

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 K455 corresponds approximately to the material 1.2550 (~60WCrV7, ~S1) in terms of the alloy concept. This classic matrix steel is characterized by high toughness, good machinability, and polishability. BÖHLER K455 offers the advantage of simple heat treatment with low hardening temperatures and single tempering. BÖHLER K455 is widely used in the field of punching and cutting tools as well as in the field of embossing tools.

Process Melting

[Airmelted](#)

Properties

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

Applications

- > Cold Forming
- > Standard Parts (Molds, Plates, Pins, Punches)
- > Powder Pressing

Technical data

Material designation	
~1.2550	SEL
~60WCrV7	EN
~60WCrV8	
~S1	AISI

Chemical composition (wt. %)

C	Si	Mn	Cr	V	W
0.63	0.60	0.30	1.10	0.18	2.00

Material characteristics

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

Delivery condition

Annealed

Hardness (HB)	max. 225
---------------	----------

Heat treatment

Annealing

Temperature	710 to 750 °C 1,310 to 1,382 °F	Slow controlled cooling in furnace at a rate of 50 to 68°F/hr (10 to 20°C/hr) down to approx. 1112°F (600°C), further cooling in air.
-------------	-----------------------------------	---

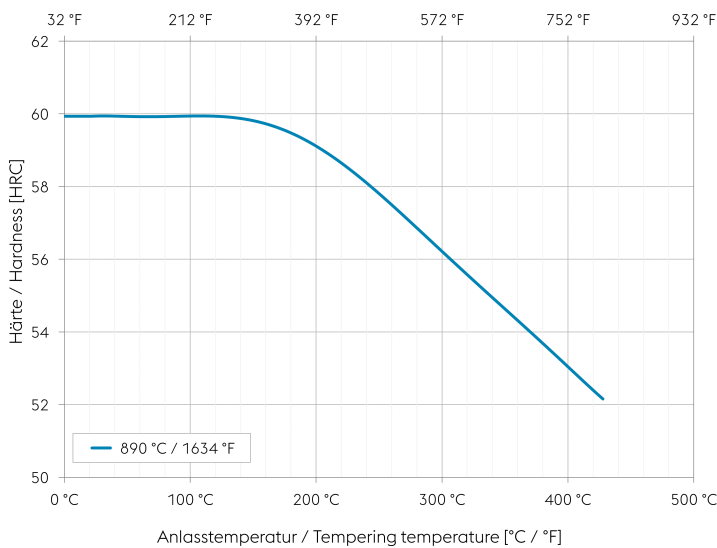
Stress relieving

Temperature	650 °C 1,202 °F	Slow cooling in furnace. Intended to relieve stresses set up by extensive machining, or in complex shapes. After through heating, hold in neutral atmosphere for 1-2 hours
-------------	-------------------	--

Hardening and Tempering

Temperature	870 to 900 °C 1,598 to 1,652 °F	Oil, Holding time after temperature equalization: 15 to 30 minutes. After hardening, tempering to the desired working hardness, see tempering chart.
-------------	-----------------------------------	--

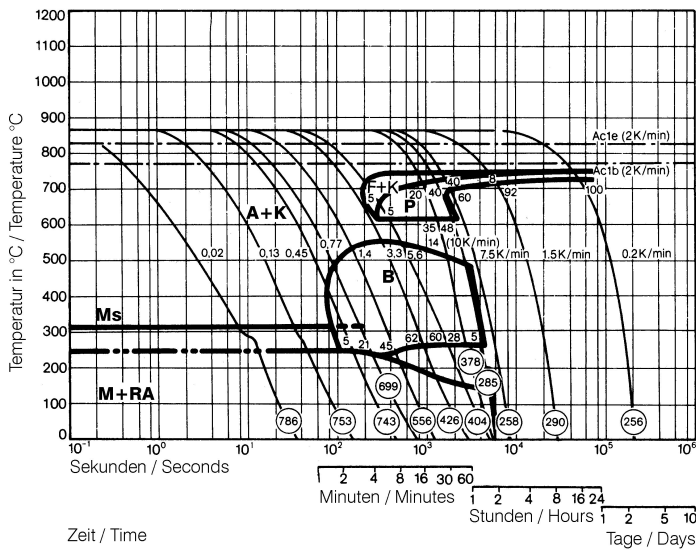
Tempering chart



Tempering:

