BÖHLER

BÖHLER K888
MATRIX

COLD WORK STEELS

Available Product Variants

Long Products

Product Description

BÖHLER K888 MATRIX - This MATRIX steel offers an excellent combination of high toughness and high compressive strength. MATRIX materials have high toughness, which is a critical factor in many applications. However, the hardness achievable with commonly used MATRIX steels often limits the potential applications. BÖHLER K888 MATRIX breaks through this barrier and offers the best of both worlds of matrix steels and high alloy tool steels. BÖHLER K888 MATRIX is a unique problem solver in situations where high compressive strength and toughness are required. Its advantageous tempering behavior with a pronounced secondary hardness maximum also enables the use of advanced coatings.

Process Melting

Powder metallurgy

Properties

- Toughness & Ductility : very high
- Hardness : very high
- Compressive strength : very high
- Machinability : very high
- Dimensional stability : very high

Applications

- Fine Blanking, Stamping, Blanking
- Powder Pressing
- General Components for Mechanical Engineering
- Standard Parts (Molds, Plates, Pins, Punches)
- Cold Forming
- Pill punching dies
- Machine knife (for producers)
- Coining
- Rolling
- Components for Recycling Industry

Technical data

Material designation	
BÖHLER patent	Market grade

Chemical composition (wt. %)

C	Si	Cr	Mo	V	W	Co
0.60	0.85	4.40	2.80	1.10	2.45	3.80

Material characteristics

	Compressive strength	Dimensional stability during heat treatment	Toughness	Wear resistance abrasive	Wear resistance adhesive
BÖHLER K888 MATRIX	★★★★	★★★★★	★★★★★	★★	★★
BÖHLER K110	★★	★★★	★	★★★	★★
BÖHLER K294 MICROCLEAN	★★★★★	★★★★★	★★★	★★★★★	★★★★★
BÖHLER K340 ISODUR	★★★	★★★★	★★★	★★★	★★★★
BÖHLER K346	★★★	★★★	★★★	★★★★	★★
BÖHLER K353	★★	★★★	★★	★★	★★
BÖHLER K360 ISODUR	★★★	★★★★	★★★	★★★★	★★★★
BÖHLER K390 MICROCLEAN	★★★★★	★★★★★	★★★★	★★★★★	★★★★★
BÖHLER K490 MICROCLEAN	★★★★	★★★★★	★★★★	★★★★	★★★★
BÖHLER K497 MICROCLEAN	★★★★★	★★★★★	★★★	★★★★★	★★★★★
BÖHLER K890 MICROCLEAN	★★★★	★★★★★	★★★★★	★★★	★★★

Delivery condition

Annealed

Hardness (HB)	max. 280

Heat treatment

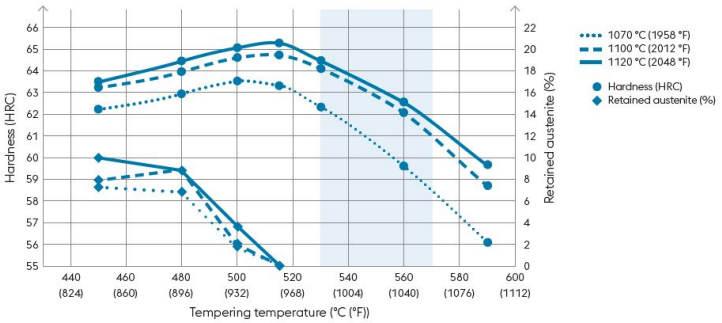
Stress relieving

Temperature	650 to 700 °C | 1,202 to 1,292 °F	After through-heating, soak for 1 to 2 hours in a neutral atmosphere. Slow cooling in furnace.

Hardening and Tempering

Temperature	1,070 to 1,120 °C | 1,958 to 2,048 °F	20-30 minutes for a hardening temperature of 1070 to 1100 °C (1958 to 2012 °F) 10 minutes for hardening temperature 1120 °C (2048 °F) After hardening, temper as necessary to the desired hardness, see tempering chart.

Tempering Chart



Tempering:

Heat up slowly to the tempering temperature immediately after hardening

Soak time in furnace 1 hour for each 20 mm of workpiece thickness, with a minimum of 2 hours

