

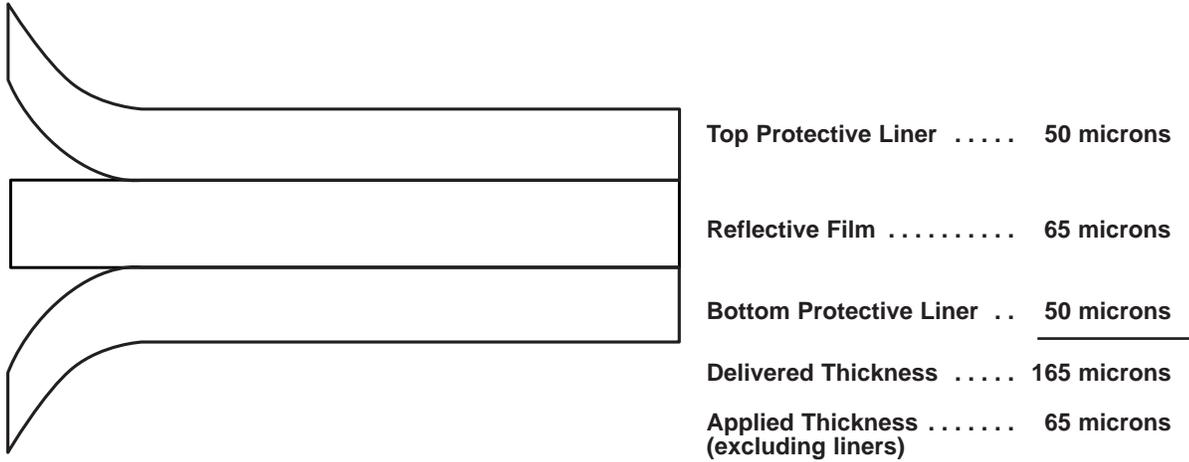


Vikuiti™ Enhanced Specular Reflector (ESR)

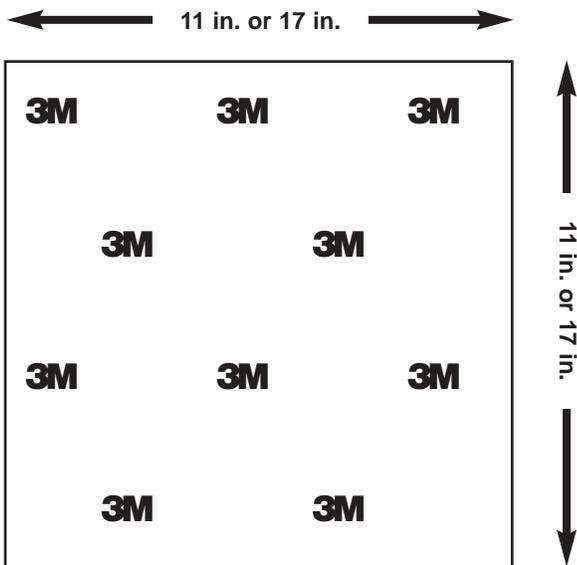
Description

Vikuiti™ Enhanced Specular Reflector (ESR) is an ultra-high reflectivity, mirror-like optical enhancement film. Utilizing 3M's multi-layer polymer technology, its non-metallic thin film construction lends itself to incorporation into a wide variety of configurations and applications. Designed primarily as the rear lightguide reflector to be used with other Vikuiti films for high efficiency brightness enhancement in light recycling LCD applications, it can also be used alone in any application requiring a high performance specular reflector. Its high reflectivity remains relatively constant across the visible spectrum, producing no unwanted color shifts, and thermal stability is good.

The figure below illustrates the film's basic construction. All dimensions are approximate.

