

“Up On Top” News



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Roof Reflectivity and Insulation Can Cut Costs

There are two ways in which roof designs can directly impact operating costs: the insulating value of the roof system and the reflectivity of the roof surface. Minimizing heat loss from the interior in winter months and minimizing heat transfer in the summer months should reduce HVAC requirements and, thus, lower operating costs.

In winter, the heat moves from heated indoor spaces to the outdoors. During the summer, heat moves from outdoors to the interior of buildings if there's a temperature differential. Well-insulated roof systems decrease the heating or cooling needs by providing effective resistance to the flow of heat.

The effectiveness of an insulation material is measured by the material's R-value. The higher an R-value, the better it is at resisting heat transfer. Roof insulation products have differing R-values. Many building codes in the United States typically require an R-value of 20. Many commercial roof insulations have an R-value of about 5 per inch thickness, which would typically require about 4 inches of insulation to reach R-20.

Radiation from the sun can also transfer heat to a building. The ability of a roof membrane covering to limit heat gain from the sun's radiation is a result of the roof's solar reflectance and thermal emittance. A roof membrane with higher solar reflectivity will reflect a large portion of the sun's radiation back away from the building and into the atmosphere. Thermal emittance is the relative ability of a roof to radiate absorbed heat out before it enters the building.

An index factor has been developed that combines solar reflectance and thermal emittance values. The combined index is the solar reflective index (SRI). The USGBC (US Green Building Council) requires an SRI of 78 or higher for a roof membrane covering.

Some consideration should be given to the location of a building with respect to solar reflectance. The SRI value of 78 is required by USGBC in part to lower the heat island effect of buildings; however, roof systems with lower SRI values might be beneficial in the northern United States due to the greater potential for heat gain into the building in climates that require more heating than cooling.

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