BÖHLER

BÖHLER W403
VMR®

SICAK IŞ TAKIM ÇELIKLERI

Mevcut Ürün Şekilleri

Uzun Ürünler

Ürün Tanımı

BÖHLER W403 VMR is a vacuum remelted material which was developed as a problem solver for tools for where a standard solution is no longer sufficient. The steel can be assigned to the 5% chromium steels and has a very high purity due to the special manufacturing technology. In addition, the increased molybdenum content leads to improved thermal resistance as well as wear resistance, which makes BÖHLER W403 VMR an all-rounder that is often used for highly stressed dies in the die casting sector. In addition, Böhler W403 VMR has outstanding polishability. For this reason, the steel is also popular as a molding material for plastic injection molds.

Erime rotası

Airmelted + VAR

Özellikler

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

Uygulamalar

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

Teknik veriler

Malzeme Tanımı	
~1.2367	SEL
~X38CrMoV5-3	EN
C1885	NADCA

Standartlar	
#207	NADCA

Kimyasal Bileşim

C	Si	Mn	Cr	Mo	V
0,38	0,20	0,25	5,00	2,80	0,65

Malzeme özellikleri

	Sıcak güç	Sıcak tokluk	Sıcak aşınma direnci
BÖHLER W403 VMR®	★★★★	★★★★	★★★★
BÖHLER W300 ISOBLOC®	★★	★★★★	★★
BÖHLER W300 ISODISC®	★★	★★★	★★
BÖHLER W302 ISOBLOC®	★★★	★★★★	★★★
BÖHLER W302 ISODISC®	★★★	★★★	★★★
BÖHLER W303 ISODISC®	★★★★	★★★	★★★★
BÖHLER W350 ISOBLOC®	★★★	★★★★★	★★★
BÖHLER W360 ISOBLOC®	★★★★★	★★★★	★★★★★
BÖHLER W400 VMR®	★★	★★★★★	★★

Teslimat durumu

Annealed

Sertlik (HB)	maks. 205

Isıl işlem

Annealing

Sıcaklık	800 kadar 850 °C	Holding time 6 to 8 hours. Slow, controlled furnace cooling at 10 to 20°C/h (50 to 68 °F/hr) to approx. 600°C (1112°F), further cooling in air.

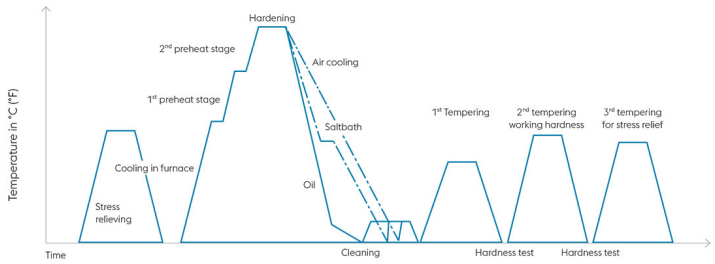
Stress relieving

Sıcaklık	600 kadar 670 °C	For stress relief after extensive machining or for complicated tools. Holding time depending on tool size after complete heating 2 - 6 hours in neutral atmosphere. Slow furnace cooling.

