Schmiedewerke Gröditz
GMH GRUPPE

Gröditz Partner

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GEST80 ESR

Precipitation hardened steel **with high** purity. Suitable for plastic molds which request well polishing performance, applied no exceed 400mm mold size, excellent polishing and texture properties, and good dimensional stability.

Material data sheet
SWG GEST80 VICTORY ESR

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material characteristics

material number / grade	SWG 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/mm²				
		359 - 400	38 - 42	1140 - 1270				
delivery condition	Q+T	359 - 400	38 - 42	1140 - 1270				variation upon request
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 38-42HRC
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

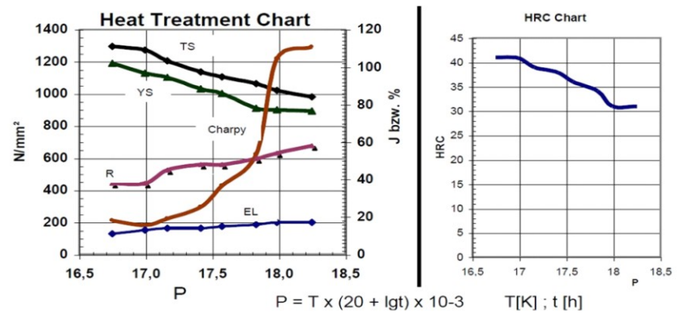
heat treatment

	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	

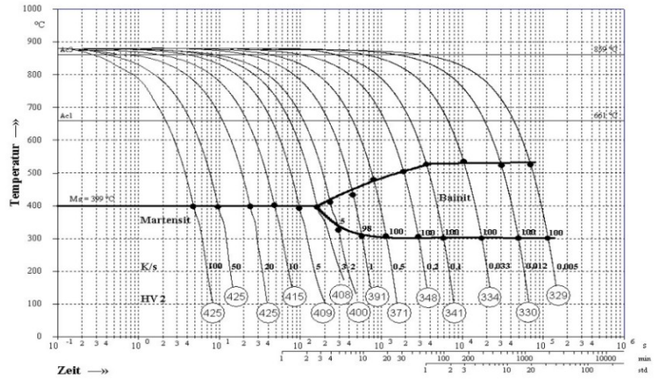
diagrams/ structure

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

Tempering diagram:



CCT-diagram



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德标钢种
Din Grades

应用 Application	交付状态 Delivery Condition	钢钟 Grade	化学成分 % Typical SWG analysis in w%						硬度(表面) Service hardness (surface)
			C	Cr	Mo	Ni	V	其它 Others	
塑胶钢 Plastic Mold Steels	预硬 Q+T	2311	0.40	2.00	0.20	-	-	-	28-34 HRC
		2312	0.40	1.90	0.20	-	-	S~0.05	28-34 HRC
		2738 / 2738H / 2738HH	0.36	1.80	0.20	1.10	-	-	30-38 HRC
		2711mod	0.55	1.10	0.80	2.00	0.10	-	36-42 HRC
		2714	0.55	1.10	0.50	1.70	0.10	-	38-44 HRC
	退火annealed	2767	0.45	1.25	0.20	3.90	-	-	49-53 HRC
不锈钢 Corrosion Resistant Steels	预硬 Q+T	2085	0.33	16.00	-	<1.00	-	S~0.08	28-34 HRC
		2316	0.35	15.50	1.00	0.50	-	-	28-34 HRC
		2316 VICTORY ESR	0.35	15.50	1.00	0.50	-	-	28-34 HRC
		2316mod VICTORY ESR	0.26	15.00	1.00	0.70	-	-	28-34 HRC
	预硬 Q+T / 退火 annealed	2083	0.40	13.00	-	-	-	-	32-52 HRC
		2083 VICTORY ESR	0.40	13.00	-	-	-	-	32-52 HRC
		2083mod VICTORY ESR	0.38	13.00	-	-	0.25	添加 alloyed	29-52 HRC
热作钢 Hot Work Steels	超精细化退火 EFS-annealed	2343 / EX3	0.36	5.00	1.20	-	0.40	-	36-52 HRC
		2343 VICTORY ESR	0.36	5.00	1.20	-	0.40	-	36-52 HRC
		2344 / EX4	0.40	5.20	1.30	-	1.00	-	36-52 HRC
		2344 VICTORY ESR	0.40	5.20	1.30	-	1.00	-	36-52 HRC
		2367 VICTORY ESR	0.36	5.10	2.80	-	0.55	-	35-52 HRC
冷作钢 Cold Work Steels	退火 annealed	2357	0.50	3.30	1.50	-	0.25	-	52-56 HRC
		2379	1.55	12.00	0.90	-	0.90	-	58-62 HRC

