

HOT WORK TOOL STEELS

Available Product Shapes

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

- High toughness & ductility
- Very high wear resistance
- Very good machinability
- Very high hot hardness
- Very good polishability
- Very high thermal conductivity
- High micro-cleanliness
- High resistance to fire cracking
- Excellent homogeneity and isotropy
- Coatable
- Lowest levels of unwanted trace elements
- Can be nitrated
- Very high thermal stability

Applications

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| <ul style="list-style-type: none"> > 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) | <ul style="list-style-type: none"> > Extrusion > General Components for Mechanical Engineering > Injection Molding > Rolling > Automotive Racing > Forging Applications > Rolls > Pill punching dies | <ul style="list-style-type: none"> > 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 |
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Standards	Patent
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Chemical composition

C	Si	Mn	Cr	Mo	V
0.50	0.20	0.25	4.50	3.00	0.60

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 - 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 - 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 at 20°C / 68°F

Density	7.81 / 0.28	[kg/dm ³ / lb/in ³]
Thermal conductivity	30.8 / 17.8	[W/(m.K) / BTU (IT) ft/hr/ft ² /F]
Specific heat	430 / 102.7	[J/(kg.K) / BTU (IT) lb/F]
Modulus of elasticity	212 / 30.8	[10 ³ N/mm ² / 10 ³ ksi]

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 www.voestalpine.com/boehler-edelstahl

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ONE STEP AHEAD.