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Physical Properties of LUBMER™

	Property	Unit	Testing method	Testing Conditions	Basic grades			Modified grades			
					L3000	L4000	L5000	Lubricant filled	Filer filled		PA alloy
								L5220	L4420	L4640	LS4140
	Characteristics				High moldablity ⟷		High abrasion resistance	Friction improved	Heat resistance improved		
Basic Properties	MFR	g/10min.	JIS K7210	—	15*1	6*1	2*1	2*1	4.5*1	7*1	14*2
	Density	kg/m³	ASTM D1505	—	969	967	966	964	1,030	1,105	1,099
Mechanical properties	Yield stress	MPa	ASTM D638	23℃·50mm/min·Type4 dumbbell	—	—	—	—	—	—	60
	Tensile strength at break	MPa	ASTM D638	23℃·50mm/min·Type4 dumbbell	37	41	47	45	46	47	62
	Elongation at break	%	ASTM D638	23℃·50mm/min·Type4 dumbbell	20	12	10	10	7	9	150
	Flexural strength	MPa	ASTM D790	23℃ distance between chucks, 43mm ; 5mm/min ; thickness:3mm	35	37	38	38	43	45	82
	Initial flexural modulus	MPa	ASTM D790	23℃ distance between chucks, 43mm ; 5mm/min ; thickness:3mm	1,530	1,590	1,620	1,260	2,210	2,300	2,200
	Izod impact strength	J/m	ASTM D256	23℃, 2mm thick, notched	162	185	194	194	180	180	88
	Rockwell hardness	—	ASTM D785	R scale	55	53	51	51	58	63	102
	Kinetic coefficient of friction	—	MCI method*3	Lubmer-contact material, SUS 304 ; surface roughness, 6S	0.11	0.10	0.09	0.08	0.17	0.17	0.16
	Heat generation temp.	℃	MCI method*3	Lubmer-contact material, SUS 304 ; surface roughness, 6S	76	70	67	65	75	75	—
	Critical PV value	MPa·m/min	MCI method*3	Lubmer-contact material, SUS 304 ; surface roughness, 6S	≧30	≧30	≧30	≧30	≧30	≧30	≧30
	Abrasion loss	$\times 10^{-13}$cm³ /kg·m	MCI method*4	Lubmer-contact material, SUS 304 ; surface roughness, 6S	180	160	150	140	200	220	30
Thermal properties	Vicat softening point	℃	ASTM D1525	Press. = 1kg	130	130	130	130	130	130	>200
	Heat distortion temp.	℃	ASTM D648	0.45MPa	80	80	80	80	88	91	175
	Expansion coefficient	$\times 10^{-4}$ cm/cm ℃	ASTM D696	—	1.3	1.3	1.3	1.6	1.2	1.2	0.8
Electrical properties	Specific volume resistance	Ω·cm	ASTM D257	—	$10^{17\sim18}$	$10^{17\sim18}$	$10^{17\sim18}$	$10^{17\sim18}$	$10^{17\sim18}$	$10^{17\sim18}$	$10^{15\sim16}$
	Die electric breakdown voltage	kV/mm	ASTM D149	—	44	45	44	43	60	60	25
	Die electric constant	—	ASTM D150	23℃	2.4	2.3	2.4	2.4	2.5	2.5	3.2
	Die electric dissipation factor	10^{-4}	ASTM D150	1MHz	1~2	1~2	1~2	1~2	1~2	1~2	160
Others	Spiral flow	cm	MCI method	4.8-mm ϕ radius	42(270℃)	36(270℃)	30(270℃)	31(270℃)	34(270℃)	33(270℃)	37(245℃)
	Mold shrinkage	%	MCI method	2-mm thick square sheet, MD/TD	1.9/1.4	1.8/1.5	1.8/1.6	1.8/1.7	1.3/1.2	1.5/1.3	0.8/1.0
	Water absorption	%	ASTM D570	24-hr. immersion	0.01	0.01	0.01	0.01	<0.02	0.01	1.5
	Flammability	1/16"	UL94	—	HB	HB	HB	HB	HB	—	HB

The above representative value of the physical properties of LUBMER™ are not guaranteed values but standard values.

*1:190℃ Load 10kgf *2:230℃ Load 2.16kgf *3:P=0.74MPa、V=12m/min *4:P=0.3MPa、168h