

TUFFAK Lumen XT



Light Diffusing

TUFFAK Lumen XT sheet is a translucent polycarbonate product with a textured surface on one side specifically designed for lighting lenses. It features a unique combination of high light diffusion and high light transmission through a combination of optimized surface texture and advanced diffuser technologies.

When compared to other light diffusing products such as glass and acrylic, TUFFAK Lumen XT sheet has superior impact strength and toughness. Its higher flammability resistance and wider service temperature range provide an additional performance advantage over acrylic diffusers.

The wide range of standard diffusion levels offers designers the flexibility to maximize light fixtures' aesthetics and performance. Other surface textures are available for additional design options.

Applications

Interior LED and conventional lighting fixtures

Regulatory code compliance and certifications

UL 94: Flammability File #E87887

Typical Properties*

Property	Test Method	Units	Values
PHYSICAL			
Specific gravity	ASTM D 792	-	1.2
Water absorption, 24 hrs	ASTM D 570	%	0.15
Poisson's Ratio	ASTM E 132	-	0.38
Light transmission			
LC0 @ 0.060" / 0.118"	ASTM D 1003	%	91 / 90
LC3 @ 0.060" / 0.118"	ASTM D 1003	%	90 / 85
LC5 @ 0.060" / 0.118"	ASTM D 1003	%	88 / 77
LC7 @ 0.060" / 0.118"	ASTM D 1003	%	79 / 62
LW3 @ 0.060" / 0.118"	ASTM D 1003	%	93 / 90
LW5 @ 0.060" / 0.118"	ASTM D 1003	%	90 / 81
LW7 @ 0.060" / 0.118"	ASTM D 1003	%	82 / 67
LW9 @ 0.060" / 0.118"	ASTM D 1003	%	73 / 55
MECHANICAL			
Tensile strength, ultimate	ASTM D 638	psi	9,540
Tensile strength, yield	ASTM D 638	psi	8,840
Tensile modulus	ASTM D 638	psi	335,000
Elongation	ASTM D 638	%	94
Flexural strength	ASTM D 790	psi	14,200
Flexural modulus	ASTM D 790	psi	362,000
Instrumented Impact @ 0.118"	ASTM D 3763	ft-lbs	49
THERMAL			
Coefficient of thermal expansion	ASTM D 696	in/in/°F	3.75 x 10 ⁻⁵
Coefficient of thermal conductivity	ASTM C 177	BTU-in/hr-ft ² -°F	1.35
Heat deflection temperature @ 264 psi	ASTM D 648	°F	274
Heat deflection temperature @ 66 psi	ASTM D 648	°F	287
ELECTRICAL			
Dielectric constant @ 10 Hz	ASTM D 150	-	2.98
Dielectric constant @ 60 Hz	ASTM D 150	-	2.88
Volume resistivity	ASTM D 257	Ohm-cm	>8 x 10 ¹⁵
Dissipation factor @ 60 Hz	ASTM D 150	-	0.002
Arc resistance, Tungsten electrodes	ASTM D 495	Seconds	125
Dielectric strength, in air @ 0.118"	ASTM D 149	V/mil	460
FLAMMABILITY			
Flame class @ 0.060" – 0.118"	UL 94	-	V2

TUFFAK Lumen XT



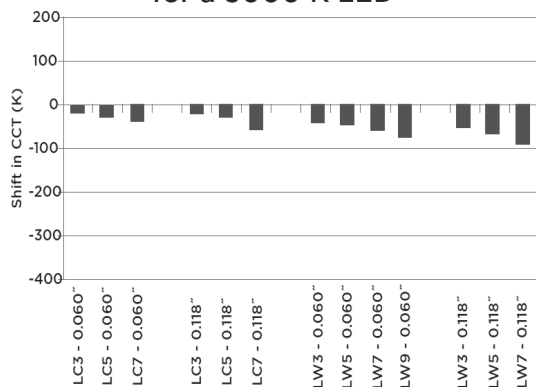
Horizontal burn	ASTM D 635	in.	<1 (CC1)
Surface Flammability @ 0.060" – 0.118"	ASTM E 162	Is	<100
Smoke density @ 1.5 min	ASTM E 662	Ds	<100
@ 4 min			<200
@ 20 min			<200
Vertical burn @ 12 sec @ 0.060" – 0.118"	FAR 25.853	-	Pass
Horizontal burn @ 2.5" & 4.0" @ 0.060" – 0.118"	FAR 25.853	-	Pass
Toxic gas generation @ 0.060" – 0.118"	BSS 7239	-	Pass
	SMP 800-C	-	Pass

*Typical properties are not intended for specification purposes.

Standard Products Comparison

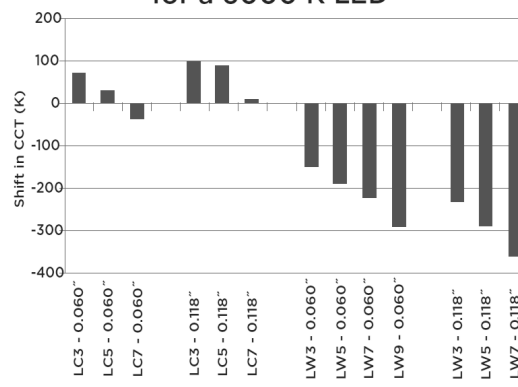
Lumen XT Grade	DIFFUSION (FWHM, degrees)		% TRANSMISSION (ASTM D 1003)	
	0.060" thickness	0.118" thickness	0.060" thickness	0.118" thickness
LC0	14	13	91	90
LC3	38	53	90	85
LC5	53	77	88	77
LC7	86	135	79	62
LW3	38	53	93	90
LW5	53	77	90	81
LW7	86	135	82	67
LW9	146	166	73	55

Correlated Color Temperature Shift for a 3000 K LED



Lumen XT Diffusion Grade and Thickness

Correlated Color Temperature Shift for a 6000 K LED



Lumen XT Diffusion Grade and Thickness

These graphs show measured shifts in Correlated Color Temperature (CCT) of light from an LED fixture with a diffuser sheet vs. the same LED fixture without a diffuser. The LED fixtures' CCT without a diffuser is 3000 K and 6000 K.