



1. Product Name

Thermal Sky 275
Thermal Sky 400

2. Manufacturer

Sunshine Rooms, Inc. / Crystal Structures
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Wichita, KS 67219
800-222-1598
316-838-0033
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3. Product Description

BASIC USE

Crystal Structures, the commercial division of Sunshine Rooms, Inc. offers the Thermal Sky 275 and 400 translucent wall and roof panel systems for the primary purpose of creating a cost effective method to build an energy efficient, structural wall and/or roof system that allows translucent (diffused) light to enter into a designated space. Typically used in large open buildings that are traditionally dark and difficult to illuminate. Commercial building applications include manufacturing and maintenance facilities, warehouses, schools, gymnasiums, large hallways, metal framed skylights of all sizes, etc.

BENEFITS

Thermal Sky panels can reduce energy and lighting cost while creating a comfortable ambience within a building. Panels come in widths of 4', 5', and 6'. Lengths are customized to fit job site requirements, maximum length is 20'. Thickness options are either 2.75" or 4". The polycarbonate panels are virtually

unbreakable and should be considered in in high crime or heavy hail areas.

COMPOSITION AND MATERIAL

The panels consist of two 3 wall (6 total) polycarbonate 16mm panels separated with a propriety structural aluminum I-beam. The polycarbonate panels are co-extruded with a high performance UV-absorbing polycarbonate to insure excellent protection against UV rays. Standard color options are clear and opal (white). Bronze, blue and green are also available. Customers can mix and match the colors allowing them 4 standard daylight transmissions ratings to select from and even more when considering the bronze, blue and green options. The standard configurations are clear/clear, clear/white, white/clear, or white/white. Prior to assembly the panels are sealed with anti-dust vent tape which reduces condensation and debris entering the panels. See daylight transmission tables within this spec sheet.

The structural I-beam is extruded from 6061-T6 aluminum. The beams are used to separate the panels and are placed on a 1' x 2' pattern. Based on loading requirements the structural span will be either 1' or 2'. This allows the panels to achieve impressive load ratings. The beams are pre painted bronze which creates an attractive grid pattern between the translucent panels. See the

loading tables with this spec sheet for more information.

The panels are permanently connected to one another using a proven acrylic VHB tape that has been designed to accommodate the expansion and contraction ratios of the polycarbonate. The structural tape also enhances the overall structural characteristics of the assembled panel.

ACCESSORY FRAMING SYSTEM(S)

Crystal Structures/Sunshine Rooms, Inc. offers several structural and nonstructural aluminum framing systems that can be used with these panels. The non structural 275 and 400 systems have been designed specifically for glazing the Thermal Sky Panels into a wall system. Framing systems are thermally broken to enhance energy performance. They are designed to go into a wall opening and encapsulate the edges of the panels. Frames can be finished using fluoropolymer (Kynar) paints or anodized to match the other glazing frames within the project.

LEED CREDITS

Thermal-Sky wall and roof panels are an ideal product for projects striving to achieve LEED Certification. The product is more energy efficient, durable and requires less maintenance than similar



product. It contains pre and post consumer recycled content and is almost 100% recyclable. Achievable points include the following:

Sustainable Sites

- SS Credit 7.1 – Reduce heat islands, non- roof
- SS Credit 7.2 – Reduce heat islands, roof
- SS Credit 8 – Light pollution reduction

Energy and Atmosphere

- EA Credit 1 – Optimize energy performance

Materials and Resources

- MR Credit 4 – Recycled and recyclable content
- MR Credit 5 – Local / Regional materials

Indoor Environmental Quality

- EQ Credit 4 – Low Emitting Materials
- EQ Credit 6 – System Controls
- EQ Credit 7 – Thermal Comfort
- EQ Credit 8 – Daylight and Views

Innovation and Design Process

- ID Credit 1 – Innovative Design feature

4. Technical Data

ENERGY & LIGHTING PERFORMANCE –

See table 1

STRUCURAL & LOADING PERFORMANCE

- See table 2

TYPICAL APPLICATIONS & DETAILS

These are samples, each project shall be evaluated and details created to meet the desired performance and characteristics of the project.

