

[TECHNICAL DATA]

EXAMPLES OF APPLICABLE STEELS FOR TYPICAL PRODUCTS · PROPERTIES OF DIE MATERIALS

Typical resins			Typical use	Required characteristics of mold materials	Suitable steels		
					Hitachi Metals, Ltd.	Daido Steel Co., Ltd.	Uddeholm Tool Co.
General thermoplastic resins and thermosetting resins	General	Polyacetal Polypropylene Polystyrene Polyamide (nylon) ABS	Bumpers Radiator gurilles Tail lamps Inner panels OA equipment Vacuum cleaners Gears	Machinability Abrasion resistance	HPM7 HPM1 FDAC HPM31	PX5 NAK55 DH2F PD613	HOLDAX IMPAX RIGOR
		Semigloss finished	ABS	Panels, Interior parts Top covers	Semigloss processability	CENA1	NAK80
	Clear articles	Methacryl resin (acryl) Polystyrene	Dust covers Audio tape containers Cosmetic cases	Gloss processability	HPM38 CENA1	S—STAR NAK80	STAVAX IMPAX
Thermoplastic		Polycarbonate Polyamide (nylon) ABS AS	Electronic parts Camera bodies Keyboards Electric tool housings Video tape housings	Ultra abrasion resistance	HPM1 FDAC HPM31	NAK55 DH2F PD613	IMPAX+ Surface treatment RIGOR ELMAX
	Thermosetting	Phenol Epoxy Polyester	Gears Breakers IC Transister parts		HPM31 DAC HAP10 HAP40 HAP72	PD613 DHA1 DEX20 DEX40 DEX80	RIGOR ORVAR ASP—23 ASP—30 ASP—60
Flame proof resins (UL standard)		ABS Polystyrene AS	TV cabinets CRT covers Hair driers	Corrosion resistance	HPM38 HPM77 (bass)	S—STAR PD742	STAVAX ELMAX RAMAX (bass)
PVC		Vinyl chloride	Telephone casings, Pipes Eaves and downspouts, Containers	Ultra corrosion resistance	PSL	NAK101	STAVAX
Ultra glossy finished goods		Methacryl resin (acryl) Polycarbonate	Lenses, Opical discs	Ultra gloss processability Anti-stain	HPM38S HPM38 YAG	S—STAR MAS1C	STAVAX
Plastic magnet		Ferrite resin	Magnet	Nonmagnetic, super hard	HPM75	—	—

Classification	Hardness (HRC)	Property Steel type	Machinability	Ability to be mirror-finished	Semigloss processability	Electric discharge machinability	Weldability	Toughness	Heat treatment deformability	Corrosion resistance	Wear resistance	Non-magnetic property	Thermal conduction	Remarks
	28	SCMgroup	◎	○	○	○	○	◎	—	○	△	—	—	SCM440group
Prehardened steel	13	SCgroup	◎	△	○	○	○	◎	—	△	△	—	—	S50C, S55Cgroup
	28	SCMgroup	◎	○	○	○	○	◎	—	○	○	—	—	SCM440group
	33	SCM (revised)	◎	○	○	○	○	◎	—	○	○	—	—	AISI P20group
	35	SUSgroup	△	◎	○	○	○	◎	—	◎	○	—	—	13Cr (revised), etc.
	40	SUSgroup	△	◎	○	○	○	◎	—	◎	○	—	—	SUS630group
Quenched/tempered steel	60	SKD11group	○	◎	○	◎	△	○	○	○	◎	—	—	Same machinability as in annealed state.
	57	SUSgroup	△	◎	○	◎	○	◎	◎	◎	◎	—	—	Ditto. SUS440Cgroup
	52	SUSgroup	△	◎	○	△	○	◎	◎	◎	◎	—	—	Ditto. SUS420J2group
Aging-treated steel	53	Maraging steel	○	◎	◎	◎	◎	◎	◎	○	◎	—	—	18Ni group
	43	Non-magnetic steel	△	○	○	△	△	○	○	○	○	◎	—	Hi—Mn group
Aluminum alloy tool die material	—	Alqueen 300	◎	○	○	○	△	○	—	○	△	—	◎	High strength Al group
Copper alloy	—	Beryllium copper	○	○	○	○	△	○	—	○	◎	—	◎	CU group
	—	Tellurium copper	○	○	○	○	△	○	—	○	○	—	◎	
Nickel alloy	—	Solid lubricant-containing nickel alloy	△	◎	○	◎	○	△	—	◎	◎	—	—	Ni group
	—	Hard nickel alloy	△	◎	○	◎	△	△	—	◎	◎	—	—	

Note : ◎ : Excellent, ○ : Moderate, △ : Slightly poor.
The above table is prepared based on accepted opinions, and is not based on quantitative comparative values.

References : Die Technique Table 2, p. 51, August, 1995
Die Technique p. 45, October, 1993
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