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Building Thermal Envelope requirements for Conditioned versus Unconditioned Space

Code: 2012 NC Energy Conservation Code

Date: May 28, 2014

Section: 101.5.2 & 202

Question:

Can permanent heating or cooling systems be installed in a residential or commercial building without invoking the building thermal envelope requirements?

Answer:

Yes, permanent heating or cooling systems may be installed in a residential or commercial building without invoking the building thermal envelope requirements on a conditional basis as explained in the below commentary.

The 2012 NCECC, Section 101.5.2 identifies:

101.5.2 Low energy buildings. The following buildings, or portions thereof, separated from the remainder of the building by *building thermal envelope* assemblies complying with this code shall be exempt from the *building thermal envelope* provisions of this code:

1. Those with a peak design rate of energy usage less than 3.4 Btu/h·ft² (10.7 W/m²) or 1.0 watt/ft² (10.7 W/m²) of floor area for space conditioning purposes.
2. Those that do not contain *conditioned space*.

Section 101.5.2, item 2 is the source of the exemption that is discussed in this commentary. Either exception 1 or 2 can be applied. The cost effectiveness of the building thermal envelope provisions contained in the 2012 NCECC were analyzed based on conditioned space at usual space conditioning temperatures.

The thermal envelope provisions of the 2012 NCECC are not required to be met for buildings or portions thereof that do not contain conditioned spaces as noted in exemption 2 above.

The 2012 NCECC contains a definition in Chapter 2 for “conditioned space” as shown below. The building thermal envelope requirements for commercial buildings are invoked when the criteria for conditioned space is met.

CONDITIONED SPACE. For energy purposes, space within a building that is provided with heating and/or cooling equipment or systems capable of maintaining, through design or heat loss/gain, 50°F (10°C) during the heating season and 85°F (29°C) during the

cooling season, or communicates directly with a conditioned space. For mechanical purposes, an area, room or space being heated or cooled by any equipment or appliance.

There can be occurrence of installation of permanent heating and/or cooling appliances or systems within a space without invoking the building thermal envelope requirements. The requirement would be that the engineered design would not provide heating capability at or above 50 degrees F or cooling capability at or below 85 degrees F as the design basis for heating and cooling. For example, the space could be designed to maintain a maximum 45 degrees F during the winter season on a design basis day and not invoke the building thermal envelope requirements. This would provide some opportunity for air tempering and/or freeze protection of spaces without triggering the building thermal envelope requirements. This does allow the owner some choice in the amount of insulation or other building thermal envelope measures that will economically meet his specific needs for these conditions.

Keywords: