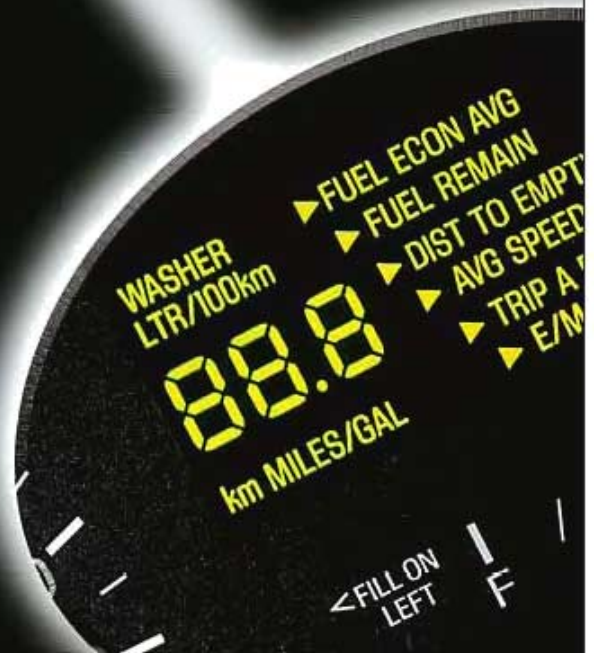


# Optical Solutions For OEM Applications

High Transmission  
Angular Control  
Homogenizer  
High Resolution Screens

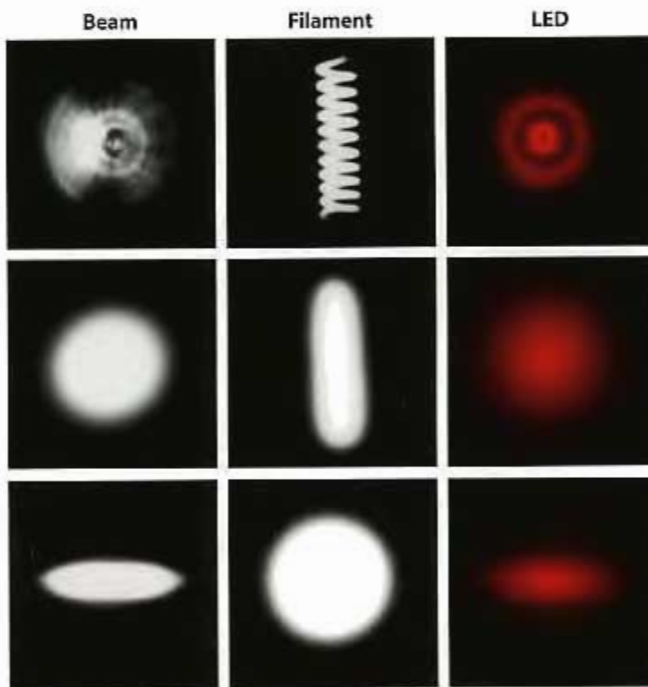
**Luminit**  
SHAPING LIGHT AS NEEDED



# LSD® Light Shaping Diffuser

LSD® Light Shaping Diffusers are holographically recorded, randomized surface relief structures that enable... **High Transmission Efficiency** (up to 92%), and **Controlled Angular Distribution**, while providing high quality **Homogenized Light**. These fully randomized (non-periodic) structures are non-wavelength dependent and will eliminate moiré, without chromatic aberration. The precise surface relief structures provide controlled angular light divergence, emulating a negative lens.

## High Quality Homogenized Light



## LSD® Films



## LSD® Films

Angle FWHM	Substrate & Thickness	Size	Options
95° x 35°	<b>Polyester</b>	10" x 10"	PSA  Protective Film
95° x 25°	PE3 - 0.003"	12" x 12"	
75° x 35°	PE4 - 0.004"	16" x 16"	
60° x 10°	PE5 - 0.005"	20" x 20"	
80°	<b>Polycarbonate</b>	<b>Roll Width</b>	
60°	PCS - 0.005"	12"	
30°	PC10 - 0.010"	16"	
20°	(2 sided diffuser)	20"	
10°	PCS10 - 0.010"	26"	
5°			

Custom OEM products are available, including a variety of angles, sizes, shapes, cut to print parts, and substrate materials including 2 sided diffusers (PCS), color tints, and low birefringent substrates. **Call for engineering assistance.**

