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**3M**

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## 3M Optical Systems



*Dual Brightness Enhancement Film II (DBEF II)*



Brighter,  
Energy Efficient



Vikuiti™ Dual Brightness Enhancement Film II (DBEF II) is a thin, multi-layer reflective polarizer. It features two diffuse surfaces to provide brightness enhancement and high visual quality. Vikuiti DBEF II can improve display efficiency, uniformity and defect hiding, and has the ability to prevent wet-out against smooth surfaces. Vikuiti DBEF II also allows you to eliminate a diffuser sheet and thus provides multifunctionality.

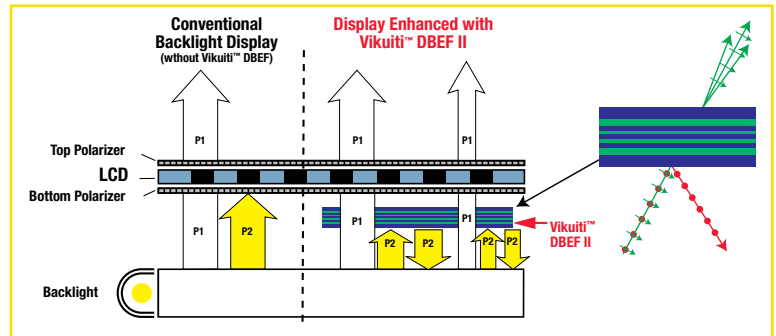




## Vikuiti™ Dual Brightness Enhancement Film II (DBEF II)

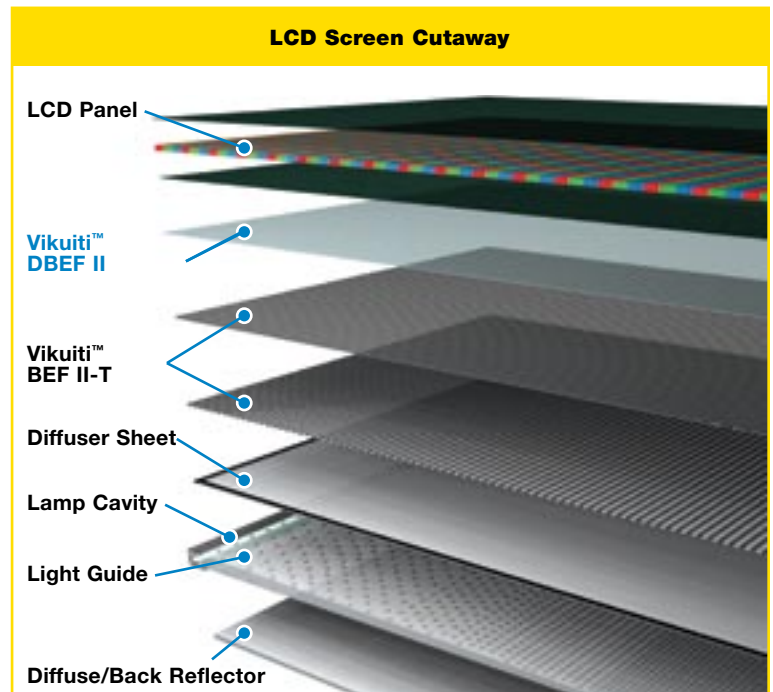
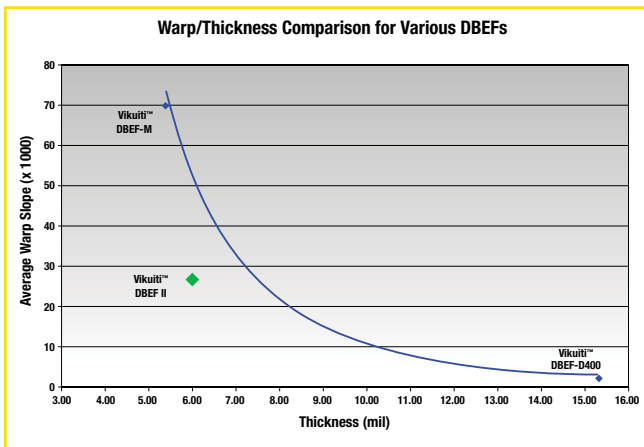
### How it works

