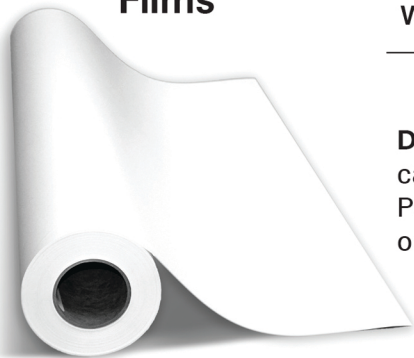


# WhiteOptics® High Performance Optical Materials for LED Lighting

## PRODUCT OVERVIEW: Films, Microstructured Optics, & Metals

### WhiteOptics® Films\*

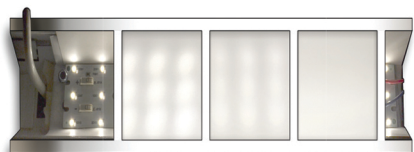


	Product #	Description	Total Thickness
White98® Film	F-16	98% High diffuse Reflector film	0.008" (0.21 mm)
	F-16A	(with adhesive and removable liner)	

**Die Cutting:** WhiteOptics® film can be laser and die-cut to form PCB reflectors, cavity liners, or any 2d designs.



### WhiteOptics® Microstructured Optics



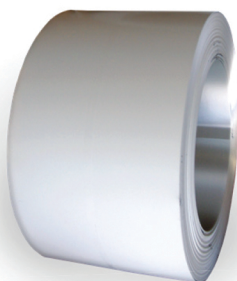
Diffusion angle: 30° 60° 90°



Product #	Description	Application	Optical Efficiency
DF90	90 conical diffusion	LED Image Diffusion	> 93%
DF60	60 conical diffusion		> 94%
DF30	30 conical diffusion		> 95%
DF7002	70 x 2 elliptical	Linear LED Homogenization	> 94%
DFGR 1	Glare Control Prismatic	Efficient high angular cutoff while increasing on axis intensity	> 90%
DFGR 2	Glare Control Prismatic		> 93%

Available in 2 mil (.05mm), 5 mil (.125mm) thickness and rigid acrylic sheet. 24" (610mm) standard width; custom widths available.

### WhiteOptics® Metal



WhiteOptics® Metal is available in coils up to 48" (1220mm) width and can be supplied as custom slit coils or cut-to-length sheets. It is supplied with a removable protective film and can be formed in most metal forming processes including punching, press brake and die forming.

	Product #	Substrate	Surface Type	Total Thickness
WhiteOptics® Metal	M16A2	Aluminum	Diffuse	0.019" (0.48mm)
	M16A6	Aluminum	Diffuse	0.023" (0.58mm)
	M16F8	Steel	Diffuse	0.024" (0.61mm)
	M16F6	Steel	Diffuse	0.034" (0.86mm)
	M17A2	Aluminum	Diffuse GEN 3	0.016" (0.40mm)
	M17A6	Aluminum	Diffuse GEN 3	0.020" (0.50mm)
	M17F8	Steel	Diffuse GEN 3	0.020" (0.50mm)
	M17F6	Steel	Diffuse GEN 3	0.030" (0.76mm)

\* US Patents 8,734,940 & 8,361,611



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## WhiteOptics® F16, M16, M17 Reflector Environmental Durability

- UV Stable for most applications
- Continuous Thermal Stability up to 100° C
- Stable in humid environments
- Antistatic, does not attract dust
- Abrasion resistant
- Chemical Resistance with most common cleaning solutions including ammonia, 409, soap solutions



Product	60 deg gloss	85 deg gloss	Reflectance vs Wavelength	Reflectance vs Incident Angle*	Bi-directional Reflectance Distribution Function measurements*
<b>F16 &amp; M16</b> (White98)	<3%	<5%			
<b>M17</b> (White96Metal, White96 Advanced Coatings)	<4%	<6%			

\* Reflectance and BRDF testing performed by LTI Optics and available in Photopia modeling software

This information has been carefully compiled from experience gained in the laboratory and under commercial conditions. However, the product's performance and its suitability depends on the particular conditions of use. We recommend that customers satisfy themselves that each product meets their requirements in all respects. This information is being provided by WhiteOptics LLC free of charge as a courtesy to customers, and WhiteOptics LLC HEREBY DISCLAIMS ALL REPRESENTATIONS, WARRANTIES AND LIABILITIES WITH RESPECT TO THE INFORMATION AND USE THEREOF. WhiteOptics® White98, WhiteOptics® Metal and WhiteOptics®. All rights reserved.