Insulation
Victoria, Australia

# How to achieve a 7 Star NatHERS Rating in a Class 1a Building

A Quick Guide on how Kingspan's Insulation Products can help achieve 7 Star Compliance in Victoria.


Kingspan®
7 Star Partner

# Introduction
## Background and Purpose

**Kingspan Insulation has produced this document as a simple guide to achieving a NatHERS 7 Star rating under the National Construction Code (NCC) 2022, which is now in use within the states of New South Wales and Victoria.**

In Australia, buildings are directly responsible for around 18% of carbon emissions, largely from heating or cooling energy demands. Making our buildings more thermally efficient is one of the most important and most straightforward steps we can take to reduce carbon emissions and help mitigate climate change. A key part of achieving this aim is being driven by changes to the National Construction Code (NCC).

The Nationwide House Energy Rating Scheme – NatHERS – is the framework that defines the energy ratings for new dwellings.

NatHERS drives energy efficiency improvements for Australia's residential buildings by nationally standardising the energy rating assessment tools used to rate dwellings.

NatHERS' 10-Star rating system estimates a home's thermal performance – in essence, its heating and cooling needs. Information about a home's design, energy performance, construction materials and climate zone all contribute to its star rating. NatHERS' rating tools use calculations following rigorous scientific research carried out by Australia's National Science Agency, CSIRO.

Following the 2022 update to the NCC, the minimum required NatHERS rating increased from 6 to 7 stars in some regions. NCC 2022 also includes more recent and more accurate weather data updates to the climate files used to calculate star ratings for NatHERS. The new files, which relate to 69 Australian Climate Zones, now include data from 1990 to the end of 2015, replacing data gathered from 1970 to 2005.

Kingspan have undertaken in-depth testing to measure the effect of increased insulation in sample single-storey and double-storey homes. It specifically concentrates on the parts that are relevant to building fabric insulation, whilst showing how compliance can be achieved using Kingspan's insulation products for walls and floors.

This document specifically looks at the state of Victoria and Climate Zone 21.

## Overview of Models

**For both house models, the wall, roof and window frame colours have been considered as medium*. They have assumed solar panels on the side of the roof, which faces North, but the front of the house has a west facing orientation. IC4 rated downlights have been used throughout. The ceiling perimeter is insulated to R2.5 as per AS 3999:2015.**

### Single-Storey Home

This example is a four bedroom single-storey home with a total floor area of 235.17m$^2$. It comprises 184.43m$^2$ of ground floor space, 25.72m$^2$ garage, 4.68m$^2$ porch and 10.34m$^2$ of alfresco.

### Double-Storey Home

This example is a four bedroom double-storey home with a total floor area of 384.70m$^2$. It comprises 168.06m$^2$ of ground floor, 36.59m$^2$ garage, 3.93m$^2$ porch and 176.12m$^2$ of first floor space.

* Medium is defined as a solar absorbance of between 0.475 ≤ M ≤ 0.7.

# 7 Star Compliance
# Single-Storey Home

## Timber Frame Buildings – Climate Zone 21 (Melbourne)

The table below provides guidance on how to achieve 7 Star compliance for a timber frame single-storey home by increasing insulation.

| Ground Floor | Windows | Sliding Doors | External Wall Insulation | Ceiling Insulation | Garage Ceiling Insulation | Roof Insulation Blanket | Laundry Perimeter Wall Insulation (within the studs) |
|---|---|---|---|---|---|---|---|
| Concrete Slab on Ground (uninsulated) | Triple Glazed Low-E | Triple Glazed Low-E | **R2.7 + 25mm Kingspan Kooltherm® K12 Framing Board*** | R7.0 | None Required | None Required | R2.7 |
| Concrete Slab on Ground (uninsulated) | Triple Glazed Low-E | Triple Glazed Low-E | **80 mm Kingspan Kooltherm K12 Framing Board** | R7.0 | None Required | None Required | **80 mm Kingspan Kooltherm K12 Framing Board** |
| Wafflepod | Double Glazed | Double Glazed | **R2.7 + 25mm Kingspan Kooltherm K12 Framing Board*** | R7.0 | R7.0 | None Required | R2.7 |
| Wafflepod | Double Glazed | Double Glazed | **80 mm Kingspan Kooltherm K12 Framing Board** | R7.0 | R7.0 | None Required | **80 mm Kingspan Kooltherm K12 Framing Board** |
| **Concrete Slab on Ground + Kingspan Kooltherm® K3 Floorboard (50mm) + Kingspan GreenGuard® GG350 (40 mm)** | Double Glazed | Double Glazed | R2.7 | R6.0 | None Required | None Required | None Required |
| **Concrete Slab on Ground + Kingspan Kooltherm K3 Floorboard (50mm) + Kingspan GreenGuard GG350 (40 mm)** | Double Glazed | Single Glazed | **R2.7 + 25mm Kingspan Kooltherm K12 Framing Board*** | R7.0 | None Required | None Required | R2.7 |
| **Concrete Slab on Ground + Kingspan Kooltherm K3 Floorboard (50mm) + Kingspan GreenGuard GG350 (40 mm)** | Double Glazed | Single Glazed | **80 mm Kingspan Kooltherm K12 Framing Board** | R7.0 | R7.0 | None Required | **80 mm Kingspan Kooltherm K12 Framing Board** |

