

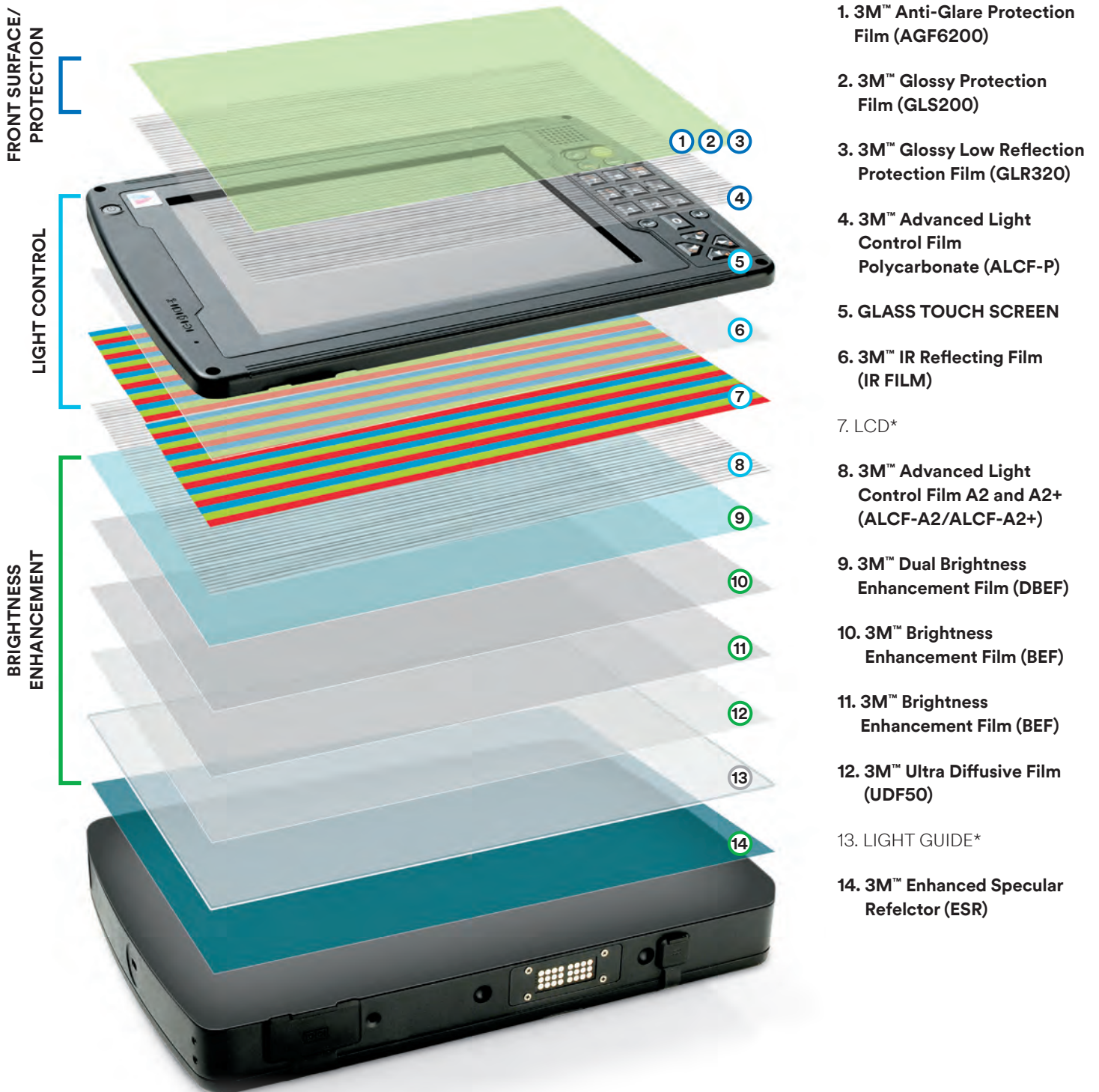


Science.
Applied to Life.™



**Advanced solutions
for protection, light
control and display
enhancement.**

3M Display Films offer advanced solutions for display enhancement above and below the display surface.



