It matters how windows are installed.



WATER MOISTURE AIR THERMAL VAPOR SOUND

It Matters how Windows are Installed

- No replacement window is being installed that delivers anywhere near the tested performance being promised
- Lab tests confirm that installation can degrade in-service performance nearly 50%
- Homeowners are not satisfied

The Number 1 complaint:

still feeling "drafts after windows are replaced…

Why?



Why?

- **Because energy is being lost through the gap between the new window and the old frame.**

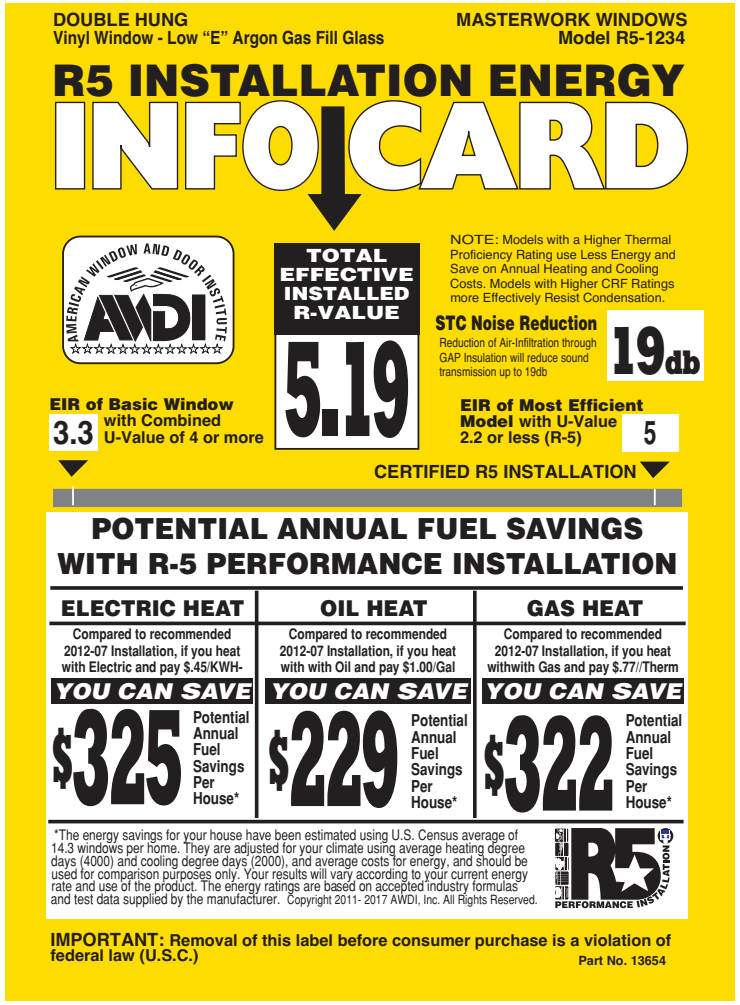
Notice the cold pouring in.



Why?

- According to a study from Oak Ridge National Laboratory Buildings Technology Center in 2010, improper treatment of the gap between the new window and the old frame causes energy robbing air leaks of nearly 28.2 cm^2/m^2

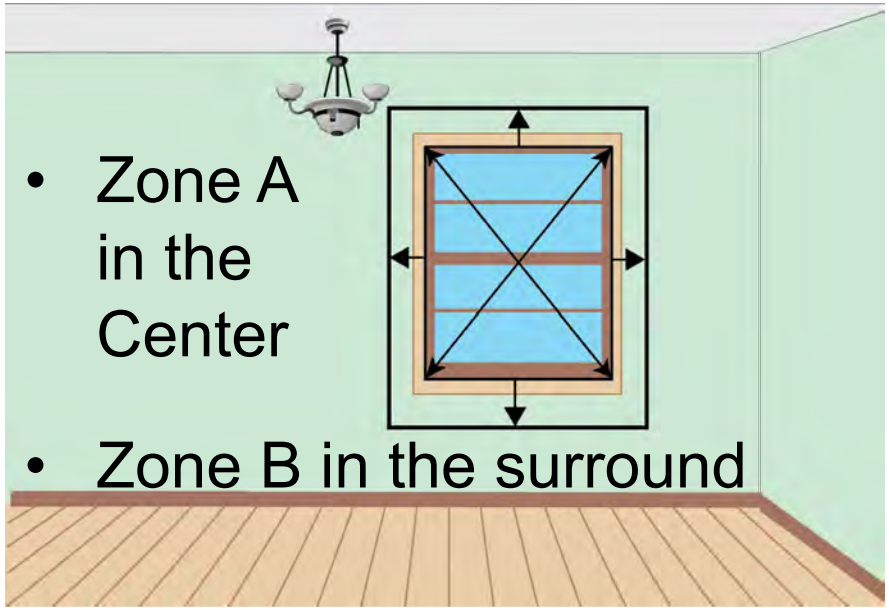
- That's equivalent to leaving one window open in a house 24/7/365!



