

KOUDVERVORMSTAAL

Beschikbare uitvoeringen

Stafstaal*

Plaat

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

Product omschrijving

Hoogproductieve snijgereedschappen (matrijzen en stempels), stansgereedschappen, gereedschappen voor houtbewerking, schaarmessen voor dun snijgoed, schroefdraadrolgereedschappen.
Gereedschappen voor trekken, dieptrekken en extrusie, persgereedschappen voor de keramische en de farmaceutische industrie, koudwalsen (strekwalsen) voor walserijen met meerdere cilinders, meetinstrumenten, kleine kunststofvormen die een hoge slijtvastheid vereisen.

Smeltroute

Airmelted

Eigenschappen

Maatvast, ledeburitisch 12%-chromstaal.
Bijzonder geschikt voor luchtharding.
Goede taaiheid.

Toepassingen

- > Machinale messen (voor fabrikanten)
- > Fijn stanswerk / ponsen / stampen
- > Rollen
- > Walsen
- > Standaardonderdelen (matrijzen, platen, pennen, ponsen)
- > Slijtstukken
- > Cold Forming
- > Componenten voor de recyclingindustrie
- > Algemene componenten voor werktuigbouw

Technische gegevens

Materiaal aanduiding	
1.2601	SEL
~T30402	UNS
X165CrMoV12	EN
~D2	AISI
~Ch12MF	GOST

Chemische samenstelling

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

Materiaaleigenschappen

	Drukbelastingcapaciteit	Dimensionale stabiliteit tijdens warmtebehandeling	Taatheid	Slijtvast abrasief	Slijtvaste lijm
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®	★★★★	★★★★★	★★★★★	★★★	★★★

Leveringsconditie
gegloeid

Hardheid (HB)	max. 250
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Warmtebehandeling
Annealing

Temperatuur	800 naar 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.
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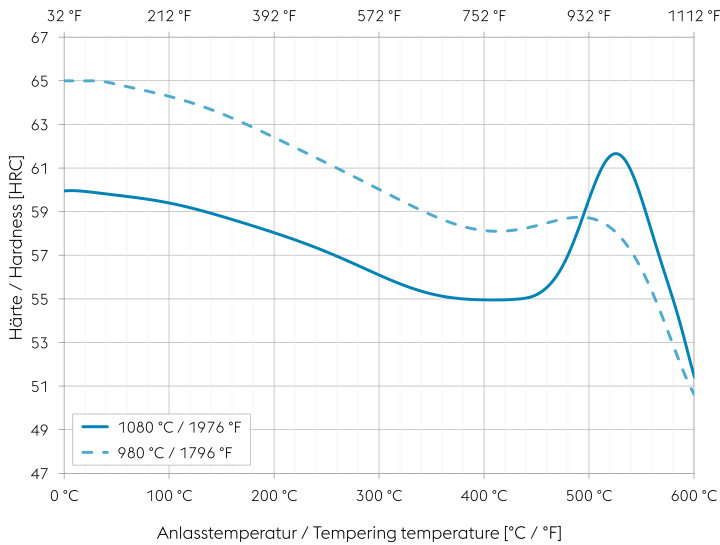
Stress relieving

Temperatuur	650 naar 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..
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Harden en ontlaten

Temperatuur	980 naar 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.
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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/cooling in air.

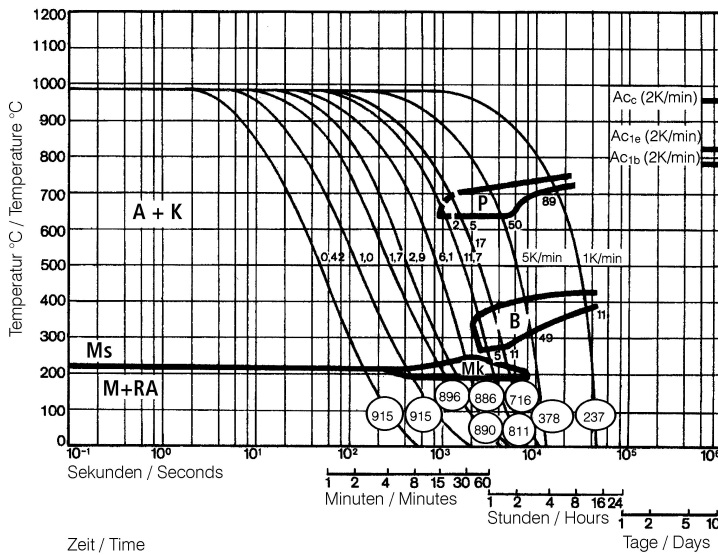
Slow cooling to room temperature after each tempering step is recommended.

