TARFLON™ Property Table（Polycarbonate for Optical LCD and LED lighting applications）①

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	Features			Light guiding Standard	Light guiding High durability	Light guiding Mid-high flow	Light guiding High flow	Light guiding Super high flow	Light guiding Extrusion molding		
	Grades			**LC1500 PURE**	**LC1508 PURE**	**LC1501 PURE**	**LC1402 PURE**	**LC1202 PURE**	**LC1700 PURE**		
	Principal use			Light guide plate, Light guide film	Light guide plate	Light guide plate	Light guide plate	Light guide plate	Light guide plate, Light guide film		
Properties	**Units**	**Test Method**	**condition**	**>PC<**	**>PC<**	**>PC<**	**>PC<**	**>PC<**	**>PC<**		
Density	g/cm^3	ISO 1183 (JIS K7112)		1.2	1.2	1.2	1.2	1.2	1.2		
Water Absorption	%	ISO 62 (JIS K7209)	24h 50%RH	0.23	0.23	0.23	0.23	0.23	0.23		
Fluidity											
Melt Volume-Flow Rate (MVR)	cm^3/10min	ISO 1133 (JIS K7210)		300℃ 1.20kg	300℃ 1.20kg	300℃ 1.20kg	300℃1.20kg	300℃1.20kg	300℃ 1.20kg		
				65	70	85	125	150	40		
Mechanical properties											
Tensile Stress at Yield*1	MPa	ISO 527-1,2 (JIS K7161, 7162)		Y65	Y65	Y65	Y65	Y65	Y65		
Nominal tensile strain at break*2	%			tB80	tB80	tB80	tB15	tB10	tB95		
Flexural Strength	MPa	ISO 178 (JIS K7171)		90	90	90	100	100	90		
Flexural Modulus	GPa			2.3	2.3	2.3	2.3	2.3	2.3		
Charpy Impact Strength	kJ/m^2	ISO 179-1 (JIS K7111)	notched at 23℃	15	12	12	9	6	40		
Rockwell Hardness	–	ISO 2039-2 (JIS K7202-2)	R scale/ M scale	R120/M50	R120/M50	R120/M50	R120/M50	R120/M50	R120/M50		
Thermal properties											
Temperature of deflection under load	℃	ISO 75-1,2 (JIS K7191-1,2)	0.45MPa	–	–	–	130	130	–		
			1.8MPa	127	124	125	120	120	128		
Linear Thermal Expansion coefficie	×10^{-5}/℃	ISO 11359-2		6.5	6.5	6.5	6.5	6.5	6.5		
Mould Shrinkage	%	Idemitsu Method	2mm MD	0.5～0.7	0.5～0.7	0.5～0.7	0.5～0.7	0.5～0.7	0.5～0.7		
	%		2mm TD	0.5～0.7	0.5～0.7	0.5～0.7	0.5～0.7	0.5～0.7	0.5～0.7		
Optical properties											
Total Luminous Transmittance	%	ISO 13468-1 (JIS K7361-1)	3mm	90	90	90	90	90	90		
Haze	%	ASTM D1003	3mm	–	–	–	–	–	–		
Diffusion angle	degree	Idemitsu Method	1mm/2mm/3mm	–	–	–	–	–	–		
Refractive Index	–	ASTM D542		1.585	1.585	1.585	1.585	1.585	1.585		
Light reflection rate(Y)	–		D65 type,10°	–	–	–	–	–	–		
Yellow Index (YI)	–	ASTM D1925		–	–	–	–	–	–		
Flammability											
Flammability Rating	mm thickness	UL94	class/mini-thickness	V-2/0.42	V-2/0.40	V-2/0.40	V-2/0.40	V-2/0.40	V-2/0.40		
Comparative tracking index(CTI)	PLC level	UL746A		–	–	–	–	–	–		
UV light,Water exposure and immersion	–	UL746C		–	–	–	–	–	–		
Thermal Index RTI Elec	℃	UL746B		80	80	80	80	80	80		
RTI Imp				80	80	80	80	80	80		
RTI Str				80	80	80	80	80	80		
AMECA	–			–	–	–	–	–	–		
Electrical properties											
Dielectric Strength	kV/mm	IEC 60243-1 (JIS C2110)		–	–	–	–	–	–		
Arc Resistance	PLC level	ASTM D495		–	–	–	–	–	–		
Volume Resistivity	Ω·cm	ASTM D257		–	–	–	–	–	–		
Dielectric Constant	–	IEC 60250	1MHz	–	–	–	–	–	–		
Dielectric dissipation Factor	–		1MHz	–	–	–	–	–	–		
Standard Molding Parameters											
Cylinder Temperature				260～300℃ (Extrusion temperature220～260℃)	260～340℃	260～320℃	280-350℃	280-350℃	260～300℃ (Extrusion temperature220～260℃)		
Mold Temperature				80～120℃ (Extrusion roll temperature 110～145℃)	80～120℃	80～120℃	80～110℃	80～110℃	80～120℃ (Extrusion roll temperature 110～145℃)		
Pre-drying conditon				120℃、5～8hours	120℃、5～8hours	120℃、5～8hours	120℃、5～8hours	120℃、5～8hours	120℃、5～8hours		

