Cold Floors: Causes and Cures

One of the building industry's oldest problems is the cold floor. Cold floors occur when they are built over unconditioned spaces, such as above a garage, over a porch, over a crawl space and cantilevered beyond the exterior wall of the building. This problem is most noticeable when the floor has been tiled.

The building codes in many areas dictate that these floors should be insulated to R-25 (RSI-4.3). But experience tells us that R-25 (RSI-4.3) of fiber material does not ensure a warm floor. In theory, the floor in a properly insulated room should be at room temperature. In practice things are quite different; it is common to find floors that are 10° F (5.5° C) cooler than the room. Why? Because it is virtually impossible to install a fiber batt so that it is in contact with, and stays in contact with, the floor above. It is also impossible to install it accurately around bracing and bridging between joists. Unfortunately, due to voids and air spaces that allow air movement, fibrous materials do not perform to their rated R-value. (R-values are determined under ideal, still-air laboratory conditions.) Because air gaps usually exist between the floor and insulation there is room for cold air to infiltrate from the exterior. The cold air essentially "short-circuits" the insulation material and renders it ineffective. When this happens it means that the floor is essentially not insulated.

Heated plenums

Some designers and builders have tried to overcome the problem with heated plenum using a dropped ceiling isolated with a fiber batt. Heated house air is then ducted in to the space created under the floor. While this helps the problem, experience proves it does not solve it. This is especially obvious when water pipes are run within the plenum; frozen pipes are still commonplace.

Why? One possible reason is that the builder may not have insulated and air-sealed the exterior wall of the heated plenum. Most builders do not place a vapor barrier over the insulation to protect it from the humid, heated air. The result is that moisture condenses in the fiber batt and on the cold exterior plenum wall, creating a potential long-term structural problem. Again, this negatively impacts R-value. Also, if a return air duct is installed to remove the heated air, it runs the risk of conveying glass-fiber particles to the house. This crude and faulty design will cost the building owner in higher energy bills for the life of the building.

Air sealing with Icynene® is the solution

The Icynene Insulation System® is a site-installed cellular foam material that expands to fill the tiniest and most awkward spaces and adheres to the floor above. Icynene® eliminates voids and resulting air movement that have plagued generations of builders and homeowners. Thousands of floors over porches, garages, crawl spaces and cantilevers have been insulated and air sealed with The Icynene Insulation System®. Many more buildings with cold floors have been cured by an Icynene® refit. Cold floors are simply not an issue any more when insulated with Icynene®.