

**ecoinsulation® with DriTherm® Technology - Thermal Ceiling R7.0****Introduction**

The following provides guidance on how to achieve H1 compliance at the perimeter of a pitched roof. The following installation instructions support the use of the R7.0 ceiling insulation. It provides examples at 20° and 25° roof pitches using a 90 and 105mm heel heights. These calculations can be used as conservative values in situations where the roof pitch and heel depth are greater.

The schedule method. H1/AS1 requires the roof building element to have a construction R-value of R6.6. It also allows for the construction value to be reduced to R3.3 for up to 500mm from the outer edge of the ceiling perimeter. Using **ecoinsulation®** glasswool R7.0 in a typical truss or pitched roof will achieve the R6.6 requirements over the main area of the roof. Using these products with a baffle / insulation barrier at the eaves will also meet the R3.3 requirements at the perimeter, without the need for a heel truss. Calculation method allows for building elements to be under the H1/AS1 schedule method's requirements. This is possible when they are offset with higher values elsewhere in the thermal envelope. Using **ecoinsulation®** glasswool R7.0 significantly lifts the thermal performance of the ceiling and the thermal values at the perimeter, making them a great choice when using the calculation method.

**Do not start work until the site is safe!**

Assess the ceiling condition and structure together with the method of installation you are to use based on the appropriate requirements established in the building code, site assessment and or plans provided. Installation must be completed to the requirements of relevant standard: NZS 4246.

**Tools required:**

- Sharp knife for trimming insulation
- Ladder
- Suitable clothing (see our Health and Safety Information)
- Tape measure
- Non-conductive insulation stick for positioning insulation in hard to reach areas
- Kneeling board to span ceiling framing

**BEFORE YOU START**

- Determine the most suitable product for your project. Ceilings can be insulated using ceiling batts, blankets and rolls.
- Where you have existing insulation that is level with the ceiling joists, you can install additional insulation over the top. It is recommended that this is installed at right angles to the existing insulation.
- Insulation is available in varying widths and thicknesses to suit most framing spaces. Please check [www.ecoinsulation.co.nz](http://www.ecoinsulation.co.nz) for the most suitable product for your application.
- To calculate the number of packs needed, determine the area (m<sup>2</sup>) to be insulated by multiplying the length by the width or wall height. The number of m<sup>2</sup> of insulation material is clearly marked on each pack. Divide the total area to be insulated by the m<sup>2</sup> in a pack to determine the number of packs required (don't forget to round up to the nearest whole pack). Allowances should be made for areas that are unable to be insulated.
- Don't take the insulation out of the packaging until you're in a position and ready to install.
- Before installation, gently agitate the insulation by gently shaking or bouncing it on its side until it recovers to the thickness stated on the label.
- Do not block ceiling vents and take care around downlights and other sources of heat. Consult the manufacturer's instructions for appropriate clearances. Additional guidance is provided in NZS 4246.

**TRUSS ROOF / INSTALLATION FROM BELOW**

- Release the insulation from the packs.
- Lightly bounce the slabs on their side to invigorate the insulation and help it recover to its 330mm nominal thickness.
- Feed the product up through the ceiling battens and position the insulation on top of the ceiling battens and against the truss cord.
- Gently push the ceiling batts against the truss to encourage them to fit around the timbers while creating room for the next ceiling batt to be installed beside it.
- Repeat the process, installing the other ceiling batts in a similar way, paying attention to all the joints between the slabs and timbers to ensure a tight and neat fit.
- Once a truss bay is completed it is recommended that you inspect from above to see that the top surface is smooth and consistent, lifting the ends and sides of the batts to ensure a tight and neat connection before moving to the next truss bay.
- Repeat this process until all truss bays are completed.
- When installing insulation in the eave (i.e. the junction between the roof, wall and ceiling), make sure the insulation covers the top plate but is not in contact with the roof. It is important to maintain a 25mm gap between the roofing substrates and the insulation.
- H1 allows for the insulation R-value to be reduced to R3.3 for 500mm from the top plate. This could assist with the 25mm requirement being met.
- Do not block ceiling vents and take care around downlights and other sources of heat. Consult the appliance manufacturer's instructions for appropriate clearances. Additional guidance is provided in NZS 4246.
- Try to fit insulation behind pipes or other obstructions unless this would compress the insulation. If so, cut the insulation to fit around objects, beams or other barriers.

