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Wall Energy Rating of Spray Polyurethane Foam Insulated Wall Assemblies

Objective

To develop a laboratory test method to determine the overall Wall Energy Rating (WER) of spray polyurethane foam wall assemblies, and to develop a calculation model that can help predict the WER of a new assembly without laboratory testing.

Background

Evaluation of thermal insulation materials has traditionally focused only on their thermal conductance properties. However materials such as spray polyurethane foam (SPF) also play a role as part of the air barrier system, and may also contribute to moisture management and to structural redundancy. Behaviour of SPF in the field also depends greatly on installation practices and on its aging and weathering behaviours (i.e., conditioning according to the CCMC *Technical Guide for Air Barrier Systems for Exterior Walls of Low-Rise Buildings*). A proper assessment of the thermal and air leakage control characteristics of an SPF insulated assembly needs to incorporate all of these factors.

Statement of Work

- Develop a laboratory test method to determine the energy rating of wall assemblies, including the thermal conductance and air leakage characteristics.
- Conduct laboratory testing on a number of wall samples (including reference walls, walls of different foam material, and walls with penetrations) to determine their energy rating (WER)
- Develop a calculation procedure to predict the WER of other wall assemblies
- Correlate the WER predicted by the calculation procedure with those values from testing

Expected Outcomes

- An experimental protocol for the series of tests needed to develop the Wall Energy Rating
- Test results for all full-scale wall specimens (about 2.4 m by 2.4 m nominal size), showing their thermal and air-leakage performance under laboratory conditions
- A calculation procedure to determine Wall Energy Rating based on thermal transmission and air leakage characteristics, and documentation of the procedure
- Recommendations for the development of a CCMC Technical Guide on the energy rating of SPF walls.

Partners

The Canadian Urethane Foam Contractors Association (CUFCA), BASF Canada, Demilec Inc., Honeywell International, USA and NRC-IRC.

Start/Expected Completion Dates

This project began in February 2005 and will be completed in November 2007.

Project Manager

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For more information see http://irc.nrc-cnrc.gc.ca/bes/hmpe/wer_e.html.

Factsheet 82, May 2007



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