



WARM ROOF SYSTEM Technical Brochure

Key Features and Benefits

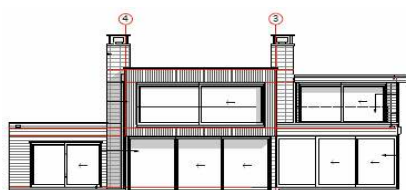
The Government and New Zealand consumers are demanding energy efficiency is designed into modern buildings. And with 30-35%¹ of heat going through the roof in an uninsulated house, roof insulation needs to be a focus during a building's design.

Higher standards requires a complete rethink about how we construct our buildings. When it comes to flat roofs, international best practice is to use "warm roof" designs.

These designs put the insulation above the substrate, completely enclosing the roof area with a highly efficient insulation blanket. Nuralite has sourced from Europe the most effective product available and combined it with our respected waterproofing products to make the Nuralite Warm Roof system.

- The most effective way to insulate a flat roof - improved insulation, with no thermal breaks.
- Less timber may be required as the rafters can be reduced to the minimum engineering requirements. There is no need to accommodate lofted insulation products and ventilation cavities
- No cross-ventilation of ceiling void required.
- Roof structure less susceptible to the effects of solar gain and thermal movement as it is insulated from outside temperature extremes
- A clear ceiling space is created providing ample space for running cables, installing downlights or speakers.
- Can be retro fitted on existing buildings to increase their energy efficiency
- Compatible with Green roof and Ballast roof systems.

Clause H1 will produce challenges for Architects creating contemporary styled homes.



Example of Modern New Zealand Design

Extensive use of glass walls will necessitate the use of calculation or modeling methods. As double glazing leaks heat, higher R-valued roof insulation will be vital to reach acceptable levels of thermal resistance for the entire building.

Slim roof profiles may be lost using traditional techniques as structural elements will need to be taller to accommodate thicker insulation in the ceiling.

Warm roof design addresses these concerns. Additional sheets of insulation can be installed on the roof deck to improve the building's thermal design, but the slim lines remain as overhanging gutters are left uninsulated.

¹DHB Your Guide to Smarter Insulation October 2007



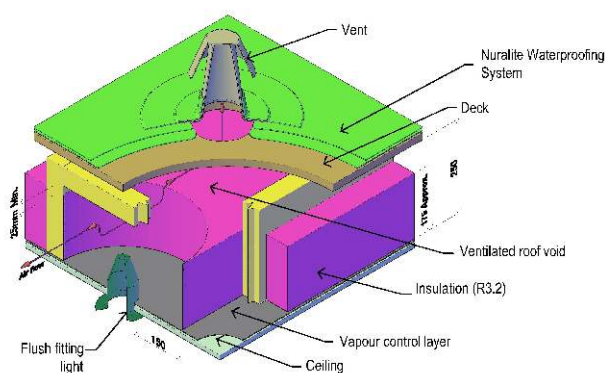
Insulation set out on plywood



Insulation fixing on metal roofing

What are the options?

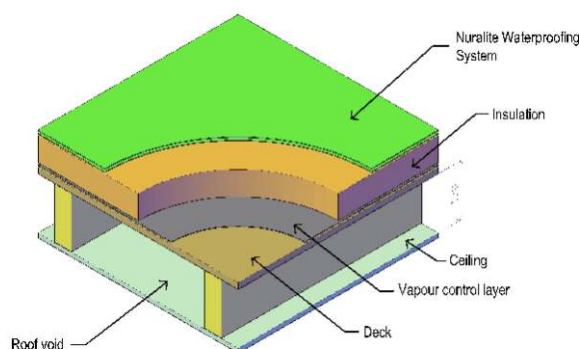
COLD ROOF



The traditional approach to flat roofing in New Zealand. The insulation is laid on top of the ceiling and the cavity space is ventilated to dissipate any condensation.

This is an inefficient method as rafters and downlights allow heat to leak through breaks in the insulation.

WARM ROOF



International best practice is to place the insulation on top of the roof substrate. A vapor barrier is installed before laying the insulation and fixing it with screws. The entire system is encased by two layers of bituminous membrane – the first being mechanically fastened.

This method promotes an R-value that is consistent across the entire roof envelope. Using materials with the same R-value, an approximately 10% gain in heating efficiency is achieved over cold roof designs².

The system can be installed on plywood, concrete or metal substrates, on new or existing buildings and on flat roofs regardless of their slope.

Warranty and Building Code Verification

Nuralite warrants Nuraply 3P and the Enertherm insulation against material defects for 20 years from the date of installation. The warranty must be applied for at the completion of the job. For this extended warranty to remain current the customer must maintain the roof and have it inspected every five years by a qualified Nuralite applicator.

The workmanship is covered by a separate workmanship warranty issued by the applicator. Nuralite will inspect the completed job if requested.

BRANZ has appraised the Nuraply 3P membrane system and has concluded that it complies with NZBC E2 – weathertightness and B2 – durability.

We are happy to work with you on any building consent issues, especially if something outside the scope of usual work is planned.





