



GOEL STEEL COMPANY

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Special Steels • Engineering Services

HIGH SPEED STEELS

A1SI/ ASTM	MATERIAL (Closest Corresponding Grades)									CHEMISTRY										APPLICATION	HEAT TREATMENT DETAILS						SUPPLY CONDITION	PROPERTIES					STOCKING PROGRAM			
	EN/ DIN	JIS	HITACHI	BOHLER	ASSAB	DAIDO	SEAH	SANYO	C	Si	Mn	S	Cr	Mo	Ni	V	W	Co	Others		Annealing (Slow Cooling)	Quenched (Hot Bath)	Quenching	Tempering (Air Cooling)	Annealed (hb)-max	Quenched & (hrc) Tempered		Red Hardness	Wear Resistance	Toughness	Grindability	Compressive Strength	Rounds(Dia)		Flats(WidthXThk)	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min		Max	Min	Max	Min	Max	Min		Max	Min	Max	Min	Max	Min	Max		
Conventional	M2	.6/5/02 , 1.3343	SKH51	YXM1	S600		MH51	THSM2	QH51	0.9	0.3	0.3		4.1	5	1.8	6.4			Taps, twist drills, reamers, broach tools, cold work tools.	800-880	Oil	1200-1240	550-570	255	63	Annealed						3	317	25x4	400x105
	M35	6/5/2+5% , 1.3243	SKH55	YXM4	S705		MH55	THS55		0.92	0.35	0.3		4.1	5	1.9	6.4	4.8		As M2, Hobs, drill reamers, milling cutters	800-840	Oil	1200-1240	550-570	277	64	Annealed						4	255		
	M42	2/10/1/8 , 1.3247	SKH59	YXM42	S500		MH59	THS59		1.1	0.25	0.25		3.9	9.2	1.2	1.4	7.8		Taps, reamers, broaching tools, twist drills.	820-840	Oil	1170-1210	520-590	285	66	Annealed						6	110		
	T1	18/4/1 , 1.3355	SKH2	YHX2	S200					0.75	0.2	0.2		4.1		1.1	18			Turning, planing, slotting tools, threading dies.	820-880	Oil	1250-1290	560-580	248	62	Annealed									
	T42	10/4/3/10 , 1.3207	SKH57		S700					1.26	0.23	0.23		4	3.6	3.2	9.3	10		Highly stressed tools and tool bits.	820-880	Oil	1210-1250	550-580	285	64	Annealed									
	M4	2/9/1/8-1.3247	SKH54		S607					1.21				4.1	5	2.9	6.2			Taps, reamers, milling cutters, drills	800-840	Oil	1190-1230	550-580	280	64	Annealed									
Matrix HSS				YXR3			MH85			0.6	1.5	0.4		4.3	2.9	1.8				For forging tools with Higher toughness	800-880	Oil	1150	560-580	241	57	Annealed						13	200		
				YXR33			MH88	QHZ		0.5	0.2	0.5		4.2	2	1.2	1.6			forging tools with most toughness	800-880	Oil	1140/1080	560-580	241	56/54	Annealed						10	255		
				YXR7						0.8	0.8	0.3		4.7	5.5	1.3	1.3			forging tools with most toughness/strength	800-880	Oil	1150	560-580	241	62	Annealed						16	100	25x13	150x50
Powder Metallurgy				HAP10	S790	ASP23	DEX20	SPM23		1.4	0.6	0.3		5	6	3.8	3			Superior toughness/avoid chipping	820-880	Oil	1180	560-580	269	63	Annealed						14	162	50x13	150x50
				HAP40	S590	ASP30	DEX40	SPM30		1.3	0.3	0.4		4.2	5	3.1	6	8		standard grade/good balance of properties	820-880	Oil	1200	560-580	277	66	Annealed						14	162		
				HAP50	S390	ASP52				1.6	0.4	0.3		4	6	4	8	7.9		higher hardness/good heat and wear resistance	820-880	Oil	1200	560-580	293	66	Annealed									
				HAP72	S290	ASP60	DEX60	SPM60		2.1	0.4	0.3		4.2	8.3	5	9.5	9.5		good wear resistance and highest hardness of 70HRC	820-880	Oil	1200	560-580	352	68	Annealed									
				HAP5R				SPMR8		0.9	0.8	0.3		4.3	3	3	2			Toughest PM steels	820-880	Oil	1140	530-570	269	58	Annealed									