* Added to the frame internally or externally. A performance solution may be required for any external application of Kooltherm to the frame.

Table 1: Achieving 7 Star Compliance in an example Timber Frame Single-Storey Home.

## Steel Frame Buildings – Climate Zone 21 (Melbourne)

The table below provides guidance on how to achieve 7 Star compliance for a steel frame single-storey home by increasing insulation.

| Ground Floor | Windows | Sliding Doors | External Wall Insulation | Internal Wall Insulation | Ceiling Insulation | Garage Ceiling Insulation | Roof Insulation Blanket | Laundry Perimeter Wall Insulation (within the studs) |
|---|---|---|---|---|---|---|---|---|
| Concrete Slab on Ground (uninsulated) | Triple Glazed Low-E | Triple Glazed Low-E | **R2.2 + 25mm Kingspan Kooltherm K12 Framing Board*** | None Required | R7.0 | R7.0 | R1.3 | R2.2 |
| Wafflepod | Double Glazed | Double Glazed Low-E | **R2.2 + 25mm Kingspan Kooltherm K12 Framing Board*** | None Required | R7.0 | R7.0 | R1.3 | R2.2 |
| **Concrete Slab on Ground + Kingspan Kooltherm K3 Floorboard (50mm) + Kingspan GreenGuard GG350 (40 mm)** | Double Glazed | Double Glazed | R2.2 | R2.2 | R7.0 | R7.0 | R1.3 | R2.2 |
| **Concrete Slab on Ground + Kingspan Kooltherm K3 Floorboard (50mm) + Kingspan GreenGuard GG350 (40 mm)** | Double Glazed | Double Glazed | **R2.2 + 25mm Kingspan Kooltherm K12 Framing Board*** | None Required | R6.0 | R6.0 | None Required | R2.2 |

* Added to the frame internally or externally. A performance solution may be required for any external application of Kooltherm to the frame.

Table 2: Achieving 7 Star Compliance in an example Steel Frame Single-Storey Home.

# 7 Star Compliance
# Double-Storey Home

## Timber Frame Buildings – Climate Zone 21 (Melbourne)

The table below provides guidance on how to achieve 7 Star compliance for a double-storey home by increasing insulation.

