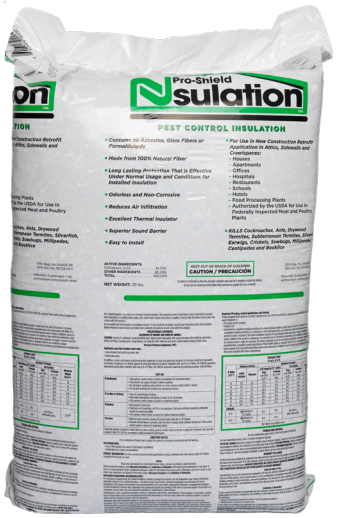
Pro-Shield Nsulation™

Attic Installation Guide

Products for Installation



Note: Due to manufacturing processes and market availability of recycled cellulose, there can be variation in the color of the Pro-Shield NSulation, ranging from light gray to light brown.

Necessary PPE

(See page 7 of this guide for a comprehensive list)

Equipment

- Insulation blowing machine
- Insulation vacuum
- Tools (see page 7 of this guide)

Products for Additional Services

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INTRODUCTION

Insulation is essential for comfort, energy efficiency, and noise control in a home. It is typically installed in attics, crawl spaces, and walls to regulate indoor temperatures. Over time, insulation may lose effectiveness due to settling, moisture, or pest damage. Many older homes also fall short of today's Department of Energy insulation standards because past building codes required less insulation than current recommendations.

Pests such as insects and rodents can further compromise insulation by nesting in it. Pro-Shield Nsulation provides a modern solution. Unlike traditional loose-fill cellulose, Pro-Shield is an EPA-registered pesticide infused with 14.72% orthoboric acid, offering the combined benefits of cellulose as an insulation and borates for effective pest management. It not only insulates but also kills listed self-grooming insects.

PRE-SERVICE CHECKLIST

☐ **Licensing**

Pro-Shield Nsulation is an EPA-registered pesticide, and applicators must consult and comply with all applicable federal, state, and local regulations governing the application of a pesticide.

In addition, additional licensing and certifications may be required for the application of an insulation product. Please consult all state and local regulations that may apply.

☐ **Equipment**

Prior to beginning any work, all equipment should be inspected to ensure that everything is in proper working order. Inspection should include all personal protective equipment, ladders, and insulation blowers and vacuums.

☐ **Product**

To ensure that multiple trips are not required during the installation process, the space to be insulated should be measured and the number of bags needed should be verified prior to starting any work. Do not begin installation unless a sufficient number of insulation bags to complete the work is on site.

ATTIC PREPARATION

Step 1: Access the Attic

Verify that the attic is safely accessible. Prior to accessing the attic, ensure that there is a safe way in which you can gain entry. If utilizing a ladder, it should be thoroughly inspected prior to use to ensure that the ladder is in full working order. It is also important to use a bump cap or hard hat to prevent any potential head injuries from unseen dangers that may present when entering the attic space.

Acceptable access points include:

- Walk-up attic
- Garage access hatch (scuttle hole)
- Interior access hatch (often in a closet)
- Pull-down attic stairs
- Gable or roof vent entry

If no access point exists, the homeowner must hire a licensed contractor to create one.

Old insulation can harbor a wide variety of pests. Your inspection can reveal where to focus any additional exclusion efforts.

Insulation adulterated by mold or moisture should be removed and the substrate evaluated for structural or other damage.

Step 2: Inspect Existing Insulation

Verify type of insulation currently installed. These types of insulation may include:

- **Loose-Fill:** Available as either a fiberglass (white or pink) or cellulose material and is the most commonly found type of insulation in attics due to its ease of application.
- **Insulation Batts:** Small, pre-cut strips of fiberglass insulation typically used for small or tight spaces.
- **Insulation Rolls:** Insulation strips that typically measure 20-40 feet in length.
- **Spray Foam:** Closed or open-cell polyurethane insulation that is sprayed into an area.

Check current insulation. Identify any conditions that may warrant the replacement or addition of insulation. Note if any additional services (e.g., leak repairs, exclusion, or sanitization) may be warranted based on your findings.

