

PLASTIC MOULD STEELS

HARDENABLE CORROSION RESISTANT STEEL

Available Product Variants

Long Products

Plates

Product Description

BÖHLER M390 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 best application properties.

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
- > Pill punching dies

Chemical composition (wt. %)

C	Si	Mn	Cr	Mo	V	W
1.9	0.7	0.3	20	1	4	0.6

Material characteristics

	Corrosion resistance	Machinability in as supplied condition	Polishability	Toughness	Wear resistance
BÖHLER M390 MICROCLEAN®	★★	★	★★★	★★	★★★★
BÖHLER M310 ISOPLAST®	★★★★	★★★★	★★	★★	★★
BÖHLER M333 ISOPLAST®	★★★★★	★★★★	★★★★★	★★★★★	★★
BÖHLER M340 ISOPLAST®	★★★	★★★	★★	★★	★★★
BÖHLER M368 MICROCLEAN®	★★★★	★★★	★★★★	★★★	★★★
BÖHLER M398 MICROCLEAN®	★★	★	★★★	★★	★★★★★

Delivery condition

Soft annealed

Hardness (HB)	max. 280
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Heat treatment

Stress relieving

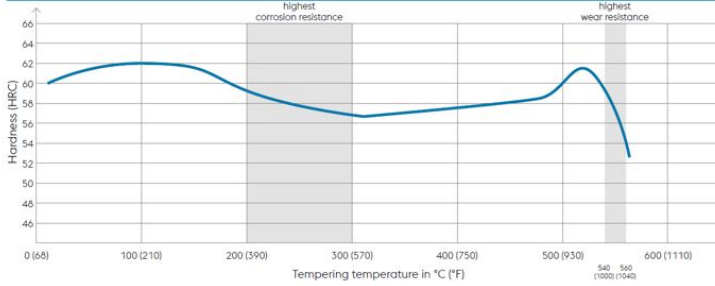
Temperature	650 °C 1202 °F	After through-heating, soak for 4 hours in a neutral atmosphere. Furnace cooling down to 300 °C (570 °F), followed by air. After hardening and tempering, stress relieving has to be performed 50°C (90°F) below last tempering temperature.
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Hardening and Tempering

Temperature	1100 to 1180 °C 2012 to 2156 °F	After through-heating, hold for: 20 - 30 minutes for a hardening temperature of 1100 - 1150 °C (2010 - 2100 °F) 5 - 10 minutes for a hardening temperature of 1180 °C (2155 °F) Quenching media: oil, N ₂ .
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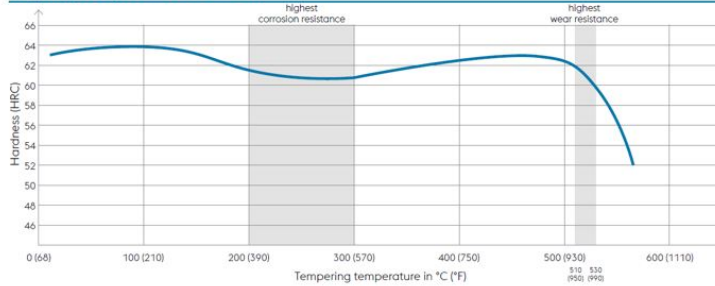
Tempering Chart

Tempering chart (without subzero treatment)



Vacuum hardening: 1150 °C (2100 °F) / 30 min / N₂, 5 bar
Tempering: 2 x 2 hours
Specimen dimensions: dia. 20.5 x 15 mm (0.81 x 0.59 inch)

Tempering chart (with subzero treatment)



Vacuum hardening: 1150 °C (2100 °F) / 30 min / N₂, 5 bar
Subzero treatment: -70 °C (-95 °F), 2 hours
Tempering: 2 x 2 hours
Specimen dimensions: dia. 20.5 x 15 mm (0.81 x 0.59 inch)

Physical Properties

Temperature (°C °F)	20 68
Density (kg/dm ³ lb/in ³)	7.54 0.27
Thermal conductivity (W/(m.K) BTU (IT) ft/hr/ft ² /F)	16.5 9.53
Specific heat (J/(kg.K) BTU (IT) lb/F)	480 114.65
Spec. electrical resistance (Ohm.mm ² /m 10 ⁻⁴ Ohm.inch ² /ft)	-
Modulus of elasticity (10 ³ N/mm ² 10 ³ ksi)	227 32.92

Thermal Expansions

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))	10.38 5.8	10.67 5.9	10.96 6.1	11.24 6.2	11.56 6.4

For more information see <https://www.voestalpine.com/boehler-edelstahl/de/>

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