

# COLD WORK STEELS

## Available Product Shapes

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

## Product Description

BÖHLER K340 ISODUR, an 8% chromium steel, is produced using the electro-slag remelting (ESR) method. This by BÖHLER developed and proven remelting technology, ensures extremely low micro and macro segregations and gives the material the purity and homogeneity necessary for excellent performance in practice.

## Properties

Key reasons for the broad application spectrum of BÖHLER K340 ISODUR:

- Outstanding toughness
- Excellent compressive strength
- Very good machinability due to homogeneous structure
- Smaller dimensional changes

BÖHLER K340 ISODUR is particularly suitable for the following application areas:

- Cutting
- Blanking
- Cold forming

## Applications

- |                                 |                                     |   |
|---------------------------------|-------------------------------------|---|
| > Machine knife (for producers) | > Rolling                           | > Cold Forming  |
| > Coining                       | > Fine Blanking, Stamping, Blanking | > Powder Pressing                                       |
| > Screws and Barrels            | > Components for Recycling Industry | > Comps. for Equip. Below Ground (Boring, Shafts, etc.) |
| > Rolls                         | > Wear parts                        | > General Components for Mechanical Engineering         |
| > Thread rolling                | > Pill punching dies                |   |

## Chemical composition (wt. %)

C	Si	Mn	Cr	Mo	V	Al	Nb
1.1	0.9	0.4	8.3	2.1	0.5	+	+

### Material characteristics

	Compressive strength	Dimensional stability during heat treatment	Toughness	Wear resistance abrasive	Wear resistance adhesive
<b>BÖHLER K340</b> ISODUR®	★ ★ ★	★ ★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★ ★
<b>BÖHLER K100</b>	★ ★	★ ★	★	★ ★ ★	★ ★
<b>BÖHLER K105</b>	★ ★	★ ★	★	★ ★	★ ★
<b>BÖHLER K107</b>	★ ★	★ ★	★	★ ★ ★	★ ★
<b>BÖHLER K110</b>	★ ★	★ ★ ★	★	★ ★ ★	★ ★
<b>BÖHLER K190</b> MICROCLEAN®	★ ★ ★ ★	★ ★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★
<b>BÖHLER K294</b> MICROCLEAN®	★ ★ ★ ★ ★	★ ★ ★ ★ ★	★ ★ ★	★ ★ ★ ★ ★	★ ★ ★ ★ ★
<b>BÖHLER K340</b> ECOSTAR®	★ ★ ★	★ ★ ★	★ ★	★ ★	★ ★
<b>BÖHLER K360</b> ISODUR®	★ ★ ★	★ ★ ★ ★	★ ★ ★	★ ★ ★ ★	★ ★ ★ ★
<b>BÖHLER K346</b>	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★ ★	★ ★
<b>BÖHLER K353</b>	★ ★	★ ★ ★	★ ★	★ ★	★ ★
<b>BÖHLER K390</b> MICROCLEAN®	★ ★ ★ ★ ★	★ ★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★ ★	★ ★ ★ ★ ★
<b>BÖHLER K890</b> MICROCLEAN®	★ ★ ★ ★	★ ★ ★ ★ ★	★ ★ ★ ★ ★	★ ★ ★	★ ★ ★
<b>BÖHLER K490</b> MICROCLEAN®	★ ★ ★ ★	★ ★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★
<b>BÖHLER K497</b> MICROCLEAN®	★ ★ ★ ★ ★	★ ★ ★ ★ ★	★ ★ ★	★ ★ ★ ★ ★	★ ★ ★ ★ ★

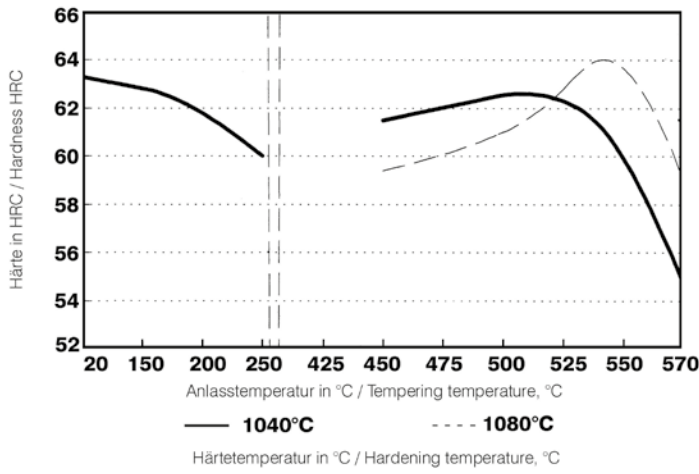
### Delivery condition

Annealed	
Hardness	max. 235 HB

### Heat treatment

Stress relieving		
Temperature (°C   °F)	650   1202	After through-heating, hold in neutral atmosphere for 1 - 2 hours. Slow cooling in furnace.
Hardening and Tempering		
Temperature (°C   °F)	1040   1904 to 1060   1940	Oil, salt bath, compressed air, air, vacuum After through-heating, hold for 15 to 30 minutes. After hardening, tempering to the desired working hardness, see tempering chart.

