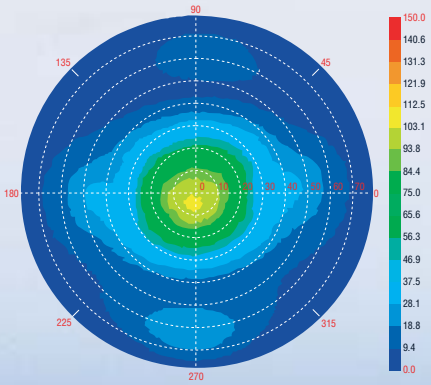
Microreplicated Prism Film

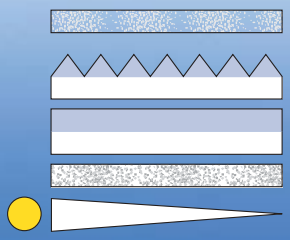
Vikuiti™ Display Enhancement

Vikuiti™ Brightness Enhancement Film (BEF) III

Vikuiti™ BEF III High Resolution Notebook Application



TN type LCD - 14.1- inch wedge type backlight



Axial Luminance Nits/Watt:	23.3
Integrated Intensity (Lum/m^2)/Watt:	19.1
Number of Films:	4
Film Stack Thickness (µm):	562
Weight (g):	45.64
Input Power to Inverter (W):	4.3
LCD Transmission (%):	7.9

See “Testing” on back page.

Description

Vikuiti™ Brightness Enhancement Film (BEF) III is a second-generation micro-replicated enhancement film that utilizes a unique random prismatic structure to provide up to a 59% brightness gain. Vikuiti BEF III film recycles diffuse light into the backlight and directs the light through the LCD, thereby providing increased brightness toward the on-axis viewer. A single sheet provides up to 59% increase in brightness and two sheets crossed at 90° can provide up to 111% brightness increase. This increased brightness can be translated into power savings.

Single sheets of Vikuiti BEF III film are ideal for use with LCD panels in monitors and televisions. Crossed sheets of Vikuiti BEF III are ideal for use with LCD panels in notebook PCs. Even greater increases in brightness can be achieved when Vikuiti BEF III is used in combination with a Vikuiti™ Reflective Polarizer film such as Vikuiti™ Dual Brightness Enhancement Film (DBEF), Vikuiti™ Dual Brightness Enhancement Film-Matte (DBEF-M) or Vikuiti™ Dual Brightness Enhancement Film-Diffuse (DBEF-D).

Vikuiti BEF III is available in both a matte (BEF III-M) bottom surface finish and a transparent (BEF III-T) finish.

3M Innovation

Vikuiti™ Brightness Enhancement Film (BEF) III

Testing

The polar plot measurement values indicated on the front page were obtained through testing crossed Vikuiti BEF III film with cover sheet and a bottom diffuser with a TN type LCD. We performed the test using our standard backlight and production films.

We measured the power to the backlight and measured the axial luminance and expressed the result as Axial Luminance Nits/Watt. Similarly, we measured the integrated intensity and expressed the result as Integrated Intensity (Lumens/m^2)/Watt.

We believe these measurements and reporting techniques clearly and concisely represent the benefits of the Vikuiti BEF III film while providing results that are readily comparable to other filmstack combinations.

Optical performance

Bottom BEF	Top BEF	Axial Luminance (nt)	Maximum Luminance (nt)	Integrated Intensity (lm/m^2)	Horizontal 1/2 Viewing Angle (°)	Vertical 1/2 Viewing Angle (°)
none	none	42.1	74.0	102.6	43.7	36.5
Vikuiti™ BEF III-T	none	87.9	96.9	108.8	45.4	29.1
Vikuiti™ BEF III-T	BEF III-T	111.2	112.6	95.3	26.0	25.4
Vikuiti™ BEF III-M	none	76.8	84.6	95.3	44.6	28.7
Vikuiti™ BEF III-M	BEF III-M	110.4	112.0	93.9	25.5	25.1
Vikuiti™ BEF III-M	BEF III-T	110.8	112.2	95.0	25.8	24.8

Eldim optical data taken on standard production 35.8 cm (14.1 inch) notebook PC, TFT display, with wedge light guide with single CCFL and standard industry back reflector.

