COLD WORK TOOL STEELS

Application Segments

Cold Work

Available Product Variants

Long Products*

Plates

* Presented data refer exclusivly to long products. Please observe the detailed explanations at the end of the data sheet (pdf).

Product Description

BÖHLER K340 ISODUR belongs to the group of 8% chromium steels. This tool steel is produced using the electro-slag remelting (ESR) process developed by BÖHLER. This re-melting technology ensures the lowest micro and macro segregation as well as excellent purity and uniformity of the material. Compared to conventional 12% chromium steels, BÖHLER K340 ISODUR offers significantly better toughness, hardening response and higher resistance to adhesive wear. This material is therefore used in virtually all cold work applications in situations where tool steels like 1.2379 are insufficient in terms of adhesive wear resistance and toughness. K340 ISODUR also features better machinability and reduces the risk of stress cracking during electrical discharge machining.

Process Melting

Airmelted + Remelted

Properties

- Toughness & Ductility : good
- Wear Resistance : high
- Compressive strength : good
- Dimensional stability : good
- Grindability : very high

Applications

- Machine knife (for producers)
- Coining
- Screws and Barrels
- Rolls
- Thread rolling
- Rolling
- Fine Blanking, Stamping, Blanking
- Components for the recycling industry
- Wear parts
- Pill punching dies
- Cold Forming
- Powder Pressing
- Components for underground construction (drilling, shafts, etc.)
- General Components for Mechanical Engineering
- Glasfibre reinforced plastics

Chemical composition (wt. %)

C	Si	Mn	Cr	Mo	V	Al	Nb
1.10	0.90	0.40	8.30	2.10	0.50	+	+

Material characteristics

	Compressive strength	Dimensional stability during heat treatment	Toughness	Wear resistance abrasive	Wear resistance adhesive
BÖHLER K340 ISODUR	★★★	★★★★	★★★	★★★	★★★★
BÖHLER K100	★★	★★	★	★★★	★★
BÖHLER K105	★★	★★	★	★★	★★
BÖHLER K107	★★	★★	★	★★★	★★
BÖHLER K110	★★	★★★	★	★★★	★★
BÖHLER K190 MICROCLEAN	★★★★	★★★★★	★★★★	★★★★	★★★★
BÖHLER K294 MICROCLEAN	★★★★★	★★★★★	★★★	★★★★★	★★★★★
BÖHLER K340 ECOSTAR	★★★	★★★	★★	★★	★★
BÖHLER K346	★★★	★★★	★★★	★★★★	★★
BÖHLER K353	★★	★★★	★★	★★	★★
BÖHLER K360 ISODUR	★★★	★★★★	★★★	★★★★	★★★★
BÖHLER K390 MICROCLEAN	★★★★★	★★★★★	★★★★	★★★★★	★★★★★
BÖHLER K490 MICROCLEAN	★★★★	★★★★★	★★★★	★★★★	★★★★
BÖHLER K497 MICROCLEAN	★★★★★	★★★★★	★★★	★★★★★	★★★★★
BÖHLER K888 MATRIX	★★★★	★★★★★	★★★★★	★★	★★
BÖHLER K890 MICROCLEAN	★★★★	★★★★★	★★★★★	★★★	★★★

Delivery condition

Annealed

Hardness (HB)	max. 235

Heat treatment

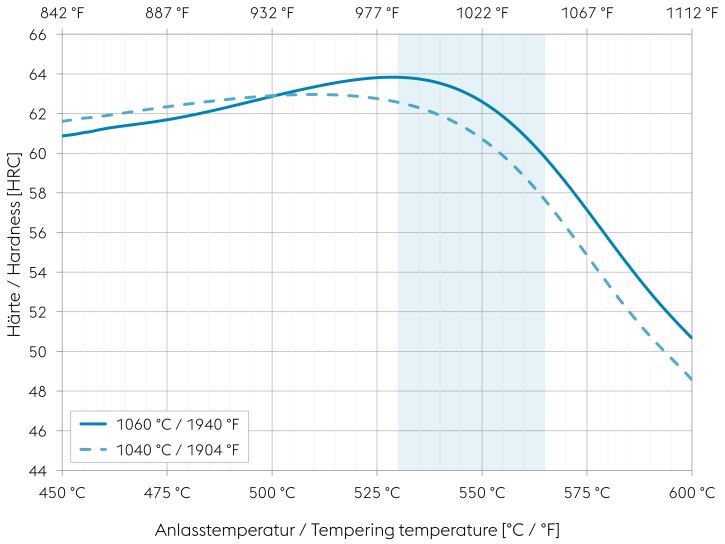
Stress relieving

Temperature	650 °C	After through heating, hold in neutral atmosphere for 1-2 hours. || Slow cooling in furnace || Intended to relieve stresses caused by extensive machining or in complex shapes.