*1 Y:Yield strength
*2 tB : Nominal tensile strain at break

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TARFLON™ Property Table（Polycarbonate for Optical LCD and LED lighting applications）②

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	Features			Light diffusion Standard Diffusivity:Medium	Light diffusion Weather resistance Diffusivity:Medium	Light diffusion Weather resistance Diffusivity:High	Light diffusion FR 0.85mmV-0 Weather resistance Extrusion molding Diffusivity:Low	Light diffusion FR 0.85mmV-0 Weather resistance Extrusion molding Diffusivity:high			
	Grades			**R1700(W3204ENU)**	**V1700R(W3026E)**	**V1700R(W3032E)**	**LZ2500V(S0086E)**	**LZ2510V(W1070ED)**			
	Principal use			–	–	–	Light diffuser plate Cover for LED lighting	Light diffuser plate Cover for LED lighting			
Properties	**Units**	**Test Method**	**condition**	**>PC<**	**>PC<**	**>PC<**	**>PC<**	**>PC<**			
Density	g/cm^3	ISO 1183 (JIS K7112)		1.2	1.2	1.2	1.2	1.2			
Water Absorption	%	ISO 62 (JIS K7209)	24h 50%RH	0.23	0.23	0.23	0.23	0.23			
Fluidity											
Melt Volume-Flow Rate (MVR)	cm^3/10min	ISO 1133 (JIS K7210)		300℃ 1.20kg	300℃ 1.20kg	300℃ 1.20kg	300℃ 1.20kg	300℃ 1.20kg			
				24	24	24	4	4			
Mechanical properties											
Tensile Stress at Yield*1	MPa	ISO 527-1,2 (JIS K7161, 7162)		Y65	Y65	Y65	Y65	Y60			
Nominal tensile strain at break*2	%			tB90	tB90	tB90	tB70	tB80			
Flexural Strength	MPa	ISO 178 (JIS K7171)		90	90	90	90	100			
Flexural Modulus	GPa			2.3	2.3	2.3	2.4	2.3			
Charpy Impact Strength	kJ/m^2	ISO 179-1 (JIS K7111)	notched at 23℃	10	10	10	90	30			
Rockwell Hardness	–	ISO 2039-2 (JIS K7202-2)	R scale/ M scale	–	–	–	R120/M50	R120/M50			
Thermal properties											
Temperature of deflection under load	℃	ISO 75-1,2 (JIS K7191-1,2)	0.45MPa	–	–	–	142	–			
			1.8MPa	125	125	125	130	129			
Linear Thermal Expansion coefficie	×10^{-5}/℃	ISO 11359-2		6.5	6.5	6.5	6.5	6.5			
Mould Shrinkage	%	Idemitsu Method	2mm MD	0.5～0.7	0.5～0.7	0.5～0.7	0.5～0.7	0.5～0.7			
	%		2mm TD	0.5～0.7	0.5～0.7	0.5～0.7	0.5～0.7	0.5～0.7			
Optical properties											
Total Luminous Transmittance	%	ISO 13468-1 (JIS K7361-1)	3mm	90/80/60 (1mm/2mm/3mm)	90/80/60 (1mm/2mm/3mm)	61/52/44 (1mm/2mm/3mm)	86/83/76 (1mm/2mm/3mm)	70/55/47 (1mm/2mm/3mm)			
Haze	%	ASTM D1003	3mm	98/99/99 (1mm/2mm/3mm)	98/99/99 (1mm/2mm/3mm)	99/99/99 (1mm/2mm/3mm)	20/30/42 (1mm/2mm/3mm)	99/99/99 (1mm/2mm/3mm)			
Diffusion angle	degree	Idemitsu Method	1mm/2mm/3mm	19/31/40	19/31/40	60/63/65	4/5/5	43/59/63			
Refractive Index	–	ASTM D542		–	–	–	–	–			
Light reflection rate(Y)	–		D65 type,10°	–	–	–	–	–			
Yellow Index (YI)	–	ASTM D1925		–	–	–	–	–			
Flammability											
Flammability Rating	mm thickness	UL94	class/mini-thickness	–	–	–	V-0/0.85	V-0/0.85			
Comparative tracking index(CTI)	PLC level	UL746A		–	–	–	3	3			
UV light,Water exposure and immersion	–	UL746C		–	–	–	–	–			
Thermal Index RTI Elec	℃	UL746B		–	–	–	80	80			
RTI Imp				–	–	–	80	80			
RTI Str				–	–	–	80	80			
AMECA	–			–	–	–	–	–			
Electrical properties											
Dielectric Strength	kV/mm	IEC 60243-1 (JIS C2110)		30	30	30	–	–			
Arc Resistance	PLC level	ASTM D495		–	–	–	–	–			
Volume Resistivity	Ω·cm	ASTM D257		1 E+16<	1 E+16<	1 E+16<	–	–			
Dielectric Constant	–	IEC 60250	1MHz	2.85	2.85	2.85	–	–			
Dielectric dissipation Factor	–		1MHz	0.001	0.001	0.001	–	–			
Standard Molding Parameters											
Cylinder Temperature				260～320℃	260～320℃	260～320℃	260～300℃	260～300℃			
Mold Temperature				80～120℃	80～120℃	80～120℃	80～120℃	80～120℃			
Pre-drying conditon				120℃、5～8hours	120℃、5～8hours	120℃、5～8hours	120℃、5～8hours	120℃、5～8hours			