Add or replace insulation if:

- The R-value does not meet current recommendations.
- The insulation is wet or moisture-damaged.
- There is evidence of rodent activity, such as droppings, urine stains, etc.

Step 3: Locate and Protect Ventilation Points

Proper ventilation prevents moisture buildup, prolongs roof life, and stabilizes attic temperature. It is important to be able to identify the signs of inadequate or poor ventilation within an attic.

Inspect for signs of poor attic ventilation:

- Extremely hot air during the summer months
- Excess moisture or mold
- Ice dams or ice buildup on the roof during the winter months
- Warped decking or shingle deterioration
- Higher energy bills

Locate soffits and/or vents that may be blocked by existing insulation. Prevent ventilation blockages using:

- **Baffles:** Corrugated cardboard or plastic inserts stapled between joists to keep soffits open.
- **Vent chutes:** Installed between rafters to maintain airflow to roof sheathing (available in 16" or 24" widths).

In attics with insufficient ventilation, **utilize the attached chart in Addendum 1 of this guide or other ventilation regulations** to determine the number of additional ventilation points needed prior to installing any insulation.

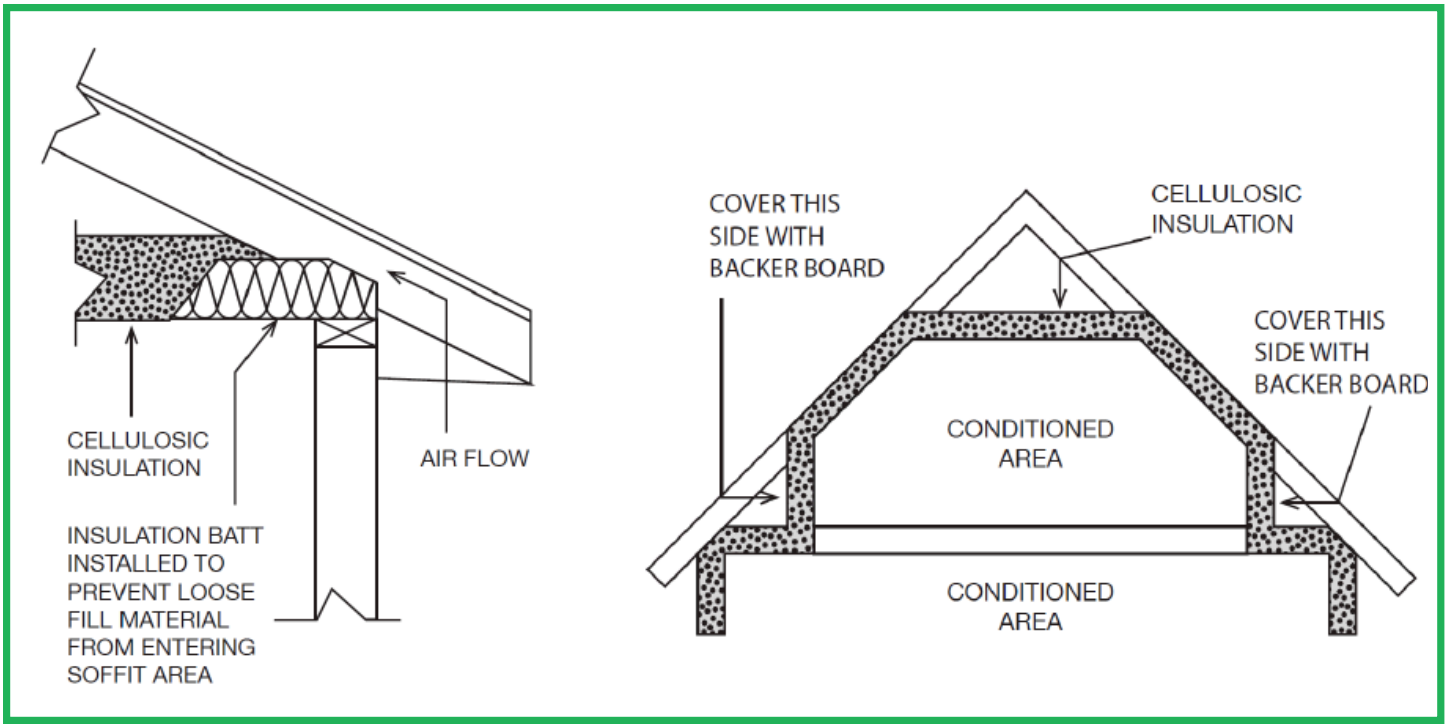


Image Credit: Cellulose Insulation Manufacturer's Association, *Technical Bulletin: Standard Practices for Installation of Cellulose Insulation in the United States,* www.cellulose.org.

