

ATTICS AND CATHEDRAL/VAULTED CEILINGS

Johns Manville AP™ Foil-Faced insulation sheathing board is an excellent choice for insulating attics and cathedral/vaulted ceilings. Polyiso provides one of the highest R-values per inch of any rigid insulation (R-6 at 1 inch). When applied to the interior face of rafters, Johns Manville AP Foil-Faced insulation provides a layer of continuous insulation that eliminates thermal bridging. This prevents heat flow and condensation, thereby increasing the ceiling's overall insulation value. AP Foil-Faced insulation is lightweight and easy to install. AP Foil-Faced insulation must be covered with an approved thermal or ignition barrier, as required by local building code, and cannot be left exposed.

BEFORE YOU BEGIN:

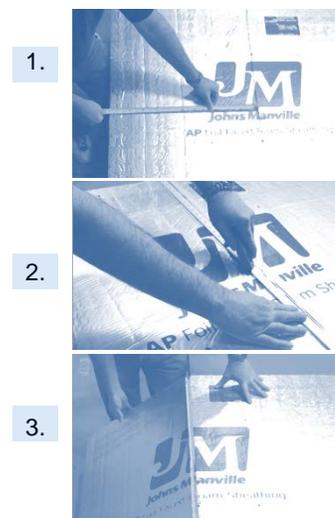
Always follow local building codes. AP Foil-Faced sheathing must be separated from the interior of a building by a minimum of ½-inch gypsum board or equivalent 15-minute thermal barrier as required by code. When AP Foil-Faced insulation sheathing is installed within an attic where entry is made only for service of utilities, an ignition barrier must be installed in accordance with local building codes. Gather all materials.

Materials Checklist

- Safety glasses and gloves
- Measuring tape and pencil
- Utility knife or handsaw
- Straight edge
- Construction-grade polyurethane adhesive, such as Liquid Nails
- Mechanical fasteners such as masonry nails with 1-inch metal washers or caps
- Flashing tape such as 3M 8067, Grace Vycor Pro, or Lamatek
- Sealant such as Tremco Spectrem® 1
- Canned foam such as Touch'nSeal All Season, Hilti CF 810 or CF-F, Dow Great Stuff or Great Stuff Pro

Measuring and Cutting

1. Measure the board by dragging a measuring tape hook across the surface of the board; create a crease while holding the tape at the desired length.
2. Using a straight edge as a guide, deeply score the crease. There is no need to cut through.
3. Snap the board along the score line over the edge of a table or workbench.

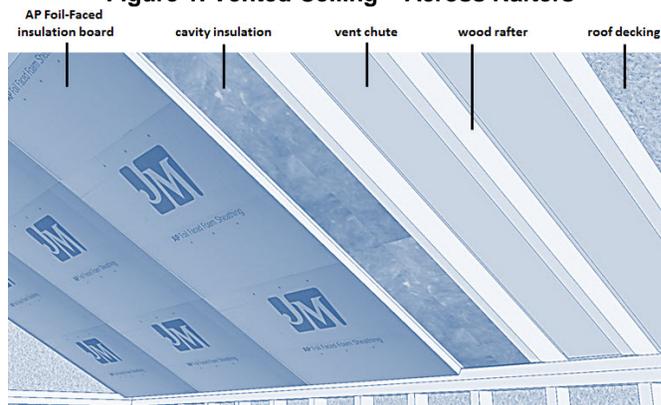


ATTIC INSTALLATION

OPTION 1A: Vented Roof – Foam Board Across Rafters

1. Ensure that proper ventilation is maintained below the roof sheathing, from the soffit vents to the ridge vent at the peak of the roof. This is best accomplished by installing baffles on the underside of the roof sheathing between every rafter prior to installing insulation. Baffles maintain a clear ventilation space and prevent cold air from penetrating into the rafter insulation.
2. If required, install insulation between the rafters. Options for insulating between rafters include Johns Manville Formaldehyde-free™ fiber glass batts (Unfaced, Faced, or ComfortTherm®), JM Climate Pro® blown-in fiber glass in the Blow-In-Blanket® system, JM Spider® Plus Custom Insulation System, JM spray polyurethane foams (Corbond III®, Corbond MCS™ or Corbond oc SPF) or other approved insulation product. Fiber glass batts should not be compressed. The level of insulation installed in the rafter cavity will depend on the product chosen and the depth of the rafters.
3. Install AP Foil-Faced foam sheathing across the inside rafter surface. Use maximum board lengths to minimize number of joints. Locate joints square to rafters and center end joints over rafters. Provide additional blocking as necessary. It is not necessary to stagger board joints. Butt board edges together tightly, and carefully fit around openings and penetrations.

