

OȚELURI PENTRU SCULE PENTRU LUCRU LA CALD

Application Segments

Lucrări la cald

Available Product Variants

Long Products*

Plates

Open Die Forgings

* Datele prezentate se referă exclusiv la produsele lungi. Vă rugăm să respectați explicațiile detaliate de la sfârșitul fișei tehnice (pdf).

Product Description

BÖHLER W300 ISODISC is a 5% chromium steel and corresponds to material number 1.2343 (X37CrMoV5-1). This common tool steel has good hot toughness as well as a high hot hardness and a high resistance against heat-checkings. The combination of these properties makes it a standard choice in extrusion, forging and low-pressure die casting. This material is also available as W300 ISOBLOC which is a remelted grade with improved cleanliness, homogeneity and toughness.

Process Melting

Aer topit

Properties

- > Rezistență și ductilitate : good
- > Rezistență la uzură : good
- > Machinability : very high
- > Duritate la cald (duritate roșie) : good
- > Poluabilitate : good
- > Conductivitate termică : good
- > Micro-curățenie : good

Applications

- > Extrudare
- > Turnare sub presiune înaltă
- > Forjare progresivă (Hatebur)
- > Aplicații de forjare
- > Cuțite industriale
- > Componente pentru industria reciclării
- > Forjare (la cald / semi-cald)
- > Turnare prin injecție
- > Inginerie mecanică
- > Cuțit de mașină (pentru producători)
- > Suporturi de scule (frezare, găurire, strunjire și mandrine)
- > Gravitate / presiune scăzută turnare sub presiune
- > Întărire prin presare / ștampilare la cald
- > Elemente de fixare, șuruburi, piulițe
- > Rulouri
- > Sisteme Hotrunner

Technical data

Material designation		Standards	
1.2343	SEL	4957	EN ISO
X37CrMoV5-1	EN	G4404	JIS
T20811	UNS		
H11	AISI		
SKD6	JIS		

Chemical composition (wt. %)

C	Si	Mn	Cr	Mo	V
0.38	1.10	0.40	5.00	1.20	0.40

Material characteristics

	High temperature strength	High temperature toughness	High temperature wear resistance	Machinability in as supplied condition	Polishability
BÖHLER W300 ISODISC	★★	★★★	★★	★★★★★	★★★
BÖHLER W300 ISOBLOC	★★	★★★★	★★	★★★★★	★★★★
BÖHLER W302 ISODISC	★★★	★★★	★★★	★★★★★	★★★
BÖHLER W302 ISOBLOC	★★★	★★★★	★★★	★★★★★	★★★★
BÖHLER W303 ISODISC	★★★★	★★★	★★★★	★★★★★	★★★
BÖHLER W320 ISODISC	★★★	★★	★★★	★★★★★	★★★
BÖHLER W350 ISOBLOC	★★★	★★★★★	★★★	★★★★★	★★★★
BÖHLER W360 ISOBLOC	★★★★★	★★★★	★★★★★	★★★★★	★★★★
BÖHLER W400 VMR	★★	★★★★★	★★	★★★★	★★★★★
BÖHLER W403 VMR	★★★★	★★★★	★★★★	★★★★	★★★★★

Delivery condition

Recoaptă

Hardness (HB)	max. 229
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Durificat și temperat

Hardness (HRC)	40 to 55 bars hardened and tempered (BHT)
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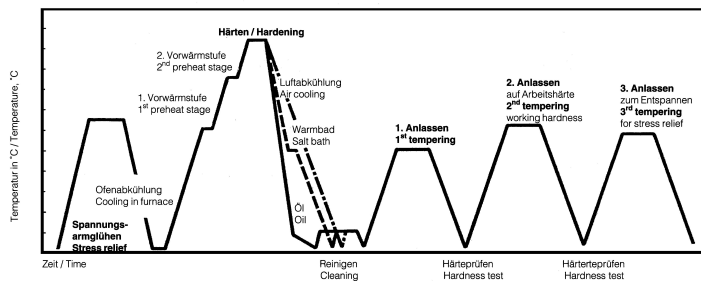
Durificat și temperat

