

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 K305 belongs to the group of 5% chromium steels and corresponds to the material 1.2363 (X100CrMoV5, A2). Compared to conventional tool steels with 1% carbon and low chromium content, BÖHLER K305 has significantly better through hardenability and wear resistance. This class of 5% chromium steels is used in situations where grades like 1.2842 are no longer sufficient in terms of wear resistance and through hardenability but materials like 1.2379 are not yet required. BÖHLER K305 is used for punching and cutting tools, die plates and inserts, thread cutting tools and machine knives in the wood, paper and recycling industries.

Process Melting

[Airmelted](#)

Properties

- > Wear Resistance : very high
- > Compressive strength : very high
- > Dimensional stability : good

Applications

- > Machine knife (for producers)
- > Fine Blanking, Stamping, Blanking
- > Rolling
- > Powder Pressing
- > Cold Forming

Technical data

Material designation		Standards	
1.2363	SEL	4957	EN ISO
~T30102	UNS		
X100CrMoV5	EN		
~X100CrMoV5-1			
A2	AISI		
SKD12	JIS		

Chemical composition (wt. %)

C	Si	Mn	Cr	Mo	V
1.00	0.30	0.55	5.20	1.10	0.25

Material characteristics

	Compressive strength	Dimensional stability during heat treatment	Toughness	Wear resistance abrasive
BÖHLER K305	★★★★★	★★★	★★	★★★★★
BÖHLER K306	★★★★★	★★★	★★★★★	★★★
BÖHLER K313	★★★★★	★★★	★★★	★★★
BÖHLER K320	★★★	★★★	★★★	★★★
BÖHLER K329	★★★	★★★	★★★★★	★★★★★
BÖHLER K600	★	★★★	★★★★★	★
BÖHLER K601	★	★★★	★★★★★	★★
BÖHLER K605	★★	★★★	★★★★★	★

Delivery condition

Annealed

Hardness (HB)	max. 240
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Heat treatment

Annealing

Temperature	800 to 850 °C 1,472 to 1,562 °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.
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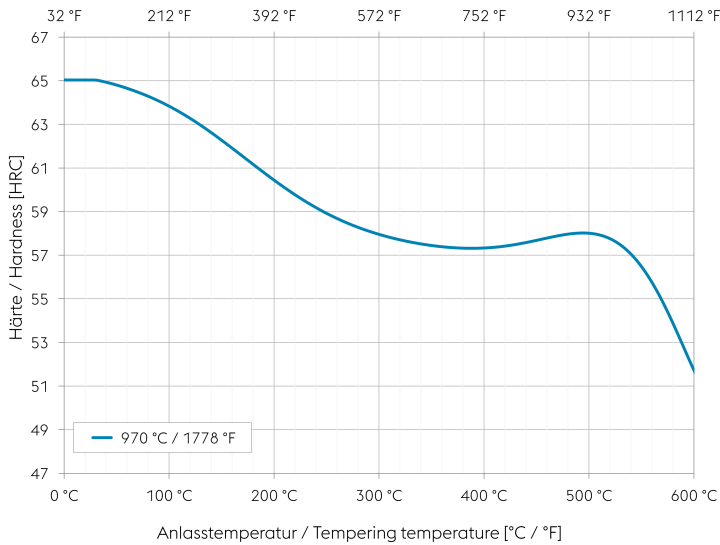
Stress relieving

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..
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Hardening and Tempering

Temperature	950 to 980 °C 1,742 to 1,796 °F	Oil, salt bath 428 to 482°F or 932 to 1022°F (220 to 250°C or 500 to 550°C), air, gas Holding time after temperature equalization: 15 to 30 minutes. After hardening, tempering to the desired working hardness, see tempering chart.
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Tempering chart



Tempering:

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

Slow heating to tempering temperature immediately after hardening.

