



Technical Data Sheet	Grade	Code (SEL)	High speed steel
	1.3247	HS2-9-1-8	

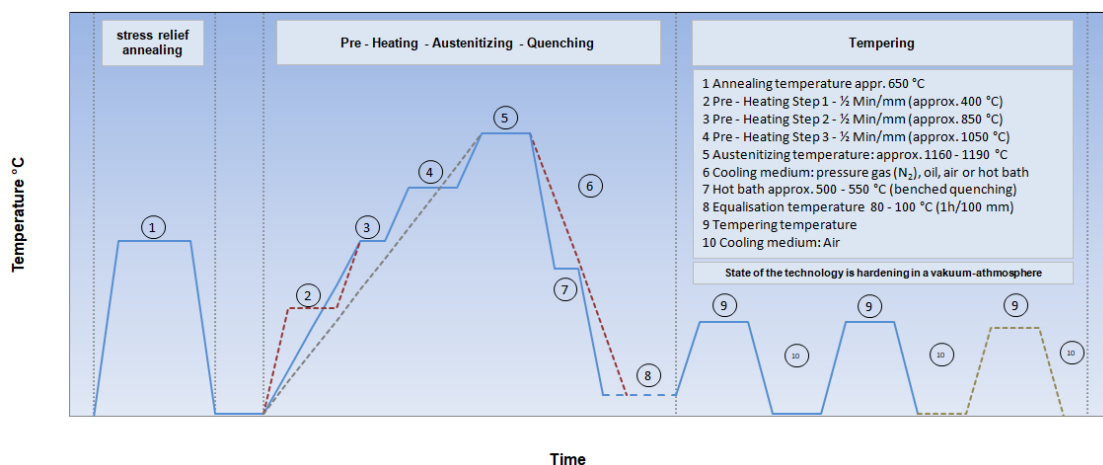
Standards	Steel properties
EN ISO 4957 HS2-9-1-8 AFNOR Z110DKWCV09-08-04-02-01 BS BM 42 UNE F.5617 UNI HS 2-9-1-8 AISI M 42 GOST P2 M10 K8	Mo-Co-alloyed, high-carbon high-speed steel with high secondary hardenability, high wear resistance, red hardness and good toughness. As a result of its low vanadium content, this grade exhibits good grindability.
	Suitable for: For tools subject to severe mechanical wear (e.g. in case of small cross-section cuts at high cutting speeds). Particularly suitable for die-sinking cutters, milling cutters and engraving machines including gravers as well as for tool bits in automatic lathes. Also suitable for non-cutting shaping (e.g. cold extrusion rams and tools employed in machining materials for the aviation industry such as titanium alloys). Broaches, cutters, twist drills, taps, cutting tools and cold work punches.

C	Si	Mn	Cr	Mo	Ni	V	W	Co	Sonst.
1,10	< 0,70	< 0,40	4,00	9,50	-	1,10	1,50	8,00	-

Melting	EAF + VOD	Remarks Hardness in the annealed plus cold drawn condition (+A+C) may be 50 HB higher than in the annealed condition (+A).
Density (g/cm³)	7,85	
Supply condition	soft annealed	
Hardness (HB)	max. 277	
Tensile strength (N/mm²)	-	
Work hardness (HRC)	-	
Structure	-	
Cleanness (DIN 50602)	-	

Physical properties		20 °C	100 °C	200 °C	300 °C	350 °C	400 °C	500 °C	600 °C	700 °C
Thermal expansion coefficient	10 ⁻⁶ * K (20 °C bis ...)	-	11,0	11,5	11,9	-	12,3	12,4	12,5	12,5
Thermal conductivity (W / m * K)	annealed	19,0	-	-	-	-	-	-	-	-
	quenched + tempered	-	-	-	-	-	-	-	-	-

Thermal Cycle Diagram (Heat treatment)

