BÖHLER

BÖHLER W320
ISODISC®

ČELICI ZA TOPLI RAD

Dostupne varijante proizvoda

Šipkasti proizvodi

Opis proizvoda

Visokoopterećeni alati za rad u toplom stanju, pretežito namijenjeni obradi teških slitina, primjerice trnova, matrica i cilindara za istiskivanje metalnih cijevi i šipkastih profila

Put taljenja

Airmelted

Karakteristike

- Žilavost i duktilnost : dobar
- Otpornost na habanje : visok
- Obradivost : vrlo visoka
- Tvrdoća pri visokim temperaturama : visok
- Mogućnost poliranja : dobar
- Mikro čistoća : dobar
- Toplinska vodljivost : vrlo visoka

Korištenje

- Istiskivanje
- Visokotlačno lijevanje
- Kovanje (vruće / poluvruće)
- Progresivno kovanje (Hatebur)
- Gravitacijsko / niskotlačno lijevanje

Tehnički podaci

Oznaka materijala	
1.2365	SEL
~T20810	UNS
32CrMoV12-28	EN
~H10	AISI
SKD7	JIS

Standardi	
4957	EN ISO
G4404	JIS

Kemijski sastav

C	Si	Mn	Cr	Mo	V
0,31	0,30	0,35	2,90	2,70	0,50

Materijal

	Otpornost na toplinu	Vruća žilavost	Otpornost na vruće trošenje
BÖHLER W320 ISODISC®	★★★	★★	★★★
BÖHLER W300 ISODISC®	★★	★★★	★★
BÖHLER W300 ISOBLOC®	★★	★★★★	★★
BÖHLER W302 ISODISC®	★★★	★★★	★★★
BÖHLER W302 ISOBLOC®	★★★	★★★★	★★★
BÖHLER W303 ISODISC®	★★★★	★★★	★★★★
BÖHLER W350 ISOBLOC®	★★★	★★★★★	★★★
BÖHLER W360 ISOBLOC®	★★★★★	★★★★	★★★★★
BÖHLER W400 VMR®	★★	★★★★★	★★
BÖHLER W403 VMR®	★★★★	★★★★	★★★★

Isporuka

Annealed

Tvrdoća (HB)	max. 229

Toplinska obrada

Annealing

Temperatura	750 do 800 °C	Holding time 6 to 8 hours. Slow, controlled furnace cooling at 10 to 20°C/h (50 to 68 °F/hr) to approx. 600°C (1112°F), further cooling in air.

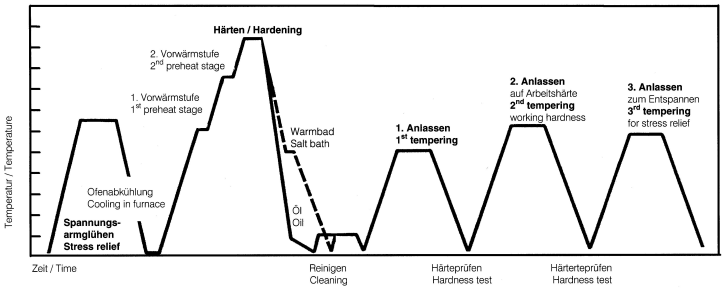
Stress relieving

Temperatura	600 do 670 °C	For stress relief after extensive machining or for complicated tools. Holding time depending on tool size after complete heating 2 - 6 hours in neutral atmosphere. Slow furnace cooling.

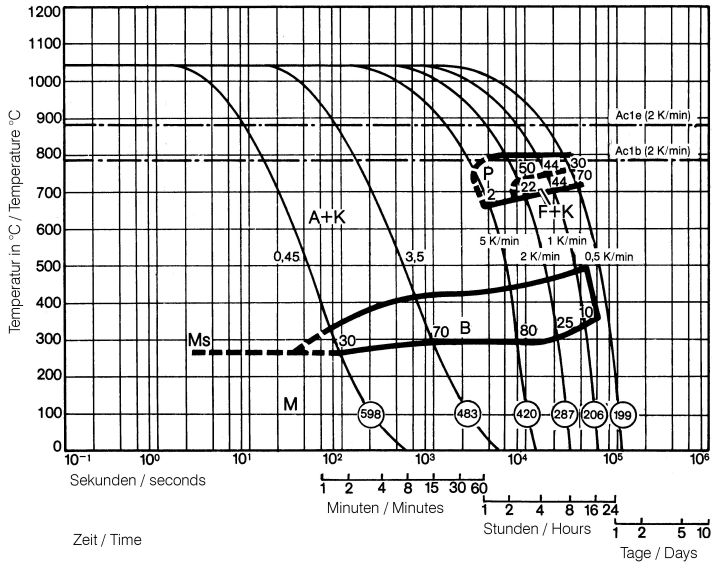
Hardening and Tempering

Temperatura	1.010 do 1.050 °C	Holding time after temperature equalization: 15 to 30 minutes; Quenching: Oil, salt bath (500 - 550°C [932-1022°F]), air, vacuum; After hardening, tempering to the desired working hardness (see tempering chart).

