
Thermal conductivity (W/(m.K))	30
Specific heat (kJ/kg K)	0.46
Spec. electrical resistance (Ohm.mm ² /m)	0.35
Modulus of elasticity (10 ³ N/mm ²)	210

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

Temperature (°C)	100	200	300	400	500
Thermal expansion (10^{-6} m/(m.K))	11.5	12	12.2	12.5	12.8

If other available product variants are listed in addition to long products, please note that these may differ in terms of melting process, technical data, delivery and surface condition as well as available product dimensions. For mandatory technical specifications, other requirements and dimensions, please contact our regional voestalpine BÖHLER sales companies. 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.