



Product Description

3M™ Specular Film DF2000MA (the “Product”) is a polymeric film providing specular reflection with greater than 99% reflectivity of visible light. This metal free, non-corroding and nonconducting film is well-suited for daylighting applications. It has a pressure-sensitive adhesive for a secure bond and a polyethylene liner to protect its reflective surface during installation.

Recommended End Uses

DF2000MA may be used for a variety of commercial and residential applications.

Unsuitable End Uses

- Exposure to sunlight radiation wavelengths less than 380 nm
- Abrasive conditions, which may scratch the film

Product Characteristics

The values in these tables are typical, and are based on test data deemed reliable, but are not warranted.

Physical Characteristics		Value	Test Method
Film Type		Polymeric	-
Adhesive		Pressure-sensitive acrylic, permanent	-
Release Liner		Paper	-
Thickness	Film + Adhesive	4.1 mils (66 microns)	3M
	Film only	2.6 mils (38 microns)	
Width	Film + Liners	51 in. (130 cm)	-
	Adhesive	>49 in. (125 cm)	-
Total Density (film layer, adhesive and liners)		20 ft ² /lb (4 m ² /kg)	3M
Tensile Strength (film)		> 35 lb/in. (6.2 kg/cm)	ASTM D-882
Elongation at Break (film)		> 60%	ASTM D-882
Modulus (film)		> 550 lb/in ² (39 kg cm ²)	ASTM D-882
Heat Shrinkage (film)		< 1% at 302°F (150°C), 15 minutes	ASTM D-1204-02

DF2000MA Product Construction

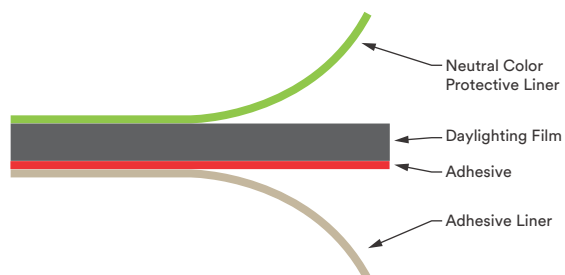


Figure 1. Product Construction

Typical Normal Angle Spectral Response DF2000MA

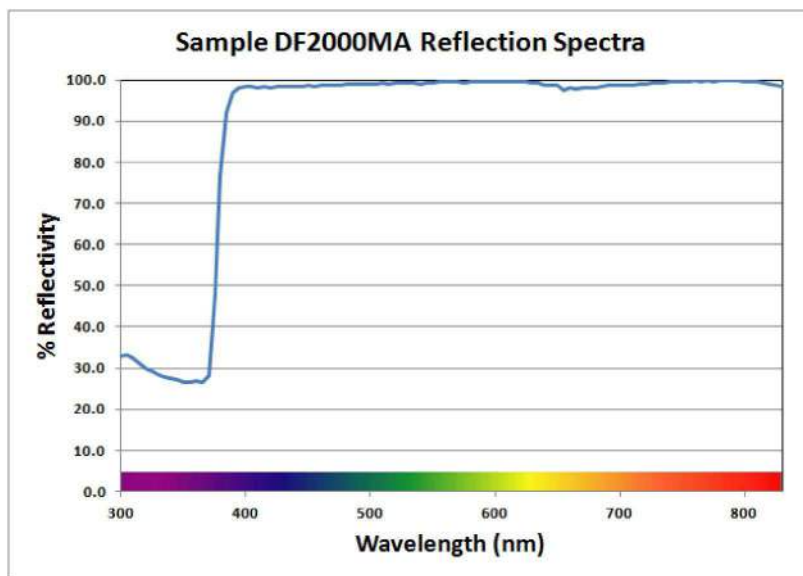


Figure 2. Typical Normal Angle Spectral Response DF2000MA

Application and Use Characteristics

Characteristic	Description
Surface Type	Flat and simple curved surfaces
Substrate Type	Laminated on any substrate the user tests and approves Cold formed on aluminum sheeting
Application Temperature	72°F - 120°F (22°C - 49°C) For other application needs, contact your 3M sales representative.
Use Temperature	40°F - 221°F (4°C - 105°C)

Handling and Fabrication



Before using any equipment, always follow the manufacturer's instructions for safe operation.

Handling: If purchasing in a roll, the roll weight typically exceeds 1000 pounds (454 kg). Lifting equipment is required when handling rolls to avoid injury or damage to the film.

Protective Liner: To prevent scratching or marking the film's reflective surface, do not remove the protective liner until all fabrication and installation processes are finished. When ready, carefully remove the liner.

Lamination: This film can be applied with a roll laminator. Use a dry application method only. Keep the protective liner on the film during the entire lamination process.

Application Instructions

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

UV and Environmental Durability

High Intensity Radiant Flux

When using high intensity radiant light sources such as LED's, designs should be considered which minimize radiant flux density, time of exposure and heat. In high irradiance applications, the Product can begin to yellow and brown in time. Initial models estimate that the first onset of yellowing will occur after a blue radiant exposure of 50kJ/mm² at 50°C. For example, the Product placed 0.2 in. (5 mm) from the edge, and perpendicular to the base, of a typical 100 lm (4000K) LED, is estimated to remain colorless for at least 115,000 hours at 50°C. Higher operating temperatures are expected to shorten this lifetime.

UV Irradiance

The Product should not be used as a reflector for light sources with measurable UV irradiation without a UV absorbing filter. Sources would include but not be limited to solar direct or indirect and fluorescent.

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-D50A 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](https://www.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 DF2000MA (the “Product”).

Warranted Characteristics

Characteristic	Value	Test Method
Photopic Reflectivity ¹	> 99%	ASTM E1164/E308
Reflected Color/Shift CIE u, v	$\leq \pm 0.002$ 4000K LED or D65, 2° Observer	ASTM E1164/E308

¹ Average of 1ft² (0.2 m²) spectra acquired using a PerkinElmer® LAMBDA™ Spectrophotometer Model 1050 and normalized with a traceable specular reference standard from OMT Solutions BV.

3M Basic Product Warranty

The Product(s) specified in this document are warranted to be free of defects in materials and manufacture (“3M Basic Product Warranty”) at the time of shipment (“Warranty Period”) by 3M or its authorized distributor.

Limited Warranty

1. For the Products specified in this document, 3M makes the 3M Basic Product Warranty only.
2. EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, THE 3M BASIC PRODUCT 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.
3. 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 Basic Product Warranty and does not warrant any Other Product Information.
4. 3M has no obligation under the 3M Basic Product 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 document 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.
5. 3M must receive any 3M Basic Product 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 BASIC PRODUCT 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, THIS DOCUMENT OR OTHER PRODUCT INFORMATION, REGARDLESS OF THE LEGAL OR EQUITABLE THEORY ON WHICH SUCH DAMAGES ARE SOUGHT.