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

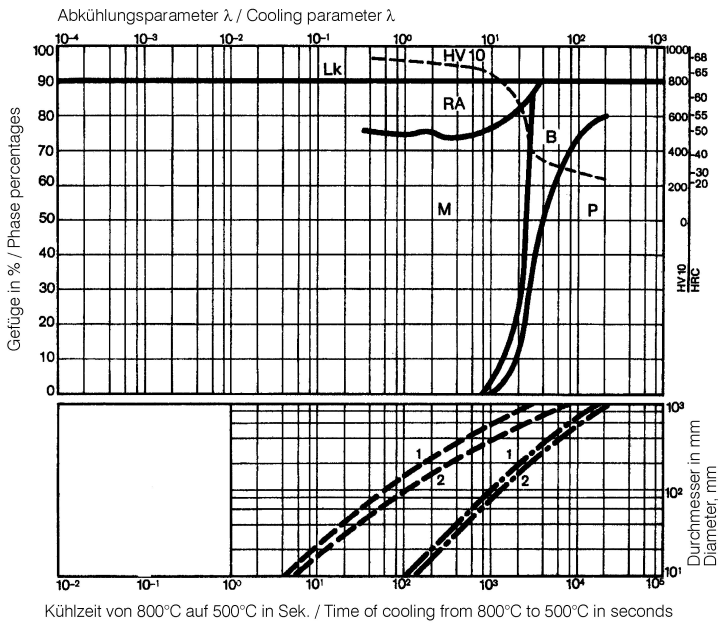
2...50 phase percentages

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

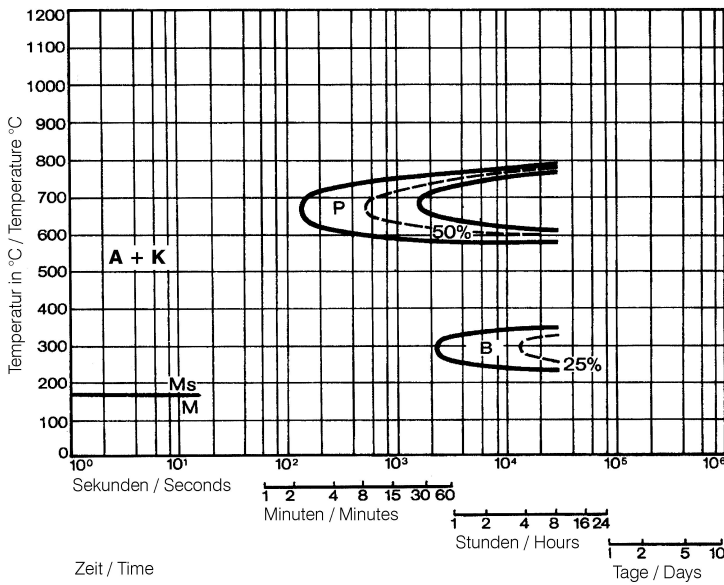
Mk... Grain boundary martensite

Quantitative phase diagram



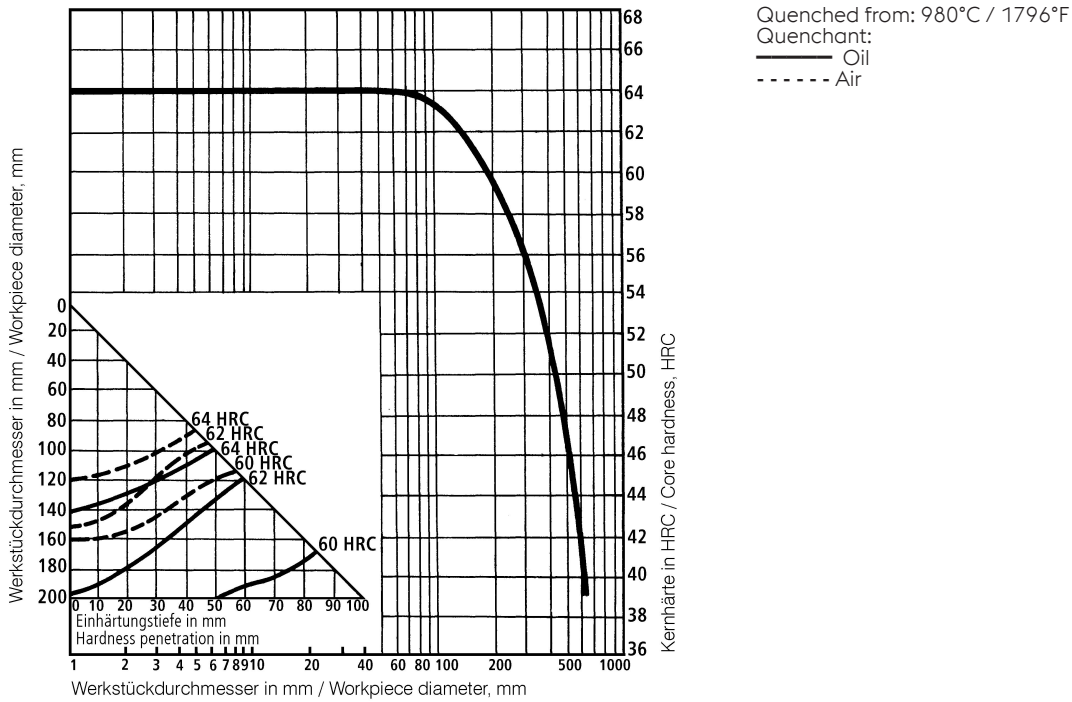
- Lk... Ledeburite carbide
 - RA... Residual austenite
 - A... Austenite
 - B... Bainite
 - P... Perlite
 - K... Carbide
 - M... Martensite
- Oil cooling
- · - Air cooling
- 1... Edge or face
2... Core

