

Roof Solar Reflectance and Thermal Emittance

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Each month the Energy Code Hotline fields numerous calls related to complying with the energy codes. These calls typically center around what are the code requirements for thermal performance of wall and roof assemblies and which systems are available to help meet them. These calls also help determine the topics for some of our Energy Code Education articles.

Recently, the Hotline received a call seeking information on available options for how to comply with the roof solar reflectance and thermal emittance requirements which are applicable for Climate Zones 1, 2, and 3 in both IECC and ASHRAE 90.1. The caller was seeking to utilize a darker colored roof which did not meet the roof solar reflectance and thermal emittance values specified in the codes.



Utilizing a darker colored roof may not meet the roof solar reflectance and thermal emittance values specified in IECC and ASHRAE 90.1 codes.

This can easily be solved by opting for a roof with a lighter color (typically shades of white) that meets the reflectance and emittance values required. However, sometimes things like building aesthetics or corporate branding do not allow for the change in color.

Buildings in climate zones 1-3 must meet minimum requirements for roof solar reflectance. We will look at IECC 2015 and ASHRAE 90.1-2013 as examples since they are still used in many of the southern states containing climate zones 1-3.



Opting for a roof with a lighter color, typically shades of white, can often meet the reflectance and emittance values required.

If you are following IECC there are two minimum roof reflectance and emittance options. You can install a roof with a Solar Reflectance Index (SRI) of 64, or you can opt for a roof with a three-year aged solar reflectance of 0.55 with a three-year aged thermal emittance of 0.75.

Roof reflectivity provisions in IECC specify that low-sloped roofs (slopes under 2:12) directly above cooled conditioned spaces in climate zones 1-3 shall comply. Any areas that are heating-only would not need to comply.

If you are following ASHRAE 90.1 there are three options available. You can install a roof with a Solar Reflectance Index (SRI) of 64, or you can select a roof with a three-year aged solar reflectance of 0.55 with a three-year aged thermal emittance of 0.75, just the same as IECC.

The third option gives ASHRAE 90.1 some additional flexibility. Option #3 allows for compliance by increasing roof insulation levels beyond what is required for the given climate zone to those which are found in Table 5.5.3.1.1.

Additionally, ASHRAE 90.1 includes a metal building specific exception to the roof solar reflectance and thermal emittance requirements. The exception is for Low-Sloped “metal building” roofs in Climate Zones 2 and 3.

For more information regarding our Energy Solutions, check out our website here:

<https://www.cbcsteelbuildings.com/capabilities/energy-resources/>

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