OSHA Fall Protection For Skylights
An Observation of Protection Versus Compliance
By Grant Grable, LEED® A.P.

In the world of roofing, there isn't a bigger subject in regards to OSHA rules and regulations then roof top openings and especially skylights. There are many questions about the vague written word of OSHA when it comes to protecting the roofer from hazards associated with roof top openings during the construction of the roof as well as protecting roof top service workers throughout the life of the structure. In order to understand what the intent of the OSHA regulations are and what is best for both contractor and building owner alike, let's take a closer look at the published OSHA regulations for skylight penetrations with key points highlighted for later discussion:

OSHA Regulations pertaining to skylight openings
Excerpts originally published prior to December 1995

Reg. 1910 pertains to a building after its construction.

Regulation: 1910.23 (a) (4)

"Every skylight floor opening and hole shall be guarded by a standard skylight screen or a fixed standard railing on all exposed sides."

Regulation: 1910.23 (e) (8)

"Skylight screens shall be of such construction and mounting that they are capable of withstanding a load of at least 200 pounds applied perpendicularly at anyone area on the screen. They shall also be of such construction and mounting that under ordinary loads or impacts, they will not deflect downward sufficiently to break the glass below them. **The construction shall be of grillwork with openings not more than 4 inches long or of slat work with openings not more than 2 inches wide with length unrestricted."**

Reg. 1926 pertains to a building only during its construction.

Regulation: 1926.500 (4)

"Wherever there is danger of falling through a skylight opening, it shall be guarded by a fixed standard railing on all exposed sides or a **cover capable of sustaining the weight of a 200-pound person."**

Regulation: 1926.500 (6)

"Skylight openings that create a falling hazard shall be guarded with a standard railing, or covered in accordance with paragraph (f) (5) (ii) of this section."

Regulation: 1926.500 (f) (5) (ii)

"The floor opening cover shall be capable of supporting the maximum intended load and so installed as to prevent accidental displacement.

Regulation: 1926.501 (a) (4) (i)

Each employee on walking/working surfaces shall be protected from falling through holes (including skylights) more than 6 feet (1.8m) above lower levels, by personal fall arrest systems, covers, or guardrail systems erected around such holes.

Regulation: 1926.501 (a) (4) (ii)

Each employee on a walking/working surface shall be protected from tripping in or stepping into or through holes (including skylights) by covers.

Regulation: 1926.501 (a) (4) (iii)

Each employee on a walking/working surface shall be protected from objects falling through holes (including skylights) by covers.

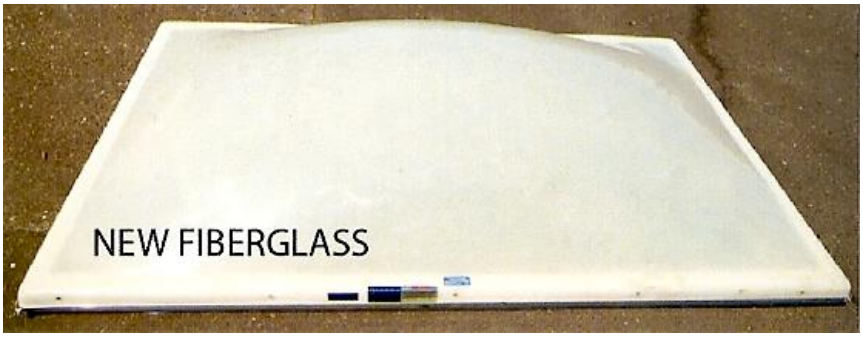
Regulation: 1926.502 (i) (2)

All other covers shall be capable of supporting, without failure, at least twice the weight of employees, equipment, and material that may be imposed on the cover at anyone time.

Interpretation of the these two sections of OSHA regulations by many skylight manufacturer's in the industry has lead them to consider their domes to meet a portion of these OSHA regulations and some have even begun to advertise that their skylights are "OSHA Compliant." This has lead to an abundance of miss information in the roofing community that there are skylight manufacturers whose domes are "OSHA Approved." First and foremost, "Compliance" and "Approved" have two completely different meanings. The Occupational Safety and Health Administration is a national regulatory agency that was established to create regulations that protect workers in their occupations. Their job is to enforce the observance of published regulations and to impose fines when confronted with violations. OSHA does not approve products of any kind. This is the biggest misconception in the roofing community when it comes to OSHA and skylights.

