

ACEROS RÁPIDOS

Formatos disponibles

Productos largos*

Chapas

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

Descripción

BÖHLER S690 MICROCLEAN - "El simple"

El acero rápido tenaz para el mecanizado más exigente y conformado en frío.

Método de obtención

Pulvimetalurgia

Propiedades

- > Dureza y Ductilidad : muy alta
- > Resistencia al desgaste : buena
- > Resistencia a la compresión : buena
- > Estabilidad de los bordes : buena
- > Afilabilidad : alto
- > Dureza en caliente (dureza roja) : buena

Aplicaciones

- > Carreras automovilísticas
- > Broches y escariadores
- > Conformado en frío / acuñado
- > Puntas de brocas
- > Corte fino / Troquelado / Estampado
- > Compactación de polvo
- > Herramientas de corte especiales

Datos técnicos

Designación		
	M4	AISI
	HS6-5-4	EN

Composición Química

C	Cr	Mo	V	W
1,44	4	5,2	4	5,6

Características

	Resistencia a la compresión	Aptitud para el rectificado	Dureza en caliente	Tenacidad	Resistencia al desgaste	Retención del filo de la navaja
BÖHLER S690 MICROCLEAN®	★★★	★★★	★★	★★★★★	★★★	★★
BÖHLER S290 MICROCLEAN®	★★★★★	★	★★★★★	★★	★★★★★	★★★★★
BÖHLER S390 MICROCLEAN®	★★★★★	★★★	★★★★★	★★★★★	★★★★★	★★★★★
BÖHLER S393 MICROCLEAN®	★★★★★	★★★	★★★★★	★★★★★	★★★★★	★★★★★
BÖHLER S590 MICROCLEAN®	★★★★★	★★★	★★★★★	★★★	★★★	★★★
BÖHLER S790 MICROCLEAN®	★★★	★★★	★★	★★★★★	★★	★★★
BÖHLER S793 MICROCLEAN®	★★★	★★★	★★★★★	★★★	★★★	★★★

Estado de suministro

recocido

Dureza (HB)	máx. 280 drawn execution max. 300 HB
Resistencia a la tracción (N/mm ²)	máx. 1.020

Tratamiento térmico

Recocido

Temperatura	870 a 900 °C	Slow cooling in furnace.
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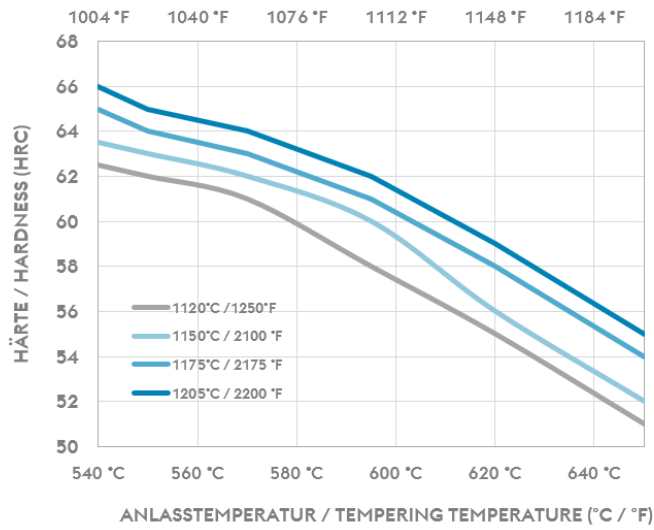
Alivio de tensiones

Temperatura	600 a 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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Temple y revenido

Temperatura	1.100 a 1.220 °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 a 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



Propiedades físicas

Temperatura (°C)	20
Densidad (kg/dm ³)	8,1
Conductividad térmica (W/(m.K))	20
Calor específico (kJ/kg K)	0,46
Resistencia eléctrica específica (Ohm.mm ² /m)	0,53
Módulo de elasticidad (10 ³ N/mm ²)	217

Expansión térmica

Temperatura (°C)	100	200	300	400	500	600	700
Expansión térmica (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.