NÁSTROJOVÉ OCELI PRO PRÁCI ZA STUDENA

Rozměrový sortiment k dispozici

Tyčová ocel* | Plech

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

Popis produktu

BÖHLER K110 - Rozměrově stálá ledeburitická ocel 12% legovaná chromem. Obzvlášť vhodná pro kalení na vzduchu. Dobrá houževnatost.

Trasa tavení

Airmelted

Vlastnosti

- Odolnost proti opotřebení : dobré
- Rozměrová stálost : dobré

Použití

- Průmyslové nože
- Ražení mincí
- Normálie (formy, plechy, kolíky, střižníky)
- Komponenty pro podzemní práce (vrtné práce, hornictví)
- Všeobecné díly pro strojírenství
- Válcování
- Přesné stříhání, lisování, ražení plechu
- Šneky a komory
- kladky
- Thread rolling (CZ)
- Tváření za studena
- Lisování prášků za studena
- Komponenty pro recyklační průmysl
- Díly odolné proti opotřebení

Technické údaje

Označení materiálu	
1.2379	SEL
X153CrMoV12	EN
~T30402	UNS
D2	AISI

Normy	
4957	EN ISO

Chemické složení

C	Si	Mn	Cr	Mo	V
1,55	0,30	0,30	11,30	0,75	0,75

Materiálové vlastnosti

	Tlaková zatížitelnost	Rozměrová stabilita při tepelném zpracování	Houževnatost	Odolnost proti opotřebení abrazivní	Odolnost proti opotřebení adhezivní
BÖHLER K110	★★	★★★	★	★★★	★★
BÖHLER K100	★★	★★	★	★★★	★★
BÖHLER K105	★★	★★	★	★★	★★
BÖHLER K107	★★	★★	★	★★★	★★
BÖHLER K190 MICROCLEAN	★★★★	★★★★★	★★★★	★★★★	★★★★
BÖHLER K294 MICROCLEAN	★★★★★	★★★★★	★★★	★★★★★	★★★★★
BÖHLER K340 ECOSTAR	★★★	★★★	★★	★★	★★
BÖHLER K340 ISODUR	★★★	★★★★	★★★	★★★	★★★★
BÖHLER K346	★★★	★★★	★★★	★★★★	★★
BÖHLER K353	★★	★★★	★★	★★	★★
BÖHLER K360 ISODUR	★★★	★★★★	★★★	★★★★	★★★★
BÖHLER K390 MICROCLEAN	★★★★★	★★★★★	★★★★	★★★★★	★★★★★
BÖHLER K490 MICROCLEAN	★★★★	★★★★★	★★★★	★★★★	★★★★
BÖHLER K497 MICROCLEAN	★★★★★	★★★★★	★★★	★★★★★	★★★★★
BÖHLER K888 MATRIX	★★★★	★★★★★	★★★★★	★★	★★
BÖHLER K890 MICROCLEAN	★★★★	★★★★★	★★★★★	★★★	★★★

Stav dodání

Žíháno	
Tvrdost (HB)	max. 250

Tepelné zpracování

Annealing

Teplota	800 na 850 °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.

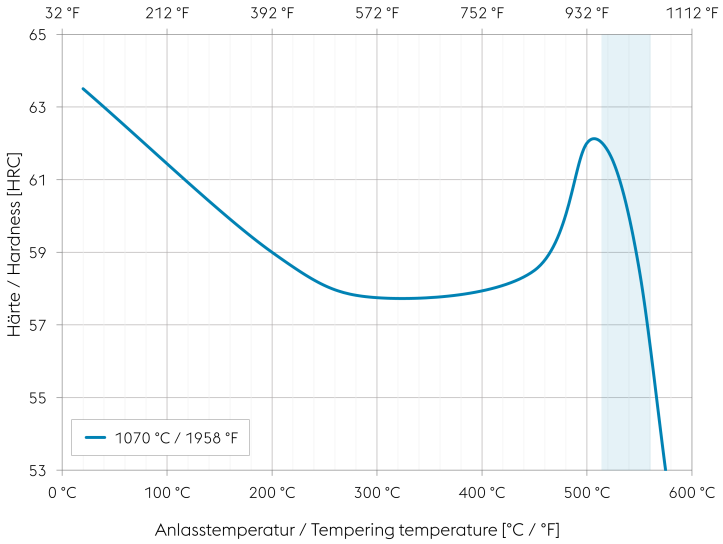
Žíhání na odstranění vnitřního pnutí

Teplota	650 na 700 °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.

