CrystaLite, Inc.
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Building Code Compliance

Skylight Fall Protection

In most industries where specification for safety performance is a requirement there is a specific test standard or test method to validate a products performance. **Unfortunately there is NOT a standard specification or test method available at this time for testing skylights for fall protection.**

CrystaLite, Inc. is active in the effort to create an ASTM standard, working in collaboration with other leading skylight manufacturers and members of the health and safety industries. This ASTM document is still in draft form and not available for use.

The generally accepted OSHA criteria outlines that covers or protective screens shall be of such construction and mounting that they are capable of withstanding a load of 200 pounds applied at any one area of the cover (screen); and that the screen should not deflect under impact to break the skylight. This same OSHA criteria is often adopted by default in other safety criteria, such as WISHA in Washington State for example. Some variations of adopted OSHA criteria will permit that the skylight itself to be allowed to be used for fall protection, if it meets these criteria with a 400% safety factor applied.

However, this language is very problematic for several reasons, including:

1. The 200 pound applied load is **static**, thus not representing the dynamic impact of a falling person. **The skylight is often stronger than the retrofit screen placed above it.**
2. The static load does not measure the screen's performance under impact.
3. If a screen is deemed required, the skylight it would mount to may not be designed for this purpose, which could consequently cause the skylight to unjustly fail or cause water leakage.
4. It should not matter if the screen deflects and breaks the skylight glazing in the event of a falling person. The IBC and IRC both include language to ensure adequate safety glazing is utilized to protect the occupants below in the event of failed glazing.
5. A screen requirement could be redundant if other means of fall protection is provided, such as a guard.

The 'duty to provide fall protection' is not limited to the danger of falling through a skylight opening, but for all falls from a roof surface, thus is not the responsibility of the skylight manufacturer, but of the building owner/manager and employers of the workers with roof access. The Skylight Council with the American Architectural and Manufacturers Association (AAMA) has outlined Skylight Fall Protection in a position paper: http://www.aamanet.org/upload/file/Skylight_Council_Position_Paper_rev_Dec_08.pdf

Specifically designed skylights may provide fall protection upon approval of the specifying authority.

The following options are available from CrystaLite, Inc. to provide fall protection when required.

1) Safety Grids (recommended option)

a) Safety grids offer the greatest overall protection because they are installed on the curb itself, just below the skylight, which makes them less prone to tampering, does interfere with cleaning the skylight and are not subjected to environmental degradation. Safety grids can be installed at time of roof framing construction, prior skylight installation, thus providing protection during all phases of construction as well.

b) CrystaLite offers two safety grid options. Our ELITE safety grid is composed of aircraft grade aluminum frame, laced with galvanized 1/8" cable. An elegant solution to providing worker fall protection without compromising interior design. The DEFENSE safety grid is composed of aircraft grade aluminum frame and steel wire grid, which also provides resistance against burglar break-ins.

c) **Performance Verification:** Both Safety Grids, ELITE and DEFENSE, resisted without failure **dynamic impacts of 800 ft-lbs** created by a 200 lbs heavy bag released from 48 inches; followed by holding over a **HALF TON** (1,038 lbs) of static load for 5 minutes. Testing was witnessed for verification by a third party accredited testing laboratory. **Test report available upon request.**

3) Guard Rails

a) Permanent guard rails can be installed around skylights where there may be permanent exposure or hazard. This may be more difficult in some installations due to the type of roof or the ability to fasten through the roof membrane to adequately carry the applied loads at the top of the guard rail. Further, penetration of the roof membrane has the potential for water leaks if not installed properly. CrystaLite offers a full line of guard rail. **Test reports and engineering analysis available upon request.**

4) 42" Tall Skylight Curbs

a) In some cases where the roof is used continuously for other activities it is often the preferred method to build the curb up to standard guard rail height thus eliminating the need for fall protection. The curb becomes the guard.

5) Skylight Glazing

a) Again, there is NOT a standard specification or test method available at this time for testing skylights for fall protection. However, CrystaLite has testing, witnessed by a certified independent test laboratory, that validate that both specific plastic and glass glazing options are available that EXCEED the OSHA criteria.

b) Plastic Glazing

i) Double domes made of co-polyester material in thickness of 0.150 outer lens and 0.118 inner lens.

ii) 4' x 8' Maximum sized tested, thus also validates all sizes smaller providing the same material thickness is used in the fabrication of product.

iii) **Performance Verification:** A 200 pound impact bag was dropped from a height of 6' twice and 7' once, thus applying **dynamic** loads of 1,200 and 1,400 ft-lbs of force respectively, all on the same test specimen. The test specimen was undamaged. **Test report available upon request.**

c) High Load Glass Glazing

i) High load static air pressure testing performed primarily to validate product performance for extreme snow and wind load conditions.

ii) 4' x 6' Maximum sized tested, thus also validates all sizes smaller providing the same material thickness is used in the fabrication of product.

iii) **Performance Verification:** Tested in accordance to the AAMA/WDMA/CSA 101/I.S.2/A440 standard per ASTM E330 test method. Multiple sizes and configurations test, each passing tested pressures of **630 pounds per square foot**, totally over **5,040 pounds** of load for a 2'x4' skylight and **15,120 pounds** of load for a 4'x6' skylight – thus far exceeding OSHA criteria which would be applied to a single area of assumed 1 sq. foot. This is an extreme load, for reference ASTM E1300 'Standard Practice for Determining Load Resistance of Glass in Buildings' does not exceed 209 psf. **Test report available upon request.**

NOTE: The testing mentioned above for skylight glazing does NOT take into account long term aging of glazing materials and degradation due to environmental exposures. Criteria for demonstration long-term weathered performance has not yet been established for glazing products intended to provide impact fall protection. Because of this, other solutions such as security grids may be the better approach thus providing long term protection.

Thank you for your interest in this matter and if we can be of any further assistance, please speak with any of our CrystaLite representatives.