Figure 1. Vented Ceiling – Across Rafters



ATTIC INSTALLATION CONTINUED

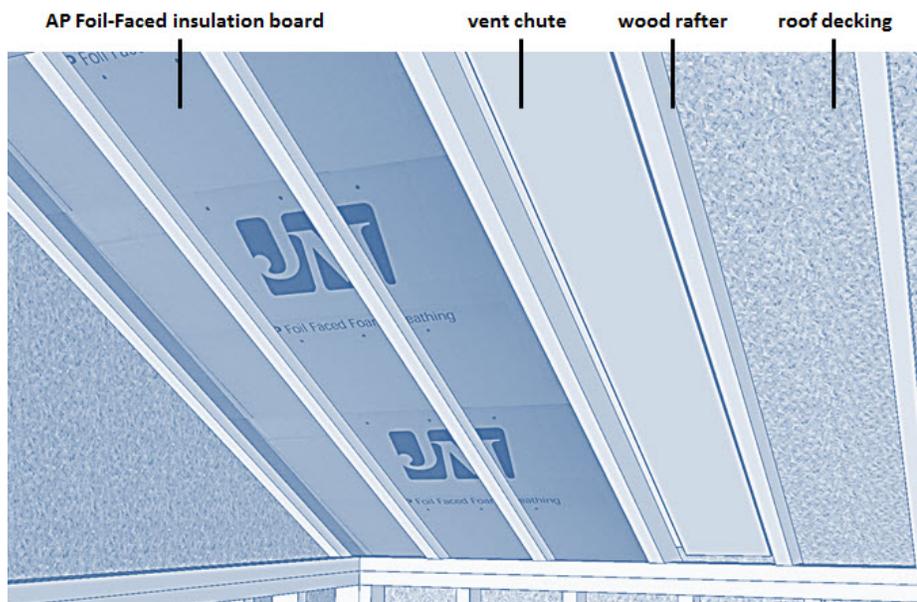
OPTION 1A: Vented Roof – Foam Board Across Rafters - continued

4. Fasten foam insulation boards to the interior of the rafters using screws or nails with 1-inch minimum washers or caps. Alternate fasteners may be used, with the type and length as recommended by their manufacturer for securing foam plastic insulating sheathing. Fasteners should be long enough to penetrate in to the rafter a minimum of $\frac{3}{4}$ inch.
5. Space fasteners approximately 16 inches on center around the perimeter and in the field of each board (16 or 24 inches on center across rafters, depending on rafter spacing). Drive fasteners so the washer or stress plate is tight and flush with the board surface, but do not countersink.
6. When installing boards that butt-up at different angles, such as a wall to a sloped ceiling, or sloped ceiling to flat ceiling junctions, mitre the edge of the foam board. This will provide a better fit as well as cover wall headers and other thermal bridges.
7. Cover AP Foil-Faced insulation with a 15-minute thermal barrier or ignition barrier as required by local building codes.