Nominal film properties

Film properties	Vikuiti™ BEF III-T	Vikuiti™ BEF III-M
On-axis Illumination Increase:*		
• One film, slab back light	59%	56%
• One film, wedge light guide	88%	77%
• Two films, slab back light	108%	96%
• Two films, wedge light guide	111%	110%
Half Brightness for Full Viewing Angle*		
• One film, slab, Horz./Vert.	47°/32°	46°/32°
• One film, wedge, Horz./Vert.	45°/29°	45°/29°
• Two films, slab, Horz./Vert.	24°/24°	25°/25°
• Two films, wedge, Horz./Vert.	26°/25°	26°/25°
Physical Characteristics		
• Thickness (ASTM D2103)	155µm (6.1 mils)	160µm (6.3 mils)
• Prism angle	90°	90°
• Prism pitch	50µm (2.0 mils)	50µm (2.0 mils)
• Thermal Shrinkage, MD/TD:	0.2/0.1%	0.2/0.1%
• Thermal Expansion, MD/TD:	0.2/0.1%	0.2/0.1%
• Thermal Shrinkage and Expansion data taken at 85°C, 15 minutes		
• Prism Material	Modified Acrylic	Modified Acrylic
• Substrate Material	Polyester	Matte Polyester

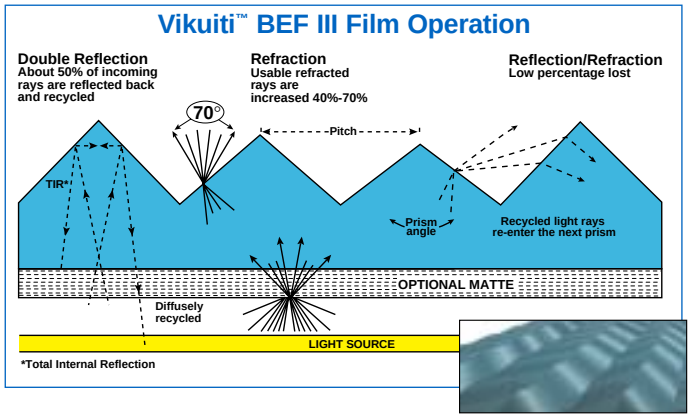
The technical data for the products described are typical, based on information accumulated during their life, and are not to be used in the generation of purchase specifications which define property limits rather than typical performance.

Percentage increase is defined as increase over displays without films.

*Vikuiti BEF III brightness increase depends on the backlight material composition, design and overall lighting efficiency.

How it works

Vikuiti BEF III film utilizes refraction and reflection to increase the efficiency of your backlight. Vikuiti BEF III film refracts light within the viewing cone toward the viewer. Light outside this angle is reflected back and recycled until it exits at the proper angle. The random prism pattern on Vikuiti BEF III film also minimizes coupling to adjacent surfaces.



Random Prism Pattern (artist's rendering)

Environmental test results

Environments	Delta, Δx	Delta, Δy	Delta Gain
Cold Temperature, (-35°C) for 1,000 hours	0.003	0.003	0.002
High Temperature/High Humidity, (65°C at 95% RH) for 1,000 hours	0.003	0.002	0.012
High Temperature, (85°C) for 1,000 hours	0.003	0.002	0.005
Thermal Shock, (-35°C to 85°C) for 100 cycles	0.003	0.002	0.007

For ordering information on Vikuiti™ Display Enhancement Films from 3M, please call:
1-800-553-9215

For technical information please send an e-mail to:
ostechserv@mmm.com

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Minimum 10% Post-Consumer Fiber

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