

## Chapter 19 - Interior Insulation

### Contents

Chapter 19 - Interior Insulation.....	19-1
Timing & Prerequisites .....	19-2
Wall Insulation .....	19-4
Insulate behind Chases and Sealed Walls.....	19-4
Insulate Wall Cavities.....	19-4
Insulate Joist bays between the First and Second Floors .....	19-8
Cutting Batt Insulation.....	19-9
Wall Insulation Check-List.....	19-9
Basement Insulation .....	19-10
Insulate Joist Bays in the Basement .....	19-10
Insulate Basement Walls with Thermax .....	19-10
Attic Insulation .....	19-11
Insulate the Drywall Penetrations in the Attic.....	19-11
Install Positive Ventilation Chutes (Cardboard Baffles).....	19-11
Insulating the Attic .....	19-12
Attic Insulation Check-List.....	19-12
Quality Assurance Checklist.....	19-13

## Things to Consider

- Under filling wall cavities with cellulose or compressing batt insulation will reduce insulation rating.
- Insulating netting must be installed tight to the studs to hold in the insulation and prevent nail pops in the drywall.

## Safety Issues

- Dust masks rated for fiberglass (N99), safety glasses & ear protection must be used whenever you are working around insulation.
- Gloves, long sleeve shirts or protective pull-on coveralls are recommended to minimize skin irritation from fiberglass.
- Disposable gloves are required for applying insulating foam.
- Be careful when handling chemical and particulates irritants such as insulation, caulk, and spray foam. (Suggest washing clothing used for insulating separate and then run the washer empty to clean out the fiberglass).

## Timing & Prerequisites

- Areas of exterior walls which are behind tub enclosures or mechanical chases must be insulated before the areas are covered up.
- Walls cannot be insulated until the rough-in mechanical and framing inspections have been passed.
- For fire rated walls, joist bays cannot be insulated until the 5/8" Type X drywall in each bay has been inspected. (See Build Fire-Rated Wall Assemblies in the "Wall" Chapter).
- Insulation baffles must be installed before the drywall.
- The marking for the insulation depth should be made on the roof trusses before the drywall is installed.
- Attics cannot be insulated until the drywall phase is complete.
- The basement joist bay insulation should be completed with the wall insulation.
- The House/Project Lead will work with the Construction Superintendent to coordinate these volunteer activities.

<b>Materials Needed</b>	
<b>Walls &amp; Band Boards</b>	
Insulation Netting Cellulose Insulation 5/16" T-50 Staples Netting Glue 4" Paint Roller Pads Paint Trays Duct Tape N99 Dust Masks Protective Overalls	Non-faced Insulation R-13 Faced Insulation R-13 and/or R-19 Gaps & Cracks Insulating Foam Cardboard Baffles 1 ½" Cap Nails Silicone Caulk Tall Kitchen Trash Bags Froth Pak Foam Insulation 1" Thermax 1 ½" roofing nails

<b>Phase Specific Tools Needed</b>
<b>Description:</b>
<b>Walls</b>
<ul style="list-style-type: none"><li>○ Insulation blower, hose and extension cords</li><li>○ Fish Scale</li></ul>

## Wall Insulation

### Safety Issues

- Respirators, face shields and protective coveralls are required when using the Froth-Pak insulation.
- Volunteers and other workers must not enter the house while the Froth-Pak insulation is being installed.
- N99 Dust Masks and gloves are required for both the volunteers working the insulation hose and the volunteers filling the blower.
- Keep hands out of the blower when it is operating. Always use a push stick.

### Insulate behind Chases and Sealed Walls

#### Critical Issues

- Insulation behind sealed areas of the exterior walls must be inspected prior to being covered.

Before sections of exterior walls are covered with either a chase or OSB, such as behind bathtubs and laundry room walls, batt insulation must be installed and inspected. (See Air Sealing chapter).

1. Cut lengths of faced R-13 (2x4 walls) or R-19 (2x6 walls) to fit the area to be covered. Cut the material as described below in “Cutting Batt Insulation”.
2. Stuff faced insulation into the areas of wall cavities which will be covered and non-faced insulation into the joist bays which will be covered. Install the Kraft paper side of the faced batts toward the interior of the house.
3. If the wall cavity has a wire or pipe running through it, starting at the bottom of the batt, split the insulation in half. Then shove one half behind the wire/pipe and the other half in front of the wire/pipe.