Why? Energy Loss Zones

- When you replace a window, the attention is on the old window alone. Everyone ignores the Gap between the new window and the old frame.

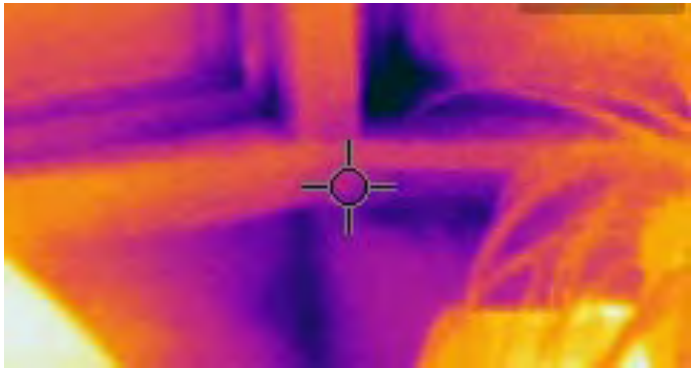
- There are two Zones of potential Energy Loss from in-service windows



Energy Loss Zones

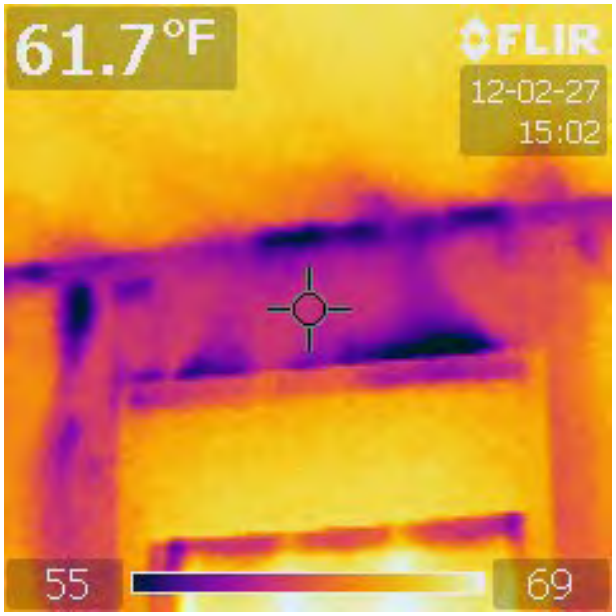
- All windows are installed in walls constructed with air, moisture, water and thermal barriers.
- These Windows are made with components that also act as air, moisture, water and thermal barriers.
- The contiguous space between the window and the wall must be constructed to integrate these wall and window barriers .
- If the window is old, and does not have modern air, moisture, water and thermal barriers, chances are the cavity between the window and wall does not either.

