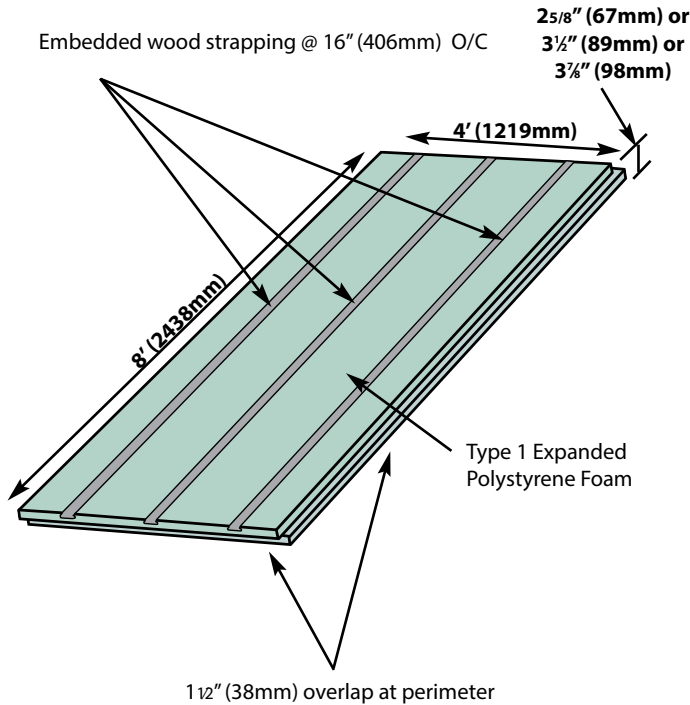


NUDURA CEILING TECHNOLOGY

PRODUCT FEATURES



NUDURA Ceiling Technology is a high performance insulation system that reduces air infiltration and thermal bridging.

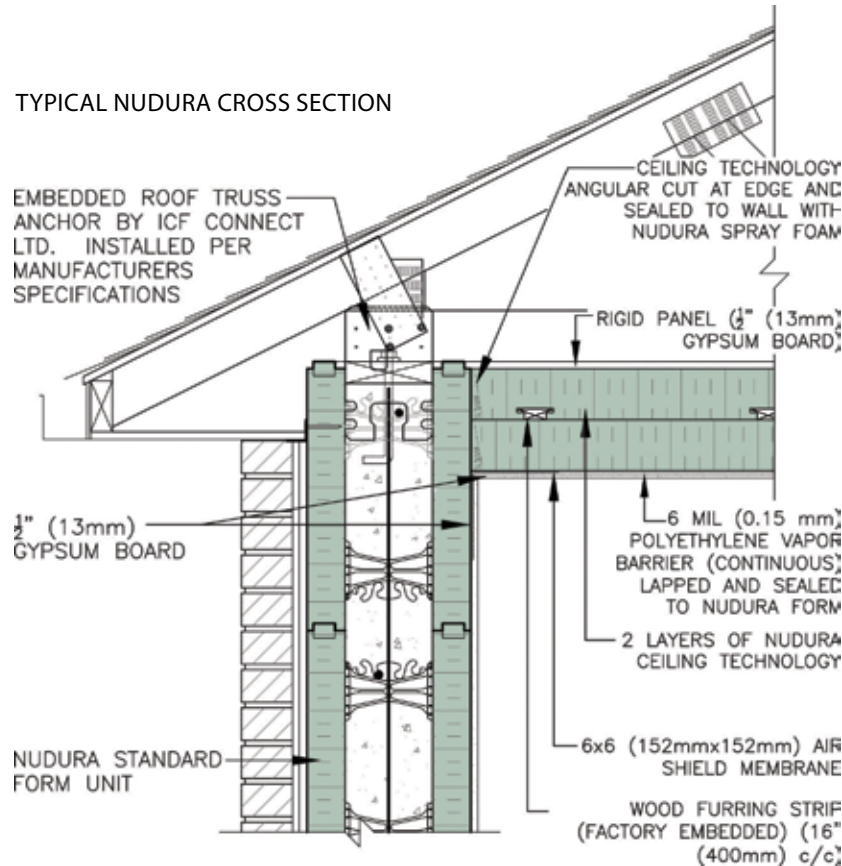
- Fast and easy mechanical attachment to trusses is provided by the embedded wood strapping
- The 1 1/2" (38 mm) perimeter overlap reduces air infiltration
- Contains no potentially harmful CFC's or HCFC's
- Safe Handling
- 100% recyclable
- A quick and economical insulation solution for retro-fitting uninsulated floors, walls and ceilings in homes, garages, cottages or commercial buildings

PACKAGING AND ORDERING

• Available in 2 5/8" (67 mm) and 3 1/2" (89 mm) thicknesses.

