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## Product Info

Skylights are widely viewed as a desirable feature for buildings that have human occupation during at least daylight hours. The list of building types that can benefit from skylights is long and includes houses, schools, hospitals, offices, libraries, factories, airport terminals and so on. It has long been recognised that daylight is an excellent source of 'cool light', meaning that a given amount of light is accompanied by less heat gain than almost any type of artificial light.

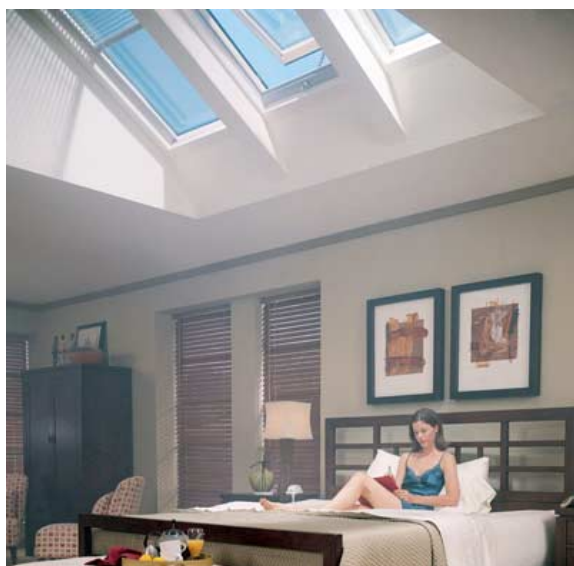
Skylights and Windows are "a natural for one and two storey construction...(and)...places where human happiness matters" (1998 Heschong). They increase the amenity of internal spaces that have no windows or low natural light levels and they promote architectural freedom.



Skylights offer excellent daylighting and have the potential to displace much electric lighting, thus saving on lighting and, potentially, cooling energy. However they must be selected carefully to prevent undue heat loss or heat gain. In practice, the actual energy burden imposed by a skylight on a house is rarely more than a few percent. This is because they are usually only a few percent of the floor area, compared with 20 – 30% for typical windows. Some inbuilt solar control may be desirable in warmer climates, such as solar-control glazing or blinds.



Skylights come in many combinations of shape, size, glazing, frame and installation details. Skylights can use transparent or translucent glazing, in glass or polymer of various configurations to achieve the twin goals of even light distribution and solar control. Diffusely transmitting glazing has a back-scattering effect on incoming solar radiation. This reduces overall visible transmittance slightly but reduces the solar heat load on the space below. At the same time, the diffuse transmission serves to scatter light over a wide range of angles. This promotes soft, glare-free lighting.



Roof windows are popular as they typically offer double glazing and controllable ventilation. Sealed insulating glass units (IGU's), or double glazing reduce heat losses through skylights while minimizing condensation. Some Skylight units are electrically operable, manually operable or permanently ventilated (ideal for wet areas such as laundries and bathrooms) to promote air flow. In Living areas in heating climates, (i.e cold geographic areas) permanently ventilated skylights may contribute to drafts and heat loss, so they should be used with caution. In cooling climates (i.e. hot geographic areas) permanently ventilated skylights can be desirable to help promote constant airflow.

A variety of shapes exist for applications on sloping or flat roofs. Glazings may be flat, glass or twin wall polymer/ polycarbonate, polymer moulded domes, single-glazed (clear or tinted), or single-glazed diffuse (opal), in various materials as detailed above. Double-glazed skylights are available in a similar range, and in the case of glass, also provide the ability to use spectrally selective optical coatings which modify solar transmission and emittance. The use of sealed insulating glass allows inert gas to be used in the gap instead of



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air, which reduces conducted and convected heat across the space. Frames may be aluminium, steel, timber or composites such as aluminium-clad wood or uPVC. Skylights with long shafts often have diffuser panels fitted at ceiling level. Some lightwells (shafts) exert nearly as much influence over the energy properties as the actual skylight itself. However a diffuser at ceiling level can minimize this influence.



Well designed Tubular Skylights reduce absolute heat loss and heat gain because of their smaller cross-sectional area. Their overall efficiency relies on their ability to 'capture' direct-beam solar radiation and the efficiency of the lightwell material. They work best in climates with a high incidence of clear, sunny days. Such Tubular Skylights capture sunlight, bounce the light down the highly reflective lightwell and diffuse it at ceiling level. On cloudy days the amount of daylight admitted is less than for a conventional skylight with a larger throat or opening size. Best examples use a specular reflective tube to direct the sunlight downward, with best results being achieved by a straight tube with a silvered (highly specularly reflective) lining. Preferably, these lightwells should have a visible reflectance of 85% or greater (AS 4285). Silver rather than aluminium results in the best colour rendition, since silver is a more uniform reflector of all colours in the solar spectrum. Tubular skylights are a system and diffusers should be fitted to these skylights to reduce glare and to throw light over a broad area.