



## **ThermaCal® Nail Base Roof Insulation Panels (all versions) – Installation Instructions**

Updated 06-06-2017

### **PRODUCTS**

- a. **ThermaCal® 1 Ventilating Roof Insulation Panel** is a venting nailable composite roof insulation panel with one layer of 7/16" (11.1 mm) OSB standard (other sheathing options available) and one layer of EnergyGuard™ Polyiso Insulation with a built-in air space for roof ventilation. Recommended for use below asphalt shingle and metal roof applications.
- b. **ThermaCal® 2 Ventilating Roof Insulation Panel** is a venting nailable composite roof insulation panel with two layers of 7/16" (11.1 mm) OSB standard (other sheathing options available) and one layer of EnergyGuard™ Polyiso Insulation with a built-in air space for roof ventilation for greater roof loads. Recommended for use below tile and traditional slate roof applications.
- c. **ThermaCal® Non-Ventilating Roof Insulation Panel** is a non-venting nailable composite roof insulation panel with one layer of 7/16" (11.1 mm) OSB standard (other sheathing options available) sheathing bonded to EnergyGuard™ Polyiso Insulation. Recommended for use below metal roof applications. Do **NOT** use below asphalt shingle applications.
- d. **GAF ThermaCal® Fastener** is a self-drilling, self-tapping roof insulation fastener without a plate. (Refer to the *Insulation Fastener* section for further details).

**Note:** Other sheathing options can be either nominal 5/8" (15.9 mm) or 3/4" (19 mm) OSB or CDX plywood. FSC sheathing is available upon request.

All ThermaCal® Nail Base Roof Insulation Panel sizes are nominal 4' x 8' (1.22 m x 2.44 m). The actual coverage is approximately 47-1/4" x 95-1/4" (1.20 m x 2.42 m). The edges of wood sheathing are rabbeted or cut back to allow for expansion with foam edges machined into a tongue and groove profile. ThermaCal® panels are **NOT** structural. For more information on the product and its uses and limitations please see product literature or visit: [www.cornellcorporation.com](http://www.cornellcorporation.com) or [www.gaf.com](http://www.gaf.com). Check local building codes for any additional and/or applicable requirements.

### **DELIVERY, HANDLING, STORAGE, AND PROTECTION**

Follow GAF Cornell directions and requirements for protection of ThermaCal® products prior to and during installation.

- a. Deliver products to site in original containers with seal unbroken and labeled with manufacturers' names, product brand names and types.
- b. Handle ThermaCal® nailbase panels with care. Do **NOT** lift ThermaCal® nailbase panels by the top OSB or plywood layer as this can cause delamination between layers. **ALWAYS** lift each panel from the bottom of the ISO layer. The adhesive between the layers is not intended to handle loads during lifting. It is only intended for placement during the manufacturing process and shipping purposes. In the event the layers do separate, during handling or installation, the ThermaCal® nailbase panels can still be used if undamaged. Install the ISO layer first, followed by the OSB or Plywood layer on top. Screw the nailbase panels to the roof deck using GAF installation instructions and standard fastening patterns.
- c. Store materials in weather-protected environment, clear of the ground and moisture, in accordance with GAF instructions.
- d. Outside storage of roofing materials:
  1. All materials stored outside must be raised above ground or roof level on pallets and covered with a tarpaulin or other waterproof and "breathable" material. Insulation products should be properly stored and weighted to avoid weather and wind damage.

2. Factory-installed plastic wrapping is not designed as protective covering for insulation materials and should be removed. Use “breathable” type covers, such as canvas tarpaulins to allow venting and protection from weather and moisture.
  3. Cover and protect materials at the end of each day’s work.
  4. Do not remove any protective tarpaulins until immediately before material will be installed. Extreme heat or cold conditions may require special storage requirements. Reference product data sheets for specific product storage requirements.
- e. Do NOT use materials that are wet or damaged to the extent that they will no longer serve their intended purposes.
  - f. All roof insulation that has been repeatedly wetted is considered damaged, even if later dried out. Remove all damaged materials from the job site. Insulation that has been slightly wetted from rain or snow should be dried out thoroughly before applying the roof covering.
  - g. No more material should be applied than can be covered and protected from the weather the same day.
  - h. When staging materials on the roof during application, ensure the deck and structure are not temporarily overloaded by the weight of construction materials.
  - i. At the job site, no more material should be stored than what will be used within two weeks. For periods longer than two weeks, the materials should be properly warehoused; i.e., dry ventilated, on pallets, etc. No more material should be stored on the rooftop than can be used within five days. When prolonged inclement weather threatens, i.e., rainy seasons, no more roofing materials should be supplied to the rooftop than can be used within two days.