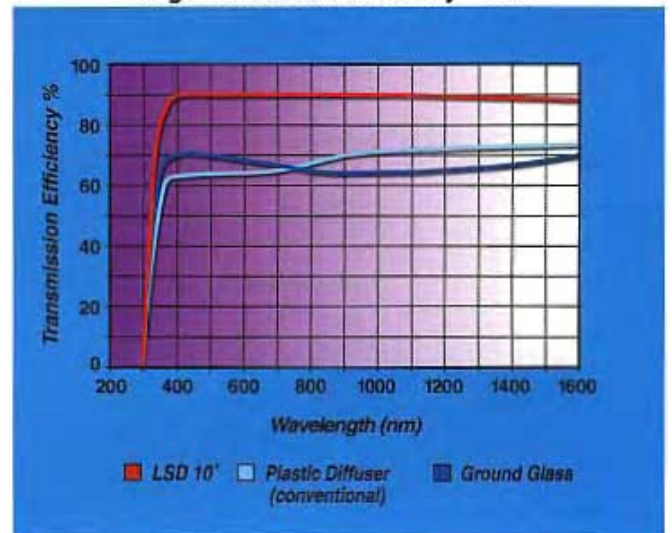
## LSD® Sheets



### POC Capabilities Include

- Angles: 0.2° to 100° FWHM
- Sheet Sizes: up to 36" x 48"
- Films: Rolls up to 30" wide
- Variable Angle LSD® Diffusers
- Custom/OEM Products
- Cut to Print Parts
- Mass Production
- Application/Engineering Assistance

### High Transmission Efficiency – 92%



## LSD® Sheets

Angle FWHM	Substrate & Thickness	Size	Options
95° x 60°	<b>Polycarbonate</b> PC5 - 0.005" PC10 - 0.010" PC20 - 0.020" PC30 - 0.030" PC60 - 0.060" PC125 - 0.125" (2 sided diffuser)	2" x 2"	PSA  Protective Film
95° x 35°		4" x 4"	
95° x 25°		6" x 6"	
75° x 35°		8" x 8"	
75° x 10°		10" x 10"	
60° x 10°		12" x 12"	
60° x 1"		16" x 16"	
40° x 0.2°		20" x 20"	
30° x 5°			
80°		<b>Polyester</b> PE3 - 0.003" PE4 - 0.004" PE5 - 0.005"	
60°			
40°			
30°			
20°			
10°	<b>Acrylic</b> AC10 - 0.010" AC30 - 0.030" AC60 - 0.060" AC125 - 0.125"		
5°			
1°			
0.5°			
0.2°	<b>Acrylic-UVT</b> ACUVT30 - 0.030" ACUVT60 - 0.060"  <b>Glass-B270</b> GL1 - 1mm* GL2 - 2mm* GL3 - 3mm*		

*\*not available in all sizes, other glass types available*

### Controlled Angular Distribution



**Laser Source**  
40° x 0.2° FWHM Linear



**LED Source**  
20° FWHM Circular



**Filament Source**  
60° x 10° FWHM Elliptical

# DDS<sup>®</sup> Directional Display Screen — Rear Projection

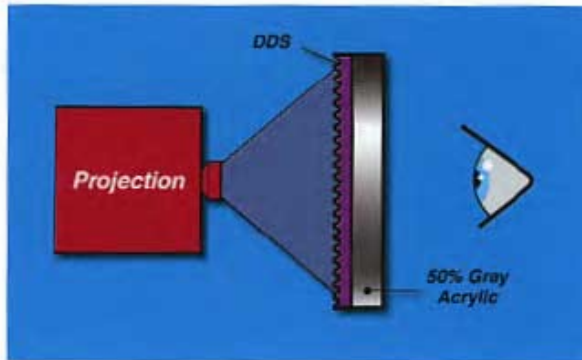


95° x 25° DDS Screen.

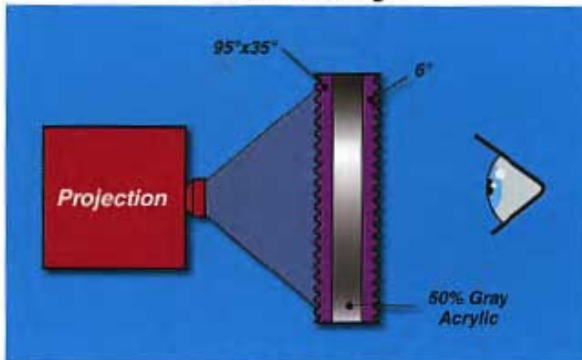
POC's DDS rear projection screens feature fully randomized (non-periodic) micron structures, suitable for the high-resolution and directional requirements of LCD projection, digital projection, high definition systems, LCD workstations, and LED displays. The patented holographic master recording process enables a wide range of viewing angles and the precise placement of photons in the viewing area. These surface relief patterns maximize the light availability for bright, high-resolution viewing.

