

ČELICI ZA HLADNI RAD

Dostupne varijante proizvoda

Šipkasti proizvodi*

Ploče

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

Opis proizvoda

BÖHLER K890 MICROCLEAN – Ovaj čelik za obradu u hladnom stanju je proizveden postupcima praškaste metalurgije i odlikuje se dobrom žilavošću, vrlo dobrom tlačnom čvrstoćom i izvrsnom zamornom čvrstoćom.

Put taljenja

Powder metallurgy

Karakteristike

- > Žilavost i duktilnost : vrlo visoka
- > Dobra žilavost znači sigurnost od pucanja kalupa koji se koriste : vrlo visoka
- > Ravnomjerno visoka čvrstoća i žilavost, čak i s velikim dimenzijama : vrlo visoka
- > Otpornost na habanje : dobar
- > Tlačna čvrstoća : visok
- > Dimenzionalna stabilnost : vrlo visoka
- > Izvrsna homogenost i izotropija : vrlo visoka
- > Fina struktura karbida : vrlo visoka
- > Homogena mikrostruktura : vrlo visoka

Korištenje

- > Strojni mjerni noževi (za proizvodnju)
- > Valjanje
- > Cold Forming
- > Coining
- > Oblikovanje utiskivanjem praškastih materijala
- > Potrošni dijelovi
- > Opći sklopovi za strojarstvo
- > Sklopovi za reciklažnu djelatnost
- > Pill punching dies
- > Precizno štancanje / štancanje / pečačenje

Kemijski sastav

C	Si	Mn	Cr	Mo	V	W	Co
0,85	0,55	0,40	4,35	2,80	2,10	2,55	4,50

Materijal

	Kapacitet tlaka	Dimenzionalna stabilnost u toplinskoj obradi	Žilavost	Abraziv otpora na habanje	Ljepilo za otpornost na habanje
BÖHLER K890 MICROCLEAN®	★★★★	★★★★★	★★★★★	★★★	★★★
BÖHLER K100	★★	★★	★	★★★	★★
BÖHLER K105	★★	★★	★	★★	★★
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	★★★★	★★★★★	★★★★★	★★	★★

Isporuka

Annealed

Tvrdoća (HB)	max. 280
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Toplinska obrada

Soft annealing

Temperatura	650 do 700 °C	Depending on the application, hardness can be adjusted by using specialized annealing treatment.
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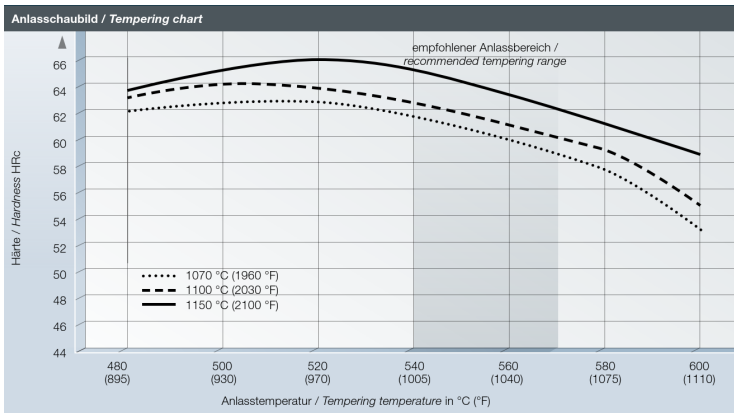
Stress relieving

Temperatura	650 do 700 °C	After through-heating, soak for 1 to 2 hours in a neutral atmosphere. Slow cooling in furnace.
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Hardening and Tempering

Temperatura	1.070 do 1.150 °C	Following temperature equalisation: 20-30 minutes for a hardening temperature of 1070 - 1100 °C (1960 - 2010 °F) 6 minutes for a hardening temperature of 1150 °C (2100 °F) After hardening, tempering to the desired working hardness, see tempering chart.
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Tempering chart



Tempering:

- Hardening temperature:
- 1070°C/1960°F
- - - 1100°C/2030°F
- 1150°C/2100°F

Slow heating to tempering temperature immediately after hardening.

