

(Noteworthy)

## **Comparison of Under-floor Insulation Systems for Hydronic Heating**

The CSA B214-00 “Installation Code for Hydronic Heating Systems” specifies that when a poured concrete radiant floor system is installed on or below grade, there shall be insulation with a minimum RSI value of 0.9 m<sup>2</sup>•K/W (minimum R-value of 5). In the Ontario Building Code, the minimum thermal resistance of insulation for concrete slab-on-ground containing pipes or heating ducts is a minimum RSI value of 1.76 m<sup>2</sup> °C/W (minimum R-value of 10).

Several basement slab insulation products are being installed including foil-faced bubble pack, 44-mm thick polyurethane panels with steel door skins on each side (from window cut-outs panels from steel-skin doors) and the traditional 50-mm extruded polystyrene panels. The thermal performance of these materials is causing some confusion in the marketplace and in an attempt to reduce the concerns the Canadian Mortgage and Housing Corporation (CMHC) ran field tests on the above products to compare the thermal performance.

The study was carried out by monitoring four new houses in Paris, Ontario with the first three homes having one of the above insulation products installed under the slab while the fourth home had no under-slab insulation. Each house was analyzed using data gathered every two weeks from February, 2004 to June, 2004. The RSI-values for all three insulating materials were assumed to be unknown and were calculated for the monitored data.

The conclusion of the study indicated the foil-faced bubble pack had a low insulating value (0.40 RSI – well below minimum code requirements) compared to the polyurethane and polystyrene panels. In fact the bubble-pack insulation showed performance quite similar to an uninsulated floor. The traditional 50mm polystyrene panels had an RSI-value similar to published data for the material (2.13 RSI – complying with the minimum code requirements). The steel-skinned polyurethane was found to have a slightly higher RSI-value than the traditional polystyrene (2.56 RSI – complying with the minimum code requirements).

From the results of this CMHC study it is being recommended to all specifiers, designers, installers and builders that careful consideration must be given to the actual thermal performance of some of the available under slab insulation materials. Selecting materials that do not meet the minimum code requirements can significantly affect comfort for the consumer through excessive wasted heat into the ground and could be a very expensive proposition to rectify the condition.

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