#### **WORKING ENVIRONMENT**

- a. Work should only begin when the contractor has decided to his/her satisfaction, that all specifications are workable as specified, and that the contractor can meet project and code requirements.
- b. The contractor should only begin roofing work when the substrates have been prepared as necessary, and are ready to accept the roofing materials installed as specified.
- c. Provide a safe working environment, including, but not limited to, adequate fall protection, restriction of unauthorized access to the work area, and protection of the building and its occupants.
- d. Safe work practices should be followed, including, but not limited to, keeping tools in good operating order; providing adequate ventilation if adhesives are used; and, daily housekeeping to remove debris and other hazards. See *Safety Considerations and Warnings* for further details.
- e. Protect the building, contents, surrounding area, building occupants and contractor personnel during work. Coordinate all work operations with the building owner and building occupants so that adequate interior protection, as necessary, is provided and disruption to normal building operations is minimized.
- f. When tearing off an existing roof, limit removal to the area that will be completely reroofed that day with the new roofing system.
- g. If conditions are uncovered or created which would be detrimental to the proper conduct of specified work, immediately notify the building owner and GAF Cornell of these conditions for consultation on acceptable treatments.

#### **SAFETY CONSIDERATIONS AND WARNINGS**

- a. As with any construction process, safety is a key element. All applicable safety standards and good roofing practices must be followed. Read and understand GAF Cornell installation instructions before starting application. Follow all precautions and directions.
- b. Only properly trained and professionally equipped contractors experienced in the installation of nail base roof insulation panel application should install these systems. Always wear protective gear, including but not limited to: hardhats, goggles, heavy-duty gloves, and snug fitting clothing.

- c. Fire safety precautions should be observed when ThermaCal® products are installed. Protect foam from flame cutting and welding operations, etc. Provide suitable fire protection around chimneys or high temperature areas.
- d. Thoroughly train all personnel in first aid procedures, and always comply with all OSHA safety standards and fire codes. Also, use extreme caution when working around equipment, such as gas lines or HVAC units, which have electrical or gas connections.

### AIR/VAPOR RETARDER

- a. Air/vapor retarder components must typically be installed when required by a design professional to address internal building pressures or humidity conditions, i.e. swimming pools.
- b. Particular care should be taken to seal all openings on the deck around lighting fixtures, skylights, end walls, and at the ridge, etc. On any building where conduit is installed above the structural deck, a separate layer of 1-1/2" (38 mm) thick foam insulation is recommended.
- c. Install the air/vapor retarder components per applicable installation recommendations of the manufacturer.

### VENTILATION

ThermaCal® 1 & 2 products are designed to allow air flow through the air space below the top sheathing. For proper ventilation, the system must have the following:

