

HOT WORK TOOL STEELS

Available Product Variants

Long Products	Round Bar	Flat Bar	Plates	Open Die Forgings
Ground Flat	Round Ground Bar			

Product Description

Hot work tool steel with high hardness, specially developed for use in warm forging applications or for forging dies. BÖHLER W360 ISOBLOC has a significantly higher toughness than 1.2367 ESR – at a higher hardness.

Properties

- > Toughness & Ductility: high
- > Wear Resistance: very high
- > Machinability: very high
- > Hot Hardness (red hardness): very high
- > Polishability: very high
- > Thermal conductivity: very high
- > Micro-cleanliness: high

Applications

- > Coining
- > Forging (Hot / Semi-hot)
- > High Pressure Die-Casting
- > Progressive Forging (Hatebur)
- > Mechanical Engineering / Machine Building General
- > Fasteners, Bolts, Nuts
- > Powder Pressing
- > Standard Parts (Molds, Plates, Pins, Punches)
- > Extrusion
- > General Components for Mechanical Engineering
- > Injection Molding
- > Rolling
- > Automotive Racing
- > Forging Applications
- > Rolls
- > Pill punching dies
- > Fine Blanking, Stamping, Blanking
- > Gravity / Low Pressure Die-Casting
- > Press Hardening / Hot Stamping
- > Shearing / Machine Knives
- > Cold Forming
- > Machine knife (for producers)
- > Screws and Barrels

Technical data

Material designation	
BÖHLER patent	Market grade

Chemical composition (wt. %)

C	Si	Mn	Cr	Mo	V
0.5	0.2	0.25	4.5	3	0.6

Material characteristics

	High temperature strength	High temperature toughness	High temperature wear resistance	Machinability
BÖHLER W360 ISOBLOC®	★★★★★	★★★★	★★★★★	★★★★★
BÖHLER W300 ISOBLOC®	★★	★★★★	★★	★★★★★
BÖHLER W300 ISODISC®	★★	★★★	★★	★★★★★
BÖHLER W302 ISOBLOC®	★★★	★★★★	★★★	★★★★★
BÖHLER W302 ISODISC®	★★★	★★★	★★★	★★★★★
BÖHLER W303 ISODISC®	★★★★	★★★	★★★★	★★★★★
BÖHLER W320 ISODISC®	★★★	★★	★★★	★★★★★
BÖHLER W350 ISOBLOC®	★★★	★★★★★	★★★	★★★★★
BÖHLER W400 VMR®	★★	★★★★★	★★	★★★★
BÖHLER W403 VMR®	★★★★	★★★★	★★★★	★★★★

Delivery condition

Annealed	
Hardness	max. 205 HB

Heat treatment

Annealing		
Temperature (°C °F)	750 1382 to 800 1472	Holding time 6 to 8 hours. Slow, controlled cooling in furnace at a rate of 10 to 20 °C/h (50 to 68 °F/h) down to approx. 600 °C (1100°F), further cooling in air.
Stress relieving		
Temperature (°C °F)	650 1202 to 700 1292	After through-heating, soak for 1 to 2 hours in a neutral atmosphere. Cool slowly in furnace.
Hardening and Tempering		
Temperature (°C °F)	1050 1922	1050 °C (1920 °F)/oil, salt bath 500 bis 550 °C (930 to 1020 °F), air, vacuum furnace with gas quenching Holding time after through-heating: 15 to 30 minutes After hardening, tempering to the desired working hardness, see tempering chart.

Physical Properties

Temperature (°C °F)	20 68
Density (kg/dm ³ lb/in ³)	7.81 0.28
Thermal conductivity (W/(m.K) BTU (IT) ft/hr/ft ² /F)	30.8 17.8
Specific heat (J/(kg.K) BTU (IT) lb/F)	430 102.7
Spec. electrical resistance (Ohm.mm ² /m 10 ⁻⁴ Ohm.inch ² /ft)	-
Modulus of elasticity (10 ³ N/mm ² 10 ³ ksi)	212 30.8

Thermal Expansions

Temperature (°C °F)	100 212	200 392	300 572	400 752	500 932	600 1112
Thermal expansion (10 ⁻⁶ m/(m.K) 10 ⁻⁶ inch/(inch.F))	10.75 5.972	11.56 6.422	12.11 6.728	12.5 6.944	12.81 7.117	13.28 7.378

For more information see <https://www.voestalpine.com/bohler-edelstahl/de/>

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