Remarks: → Original Steel

COLD WORK TOOL STEELS

A1SI/ ASTM	MATERIAL (Closest Corresponding Grades)									CHEMISTRY										APPLICATION	HEAT TREATMENT DETAILS						Red Hardness	Wear Resistance	Toughness	Grindability	Compressive Strength	STOCKING PROGRAM						
	EN/ DIN	JIS	HITACHI	KIND	BOHLER	ASSAB	DAIDO	SEAH	SANYO	C	Si	Mn	S	P	S	Cr	Ni	W	Mo		V	Others	Annealing (Slow Cooling)	Quenched (Hot Bath)	Quenching	Tempering (Air Cooling)						Annealed (hb)-max	Quenched & (hrc) Tempered	Min	Max	Min	Max	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min		Max	Min	Max	Min	Max	Min						Max	Min	Max	Min	Max		
D3	X210Cr12/ 1.2080	SKD1	CRD	CH16V	K100				QC1	2	0.25	0.45		0.03	0.01	12																						
D2	X 155CrVMoV12.1/ 1.2379	SKD11	SLD		K110	SV21	DC11	TD11	QC11	1.55	0.25	0.35		0.03	0.01	12			0.9	0.9																		
O1	100MnCrW4/ 1.2510	SKS3	SGT		K460		GOA	T01	QK53	0.95	0.25	1.1		0.03	0.01	0.6		0.6	0.1																			
S1	60WCrV7/ 1.2550				K455					0.6	0.6	0.3		0.06	0.01	1.1		2		0.2																		
D6	X 165CrMoV12/ 1.2601				K105					1.65	0.25	0.45		0.03	0.01	12		1		0.3																		
O2	90MnCrV8/ 1.2842			YC3	K720		YK30	T02		0.9	0.25	2		0.03	0.01	0.4				0.1																		
A2	1 00CrMoV5- 1/ 1.2363	SKD12	HPM317/SCD		K305	RIGOR	TA2			1	0.25			0.03	0.01	5		1																				
	FLAME HARDENING/1.2108		HMD5				GO5	TA23F85	QF3	0.7	1	1				1.2			0.2																			
	1.2360			CR7VL						0.42	0.5	0.4				6.5		1.3	0.8																			
			SLD MAGIC		K340		DC53																															
			SLD10		K340	SLIEPNER	DC53	TD21	QCM8	1.0	1.0	0.4				8.0		2.8	0.8																			
				PM823*	K340					0.85	0.85	0.35				7.7		1.5	2.45																			
				HS1			DCMX			0.5	0.9	0.8				8		1.5	1.70																			
			SKS93	YCS3					QK3M	1	0.4	0.9				0.4																						
			SKH51	YXM1		S600		MH51	THSM2	QH51	0.9	0.3	0.4			5.2		1.3	2																			
				YXR7						0.8	0.8	0.3				4.7		1.3	5.5	1.3																		
				YXR3				MH85		0.6	1.5	0.4	0.3			4.3		2.9	1.8																			
				YXR33				MH88	QHZ	0.5	0.2	0.5				4.2		1.6	2	1.2																		
				HAP5R			DEXM1	SPM8R		0.9	0.8	0.3				4.3		2	3	3																		
				HAP10		S790	ASP23	DEX20	SPM23	1.4	0.6	0.3				5		3	6	3.8																		
				HAP40		S590	ASP30	DEX40	SPM30	1.3	0.3	0.4				4.2		6	5	3.1	Co-8																	
				HAP72		S290	ASP60	DEX60	SPM60	2.1	0.4	0.3				4.2		9.5	8.3	5	Co-9.5																	

Remarks: → Original Steel * → Available only in ESR

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 E&OE / Apr. 2022

**Tool Steels
 Tool Room
 Vacuum Heat Treatment
 Gas Nitriding
 Oxidation**

**Specification
 Stocked by
 Goel Steel**



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Special Steels • Engineering Services