Hardness (HRC)	30 to 44
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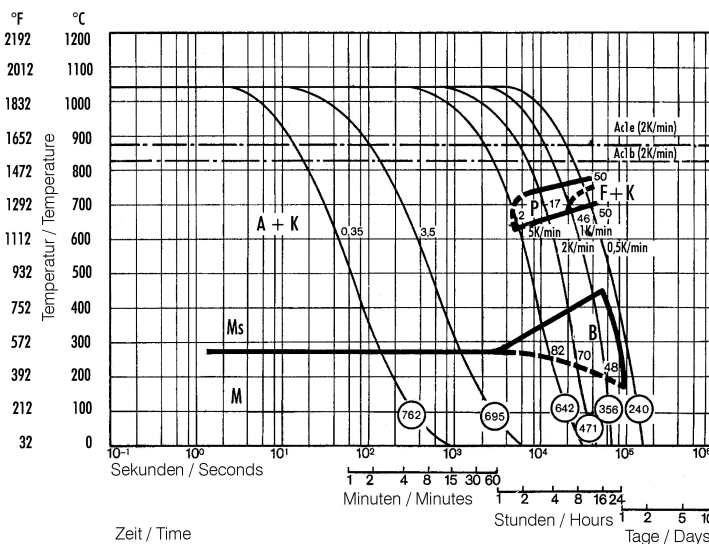
Heat treatment

Recoacere		
Temperature	750 to 800 °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.
Eliminarea stresului		
Temperature	600 to 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.
Călire și revenire		
Temperature	1,000 to 1,030 °C	Holding time after temperature equalization: 15 to 30 minutes; Quenching: Oil, salt bath (500 - 550°C [932-1022°F]), air, vacuum; After hardening, tempering to the desired working hardness (see tempering chart).

Heat treatment sequence



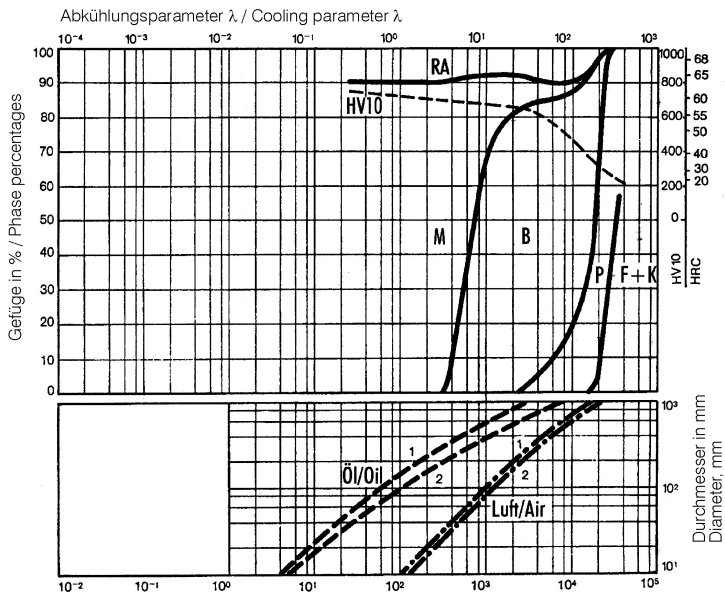
Continuous cooling CCT curves



Austenitising temperature: 1030°C (1886°F)
Holding time: 15 minutes

- Vickers hardness
- 2...46 phase percentages
- 0.35...3.5 cooling parameter, i.e. duration of cooling from 800 - 500°C (1472-932°F) in $s \times 10^{-2}$
- 5...0.5 K/min cooling rate in K/min in the 800 - 500°C (1472-932°F) range

