

material characteristics	material number / grade	SWG 2767					
	DIN standard	45NiCrMo16					
	comparable grade	-					
	chemical composition - reference analysis [%]	C	Si	Mn	Cr	Mo	Ni
		0.45	0.25	0.35	1.25	0.20	3.90
	production technology	EAF/LF/VD, forging, annealing					
	service hardness / strength	HB		HRC		N/mm ²	
		-		48.9 - 53.0		-	
	delivery condition	annealed	≤ 285	-		-	
	maximum dimension	diameter			thickness		
≤ 750 mm			≤ 500 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 ≤ 30			A ≤ 1,5; B, C, D ≤ 2			
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		■	■	■	■			annealed
	polishability		■	■	■				ISO/SPI: N3/A-3
	weldability		■	■					CET = 0.67 % 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 ⁻¹ · K ⁻¹]	20 °C	200 °C	300 °C	500 °C
		30.0	32.0	32.0	30.0
	coefficient of thermal expansion between 20 °C and ... [10 ⁻⁶ · K ⁻¹]	100 °C	200 °C	300 °C	500 °C
		11.3	12.5	12.8	13.4
elastic modulus [kN/mm ²]	20 °C	200 °C	300 °C	500 °C	
	207	196	189	172	

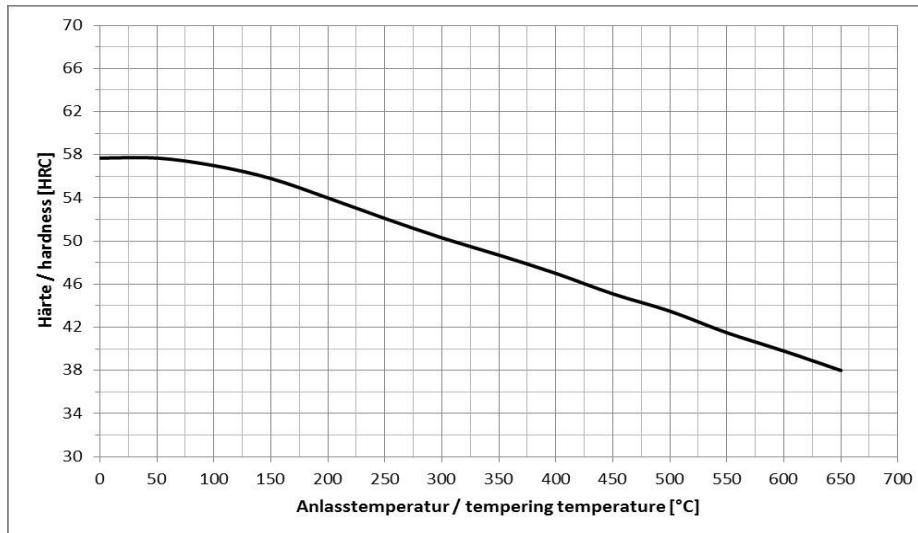
application	technology	mold making, steel cold forming
	tools	stamping tools, cutting tools, plastic molds high hard
	process temperature	< 300 °C
	tool size	small- and medium sized molds
	final products	steel sheets, strip steel, plastic injection parts
	features	low hardening distortion, high hardness, high toughness

SWG processing instructions	welding
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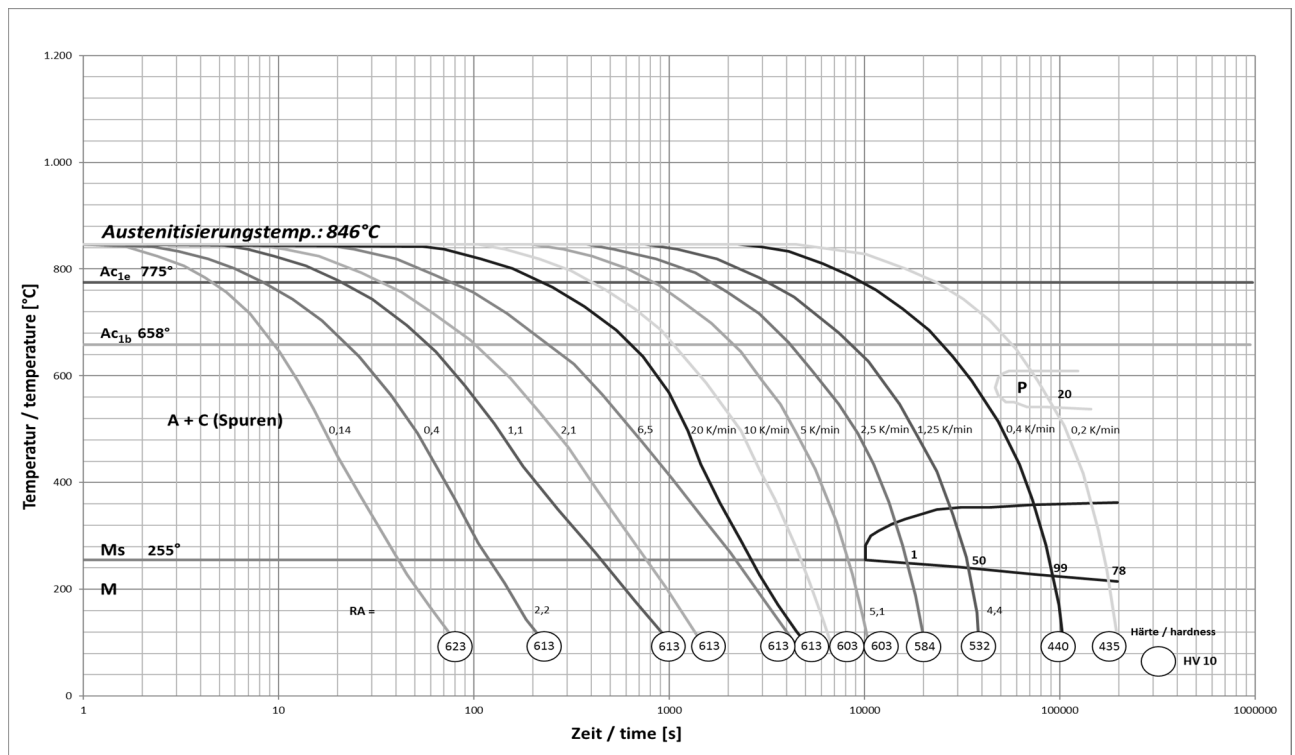
heat treatment		T min [°C]	T max [°C]	medium / comment
	annealing	610	650	air
	hardening	840	870	vacuum, air, oil, polymer
	tempering	200	300	air
	stress relieving	550	600	before hardening only
	pre-heating before welding	280	320	
	nitriding	400	450	with lower hardness only
	PVD-treating	400	450	

diagrams/ structure	CCT-diagram	yes
	tempering diagram	yes
	advice on heat treatment	air or vacuum
	microstructure	martensitic

Tempering diagram: Average values on samples dia 25 mm x length 50 mm; hardened at 850 °C in oil



CCT-diagram



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