

# TOOL STEELS

## HARDENABLE CORROSION RESISTANT STEEL

### Application Segments

Mucegai din plastic

### Available Product Variants

Long Products

### Product Description

BÖHLER N685 is a corrosion-resistant, martensitic chromium steel with a high carbon content and molybdenum and vanadium additives.

### Process Melting

Aer topit

### Properties

- > Rezistență și ductilitate : good
- > Rezistență la uzură : very high
- > Machinability : good
- > Stabilitatea dimensională : good
- > Poluabilitate : good
- > Rezistență la coroziune : high

### Applications

- > Componente pentru prelucrarea alimentelor și hrana animalelor
- > Instrumente de tăiere și cuțite tipice
- > Matrițe de perforare a pastilelor
- > Turnare prin injecție
- > Packaging
- > Piese standard (matrițe, plăci, pini, perforatoare)
- > Industria electronică
- > Vytlačanie plastov
- > Cuțit de mașină (pentru producători)
- > Cutting
- > Sisteme Hotrunner
- > Materiale plastice ranforsate cu fibră de sticlă
- > Șuruburi și butoaie
- > Cuțite industriale
- > Industria ambalajelor

### Technical data

Material designation	
1.4112 ~1.2361	SEL
X90CrMoV18 ~X91CrMoV18	EN
~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

Recoaptă	
Hardness (Unit)	max. 265

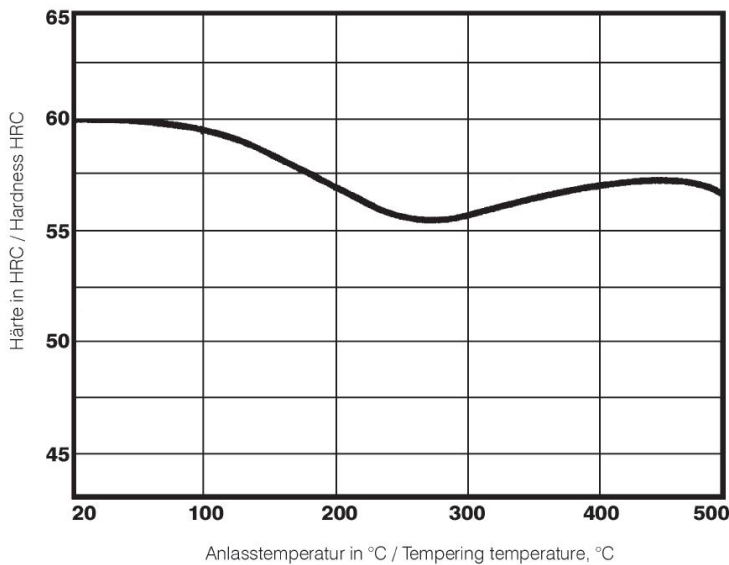
### Heat treatment

Eliminarea stresului		
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.

### Călire și revenire

Temperature	1,000 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]. Tempering should take place immediately.
Temperature	100 to 200 °C	Tempering treatment to the desired working hardness after hardening - see tempering diagram. Heat the material slowly and temper once for 1 hour/20mm material thickness, but at least 2 hours. After the heat treatment step, the material must be cooled to approx. 30°C[86 °F].

### Tempering chart



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

Hardness up to 57 - 59 HRC

### Physical Properties

<b>Temperature (°C)</b>	<b>20</b>
Density (kg/dm <sup>3</sup> )	7.7
Thermal conductivity (W/(m.K))	15
Specific heat (kJ/kg K)	0.43
Spec. electrical resistance (Ohm.mm <sup>2</sup> /m)	0.8
Modulus of elasticity (10 <sup>3</sup> N/mm <sup>2</sup> )	215

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

<b>Temperature (°C)</b>	<b>100</b>	<b>200</b>	<b>300</b>	<b>400</b>	<b>500</b>
Thermal expansion (10 <sup>-6</sup> m/(m.K))	10.4	10.8	11.2	11.6	11.9

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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