ACEROS PARA TRABAJO EN FRÍO

Formatos disponibles

Productos largos* | Chapas

*) Presented data refer exclusivly 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, herramientas de carpintería, cuchillas de corte para corte de láminas, herramientas de roscado.
Herramientas de embutición, embutición profunda. y extrusión, herramientas de extrusión para la industria de la cerámica y farmacéutica, laminación en frío (cilindros de trabajo) para rodillos de laminación, aparatos de medición, pequeños moldes de plástico, los cuales exigen alta resistencia al desgaste.

Método de obtención

Convencional

Propiedades

- Acero ledeburítico con 12 % de Cromo y alto contenido en Carbono
- Buena estabilidad dimensional
- Especialmente adecuado para temple al aire
- Buena tenacidad.

Aplicaciones

- Cuchillas de máquinas (fabricantes)
- Corte fino / Troquelado / Estampado
- Rodillos
- Laminación
- Componentes estándar (moldes, placas, expulsores, punzones)
- Componentes de desgaste
- Conformado en frío
- Componentes para la industria del reciclaje
- Componentes generales de ingeniería mecánica

Datos técnicos

Designación	
1.2601	SEL
~T30402	UNS
X165CrMoV12	EN
~D2	AISI
~Ch12MF	GOST

Composición Química

C	Si	Mn	Cr	Mo	V	W
1,60	0,35	0,30	11,50	0,60	0,30	0,50

Características

	Resistencia a la compresión	Estabilidad dimensional durante el tratamiento térmico	Tenacidad	Resistencia al desgaste abrasivo	Resistencia al desgaste adhesivo
BÖHLER K105	★★	★★	★	★★	★★
BÖHLER K100	★★	★★	★	★★★	★★
BÖHLER K107	★★	★★	★	★★★	★★
BÖHLER K110	★★	★★★	★	★★★	★★
BÖHLER K190 MICROCLEAN	★★★★	★★★★★	★★★★	★★★★	★★★★
BÖHLER K294 MICROCLEAN	★★★★★	★★★★★	★★★	★★★★★	★★★★★
BÖHLER K340 ECOSTAR	★★★	★★★	★★	★★	★★
BÖHLER K340 ISODUR	★★★	★★★★	★★★	★★★	★★★★
BÖHLER K346	★★★	★★★	★★★	★★★★	★★
BÖHLER K353	★★	★★★	★★	★★	★★
BÖHLER K360 ISODUR	★★★	★★★★	★★★	★★★★	★★★★
BÖHLER K390 MICROCLEAN	★★★★★	★★★★★	★★★★	★★★★★	★★★★★
BÖHLER K490 MICROCLEAN	★★★★	★★★★★	★★★★	★★★★	★★★★
BÖHLER K497 MICROCLEAN	★★★★★	★★★★★	★★★	★★★★★	★★★★★
BÖHLER K888 MATRIX	★★★★	★★★★★	★★★★★	★★	★★
BÖHLER K890 MICROCLEAN	★★★★	★★★★★	★★★★★	★★★	★★★

Estado de suministro

recocido	
Dureza (HB)	máx. 250

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. 600°C, further cooling in air.

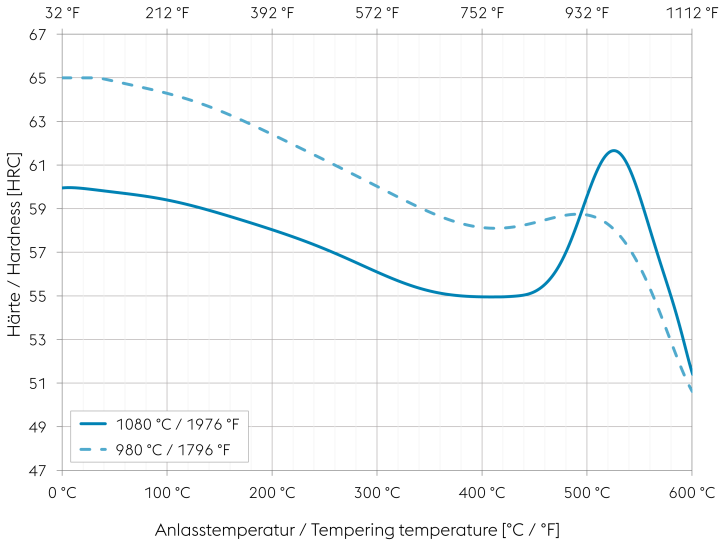
Alivio de tensiones

Temperatura	650 a 700 °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..

Temple y revenido

Temperatura	980 a 1.010 °C	Oil, salt bath from 428 to 482°F or 932 to 1022°F (220 to 250°C or 500 to 550°C), air, gas. Tools of intricate shape or with sharp edges should preferably be hardened in air or salt bath. 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/cooling in air.