## DDS<sup>®</sup> Advantages

- High-resolution/high-gain screens.
- Custom viewing angles (0.2° to 100°).
- Low back-scattering for high transmission.
- Randomized (non-periodic) structures eliminate moiré fringes and chromatic aberration.
- Minimal effects to polarization. Acrylic substrate offers low birefringence.
- Can be combined with polarizer, Fresnel, prismatic structures, lenses and contrast correcting material.
- A second front surface diffusing angle reduces glare, scintillation and specular reflection.



Front Surface Angle



DDS 95 x 35/6° AC 80/50

Front surface structure reduces glare, scintillation and specular reflection

Angle FWHM	Substrate & Thickness	Size
95° x 50° 95° x 35° 95° x 25° 75° x 35° 60° x 25° 80° 60°	<b>Acrylic - Clear</b> AC30 - 0.030" AC60 - 0.060"  <b>Acrylic - gray tint</b> <b>50% transmitting</b> AC80/50 - 0.080"	<b>4:3 Aspect</b> H x V 15" - 12" x 9" 20" - 16" x 12" 30" - 24" x 18" 40" - 32" x 24" 50" - 40" x 30" 60" - 48" x 36" 80" - 64" x 48"
Additional Angles Available, Call for Assistance	<b>Polycarbonate - Clear</b> PC10 - 0.010" PC30 - 0.030" PC60 - 0.060"	<b>16:9 Aspect</b> H x V 15" - 13.1" x 7.4" 20" - 17.4" x 9.8" 30" - 26.1" x 14.7" 40" - 34.9" x 19.6" 50" - 43.6" x 24.5" 60" - 52.3" x 29.4" 80" - 69.7" x 39.2"
6° second surface available.	<b>Polyester - Clear</b> PE5 - 0.005"  Custom substrates and tints available	

Custom sizes, angles, contrast tinted substrates, and materials are available, including pressure sensitive adhesive (PSA).  
Contact POC for quantity pricing and engineering assistance.

# LORS® Lights On Reflection Screens — Front Projection



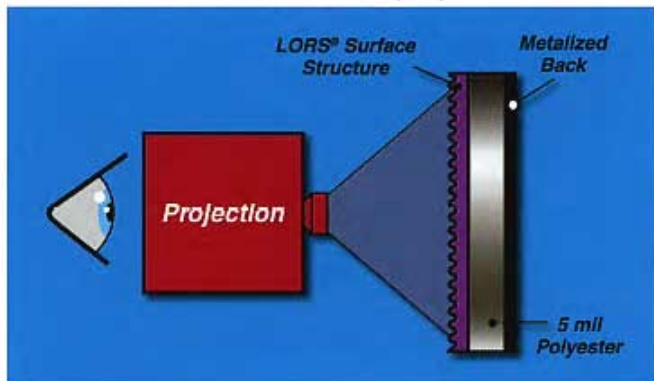
White Board LORS20PE5MB/MAG

POC's holographic Lights On Reflection Screens offer high gain and directional viewing even with the LIGHTS ON! Projection displays are now enhanced even in high ambient conditions. The surface relief structure allows the precise placement of photons in the desired viewing zone. These random non-periodic structures maximize light availability for bright, high-gain viewing. These surface structures also work well as a directional/retro-reflector.

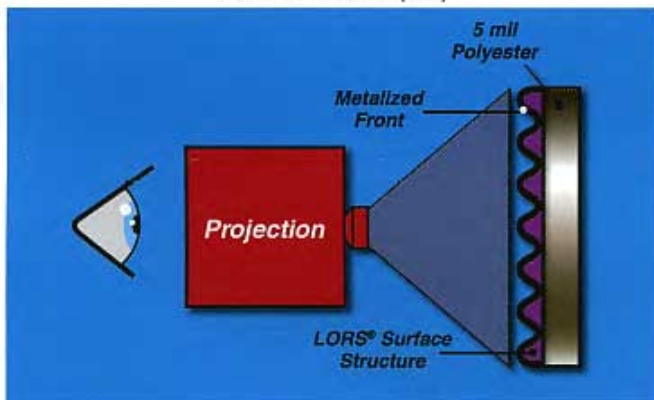
## LORS® Advantages

- High-gain/high-resolution screens.
- Excellent viewing under high ambient light conditions.
- Precise dispersion angles allow maximum utilization of available light.
- Custom viewing angles available.
- With a Metalized Front Surface (MF), polarization is not impacted and reflection screens can be used in PMLCD reflector applications.
- Portable screens — carry them with you.
- Works well as a directional/retro-reflector.