- a. **Adequate air entry flow at the eave:** Use eave edge vents or eave soffit vents which typically allows approximately 9 square inches (58 cm<sup>2</sup>) of Net Free Ventilation Area (NFVA). ThermaCal® Ventilated Roof Insulation Panels provide 10 square inches (64.5 cm<sup>2</sup>) of air intake per lineal foot (meter) of eave for panels with 1" (25 mm) air space. Where edge blocking is used at the eave, do not cover the entrance to the air space as this will restrict or prevent positive air flow intake.
- b. **Adequate air exit flow at the ridge:** Use a ridge vent, such as a Cobra® 4' (1.22 m) plastic ridge vent, which allow approximately 18 total square inches (116 cm<sup>2</sup>) of air exhaust area per lineal foot (meter) of ridge for panels with 1" (25 mm) air space.
- c. For ThermaCal® 1 & 2 panels with greater than 1" (25 mm) airspace or a run (from eave to ridge) in excess of 40 ft. (12 m), a design professional should be consulted to determine actual ventilation requirements and the need for moisture control. Refer to the GAF Cornell Eave and Ridge detail drawings for further information on ventilation.
- d. ThermaCal® airspaces must not be closed off. If a smaller panel is needed, it is recommended to cut off the side or end with the tongue on it. Support the cut edge with spacer blocks running up the slope. Extra spacers are supplied with every shipment.
- e. Warm moist air leaking from the inside of the building can cause condensation at the ridge, at the end walls or at any other opening. Seal off these openings by cutting the foam insulation at a suitable angle and filling any gaps with spray foam or caulking. Do not use combustible spray foam around chimneys or high temperature areas.

### INSTALLATION

- a. Check that the supporting roof deck is smooth and even without bumps or depressions. The supporting roof deck must be dry and free of any ice or snow.
- b. Remove or hammer down any protruding nails
- c. Install wood nailers at the eave and rake edge of the roof. Multiple layers of wood nailers may be necessary in order to match the thickness of ThermaCal® panel. At the eave, ensure the nailers do not block the vent area of the panel.

- d. Before installing the first row of insulation at the eave, check how the eave vent and/or the sheathing over the roof overhang will be supported.
- e. At the rake edge, make sure to cut back the polyiso along the 4' (1.22 m) side of the ThermaCal® panel so that the wood sheathing can be installed on top of the wood nailer. Fasten the sheathing along the rake edge using 8p nails fastened 8" (203 mm) o.c.
- f. Lay ThermaCal® panels with the wood side up and the long side parallel to the ridge. The tongue edge on the polyiso should face up the slope. Sheathing has rabbetted edges to maintain the proper expansion clearance between adjacent panels. Field cut panels should be kerf cut to maintain a 1/8" (3 mm) minimum gap between the sheathing on adjacent panels. Stagger end joints in succeeding panel rows. **Clips are NOT required to gap ThermaCal® panels.**
- g. Install GAF ThermaCal® Fasteners directly through the panel into the structural deck using the insulation fastening pattern as shown on Diagram 1. Secure fasteners so that they are firmly imbedded into the wood surface without over or under-driving.
- h. Do not install a ThermaCal® panel smaller than 12" (305 mm) at the ridge.
- i. Check the insulation top surface for uneven edges BEFORE covering. Grind off any uneven edges with an electric sander or grinder. Roofing should be applied over dry insulation as soon as possible.
- j. Install metal drip edge with a minimum 3" (76 mm) flange at the eaves and rake edges fastening every 8-10" (203-254 mm) per standard GAF requirements.
- k. Apply roofing underlayment and overlying roof covering to the ThermaCal® panel according to the shingle or roof covering manufacturers' recommendations. Install the appropriate underlayment as needed for the type of roof covering you are working with. Follow the roof covering manufacturer's installation requirements and code requirements for all underlayments.
- l. Install eave and ridge vents as described under the *Ventilation* section and shown on GAF Cornell detail drawings.