| Ground Floor | Windows | Sliding Doors | External Wall Insulation – Ground Floor | External Wall Insulation – First Floor | Ceiling Insulation | Roof Insulation Blanket | Laundry Perimeter Wall Insulation (within the studs) | Bathroom Perimeter Wall Insulation (within the studs) | W/C Perimeter Wall Insulation (within the studs) |
|---|---|---|---|---|---|---|---|---|---|
| Concrete Slab on Ground (uninsulated) | Double Glazed Low-E | Double Glazed Low-E | **R2.5 + 25mm Kingspan Kooltherm K12 Framing Board*** | **R2.5 + 25mm Kingspan Kooltherm K12 Framing Board*** | R6.0 | None Required | R2.5 | R2.5 | R2.5 |
| Concrete Slab on Ground (uninsulated) | Double Glazed Low-E | Double Glazed | **80 mm Kingspan Kooltherm K12 Framing Board** | **80 mm Kingspan Kooltherm K12 Framing Board** | R7.0 | None Required | **80 mm Kingspan Kooltherm K12 Framing Board** | **80 mm Kingspan Kooltherm K12 Framing Board** | **80 mm Kingspan Kooltherm K12 Framing Board** |
| Wafflepod | Double Glazed Low-E | Double Glazed | **R2.5 + 25mm Kingspan Kooltherm K12 Framing Board*** | **R2.5 + 25mm Kingspan Kooltherm K12 Framing Board*** | R4.0 | None Required | R2.5 | None Required | None Required |
| Wafflepod | Double Glazed | Double Glazed | **80 mm Kingspan Kooltherm K12 Framing Board** | **80 mm Kingspan Kooltherm K12 Framing Board** | R7.0 | R1.3 | **80 mm Kingspan Kooltherm K12 Framing Board** | **80 mm Kingspan Kooltherm K12 Framing Board** | **80 mm Kingspan Kooltherm K12 Framing Board** |
| **Concrete Slab on Ground + Kingspan Kooltherm K3 Floorboard (50mm) + Kingspan GreenGuard GG350 (40 mm)** | Double Glazed | Double Glazed | R2.7 | R2.7 | R7.0 | None Required | R2.7 | R2.7 | R2.7 |
| **Concrete Slab on Ground + Kingspan Kooltherm K3 Floorboard (50mm) + Kingspan GreenGuard GG350 (40 mm)** | Double Glazed | Double Glazed | **R2.7 + 25mm Kingspan Kooltherm K12 Framing Board*** | **R2.7 + 25mm Kingspan Kooltherm K12 Framing Board*** | R7.0 | None Required | None Required | None Required | None Required |
| **Concrete Slab on Ground + Kingspan Kooltherm K3 Floorboard (50mm) + Kingspan GreenGuard GG350 (40 mm)** | Double Glazed | Double Glazed | **80 mm Kingspan Kooltherm K12 Framing Board** | **80 mm Kingspan Kooltherm K12 Framing Board** | R5.0 | None Required | **80 mm Kingspan Kooltherm K12 Framing Board** | None Required | None Required |

* Added to the frame internally or externally. A performance solution may be required for any external application of Kooltherm to the frame.

Table 3: Achieving 7 Star Compliance in an example Timber Frame Double-Storey Home.

# 7 Star Compliance
# Double-Storey Home

## Steel Frame Buildings – Climate Zone 21 (Melbourne)

The table below provides guidance on how to achieve 7 Star compliance for a double-storey home by increasing insulation.

| Ground Floor | Windows | Sliding Doors | External Wall Insulation – Ground Floor | External Wall Insulation – First Floor | Ceiling Insulation | Roof Insulation Blanket | Laundry Perimeter Wall Insulation (within the studs) | Bathroom Perimeter Wall Insulation (within the studs) | W/C Perimeter Wall Insulation (within the studs) |
|---|---|---|---|---|---|---|---|---|---|
| Concrete Slab on Ground (uninsulated) | Double Glazed Low-E | Double Glazed Low-E | **R2.2 + 25mm Kingspan Kooltherm K12 Framing Board*** | **R2.2 + 25mm Kingspan Kooltherm K12 Framing Board*** | R7.0 | R1.3 | R2.2 | R2.2 | R2.2 |
| Wafflepod | Double Glazed Low-E | Double Glazed | **R2.2 + 25mm Kingspan Kooltherm K12 Framing Board*** | **R2.2 + 25mm Kingspan Kooltherm K12 Framing Board*** | R6.0 | None Required | R2.2 | R2.2 | R2.2 |
| **Concrete Slab on Ground + Kingspan Kooltherm K3 Floorboard (50mm) + Kingspan GreenGuard GG350 (40 mm)** | Double Glazed Low-E | Double Glazed | R2.2 | R2.2 | R5.0 | None Required | R2.2 | None Required | None Required |
| **Concrete Slab on Ground + Kingspan Kooltherm K3 Floorboard (50mm) + Kingspan GreenGuard GG350 (40 mm)** | Double Glazed | Double Glazed | **R2.2 + 25mm Kingspan Kooltherm K12 Framing Board*** | **R2.2 + 25mm Kingspan Kooltherm K12 Framing Board*** | R7.0 | R1.3 | R2.2 | None Required | None Required |

* Added to the frame internally or externally. A performance solution may be required for any external application of Kooltherm to the frame.

Table 4: Achieving 7 Star Compliance in an example Steel Frame Double-Storey Home.

# Insulation Solutions
for Walls

## External Insulation*

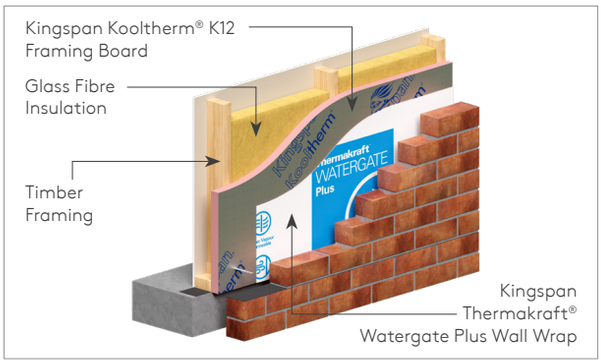


Figure 1. Externally* lined Continuous Insulation for Timber Frame.