Quantitative phase diagram

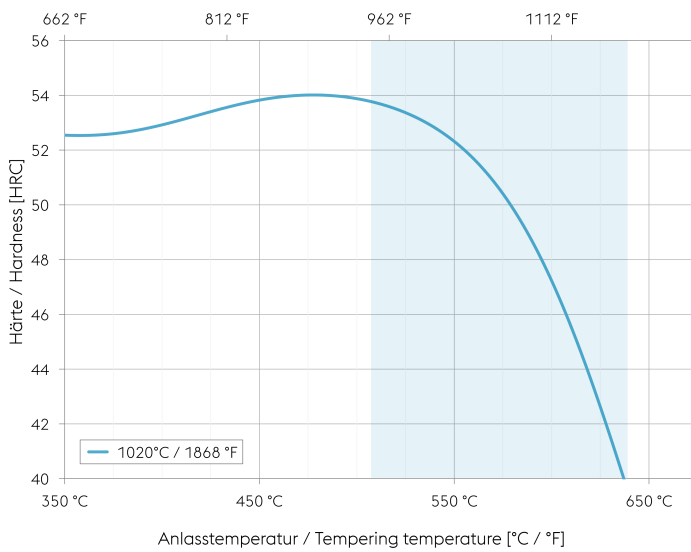


- A... Austenite
- B... Bainite
- F... Ferrite
- K... Carbide
- M... Martensite
- P... Pearlite
- RA... Retained austenite

- 1... Edge or face
- 2... Core

Kühlzeit von 800°C auf 500°C in Sek. / Time of cooling from 800°C to 500°C (1472-932°F) in seconds

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.

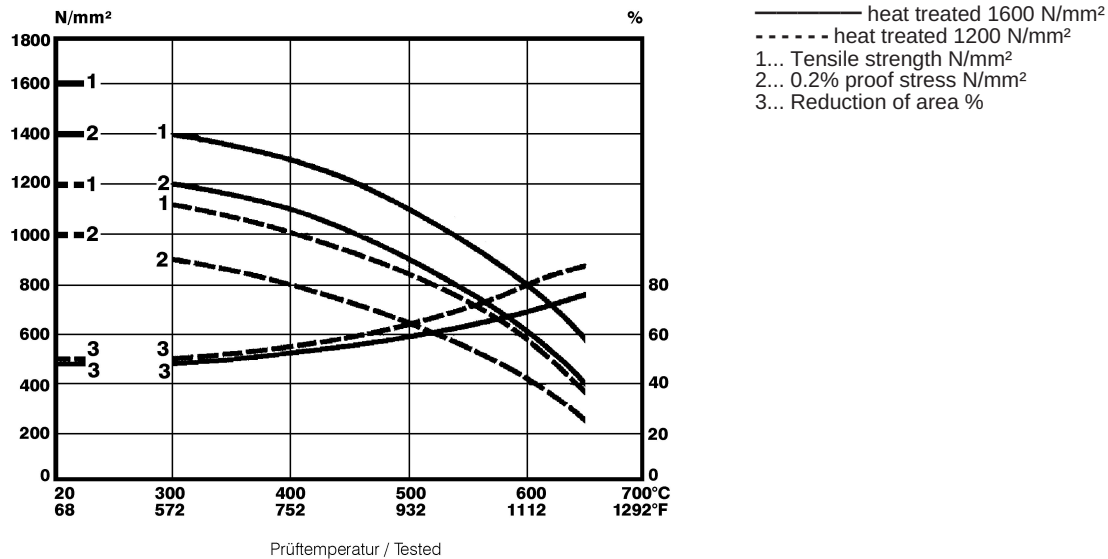
The tempering chart shows average tempered hardness values.

3rd for stress relieving at a temperature 86 to 122°F (30 to 50°C) below highest tempering temperature.

Recommended tempering temperature range is indicated by the blue area in the chart.

Hardening temperature: 1020°C (1868°F)
Specimen size: square 50 mm

Hot strength chart



Physical Properties

Temperature (°C)	20
Density (kg/dm ³)	7.8
Thermal conductivity (W/(m.K))	24.9
Specific heat (kJ/kg K)	0.46
Spec. electrical resistance (Ohm.mm ² /m)	0.52
Modulus of elasticity (10 ³ N/mm ²)	215

Thermal Expansions between 20°C | 68°F and ...

Temperature (°C)	100	200	300	400	500	600	700
Thermal expansion (10 ⁻⁶ m/(m.K))	11.5	12	12.2	12.5	12.9	13	13.2

If other available product variants are listed in addition to long products, please note that these may differ in terms of melting process, technical data, delivery and surface condition as well as available product dimensions. For mandatory technical specifications, other requirements and dimensions, please contact our regional voestalpine BÖHLER sales companies. 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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