A) Secure Insulation

B) Mechanically Fasten Basesheet

C) Weld Capsheet

General Application Method

1. A vapour layer is laid upon the substrate, with the joints being welded shut. Depending on the project timetable, this layer can be left exposed to act as temporary waterproofing.
2. The Enertherm insulation is set out over the vapour barrier. The sheets are staggered in a brick bond fashion to prevent movement which could result in gaps in the insulation. The insulation is secured using screws with a wide flange. (Photo A)
3. A mechanically fixed layer is applied over the insulation. Mechanical fixation prevents vapour bubbles and ensures the entire system is securely fastened to the substrate. (Photo B)
4. A cap sheet of Nuraply 3P or Nuraply 3PM is welded onto the mechanically fixed layer. The joints are welded to ensure a watertight solution. (Photo C)

Applicators

All of our authorized applicators have been trained at our premise followed by on-site training. Most applicators have been working with our systems for many years.

We work closely with applicators to ensure quality standards are maintained.

Our applicators install the both the insulation and waterproofing systems.

Because it comes in lightweight sheets, the insulated roof system is simple and quick to install.

Things to consider

Thermal modeling

If building a home which does not comply with H1 via the Schedule method, a warm roof can provide valuable energy saving units to offset against other areas like oversized glazing. Due to the absence of thermal bridges (via rafters or downlights) a warm roof requires approximately 10% less energy to heat a house compared to a cold roof house build using materials with similar R values².

Retro fitting

If a building is being renovated, consideration should be given to boosting the thermal efficiency by adding insulation outside of the current building envelope. By adding retro fitted insulation, improvement in air conditioning loads can be achieved without disturbing the inside core of the building.

Detailing

Ensure that the insulation is correctly detailed in all specification drawings. Generic Membrane Roofing details will not suffice. Visit www.nuralite.co.nz for a set of Insulated Roof details and contact Nuralite if you have any questions.

Parapets

With the Insulation being installed upon the substrate, attention needs to be paid to parapet heights. This is particularly relevant if a retrofit to an existing building is proposed.

Condensation

The Nuralite warm roof system specification has been developed based on normal residential environmental conditions. Adequate ventilation must be provided to bathrooms, laundries, habitable spaces and other areas where moisture may be generated or may accumulate.

For unusual building conditions, consult a Nuralite expert as a specific vapour control layer specification may be required.

²E³ Simulation report Oct 2007

Technical Information

A comprehensive set of details and specifications are available at www.nuralite.co.nz.

The Nuralite advisors are all very experienced and willing to help either on the phone, in your office or on site. Call **09 579 2046** or **0800 Nuralite (0800 6872548)**.

Waterproofing Membrane

Refer to the technical literature for Nuraply 3P or Nuraply 3PM for detailed information.

Enertherm Insulation

IKO enertherm ALU is a 100 % CFC-free insulation board with a rigid polyisocyanurate foam core, faced with aluminium tri-laminate foil on both sides. Enertherm's unique properties combine to give it a significantly higher insulation value per mm of insulation than insulation products which use traditional methods.

The insulation board is designed for the application in mechanically fixed, or loose laid (ballast) or partial bonding self adhesive

Application

Thermal insulation of flat roofs – regardless of its slope.

Technical Characteristics

- Core density: 32 kg/m³
- Compression strength at 10% deformation: ≥ 120 kPa (EN 13165)
- Performance under the influence of an equally distributed load: class C
- λ_d -value (EN 13165 – declared value) : 0,023 W/Mk
- Tensile strength perpendicular to surface: > 80 kPa (EN 1607)
- Facing: aluminium tri-laminated foil
- Fire reaction: Class E according to EN 13501 part 1

Thermal Performance

λ_d value according EN 13165 = 0,023 W/mK

| | | | | | | | | |
|----------------|----------------------|-----|-----|------|-----|-------|------|-----|
| Thickness | in mm | 30 | 40 | 50 | 60 | 70 | 80 | 100 |
| R value | [m ² K/W] | 1.3 | 1.7 | 2.15 | 2.6 | 3 | 3.45 | 4.3 |
| Minimum for H1 | Zone | | | | | 1 & 2 | 3 | |

Vapour diffusion resistance coefficient:

PIR boards: $\mu = 60$

ALU-facing: $\mu > 100.000$

Chemical resistance: only degraded by concentrated leach and acids. Most in practice used paintings and solvents have no influence on the foam.

Fungus resisting: PIR insulation boards have no potential on growing micro organisms.

Enertherm is resistance to vermin attack as PIR is not a source of food.

Enertherm is easy to handle and does not irate installer. There are no special safety requirements for installing Enertherm Insulation.

Moisture resistance. Does not easily absorb water because of its closed cell structure.

Dimensions and Thickness

| | | | | | | | | |
|----------------|----|----|----|----|----|----|-----|--|
| 1000 x 1200 mm | | | | | | | | |
| (in mm) | 30 | 40 | 50 | 60 | 70 | 80 | 100 | |

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