

# HITACHI (YSS) SPECIALITY STEELS

## OUR NEW TECHNICAL APPROACH...

# Isotropy

### HIGH SPEED TOOL STEELS

Hitachi grade	TYPICAL ANALYSIS %						REFERENCE SPECIFICATION			APPLICATIONS	AS DELIVERED MAX. HB	HARDENING °C	QUENCHING MEDIUM	TEMPERING TEMPERATURE °C	STANDARD HARDNESS HRC
	C	Cr	W	Mo	V	Co	JIS	AISI	W.Nr						
<b>YXM1</b>	0.85	4.0	6.0	5.0	2.0	-	SKH51	M2	1.3343	Drill, Reamer, Broach, Chaser, Metal saw, Cutters, Cold punch, Dies	255	1200~1240	Oil or Salt	550~570	Min63
<b>YXM4</b>	0.85	4.0	6.0	5.0	2.0	5.0	SKH55	M35	1.3243	Hob, Drill, Reamer, Chaser, Cutters, heading tool for stainless, Endmill	277	1210~1250	Oil or Salt	560~580	Min64
<b>YXR3</b>	Matrix high speed steel						-	-	-	Cold heading punch, Trimming dies, Cold forging punch and die	241	1130~1170	Oil or Salt	560~590	Min57
<b>YXR33</b>	Extremely tough matrix high speed steel						-	-	-	Warm forging dies, Hot forging dies, Cold forging dies, AI-die cast insert pin	241	1080~1160	Oil or Salt	550~600	Min56

### POWDER METALLURGY HIGH SPEED TOOL STEELS

<b>HAP10</b>	1.3	5.0	3.0	6.0	4.0	-	-	-	-	Heavy duty working tools as fine blanking dies, Lower speed cutting tools as taps	269	1050~1190	Oil or Salt	550~580	58~66
<b>HAP40</b>	1.3	4.0	6.0	5.0	3.0	8.0	SKH40	-	-	Cutters, Dies	277	1180~1210	Oil or Salt	560~580	64~68
<b>HAP72</b>	2.1	4.0	9.5	8.2	5.0	9.5	-	-	-	Heavy duty cutting tools, Dies	352	1180~1210	Oil or Salt	560~580	68~70