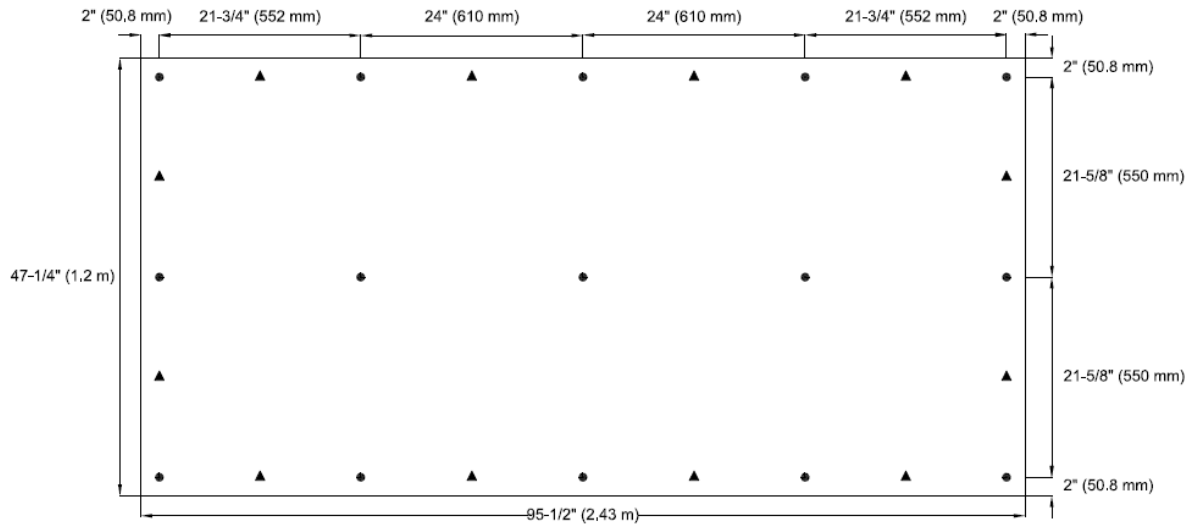
#### **INSULATION FASTENERS**

- a. **Wood Deck:** Use GAF ThermaCal® Thread Point Fasteners. They need to be 1-1/4" (31.7 mm) to 1-1/2" (38.1 mm) longer than the overall depth of the vented roof insulation. If the wood deck is less than 2" (51 mm) actual thickness, use fasteners with a minimum of 1" (25 mm) penetration and install 4 extra fasteners on the horizontal center line of the panel. On a plywood deck, use GAF ThermaCal® Fasteners that penetrate through the deck at least 1/4" (3 mm). If exposed fastener tips are not acceptable, contact GAF Cornell for suggestions.
- b. **Steel Deck:** Use GAF ThermaCal® Light-Duty Drill Point Fasteners that penetrate through the deck 1" (25 mm) min.
- c. **Concrete Deck:** Use ThermaCal® Thread Point Fasteners, Drill-Tec™ #14 or CD-10 Fasteners that penetrate into the deck 1" (25 mm) min. Pre-drilling 13/16" (20.6 mm) and advanced testing is recommended.
- d. **Special Applications:** Contact GAF Cornell for special applications not shown here.

#### **STANDARD FASTENING PATTERN**

- a. **Number of Fasteners:** Use a minimum of 15 ThermaCal® Fasteners (5 across-parallel to the ridge & 3 up the slope) per 4' x 8' (1.22 m x 2.44 m) panel to meet standard load requirements. Apply fasteners at the approximate position of the internal spacers as shown in drawing below. There are lines on the sheathing (OSB only) at 24" (610 mm) and 48" (1.22 m) from the panel ends which will assist in locating the fasteners. Ignore the lines at 16" (406 mm) and 32" (813 mm). Use additional fasteners at the rakes, eaves, and ridges as shown in Diagram 1 below. If high wind load requirements exist, contact GAF Cornell for recommendations.

**Diagram 1**



**NOTES:**

1, ▲ INDICATES ADDITIONAL FASTENERS REQUIRED AT THE PERIMETER OF THE ROOF ALONG THE EAVE, RAKE & RIDGE LINES (TYPICAL)

- b. When installing heavy material such as natural slate or tile on a slope greater than 4:12 but less than 8:12, install 4 additional fasteners. These fasteners are to be installed on each panel along the center of the panel aligned along the 8' (2.44 m) length parallel with the ridge line. For roof slopes 8:12 or greater contact GAF Cornell for recommended fastener patterns.
- c. For panels of overall thickness 6" (152 mm) or more, add 5 additional fasteners per panel. Refer to 20 Count Fastening Pattern Layout Drawing.

**Note:**

Check the architect's eave and ridge detail drawings and specification for accuracy. Refer to GAF Cornell ventilation roof details located on the GAF website [www.gaf.com](http://www.gaf.com) or contact GAF Technical Services at 1-800-766-3411.



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