Both products pictured can support a 200-pound weight with obvious strength differences. However, all plastics age when exposed to of UV from the sun over time. The question is can a plastic skylight of any kind withstand the weight of a falling worker or object when new or when exposed to 10 to 20 years of UV from the sun?

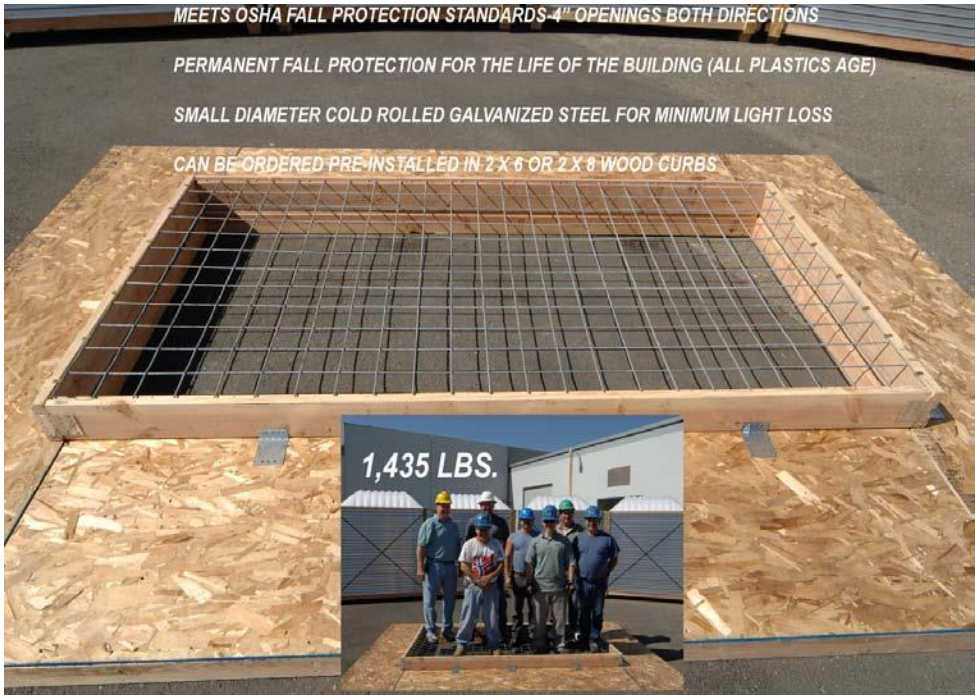
In order to get a better understanding of these OSHA Regulations, let's examine some of their key points. The first category to examine is OSHA Regulation 1926, which pays particular attention to the skylight opening during initial construction. This is key as this is the section that some skylight manufacturers are stating that their products are "OSHA Compliant" with and draws a lot of confusion in the industry. This section DOES NOT pertain to the skylight opening after it is installed and in use and this difference needs to be specifically addressed. In section OSHA 1926.500 (4), it states, "*Wherever there is danger of falling through a skylight opening, it shall be guarded by a fixed standard railing on all exposed sides or a cover capable of sustaining the weight of a 200 pound person."* This is the first inference that a "cover" should be capable of "sustaining the weight of a 200-pound person." There is no doubt that a number of skylights, when new and with limited exposure to the sun and/or UV, can handle the weight of a 200-pound person. The issue with this regulation is the vagueness of the word "sustaining" and the fact that all plastic skylights age to varying degrees when exposed to the sun and UV. Some plastics are much more stable to the long term affects of UV as well as different plastics and manufacturer standards for structural stability and dome thickness vary greatly in the industry. As you can see from the provided photos in this article, some age and perform at different rates and test to different manufacture standards of quality. However, the affects of UV



exposure are inevitable and will eventually cause any plastic to lose structural integrity at some point in the product's lifecycle.

