

# ACIERS POUR TRAVAIL À FROID

## Variantes de produits disponibles

 Produit long\*

 Tôle

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

## Description du produit

Outils de serrage (par exemple pinces de serrage, mandrins), lames de cisailles, chasse-goupilles, tournevis, poinçons, mandrins d'emboutissage, pointeaux, chassoirs à clous.

## Procédé d'élaboration

 Airmelted

## Propriétés

- > Ténacité et ductilité : très élevé
- > Résistance à la compression : bien
- > Stabilité dimensionnelle : bien
- > Résistance à la traction / Limite d'élasticité : élevé

## Applications

- > Formage à froid
- > Composants pour la mécanique générale
- > Eléments standards (carcasses, ejecteurs, bagues...)
- > Composants pour l'industrie du recyclage

## Données techniques

Désignation normalisée	
1.2101	SEL
62SiMnCr4	EN

## Composition chimique

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

## Comparaison des caractéristiques

	Résistance à la compression	Stabilité dimensionnelle lors du traitement thermique	Ténacité	Résistance à l'usure abrasive
<b>BÖHLER K245</b>	★★	★	★★★★★	★
<b>BÖHLER K455</b>	★★★	★	★★★★★	★
<b>BÖHLER K460</b>	★★★★	★	★★★★	★★
<b>BÖHLER K720</b>	★★	★	★★★★	★

## Condition de livraison

### Recuit

Dureté (HB)	max. 235
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## Traitement thermique

### Recuit

Température	710 jusqu'à 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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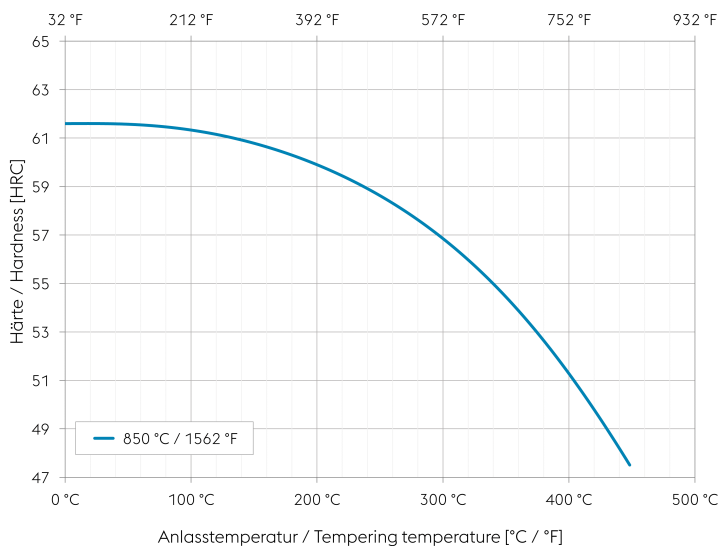
### Recuit de détente

Température	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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### Trempe et revenu

Température	830 jusqu'à 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.

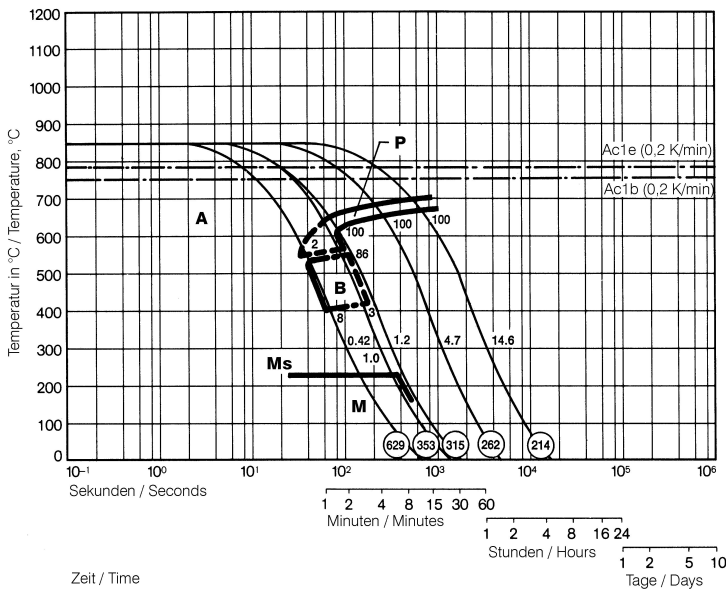
1. Tempering at 392 to 482 °F (200 to 250 °C) to working hardness

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.

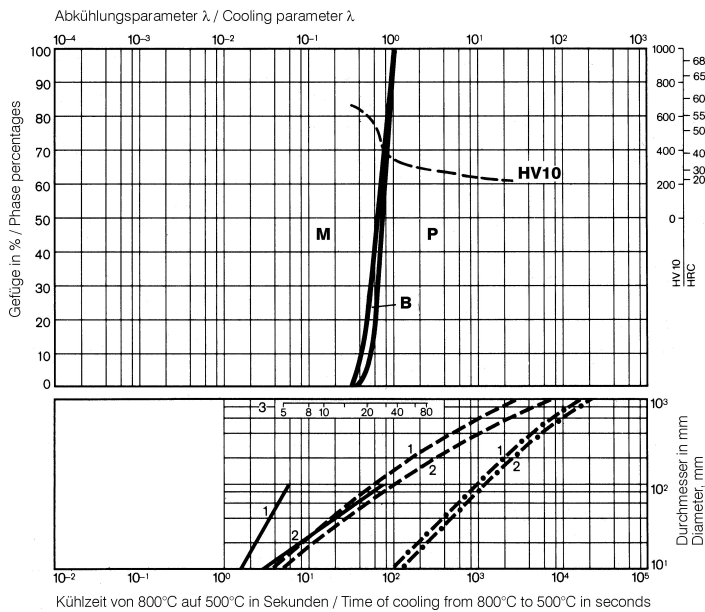
Continuous cooling CCT curves



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

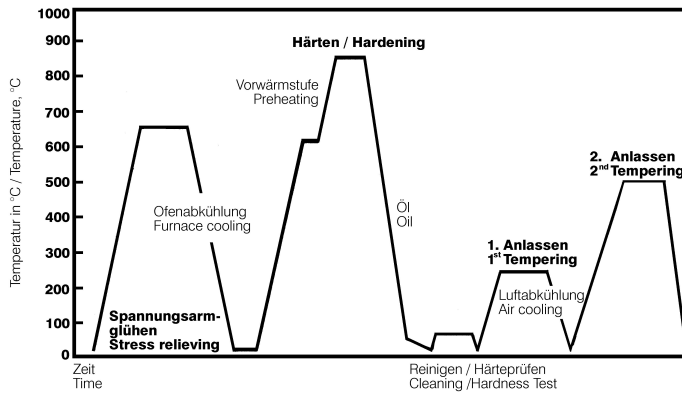


A... Austenite  
B... Bainite  
P... Pearlite  
M... Martensite

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

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

## Heat treatment sequence



## Propriétés physiques

Température (°C)	20
Densité (kg/dm <sup>3</sup> )	7,7
Conductivité thermique (W/(m.K))	30
Chaleur spécifique (kJ/kg K)	0,46
Résistivité électrique (Ohm.mm <sup>2</sup> /m)	0,35
Module d'élasticité (10 <sup>3</sup> N/mm <sup>2</sup> )	210

## Dilatation thermique

Température (°C)	100	200	300	400	500
Dilatation thermique (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.

**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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