

# 3M™ Ultra Barrier Solar Film 510-F

## Product Description

Designed to address the needs of lightweight, flexible thin film solar manufacturers, 3M™ Ultra Barrier Solar Film 510-F can act as a replacement for glass with its high light transmission, superb moisture barrier performance and excellent weatherability. It has improved adhesion to edge seals and transmission equivalent to solar glass. 3M combined its knowledge of polymer films, adhesives and advanced materials to deliver a high performing, multi-layered front sheet barrier film to the solar industry.

## Features

- Good optical transmission from 400 – 1400 nm
- Very low moisture vapor transmission rate
- Excellent UV stability
- Flexible

## Key Highlights

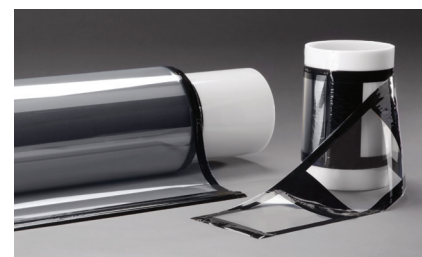
- UL Certified Component (E316895)
- WVTR:  $<5 \times 10^{-4}$  g/m<sup>2</sup>/day @ 23°C, 85%RH
- Transmission >90% (Avg 400 nm – 1400 nm)
- Low Shrinkage: 0.15%
- Partial Discharge 1,000V
- Low CTE

## Typical Properties

Property	Test Method (Tested in accordance with ASTM)	Value*	Comment
<b>Mechanical</b>			
Thickness	ASTM D 6988	0.203 mm (0.008")	
Width		1.2 meters (47.24")	
Tensile Strength	ASTM D 882	175 MPa	
Elongation	ASTM D 5026	127%	
Storage Modulus @ 23°C	ASTM D 5026	2546 MPa	
Shrinkage (Substrate Layer)	3M	0.15%	
<b>Optical</b>			
Optical Transmission	3M	>90%	Average (400–1400 nm)
<b>Thermal</b>			
Coefficient of Linear Thermal Expansion CTE1 (Substrate Layer) (ppm/°C)	ASTM E831 Film	MD 27	-30 to 80°C
		TD 21	-30 to 100°C
Processing Temperature		150°C for <15 min	
Operating Temperature		-40 to 100°C	
Storage Temperature		0 to 40°C	
<b>Electrical</b>			
Dielectric	ASTM D 149	>10KV	
Partial Discharge	IEC 61730-2 MST 15	>1000V	
<b>Other</b>			
Water Vapor Transmission Rate	See WVTR Application Guide	$<5 \times 10^{-4}$ g/m <sup>2</sup> /day @ 23°C 85%RH	@ 23°C 85% RH
Outdoor Exposure	UL746C	Pass	Water immersion and UV exposure
Certifications	UL Recognized Component		E316895
	TUV		

\* Values listed are preliminary and for reference only.

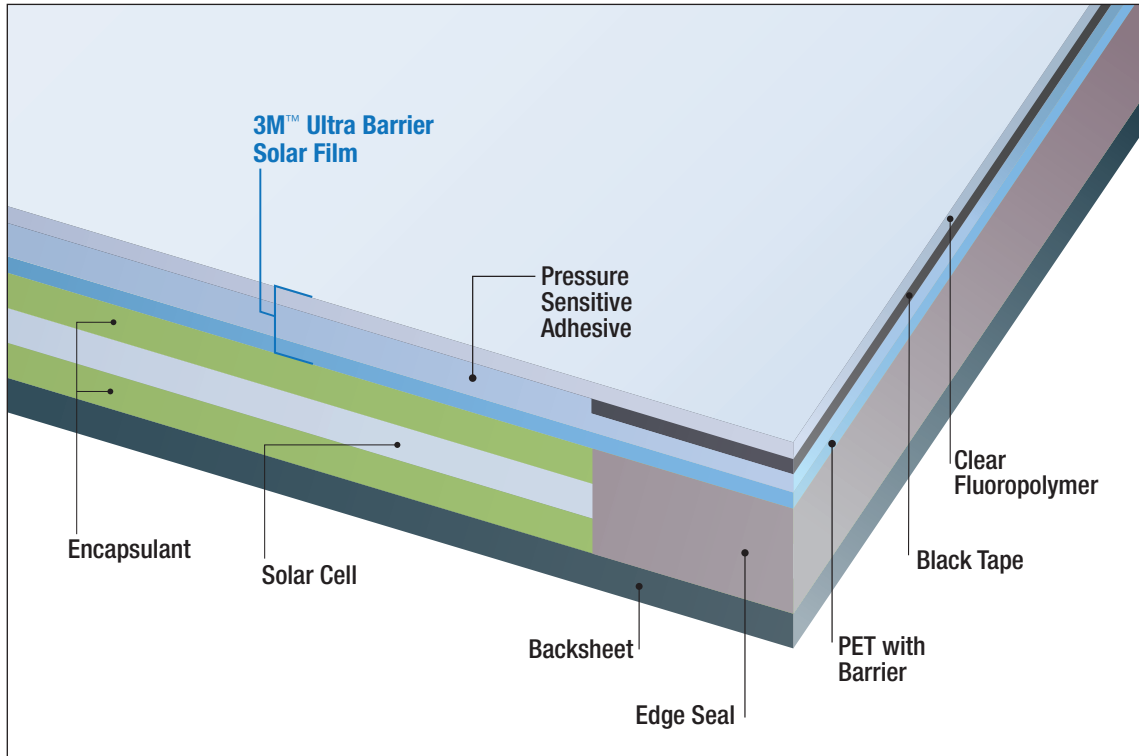
**Note:** The following technical information and data is based upon limited 3M testing conditions and should not be used for specification purposes.



## Shelf Life

To obtain the best performance, use this product within one year of the date of manufacture. Performance of 3M™ Ultra Barrier Solar Film is not projected to change even after shelf life expires; however, 3M does suggest that 3M™ Ultra Barrier Solar Films are used prior to the shelf life date whenever possible. Product re-verification literature can be provided upon request.

## Typical Flexible PV Module Construction



**United States**  
3M Renewable Energy Division  
800 755 2654

**Germany**  
49 2131 144450

**Denmark**  
45 43 480100

**Spain**  
34 91 3216000

**France**  
33 1 30316161

**United Kingdom**  
44 1344 858000

**Italy**  
39 02 70351

**Singapore**  
65 6450 8888

**China**  
86 21 62753535

**South Korea**  
82 2 3771 4043

**India**  
91 80 22231414

**Canada**  
800 364 3577

**Brazil**  
0800 13 23 33

**Mexico**  
52 55 52702250

**Taiwan**  
886 933 896752

**Japan**  
81 3 3709 8283

**Malaysia**  
603 78062888

**Other Areas**  
800 755 2654

For more information on our solar manufacturing product line, contact 3M Renewable Energy at 800-755-2654 or visit us at [3M.com/solar](http://3M.com/solar).

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