

SOĞUK İŞ ÇELİKLERİ

Mevcut Ürün Şekilleri

[Uzun Ürünler*](#)[Levhalar](#)

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

Ürün Tanımı

BÖHLER K890 MICROCLEAN is a high-performance cold work tool steel manufactured using powder metallurgy. It features good toughness, very high compressive strength and excellent fatigue strength. This favorable combination of properties can avoid chipping damages to tools. BÖHLER K890 MICROCLEAN is not only used in cold work applications, but also in mold making.

Erime rotası

[Powder metallurgy](#)

Özellikler

- > Tokluk ve Süneklik : çok yüksek
- > İyi tokluk, kullanım sırasında kalıpların çatlamasına karşı güvenlik anlamına gelir : çok yüksek
- > Büyük boyutlarda bile eşit derecede yüksek mukavemet ve tokluk : çok yüksek
- > Aşınma Direnci : iyi
- > Basınç Dayanımı : yüksek
- > Boyutsal kararlılık : çok yüksek
- > Mükemmel homojenlik ve izotropi : çok yüksek
- > İnce karbür yapısı : çok yüksek
- > Homojen mikroyapı : çok yüksek

Uygulamalar

- > Machine knife (for producers)
- > Coining
- > Makine Mühendisliği için Genel Parçalar
- > Fine Blanking, Stamping, Blanking
- > Rolling
- > Powder Pressing
- > Geri Dönüşüm Endüstrisi için Parçalar
- > Cold Forming
- > Wear parts
- > Pill punching dies

Kimyasal Bileşim

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

Malzeme özellikleri

	Basınç Dayanımı	Isıl işlem sırasında boyutsal kararlılık	Sertlik	Aşındırıcı aşınma direnci	Aşınma direnci yapıştırıcı
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	★★★★★	★★★★★	★★★★★	★★	★★

Teslimat durumu

Annealed

Sertlik (HB)	maks. 280
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Isıl işlem

Soft annealing

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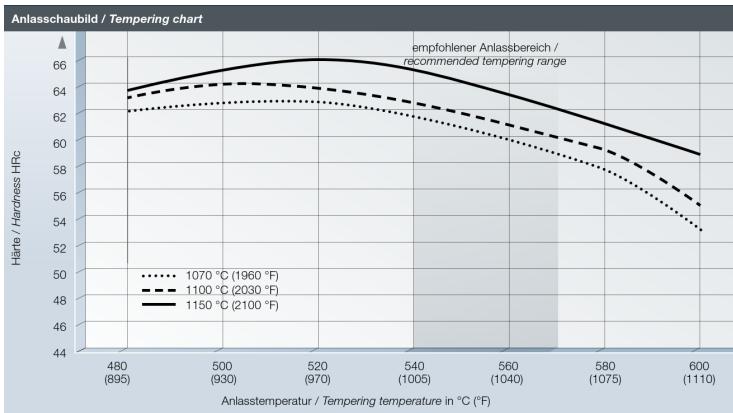
Stress relieving

Sıcaklık	650 kadar 700 °C	After through-heating, soak for 1 to 2 hours in a neutral atmosphere. Slow cooling in furnace.
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Sertleştirme ve Temperleme

Sıcaklık	1.070 kadar 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.

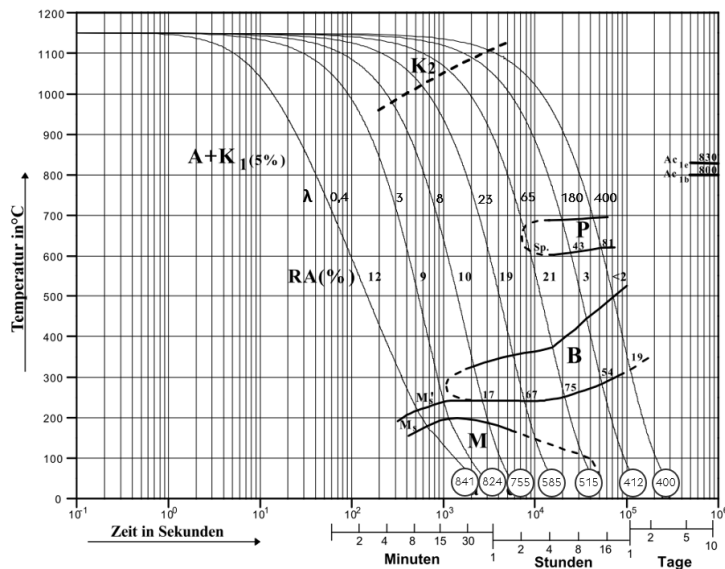
Dwell time in the oven 1 hour per 20 mm workpiece thickness, but at least 2 hours.

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

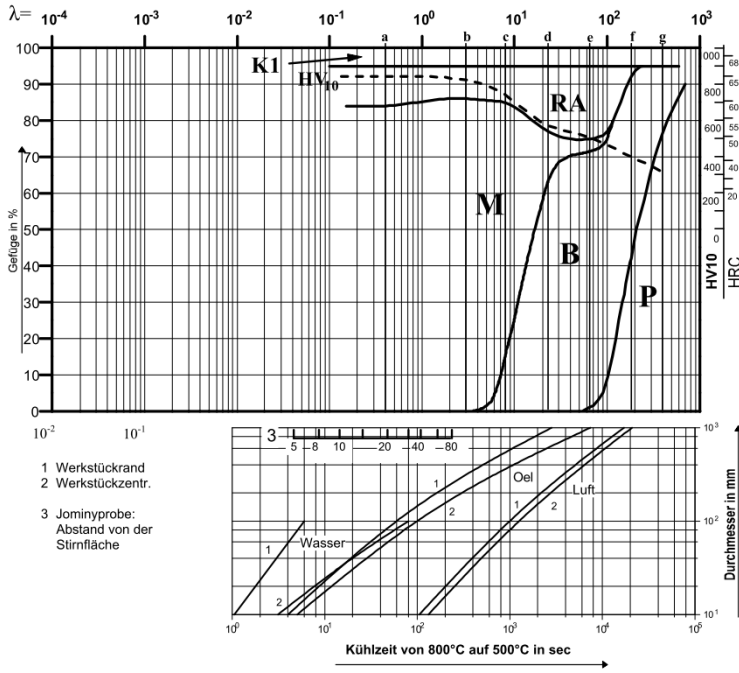
Tempering at 540-570 °C (1004-1058 (°F)) at least three times is recommended.

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



Fiziksel özellikler

Sıcaklık (°C)	20
Yoğunluk (kg/dm ³)	7,85
Termal iletkenlik (W/(m.K))	22,5
Özgül ısı kapasitesi (kJ/kg K)	0,45
Spes. elektrik direnci (Ohm.mm ² /m)	0,5
Elastikiyet modülü (10 ³ N/mm ²)	218

Termal genişmeler

Sıcaklık (°C)	100	200	300	400	500	600	700
Termal genişleme (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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