



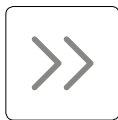
HIGH SPEED
STEEL

HIGH SPEED STEEL

BÖHLER S730

THE SAME PERFORMANCE IMPROVED EFFICIENCY

BÖHLER S730
the efficient performer



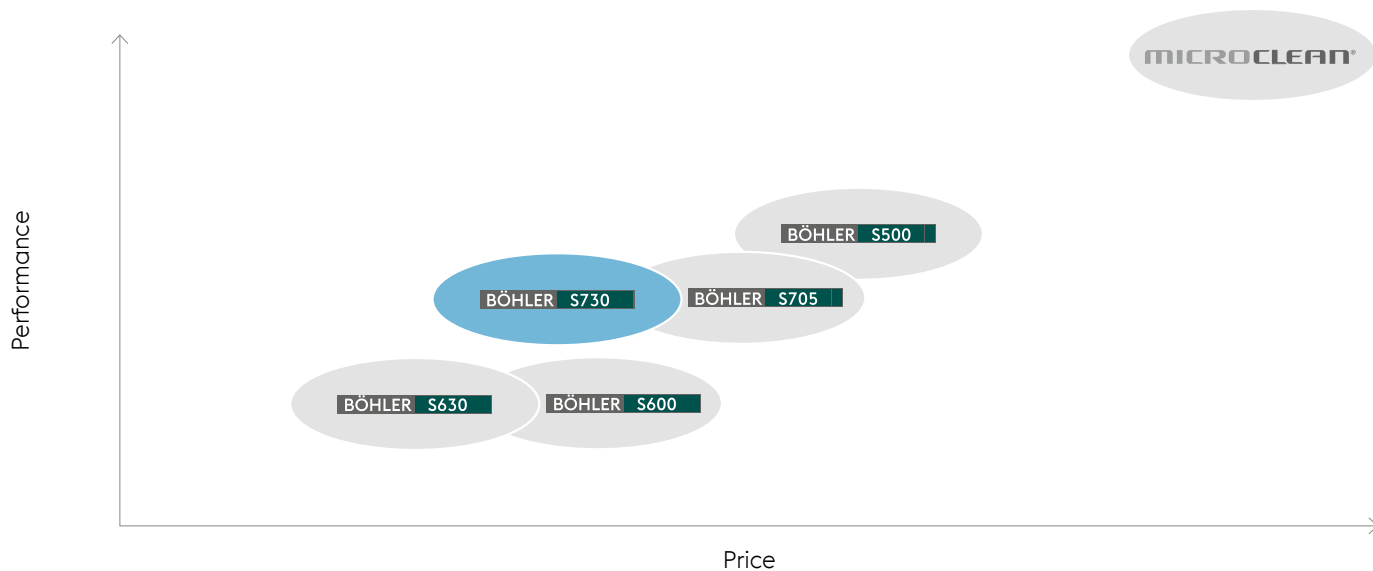
HIGH SPEED
STEEL

The cost-effectiveness of high speed steels is strongly dependent on their alloy components. Strong fluctuations in the raw materials market and resulting price variations have compelled voestalpine BÖHLER Edelstahl to rethink the basic alloy concepts of the high speed steels in our product portfolio. The result is the patented BÖHLER S730 material, which is an economical alternative to the generally applicable standard sort 1.3243 or M35 (BÖHLER S705). Despite its economic advantage, BÖHLER S730 is fully equivalent to the standard 1.3243 in terms of performance.