Step 4: Install Attic Rulers

Loose-fill insulation performance depends on thickness. Rulers confirm depth and compliance. Install one ruler per 300 sq. ft. or per local code requirements. Place against supports where they are visible for inspectors and homeowners.

During installation, rulers are a visual indication that insulation has reached the appropriate depth and is dispersed evenly.

Here insulation has been INCORRECTLY installed. Baffles should have been put in place to allow for appropriate clearance. See Step 5 above.

Step 5: Recessed Lighting

Check fixtures for IC (Insulation Contact) rating. If unmarked, assume fixture is non-IC.

Requirements:

- Keep at least ½-inch clearance from combustibles.
- Maintain 3-inch clearance from non-IC fixtures, wiring, or ballasts.
- Install metal flashing when needed to ensure circulation and prevent heat entrapment.

Step 6: Address Special Situations

Exhaust flues: Maintain 3-inch clearance; add barriers per code.

Whole-house fans: Build barrier at least 4 inches above fan or insulation level; recommend winter covers.

HVAC systems: Ensure you meet the following guidelines:

- Install barriers around equipment.
- Seal visible duct openings.
- Prevent insulation from entering ducts or interfering with system operation.

Step 7: Seal Open Areas

Close gaps that could let insulation escape, such as:

- Wall openings
- Stairwell cavities
- Cabinet or shower/tub bulkheads

CALCULATING INSULATION REQUIREMENTS IN ATTICS

1. **Determine Target R-value (see Addendum 2 for included chart).**

2. **Account for existing insulation:**

If keeping the existing insulation, measure the depth of the current insulation and subtract its R-value from the desired R-value.

If removing the existing insulation, skip this step.

3. **Measure attic area:**

Area (sq. ft.) = Length × Width

4. **Estimate Pro-Shield R-value needed:**

Required R-value – Existing R-value = Pro-Shield R-value Estimate

5. **Calculate number of bags:**

Consult the chart below for the number of bags needed per 1000 ft^2 area to achieve the required R-value. This coverage chart can also be found on Pro-Shield Nsulation bags.

Bags Needed = (Area to be insulated × Number of bags at Required R-value) ÷ 1000

R-Value @75° F	Thickness (Inches)		Maximum Coverage				
			2x6 Framed on 16" Centers		No Framing		Minimum Weight (lb/sq. ft.)
	Initial Installed	Minimum Settled	Bags (per 1000 sq. ft.)	Coverage (sq. ft. per bag)	Bags (per 1000 sq. ft.)	Coverage (sq. ft. per bag)	
13	4.5	4.1	13.9	71.7	15.4	65.0	.39
19	6.3	5.7	22	45.4	24.2	41.3	.61
22	7.3	6.5	26.4	37.8	28.7	34.8	.72
30	9.7	8.7	38.3	26.1	40.7	24.6	1.02
38	12.2	10.9	50.2	19.9	52.7	19	1.32
49	15.6	14.0	66.7	15.0	69.2	14.4	1.73
60	18.9	17.1	83.2	12.0	85.8	11.7	2.15

Side Walls

R-13	2x4 Framed on 16" Centers	25.2	39.7	**Dry Pack or Wall Cavity Spray**	3.3 ft^3
R-20	2x6 Framed on 16" Centers	41	24.4		

*Note: These are **minimum** values.*

Actual usage may vary based on blower type, weather, installation method, and hose type.