*Not 3M Products

Environmental Performance and Specifications

		Transmission	Haze	Clarity	Pencil Hardness	Reflection	Applied Thickness	Cold	Dry Heat	Heat & Humidity	Thermal Shock
PROTECTION FILMS											
3M™ Glossy Low Reflection Protection Film	GLR ¹ (Glossy Low Reflection)	≥ 96%	≤ 0.6%	≥ 99%	3H (200g)	1.95%	.130mm	-40°C/ 500 hours	+85°C/ 500 hours	+60°C/ 90% R.H./ 500 hours ²	+85°C for 1 hour to -40°C for 1 hour, 100 cycles
3M™ Glossy Protection Film	GLS 200 ¹ (Glossy Protection)	≥ 92%	≤ 2%	≥ 99%	4H (500g)	N/A	.155mm				
3M™ Anti-Glare Protection Film	AGF 6200 ¹ (Anti-Glare Protection)	≥ 94%	≤ 20%	≥ 40%	3H (500g)	N/A, anti-glare matte	.146mm				

		Cold	Dry Heat		Heat & Humidity		Thermal Shock		Non-Halogenated	Applied Thickness
		-40°C/ 1,000 hours	+95°C/ 1,000 hours	+85°C/ 1,000 hours	+65°C/ 95% R.H./ 1,000 hours ²	+65°C/ 90% R.H./ 1,000 hours ²	-40°C/1 hour followed by +95°C/1 hour	-40°C/1 hour followed by +85°C/1 hour		

LOUVER FILMS										
3M™ Advanced Light Control Film Polycarbonate	ALCF-P ABRO/ABR2	●		●	●			●		533 μm
3M™ Advanced Light Control Film A2 and A2+	ALCF-A2	●	●			●	●			380 μm
	ALCF-A2+	●	●			●	●			490 μm
3M™ Light Control Film	LCFHI-T48	500 hours	500 hours			500 hours		500 hours		680 μm

PRISM FILMS										
3M™ Brightness Enhancement Film	BEF2-T-155n	●	●			●	●		●	150 μm
	BEF3-T-155n	●	●			●	●		●	155 μm
	BEF3-M2-155n	●	●			●	●		●	154 μm
	BEF4-GT-90 (24)	●	●			●	●		●	90 μm

REFLECTIVE POLARIZERS										
3M™ Dual Brightness Enhancement Film	DBEF-D2-400	●	●			●	●			395 μm
	DBEF-D2-280	●	●			●	●			280 μm
	DBEF-QV2 with OCA	●		●		●		●		117 μm
	DBEF II	●		●	●			●		150 μm
	DBEF-QV2	●		●	●			●		92 μm

REFLECTOR										
3M™ Enhanced Specular Reflection	ESR	●	●			●	●		●	66 μm
	ESR 80v2	●	●			●	●		●	80 μm
	PROTECTED ESR w/adhesive D50 A	●	●		●			●	●	110 μm
	PROTECTED ESR w/adhesive D50 F	●	●		●			●	●	84 μm

DIFFUSER										
3M™ Ultra Diffusive Film	UDF50	●	●			●	●		●	50 μm

¹ Typical Value

² Non-condensing



Film Applications

Mobile Enterprise

- Field Services
 - Inventory
 - Warehouse
 - Delivery
-

Government

- Public Safety
 - Military
 - Law Enforcement
 - Rugged LCDs
 - Aviation
-

Financial

- Mobile Banking
 - ATMs
-

Healthcare

- Medical Records
 - All-In-One Monitors
 - Tablets
 - Patient Check-In
 - Nursing Stations
 - EHRs
-

Entertainment

- In-Flight
 - Gaming Stations
 - Slot Machines
-

Transportation

- Off-Road/Heavy Equipment Vehicles
 - Locomotives
 - Information Displays
 - Aviation
-

Automotive

- Center Console
 - Instrument Cluster
 - Rear-View Mirrors
 - Entertainment Displays
 - Passenger Displays
-

Retail

- Hospitality
 - Retail POS
 - Information Kiosks
 - Digital Signage
-

Protection, Light Control and Display Enhancement

3M Protection Films

3M Display Films are designed to be brighter, lighter-weight, more energy efficient, and durable.