### Metalized Back (MB)



### Metalized Front (MF)



Angle FWHM	Substrate & Thickness	Backing Options	Size
5°	Polyester - metalized back PE5MB - .005"	Magnetic Backing MAG	12" - 12" x 12"
10°			20" - 16" x 12"
20°			30" - 24" x 18"
30°		40" - 32" x 24"	
40°		Polyester - metalized front PE5MF - .005"	Pressure Sensitive Adhesive PSA
60°	60" - 48" x 36"		
40° x 10° 40° x 20°			
	(excellent for 3D projection)	Plain	Roll Width
			12"
			16"
			20"
			26"

### Directional / Retro-Reflectors



Automotive/Signs/Displays

Custom OEM products are available.  
Call for engineering assistance.

# Holographic Backlights/Light Guides/Displays/Microdisplays

## LSD® Light Shaping Diffusers

POC serves the OEM backlighting, display, and lighting needs with a variety of standard and custom Light Shaping Diffuser films. These films will improve transmission and control angle while providing high quality homogeneous light. LSD Diffusers are available with the surface structure on one side or two sided "PCS" films and sheets.

## POC Designs

Complete optical design and prototyping services are available including ray traced results. Once customer specifications are known, POC will perform a feasibility design, proving the design concept prior to completing a full design. Our designs are being used in automotive lighting, cell phones, displays, LCD backlights, LED backlights, and machine vision applications.

## OEM Applications

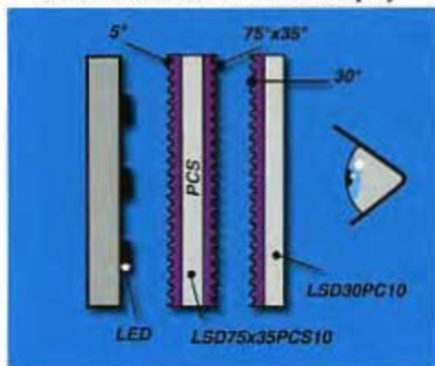
POC serves the OEM marketplace with LSD® Diffuser Films, optical components, light guides, and designs.

