

YÜKSEK HIZ 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 S390 MICROCLEAN – "The decathlete"

This grade is our PM steel with many positive usage properties. For twist drills, taps, mills, broaches, or cold-work applications, BÖHLER S390 MICROCLEAN is always a high performer.

Erime rotası

[Powder metallurgy](#)

Özellikler

- > Tokluk ve Süneklik : yüksek
- > Aşınma Direnci : yüksek
- > Basınç Dayanımı : çok yüksek
- > Kenar Stabilitesi : çok yüksek
- > Öğütülebilirlik : yüksek
- > Sıcak Sertlik (kırmızı sertlik) : çok yüksek

Uygulamalar

- > Motor Sporları
- > End Mills
- > Powder Pressing
- > Special Cutting Tools
- > Pill punching dies
- > Broaches and Reamers
- > Fine Blanking, Stamping, Blanking
- > Rolling
- > Twist Drills and Taps
- > Cold Forming / Coining
- > Gear Cutting, Shaving and Shaping Tools
- > Shearing / Machine Knives
- > Wear parts

Kimyasal Bileşim

C	Cr	Mo	V	W	Co
1,64	4,80	2,00	4,80	10,40	8,00

Malzeme özellikleri

	Basınç Dayanımı	Öğütülebilirlik	Sıcak sertlik	Sertlik	Aşınma direnci	Kesilme direnci
BÖHLER S390 MICROCLEAN	★★★★	★★★	★★★★★	★★★★★	★★★★★	★★★★★
BÖHLER S290 MICROCLEAN	★★★★★	★	★★★★★	★★	★★★★★	★★★★★
BÖHLER S393 MICROCLEAN	★★★★	★★★	★★★★★	★★★★★	★★★★★	★★★★★
BÖHLER S590 MICROCLEAN	★★★★	★★★	★★★★★	★★★	★★★	★★★
BÖHLER S690 MICROCLEAN	★★★	★★★	★★	★★★★★	★★★	★★
BÖHLER S790 MICROCLEAN	★★★	★★★	★★	★★★★★	★★	★★★
BÖHLER S792 MICROCLEAN	★★★	★★★	★★	★★★★★	★★	★★★
BÖHLER S793 MICROCLEAN	★★★	★★★	★★★★★	★★★	★★★	★★★

Teslimat durumu

Annealed

Sertlik (HB)	maks. 320 drawn execution max. 320 HB
Çekme mukavemeti (N/mm ²)	maks. 1.080

Hardened and Tempered

Sertlik (HRC)	64 kadar 68
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Isıl işlem

Annealing

Sıcaklık	870 kadar 900 °C	4 h, controlled slow cooling in furnace (10 to 20°C/h / (50 to 68°F/h) to 740°C/2h (1364°F/2 h) cooling in furnace,
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Stress relieving

Sıcaklık	600 kadar 650 °C	Slow cooling in furnace. To relieve stresses set up by extensive machining or in tools of intricate shape. After through heating, hold in neutral atmosphere for 1 to 2 hours.
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Sertleştirme ve Temperleme

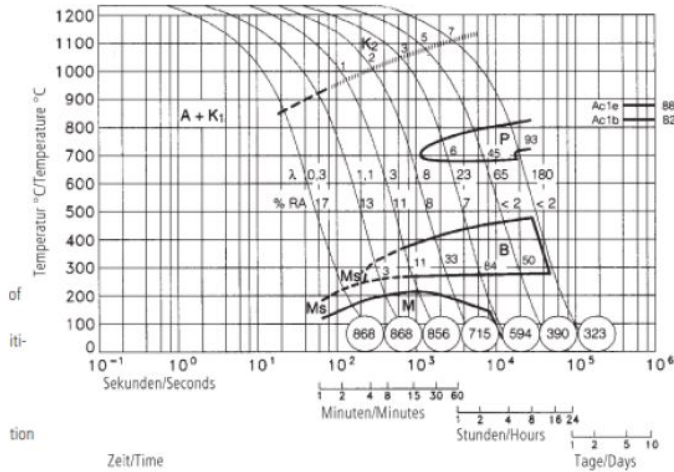
Sıcaklık	1.100 kadar 1.200 °C	Salt bath, vacuum Preheating: 1st stage ~ 500 °C (930 °F), 2nd stage ~ 850 °C (1560 °F), 3rd stage ~1050 °C (1920 °F) Austenitising: 1100 - 1200 °C (2010 °F - 2190 °F), holding time after complete heating 80 seconds, maximum 150 seconds, to avoid material damage due to overheating. Quenching: oil, warm bath (500 - 550 °C (930 °F - 1020 °F)), gas
Sıcaklık	550 kadar 570 °C	Slow heating to tempering temperature immediately after austenitising. Holding time in the furnace 1 hour per 20 mm material thickness (at least 1 hour) Slow cooling to room temperature between each tempering step 3 tempering cycles recommended Hardness see tempering chart

