

Characteristic Values of Sanalloy Grades

WC Grain Size	Characteristics								Grades Classification Symbol	Grades	Specific Gravity	Hardness		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
	Corrosion Resistance	Wear-Resistance	Impact Resistance	Seizure Resistance	Chipping Resistance	High-Fracture Toughness	Hot Forging	Non Magnetic				HRA	HV								
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	
	○	○			○				-	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	
Microfine Grain		○							VF-30	FD15	14.25	91.0	1450	3.3	5.4	12	560	0.22	5.3	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-40	FRT15	14.10	90.5	1400	3.3	5.2	14	550	0.22	5.5	71	
		○							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	1300	3.6	4.7	14	540	0.23	5.4	67	
Medium 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	
Coarse Grain	○	○	○						-	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
Ultra-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	

※ All data shown above are typical values, not guaranteed ones. We will not compensate any losses and damages caused by using any or entire part of the data. We reserve the right to modify the data without previous notice.

※ Grade Classification Symbol is quoted from JIS (Japanese Industrial Standards) B 4054 : 2020