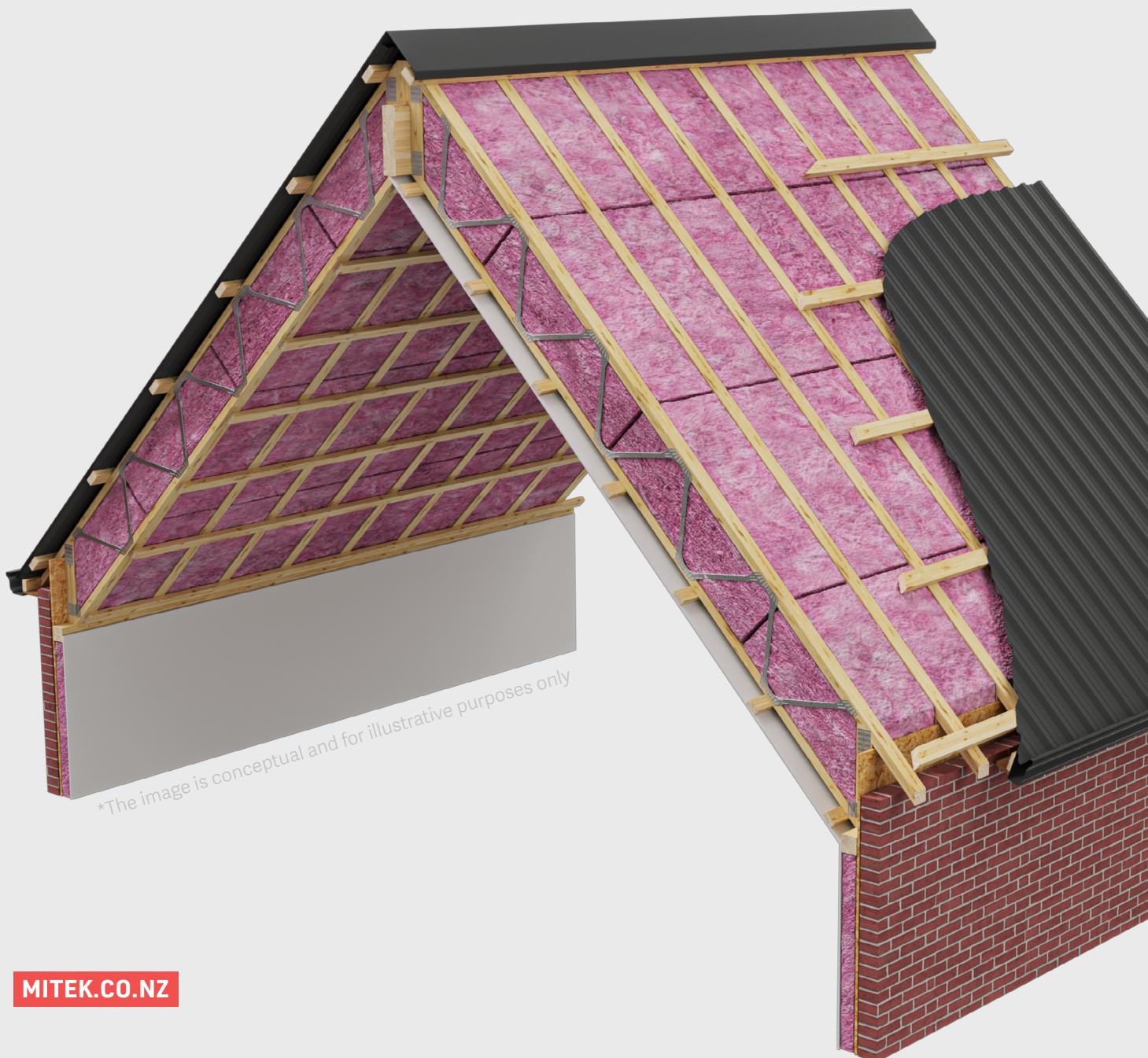


DESIGN GUIDE

COMPUTING R-VALUE FOR POSI-STRUT RAFTER TRUSSES USING DESIGN NAVIGATOR



BRIEF

Thermally conscious specifiers are looking to Posi-Strut Trusses due to the high strength to weight ratio, dimensional stability and the hassle-free benefit of receiving a prefabricated engineered truss that is ready to install.

