

ACEROS PARA TRABAJO EN FRÍO

Formatos disponibles

 Productos largos*

 Chapas

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

Descripción

Acero para herramientas de corte (matrices y punzones), herramientas de estampación y punzonado, herramientas de roscado y cuchillas de corte.

Método de obtención

 Convencional

Propiedades

- > Resistencia al desgaste : muy alta
- > Resistencia a la compresión : muy alta
- > Estabilidad dimensional : buena

Aplicaciones

- > Cuchillas de máquinas (fabricantes)
- > Corte fino / Troquelado / Estampado
- > Laminación
- > Compactación de polvo
- > Conformado en frío

Datos técnicos

| Designación | | Estándares | |
|---------------|------|------------|--------|
| 1.2363 | SEL | 4957 | EN ISO |
| ~T30102 | UNS | | |
| X100CrMoV5 | EN | | |
| ~X100CrMoV5-1 | | | |
| A2 | AISI | | |
| SKD12 | JIS | | |

Composición Química

| C | Si | Mn | Cr | Mo | V |
|------|------|------|------|------|------|
| 1,00 | 0,30 | 0,55 | 5,20 | 1,10 | 0,25 |

Características

| | Resistencia a la compresión | Estabilidad dimensional durante el tratamiento térmico | Tenacidad | Resistencia al desgaste abrasivo |
|--------------------|-----------------------------|--|-----------|----------------------------------|
| BÖHLER K305 | ★★★★★ | ★★★ | ★★ | ★★★★★ |
| BÖHLER K306 | ★★★★ | ★★★ | ★★★★ | ★★★ |
| BÖHLER K313 | ★★★★ | ★★★ | ★★★ | ★★★ |
| BÖHLER K320 | ★★★ | ★★★ | ★★★ | ★★★ |
| BÖHLER K329 | ★★★ | ★★★ | ★★★★★ | ★★★★★ |
| BÖHLER K600 | ★ | ★★★ | ★★★★★ | ★ |
| BÖHLER K601 | ★ | ★★★ | ★★★★★ | ★★ |
| BÖHLER K605 | ★★ | ★★★ | ★★★★★ | ★ |

Estado de suministro

recocido

| | |
|-------------|----------|
| Dureza (HB) | máx. 240 |
|-------------|----------|

Tratamiento térmico

Recocido

| | | |
|-------------|--------------|---|
| Temperatura | 800 a 850 °C | Slow controlled cooling in furnace at a rate of 50 to 68°F/hr (10 to 20°C/hr) down to approx. 1112°F (600°C), further cooling in air. |
|-------------|--------------|---|

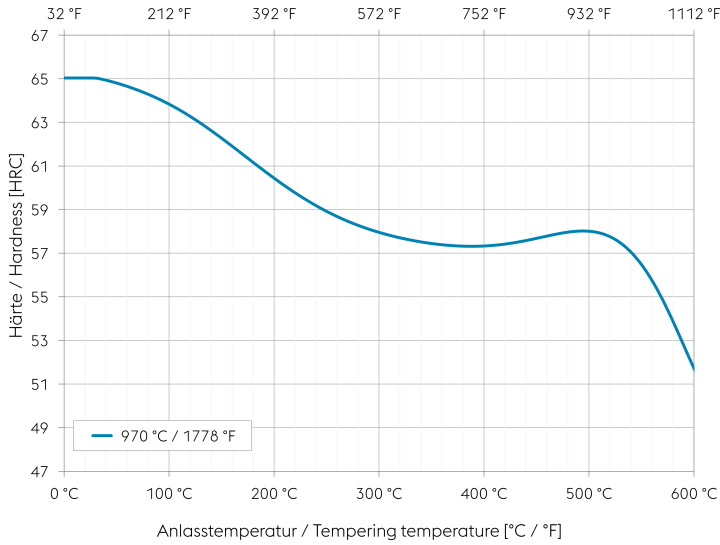
Alivio de tensiones

| | | |
|-------------|--------|--|
| Temperatura | 650 °C | Slow cooling in furnace. Intended to relieve stresses set up by extensive machining, or in complex shapes. After through heating, hold in neutral atmosphere for 1 - 2 hours.. |
|-------------|--------|--|

Temple y revenido

| | | |
|-------------|--------------|---|
| Temperatura | 950 a 980 °C | Oil, salt bath 428 to 482°F or 932 to 1022°F (220 to 250°C or 500 to 550°C), air, gas Holding time after temperature equalization: 15 to 30 minutes. After hardening, tempering to the desired working hardness, see tempering chart. |
|-------------|--------------|---|

Tempering chart



Tempering:

Specimen size: square 0,787 inch (20 mm)

Slow heating to tempering temperature immediately after hardening.