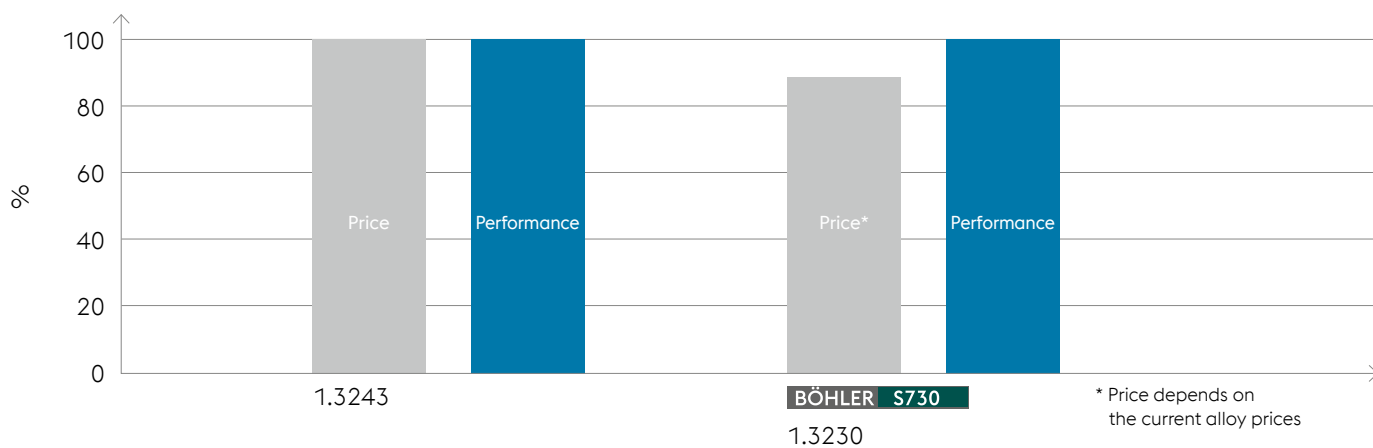
| BÖHLER Grade | Chemical composition (average %) | | | | | | |
|----------------------|----------------------------------|------|------|------|------|------|------|
| | C | Cr | W | Mo | V | Co | Al |
| BÖHLER S705 1.3243 | 0.92 | 4.10 | 6.20 | 5.00 | 1.90 | 4.80 | - |
| BÖHLER S730 1.3230 | 0.92 | 4.10 | 4.25 | 4.15 | 1.95 | 4.75 | 0.50 |



