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## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

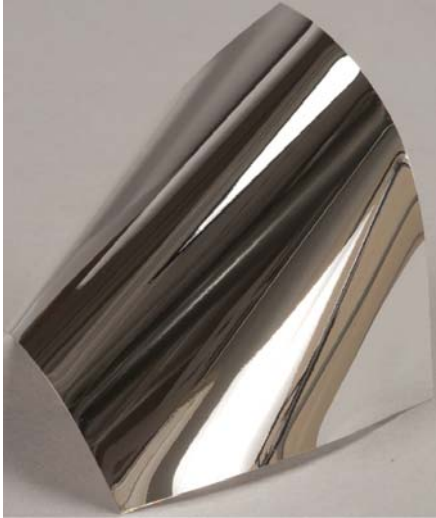
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



# 3M™ Specular Film Protected - D50F

## Technical Data Sheet

Release A, January 2014



### Product Description

3M™ Specular Film - Protected D50F (“SFP-D50F” or “Product”) consists of 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-D50F is specially formulated to provide significantly increased lifetime when used in high intensity LED light engines over the standard SFP product. The Product also shows significant lifetime improvement over the standard SFP product for UV irradiance stability.

A protective coating on the premask side provides abrasion resistance to allow for mild cleaning.

### Recommended End Uses

SFP-D50F is particularly well suited as a cavity reflector applique for planar and conical surfaces. The Product is available as a sheet kit and as custom cut shapes.

### Key Attributes

- Superior specular reflectivity at >98.5%
- UV and high intensity LED irradiance stability
- Abrasion resistant coating
- Nonconductive 100% polymeric film
- Cut to custom shapes

### Product Characteristics

Typical values for SFP-D50F shown below are based on test data deemed reliable but not warranted, except for those values identified in the Warranted Characteristics section.

#### Physical

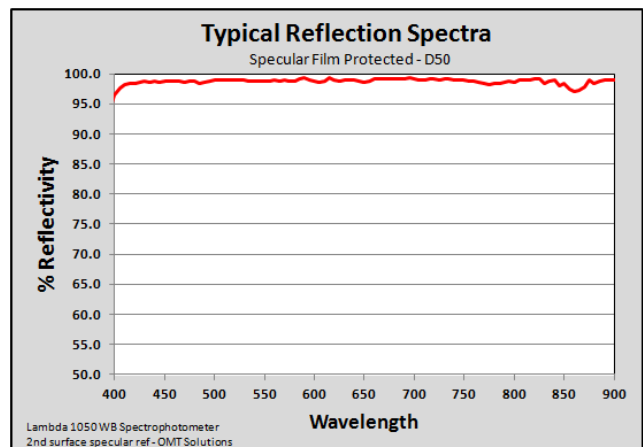
Characteristic	Value	Test
Total Thickness (with Premask)	0.0045 in (0.11 mm, 4.5 mils)	Micrometer
Film only	0.0033 in (0.084 mm, 3.3 mils)	Micrometer
Premask	0.0012 in (0.030 mm, 1.2 mils)	Micrometer
Construction	100% polymeric	N/A

#### Electrical

Dielectric Strength	12.0 ± 1.0 (kV)	ASTM D257/D149
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#### Optical

Photopic Reflectivity	≥ 98.5%	ASTM E1164/E308
Reflected Color Shift		
CIE a*, b*	0 ± 2 unit	ASTM E1164/E308
CIE u, v	≤ 0.001	4000K LED or D65, 2° Observer



## Operating Temperature Range

Up to 105°C.

## Shrinkage At Operating Temperature

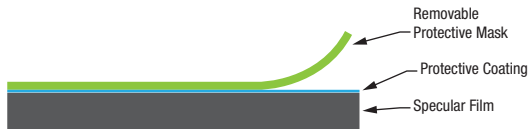
Characteristic	Value	Test
105°C, 15 mins	≤ 0.5%	3M

## 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

## Product Construction



## Application Instructions

Depending on the application, simply cut the film to the desired size.

## Cleaning

To clean light smudges and fingerprints from SFP-D50F 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.

## Recommended Storage Conditions

Store SFP-D50F in its original container, out of direct sunlight, in a clean, dry area, at 40° to 100°F (4° to 38°C), for no more than one year.

## Warranted Characteristics

Characteristic	Value	Test
Photopic Reflectivity <sup>1</sup>	≥ 98.5%	ASTM E1164/E308
Reflected Color Shift CIE u, v	≤ 0.001	ASTM E1164/E308 4000K LED or D65, 2° Obs

<sup>1</sup> - Average of 1ft<sup>2</sup>, spectra acquired using a Perkin Elmer model 1050 and normalized with a traceable specular reference standard from OMT Solutions BV.



## Limited Warranty

1. 3M warrants that the Product will have the Warranted Characteristics on the buyer's receipt of Product (the "3M Warranty"). 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, 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.

2. For a buyer's convenience, 3M may provide engineering or technical information, recommendations, installation instructions, and other information or materials relating to Product ("Other Product Information"), but 3M makes only the 3M Warranty and does not warranty any Other Product Information.

3. 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 this Product Bulletin/Technical Data Sheet and in Other Product Information; (c) damaged through contact with a person or thing, misuse, accident, neglect, or other action by anyone other than 3M; or (d) affected by environmental forces or stresses, such as excessive heat or water exposure.

## Limited Remedy

If any Product is proven not to have met the 3M Warranty on the buyer's receipt, then the buyer's exclusive remedy, and 3M's sole obligation, will be, at 3M's option, to replace that Product quantity or refund the applicable 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 A PRODUCT, THIS PRODUCT BULLETIN/TECHNICAL DATA SHEET, OR OTHER PRODUCT INFORMATION, REGARDLESS OF THE LEGAL OR EQUITABLE THEORY ON WHICH SUCH DAMAGES ARE SOUGHT.



### 3M Architectural Markets 3M U.S.

3M Center  
Building 220-7W-07  
St. Paul, MN 55144-1000  
1-888-650-3497  
3MArchitecturalMarkets.com

### 3M Canada

1840 Oxford St E  
London, ON N5V 3R6  
1-800-265-1840

### 3M Architectural Markets 3M Europe

Hermeslaan 7  
1831 Diegem  
Belgium  
[www.3M.eu/ArchitecturalMarkets](http://www.3M.eu/ArchitecturalMarkets)

### 3M Architectural Markets 3M Italia, S.p.A.

Via Nortberto Bobbio, 21  
20096 Pioltello MI  
Tel. 02.7035.2517  
[www.dubic.it](http://www.dubic.it)

### 3M India Limited Architectural Markets Department

Concorde Blook, UB City  
24 Vittal Mallya Road, Bangalore 560 001  
Tel: 080 2223 1414 Fax: 080 2223 1450  
3minteriors.in@mmm.com  
www.3M.com/in/interiors  
www.spacesunleased.com

### 3M Architectural Markets 3M Gulf

PO Box 20191, Dubai Internet City  
Building @ 11  
Dubai, United Arab Emirates  
Tel. 971 4 3670 777  
Fax 971 4 3670 998

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