

Solar Concentrator Lens Panels

Description

3M™ Solar Concentrator Lens Panels are Fresnel lens panels comprised of either radial or linear prism patterns. These panels have micro-replicated Fresnel lenses (prisms) on one side, with a smooth surface on the other. The film is manufactured as a continuous web of optically clear, acrylic film with design-specific concentration ratios and then bonded to optically clear acrylic substrates of a thickness suitable for the application and expected environment.

Product Characteristics

Note: Values listed represent the standard design range for solar concentrator lens panels.

Physical Characteristics

Product	Test Method	Value
Material	–	Acrylic (polymethyl methacrylate)
Film Thickness	ASTM D-374	Typical 0.55 mm, Min 0.50 mm, Max 0.95 mm
Substrate Thickness	–	Typical 2.9 mm
Prism Pattern Width	–	1 m (wider widths can be available for specific applications)
Maximum Panel Length	–	Radial 1.2 m Linear 3.6 m
Coefficient of Linear Thermal Expansion	ASTM D-696	6.8 E-05 mm/mm/°C
Specific Gravity	–	1.19

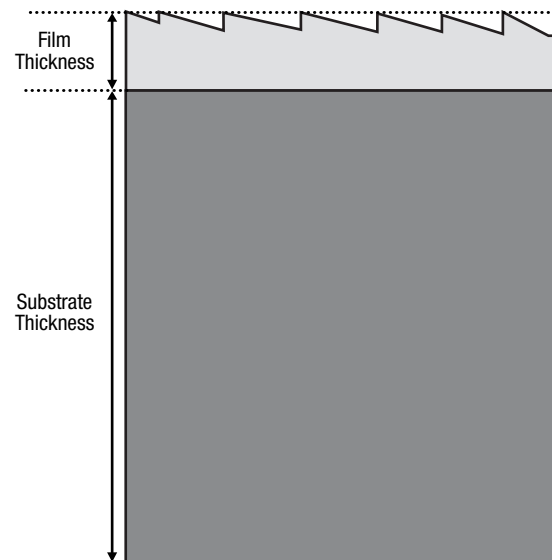
Applications

⚠ Warning: To reduce the risk of fire, avoid focusing sunlight on to combustible materials.

Solar Concentrator Lens Panels with a radial prism pattern are used primarily in high-concentration solar photo voltaic applications. Panels having a linear pattern may be used in either a flat or curved configuration, for both low-concentration solar photovoltaic and thermal applications.

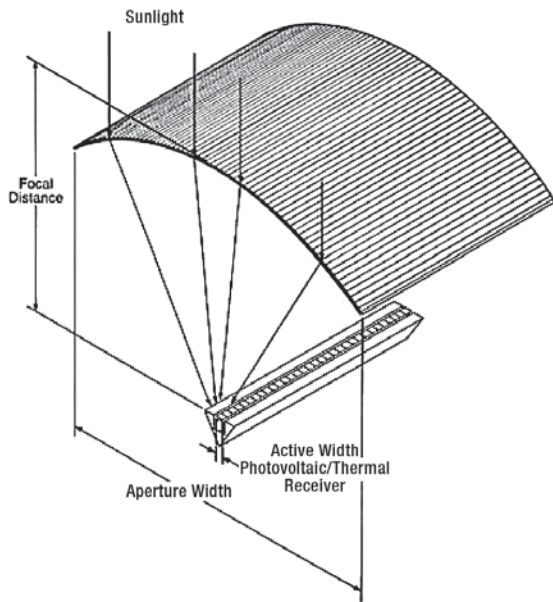
Tests conducted by Sandia National Laboratories have demonstrated that weatherable acrylic lenses maintain high optical transmission over 17 years of outdoor exposure. (SAND74-0241 “Effect of Outdoor Aging on Acrylic Sheet”)