WALL APPLICATION – See table 3a

TABLE 1 - ENERGY AND LIGHTING PERFORMANCE

	Daylight Transmission	Solar Heat Gain	Shading Coefficient	U-Value
<u>Thermal Sky 275</u>				
Clear over Clear	54%	56	64	.19
Opal over Clear	32%	42	46	.19
Clear over Opal	29%	42	46	.19
Opal over Opal	20%	36	39	.19
<u>Thermal Sky 400</u>				
Clear over Clear	53%	56	64	.19
Opal over Clear	31%	42	46	.19
Clear over Opal	28%	42	46	.19
Opal over Opal	19%	36	39	.19

*Values are estimated for the center of panel, based on individual panel testing calculations, and computer analysis.

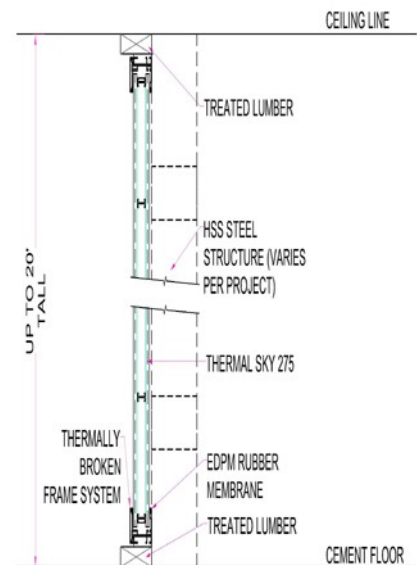
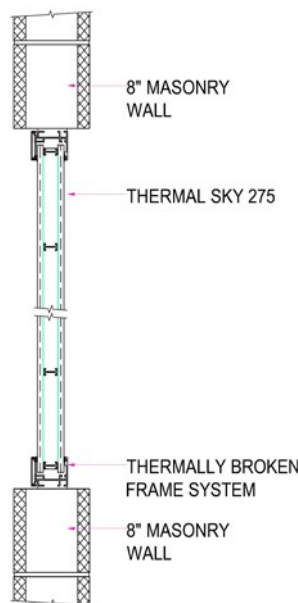
TABLE 2 - STRUCTURAL AND LOADING PERFORMANCE

	Dead load	Live loads (snow / wind) at L/125 deflection		
	Weight of material w/o framing	4' widths	5' widths	6 widths
Thermal Sky 275	2 lbs	46	27	20
Thermal Sky 400	2.5 lbs	49	29	22

* All systems will be designed to meet or exceed the loading requirements required per specific project. Contact our technical support department for additional information and assistance.

TABLE 3a - WALL APPLICATION

TABLE 3b - FLOOR TO CEILING APPLICATION



FLOOR TO CEILING APPLICATION – See table 3b

SKYLIGHT APPLICATION SELF SUPPORTED – See table 3c

SKYLIGHT APPLICATION WITH STRUCTURE – See table 3d

APPLICABLE STANDARDS & TESTING

Polycarbonate panels have been tested to the following specifications.

- ASTM D638-03 – Tensile properties of plastic
- ASTM E84-01 - Standard flame spread test
- ASTM D635-98 – Standards for rate of burning
- ASTM G154-04 – Standard practice for operating fluorescent light and UV exposure
- ASTM E313-00 - Practice for calculating yellowness and whiteness
- ASTM E308-01 – Test method for computing colors of objects by using the CIE system
- ASTM E 133'-96 – Reflectance factor and color by spectrophotometer
- ASTM D 790-03 - Test method for flexural properties of unreinforced and reinforced plastics

Aluminum I-beam and accessory framing members have been extruded to meet or surpass the following standards and tests.

- ASTM B221 – Standard specification for aluminum extrusions
- ASTM B209 – Standard specification for aluminum extrusion in mill finish
- ASTM F593-01 – Standard specification for stainless steel screws
- ASTM D471-01 - Standard test method for rubber properties Acrylic VHB tape has been manufactured to meet or exceed the following specifications.

