

# 3M™ Solar Mirror Film 1100

## Introduction

3M™ Solar Mirror Film 1100 offers a number of significant advantages over traditional glass mirrors, including higher reflectance, less weight and improved mechanical properties. These features can increase the output and design flexibility of your CSP system.

## Features

- Highly reflective
- Design flexibility
- Lead-free\*
- Lightweight materials enable lower cost sub-structure designs

## Description

3M Solar Mirror Film 1100 is a silver metallized weatherable acrylic film. It has a solar-weighted total hemispherical reflectance of 94% at air mass 1.5 and is designed for use in concentrating solar collectors. A pressure-sensitive adhesive allows application to recommended smooth substrates.

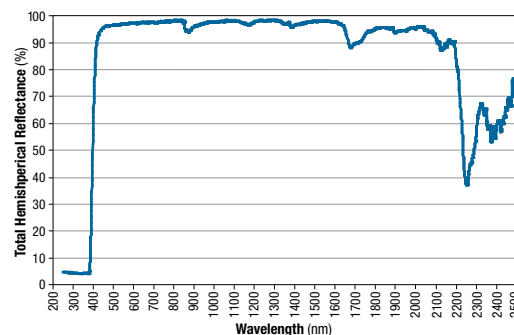
## Optical Properties

### Specular Reflectance\*\* versus Angular Resolution Property Value

Target 95% at 15 MRAD (0.9°) cone angle

### Solar Weighted Total Hemispherical Reflectance

Target 94% per ASTM E903, ASTM E891



\* Per JEDEC Standard JESD97 Marking, Symbols, and labels for Identification of Lead (Pb) Free Assemblies, Components, and Devices, "Electrical and electronic assemblies and components in which the Lead (Pb) level in any of the raw materials and the end product is less than or equal to 0.1% by weight and also meets any Pb-free requirements/definitions adopted by the ROHS Directive 2002/95/EC."

\*\* Value measured at 660 nanometers with Devices & Services Co., Model 15R, Reflectometer

## Physical Properties

Property	Test Method	U.S. Units	Metric
Thickness (without liner)	(nominal)	4.6 mils	117 microns
Maximum Width	(nominal)	49.5 inches	1.26 m
Tensile Strength	ASTM D882	39 lbs/in width	6.8 kN/mm width
Elongation at Break	ASTM D883	5%	5%
Yield Strength	ASTM D884	36.5 lbs/in width	6.5 kN/mm width
Elongation at Yield	ASTM D885	3.5%	3.5%
Coefficient Thermal Expansion (0 to 60°C)	ASTM D696	40 x 10 <sup>-6</sup> /F	70 x 10 <sup>-6</sup> /°C
Total Solar Reflectance (Air Mass 1.5)		94%	94%
Specularity	D&S 15 mrad 660 nm	>95%	>95%
Operating Temperature Range	IEC 62108	-40°F to 149°F	-40°C to 65°C

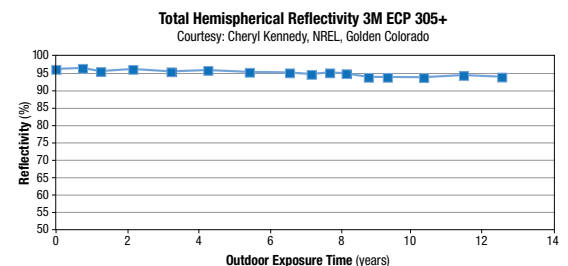
## Durability Testing

### Accelerated Aging Testing

Test	Method	Result
Thermal Cycling	Section 10.6.3 of IEC 62108	Pass
Damp Heat	Section 10.7.3.b of IEC 62108	Pass
Humidity Freeze	Section 10.8.3 of IEC 62108	Pass
Neutral Salt Spray	ISO 9227 NSS	> 480 hours

## Outdoor Weathering Testing

An early prototype of 3M Solar Mirror Film 1100 has been on outdoor exposure testing at National Renewable Energy Lab (NREL) in Golden, Colorado since 1995. With the test still ongoing, the decline in THR has been less than 3%.



## Safety & Handling

See Safety Information Packaging Insert for additional safe use information.



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

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