OPTION 1B: Vented Roof – Foam Board Between Rafters

1. Ensure that proper ventilation is maintained below the roof sheathing, from the soffit vents to the ridge vent at the peak of the roof. This is best accomplishing by installing baffles on the underside of the roof sheathing in between every rafter prior to installing insulation between the rafters. Baffles maintain a clear ventilation space and prevent cold air from penetrating into the rafter insulation.
2. Cut AP Foil-Faced foam sheathing to fit snugly between the rafters, and install against the baffles. Properly cut boards should friction-fit between the rafters without falling out. Secure insulation boards and seal all board edges using one-part canned foam.
3. If additional insulation is required, install in the remaining rafter space. Options for insulating the remaining rafter depth include Johns Manville Formaldehyde-free™ fiber glass batts (Unfaced, Faced, or ComfortTherm), JM Climate Pro blown-in fiber glass in the Blow-In-Blanket system, JM Spider® Plus Custom Insulation System or other approved insulation product. Fiber glass batts should not be compressed. The level of additional insulation will depend on the product chosen and the depth of the rafters. All additional insulation must be secured to hold it in place.
4. If additional insulation is not required, the foil facing of AP Foil-Faced foam sheathing can provide additional thermal performance to the attic by functioning as a radiant barrier. The reflective side of the board should be oriented to the interior, and the nonreflective white side should be oriented to the exterior. To gain radiant barrier performance, an air space of at least $\frac{1}{2}$ inch should be left between the foam insulation and the thermal or ignition barrier.
5. Cover AP Foil-Faced insulation with a 15-minute thermal barrier or ignition barrier as required by local building code.

Figure 2. Vented Ceiling – Between Rafters

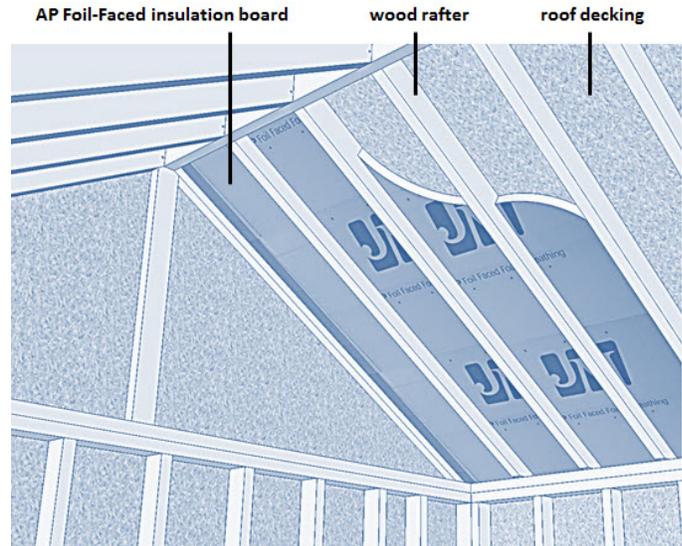


ATTIC INSTALLATION CONTINUED

OPTION 2: Unvented Roof Sheathing

1. Cut AP Foil-Faced foam sheathing to fit snugly between the rafters.
2. Install AP Foil-Faced foam boards between rafters, directly against the bottom of the roof sheathing. The R-value of the insulation must meet local building code requirements for unvented attics to prevent condensation. Multiple layers of foam board may be required. If multiple layers are installed, stagger board joints.
3. Fasten insulation boards to the roof sheathing per the following options:
 - a. Secure insulation boards between the rafters and seal board edges using one-part canned foam. Properly cut boards should friction-fit between rafters without falling out.
 - b. Use screws or nails with 1-inch minimum washers or caps. Alternate fasteners may be used, with the type and length as recommended by their manufacturer for securing foam plastic insulating sheathing. Fasteners should be long enough to penetrate in to the roof sheathing a minimum of $\frac{1}{2}$ inch, but not too long as to penetrate through the roof waterproofing. Fasteners are not required around the perimeter of the boards. Space fasteners approximately 24 inches on center in the field.
4. Seal all board edges and penetrations with one-part expanding canned foam to prevent air leakage and water vapor diffusion to the roof sheathing.
5. If additional insulation is required, install in the remaining rafter space. Options to insulate the remaining rafter depth include Johns Manville Formaldehyde-free™ fiber glass batts (Unfaced, Faced, or ComfortTherm), JM Climate Pro blown-in fiber glass in the Blow-In-Blanket system, JM Spider® Plus Custom Insulation System or other approved insulation product. Fiber glass batts should not be compressed. The level of additional insulation will depend on the product chosen and the depth of the rafters. Additional insulation must be secured.
6. If additional insulation is not required, the foil facing of AP Foil-Faced foam sheathing can provide additional thermal performance to the attic by acting as a radiant barrier. The reflective side of the board should be oriented to the interior, and the nonreflective white side should be oriented to the exterior. To gain radiant barrier performance, an air space of at least $\frac{1}{2}$ inch should be left between the foam insulation and the thermal or ignition barrier.
7. Cover AP Foil-Faced insulation with a 15-minute thermal barrier or ignition barrier as required by local building code.