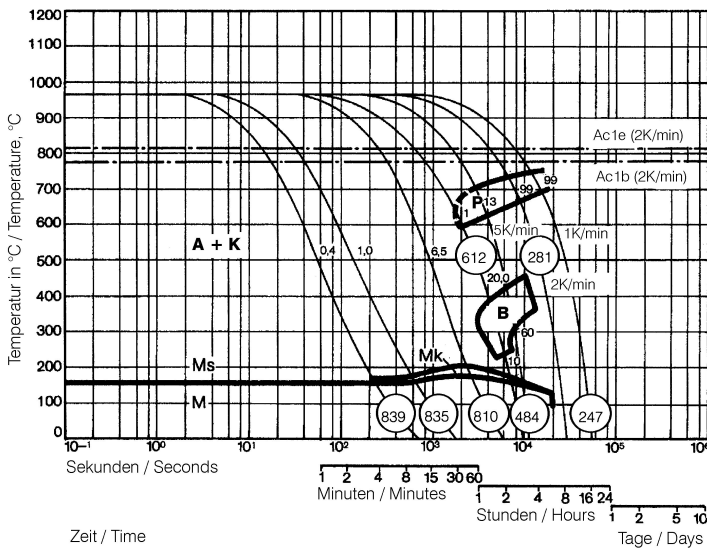
Time in furnace 1 hour for each 0,787 inch (20 mm) of workpiece thickness but at least 2 hours.

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

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: 960°C
Holding time: 15 minutes

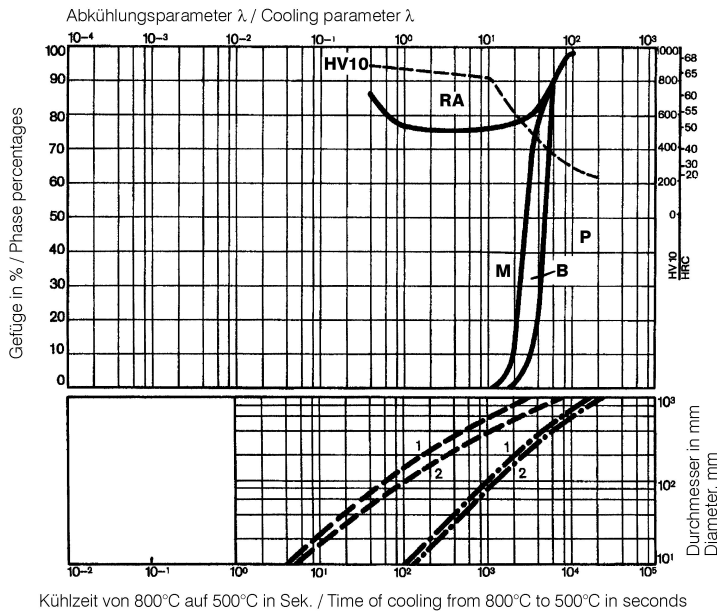
O Vickers hardness

1...99 phase percentages

0.4...20.0 cooling parameter, i.e. duration of cooling from 800°C to 500°C in $s \times 10^{-2}$

5K/min...1K/min cooling rate in K/min in the 800°C to 500°C range

Quantitative phase diagram

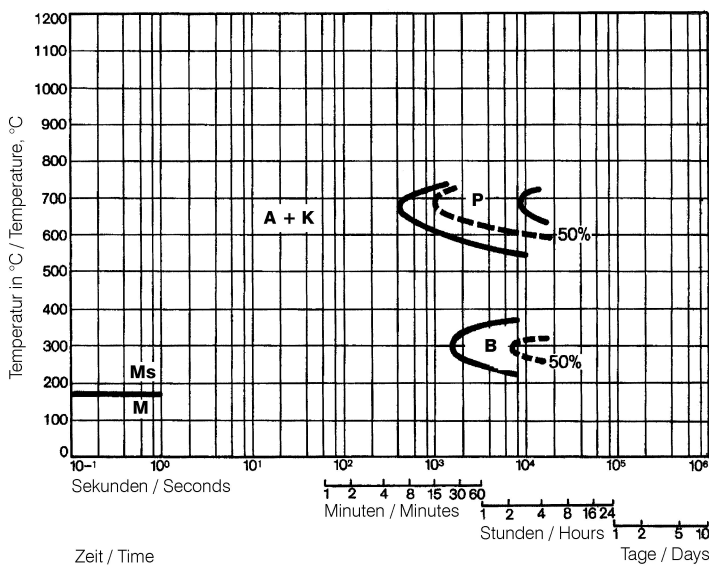


Mk... Grain boundary martensite
 RA... Residual austenite
 A... Austenite
 B... Bainite
 P... Pearlite
 K... Carbide
 M... Martensite

