












LKM Steel Rainbow Chart

Manufacturer	Material Grade	Comparable Standard			Delivered Hardness from steel mill (Surface)	Characteristics	Typical Analysis at Major Chemical Content								Applications							
		AISI	JIS	W.Nr			C	Si	Cr	Ni	Mn	Mo	V	W								
	Aubert & Duval																					
	MEK4	–	–	1.8523	Prehardened to HB350 – 400	High hardness and toughness, good for nitriding to increase surface hardness	0.4	–	3.0	–	–	1.0	0.2	–	Plastic injection mould and slider with complicated structure requiring high wear resistance. Nitriding can be applied after pilot run to improve the mould life; not suitable for moulding corrosive resins							
	ADC3	H11 Modified High Purity Process	SKD6 Modified High Purity Process	1.2340 High Purity Process	Annealed to HB235	High purity, better toughness and thermal conductivity than common hot work steels, excellent resistance to heat checking, outstanding hardenability, good dimensional stability during hardening process	0.35	–	5.0	–	–	1.3	0.4	–	Large size light–alloy die casting dies with long production run							
	ASSAB Steel																					
	718H (IMPAX HI HARD)	P20 Modified	–	1.2738	Prehardened to HB330 – 380	Homogenous microstructure, stable quality, good texturing and EDM property	0.38	0.3	2.0	1.0	1.4	0.2	–	–	Plastic injection mould for medium production run and PS, PE, PP, ABS and other non–corrosive resins							
	NIMAX	Special Steel			Prehardened to HB360 – 400	Good polishing and texturing properties. Superior EDM–ability and machinability. High toughness and good weldability	0.1	–	3.0	1.0	2.5	–	–	–	Plastic injection mould for various applications such as LCD TV panels, interior part for automobile, engineering components and those resins without corrosive property							
	S136 (STAVAX ESR)	420 Modified ESR	SUS420J2 Modified ESR	1.2083 Modified ESR	Annealed to HB200	High purity with fine microstructure, can be polished to mirror finish. Excellent corrosion resistance and low deformation during heat treatment	0.38	0.8	13.6	–	0.5	–	0.3	–	Plastic injection mould with small to medium size, long production run and high polishing requirement, e.g. PMMA, PC, resins such as PVC, PA, POM or additives with corrosive property, machine part for food processing machinery							
	S136H (STAVAX ESR (PRE–HARDENED))				Prehardened to HB290 – 330										Plastic injection mould with small to medium size, medium production run and high polishing requirement, e.g. PMMA, PC, resins such as PVC, PA, POM or additives with corrosive property, machine part for food processing machinery							
	S136 SUP (MIRRAX ESR)	420 Modified ESR	SUS420J2 Modified ESR	1.2083 Modified ESR	Annealed to HB250(max)	Improved version of S136 with better corrosion resistance and toughness	0.24	–	13.3	1.4	0.5	0.35	0.35	–	Large size and complicated structure plastic mould for PMMA, PC, PVC, PA, POM plastics and machine part for food processing machinery							
	S136H SUP (MIRRAX ESR (PRE–HARDENED))				Prehardened to HB290 – 330	Improved version of S136H with better corrosion resistance and toughness																
	POLMAX	420 Modified ESR+VAR	SUS420J2 Modified ESR+VAR	1.2083 Modified ESR+VAR	Annealed to HB200	Ultra–high purity and extremely low segregation by double remelting process(ESR+VAR). Superb polishability to attain optical standard. Good corrosion resistance and low deformation during heat treatment	0.38	0.9	13.6	–	0.5	–	0.3	–	High quality moulds for Lens, optical products, compact discs and medical applications							
	ROYALLOY	Special Stainless Steel			Prehardened to HB290 – 330	Superior machinability, good corrosion resistance, uniform and consistent hardness in every dimension, excellent weldability	0.05	0.4	12.6	–	1.2	–	–	–	Mould base of plastic mould with requirement of long run, corrosion resistance and high precision; also suitable for plastic and rubber moulds, machine part with low requirement on polishability and texturing							