TOOLS CHECKLIST

Tools & Supplies

- ☐ Basic tool kit (hammer, screwdriver set, wrench/socket set, box cutter, etc.)
- ☐ Flashlight
- ☐ LED clamp lights
- ☐ Tin/metal snips
- ☐ Duct tape
- ☐ 32 gauge metal flashing materials
- ☐ Construction stapler
- ☐ Corrugated cardboard or thick plastic to serve as baffles
- ☐ 16" or 24" vent chutes
- ☐ Scoop shovel
- ☐ Protective covers (such as poly sheets, painter's drop cloths, etc.)
- ☐ Yard stick or measuring stick
- ☐ Attic rulers
- ☐ Staple gun (to adhere attic rulers to beams)

A PMP applying insulation with appropriate PPE.

Personal Protective Equipment

- ☐ Long-sleeved shirt and pants
- ☐ Crawl suit or Tyvek suit
- ☐ Unlined gloves
- ☐ Knee pads
- ☐ Shoe covers/booties
- ☐ Bump cap or hard hat
- ☐ Safety goggles
- ☐ NIOSH-approved particulate filtering facepiece respirator with any N, R, or P filter or elastomeric particulate respirator with any N, R, or P filter

Debris such as screws, staples, and nails can end up hidden in insulation and damage vacuum or harm applicators during removal. Ensure that precautions are taken.

Equipment

- ☐ Attic safety platform/walking boards
- ☐ Insulation blowing machine
  Note: *Ensure that you select a model that will protect operators and machine while in use.*
- ☐ Hose (minimum length required)
- ☐ Insulation vacuum machine if removing old insulation
  Note: *Depending upon the vacuum being used, additional safety devices or equipment may be required to protect PMP and machine.*
- ☐ Vacuum waste bags if removing old insulation

Pre-Installation Checklist

- ☐ Remove stored items.
- ☐ Cover flooring and household items with poly.
- ☐ Seal or block attic opening to prevent material from entering home.
- ☐ Install attic rulers as required.
- ☐ Block and create a barrier around recessed lights and other heat sources.
- ☐ Seal attic holes.
- ☐ Seal or repair any visible holes in existing ductwork.
- ☐ Block and create a barrier around the furnace and/or drain pan.
- ☐ Confirm attic is blocked and vented.
- ☐ Turn off HVAC.
- ☐ Close interior doors.
- ☐ Confirm insulation quantity required.

Damaged ductwork should be patched and sealed prior to installation.

PERFORMING THE SERVICE

Equipment Operation

Note: *All equipment must be operated in strict accordance with the instructions and procedures provided by the equipment manufacturer. Blowing machines should be properly maintained and serviced as directed in the manufacturer's guidelines to ensure safe and effective use.*

Step 1. Review owner's manual and/or all instructions for the blower.

Step 2. Wear protective equipment (see Tool Checklist in this document).

Step 3. Connect machine to a grounded power source with proper amperage.

Step 4. Start with maximum air flow and adjust as needed to balance material flow.

Step 5. Fully open material feed gate; adjust for proper fiber projection.

Step 6. Test system with remote hand pendant.

Step 7. Secure all hoses with clamps.

Step 8. Start and finish jobs with hopper empty.

Insulation should be applied evenly. Rulers should be used to provide a visual indication of depth and to assure homeowners and inspectors that the appropriate amount of insulation has been installed.

Installation

Step 1. Open feed rate to maintain strong agitation.

Step 2. Use shortest hose possible to reduce dust.

Step 3. Start at attic's furthest point, working towards your access point.

Step 4. Apply insulation evenly to required depth.

Step 5. Confirm thickness against rulers and coverage chart.

Step 6. Use rigid PVC extension for hard-to-reach edges.

Clean-Up

Step 1. If HVAC is present, empty and replace drain pan.

Step 2. Remove all Pro-Shield bags, waste, and debris from site.

POST-INSTALLATION CHECKLIST

- ☐ Remove all equipment from the area insulated, including tools, flashing, and all lighting.
- ☐ Verify that access paths and walkways are clean and free of insulation debris.
- ☐ Check that insulation is maintained behind a barrier a minimum of 3 inches from all recessed lighting, the water heater, furnace flue, or other heat sources that are present in the attic.
- ☐ Ensure all drain lines and drain pans are free of insulation.
- ☐ Make sure that there is a 4-inch gap between the insulation and the whole house fan, if present.