### COLD WORK TOOL STEELS

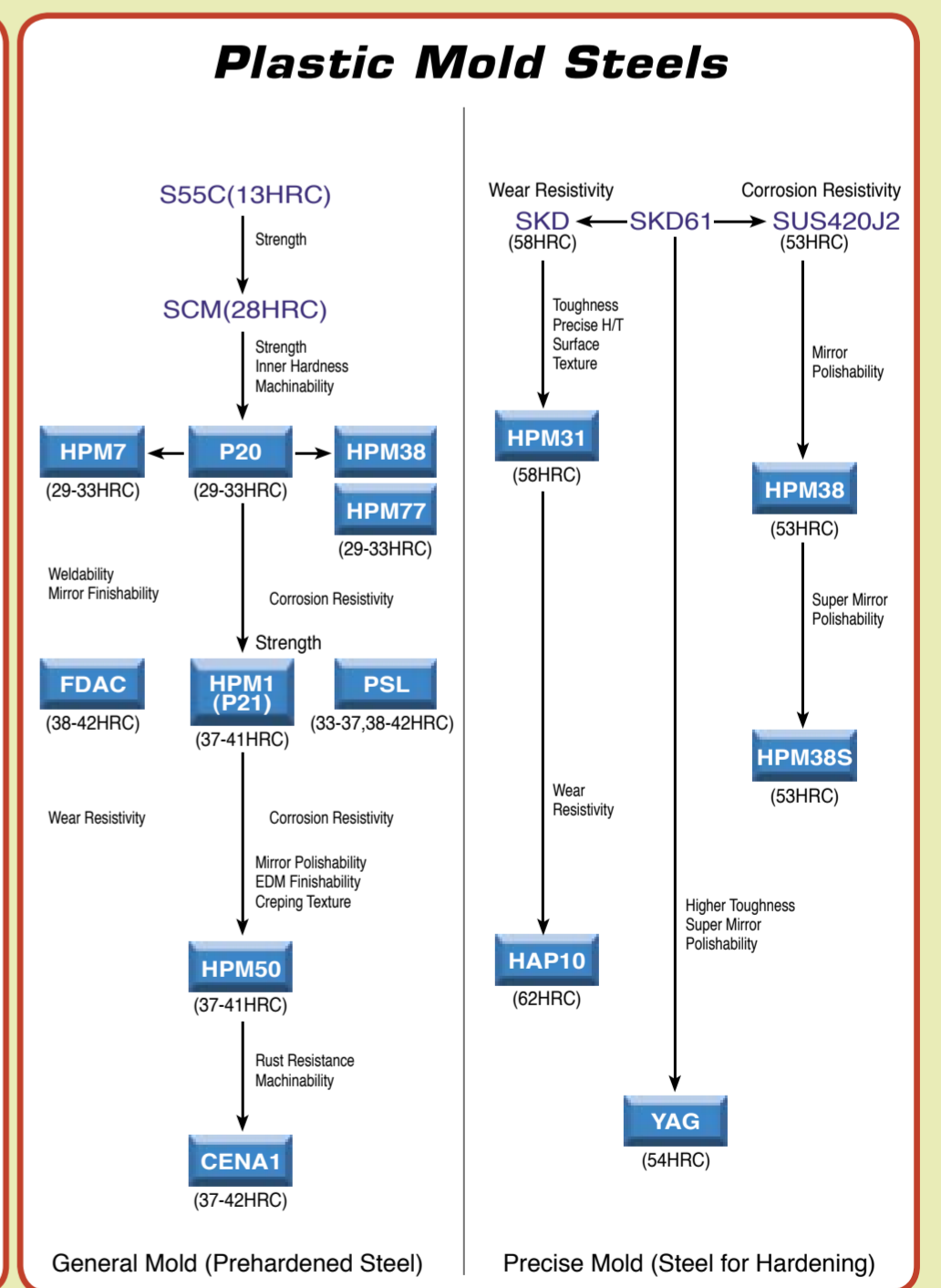
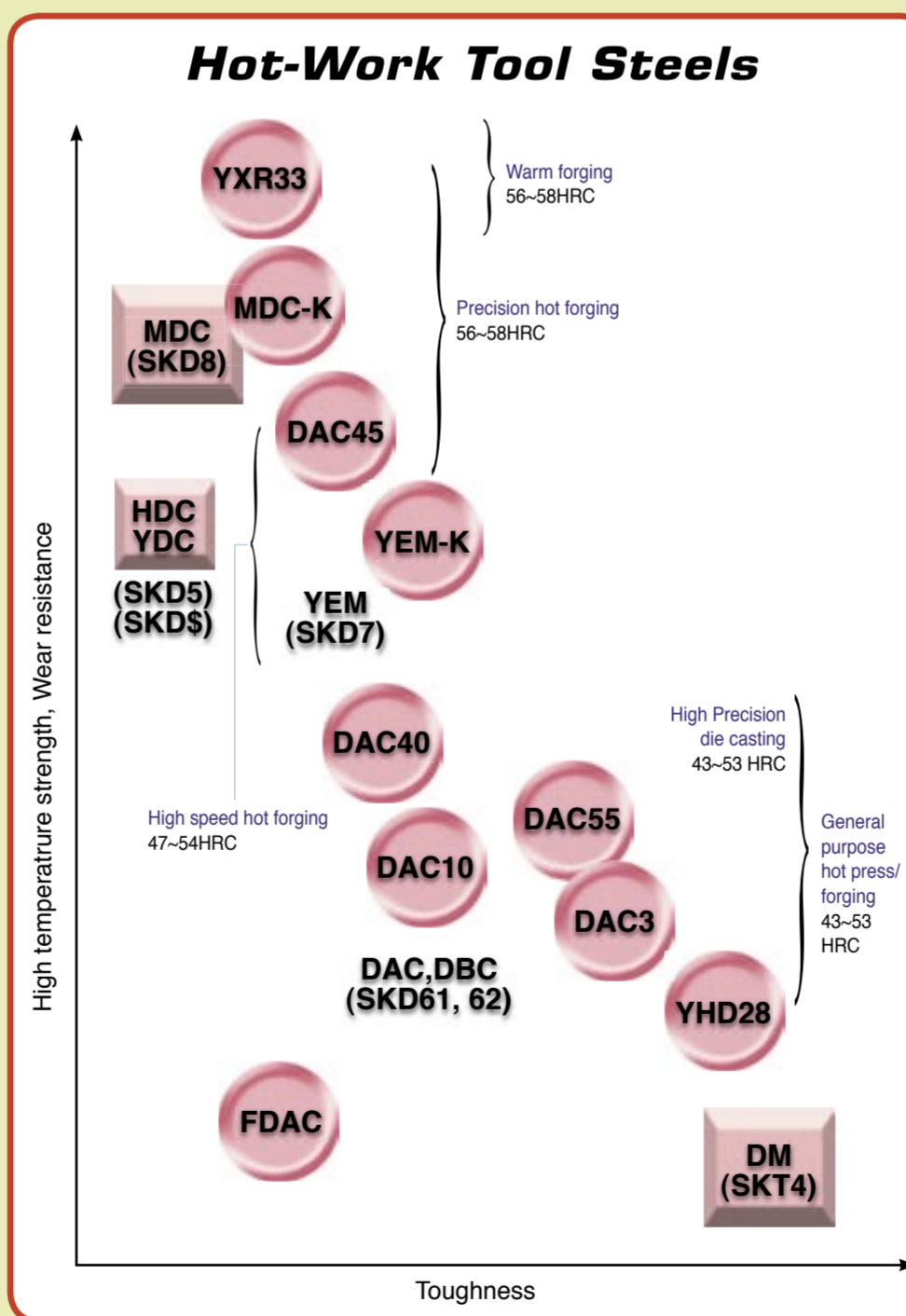
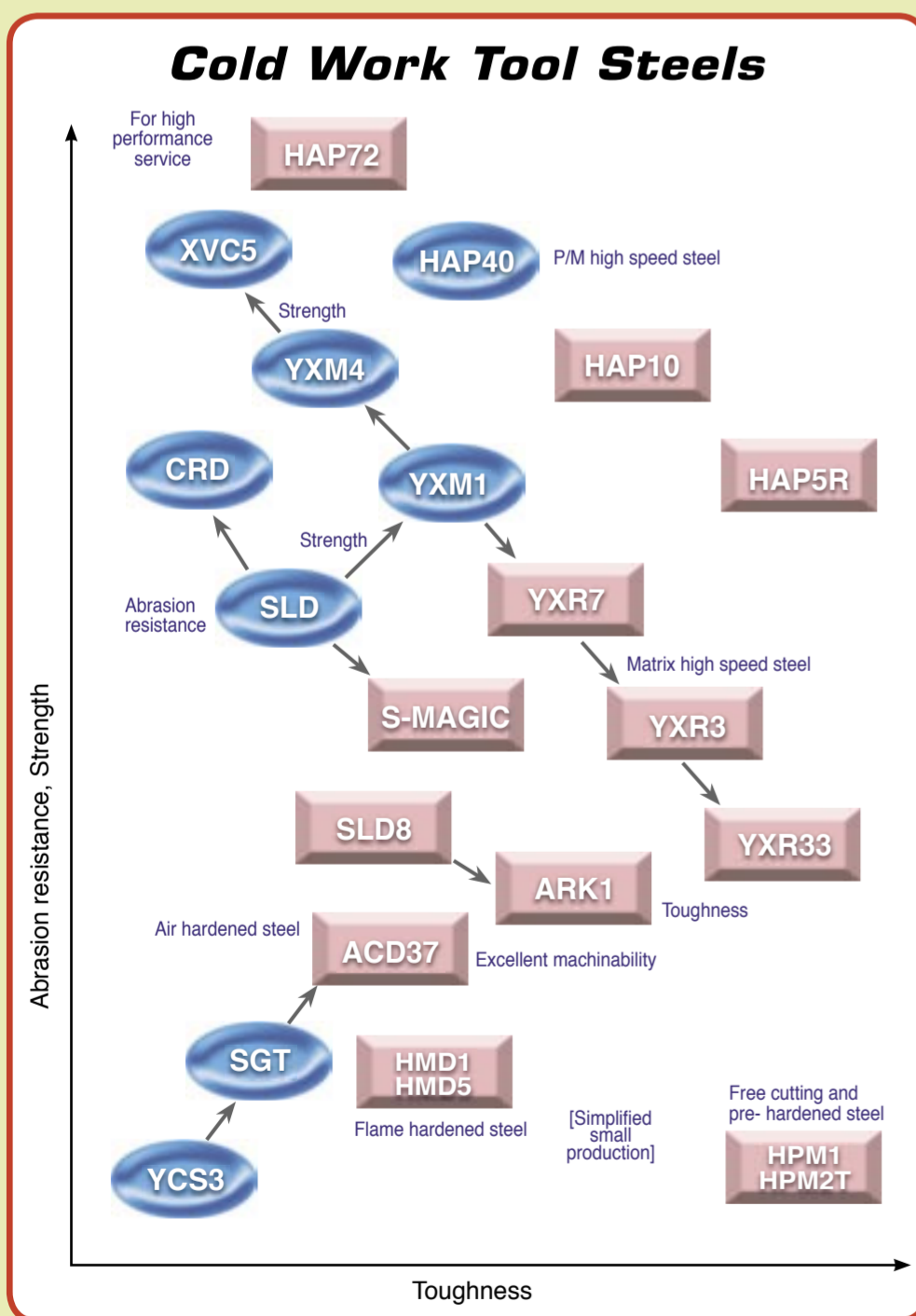
<b>SLD</b>	1.5	12	-	1	0.35	-	SKD11	D2	1.2379	Cold work dies for general use, forming roll, shear	248	1000~1050	Air	500~530 or 150~200	Min58
<b>SLD-MAGIC</b>	High performance cold work tool steel						-	-	-	Cold work dies for high-tensile steels, SUS, mass production, and general use	255	1010~1040	Air	480~530	Min58
<b>SLD8</b>	High strength cold work tool steel						-	-	-	Rolling dies, cold forging dies	248	1020~1040	Air	520~550	Min60
<b>SGT</b>	0.95	0.75	-	0.75	-	-	SKS3	O1	1.2510	Punch, dies, gauges for general work	217	800~850	Air	150~200	Min60
<b>HMD5</b>	Flame hardening steel						-	-	-	Blanking dies Trimming dies	235	Flame hardening 850-1000°C (Aiming 900°C)	-	-	Min60

