

Maximum diffusion and transmission

Plexiglas® acrylic resins have been used in lighting lens applications for more than 70 years. Additionally, they have played a vital role in the development of durable, weatherable lenses for commercial, industrial, residential and roadway lighting. Plexiglas® acrylic resins are materials of choice for leading light system manufacturers, resin processors, molders, specifiers and designers for incandescent, fluorescent, high intensity discharge (HID), and now light emitting diode (LED) light source technologies.

At Altuglas International, we are pleased to offer new acrylic solutions that enable higher light output and diffusion in lighting systems. Our recent focus in LED diffusers has led to the development of a new family of diffusion offerings, called Plexiglas® Diffuse™ resins.

Plexiglas® Diffuse™ resins are specifically formulated to enable efficient LED systems to offer high output and uniform illumination. These resins may be easily processed using injection molding or extrusion. They are also sufficiently concentrated to allow lens makers to formulate them with other Plexiglas® resins via extrusion for tailored lens properties, if desired. A wide range of performance is achievable using Plexiglas® Frosted and Diffuse™ resins (see below).



Transmission and Hiding Performance* of Plexiglas® Frosted and Diffuse™ Resins at Full Strength (100% Loading) and Dilutions

	Extruded Sheet Material	Sample Thickness	25% Loading		50% Loading		100% Loading	
			Trans. (%)	Hiding (%)	Trans. (%)	Hiding (%)	Trans. (%)	Hiding (%)
Plexiglas® Frosted	V045-68177 / DR®-66080	0.060"	92	23	92	40	92	60
		0.080"	92	25	92	44	92	66
Plexiglas® Diffuse™	V045-68207	0.060"	Used as is for IM and Extrusion Applications				91	82
		0.080"	Used as is for IM and Extrusion Applications				89	85
	V045-68209	0.060"	92	68	91	81	83	91
		0.080"	92	73	89	86	79	92
	DR®-66151	0.060"	68	93	57	95	47	95
		0.080"	61	94	50	95	40	95

Note: Properties are dependent on process, processing conditions, sample thickness, etc.

* - Measured using Perkins Elmer Lambda 950 where Hiding Performance = $[T(0'') - T(2'')]/T(0'')$.

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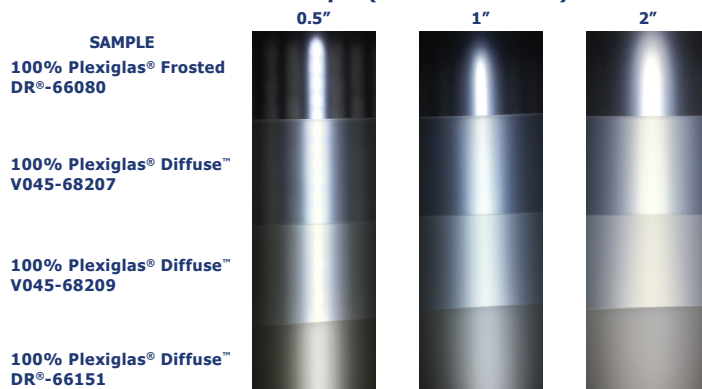
Features

The Plexiglas® Diffuse™ family of resins provides LED luminaire OEMs and optics' suppliers with:

- Excellent light diffusion
- Superior light transmission
- Choice of smooth or textured surface on extruded lenses
- Outstanding UV resistance and weatherability
- Excellent surface gloss and scratch resistance
- Easy to extrude, injection mold, thermoform and cut
- Recyclable

Relative Diffusing Performance

LED to Extruded Sheet Sample (0.080" thickness) Distance



Typical Properties¹

	Test Method	Units	Plexiglas® Frosted Resins		Plexiglas® Diffuse™ Resins		
			Plexiglas® Frosted V045-68177	Plexiglas® Frosted DR®-66080	Plexiglas® Diffuse™ V045-68207	Plexiglas® Diffuse™ V045-68209	Plexiglas® Diffuse™ DR®-66151
Physical							
Melt Flow Rate (230°C/3.8 kg)	ASTM D1238	g / 10 min	1.8	0.8	2.0	1.7	1.5
Specific Gravity	ASTM D792	-	1.18	1.16	1.19	1.19	1.2 - 1.3
Mold Shrinkage	ASTM D955	%	0.3 - 0.8	0.3 - 0.8	0.2 - 0.6	0.2 - 0.6	0.2 - 0.6
Water Absorption (24 hr immersion)	ASTM D570	% wt gain	0.4	0.3	0.3	0.3	0.3
Mechanical							
Tensile Strength @ Maximum	ASTM D638	MPa (kpsi)	71 (10.3)	52 (7.6)	69 (10)	61 (8.8)	39 (5.7)
Tensile Elongation @ Break	ASTM D638	%	6	38	15	15	45
Tensile Modulus	ASTM D638	GPa (kpsi)	3.2 (470)	2.3 (330)	3.3 (480)	2.9 (420)	1.9 (280)
Flexural Strength @ Maximum	ASTM D790	MPa (kpsi)	106 (15.4)	86 (12.5)	100 (15)	100 (15)	59 (8.5)
Flexural Modulus	ASTM D790	GPa (kpsi)	3.2 (470)	2.3 (330)	3.0 (435)	2.7 (380)	1.6 (240)
Notched Izod Impact @ 23°C (73°F)	ASTM D256	J/m (ft-lb/in)	16 (0.3)	38 (0.7)	36 (0.7)	38 (0.7)	48 (0.9)
Rockwell Hardness	ASTM D785	M-Scale	94	50	88	86	38
Thermal							
DTUFL - 0.455 MPa/66 psi; annealed ²	ASTM D648	°C (°F)	94 (202)	89 (192)	101 (214)	105 (221)	102 (216)
DTUFL - 1.82 MPa/264 psi; annealed ²	ASTM D648	°C (°F)	93 (199)	79 (175)	97 (207)	100 (212)	94 (202)
Vicat Softening Point - 50°C/hr, 10N	ASTM D1525	°C (°F)	103 (217)	96 (205)	106 (222)	109 (228)	107 (224)
Vicat Softening Point - 50°C/hr, 50N	ASTM D1525	°C (°F)	97 (207)	85 (185)	100 (212)	104 (219)	100 (212)
Flammability	ASTM D635	Class	HB	HB	HB	HB	HB
Optical³							
Refractive Index (N _d @ 23°C/73°F)	ASTM D542	-	N/A	N/A	N/A	N/A	N/A
Luminous Transmittance - 2.0mm/0.080"	ASTM D1003	%	92	92	89	79	40
Haze - 2.0mm/0.080"	ASTM D1003	%	97	97	>100	>100	>100
Classification							
ASTM Classification	ASTM D788	PMMA	0131T1V1	0210T1V1	0131T1V1	0111T0V1	0231T0V1

1 - Values reported are averages measured on 3.2 mm (0.125") thick samples (unless otherwise noted) and should not be used for specification purposes.

2 - Deflection Temperature Under Flexural Load (DTUFL) Annealing Cycle: 4 hours @80°C (176°F) for Plexiglas® Frosted resins, 16 hours @90°C (194°F) for Plexiglas® Diffuse™ resins.

3 - Optical properties measured using extruded sheet samples, and haze reading >30% reported for informational purposes.

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