*Call for engineering / application assistance.*

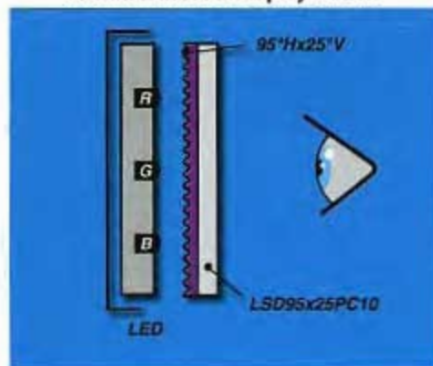


## Applications

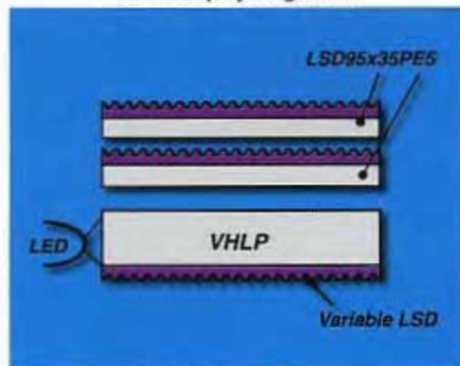
Automotive Direct View LED Display



Commercial LED Display Screen



Microdisplay Single LED

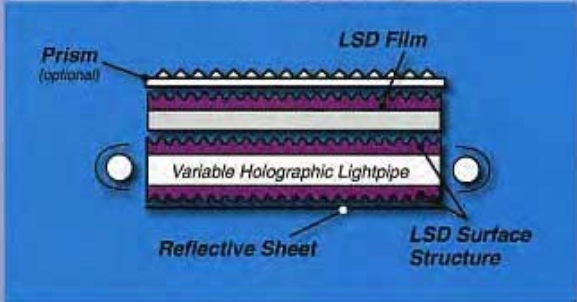


# OEM Solutions

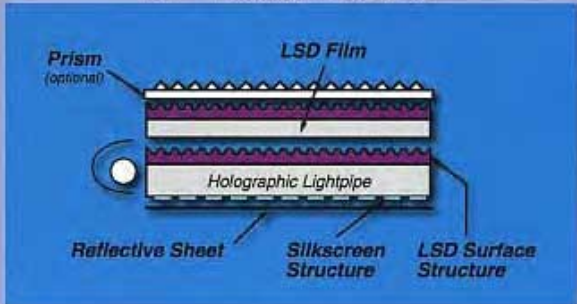


## Holographic Backlight™ Lightpipe Technology Options

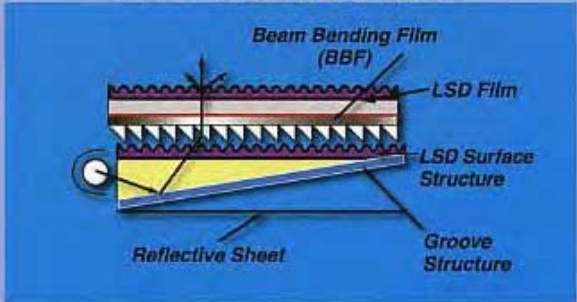
VHLP™ Variable Holographic Light Pipe



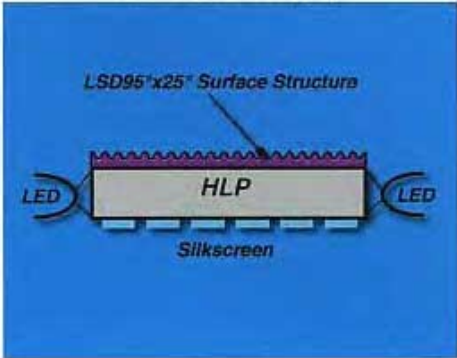
HLP™ Holographic Light Pipe



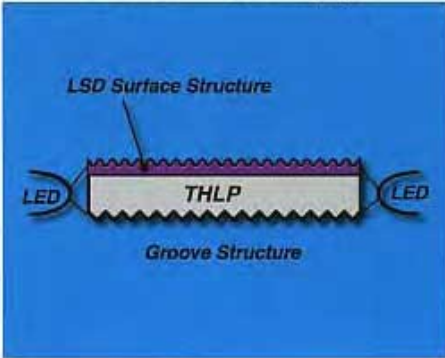
THLP™ Thin Holographic Light Pipe



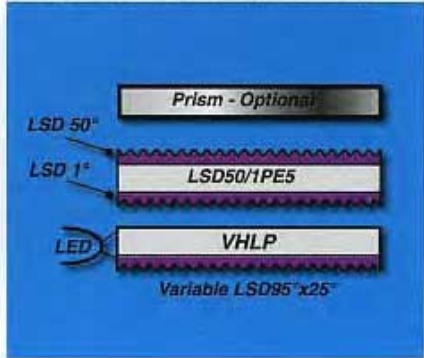
Car Audio LED Display



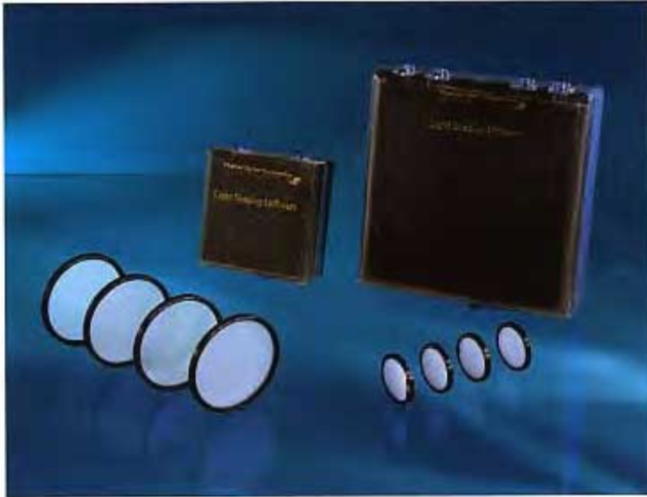
Cell Phone Thin LED Display



High Brightness Backlight LED Edgelit



# LSD® Light Shaping Diffuser Kits



Light Shaping Diffuser Kits are excellent for testing, evaluating, and lab use.

**Notes:**

1. Each kit includes 4 LSD angles which are measured at FWHM.
2. Polycarbonate substrates (0.030" thick) are used. The metal rim is 2.5 mm thick with a clear aperture of 45mm (50mm), 21.4 mm (25mm).
3. Call for technical and application assistance.
4. Call for custom sizes and quantity pricing.

