

3M Electrical Markets Division

# 3M™ Ultra Barrier Solar Film 512

## Product Description

Designed to address the needs of lightweight, flexible thin film solar manufacturers, 3M™ Ultra Barrier Solar Film 512 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:  $< 6 \times 10^{-5}$  g/m<sup>2</sup>/day @ 50°C, 100% RH
- Transmission > 90% (Avg 400 nm – 1400 nm)
- Low Shrinkage: 0.15%
- Partial Discharge 1,000V
- Low CTE

## Typical Properties

| Properties  | Test Method             | Typical Values*                            | Comment                         |
|---|-------------------------|--|---------------------------------|
| <b>Mechanical</b>   |                         |  |                                 |
| Thickness   | ASTM D 6988             | 0.203 mm (0.008")                          |                                 |
| Width   | –                       | 1.295 meters (51")                         |                                 |
| 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   | Mocon, Aquatran         | $< 6 \times 10^{-5}$ g/m <sup>2</sup> /day | @50°C 100% RH                   |
| Outdoor Exposure  | UL746C                  | Pass                                       | Water immersion and UV exposure |
| Certifications  | UL Recognized Component |  | E316895                         |

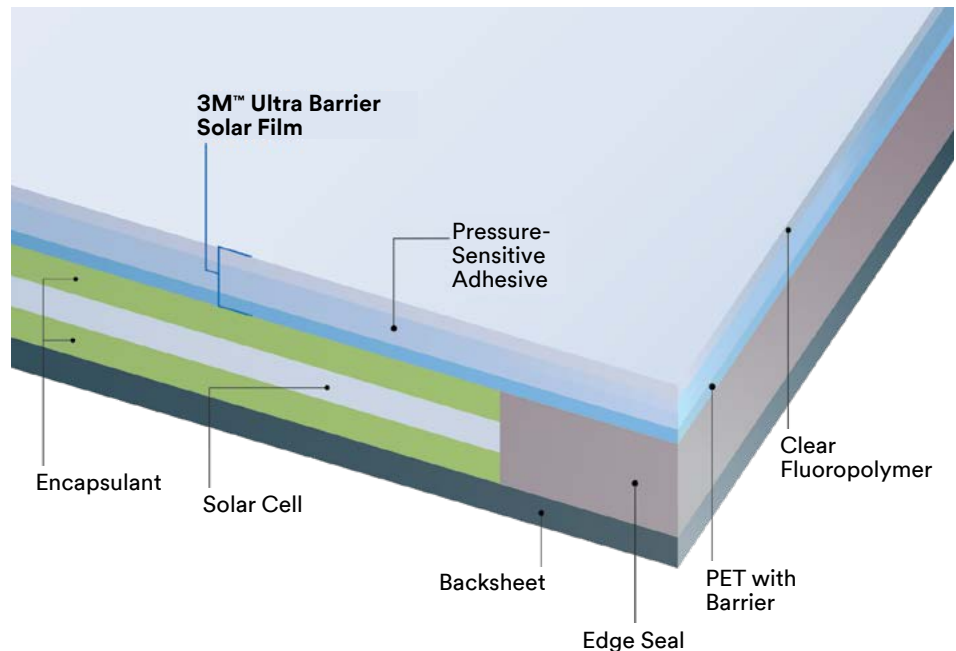
\* Values listed are typical and for reference only.

**Note:** This technical information and data should be considered representative or typical only and should not be used for specification purposes. Read and follow the precautions on label and SDS before using product.

## 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.

## Typical Flexible PV Module Construction



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For more information on our solar manufacturing product line, contact 3M at 800 676 8381 or visit us at [3M.com/solar](http://3M.com/solar).

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