Price-performance chart



Comparison price-performance ratio



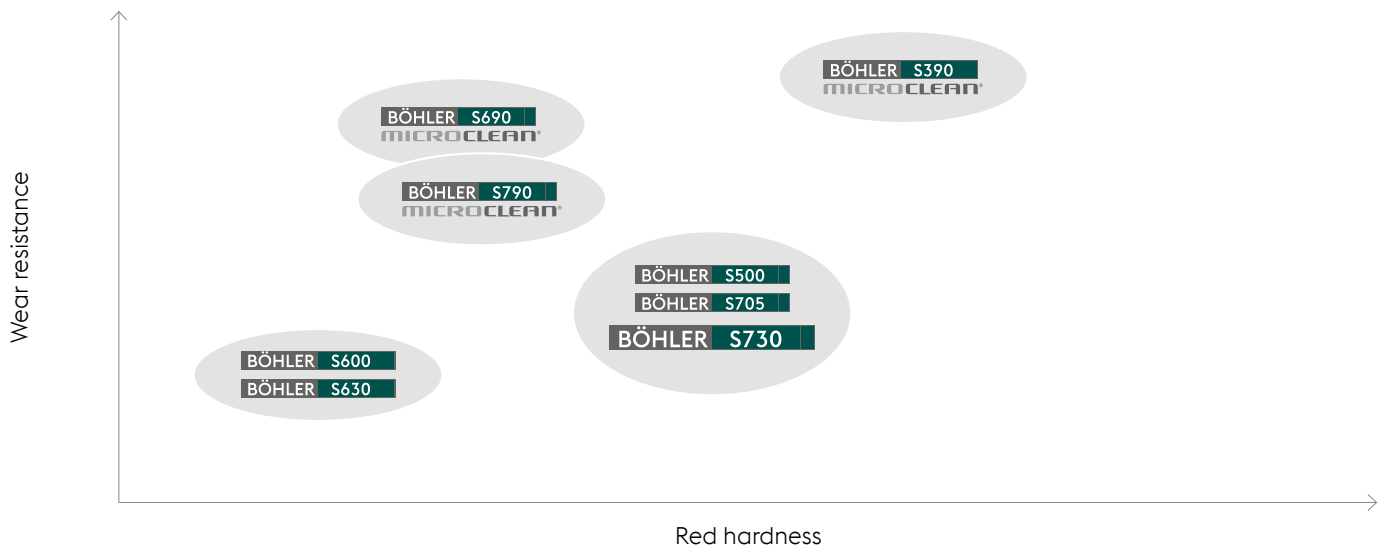


COMPARISON OF THE MAJOR STEEL PROPERTIES

| BÖHLER Grade | Red hardness | Wear resistance | Toughness | Grindability | Compressive strength |
|----------------------------|--------------|-----------------|-----------|--------------|----------------------|
| BÖHLER S730 | ★★★ | ★★ | ★★★ | ★★★ | ★★★ |
| BÖHLER S705 | ★★★ | ★★ | ★★★ | ★★★ | ★★★ |
| BÖHLER S500 | ★★★★ | ★★ | ★★ | ★★★ | ★★★★ |
| BÖHLER S600 | ★★★ | ★★ | ★★★ | ★★★ | ★★★ |
| BÖHLER S390 MICROCLEAN® | ★★★★ | ★★★★ | ★★★★ | ★★★ | ★★★★ |
| BÖHLER S690 MICROCLEAN® | ★★ | ★★★ | ★★★★★ | ★★★ | ★★★ |
| BÖHLER S790 MICROCLEAN® | ★★ | ★★ | ★★★★ | ★★★ | ★★★ |

This table is intended to facilitate the steel choice. It does not, however, take into account the various stress conditions imposed by the different types of application. Our technical consultancy staff will be glad to assist you in any questions concerning the use and processing of steels.

Requirements in the machining sector



BEST PROPERTIES

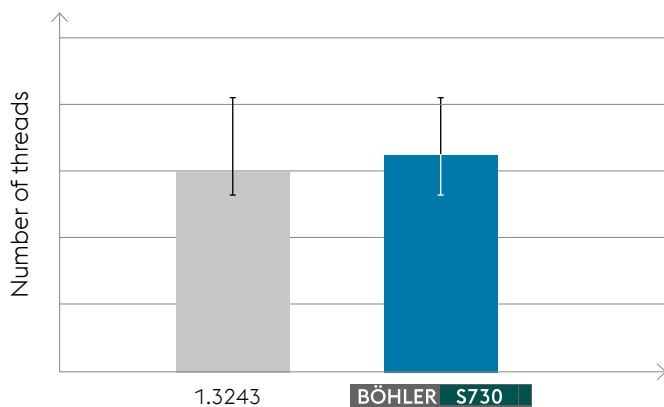
Properties

BÖHLER S730 is a cobalt-alloyed tungsten-molybdenum high speed steel with high hardness, excellent cutting properties, extremely high compression strength, high elevated temperature hardness and good toughness. BÖHLER S730 thus combines economy and performance in a single material and is ideally suitable for use in screw taps and drills.

Applications

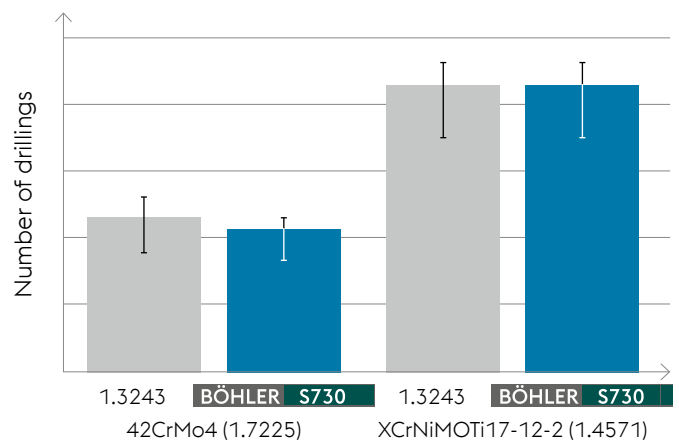
Slotting tools, milling cutters, spiral drills and screw taps, as well as the full spectrum of cold working applications.

Tapping Test



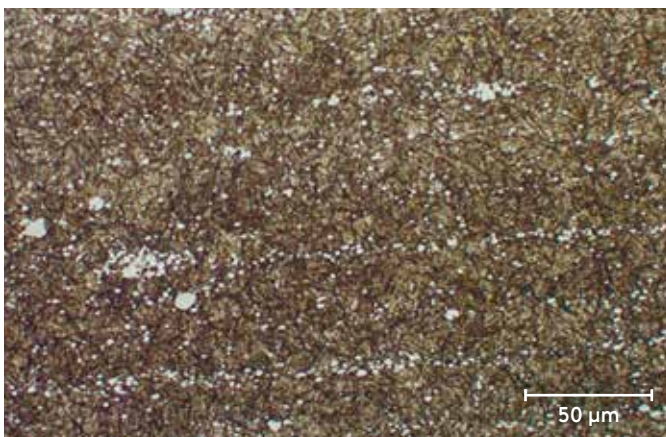
Material used in Tapping tests: 42CrMo4, Ck75, C45