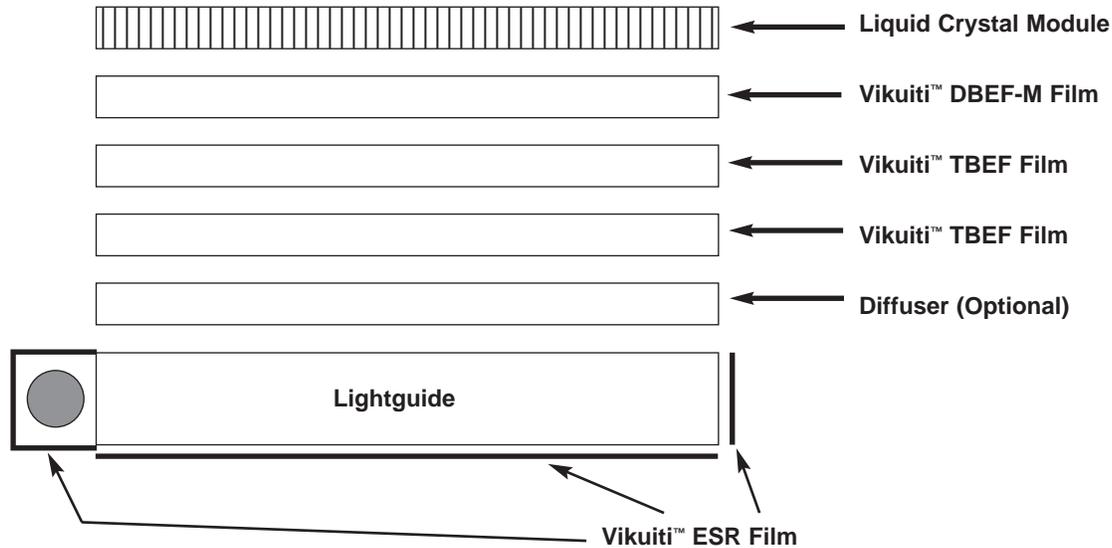


Vikuiti™ Enhanced Specular Reflector (ESR) film is sold in standard sized sheets of 11 in. x 11 in. or 17 in. x 17 in. and has a clear protective liner on both sides. It is also available from 3M as specially converted parts. There are also some special configurations which will be discussed later. The films front and rear surfaces are different in that the front surface is slightly more reflective than the rear surface, although this is not apparent to the naked eye. Maximum performance will, of course, be achieved by using the front surface as the reflector. The front surface can be identified by looking for the “3M” logo pattern printed on the clear protective liner. See the illustration below.



As you can see in the typical application below, Vikuiti ESR film should be incorporated wherever its high reflectivity can be used to keep light loss to an absolute minimum. This would include the rear reflector on the lightguide, and possibly wrapping around its sides and end. It is also very useful to enclose the light source (whether fluorescent tube or LED) in Vikuiti ESR film to get the best possible light injection into the lightguide.

Typical Application



Specialty Configurations

In addition to the standard sized sheets, Vikuiti ESR film is also available in several specialty configurations. Please contact 3M Optical Systems for more information.

Vikuiti™ ESR-PT film (PSA Tape) This is Vikuiti ESR film already converted into cut-size parts with adhesive strips attached for convenient mounting.

Vikuiti™ ESR-B film (Black) This is Vikuiti ESR film with an opaque black coating on the back, for applications where IR radiation must be completely blocked. The front surface must not actually touch the lightguide or there will be distortion due to optical coupling.

Vikuiti™ DESR-M film (Matte) This is Vikuiti ESR film which has a UV protection coating on the front, and is then laminated to a metal substrate, for those designs requiring pre-formed lamp reflector cavities.

Thermal Expansion Considerations

This product is a polymer film that will expand and contract with changes in temperature. Under certain conditions, these dimensional changes can cause minor localized deformations in the flatness of the film. This can result in a warping or rippling effect that can sometimes be visible when the display is energized. This effect can be minimized by considering the following design guidelines:

As the main cause of warping is thermal expansion, anything that reduces the heat load will help. The largest source of heat will probably be from the backlight, although some types of lamps, such as CCFL, will be worse than others, like LED. In your design, try to maintain some distance between the film and the actual light sources. Other sources of heat can be internal battery charging, ambient environmental conditions, as well as the on-board logic circuitry. The film might be protected by other nearby components, such as circuit boards, that can provide insulation from the heat sources as well as additional thermal mass.

The film should be constrained as little as possible, if at all. Expansion coefficients may be as much as 0.2% along both the x and y axes. The best practice is to let the film free-float, with no constraints at all in the x, y, and z axes. If this is not practical, keep the restraints to a minimum by securing along only one edge, or perhaps two adjacent corners. Provide gaps between the film edge and adjacent components in all three axes, so that it may expand freely. For the z-axis, a minimum gap of 0.1 mm should be maintained.

It is practically impossible to reliably predict these effects, and we strongly recommend that proposed designs always be tested under actual environmental and end-user conditions to verify suitability and compatibility with Vikuiti™ Products.

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 can also be acceptable. Whatever method used, you should ensure that the part has clean, crisp edges without any raggedness or other damage.

The part may be left free-floating in the cavity to avoid warping or buckling, or it may be tacked down along edges or corners with an adhesive or double-backed tape. It may also be completely laminated across its entire width.

If left free-floating, the part should be precisely cut so as to provide a close fit in the cavity, yet not so close as to experience binding or warping problems from thermal expansion.

Remove both protective liners by tacking near an edge or corner with a piece of aggressive tape and pulling 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-room gloves and holding the product at the edges.

Keep the area very clean to lessen the likelihood of debris contamination. Maintaining class 1000 cleanroom 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 35 – 65% 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. Should product not meet specifications at time of shipment, 3M will replace or refund the purchase price of such quantity of the product found not to meet specifications. Purchaser shall determine the suitability of the 3M product for purchaser's application. **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.**

The warranties and remedies set forth herein are purchaser's sole and exclusive warranties and remedies.



Electronic Display Lighting Optical Systems Division

3M Center, Building 260-5N-10
St. Paul, MN 55144-1000
www.3M.com/Vikuiti



Minimum 10% Post-Consumer Fiber

Vikuiti and the Vikuiti "Eye" symbol are trademarks of 3M.

Printed in U.S.A.

© 3M 2003
75-0500-5165-7