Continuous cooling CCT curves

Austenitising temperature: 1230°C
Haltedauer: 180 Sekunden

Austenitising temperature: 1230°C (2246°F)
Holding time: 180 seconds

Austenitising temperature: 1230°C (2246°F)
Holding time: 180 seconds

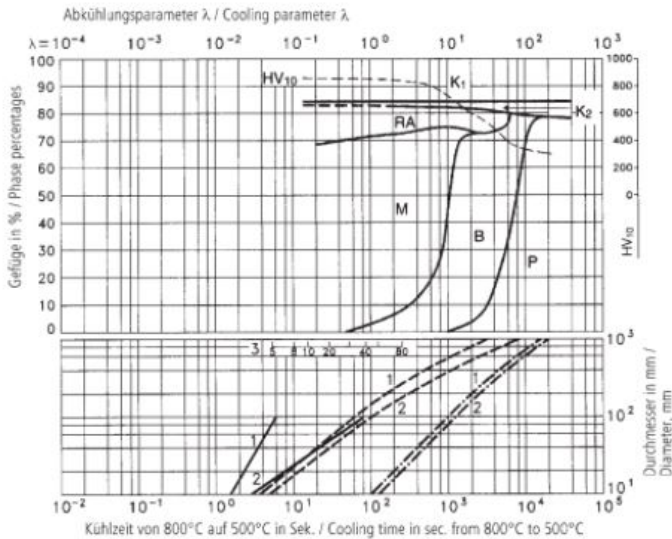


A....Austenite
B....Bainite
K....Carbide
P....Pearlite
M....Martensite
RA...Retained Austenite

Quantitative phase diagram

Austenitising temperature: 1230°C
Haltedauer: 180 Sekunden

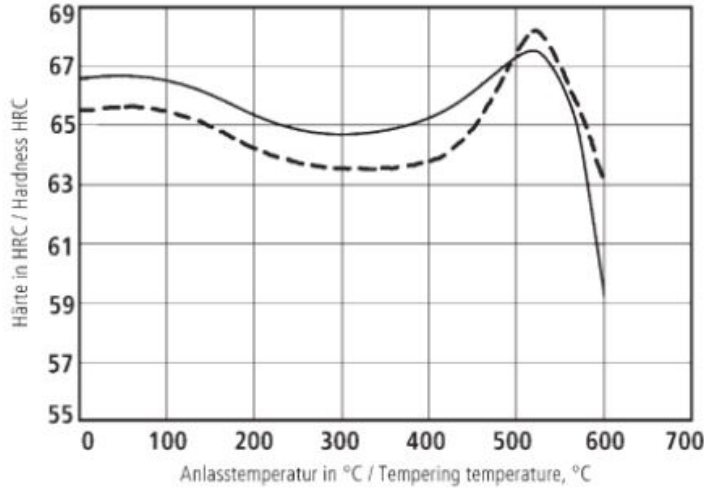
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1....Edge or Face
2....Core
3....Jominy test: distance from quenched end

Tempering Chart



Fiziksel özellikler

Sıcaklık (°C)	20
Yoğunluk (kg/dm ³)	8,1
Termal iletkenlik (W/(m.K))	17
Özgül ısı kapasitesi (kJ/kg K)	0,42
Spes. elektrik direnci (Ohm.mm ² /m)	0,61
Elastikiyet modülü (10 ³ N/mm ²)	231

Termal genişmeler

Sıcaklık (°C)	100	200	300	400	500	600	700
Termal genişme (10 ⁻⁶ m/(m.K))	10	10,5	10,8	11,2	11,3	11,4	11,6

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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