3M™ Glossy Protection Film (GLS200)

- Helps prevent damage, scratches and scuffs
- Instant upgrade in mechanical robustness
- High clarity, glossy finish
- Scotchgard™ easy-to-clean surface
- Chemical and disinfectant resistant

3M™ Glossy Low Reflection Protection Film (GLR320)

- Helps prevent damage, scratches and scuffs
- Reduces annoying reflections
- Enhances display clarity while maintaining glossy finish
- Scotchgard™ easy-to-clean surface
- Chemical and disinfectant resistant

3M™ Anti-Glare Protection Film (AGF6200)

- Helps prevent damage, scratches and scuffs
- Anti-glare matte to reduce mirror-like reflections
- Mask fingerprints
- Minimal impact on display image
- Chemical and disinfectant resistant

3M Light Control Films

Manage the distribution of light with 3M™ MicroLouver Films that create privacy, manage reflections or improve display contrast.

3M™ Advanced Light Control Film Polycarbonate (ALCF-P)

- Create visual security on the outside of LCDs
- +/- 30 degree viewing angle perpendicular to the louvers
- Available with or without matte hardcoat
- Compatible with most touch systems

3M™ Advanced Light Control Film A2 and A2+ (ALCF-A2/ALCF-A2+)

- Help prevent nighttime reflections from glass surfaces of automobiles
- Low birefringent polycarbonate film
- +/- 30 degree viewing angle perpendicular to the louvers
- ALCF-A2+ film features a reflective polarizer (DBEF)

3M™ Light Control Film (LCF)

- Create visual security on the outside of LCDs
- +/- 24 degree viewing angle perpendicular to the louvers
- Polyester-based film

3M Brightness Enhancement Films

Light management films increase the brightness of a display. Use them to increase brightness in the display, or translate them into power savings or thermal management.

3M™ Brightness Enhancement Film (BEF)

- Prismatic film that manages the angular output of light to increase brightness
- Refraction technology compresses backlight output to on-axis viewer
- Cross two sheets of 3M BEF for even higher brightness
- Variety of configurations for specific needs

3M™ Dual Brightness Enhancement Film (DBEF)

- Multilayer, reflective polarizer
- Increases brightness and amount of available light over entire display
- Polarizes a backlight's output to allow more light to pass through to the viewers

- Light normally absorbed and lost by the backlight is "re-polarized"
- Variety of configurations for specific needs

3M™ Enhanced Specular Reflection (ESR)

- Thin, 100% polymer reflector film
- Backlight reflector for displays
- Provides more than 98% reflectance across the entire spectrum
- Maximizes the recycling efficiency of LCD backlights

3M™ Ultra Diffusive Film (UDF50)

- Micro-replicated (beadless) hi-transmission diffuser film
- Eliminates debris/shedding as not a bead coated diffuser

- Ball drop and scratch damage reduction
- Halogen-free diffusion film for improved spatial uniformity and optical efficiency
- Decreased damage to light guide

3M™ IR Reflecting Film (IR FILM)

- Provides thermal management and heat mitigation
- Neutral color and excellent clarity
- $\geq 92\%$ reflection on average in near (800 μm – 1100 μm)
- $\geq 80\%$ transmission on average in visible (400 μm – 700 μm)

3M Automotive Grade Films

Offering benefits critical to the automotive industry.

3M offers a full line of enhancement films that can be used to increase the design freedom for automotive interiors. They are used to manage reflections, manipulate light distribution and increase display brightness. Benefits can include improved driver/passenger viewability, increased thermal management and more flexibility in interior designs.

- Center console displays
- Instrument cluster displays
- Rear-seat displays
- Rear-view mirror displays
- Lighting elements



Design freedom through reflection control.

3M™ Advanced Light Control Film A2 and A2+ (ALCF-A2 and A2+) manage reflections created by stray light exiting automotive displays and instrumentation. These reflections, on the windshield or side glass, can cause driver distraction. Managing this light allows automotive interior designs to be more open. ALCF-A2+ film has the added advantage of brightness enhancement with the inclusion of 3M™ Dual Brightness Enhancement Film (DBEF) in its construction.

3M has been supplying enhancement films to the LCD monitor industry since its emergence, reliably offering solutions customized to meet the demands of new technologies. 3M is committed to providing industry-leading service and support for the complete line of film products and the designers, engineers and brands that implement them.