Hot Work Tool Steels

AISI/ASTM	MATERIAL (Closest Corresponding Grades)									CHEMISTRY										APPLICATION	HEAT TREATMENT DETAILS						PROPERTIES				STOCKING PROGRAM					
	EN/ DIN	JIS	HITACHI	KIND	SEAH	BOHLER	ASSAB	DAIDO	C	Si	Mn	P	S	Cr	W	Mo	Ni	V	Others		Annealing (Slow Cooling)	Quenchant (Hot Bath)	Quenching	Tempering (Air Cooling)	Annealed (hb)-max	Quenched & (hrc) Tempered	High Temperature Strength	High Temperature Toughness	High Temperature Wear Resistance	Machinability	Rounds(Dia)		Flats(WidthXThk)			
																															Min	Max	Min	Max		
H11	X38CrMoV5-1 / 1.2343	SKD6		USN	TH11	W300		DH6	0.38	1.1	0.4	0.03	0.01	5	1.25		0.45			Hot extrusion tools, tools for manufacture of screws, nuts, bolts etc	750-800	Oil/AIR	1000-1040	500-600	240	48							3	410	100X13	500X200
H13 (ESR & Non-ESR)	X40CrMoV5-1 / 1.2344	SKD61	DAC**	USD	TH61	W302	ORVAR	DHA1	0.39	1.1	0.4	0.03	0.01	5.2	1.4		0.95		Die casting tool & extrusion tool for Al, Zn, Mg, Shear blade, plastic mould etc	800-850	Oil/AIR	1000-1050	500-600	230	52							3	702	100X13	1110X510	
			DACi																High performance die steel for PDC/Highest toughness/strength at elevated temperatures.	800-850	Oil/AIR	1000-1050	500-600	230	52								100X13	1110X510		
	32CrMoV12-28 / 1.2367		DAC10*	RPU		W303		DH21	0.38	0.3	0.35			5	3		0.4		Hot forming (forging) dies, die casting mould, For processing heavy metal.	820-870	Oil	1030-1060	520-700	230	54							26	272		500X100	
			DAC MAGIC*	TQ1/ Q10		W403	DIEVAR	DH31EX											High performance die steel for PDC/Highest toughness/strength at elevated temperatures.	820-870	Oil/AIR	1010-1030	550-610	229	>48									920X420		
			FDAC						0.3	1	0.7			5.2	1.3		0.4	S:0.1	Prehardened/free cutting for small lot production					38-42RC							20	100		400X100		
	Special			HP1		W400			0.35	0.2	0.3	0.03	0.01	5.2	1.4		0.55+ Nb		High-Performance die casting moulds and inserts especially suited for large die casting moulds	800-870	Oil/AIR	1010-1030	540-680	230	52										820X260	
H10	32CrMoV12-28 / 1.2365	SKD7	YEM	RP		W320	QR090		0.4	0.3	0.9			3.2	2.5		0.4		Hot forming (forging) dies. For processing heavy metal.	820-870	Oil	1010-1050	500-600	230	52							25	192			
H10A	1.2885		YEMK			W321			0.4	0.3	0.9			3.4	2	1.6	0.9	1.7	Co +	tools with high toughness and strength at elevated temperatures	820-870	Oil/AIR	1000-1050	550-600	229	>46							25	162		
			YXR33	FTCO		W360			0.5	0.2	0.5			4.2	1.6	2		1.2	Co +	HSS with very high toughness and strength and wear resistance at high temperatures for warm and precision forgings.	800-880	Oil/AIR	1080-1140	550-600	241	>54							10	255		
			DAC3	GSF					0.4	0.3	0.6			0.6	5.2	1.6	0.6	0.7		Higher toughness than H13 for hot forging and Al extrusion	820-870	Oil/AIR	1000-1050	550-600	229	>50										
		SKD8	MDCK						0.4	0.3	0.5			4.4	2	1.6		1.7	Co +	For cu extrusion, high temp resistance than SKD8	820-870	Oil/AIR	1050-1140	600-700	241	>48										
H21	X30WCrV9-3 / 1.2581	SKD5				W100			0.35	0.25	0.3	0.03	0.03	2.7	9			0.35		Processing heavy metal alloys.	750-800	Oil/AIR	1070-1150	500-600	240	51						32	235			
H19	1.2678	SKD8	MDC	HWD					0.4	0.25	0.4	0.03	0.03	4.2	4.2			Co:4.2	2	Very high strength hot working steels.	820-870	Oil	1070-1170	820-870	240	55										
L6	56NiCrMoV7 / 1.2714	SKT4	DM	PWM	THKT4	W500		GFA	0.55	0.25	0.8	0.03	0.02	1.2		0.4	1.7	0.15		Hammer dies, Press forging dies, Shear blade etc (Pre hardened on supply)	750-800	Oil	830-850	400-650	240	50						20	1160	30THK	1400X650	
H12		SKD62			TH62			DH62	0.38	1	0.4	0.03	0.01	5	1.25	1.25		0.4		Hot forging tools with high toughness	750-850	Oil/AIR	1000-1040	530-590	240	52										
	1.2888			RM10 Co		W705			0.2	0.2	0.5			9.5	5.5	2		Co+10		Extremely high temperature resistant for mg alloys/above 700degrees working	820-870	Oil/AIR	1100-1150	600-750	320	<54										
H19A	1.2889			HMoD					0.45	0.3	0.4			4.5	3			2	Co+4.5		High performance hammer forging dies, small & large press dies with deep cavities	820-870	Oil/AIR	1120-1150	580-750	240	<54									
				CS1					0.5	0.3	0.4			5		1.9		0.55	Co Nb+		High performance dies closed Die forging, hot stamping, piercing mandrels, straightening rollers & semi cold forming			1010-1040	540-680	230	57-34									
				CR7VL					0.42	0.5	0.4			6.5	1.3		0.8						1030-1040	500-700	240	56-34										