葛利兹钢种
SWG Grades

交付状态 Delivery Condition	钢钟 Grade	化学成分 % Typical SWG analysis in w%						硬度(表面) Service hardness (surface)
		C	Cr	Mo	Ni	V	其它 Others	
预硬 Q+T	738HH	0.27	1.35	添加 alloyed	1.00	-	添加 alloyed	32-38 HRC
	XPM	0.27	1.35	0.50	1.00	-	添加 alloyed	38-42 HRC
	XPM VICTORY ESR	0.30	1.35	0.70	1.00	-	添加 alloyed	38-42 HRC
	CPM40 VICTORY ESR	0.15	4.00	1.10	3.00	-	添加 alloyed	38-42 HRC
	GEST80 VICTORY ESR	0.14	0.30	0.30	2.80	-	Cu, Al	38-42 HRC
退火annealed	GPM58 VICTORY ESR	0.50	5.00	2.20	添加 alloyed	0.70	-	54-58 HRC
预硬 Q+T	CPM50 VICTORY ESR	0.28	14.00	-	0.60	-	N	38-42 HRC
退火 annealed	CRMHP VICTORY ESR	0.25	14.00	-	0.60	-	N	50-52 HRC
	OPTI N+ PESR	0.15	14.00	-	0.60	-	N	50-57 HRC
	HNS28 PESR	0.25	14.00	-	0.60	-	N	57-59 HRC
	HNS40HC PESR	0.40	15.00	2.00	<0.50	<1.50	N	58-60 HRC
	Cronidur®30 PESR	0.30	15.00	1.00	0.50	-	N	58-60 HRC
退火 annealed	EX1 VICTORY ESR	0.35	5.00	2.20	-	0.55	-	40-52 HRC
	2343PLUS VICTORY ESR	0.38	5.00	1.80	-	0.55	-	40-52 HRC
	EX55 VICTORY ESR	定制产品 Customized Steel						40-52 HRC
	EX6 VICTORY ESR	0.43	6.40	1.30	-	0.90	-	52-56 HRC

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葛利兹钢材特性-应用参考表

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特性比例(Characteristic ratio) : 0=不适合(NA)/ 1=低度(LOW) / 2=中度(Medium)/ 3=好(Good) / 4-很好(Very good) / 5=非常好(Excellent)