Isothermal TTT curves

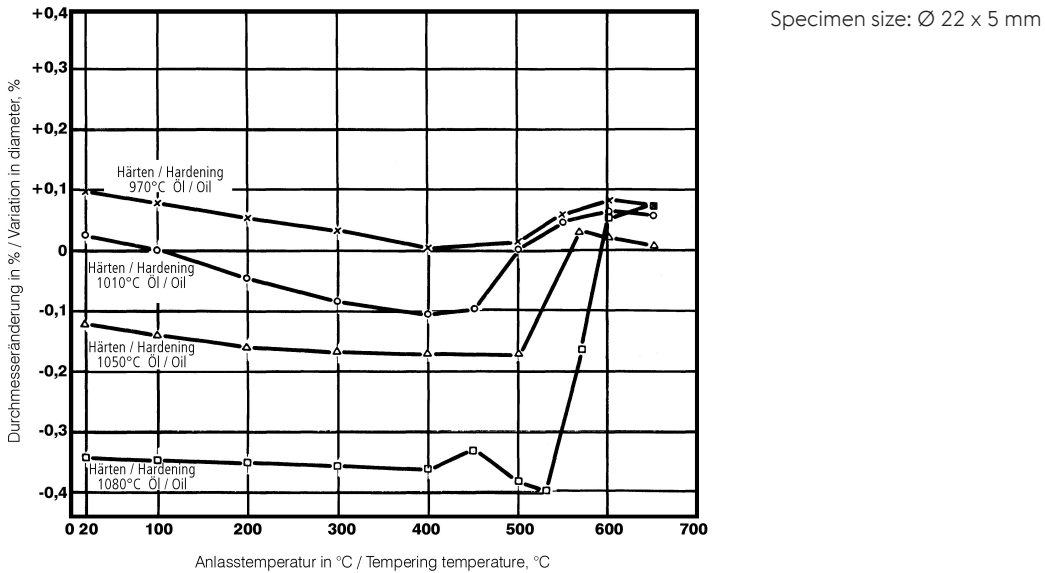


- Austenitising temperature: 980°C / 1796°F
Holding time: 30 minutes
- A... Austenite
 - B... Bainite
 - P... Pearlite
 - K... Carbide
 - M... Martensite

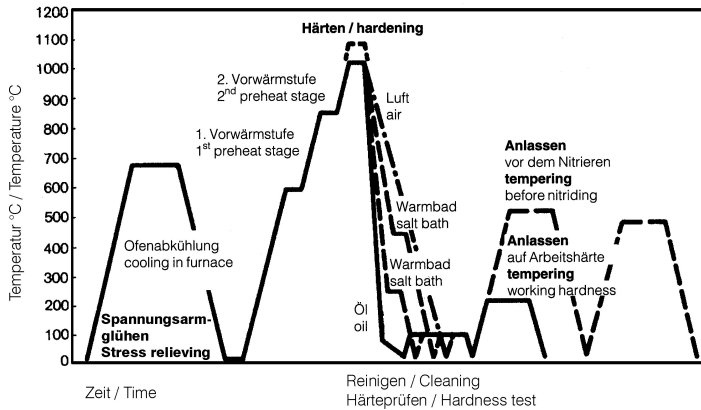
Influence of work diameter on core hardness and hardness penetration



Variation in size as a function of tempering temperature after hardening



Heat treatment sequence



Fysische eigenschappen

Temperatuur (°C)	20
Soortelijk gewicht (kg/dm ³)	7,7
Thermische conductiviteit (W/(m.K))	20
Soortelijke warmte (kJ/kg K)	0,46
Specifieke elektrische weerstand (Ohm.mm ² /m)	0,65
Elasticiteitsmodus (10 ³ N/mm ²)	210

Thermische expansie

Temperatuur (°C)	100	200	300	400	500	600
Thermische expansie (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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ONE STEP AHEAD.