

# Material data sheet

## SWG XPM VICTORY ESR

material characteristics	material number / grade	SWG XPM VICTORY ESR						
	short designation	25MnCrNiMoV6-6-4						
	comparable grade	P20HH ESR						
	chemical composition - reference analysis [%]	C	Si	Mn	Cr	Mo	Ni	others
		0.30	0.30	1.55	1.35	0.70	1.00	alloyed
	production technology	EAF/LF/VD, ESR, forging, Q+T						
	service hardness / strength <small>converted acc. to DIN EN ISO 18265 table B2</small>	HB		HRC		N/mm <sup>2</sup>		
		359 - 400		38 - 42		1140 - 1270		
	delivery condition	Q+T	359 - 400	38 - 42	1140 - 1270			
	maximum dimension	diameter			thickness			
		≤ 1200 mm			≤ 1500 mm			
US-specification	EN 10228-3			SEP 1921				
	table 3 - type 1 - qual. class 4			group 3 - class E,e (t ≤ 800 mm)				
cleanliness	DIN 50602			ASTM E45 method A				
	K1 ≤ 10			A ≤ 0,5; B, C, D ≤ 1				
							variation upon request	

technological properties		0	1	2	3	4	5	comment	
	toughness		■	■	■	■			in relation to service hardness
	hot strength at working temp.		■	■	■				
	wear resistance		■	■	■	■			
	corrosion resistance	■							
	machinability		■	■	■			Q+T	
	polishability		■	■	■	■		ISO/SPI: N1/A-1	
	weldability		■	■	■			CET = 0.57 % acc. DIN EN 1011-2	
	texturability		■	■	■	■	■		
	nitridability		■	■	■			nitriding hardness 550 - 700 HV1	
chrome-platability		■	■	■	■	■			

rating properties: 0 = not suitable; 1 = low; 2 = middle; 3 = good; 4 = very good; 5 = perfectly suitable

physical properties	thermal conductivity [W · m <sup>-1</sup> · K <sup>-1</sup> ]	20 °C	200 °C	300 °C	500 °C
		31.3	34.4	34.1	32.0
	coefficient of thermal expansion between 20 °C and ... [10 <sup>-6</sup> · K <sup>-1</sup> ]	100 °C	200 °C	300 °C	500 °C
		12.2	12.5	13.1	14.8
elastic modulus [kN/mm <sup>2</sup> ]	20 °C	200 °C	300 °C	500 °C	
	212	207	192	175	

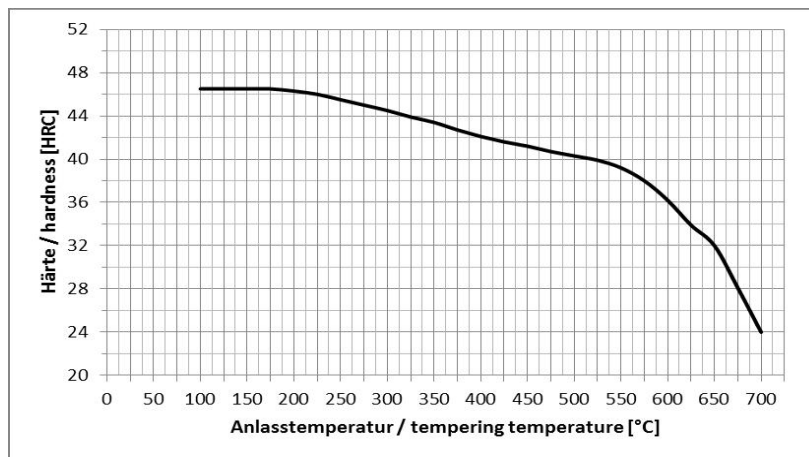
application	technology	mold making, injection molding, press-molding
	tools	plastic molds and cavities, with highest surface requirements
	process temperature	< 250 °C
	tool size	small-, medium- and large-sized molds
	final products	transparent plastic parts, high gloss parts, car lights
	features	high homogeneity and cleanliness

SWG processing instructions	welding, texturing, polishing, deep-hole drilling
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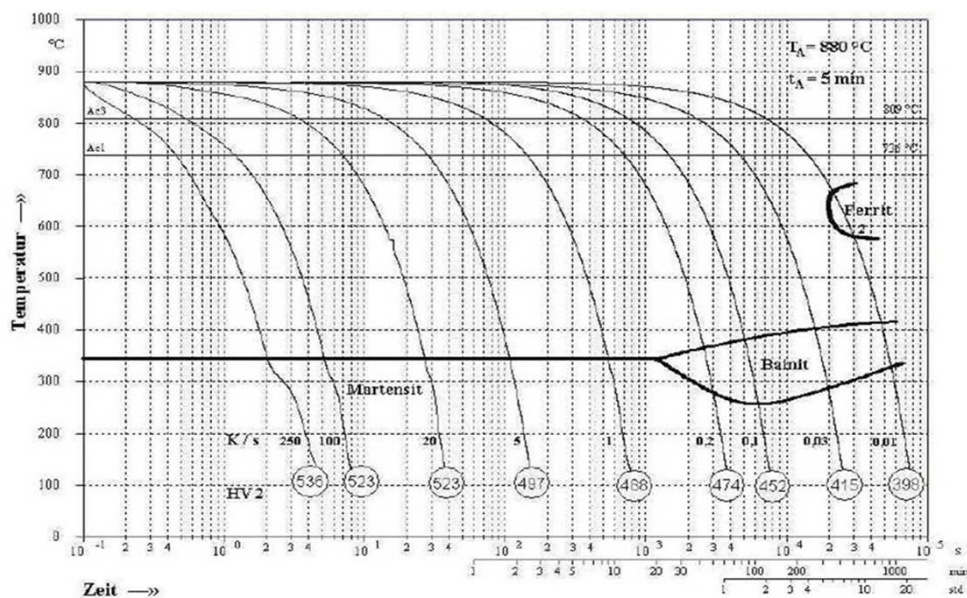
heat treatment		T min [°C]	T max [°C]	medium / comment
	annealing	710	740	air
	hardening	870	920	oil, polymer
	tempering	540	650	air
	stress relieving	500	530	max. 30 °C below tempering temp.
	pre-heating before welding	300	330	
	nitriding	450	530	max. 30 °C below tempering temp.
	PVD-treating	450	530	

diagrams / structure	TTT-diagram	yes
	tempering diagram	yes
	advice on heat treatment	pre-hardened
	microstructure	mainly bainitic

Tempering diagram: Average values on samples dia 25 mm x length 50 mm; hardened at 880 °C in oil



TTT-diagram (continuous)



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