

Product Description

3M™ Specular Film Protected D50 (“SFP-D50” or “Product”) is the next generation of 3M's high performance ultra-high reflectivity film, which is greater than 98.5% reflective over the full visible spectrum and all incident angles. SFP-D50 is specially formulated to provide increased durability and UV irradiance stability when used in high intensity LED light engines over 3M DF2000MA Specular Film.

SFP-D50A is coated with a pressure-sensitive adhesive, and has a release liner for easy attachment. A protective coating on the reflective use side provides abrasion resistance to allow for mild cleaning.

SFP D50F is the same as SFP D50A without the adhesive coating.

Recommended End Uses

SFP-D50 is particularly well suited as a cavity reflector for flat and conical surfaces.

Key Attributes

- Superior specular reflectivity at >98.5%
- UV and high intensity LED irradiance stability
- Nonconductive 100% polymeric film
- Available with or without adhesive
- Significantly increased lifetime in high intensity LED light engines
- Protective coating allows for mild cleaning

Product Characteristics

Typical values for SFP-D50:

| Physical Characteristics | | Value | Test Method |
|----------------------------|----------------------------|------------------------|--------------------|
| Film Type | | Polymeric | - |
| Liner, Adhesive | | Polyester | - |
| Adhesive | | Pressure-sensitive | - |
| Width | | 25 in. (64 cm) | 3M |
| Thickness (nominal) | Film (SFP-D50F) | 3.3 mils (84 microns) | 3M |
| | Film + Adhesive (SFP-D50A) | 4.5 mils (114 microns) | |
| Electrical Characteristics | | Value | Test Method |
| Dielectric Strength | | 12.0 ± 1.0 kV | ASTM D257/ D149 |

SFP-D50 Product Construction

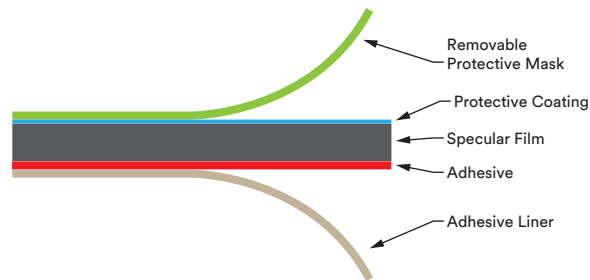


Figure 1. SFP-D50A Product Construction

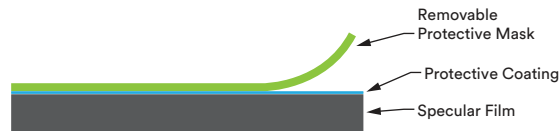


Figure 2. SFP-D50F Product Construction

Adhesion Results for SFP-D50A

| Substrate (24 hr @ RT) | 180 degree peel at 12 in./min. (lbs./in) | |
|------------------------|--|-----------|
| | Average | Std. Dev. |
| Polycarbonate | 8.46 | 2.14 |
| PETG | 7.43 | 0.64 |
| Acrylic | 6.61 | 0.28 |
| ABS | 5.60 | 1.72 |
| Aluminum | 9.75 | 1.16 |
| Stainless Steel | 6.47 | 0.60 |

Typical Normal Angle Spectral Response SFP-D50

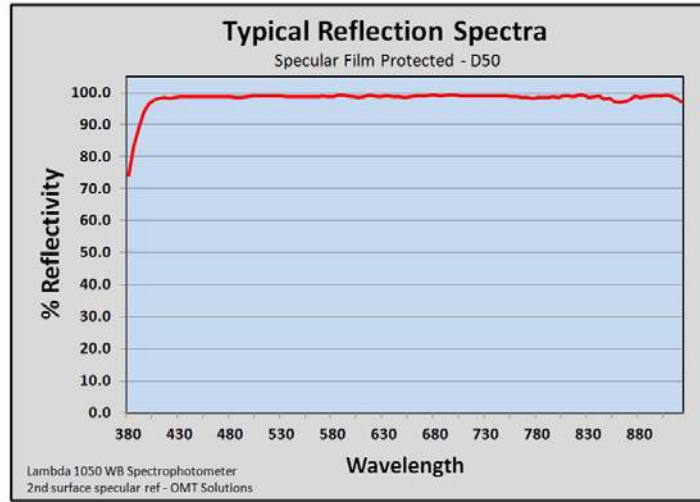


Figure 3. Typical Normal Angle Spectral Response SFP-D50

Operating Temperature Range

Up to 105°C.

Shrinkage At Operating Temperature

| Characteristic | Value | Test Method |
|----------------|--------|-------------|
| 105°C, 15 mins | ≤ 0.5% | 3M |

Environmental Performance

Optical and physical properties stable under these test conditions:

| Cycle | Environment/Duration |
|-----------------------|---|
| Cold Temperature | -40 °C, 1000 hrs |
| Hot Temperature/Dry | 100 °C, 1000 hrs |
| Hot Temperature/Humid | 65 °C/95% RH, 1000 hrs |
| Thermal Shock | -40 °C to 85 °C, 100 cycles, 1 hour dwell |
| Total Reflectivity | < 0.5% shift |
| ΔE Color Shift | < 0.4 |

Suitable Substrates

The user is ultimately responsible for confirming adequate adhesion of SFPD50A to their substrate. Read Application Instructions below for directions to enhance long term adhesion of SFP-D50A film to your substrate. Tested substrates that are considered suitable include Polycarbonate, ABS, PETG, Acrylic, PVC, and Aluminum.

