Characteristic Values of Sanalloy Grades

WC Grain Size	Characteristics: Corrosion Resistance	Wear-Resistance	Impact Resistance	Seizure Resistance	Chipping Resistance	High-Fracture Toughness	Hot Forging	Non Magnetic	Symbol of Classification	Grades	Specific Gravity	Hardness HRA	Hardness HV	Transverse Rupture Strength GPa	Compressive Strength GPa	Fracture Toughness MPa·m$^{1/2}$	Young's Modulus GPa	Poisson's Ratio	Coefficient of Thermal Expansion MK^{-1}	Coefficient of Thermal Conductivity W/m·k	Applications
Ultrafine Grain	○	○			○				VF-10	**RF06**	14.85	93.5	1820	3.2	6.0	11	620	0.21	5.1	79	Nozzles, Plugs, Drawing dies, Bushes, Plungers, Various gauge blocks, Cutting blades, Slitters, Progressive dies, Press-forming dies, Powder compacting dies, Dies for molding resins and glass, Blanking punches, Punches for deep drawing, Dies for deep drawing, Bending dies
	○	○			○				VF-30	**RF10**	14.55	91.5	1510	3.3	5.5	14	590	0.21	5.3	75	
	○	○			○				VF-40	**RF20**	14.00	90.0	1350	3.5	5.3	16	540	0.22	5.5	71	
	○	○			○				VF-50	**RF30**	13.50	88.0	1160	3.5	5.1	17	490	0.23	5.7	68	
	○	○		○	○				VF-30	**PRF9N**	14.55	91.5	1510	3.0	5.5	13	590	0.21	5.3	75	Nozzles, Cutting blades, Progressive dies, Press-forming dies, Powder compacting dies, Blanking punches, Slitters, Drawing dies, Bushes, Dies for deep drawing, Bending dies
	○	○		○	○				VF-40	**PRF14N**	14.00	90.0	1350	3.5	5.3	15	540	0.22	5.5	71	
	○	○							VF-20	**FD25**	13.90	92.0	1570	3.9	5.9	11	550	0.22	5.5	71	Nozzles, Plugs, Drawing dies, Bushes, Plungers, Various gauge blocks, Cutting blades, Slitters, Progressive dies, Press-forming dies, Powder compacting dies, Dies for molding resins and glass, Blanking punches, Punches for deep drawing, Dies for deep drawing
		○							VF-30	**FD15**	14.25	91.0	1450	3.3	5.4	12	560	0.22	5.3	71	
	○	○							VF-40	**FRT15**	14.10	90.5	1400	3.3	5.2	14	550	0.22	5.5	71	
Microfine Grain		○							VF-20	**DA10**	15.00	92.5	1640	3.0	5.9	11	630	0.21	4.8	79	
		○					○		VF-20	**KA10**	14.85	92.5	1640	2.8	5.8	11	630	0.21	4.8	79	General cutting tools, Powder compacting dies
		○					○		VF-30	**KA20**	14.75	91.5	1510	2.5	5.4	12	620	0.21	5.0	75	
	○							○	NF-30	**NA20**	14.35	91.0	1450	3.3	4.9	12	570	0.22	5.1	71	Nozzles, Seal rings, Powder compacting dies, Corrosion-resistant molds, Nonmagnetic molds, Dies for molding resins and glass
	○							○	NF-40	**NA30**	13.90	89.5	1250	3.6	4.7	14	540	0.23	5.4	67	
Fine Grain	○	○							VM-30	**RD20**	14.75	91.5	1510	2.9	5.5	14	610	0.21	5.0	79	Nozzles, Plugs, Drawing dies, Bushes, Guides, Center tips, Various gauge blocks, Cutting blades, Slitters, Guide rolls, Progressive dies, Press-forming dies, Powder compacting dies, Punches, Blanking punches, Punches for deep drawing, Dies for deep drawing, Bending dies
	○	○							VM-30	**RD25**	14.55	91.0	1450	3.3	5.3	15	590	0.21	5.1	75	
	○	○							VM-40	**RD30**	14.30	90.0	1350	3.5	5.2	16	570	0.22	5.2	75	
	○	○							VM-40	**RD50**	14.00	89.0	1250	3.7	4.8	17	540	0.23	5.4	71	