• Packaging:	Thickness	Pieces/Bundle
	2 5/8" (67 mm)	6
	3 1/2" (89 mm)	4
	3 7/8" (98 mm)	4

TYPICAL NUDURA CROSS SECTION



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Recent changes to building codes throughout the world over the past two years are now demanding increases in exterior building envelope insulation amounts as well as improvements in overall building air tightness. As a result of these changes, the following procedures, must be followed for correct installation of NUDURA Ceiling Technology to assure its compliance to these new requirements. The procedures outlined in this document provide as much guidance to the installer as possible to assure these new code requirements are met or exceeded.

NOTE: Before beginning your Ceiling Technology installation project, be sure to check with your local Building official to determine the R-Value or U-Value performance requirements for insulated ceilings in your region. NUDURA's Ceiling Technology system, as specified herein, provides an estimated thermal conductance or heat flux of 2 Btu/hr/ft² at -11 deg. F (6.301 W/m² at -24 degrees C) which reflects an insulation value that is approximately equivalent to R46 (RSI 8.1 or U-Value 0.123 W/m²·K) at this temperature.

Please ensure this insulation performance complies with your local Code requirements before beginning your project. If additional insulation should be required beyond these levels, this must be added to the insulation assembly either above or below the NUDURA Ceiling Technology product described herein prior to application of vapour barrier and drywall finishes.

- Standard ½" (12.7 mm) gypsum board or equivalent for your region in 4' x 8' (1219 mm x 2438 mm) or 1200 mm x 2400 mm (UK/Europe) sheets. To compute the amount required (per layer) application simply take the Finished Ceiling Area and divide it by the area of each gypsum board panel (ft²/₃₂ or m²/2.88) then add a suitable waste factor.
- 3 ½" (89 mm) thick NUDURA Ceiling Technology (the number required will be the same number of sheets as the drywall)
- NUDURA No. 10 Screws (minimum 20 screws per Ceiling Technology panel)
- NUDURA Low Expansion Foam
- 12" x 36" (300 mm x 914 mm) cut segments of NUDURA Waterproofing/Dampproofing Membrane (Vapor/Air Shield Barrier) creased on long axis
- Drywall Screws No. 6 x 1 ½" (2.8 mm dia. x 38 mm) (amount varies per code)
- 6 mil (0.15mm) Polyethylene Vapor Barrier

TOOLS:

- Tape Measure
- Chalk Line
- Screw Guns
- Foam Guns
- Installation Platform (rolling, lockable) Baker Scaffold
- Marking Pens
- Skill Saw
- Drywall Lift
- Foam Gun Cleaner

MATERIALS:

TECHNICAL DATA

PHYSICAL PROPERTIES OF MOLDED EPS INSULATION	ASTM TEST METHOD	ULC S701-97 REQUIREMENTS (TYPE 1)	NUDURA® CEILING TECHNOLOGY TYPE 1
Thermal Resistance (1" thick) hr.ft ² .°F/BTU (m ² .°K/w)	C-518	min.: 3.7 (min.: 0.65)	3.82 (0.67)
Water Vapor Permeability Perm. (ng/Pa.s.m ²)	E-96	max.: 5.3 (max.: 300)	0.70 (40)
Dimensional Stability %	D-2126	max.: 1.5	1.0
Flexural Strength PSI (kPa)	C-203	min.: 25 (min.: 170)	80 (550)
Water Absorption %	D-2842	max.: 6.0	1.8
Compression Strength PSI (kPa)	D-1621	min.: 10 (min.: 70)	14 (97)
Oxygen Limit Indication %	D-2863	min.: 24	42

NUDURA CEILING TECHNOLOGY

NOTE: Skip to PREPARING OF INSTALLATION AREA if your building does NOT have any interior load bearing partition conditions.

PREPARING FOR CEILING TECHNOLOGY INSTALLATION IN BUILDINGS WITH INTERIOR LOAD-BEARING PARTITIONS

Generally, most residential or commercial buildings using NUDURA Ceiling Technology feature roof framing or truss grids that are clear spanning the living space to be insulated with the product. On occasion, however, a roof framing plan may call for the roof structure to bear onto an interior partition that's carrying the roof load though the structure to the foundation – in effect splitting the Ceiling Technology into two separate zones. In these instances, the following pre-installation steps need to be followed for installing Ceiling Technology ABOVE the ceiling line BETWEEN the trusses or rafters to facilitate continuous insulation through these areas. This operation is more easily carried out at this stage while the ceiling spaces are open on either side of the partition.