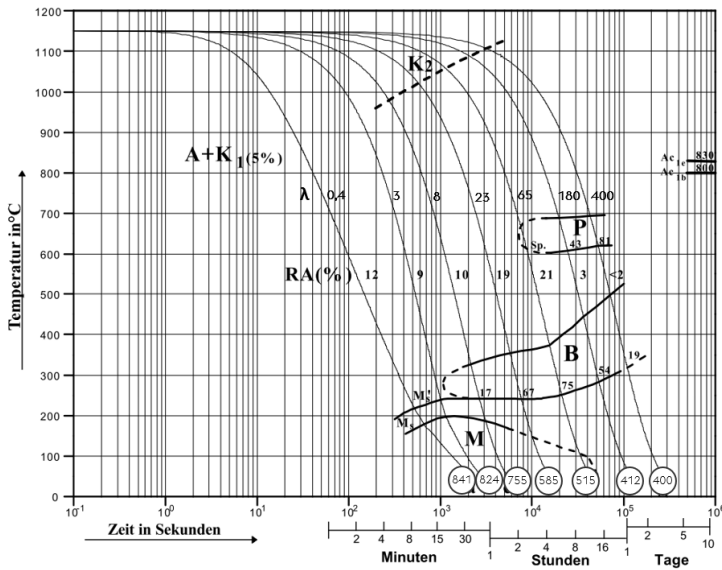
Dwell time in the oven 1 hour per 20 mm workpiece thickness, but at least 2 hours.

Slow cooling to room temperature after each tempering step is recommended.

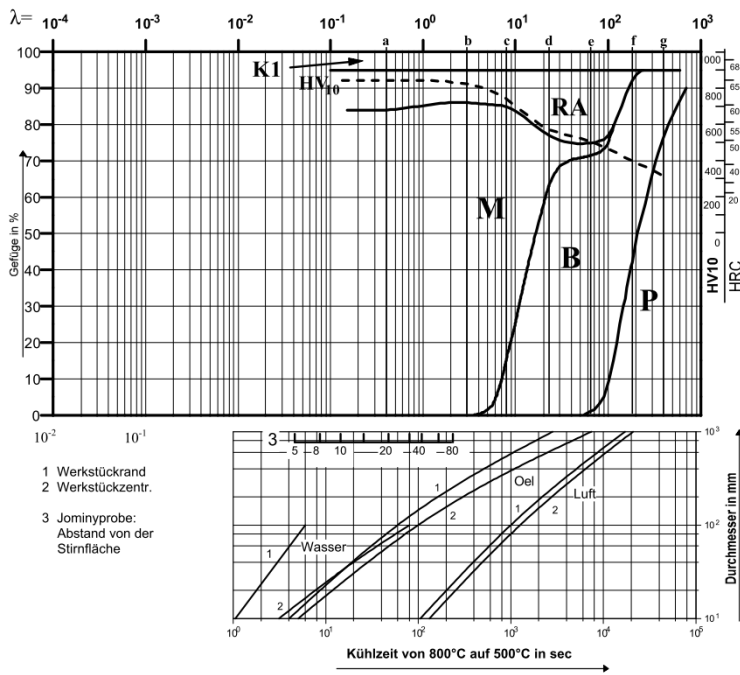
Tempering at 540-570 °C (1004-1058 (°F)) at least three times is recommended.

Please refer to the tempering diagram for guide values for the achievable hardness after tempering. Tempering for stress relieving 30 to 50°C below the highest tempering temperature.

Continuous cooling CCT curves



Quantitative phase diagram



Fizička svojstva

Temperatura (°C)	20
Gustoća (kg/dm ³)	7,85
Toplinska vodljivost (W/(m.K))	22,5
Specifični toplinski kapacitet (kJ/kg K)	0,45
Spec. Otpornik (Ohm.mm ² /m)	0,5
Modul elastičnosti (10 ³ N/mm ²)	218

Toplinska ekspanzija

Temperatura (°C)	100	200	300	400	500	600	700
Toplinska ekspanzija (10 ⁻⁶ m/(m.K))	10,5	11	11,3	11,7	12,1	12,4	12,9

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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