Grade 钢种	Chemical Composition (%)化学成分-範圍值							Machin-Ability 机加性能						Polish-Ability 抛光性能						Grain-Ability 蚀纹性能						Wear-Ability 耐磨性能						Weld-Ability 焊接性能					
	C	Si	Mn	Cr	Mo	Ni	Others	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5
2311	0.40	0.30	1.50	2.00	0.20				■	■	■				■						■	■					■	■					■	■	■		
2312	0.40	0.30	1.50	1.90	0.20		S:0.05		■	■	■	■	■	■						■							■	■					■	■	■		
2738	0.36	0.25	1.50	1.80	0.20	1.10			■	■	■	▮			■	■					■	■					■	■	▮				■	■	■		
738HH	0.27	0.30	1.35	1.35	add	1.00	add		■	■	■	▮			■	■	▮				■	■	■				■	■	■				■	■	■	■	
XPM	0.27	0.30	1.55	1.35	0.50	1.0	add		■	■	■	▮			■	■	■				■	■	■	■			■	■	■				■	■	■	■	
XPM ESR	0.30	0.30	1.55	1.35	0.70	1.00	add		■	■	■	■			■	■	■	■			■	■	■	■	■		■	■	■	■	■		■	■	■		
2711	0.55	0.25	0.70	0.70	0.30	1.70	V:0.1		■	■					■	■					■	■					■	■	■	■			■	■			
2714	0.55	0.25	0.70	1.10	0.50	1.70	V:0.1		■	■					■	■					■	■					■	■	■	■			■	■			
GEST 80 ESR	0.14		1.40	0.30	0.30	2.80	Cu:0.9 Al:0.3		■	■	■				■	■	■	■			■	■	■	■			■	■	■	■			■	■	■		
CPM 40	0.15	0.30	0.50	4.00	1.10	3.00	add		■	■					■	■	■	■			■	■	■	■			■	■	■	■			■	■			
2343(EX3)	0.36	1.00	0.35	5.00	1.20		V:0.4		■	■	■	■			■	■	■				■	■					■	■	■	■			■				
2343(EX3) ESR	0.36	1.00	0.35	5.00	1.20		V:0.4		■	■	■	■			■	■	■	■	▮		■	■	■	■	■		■	■	■	■	■		■				
2344(EX4)	0.4	1.00	0.40	5.20	1.30		V:1.0		■	■	■	■			■	■	■				■	■	■				■	■	■	■	■		■				
2344(EX4) ESR	0.4	1.00	0.40	5.20	1.30		V:1.0		■	■	■	■			■	■	■	■	▮		■	■	■	■	■		■	■	■	■	■		■				
2767	0.45	0.25	0.35	1.25	0.20	3.90			■	■	■	■			■	■	■				■	■	■	■			■	■	■	■	■		■	■			
GPM 58 ESR	0.5	≤0.5	0.50	5.00	2.20		V:0.7 Ni +		■	■					■	■	■	■			■	■	■				■	■	■	■	■		■				

交货状态 Delivery Status : (字段颜色 field color)--- ■ : 预硬模具钢料(Pre-hardened steel) / ■ : 退火模具钢料(Anneal steel)

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葛利兹钢材特性-应用参考表

Gröditz Steel Characteristic- Application Reference

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Grade 钢种	Chemical Composition (%)化学成分-範圍值							Corrosion resistance 耐腐蚀能力						Toughness 韧性						Chrome platability 镀铬性能						Nitridability 氮化性能											
	C	Si	Mn	Cr	Mo	Ni	Others	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5						
2311	0.40	0.30	1.50	2.00	0.20			■							■	■					■	■					■	■	■							
2312	0.40	0.30	1.50	1.90	0.20		S:0.05	■							■					■							■	■	■							
2738	0.36	0.25	1.50	1.80	0.20	1.10		■							■	■	■				■	■	■				■	■	■							
738HH	0.27	0.30	1.35	1.35	add	1.00	add	■							■	■	■				■	■	■				■	■	■							
XPM	0.27	0.30	1.55	1.35	0.50	1.0	add	■							■	■	■				■	■	■	■			■	■	■							
XPM ESR	0.30	0.30	1.55	1.35	0.70	1.00	add	■							■	■	■	■			■	■	■	■	■	■	■	■	■							
2711	0.55	0.25	0.70	0.70	0.30	1.70	V:0.1	■							■	■	■				■	■					■	■								
2714	0.55	0.25	0.70	1.10	0.50	1.70	V:0.1	■							■	■	■				■	■					■	■								
GEST 80 ESR	0.14		1.40	0.30	0.30	2.80	Cu:0.9 Al:0.3	■							■	■					■	■	■	■			■	■	■	■						
CPM 40	0.15	0.30	0.50	4.00	1.10	3.00	add	■							■						■	■	■	■			■	■	■	■	■					
2343(EX3)	0.36	1.00	0.35	5.00	1.20		V:0.4	■							■	■					■	■					■	■	■	■						
2343(EX3) ESR	0.36	1.00	0.35	5.00	1.20		V:0.4	■							■	■	■				■	■	■	■	■	■	■	■	■	■	■					
2344(EX4)	0.4	1.00	0.40	5.20	1.30		V:1.0	■							■	■					■	■					■	■	■	■	■					
2344(EX4) ESR	0.4	1.00	0.40	5.20	1.30		V:1.0	■							■	■	■				■	■	■	■	■	■	■	■	■	■	■					
2767	0.45	0.25	0.35	1.25	0.20	3.90		■							■	■	■				■	■					■	■								
GPM 58 ESR	0.5	≤0.5	0.50	5.00	2.20		V:0.7 Ni +	■							■	■	■				■	■	■	■	■	■	■	■	■	■	■					

