

SICAK İŞ TAKIM ÇELİKLERİ

Mevcut Ürün Şekilleri

Uzun Ürünler*

Levhalar

Açık Kalıpta Dövme

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

Ürün Tanımı

BÖHLER W350 ISOBLOC is a material produced by the electroslag remelting process (ESR) which is particularly suitable for use in large casting and forging molds. Although the steel can be classified as a 5% chromium steel, the chemical composition has been chosen to provide the best possible through-hardening without any loss of toughness or resistance against heat-checkings. These properties make the steel the perfect choice to produce very large die casting molds, for example for mega- or giga-casting.

Erime rotası

Airmelted + Remelted

Özellikler

- > Tokluk ve Süneklik : çok yüksek
- > Aşınma Direnci : yüksek
- > İşlenebilirlik : çok yüksek
- > Sıcak Sertlik (kırmızı sertlik) : yüksek
- > Cilalanabilirlik : çok yüksek
- > Termal iletkenlik : çok yüksek
- > Mikro temizlik : yüksek

Uygulamalar

- > Ekstrüzyon
- > Dövme (Sıcak / Yarı Sıcak)
- > Makine Mühendisliği için Genel Parçalar
- > Yerçekimi / Düşük Basıncılı Döküm
- > Yüksek Basıncılı Döküm
- > Enjeksiyon kalıplama
- > Pres Sertleştirme / Sıcak Damgalama
- > Progressive Forging (Hatebur)
- > Makine Mühendisliği / Makine İmalatı, Genel




Teknik veriler

Malzeme Tanımı		Standartlar	
BÖHLER patent	Market grade	#207	NADCA
E1850	NADCA		

Kimyasal Bileşim

C	Si	Mn	Cr	Mo	V	N
0,38	0,20	0,55	5,00	1,80	0,55	def.

Malzeme özellikleri

	Sıcak güç	Sıcak tokluk	Sıcak aşınma direnci
	★★★	★★★★★	★★★
	★★	★★★★	★★
	★★	★★★	★★
	★★★	★★★★	★★★
	★★★	★★★	★★★
	★★★★	★★★	★★★★
	★★★	★★	★★★
	★★★★★	★★★★	★★★★★
	★★	★★★★★	★★
	★★★★	★★★★	★★★★

Teslimat durumu

Annealed

Sertlik (HB)	maks. 205
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Isıl işlem

Annealing

Sıcaklık	800 kadar 850 °C	Slow controlled cooling in furnace at a rate of 10 to 20 °C/hr (50 to 68 °F/hr) down to approx. 600 °C (112 °F), further cooling in air.
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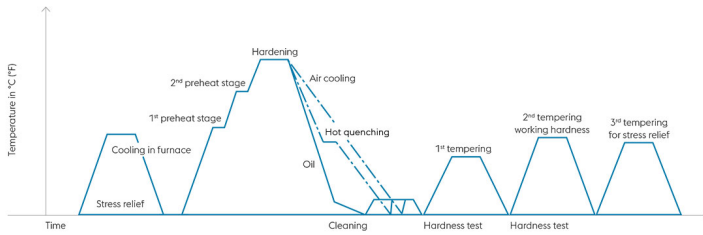
Stress relieving

Sıcaklık	600 kadar 670 °C	Slow cooling furnace. To relieve stresses caused by extensive machining, or for complex shapes. Soak for 1 -2 hours after temperature equalisation (in neutral atmosphere).
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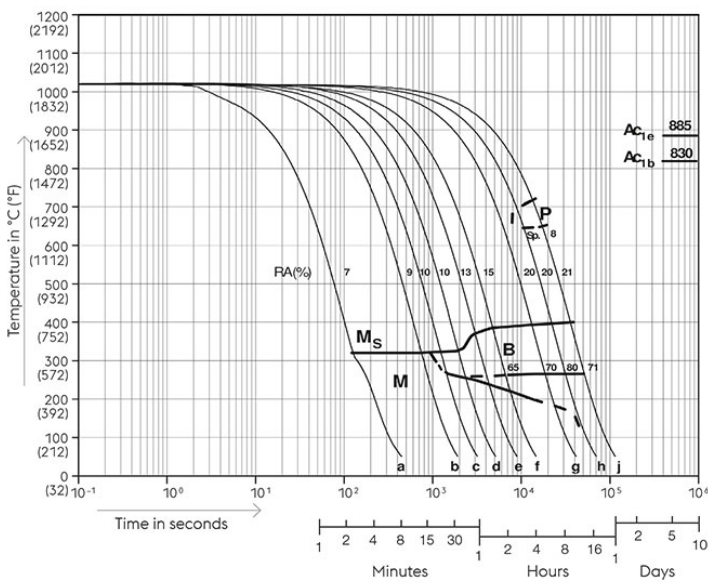
Sertleştirme ve Temperleme

