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Starlight Skylights
30 1/4" x 46 1/2" Residential Skylight
11-Jun-19

STRUCTURAL CALCULATION
30 1/4" x 46 1/2" Residential Skylight

Starlight Skylights
Ocean City, Maryland

Prepared for:
Starlight Skylights
ORCA Manufacturing, Inc.
P.O. Box 992
Hurlock, MD 21643-0992

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WIND SPEED (Vult): 128
Exposure: D
Gcpi: +/-0.18

Ground Snow Load (psf): 20
Roof Live Load (psf): 20
Seismic: Ss = 0.084

CONCLUSION: The glass for this skylight (3/16"FT, 3/16" FT insulating glass) will safely support the leads required for Ocean City, Maryland.

	Inward	Outward	
	Wind Load	Wind Load	
DesignLoad:	29.4	-52.3	PSF
Glass Strength:	340	360	PSF
Calculated Deflection:	0.13	0.21	inches



Leon Murray
11-Jun-19

Glass Load Resistance Report

June 11, 2019

Project Details

Project Name: Starlight Skylights
Project Location: Ocean City, Maryland
Comments: Skylight Glass

Window Glass Details

Glass Construction: Double Glazed Insulated Unit

Edge Support: 4-Sided
Glazing Angle: 14°
Rectangular Dimension:
Width: 30.0 in.
Height: 46.5 in.

	Outboard Lite	Inboard Lite
Glass Type	Fully Tempered	Fully Tempered
Construction	Monolithic	Monolithic
Nominal Thickness	3/16 in.	3/16 in.

Short Load Duration, Resistance and Deflection Data

Load (<= 60 sec.) + Glass Weight: 57.3 psf
Factored Resistance: 360 psf
Approximate Center of Glass Deflection: 0.21 in.

Long Load Duration, Resistance and Deflection Data

Load (<= 60 sec.) + Glass Weight: 32.7 psf
Factored Resistance: 340 psf
Approximate Center of Glass Deflection: 0.13 in.

Conclusion

Based on your design information, this glass configuration will resist the specified loading.

Statement of Compliance

Procedures followed in determining the resistance of this window glass are in accordance with ASTM E 1300-98

Disclaimer:

This software can be used to determine the load resistance of specified glass types exposed to uniform lateral loads of short or long duration subject to the following conditions:
- The glass is free of edge and surface damage and has been properly glazed in the opening in conformance with the manufacturers recommendations;
- The glass is supported on all four sides by a framing system sufficiently stiff to limit lateral deflection of the glass edge (not center-of-glass) less than or equal to 1/175 of the glass edge length. Center of glass deflection in excess of 19-mm (0.75-in.) is a design issue and does not affect glass strength;
For other limiting conditions that may apply, refer to Section 5 of ASTM E1300 and local building codes.

Prepared by: Leon Murray on 6/11/2019
L. Murray

DESIGN LOADS

LOCAL BUILDING CODE: 2015 International Building Code with amendments
 2015 International Residential Code with amendments

	MINIMUM SKYLIGHT SLOPE =	14.04	DEGREES	
I)	<u>DEAD LOAD:</u>	Total (D) =	6.0	PSF - SURFACE AREA
		Glazing:	5.0	PSF (3/16", 3/16" Glass)
		Frame:	1.0	PSF
II)	<u>SNOW LOAD:</u>	Pg =	20.0	PSF (Residential Code amendment)
		Is =	1.00	ASCE 7-10 Table 1.5-2
		Ce =	1.00	Partially Exposed ASCE 7-10 Table 7-2
		Ct =	1.00	ASCE 7-10 Table 7-2
		Pf =	14.0	PSF Equation 7.3-1
		Cs =	1.00	ASCE 7-10, Fig. 7-2a
		Ps =	14.0	PSF Equation 7.4-1
		Unbalanced Snow: Psu =	20.0	PSF ASCE 7-10 Section 7.6.1
III)	<u>ROOF LIVE LOAD:</u>	Lr' =	20	PSF
		R1 =	1.0	
		R2 = 1.2-0.05F =	1.00	
		Lr =	20.0	PSF
III)	<u>WIND LOAD:</u>	ASCE 7-10 'components and cladding wind pressures		
		Risk Category:	II	
		BASIC WIND SPEED (V _{ult}):	128	MPH (Residential code amendment)
		EXPOSURE :	D	
		MEAN ROOF HEIGHT =	25	ft
		Kzt =	1.00	(FLAT TERRAIN) Section 26.8.2
		Kd =	0.85	Table 26.6.1
		GCpi =	0.18	-0.18
		Kz =	1.12	Table 30.3-1
		qz =	39.93	PSF Section 30.4.2
	Effective Area:	10 SF		
		Equation 30.4-2A $p=qh[(GCp)-(GCpi)]$		
	(FIG. 30.4-2C)	<u>GCp</u>	<u>p</u>	(ASD)
	Zone 1, 2 & 3:	0.30	19.2	PSF 11.5 PSF
	Zone 1:	-1.00	-47.1	PSF -28.3 PSF
	Zone 2:	-1.80	-79.1	PSF -47.4 PSF
	Zone 3:	-2.80	-119.0	PSF -71.4 PSF
		Use Zone 2 wind pressures for skylight design		
	Dimension 'a' =	3.0	ft	

