

# ACCIAI DA UTENSILI PER LAVORAZIONE A FREDDO

## Granulometria disponibile

Prodotti lunghi\*

Lamiere

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

## Descrizione del prodotto

Acciaio per lavorazione a freddo con buona resistenza all'usura ed eccellenti proprietà elastiche.

## Percorso di fusione

Airmelted

## Proprietà

- > Durezza e duttilità : molto alto
- > Resistenza alla compressione : buono
- > Stabilità dimensionale : buono
- > Resistenza alla trazione / Resistenza allo snervamento : alto

## Applicazioni

- > Stampaggio a freddo
- > Componenti per il settore ingegneria meccanica
- > Parti standard (stampi, piastre, perni, punzoni)
- > Componenti per il settore del riciclo

## Dati tecnici

Corrispondenze	
1.2101	SEL
62SiMnCr4	EN

## Analisi chimica

C	Si	Mn	Cr
0,63	1,10	1,10	0,60

## Proprietà del materiale

	Resistenza alla compressione	Stabilità dimensionale durante il trattamento termico	Tenacità	Abrasivo resistente all'usura
<b>BÖHLER K245</b>	★★	★	★★★★★	★
<b>BÖHLER K455</b>	★★★	★	★★★★★	★
<b>BÖHLER K460</b>	★★★★	★	★★★★	★★
<b>BÖHLER K720</b>	★★	★	★★★★	★

## Condizioni di consegna

### Ricotto

Durezza (HB)	max. 235
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## Trattamento termico

### Annealing

Temperatura	710 a 750 °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.
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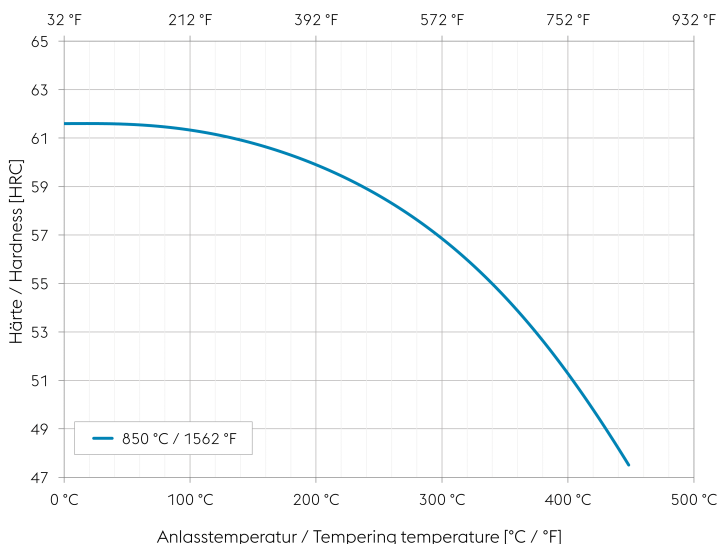
### Alleviare lo stress

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 to 2 hours.
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### Tempra e rinvenimento

Temperatura	830 a 860 °C	Oil, salt bath (for small sizes) Holding time at hardening temperature: 15 to 30 minutes. After hardening, tempering to the desired working hardness, see tempering chart.
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## 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.

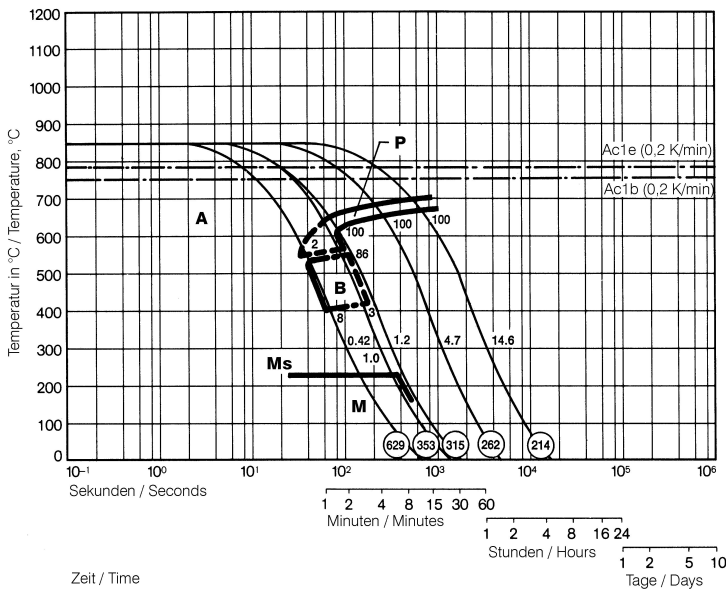
1. Tempering at 392 to 482 °F (200 to 250 °C) to working hardness

2. Partial tempering at 932 to 1022 °F (500 to 550 °C) to spring hardness

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.