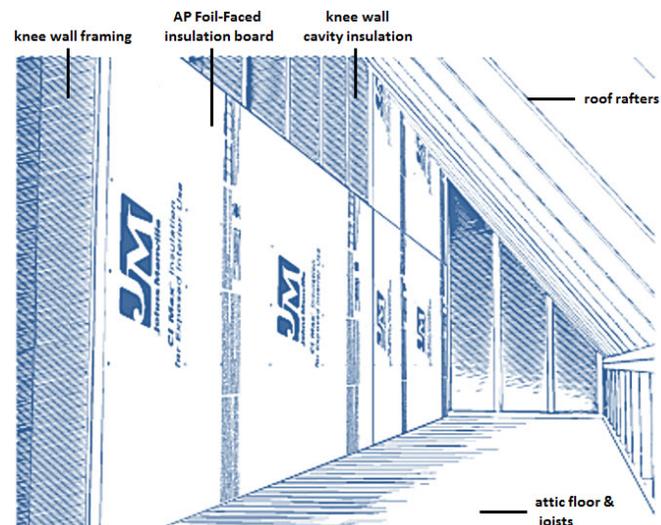
Figure 3. Unvented Ceiling – Between Rafters



OPTION 3: Knee Walls

1. If desired, insulate the knee wall cavity with either Johns Manville Formaldehyde-free™ fiber glass batts (Unfaced, Faced, or ComfortTherm), JM Climate Pro blown-in fiber glass in the Blow-In-Blanket system, JM Spider Plus Custom Insulation System, JM spray polyurethane foam (Corbond III, Corbond MCS or Corbond oc SPF) or other approved insulation product. Fiber glass batts should not be compressed. The amount of insulation will depend on the product chosen and the depth of the framing.
2. There are two options for installing continuous foam board insulation over knee wall framing:
 - a. Use wood lath or strapping fastened to the exterior of the knee wall framing to secure cavity insulation. Install AP Foil-Faced insulation as described in section 1A. Ensure that there is a ventilation space below the roof sheathing at the intersection of the knee wall and roof.

Figure 4. Knee Walls



ATTIC INSTALLATION CONTINUED

- b. Insulate the knee wall framing on the exterior with AP Foil-Faced insulation by screwing or nailing insulation boards to the exterior (attic side) of the framing using screws or nails with 1-inch minimum washers or caps. Alternate fasteners may be used, with the type and length as recommended by their manufacturer for securing foam plastic insulating sheathing. Fasteners should be selected to be long enough to penetrate in to the framing a minimum of $\frac{3}{4}$ inch. To provide air sealing to the knee wall, foam board seams may be taped. Additional sections of board foam should be cut and fit to block off the space between attic floor joists and sealed in place with one-part expanding foam to provide an air seal below the knee wall.
3. Cover AP Foil-Faced insulation with a 15-minute thermal barrier or ignition barrier as required by local building code.

CATHEDRAL/VAULTED CEILINGS INSTALLATION

OPTION 1: Gypsum Board Finish

1. The roof sheathing may be vented or unvented. The following options may be followed prior to installing foam board sheathing:

Vented Roof Sheathing

- a. Ensure that proper ventilation is maintained below the roof sheathing, from the soffit vents to the ridge vent at the peak of the roof. This is best accomplishing by installing baffles on the underside of the roof sheathing in between every rafter prior to installing insulation between the rafters. Baffles maintain a clear ventilation space and prevent cold air from penetrating into the rafter insulation.
- b. If desired, install insulation between the rafters. Options for insulating between rafters include Johns Manville Formaldehyde-free™ fiber glass batts (Unfaced, Faced, or ComfortTherm), JM Climate Pro blown-in fiber glass in the Blow-In-Blanket system, JM Spider Plus Custom Insulation System, JM spray polyurethane foams (Corbond III, Corbond MCS or Corbond oc SPF) or other approved insulation product. Fiber glass batts should not be compressed. The level of insulation installed in the rafter cavity will depend on the product chosen and the depth of the rafters.