*1 Y:Yield strength
*2 tB : Nominal tensile strain at break

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TARFLON™ Property Table（Polycarbonate for Optical LCD and LED lighting applications）③

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	Features			High light reflection Light shielding FR 1.5mmV-0 (Flame retardants free)	High light reflection High Light shielding FR 1.0mmV-0 (Flame retardants free)	High light reflection Light shielding FR 1.5mmV-0 (Non-bromine FR)	High light reflection High Light shielding FR 1.5mmV-0 (Non-bromine FR)	Weather resistance High transparency Humidity and Heat resistance	Weather resistance High transparency Humidity and Heat resistance High strength		
	Grades			**URC2500**	**URC2501**	**URZ2500**	**URZ2501**	**LEV1700KL**	**LEV2200KL**		
	Principal use			Frame for BLU LED reflector	Frame for BLU LED reflector	Frame for BLU LED reflector	Frame for BLU LED reflector	LED lens for outdoor lighting,LED cover for outdoor lighting	LED lens for outdoor lighting,LED cover for outdoor lighting		
Properties	**Units**	**Test Method**	**condition**	**>PC-MD10<**	**>PC-MD20<**	**>PC-MD10FR(40)<**	**>PC-MD20-FR(40)<**	**>PC<**	**>PC<**		
Density	g/cm³	ISO 1183 (JIS K7112)		1.3	1.4	1.3	1.4	1.2	1.2		
Water Absorption	%	ISO 62 (JIS K7209)	24h 50%RH	–	–	–	–	0.23	0.23		
Fluidity											
Melt Volume-Flow Rate (MVR)	cm³/10min	ISO 1133 (JIS K7210)		300℃ 1.20kg	300℃ 1.20kg	300℃ 1.20kg	300℃ 1.20kg	300℃ 1.20kg	300℃ 1.20kg		
				28	35	42	18	27	12		
Mechanical properties											
Tensile Stress at Yield*1	MPa	ISO 527-1,2 (JIS K7161, 7162)		Y60	Y50	Y60	Y50	Y65	Y65		
Nominal tensile strain at break*2	%			tB70	tB70	tB60	tB70	tB95	tB95		
Flexural Strength	MPa	ISO 178 (JIS K7171)		90	80	90	80	90	90		
Flexural Modulus	GPa			2.4	2.2	2.6	2.7	2.3	2.3		
Charpy Impact Strength	kJ/m²	ISO 179-1 (JIS K7111)	notched at 23℃	40	30	15	30	40	80		
Rockwell Hardness	–	ISO 2039-2 (JIS K7202-2)	R scale/ M scale	–	–	–	–	R120/M50	R120/M50		