Energy Loss Zones



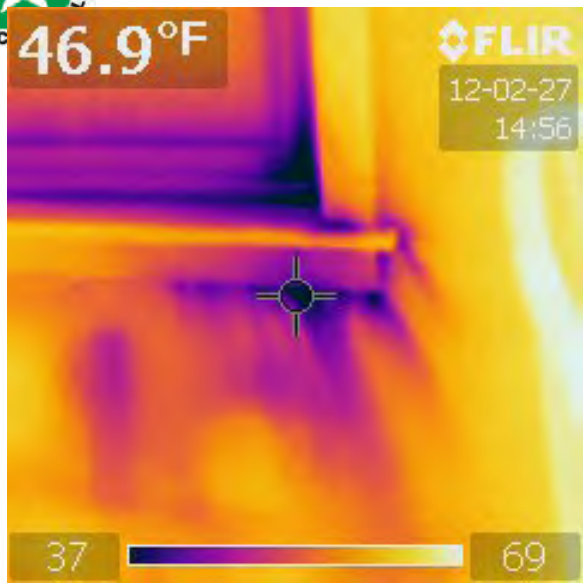
Moisture
Or Water





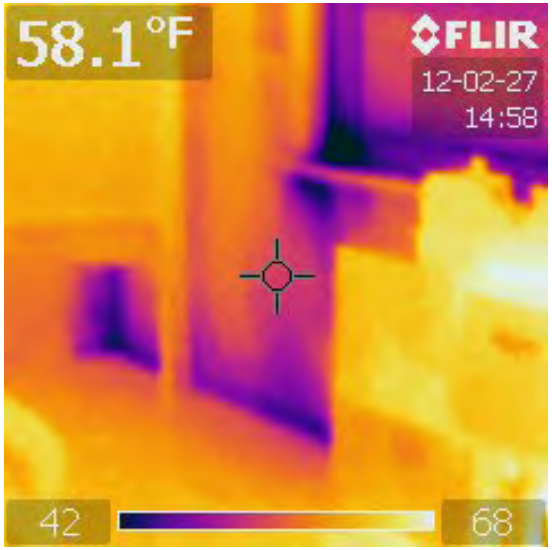
Air
Infiltration



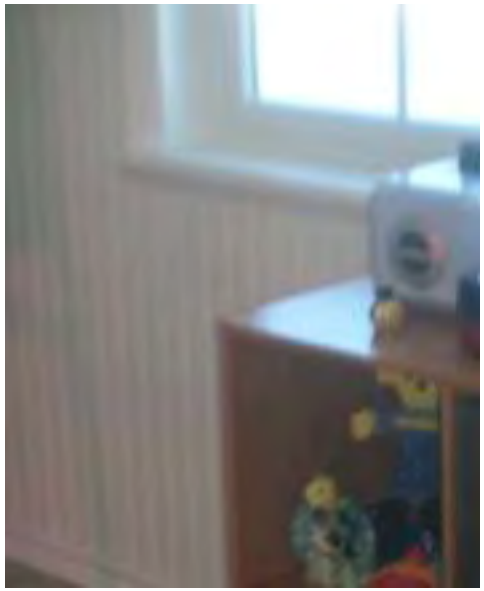




Heat Loss,
Air Infiltration,
Moisture
Or Water
Problems

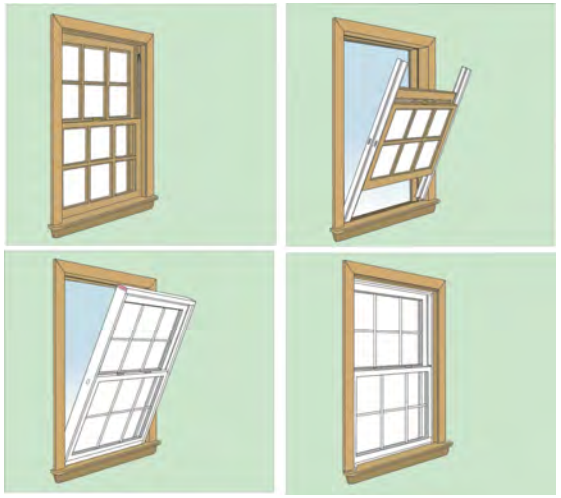


Heat Loss,
Moisture
Or Water
Problems

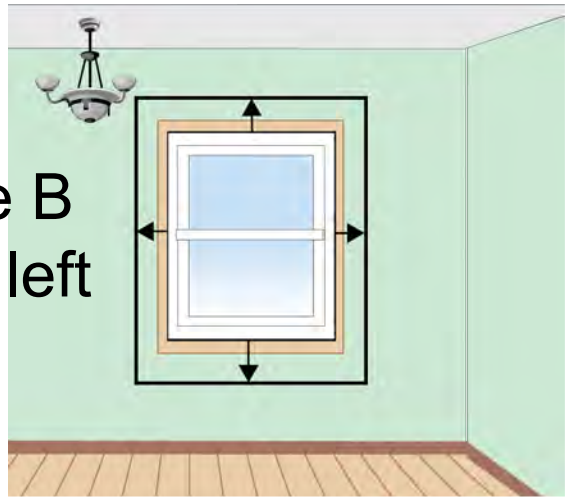


Energy Loss Zones

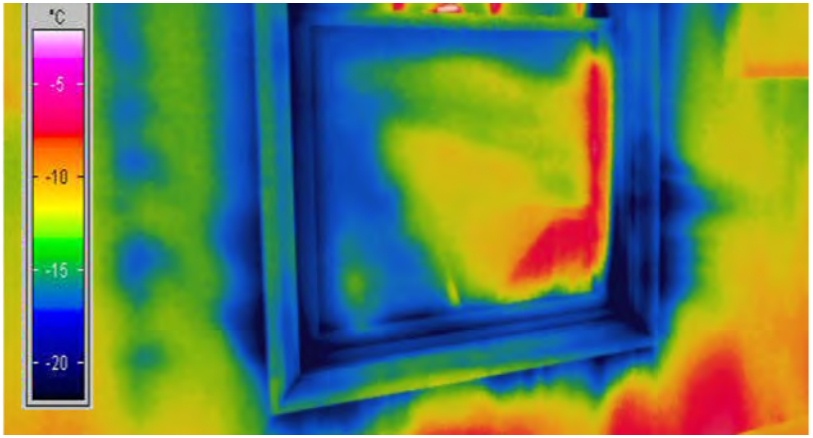
- Replacing Zone A with a High Performance, Energy Efficiency Window alone is only half the solution when the cavity between the old window and the wall is ignored, and continues to leak air and moisture.

