

Technical Data Sheet	Grade	Code (SEL)	Powder metallurgical High Speed Steel
	OB-PM-S79	-	

Steel properties

OB-PM-S79 is a high-speed steel produced by means of a powder metallurgical process which has a very fine, uniform, segregation-free microstructure and carbide distribution. It possesses good wear resistance, high toughness and very good dimensional stability

OB-PM-S79 is readily nitridable to improve its abrasive and adhesive wear resistance. Its homogeneous microstructure also makes it highly suitable for PVD and CVD coating.

Applications

OB-PM-S79 is employed in particular for applications in the area of cold working, such as punching, cutting and forming tools.

Other applications cover machining tools, such as heavy-duty hob cutters, broaches, generating cutters, punches, dies etc.

C %	Si %	Mn %	Cr %	Mo %	Ni %	V %	W %	Co %	Other %
1,30	0,60	0,30	4,10	5,00	-	3,10	6,30	-	-

Melting

Density (g/cm³)

7,80

Supply condition

soft annealed

Hardness (HB)

max. 280

Tensile strength (N/mm²)

-

Work hardness (HRC)

58 – 64 (depending on intended use)

Structure

-

Cleanness (DIN 50602)

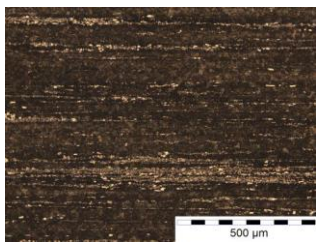
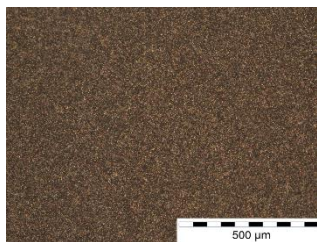
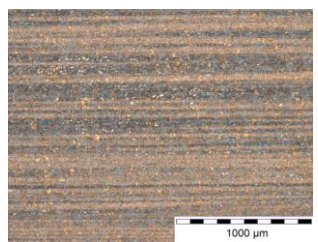
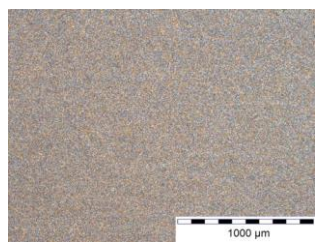
K1 max. 15

Remarks

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 to ...)	-	11,0	11,3	11,6	-	11,9	12,4	12,6	12,5
Thermal conductivity (W / m * K)	annealed	20,3	22,0	23,5	24,3	-	25,0	25,3	25,7	26,2

Comparison of microstructural properties

Carbide distribution (V = 100:1)		Segregation (V = 50:1)	
conventional	OB powderTEC	conventional	OB powderTEC
			

Heat treatment

Temperature (°C)

Cooling

Remarks heat treatment

Stress-relief annealing

ca. 650

Furnace – Air

Stress relief after extensive machining and in case of complex tools.

Holding time: min. 4 h - controlled furnace cooling to approx. 300 °C, followed by cooling in still air



Heat treatment	Temperature (°C)	Cooling	Remarks heat treatment
Hardening	1050 – 1180		Hardening can be carried out under vacuum, in salt bath or in a furnace with a controlled (neutral) atmosphere.
Pre – heating Step 1	450 – 550		
Pre – heating Step 2	850 – 900		*) Essential when high austenitizing temperatures are involved.
Pre – heating Step 3	1050 *)		
Quenching	ca. 550	Hot bath Vakuum	Quench in hot bath and hold. Followed by slow cooling to lukewarm temperature in the air. Gas pressure: Dependent on size of part, but min. 4 bar. Then continue cooling to room temperature in still air.

