



A product for the Resolution of Leaks in Existing Skylights

A skylight in a room provides a unique and functional architectural element. Not only does it make a room seem brighter and bigger, it lets in light where traditional windows cannot or will not work. When a person enters a room with a skylight for the first time, they cannot help but to be drawn to look out the skylight, even though nothing but the sky can be seen.

For various reasons however, just about all skylights will suffer from leaks at one time during their life often resulting in costly interior and structural damage. Accordingly, there exists a need for a means by which leaks from any and all areas of skylights can be stopped on either a temporary or permanent basis.

The Skylight Stop Leak fulfills this need.

Skylight Stop Leak Product

A simple device that is affixed to the roof and prevents an existing skylight from leaking as a result of poor installation, skylight aging, ice damming or snow accumulation. It prevents water from entering skylights that have been poorly installed or manufactured, have compromised or deteriorated flashings, caulking, gaskets or sealants. It also minimizes heat loss and condensation on the inside of the skylight which is frequently mistaken for leaking. In addition it protects the skylight from damage from fallen snow, ice, hail, branches and other such hazards.

Physical Attributes

The product is very simple and installation lends itself to the Do-it-Yourself (DIY) market. It is light and easy to handle. Typical installation is less than 30 minutes requiring only very common tools.

When installed the product has a pleasing exterior appearance that is much like that of a normal skylight.

From the inside of the structure looking out through the existing skylight, there is little or no evidence of the new Skylight Stop Leak installation and the appearance from the inside is preserved.

Status

US Utility Patent Pending and Patent Cooperation Treaty (PCT) provision with a placeholder in 155 countries.

Product Description

The product consists of a shroud constructed in such a manner as to cover the entire existing skylight with an outer peripheral frame constructed of metal, plastic, wood or composite material. The product provides for physical separation from the skylight thereby preventing snow, water and ice from coming in contact with the skylight. It also incorporates flashings on the edge that contact the roof such that water is deflected away from the skylight. The top surface is constructed of smooth transparent material such as glass or plastic that allows the entrance of light and provides physical separation from the skylight upper surface thus preventing snow, water and ice from coming in contact with the existing skylight upper surface. It further protects the skylight from damage from fallen snow, ice, hail, branches and other such hazards.

The product allows the normal use and functionality of a non-opening skylight installed on a sloping roof and is designed to stop leaks of skylights (opening or non-opening) by forming a shroud around and above the existing skylight in such a manner that it protects the existing skylight from water, ice, snow, leaves, debris and other situations that can allow the skylight to leak into the structure. It is designed to provide external protection for an existing skylight from situations where it is poorly installed, poorly designed, poorly maintained or compromised in its integrity or installation. It is designed in such a manner as to prevent water, snow, ice and debris from coming into contact with the skylight and to deflect water away from the skylight. It is also designed in such a manner that it provides thermal isolation from direct contact with the skylight by snow, ice and water thereby reducing heat loss through the skylight and reducing condensation on the inside of the skylight. The outer surface is designed in a manner such that snow will easily slide off of the top surface without melting when the surface temperature approaches the freezing point thereby minimizing any ice damming on the roof surface on the lower side of the skylight that would otherwise trap water and allow the skylight to leak.

Secondary Application

Metal replacement roofs are gaining in popularity. In the vast majority of cases, the construction method is to leave the existing shingle roof intact and cover it with a waterproof membrane, apply strapping to the existing roof and apply the new metal roof to the strapping.

In the case where the roof has skylights, in many instances the buildup of the roof leaves the skylight too low to apply flashings and necessitates modification or in most cases skylight replacement.

The product can be placed on the surface of the new roof over the existing skylight thereby speeding the roof installation process and reducing the cost to the consumer by eliminating the need for skylight replacement.

Product Construction

Construction could be of a plastic, metal, wood or composite outer framework with a glass, plastic or polycarbonate removable top plus a metal or plastic flashing for the upper edge to facilitate ease of installation.

Construction could also be of blow molded, injection molded or vacuum formed plastic in 3 parts consisting of the two ends and a centre section plus an upper flashing for the upper edge to facilitate ease of installation.

The top could be either flat or slightly domed in shape while ensuring that the bottom edge has no impediment to snow and ice sliding off freely.

In addition, a domed top could more easily accommodate both flat and domed top skylights.

Constructing the product in 3 parts that could be nested and could be easily assembled on site would allow for small packaging thereby facilitating economical shipping for on-line sales and a small footprint in the retail environment.

To accommodate larger skylights, an additional centre section could be provided thereby allowing the same product parts for multiple size applications.

Sizing

There are many different sizes of skylights. While other less common sizes do exist, the vast majority of residential construction skylights are designed with a width dimension to fit between roof trusses that are placed on 24" centres. The variation in residential skylight sizes is predominately in the skylight length with by far the most common being approximately 48".