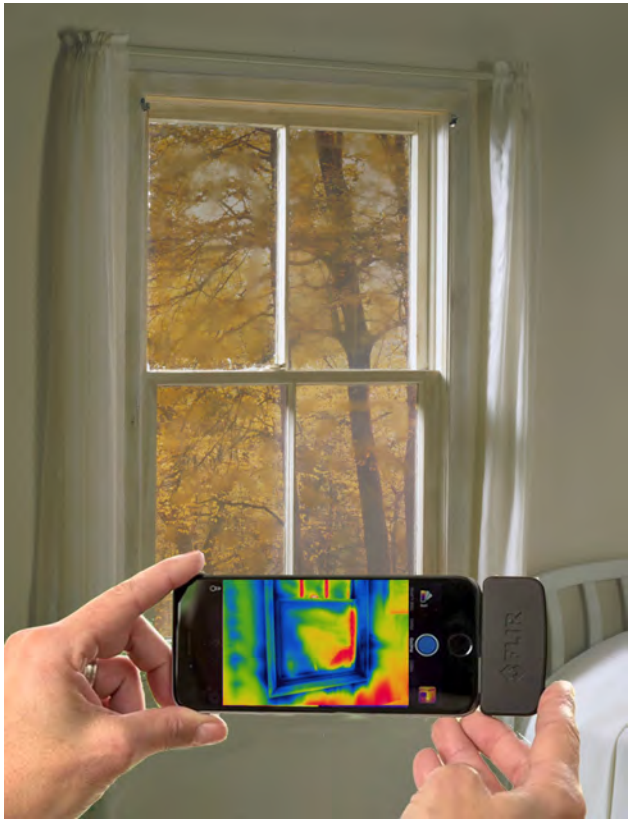


Zone B
is left



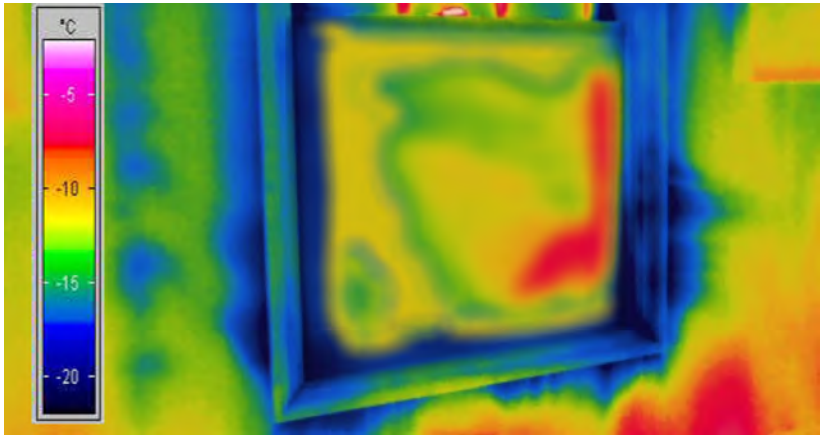
Heat Loss through Window and cavity in Wall



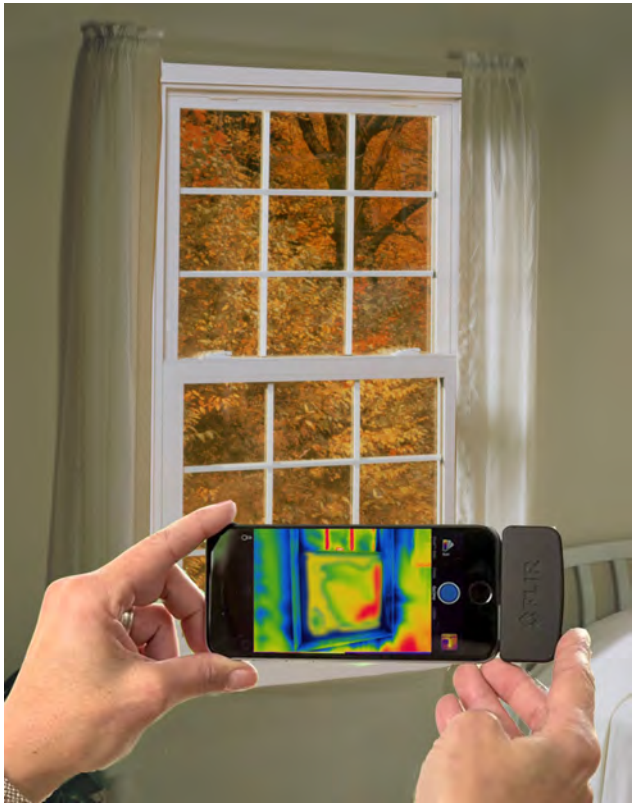


An Infrared photo of an old window highlights the blue areas which show air, water, and thermal deficiencies of the window and the surrounding area