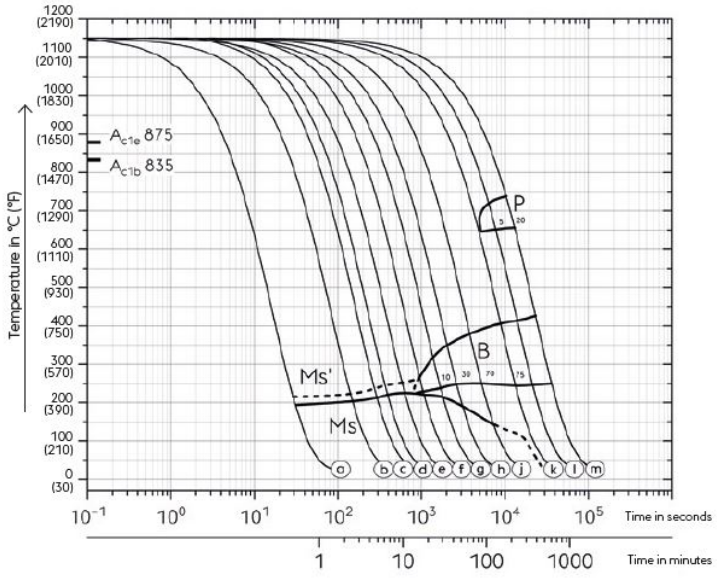
Cooling to room temperature after each tempering step is recommended.

Three tempering cycles between 530 and 570 °C (986 and 1058 °F) are recommended.

Refer to the tempering chart for typical values of hardness achievable after tempering.

Additional stress relieving after tempering, e.g. after hard machining, can be carried out at a temperature 30 - 50 °C (86 - 122 °F) lower than the highest tempering temperature in order to minimize hardness decay.

Continuous cooling CCT curves



Austenitizing temperature: 1150 °C / 2102 °F

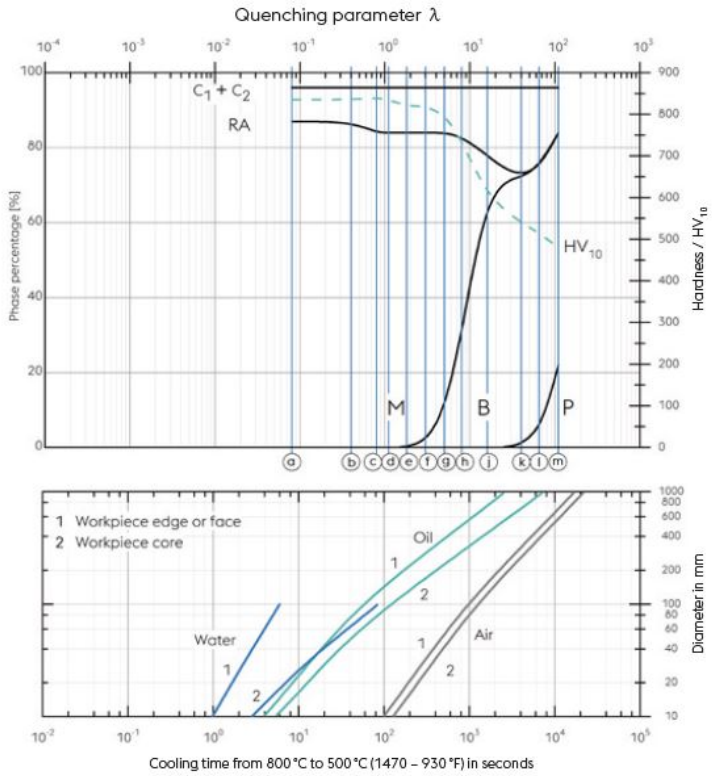
Soak time: 180 sec

5...75 Phase proportion in %

0.08 – 110 Quenching parameter λ, i.e. quenching time from 800 to 500 °C (1470 – 930 °F) in s x 10^{-2}

Specimen	λ	HV_{10}
a	0,08	835
b	0,40	835
c	0,80	840
d	1,10	835
e	1,80	820
f	3,00	820
g	5,00	800
h	8,00	740
j	16,00	600
k	40,00	540
l	65,00	515
m	110,00	480

Quantitative phase diagram



C1...Carbide content not dissolved during austenitization

C2...Start of carbide precipitation during quenching from the austenitization temperature

RA...Retained austenite

A...Austenite

M...Martensite

P...Perlite

B...Bainite

Physical Properties

Temperature (°C | °F)	20 | 68
Density (kg/dm³ | lb/in³)	7.86 | 0.28
Thermal conductivity (W/(m.K) | BTU/ft h °F)	20.8 | 12.02
Specific heat (kJ/kg K | BTU/lb °F)	0.442 | 0.1056
Spec. electrical resistance (Ohm.mm²/m | 10⁻⁴ Ohm.inch²/ft)	0.5 | 2.36
Modulus of elasticity (10³N/mm² | 10³ksi)	218 | 31.62

Thermal Expansions between 20°C | 68°F and ...

Temperature (°C | °F)	100 | 212	200 | 392	300 | 572	400 | 752	500 | 932	600 | 1,112	700 | 1,292
Thermal expansion (10⁻⁶ m/(m.K) | 10⁻⁶ inch/inch.°F)	10.7 | 5.9	11.5 | 6.4	11.9 | 6.6	12.5 | 6.9	12.5 | 6.9	12.8 | 7.1	12.7 | 7.1

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voestalpine
ONE STEP AHEAD.