

How do 3M's solutions address your key needs?

3M Display Enhancement Films

Improve visual quality.

Wider viewing angle

Reduced cosmetic defects

Higher color gamut

Enhance robustness.

Environmentally stable

Ball-drop durable & warp-resistant

Maximize power efficiency.

Increased axial luminance

Longer battery life

Reduce thickness and weight.

Thinner brightness enhancement films

Make your smartphone's performance as impressive as its design.



Enhanced Visual Quality



Weight Reduction


























Thickness Reduction



Power Efficiency



Environmentally Stable

Product Description	Structure	Thickness (μm)	Pitches (μm)	Application		Features
				Smart Phone	Tablet	
Reflective Polarizer & Multifunctional Films						
3M APF-QWP On-glass reflective polarizer with 1/4 wave plate coating		28 ± 3		●	●	On-glass reflective polarizer with 1/4 wave plate coating to further improve brightness
3M APF-QWP+HCS On-glass reflective polarizer		29 ± 3		●	●	On-glass reflective polarizer with 1/4 wave plate and hard coat for improved scratch resistance
3M APF-v3 On-glass reflective polarizer		26 ± 3		●	●	Reflective polarizer laminated to back side of display; imprint resistant
3M APF-v4 On-glass reflective polarizer		16.5 ± 2		●	●	Thinner, reflective polarizer laminated to back side of display
3M APF-v4 HC On-glass reflective polarizer with hardcoat		19.5 +3 / -2		●	●	Thin reflective polarizer with a hardcoat for improved scratch resistance
3M BEFRP2-RCn Backlight reflective polarizer with hard coat		115 ± 10	24	●		Backlight reflective polarizer with hard coat
3M BEFRP2-RZn Backlight reflective polarizer with low haze matte		120 ± 10	24	●		Backlight reflective polarizer with designed matte
3M BEFRP3-RZn Backlight reflective polarizer with low haze matte		72 ± 8	17	●		Thin backlight reflective polarizer with designed matte
Brightness Enhancement Film (BEF)						
3M ASOC3 Advanced Structured Optical Composite for thin backlight		106 ± 7	24	●	●	Integrated dual prism stack for thin backlight
3M ASOC4-LS-82 (24) LH						
3M TBEF2-DML-LS Durable high brightness prism film with low haze matte		70 ± 6	24	●		Durable prisms with designed matte backside at high brightness
3M TBEF2-DT-LS Durable transparent high brightness prism film		65 ± 5	21, 2	●		Durable prisms at high brightness
3M BEF4-DML-95-LS Durable high brightness prism film with low haze matte		95 ± 7	24	●	●	Durable prisms with designed matte backside at high brightness
3M BEF4-DT-90-LS Durable transparent high brightness prism film		90 ± 7	24	●	●	Durable prisms at high brightness
3M BEF4-DMH-95 LS						
Diffusers						
3M UDF2 35 Non-Beaded Diffusers		39 ± 5		●		Designed matte no beads
3M UDF2 50 Non-Beaded Diffusers		52 ± 5		●	●	Designed matte no beads
Reflectors						
3M ASR Advanced specular reflector		82 ± 4		●		New advanced specular reflector—measuring up to 99.9% reflectivity. The most reflective surface in the world.
3M ESR Enhanced specular reflector		65 ± 4		●		Standard enhanced specular reflector for superior light management in handheld devices
3M ESR-80 v2 Enhanced specular reflector for mid-size		82 ± 7		●	●	Standard enhanced specular reflector for superior light management in handheld and tablet devices. Contains anti-wet out surface for increased performance.
3M ESR-B2 Enhanced specular reflector with black coating		72 ± 9		●		Standard enhanced specular reflector for superior light management in handheld devices. Includes black coated backside surface to prevent light leakage.
3M ESR-80-B2 v2 Enhanced specular reflector with black coating		89 ± 9		●	●	Standard enhanced specular reflector for superior light management in handheld and tablet devices. Contains both anti-wet out surface and black coated backside to prevent light leakage.
3M EDR Enhanced Diffuse Reflector		80 ± 7 95 ± 7		●	●	Diffuse coated reflector to enhance performance in large area display.
3M™ Advanced Polarizer Film-Quarter Wave Plate (APF-QWP)				3M™ Thin Brightness Enhancement Film (TBEF)		
3M™ Advanced Polarizer Film (APF)				3M™ Ultra Diffuse Film (UDF)		
3M™ Brightness Enhancement Film Reflective Polarizer (BEFRP)				3M™ Advanced Specular Reflector (ASR)		
3M™ Advanced Structured Optical Composite (ASOC)				3M™ Enhanced Specular Reflector (ESR)		
				3M™ Enhanced Diffuse Reflector (EDR)		



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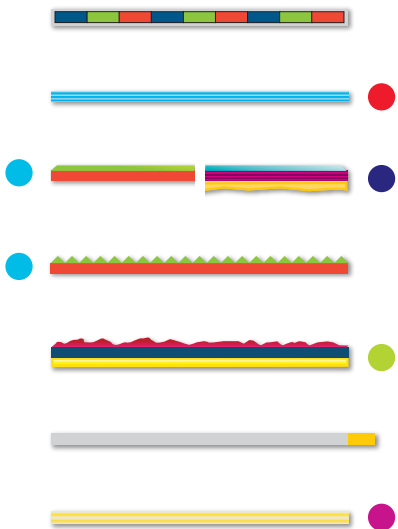
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Applied to Life.™

A brilliant point of view.