Hardening and Tempering

Temperature	1,040 to 1,060 °C	Quenching: Oil, salt bath, compressed air, air, gas. || Holding time after temperature equalization: 15 to 30 minutes. || After hardening, tempering to the desired working hardness according to the tempering chart.

Tempering chart



Specimen size: square 20 mm (0,787 inch)

Slow heating to tempering temperature immediately after hardening.

Time in furnace 1 hour for each 20 mm (0,787 inch) of workpiece thickness but at least 2 hours.

Please refer to the tempering chart for guide values for the achievable hardness after tempering.

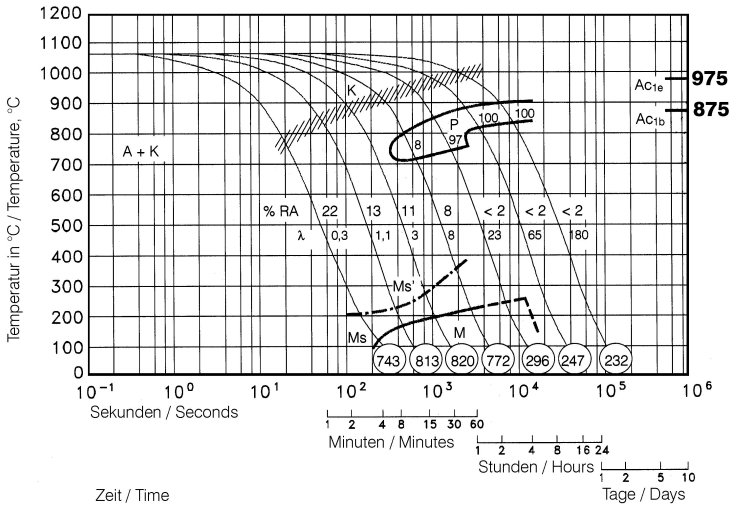
It is recommended to temper at least three times above the secondary hardness maximum.

Cooling in air to room temperature after each tempering step is recommended.

Tempering for stress relieving 30 to 50 °C (86 to 122 °F) below the highest tempering temperature.

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

CCT chart for continuous cooling



Austenitising temperature: 1060 °C (1940 °F)
Holding time: 30 minutes

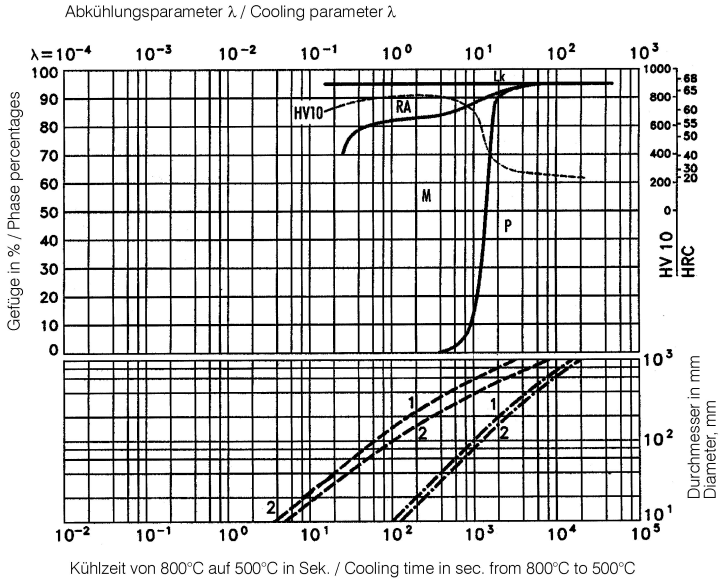
O Vickers hardness

8...100 phase percentages

0.3...180 cooling parameter λ, i.e. duration of cooling from 800 to 500 °C (1472 to 932 °F) in s x 10^{-2}

A... Austenite
K... Carbide
P... Perlite
RA... Residual austenite
M... Martensite
Ms... Martensite starting temperature

Quantitative phase diagram



HV10... Vickers Hardness
LK... Ledeburitic carbides
RA... Retained austenite
M... Martensite
P... Perlite

- - - Oil cooling
- • - Air cooling

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

Physical Properties

Temperature (°C)	20
Density (kg/dm³)	7.68
Thermal conductivity (W/(m.K))	17.8
Specific heat (kJ/kg K)	0.49
Spec. electrical resistance (Ohm.mm²/m)	0.64
Modulus of elasticity (10³N/mm²)	206

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

Temperature (°C)	100	200	300	400	500	600	700
Thermal expansion (10⁻⁶ m/(m.K))	11.2	11.8	12.3	12.7	12.9	13.1	13.1

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ONE STEP AHEAD.