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 K306 belongs to the group of 5% chromium steels and is approximately equivalent to the material 1.2345 (~X50CrMoV5 1). Its alloy composition, however, has a higher vanadium content, making BÖHLER K306 more wear resistant than the conventional hot work tool steel 1.2345. BÖHLER K306 is used in hot work applications and for stamping and cutting tools. With its high toughness and resulting high fracture safety, this material is also very suitable for machine knives in the wood, paper and recycling industries.

Process Melting

Airmelted

Properties

- Toughness & Ductility : high
- Wear Resistance : good
- Compressive strength : high
- Dimensional stability : good

Applications

- Cold Forming
- Fine Blanking, Stamping, Blanking

Technical data

Material designation	
~1.2345	SEL
~X50CrMoV5-1	EN

Chemical composition (wt. %)

C	Si	Mn	Cr	Mo	V
0.51	0.95	0.30	5.00	1.40	1.40

Material characteristics

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

Delivery condition

Annealed

Hardness (HB)	max. 240

Heat treatment

Annealing

Temperature	750 to 800 °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.

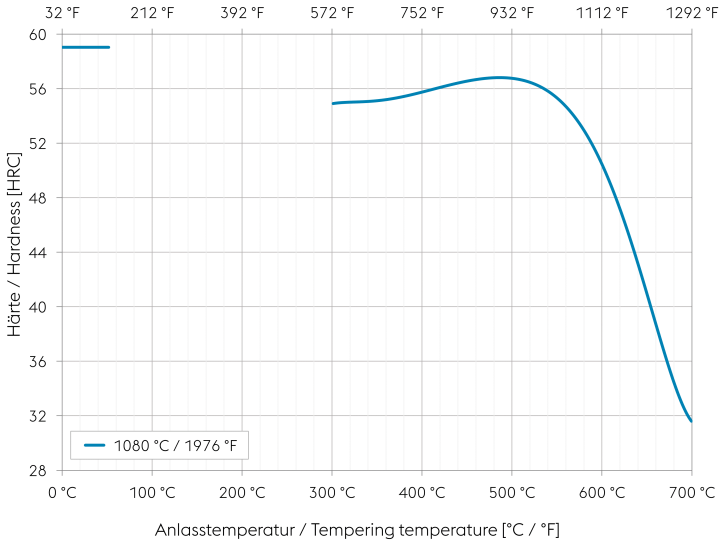
Stress relieving

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	1,050 to 1,100 °C	Quenching: Oil, salt bath (500 to 550 °C | 932 to 1022 °F), 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.

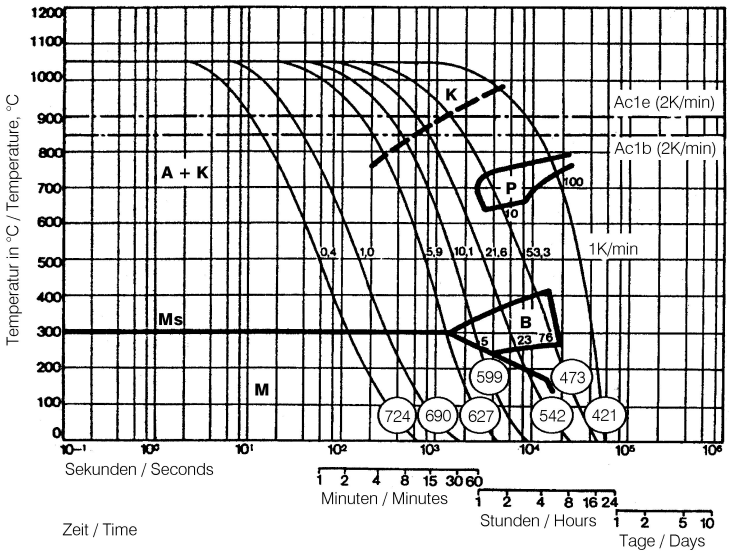
Please refer to the tempering chart for guide values for the achievable hardness after tempering.

It is recommended to temper at least three times above the secondary hardness maximum.