Kalení a popouštění

Teplota	1 030 na 1 070 °C	Quenching: Oil, salt bath (220 to 250 °C or 500 to 550 °C | 428 to 482 °F or 932 to 1022 °F), gas, compressed or still air. Tools of intricate shape or with sharp edges should preferably be hardened in 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.

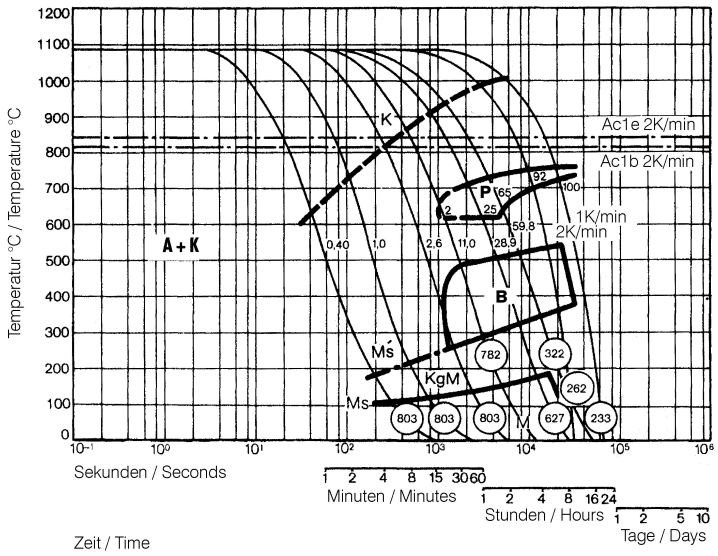
It is recommended to temper at least three times above the secondary hardness maximum.

Cooling in air to room temperature after each tempering step is recommended.

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

Recommended tempering temperature range is indicated by the blue area in the chart.

Continuous cooling CCT curves



Austenitising temperature: 1080 °C (1976 °F)
Holding time: 30 minutes

O Vickers hardness

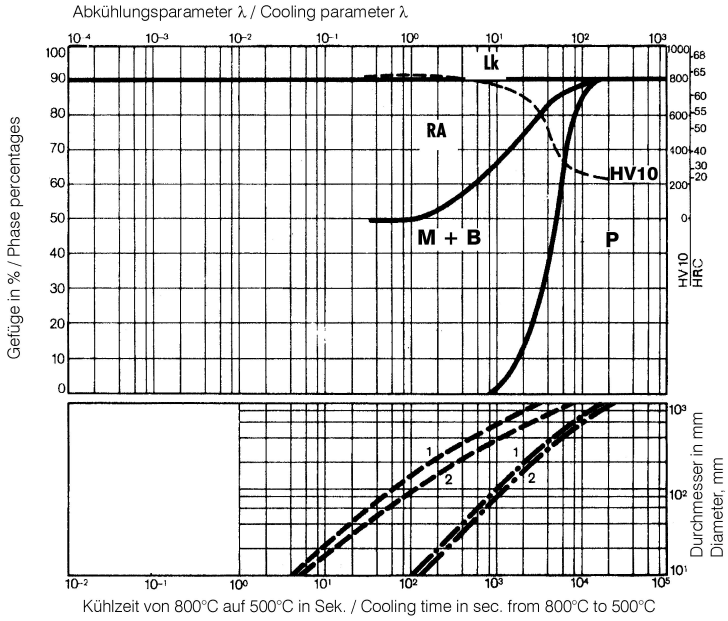
2...100 phase percentages

0.40...59.8 cooling parameter λ, i.e. duration of cooling from 800 to 500 °C (1472 to 932 °F) in s x 10^{-2}

1...2 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

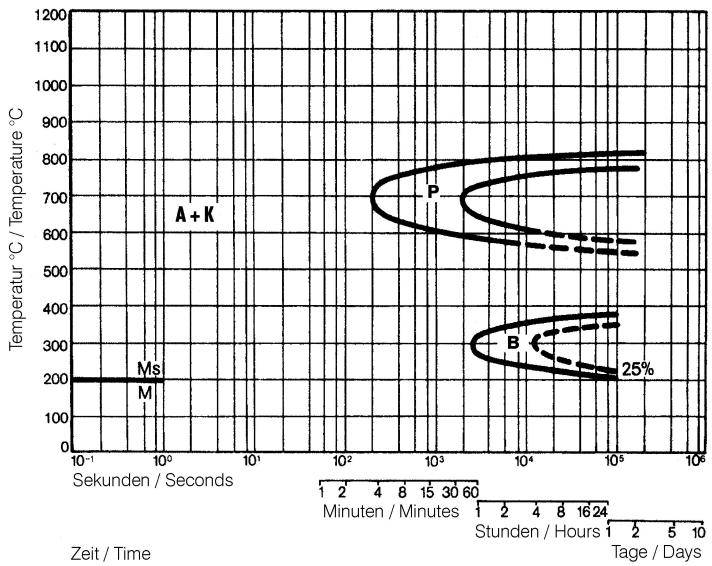


HV10... Vickers Hardness
Lk... Ledeburite carbide
RA... Residual austenite
M... Martensite
B... Bainite
P... Perlite

