

OȚELURI DE MARE VITEZĂ

Application Segments

Unelte de tăiere

Industria auto

Available Product Variants

Long Products*

* Datele prezentate se referă exclusiv la produsele lungi. Vă rugăm să respectați explicațiile detaliate de la sfârșitul fișei tehnice (pdf).

Product Description

BÖHLER S690 MICROCLEAR – "The simple one"

The tough high-speed steel for challenging machining and cold forming.

Process Melting

Metalurgia pulberilor

Properties

- > Rezistență și ductilitate : very high
- > Rezistență la uzură : good
- > Rezistența la compresiune : good
- > Stabilitatea marginilor : good
- > Măcinabilitate : high
- > Duritate la cald (duritate roșie) : good

Applications

- > Răzuitoare și alezoare
- > Blanking fin, ștanțare, blanking
- > Drilling
- > Camshafts
- > Cold Forming / Coining
- > Pulbere de presare
- > Mineral Processing
- > Industria ambalajelor
- > End Mills
- > Unelte de tăiere speciale
- > Wear Applications

Technical data

Material designation	
~HS6-5-4	EN
~M4	AISI

Chemical composition (wt. %)

C	Cr	Mo	V	W
1.44	4	5	4	5.5

Material characteristics

	Compressive strength	Grindability	Red hardness	Toughness	Wear resistance	Edge Stability
BÖHLER S690 MICROCLEAN	★★★	★★★	★★	★★★★★	★★★	★★
BÖHLER S290 MICROCLEAN	★★★★★	★	★★★★	★★	★★★★★	★★★★
BÖHLER S390 MICROCLEAN	★★★★	★★★	★★★★	★★★★	★★★★	★★★★
BÖHLER S393 MICROCLEAN	★★★★	★★★	★★★★	★★★★	★★★★	★★★★
BÖHLER S590 MICROCLEAN	★★★★	★★★	★★★★	★★★	★★★	★★★
BÖHLER S790 MICROCLEAN	★★★	★★★	★★	★★★★	★★	★★★
BÖHLER S793 MICROCLEAN	★★★	★★★	★★★★	★★★	★★★	★★★

Delivery condition

Recoaptă

Hardness (HB)	max. 280 drawn execution max. 300 HB
Tensile Strength (MPa)	max. 1,020

Heat treatment

Recoacere

Temperature	770 to 840 °C	Slow cooling in furnace.
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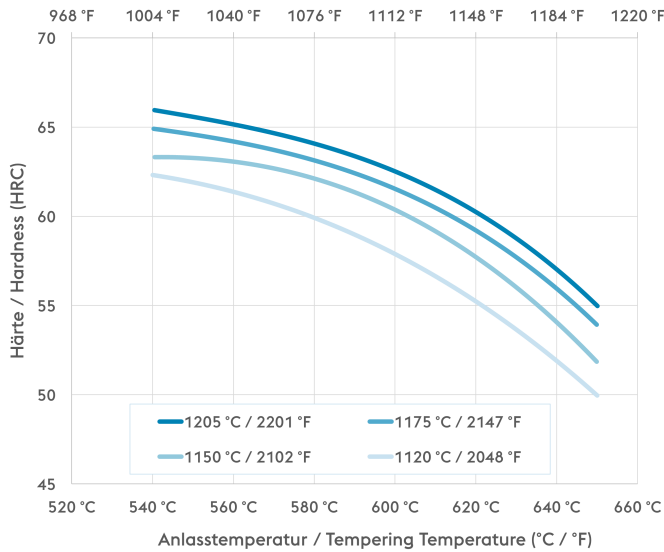
Eliminarea stresului

Temperature	600 to 650 °C	Slow cooling 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.
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Călire și revenire

Temperature	1,100 to 1,200 °C	Salt bath, vacuum Preheating: 1st stage ~ 500 °C (930 °F), 2nd stage ~ 850 °C (1560 °F), 3rd stage ~1050 °C (1920 °F) Austenitising: 1100 - 1200 °C (2010 °F - 2230 °F), holding time after complete heating 80 seconds, maximum 150 seconds, to avoid material damage due to overheating. Quenching: oil, warm bath (500 - 550 °C (930 °F - 1020 °F)), gas
Temperature	540 to 570 °C	Slow heating to tempering temperature immediately after austenitising. Holding time in the furnace 1 hour per 20 mm material thickness (at least 1 hour) Slow cooling to room temperature between each tempering step 3 tempering cycles recommended Hardness see tempering chart

Tempering Chart



Holding time 3 x 2 hours
Specimen size: square 25 mm

Tempering Chart

Physical Properties

Temperature (°C)	20
Density (kg/dm ³)	8.1
Thermal conductivity (W/(m.K))	20
Specific heat (kJ/kg K)	0.46
Spec. electrical resistance (Ohm.mm ² /m)	0.53
Modulus of elasticity (10 ³ N/mm ²)	217

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

Temperature (°C)	100	200	300	400	500	600	700
Thermal expansion (10 ⁻⁶ m/(m.K))	11.5	11.7	12.2	12.4	12.7	13	12.9

If other available product variants are listed in addition to long products, please note that these may differ in terms of melting process, technical data, delivery and surface condition as well as available product dimensions. For mandatory technical specifications, other requirements and dimensions, please contact our regional voestalpine BÖHLER sales companies. 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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