**For more information visit 3M.com/displayenhancement
or call 1-800-553-9215**

Intended Use: Not intended for household or personal use.

IMPORTANT NOTICE TO PURCHASER: Specifications are subject to change without notice. These 3M Touch Systems' Products and software are warranted to meet their published specifications from the date of shipment and one year from the time of purchase. 3M Touch Systems makes no additional warranties, express or implied, including but not limited to any implied warranties of merchantability or fitness for a particular purpose. User is responsible for determining whether the 3M Touch Systems Products and software are fit for User's particular purpose and suitable for its method of production, including intellectual property liability for User's application. If the Product, software or software media is proven not to have met 3M Touch Systems' warranty, then 3M Touch Systems' sole obligation and User's and Purchaser's exclusive remedy will be, at 3M Touch Systems' option, to repair or replace that Product quantity or software media or to refund its purchase price. 3M Touch Systems has no obligation under 3M Touch Systems' warranty for any Product, software or software media that has been modified or damaged through misuse, accident, neglect, or subsequent manufacturing operations or assemblies by anyone other than 3M Touch Systems. 3M Touch Systems shall not be liable in any action against it in any way related to the Products or software for any loss or damages, whether non-specified direct, indirect, special, incidental or consequential (including downtime, loss of profits or goodwill) regardless of the legal theory asserted. (7/02)



Display Materials & Systems Division – Specialty Display Systems
3M Center, Building 235-2S-62
St. Paul, MN 55144-1000

3M and Scotchgard are trademarks of 3M Company. Please recycle. Printed in USA © 3M 2016. All rights reserved.
75-0501-3927-0

Protection, Light Control and Display Enhancement

3M Protection Films

3M Display Films are designed to be brighter, lighter-weight, more energy efficient, and durable.

3M™ Glossy Protection Film (GLS200)

- Helps prevent damage, scratches and scuffs
- Instant upgrade in mechanical robustness
- High clarity, glossy finish
- Scotchgard™ easy-to-clean surface
- Chemical and disinfectant resistant

3M™ Glossy Low Reflection Protection Film (GLR320)

- Helps prevent damage, scratches and scuffs
- Reduces annoying reflections
- Enhances display clarity while maintaining glossy finish
- Scotchgard™ easy-to-clean surface
- Chemical and disinfectant resistant

3M™ Anti-Glare Protection Film (AGF6200)

- Helps prevent damage, scratches and scuffs
- Anti-glare matte to reduce mirror-like reflections
- Mask fingerprints
- Minimal impact on display image
- Chemical and disinfectant resistant

3M Light Control Films

Manage the distribution of light with 3M™ MicroLouver Films that create privacy, manage reflections or improve display contrast.

3M™ Advanced Light Control Film Polycarbonate (ALCF-P)

- Create visual security on the outside of LCDs
- +/- 30 degree viewing angle perpendicular to the louvers
- Available with or without matte hardcoat
- Compatible with most touch systems

3M™ Advanced Light Control Film A2 and A2+ (ALCF-A2/ALCF-A2+)

- Help prevent nighttime reflections from glass surfaces of automobiles
- Low birefringent polycarbonate film
- +/- 30 degree viewing angle perpendicular to the louvers
- ALCF-A2+ film features a reflective polarizer (DBEF)

3M™ Light Control Film (LCF)

- Create visual security on the outside of LCDs
- +/- 24 degree viewing angle perpendicular to the louvers
- Polyester-based film

3M Brightness Enhancement Films

Light management films increase the brightness of a display. Use them to increase brightness in the display, or translate them into power savings or thermal management.