### Insulate Wall Cavities

#### Critical Issues

- The netting must be pulled taut and secured before blowing the insulation.

#### Safety Issues

- Individuals using the Insulation Blower Machine must be trained in its use, the controls and safety hazards; including the emergency shut off button and the controls for chopper/feeder and blower.
- The person holding the pendant control switch should be in constant view of the person feeding the machine and within earshot of the person operating the hose.
- If anything falls into the hopper (ex. Utility knife, push stick, clothing, etc.) the machine must be stopped immediately, unplugged, and the object found and removed, before restarting the process.

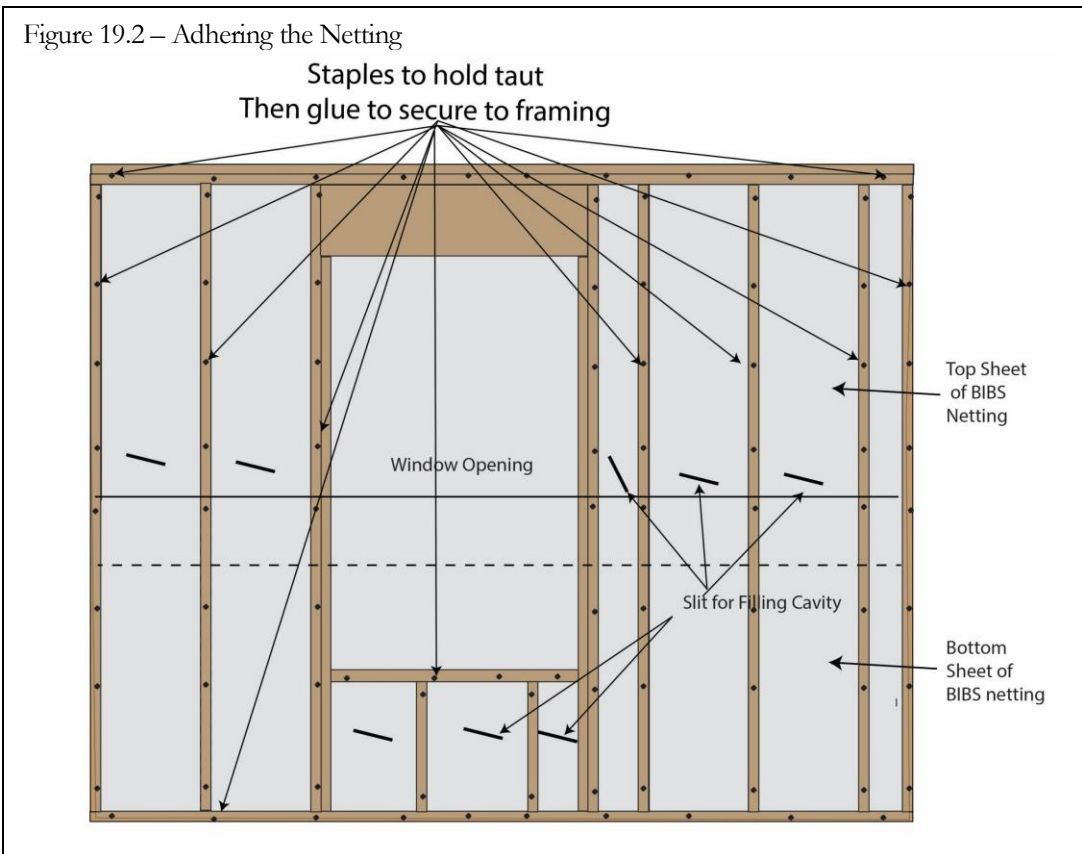
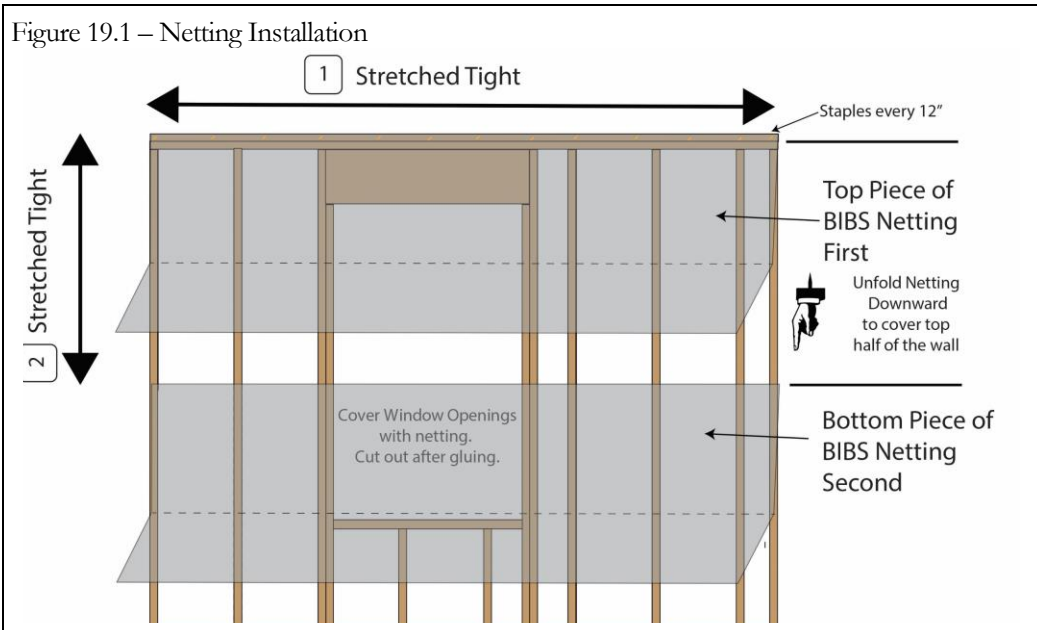
The exterior wall cavities will be insulated using a blown-in insulation. This is a system which uses netting and cellulose insulation. The insulation is blown-in using a blower and enough hose to reach all of the exterior walls in the house.