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葛利兹不锈钢钢材系列特性-应用参考表

Gröditz Steel Characteristic- Application Reference

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Grade 钢种	Chemical Composition (%)化学成分-范围值							Machin-Ability 机加性能						Polish-Ability 抛光性能						Grain-Ability 蚀纹性能						Wear-Ability 耐磨性能						Weld-Ability 焊接性能					
	C	Si	Mn	Cr	Mo	Ni	Others	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5
2316	0.35	0.35	0.70	15.50	1.00	0.50			■	■					■	■				■							■	■					■				
2085	0.33	≤1.00	≤1.00	16.00		≤1.00	S:0.08		■	■	■	■	■	■						■							■	■					■				
CPM50 ESR	0.28	0.30	0.40	14.00		0.60	+N		■	■					■	■	■	■			■	■	■	■			■	■	■				■				
2083	0.40	0.40	0.70	13.00					■	■	■				■	■	■				■						■	■	■	■			■				
2083 ESR	0.40	0.40	0.70	13.00					■	■	■				■	■	■	■	■		■	■	■	■			■	■	■	■			■				
2083 mod ESR	0.38	1.00	0.50	13.00			V:0.25		■	■	■				■	■	■	■	■		■	■	■	■			■	■	■	■			■				
CRMHP	0.25	0.30	0.40	14.00		0.60	+N		■	■					■	■	■	■	■		■	■	■	■			■	■	■	■			■				
OPTI N+	0.15	0.30	0.40	14.00		0.60	+N		■						■	■	■	■	■		■	■	■	■			■	■	■	■	■	■	■					

Grade 钢种	Chemical Composition (%)化学成分-范围值							Corrosion resistance 耐腐蚀能力						Toughness 韧性						Chrome platability 镀铬性能						Nitridability 氮化性能					
	C	Si	Mn	Cr	Mo	Ni	Others	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5
2316	0.35	0.35	0.70	15.50	1.00	0.50			■	■	■	■			■	■	■			■							■					
2085	0.33	≤1.00	≤1.00	16.00		≤1.00	S:0.08		■	■	■				■					■							■					
CPM50 ESR	0.28	0.30	0.40	14.00		0.60	+N		■	■	■	■			■	■	■	■			■	■	■				■					
2083	0.40	0.40	0.70	13.00					■	■	■				■					■							■					
2083 ESR	0.40	0.40	0.70	13.00					■	■	■	■			■	■					■	■	■	■			■					
2083 mod ESR	0.38	1.00	0.50	13.00			V:0.25		■	■	■	■			■	■					■	■	■	■			■					
CRMHP ESR	0.25	0.30	0.40	14.00		0.60	+N		■	■	■	■	■		■	■	■				■	■	■	■	■		■					
OPTI N+	0.15	0.30	0.40	14.00		0.60	+N		■	■	■	■	■		■	■					■	■	■	■	■		■					

