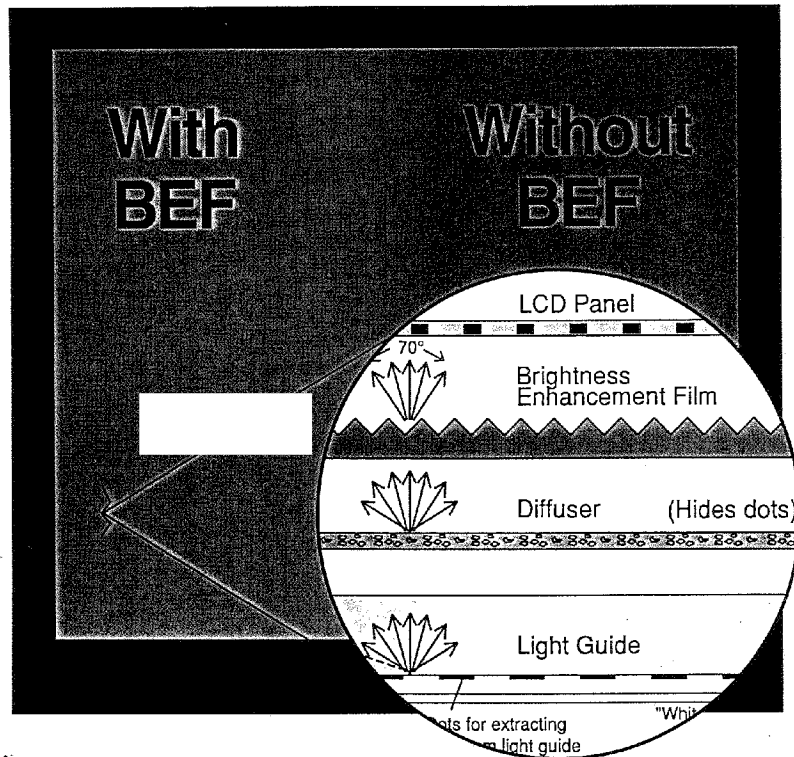


3M

Brightness Enhancement Film (BEF)

4

3M brightness enhancement film is designed for use in backlight assemblies of many electronic and transportation displays, and in specialty lighting. Applications include backlights for liquid crystal displays (LCDs), electroluminescent (EL) panels, and other diffuse light sources. Backlights are used in equipment such as laptop computers, word processors, personal TVs, camcorders, mobile communication devices, and automobile and avionic instrument displays. The film is available in rolls or converted into parts to meet your specific needs. The 3M film is an optical element in which the material, film thickness, prism angles, and spacing are closely controlled using 3M's extensive background in precision microreplication.



3M sheds some light on backlight enhancement

As a leading designer and manufacturer of innovative optical components, 3M is in a unique position to provide products and materials for specialty light management. 3M brightness enhancement film is one such product. It exemplifies our expertise in design, tooling, and manufacturing of optical products. Maximum light enhancement is obtained by precise replication of the prismatic pattern. Moiré interference

patterns are minimized by the very fine prism spacing. This film, when integrated into your product, can significantly improve overall system performance.

3M brightness enhancement film offers:

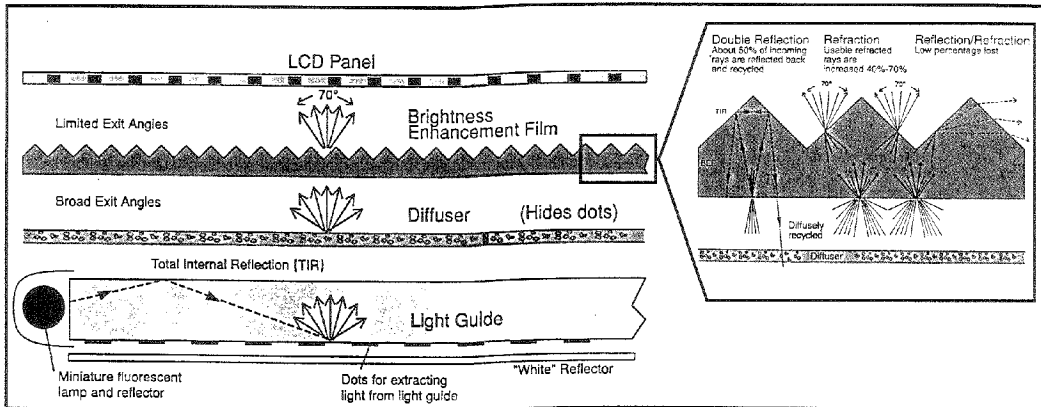
- Better visibility. 3M film maximizes the use of available light by working with the other components in the lighting system.
- Improved battery performance. Because the 3M film uses the light so effectively, you can design your product to operate with less power to the lamp, thereby increasing the time between battery recharging.
- Increased lamp life. Decreasing the power to the lamp will reduce the heat load and increase lamp life. With 3M film you can get the same display brightness with lower power.
- Flexible format. Brightness enhancement film can be provided in roll format or converted to your specific part size.
- Easy assembly. Simple to integrate into your backlight system, the film does not require lamination and can be held in place by attaching it to the backlight along one or more edges.
- Minimal weight and thickness. Brightness enhancement film is a lightweight, transparent optical polycarbonate that adds only 0.009" to the thickness of your backlight.

How 3M brightness enhancement film works

The 3M film is placed between the diffuser and the LCD panel. The degree of light enhancement is a function of all the backlight components working together. The efficiency of the backlight is dependent on the

light absorbed by the diffuser and reflector, as well as edge losses and the reflectivity of the components. One of the keys to its effectiveness is that the optical film

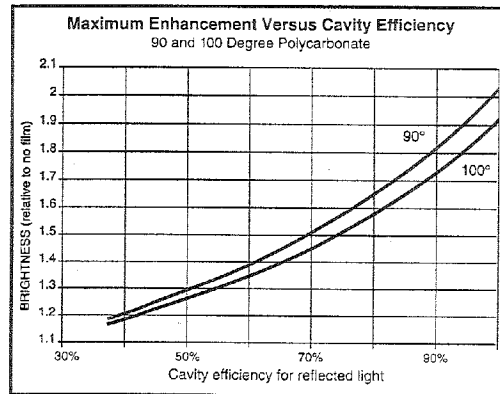
actually recycles light. Light rejected by the prismatic film is reflected to the diffuser and reflector, adding to the light trying to reach the LCD, thereby increasing the brightness.



3M brightness enhancement film is available in two pitch and angle designs. Depending on the specific needs of your application, one may be more appropriate for your requirements.

Specifications	Product	
	90/50	100/31
Repeating Prism		
• Prism Replication	99.5%	99.5%
• Prism Angle	90°	100°
• Prism Pitch	50µm	31µm
Nominal Total Viewing Angle (Horizontal Prism)		
• Horizontal	104°	112°
• Vertical	70°	80°
Nominal Brightness Enhancement*	50%	45%
Material		
• Polycarbonate	Yes	Yes
• Index of Refraction	1.586	1.586
Physical Characteristics		
• Form	Film	Film
• Nominal Thickness	.009in. (.23mm)	.009in. (.23mm)
• Rolls (nominal dimensions)**		
Width	37.5in. (.95M)	37.5in. (.95M)
Length	50yds. (45.7M)	50yds. (45.7M)
Segments	37.5in. x 40in.	37.5in. x 40in.
(19mm loss at each segment)	(.95M x 1.02M)	(.95M x 1.02M)
Interleaving	Yes	Yes

*Performance is controlled by interaction with other system components. Nominal enhancement shown is typical for a well designed, efficient system.
 **Also available converted to meet specific needs.



Important Notice to Purchaser

The following is made in lieu of all warranties, express or implied, including any implied warranties of merchantability or fitness for a particular purpose. 3M will replace or refund the purchase price of such quantity of the product found to be defective in materials or manufacture. 3M shall not be liable in contract or in tort for any injury, loss, or damage, whether direct, indirect, incidental, special or consequential, arising out of the use of or the inability to use the product. The remedies set forth herein are exclusive.

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Optical Systems
 3M Safety and Security Systems Division
 3M Center, Building 225-4N-14
 St. Paul, MN 55144-1000
 1-800-328-7098



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