The netting is attached to the framing lumber with 5/16" T-50 staples and then glued to the lumber with "Glue All".

The blown-in insulation provides an R-14 insulation value.

### Insulation Netting

1. Cover the inside of the exterior walls with insulation netting. (See Figure 19.1).
2. The netting is 52" wide; therefore, two rows of netting will be required to cover standard 8' walls. Cover the top of the wall first then add the second row across the bottom of the wall.
3. **First Row** - Stretch the first row of netting across the top plate of the wall. Pull it tight and attach it to the top plate with just enough staples to hold it taut; initially about every 2' across the top plate; installing staples with hammer (slap), pneumatic, or hand staplers.
4. Stretch the netting down the wall. Pull it tight and attach it to the studs with staples every 12". (See Figure 19.2). Keep the netting tight!
5. **Second Row** - Then, stretch the second row of netting across the bottom of the wall. Pull it tight and attach it to the bottom plate similarly to the top plate.
6. Stretch the netting up the wall. Pull it tight and attach it to the studs with staples every 12". Keep the netting tight!
7. Attach the netting to all additional framing, such as window headers, window sills, door headers, and cabinet blocking. Use one staple every 12" into the framing lumber around the outside of the cavity.
8. **Gluing** - Adhere the insulation netting to the framing lumber using "Glue All" glue. Apply the glue over the netting at studs, headers, sills and pieces of blocking with a 4" paint roller. Roll the glue out over the entire surface.
9. **Insulating Holes** - Cut holes in the netting at the center of each cavity for inserting the blower hose. Cut open a 4" diagonal slit in each bay. For full length cavities without wires or piping, a single hole just above the seam between the two rows will be enough. For bays above/below windows or divided with horizontal wiring, piping or other blocking which divides the bay, cut a slit in each section.



### Insulation Blower and Hose

1. Setup the insulation blower.
  - The blower can be rolled into the house, but should be carried if the finished flooring has been installed.

