

## Section 3: Sides of Building

### Exterior Walls

#### Uninsulated Walls

Every uninsulated wall system that is, or will become, part of the thermal envelope shall be screened for energy improvement measures.

Whenever a potential energy improvement for an uninsulated wall section is determined to be cost effective, attempts to install the measure shall be taken during the project. For these wall sections, it is not allowable to exclude the insulation upgrades that meet or exceed minimum SIR levels from the scope of work.



#### Poorly Insulated Walls

Walls that appear to be poorly insulated during infrared scanning or while probing wall cavities must be thoroughly evaluated to determine the potential for energy improvement measures.


Walls that are determined to be poorly insulated, but that are not completely void of insulation, need to be screened for cost-effective improvement measures just like uninsulated wall systems.

However, implementing potential improvement measures for poorly insulated wall systems that meet or exceed the minimum SIR guidelines are not automatically required.

Inclusion of this type of measure in a WAP project is optional and shall be prioritized along with other potential energy saving measures based on SIRs.

#### Policy Exemption | Masonry Construction

Leaving a wall system uninsulated when potential upgrades do screen as cost-effective is only allowable with...

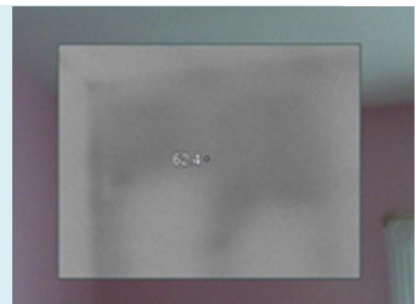
-  masonry construction where there is no sheathing and/or vapor retardant layer to separate the interior side of the masonry wall materials from the insulation that would be added. This applies to structural masonry and masonry veneers.

The decision to insulate this type of wall system is at the sole discretion of the WAP agency.

**The use of infrared cameras as building diagnostic and quality assurance tools is recommended for all projects, all year long. The use of infrared cameras is required during (1) the energy audit, (2) the weatherization project installation & (3) the quality control inspection whenever there is a 10°F temperature difference between the inside & outside of the building.**

#### Modeling Wall Systems with Settled Insulation

When only a portion of a wall system is found to be void of insulation because the preexisting insulation has settled over time, **that section of wall shall be considered uninsulated and entered separately in the energy audit software.** Attempts must be made by the WAP to insulate the empty wall sections.



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All exterior wall insulation upgrades shall be addressed from the building exterior and/or by tubing down from attics or kneewall closet areas whenever possible.



#### Material Preference

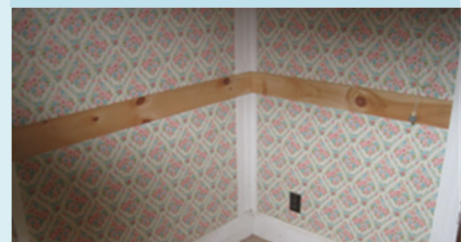
When a blown-in material is used to insulate exterior walls preference shall be given to dense-packed cellulose insulation.

#### Installation Standards

- ✓ Cellulose must be installed to at least 3.5 pounds per cubic foot using tube insertion methods.
- ✓ Two-hole installation methods (think 1980's) are not allowable.

#### Alternate Installation Techniques

Densepacking walls from inside is acceptable practice if working from the exterior is not possible and the client finds this approach acceptable. All holes must be patched. Installing chair rail over the holes is recommended. A first coat of finish materials shall be applied if chair rail or comparable is not installed.



Chair Rail Approach

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#### Sheds, Cold Storage Areas, Split-Levels

##### Establishing Thermal Boundaries

In many buildings establishing a continuous thermal boundary is challenging. Whenever a heated space backs an unconditioned space and the wall between them is going to be considered part of the thermal boundary, then the surface is to be addressed using the protocols established for exterior walls.



Above, spray foam was utilized to separate an unheated storage area from the rest of the home.