ADDITIONAL SERVICE OPTIONS

Attic Wood Treatment

In situations where wood destroying organisms are present or are a concern, the treatment of all accessible wood members is recommended. Treatment of these wood members, which are not themselves protected by Pro-Shield Nsulation, can provide an additional level of security within the attic space. Treatments to the wood, with products such as Bora-Care, provide an additional level of protection against wood destroying organisms that may enter the structure. These treatments should be made prior to the application of any new Pro-Shield Nsulation, and after the removal of any old insulation, if applicable.

Attic Disinfection Treatment

Past infestation of rodents or other pests within an attic space can result in soiled insulation that can provide a breeding ground for different pest-borne pathogens. The decontamination of the attic space, especially after the removal of all soiled insulation, is one way to minimize the potential for the transmission of any pathogens to the structure's inhabitants. The use of products, such as Nisus DSV or Steri-fab, can help to reduce the number of pathogens left behind by pests that continue to exist within the attic space.

ADDENDUM 1: CALCULATING VENTILATION

Ensuring appropriate ventilation is not only important for compliance with codes and building authorities, but for the producing safe and effective results. Ventilation capacity is measured as **Net Free Vent Area (NFA/NFVA)**. It is important to know the ventilation codes for the structure. Most municipalities fall within the guidelines below.

Identify any relevant local and state code requirements.

1. **Calculate total NFVA.**

   Measure attic area using exterior dimensions. Please use the following formula:

   Total NFVA (sq. ft.) = Attic area (sq. ft.) ÷ Ventilation ratio

2. **Divide between intake and exhaust.**

   Intake should make up 40–50% of NFVA (ideally 50/50 split). Intake vents should be low (soffits), exhaust vents high (ridge, roof, gable).

3. **Match with actual vents.**

   Compare calculated NFVA with vent product ratings. If insufficient, homeowner must arrange for licensed contractor to add vents before insulation installation.