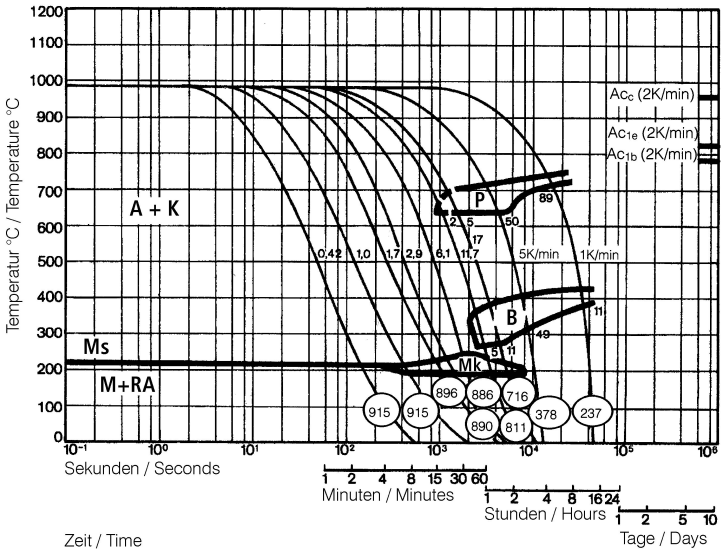
Slow cooling to room temperature after each tempering step is recommended.

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

It is recommended to temper at least three times above the secondary hardness maximum.

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

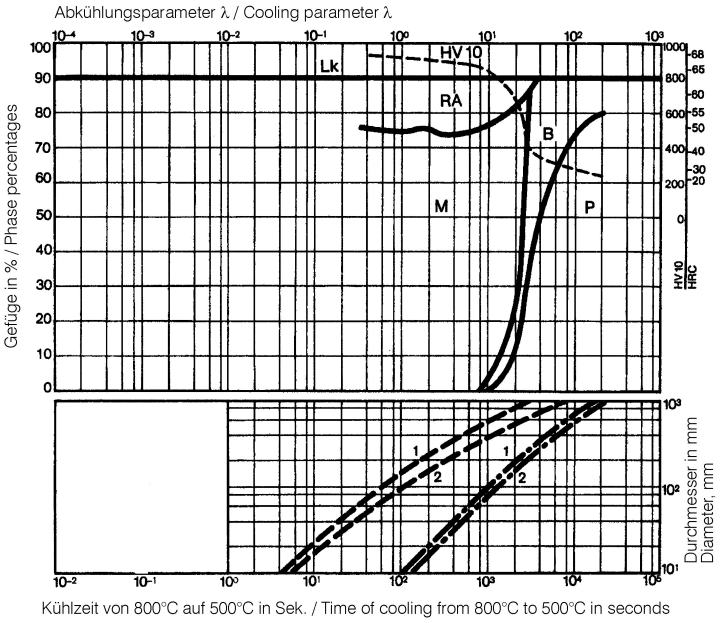
Continuous cooling CCT curves



Austenitising temperature: 1796°F (980°C)
Holding time: 30 minutes

O Vickers hardness
2...50 phase percentages
0.42...17 cooling parameter (λ), i.e. duration of cooling from 1472 to 932°F (800 to 500°C) in s x 10^{-2}
41...33,8°F/min (5...1K/min) cooling rate in °F/min (K/min) in the 1472 to 932°F (800 to 500°C) range
Mk... Grain boundary martensite

Quantitative phase diagram

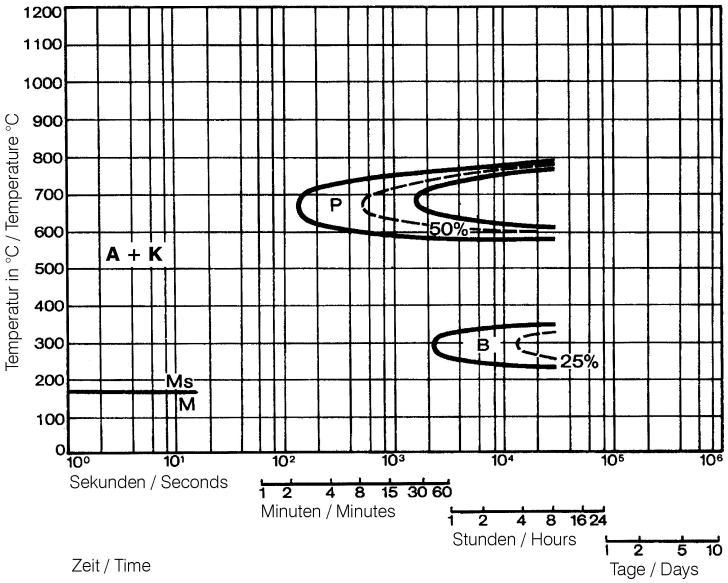


Lk... Ledeburite carbide
RA... Residual austenite
A... Austenite
B... Bainite
P... Perlite
K... Carbide
M... Martensite

