

# 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 S590 MICROCLEAN – "The expert"

High-speed steel manufactured in a powder metallurgy process, with good hot hardness, compressive strength, and wear resistance. PM technology gives it good toughness and excellent workability, such as the best machinability.

## Erime rotası

[Powder metallurgy](#)

## Özellikler

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

## Uygulamalar

- > Blades for Sawing Machines
- > Fine Blanking, Stamping, Blanking
- > Rolling
- > Broaches and Reamers
- > Gear Cutting, Shaving and Shaping Tools
- > Shearing / Machine Knives
- > End Mills
- > Powder Pressing
- > Twist Drills and Taps

## Teknik veriler

Malzeme Tanımı		Standartlar	
1.3244	SEL	4957	EN ISO
HS6-5-3-8	EN		

## Kimyasal Bileşim

C	Cr	Mo	V	W	Co
1,29	4,2	5	3	6,3	8,4

## Malzeme özellikleri

	Basınç Dayanımı	Öğütülebilirlik	Sıcak sertlik	Sertlik	Aşınma direnci	Kesilme direnci
<b>BÖHLER S590</b> <b>MICROCLEAN</b>	★★★★	★★★	★★★★★	★★★	★★★	★★★
<b>BÖHLER S290</b> <b>MICROCLEAN</b>	★★★★★	★	★★★★★	★★	★★★★★	★★★★★
<b>BÖHLER S390</b> <b>MICROCLEAN</b>	★★★★	★★★	★★★★★	★★★★★	★★★★★	★★★★★
<b>BÖHLER S393</b> <b>MICROCLEAN</b>	★★★★	★★★	★★★★★	★★★★★	★★★★★	★★★★★
<b>BÖHLER S690</b> <b>MICROCLEAN</b>	★★★	★★★	★★	★★★★★	★★★	★★
<b>BÖHLER S790</b> <b>MICROCLEAN</b>	★★★	★★★	★★	★★★★★	★★	★★★
<b>BÖHLER S793</b> <b>MICROCLEAN</b>	★★★	★★★	★★★★★	★★★	★★★	★★★

## Teslimat durumu

### Annealed

Sertlik (HB)	maks. 300
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## Isıl işlem

### Annealing

Sıcaklık	770 kadar 840 °C	Controlled slow cooling in furnace (10 to 20°C / h) to approx. 600°C (1110°F), air cooling.
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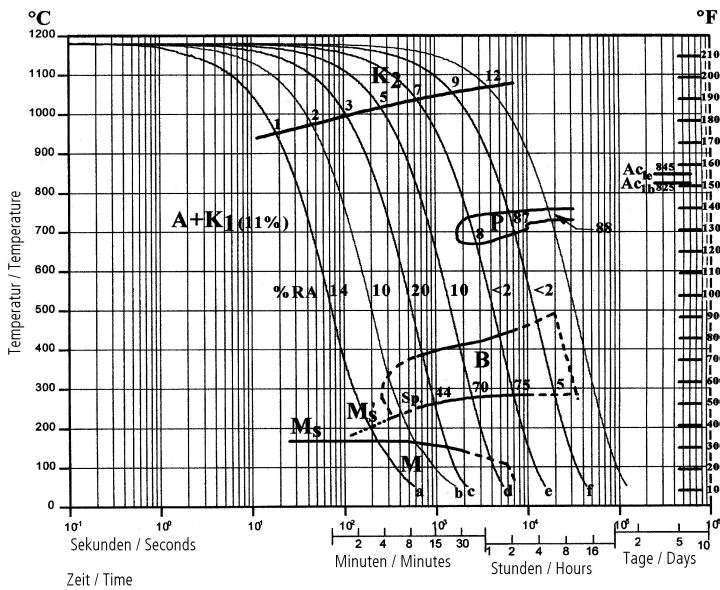
### Stress relieving