- - - Oil cooling
- • - Air cooling

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

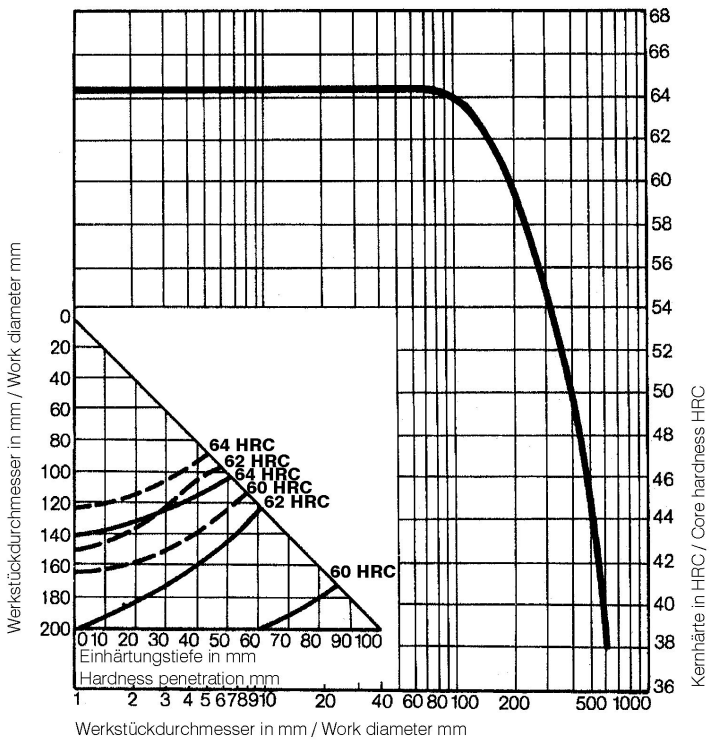
Isothermal TTT curves



Austenitising temperature: 1020 °C / 1868 °F
Holding time: 30 minutes

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

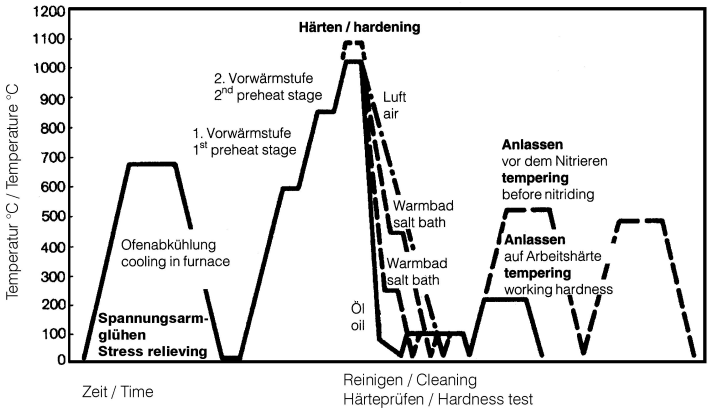
Influence of work diameter on core hardness and hardness penetration



Quenched from: 1030 °C / 1886 °F

Quenchant:
——— Oil
- - - - - - Air

Heat treatment sequence



Fyzikální vlastnosti

Teplota (°C)	20
Hustota (kg/dm^3)	7,67
Tepelná vodivost (W/(m.K))	23,9
Měrná tepelná kapacita (kJ/kg K)	0,47
Měrný elektrický odpor (Ohm.mm^2/m)	0,65
Modul pružnosti (10^{3}N/mm^2)	200

Tepelná roztažnost

Teplota (°C)	100	200	300	400	500	600	700
Tepelná roztažnost (10^{-6} m/(m.K))	11	11,4	11,9	12,2	12,7	12,8	12,1

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.

The data contained in this brochure is merely for general information and therefore shall not be binding on the company. We may be bound only through a contract explicitly stipulating such data as binding. Measurement data are laboratory values and can deviate from practical analyses. The manufacture of our products does not involve the use of substances detrimental to health or to the ozone layer.

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ONE STEP AHEAD.