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葛利兹钢材应用— 塑胶

Gröditz Steel Grade Application-Plastic Grade

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Plastic 塑料		Plastic type 胶料种类	Recommendation 推荐	
			Steel grade 钢种	Hardness 硬度
Normal plastic 常用型胶料	Without corrosion 不带腐蚀性	PP, ABS, PE ,PS , …….	2738/2738H 738HH XPM/XPMESR 2343/2344(EX3/EX4) 2343ESR/2344ESR(EX3ESR/EX4ESR) 2083/2083ESR	HRC29-38 HRC32-38 HRC35-42 HRC44-52 HRC48-52 HRC42-52
	With corrosion 带腐蚀性	PVC, POM , PA, SAN,PMMA …….	2316 2083/2083ESR CRMHP OPTI N+	HRC28-34 HRC42-52 HRC50-52 HRC54-57
Special plastic 特殊添加型胶料	+ < Plastic +GF% or Talc 加玻签或滑石粉…. 增强塑料	+ < 30% GF(Glass Fiber) or Talc 加 30%以下的增强型胶料	2738/2738H 738HH XPM/XPMESR GEST80 CPM40	HRC29-38 HRC32-38 HRC35-42 HRC38-42 HRC38-42
		+ > 30% GF(Glass Fiber) or Talc 加 30%以上的增强型胶料	2343/2344(EX3/EX4) 2343ESR/2344ESR(EX3ESR/EX4ESR) 2083/2083ESR CRMHP OPTI N+ GPM58	HRC48-52 HRC48-52 HRC42-52 HRC50-52 HRC54-57 HRC54-58
	Plastic + fire retardant 阻燃增强胶料	Added Cl-,Br-,P3- based fire retardant product 添加 Cl-,Br,P3-基阻燃剂胶料	2316 2083/2083ESR CRMHP OPTI N+	HRC28-34 HRC42-52 HRC50-52 HRC54-57

※ The information provided in this table is based on our level of knowledge and is intended to provide general recommendations for the use of our products. This is not considered a guarantee of product quality characteristics, and every user of Gliese steel should make their own judgment on the suitability of choosing Groetiz steel products.

Schmiedewerke Gröditz
GMH GRUPPE

葛利兹钢材应用— 塑胶晒纹特性

Gröditz Steel Grade Application-Texture level

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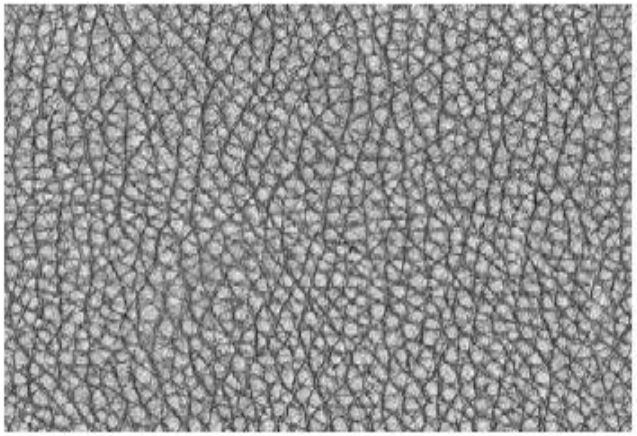
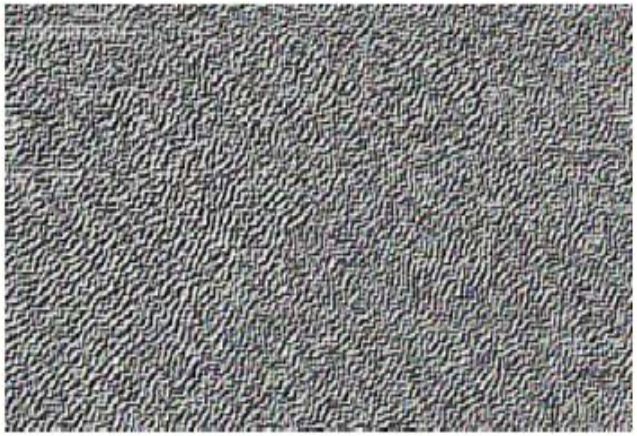
Normal Texturing
SWG 738HH



High Texturing
SWG XPM



Fine and Geometric Texturing
SWG 2083ESR, CRMHP ESR, GEST80 ESR

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Schmiedewerke Gröditz
GMH GRUPPE