- - - - - - Oil cooling
- • - Air cooling

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

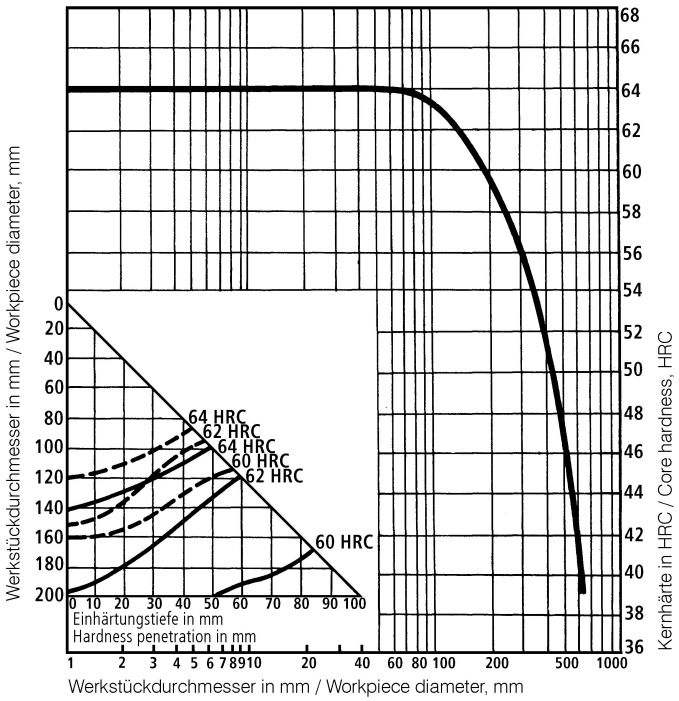
Isothermal TTT curves



Austenitising temperature: 980°C / 1796°F
Holding time: 30 minutes

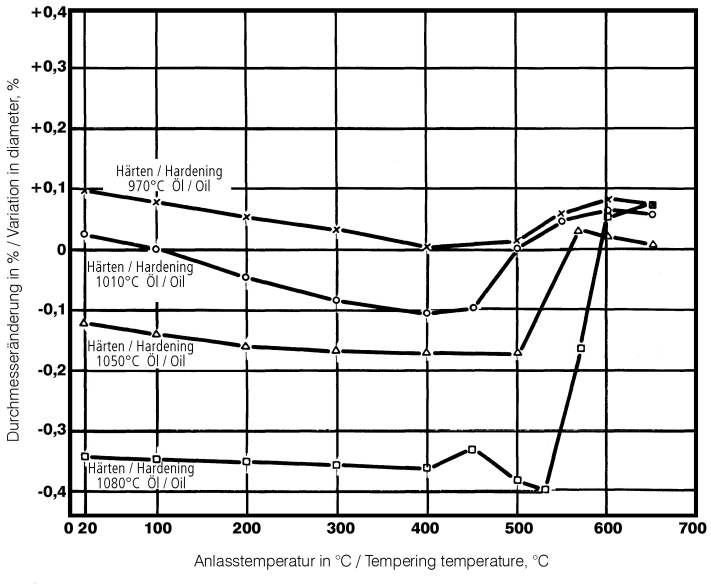
A... Austenite
B... Bainite
P... Perlite
K... Carbide
M... Martensite

Influence of work diameter on core hardness and hardness penetration



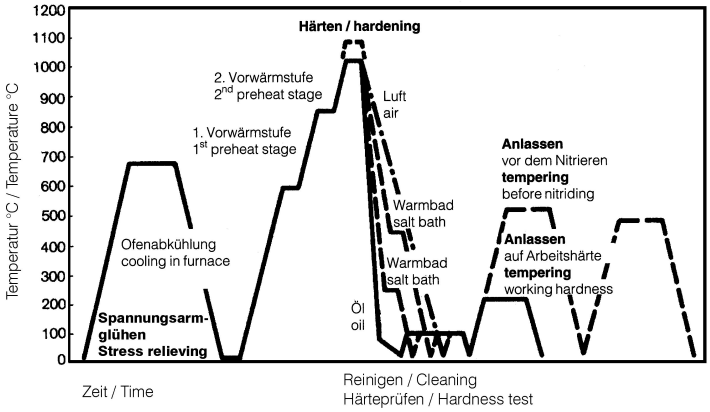
Quenched from: 980°C / 1796°F
Quenchant:
——— Oil
- - - - - - Air

Variation in size as a function of tempering temperature after hardening



Specimen size: Ø 22 x 5 mm

Heat treatment sequence



Propiedades físicas

Temperatura (°C)	20
Densidad (kg/dm^3)	7,7
Conductividad térmica (W/(m.K))	20
Calor específico (kJ/kg K)	0,46
Resistencia eléctrica específica (Ohm.mm^2/m)	0,65
Módulo de elasticidad (10^{3}N/mm^2)	210

Expansión térmica

Temperatura (°C)	100	200	300	400	500	600
Expansión térmica (10^{-6} m/(m.K))	10,5	11	11	11,5	12	12

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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voestalpine
ONE STEP AHEAD.