

# PLASTIC MOULD STEELS

## HARDENABLE CORROSION RESISTANT STEEL

### Application Segments

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Plastic Mould

### Available Product Variants

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Long Products\*

Plates

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

### Product Description

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BÖHLER M310 ISOPLAST is a corrosion-resistant, martensitic chromium steel which, through electroslag remelting and optimization of the chemical composition, has a good homogeneity and a balanced hardness-toughness-corrosion resistance ratio.

### Process Melting

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Airmelted + Remelted

### Properties

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- > Toughness & Ductility : good
- > Wear Resistance : good
- > English (United Kingdom) : very high
- > Dimensional stability : very high
- > Polishability : good
- > Corrosion resistance : high
- > Micro-cleanliness : high

### Applications

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|--|-------------------------------|----------------------------|
| > Components for food processing and animal feed | > Injection Molding           | > Plastic Extrusion        |
| > Standard Parts (Molds, Plates, Pins, Punches)  | > Blow Molding                | > Consumer Goods - General |
| > General Components for Mechanical Engineering  | > Lamps/Lenses for Automotive | > Medical                  |
| > Packaging industry                             | > Camera lenses               | > Components for Displays  |
| > Electronic industry                            | > Screws and Barrels          | > Hotrunner systems        |
| > Glasfibre reinforced plastics                  |                               |                            |

## Technical data

Material designation		Standards	
~1.2083	SEL	4957	EN ISO
X40Cr14	EN	AFNOR Z40C14	Others
~420	AISI		
~SUS420J2	JIS		

## Chemical composition (wt. %)

C	Si	Mn	Cr	V
0.38	0.7	0.45	14.3	0.2

## Delivery condition

### Soft annealed

Hardness (HB)	max. 225
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## Heat treatment

### Stress relieving

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.
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### Hardening and Tempering

Temperature	1,025 to 1,050 °C	For hardening, hold the material at the specified temperature for 15-30 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	250 to 350 °C	Tempering treatment: For maximum corrosion resistance, temper the material once for 1 hour/ 20 mm material thickness, but for at least 2 hours. Achievable hardness - see tempering diagram.
Temperature	490 to 520 °C	Tempering treatment: For optimum toughness and hardness values (without sub-zero cooling), temper the material twice for 1 hour/20 mm material thickness, but for at least 2 hours. After each heat treatment step, cool the material to approx. 30°C [86 °F]. Achievable hardness - see tempering diagram.
Temperature	480 to 510 °C	Tempering treatment: For optimum toughness and hardness values (with sub-zero cooling), temper the material twice for 1 hour/20 mm material thickness, but for at least 2 hours. After each heat treatment step, cool the material to approx. 30°C [86 °F]. Achievable hardness - see tempering diagram.

## Physical Properties

Temperature (°C)	20
Density (kg/dm <sup>3</sup> )	7.68
Thermal conductivity (W/(m.K))	19.5
Specific heat (kJ/kg K)	0.46
Spec. electrical resistance (Ohm.mm <sup>2</sup> /m)	0.65
Modulus of elasticity (10 <sup>3</sup> N/mm <sup>2</sup> )	217

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

Temperature (°C)	100	200	300	400	500
Thermal expansion ( $10^{-6}$ m/(m.K))	10.6	10.9	11.3	11.7	12

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.