#### Rim Joists (2<sup>nd</sup> Floor & Above)

##### Evaluation Requirements

- ✓ The thermal performance of every rim joist area must be thoroughly evaluated utilizing blower-door-assisted (BDA) pressure diagnostics and/or BDA infrared scanning.
- ✓ The full perimeter of the rim joist area must be entered/modeled separately from the exterior walls in the Hancock Energy Software **for every project.**

##### Improvement Requirements

###### **With Accessible Kneewall Closets**

Refer to the “Top of Building” section of this manual for complete airsealing and insulating protocols at the rim joist level.

###### **Without Accessible Kneewall Closets**

Whenever potential energy improvements screen as cost-effective, an attempt to densepack the rim with cellulose using the bag & blow method shall be undertaken during the WAP project.

If after reasonable attempts have been made, it is not possible to upgrade the rim in a timely, cost-effective manner, this shall be noted on the workscope and recorded in the client file.

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#### Rim Joist (2<sup>nd</sup> Floor & Above)

##### Attempted Measure Exemption

Attempting to airseal/insulate the rim area is not required during a Wx project if the rim is a solid beam and there is no access to the beam from a kneewall closet area. However, this measure is allowable if:

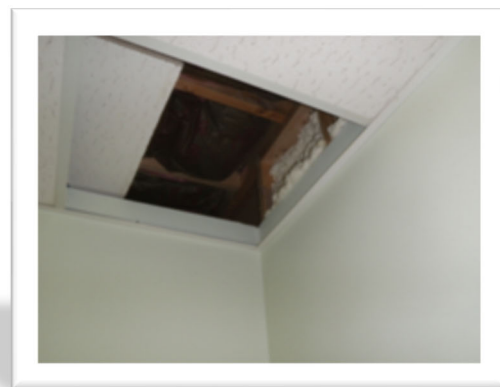
- ✓ The measure is cost-effective (*inclusive of all necessary ancillary measure costs*).
- ✓ The proposed execution of the measure is acceptable to the weatherization client.



Above, self-help project components enabled the rim (a 6" beam) to be included in the Wx project.

### Suspended Ceilings

Wall sections above suspended ceilings shall be thoroughly evaluated on all Wx projects. If the wall sheathing is missing or in disrepair then, at minimum, the wall section shall be thoroughly airsealed (*see images below*). If the area is insulated with fiberglass batting and the existing batting is exposed, then it is allowable practice to remove the exposed fiberglass and reinsulate the surface in accordance with the policies outlined for boxesills in the "Bottom of Building" section of this manual (*Section 2: Page 1*).



## Section 3: Sides of Building

### Windows & Doors

Existing windows & doors shall only be improved as energy saving measures after all other potential energy-saving improvements have been completely addressed. Appropriate measure groups are identified below.

#### Energy Saving Measures

Airsealing Improvements	R-Value Improvements
<ul style="list-style-type: none"> <li>✓ Door- Sweep/bottom</li> <li>✓ Door- "Q-Ion" or comparable <i>(do not use felt or foam)</i></li> <li>✓ Door- Adjustment/repair with airsealing benefit</li> <li>✓ Window- Caulk/seal/weatherstrip</li> <li>✓ Window- Sash locks, pulley seals</li> <li>✓ Window- Install "Tyzall" or comparable window kit</li> <li>✓ Window- Repair existing when glass is broken or missing <i>(at single pane only)</i></li> </ul>	<ul style="list-style-type: none"> <li>✓ Door- Replace a hollow-core exterior door w/an R-5 (+) door</li> <li>✓ Door- Fasten a layer of foam insulation board to a wooden door</li> <li>✓ Window- Install metal-frame storm <i>(at single pane only)</i></li> <li>✓ Window- Install wood-frame storm <i>(at single pane only)</i></li> </ul>

#### Non-Energy Saving Measures

All window & door replacement measures, except the replacement of a hollow core door, shall be:

- ✚ Classified as incidental repairs
- ✚ Performed using Non-DOE funding

**Window & doors shall only be replaced when they are damaged beyond repair.**

**Window example:** A single pane window where the glass is badly cracked and the sash is too rotted for the successful installation of a replacement pane of glass.

**Door example:** An exterior door that cannot be adjusted or repaired to close and lock.

