

# Material data sheet

## SWG CPM50 VICTORY ESR



**Schriedewerke Gröditz**  
**GMH GRUPPE**

material characteristics	material number / grade	SWG CPM50 VICTORY ESR					
	short designation	X28CrNiMo13					
	comparable grade	1.4021mod, AISI 420mod					
	chemical composition - reference analysis [%]	C	Si	Mn	Cr	Ni	N
		0.28	0.30	0.40	14.00	0.60	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>		
			360 - 400	38 - 42	1145 - 1265		
	delivery condition	Q+T	360 - 400	38 - 42	1145 - 1265		
	maximum dimension	diameter			thickness		
	-			≤ 400 mm			
US-specification	EN 10228-3			SEP 1921			
	table 3 - type 1 - qual. class 4			group 3 - class E,e			
cleanliness	DIN 50602			ASTM E45 Methode 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		■	■	■	■			polished surface for best corrosion resistance
	machinability		■	■					Q+T
	polishability		■	■	■	■			ISO: N1/A-1
	weldability		■						CET = 1.00 % acc. DIN EN 1011-2
	texturability		■	■	■	■			
	nitridability		■	■	■	■			nitriding hardness 900 - 1200 HV1
chrome-platability		■	■	■	■	■		high cleanliness	

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
		24.7	25.7	26.3	26.6
	coefficient of thermal expansion between 20 °C and ... [10 <sup>-6</sup> · K <sup>-1</sup> ]	100 °C	200 °C	300 °C	500 °C
		10.5	11.0	11.0	-
elastic modulus [kN/mm <sup>2</sup> ]	20 °C	200 °C	300 °C	500 °C	
	218	202	198	180	

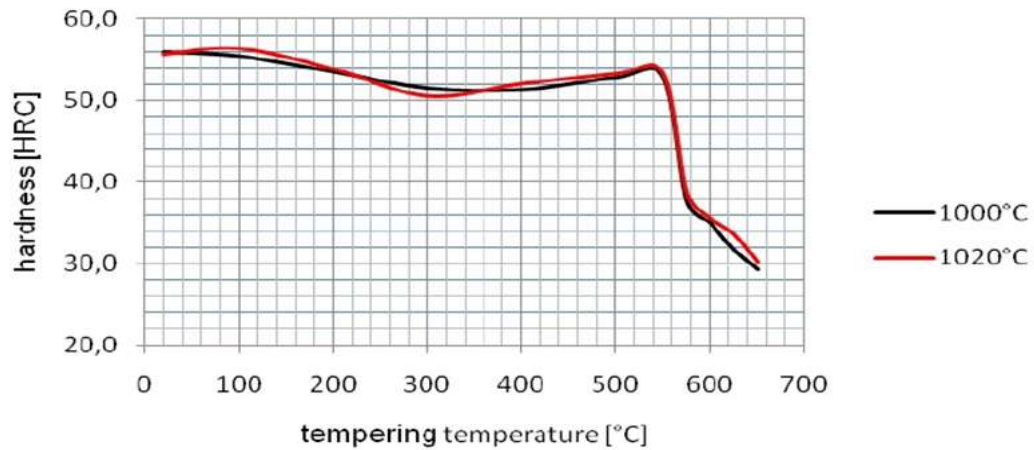
application	technology	plastic injection molding, rapid heat cycle molding
	tools	plastic molds, corrosion resistant for "weldless molding"
	process temperature	< 300 °C
	tool size	small- and medium-sized molds
	final products	injection molding parts, high gloss, transparent
	features	pre-hardened ~ 40 HRC delivery hardness, corrosion resistant

SWG processing instructions	welding, texturing, polishing
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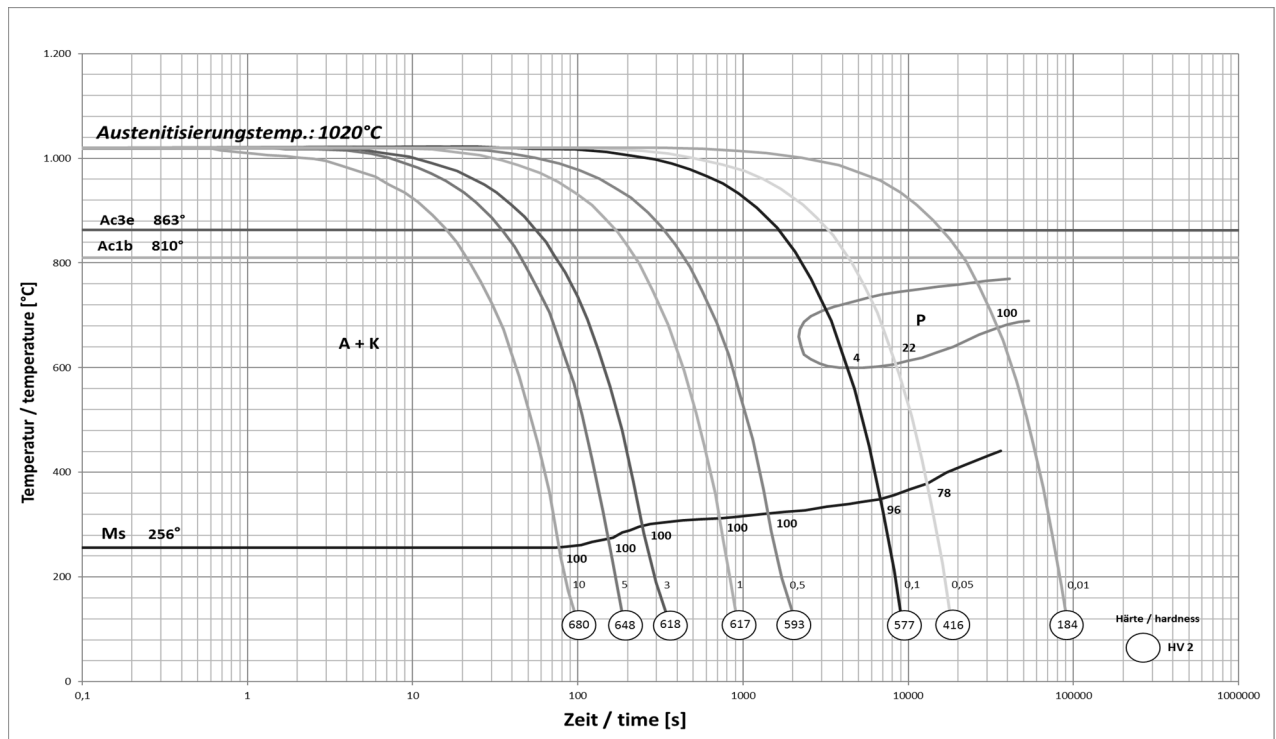
heat treatment		T min [°C]	T max [°C]	medium / comment
	annealing	760	800	furnace
	hardening	1000	1030	vacuum, oil
	tempering	250	600	air, protective atmosphere
	stress relieving	450	500	min. 30 °C below tempering temp.
	pre-heating before welding	320	350	
	nitriding	400	500	min. 30 °C below tempering temp.
	PVD-treating	400	500	

diagrams/ structure	CCT-diagram	yes
	tempering diagram	yes
	advice on heat treatment	pre-hardened
	microstructure	martensitic

**Tempering diagram:** Average values on samples dia 25 mm x length 50 mm; hardened at 1000 °C and 1020 °C in oil



**CCT-diagram**



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