BÖHLER

BÖHLER S290 MICROCLEAN®

HIGH SPEED STEELS

Available Product Shapes

Long Products | Plates

Product Description

BÖHLER S290 MICROCLEAN – "The hard stuff"
The unusual alloy point of this bridge material between carbide and high-speed steel gives it a hardness of up to 70 HRC. In addition to its hot hardness and good wear resistance, its compressive strength is one of the most important properties of this powder-metallurgical high-speed steel class.

Properties

- Toughness & Ductility: good
- Wear Resistance: very high
- Compressive strength: very high
- Edge Stability: very high
- Grindability: good
- Hot Hardness (red hardness): very high

Applications

- Cold Forming / Coining
- Powder Pressing
- Fine Blanking, Stamping, Blanking
- Special Cutting Tools
- Gear Cutting, Shaving and Shaping Tools
- Wear parts

Chemical composition (wt. %)

C	Si	Mn	Cr	Mo	V	W	Co
2	0.5	0.3	3.8	2.5	5.1	14.3	11

Material characteristics

	Compressive strength	Grindability	Red hardness	Toughness	Wear resistance	Edge Stability
BÖHLER S290 MICROCLEAN®	★★★★★	★	★★★★	★★	★★★★★	★★★★
BÖHLER S200	★★★	★★	★★★	★★	★★★	★★
BÖHLER S390 MICROCLEAN®	★★★★	★★★	★★★★	★★★★	★★★★	★★★★
BÖHLER S400	★★★	★★★	★★★	★★★	★★	★★
BÖHLER S401	★★	★★★	★★	★★★	★★	★★★
BÖHLER S404	★★	★★★	★★	★★★	★★	★★
BÖHLER S500	★★★★	★★★	★★★★	★★	★★★	★★★
BÖHLER S590 MICROCLEAN®	★★★★	★★★	★★★★	★★★	★★★	★★★
BÖHLER S600	★★★	★★★	★★★	★★	★★	★★★
BÖHLER S607	★★★	★★★	★★★	★★	★★★	★★★
BÖHLER S690 MICROCLEAN®	★★★	★★★	★★	★★★★★	★★★	★★
BÖHLER S705	★★★	★★★	★★★★	★★	★★	★★★★
BÖHLER S790 MICROCLEAN®	★★★	★★★	★★	★★★★	★★	★★★

Delivery condition

Annealed

Hardness	max. 350 HB

Heat treatment

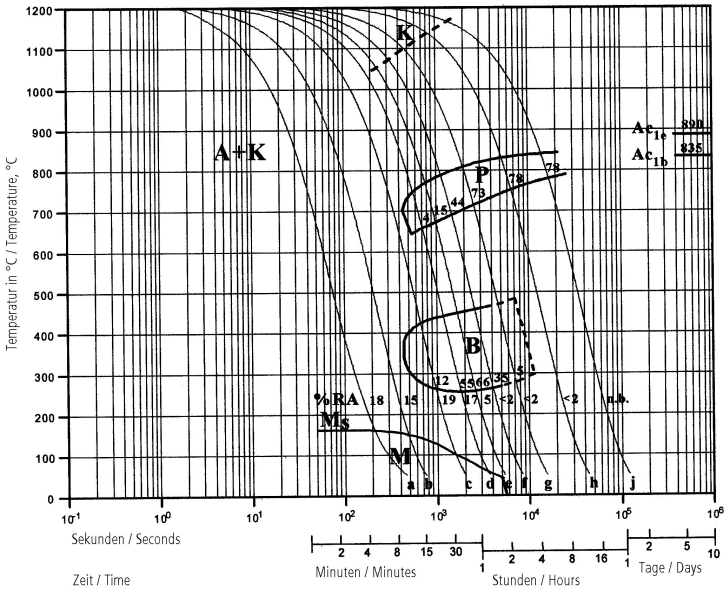
Stress relieving

Temperature (°C | °F)	600 | 1112 to 650 | 1202	Slow cooling in furnace. To relieve stresses set up by extensive machining or in tools of intricate shape. After through heating, hold in neutral atmosphere for 1 to 2 hours.