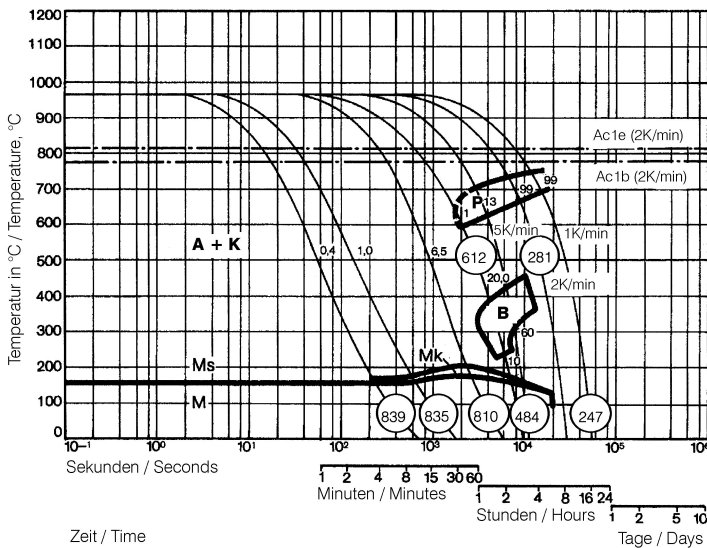
Time in furnace 1 hour for each 0,787 inch (20 mm) of workpiece thickness but at least 2 hours.

Slow cooling to room temperature after each tempering step is recommended.

Please refer to the tempering chart for guide values for the hardness achievable after tempering.

Tempering for stress relieving 86 to 122 °F (30 to 50 °C) below the highest tempering temperature.

Continuous cooling CCT curves



Austenitising temperature: 960°C
Holding time: 15 minutes

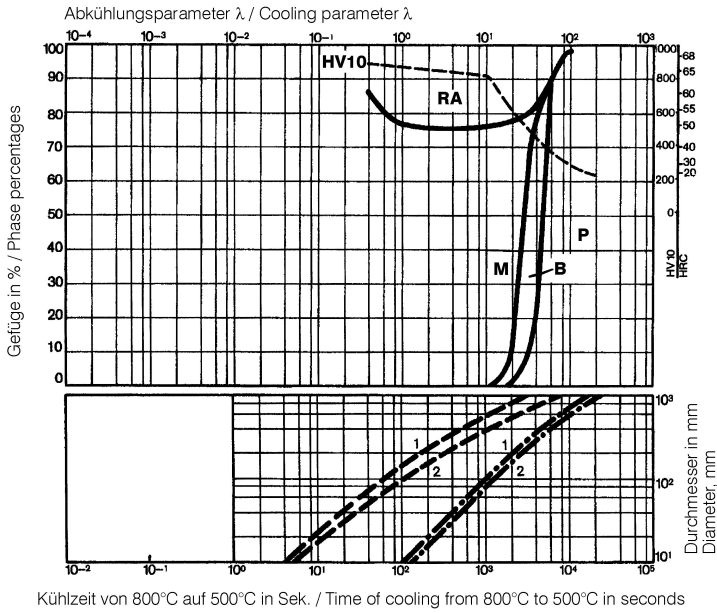
O Vickers hardness

1...99 phase percentages

0.4...20.0 cooling parameter, i.e. duration of cooling from 800°C to 500°C in $s \times 10^{-2}$

5K/min...1K/min cooling rate in K/min in the 800°C to 500°C range

Quantitative phase diagram

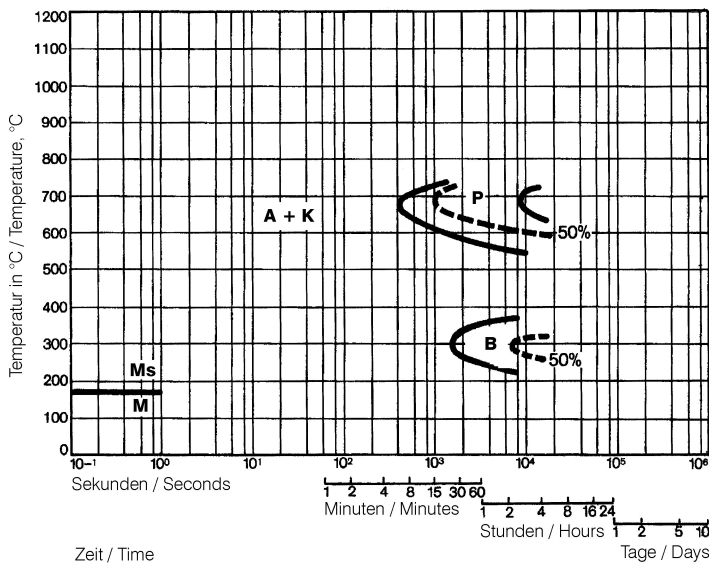


Mk... Grain boundary martensite
 RA... Residual austenite
 A... Austenite
 B... Bainite
 P... Pearlite
 K... Carbide
 M... Martensite

