HIGH SPEED STEELS

Application Segments

Cutting Tools

Available Product Variants

Long Products

Product Description

Böhler S430 "The eco-responsible choice!"
Tungsten-molybdenum-vanadium High Speed steel with Aluminum - with good toughness and machinability. The optimal choice for any application, aligning environmental sustainability and budgetary prudence.

Process Melting

Airmelted

Properties

- Toughness & Ductility : high
- Wear Resistance : good
- Compressive strength : good
- Edge Stability : high
- Grindability : good
- Hot Hardness (red hardness) : good

Applications

- Twist Drills and Taps

Technical data

Material designation	
HS 2-2-2 Al	Market grade
1.3331	SEL

Chemical composition (wt. %)

C	Si	Mn	Cr	Mo	V	W	Al
0.87	0.5	0.28	4	2.1	2.1	2.1	+

Material characteristics

	Compressive strength	Grindability	Red hardness	Toughness	Wear resistance	Edge Stability
BÖHLER S430	★★	★★★	★★	★★★	★★	★★
BÖHLER S200	★★★	★★	★★★	★★	★★★	★★
BÖHLER S400	★★★	★★★	★★★	★★★	★★	★★
BÖHLER S401	★★	★★★	★★	★★★	★★	★★★
BÖHLER S404	★★	★★★	★★	★★★	★★	★★
BÖHLER S405	★★★	★★★	★★	★★★	★★	★★
BÖHLER S500	★★★★	★★★	★★★★	★★	★★★	★★★
BÖHLER S600	★★★	★★★	★★★	★★	★★	★★★
BÖHLER S607	★★★	★★★	★★★	★★	★★★	★★★
BÖHLER S630	★★★	★★★	★★★	★★	★★	★★★
BÖHLER S705	★★★	★★★	★★★★	★★	★★	★★★★
BÖHLER S730	★★★	★★★	★★★★	★★	★★	★★★★

Delivery condition

Annealed

Hardness (HB)	max. 280
Tensile Strength (MPa)	max. 950

Heat treatment

Annealing

Temperature	770 to 840 °C	Controlled slow cooling in furnace (10 - 20°C / h / (50 - 68°F 7 h) to approx. 600°C (1110°F), air cooling.

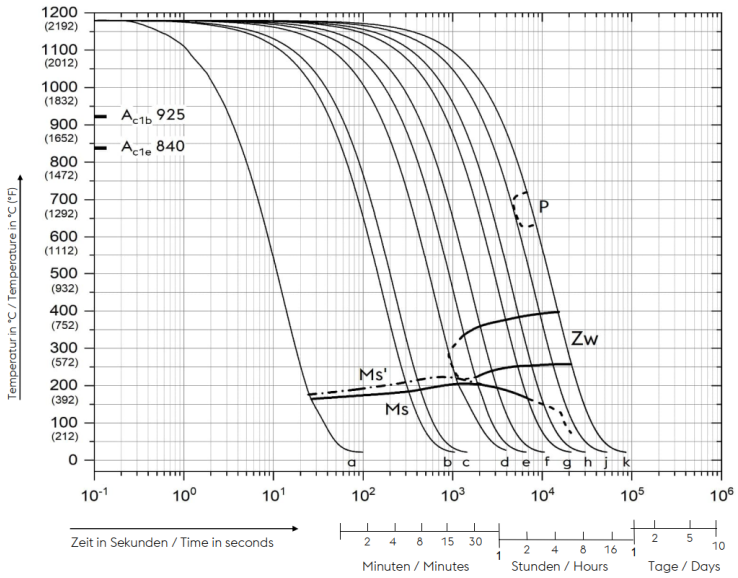
Stress relieving

Temperature	600 to 650 °C	Slow cooling furnace. || To relieve stresses set up by extensive machining or in tools of intricate shape. || After through heating, hold in neutral atmosphere for 1 to 2 hours.

Hardening and Tempering

Temperature	1,030 to 1,180 °C	Salt bath, vacuum || Preheating: 1st stage ~ 500 °C, 2nd stage ~ 850 °C, 3rd stage ~1050 °C (for higher austenitising temperature) || Austenitising: for cutting applications at higher austenitising temperatures (>1130 °C), holding time after complete heating 80 seconds, maximum 150 seconds, to avoid material damage due to overtime. || Austenitising: for cold work applications at lower austenitising temperatures (<1100°C). Holding time after complete heating 15 to 30 min || Quenching: oil, warm bath (500 - 550 °C), gas.
Temperature	540 to 560 °C	Slow heating to tempering temperature immediately after austenitising. || Dwell time in the furnace 1 hour per 20 mm material thickness (at least 1 hour) || Slow cooling to room temperature after each tempering step|| 3 tempering cycles recommended || Hardness see tempering chart

