OCELE PRE PRÁCU ZA STUDENA

Dostupné výrobné profily

Tyčové polotovary* | Plechy

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

Popis produktu

Vysokovýkonné strižné nástroje (matrice a razníky), lisovacie nástroje, taktiež nástroje na opracovanie dreva, nože nožníc pre tenkostenné strihy, nástroje k valcovaniu závitov, ťažné, hlbokoťažné a pretláčacie nástroje, lisovacie nástroje pre keramický a farmaceutický priemysel. Pracovné valce pre valcovacie stolice viacúčelových profilovacích tratí pre valcovanie za studena, meradlá, malé formy na plasty, od ktorých je požadovaná vysoká odolnosť proti abrazívnemu opotrebeniu.

Spôsob výroby

Konvenčná výroba

Vlastnosti

- Odolnosť proti opotrebovaniu : dobré

Aplikácia

- Strojové nože (pre výrobcov)
- Strihanie / Dierovanie / Lisovanie / Presné strihanie
- Valcovanie profilov
- Valcovanie
- Výroba normalizovaných dielov (strižníky, platne, kolíky, razníky)
- Oteruvzdorné diely
- Tvárnenie za studena
- Komponenty pre recykláciu
- Diely pre všeobecné strojárstvo

Technické údaje

Označenie materiálu	
1.2601	SEL
~T30402	UNS
X165CrMoV12	EN
~D2	AISI
~Ch12MF	GOST

Chemické zloženie

C	Si	Mn	Cr	Mo	V	W
1,60	0,35	0,30	11,50	0,60	0,30	0,50

Porovnanie vlastnosti materiálu

	Odolnosť proti tlakovému zaťaženiu	Rozmerová stabilita počas tepelného spracovania	Húževnatosť	Odolnosť proti abrazívnemu opotrebovaniu	Odolnosť proti adhezívnemu opotrebovaniu
BÖHLER K105	★★	★★	★	★★	★★
BÖHLER K100	★★	★★	★	★★★	★★
BÖHLER K107	★★	★★	★	★★★	★★
BÖHLER K110	★★	★★★	★	★★★	★★
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 pri dodaní

Žíhaný

Tvrdosť (HB)	max. 250

Tepelné spracovanie

Žíhanie

Teplota	800 až 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.

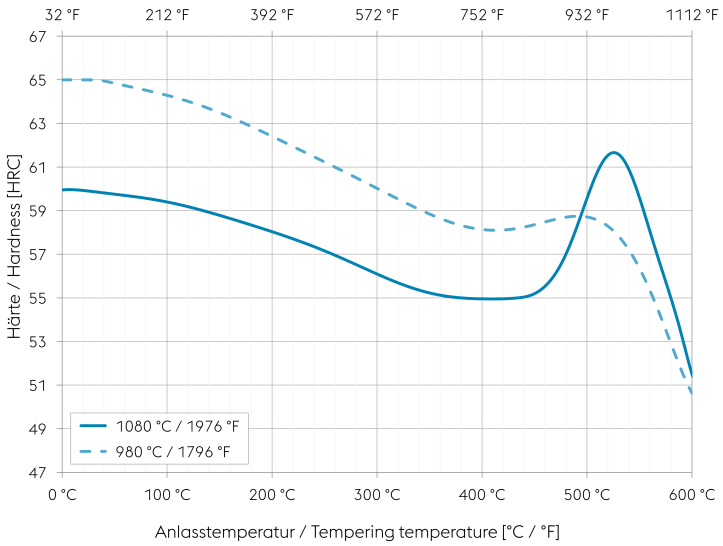
Žíhanie na odstránenie pnutí

Teplota	650 až 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.

Kalenie a popúšťanie

Teplota	980 až 1 010 °C	Quenching: Oil, salt bath (220 to 250 °C or 500 to 550 °C | 428 to 482 °F or 932 to 1022 °F), gas, air. Tools of intricate shape or with sharp edges should preferably be hardened in air or salt bath. || 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.

