Home Improvement Expert™ Factsheet

Masonry Wall Insulation

WHY HOME IMPROVEMENT EXPERT?

An easy way to get a quality job.

Research findings reveal significantly reduced energy savings and potential performance risks where home improvements are not properly installed. To help homeowners address this challenge, the U.S. Department of Energy has compiled world-class expert guidance from industry leaders and national laboratories in factsheets and checklists under the name ***Home Improvement Expert***. Homeowners can leverage these expert recommendations to help ensure quality installation by attaching Home Improvement Expert checklists to vendor contracts and ensuring the vendor completes and signs the checklist before accepting the work.

READY TO DO MORE?

This factsheet and accompanying checklist cover one of more than 20 home improvements covered by the U.S. Department of Energy Home Improvement Expert. Use them to help optimize energy savings and improve performance related to comfort, health, safety, and durability.

To download other checklists: basc.pnnl.gov/home-improvement-expert

For more customized home improvement recommendations:

- Get your ***Home Energy Score*** from a qualified assessor (www.home-energy-score.gov)
- Schedule an expert assessment through **Home Performance with ENERGY STAR®** (www.energystar.gov/homeperformance).

BENEFITS

Installed correctly, masonry wall insulation can cut your utility bills, make your home more comfortable, and increase its value.

Older homes without effective wall insulation allow excessive heat loss in winter and heat gain in summer. Insulating walls is a highly effective way to improve your home's performance. However, the traditional exterior "drill and fill" approach will not work with masonry brick or concrete walls. Options for insulating from the exterior include covering existing brick with rigid foam or removing existing siding from concrete block, then installing rigid foam and new siding. Alternately, drill and fill can be used on the interior if a cavity wall exists or rigid foam or an insulated cavity wall can be installed on the inside surface of a concrete block wall.

RELATED HOME IMPROVEMENT CONSIDERATIONS

Before insulating your masonry walls, consider working with a qualified home energy assessor to evaluate other related home performance needs and opportunities. This includes:

- testing for adequate combustion air for natural draft combustion equipment (e.g., a furnace, boiler, or water heater) to ensure safety;
- integration of a fresh air intake to the HVAC system to provide ventilation;
- installation of kitchen and bath fans to remove moisture, odors, and stove emissions;
- In areas prone to flood, consider wall cavity insulation that can be decontaminated like closed-cell spray foam.

For more information on masonry walls, please search the Building America Solution Center, basc.pnnl.gov.

TIPS FOR HIRING A CONTRACTOR

- Look for licensed, insured, and certified contractors.
- Check references and reviews on home improvement web sites.
- Get multiple bids in writing.
- Check with your utility and state, local, and federal weatherization programs for rebates and incentives.
- Include the Home Improvement Expert™ checklist in bids and contracts to ensure quality installation.
- Consider using a Residential Energy Services Network (RESNET) certified Home Energy Rating System (HERS) rater, Building Performance Institute (BPI) certified Building Analyst, or other qualified professional (e.g., licensed engineer or architect) to inspect the work.

ENCLOSURE UPGRADES

- Attic Air Sealing and Insulation
- Basement Wall Insulation
- Framed Wall Insulation
- Masonry Wall Insulation
- Home Air Sealing
- Vented to Unvented Attic
- Vented to Unvented Crawl Space
- Window Replacement

HEATING & COOLING

- Air Conditioner Replacement
- Gas Furnace Replacement
- Heat Pump Replacement
- Duct Sealing and Insulation
- Oil or Gas Boiler Replacement

HOT WATER HEATING

- Gas Tank Water Heater
- Gas Tankless Water Heater
- Heat Pump Water Heater

FRESH AIR SYSTEM

- Bathroom Exhaust Fan
- Kitchen Exhaust Fan
- Balanced HRV/ERV
- Balanced Supply plus Exhaust
- Supply Integrated with HVAC

PROPER SEQUENCING OF HOME IMPROVEMENTS

Through the U.S. Department of Energy's Building America research program, expert guidance has been developed for optimizing whole-house energy-efficiency upgrades. This includes a recommended sequence for home improvements (shown below) to help ensure homeowners get the most out of their upgrade investments while minimizing potential harm from safety, indoor air quality, and moisture issues.

STEP 1: ENSURE SAFE AND DURABLE

Have experts assess opportunities to improve energy efficiency and identify comfort, moisture management, health, and safety issues.

