



Technical data sheet	Grade	PT-S30 powderTEC®	
powderTEC® is a registered trademark of W. Oberste-Beulmann GmbH Co. KG			

Chemical composition (%)	Material properties
Carbon content	1,28
Silicon	0,50
manganese	0,40
chromium	4,20
Molybdenum	5,00
Vanadium	3,00
Tungsten	6,30
Cobalt	8,40
other	-

PT-S30 powderTEC® is a powder metallurgically produced, highly cobalt-alloyed high-performance high-speed steel with a very fine, uniform, and segregation-free microstructure and carbide distribution.

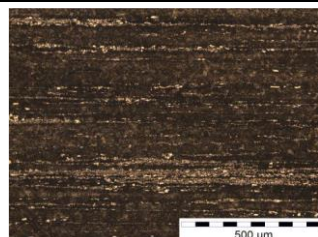
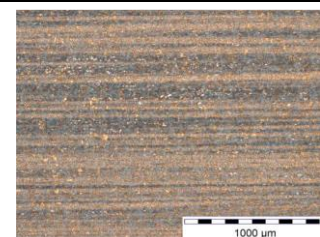
PT-S30 powderTEC® offers good wear resistance, good hot hardness, high compressive strength, and good toughness.

PT-S30 powderTEC® is highly suitable for nitriding and, due to its homogeneous microstructure, is also well suited for PVD and CVD coating.

Intended use	Manufacturing program														
- High-performance cutting tools - Tools for cold working - Broaching tools - End mills, hobbing cutters - Punching, cutting, and forming tools - Highly stressed gear hobs, cutting punches, broaching needles, shaping cutters, dies - Twist drills - Tap drills	<table> <tr> <th>Delivery form</th><th>Dimension (mm)</th></tr> <tr> <td>Round</td><td>3 – 350 mm</td></tr> <tr> <td>Flat</td><td>5 x 50 to 205 x 505 mm</td></tr> <tr> <td>Square</td><td>10 – 300 mm</td></tr> <tr> <td>wire</td><td>on request</td></tr> <tr> <td>Sheet metal</td><td>on request</td></tr> <tr> <td>Round blanks</td><td>on request</td></tr> </table>	Delivery form	Dimension (mm)	Round	3 – 350 mm	Flat	5 x 50 to 205 x 505 mm	Square	10 – 300 mm	wire	on request	Sheet metal	on request	Round blanks	on request
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Physical properties	Physical properties
Melting	Powder metallurgy
Delivery condition	Soft annealed
Hardness (HB)	max. 300
Tensile strength (N/mm²)	-
Working hardness (HRC)	57 – 68
Microstructure	-
Degree of purity (DIN 50602)	K1 max. 15

	20°C	400°C	600°C
Specific weight (g/cm³)	8,00	7,9	7,9
Modulus of elasticity E (GPa)	240	214	192
Thermal conductivity (W / m * K)	24	28	27
Coefficient of thermal expansion (10 ⁻⁶ m/m.K)		11,8	12,3

Comparison of microstructure properties			
Carbide distribution (V = 100:1)		Segregations (V = 50:1)	
Conventional	OB powderTEC®	Conventional	OB powderTEC®
			

Comparison of properties						
Werkstoff Grade	Bearbeitbarkeit Machinability	Verschleißwiderstand Wear resistance	Zähigkeit und Duktilität Toughness and Ductility	Warmhärte Red Hardness	Schleifbarkeit Grindability	Druckbelastbarkeit Compressive Strength
1.3243	7	5	2	4	4	7
1.3343	8	4	3	4	5	7
PT-SM4	7	5	5	6	7	8
PT-S23	7	5	6	5	7	8
PT-S30	6	6	5	7	7	9
PT-S52	4	7	4	7	6	9
PT-S53	4	8	4	6	6	8
PT-S60	3	9	3	8	4	8



Heat treatment

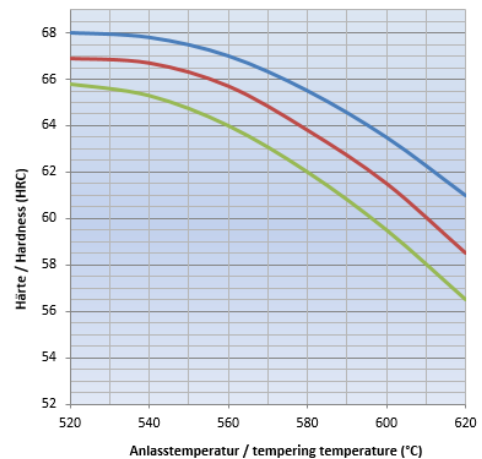
Soft annealing

Heating	uniformly to 850 - 900 °C
Holding time	3 h
Cooling down	Oven
Cooling rate	approx. 10 °C / hour to 700 °C
Final cooling	Still air

Low stress annealing

Heating	to 600 – 700 °C
Cooling down	After complete heating through furnace - to approx. 500 °C
Final cooling	still air

Tempering diagram



Hardening

Preheating stage 1	450 – 500 °C
Preheating stage 2	850 – 900 °C
Preheating stage 3 **)	1050 – 1080 °C

***) depending on the tool geometry and the hardening temperature (> 1150 °C)

Hardening temperature	1100 – 1180 °C
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The holding times must be adjusted accordingly for large or very thin-walled tool cross-sections

Hardness (+/- 1 HRC)

Tempering temperature

520 °C
540 °C
560 °C
580 °C
600 °C
620 °C

Hardening temperature

1100 °C	1150 °C	1180 °C
66	68	69
65	67	68
64	66	67
62	64	65
59	61	63
57	59	61

Service hardness (depending on the heat treatment parameters)

Cooling down

Cooling medium	Air, hot bath (at 540 °C), interrupted oil quenching
Cooling vacuum	min. 5 bar overpressure
Cooling salt bath / oil	Achieving maximum hardness
Final cooling	still air - < 50 °C
Recommendation	Best toughness properties through Hot bath cooling

Heat treatment instructions

1st preheating stage	450 – 500 °C
2nd preheating stage	850 – 900 °C
3rd preheating stage **)	1050 – 1080 °C
Hardening	see table
Tempering	560 °C - 3 x 2 hours each
Service hardness	64 – 67 HRC
Remark	**) at hardening temperature > 1150 °C

Tempering

Time	Slow heating to tempering temperature immediately after hardening.
Tempering temperature	520 – 620 °C
Dwell time in the oven	1 hour / 20 mm work piece thickness, min. 2 h
Tempering cycles	min. 3 cycles Tools must cool down to room temperature between tempering cycles.

Surface treatment

Surface coating using the CVD or PVD process is possible. The use of all common nitriding processes is also possible at any time.