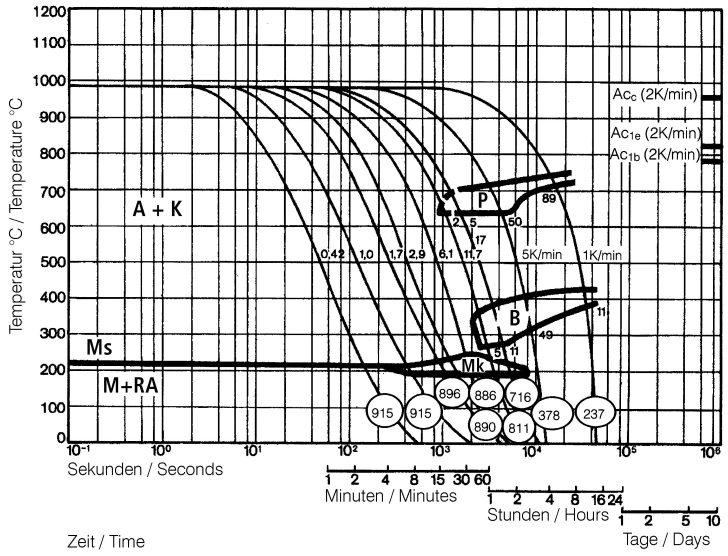
Time in furnace 1 hour for each 20 mm (0,787 inch) of workpiece thickness but at least 2 hours.

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: 980 °C (1796 °F)
Holding time: 30 minutes

O Vickers hardness

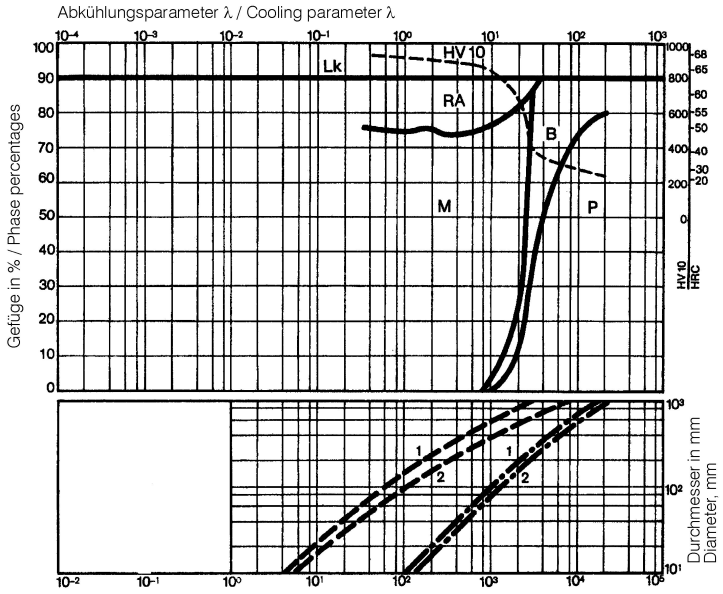
2...89 phase percentages

0.42...17 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
Mk... Grain boundary martensite
RA... Retained austenite
Ms... Martensite starting temperature

Quantitative phase diagram

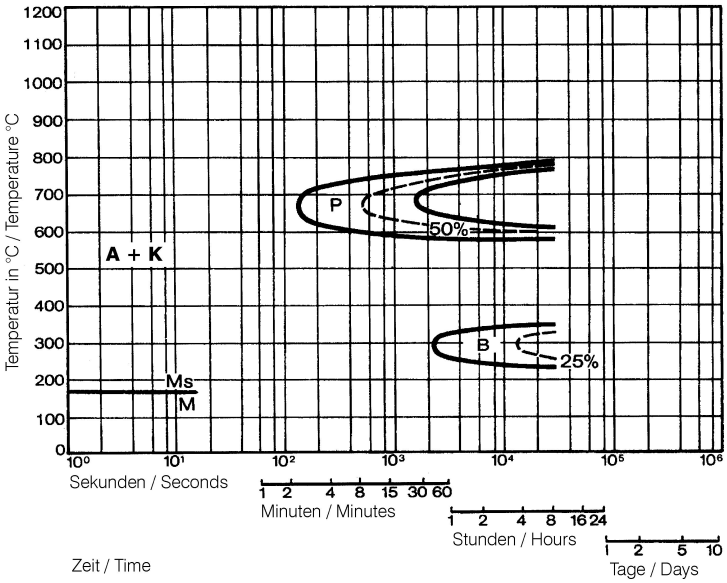


HV10... Vickers Hardness
Lk... Ledeburite carbide
RA... Residual austenite
M... Martensite
B... Bainite
P... Perlite