Remarks: Original Steel Available in ESR & NON-ESR Available only in ESR

PLASTIC MOULD STEELS

AISI/ASTM	MATERIAL (Closest Corresponding Grades)										CHEMISTRY										APPLICATION	HEAT TREATMENT DETAILS						PROPERTIES					STOCKING PROGRAM			
	EN/ DIN	JIS	HITACHI	KIND	SEAH	BOHLER	ASSAB	DAIDO	DOOSAN	C	Si	Mn	S	Cr	Mo	Ni	Others	Annealing	Quenchant	Quenching		Tempering	Annealed (hb)-max	Quenched & (hrc) Tempered	Supply Condition	Wear Resistance	Toughness	Polishability	Machinability in the as-supplied condition	Corrosion Resistance	Rounds(Dia)		Flats(WidthXThk)			
																															Min	Max	Min	Max		
P20	40CrMnMo7 / 1.2311		HPM7		PSTP4P	M201	618	PX5	HP4A	0.4	3	1.5		1.9	0.2					Mould frames, plastic moulds <400mm	720-750	Oil/AIR	850-880	600-680	240	29-32	H & T 280-320BHN	2	2	3	5	2	10	230	20	550
P20+Ni	40CrMnNiMo864 / 1.2738		HPM MAGIC		STP4M	M238	NIMAX	PX7	HP4MA	0.4	0.3	1.5		2	0.2	1.1				Large, medium sized moulds for general mechanical engg. and tool manufacture.	720-740	Oil/AIR	850-880	710-740	240	29-40	H & T 280-320BHN	2	4	3+	4	2	10	708	20	610
P20+S	40CrMnMoS86 / 1.2312									0.4	0.3	1.5	0.07	1.9	0.2					Moulds requiring good machinability, uniform hardness	740-760	Oil/AIR	840-870	600-680	240	29-32	H & T 280- 320BHN							70	125	
	36CrMo17 / 1.2316	SUS420JSU	HPM77	CMR		M314	RAMAX			0.36	0.4	0.65		16	1.2	1				Excellent corrosion resistant, for chemically aggressive compounds.	780-820	Oil/air	1000-1040	600-700	235	29-32	H & T 280-320BHN	2	3	2	4	4	10	200	30	160
420	42Cr13 / 1.2083	S420F	HPM38	RF		M310	STAVAX			0.42	0.4	0.45		14	0.6					Moulds for corrosive plastics and thermo plastics.	840-870	Oil	1000-1050	250-570	200	53HRC	ANNEALED	3	3	5	3	4	8	203	10	205
	33Cr516 / 1.2085		HPM77				RAMAX			0.3	0.35	1.4	0.1	16	0.2	0.6				Corrosion resistant moulds and holding blocks.					29-32	H & T 280- 320BHN	2	3	2	4	4	10	200	30	160	
P20+Ni-HH	40CrMnNiMo864 / 1.2738-HH		HPM MAGIC		PSPT10					0.4	0.3	1.5		2	0.2	1.1				Large, medium sized moulds for general mechanical engg. and tool manufacture.	720-740	Oil/AIR	850-880	710-740	240	34-38	H & T 310-340BHN							30	550	
P21	1.2767		CENA1	N400				NAK5/8	HP70	0.45	0.25	0.4		1.4	4	0.25				For high toughness and high polishability and very good etching	720-750	oil/air	840-880	200-300	260	52-56		2	3	4	3	3				
P21IMP			HPMPRO					NAK80												High quality precision moulding					40	H&T										
			HPM31				RIGOR			0.9	0.7	0.5		7	1.1			V:0.4		wear resistance mould for Engg resin	800-85-	oil/air	1000-1050	200-550	248	50-55	ANNEALED	4	3	4	3	3		30	150	
440C	1.4125		SUS440C			N695				1	0.4	0.4		17						Very high polishability and corrosion resistant					50-55	ANNEALED										
			YAG			V720								5	18.5		Co:9/Ti/Al			for exceptional toughness/corepins/thin wall/super mirror polish					50-55	ANNEALED	3	5	5	2	2					
			FDAC							0.3	1	0.7		5.2	1.3			V:0.4		Engineering resin/side core					38-40	H&T	3	3	2	3	2		40	100		

Remarks: Original Steel

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 E&OE / Apr. 2022

**Tool Steels
Tool Room
Vacuum Heat Treatment
Gas Nitriding
Oxidation**

**Specification
Stocked by
Goel Steel**