



material characteristics	material number / grade	SWG 2083mod VICTORY ESR				
	short designation	X40Cr14				
	comparable grade	AISI 420 mod ESR				
	chemical composition - reference analysis [%]	C	Si	Mn	Cr	V
		0.38	1.00	0.50	13.00	0.25
	production technology	EAF/LF/VD/ESR, forging, Q+T or annealing				
	service hardness / strength <small>converted acc. to DIN EN ISO 18265 table B2</small>		HB	HRC	N/mm ²	
			-	29 - 52	-	
	delivery condition	Q+T	285 - 332	29 - 35	905 - 1055	
		annealed	≤ 241	-	-	
maximum dimension	diameter		thickness			
	≤ 700 mm		≤ 500 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 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 48 - 52 HRC
	hot strength at working temp.		■	■	■	■			
	wear resistance		■	■	■	■			
	corrosion resistance		■	■	■	■	■		polished surface for best corrosion resistance
	machinability		■	■	■				annealed
	polishability		■	■	■	■	■		ISO/SPI: N0/A-1; 48 - 52 HRC
	weldability		■						CET = 1.12 % 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 ⁻¹ · K ⁻¹]	20 °C	200 °C	300 °C	500 °C
		21.0	23.0	25.0	24.0
	coefficient of thermal expansion between 20 °C and ... [10 ⁻⁶ · K ⁻¹]	100 °C	200 °C	300 °C	500 °C
		11.0	11.3	11.6	12.0
elastic modulus [kN/mm ²]	20 °C	200 °C	300 °C	500 °C	
	218	206	198	180	



application	technology	mold making, injection molding, corrosion resistant
	tools	plastic molds, corrosion resistant, high surface quality
	process temperature	< 300 °C
	tool size	small- and medium-sized molds
	final products	plastic injection parts, high gloss, transparent (e.g optical and electronical parts)
	features	pre-hardened up to 35 HRC delivery hardness, high cleanliness

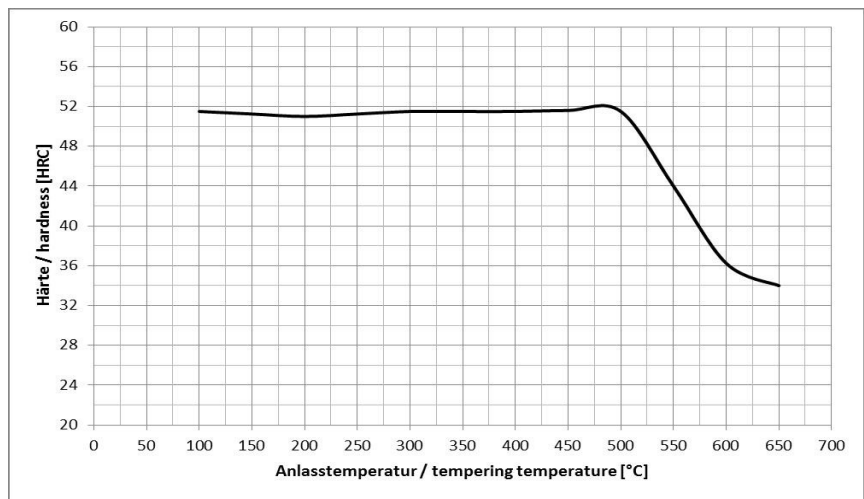
SWG processing instructions	welding, texturing, polishing, vacuum hardening
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heat treatment		T min [°C]	T max [°C]	medium / comment
	annealing	760	800	furnace
	hardening	1000	1030	vacuum, oil
	tempering	250	600	furnace, air
	stress relieving	450	500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

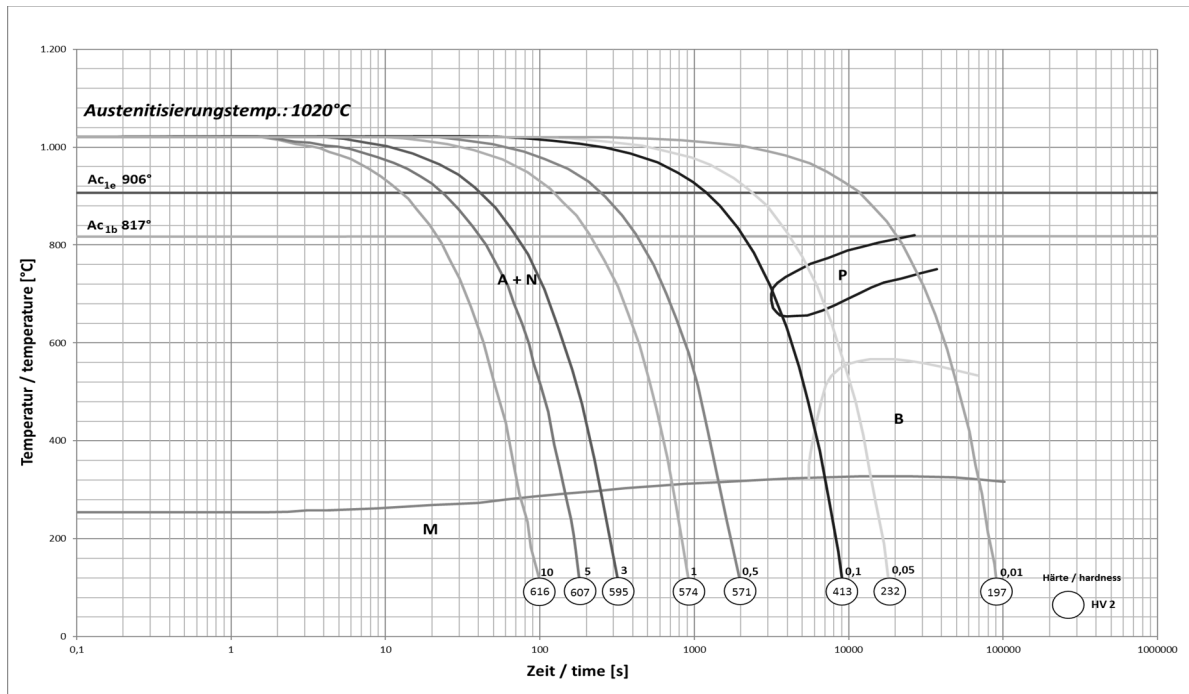
diagrams/ structure	CCT-diagram	yes
	tempering diagram	yes
	advice on heat treatment	pre-hardened, annealing before new-hardening
	microstructure	martensitic



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



CCT-diagram



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