BÖHLER

BÖHLER M398
MICROCLEAN®

# PLASTIC MOULD STEELS

## HARDENABLE CORROSION RESISTANT STEEL

### 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 martensitic chromium steel produced with powder metallurgy. Due to its alloying concept this steel offers extremely high wear resistance and
high corrosion resistance – the perfect combination for highly wear-resistant tools.

### 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

- Comps. for Food processing and Animal Feed
- Shearing / Machine Knives
- Food processing Industry
- Plastic Extrusion
- Injection Molding
- Custom Hand Knives
- Medical
- Powder Pressing
- Screws and Barrels
- Electronic Industry
- Packaging

### 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 | 650 °C \| 1,202 °F | After through-heating, soak for 4 hours in a neutral atmosphere. Furnace cooling down to 300 °C (570 °F), followed by air. After hardening and tempering, stress relieving has to be performed 50°C (90°F) below last tempering temperature. |

### Hardening and Tempering

| | | |
|---|---|---|
| Temperature | 1,120 to 1,180 °C \| 2,048 to 2,156 °F | For hardening hold at temperature for 20 to 30 min (for hardening temperature 1180°C/ 2156°F 5-10 min). An optional sub-zero treatment at -80°C/-112°F can be applied after hardening. For highest corrosion resistance, temper once for a minimum of 2h at 200-300°C/ 392-572°F. For best wear resistance, temper twice for a minimum of 2h at 540-560°C/ 1004-1040°F (without sub-zero treatment) or 510-530°C/950-986°F (with sub-zero treatment). After each heat treatment step, material should be cooled down to approx. 30°C! |

## Physical Properties

| **Temperature (°C \| °F)** | **20 \| 68** |
|---|---|
| Density (kg/dm$^3$ \| lb/in$^3$) | 7.46 \| 0.27 |
| Thermal conductivity (W/(m.K) \| BTU/ft h °F) | 15.2 \| 8.78 |
| Specific heat (kJ/kg K \| BTU/lb °F) | 0.49 \| 0.117 |
| Spec. electrical resistance (Ohm.mm$^2$/m \| 10$^{-4}$ Ohm.inch$^2$/ft) | - |
| Modulus of elasticity (10$^3$N/mm$^2$ \| 10$^3$ksi) | 231 \| 33.5 |

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

| **Temperature (°C \| °F)** | **100 \| 212** | **200 \| 392** | **300 \| 572** | **400 \| 752** | **500 \| 932** |
|---|---|---|---|---|---|
| Thermal expansion (10$^{-6}$ m/(m.K) \| 10$^{-6}$ inch/inch.°F) | 10.4 \| 5.8 | 10.6 \| 5.9 | 10.9 \| 6.1 | 11.2 \| 6.2 | 11.5 \| 6.4 |

**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.



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