	8418 (DIEVAR)	Special Steel			Annealed to HB160	High purity, good high–temperature strength, outstanding temperature resistance and excellent resistance to heat checking, excellent hardenability, good dimensional stability during hardening	0.35	0.2	5.0	–	0.75	2.3	0.8	–	High demand light–alloy die casting die, hot forging inserts, extrusion dies with long production run							
	8407 (ORVAR SUPREME)	H13 Modified ESR	SKD61 Modified ESR	1.2344 Modified ESR	Annealed to HB185	High purity, high toughness and good resistance to thermal fatigue	0.38	1.0	5.3	–	0.4	1.3	0.9	–	Die casting die, extrusion die, through–hardened plastic mould for PA, POM,PS, PE, EP and other non–corrosive plastics							
	635 (CALMAX)	High wear resistance multi–functional tool steel			Annealed to HB200	Combining with high toughness and high wear resistance; good hardenability and can be flame hardening to HRC56–60 with harden layer up to 5mm thick	0.6	0.35	4.5	–	0.8	0.5	0.2	–	Heavy duty blanking, forming tool or coining tool which required good adhesive wear resistance; also suitable for moulding fibre–reinforce plastics							
	DAIDO Steel																					
	PAC5000	P20 Modified	–	1.2311 Modified	Prehardened to HB336 – 362	Patent composition to reduce cracking during welding process; homogenous structure and hardness; good texturing property; can be polished up to #5000	Patent Pending								Plastic injection mould for medium production run with high texturing requirement such as housing for Office Equipment, Copier, Printer; not suitable for moulding corrosive resins							
	NAK80	P21 Modified VAR	–	–	Prehardened to HB344 – 400	Age hardening steel with high delivery hardness; excellent texturing and EDM properties; can be polished up to #8000	Improved Composition from NAK55								Plastic injection mould for medium production run with high polishing and texturing requirement; not suitable for moulding corrosive resins							
	PAT868	Special Steel			Annealed to HB229(max)	Special alloying design and steel making process to provide the material with integrated properties of high toughness, anti–corrosion and mirror polishability	Patent Pending								Plastic injection mould with the adoption of rapid heat and cool technology, mould insert or slider for long production run with complicated mould design and high polishing or texturing requirement							
	S–STAR	420 Modified ESR	SUS420J2 Modified ESR	1.2083 Modified ESR	Prehardened to HB300 – 330	High purity with fine microstructure, can be polished to mirror finish. Excellent corrosion resistance and low deformation during heat treatment	0.38	0.9	13.5	–	–	0.1	0.3	–	Plastic injection mould with small to medium size, long production run and high polishing requirement, e.g. PMMA, PC, resins such as PVC, PA, POM or additives with corrosive property, machine part for food processing machinery							
	S–STAR–A	420 Modified ESR	SUS420J2 Modified ESR	1.2083 Modified ESR	Annealed to HB229(max)		0.38	0.9	13.5	–	–	0.1	0.3	–	Plastic injection mould with small to medium size, medium production run and high polishing requirement, e.g. PMMA, PC, resins such as PVC, PA, POM or additives with corrosive property, machine part for food processing machinery							
	DH31–S	Special Steel			Annealed to HB235(max)	Good through–hardening property, high resistance to thermal fatigue and hot erosion	Patent Pending								Small to medium size Al and Mg alloy die casting dies, component for die casting die, Al alloy extrusion die							
	DHA1	H13	SKD61	1.2344	Annealed to HB229(max)	Good toughness and resistance to thermal fatigue	0.38	0.9	5.0	–	0.4	1.3	1.0	–	Small size Zn alloy die casting die, component for die casting die, Al alloy extrusion die, through–hardened plastic injection mould							
	DHA–WORLD	H11 Modified	SKD6 Modified	1.2343 Modified	Annealed to HB229(max)	Excellent through–hardening property, high resistance to thermal fatigue and hot erosion	Patent Pending								Medium to big sizes Al and Mg alloy die casting dies with medium to long production run							