Sıcaklık	1.010 kadar 1.020 °C	Holding time after temperature equalization: 15 to 30 minutes; In order to prevent coarsening of the grain, hardening must be carried out at the recommended temperature. For big dimensions it's recommended to reduce the temperature to 1010 °C (1850 °F); Quenching: oil, salt bath (500 - 550°C [932 - 1022 °F]), air, inert gas in vacuum; After hardening, required tempering treatment to achieve desired working hardness (see tempering chart).
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Heat treatment sequence



Continuous cooling CCT curves

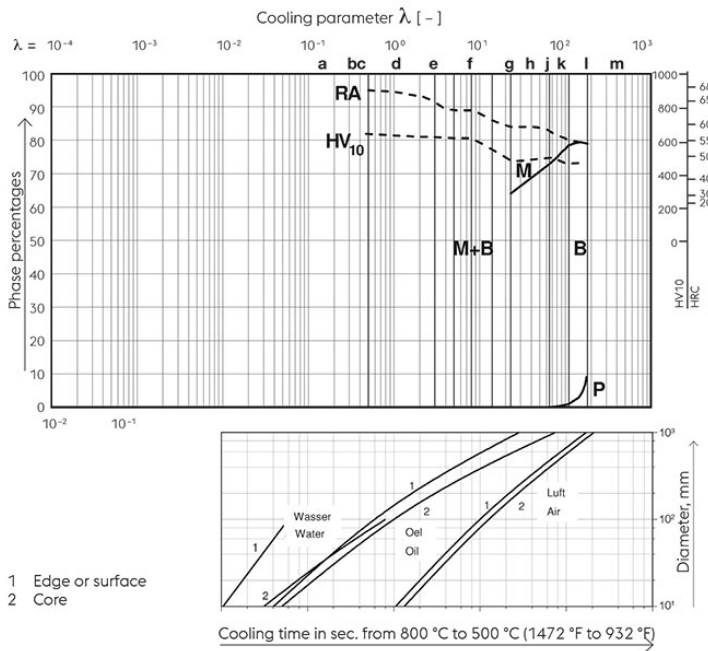


Austenitising temperature: 1020°C (1868°F)
 Holding time: 15 minutes
 5...100 phase percentages
 0.5...180 cooling parameter, i.e. duration of cooling from 800 - 500°C (1472-932°F) in s x 10⁻²

Table:
 Sample λ HV10

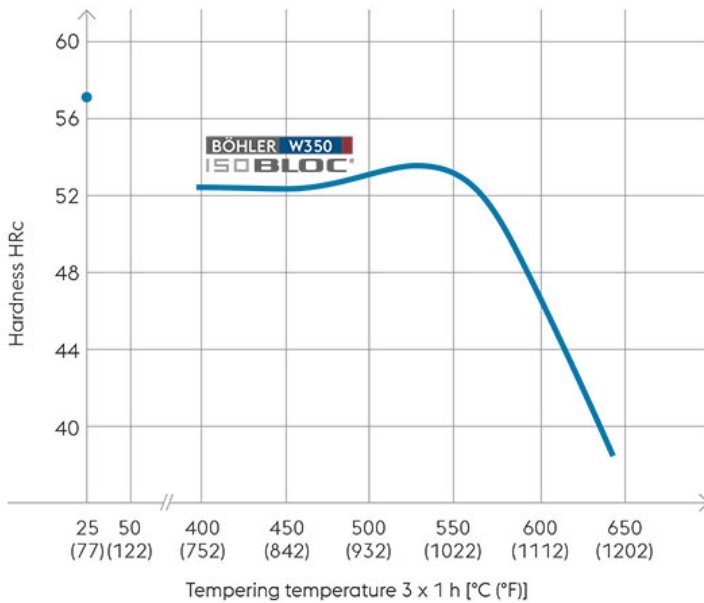
a	0,50	630
b	3	616
c	5	606
d	8	606
e	14	517
f	23	478
g	65	497
h	110	454
j	180	459

Quantitative phase diagram



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

Tempering chart



Tempering:

Slow heating to tempering temperature immediately after hardening (time in furnace 1 hour for each 0,787 inch (20 mm) of workpiece 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. 86°F (30°C) 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 to 50°C) below highest tempering temperature.

Hardening temperature: 1020°C (1868°F)
Specimen size: square 20 mm

Fiziksel özellikler

Sıcaklık (°C)	20
Yoğunluk (kg/dm ³)	7,8
Termal iletkenlik (W/(m.K))	28,8
Özgül ısı kapasitesi (kJ/kg K)	0,46
Spes. elektrik direnci (Ohm.mm ² /m)	-
Elastikiyet modülü (10 ³ N/mm ²)	214

Termal genleşmeler

Sıcaklık (°C)	100	200	300	400	500	600	700
Termal genleşme (10 ⁻⁶ m/(m.K))	11,14	11,94	12,42	12,85	13,21	13,51	13,58

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

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