

# 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 content and molybdenum addition.

### Properties

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

### Applications

- > Injection Molding
- > Pharmaceutical industry like pill punches and -dies
- > Extrusion screws for plastic processing
- > Foodindustry like extrusion screws, can closing rolls
- > Hotrunner systems
- > Standard Parts (Molds, Plates, Pins, Punches)

### Technical data

| Material designation |      |
|----------------------|------|
| 1.4125               | SEL  |
| X105CrMo17           | EN   |
| 440C                 | AISI |

### Chemical composition (wt. %)

| C    | Si  | Mn  | Cr   | Mo  |
|------|-----|-----|------|-----|
| 1.05 | 0.4 | 0.4 | 16.7 | 0.5 |

## Delivery condition

### Annealed

|               |          |
|---------------|----------|
| Hardness (HB) | max. 265 |
|---------------|----------|

## Heat treatment

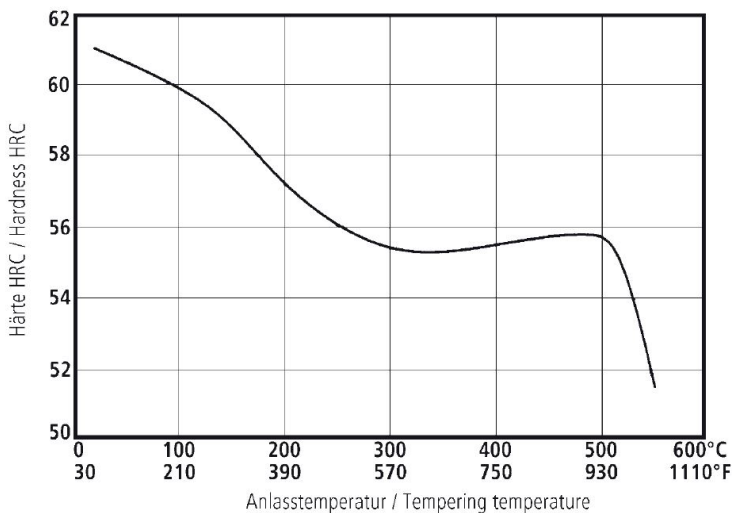
### Stress relieving

|             |                   |   |
|-------------|-------------------|---|
| 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 58 - 60 HRC

## Physical Properties

|   |               |
|---|---------------|
| Temperature (°C   °F)   | 20   68       |
| Density (kg/dm <sup>3</sup>   lb/in <sup>3</sup> )  | 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 <sup>2</sup> /m   10 <sup>-4</sup> Ohm.inch <sup>2</sup> /ft) | 0.8   3.78    |
| Modulus of elasticity (10 <sup>3</sup> N/mm <sup>2</sup>   10 <sup>3</sup> 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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