

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	
1.3331	SEL
HS 2-2-2 Al	Market grade

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 ksi)	max. 950 138

Heat treatment

Annealing

Temperature	770 to 840 °C 1,418 to 1,544 °F	Controlled slow cooling in furnace (10 - 20°C / h / (50 - 68°F 7 h) to approx. 600°C (1110°F), air cooling.
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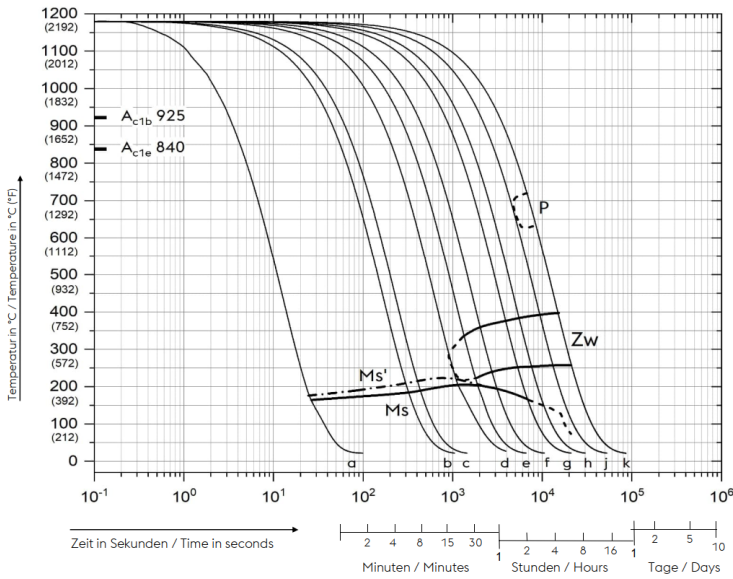
Stress relieving

Temperature	600 to 650 °C 1,112 to 1,202 °F	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.
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Hardening and Tempering

Temperature	1,030 to 1,180 °C 1,886 to 2,156 °F	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 1,004 to 1,040 °F	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

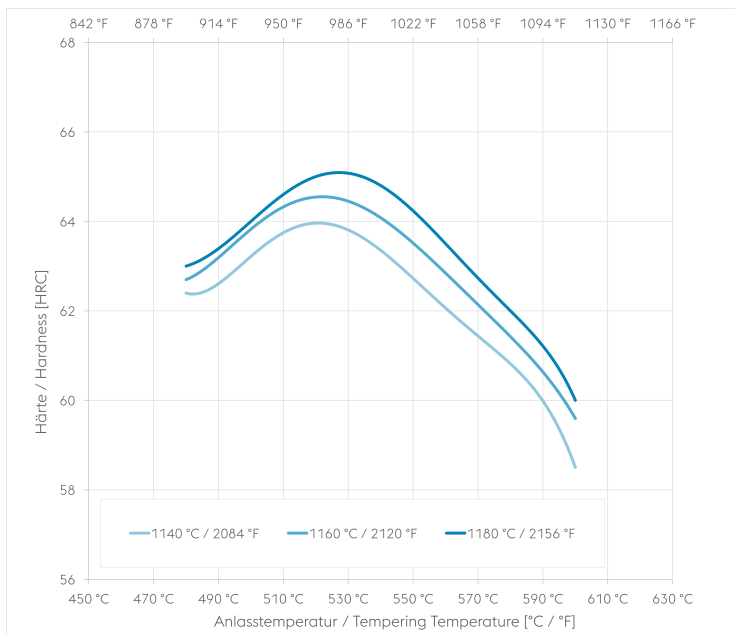


Austenitising temperature: 1180°C (2156°F)
Holding time: 180 seconds

A....Austenite
Zw....Bainite
K....Carbide
P....Pearlite
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

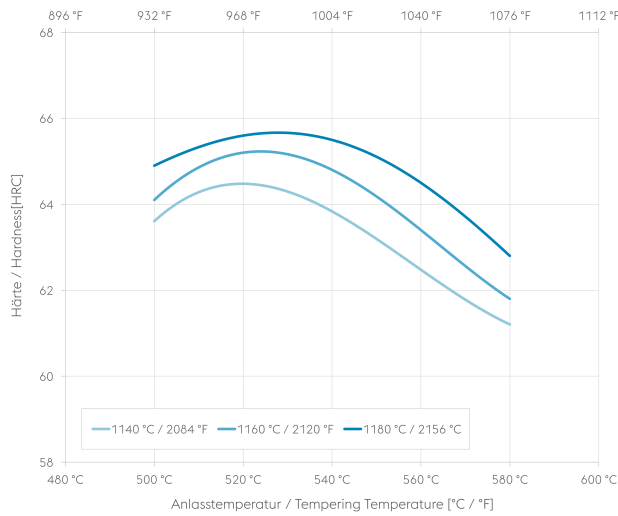


Cutting Application

Saltbath

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

Tempering Chart Vacuum - Cutting Application

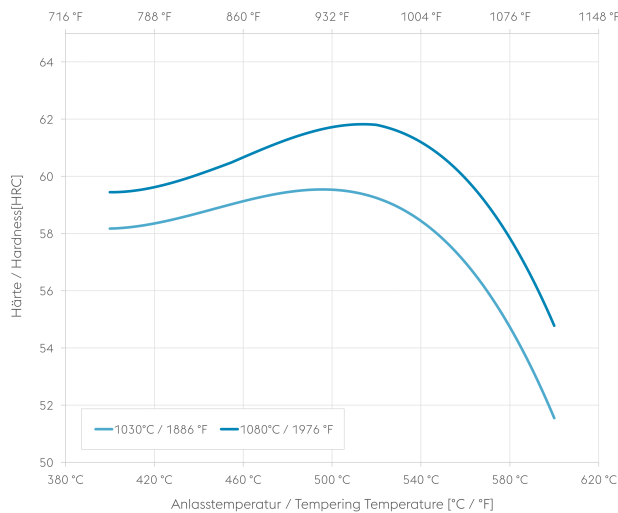


Cutting Application

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 °F)	20 68
Density (kg/dm ³ lb/in ³)	7.8 0.28
Thermal conductivity (W/(m.K) BTU/ft h °F)	27.1 15.66
Specific heat (kJ/kg K BTU/lb °F)	0.443 0.1058
Spec. electrical resistance (Ohm.mm ² /m 10 ⁻⁴ Ohm.inch ² /ft)	0.4 1.89
Modulus of elasticity (10 ³ N/mm ² 10 ³ ksi)	217 31.47

For additional specifications and technical requirements, please contact our regional voestalpine BÖHLER sales companies.

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voestalpine BÖHLER Edelstahl GmbH & Co KG
Mariazeller Straße 25
8605 Kapfenberg, AT
T. +43/50304/20-0
E. info@boehler-edelstahl.at
<https://www.voestalpine.com/boehler-edelstahl/de/>

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ONE STEP AHEAD.