Glazing Proportions for New Housing in PA

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Preface and acknowledgments

This report is one in a series of reports prepared by the Pennsylvania Housing Research Center (PHRC) that document or complement the development of an alternative energy code for housing for the Commonwealth of Pennsylvania. Its intended audience includes policy makers in state and local governments, building code officials, builders, contractors and others involved in the development or implementation of building code regulation in Pennsylvania.

Early in the year we were asked whether we knew what proportion of glazing was being used on new housing in Pennsylvania. We did not know; nor did anyone else seem to know and, as a result, this project was initiated. In spite of the constraints on time and money and the limitations of the available data, we not only answered the initial question but also arrived at some interesting conclusions.

The authors of this report were Eric Burnett, Steven Bentz and Mark Fortney. Steven Bentz was responsible for handling the data.

The Act 222 survey forms analyzed for this project were provided by the Weatherization Training Center at the Pennsylvania College of Technology.

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- The Commonwealth of Pennsylvania through the Pennsylvania Department of Community and Economic Development (DCED),
- The individuals, associations, and corporations that are members of the PHRC,
- The Hankin Endowment, and
- The Pennsylvania State University.

We welcome questions or other feedback plus advice on what the PHRC can best do to facilitate the efficiency and quality of housing within as well as outside Pennsylvania.

Eric F. P. Burnett
Director

Executive summary

The principal objective of this study was to quickly establish representative values for the proportion of glazing (mainly windows) being used in new housing in Pennsylvania. More precisely, there was a need to establish values for the average glazing ratio (total area of glazing to total exposed wall area) for single-family detached houses and for townhouse units. These values were needed in order to initiate work on the

development of a Pennsylvania-focused alternative to Chapter 11 ***Energy Efficiency*** in the newly published International Residential Code (IRC) 2000.

Because there was neither the time nor the money available to undertake any sort of physical survey, it was decided to make use of Act 222 survey forms. Under this Act new home owners can ask to have their houses inspected for compliance with Act 222 energy provisions. The data set we used included some 60 single-family, detached houses, 13 of which had heated basements, and 15 townhouse units, 8 of which were end-units. These houses and townhouse units were generally larger and probably more expensive than much of the new housing being built in Pennsylvania. The sample was also skewed towards the warmer south-eastern part of Pennsylvania, with only three houses being in the Pittsburgh area. Glazing ratios derived from this data set will be on the high side and therefore may be considered to be conservative for the purpose of energy conservation planning or regulation.

It was established that:

- For new, detached, single-family houses in Pennsylvania the average glazing ratio (total glazing area to total exposed floor area) is significantly less than 15%, which is the target glazing ratio for houses in Chapter 11 of the IRC 2000. A value of about 12% would seem to be appropriate for an average, state-wide glazing ratio for new, detached houses in Pennsylvania.

- For townhouses, both mid and end-units, the average glazing ratios are less than 15% and thus much less than 25%, the target value used for town housing in Chapter 11 of the IRC 2000.

The same data set also suggests that:

- The determining factor in the decision as to where to place the windows in a house or townhouse is the orientation of the street. Solar advantage does not appear to be given much consideration. This should be a cause of some concern to those agencies seeking to promote energy conservation.

In general the largest proportion of the glazing is placed on the rear face of the house or town house unit. The front of the house or townhouse unit also has a large proportion of glazing. Much less glazing is placed on the sides of houses and end-unit townhouses.