OR

Unvented Roof Sheathing

- c. If desired, install JM spray polyurethane foams (Corbond III, Corbond MCS or Corbond oc SPF) directly against the bottom of the roof sheathing. The amount of insulation should be sufficient to meet local building code requirements for unvented attic spaces to prevent condensation.
2. Install AP Foil-Faced™ foam sheathing across the inside rafter surface. Use maximum board lengths to minimize number of joints. Locate joints square to rafters and center end joints over rafters. Provide additional blocking as necessary. It is not necessary to stagger board joints. Butt board edges together tightly, and carefully fit around openings and penetrations.
3. Fasten foam insulation boards to the interior of the rafters using screws or nails with 1 inch minimum washers or caps. Alternate fasteners may be used, with the type and length as recommended by their manufacturer for securing foam plastic insulating sheathing. Fasteners should be selected to be long enough to penetrate in to the rafter a minimum of $\frac{3}{4}$ -inch.
4. Space fasteners approximately 16 inches on center around the perimeter and in the field of each board. (16 or 24 inches on center across rafters, depending on spacing). Drive fasteners so the washer or stress plate is tight and flush with the board surface, but do not countersink.
5. AP Foil-Faced foam boards qualify as Class I vapor retarders, so no additional vapor retarder is required.
6. Cover AP Foil-Faced insulation with a minimum $\frac{1}{2}$ -inch gypsum board or equivalent 15-minute thermal barrier as required by local building code.