3M™ Brightness Enhancement Film (BEF)

- Prismatic film that manages the angular output of light to increase brightness
- Refraction technology compresses backlight output to on-axis viewer
- Cross two sheets of 3M BEF for even higher brightness
- Variety of configurations for specific needs

- Light normally absorbed and lost by the backlight is “re-polarized”
- Variety of configurations for specific needs

3M™ Enhanced Specular Reflection (ESR)

- Thin, 100% polymer reflector film
- Backlight reflector for displays
- Provides more than 98% reflectance across the entire spectrum
- Maximizes the recycling efficiency of LCD backlights

3M™ Ultra Diffusive Film (UDF50)

- Micro-replicated (beadless) hi-transmission diffuser film
- Eliminates debris/shedding as not a bead coated diffuser

3M™ Dual Brightness Enhancement Film (DBEF)

- Multilayer, reflective polarizer
- Increases brightness and amount of available light over entire display
- Polarizes a backlight's output to allow more light to pass through to the viewers

- Ball drop and scratch damage reduction
- Halogen-free diffusion film for improved spatial uniformity and optical efficiency
- Decreased damage to light guide

3M™ IR Reflecting Film (IR FILM)

- Provides thermal management and heat mitigation
- Neutral color and excellent clarity
- ≥ 92% reflection on average in near (800 μm – 1100 μm)
- ≥ 80% transmission on average in visible (400 μm – 700 μm)

3M Automotive Grade Films

Offering benefits critical to the automotive industry.

3M offers a full line of enhancement films that can be used to increase the design freedom for automotive interiors. They are used to manage reflections, manipulate light distribution and increase display brightness. Benefits can include improved driver/passenger viewability, increased thermal management and more flexibility in interior designs.

- Center console displays
- Instrument cluster displays
- Rear-seat displays
- Rear-view mirror displays
- Lighting elements



Design freedom through reflection control.

3M™ Advanced Light Control Film A2 and A2+ (ALCF-A2 and A2+) manage reflections created by stray light exiting automotive displays and instrumentation. These reflections, on the windshield or side glass, can cause driver distraction. Managing this light allows automotive interior designs to be more open. ALCF-A2+ film has the added advantage of brightness enhancement with the inclusion of 3M™ Dual Brightness Enhancement Film (DBEF) in its construction.

3M has been supplying enhancement films to the LCD monitor industry since its emergence, reliably offering solutions customized to meet the demands of new technologies. 3M is committed to providing industry-leading service and support for the complete line of film products and the designers, engineers and brands that implement them.

For more information visit 3M.com/displayenhancement or call 1-800-553-9215

Intended Use: Not intended for household or personal use.

IMPORTANT NOTICE TO PURCHASER: Specifications are subject to change without notice. These 3M Touch Systems' Products and software are warranted to meet their published specifications from the date of shipment and one year from the time of purchase. 3M Touch Systems makes no additional warranties, express or implied, including but not limited to any implied warranties of merchantability or fitness for a particular purpose. User is responsible for determining whether the 3M Touch Systems Products and software are fit for User's particular purpose and suitable for its method of production, including intellectual property liability for User's application. If the Product, software or software media is proven not to have met 3M Touch Systems' warranty, then 3M Touch Systems' sole obligation and User's and Purchaser's exclusive remedy will be, at 3M Touch Systems' option, to repair or replace that Product quantity or software media or to refund its purchase price. 3M Touch Systems has no obligation under 3M Touch Systems' warranty for any Product, software or software media that has been modified or damaged through misuse, accident, neglect, or subsequent manufacturing operations or assemblies by anyone other than 3M Touch Systems. 3M Touch Systems shall not be liable in any action against it in any way related to the Products or software for any loss or damages, whether non-specified direct, indirect, special, incidental or consequential (including downtime, loss of profits or goodwill) regardless of the legal theory asserted. (7/02)



Display Materials & Systems Division – Specialty Display Systems
3M Center, Building 235-2S-62
St. Paul, MN 55144-1000