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: 1050 °C (1922 °F)

Holding time: 15 minutes

O Vickers hardness

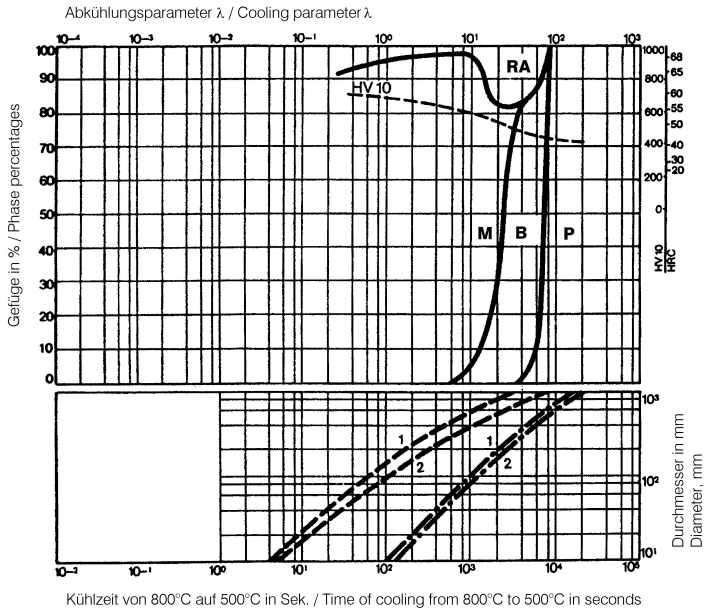
5...100 phase percentages

0.4...53.3 cooling parameter λ, i.e. duration of cooling from 800 to 500 °C (1472 to 932 °F) in s x 10^{-2}

1 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

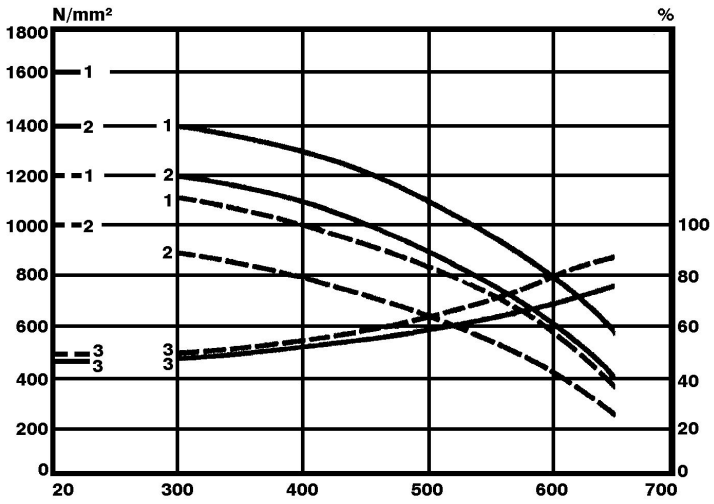


HV10... Vickers Hardness
RA... Residual austenite
M... Martensite
B... Bainite
P... Perlite

- - - Oil cooling
- • - Air cooling

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

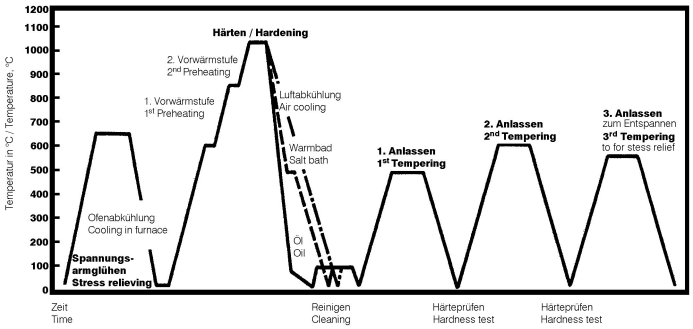
Hot strength chart



—— heat treated 1600 N/mm²
- - - heat treated 1200 N/mm²

1... Tensile strength N/mm²
2... 0.2 % offset yield strength N/mm²
3... Reduction of area %

Heat treatment sequence



Physical Properties

Temperature (°C)	20
Density (kg/dm^3)	7.8
Thermal conductivity (W/(m.K))	25
Specific heat (kJ/kg K)	0.46
Spec. electrical resistance (Ohm.mm^2/m)	0.52
Modulus of elasticity (10^{3}N/mm^2)	215

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

Temperature (°C)	100	200	300	400	500
Thermal expansion (10^{-6} m/(m.K))	11.5	12	12.2	12.5	12.9

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ONE STEP AHEAD.

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