- 1 Measure the total linear footage of load bearing partition that will need to be capped with NUDURA Ceiling Technology. Divide this dimension by 8' (2.44 m). This will give you the total number of Ceiling Technology panels that you will need for capping over the partition walls.
- 2 Measure and record the typical opening distance between framing members that are bearing onto the partition wall. Typically this will be 22 ½" (572 mm) for trusses spaced at 24" (610 mm) centers or 14 ½" (371 mm) for joists or rafters spaced at 16" (406 mm) centers. If this distance varies, this should also be recorded and planned for accordingly.
- 3 Prepare the required panels for this installation by first trimming off the shiplap segments on the two long sides of the panels (parallel to the fastening strips. Do this by first laying the Ceiling Technology panel flat on the work surface (strapping face UPWARD) and snap two chalk lines 2" (50 mm) in from either long side of the panel.
- 4 Next, using a skill saw set at a pitch of 10° from vertical, trim the long edges of the panels along the chalk lines so that the resulting cut beveled edge pitches downward and OUTWARD towards the EDGE of the panel. The remaining shiplap edges on the short sides of the panels can then be left as they are.
- 5 Using straight cuts mark and cut each of the panels prepared in Step 4 laterally across the panel width into four equal segments [each being approximately 2' (610 mm) in width].
- 6 With the cut piece from Step 5 placed strapping side down, using the typical opening distance between framing members recorded in Step 2, mark the cut width required. NOTE: This line may possibly align (on the strapping side) with the center strapping of the piece you are cutting.
- 7 Once again, set the cutting blade 10° from vertical, cut along the line marked in Step 6 angling the blade towards the bulk of the segment you measured so that the end piece you are cutting results in a trapezoid shape.
- 8 Center the segment long ways OVER the load bearing partition, screw the segment into position into the top plate of the partition through the wood strap using the No. 10 x 5" (127 mm) screws.
- 9 Foam the beveled edge along the edges of the segment where they meet the truss bottom chord or ceiling joist.
- 10 The second layer of Ceiling Technology, capping over the segments installed in steps 7 through 9, can easily be facilitated using the full segments cut in Step 5 and orienting the wood strap to be in line with the partition. For trusses with bottom chords that are matching the 3 ½" (89 mm) thickness of the Ceiling Technology, the uncut shiplap edges of the panels may be able to be used to lap each segment that may extend over the truss bottom chords. Regardless of bottom chord depth, these segments will require specific NOTCHING around the truss webs or vertical members as may be required. NOTE: Be sure that screw fastening aligns with the strapping in the Ceiling Technology segment installed below it.
- 11 Once cut to fit, screw the panel into position and foam seal the edges as well as around the interfacing truss web members. Additional NUDURA Low Expansion Spray Foam may need to be applied at any gypsum board interfaces installed under the section of this document entitled PRIMARY GYPSUM BOARD INSTALLATION.

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PREPARING THE INSTALLATION AREA

- Installation of NUDURA Ceiling Technology MUST be planned to occur AFTER all roof shingling has been completed – but PRIOR TO installation of any interior non-load bearing interior partitions.
- Any planned electrical and plumbing runs coming from the exterior NUDURA (or frame) walls required to pass through above the ceiling space should be sleeved with PVC PRIOR to the Ceiling Technology being installed to make for easier feeding or connecting to these services later.
- Preparations for interior vents, light fixtures, and in particular pot lamps, ceiling fans or other similar fixtures should be planned for in advance and roughed into the ceiling framing as much as possible PRIOR to commencing the Ceiling Technology installation (or install these items at the same time). Contact your local distributor or www.nudura.com for details covering these aspects of installation.
- 6 Mil (0.15 mm) sheet vapor barrier is required to be applied over any exterior batt insulated framed wall elements such as 2nd floor return window dormer sections that will be required to interface with NUDURA Ceiling Technology to the NUDURA Wall System. The vapor barrier MUST extend and lap onto the interior face of any NUDURA Wall System elements where connecting with them and have sufficient lap length to lap onto the interior face of the NUDURA Ceiling Technology once it is in position.