Application Instructions

Refer to the 3M™ Specular Film Installation Guide for application instructions.

Shelf Life, Storage and Shipping

Shelf Life

Install the Product within 1 year from date of purchase as long as the storage conditions listed below are met.

Storage Conditions

- 40 °F - 100 °F (4 °C - 38 °C)
- Away from direct sunlight and high humidity
- Clean dry area
- Original container with end caps, in the plastic sleeve, stored horizontally, maximum of 6 cartons high

Shipping

Ship Product in original container with end caps, in the plastic sleeve, stored horizontally, maximum of 6 cartons high.

Cleaning and Maintenance

To clean light smudges and fingerprints from SFP-D50 film, use glass cleaner and clean cotton wipes or equivalent. DO NOT apply spray cleaner directly to the reflector surface. Instead, apply spray cleaner to the wipes, and use a gentle circular cleaning motion. The abrasion resistant coating is intended only to protect against light contact. Repeated cleaning could lead to scratches over time.

Health and Safety

CAUTION

When handling any chemical products, read the manufacturers' container labels and the Safety Data Sheets (SDS) for important health, safety and environmental information. To obtain SDS sheets for 3M products go to 3M.com/SDS, or by mail or in case of an emergency, call 1-888-364-3577 or 1-651-737-6501.

When using any equipment, always follow the manufacturers' instructions for safe operation.

Technical Information

Technical information and data, recommendations, and other statements provided by 3M are based on information, tests, or experience which 3M believes to be reliable, but the accuracy or completeness of such information is not guaranteed. Such technical information and data are intended for persons with knowledge and technical skills sufficient to assess and apply their own informed judgment to the information. The typical values shown should not be used for the purpose of specification limits. If you have questions about this Product, contact the Technical Service helpline at 1-888-650-3497.

WARRANTY

Product

3M™ Specular Film Protected D50 (the “Product”).

Warranted Characteristics

| Characteristic | Value | Test Method |
|------------------------------------|---------|---|
| Photopic Reflectivity ¹ | > 98.5% | ASTM E1164/E308 |
| Reflected Color/ Shift CIE u, v | ≤ 0.001 | ASTM E1164/E308 4000K LED or D65, 2° Observer |

Limited Warranty

- 3M warrants that the Product will be free from defect in manufacture (“3M Warranty”) for three years from the date of shipment by 3M or its authorized distributor (“Warranty Period”). EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, THE 3M WARRANTY IS MADE IN LIEU OF ALL OTHER WARRANTIES, RIGHTS OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY, SATISFACTORY QUALITY, FITNESS FOR A PARTICULAR PURPOSE AND THOSE ARISING FROM A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. THE BUYER IS RESPONSIBLE FOR DETERMINING IF A PRODUCT IS SUITABLE FOR ITS PARTICULAR PURPOSE AND APPLICATION METHODS.
- For a buyer’s convenience, 3M may provide engineering or technical information, recommendations, installation instructions or guides, and other information or materials relating to a Product (“Other Product Information”), but 3M makes only the 3M Warranty and does not warrant any Other Product Information.
- 3M has no obligation under the 3M Warranty as to Product that has been: (a) modified, altered or processed in any manner; (b) stored, applied, installed, or used in a manner other than that 3M recommends in the Technical Data Sheet and Installation Guide and in all Other Product Information; (c) damaged through contact with a person or thing, misuse, accident, neglect, or other action by anyone other than 3M; (d) improperly installed, including, without limitation, installation after the expiration the Product’s shelf life or installation without proper surface preparation, or (e) exposed to excessive heat, humidity, dirt or UV light.
- 3M must receive any 3M Warranty claim in writing no later than 10 business days after (a) the end of the Warranty Period or (b) the discovery of the 3M Warranty claim, whichever is earlier.

Limited Remedy

IF ANY PRODUCT IS PROVEN NOT TO HAVE MET THE 3M WARRANTY DURING THE WARRANTY PERIOD, THEN THE BUYER’S EXCLUSIVE REMEDY, AND 3M’S SOLE OBLIGATION, WILL BE, AT 3M’S OPTION, TO REPLACE THE NONCONFORMING PRODUCT OR TO REFUND THE NONCONFORMING PRODUCT’S PURCHASE PRICE.

Limitation of Liability

3M WILL NOT UNDER ANY CIRCUMSTANCES BE LIABLE TO A BUYER FOR DIRECT (other than the Limited Remedy stated above), SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES (INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS) IN ANY WAY RELATED TO THE PRODUCT, THE TECH DATA SHEET OR OTHER PRODUCT INFORMATION, REGARDLESS OF THE LEGAL OR EQUITABLE THEORY ON WHICH SUCH DAMAGES ARE SOUGHT.