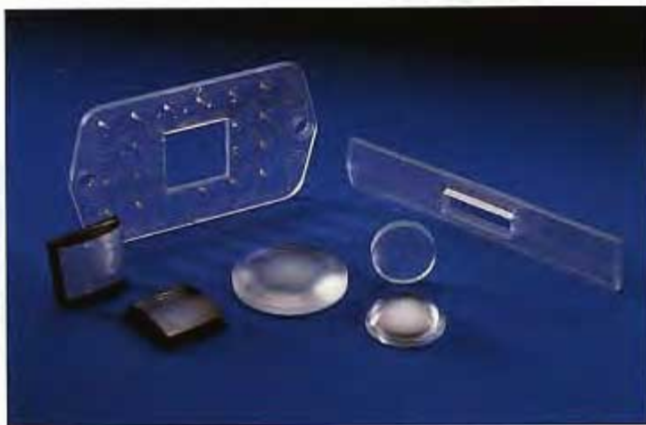
## LSD® Circular Kits

Angles FWHM	25mm DIA Kit Stock #	50mm DIA Kit Stock #
0.5° 1° 5° 10°	LSDKITCN-25	LSDKITCN-50
10° 15° 20° 25°	LSDKITCM-25	LSDKITCM-50
30° 40° 60° 80°	LSDKITCW-25	LSDKITCW-50

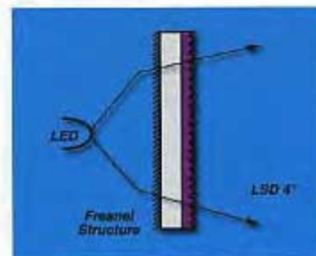
## LSD® Elliptical Kits

Angles FWHM	25mm DIA Kit Stock #	50mm DIA Kit Stock #
0.2° x 10° 0.2° x 40° 2° x 10° 10° x 20°	LSDKITEN-25	LSDKITEN-50
2° x 60° 5° x 30° 10° x 60° 20° x 80°	LSDKITEM-25	LSDKITEM-50
25° x 95° 35° x 75° 35° x 95° 60° x 90°	LSDKITEW-25	LSDKITEW-50

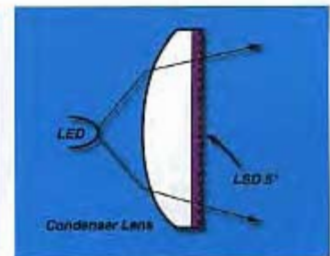
# LSD®/Lens Combinations — Integrated Active Optics



LSD® Diffuser surface structures and angular properties can be combined with the power of optical lenses such as Fresnels and condenser lens to create a more collimated and homogenous source. POC can replicate LSD® angles onto plano optical surfaces, or supply injection molded components. Call for assistance.



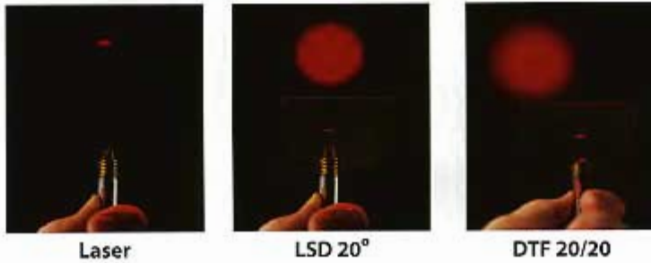
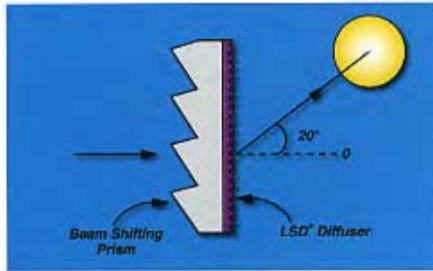
LSD / Fresnel Lens



LSD / Condenser Lens

# DTF<sup>®</sup> Directional Turning Film

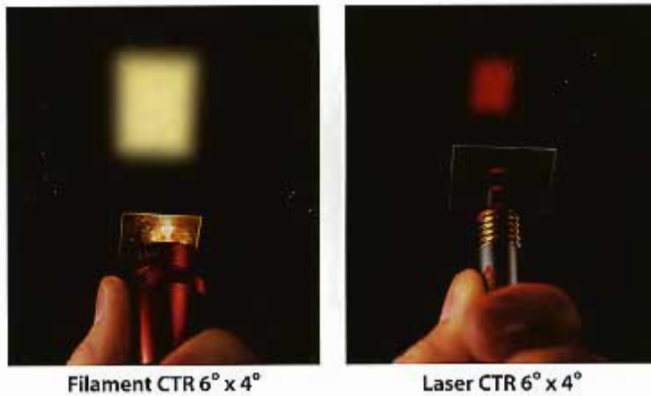
DTF<sup>®</sup> Directional Turning Films combine the high transmission, light source diffusion and angular distribution of the Light Shaping Diffuser with a Fresnel/Prism beam shifting structure to create the Directional Turning Film. DTF is a multilayer single film that creates off-axis images and illumination. The DTF film is useful where the light energy distribution needs to be placed off normal or cannot be placed in the direct line of sight. Applications include aviation displays, traffic signs, exit signs, LED displays, and LCD backlights. Custom products are available. Call for engineering assistance.



