COLD WORK TOOL STEELS

Application Segments

Cold Work

Available Product Variants

Long Products*

Plates

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

Product Description

BÖHLER K245 corresponds to the material 1.2101 (62SiMnCr4). This cold work tool steel is essentially a spring steel optimized for cold work, with very good toughness and spring properties. BÖHLER K245 offers the advantage of simple heat treatment with very low hardening temperatures and single tempering. However, this characteristic tempering behaviour limits the use of advanced coatings. BÖHLER K245 is especially suitable for thin-walled tools such as screwdrivers, hole punches, center punches, ejector pins, punches and cutting tools.

Process Melting

Airmelted

Properties

- Toughness & Ductility : very high
- Compressive strength : good
- Dimensional stability : good
- Tensile strength / Yield strength : high

Applications

- Cold Forming
- General Components for Mechanical Engineering
- Standard Parts (Molds, Plates, Pins, Punches)
- Components for the recycling industry

Technical data

Material designation	
1.2101	SEL
62SiMnCr4	EN

Chemical composition (wt. %)

C	Si	Mn	Cr
0.63	1.10	1.10	0.60

Material characteristics

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

Delivery condition

Annealed

Hardness (HB)	max. 235

Heat treatment

Annealing

Temperature	710 to 750 °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.

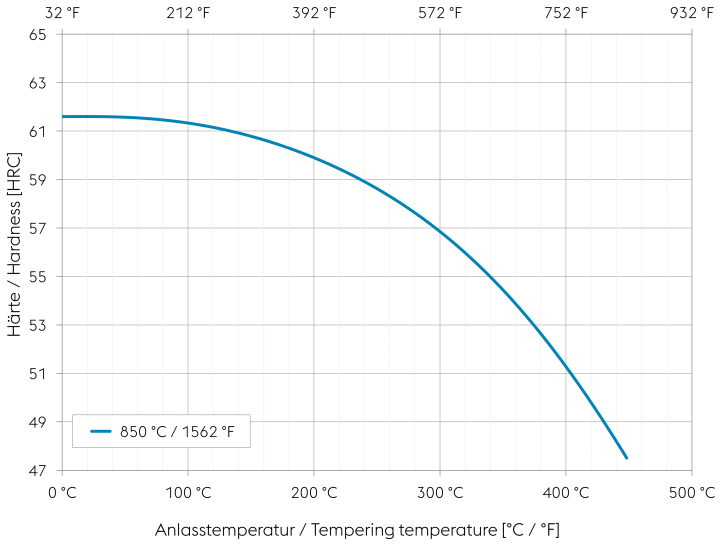
Stress relieving

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	830 to 860 °C	Quenching: Oil, salt bath (for small sizes). || Holding time after temperature equalization: 15 to 30 minutes. || After hardening, tempering to the desired working hardness according to the tempering chart.

Tempering chart



Specimen size: square 20 mm (0,787 inch)

Slow heating to tempering temperature immediately after hardening.

Time in furnace 1 hour for each 20 mm (0,787 inch) of workpiece thickness but at least 2 hours.

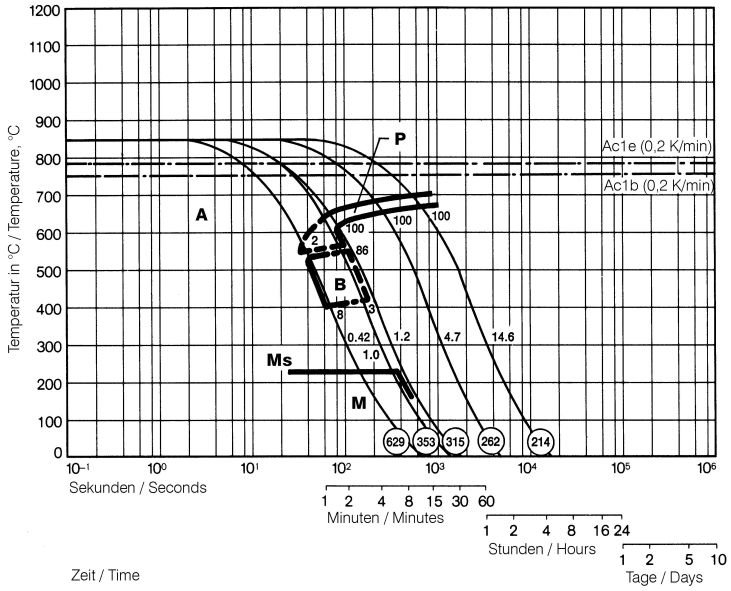
1. Tempering at 200 to 250 °C (392 to 482 °F) to working hardness

