

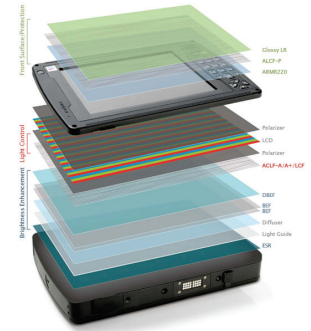
F16 and F35  
 Helmet embedded  
 with Diffusers and  
 optically clear  
 adhesive.

## Optical Films, Lenses and Screen Assembly

**Pronat offers a range of enhancement films and diffusers which dramatically improve the visual appearance of electronic device monitors and displays.**

These films offer a variety of solutions for:

- Improved readability
- Increased brightness
- Excellent contrast
- Colour uniformity
- Glare reduction
- Security & privacy,



### Films - 3M Vikuiti™ BEF-DBEF-ESR

#### Reflectors

Enhanced Specular Reflector (ESR) are ultra-high reflectivity, mirror-like optical enhancement films utilizing 3M multi-layer optical film technology to create a highly efficient specular reflector. ESR can be used alone, or can be combined with other display enhancement films for an even greater brightness improvement as the rear light-guide reflector.

#### Brightness Enhancement Films

BEF and DBEF films are transparent optical films that increase LCD brightness through improved management of the existing light. They are recycling, light management films, that are used to increase the brightness of backlights used in liquid crystal displays (LCD).

#### Light Control & Privacy Films

Vikuiti Light Control Films consist of micro-louvers that act like window blinds to control the direction of light transmission through the film. They offer privacy at specific viewing angles and help reduce glare in both high and low ambient light conditions.

#### Anti-Reflection Films

AR films improve the performance of flat panel displays, CRTs and touch screens by decreasing reflections and increasing contrast. They can also be used to reduce unwanted reflections from windows and in other non-display applications.

### Films - Clarex

#### Specialist Optical Films

**Laser Scanner Filter,**  
 designed to maximize transmission.

**Light Guide Reflectors,**  
 developed for edge lighting LCD units

**Light Guide Panels,**  
 an excellent conductor of light, optimize the uniformity and brightness of backlights.

**DR-I Diffusion Reflectors,**  
 uniformly reflect and diffuse external light.

#### Diffusers

Diffusers improve the visual appearance of electronic displays and offer a variety of solutions for LCD applications.

**Precision Thin Sheet,**  
 affords unsurpassed optical properties.

**Non-Glare Sheet,**  
 optimizes display characteristics by diffusing unwanted reflections.

**AR (Anti-Reflective) Filter,**  
 multi-layer coating prevents light reflection.

# Films - Luminit Diffusers

## Light Shaping Diffusers- LSD

### TRANSFORMING LED LIGHT

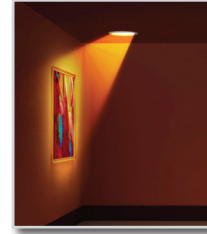
- \*LED Hiding Power/Homogenization
- \*Precise Beam Angle Control, 0.5° to 100°
- \*Symmetrical or Asymmetrical
- \*Improved Uniformity

### Direction Turning Film (DTF)

is a non-symmetrical linear micro-prismatic that imparts a 20° shift in the angle of a semi-collimated light source.



Down Light



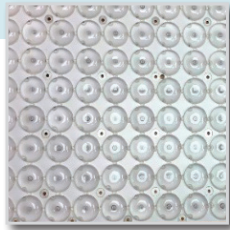
Redirected Light

## Assembly of lenses, capsules and displays

### Lens Assembly

Pronat offers to assemble flight deck touch screens for civil and defense contractors requiring enhanced flight vision systems. This includes the lens and capsule assembly. Displaying clear and concise situational information on a touch activated display

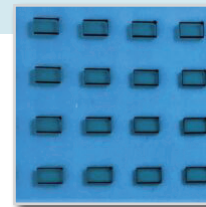
**Pronat uses optically clear adhesive when assembling lenses.**



### Capsule Manufacturing

Pronat has a unique capability to construct miniature capsule structures:

Each capsule is made up of up to 9 layers of different films and adhesive layers, each structure having a base area from 2.5mm x 4mm. Behind each capsule there is a LED directing light through the capsule to the next level being the assembled lens.



### Back Plate Assembly

Lens and Capsules are assembled in a pre-determined matrix on a back plate which is covered with optical reflectors. The finished assembly is then subject to very aggressive vibration testing to ensure the lens and capsule construction is secure for extreme flight conditions.



F15 with Large Area Display -LAD

Our supply partners include:

**3M**

**Luminit**  
LIGHT MANAGEMENT SOLUTIONS

astra★products

Visually amazing  
**Vikuiti**

**KEIWA**

**CLAREX**

**3M**

**Pronat is a 3M Approved Converter**

[www.pronatindustries.com](http://www.pronatindustries.com)