----- Oil cooling
 - · - Air cooling

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

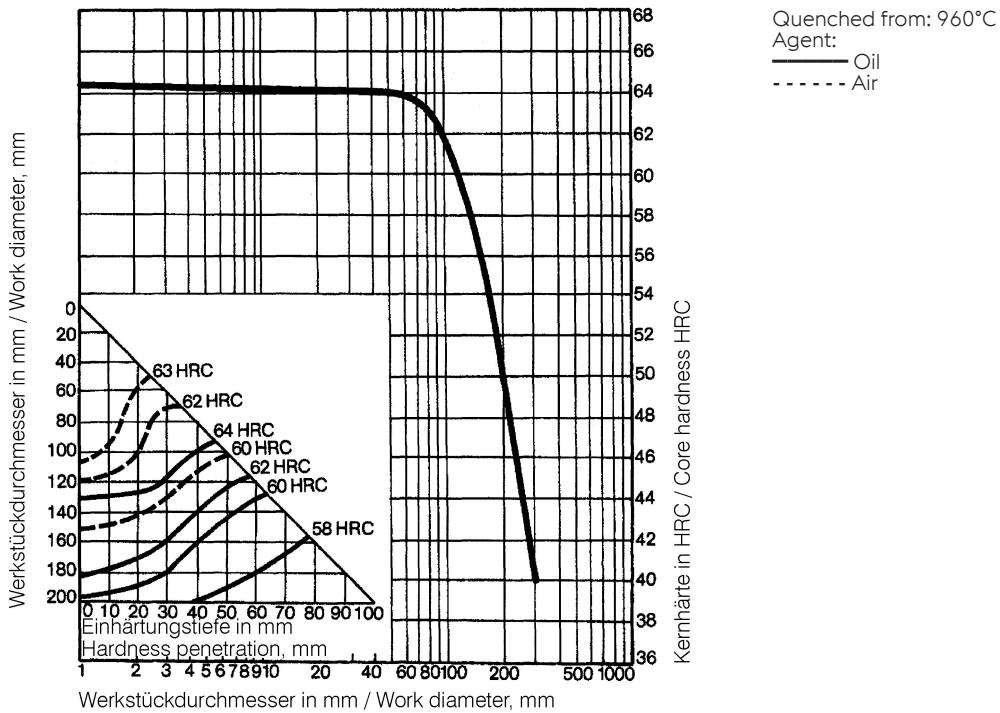
Isothermal TTT curves



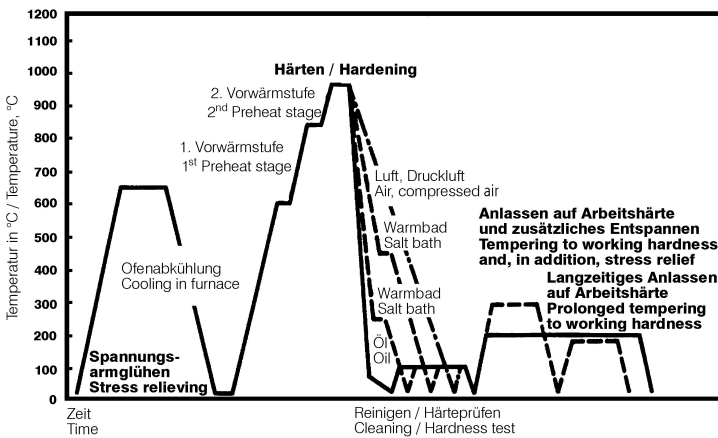
Austenitising temperature: 960°C
 Holding time: 15 minutes

A... Austenite
 B... Bainite
 P... Pearlite
 K... Carbide
 M... Martensite

Influence of work diameter on core hardness and hardness penetration



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)	26 15.02
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)	0.52 2.46
Modulus of elasticity (10 ³ N/mm ² 10 ³ ksi)	190 27.56

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 6.7	12.1 6.7	11.9 6.6	11.6 6.4	11.7 6.5

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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