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 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	
1.2363	SEL
~T30102	UNS
X100CrMoV5	EN
~X100CrMoV5-1	
A2	AISI
SKD12	JIS

Standards	
4957	EN ISO

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

Heat treatment

Annealing

Temperature	800 to 850 °C | 1,472 to 1,562 °F	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.

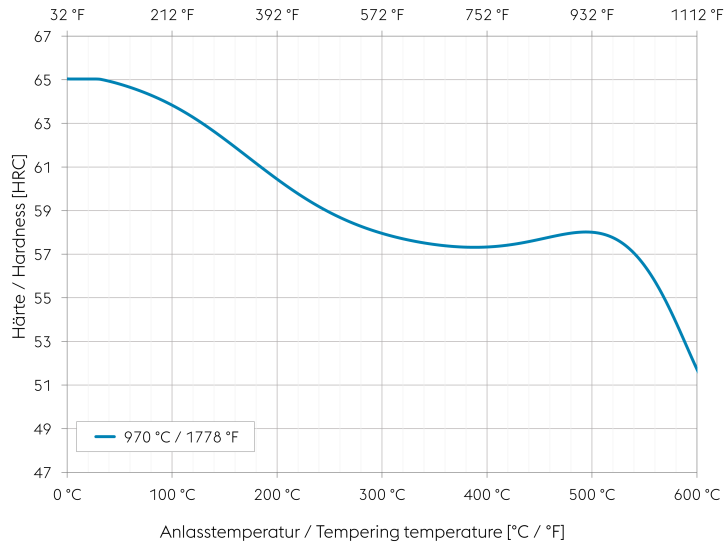
Stress relieving

Temperature	650 °C | 1,202 °F	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	950 to 980 °C | 1,742 to 1,796 °F	Quenching: Oil, salt bath (220 to 250 °C or 500 to 550 °C | 428 to 482 °F or 932 to 1022 °F), gas, air. || 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.

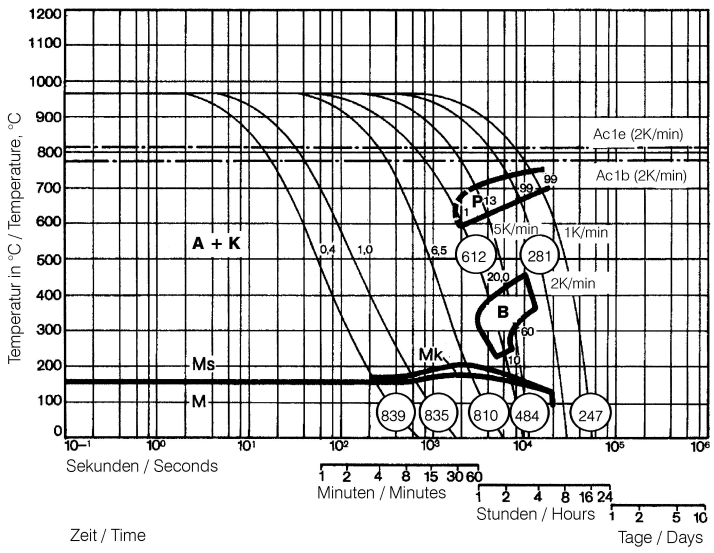
Time in furnace 1 hour for each 20 mm (0,787 inch) of workpiece thickness but at least 2 hours.

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

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

Cooling in air after each tempering step is recommended.

Continuous cooling CCT curves



Austenitising temperature: 960 °C (1760 °F)

Holding time: 15 minutes

O Vickers hardness

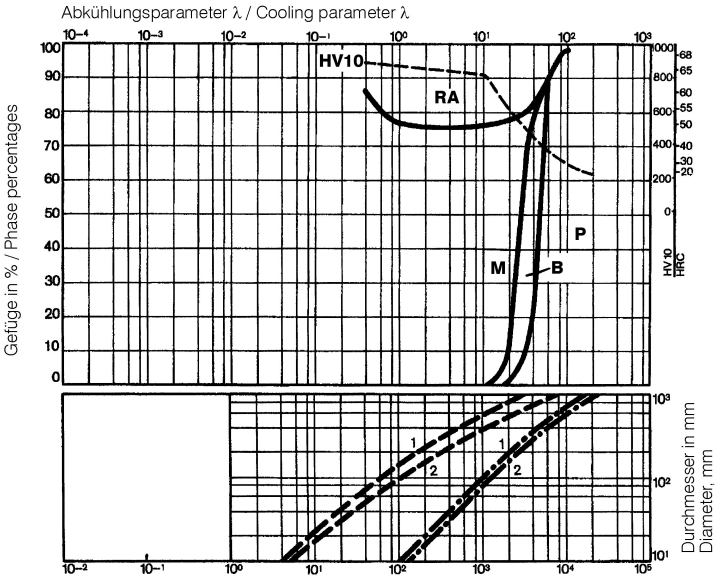
1...99 phase percentages

0.4...20.0 cooling parameter λ, i.e. duration of cooling from 800 to 500 °C (1472 to 932 °F) in s x 10^{-2}