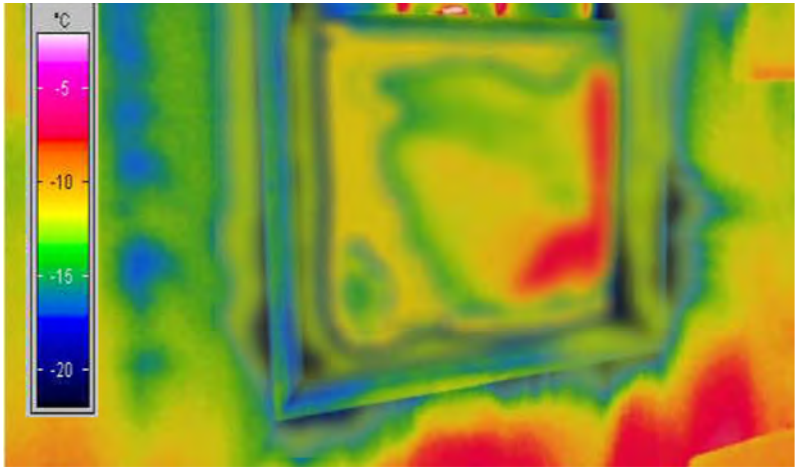
Remaining Heat Loss through cavity (Zone B)



An Infrared photo of the area when the old window is replaced shows ***continued*** air infiltration, water/moisture and thermal leakage.



Heat loss Maximum Reduction





An Infrared photo of a WindowRight Installation shows dramatic reduction of air, water, moisture and thermal deficiencies of both Zones (the window and surrounding cavity area).

Lab Tests Prove

- Full Lab Tests were conducted at NCTL in York, PA and at MPA/BAU in Hannover, Germany

- The tests compared replacement windows installed to ASTM- 2112-07 and traditional “Caulk ‘n’ Walk” methods



Image 4: Specimen installed in the test stand

Lab Tests Prove

- 48” x 48” R-5 uPVC windows and the gap representing the installation space were tested using the 3 methods.

- Caulk n’ Walk produced an in-service performance of R-2.346

- ASTM-2112 produced an R-1.280

- **The WindowRight, AWDI method produced an in-service performance of R- 5.077**

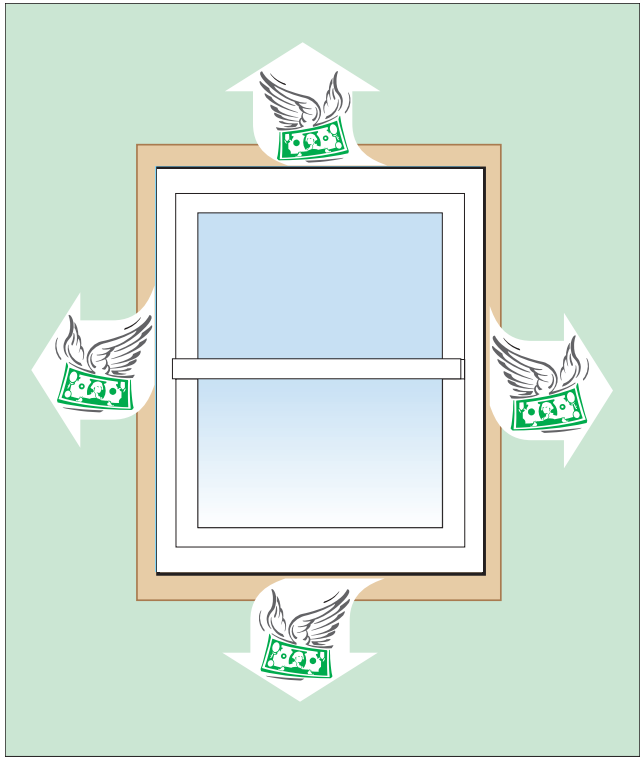
In both the York and Hannover tests



Lab Tests Prove

- The “Achille’s” heel of standardized installation are the thermal bridges and air gaps produced by shims and weep paths.