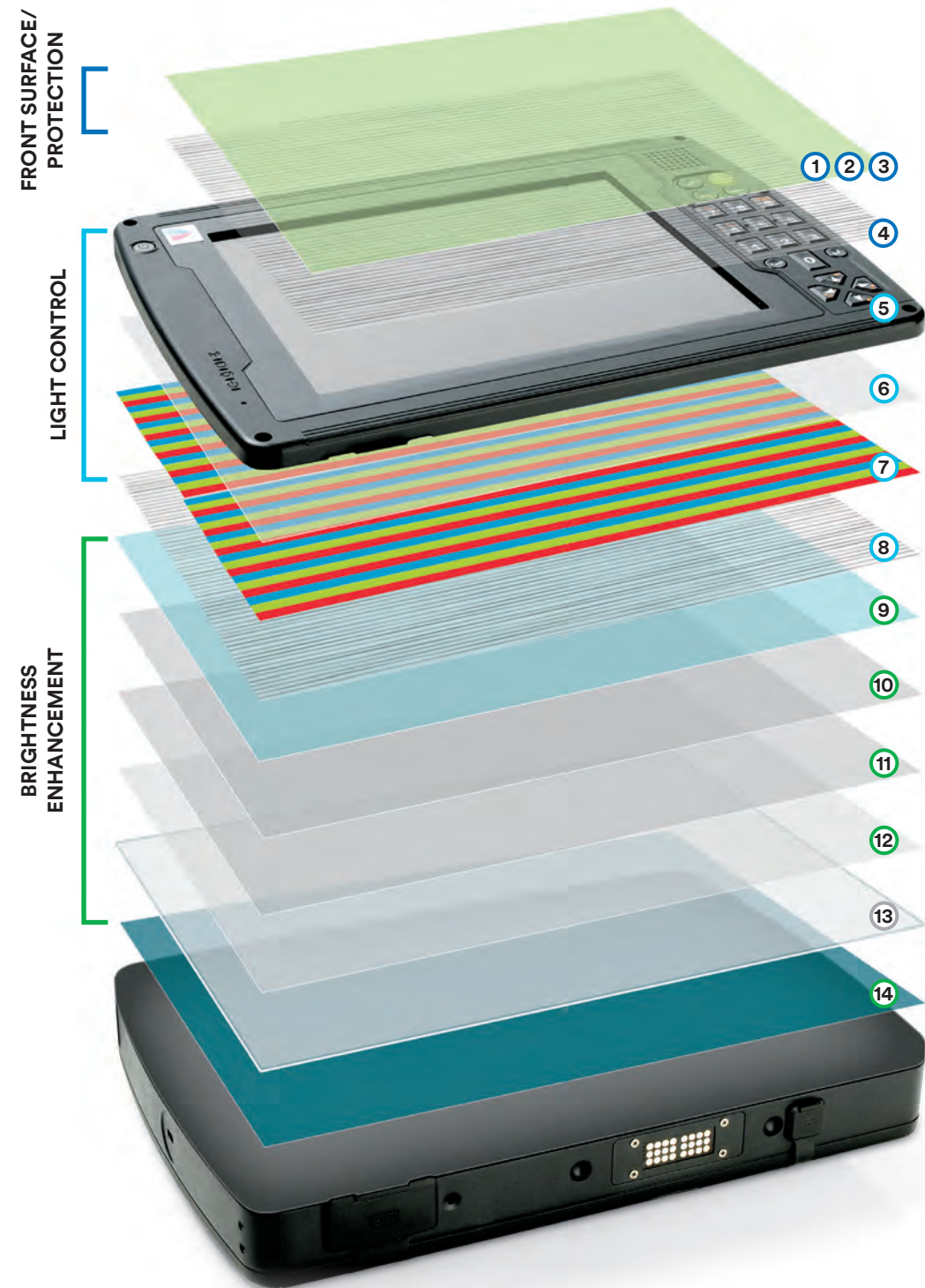
3M and Scotchgard are trademarks of 3M Company. Please recycle. Printed in USA © 3M 2016. All rights reserved. 75-0501-3927-0

3M Science.
Applied to Life.™



Advanced solutions for protection, light control and display enhancement.

3M Display Films offer advanced solutions for display enhancement above and below the display surface.



1. 3M™ Anti-Glare Protection Film (AGF6200)
2. 3M™ Glossy Protection Film (GLS200)
3. 3M™ Glossy Low Reflection Protection Film (GLR320)
4. 3M™ Advanced Light Control Film Polycarbonate (ALCF-P)
5. GLASS TOUCH SCREEN
6. 3M™ IR Reflecting Film (IR FILM)
7. LCD*
8. 3M™ Advanced Light Control Film A2 and A2+ (ALCF-A2/ALCF-A2+)
9. 3M™ Dual Brightness Enhancement Film (DBEF)
10. 3M™ Brightness Enhancement Film (BEF)
11. 3M™ Brightness Enhancement Film (BEF)
12. 3M™ Ultra Diffusive Film (UDF50)
13. LIGHT GUIDE*
14. 3M™ Enhanced Specular Refelctor (ESR)