	DH31–EX	Special Steel			Annealed to HB235(max)	Excellent through–hardening property and toughness, excellent resistance to thermal shock and thermal fatigue, high hot strength and fracture toughness, superior resistance to heat checking and hot erosion	Patent Pending								Big sizes Al and Mg alloy die casting dies with long production run							
	DC53	D2 Modified	SKD11 Modified	1.2379 Modified	Annealed to HB255	Toughness is better than that of conventional SKD11; hardness can be attained to around HRC62 after high–temperature tempering, which massively reduces the risk of cracking during wire–cutting (WEDM) or grinding processes; suitable for surface treatment	Patent Pending								Cold work dies for stamping, forming, deep drawing, rolling							
		Finkl																				
P20 HH		P20 Modified	–	1.2311 Modified	Prehardened to HB320 – 370	With special chemical composition adjustment and good forging process/forging ratio, mechanical properties are better than those of normal AISI P20 grade	0.33	0.3	18.5	0.6	0.9	0.5	–	–	Plastic injection mould for interior/exterior part for automobile and medium production run, household appliances; not suitable for mould corrosive resins							
	Gröeditz																					
	XPM	P20 Modified	–	1.2738 Modified	Prehardened to HB359 – 400 (HRC38 – 42)	Homogenous hardness, improved properties such as machinability, thermal conductivity, polishability, texturing property and weldability over normal AISI P20 tool steel	0.27	0.3	1.35	1.00	1.55	0.5	–	–	Large size plastic injection mould for car bumper, dashboard and housings for photocopier and printer; not suitable for moulding corrosive resins							
	XPM V ESR	P20 Modified ESR	–	1.2738 Modified ESR	Prehardened to HB341 – 400 (HRC36 – 42)	ESR version of XPM. Reduction of anisotropy, impurities and segregation to provide better polishability	0.27	0.3	1.35	1.00	1.55	0.5	–	–	Large size plastic injection mould that requires high surface quality, such as automobile headlights, rear view mirror, decorative part, housing for lighting, LCD/LED TV, photocopier and printer; not suitable for moulding corrosive resins							
	SWG 2083mod V ESR	420 Modified ESR	SUS420J2 Modified ESR	1.2083 Modified ESR	Annealed to HB241(max)	Good corrosion resistance, high wear resistance, better mirror polishability than SWG2083	0.38	1.0	13.0	–	0.5	–	0.25	–	Plastic injection mould for PVC, PP, EP,PC, PMMA with long production run and requiring high surface finish							
	LKM also provides SWG738-, SWG738H-, SWG271I-, SWG2083-, SWG2083H-, SWG2316-, SWG2316H-, SWG2344-, SWG2344 ESR-, SWG2343-, SWG2343 ESR and SWG2767 on stock. For inquiry, please contact our Sales or Steel Marketing departments																					
	Lung Kee Special Steel																					
	LKM P20(MOD)	P20 Modified	–	1.2311 Modified	Prehardened to HB250 – 330	Economical choice of pre–hardened plastic mould steel	Patent Pending								Mould base/plate with high strength requirement for plastic injection mould; core/movable part of plastic injection mould without high surface finish requirement							
	LKM231I	P20	–	1.231I	Prehardened to HB280 – 325	Pre–hardened plastic mould steel	0.37	–	1.9	–	1.45	0.2	–	–	Mould base/plate with high strength requirement for plastic injection mould; core/movable part of plastic injection mould without high surface finish requirement							
	LKM2312	P20+5	–	1.2312	Prehardened to HB280 – 325	Excellent machinability	0.37	–	1.9	–	1.45	0.2	–	–	Mould base/plate with requirement of high strength and high volume/speed machining for plastic injection mould							
	LKM738	P20 Modified	–	1.2738	Prehardened to HB290 – 330	Modified version of conventional AISI P20 plastic mould steel with Ni added to increase through hardening property	0.37	–	2.0	1.0	1.1	0.4	–	–	Plastic injection mould for medium production run and PS, PE, PP, ABS and other non–corrosive resins							