Vikuiti DBEF II works through polarization recycling. The diagram shows a conventional backlit system emitting P1 and P2 light. A typical polarizer absorbs P2, but Vikuiti DBEF II reflects P2 into the backlight, where it is recycled into P1 and P2 light. With Vikuiti DBEF II, more P1 light is available to be transmitted through the LCD, increasing on-axis luminance.



### Warp Performance

The construction of Vikuiti DBEF II has been improved to increase stiffness and help resist warp in backlight environments.



# Energy Efficient

## Testing

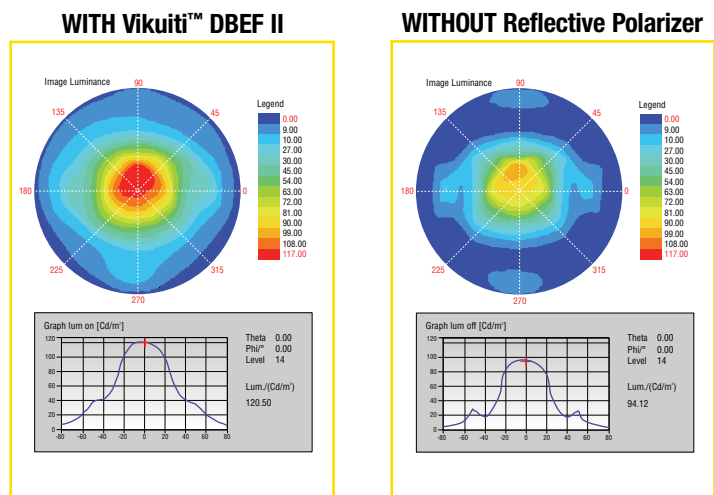
The polar plot measurement values and brightness data in the table at right were obtained through testing Vikuiti™ Dual Brightness Enhancement Film II (DBEF II) with Vikuiti™ Brightness Enhancement Film II-T (BEF II-T) and a bottom diffuser with a typical TN type LCD. For comparison purposes, Vikuiti DBEF II was tested against Vikuiti™ Dual Brightness Enhancement Film Matte (DBEF-M) and Vikuiti™ Dual Brightness Enhancement Film D400 (DBEF-D400). Tests were performed using randomly selected production films and results are representative, but do not imply specifications.

Power to backlight and axial luminance were measured and the results expressed as Axial Luminance candelas/m<sup>2</sup>. Similarly, integrated intensity was measured and the result was expressed as Integrated Intensity (Lumens/m<sup>2</sup>).

A very severe “tape-down” test was also performed to measure warp resistance. Comparative performance between the three films is shown at right.

Results show that Vikuiti DBEF II is very similar in brightness to the previous Vikuiti DBEF-M it replaces, with increased resistance to warp and increased haze. Vikuiti DBEF II also shows similar brightness to Vikuiti DBEF-D400, but is much thinner and more suitable for notebook displays where the much thicker and stiffer film is not required.

## Vikuiti™ DBEF II Performance



	No reflective polarizer	Vikuiti™ DBEF II average	Vikuiti™ DBEF-M average	Vikuiti™ DBEF-D400 average
Axis Luminance (cd/m <sup>2</sup> )	1.00	1.28	1.31	1.25
Maximum Luminance (cd/m <sup>2</sup> )	1.00	1.18	1.21	1.13
Integrated Intensity	1.00	1.61	1.63	1.55

Film properties	Vikuiti™ DBEF II
Thickness	150 µm
Haze	40% ±10%
Environmental Performance	1000 hours
Stable:	
- Cold	-40°C
- Dry Heat	85°C
- Heat & Humidity	65°C/95% RH
- Thermal Shock	-40°C/85°C