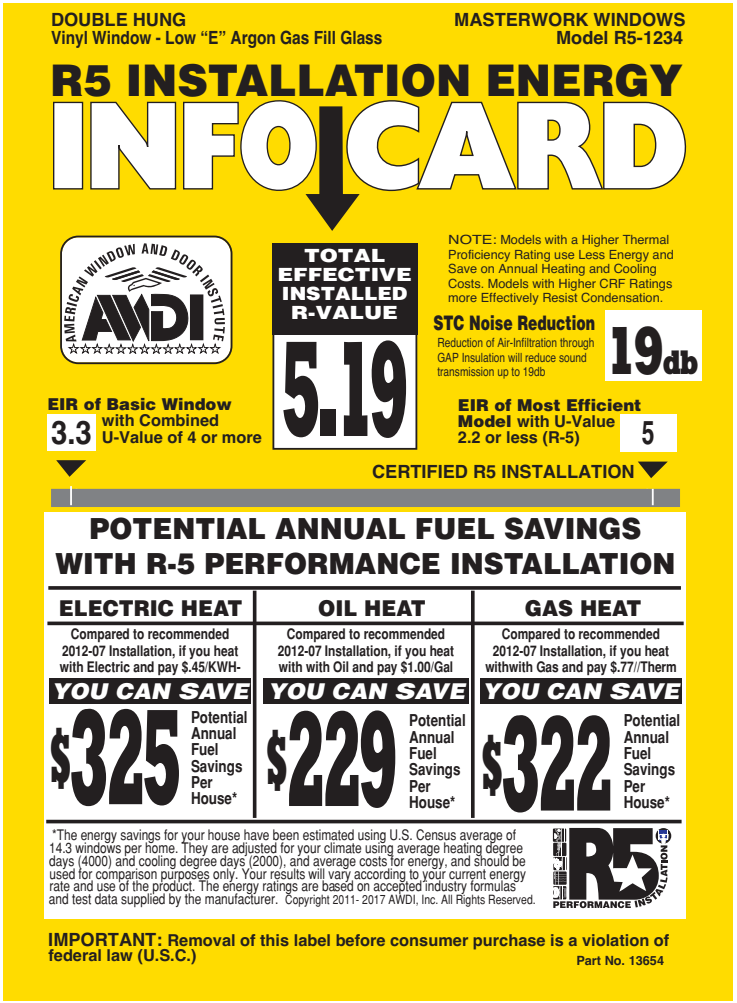
- It didn’t matter much when windows were R-2 because the gap was also R-2.



Lab Tests Prove

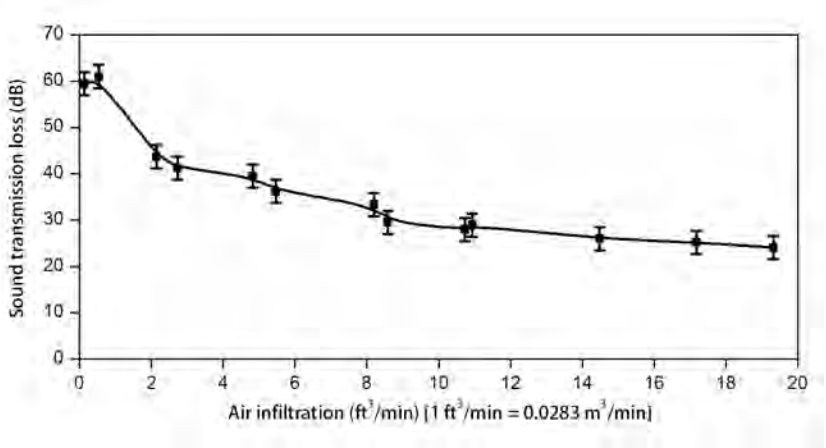
- Now with High Performance windows, ***gap infiltration really matters***.