ADDENDUM 2: R-VALUE MAP & CHART

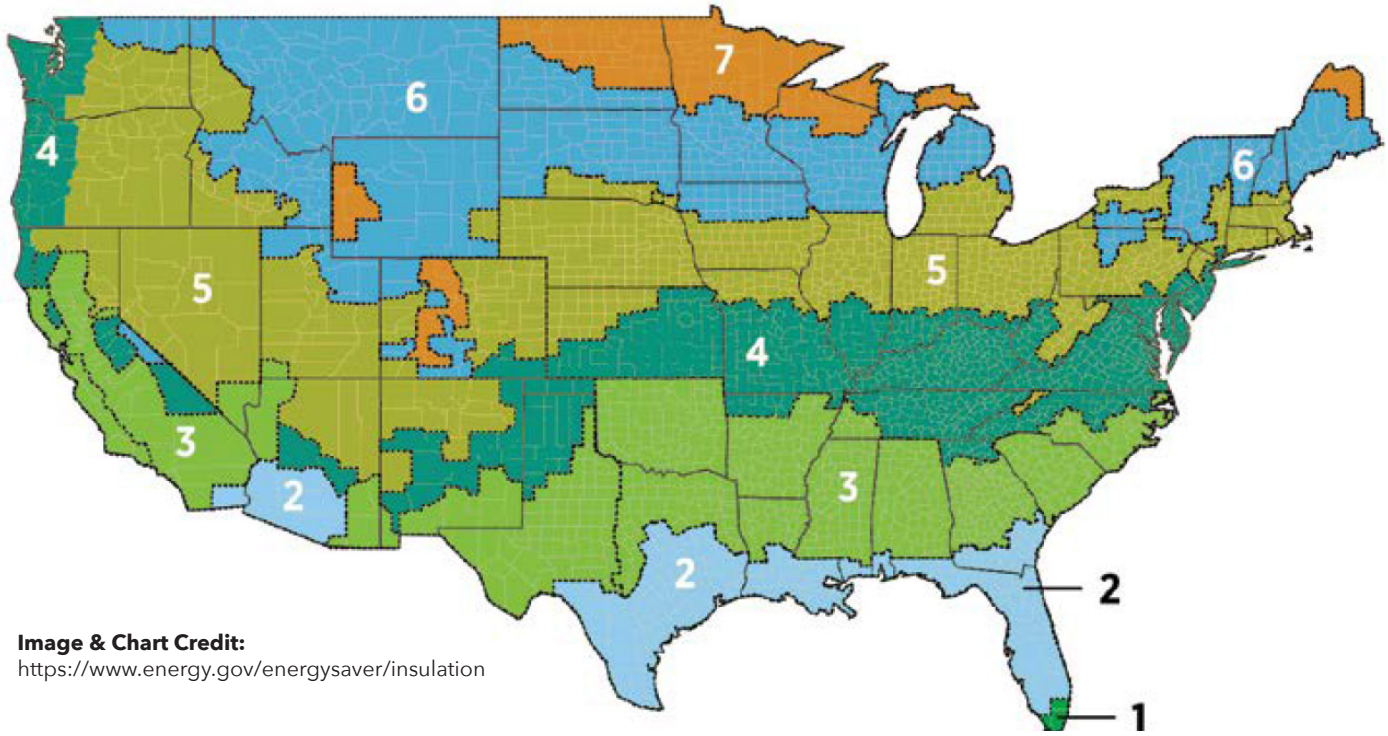


Image & Chart Credit:
https://www.energy.gov/energysaver/insulation

Zone 1 includes **Hawaii**, **Guam**, **Puerto Rico**, and the **US Virgin Islands**.

ALASKAN ZONES

Zone 5: Ketchikan Gateway, Prince of Wales-Outer Ketchikan, Sitka

Zone 6: Haines, Juneau, Kodiak Island, Wrangell-Petersburg, Skagway-Hoonah-Angoon

Zone 7: Aleutians East & West, Anchorage, Bethel, Bristol Bay, Dillingham
Kenai Peninsula, Lake and Peninsula, Matanuska-Susitna, Valdez-Cordova, Yakutat

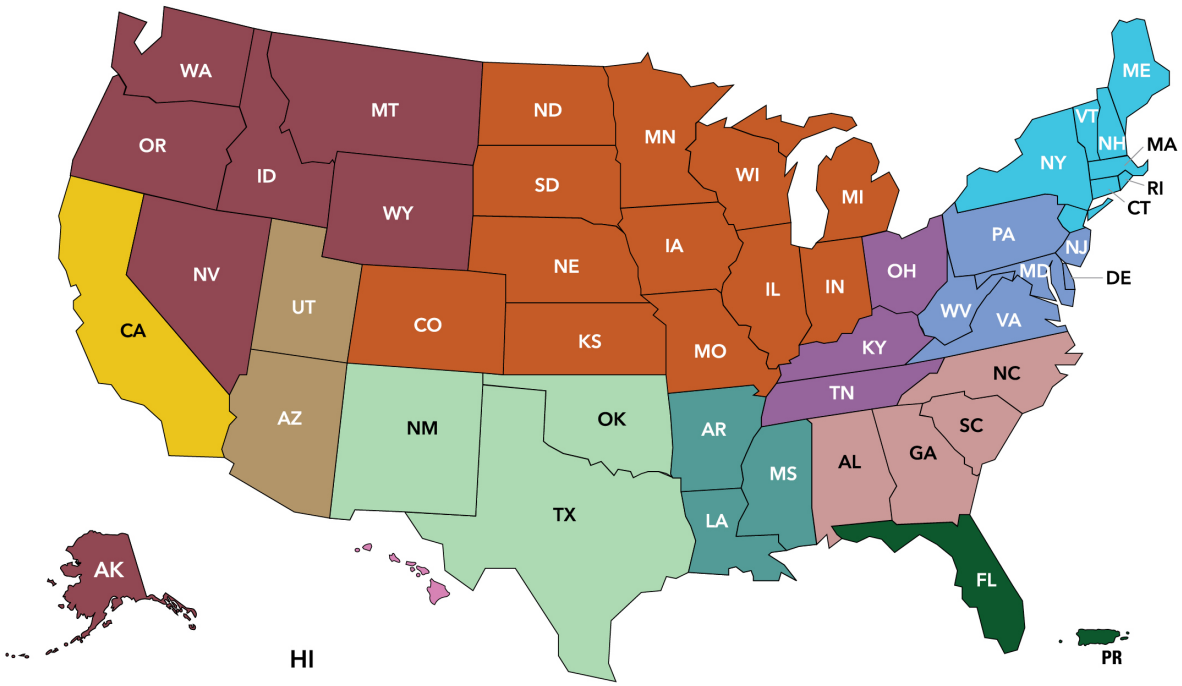
Zone 8: Denali, Fairbanks North Star, Nome, North Slope, Northwest Arctic, Southeast Fairbanks, Wade Hampton, Yukon-Koyukuk