DESIGN LOADS

V) SEISMIC LOAD:

Reference: ASCE 7-10 Section 13.3 "NONSTRUCTURAL COMPONENTS"

Exterior Nonstructural Wall Attachments and Connections Wall Element & Body of wall panel connections

	<u>Frame</u>	<u>Fasteners</u>	
ap	1.0	1.25	Table 13.5-1
Fa	1.6	1.6	Table 11.4-1
Ss	0.084	0.084	Fig 22-1
Sms	0.134	0.134	
Sds	0.090	0.090	
Wp	6.0	6.0	PSF
Rp	2.5	1.00	Table 13.5-1
Ip	1.25	1.25	
z	25.0	25.0	ft
h	25.0	25.0	ft
Fp	0.32	1.01	PSF - Eq 9.6.1.3-1
Maximum $F_p = 1.6S_{ds}I_pW_p =$	1.08		lbf - Unit Load
Minimum $F_p = 0.3S_{ds}I_pW_p =$	0.20		lbf - Unit Load
Concurrent Vertical Force: $F_{pv} =$	0.11		lbf - Unit Load

Seismic loads do not control the glass design

VI) COMBINATION LOADS - NORMAL TO GLASS SURFACE

Ref: IBC 2015 Section 2404.2

	<u>Normal to surface</u>	
Dead: D =	4.85	
Live: Lr =	18.8	
Unbalanced Snow (Su) =	18.8	
Wind (Wi) =	19.2	
Outward Wind (Wo) =	-79.1	
Equation 24-2: $F_g = 0.6W_o - D =$	-52.3	PSF
Equation 24-3: $F_g = 0.6W_i + D + 0.5S =$	25.8	PSF
Equation 24-4: $F_g = 0.3W_i + D + S =$	29.4	PSF
$F_g =$	52.3	PSF

DESIGN LOADS

ATC Hazards by Location

Search Information

Address: Ocean City Maryland
Coordinates: 38.3365032, -75.0849058
Elevation: 4 ft
Timestamp: 2019-06-11T16:02:48.447Z
Hazard Type: Wind



ASCE 7-16

MRI 10-Year 79 mph
 MRI 25-Year 88 mph
 MRI 50-Year 96 mph
 MRI 100-Year 104 mph
 Risk Category I 116 mph
 Risk Category II 128 mph
 Risk Category III 137 mph

If the structure under consideration is a healthcare facility and you are also within 1 mile of the coastal mean high water line, you are in a wind-borne debris region. If other occupancy, use the Risk Category II basic wind speed contours to determine if you are in a wind-borne debris region.

Risk Category IV 141 mph
 You are in a wind-borne debris region.

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

ASCE 7-10

MRI 10-Year 78 mph
 MRI 25-Year 89 mph
 MRI 50-Year 96 mph
 MRI 100-Year 104 mph
 Risk Category I 117 mph
 Risk Category II 129 mph
 Risk Category III-IV 137 mph

If the structure under consideration is a healthcare facility and you are also within 1 mile of the coastal mean high water line, you are in a wind-borne debris region. If other occupancy, use the Risk Category II basic wind speed contours to determine if you are in a wind-borne debris region.

ASCE 7-05

ASCE 7-05 Wind Speed 118 mph
 You are in a wind-borne debris region if you are also within 1 mile of the coastal mean high water line.

ATC Hazards by Location

Search Information

Address: Ocean City Maryland
Coordinates: 38.3365032, -75.0849058
Elevation: 4 ft
Timestamp: 2019-06-11T16:04:18.052Z
Hazard Type: Snow



ASCE 7-16

Ground Snow Load 15 lb/sqft

ASCE 7-10

Ground Snow Load 15 lb/sqft

ASCE 7-05

Ground Snow Load 15 lb/sqft

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are interpolated from data provided in ASCE 7 and rounded up to the nearest whole integer.

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