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3M Optical Systems



Brightness Enhancement Film (BEF) III-10T



Increased
Brightness.

Improved Durability.



Vikuiti™ Brightness Enhancement Film (BEF) III-10T offers improved durability and handling in large monitor and LCD TV applications. As is standard with Vikuiti BEF III, a unique random prismatic structure increases brightness.

Vikuiti BEF III-10T provides a 37% increase in on-axis brightness for direct-light systems. It is primarily designed as a single-sheet application in large (>20") LCD TVs and monitors. However, when combined with Vikuiti DBEF-D400 (or D550), on-axis brightness can be increased by up to 68%. Additionally, combining Vikuiti BEF III-10T with Vikuiti DBEF can significantly improve contrast. Vikuiti BEF III-10T also improves uniformity by hiding direct-light system CCFL bulbs.

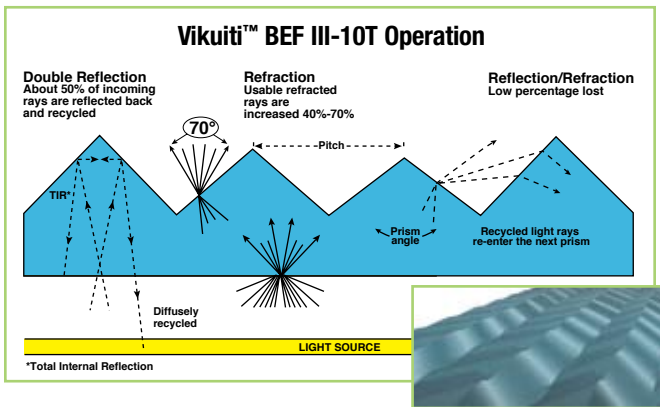




Vikuiti™ Brightness Enhancement Film (BEF) III-10T

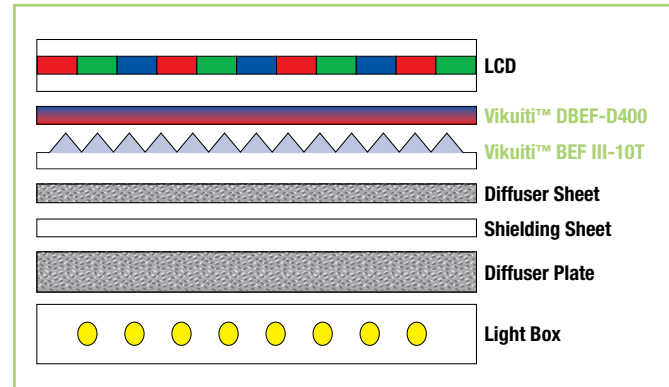
How it works

Vikuiti BEF III-10T utilizes refraction and reflection to increase the efficiency of your backlight. Vikuiti BEF III-10T 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-10T also minimizes coupling to adjacent surfaces.



Random Prism Pattern (artist's rendering)

VA type LCD with direct lit backlight

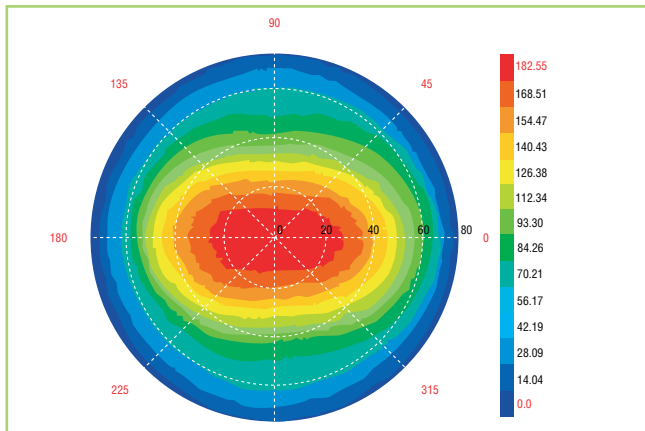


Testing

The polar plot was obtained through testing Vikuiti BEF III-10T (with Vikuiti™ DBEF-D400) in a commercially available 22" LCD TV. The LCD system was modified with the films and evaluated on an autronic-MELCHERS GmbH conoscope.

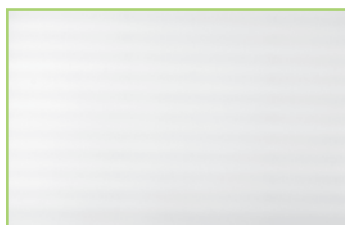
We believe these measurements and reporting techniques clearly and concisely represent the benefits of Vikuiti BEF III-10T while providing results that are readily comparable to other filmstack combinations.

Vikuiti™ BEF III-10T LCD TV Application

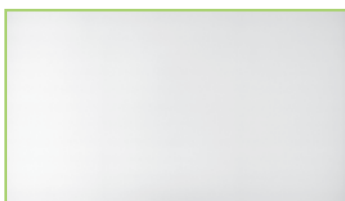


Brighter
brighter

Improved uniformity



30" LCD TV Without Vikuiti™ BEF and Vikuiti™ DBEF



30" LCD TV With Vikuiti™ BEF and Vikuiti™ DBEF

Film properties

Film properties	Vikuiti™ BEF III-10T
On-axis Illumination Increase*	59.0%
Half Brightness for Full Viewing Angle (°) (Horz./Vert.)	50.5°/34.4°
Physical Characteristics	
• Thickness (ASTM D2103)	282µm (11.1 mils)
• Prism Angle	90°
• Prism Pitch	50µm (2.0 mils)
• Prism Material	Modified Acrylic
• Substrate Material	Polyester

On-axis optical data was taken on a diffuse Lambertian recycling cavity, using a PR-650 spectroradiometer.

Angular data was taken on a diffuse Lambertian recycling cavity, using an autronic-MELCHERS GmbH conoscope.

*Luminance percentage increase is defined as the increase over the cavity without films.

System optical performance

Film Configuration	Axial Luminance (cd/m ²)	Maximum Luminance (cd/m ²)	Integrated Intensity (lm/m ²)	Horizontal 1/2 Viewing Angle (°)	Vertical 1/2 Viewing Angle (°)
No Films	115.0	121.8	263.9	61	60
Vikuiti™ BEF III-10T (Horizontal)*	157.3	160.2	231.0	51	34
Vikuiti™ BEF III-10T and Vikuiti™ DBEF-D400	193.6	197.4	334.9	54	38

System optical data was taken on a standard production 22" diagonal LCD TV with a direct-lit backlight, using an autronic-MELCHERS conoscope.

* Vikuiti BEF III-10T luminance increase depends on the backlight material composition, design and overall lighting efficiency.

Environmental test results

Environments	Change of Color	Change of Effective Transmission
Cold Temperature, (-40°C) for 1,000 hours	.73 in delta E* vs. initial value	100.0% vs. initial value
High Temperature/High Humidity, (65°C at 95% RH) for 1,000 hours	.52 in delta E* vs. initial value	97.9% vs. initial value
High Temperature, (85°C) for 1,000 hours	.63 in delta E* vs. initial value	97.6% vs. initial value
Thermal Shock, (-40°C to 85°C) for 100 cycles	.57 in delta E* vs. initial value	98.0% vs. initial value