

TOOL STEELS

HARDENABLE CORROSION RESISTANT STEEL

Application Segments

Plastic Mould

Cold Work

Available Product Variants

Long Products

Product Description

Martensitic chromium steel with high carbon, molybdenum and vanadium addition.

Process Melting

Airmelted

Properties

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

Applications

- > Hotrunner systems
- > Moulds for plastic injection (PIM)
- > Foodindustry like extrusion screws, can closing rolls
- > Pharmaceutical industry like pill punches and -dies
- > Extrusion screws for plastic processing

Technical data

Material designation	
1.4112	SEL
~1.2361	
X90CrMoV18	EN
~X91CrMoV18	
~440B	AISI

Chemical composition (wt. %)

C	Si	Mn	Cr	Mo	V
0.9	0.45	0.4	17.5	1.1	0.1

Delivery condition

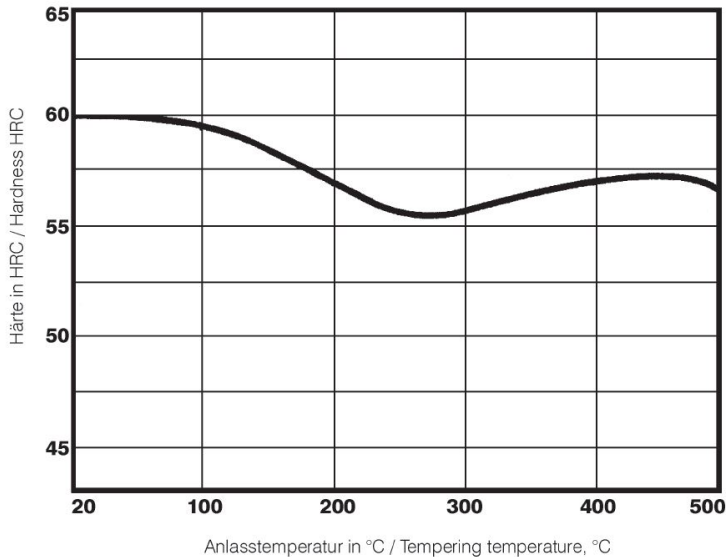
Annealed	
Hardness (Unit)	max. 265

Heat treatment

Stress relieving		
Temperature	650 °C 1,202 °F	After through heating, keep at temperature for 1 to 2 hours in a neutral atmosphere. Slow furnace cooling

Hardening and Tempering		
Temperature	1,000 to 1,050 °C 1,832 to 1,922 °F	Holding time after complete soaking, max. 30 minutes / 25 mm cross section
Temperature	150 to 350 °C 302 to 662 °F	Tempering treatment required after hardening to the desired working hardness - see tempering chart. Tempering of min. 2h after complete soaking. Tempering shall be made immediately after hardening. After each tempering a cooling RT shall be done.

Tempering chart



Hardening temperature: 1030°C / 1886°F
Specimen size: square 20 mm

Hardness up to 57 - 59 HRC

Physical Properties

Temperature (°C °F)	20 68
Density (kg/dm ³ lb/in ³)	7.7 0.28
Thermal conductivity (W/(m.K) BTU/ft h °F)	15 8.67
Specific heat (kJ/kg K BTU/lb °F)	0.43 0.1027
Spec. electrical resistance (Ohm.mm ² /m 10 ⁻⁴ Ohm.inch ² /ft)	0.8 3.78
Modulus of elasticity (10 ³ N/mm ² 10 ³ ksi)	215 31.18

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	10.8 6	11.2 6.2	11.6 6.4	11.9 6.6

For additional specifications and technical requirements, please contact our regional voestalpine BÖHLER sales companies.

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