- Energy Loss isn't the only problem with gap infiltration



Air Infiltration is Noisy

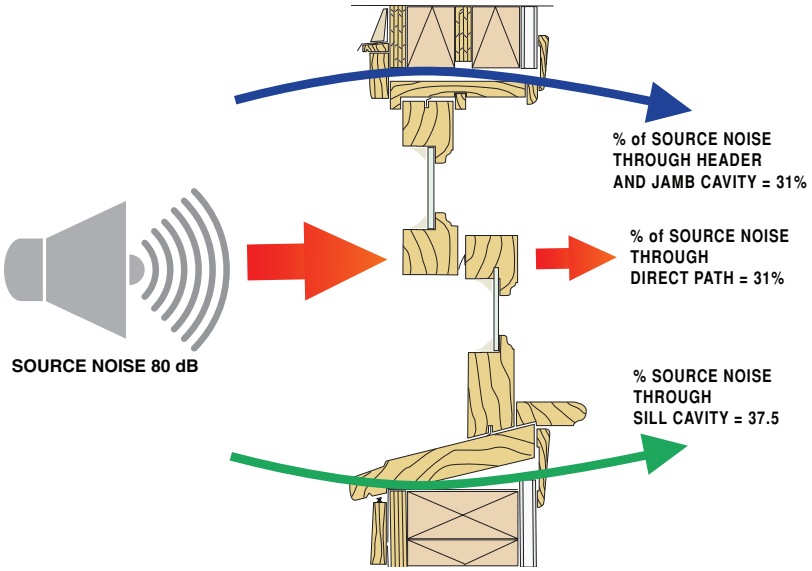


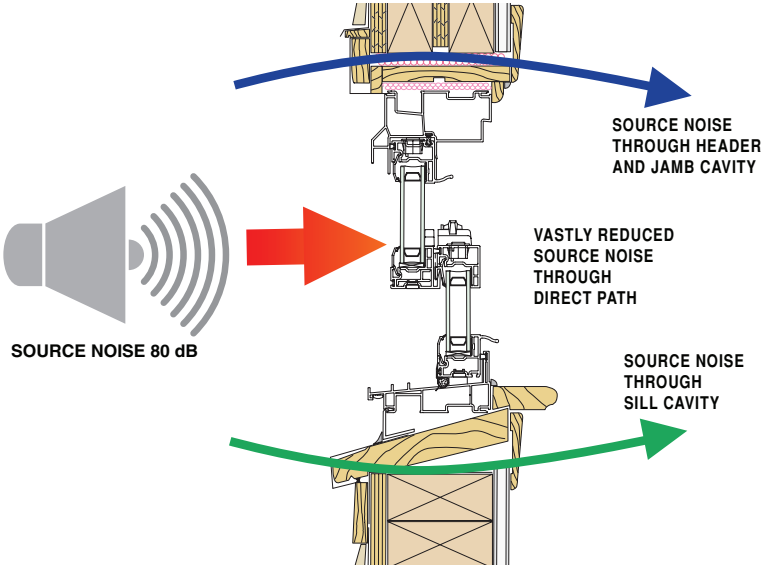


Graph Courtesy of International Journal of Green Energy
Air-Infiltration/Sound Transmission – Varshney, Rosa, Shapiro, & Scott 2011

Noise comes in by vibration through a solid, or sound waves through the air. The graph shows Sound Transmission Loss (quieter) increases when Air Infiltration is reduced. Properly insulated Zone B (WindowRight) can significantly reduce noise in your home.

Testing by the National Bureau of Standards shows cracks around windows degrade their STC rating significantly