Drilling Test

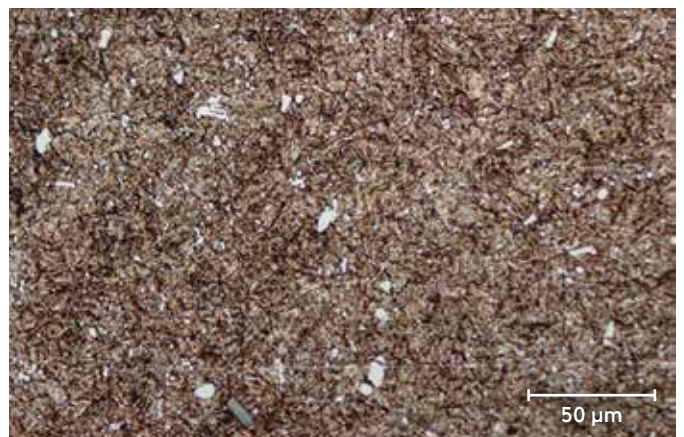


Material used in Tapping tests: 42CrMo4, Ck75, C45

Structure (salt bath TA = 1190 °C (2174 °F), TT = 560 °C (1040 °F) / 3 x 2 h)



1.3243



BÖHLER S730





HEAT TREATMENT

Hot forming

Forging

1100 to 900 °C (2012 to 1652 °F)
Slow cooling in furnace or in
thermoinsulating material.

Heat treatment

Annealing

770 to 840 °C (1418 to 1544 °F) /
Controlled slow cooling in furnace
(10 to 20 °C/h / (50 to 68 °F/h)
to approx. 600 °C (1110 °F), air cooling.
Hardness after annealing:
max. 280 Brinell.

Stress relieving

600 to 650 °C (1112 to 1202 °F)
Slow cooling in furnace.
To relieve stresses set up by extensive
machining or in tools of intricate shape.
After through heating, maintain
a neutral atmosphere for 1-2 hours.

Hardening

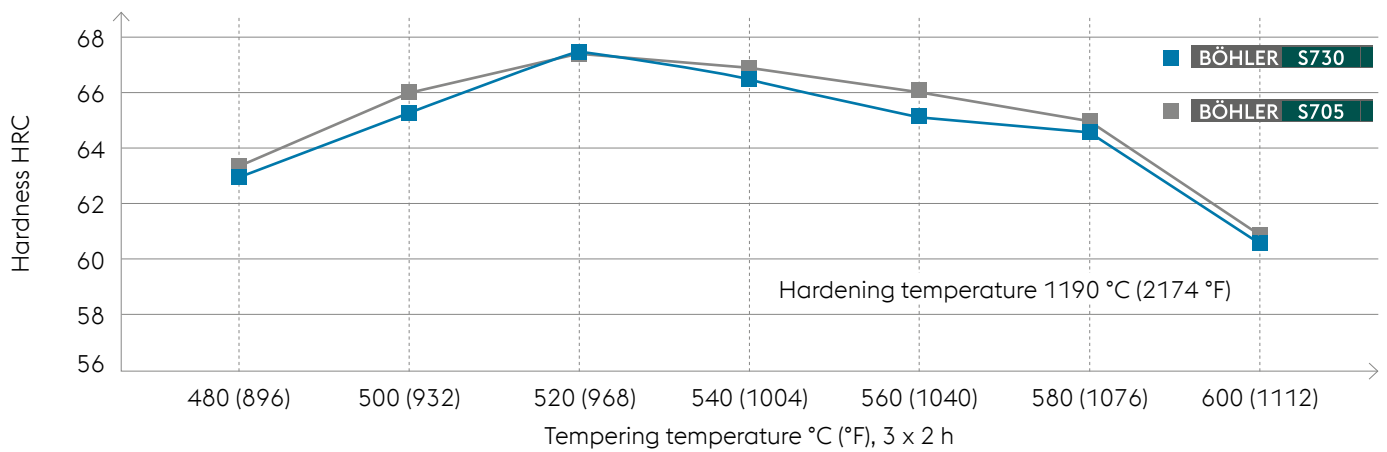
1150 to 1190 °C (2102 to 2174 °F)
Oil, air, salt bath (500 to 550 °C /
932 to 1022 °F), gas.