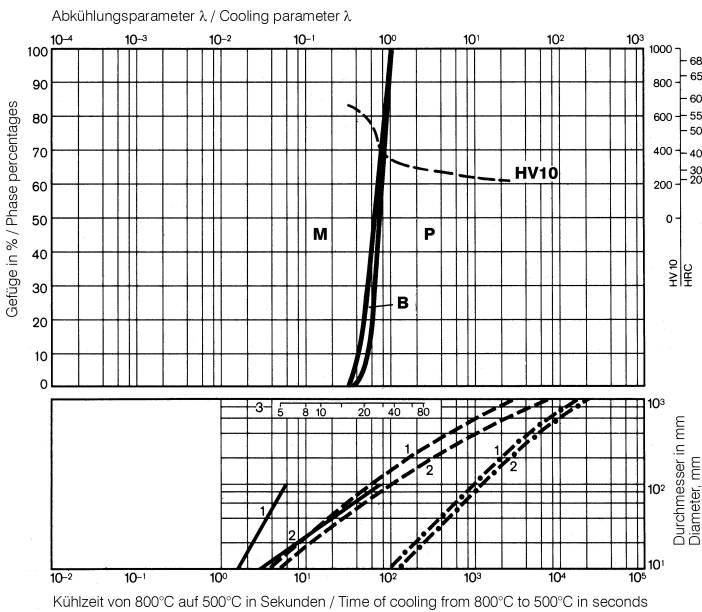
Continuous cooling CCT curves



Austenitising temperature: 845°C / 1553°F  
Holding time: 15 minutes

O Vickers hardness  
2...100 phase percentages  
0.42...14.6 cooling parameter, i.e. duration of cooling from 800°C to 500°C (1472°F to 932°F) in  $s \times 10^{-2}$

Quantitative phase diagram

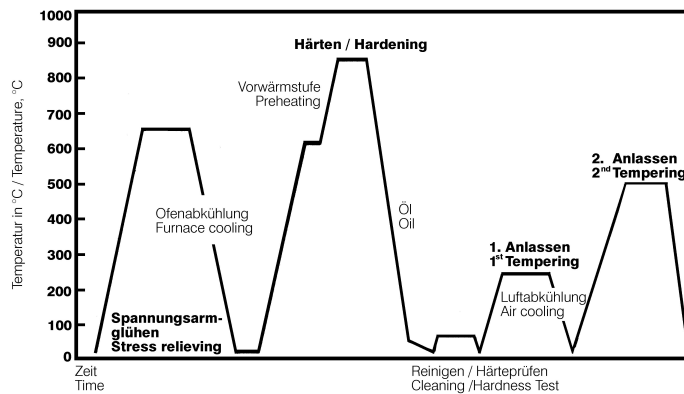


A... Austenite  
B... Bainite  
P... Pearlite  
M... Martensite

— Watercooling  
- - - Oil cooling  
- · - Air cooling

1... Edge or face  
2... Core  
3... Jominy test: distance from end

## Heat treatment sequence



## Proprietà fisiche

Temperatura (°C)	20
Densità (kg/dm <sup>3</sup> )	7,7
Conducibilità termica (W/(m.K))	30
Capacità termica specifica (kJ/kg K)	0,46
Resistenza elettrica specifica (Ohm.mm <sup>2</sup> /m)	0,35
Modulo di elasticità (10 <sup>3</sup> N/mm <sup>2</sup> )	210

## Espansioni termiche

Temperatura (°C)	100	200	300	400	500
Espansione termica (10 <sup>-6</sup> m/(m.K))	12,4	12,1	12,6	12,8	13

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

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