Sıcaklık	600 kadar 650 °C	Slow cooling 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	1.075 kadar 1.180 °C	Salt bath, vacuum    Preheating: 1st stage ~ 500 °C, 2nd stage ~ 850 °C, 3rd stage ~1050 °C (for higher austenitising temperature)    Austenitising: for cutting applications at higher austenitising temperatures (> 1100 °C), holding time after complete heating 80 seconds, maximum 150 seconds, to avoid material damage due to overtime.    Austenitising: for cold work applications at lower austenitising temperatures (< 1100°C). Holding time after complete heating 15 to 30 min    Quenching: oil, warm bath (500 - 550 °C), gas.
Sıcaklık	540 kadar 570 °C	Slow heating to tempering temperature immediately after austenitising.    Dwell time in the furnace 1 hour per 20 mm material thickness (at least 1 hour)    Slow cooling to room temperature    3 tempering cycles recommended    Hardness see tempering chart

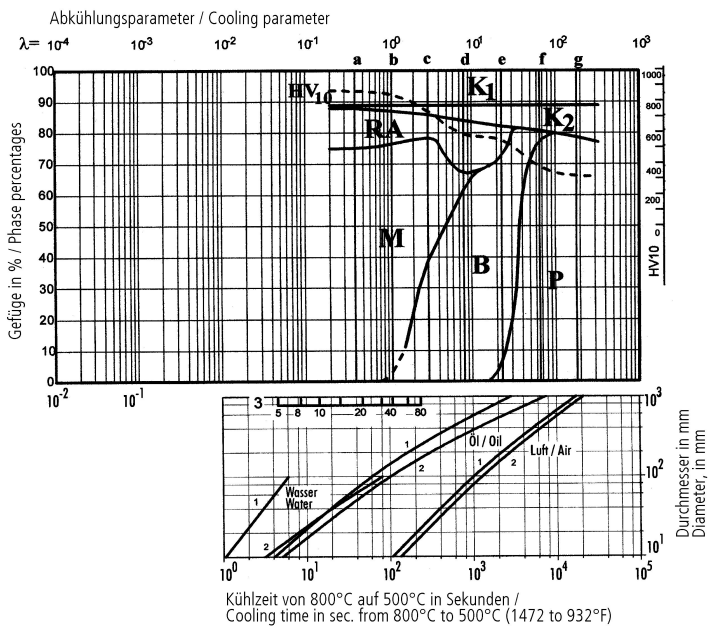
Continuous cooling CCT curves



Austenitising temperature: 1180°C (2156°F)  
Holding time: 180 seconds

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

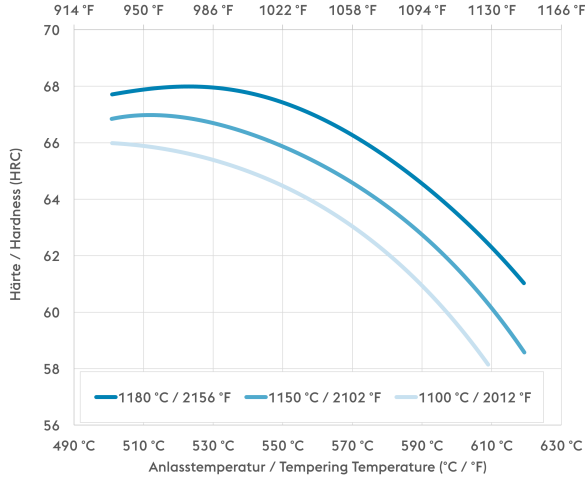
Quantitative phase diagram



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

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

## Tempering Chart



Holding time 3 x 2 hours  
Specimen size: square 25 mm

## Fiziksel özellikler

Sıcaklık (°C)	20
Yoğunluk (kg/dm <sup>3</sup> )	8,05
Termal iletkenlik (W/(m.K))	22
Özgül ısı kapasitesi (kJ/kg K)	0,42
Spes. elektrik direnci (Ohm.mm <sup>2</sup> /m)	0,61
Elastikiyet modülü (10 <sup>3</sup> N/mm <sup>2</sup> )	240

## Termal genleşmeler

Sıcaklık (°C)	100	200	300	400	500	600	700
Termal genleşme (10 <sup>-6</sup> 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.

*The data contained in this brochure is merely for general information and therefore shall not be binding on the company. We may be bound only through a contract explicitly stipulating such data as binding. Measurement data are laboratory values and can deviate from practical analyses. The manufacture of our products does not involve the use of substances detrimental to health or to the ozone layer.*

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ONE STEP AHEAD.