Upper temperature range for parts of
simple shape, lower for parts of complex
shape. For coldworking tools also lower
temperatures are of importance for
higher toughness. A minimum of 80
seconds soaking time after heating the
whole section of a work-piece is required
for dissolving sufficient carbides with a
maximum soaking time of 150 seconds
to avoid damages by oversoaking. In
practice instead of soaking time, the
time of exposure from placing the
workpiece into the salt bath after
preheating until its removal (including
the stages of heating to the speci fied
surface temperature and of heating to
the temperature throughout the whole
section) is used (see immersion time
diagrams).

Vacuum hardening is also possible. The
time in the vacuum furnace depends
on the relevant workpiece size and
furnace parameters.

HEAT TREATMENT

Hardness-annealing properties in comparison



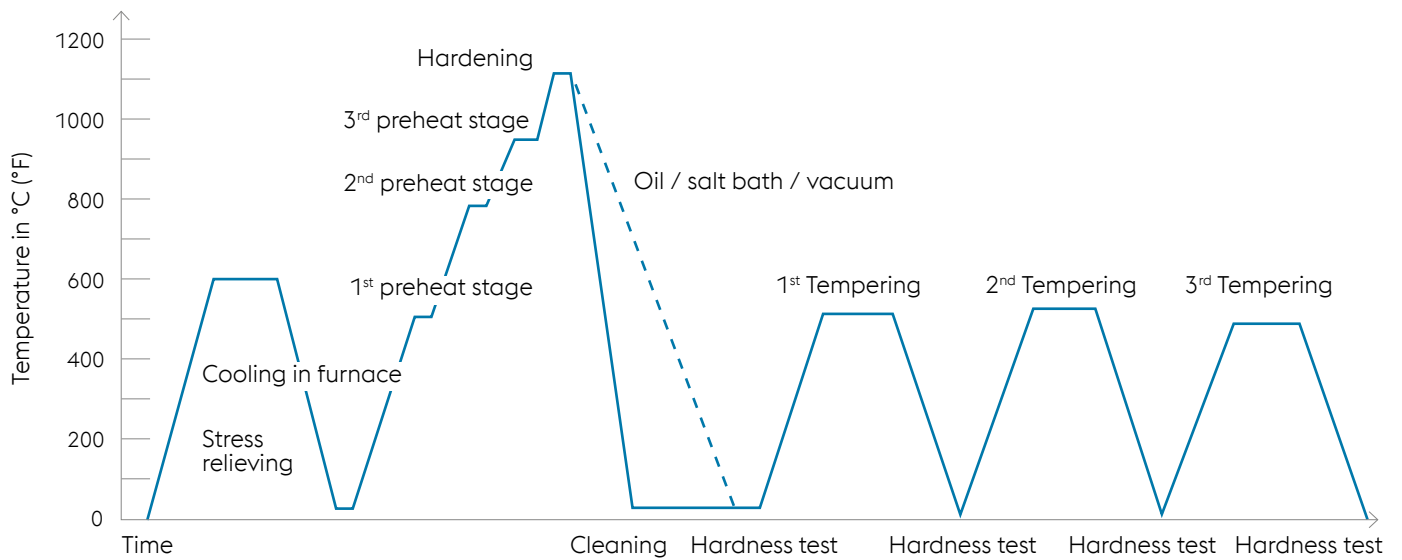
Surface treatment

Nitriding

Parts made from this steel can be plasma, bath and gas nitrided.



