COLD WORK STEELS

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 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 | 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.

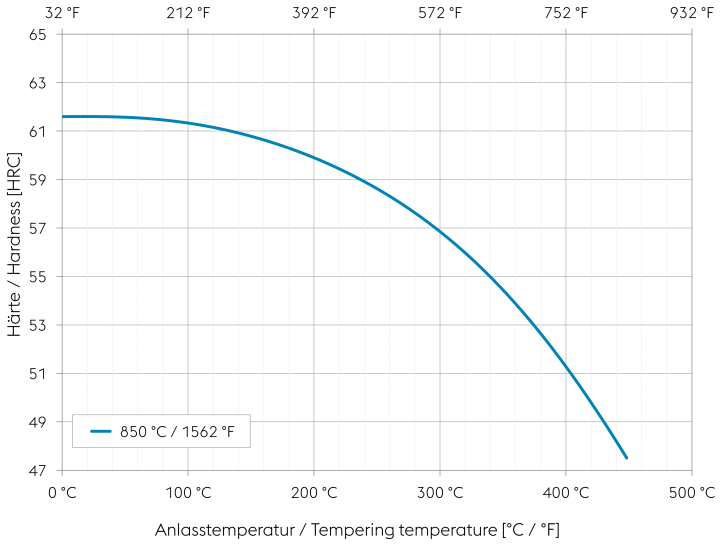
Stress relieving

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 to 2 hours.

Hardening and Tempering

Temperature	830 to 860 °C | 1,526 to 1,580 °F	Oil, salt bath (for small sizes) Holding time at hardening temperature: 15 to 30 minutes. After hardening, tempering to the desired working hardness, see tempering chart.

Tempering chart



Tempering:

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

Slow heating to tempering temperature immediately after hardening.

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

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

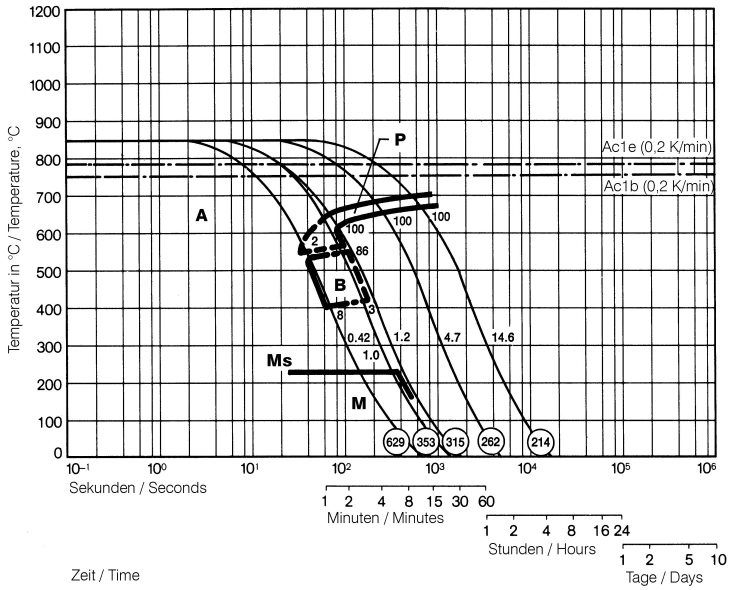
1. Tempering at 392 to 482 °F (200 to 250 °C) to working hardness

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

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

Tempering for stress relieving 86 to 122 °F (30 to 50 °C) below the highest tempering temperature.

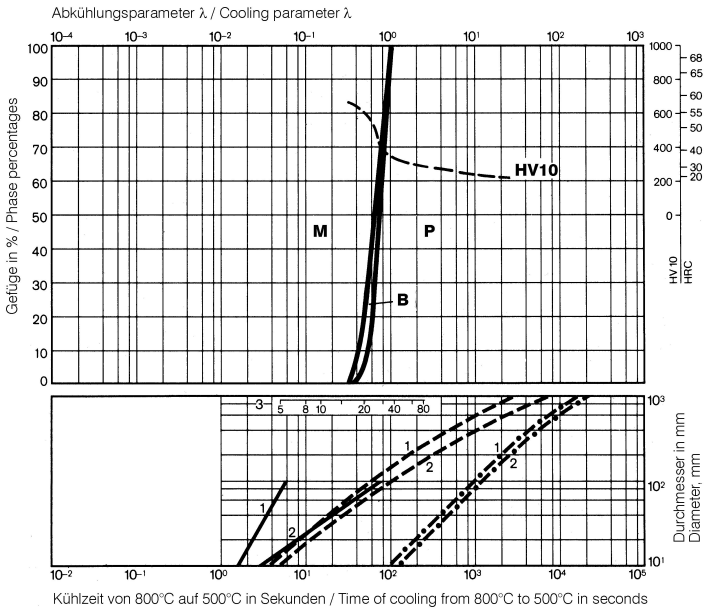
Continuous cooling CCT curves



Austenitising temperature: 845°C / 1553°F
Holding time: 15 minutes

O Vickers hardness
2...100 phase percentages
0.42...14.6 cooling parameter, i.e. duration of cooling from 800°C to 500°C (1472°F to 932°F) in s x 10^{-2}

Quantitative phase diagram

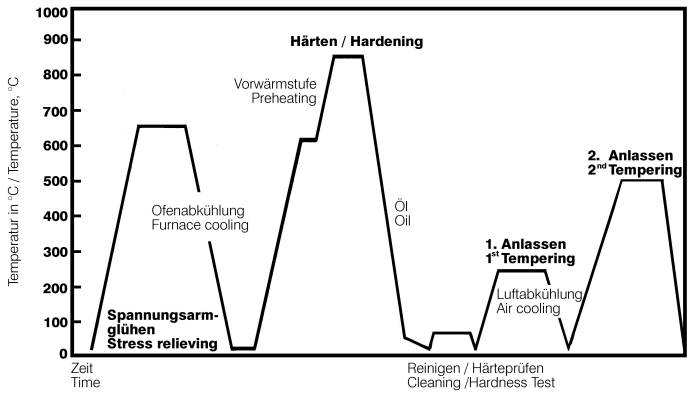


A... Austenite
B... Bainite
P... Perlite
M... Martensite

———— Watercooling
- - - - - - Oil cooling
- • - Air cooling

1... Edge or face
2... Core
3... Jominy test: distance from end

Heat treatment sequence



Physical Properties

Temperature (°C | °F)	20 | 68
Density (kg/dm^3 | lb/in^3)	7.7 | 0.28
Thermal conductivity (W/(m.K) | BTU/ft h °F)	30 | 17.33
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)	0.35 | 1.65
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)	12.4 | 6.9	12.1 | 6.7	12.6 | 7	12.8 | 7.1	13 | 7.2

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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voestalpine
ONE STEP AHEAD.