Angle FWHM	Substrate & Thickness	Beam Shift	Size
5°	<b>Polycarbonate</b> PC10 - 0.010" PC30 - 0.030" PC60 - 0.060" Other Substrates Available	20°  Off-axis Output	2' x 2'
20°			4' x 4'
60°			6' x 6'
60° x 10°			8' x 8'
95° x 25°			

# CTR<sup>®</sup> Circle to Rectangle Diffusers

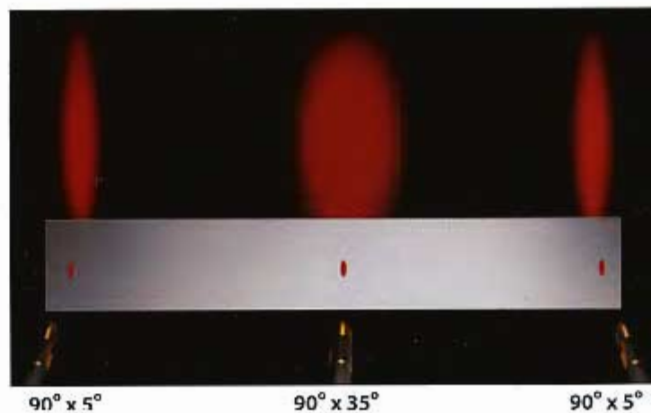
CTR<sup>®</sup> Beam Shaping Diffusers take circular light sources and shapes them into specific rectangular profiles. Applications would include projector systems, machine vision, sensors, and scanners. Custom angles are available. Call for engineering assistance.



Angle FWHM	Substrate & Thickness	Size
6° x 4°	<b>Polycarbonate</b> PC10 - 0.010" PC30 - 0.030" PC60 - 0.060"	2' x 2'
5° x 3°		4' x 4'
Custom Angles Available		6' x 6'

# VLSD<sup>™</sup> Variable Light Shaping Diffuser

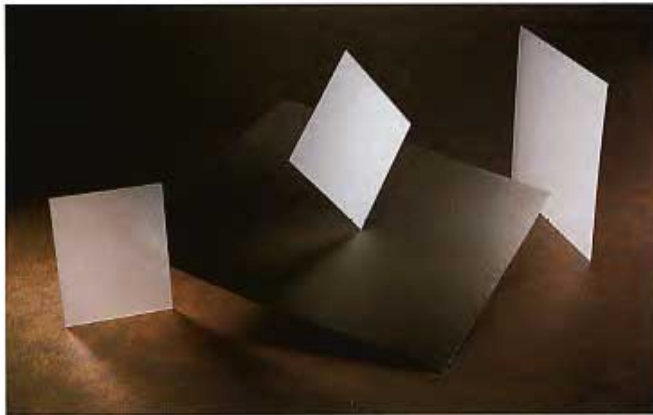
Light Shaping Diffuser angles can now be varied in a single film. Applications would include light guides, backlights, projection screens, and screen displays. Custom angles are available. Call for engineering assistance.



Angle FWHM	Substrate & Thickness	Size
<b>Elliptical</b> 90° x 5° - 90° x 35° - 90° x 5°	<b>Polycarbonate</b> PC10 - 0.010" PC30 - 0.030" PC60 - 0.060" Other Substrates Available	1' x 12"
<b>Circular</b> 5° x 20° x 5°		2' x 12"
Other Angles Available		4' x 12"

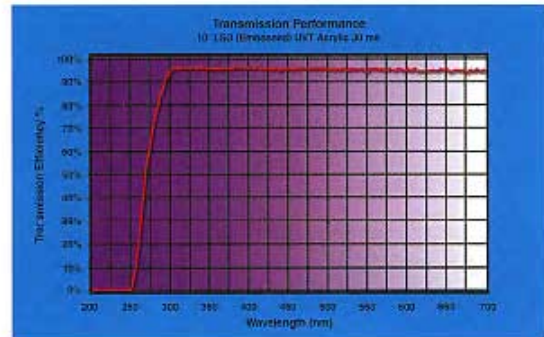
# LSD<sup>®</sup> Light Shaping Diffuser

## Acrylic UV Transmitting—Embossed



The Light Shaping Diffuser surface structures embossed into UV Transmitting Acrylic substrates, achieve high transmission at UV wavelengths, while maintaining angular control and homogenous light distribution. The following transmission levels can be achieved: 400nm >90%, 350nm >90%, 325nm >90%, 300nm >90%, 275nm >60%. Custom angles are available.

