



material characteristics	material number / grade	GEST80 VICTORY ESR						
	short designation	15NiMnCuAlMo12-6						
	comparable grade	-						
	chemical composition - reference analysis [%]	C	Mn	Cr	Mo	Ni	Cu	Al
		0.14	1.40	0.30	0.30	2.80	0.90	0.90
	production technology	EAF/LF/VD/ESR, forging, Q+T						
	service hardness / strength converted acc. to DIN EN ISO 18265 table B2	HB		HRC		N/mm ²		variation upon request
		359 - 400		38 - 42		1140 - 1270		
	delivery condition	Q+T	359 - 400	38 - 42	1140 - 1270			
	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 method A				
	K1 ≤ 10			A, B, C ≤ 1; D ≤ 2				

technological properties		0	1	2	3	4	5	comment	
	toughness		■	■					in relation to service hardness 38-42 HRC
	hot strength at working temp.		■	■	■				
	wear resistance		■	■	■	■			
	corrosion resistance	■							
	machinability		■	■	■				
	polishability		■	■	■	■		ISO/SPI: N1/A-1	
	weldability		■	■	■			CET = 0.45 % acc. DIN EN 1011-2	
	texturability		■	■	■	■			
	nitridability		■	■	■	■		nitriding hardness 900 - 1250 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
		43.1	42.2	-	-
	coefficient of thermal expansion between 20 °C and ... [10 ⁻⁶ · K ⁻¹]	100 °C	200 °C	300 °C	500 °C
		11.3	12.6	13.5	-
elastic modulus [kN/mm ²]	20 °C	200 °C	300 °C	500 °C	
	203	192	185	172	



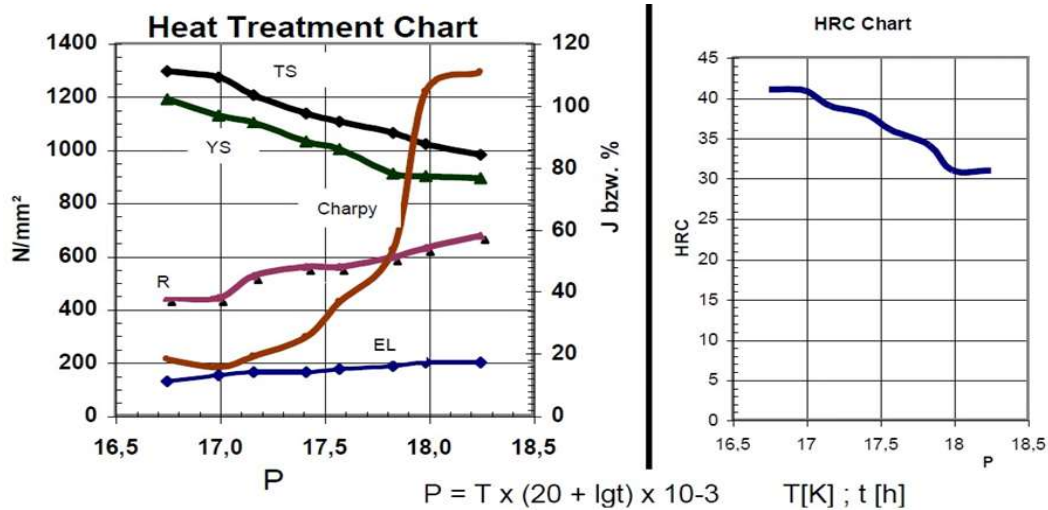
application	technology	mold making, injection molding
	tools	plastic injection molds with high surface quality
	process temperature	< 300 °C
	tool size	small- and medium-sized molds
	final products	plastic parts, textured parts, high gloss parts
	features	precipitation hardened, high cleanliness

SWG processing instructions	welding, texturing, polishing
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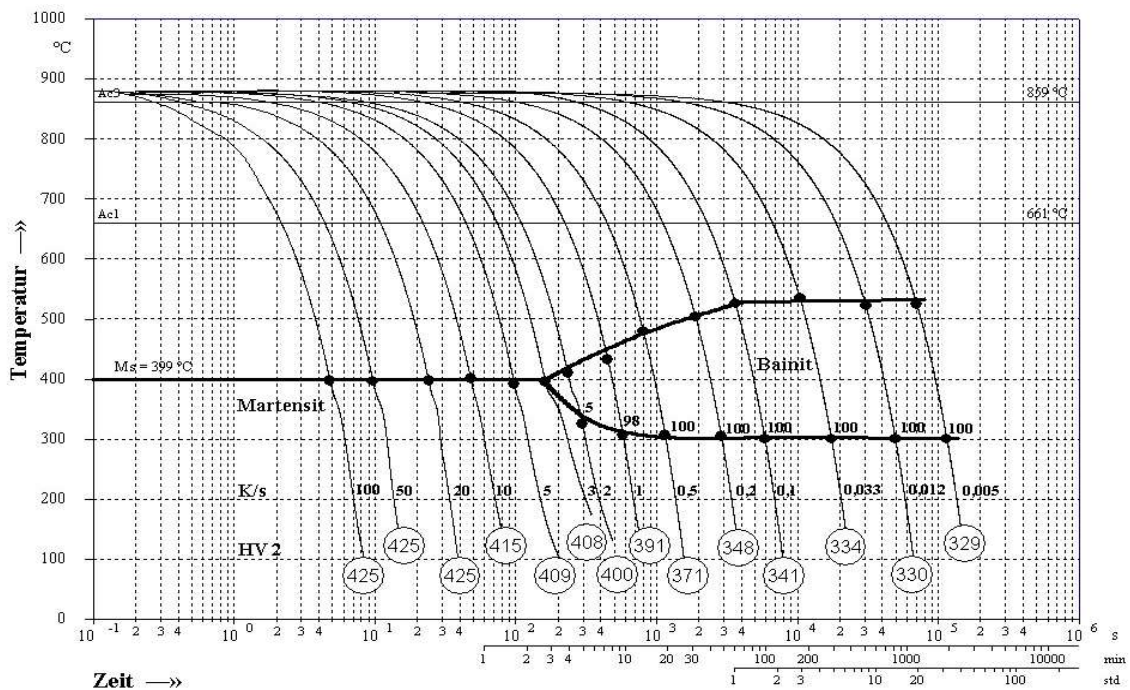
heat treatment		T min [°C]	T max [°C]	medium / comment
	annealing	640	680	air
	hardening	880	920	oil
	tempering	-	~ 550	air
	stress relieving	500	520	min. 30 °C below tempering temp.
	pre-heating before welding	320	350	
	nitriding	450	520	min. 30 °C below tempering temp.
	PVD-treating	450	520	

diagrams/ structure	CCT-diagram	yes
	tempering diagram	yes
	advice on heat treatment	precipitation hardened
	microstructure	soft-martensite + precipitations

Tempering diagram



CCT-diagram



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