## Window Retrofit: Kalamazoo, MI

### **Builder Profile**

Homeowner and Contractor Tom Tishler Portage, MI tishlertom@gmail.com

#### **Project Home**

- Name: Kalamazoo Kit Home Re-Siding
- Location: Portage, Michigan
- Layout: 2 bdrm, 1 bath, 1 fl + basement, 1,500 ft<sup>2</sup>
- Climate: IECC 5B, cold
- Year Built: 1946
- Retrofit Completed: Jan. 2022

#### Kalamazoo - Windows

Pre-Retrofit	Post-Retrofit
(1946)	(2022)
2005 double-	Added interior
pane vinyl-frame	low-e storm
windows	windows

Kalamazoo Project	Windows
Upgrade	Install interior low-e storm windows
Number of Windows Upgraded	12
Planned Material Cost	\$0
Planned Labor Cost	\$0
Total Planned Cost	\$0
Added Upgrade Material Cost	\$1,594
Added Upgrade Labor Cost	\$250 <sup>1</sup>
Upgrade Incremental Cost	\$1,844
Total Project Cost with Upgrades	\$1,844
<sup>1</sup> Estimated labor.	



The homeowner/contractor on this home had already begun a retrofit of this 1946 kit home to remove vinyl siding installed in 2005 so he could air seal the walls and install new cavity insulation plus 1 inch of rigid foam topped by new vinyl siding, when he was approached with the possibility of upgrading the windows as well as part of a U.S. Department of Energy wall and window residing retrofit case study. He had already decided against replacing the windows because he had replaced the original single-pane clear-glass windows with double-pane vinyl-framed windows 15 years prior and had then painstakingly installed new interior wood trim around all of the windows. The homeowner realized, however, that after increasing the wall insulation so much, the lower grade windows would feel even more cold and drafty. Wiping down the windows had been a daily chore to reduce ice formation inside the home in winter and water accumulation and mold around the windows the rest of the year. Low-emissivity storm windows were recommended as a retrofit. Powder-coated aluminum storm windows were selected that attached to the interior of the window frames and had openable glass panels.



The homeowners love the new storm windows; they have nearly eliminated condensation and have greatly reduced sound transmission. Temperature readings showed the interior surface of the glass was 30% warmer, increasing from 40°F to 60°F on a 20-degree winter day when the storm windows were in place. A sound test showed that the storm windows cut exterior noise by 8 decibels, from 56 decibels to 48 decibels.

The homeowner/contractor did the installation and commented that they were very easy to install, taking about 20 minutes per storm window once he got through the learning curve.

#### Jamb Detail



The new storm windows have powdercoated aluminum frames that provide a tight seal to the existing window frame. They also have low-emissivity coatings to reduce heat transfer and operable openings that match the single-hung original windows.

Sill Detail



For the head and sill details, the view is from the side and the interior of the home is to the left of the wall. For the jamb detail, the view is from the top and the interior of the home is below the wall.



Each storm window took less than 20 minutes to install and they are nearly invisible once installed. The increase in comfort and decrease in condensation and noise were immediately noticeable.

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For more information, visit: Building America Solution Center basc.pnnl.gov.

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