### HOT WORK TOOL STEELS

<b>DAC</b>	0.39	5.15	-	1.4	0.8	-	SKD61	H13	1.2344	General-purpose hot-working tool steel used in a wide range of applications	229	1000~1050	Air	550~650	Max53
<b>DAC-S</b>	0.39	5.15	-	1.4	0.8	-	SKD61	H13	1.2344	Steel for die casting dies which has excellent toughness and complies with NADCA Superior H13	229	1000~1050	Air	550~650	Max53
<b>DAC55</b>	High-strength and toughness die steel (5Cr-Mo-V-Ni-Co)						-	-	-	Tool steel for large or squeeze die casting moulds with excellent heat crack resistance	229	1000~1030	Air	550~650	Max53
<b>DAC10</b>	High-strength die steel (5Cr-2.5Mo-V)						-	-	-	Steel for precision die casting and hot-working press die which has excellent heat crack resistance and wear resistance	229	1000~1030	Air	550~650	Max53
<b>DAC45</b>	High-strength die steel (3.5Cr-W-Mo-V)						-	-	-	Very-strength hot working tool steel High Si-Al die casting Cu alloy die casting and hot forging	241	1060~1080	Oil	580~650	Max55
<b>FDAC</b>	0.39	5.15	-	1.4	0.55	-	SKD61	-	-	Free-cutting hot-working tool steel	HRC38-42	-	-	-	38~42

### PLASTIC MOLD STEELS

<b>HPM38</b>	0.4	13.5	-	0.6	-	-	SUS420J2	420	1.2083	Flame retardant resin, Transparent parts, Rubber	HRC29-33	1000~1050	Air	200~500	50~54
<b>CENA1</b>	P21 improved						-	P21	-	Rust resistant mold with sensitive surface as mirror polishing, Creping, EDM (OA electronics, Transparent case etc)	HRC37-42	Prehardened Steel			37~42
<b>HPM7</b>	P20 improved						-	P20	1.2311	Mold required good weldability & machinability (Autoparts, Home electronics, House equipment)	HRC29-33	Prehardened Steel			29~33
<b>HPM77</b>	420 improved						-	-	1.2085	Corrosion resistant mold plates, rubber mold	HRC29-33	Prehardened Steel			29~33
<b>HPM31</b>	SKD11 improved						-	-	-	Wear resistant mold for engineering resin (Gear, Connector, IC)	248	1000~1050	Air	200~550	55~60



#### Cold Work Tool Steels

Hitachi grade	Abrasion resistance	Pressure Resistance	Strength at elevated Temp.	Toughness	Hardening ability	Distortion by heat treatment	Machinability	Weldability	Standard Hardness HRC
SLD	A	A	B	B	A+	A+	B	C	57~63
SLD-MAGIC	A	A	B	A-	A+	A+	A-	B	58~62
SLD8	A-	A	B+	A-	A+	A	B+	C	60~63
SGT	C	B+	D	B	C	D	A	B	57~63
HMD5	C	B	D	B	B	A-	A	A	55~60
YXM1	A	A+	A	A-	B	B	B	C	58~64
YXR3	A-	A	A	A+	B	B	B+	C+	58~61
HAP10	A+	A+	A	A	A	A	C+	C	62~65
HAP40	A++	A++	A++	A-	B	A	C+	C	64~67
HAP72	A++	A++	A++	C	A-	A	C-	D	68~71

#### Hot Work Tool Steels

Hitachi grade	Abrasion resistance	Strength at elevated Temp.	Toughness	Machinability	Standard Hardness HRC
DAC	A	A	A	A	42~51
DAC-S	A	A	A++	A	42~51
DAC55	A	A+	A+++	C	43~53
DAC10	A+	A++	A-	B	44~51
DAC45	A++	A+++	B	C	47~54
FDAC	A	A	D	A+++	36~44
YXR33	A+++	A+++	C	D	52~58

(A is the uppermost level and + indicates higher performance)

#### Plastic Mold Steel

Hitachi grade	Machinability	EDM Creeping-texture	Mirror polishability	Weldability	Rust resistance	Wear resistance	Toughness	Standard Hardness HRC
HPM38	3	5	4	3	4	3	3	50~55
CENA1	4	5	4	4	3	2	3	37~42
HPM7	4	3	3	5	2	2	4	29~33
HPM77	4	2	2	3	4	2	3	29~33
HPM31	3	5	4	2	3	4	3	56~60
(P20)	3	3	2	3	2	2	3	32

(5 is the uppermost)