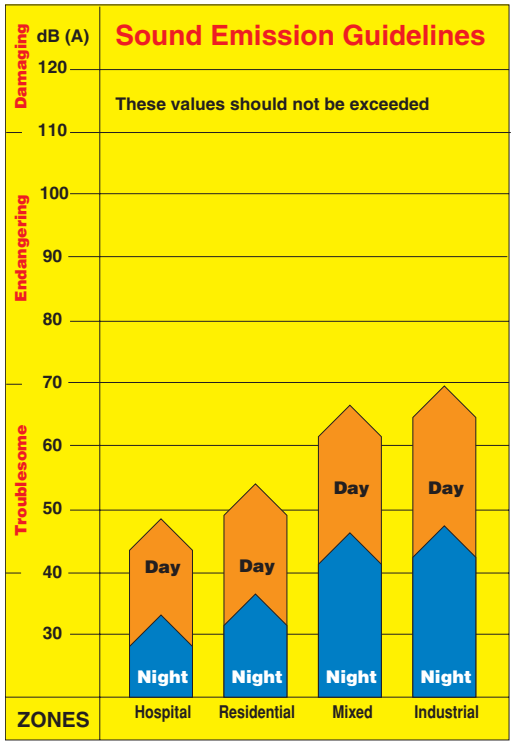


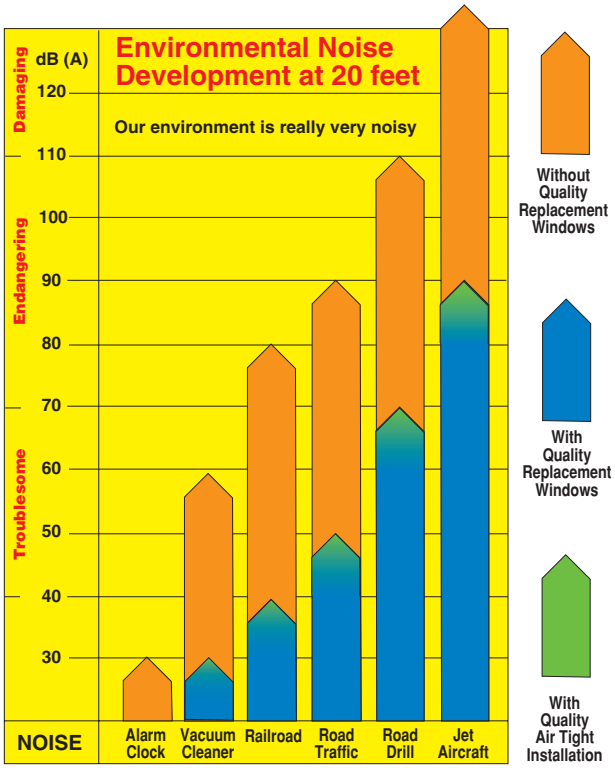


3 x 5 ft double hung window, single pane glass = STC 28
3 x 5 ft double hung window, 7/16 in. glazed insulating glass = STC 34
3 x 5 ft double hung window, 7/16 in. glazed insulating glass, completely sealed = STC 38

3 x 5 ft double hung window, 7/16 in. glazed insulating glass, with air leakage from 1/32 “crack” in Zone B = STC 26
3 x 5 ft double hung window, 7/16 in. glazed insulating glass, with air leakage from 1/16 “crack” in Zone B = STC 23
3 x 5 ft double hung window, 7/16 in. glazed insulating glass, with air leakage from 1/8 “crack” in Zone B = STC 19
(Source U.S. Department of Commerce/National Bureau of Standards - Acoustical and Thermal Performance of Exterior Residential Walls, Doors and Windows - 11/75)

Air Infiltration is Noisy

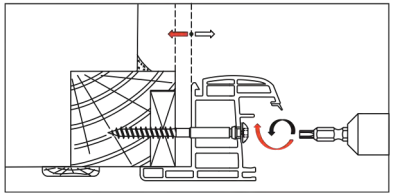




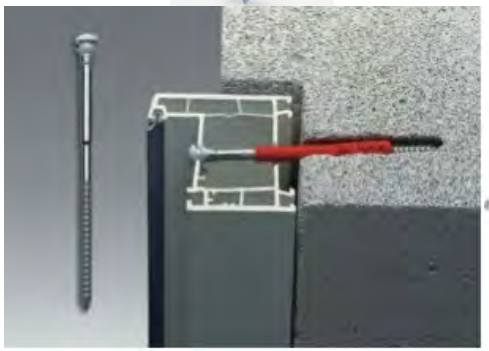
Reducing Air Leakage through Zone B can increase the STC Rating of your installed windows by 10 or more! A difference you can hear.

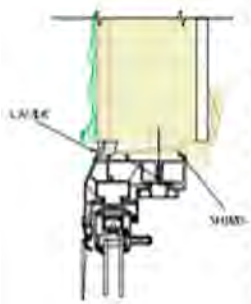
How?

- Use neoprene or cork pads on sill to keep replacement window raised
- Use self-expanding sealant foam to seal exterior, but allow breathing
- Use self shimming anchors and not shims to eliminate air and water paths





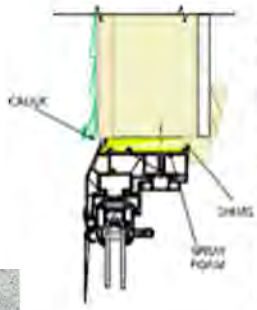




'CAULK 'N WALK' INSTALLATION

R-2.346

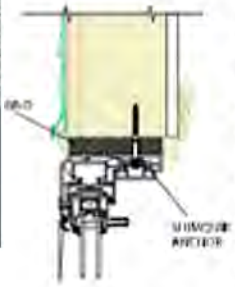
Sealing the interior and exterior around the total perimeter creates a sealed cavity which is contrary to ASHRAE. Allowing breathing gaps,and drainage slots introduce rain water and air infiltration reducing R-Value and causing rot.



SPRAY FOAM INSTALLATION METHOD

R-1.280

›Substituting spray foam, drainage gaps and shim spaces create voids for air and water to get in. Spray foam can expand, distorting the window frame causing air sealing problems.



R-5 PERFORMANCE INSTALLATION

R-5.346

Slow expansion foam sealing tape conforms to the gap perfectly allowing the weather resistant barrier(s) to be restored. Spray Foam and R-5 Sealant complete the barriers.

Adaptable and it Works!