	LKM738H				Prehardened to HB330 – 370																	
	LKM838HS	P20 Modified	–	1.2738 Modified	Prehardened to HB330 – 370	With special adjustment to the chemical composition and steel making process, LKM838HS possesses better polishability, EDM and texturing properties, weldability, thermal conductivity than conventional W.Nr 1.2738HH plastic mould steel	Patent Pending								Plastic injection mould for medium production run with good texturing property, e.g. car bumper, dashboard and housings for photocopier and printer; not suitable for moulding corrosive resins							
	LKM271I	–	–	1.271I	Prehardened to HB335 – 380	Combining high yield strength and good toughness; suitable for nitriding	0.55	–	0.7	1.7	0.8	0.25	–	–	Plastic injection mould for medium production run and PS, PE, PP, ABS and other non–corrosive resins							
	LKM808E	P21 Modified ESR	–	–	Prehardened to HB360 – 415	Age hardening steel with high delivery hardness, good polishability and texturing property	0.1	–	–	3.0	1.5	0.35	–	–	Plastic injection mould for medium production run with simple geometry design; not suitable for moulding corrosive resins							
	LKM420	420	SUS420J2	1.2083	Annealed to HB240(max)	Good anti–rusting property	0.38	–	13.0	–	0.5	–	–	–	Plastic injection mould for long production run with simple geometry and anti–rusting property but without high surface finish requirement							
	LKM420H	420	SUS420J2	1.2083	Prehardened to HB280 – 330	Pre–hardened stainless steel	0.38	–	13.0	–	0.5	–	–	–	Plastic injection mould for small to medium production run with simple geometry and anti–rusting property but without high surface finish requirement; suitable for mould base/plate with anti–rusting property							
	LKM420HM	420 Modified	SUS420J2 Modified	1.2083 Modified	Prehardened to HB260 – 320	Economical and confined version of LKM420H	0.38	–	12.0	Some	0.5	–	–	–	Mould base/plate for plastic injection mould with anti–rusting property							
	LKM2083	420	SUS420J2	1.2083	Annealed to HB240(max)	Working in through hardening condition with good corrosion resistance, wear resistance and polishability	0.43	–	13.0	–	0.3	Some	–	–	Plastic injection mould for moulding resins such as PA, POM and flame retarding additives and long production run							
	LKM2083H				Prehardened to HB280 – 320	Pre–hardened corrosion stainless steel									Plastic injection mould for moulding resins such as PA, POM and flame retarding additives and medium production run							
	LKM2083 ESR	420 Modified ESR	SUS420J2 Modified ESR	1.2083 Modified ESR	Annealed to HB250(max)	Good corrosion resistance, high wear resistance, better mirror polishability than LKM2083	0.38	0.9	13.0	–	0.5	–	Some	–	Plastic injection mould for PVC, PP, EP, PC, PMMA with long production run and requiring high surface finish							
	LKM2316	–	–	1.2316	Annealed to HB250(max)	Working hardness can be attained to HRC44–47. Excellent corrosion resistance	0.4	–	16.0	Some	0.5	1.0	–	–	Plastic injection mould for PVC and other high corrosive resins with requirement of long production run; components for injection moulding machine and machine part for food processing machinery							
	LKM2316H				Prehardened to HB265 – 320										Pre–hardened high corrosion resistance steel	Plastic injection mould for PVC and other high corrosive resins with requirement of medium production run; components for injection moulding machine and machine part for food processing machinery						
	LKMH13	H13	SKD61	1.2344	Annealed to HB225(max)	Economical choice of hot work steel	0.38	1.0	5.0	–	0.4	1.3	1.0	–	Through–hardened plastic injection mould for those non–corrosive resins; slider and lifter for plastic injection mould; small size of Zn die casting die for small to medium production run							