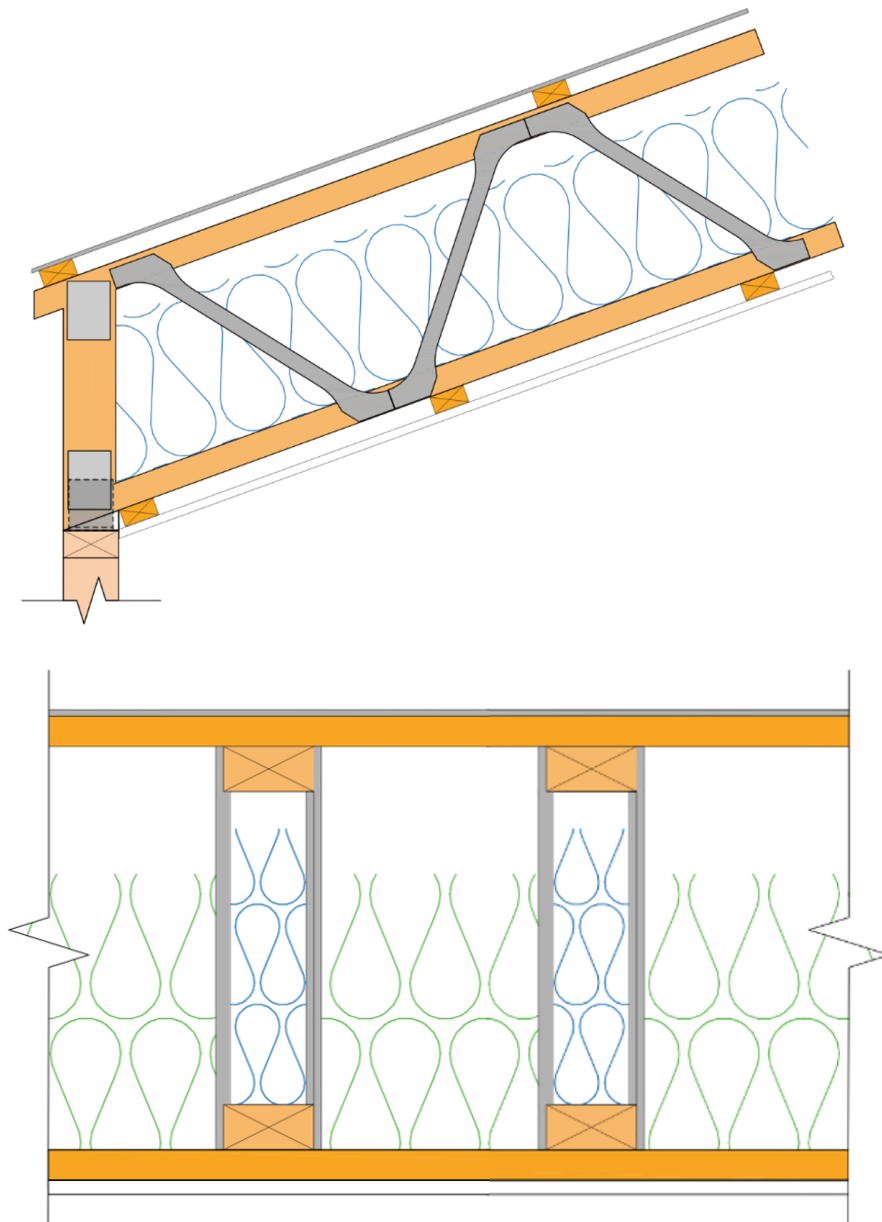
As such, this document aims to provide specifiers with guidance on how to utilize the online calculator, 'The Design Navigator' to determine the thermal properties of a structural roof system using Posi-Strut Rafter Trusses. Furthermore, practitioners will learn how to maximise the thermal properties of the Posi-Strut rafter truss when used in concert with non-rigid ceiling insulation (such as fibreglass batts) and ceiling battens.

ASSUMPTIONS

Please note that the 'H1 compliance calculator' should be used for a full H1 calculation. Furthermore, these calculations are approximate and for more accurate R-values, a 3-dimensional finite element model should be used.