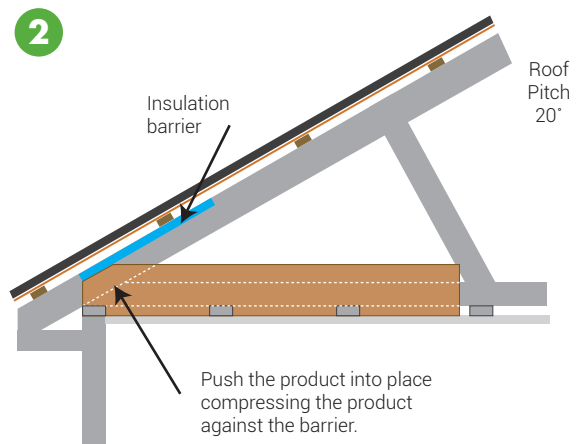
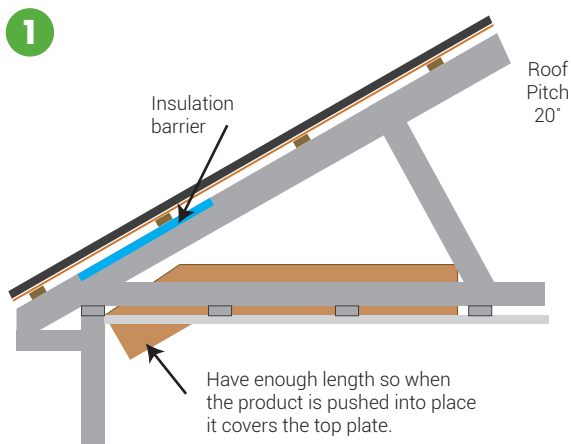
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### H1 PERIMETER INSULATION REQUIREMENTS

The H1 schedule method requires ceilings to achieve an R6.6 construction value with the ability to reduce the construction R-value to R3.3 for the first 500mm from the inside of the top plate. The following details the R7.0 ceiling batts compressed into the eaves with the use of a barrier to achieve the R3.3 compliance. **ecoinsulation®** glasswool R7.0 product has been designed with a nominal density which allows the product to be easily compressed into the eaves. The following provides guidance and a calculation of the thermal performance in roofs with a roof pitch of  $\geq 20^\circ$ .

### Install instructions

- If the eave barrier has not already been installed, cut the barrier between the truss timbers and staple into place.
- Running the ceiling batts length parallel with the truss, slide the ceiling batt into the eaves. The following two step procedure can help with this process.
- The ceiling batts can also be installed with the length of the product parallel to the eave if required.



### THERMAL CALCULATION

H1 requires that the construction R-value is minimum of R3.3 the below values are material values and should be used to determine the construction R-values.

The following is a calculation of the total material R-value 500mm from the eave at a 20° pitch.

Heel Height (mm)	R-Value	Roof pitch (°)	Material Performance
90	R7.0	20	R4.1
90	R8.0	20	R4.7
105	R7.0	20	R4.5
105	R8.0	20	R5.0

The following is a calculation of the total material R-value 500mm from the eave at a 25° pitch.

Heel Height (mm)	R-Value	Roof pitch (°)	Material Performance
90	R7.0	25	R4.5
90	R8.0	25	R5.1
105	R7.0	25	R4.8
105	R8.0	25	R5.4

**Notes:** (1) The above values have been calculated using the BRANZ home insulation guide 6th edition. (2) The heel depth has been calculated based on the table above. Greater heel depth will increase the thermal calculation. If this value is critical to your project design, contact Knauf Insulation for a specific design.

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### RETRO FIT / INSTALLATION FROM ABOVE