Continuous cooling CCT curves

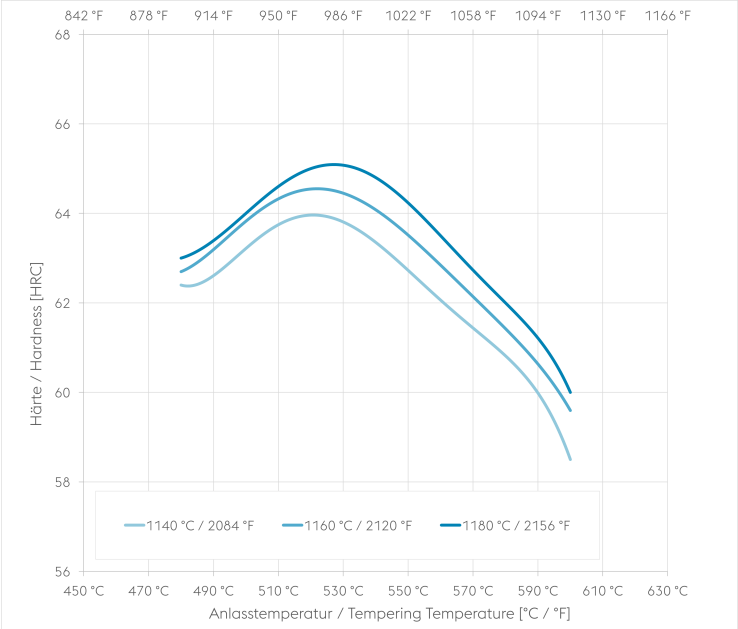


Austenitising temperature: 1180°C (2156°F)
Holding time: 180 seconds

A....Austenite
Zw....Bainite
K....Carbide
P....Perlite
M....Martensite
RA...Retained Austenite

Sample	λ	HV10	Sample	λ	HV10
a	0,06	840	f	8,0	700
b	0,8	840	g	16,0	600
c	1,1	835	h	23,0	550
d	3,0	795	j	40,0	510
e	5,0	785	k	65,0	485

Tempering Chart Saltbath - Cutting Application

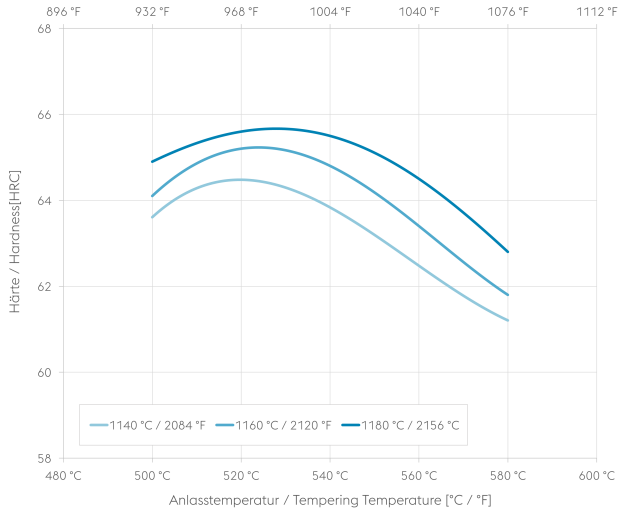


Cutting Application

Saltbath

Holding time 3 x 2 hours
Specimen size: square 25 mm

Tempering Chart Vacuum - Cutting Application

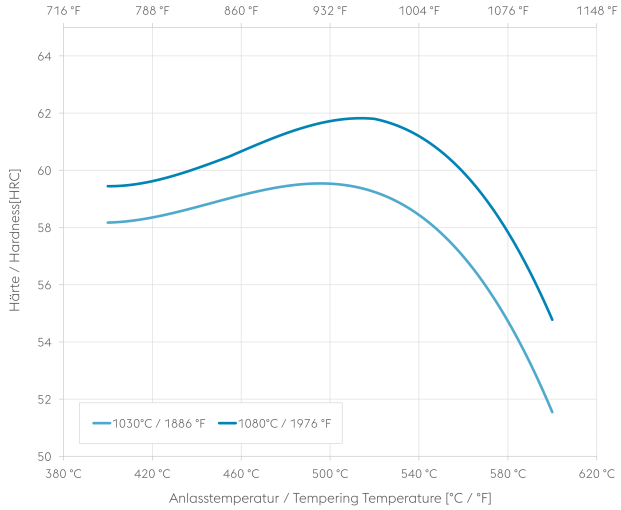


Cutting Application

Vacuum

Holding time 3 x 2 hours
Specimen size: square 25 mm

Tempering Chart Vacuum - Coldwork Application



Coldwork Application

Vacuum

Holding time 3 x 2 hours
Specimen size: square 25 mm

Physical Properties

Temperature (°C)	20
Density (kg/dm^3)	7.8
Thermal conductivity (W/(m.K))	27.1
Specific heat (kJ/kg K)	0.443
Spec. electrical resistance (Ohm.mm^2/m)	0.4
Modulus of elasticity (10^{3}N/mm^2)	217

If other available product variants are listed in addition to long products, please note that these may differ in terms of melting process, technical data, delivery and surface condition as well as available product dimensions. For mandatory technical specifications, other requirements and dimensions, please contact our regional voestalpine BÖHLER sales companies. 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. Measurement data are laboratory values and can deviate from practical analyses. The manufacture of our products does not involve the use of substances detrimental to health or to the ozone layer.

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ONE STEP AHEAD.

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