- Attach the hose to the unit. Use the hose clamp which should be hanging from the side of the machine.
  - There needs to be enough hose to reach from the machine to the cavities to be filled.
  - Clear the hopper of any cords, push sticks, or other non-insulation materials.
  - Uncoil the switch cord and route it to the first area to be insulated.
  - Plug in the machine. Two (2) heavy duty extension cords will be provided with the machine. Each cord must be plugged into a separate GFCI outlet. Do not use multi-plug adaptors or additional extension cords.
2. Load the insulation blower.
- The insulation bales must be cut into thirds or fourths to feed into the machine. Do not unwrap the bales until the product is in the machine.
  - Place the insulation in the large hopper on top of the unit.
  - Once the bale is in the machine, cut the wrapping on one side of the bale, then pull the wrapping out. Keep your hands above the safety bar!
  - The insulation will occasionally “bridge over” and need to be pushed down past the safety bar. Use a push stick to move the insulation down into the lower part of the machine. Keep the push stick above the moving feeder parts.

Note – Use a push stick to feed the hopper; not your hands.

### **Insulation Installation Process (See Figure 19.3).**

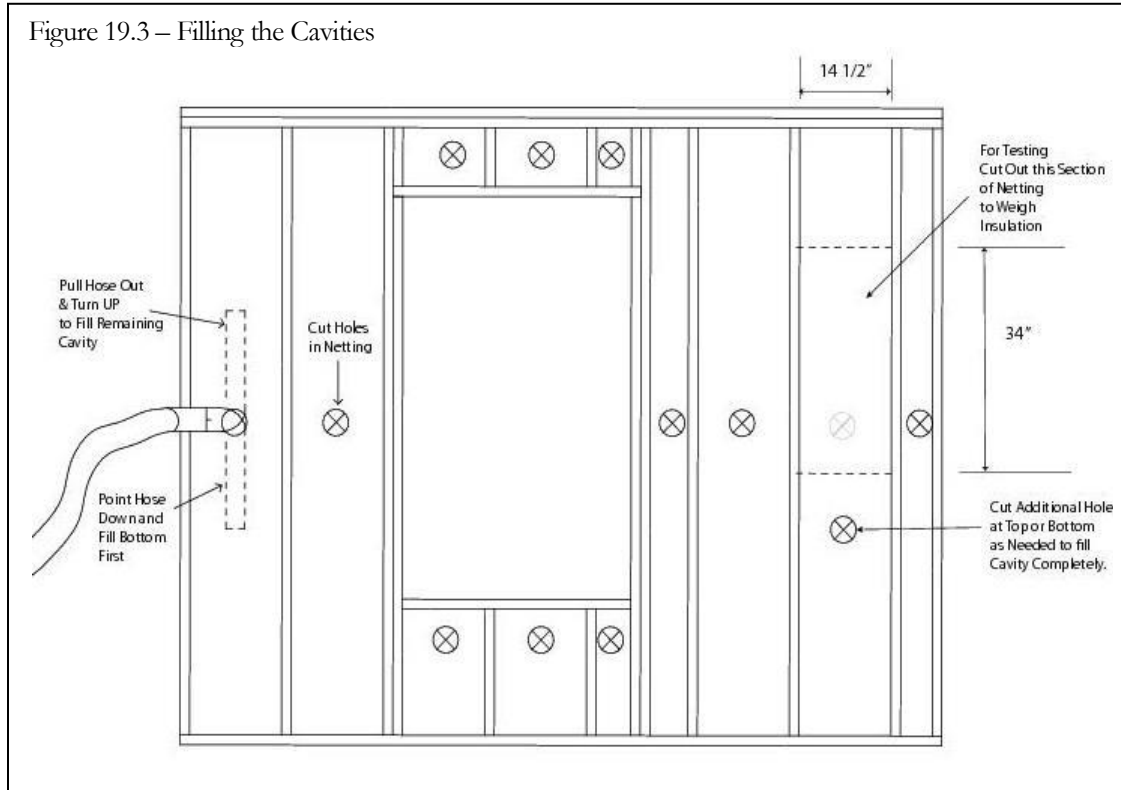
1. Insert the end of the hose into the holes cut in the netting.
2. Push the hose partially into the bottom of the cavity to be filled. Turn on the switch and fill the cavity. Retract the hose as the cavity fills. When the insulation is packed up to the hole, turn off the switch. Be aware some insulation will likely blow out the hole around the hose. Work to minimize it.
3. Push the hose partially into the top of the cavity and fill the remainder of the cavity using the same process.
4. Remove the hose from the hole.
5. Stuff insulation which blew out of the hole back into the hole until the void left by the hose is filled.
6. The holes can be taped shut with duct tape, but is not necessary.