It is also important to remember that this section of OSHA regulation is strictly for new construction and the vague nature of the statement, "…sustaining the weight of a 200 pound person," does not include a statement of lifecycle for the product or a UV age testing requirement. Another section of OSHA Regulation 1926 that some manufacturers call out specifically in their advertising and promotion to roofing contractors is OSHA Regulation 1926.502. In this regulation, section 1926.502 (i) (2) states*, "All other covers shall be capable of supporting, without failure, at least twice the weight of employees, equipment, and material that may be imposed on the cover at anyone time."* Again, this regulation is specifically utilized during the construction of the skylight opening. This section does impose that the "cover shall be capable of supporting, without failure, at least twice the weight of employees, equipment, and material that may be imposed on the cover at any one time," and the words, "without failure," do leave little room for interpretation. However, what the figure of twice the weight of these items is left to interpretation of the reader. Consider the following scenario of a roofing installer working around a skylight that claims to be "OSHA Compliant" and is mechanically installing insulation with an electric screw gun, deck screws and plates when all of a sudden, he trips over the box of plates and falls into the plastic skylight, screw gun tip first. In this scenario, the skylight will not only be subjected to the calculated weight of the roofing contractor, but the inertia and force of his weight applied to the tip of the screw gun bit. This scenario is called point loading. Point loading takes the combined weight and inertia of the falling object, in this case the falling weight of the roofer, and concentrates it to the tip of the screw bit. In the case of a common #2 Philips Head screw bit, the concentration is approximately point loaded to an area less than 1/16 of an inch. Calculating this out to find out the weight load per square foot, you can quickly see that point loading any plastic, new or aged, can easily cause failure that even the strongest plastic formulas can not prevent. Obviously this is just a scenario, but you can easily see that without secondary protection from a screen or grid device, a plastic skylight can quickly become non-compliant.

Now that the skylights are installed in the project, a different section of OSHA regulation takes over for the life of the opening. OSHA Regulation1910 pays particular attention to fall protection requirements of a skylight opening after it has been constructed. In 1910.23 (a) (4), it states, *"Every skylight floor opening and hole shall be guarded by a standard skylight screen or a fixed standard railing on all exposed sides."* This section leaves little interpretation to the rule in that it requires a "standard" screen or fixed "standard" railing. However, the rule is left with the reader with a vague interpretation by the use of the word "standard" in the rule. However, later in the regulation, rule 1910.23 (a) (8) specifies that *"Skylight screens shall be of such construction and mounting that they are capable of withstanding a load of at least 200 pounds applied perpendicularly at anyone area on the screen. They shall also be of such construction and mounting that under ordinary loads or impacts, they will not deflect downward sufficiently to break the glass below them. The construction shall be of grillwork with openings not more than 4 inches long or of slat work with openings not more than 2 inches wide with length unrestricted."* This portion of the regulation better defines that a skylight must have a screen or slat work device installed in conjunction with the skylight. The statement has left interpretation as to where the screen or slat work should be installed to the exterior of the skylight or installed structurally into the curb of the unit. However, the rule is strictly mandated that the screen does not break "glass" below it. Skylight screens and slat work come in many forms and are available in both exterior and interior mounting options. However, protection is mandated at all times



during the lifetime of the opening. Utilizing an exterior mounted device for fall protection becomes an issue at the time of roof replacement or reroof when the dome and exterior device need to be removed in order to perform flashing details. Once removed, the opening is no longer in compliance with the regulation and as such, the roofing contractor is required to protect the opening in some form or fashion. The usual fix for this situation is to place 4'x8' plywood over every opening requiring the lift and purchase of a secondary protection device that must be removed after flashing details are installed so that the skylight can be replaced and exterior guard placed back into use. A more simple approach is to utilize a curb top mounted screen device consisting of 4" square grillwork that is installed to the interior of the skylight so that it becomes a lifetime fall protection device. Even in the event of reroof or roof replacement, removing the skylight dome does not pose a fall protection risk for the contractor and complies with both the current national OSHA standard as well as the recently enacted California OSHA standards.

It is important for roofing contractors to educate themselves in all aspects of OSHA and the safety requirements and regulations pertaining to the protection of their employees as well as their businesses. It is also important for contractors to fully investigate marketing and sales statements when it comes to a product manufacturer's advertisement of compliance with any regulatory body or industry requirement, especially when it comes to safety and employee welfare. Ultimately, in the case of skylights, once the product is installed it is the building owner's responsibility to make sure that their property is up to OSHA and other building regulatory requirements until the next contractor is selected for a roofing project to be performed. Good business sense only leads to informing your customer of current regulations in regards to OSHA and building safety. Providing a lifetime solution for fall protection while providing the environmental and productivity advantages of rooftop daylighting through skylights is not only a substantial advantage for your customer, but also provides a lifetime of advantages to the contractor for future reroofing or restoration projects in the process.