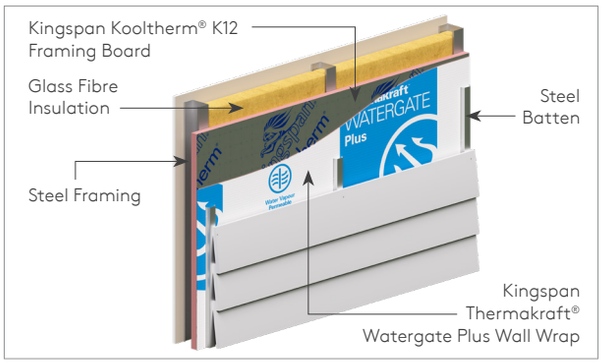


Figure 2. Externally* lined Continuous Insulation for Steel Frame.

**Build up to achieve R2.7, R2.5 or R2.0 within the stud with 25 mm of Kingspan Kooltherm K12 Framing Board on the outside* (Refer Figure 1)**

**Wall Build Up**

| Stud Depth (mm) | Between studs insulation – Glass Fibre Insulation (mm) | External Insulation* – Kingspan Kooltherm K12 Framing Board (mm) |
|---|---|---|
| 90 | 90 (R2.7, R2.5 or R2.0) | 25 (R1.1) |

**Build up to achieve R2.2 within the stud with 25 mm of Kingspan Kooltherm K12 Framing Board on the outside* (Refer Figure 2)**

**Wall Build Up**

| Stud Depth (mm) | Between studs insulation – Glass Fibre Insulation (mm) | External Insulation* – Kingspan Kooltherm K12 Framing Board (mm) |
|---|---|---|
| 76 | 75 (R2.2) | 25 (R1.1) |

* A performance solution may be required for any external application of Kooltherm to the frame.

## Internal Insulation

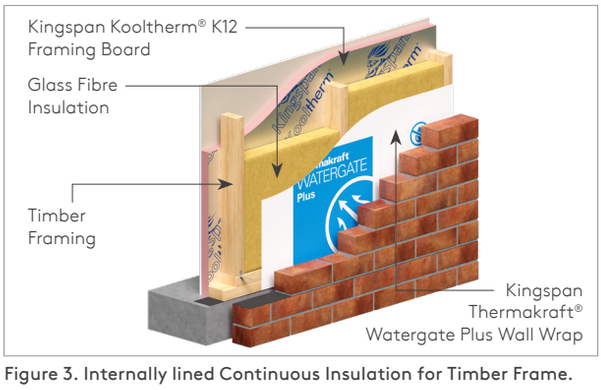


Figure 3. Internally lined Continuous Insulation for Timber Frame.

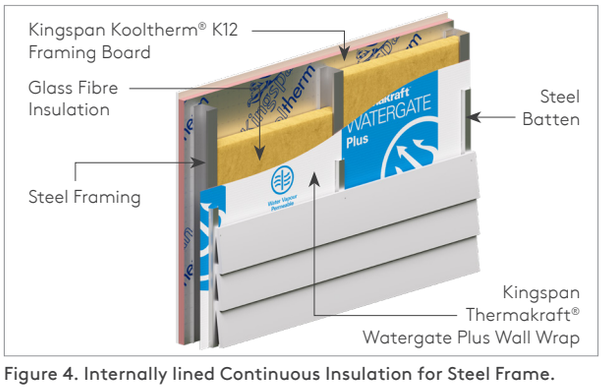


Figure 4. Internally lined Continuous Insulation for Steel Frame.

**Build up to achieve R2.7, R2.5 or R2.0 within the stud with 25 mm of Kingspan Kooltherm K12 Framing Board on the inside (Refer Figure 3)**

**Wall Build Up**

| Stud Depth (mm) | Between studs insulation – Glass Fibre Insulation (mm) | Internal Insulation – Kingspan Kooltherm K12 Framing Board (mm) |
|---|---|---|
| 90 | 90 (R2.7, R2.5 or R2.0) | 25 (R1.1) |

**Build up to achieve R2.2 within the stud with 25 mm of Kingspan Kooltherm K12 Framing Board on the inside (Refer Figure 4)**

