City of Arlington Texas

Notice to Contractors

October 18, 2002

CLARIFICATION OF ROOF/CEILING CONSTRUCTION

Both the IRC and the IECC will permit limited construction of roof/ceiling assemblies with R-22 batt insulation. The batt insulation must be separated from the roof decking with a 1-inch air gap for ventilation. The air gap may be accomplished by the use of insulation baffles. In July, we stated that the minimum framing depth for roof/ceiling assemblies to accommodate batt insulation is the equivalent of a 2 X 10 dimensional lumber. The purpose of this notice is to revise and clarify the requirements for construction and inspection of the roof/ceiling assemblies.

Roof/ceiling framing depth:

Depending on the manufacturer, R-22 batt insulation is available in various thicknesses. Based on the information gathered to date, the minimum framing member size acceptable for roof/ceiling assemblies that will receive R-22 insulation is a 2 X 8. A 2 X 8 framing member will allow for a batt thickness of 6 ½ inches while allowing for the 1-inch air space. It is important to note that a 2 X 8 will not accommodate all brands of R-22 insulation.

As part of the seconds (framing) inspection, the building inspector will measure and document the depth of the roof/ceiling framing. Any depth that is equivalent or greater than a 2 X 8 (7 ½ inches) will satisfy the framing requirements for the purpose of receiving cavity insulation at the seconds inspection. At the insulation inspection, the inspector will check and verify: 1) the stated R-value is a minimum of R-22 and 2) the expanded depth of the insulation will fit in the framing cavity. If the expanded depth of the insulation is greater than the recorded framing depth less the 1-inch air space, **the inspection will be denied**.

Roof/ceiling cavity framing method:

A second issue is that of the method of expanding the cavity to accommodate the batt insulation. If the selected size of the rafter/joist for a roof/ceiling assembly is a 2 X 6, the framer will have to add to the long dimension of the member in order to provide for adequate space for the batt insulation. Sufficient depth must be added to provide for the expanded batt insulation and the 1-inch air space. The depth must be added as follows: 1) the depth must be added in line with the depth of the framing member. 2) The depth must be secured in such a manner to hold the weight of the attached drywall. The use of nails that will be subject to withdrawal is not accepted; screws make a better choice. The use of gusset plates to join the rafter/joists and the added dimension is acceptable. Please note that the added dimension **cannot** be nailed on to the side of the rafter/joist. The cavity must allow for the full expansion of the batt and not create air voids. (See attached photograph).

Fire blocking at cove ceilings:

Another issue that has been identified is the creation of a cove type ceiling when dimension is added to the rafter/joist. In conventional framing, the double top plate also serves as fire blocking at the top of the wall. When dimension is added to the rafter/joist so that the roof/ceiling cavity is open to the wall, the framer must add additional fire blocking material to close up the opening between the roof/ceiling cavity and the wall cavity. (See attached photograph).

INSULATION THICKNESSES & STRIPING CODING

BATT INSULATION THICKNESSES BASED ON *R* VALUE/MANUFACTURER

	CertainTeed	Johns Manville	Owens Corning
R11	3 ½	3 ?	3 ½
R13	3 ½	3 ½	3 ½
R15	3 ½	3 ½	3 ½
R19	6 ¼	6 ¼	6 ¼
R22	6 ½	7 ½	6 ¾
R30	10	10 ¼	9 ¼

UNIVERSAL STRIPING CODE FOR *R* VALUES

R-11 .....3 STRIPES
R-13 .....4 STRIPES
R-19 .....5 STRIPES
R-22 .....6 STRIPES
R-30 .....2 STRIPES SEPARATED BY MIN 6 INCHES

There may be other manufacturers that have products with different installed thicknesses. For batt insulation, here are the critical items:

1. The batt must fill the cavity and not create any air pockets or voids within the cavity or between the batt and conditioned space. A 4% void or air pocket equals a 15% loss in *R*-value.
2. The batt may not be compressed. The percentage of batt compression reduces the *R*-value equal to the percentage of compression.
3. For batts installed in a roof-ceiling assembly, there must be 1” of ventilation space between the top of the expanded batt and the decking.
4. For batts installed under a floor over unconditioned area (example: over a garage), the batts must be placed directly against the floor above with no air voids.

This picture illustrates one approach to adding dimension to the roof/ceiling cavity to accept batt insulation. In this illustration, dimension lumber has been added to the side of the rafter/joist framing. This approach creates a cavity that **will not** accept batt insulation without creating air pockets. This approach **is not approved**. All dimension lumber that is added to the rafter/joist framing must be added to the long dimension.