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Thermal Performance Information Sheet for Four Reward Wall Systems
CTLGroup Project No. 314019

As authorized on June 14, 2007, CTLGroup has prepared this thermal performance information sheet for Reward Wall Systems iForm insulating concrete form (ICF) wall. This information sheet is similar to thermal performance information sheets prepared by Oak Ridge National Laboratory.

SCOPE

The information sheet shows steady-state R-values, dynamic R-value equivalents for massive systems including a reduction in air infiltration, and the dynamic benefit for massive systems (DBMS) also including a reduction in air infiltration. Dynamic R-value equivalent is the wall R-value of a house with wood frame walls that has the same space heating and cooling energy consumption as a similar house with iForm walls. The DBMS is a dimensionless multiplier of steady-state R-value to enable simple comparisons of dynamic energy performances of wall systems. The product of DBMS and steady-state R-value is the dynamic R-value equivalent for massive systems.

LIMITATIONS

The information sheet should be used only as an answer to the question: “What wall R-value should a house with wood frame walls have to obtain the same space heating and cooling energy consumption as a similar house with iForm walls?” Any dissemination of this work shall include actual R-values and shall not mislabel the resulting dynamic R-values, which include air infiltration effects, as actual R-values.

METHODOLOGY

We performed whole-building energy simulation using four thicknesses of iForm ICF walls: 9-inch, 11-inch, 13-inch, and 15-inch. The energy simulation software is based on DOE-2.1E. The building modeled is a house based on a design we have used in previously published reports (for example, see Gajda, J. and VanGeem, M.G., *Energy Use in Residential Housing: A Comparison of Insulating Concrete Form and Wood-frame Walls*, PCA R&D Serial No. 2415, Portland Cement Association, Skokie, IL, 2000). It is two stories and has 2450 sq ft of conditioned floor area. We analyzed the house in 14 climate zones as presented in the *2006 International Energy Conservation Code (2006 IECC)*. These are climate zones 1A, 2A, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 6A, 6B, and 7. We used clear wall R-values as opposed to overall R-values used by Oak Ridge National Laboratory. The overall R-values are more precise, but

the added precision is not needed in this type of analysis. We used iForm thicknesses and R-values provided by Reward and noted in the table. We determined the heating and cooling energy loads of the house using the four different thicknesses of iForm, and with glazing, foundation, and roof thermal performance that meets the minimum requirements of the *2006 IECC*.

We then determined the R-value of a wood frame wall in the same house that has the same total energy load as the house with Reward iForm walls. The only differences between the houses are the exterior walls and the rate of air infiltration. Wood frame walls are a combination of fiberglass batt insulation and insulated sheathing to achieve the necessary R-value. Reward provided the air infiltration rate of 0.15 air changes per house (ACH) for the iForm house and 0.35 ACH for the wood frame house. Note that in climate zones 1A to 3C, the energy difference due to infiltration can not be made up by additional wall thermal resistance (R-1000 is the maximum R-value allowed DOE-2.1E).

We appreciate the opportunity to be of service to Reward.

Sincerely,

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