### **Density Testing**

1. The insulation needs to be tested to ensure the insulation has been installed to the proper density so the R-14 value is achieved. Two (2) cavities on each level of the house are to be tested.
2. Cut out a 34” section of the netting from the center of a full 14 ½” cavity.
3. Stuff the insulation from that section into a tall kitchen trash bag. Ensure all the insulation has been captured.
4. Using a fish scale, weigh the bag and its contents. The section of insulation should weigh 3.2 pounds.

5. If the weight is under or over by more than ½ pound, adjust the blower to improve the packing of the insulation by opening or closing the Material Feed Gate. (Hand crank at the bottom of the blower).
6. Install a new piece of netting over the testing hole and blow-in replacement insulation.

Figure 19.3 – Filling the Cavities



## Insulate Joist bays between the First and Second Floors

### Safety Issues

- Respirators and face shields must be worn when using the Froth-Paks.
- N99 Dust Masks must be worn whenever you are working around insulation.

Ensure any “Fire-Rated” wall assemblies have been inspected before insulating the joist bays.

1. Apply 1” of R-3 spray foam (Froth Pak) to each joist bay.
2. After the Froth-Pak foam has dried, cut and install pieces of R-13 non-faced insulation over the foam sealant in each bay.
  - Cut 9 ½” pieces of non-faced R-13 insulation.
  - Stuff this material into the openings.
  - Go behind / around vent pipes, wires, etc.
  - Do not staple or cover in any way.



### **Cutting Batt Insulation**

1. Place the insulation on a piece of OSB.
2. Lay a wooden straight edge on top of the insulation along the line to be cut and press it down to compress the insulation.
3. Use a utility knife to cut down through the fibers.
4. It will take several passes to cut completely through the material.

### **Wall Insulation Check-List**

- Ensure the external wall cavities are all completely and uniformly filled (no voids) and are firm to the touch.
- Ensure the basement joist cavities have been insulated with “Froth-Pak” foam and R-13 non-faced batts.
- For two-story houses, ensure the second floor joist cavities have been insulated with “Froth-Pak” foam and R-13 non-faced batts.
- Ensure insulation fills the cavity between conditioned and unconditioned space without gaps, voids, misalignments or compression.
- Ensure batt insulation has been cut and split around blocking, plumbing, HVAC and electrical components.
- Ensure insulation completely fills floor and/or cantilever framing.

## **Basement Insulation**

### **Insulate Joist Bays in the Basement**

The basement band boards will be insulated after all of the mechanicals have been completed.

1. Apply 1" of R-3 spray foam (Froth Pak) to each bay.
2. After the Froth-Pak has dried, cut and install pieces of R-13 non-faced insulation over the foam sealant in each bay.

### **Insulate Basement Walls with Thermax**

The interior of the basement walls from the exterior grade up to the floor joists must have additional insulation to meet the thermal bypass requirements. The top 24" of each wall will be covered with 1" Thermax. This will add an additional insulation factor of R-2 to the walls.

1. Cut the 4x8 sheets of 1" Thermax into 2x8 sheets. These will be installed horizontally.
2. Cut the 2x8 sheets to fit along the basement walls. Break the Thermax at the windows and stairways.
3. Position the top edge of the Thermax even with the top edge of the sill plate (just below the floor trusses) and nail in place with 1 ½" roofing nails; 1 nail every 16".
  - Note - Taping of the joints is not required.

## Attic Insulation

### Safety Issues

- Disposable gloves must be worn when using the insulating foam.
- N99 dust masks and protective coveralls must be worn by the volunteer filling the attic and by the volunteers filling the blower.

