Effective: January 14, 2010

Vikuiti™ Display Enhancement

Vikuiti™ Brightness Enhancement Film II (BEF II)

Vikuiti™ Brightness Enhancement Film III (BEF III)

Vikuiti™ Thin Brightness Enhancement Film (TBEF)

Description

The prismatic structure of Vikuiti™ Brightness Enhancement Film (BEF) allows you to manage the angle of light exiting from your display. Vikuiti BEF films work by utilizing the principles of refraction and total internal reflection. The process of refracting usable light towards the viewer and reflecting most of the remaining light back into the display is called recycling. This form of light management can be done with a single sheet of Vikuiti BEF film or two sheets crossed at 90 degrees to each other. Vikuiti BEF films can also be used with Vikuiti™ Dual Brightness Enhancement Films (DBEF) and Vikuiti™ Enhanced Specular Reflector (ESR) to further increase the efficiency of your display.

Vikuiti™ BEF II Film This is the current version of the original Vikuiti BEF I film, which has been out of production for some time. It features an acrylic resin prismatic structure coated on a polyester substrate. This is the highest performance member of the family, and incorporates structural features which helps avoid wet-out, which is an optical coupling that can mar the appearance of an LCD display. It is available in the standard 90/50 version, and a 90/24 version for additional moiré avoidance.

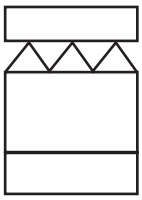
Vikuiti™ BEF III Film This is a newer version, featuring similar structural elements to Vikuiti BEF II film, but utilizing a randomized prism pattern for increased wet-out and reflective moiré avoidance. It has slightly lower performance than Vikuiti BEF II film. It is also available in an M (Matte) version. The M version softens the brightness fall-off at the edges and may allow the elimination of a separate diffuser from the display. Essentially, Vikuiti BEF III film is a slightly lower cost, slightly lower performance alternative to Vikuiti BEF II film.

Vikuiti™ TBEF Film The “T” stands for Thin. Vikuiti TBEF film has excellent optical performance, yet is less than half as thick as Vikuiti BEF III film. It is intended for those applications where the thickness of the entire display/module must be kept to an absolute minimum. Its thin nature makes it somewhat less robust, and should be restricted to relatively smaller displays where its reduced warp resistance and environmental stability will not be a factor.

3M

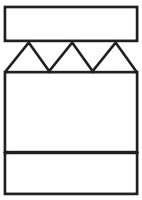
The figures below illustrate the film's basic constructions. All dimensions are approximate, and the figures are not drawn to scale.

Vikuiti™ BEF II 90/50 Film



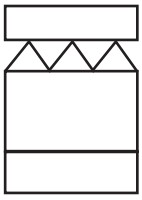
Removable Liner	40 microns
Prismatic Structure	23 microns
Polyester Substrate	127 microns
Removable Liner	60 microns
Delivered Thickness	250 microns
Applied Thickness (excluding liners)	150 microns

Vikuiti™ BEF II 90/24 Film



Removable Liner	45 microns
Prismatic Structure	13 microns
Polyester Substrate	127 microns
Removable Liner	60 microns
Delivered Thickness	245 microns
Applied Thickness (excluding liners)	140 microns

Vikuiti™ BEF III-T Films

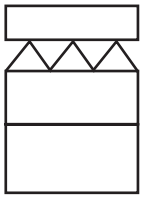


	5T	10T
Removable Liner	40 microns	40 microns
Prismatic Structure	28 microns	24 microns
Polyester Substrate	127 microns	254 microns
Removable Liner	60 microns	60 microns
Delivered Thickness	255 microns	378 microns
Applied Thickness (excluding liners)	155 microns	278 microns

Vikuiti™ BEF III-M Film

Removable Liner	40 microns
Prismatic Structure	28 microns
Polyester Substrate	127 microns
Matte Coating	5 microns
Removable Liner	60 microns
Delivered Thickness	260 microns
Applied Thickness (excluding liners)	160 microns