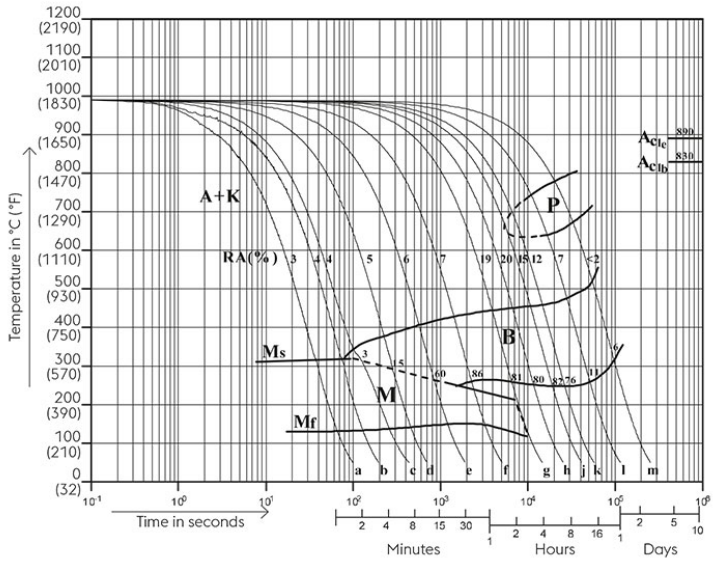
Sertleştirme ve Temperleme

Sıcaklık	1.020 kadar 1.030 °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; Quenching: oil, salt bath (500 - 550°C [930 to 1020 °F]), air, inert gas in vacuum; After hardening, required tempering treatment to achieve desired working hardness (see tempering chart).

Heat treatment sequence



Continuous cooling CCT curves

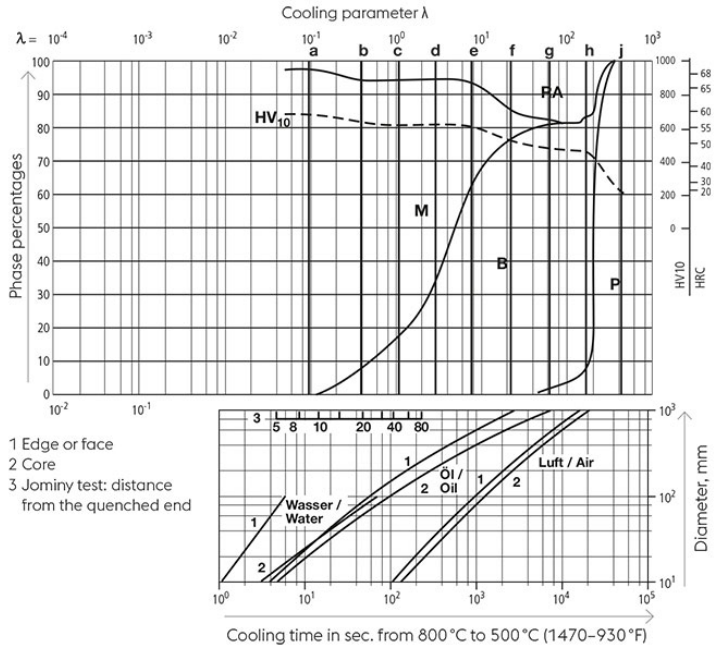


Austenitising temperature: 1025°C (1877°F)
Holding time: 15 minutes
5...100 phase percentages
0.5...180 cooling parameter, i.e. duration of cooling from 800 - 500°C (1472-932°F) in s x 10^{-2}

Table:

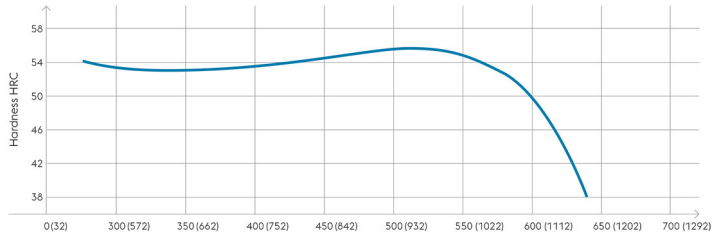
Sample	λ	HV10
a	0,1	686
b	0,4	643
c	1,1	619
d	3	624
e	8	615
f	23	529
g	65	494
h	180	465
j	400	234

Quantitative phase diagram



A... Austenite
B... Bainite
K... Carbide
M... Martensite
P... Perlite
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: 1030°C (1886°F)
Specimen size: square 20 mm

Fiziksel özellikler

Sıcaklık (°C)	20
Yoğunluk (kg/dm^3)	7,85
Termal iletkenlik (W/(m.K))	29,8
Özgül ısı kapasitesi (kJ/kg K)	0,47
Spes. elektrik direnci (Ohm.mm^2/m)	-
Elastikiyet modülü (10^{3}N/mm^2)	211

Termal genleşmeler

Sıcaklık (°C)	100	200	300	400	500	600
Termal genleşme (10^{-6} m/(m.K))	10,63	10,83	12	12,92	14,13	14,34

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

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