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WINDOW Master®
Fresh Air. Fresh People.

Reduce your energy bills by introducing night purging

Night purging is a critical component to enhance the performance of any naturally ventilated building, which is used during the summer time

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It is a fact that new buildings are becoming more and more insulated due to requirements in the national regulations, lowered U-values and the continuing focus on the heating usage of the building. We are experiencing that the buildings now have a need for cooling even during the winter time, due to the high heat loads generated from people, lighting and computers etc.

In a typical new office building with normal heat loads the need for cooling can be required even at outdoor temperatures well below 0 degrees Celsius. This leads to buildings which actually have decreased the need for heating but increased the need for cooling.

Passive cooling measure can play an important role in improving the energy efficiency of a building by reducing or even eliminating the need for auxiliary cooling.
One passive cooling technique, commonly used in private, public and commercial applications to maintain a comfortable indoor climate, is night purging – the removal of heat from a building by bringing in cool night time air without the use of active HVAC cooling and ventilation.

Night purging using natural ventilation – how does it works?
Natural night ventilation is a passive cooling method, driven by the natural driving forces of the wind and/or thermally (stack) generated pressures. The heat absorbed by a building's exposed thermal mass during the day is released to the indoor air at night, after which it is purged by night ventilation.

Meanwhile, external fresh air cools down the thermal mass which then acts as a heat sink during the following day.
The night purge involves automatically operable windows or louvres being opened for a pre-set period of time over night, allowing a natural air flow through the building.

Why should night purging be incorporated into your building?
Night purging can help reduce the building operating costs, with hot and stale air being replaced with fresh night time air. This reduces the need for the HVAC system to be activated as soon as the building is occupied in the morning. The thermal mass of the building will be cooled, providing a fresher and cooler environment for the occupants.

If hot and stale air is not removed, not only will the room feel stuffy, but air borne pollutants, such as carbon dioxide, may reach alarming levels. This can be potentially harmful for the occupants with symptoms such as headaches, dry and itchy eyes or a sore throat developing. In turn this can have a negative effect on both productivity and satisfaction levels with the internal environment.

In which climates is night purging most effective?
The efficiency of night cooling depends on the thermal properties of the building and on the local climate conditions, i.e. night-time wind speed and the temperature swing of the ambient air.

It is particularly effective in climates that have cool to cold night time temperatures as there will be a greater difference between internal and external temperatures. This is not to say that night purging cannot be effective in warmer climates. Even when internal and external temperatures are very similar night purging can still provide a means for air borne pollutants to be exhausted and allow fresh air to enter.

Avoiding Common Concerns with Night Purging
Security is a somewhat common concern when night purging is considered. This concern is alleviated by selecting high level openings which minimises a number of risks. Security risks are reduced because insurance companies generally prefer small openings at higher level if night cooling. The risks from entrapment can be lowered by using intelligent actuators which have an inbuilt pressure safety function. Furthermore, by using an intelligent actuator in combination with an intelligent control system you are able to control your openings very precisely, as the windows normally do not have to open fully during night purging to secure an effective cooling. The intelligent control system should include wind and rain sensors which are able to detect when rain and wind speed limits are exceeded and then send a close signal to the windows to avoid potential water damage.

So passive night purging should be considered in order to reduce energy bill, but also to improve the health and wellbeing of the occupants.