TABLE 3c – SKYLIGHT APPLICATION SELF SUPPORTED

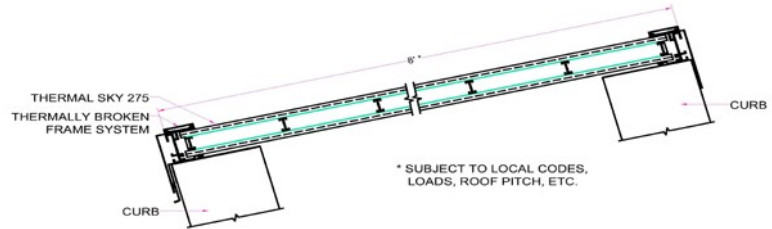
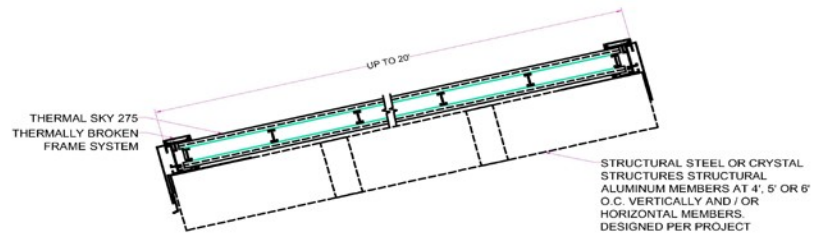


TABLE 3d – SKYLIGHT APPLICATION WITH STRUCTURE



- ASTM D3330 – Adhesion test using a 90 degree peel.
- ASTM D897 – Tensile properties of adhesive bonds
- ASTM D3654 – Static shear adhesion of pressure sensitive tapes

The Thermal Sky 275 and 400 systems will meet or exceed the following specifications.

- ASTM E3331-00 - Water penetration resistance
- ASTM E 283-04 - Air infiltration
- ASTM E-330 – Uniform load structural test pressure

5. Installation

PREPITORY WORK

All areas must be clean, dry and structural sound. When using panels within a metal framed skylight the curbs that the skylight will be attached to must be designed and built to accept all loads that will be transferred from the panels/skylights to the curb/building. All surrounding areas must be square, level, plumb and prepared as described within

the job specific shop drawings that will be provided.

STORAGE AND HANDLING

Store all materials in a dry safe space protected from inclement weather. DO NOT store panels in direct sunlight or high heat conditions. Supported, sloped stacking recommended, but panels may be stacked up to 3' high on a flat, even supported area. Do not remove packaging materials until you are ready to install the panels. Remove protective film after complete installation (pull film's edges back during installation). Do not open boxes using sharp knives, box cutters, etc.

INSTALLATION

Install panels and system according to the job specific shop drawings. THE UV PROTECTED SIDE MUST BE INSTALLED FACING THE SUN, NO EXCEPTIONS. The protective film has been printed with "UV resistance side." There shall be no cutting or drilling of the panels during the installation. Panels should be installed with the fluted cells in a vertical position,



allowing moisture, if collected, to run to the bottom of the panels and exit through the vent tape. Roof and skylight installations should have a minimum roof pitch of 5 degrees (1/ 12 pitch). Final cleaning shall to be done using a mild soap and lukewarm water. Harsh chemicals and solvents should never be used on polycarbonate. See the maintenance section for more information.

6. Availability and Costs

AVAILABILITY

Thermal Sky panels and systems are manufactured in Wichita, KS and are available throughout the world on a per project basis. Product(s) is designed, manufactured, packaged, shipped and installed per project specifications. Most projects are sold and installed by the company. To obtain additional information please contact the company directly.

COST

Product is competitively priced. Design and structural capabilities of the product allow many projects to reduce related buildings costs in the areas of steel, masonry, lighting, etc. Contact the manufacturer for estimating and pricing.

7. Warranty

POLYCARBONATE

The polycarbonate panels are warranted by its manufacturer for 10 years against breakage and yellowing per ASTM 313-00.

RELATED COMPONENTS

Panels are warranted for 10 years against delaminating and surface finishes of the framing system. Installations are warranted for 5 years against leakage as a result of improper manufacturing or

installation. Contact the manufacturer for complete warranty information.

8. Maintenance

Polycarbonate panels should be cleaned using a mild soap and lukewarm water. Use only a soft cloth or clean sponge for cleaning tools. Do not scrub or scrap plastic with sharp or abrasive objects. Many chemicals are harmful to the polycarbonate panels or the UV coatings, read the cleaning instruction carefully before cleaning. Panels and system should be checked periodically to insure the weepage system is working properly. In regions that have a high volume of dust and other airborne impurities we recommend regular cleaning schedules.

9. Technical Services

Complete technical and design assistance is available from the company.

10. Filing Systems

- Sweets Source
- Reed Construction Data / Smart Building Index
- Arcat

* Additional information is available from the manufacturer.