Heat treatment sequence



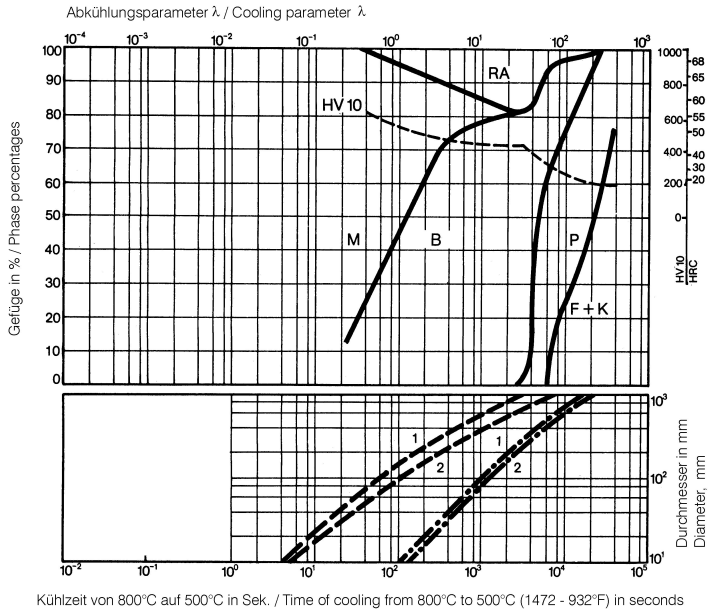
Continuous cooling CCT curves



Austenitising temperature: 1886°F (1030°C)
Holding time: 15 minutes

O Vickers hardness
2...80 phase percentages
0.45...3.5 cooling parameter, i.e. duration of cooling from 1472-932°F (800 - 500°C) in s x 10^{-2}
41...32,9°F/min (5...0.5 K/min) cooling rate in °F/min (K/min) in the 1472-932°F (800 - 500°C) range

Quantitative phase diagram

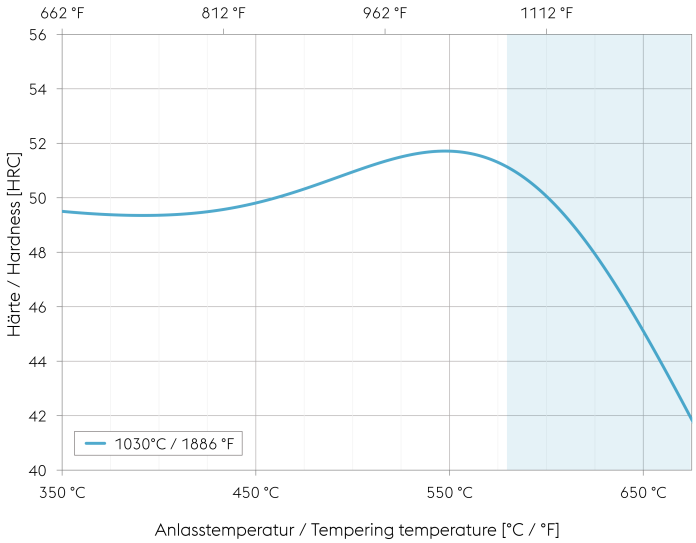


A... Austenite
B... Bainite
F... Ferrite
K... Carbide
M... Martensite
P... Perlite
RA... Retained austenite

- - - - - - Oil cooling
- • - Air cooling

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

Tempering chart



Tempering:

Slow heating to tempering temperature immediately after hardening / time in furnace 1 hour for each 0,787 inch (20 mm) of work piece thickness but at least 2 hours / cooling in air. It is recommended to temper at least twice.

A third tempering cycle for the purpose of stress relieving may be advantageous.

1st tempering approx. 30°C (86°F) above maximum secondary hardness.

2nd tempering to desired working hardness.

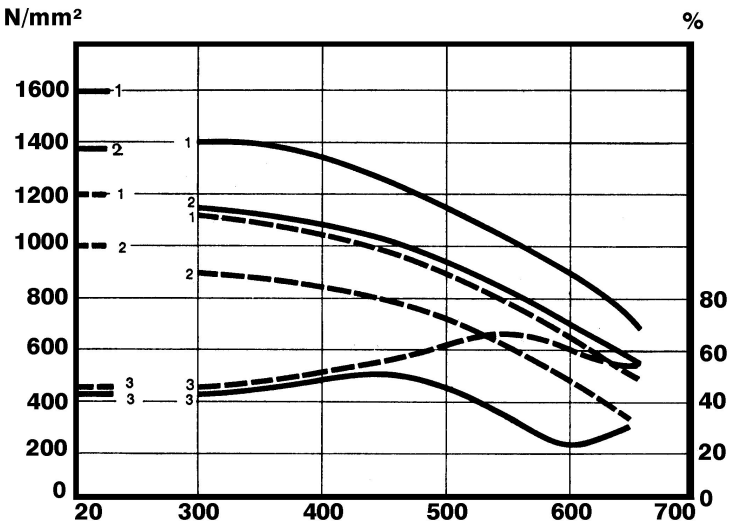
The tempering chart shows average tempered hardness values.

3rd for stress relieving at a temperature 86 to 122°F (30 - 50°C) below highest tempering temperature.

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

Hardening temperature: 1030°C (1886°F)
Specimen size: square 50 mm

Hot strength chart



Prüftemperatur in °C / Tested at °C

——— heat treated 1600 N/mm²
- - - - - - heat treated 1200 N/mm²
1... Tensile strength N/mm²
2... 0.2% proof stress N/mm²
3... Reduction of area %

Fizička svojstva

Temperatura (°C)	20
Gustoća (kg/dm³)	7,9
Toplinska vodljivost (W/(m.K))	30
Specifični toplinski kapacitet (kJ/kg K)	0,46
Spec. Otpornik (Ohm.mm²/m)	0,37
Modul elastičnosti (10³N/mm²)	215

Toplinska ekspanzija

Temperatura (°C)	100	200	300	400	500	600	700
Toplinska ekspanzija (10⁻⁶ m/(m.K))	12	12,5	12,7	13	13,2	13,4	13,7

For additional specifications and technical requirements, please contact our regional voestalpine BÖHLER sales companies.

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ONE STEP AHEAD.