INSTALLING NUDURA CEILING TECHNOLOGY

GENERAL GUIDELINES

- Plan your installation work to ensure that panel seams of both drywall and Ceiling Technology layers are staggered [typically by a 2' (610 mm) offset]. This staggering and overlapping of seams ensures greater air tightness of the insulation system.
- IMPORTANT: Your installation should take into consideration the shi lap design of the Ceiling Technology panels. Installation proceeds a lot more easily if the exposed "free" edges of the shi lap are located AWAY from the walls and towards the center of the room. (See Figure 2). Standing in the room where the installation is to proceed, looking at one of the walls running parallel to the roof



FIGURE 2

trusses, your starting panel should commence from the corner located on your LEFT side - lapping the panels outward ACROSS the truss spans. From this point, the panels will be installed outward away from the corner and to the RIGHT towards the center of the room.

PRIMARY GYPSUM BOARD INSTALLATION

The first layer of gypsum board provides thermal barrier protection of the top surface of the Ceiling Technology panels in the event of fire within the attic or roof space.

- 1 Plan the first row of gypsum board starting with its length perpendicular to the truss rafters or ceiling joist span. Follow local code requirements for drywall screw type and spacing [typically at 8" (203mm) centers along panel edges and maximum 16" (406 mm) centers along structural members].
- 2 Cut the first piece of drywall to 2' (600 mm) width by whatever dimension shorter than 8' (2438 mm) that will align best with the truss or roof-framing layout.
- 3 Start by facing a wall parallel to the truss span hoist and secure drywall in place with screws as per above noted requirements beginning your installation from the corner located to your LEFT.
- 4 Continue working to the RIGHT and CENTER of the room away from the end wall ensuring that the gypsum board joints are staggered out of alignment by at least one truss space or 2' (610 mm). NOTE: the first layer of gypsum board joints DO NOT require taping.
- 5 LOAD BEARING PARTITION INSTALLATIONS ONLY: Foam seal joints between drywall that is interfacing with the Ceiling Technology panels previously installed ovetop of any load-bearing partitions. Care should be taken at these areas to ensure all air gaps have been sealed at these intersections BEFORE the Ceiling Technology installation begins. (See Figure 3)

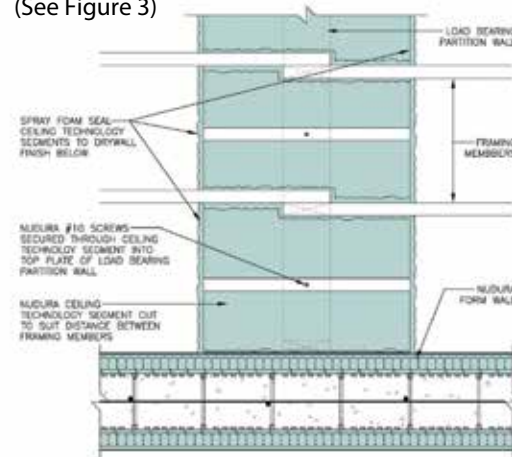


FIGURE 3

NUDURA CEILING TECHNOLOGY

INSULATION TECHNOLOGY LAYER 1

- 6** All edges of any Ceiling Technology panels abutting to all exterior vertical wall conditions must be prepared for installation by making a beveled angle cut along these edges, which will be filled with NUDURA Low Expansion Spray Foam AFTER the panels are installed in position. The panels abutting to the corners will require two edges to be prepared. This is accomplished as follows:
- Place the panel (strapping face down) on the work surface
 - Measure and strike a chalk line 2" (50 mm) IN from BOTH projecting dovetail edges.
 - Set the skill saw blade to a pitch of 10° off vertical. (NOTE: variations of this angle will be required for interface with wall at the base of cathedral ceiling connections depending upon roof pitch).
 - IMPORTANT:** Cut along the chalk lines so that the blade angle is pointing INWARD toward the center of the panel (See Figure 4). The resulting side profile of the panel will appear similar to that shown in Figure 5.



FIGURE 4



FIGURE 5

- 7** Install the first panel into the corner with the ship lap edge facing outward from the wall on the end and to the right side of the panel and screw the panel into position through the embedded wood straps into the truss bottom chords or roof framing using No. 10 x 5" (127 mm) screws fastening at 24" (610 mm) centers. Care must be taken to ensure the panel is fitted as tightly as possible to both wall surfaces.
- 8** Position the bevel edged panel (cut as detailed in Step 6) and fit it over the shiplap end of the previously installed panel adjacent to the wall on the left and screw into position.
- 9** Continue panel installation as described in Step 7 until just before reaching the room corner that's farthest from your starting point. Measure the remaining distance from the inside step of the shiplap edge of the last panel installed and transfer this dimension to the next Ceiling Technology Panel (laid strapping side down) and strike a chalk line parallel to the panel edge.