Vikuiti™ TBEF Film

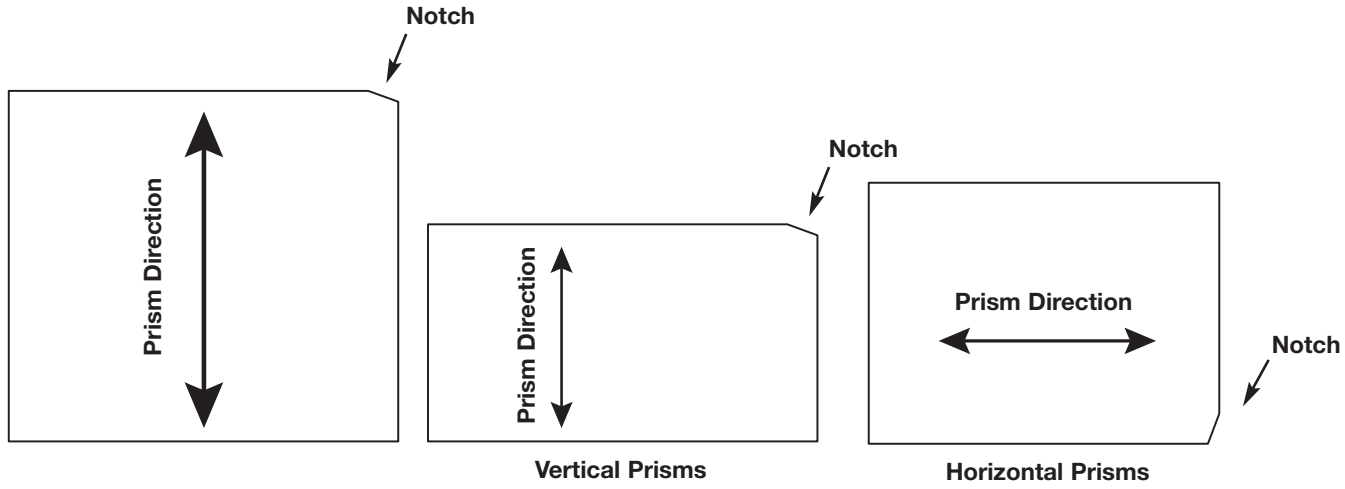


Removable Liner	40 microns
Prismatic Structure	12 microns
Polyester Substrate	50 microns
Removable Liner	75 microns
Delivered Thickness	177 microns
Applied Thickness (excluding liners)	62 microns

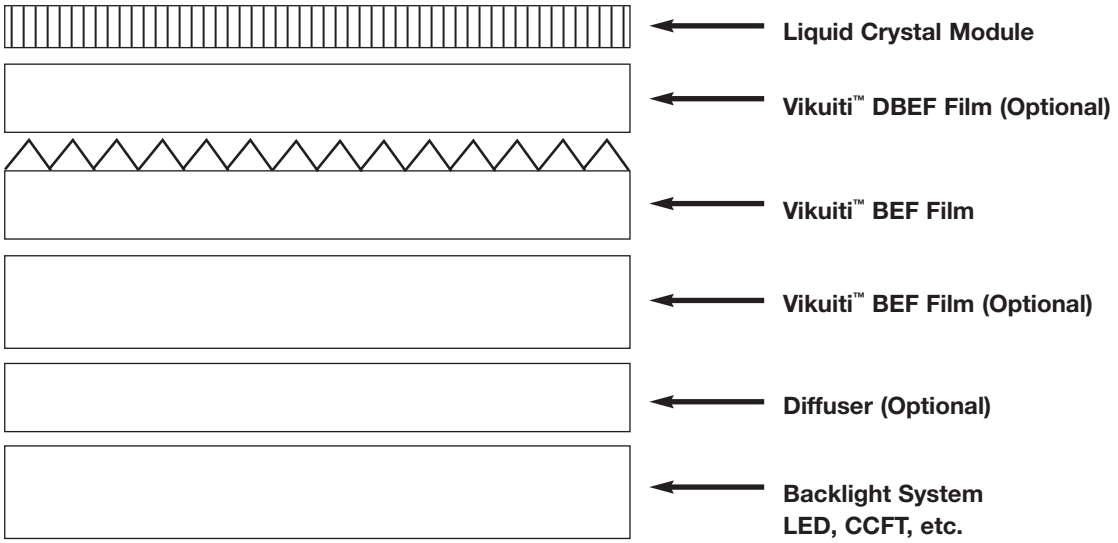
Formats

Reference the current price sheet or call customer service (1-800-553-9215) for information on part sizes.

