

BRZOREZNI ČELICI

Dostupne varijante proizvoda

 Šipkasti proizvodi* Ploče

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

Opis proizvoda

BÖHLER S690 MICROCLEAN – jednostavni čelik"

Žilavi brzorezni čelik namijenjen za zahtjevnu strojnu obradu i hladno oblikovanje.

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Put taljenja

 Powder metallurgy

Karakteristike

- > Žilavost i duktilnost : vrlo visoka
- > Otpornost na habanje : dobar
- > Tlačna čvrstoća : dobar
- > Stabilnost rubova : dobar
- > Mogućnost brušenja : visok
- > Tvrdća pri visokim temperaturama : dobar

Korištenje

- > Automobilske utrke
- > Glodala
- > Posebni rezni alati
- > Strugači i razvrtači
- > Precizno štancanje / štancanje / pečačenje
- > Hladno oblikovanje / utiskivanje
- > Oblikovanje utiskivanjem praškastih materijala

Technički podaci

Oznaka materijala		
	~M4	AISI
	~HS6-5-4	EN

Kemijski sastav

C	Cr	Mo	V	W
1,44	4	5	4	5,5

Materijal

	Kapacitet tlaka	Brušenje	Vruća tvrdoća	Žilavost	Otpornost na habanje	Točnost rezanja
	★★★	★★★	★★	★★★★★	★★★	★★
	★★★★★	★	★★★★	★★	★★★★★	★★★★
	★★★★	★★★	★★★★	★★★★	★★★★	★★★★
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	★★★★	★★★	★★★★	★★★	★★★	★★★
	★★★	★★★	★★	★★★★★	★★★	★★
	★★★	★★★	★★	★★★★	★★	★★★
	★★★	★★★	★★	★★★★	★★	★★★
	★★★	★★★	★★★★	★★★	★★★	★★★

Isporuka

Annealed

Tvrdoća (HB)	max. 280 drawn execution max. 300 HB
Vlačna čvrstoća (MPa)	max. 1.020

Toplinska obrada

Annealing

Temperatura	770 do 840 °C	Slow cooling in furnace.
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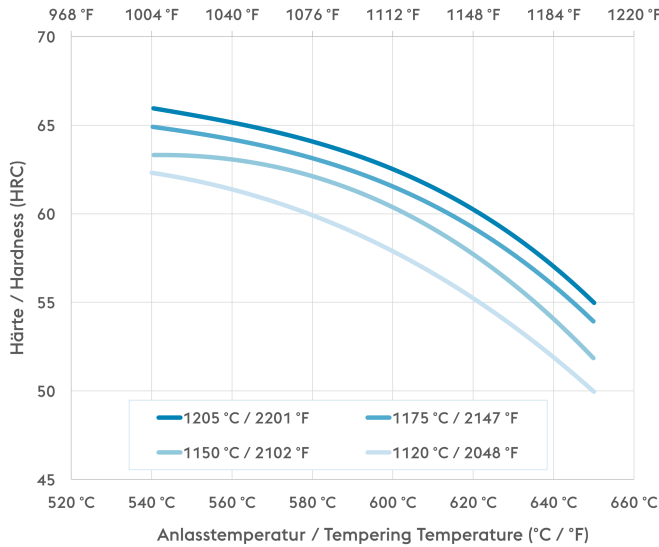
Stress relieving

Temperatura	600 do 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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Hardening and Tempering

Temperatura	1.100 do 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
Temperatura	540 do 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

Fizička svojstva

Temperatura (°C)	20
Gustoća (kg/dm ³)	8,1
Toplinska vodljivost (W/(m.K))	20
Specifični toplinski kapacitet (kJ/kg K)	0,46
Spec. Otpornik (Ohm.mm ² /m)	0,53
Modul elastičnosti (10 ³ N/mm ²)	217

Toplinska ekspanzija

Temperatura (°C)	100	200	300	400	500	600	700
Toplinska ekspanzija (10 ⁻⁶ m/(m.K))	11,5	11,7	12,2	12,4	12,7	13	12,9

Long Products: For additional specifications and technical requirements, please contact our regional voestalpine BÖHLER sales companies.

Sheet & Plates: Product Variant may differ in terms of melting process, technical data, delivery, and surface condition as well as available product dimensions. Please contact voestalpine BÖHLER Bleche GmbH & Co KG.

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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ONE STEP AHEAD.