PLASTIC MOULD STEELS

HARDENABLE CORROSION RESISTANT STEEL

Application Segments

Plastic Mold

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 M398 MICROCLEAN is a corrosion-resistant, martensitic chromium steel produced by powder metallurgy. Due to its alloy design, this steel has good corrosion resistance and higher wear resistance compared to BÖHLER M390 MICROCLEAN.

Process Melting

Powder metallurgy

Properties

- Toughness & Ductility : good
- Wear Resistance : very high
- Machinability : good
- Dimensional stability : very high
- Polishability : very high
- Corrosion resistance : good
- Micro-cleanliness : very high

Applications

- Components for food processing and animal feed
- Industrial Knives
- Packaging industry
- Glasfibre reinforced plastics
- Injection Molding
- Custom Hand Knives
- Plastic Extrusion
- Screws and Barrels
- Electronic industry
- Pill punching dies

Chemical composition (wt. %)

C	Si	Mn	Cr	Mo	V	W
2.7	0.5	0.5	20	1	7.2	0.7

Delivery condition

Soft annealed

Hardness (HB)	max. 330

Heat treatment

Stress relieving

Temperature	max. 650 °C	Soft annealed material: For stress relief annealing after mechanical processing, hold the material at temperature in a neutral atmosphere for 1-2 hours after complete heating, then slowly cool the furnace at 20°C [68 °F]/hour to 200°C [392 °F], then cool in air.
Temperature		Hardened and tempered material: The temperature for stress relief annealing should be approx. 50°C [122 °F] below the previously selected tempering temperature. Other procedure as for stress relief annealing of soft annealed material.

Hardening and Tempering

Temperature	1,120 to 1,150 °C	For hardening, hold the material at the specified temperature for 20-30 minutes after complete heating and quench quickly. Cool the material to approx. 30°C [86 °F]. Immediately afterwards, the material can be deep-frozen for 2 hours (at -80°C [- 112 °F]) for residual austenite transformation. Tempering should also be carried out immediately.
Temperature	1,151 to 1,180 °C	For hardening, hold the material at the specified temperature for 5-10 minutes after complete heating and quench quickly. Cool the material to approx. 30°C [86 °F]. Immediately afterwards, the material can be deep-frozen for 2 hours (at -80°C [- 112 °F]) for residual austenite transformation. Tempering should also be carried out immediately.
Temperature	200 to 300 °C	Tempering treatment: For maximum corrosion resistance, heat the material slowly and temper once for 1 hour/20 mm material thickness, but for at least 2 hours. Take slow heating into account and cool the material to approx. 30°C [86 °F] after each heat treatment step. Achievable hardness - see tempering diagram.
Temperature	540 to 560 °C	Tempering treatment: For maximum wear resistance (without sub-zero cooling), temper the material 3 times for 1 hour/20 mm material thickness, but at least 2 hours. Allow for slow heating and cool the material to approx. 30°C [86 °F] after each heat treatment step. Achievable hardness - see tempering diagram.
Temperature	510 to 530 °C	Tempering treatment: For maximum wear resistance (with sub-zero cooling), temper the material 3 times for 1 hour/20 mm material thickness, but at least 2 hours. Allow for slow heating and cool the material to approx. 30°C [86 °F] after each heat treatment step. Achievable hardness - see tempering diagram.

Physical Properties

Temperature (°C)	**20**
Density (kg/dm³)	7.46
Thermal conductivity (W/(m.K))	15.2
Specific heat (kJ/kg K)	0.49
Spec. electrical resistance (Ohm.mm²/m)	-
Modulus of elasticity (10³N/mm²)	231

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

Temperature (°C)	**100**	**200**	**300**	**400**	**500**
Thermal expansion (10⁻⁶ m/(m.K))	10.4	10.6	10.9	11.2	11.5

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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