Material data sheet
SWG 2367 VICTORY ESR (EX7 ESR)

Schmiedewerke Gröditz
GMH GRUPPE

material characteristics

material number / grade	SWG 2367 VICTORY ESR (SWG EX7 VICTORY ESR)						
DIN standard	X38CrMoV5-3						
comparable grade	-						
chemical composition - reference analysis [%]	C	Si	Mn	Cr	Mo	V	
	0.36	0.35	0.35	5.10	2.80	0.55	
production technology	EAF/LF/VD/ESR, (3D) forging, EFS annealing						
service hardness / strength		HB	HRC	N/mm²			
		-	35 - 52	-			
delivery condition	annealed	≤ 229	-	-	variation upon request		
maximum dimension	diameter		thickness				
	≤ 600 mm		≤ 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 ≤ 0,5; B, C, D ≤ 1				

technological properties

	0	1	2	3	4	5	comment
toughness		■	■	■			in relation to service hardness 42 - 48 HRC
hot strength at working temp.		■	■	■	■	■	
wear resistance		■	■	■	■	■	
corrosion resistance	■						
machinability		■	■	■	■		annealed
polishability		■	■	■	■		ISO/SPI: N0/A-1, 48-52 HRC
weldability		■					CET = 0.94 % acc. DIN EN 1011-2
texturability		■	■	■	■	■	hardened
nitridability		■	■	■	■	■	nitriding hardness 900 - 1250 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
	23.6	30.4	31.1	30.4
coefficient of thermal expansion between 20 °C and ... [10^{-6} · K^{-1}]	100 °C	200 °C	300 °C	500 °C
	11.5	12.0	12.2	12.9
elastic modulus [kN/mm^2]	20 °C	200 °C	300 °C	500 °C
	212	199	192	175

Material data sheet
SWG 2367 VICTORY ESR (EX7 ESR)

Schmiedewerke Gröditz
GMH GRUPPE

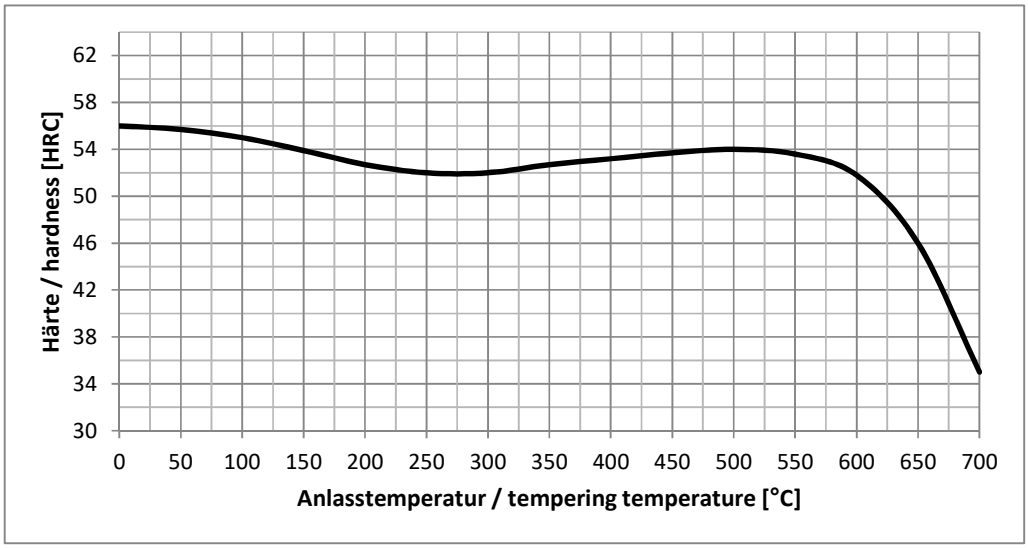
application	technology	mold making, die-casting
	tools	die-casting molds and inserts with high thermal load, high life time
	process temperature	< 600 °C
	tool size	small-sized dies
	final products	die-casting parts
	features	for highest requirements on hot strength and wear resistance

SWG processing instructions	welding, vacuum hardening

		T min [°C]	T max [°C]	medium / comment
heat treatment	annealing	820	840	furnace until 650 °C, air
	hardening	1030	1060	vacuum, oil
	tempering	530	650	air, protective gas
	stress relieving	500	550	min. 30 °C below tempering temp.
	pre-heating before welding	300	320	
	nitriding	480	550	min. 30 °C below tempering temp.
	PVD-treating	480	550	

diagrams/ structure	CCT-diagram	yes
	tempering diagram	yes
	advice on heat treatment	vacuum hardening after pre-machining
	microstructure	martensitic

Tempering diagram



CCT-diagram