葛利兹钢材应用— 抛光特性

Gröditz Steel Grade Application-Polish Level

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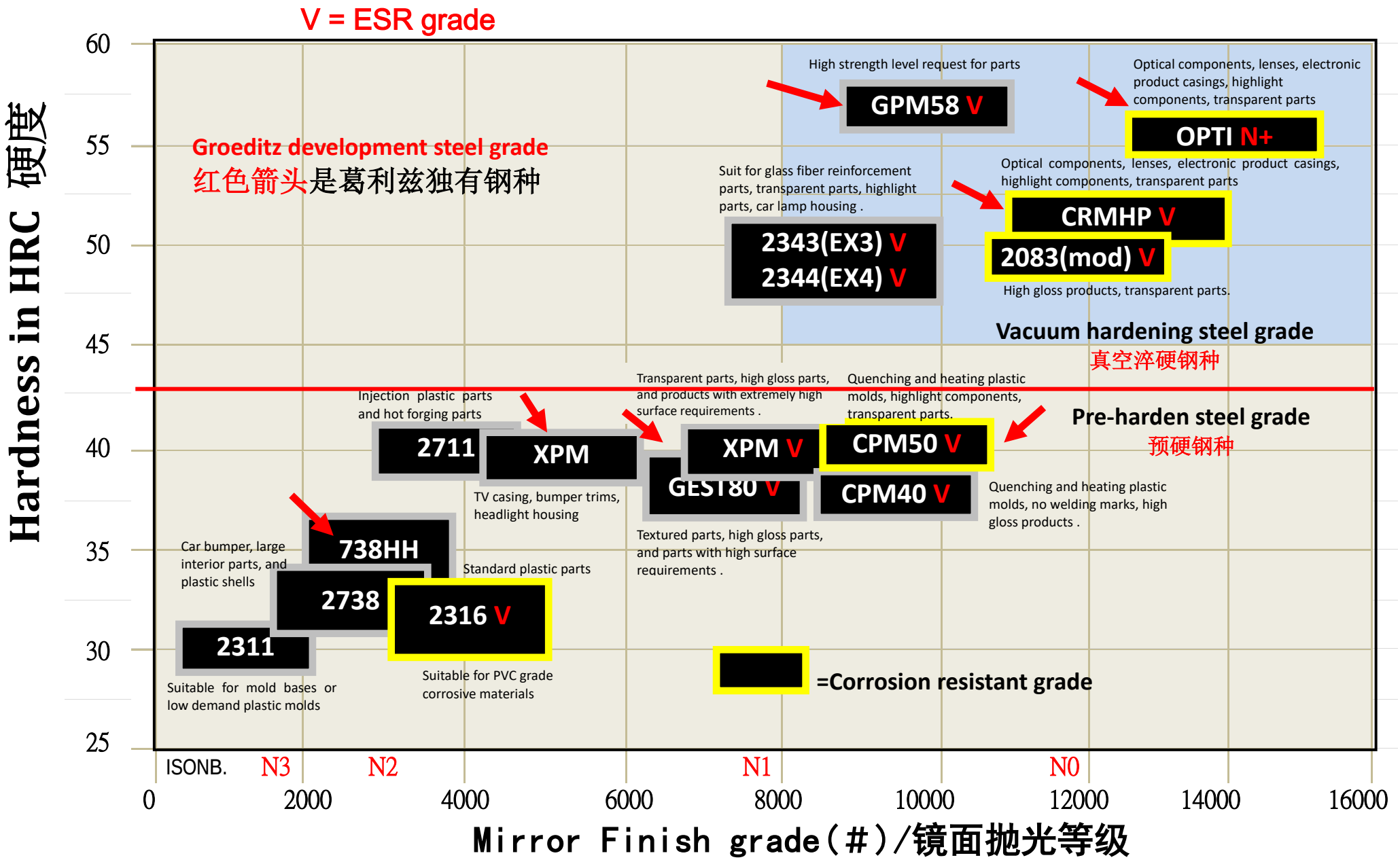

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