	LKM2343	H11	SKD6	1.2343	Annealed to HB225(max)	High toughness and good heat resistance; good resistance to heat checking and good through hardening property	0.36	1.0	5.0	–	0.4	1.2	0.35	–	Light–alloy die casting die, Al alloy extrusion die, components for die casting, e.g. nozzles; through–hardened plastic injection mould for non–corrosive resins							
	LKM2343 ESR	H11 ESR	SKD6 ESR	1.2343 ESR	Annealed to HB225(max)	Homogenous structure and good isotropic property. High toughness and good heat resistance, good resistance to heat checking, excellent through hardening property and mirror polishability	0.36	1.0	5.0	–	0.4	1.2	0.35	–	Light–alloy die casting die, Al alloy extrusion die, components for die casting, e.g. nozzles; through–hardened plastic injection mould for non–corrosive resins with high surface finish requirement							
	LKM2344	H13	SKD61	1.2344	Annealed to HB225(max)	High toughness and good heat resistance, good resistance to heat checking and through hardening property	0.38	1.0	5.0	–	0.4	1.3	1.0	–	Light–alloy die casting die, Al alloy extrusion die, components for die casting, e.g. nozzles; through–hardened plastic injection mould for non–corrosive resins							
	LKM2344 ESR	H13 ESR	SKD61 ESR	1.2344 ESR	Annealed to HB225(max)	Homogenous structure and good isotropic property. High toughness and good heat resistance, good resistance to heat checking, excellent through hardening property and mirror polishability									Light–alloy die casting die, Al alloy extrusion die, components for die casting, e.g. nozzles; through–hardened plastic injection mould for non–corrosive resins with high surface finish requirement							
	LKM2510	O1	SKS3	1.2510	Annealed to HB230	Working in through hardening condition with good wear resistance									Dies for shearing blades, cold forming, blanking and punching dies and medium production run; mould component e.g. slider for plastic injection mould							
	LKM2767	6F7	–	1.2767	Annealed to HB262(max)	Working in through hardening condition with high toughness									Small to medium size of through–hardened plastic injection mould with complicated structure; dies for shearing and blanking of sheet metal with 10mm thick or above							
		Sinto																				
		PORCERAX II PM – 35	Sintering powder metallurgical porous material			Prehardened to HV350 – 400	Porous material with high corrosion resistance, high machinability and EDM property (supplied with 7 µm pore size)	0.02	0.07	16.5	1.2	0.17	1.9	–	–	Insert for plastic injection mould to solve the problem of gas trapping during production						
		Beryllium Copper Alloy																				
		MOLDMAX HH (MM 40)	UNS C17200			Prehardened to HRC36 – 42	High strength beryllium copper alloy, high thermal conductivity and high hardness, shortening moulding cycle	Be1.9	Co+Ni0.25			Cu 97.85			Plastic injection mould/insert for rapid heat dissipation							
		EDM Copper																				
		LKM C110OP	JIS H3100			–	Extremely high purity, good electrical conductivity, high machinability, low thermal deformation	Cu 99.95								EDM copper electrode						
		China Made Plastic Mould Steel																				
WY718 WY718H		P20 Modified	–	1.2738	Prehardened to HB290 – 340 Prehardened to HB340 – 380	Prehardened plastic mould steel, hardness homogeneity is better than normal AISI P20 plastic mould steel	0.37	–	18	10	11	0.25	–	–	Mould base/plate with high strength requirement for plastic injection mould; core/movable part of plastic injection mould without high surface finish requirement							
WY231I		P20	–	1.2311	Prehardened to HB290 – 340	Prehardened plastic mould steel	0.37	–	17	–	11	0.25	–	–	Mould base/plate with high strength requirement for plastic injection mould; core/movable part of plastic injection mould without high surface finish requirement							
	Plain Carbon Steel																					
	S45C – S55C	1045 – 1055	S45C – S55C	~1.1730	Annealed to HB170 – 220	Good machinability	0.5	0.35	–	–	0.8	–	–	–	Mould base/plate for plastic injection mould and machinery part							