Research & Development Highlights

Technical Series
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Field Study of the Indoor Environment in Mobile Homes

Introduction

Because mobile homes have a high loading of pressed wood products relative to their size and air change rate, the concentrations of formaldehyde are significantly higher than in other housing. The Canadian Manufactured Housing Institute, in co-operation with CMHC, commissioned this study to investigate means of addressing this problem in new mobile homes. This study investigated the variations in formaldehyde source strength, envelope air tightness and mechanical air change rates in several mobile homes in each of two manufacturing plants.

Findings

Air tightness was found to vary from 4.33 air changes per hour (ac/h) to 5.89 ac/h at 50 Pascals (Pa) pressure. Although this is considerably looser than the R2000 air tightness target of 1.5 ac/h, almost all of the leakage was located at the floor level around plumbing and ducting. Because the leakage is all at one level it would not produce very much natural air leakage.

Air change rates and formaldehyde concentrations were measured in several units at the manufacturing plant. Air change rates in rooms with closed doors and no mechanical system operating were at or near zero (less than 0.01 ac/h). These conditions are not prevalent but do occur under normal circumstances. The highest air change rates (maximum 0.78 ac/h) were measured under conditions where the bathroom exhaust and natural gas furnace fans were operated. Ducting was provided between the outdoors and the return air grill of the furnace.

Under conditions of slight natural air leakage and no mechanical ventilation, formaldehyde reached levels of 0.9 parts per million (ppm). With mechanical air change systems on for 24 hours, formaldehyde concentrations dropped to as low as 0.3 ppm. These concentrations will continue to decrease over time but may not do so fast enough to meet Health and Welfare Canada's short term guideline of 0.1 ppm by the time of occupancy.

Formaldehyde concentrations were also measured at the surface of various pressed wood products after 24 hours of no air change (sealed with polyethylene). These results varied from 0.00 to 8.01 ppm. Obviously a wide variety exists among products and the way they are used. Unfortunately, methods of screening products are not yet available to mobile home manufacturers. Because of the formaldehyde off-gassing rates, ventilation cannot lower the concentrations enough.

Implications for the Housing Industry

The Canadian Manufactured Housing Institute and Canada Mortgage and Housing Corporation, with some support from provincial agencies, have extended this work to develop product screening techniques and methods of sealing certain products or assemblies to prevent off-gassing. CMHC also intends to support the rating and labelling of products for off-gassing.

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A full report on this research project is available from the Canadian Housing Information Centre at the address below.

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