



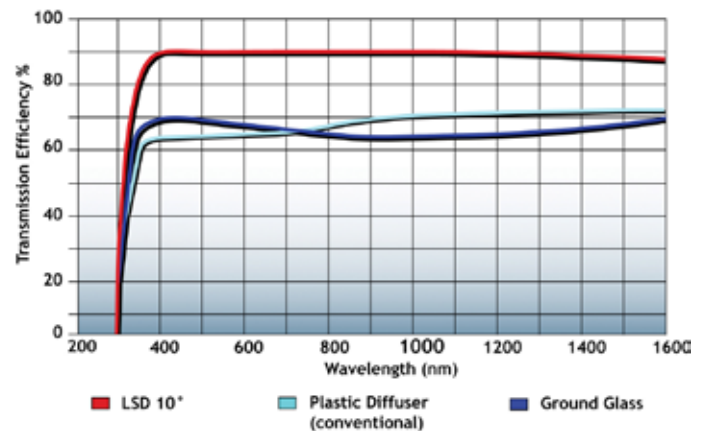
## Light Shaping Diffusers®

### Technical Data Sheet

Light Shaping Diffusers® are holographically recorded, randomized surface structures that enable:

### High Transmission Efficiency - 92%

Luminit's holographic Light Shaping Diffusers offer superior optical transmission between 300nm and 1500nm. Depending on the angle of distribution, Light Shaping Diffusers will achieve between 85% and 92% transmission efficiency. The low back-scatter of the diffuser structures are anti-reflective in nature and utilize light that would otherwise be wasted due to Fresnel loss. A clear piece of polycarbonate substrate is 89% transmissive. With Light Shaping Diffusers, transmission improves to 92%. Note: Luminit measures transmission utilizing an integrated sphere with the diffuser structure facing the light source. Listed are the transmission efficiencies of a 10° Light Shaping Diffuser measured at the following wavelengths: 532nm-90%, 632nm-90%, 850nm-89%, 980nm-89%, 1064nm-89%, 1550nm-88% (UV Transmitting Diffusers are also available.)



### Beam Shaping

Light Shaping Diffusers precisely shape, control and distribute light. The patented holographic master recording process allows a variety of circular or elliptical light patterns. Standard circular angles range from 0.5° to 100° FWHM.



Laser Source  
40° x 20° FWHM



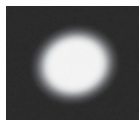
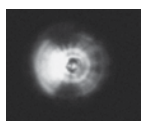
LED Source  
20° FWHM Circular



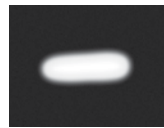
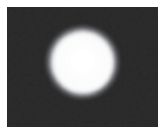
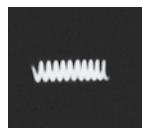
Filament Source  
60° x 10° FWHM Elliptical

### Homogenized Light

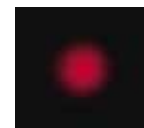
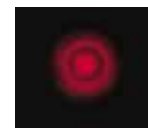
"Hotspots" and uneven light distribution are common problems with filament, arc, LED, CCFL, fiberoptic and laser light sources. Luminit Light Shaping Diffusers greatly smooth and homogenize sources while providing uniform light in critical applications such as LCD backlights, LED displays, machine vision, automotive lighting and viewing screens. Large angle diffusers produce the greatest degree of homogenized light.



Beams



Filament



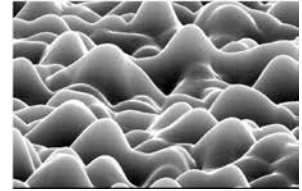
LED

## Applications

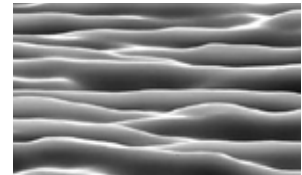
- LED Lighting
- Signs and Displays
- Barcode Scanners
- Microscopic Illumination
- LCD Backlighting
- Machine Vision Inspection
- Inspection Systems
- Fiber-Optic Illumination
- LED Display
- Front Projection Screens
- Set/Event Lighting
- Medical Instrumentation
- Projection Systems
- Mobile Phones & PDAs
- Architectural Lighting

## How Light Shaping Diffusers Work

Surface relief holograms are replicated from a holographically recorded master. These pseudo random, non-periodic structures can be thought of as randomized micro-lenslets. Non-wavelength dependent, Light Shaping Diffusers will work with white, monochromatic, coherent or incoherent light, and the diffusers diverge light, emulating a negative lens. While Luminit Light Shaping Diffusers work best with collimated light, they will also work well with non-collimated light. The randomized structures eliminate Moiré and color diffraction, and incoming light is precisely controlled within well defined areas. Light does not escape these boundaries, resulting in greater control and utilization of light, thus maximizing photon utilization.



60° LSD  
SEM Structure 1500x



60° x 1° Elliptical LSD  
SEM Structure 600x

1. All diffuser angles are specified in Full Width at Half Maximum (FWHM)
2. Large angle Light Shaping Diffusers, when placed at the image plane, make excellent high resolution viewing screens.
3. Small angle Light Shaping Diffusers can be combined with polarizers to reduce moiré and improve uniformity.
4. Light Shaping Diffusers can be combined with other optical components such as lenses, Fresnels, and prismatic structures.
5. In selecting Light Shaping Diffuser angles, location and light source must be considered. For assistance, email [sales@luminitco.com](mailto:sales@luminitco.com).
6. Effective Angular Output =  $\sqrt{(\text{Light source angle})^2 + (\text{LSD angle})^2}$

## SPECIFICATIONS

LSD Angle Range (FWHM):	Circular: 0.5° to 100° / Elliptical: minor: 1° to 60° ; major: 10° to 80°		
Transmission Efficiency:	Circular: 0.2° to 20° ≥ 90% ; 20° to 80° ≥ 85% Elliptical: ≥ 85%		
Angle Tolerance: (Based on a 10"x10" area)	≤ 1° ± 0.5° (>1° < 10°) ± 1° >10° ± 10%		
Transmission Spectral Range:	300nm to 1500nm		
Temperature Range:	-30°C to 80°C @ 240 hours		
Humidity:	> 95% ± 5% RH @ 24 hours		
Refractive Index:	PC=1.586, PET=1.60, PMMA: 1.494 (dependent on wavelength and composition)		
Pencil Hardness:	> 2H		
UV Resistance: UVA/UVB (900 Kjm <sup>2</sup> )	PET Δa=-2.3 Δb=-4.42	PC (0.010"/0.25mm) Δa=-2.98 Δb=10.27	PC (0.030"/0.75mm) Δa=1.90 Δb= 3.98