Thermal properties											
Temperature of deflection under load	℃	ISO 75-1,2 (JIS K7191-1,2)	0.45MPa	138	136	127	127	–	–		
			1.8MPa	126	125	117	117	128	125		
Linear Thermal Expansion coefficie	×10⁻⁵/℃	ISO 11359-2		6.5	6.5	6.5	6.5	6.5	6.5		
Mould Shrinkage	%	Idemitsu Method	2mm MD	0.5～0.7	0.5～0.6	0.5～0.7	0.5～0.7	0.5～0.7 (1mm)	0.5～0.7 (1mm)		
	%		2mm TD	0.5～0.7	0.5～0.6	0.5～0.7	0.5～0.7	0.5～0.7 (1mm)	0.5～0.7 (1mm)		
Optical properties											
Total Luminous Transmittance	%	ISO 13468-1 (JIS K7361-1)	3mm	0.6(1mm)	0.1(1mm)	0.6(1mm)	0.1(1mm)	90	90		
Haze	%	ASTM D1003	3mm	–	–	–	–	–	–		
Diffusion angle	degree	Idemitsu Method	1mm/2mm/3mm	–	–	–	–	–	–		
Refractive Index	–	ASTM D542		–	–	–	–	1.585	1.585		
Light reflection rate(Y)	–		D65 type,10°	97	97.5	97	97.5	–	–		
Yellow Index (YI)	–	ASTM D1925		–	–	–	–	–	–		
Flammability											
Flammability Rating	mm thickness	UL94	class/mini-thickness	V-0/1.5 V-2/0.4	V-0/1.0 V-2/0.4	V-0/1.5 V-2/0.4	V-0/1.5 V-2/0.4	V-2/0.36	V-2/0.36		
Comparative tracking index(CTI)	PLC level	UL746A		–	–	–	–	2	2		
UV light,Water exposure and immersion	–	UL746C		–	–	–	–	f1 (NC)	f1 (NC)		
Thermal Index RTI Elec	℃	UL746B		80	80	80	80	130(0.36mm)	130(0.36mm)		
RTI Imp				80	80	80	80	125(0.36mm)	125(0.36mm)		
RTI Str				80	80	80	80	130(0.36mm)	130(0.36mm)		
AMECA	–			–	–	–	–	–	–		
Electrical properties											
Dielectric Strength	kV/mm	IEC 60243-1 (JIS C2110)		–	–	–	–	–	–		
Arc Resistance	PLC level	ASTM D495		–	–	–	–	–	–		
Volume Resistivity	Ω·cm	ASTM D257		–	–	–	–	–	–		
Dielectric Constant	–	IEC 60250	1MHz	–	–	–	–	–	–		
Dielectric dissipation Factor	–		1MHz	–	–	–	–	–	–		
Standard Molding Parameters											
Cylinder Temperature				260～300℃	260～300℃	260～300℃	260～300℃	260～300℃	260～300℃		
Mold Temperature				80～90℃	80～90℃	80～90℃	80～110℃	80～120℃	80～120℃		
Pre-drying conditon				120℃、5～8hours	120℃、5～8hours	120℃、5～8hours	120℃、5～8hours	120℃、5～8hours	120℃、5～8hours		

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