3M Display Materials & Systems Division
Display Solutions for Smartphones

3M display enhancement.

Solutions Introduction



● **Reflective Polarizer Films**

3M APF

Reflective Polarizers recycle and recover light that is normally absorbed by the panel to increase the amount of light transmitted to the viewer by 30%-40%.

3M APF (Advanced Polarizer Film) is a reflective polarizer. 3M APF is applied directly to the LCD panel providing a thin and environmentally stable solution.

● **Brightness Enhancement Films**

3M BEF, 3M TBEF, 3M ASOC

Prism films recycle and redirect light to manage the angular output from the backlight increasing forward brightness. A variety of prism and matte combinations are available to mitigate moiré, mura, sparkle and other artifacts, providing crisp, bright and uniform displays.

Durable products provide the brightest durable solution, with better ball drop performance and improved defect hiding.

3M Advanced Structured Optical Composite (ASOC) is an integrated dual prism film stack designed to increase on axis brightness of the backlight, improve the appearance, and enable the thinnest Backlight solution for LCD Display.

● **Multifunctional Films**

3M BEFRP

3M BEFRP (3M Brightness Enhancement Film with Reflective Polarizer) combines the functions of a prism film and a reflective polarizer film into a single high-performance backlight film.

3M BEFRP, usually paired with a bottom 3M BEF, enables reflective polarizers to be used in the backlight as an alternative to on-panel 3M APF.

● **Ultra Diffuser Film**

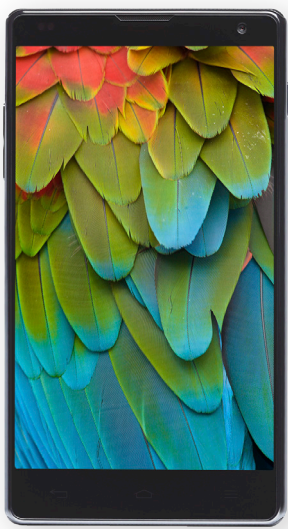
3M UDF

3M UDF is a beadless bottom diffuser film that offers decreased damage to the light guide and eliminates debris from beads.

● **Reflector Films**

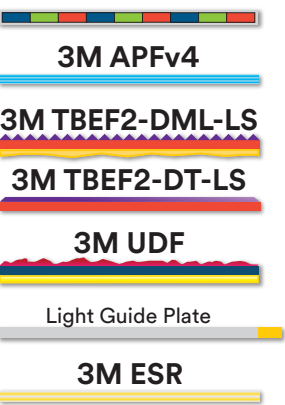
3M ESR

3M ESR (Enhanced Specular Reflector) is a high performance, non-metallic, colorneutral reflector which works synergistically with prisms and reflective polarizers to optimize light recycling in the backlight. 3M ESR will increase the brightness by 10% or more versus silver reflector.



Recommended display solutions for smartphones.

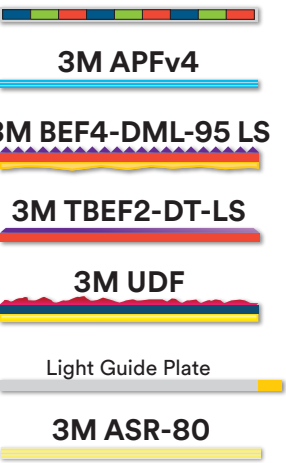
Durable & Bright



3M Film Thickness: 255.5 µm

Durable & Bright

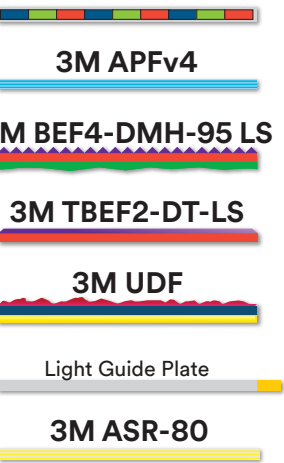
(large sizes)



3M Film Thickness: 297.5 µm

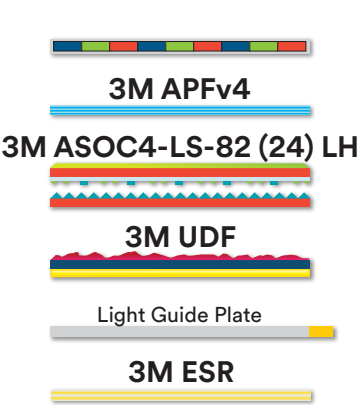
Durable & High Haze

(large sizes)



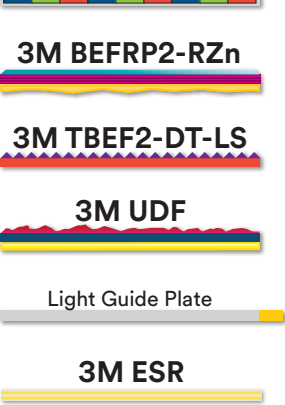
3M Film Thickness: 297.5 µm

Thin & Bright



3M Film Thickness: 226.5 µm

Back Light RP



3M Film Thickness: 289 µm

Why 3M?

3M provides a full suite of high performance optical films. There are several new technologies coming to displays.

With cutting edge R&D, close to 30 years of industry experience, and an extensive global support network, 3M will bring solutions to make your products more appealing to your customer.

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