Tempering Chart

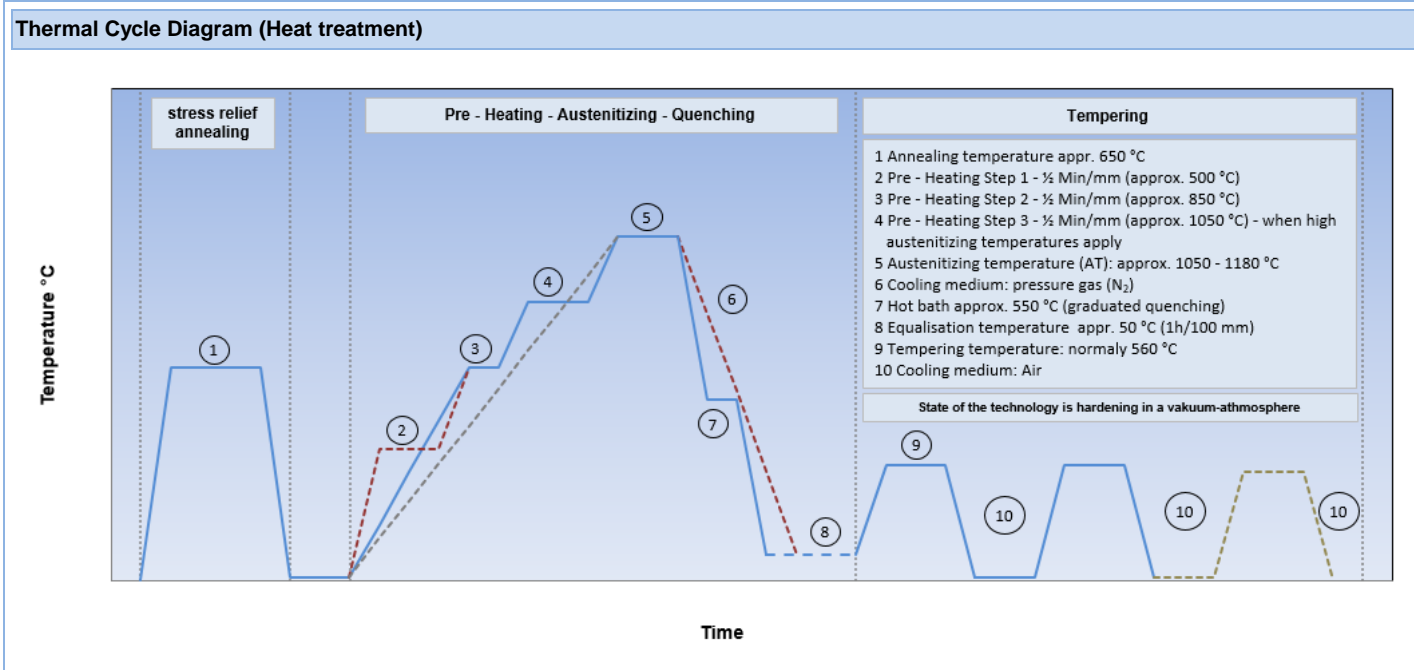
Tempering – Hardness (HRC) after tempering (Reference value)

Temperature °C	500	520	540	560	580	600	620
1180	64,5	67,0	67,0	66,0	65,0	62,0	59,0
1150	64,0	66,0	66,0	64,0	63,0	60,0	57,0
1100	63,0	64,0	63,0	62,0	60,0	57,0	54,0
1050	61,5	62,0	61,0	60,0	57,0	55,0	51,0

The tempering diagram shows hardness values at different austenitizing and tempering temperatures.

Remarks for tempering

- Temper directly after quenching
- Slow heating to tempering temperature directly after hardening
- Holding time in furnace 1 h per 20 mm of workpiece thickness, but min. 2 h
- A second tempering cycle (normally at 560 °C) is necessary, a third tempering cycle is recommended
- Slow cooling to 50 °C to ensure transformation of residual austenite



Note: The information contained in this brochure serves to describe the relevant products and processes; liability is excluded.