To help you orient the film, the sheets will have a small notch cut into one of the corners. Hold the sheets with the cut notch in the upper right-hand corner to identify the prism direction for square parts and rectangular parts with vertical prisms. Orient the notch to the lower right hand corner for rectangular parts with horizontal prisms as illustrated below. When held like this, you will be looking at the upper surface with the prismatic structure, which must face the LC glass module, and away from the backlight.



Typical Application



The Vikuiti BEF film family increases on-axis brightness by compressing light into a narrower viewing angle. It is mounted with the prisms running either vertically or horizontally. The compressed viewing angle will be primarily on the plane that is 90 degrees away from the direction of the prisms. In other words, if the prisms are running vertically, the viewing angle will be compressed in the horizontal plane, and with a slight compression in the vertical plane. Likewise, if the prisms are running horizontally, then the viewing angle will be compressed in the vertical plane, with a slight compression in the horizontal plane.

As is shown in the “Typical Application” above, Vikuiti BEF film must always be mounted with the prisms facing the LC module, and away from the backlight. If a second sheet of Vikuiti BEF film is to be used to gain even greater brightness, its prism direction must be 90 degrees away from the prism direction of the first sheet, and the viewing angle will then be compressed in both the horizontal and vertical planes.

If a sheet of the Vikuiti DBEF film family is to be included for maximum brightness, it should always be mounted on top of the Vikuiti BEF film, closest to the LC module.

General Converting, Assembly, and Handling Recommendations

During converting operations, both the front and rear protective liners should remain on the film.

Die cutting is the recommended form of converting and will result in the cleanest edges, although shear cutting and laser cutting may also be acceptable. Whatever method used, you should ensure that the part has clean, crisp edges without any raggedness or other damage.

The part should be precisely cut to provide a close fit in the cavity, yet not so close to experience binding or warping problems from thermal expansion.

The part should be left free-floating in the cavity to avoid warping or buckling. If necessary, the part may be tacked down along one edge or two adjacent corners with a double coated tape, such as Scotch® Tape #415. Designs incorporating mounting tabs, or holes mated to mounting pins are also popular.

Remove both protective liners, if the film has them, by tacking near an edge or corner with a piece of aggressive tape and pull gently.

Be aware that handling any polymer film can generate electrostatic charges which can attract dust and debris.

Remove any loose debris from the film by using compressed air.

Avoid fingerprints and debris by wearing clean latex gloves and holding the product at the edges.

Keep the area very clean to lessen the likelihood of debris contamination. Maintaining class 1000 clean room conditions is recommended.

Using anti-static measures, such as ionized air blowers whenever possible, is recommended.

As always, protect the film, especially the edges, from any undue shock or stress.

Storage

Material should be stored in its original packaging, laying in a horizontal orientation, away from direct sunlight. Heavy objects should not be piled on top of it to avoid damaging the product. Ambient temperature and humidity should be controlled to 10 – 30 degrees C at 50 +/- 20% R.H.

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 warrants that, at the time of shipment, product will meet 3M's published specification or that specification agreed in writing between 3M and purchaser, for twelve months after the date of receipt at purchaser's location provided that the product is stored flat in accordance with the requirements in the section titled Storage above and in the original package. Should product not meet specifications at time of shipment and for twelve months thereafter, 3M will replace or refund the purchase price of such quantity of the product found not to meet specifications. Given the variety of factors that can affect the use and performance of a 3M Mobile Interactive Solutions Product (the "Product"), some of which are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M Mobile Interactive Solutions Product to determine whether it is suitable for user's particular purpose and suitable for user's method of application. 3M Mobile Interactive Solutions' statements, engineering/technical information, and recommendations are provided for user's convenience, but their accuracy or completeness is not warranted.

3M shall not be liable under any legal theory, including 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.

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