- When retrofitting ceilings you must turn the power 'Off'. A torch or adequate lighting will be required. Step / kneeling boards can be used to help with access, especially in truss roof designs. A wooden, non-conductive positioning rod (1-2 metres long) can assist in insulating eaves or hard to reach areas.
- Ensure you have the right product for the application. Check the thermal resistance rating (R-value) required on the drawings / plans and that this matches the product selected. Check the condition of the roof ensuring that it is watertight repairing any damage to the roof sarking.
- Start installing the insulation at the far corners of the roof and work your way back towards the ceiling access.
- When installing insulation between ceiling joists, ensure that you achieve a snug fit avoiding any gaps (we recommend installing between the ceiling timbers and in contact with the ceiling linings. For installs over timbers refer to NZS 4246 for guidance).
- When installing insulation in truss roofs, ensure that insulation is firmly butted together to achieve a consistent layer of insulation without any gaps.
- Where required, use a sharp knife to cut the insulation to fit, be careful avoid gaps and maintain a continuous layer. It is important that when you cut the insulation that you avoid coming into contact with any electrical services.
- When installing insulation in a roof eave (i.e. the junction between the roof, wall and ceiling), make sure the insulation covers the top plate but is not in contact with the roof. It is important to maintain a 25mm gap between the roofing substrates and the insulation.
- Once you have worked your way back to the ceiling access, make sure you insulate the ceiling access panel before exiting the roof space.
- Always take extra care while moving around in a ceiling space. Ensure sound footing at all times. Only use roof trusses or ceiling joists for support and never stand on ceiling plasterboard.
- Watch out for nails – especially in ceilings where roofing nails may protrude through the sheathing.
- To make access across the roof space easier, use kneeling boards. Place boards over roof trusses or ceiling joists to make a path.
- Do not take the insulation out of the packaging until you're in position and ready to install. Before installation, gently invigorate the insulation by 'bouncing' it on its side until it recovers to thickness stated on the label.
- Do not block ceiling vents and take care around downlights and other sources of heat. Consult the appliance manufacturer's instructions for appropriate clearances. Additional guidance is provided in NZS 4246.
- Try to fit insulation behind pipes or other obstructions unless this would compress the insulation. If so, cut the insulation to fit around objects, beams or other barriers.

### WHERE YOU HAVE EXISTING CEILING INSULATION

- When you are topping up existing insulation you may want to establish the thermal value of the existing insulation. A contribution of R0.2 for every 10mm of existing insulation is a conservative approach.
- Once you have determined your existing insulation levels, install **ecoinsulation®** glasswool with a suitable R-value to achieve the desired thermal performance. (allowance should be made for a slight compression of the lower layer)
- Place the insulation over the existing insulation at right angles to the ceiling joists ensuring a consistent layer with no gaps or voids.
- For further guidance of retrofit solutions refer to NZS 4246.

### CATHEDRAL/SKILLION ROOFS

- Where cavity depths allow the R7.0 product can be used in skillion roofs, take care to ensure that the 25mm gap between the insulation and the roof is maintained.
- For smaller cavities refer to the range Skillion roof products designed for this application.

## SAFETY WARNINGS AND HAZARDS

- You must turn the mains power "Off" before entering the work space, and, if in any doubt about how to turn the power "Off", you must consult a licensed electrician.
- Working in areas that contain live electrical wiring is extremely hazardous. Take extreme care to avoid touching any live overhead electrical lines, supply cables or any other live cables in the workspace.
- Defective electrical cables, exposed terminals and conductors of electrical equipment such as light fittings and fans can cause burns and electric shocks please exercise caution when working near such hazards – check with an electrician if you are unsure if the cabling is safe.
- Working in hot and poorly ventilated areas when installing insulation can be dangerous.
- Working at heights, when installing insulation can be dangerous.

## BEFORE INSTALLATION

- You must turn the mains power "Off" and, if in any doubt about how to turn the power "Off", consult a licensed electrician.
- Do not enter the workspace for the purposes of the pre-work inspection or the installation until you are satisfied that the power has been isolated. Even after isolating the power via the switchboard there may still be an electrical mains cable in either the ceiling or underfloor space that is live.
- Complete a pre-work assessment before installation to identify safety hazards which may include but are not limited to the following:
  - access to the roof area,
  - working at heights,
  - electrical safety hazards,
  - adequate ventilation of the work area and
  - nails and sharp objects on the ground
- Before commencing work you must have systems in place to reduce risks identified in the pre-work assessment such as but which are not limited to:
  - systems to prevent falling when working at heights.
  - ventilate the working area if possible.
  - cover exposed skin. When working in an unventilated area, wear a disposable face mask.
  - rinse hands in cold water before washing.
  - wear goggles when working overhead.
  - clean using vacuum equipment.