- 10** Repeat the bevel cut along this line (as outlined under Step 6d).
- 11** Screw this final piece in place taking care to fit it tight into the corner and in line with the previously installed panels.
- 12** Repeat Steps 7 though 11 for each successive row of Ceiling Technology panels as you work towards the opposite side and diagonally opposite corner of the room. In each row, be sure to maintain staggering of all joints (Figure 6).

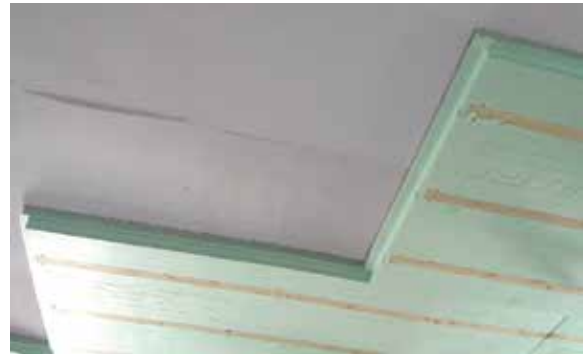


FIGURE 6

- 13** Once all of the panels are installed, using NUDURA Low Expansion Spray Foam, carefully inject the beveled edges adjacent to the wall surfaces full of foam around the complete perimeter of the ceiling installation (See Figure 7). In addition, apply expansion foam to seal all exposed panel joints across the entire surface of the installation.



FIGURE 7

- 14** After curing, use a flat utility knife or sharpened drywall spatula to shave the excess foam flat to the surface of the Ceiling Technology panels.

INSULATION TECHNOLOGY LAYER 2

- 15** The SECOND layer of Ceiling Technology will be installed perpendicular to the FIRST layer. Again, it is important to start at a corner of the room that is located to your LEFT as you are now placing the

NUDURA CEILING TECHNOLOGY

panels with their length running parallel to joist span (See Figure 8).



FIGURE 8

16 Also consistent with the first layer, repeat ALL of the instructions outlined in Step 6 for preparing the edges of the panels that are abutting to ANY vertical wall conditions.

17 Use the same screws as used on the first layer - this time applying screws to anchor at EVERY point where the Ceiling Technology wood fastening strips cross-lap.

18 Repeat steps 7 through 14 to complete the installation of the second layer of Ceiling Technology.

APPLYING AIR/VAPOR SEAL AROUND PERIMETER

19 IMPORTANT: Upon completion of foam sealing, curing and trimming of excess spray foam, apply the perimeter air/vapor seal between all Ceiling Technology and wall intersections by cutting 12" (305 mm) wide strips of NUDURA Waterproofing/Dampproofing Membrane and folding them down the 3' (914 mm) length of the membrane strips. Carefully peel back the release paper on one half of the membrane segment length and place it against the wall to position the fold length TIGHT into the intersection between the wall and the Ceiling Technology panel. (See Figure 9)



FIGURE 9

20 Additionally, cut smaller special segments to be installed at abutting wall corner conditions and cross lap the membrane as shown in Figure 10.



FIGURE 10

21 Continue air/vapor seal strip placement - lapping the segments by 2" (50 mm) until the complete ceiling perimeter is sealed to the wall.

COMPLETION

22 Prior to completing the finishing layer of ceiling gypsum board application, ensure all rough-ins for wiring plumbing, venting, ceiling fixtures, ceiling fans, pot lamps, etc. have been properly completed and ready for fixture installation.

23 Finally, even though the sealed EPS foam panels are capable of functioning as a Code compliant vapor barrier, as part of most NEW Code requirements for increased air tightness of the building envelope, NUDURA strongly recommends application of a continuous minimum 6 mil (0.15 mm) thick polyethylene film vapor barrier across the complete interior surface of the Ceiling Technology, lapping a minimum 6" (152 mm) down the wall and taped to the NUDURA wall surface using an approved air barrier tape. Again, care should be taken to complete the air vapor seals around all fixtures penetrating the Ceiling Technology.

24 Apply the finish layer of gypsum board perpendicular to the second layer of Ceiling Technology ensuring that all seams do not align with any of the three previously installed layers of material (See Figure 11).



FIGURE 11