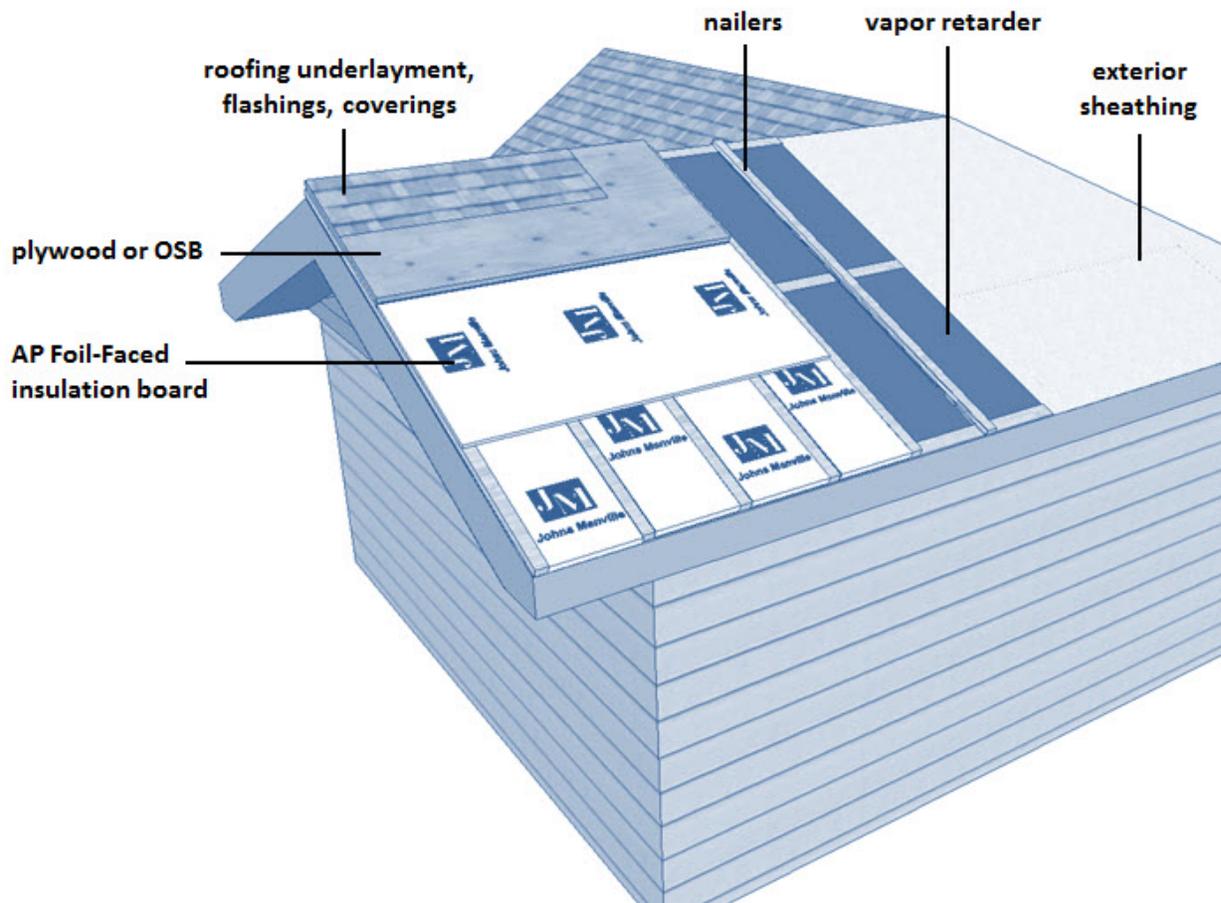
OPTION 2: Exposed Beams Finish

1. From the exterior side of the ceiling, install an appropriate vapor retarder over the wood planks.
2. Over the vapor retarder, install wood nailers 3.5 inches wide by the thickness of the foam insulation. Wood nailers are installed parallel to the roof slope on 16- or 24-inch centers and around the perimeter of the roof deck, at valleys, ridges and anywhere flashings will be attached. 2x4 lumber is approximately 1.5 inches thick, so 2x4 lumber may require a strip of plywood or foam insulation under the wood nailer to match the final foam board thickness. Install nailers with additional strips of foam or plywood against the vapor retarder. Screw or nail wood nailers securely to roof deck.

CATHEDRAL/VAULTED CEILINGS INSTALLTION - CONTINUED

3. Install AP Foil-Faced insulation tightly between the wood nailers, nailing minimally.
4. Install a second layer of foam insulation perpendicular to the wood nailers keeping all joints tight and nailing minimally into the wood nailers.
5. If an unvented roof is desired, install plywood/OSB shingle base over the foam insulation, staggering all joints versus foam joints. Run plywood/OSB perpendicular to the wood nailers and ensure end joints in plywood/OSB are located over a wood nailer (wood nailers are under top layer of foam insulation). Secure plywood/OSB to the wood nailers.
6. If a vented roof is desired, install a second set of wood nailers or furring strips over the top layer of foam insulation and directly over existing wood nailers which are below top layer of foam insulation. Fasten top wood nailer into existing wood nailer. Install plywood/OSB shingle base perpendicular to the wood nailers and ensure end joints in plywood/OSB are located over a wood nailer. Secure plywood/OSB to the wood nailers. Vented roofs require vents at the eaves and at the ridge that are connected via the air space under the shingle base.
7. Install roofing underlayment, flashings, and roof coverings.

**Figure 5. Cathedral/Vaulted Ceiling
Exposed Beams – Unvented**



PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/Face

Safety glasses with side shields are recommended to keep dust out of the eyes.

Personal Protective Equipment: Skin

Leather or cotton gloves should be worn to prevent skin contact and irritation.

Personal Protective Equipment: Respiratory

A NIOSH-certified respirator should be used if ventilation is unavailable, or is inadequate for keeping dust levels below the applicable exposure limits.

Ventilation

In fixed manufacturing settings, local exhaust ventilation should be provided at areas of cutting to remove airborne dust. General dilution ventilation should be provided as necessary to keep airborne dust below the applicable exposure limits and guidelines. The need for ventilation systems should be evaluated by a professional industrial hygienist, while the design of specific ventilation systems should be conducted by a professional engineer.

Personal Protective Equipment: General

Loose-fitting, long-sleeved clothing should be worn to protect skin from irritation. Work clothing should be washed separately from other clothes, and the washer should be rinsed thoroughly (run empty for a complete wash cycle). This will reduce the chances of dust being transferred to other clothing.