Heat treatment sequence

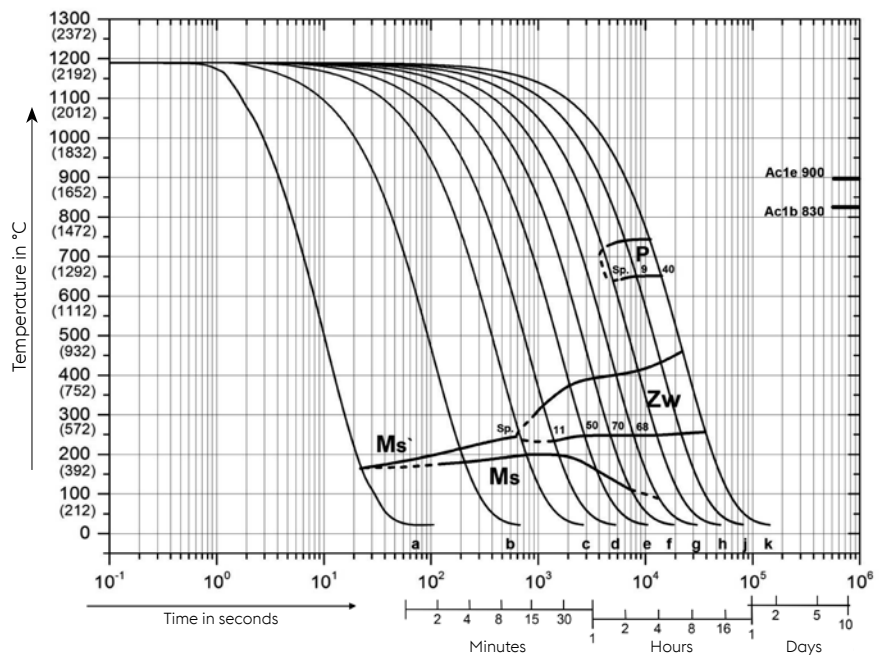


HEAT TREATMENT RECOMMENDATION



Continuous cooling CCT curves

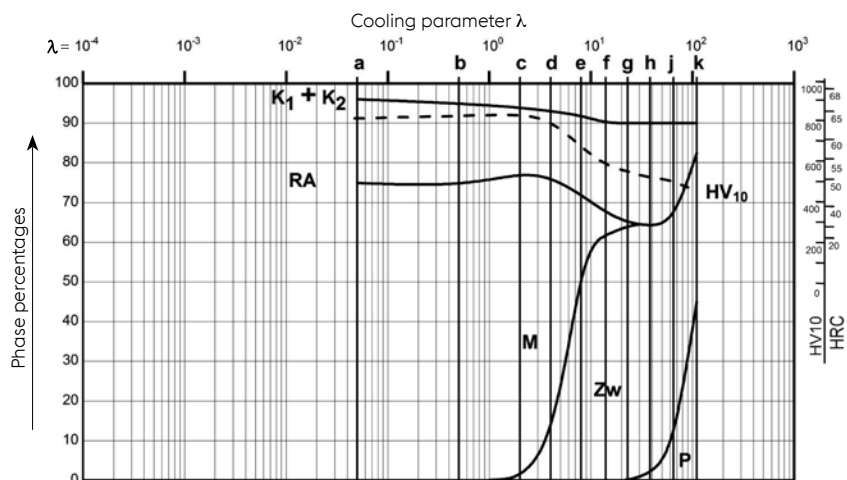
| | |
|----------------------------------|---|
| Austenitizing temperature | 1190 °C (2174 °F) |
| Holding time | 150 seconds |
| Vickers hardness | |
| 1 | 30 phase percentages |
| 0.39 | 23.5 cooling parameter, i.e. duration of cooling from 800 – 500°C (1472 – 932 °F) in $s \times 10^{-2}$ |
| 2 K/min | 0.5 K/min cooling rate in K/min in the 800 – 500°C (1472 – 932 °F) range |
| Ms-Ms' | range of grain boundary martensite formation |



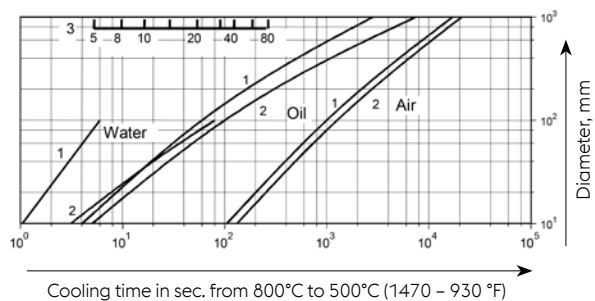


Quantitative phase diagram

| | |
|----|--------------------|
| A | Austenite |
| B | Bainite |
| K | Carbide |
| M | Martensite |
| P | Perlite |
| Lk | Ledeburite carbide |
| RA | Retained austenite |



- 1 Edge of face
- 2 Core
- 3 Jominy End Quench Test: Distance from the quenched end



| Analysis | C | Si | Mn | Co | W | Al | Cr | Mo | Ni | V | NB | Cu |
|--------------------|------|------|------|------|------|------|------|------|------|------|-------|------|
| BÖHLER S730 | 0.92 | 0.31 | 0.25 | 4.75 | 4.25 | 0.50 | 4.10 | 4.15 | 0.28 | 1.95 | 0.007 | 0.11 |

S730

AT A GLANCE

The cost-effectiveness of high speed steels is strongly dependent on their alloy components. Strong fluctuations in the raw materials market and resulting price variations have compelled voestalpine BÖHLER Edelstahl to rethink the basic alloy concepts of the high speed steels in our product portfolio. The result is the patented BÖHLER S730 material, which is an economical alternative to the generally applicable standard sort 1.3243 or M35 (BÖHLER S705). Despite its economic advantage, BÖHLER S730 is fully equivalent to the standard 1.3243 in terms of performance.