**Transmission Performance**



Angle FWHM	Substrate & Thickness	Size
5°	<b>UV Transmitting Acrylic</b> UVTAC30 - 0.030" UVTAC60 - 0.060"	2" x 2"
10°		4" x 4"
20°		6" x 6"
60°		8" x 8"
60° x 10°		10" x 10"
95° x 25°		

## Glass UV, High Temperature, Laser Damage Threshold

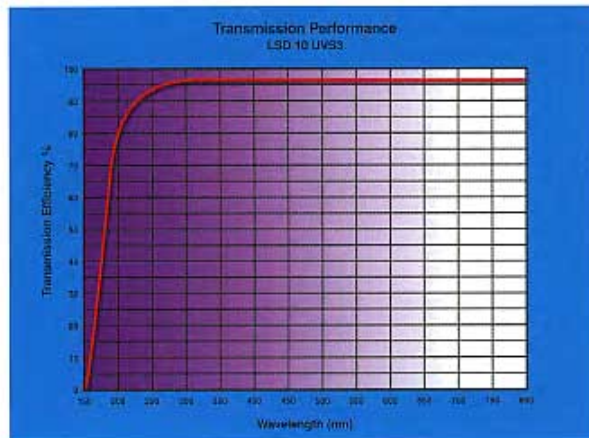


Now it is possible to achieve high transmission, angular control and homogenous light distribution in: UV wavelengths, high temperature, and high power laser applications.

**LSD<sup>®</sup> UV Transmitting Diffuser — 70% at 190nm**

Angle FWHM	Substrate & Thickness	Size
0.5°	<b>Silica</b> UVS3 - 3mm	25mm Dia
1°		50mm Dia
5°		2" x 2"
10°		
20°		

**Transmission Performance**



**LSD<sup>®</sup> High Temperature Diffuser — 500° C Stable**

Angle FWHM	Substrate & Thickness	Size
0.5°	<b>Glass B270</b> HTG3 - 3mm	25mm Dia
1°		50mm Dia
5°		2" x 2"
10°		
20°		

**LSD<sup>®</sup> High Power Diffuser**

Angle FWHM	Substrate & Thickness	Size
0.5°	<b>Silica</b> HPS3 - 3mm	25mm Dia
1°		50mm Dia
5°		2" x 2"
10°		
20°		

**Optical Design**



*As a result of assisting many of our customers solve their lighting problems, POC has established the "Design Center". Our designs pull from a unique blend of design engineers, optical engineers, scientists, and software experts to offer advanced optical designs, ray tracing, and rapid prototyping. Our designs are already being used in many automotive, aerospace, display, LCD backlights, cellphone, scanner, and machine vision applications. Call for assistance.*

**Custom OEM Products**



POC primarily serves the OEM optical marketplace with unique, customized, and mass produceable solutions. Here are some examples:



**Product Authentication  
Optical Signature**



**Inked and Silk Screened  
LSD Diffuser**

**Cut to Print**



*LSD® Light Shaping Diffusers can be custom cut to customer print specifications. Call for assistance.*



**Injection Molding**

Light Shaping Diffuser surface structures can be injection molded to a variety of optical components, including waveguide optics.



**Holographic Mastering**

Full scale mastering and production submastering up to 72" x 72"



**Custom Replication**

LSD® diffusers can be directly replicated onto a variety of materials, substrates, lenses, and optical components.



**Mass Production**

Web replication of thin and rigid films, along with injection molding, embossing, laminating, silkscreening, and cutting services.

# LSD<sup>®</sup> Light Shaping Diffuser

Custom • OEM • Optical Components



*POC serves the optical community with unique and novel optical solutions for OEM applications. Much of what we produce is to the customer's specification. We provide standard and customized products, angles, sizes, and materials for a variety of optical/lighting applications.*

**Contact POC with your OEM requirement and for engineering and application assistance.**



LCD Backlight



Display



Automotive



Machine Vision



Viewing Screens



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PH: 310-320-3088 • FX: 310-320-8067 • [www.poc.com](http://www.poc.com)



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