Environmental Performance and Specifications

		Transmission	Haze	Clarity	Pencil Hardness	Reflection	Applied Thickness	Cold	Dry Heat	Heat & Humidity	Thermal Shock
PROTECTION FILMS											
3M™ Glossy Low Reflection Protection Film	GLR ¹ (Glossy Low Reflection)	≥ 96%	≤ 0.6%	≥ 99%	3H (200g)	1.95%	.130mm				
3M™ Glossy Protection Film	GLS 200 ¹ (Glossy Protection)	≥ 92%	≤ 2%	≥ 99%	4H (500g)	N/A	.155mm	-40°C/ 500 hours	+85°C/ 500 hours	+60°C/ 90% R.H./ 500 hours ²	+85°C for 1 hour to -40°C for 1 hour, 100 cycles
3M™ Anti-Glare Protection Film	AGF 6200 ¹ (Anti-Glare Protection)	≥ 94%	≤ 20%	≥ 40%	3H (500g)	N/A, anti-glare matte	.146mm				

	Cold	Dry Heat	Heat & Humidity	Thermal Shock	Non-Halogenated	Applied Thickness
	-40°C/ 1,000 hours	+95°C/ 1,000 hours	+85°C/ 1,000 hours	+65°C/ 95% R.H./ 1,000 hours ²	+65°C/ 90% R.H./ 1,000 hours ²	
				-40°C/1 hour followed by +95°C/1 hour	-40°C/1 hour followed by +85°C/1 hour	

LOUVER FILMS											
3M™ Advanced Light Control Film Polycarbonate	ALCF-P ABR0/ABR2	●		●	●						533 μm
3M™ Advanced Light Control Film A2 and A2+	ALCF-A2	●	●		●	●					380 μm
	ALCF-A2+	●	●		●	●					490 μm
3M™ Light Control Film	LCFHI-T48	500 hours	500 hours		500 hours			500 hours			680 μm

PRISM FILMS											
3M™ Brightness Enhancement Film	BEF2-T-155n	●	●		●	●			●		150 μm
	BEF3-T-155n	●	●		●	●			●		155 μm
	BEF3-M2-155n	●	●		●	●			●		154 μm
	BEF4-GT-90 (24)	●	●		●	●			●		90 μm

REFLECTIVE POLARIZERS											
3M™ Dual Brightness Enhancement Film	DBEF-D2-400	●	●		●	●					395 μm
	DBEF-D2-280	●	●		●	●					280 μm
	DBEF-QV2 with OCA	●		●	●			●			117 μm
	DBEF II	●		●	●			●			150 μm
	DBEF-QV2	●		●	●			●			92 μm

REFLECTOR											
3M™ Enhanced Specular Reflection	ESR	●	●		●	●			●		66 μm
	ESR 80v2	●	●		●	●			●		80 μm
	PROTECTED ESR w/adhesive D50 A	●	●		●			●	●		110 μm
	PROTECTED ESR w/adhesive D50 F	●	●		●			●	●		84 μm

DIFFUSER											
3M™ Ultra Diffusive Film	UDF50	●	●		●	●			●		50 μm

¹ Typical Value ² Non-condensing



Film Applications

Mobile Enterprise

- Field Services
- Inventory
- Warehouse
- Delivery

Government

- Public Safety
- Military
- Law Enforcement
- Rugged LCDs
- Aviation

Financial

- Mobile Banking
- ATMs

Healthcare

- Medical Records
- All-In-One Monitors
- Tablets
- Patient Check-In
- Nursing Stations
- EHRs

Entertainment

- In-Flight
- Gaming Stations
- Slot Machines

Transportation

- Off-Road/Heavy Equipment Vehicles
- Locomotives
- Information Displays
- Aviation

Automotive

- Center Console
- Instrument Cluster
- Rear-View Mirrors
- Entertainment Displays
- Passenger Displays

Retail

- Hospitality
- Retail POS
- Information Kiosks
- Digital Signage

*Not 3M Products