Hardening temperature:
 890°C / 1634°F
 Specimen size: square 20mm

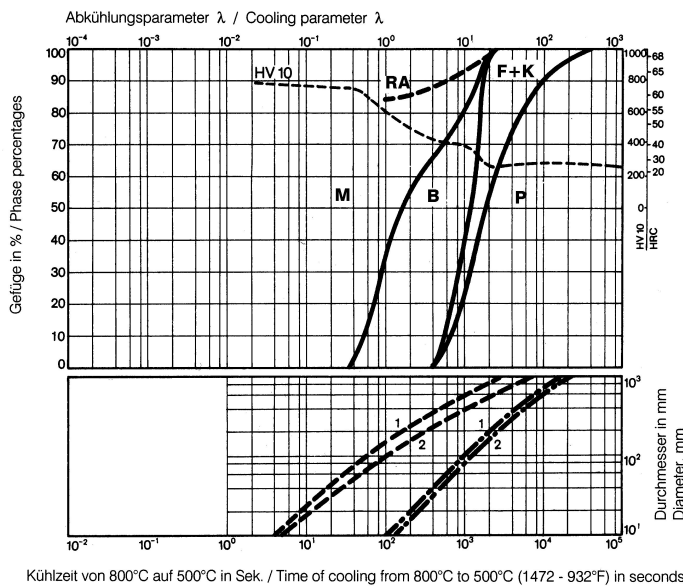
Continuous cooling CCT curves



Austenitising temperature: 880°C / 1616°F
Holding time: 15 minutes

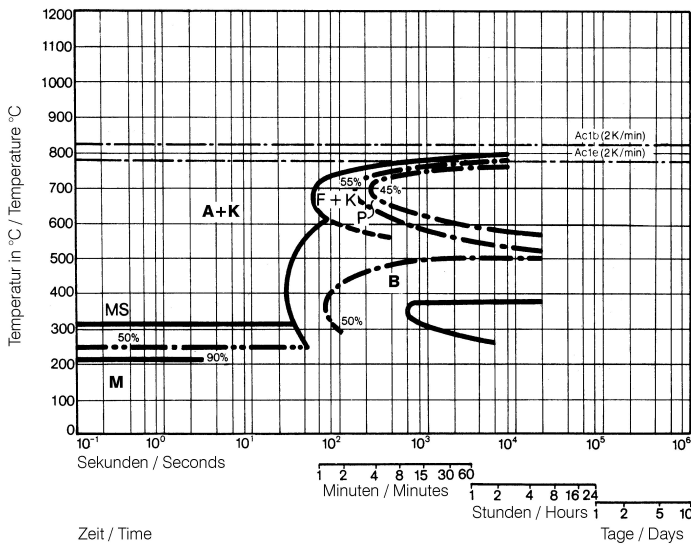
O Vickers hardness
5...35 phase percentages
0.02...14 cooling parameter, i.e. duration of cooling from 800°C to 500°C (1472°F to 932°F) in $s \times 10^{-2}$
10...0.2K/min cooling rate in K/min in the 800°C to 500°C (1472°F to 932°F) range

Quantitative phase diagram



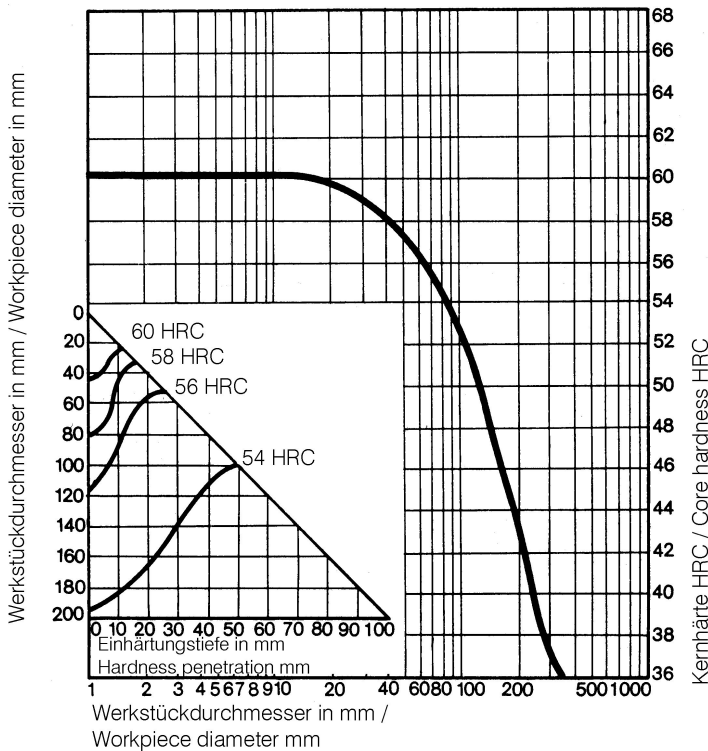
A... Austenite
B... Bainite
K... Carbide
M... Martensite
P... Pearlite
RA... Retained austenite
- - - - Oil cooling
- • - Air cooling
1... Edge or face
2... Core

Isothermal TTT curves



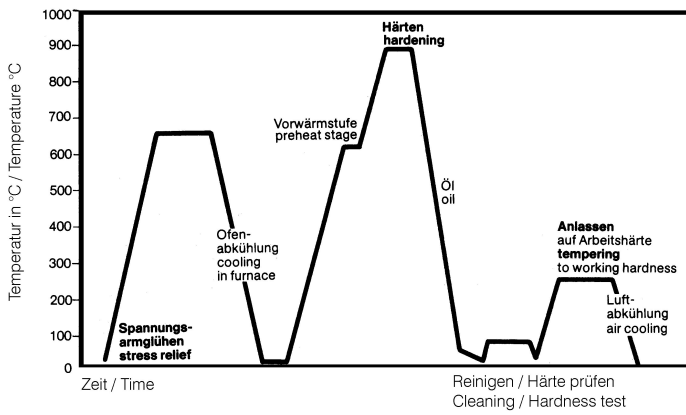
Austenitising temperature: 880°C / 1616°F
Holding time: 15 minutes

Influence of work diameter on core hardness and hardness penetration



Quenched from: 890°C / 1634°F
Agent: Oil

Heat treatment sequence



Physical Properties

Temperature (°C °F)	20 68
Density (kg/dm ³ lb/in ³)	8 0.29
Thermal conductivity (W/(m.K) BTU/ft h °F)	25 14.44
Specific heat (kJ/kg K BTU/lb °F)	0.46 0.1099
Spec. electrical resistance (Ohm.mm ² /m 10 ⁻⁴ Ohm.inch ² /ft)	0.3 1.42
Modulus of elasticity (10 ³ N/mm ² 10 ³ ksi)	210 30.46

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

Temperature (°C °F)	100 212	200 392	300 572	400 752	500 932
Thermal expansion (10^{-6} m/(m.K) 10^{-6} inch/inch.°F)	11 6.1	12.5 6.9	13 7.2	13.5 7.5	14 7.8

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.

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.