

<b>material characteristics</b>	material number / grade	<b>SWG 2738</b>					
	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 <sup>2</sup>		
			280 - 325	28.3 - 34.2	890 - 1030		
	delivery condition	Q+T	280 - 325	28.3 - 34.2	890 - 1030		<b>variation upon request</b>
	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				

<b>technological properties</b>		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

<b>physical properties</b>	thermal conductivity [W · m <sup>-1</sup> · K <sup>-1</sup> ]	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 <sup>-6</sup> · K <sup>-1</sup> ]	100 °C	200 °C	300 °C	500 °C
		11.8	12.9	13.4	14.2
	elastic modulus [kN/mm <sup>2</sup> ]	20 °C	200 °C	300 °C	500 °C
		212	207	192	175

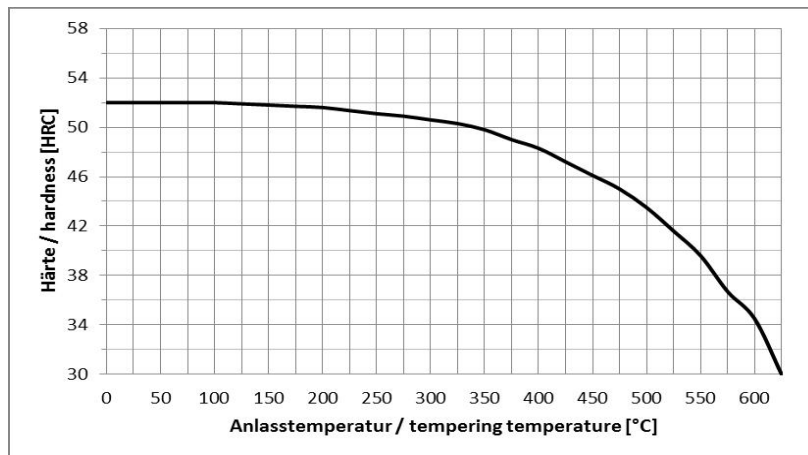
application	technology	mold making, injection molding
	tools	plastic molds, large mold frames, die-holder
	process temperature	< 250 °C
	tool size	medium- and large-sized molds
	final products	standard plastic parts
	features	quenched and tempered, can be used as replacement for 1.2311, for high surface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

SWG processing instructions	welding, texturing
-----------------------------	--------------------

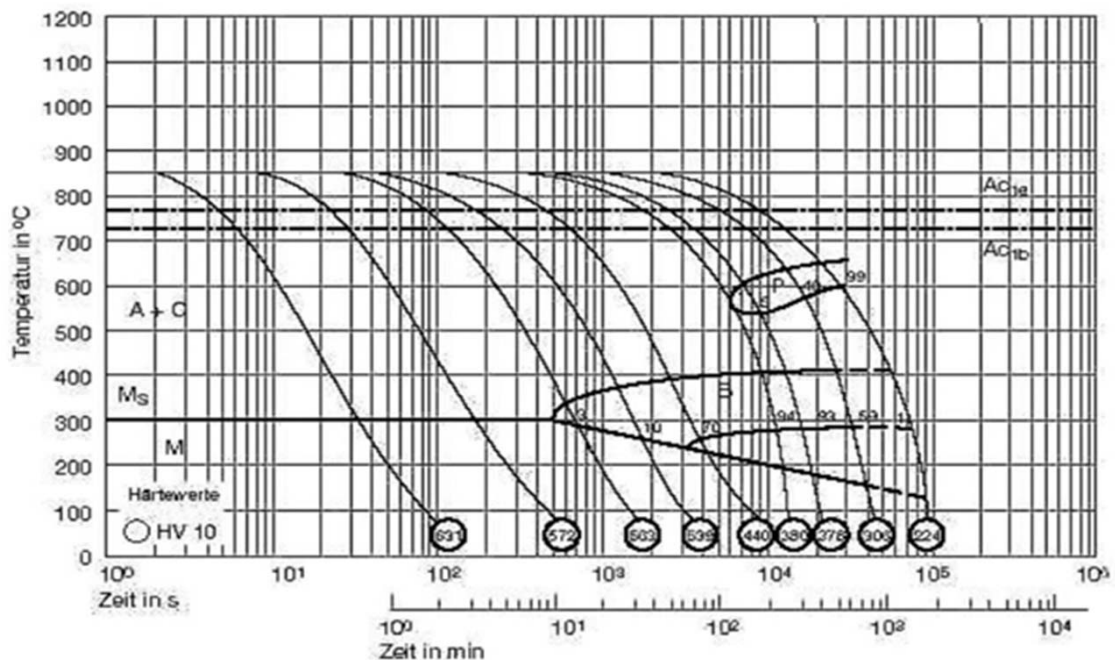
heat treatment		T min [°C]	T max [°C]	medium / comment
	annealing	710	740	air
	hardening	850	880	oil, polymer
	tempering	560	640	air
	stress relieving	500	550	max. 30 °C below tempering temp.
	pre-heating before welding	320	350	
	nitriding	400	550	max. 30 °C below tempering temp.
	PVD-treating	400	550	

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)**



PLEASE NOTE: The information contained in this data sheet is unbinding. It merely serves the first orientation of the user. Therefore, we do not assume any liability for the correctness, completeness or up-to-dateness of such data. In case of an order, the properties of the product are exclusively subject to the provisions of the respective contract.

© Schmiedewerke Gröditz GmbH, Gröditz