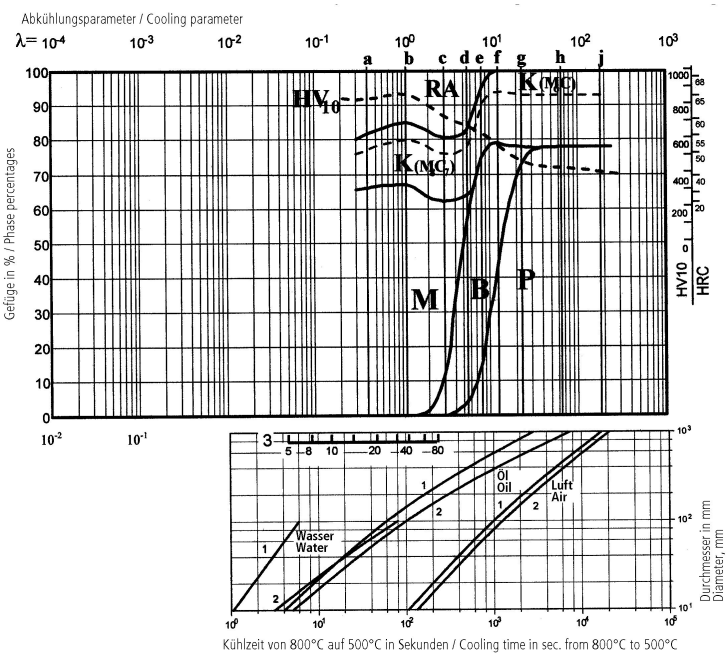
Hardening and Tempering

Temperature (°C | °F)	1150 | 2102 to 1210 | 2210	1150 to 1210°C (2102 to 2210°F), salt bath. 1150 to 1190°C (2102 to 2174°F), gas. Upper temperature range for parts of simple shape, lower for parts of complex shape. For cold working tools also lower temperatures are of inportance for higher toughness. Soaking time after heating up the whole section of a workpiece 80 seconds minimum is required for dissolving sufficient carbides. Maximum soaking time 150 seconds to avoid detriments by oversoaking. In practice instead of soaking time the time of exposure from placing the workpiece into the salth bath after preheating until removing (including the stages of heating to the specified surface temperature and of heating to the temperature. throughout the whole section) is used. “see immersion time diagrams”. Vacuum hardening is also possible. The time in the vacuum furnace depends on the relevant workpiece size and furnace parameters.

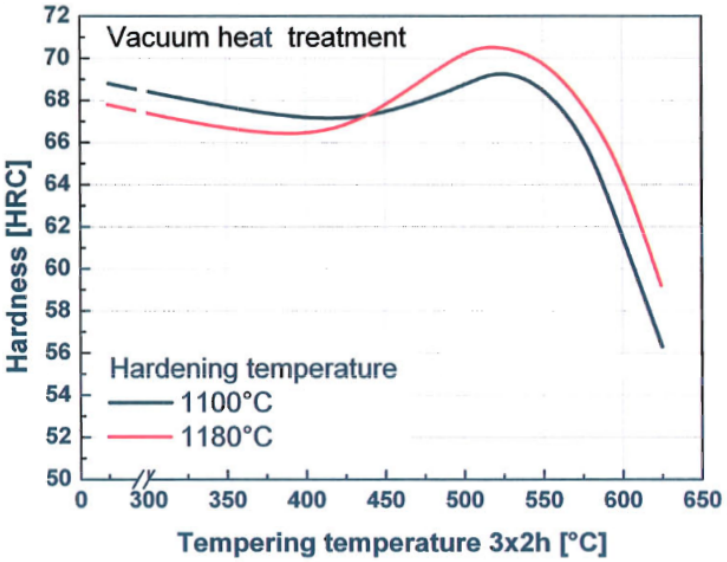
Continuous cooling CCT curves



Quantitative phase diagram



Tempering Chart



Physical Properties

Temperature (°C | °F)	20 | 68
Density (kg/dm^3 | lb/in^3)	8.3 | 0.3
Thermal conductivity (W/(m.K) | BTU (IT) ft/hr/ft^2/F)	19 | 10.98
Specific heat (J/(kg.K) | BTU (IT) lb/F)	410 | 97.93
Spec. electrical resistance (Ohm.mm^2/m | 10^{-4} Ohm.inch^2/ft)	0.56 | 2.65
Modulus of elasticity (10^{3}N/mm^2 | 10^{3}ksi)	242 | 35.1

Thermal Expansions

Temperature (°C | °F)	100 | 212	200 | 392	300 | 572	400 | 752	500 | 932	600 | 1112	700 | 1292
Thermal expansion (10^{-6} m/(m.K) | 10^{-6} inch/(inch.F))	9.6 | 5.333	10 | 5.556	10.3 | 5.722	10.6 | 5.889	10.9 | 6.056	11.2 | 6.222	11.6 | 6.444

For more information see www.voestalpine.com/bohler-edelstahl

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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voestalpine
ONE STEP AHEAD.