2. Partial tempering at 500 to 550 °C (932 to 1022 °F) to spring hardness

Please refer to the tempering chart for guide values for the achievable hardness after tempering.

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

Continuous cooling CCT curves



Austenitising temperature: 845 °C / 1553 °F

Holding time: 15 minutes

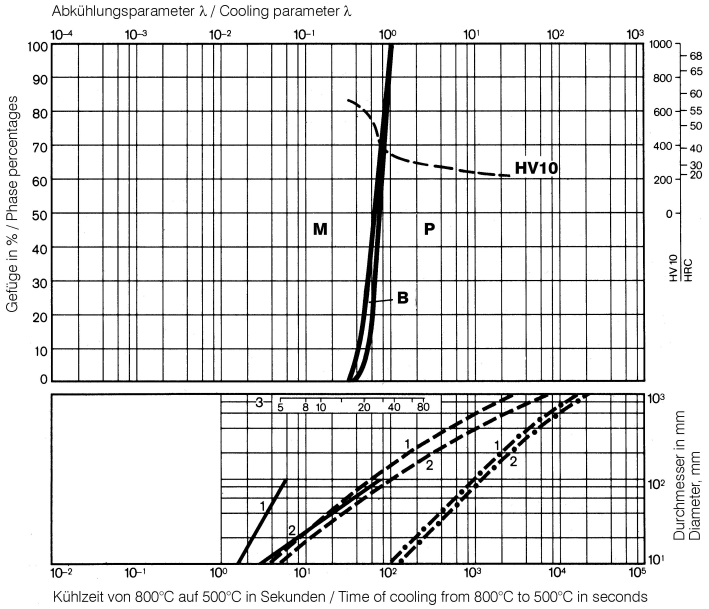
O Vickers hardness

2...100 phase percentages

0.42...14.6 cooling parameter λ, i.e. duration of cooling from 800 to 500 °C (1472 to 932 °F) in s x 10^{-2}

A... Austenite
P... Perlite
B...Bainite
M... Martensite
Ms... Martensite starting temperature

Quantitative phase diagram

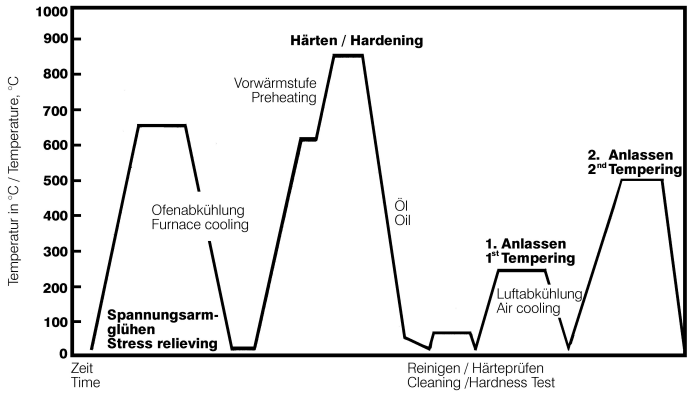


HV10... Vickers Hardness
M... Martensite
B...Bainite
P... Perlite

—— Water cooling
- - - Oil cooling
- • - Air cooling

1... Edge or face
2... Core

Heat treatment sequence



Physical Properties

Temperature (°C)	20
Density (kg/dm^3)	7.7
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))	12.4	12.1	12.6	12.8	13

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ONE STEP AHEAD.