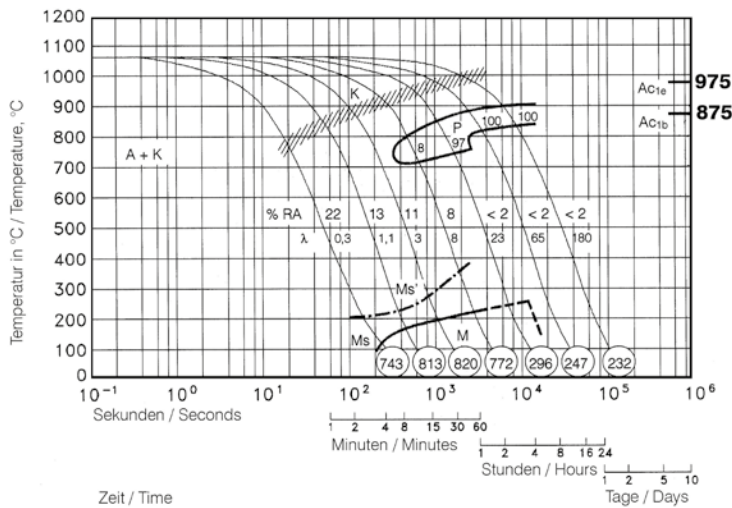
**Tempering chart**



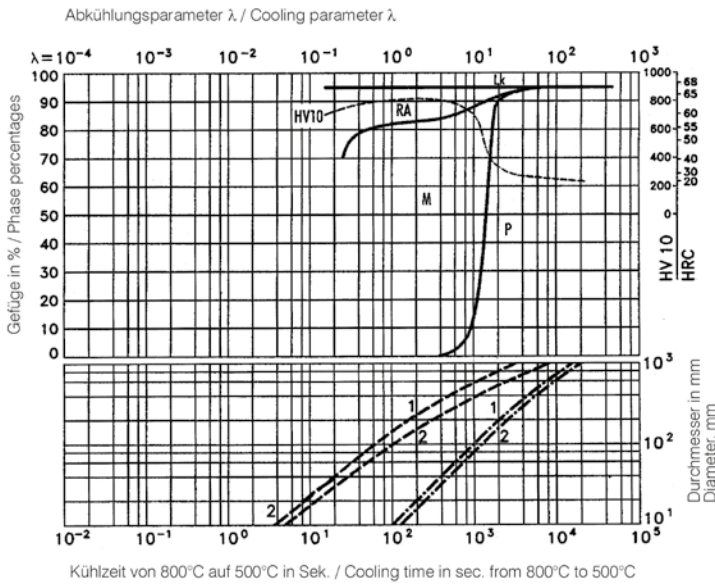
**Tempering:**

Hardening temperature:  
 — 1040°C/1904°F  
 - - - - 1060°C/1940°F  
 Specimen size: square 20 mm

**CCT chart for continuous cooling**



**Quantitative phase diagram**



LK... Ledeburitic carbides  
RA... Retained austenite  
M... Martensite  
P... Perlite

**Physical Properties**

Temperature (°C   °F)	20   68
Density (kg/dm <sup>3</sup>   lb/in <sup>3</sup> )	7.68   0.28
Thermal conductivity (W/(m.K)   BTU (IT) ft/hr/ft <sup>2</sup> /F)	17.8   10.28
Specific heat (J/(kg.K)   BTU (IT) lb/F)	490   117.03
Spec. electrical resistance (Ohm.mm <sup>2</sup> /m   10 <sup>-4</sup> Ohm.inch <sup>2</sup> /ft)	0.64   3.02
Modulus of elasticity (10 <sup>3</sup> N/mm <sup>2</sup>   10 <sup>3</sup> ksi)	206   29.88

**Thermal Expansions**

Temperature (°C   °F)	100   212	200   392	300   572	400   752	500   932	600   1112	700   1292
Thermal expansion (10 <sup>-6</sup> m/(m.K)   10 <sup>-6</sup> inch/(inch.F))	11.2   6.222	11.8   6.556	12.3   6.833	12.7   7.056	12.9   7.167	13.1   7.278	13.1   7.278

For more information see [www.voestalpine.com/bohler-edelstahl](http://www.voestalpine.com/bohler-edelstahl)

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MATERIALS | MACHINING | PVD COATINGS | ADDITIVE



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