Climate Zone	Uninsulated Attic	3-4" of Existing Attic Insulation	Uninsulated Floor	Uninsulated Wood-Frame Wall	Insulated Wood Frame Wall
1	R30-R49	R19-R38	R13	R13 or R0 + R10 Cl*	N/A
2	R49-R60	R38-R49	R13	R13 or R0 + R10 Cl	N/A
3	R49-R60	R38-R49	R19	R20 or R13 +R5 Cl or R0 +R15 Cl	Add R5 Cl
4 (except Marine)	R60	R49	R19	R20 + R5Cl or R13 + R10 CL or R0 + R15 Cl	Add R10 Cl
4 (Marine) & 5	R60	R49	R30	R20 + R5 Cl or R13 +R10 Cl or R0 +R20 Cl	Add R10 Cl
6	R60	R49	R30	R20 + R5 Cl or R3 + R10 Cl or R0 + R20 Cl	Add R10 Cl
7 & 8	R60	R49	R38	R20 + R5 Cl or R3 + R10 Cl or R0 + R20 Cl	Add R10 Cl

***Cl** in theis table stands for **"continunus insulation"** that is applied to the exterior of the wall assembly just inside the cladding.

For additional information regarding the **United States Department of Energy's climate zones, moisture regimes, and warm/humid designations by state and county,** visit:

https://codes.iccsafe.org/content/IECC2021V3.0/chapter-3-ce-general-requirements



MIDWEST
Regional Manager
Jeff Caudill
jeffc@nisuscorp.com
641-208-1311

NORTHEAST
Regional Manager
George Williams
georgew@nisuscorp.com
646-531-2490

MID-ATLANTIC
Regional Manager
John Singletary
johns@nisuscorp.com
571-369-0879

SOUTHEAST
Regional Manager
Mike Purcell
mikep@nisuscorp.com
404-450-0531

FLORIDA & PUERTO RICO
Regional Manager
Charlene Mertz
charlenem@nisuscorp.com
407-375-6313

SOUTHERN APPALACHIA
National Product Manager
Jeff Thomas
Jefft@nisuscorp.com
865-315-2218

SOUTHWEST
Regional Manager
Marty Keane
martyk@nisuscorp.com
214-766-8383

WEST
Regional Manager
Chaz Estrada
chaze@nisuscorp.com
602-290-6098

CALIFORNIA
Territory Manager
Javier Ramos
javierr@nisuscorp.com
951-532-7365

HAWAIIAN ISLANDS
Territory Manager
Sanya Brandow-Kettler
sanyab@nisuscorp.com
808-798-9916

DELTA
Industry Specialist
Kendall Stovall
kendalls@nisuscorp.com
706-424-9565

NORTHWEST
Industry Specialist
James Rodriguez
jrodriguez@nisuscorp.com
725-340-1650

Director of Product Sales
Jim Sparks
jims@nisuscorp.com
801-698-3504

Vice President of Business Development
Harry Bryan
harryb@nisuscorp.com
865-406-9710

Technical Services
800-264-0870
technical@nisuscorp.com

Regulatory Services
800-264-0870
regulatory@nisuscorp.com

800.264.0870 | www.nisuscorp.com | 100 Nisus Drive | Rockford, TN