1...5 K/min... cooling rate in the range of 800 to 500 °C (1472 to 932 °F)

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

Quantitative phase diagram

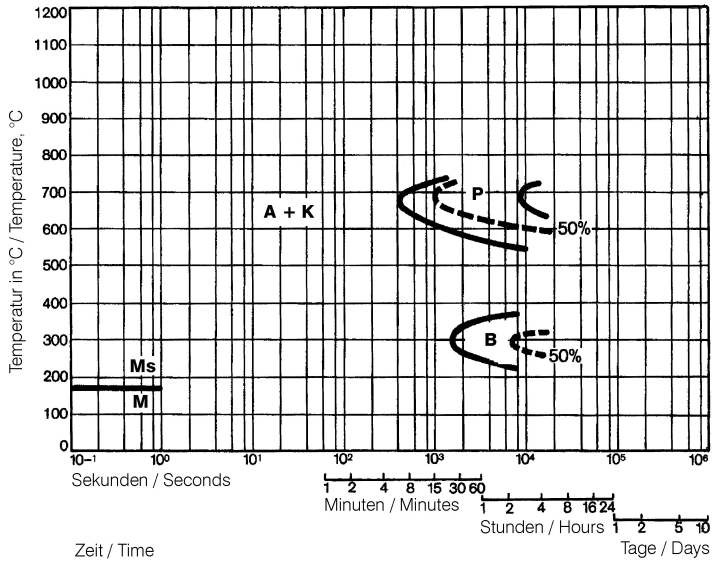


HV10... Vickers Hardness
RA... Residual austenite
M... Martensite
B... Bainite
P... Perlite

- - - Oil cooling
- • - Air cooling

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

Isothermal TTT curves



Austenitising temperature: 960 °C (1760 °F)
Holding time: 15 minutes

A... Austenite
K... Carbide
P... Perlite
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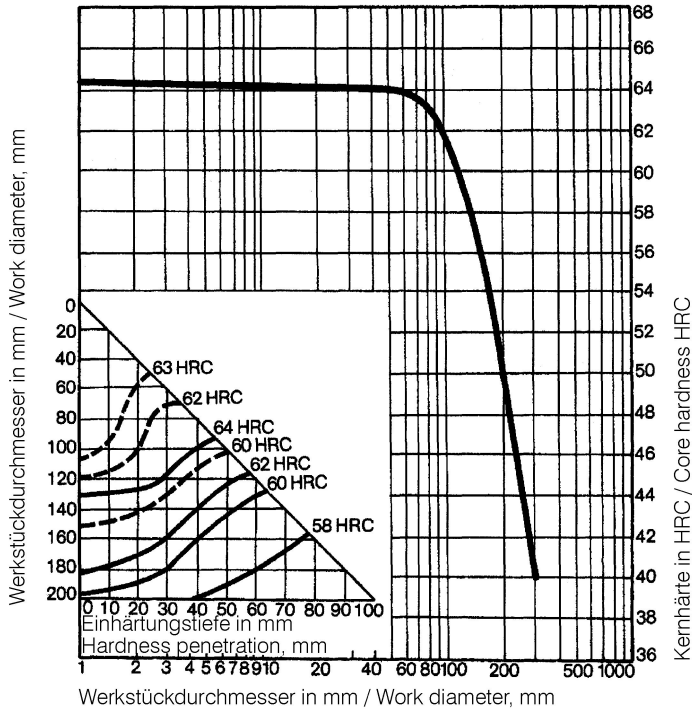
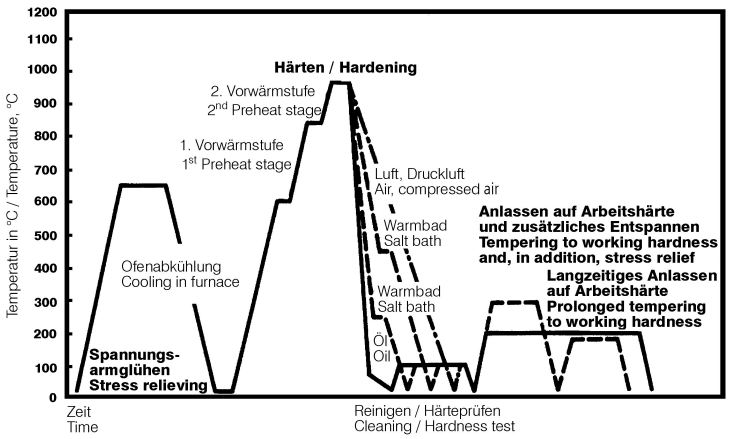
Influence of work diameter on core hardness and hardness penetration



Quenched from: 960 °C (1760 °F)

Quenchant:
— Oil
- - - Air

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 (10^3N/mm^2 | 10^3ksi)	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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ONE STEP AHEAD.