- - - Oil cooling
- • - Air cooling

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

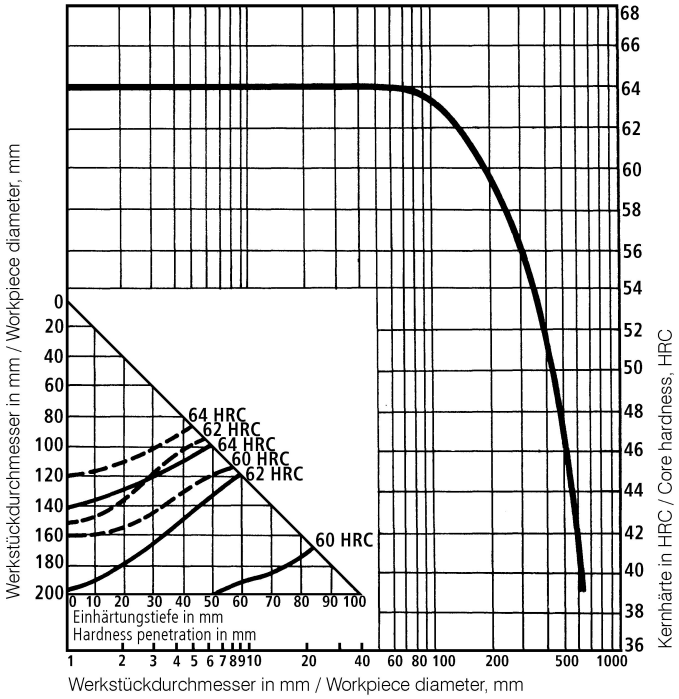
Isothermal TTT curves



Austenitising temperature: 980 °C / 1796 °F
Holding time: 30 minutes

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

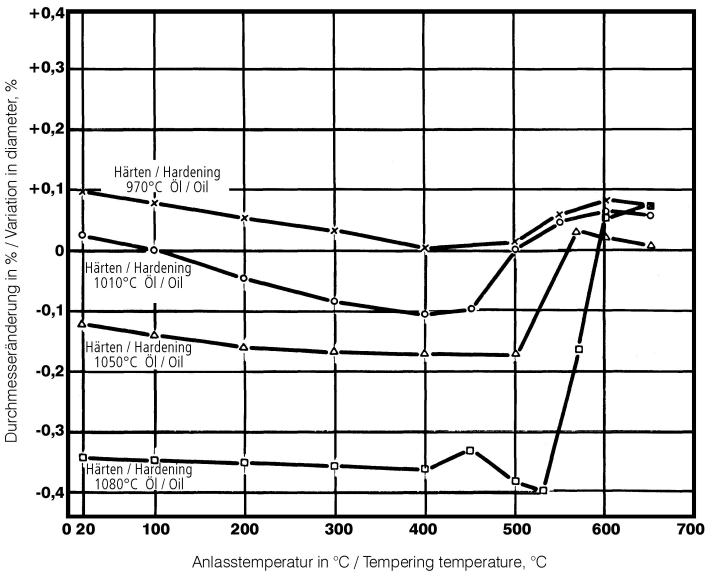
Influence of work diameter on core hardness and hardness penetration



Quenched from: 980 °C / 1796 °F

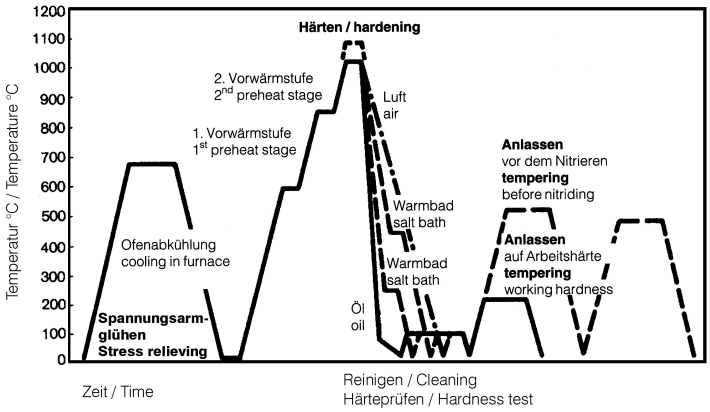
Quenchant:
——— Oil
- - - - - - Air

Variation in size as a function of tempering temperature after hardening



Specimen size: Ø 22 x 5 mm

Heat treatment sequence



Fyzikálne vlastnosti

Teplota (°C)	20
Hustota (kg/dm^3)	7,7
Tepelná vodivosť (W/(m.K))	20
Merná tepelná kapacita (kJ/kg K)	0,46
Merný elektrický odpor (Ohm.mm^2/m)	0,65
Modul pružnosti (10^{3}N/mm^2)	210

Tepelná rozťažnosť

Teplota (°C)	100	200	300	400	500	600
Tepelná rozťažnosť (10^{-6} m/(m.K))	10,5	11	11	11,5	12	12

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 BÖHLER Edelstahl GmbH & Co KG
Mariazeller Straße 25
8605 Kapfenberg, AT
T. +43/50304/20-0
E. info@bohler-edelstahl.at
https://www.voestalpine.com/bohler-edelstahl/de/

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