



BALTIMORE

spec NEWS

Felt Tips

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ROOF INSULATION

Insulation specifications should be so written that either the total "U" value of the roof is specified or the "C" factor or "R" factor of the insulation. What should not be specified is thickness alone or "K" factor alone, because these values, by themselves, lose their meaning or significance when specifying insulation for a specific job.

The "K" factor is defined as the thermal conductance of a homogenous material of 1" thickness only. The numerical value for "K" factor on a specific product is determined by various types of heat flow materials and is mathematically expressed as the heat flow in BTU's per hour through a square foot of material 1" thick.

$$\text{"K" factor} = \text{BTU/Hr.} \times \text{Sq. Ft.} \times \text{°F/In.}$$

The term "C" factor is the thermal conductance or the heat flow in BTU's per hour through a square foot of any given thickness of a homogenous or composite material. The "C" value, therefore, is directly related to thickness by the formulation "C" factor = "K" factor divided by thickness in inches and is expressed as BTU's.

$$\text{"C" factor} = \text{"K"/Thickness expressed as BTU/Hr.} \times \text{Sq. Ft.} \times \text{°F.}$$

"R" factors are the thermal resistance values for any specific thickness of insulation and are arrived at by taking the reciprocal of the "C" factor, "R" = 1/"C". "R" factors are significant, because they are the only factors that can be handled arithmetically, that is, they can be added and subtracted, etc., and they are used in this manner for determining the overall resistance of various components in a roofing assembly.

$$\text{"R" total} = R_1 + R_2 + R_3 + \text{Etc.}$$

"U" factor defines the overall coefficient of heat transmission for the entire roof assembly from the outside air surface through the assembly to the inside air surface and is the final value which is used for calculating the thermal efficiency of the entire roofing assembly. The "U" value is arrived at by taking the reciprocal of the total resistance of the roofing assembly.

$$\text{"U"} = 1/R_t \text{ expressed at BTU's/Hr.} \times \text{Sq. Ft.} \times \text{°F.}$$

Moisture in insulated built-up roofs is the most prominent cause of rapid deterioration of both the insulation and BUR. The insulation suffers degradations of one kind or another, while the BUR blisters and develops ridges and cracks.

On pre-manufactured decks (steel, precast, etc.) avoid a vapor barrier except in such extreme cases as laundry, pool, processing areas. Allow moisture to escape downward. Over vapor barriers and poured concrete decks, install vents to allow moisture to escape. Do not use uninsulated base vents as moisture condenses on them and runs back into the insulation during cool conditions, concentrating at the vent.

Information summarized from copies of Roof Insulation Digest.