The critical part of the construction of this product is the minimal inside physical separation between the existing skylight perimeter as well as the top and the product to ensure it functions properly. As such a product that is of a size that satisfies this minimum separation requirement will function satisfactorily. A "one size fits all" concept could then be used such that one size that fits a larger skylight could also be used to accommodate many smaller sizes and still function satisfactorily.

Other Application Accommodation

Although the application and configuration discussed above applies to skylights commonly found on domestic residential structures, the concept also applies to virtually all styles of conventional skylights including but not limited to ventilating, fixed and tubular, with a wide variety of shapes including but not limited to flat, arched, domed, and pyramid. Likewise, the roof surface used with the cover may also include, but not be limited to metal roofing, slate shingles, rubber membrane, solar roofs, wood shakes, built-up roofs, and the like. Accordingly, its use with any particular style of conventional skylight or roof surface is not a limiting factor of the product.

Principle of Operation

The product provides a protective cover over the existing skylight thereby protecting the skylight from the elements and providing physical protection from damage as a result of hail, ice, snow, branches and other hazards that would otherwise damage the skylight.

The design of the product is such that water is deflected away from the sides and the top of the skylight where it may be compromised as a result of deterioration and or poor design or construction thereby preventing leaking that would otherwise occur.

The product also provides physical separation from the skylight on all sides thereby preventing snow and ice from contacting the surfaces of the skylight thereby creating a thermal barrier to snow and ice and the

elements resulting in less heat loss from the skylight. This concept allows the inner surfaces of the skylight to stay warmer thereby reducing condensation on the inside of the skylight that would otherwise occur as a result of poor insulation, compromised or lack of thermal glazing, as well as poor design and construction.

By providing a thermal barrier between the product and the skylight, there is less melting of snow and ice on the sides of the product than would otherwise occur with snow and ice in direct contact with the skylight thereby reducing the amount of water that would run down the roof and freeze below the skylight contributing to ice damming.

A large portion of skylight leaks in northern climates occur as a result of ice damming on the roof below the skylight. This occurs when snow and ice on the top of the skylight melts and water runs off of the lower edge of the skylight onto the roof where it freezes. This eventually builds up creating an ice dam that prevents the water from running away and leaks under the singles or eventually gets high enough to come over the skylight glass. In the case of opening skylights, leaking usually occurs at the seal where the skylight opens. Leaking also occurs where flashings, sealants or caulking on the skylight sides or around the glazing is compromised.

By providing a physical and thermal barrier between the skylight upper surface and the top of the product, snow and ice is not in direct contact with the skylight surface resulting in snow and ice not melting and staying on the upper surface of the product. Since there is no or very minimal melting, ice damming on the roof below the product is very minimal or does not occur. The physical separation between the product and the skylight on the outer edges also provides more protection for the skylight.

When the environmental temperature rises and approaches the freezing point, a thin film of water forms between the snow and ice on the upper surface and the product surface, allowing the snow to slide off of the product without thawing thereby eliminating the potential for ice damming.

Product / Market Research

Product Take-up and Value

Every opportunity has been taken to ask those who have skylights that leak if they would spend \$200, \$300 or \$400 on a DIY solution that would resolve the issue permanently. Out of 93 people surveyed, 100% would spend up to \$300 and that drops to 78% at \$400. That result established a ballpark value for the product as well as a possible take-up.

Potential Market

In USA alone it has been determined that there are about 1.4 million residential skylights that leak. This is based on 20 year sales and the probability of failure in a ten year period.

Additionally, 3rd party research has concluded that in USA there are approximately 1.3 million residential skylights that leak based on information obtained from skylight manufacturers and information on residential structures taken from the USA census.

The global skylight replacement market is estimated at about \$US800 Million annually and that the primary reason for replacement is failure and secondly damage.

A smaller portion of the market but potentially growing is the use of the product for steel roof retrofits to eliminate the need for skylight replacement.

Prototype Installations

Three prototypes (constructed of metal and glass) were installed in Ottawa Ontario in 2016 on skylights that had a history of chronic leaking from ice damming and seal deterioration. They had been repaired several times only to leak again.



Prototype Installation

Preferred Final Design Concept

All three installed prototypes have been successful in mitigating the leaking issues for 5 1/2 years in one of the most difficult environmental conditions in North America for skylight failures (Ottawa Ontario) where there is significant snowfall and frequent freeze / thaw cycles during the winter period.

Although the prototypes were constructed of metal and tempered glass to prove the concept, the preferred final product would be constructed of molded plastic as shown above in at least 3 sections to accommodate ease of and economical shipping as well as minimizing the requirement for retail floor space.

Opportunity

The Skylight Stop Leak is currently available for patent licensing or patent purchase. Proposals from interested parties are welcome. Creativity in operational relationship to the benefit of all parties is encouraged.

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