----- Oil cooling
 - · - Air cooling

1... Edge or face
 2... Core

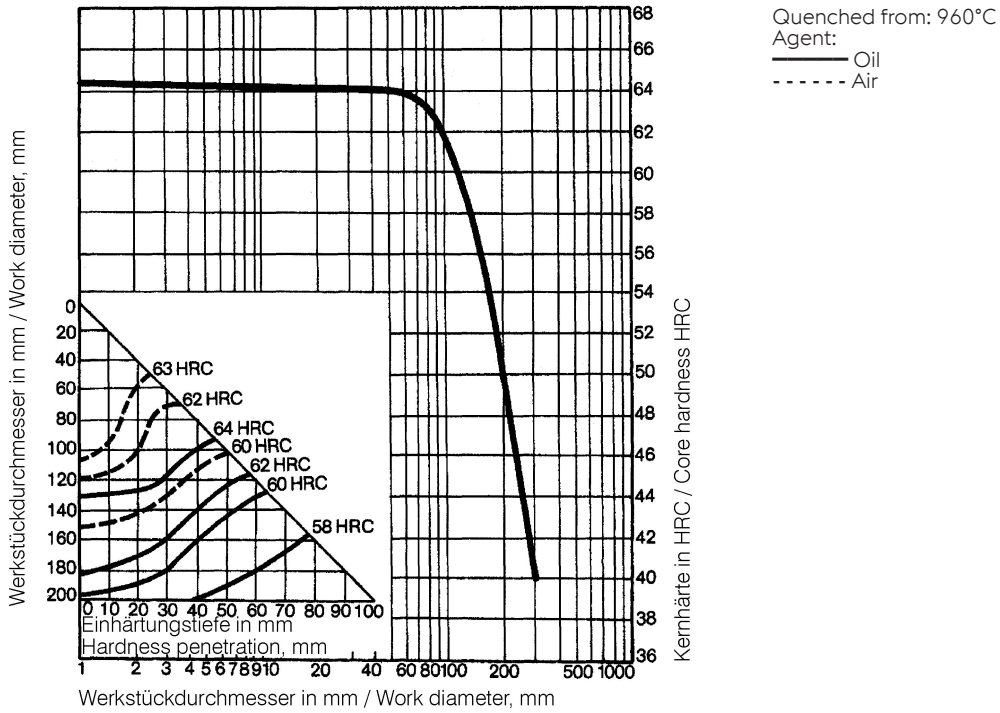
Isothermal TTT curves



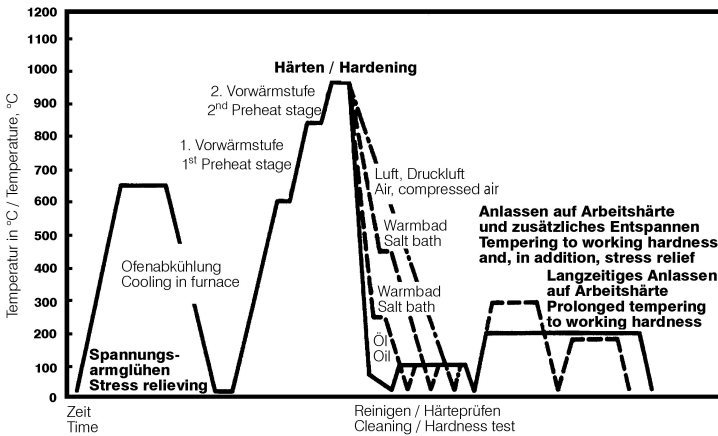
Austenitising temperature: 960°C
 Holding time: 15 minutes

A... Austenite
 B... Bainite
 P... Pearlite
 K... Carbide
 M... Martensite

Influence of work diameter on core hardness and hardness penetration



Heat treatment sequence



Propiedades físicas

| | |
|--|------|
| Temperatura (°C) | 20 |
| Densidad (kg/dm ³) | 7,7 |
| Conductividad térmica (W/(m.K)) | 26 |
| Calor específico (kJ/kg K) | 0,46 |
| Resistencia eléctrica específica (Ohm.mm ² /m) | 0,52 |
| Módulo de elasticidad (10 ³ N/mm ²) | 190 |

Expansión térmica

| | | | | | |
|--|-----|------|------|------|------|
| Temperatura (°C) | 100 | 200 | 300 | 400 | 500 |
| Expansión térmica (10 ⁻⁶ m/(m.K)) | 12 | 12,1 | 11,9 | 11,6 | 11,7 |

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

Sheet & Plates: Product Variant may differ in terms of melting process, technical data, delivery, and surface condition as well as available product dimensions. Please contact voestalpine BÖHLER Bleche GmbH & Co KG.

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