Physical Characteristics

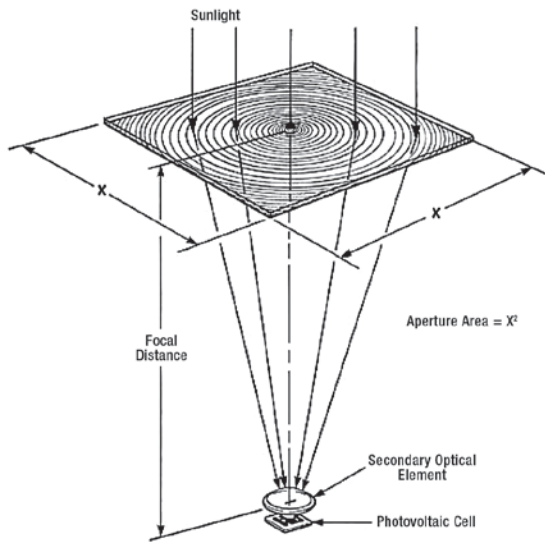


Typical Applications

Linear Lens Panel
(Photovoltaic/thermal)



Radial Lens Panel
(High Concentration Photovoltaics (>300X))



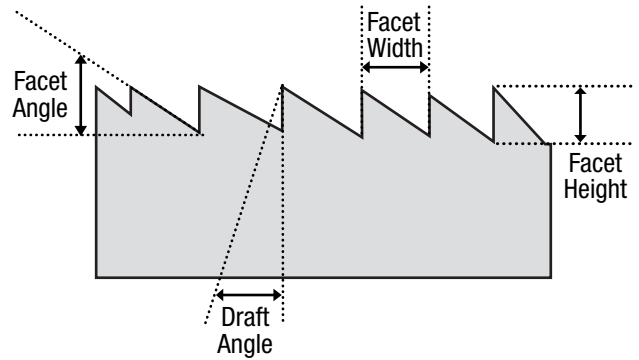
Design Considerations

Dimensional changes due to variations in temperature and humidity must be taken into consideration. The following dimensions are typical and under certain circumstances may be increased/decreased as needed for specific customer applications.

Solar Lens Characteristics

Characteristic	Radial Lens			Linear Lens		
	Standard Operating Range Typical	Min.	Max.	Standard Operating Range Typical	Min.	Max.
Facet Width	0.2 mm	0.2 mm	1 mm	0.2 mm	0.2 mm	1 mm
Facet Height	0.2 mm	0 mm	0.25 mm	0.2 mm	0 mm	0.25 mm
Facet Angle	-	0°	60°	-	0°	60°
Aspect Ratio (height:width)	1:1	0	2:1	1:1	0	2:1
Draft Angle	2°	2°	-	2°	2°	-
Lens Diameter (width)	200 mm	40 mm	400 mm	200 mm	25 mm	1524 mm
Facet Flatness	<300 nm (peak to valley)			-		
Facet Rounding	<0.003 mm (radius)			-		

Lens Dimensions



Handling and Installation

⚠ Warning: Follow recommended practices for handling acrylic sheeting. Wearing soft cotton or nylon gloves during installation will help to prevent scratching or marking the panel. The panel may be cut using a scoring knife. Panel edges may be sharp, so use caution when handling.

Maintenance and Cleaning

If needed, use a mild, non-abrasive detergent to clean the panel. Do not use solvent-based cleaning solutions; these may damage the panel.

User Information

Product Suitability for Use.

User is responsible for evaluating and determining whether a 3M Product is suitable and appropriate for a particular use and intended application. Please remember that the conditions of evaluation, selection, and use of a 3M Product can vary widely and affect the use and intended application of a 3M Product. Because many of these conditions are uniquely within the user's knowledge and control, it is essential that the user reevaluate and determine whether the 3M Product is suitable and appropriate for a particular use and intended application.

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Warranty Information

Warranty and Limited Remedy

3M warrants that this 3M Product will conform to 3M specifications for the product at the time of shipment to the Buyer. 3M makes no other warranties, express or implied, including, but not limited to, any implied warranty of merchantability or fitness for a particular purpose or implied warranty arising out of a course of dealing, custom, or usage of trade. If a 3M Product is found not to conform to this warranty, Buyer's exclusive remedy, at 3M's option, shall be to refund the purchase price of, or replace the quantity of 3M Product shown to be nonconforming. 3M has no obligation under this warranty with respect to 3M Product that has been modified or damaged through misuse, abuse, accident, neglect, or mishandling by Buyer.

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