Physical properties

| | at 20 °C | at 68 °F |
|------------------------|--|-----------------------------|
| Density | 7,93 kg/dm ³ | 0.29 lbs/in ³ |
| Thermal conductivity | 19,0 W/(m.K) | 10.99 Btu/ft h °F |
| Specific heat | 430 J/(m.K) | 0.103 Btu/lb °F |
| Electrical resistivity | 0,57 Ohm mm ² /m | 0.57 Ohm mm ² /m |
| Modulus of elasticity | 217,8* 10 ³ N/mm ² | 31.6* 10 ⁶ psi |

In each individual case with regards to applications and processing steps that are not expressly mentioned in this product description/ data sheet, the customer is required to consult us.

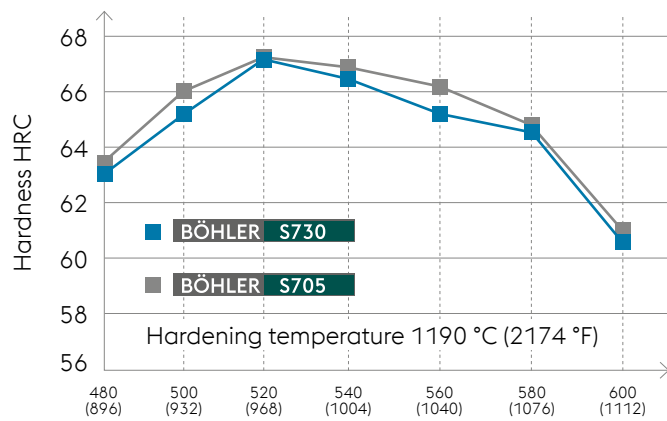
BÖHLER Grade

Chemical composition (average %)

| | C | Cr | W | Mo | V | Co | Al |
|-----------------------------|------|------|------|------|------|------|------|
| BÖHLER S730 | 0.92 | 4.10 | 4.25 | 4.15 | 1.95 | 4.75 | 0.50 |
| DIN/EN: <1.3230>, HS4-4-2-5 | | | | | | | |

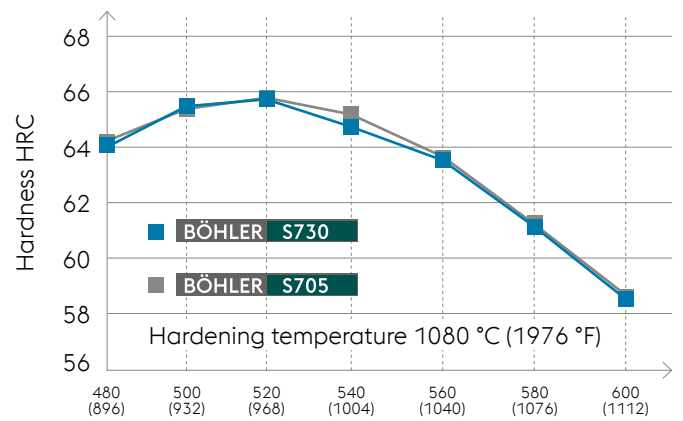


Hardness-annealing properties for cutting applications



Tempering temperature °C (°F), 3 x 2 h

Hardness-annealing properties for cold work applications



Tempering temperature °C (°F), 3 x 2 h

The data contained in this brochure is merely for general information and therefore shall not be binding on the company. We may be bound only through a contract explicitly stipulating such data as binding. The manufacture of our products does not involve the use of substances detrimental to health or to the ozone layer.



voestalpine BÖHLER Edelstahl GmbH & Co KG

Mariazeller Straße 25

8605 Kapfenberg, Austria

T. +43/50304/20-0

F. +43/50304/60-7576

E. info@bohler-edelstahl.at

www.voestalpine.com/bohler-edelstahl

voestalpine

ONE STEP AHEAD.