## DURING INSTALLATION

- Work with another person and maintain contact throughout both the assessment and installation process.
- Only open bags as required.
- Wear appropriate clothing for the job such as long sleeved top, flat rubber sole shoes, gloves conforming to Australian Standard AS2161 and ventilated non-fogging dust resistant goggles conforming to AS/NZ 1336, and a P2 dust mask.
- Avoid eye contact with dust or fibres to minimise eye or skin contact and inhalation during handling.
- Avoid installing insulation in hot weather and at the hottest part of the day.
- Under no circumstances must fixing devices in ceiling spaces or under floors, or in proximity to electrical wiring, be of metal or other conductive material.

## PROVEN PERFORMANCE

- Preferred by professional installers concerned with quality, appearance and productivity.
- Excellent acoustical properties reduce sound transmission in the home when properly installed.

## ELECTRICAL SAFETY CONSIDERATIONS BEFORE ISOLATING POWER

- Locate and review the incoming power supply, main switchboard and meter box.
- Ensure you understand if there is a main isolator and how power can be safely isolated.
- Ensure you understand the direction of the "On" and "Off" position of the main switch (NOTE: the "Off" position is not always as it seems - check with an electrician if you are unsure).
- Before installation, switch "Off" the electricity supply at the main switchboard (check with an electrician if you are unsure if power can be turned "Off" at the switchboard).
- Be aware that even after isolating the power via the switchboard there may still be an electrical mains cable in either the ceiling or underfloor space that is live. Take extreme care to avoid touching any live overhead electrical lines, supply cables or any other live cables in the workspace.

## **PROCEDURE FOR ISOLATION - CERAMIC FUSES (IF IN DOUBT YOU MUST CONSULT A LICENSED ELECTRICIAN)**

- Ceramic fuses are typically found in older style homes.
- Identify if any fuse is deactivated.
- Check if there are any fuses currently in the "Off" position, take note of them.
- Place a strip of electrical tape over main switch isolator after it is turned "Off".
- Apply additional strips of electrical tape over the deactivated fuse and any individual isolator in the "Off" position as a reminder to leaving it in the "Off" position once the re-activation procedure has been completed.
- If you find a fuse plug out of its socket, whilst the main isolator is in the "Off" position, place electrical tape over its respective switch and one over the fuse socket opening.
- DO NOT touch the internal metal fittings.
- Place a written note on the main isolator switch or meter box enclosure to advise the power is "Off" and WORK IN PROGRESS is occurring.
- Check to ensure the lights and appliances, within the home, previously left on are no longer operating to confirm the mains power is now isolated.
- The original person who placed the isolation tag is the only one who can re-activate the power. Advise occupants of this requirement.

## **PROCEDURE FOR ISOLATION CIRCUIT BOARD (IF IN DOUBT YOU MUST CONSULT A LICENSED ELECTRICIAN)**

- Circuit boards are typically found in modern homes.
- Check if there are any switches currently in the "Off" position, take note of them.
- Place a strip of electrical tape over main switch isolator after it is turned "Off".
- Apply additional strips of electrical tape over any deactivated fuses or individual switches in the "Off" position after isolating the mains power as a reminder to leave it in the "Off" position once the re-activation procedure has been completed.
- Turn "Off" all individual switches on the circuit board.
- Place a written note on the switches or meter box enclosure to advise the power is "Off" and WORK IN PROGRESS is occurring.
- Check to ensure the lights and appliances within the home previously left on are no longer operating to confirm the mains power is now isolated.
- The originator that placed the isolation tag is the only one who can re-activate the power. Advise occupants of the requirement.

## **REACTIVATING THE POWER**

- After the completion of the installation, switch the mains power to the "On" position (for ceramic fuse board), but for a circuit board, switch the main power "On" and then each individual power isolator on one at a time. The taped switches in the "Off" position should stay switched "Off".
- **WARNING:** If you cannot reconnect power please ensure you seek assistance from a qualified electrician.

## **SUITABLE CLOTHING**

- When handling any insulation material, especially in enclosed poorly ventilated areas and/or overhead, the use of suitable eye protection conforming to AS/NZS 1336 will greatly reduce contact with dust or fibres.
- Wear suitable loose fitting clothes, including long sleeved shirts, long pants, cap and gloves.
- A suitable dust mask is recommended when working in confined, poorly ventilated and dusty areas.
- Wash work clothes separately and rinse the washing machine after use.