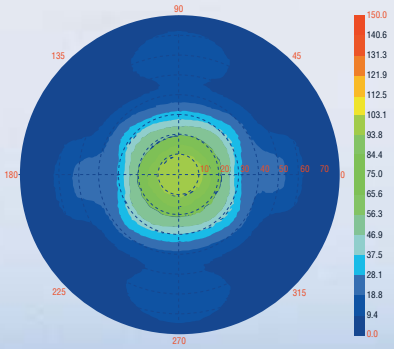
Microreplicated Prism Film

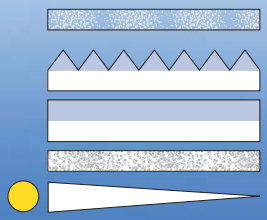
Vikuiti™ Display Enhancement™

Vikuiti™ Brightness Enhancement Film (BEF) II

Vikuiti™ BEF II High Resolution Notebook Application



TN type LCD - 14.1- inch wedge type backlight



Axial Luminance Nits/Watt:	23.6
Integrated Intensity (Lum/m^2)/Watt:	19
Number of Films:	4
Film Stack Thickness (µm):	554
Weight (g):	45.6
Input Power to Inverter (W):	4.3
LCD Transmission (%):	7.9

See “Testing” on back page.

Description

Vikuiti™ Brightness Enhancement Film (BEF) II is a second-generation micro-replicated enhancement film that utilizes a prismatic structure to provide up to a 60% brightness gain. Vikuiti BEF II 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 60% increase in brightness and two sheets crossed at 90° can provide up to 120% brightness increase. This increased brightness can be translated into power savings.

Single sheets of Vikuiti BEF II film are ideal for use with LCD panels in monitors and televisions. Crossed sheets of Vikuiti BEF II are ideal for use with LCD panels in notebook PCs. Even greater brightness increases can be achieved when Vikuiti BEF II 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 II is available in two different prism pitch and angle geometry versions. The prism pitch refers to the distance between the peaks of adjacent prisms when the prism angle is fixed at 90°. Prism pitches available are 50 micrometer and 24 micrometer.

3M Innovation

Vikuiti™ Brightness Enhancement Film (BEF) II

Testing

The polar plot measurement values indicated on the front were obtained through testing Vikuiti BEF II film 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 Vikuiti BEF II 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 II 90/50	none	92.0	103.0	114.1	45.3	29.0
Vikuiti™ BEF II 90/24	BEF II 90/50	121.0	123.0	93.1	24.4	22.1
Vikuiti™ BEF II 90/24	none	88.3	97.4	108.2	45.4	28.7
Vikuiti™ BEF II 90/24	BEF II 90/24	112.9	114.9	90.6	25.2	23.1
Vikuiti™ BEF II 90/24	BEF II 90/50	115.4	117.3	91.5	25.1	22.8

Nominal film properties

Film properties	Vikuiti™ BEF II 90/50	Vikuiti™ BEF II 90/24
On-axis Illumination increase:*		
• One film, slab back light	57%	56%
• One film, wedge light guide	92%	88%
• Two films, slab back light	106%	100%
• Two films, wedge light guide	121%	113%
Half Brightness for Full Viewing Angle*		
• One film, slab, Horz./Vert.	49°/35°	47°/31°
• One film, wedge, Horz./Vert.	45°/29°	45°/29°
• Two films, slab, Horz./Vert.	23°/22°	24°/23°
• Two films, wedge, Horz./Vert.	24°/22°	25°/23°
Physical Characteristics		
• Thickness (ASTM D2103)	155µm (6.1 mils)	140µm (5.5 mils)
• Prism angle	90°	90°
• Prism pitch	50µm (2.0 mils)	24µm (0.9 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		

The technical data for the products 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.

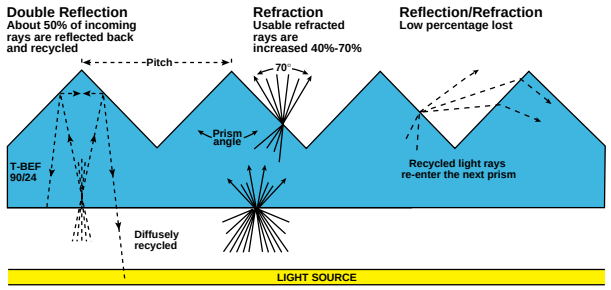
Percentage increase is defined as increase over displays without films.

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

How it works

Vikuiti BEF II film utilizes refraction and reflection to increase the efficiency of your backlight. Vikuiti BEF II film refracts light within the viewing cone (up to 35° off the perpendicular) toward the viewer. Light outside this angle is reflected back and recycled until it exits at the proper angle. Vikuiti BEF II film also minimizes coupling to adjacent surfaces.

Vikuiti™ BEF II Film Operation



Environmental test results

Environments	Delta, Δx	Delta, Δy	Delta Gain
Cold Temperature, (-35°C) for 1,000 hours	0.002	0.002	0.002
High Temperature/High Humidity, (65°C at 95% RH) for 1,000 hours	0.004	0.003	0.002
High Temperature, (85°C) for 1,000 hours	0.003	0.002	0.004
Thermal Shock, (-35°C to 85°C) for 100 cycles	0.003	0.003	0.004

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

Important Notice to Purchaser

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3M

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Minimum 10% Post-Consumer Fiber

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