### Insulate the Drywall Penetrations in the Attic

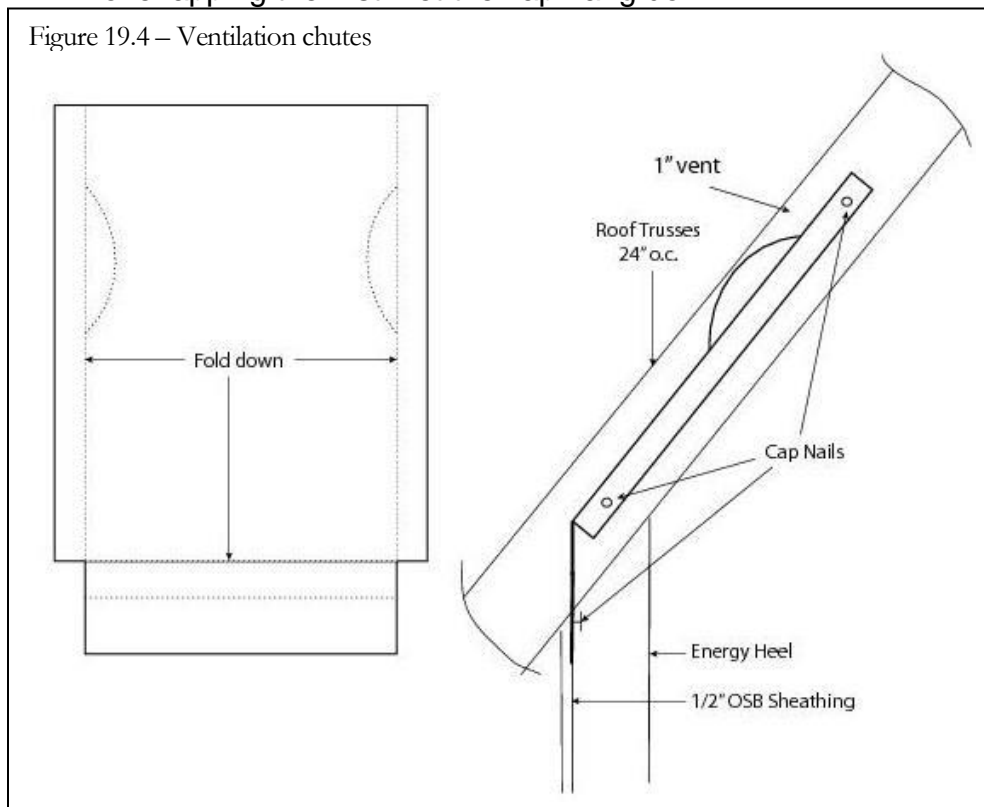
Before installing the cellulose insulation in the attic, use Gaps and Cracks insulating foam to seal the holes in the drywall ceilings below the attic where the electrical fixtures and detectors pass through. Apply the foam from the attic, sealing the area around the boxes. Do not spray the foam into the seam as it will drop into the room below.

### Install Positive Ventilation Chutes (Cardboard Baffles)

Before insulating the attic, install ventilation chutes in the bays between each of the trusses/rafters. The chutes will keep the insulation from escaping into the soffits and will maintain 1" of ventilation under the roof. Each bay will need two (2) chutes since sixteen inches of insulation is taller than one baffle.

1. Fold the first baffle for each bay as shown in the Figure 19.4.
2. Nail the baffles in place with 1 ½" cap nails.
3. Fold a second baffle as before. Install it above the first baffle with the flap overlapping the first. Let the flap hang down.

Figure 19.4 – Ventilation chutes



### **Insulating the Attic**

The cellulose insulation will be blown-in to a uniform depth of 16". Measure and mark this height in multiple places on the vertical roof truss members, in locations visible from the attic access hatch to assist with controlling the depth of the insulation.

Feed the hose up through the attic access. Blow the insulation into place. Keep the spray low. Do not blow insulation into the ventilation chutes.

### **Attic Insulation Check-List**

- Ensure Insulation has been installed to a level of 16".
- Install ventilation chutes to achieve a minimum of 75% of attic R-value over exterior top plates and to be at least 4" higher than the level of attic insulation.
- Before the Final Occupancy Inspection, post the Insulation R Factor/Insulation depth- Certification sheet in a visible location just inside the access hatch.

## **Quality Assurance Checklist**

- Take pictures of completed items
- Ensure work site is clean and materials are properly stored before proceeding.