



material characteristics	material number / grade	SWG 2738					
	DIN standard	40CrMnNiMo8-6-4					
	comparable grade	AISI P20+Ni					
	chemical composition - reference analysis [%]	C	Si	Mn	Cr	Mo	Ni
		0.36	0.25	1.50	1.80	0.20	1.10
	production technology	EAF/LF/VD, forging, Q+T					
	service hardness / strength <small>converted acc. to DIN EN ISO 18265 table B2</small>		HB	HRC	N/mm ²		
			280 - 325	28.3 - 34.2	890 - 1030		
	delivery condition	Q+T	280 - 325	28.3 - 34.2	890 - 1030		variation upon request
	maximum dimension	diameter		thickness			
≤ 1300 mm		≤ 1200 mm					
US-specification	EN 10228-3		SEP 1921				
	table 3 - type 1 - qual. class 3		group 3 - class D,d				
cleanliness	DIN 50602		ASTM E45 method A				
	K4 ≤ 20		A ≤ 1,5; B, C, D ≤ 2				

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: N2/A-2; for high-polishing XPM
	weldability		■	■	■				CET = 0.65 % acc. DIN EN 1011-2
	texturability		■	■					for high texturing reliability: XPM
	nitridability		■	■	■				nitriding hardness 700 - 850 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 ⁻¹ · K ⁻¹]	20 °C	200 °C	300 °C	500 °C
		34.2	35.4	34.7	32.5
	coefficient of thermal expansion between 20 °C and ... [10 ⁻⁶ · K ⁻¹]	100 °C	200 °C	300 °C	500 °C
		11.8	12.9	13.4	14.2
elastic modulus [kN/mm ²]	20 °C	200 °C	300 °C	500 °C	
	212	207	192	175	



application	technology	mold making, injection molding
	tools	plastic molds, large mold frames, die-holder
	process temperature	< 250 °C
	tool size	medium- and large-sized molds
	final products	standard plastic parts
	features	quenched and tempered, can be used as replacement for 1.2311

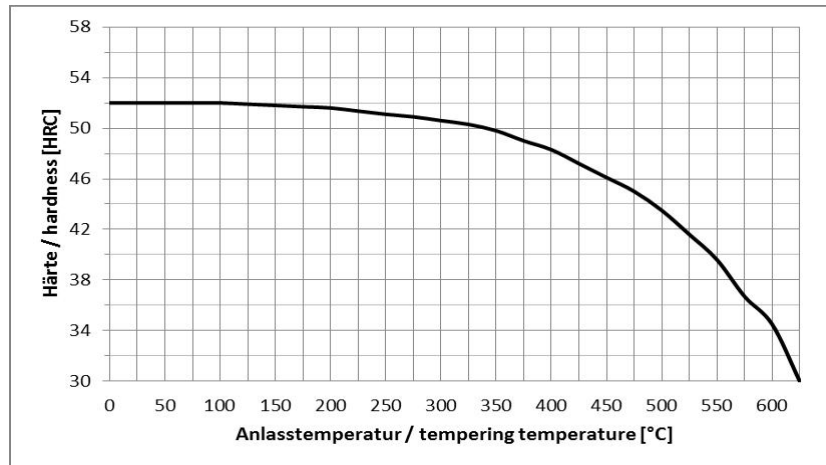
SWG processing instructions	welding, texturing
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heat treatment		T min [°C]	T max [°C]	medium / comment
	annealing	710	740	air
	hardening	850	880	oil, polymer
	tempering	560	640	air
	stress relieving	500	550	max. 30 °C below tempering temp.
	pre-heating before welding	320	350	
	nitriding	400	550	max. 30 °C below tempering temp.
	PVD-treating	400	550	

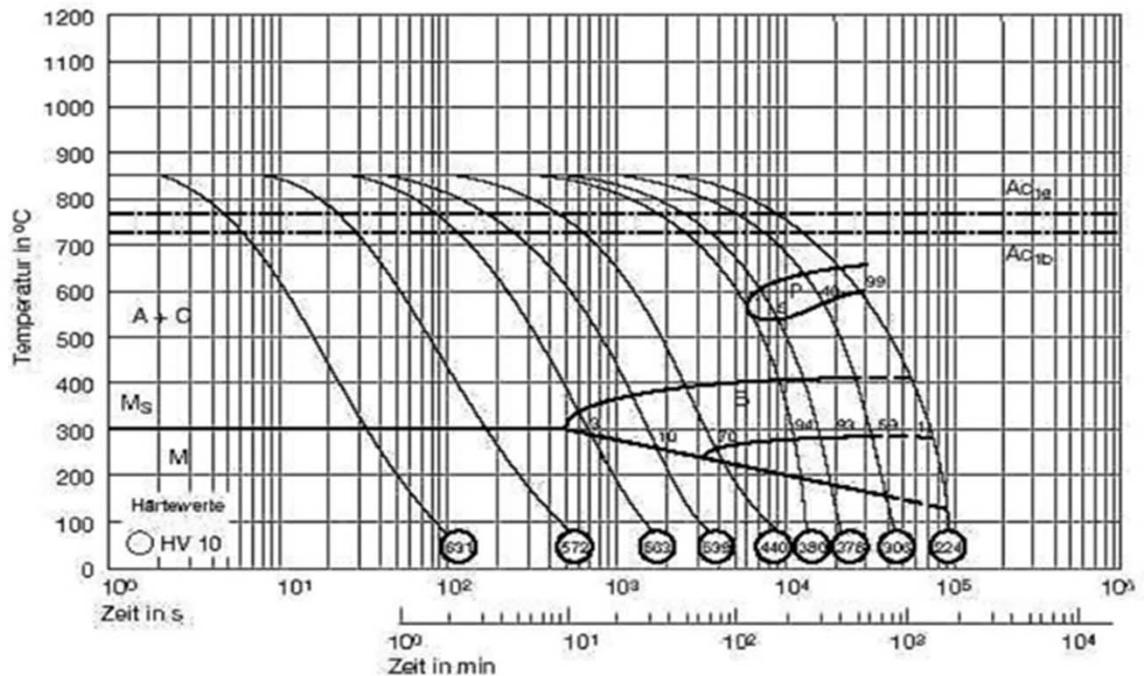
diagrams / structure	TTT-diagram	yes
	tempering diagram	yes
	advice on heat treatment	pre-hardened
	microstructure	mainly bainitic



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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