STEP 2: ENSURE FRESH AIR

Ensure effective ventilation before increasing air tightness.

STEP 3: ENSURE MOISTURE CONTROL

Ensure adequate water protection before reducing the ability of walls to dry by adding air sealing and insulation.

STEP 4: ENSURE DRAFT-FREE

Capture air sealing opportunities not accessible after insulation is installed.

STEP 5: ENSURE THERMAL COMFORT

Insulate at least to the latest national code recommendations for your location after addressing related safety, indoor air quality, and moisture management issues.

ANYTIME: EQUIPMENT UPGRADES

Replace heating and cooling equipment, water heaters, windows, appliances, lighting, fans, and electronics when they fail or become out of date with ENERGY STAR® qualified products or better, and improve systems to operate more efficiently.

U.S. DEPARTMENT OF ENERGY
Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

For more resources, visit
basc.pnnl.gov/home-improvement-expert

PNNL-SA-139939 • March 2019

U.S. DEPARTMENT OF ENERGY | Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

Home Improvement Expert™ Checklist

Masonry Wall Insulation

This U.S. Department of Energy checklist includes important specifications that can contribute to a complete and quality installation. All work shall comply with these specifications, all relevant codes and standards, and all manufacturer installation instructions. The contractor shall check each box on the checklist below and sign and date at the bottom to certify the work is completed.

PREPARATION

☐	The walls shall be inspected for any evidence of damage from bulk water intrusion, moisture, or pests. A list of any potential problems shall be provided to the homeowner before proceeding with wall insulation so remediation can be fully addressed as necessary, including improving exterior flashing details as needed, before starting the work.

INSTALLATION: OPTION 1 - EXTERIOR RIGID FOAM BOARD INSULATION

☐	Rigid insulation shall be attached to the exterior side of the existing masonry using fasteners or glue, as recommended by the manufacturer. All seams shall be tight fitting and the insulation shall completely cover the masonry without any gaps or voids, and all joints shall be fully sealed with tape, spray foam, or caulk.
☐	New window and door flashing shall be installed including pan flashing at the sills.
☐	The door and window jambs and sills shall be extended if needed, based on the thickness of the foam. This may require removal and re-installation of the windows and doors.
☐	Furring strips or spacers shall be installed to provide a drainage and ventilation space between the rigid foam and the new siding.

INSTALLATION: OPTION 2 - INTERIOR SPRAY FOAM AND BATT INSULATION

☐	A steel stud wall shall be constructed 2 inches away from the masonry wall.
☐	Window sills and door jambs shall be extended and electrical boxes relocated as needed for increased wall depth.
☐	Two to 4 inches of high-density closed-cell or medium-density open-cell foam shall be sprayed directly onto the masonry behind the studs to completely cover the wall surface.
☐	Once the foam is in place, fibrous insulation shall be installed in the stud cavities for any additional R-value specified for the wall assembly under the contract agreement for this work. Install fire stop as necessary above foam cavity insulation.
☐	Finishing material (e.g., drywall) shall be attached to the studs. No vinyl wallpaper or other Class I vapor retarder shall be used.

INSTALLATION: OPTION 3 - INTERIOR RIGID FOAM BOARD INSULATION

☐	Rigid foam insulation boards with an R-value that meets or exceeds the 2012 International Energy Conservation Code prescriptive requirement for the home's location shall be attached to the interior of the wall with construction adhesive applied in a serpentine pattern. When using two layers of foam, the seams shall be staggered.
☐	The rigid foam boards shall completely cover the interior wall surface and shall be fully in contact with the wall.
☐	Seams shall be sealed with caulk, foam, mastic, or flashing tape specified by the rigid foam insulation manufacturer.
☐	Furring strips shall be installed to create a nailing surface for the drywall. Install fire stop as necessary above rigid foam insulation.
☐	No vinyl wallpaper or any other kind of Class I vapor retarder shall be used on the inside face of the wall.

I hereby certify that, to the best of my knowledge and ability, all checked items on the above checklist have been accomplished as part of completion of this home upgrade.

Contractor Signature: _____ Date: _____

Contracting Organization: _____

U.S. DEPARTMENT OF ENERGY
Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

For more resources, visit
basc.pnnl.gov/home-improvement-expert

PNNL-SA-139939 • March 2019