**Wall Build Up**

| Stud Depth (mm) | Between studs insulation – Glass Fibre Insulation (mm) | Internal Insulation – Kingspan Kooltherm K12 Framing Board (mm) |
|---|---|---|
| 76 | 75 (R2.2) | 25 (R1.1) |

# Insulation Solutions for Walls

## Rigid Insulation In-Between Studs

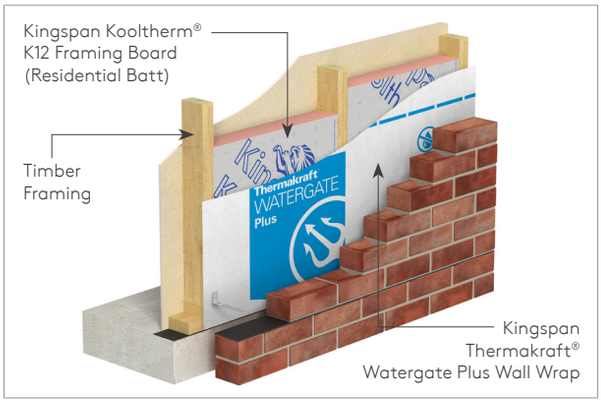


Figure 5. Rigid Board Insulation between Studs for Timber Frame.

| Build up for Kingspan Kooltherm K12 Framing Board in between the Timber Frame (Refer Figure 5) | |
|---|---|
| **Wall Build Up** | |
| Stud Depth (mm) | Between studs insulation – Kingspan Kooltherm K12 Framing Board (mm) |
| 90 | 80 (R3.6) |

## Product Pack Sizes for Walls

| Kingspan Kooltherm K12 Framing Board Pack Sizes | |
|---|---|
| 25 mm x 2400 mm x 1200 mm | 12 x per pack |
| 80 mm x 1200 mm x 403 mm | 6 x per pack |
| 80 mm x 1200 mm x 413 mm | 6 x per pack |
| 80 mm x 1200 mm x 553 mm | 6 x per pack |
| 80 mm x 1200 mm x 563 mm | 6 x per pack |

| Thermakraft Watergate Plus Wall Wrap Pack Sizes | |
|---|---|
| 1370 mm wide x 36.5 m long | 50m² coverage* |
| 1500 mm wide x 30 m long | 45m² coverage* |
| 2740 mm wide x 30 m long | 82m² coverage* |
| 3000 mm wide x 30 m long | 90m² coverage* |

* Note:
m² is the roll size. For actual coverage, allow for laps and joins.

# Insulation Solutions for Floors

## Underfloor and Slab Edge Insulation

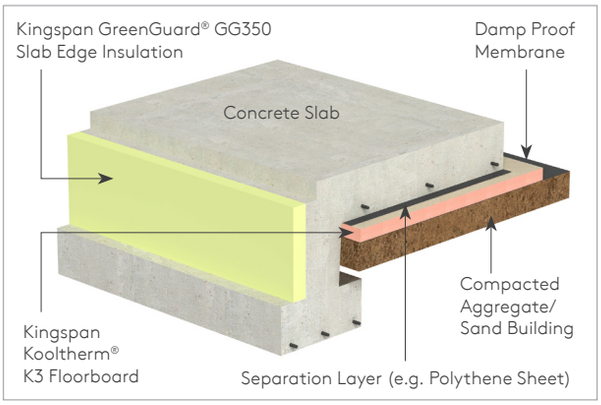


Figure 6. Underfloor and Slab Edge Insulation.

| Concrete Slab on Ground + Kingspan Kooltherm K3 Floorboard 50 mm + Kingspan GreenGuard GG350 40 mm (Refer Figure 6) | |
|---|---|
| **Floor Build Up** | |
| **Under slab insulation –** Kingspan Kooltherm K3 Floorboard (mm) | **Perimeter Insulation –** Kingspan GreenGuard GG350 (mm) |
| 50 (R2.3) | 40 (R1.0) |

## Product Pack Sizes for Floors

| Kingspan Kooltherm K3 Floorboard Pack Sizes | |
|---|---|
| 25 mm x 2400 mm x 1200 mm | 12 x per pack |
| 50 mm x 2400 mm x 1200 mm | 6 x per pack |

| Kingspan GreenGuard GG350 Slab Edge Insulation Pack Sizes | |
|---|---|
| 40 mm x 2400 mm x 300 mm | 5 x per pack |

# Contact Details
## For More Information

### Australia

**Kingspan Insulation Pty Ltd**
25 O'Herns Road, Somerton 3062, VIC
T: 1300 247 235
E: info@kingspaninsulation.com.au
www.kingspaninsulation.com.au



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