

HIGH SPEED STEELS

Available Product Variants

- Long Products*
- Plates

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

Product Description

BÖHLER S630 – "The economical one"
 Tungsten-molybdenum high-speed steel with aluminum alloy for great toughness and good machinability. Universally usable for taps and twist drills, reamers, metal saws, mills of all types, and woodworking tools.

Process Melting

- Airmelted

Properties

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

Applications

- > Cold Forming / Coining
- > Fine Blanking, Stamping, Blanking
- > Powder Pressing
- > Rolling
- > Shearing / Machine Knives
- > Special Cutting Tools
- > Standard Parts (Molds, Plates, Pins, Punches)
- > Twist Drills and Taps
- > Wear parts
- > Thread rolling

Technical data

Material designation	
1.3330	SEL
HS 4-4-2 Al	EN

Chemical composition (wt. %)

C	Cr	Mo	V	W	Al
0,95	4,00	4,00	2,00	4,00	+

Material characteristics

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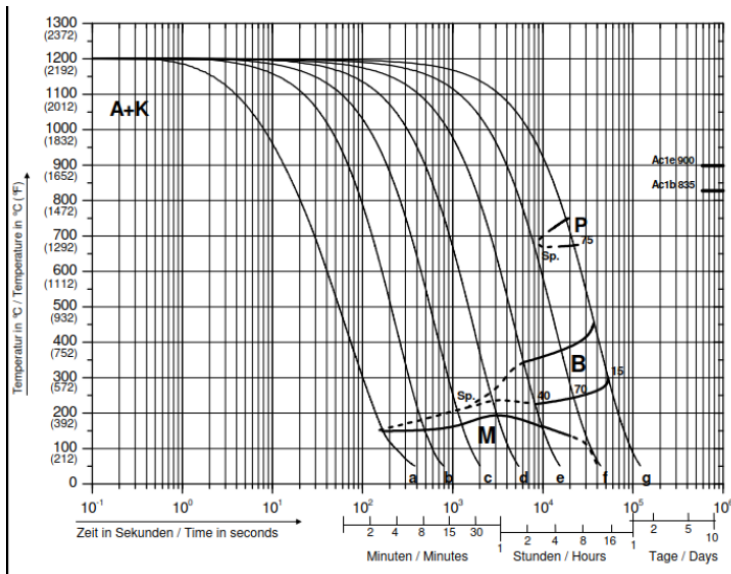
Stress relieving

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	1,050 to 1,200 °C 1,922 to 2,192 °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	550 to 570 °C 1,022 to 1,058 °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

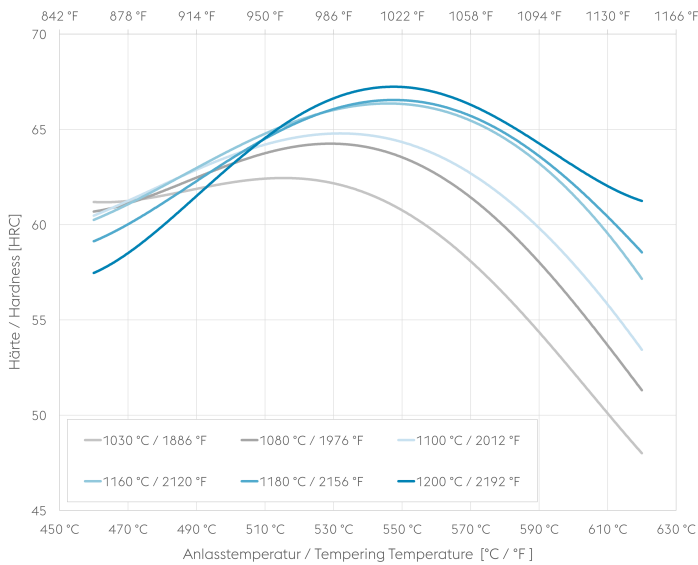


Austenitising temperature: 1210°C (2210°F)
Holding time: 180 seconds

- A....Austenite
- B....Bainite
- K....Carbide
- P....Pearlite
- M....Martensite
- RA...Retained Austenite

Sample	λ	HV10	Sample	λ	HV10
a	0,34	780	f	65,0	570
b	1,1	780	g	180,0	360
c	3,0	790			
d	8,0	790			
e	23	680			

Tempering Chart



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)	7.88 0.28
Thermal conductivity (W/(m.K) BTU/ft h °F)	18.8 10.86
Specific heat (kJ/kg K BTU/lb °F)	0.432 0.1032
Spec. electrical resistance (Ohm.mm ² /m 10 ⁻⁴ Ohm.inch ² /ft)	0.56 2.65
Modulus of elasticity (10 ³ N/mm ² 10 ³ ksi)	217 31.47

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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