	○	○							VM-50	**RD60**	13.70	88.0	1160	3.5	4.4	18	520	0.23	5.6	69	
	○	○		○					VM-30	**PRD9N**	14.55	91.0	1450	3.0	5.3	15	590	0.21	5.1	75	Nozzles, Drawing dies, Bushes, Guide rolls, Progressive dies, Press-forming dies, Powder compacting dies, Punches, Blanking punches, Punches for deep drawing, Dies for deep drawing, Bending dies, End-surface reforming dies
	○	○		○					VM-40	**PRD14N**	14.00	89.0	1250	3.5	4.8	17	540	0.23	5.4	71	
	○	○		○					VM-50	**PRD20N**	13.40	87.0	1070	3.2	4.0	19	490	0.24	5.8	67	
Medium Grain	○	○	○						VC-30	**REA25**	14.95	91.0	1450	2.6	5.1	15	620	0.21	4.8	79	Drawing dies, Bushes, Slitters, Crushing tools, Reforming rolls, Guide rolls, Press-forming dies, Powder compacting dies, Punches, Dies for deep drawing, Header dies, Former dies
	○	○	○						VC-40	**REA35**	14.50	89.0	1250	3.3	4.7	17	580	0.22	5.2	75	
	○	○	○						VC-50	**REA65**	13.90	87.0	1070	3.4	4.2	21	530	0.23	5.6	71	
	○	○	○						VC-60	**REA75**	13.40	85.5	970	3.2	3.6	25	490	0.24	6.1	67	
	○	○	○						VC-70	**REA85**	13.00	83.5	860	3.0	3.4	28	440	0.24	6.5	63	
		○	○				○		VC-50	**KEA45**	14.40	88.0	1160	3.0	4.2	16	550	0.22	5.5	71	Dies for warm/hot forging, Valve molds, Crushing dies, Sizing dies
Coarse Grain	○		○						VU-50	**RV46**	14.55	88.0	1160	3.1	4.3	21	580	0.22	5.2	75	Crushing tools, Milling rolls, Reforming rolls, Dies for hot forging, Punches, Header dies, Former dies
	○		○						VU-60	**RV56**	14.15	86.5	1040	2.8	4.1	23	550	0.22	5.5	71	
	○		○						VU-60	**RV66**	13.95	86.0	1000	2.8	3.9	25	530	0.23	5.6	71	
	○		○						VU-70	**RV76**	13.55	84.5	910	2.7	3.6	27	490	0.23	6.1	67	
	○		○						VU-70	**RV86**	13.25	83.5	860	2.7	3.4	28	460	0.24	6.3	67	
	○		○						VU-70	**RL89**	13.50	83.0	840	2.5	3.4	30	480	0.24	6.2	67	
	○		○			○			VU-40	**RX71**	14.85	90.0	1350	2.2	4.8	18	610	0.21	4.8	79	Blanking punches, Backward punches, Deformed punches, Deformed dies such as spiders and bevel gears, Various forging dies such as diff-pinion and pinion-gears
	○		○			○			VU-50	**RX92**	14.45	87.5	1110	2.8	4.5	24	570	0.22	5.3	74	
	○		○			○			VU-60	**RX73**	14.25	86.5	1040	2.5	4.2	25	550	0.22	5.4	73	
	○		○			○			VU-70	**RX75**	13.70	84.5	910	2.4	3.8	28	500	0.24	6.0	68	
	○		○			○			VU-70	**RX94**	13.10	82.5	810	2.4	3.4	32	450	0.24	6.5	63	
	○		○			○			VU-80	**RX95**	12.80	81.0	770	2.2	3.2	35	410	0.25	6.6	61	
	○		○	○		○			VU-40	**PRV6N**	14.85	90.0	1350	2.4	4.8	18	610	0.21	4.8	79	Crushing tools, Progressive dies, Deformed punches, Deformed dies
	○		○	○		○			VU-60	**PRV12N**	14.25	86.5	1040	2.5	4.2	25	550	0.22	5.4	73	
	○		○	○		○			VU-70	**PRV18N**	13.70	84.5	910	2.4	3.8	28	500	0.24	6.0	68	
	○		○	○		○			VU-70	**PRV24N**	13.10	82.5	810	2.3	3.4	32	450	0.24	6.5	63	
	○		○			○	○		RU-60	**WM7**	14.40	85.0	940	2.1	3.9	23	570	0.22	5.6	71	Hot milling rolls, Dies for warm/hot forging, Blanking punches, Crushing dies, Sizing dies
	○		○			○	○		RU-70	**WX80**	13.70	83.0	840	2.4	3.5	26	510	0.24	6.1	66	

※ All data shown are typical values, for reference only. ※ We reserve the right to modify the data due to technical progress.