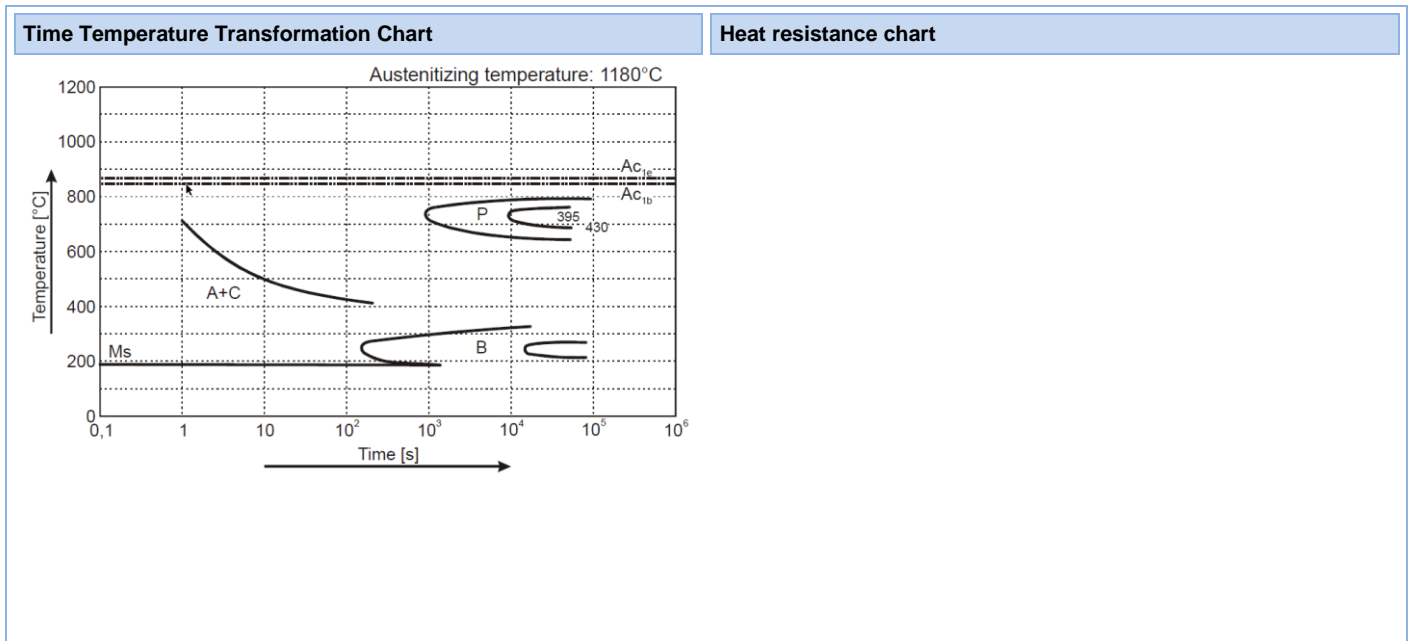


Hinweis: Die in diesem Datenblatt enthaltenen Angaben dienen der Beschreibung, eine Haftung ist ausgeschlossen.



Heat treatment	Temperature (°C)	Cooling	Remarks heat treatment
Soft annealing	800 - 860	Furnace	Controlled slow cooling in furnace
Stress-relief annealing	ca. 650	Furnace	Slow cooling in furnace. After extensive machining process or complex shapes
Hardening	1160 - 1190		After through-heating hold for 15-30 minutes
Pre – heating Step 1	appr. 400		Upper temperature range for parts of simple shape and highest requirements concerning wear resistance, lower temperature for parts of complex shape and high ductility requirements. For coldworking tools also lower temperatures are of importance for higher toughness.
Pre – heating Step 2	appr. 850		
Pre – heating Step 3	appr. 1050		
Quenching	500 - 550	hot bath	In case of oil hardening interrupt at appr. 400 °C.
	appr. 80	Oil	
	appr. 80	Air	
	appr. 80	pressure gas	

Tempering Chart		Tempering – Hardness after tempering									
	Temperature °C	100	200	300	400	500	550	600	650	700	
	HRC	62	62	62	61	67	69	64	53	-	
Remarks for tempering											
Slow heating to tempering temperature immediately after hardening in the range of 530 und 580 °C acc. to hardness requirements. Time in furnace 1 hour for each 20 mm of workpiece thickness but at least 2 hours.											
Tempering must be repeated two times. 1st and 2nd tempering to desired working hardness. 3rd tempering for stress relieving (appr.40 °C below the highest tempering temperature)											



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Wilhelm Oberste-Beulmann GmbH & Co. KG

An der Hasenjagd 2, D-42897 Remscheid | Tel.: +49 (0) 2191 93 60-0, Fax: +49 (0) 2191 34 99 80 | info@oberste-beulmann.de | www.oberste-beulmann.de