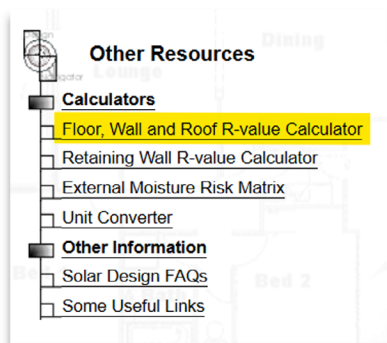
In this example, we have a typical skillion roof with the following constituents:

1. Metal corrugate roofing with building paper
2. Purlins
3. Posi-Strut PS40-40x09 Rafter Trusses, spaced at 600mm, with R7.4 Insulation stuffed into core of truss
4. R7.4 ceiling insulation between trusses
5. Ceiling battens
6. Plasterboard ceiling



INSTRUCTIONS (RIGID CEILING INSULATION)

1. Go to the website: www.designnavigator.solutions/
2. Under 'Other Resources', under 'Calculators', click on 'Floor, Wall and Roof R-value Calculator'



3. For 'Element type', select 'Roofs'

Floors ☐
Walls ☐
Roofs ☒

4. Input the following parameters into the fields highlighted below:

- For 'Type', select 'Roof: Timber framed skillion or flat Roof'

Type: **Roof: Timber framed skillion or flat Roof** ▼
Timber framed skillion or flat Roof [view detail](#)

- For 'Roofing' select 'generic – Metal corrugate Iron with building paper'

Roofing : **generic - Metal corrugate Iron with building paper** ▼

- Under 'Timber Frame & Cavity', select 'Posi-STRUT PS40 @ 600mm, Posi-STRUT core insulated, battens covered with insulation, insulation height 250mm'. Note that R7.4 is assumed to be 275mm.

Timber Frame & Cavity :
Posi-STRUT PS40 @ 600mm, Posi-STRUT core insulated, battens covered with insulation, insulation height 250mm ▼

- For 'still Airgap', select '10-30mm airgap (non-reflective)'

still Airgap : **10-30mm airgap (non-reflective)** ▼
R-value: 0.13

- For 'Insulation', input 7.4. Alternatively, you may select an insulation product from the panel on the right of the screen.

Insulation : **7.4**

- For 'Ceiling Lining', select 'generic – gypsum Plasterboard 13mm'

Ceiling Lining : **generic - gypsum Plasterboard 13mm** ▼

5. The resulting R-value should yield '**5.43 m²°C/W**'

Element Name (optional) 5.43 m²°C/W

Type: Roof: Timber framed skillion or flat Roof ▼

Timber framed skillion or flat Roof view detail

external surface 0.03	
Roofing :	generic - Metal corrugate Iron with building paper ▼
R-value: 0.01	
Timber Frame & Cavity :	
Posi-STRUT PS40 @ 600mm, Posi-STRUT core insulated, battens covered with insulation, insulation height 250mm ▼	
Roof Frame Area: 0.0%	Cavity Area: 100.0%
Framing :	still Airgap :
R-value: 0.01	10-30mm airgap (non-reflective) ▼
R-value: 0.13	
Thermal Break :	Insulation :
generic - none ▼	7.4
R-value: 0.00	
Ceiling Lining :	
generic - gypsum Plasterboard 13mm ▼	
R-value: 0.06	
internal surface 0.09	
Non-IC-rated recessed downlights	
Ceiling Area [m²]:	Number of downlights:
	Clearance from lamp holder side [m]:
	i

R-value only valid for H/AS1 Edition 5 and H1/AS2 Edition 1 compliance calculations.
Construction R-value calculated by DesignNavigator ©

INSTRUCTIONS (NON-RIGID CEILING INSULATION)

1. "In instances where a Posi-Strut rafter truss roof employs ceiling insulation that is non-rigid (such as fibreglass), it is permissible to set the 'Thermal Break' to 'generic – Airgap, upward heatflow (ceiling) 10 – 40mm' to represent the air gap channels created under the rafters due to the ceiling battens. The assumption is that the non-rigid ceiling insulation will sag, creating air gaps under the bottom chords, which are assumed to be 'still air gaps' meeting the requirements of NZS4214. This increases the thermal performance of the roof" – **Albrecht Stoecklein (Director/ Developer for Design Navigator)**

Thermal Break :

generic - Airgap, upward heatflow (ceiling) 10-40mm ▼

2. The resulting R-value should yield '**7.54 m²°C/W**'

Element Name (optional) 7.54 m²°C/W

Type: Roof: Timber framed skillion or flat Roof ▼

Timber framed skillion or flat Roof view detail

external surface 0.03	
Roofing :	generic - Metal corrugate Iron with building paper ▼
R-value: 0.01	
Timber Frame & Cavity :	
Posi-STRUT PS40 @ 600mm, Posi-STRUT core insulated, battens covered with insulation, insulation height 250mm ▼	
Roof Frame Area: 0.0%	Cavity Area: 100.0%
Framing :	still Airgap :
R-value: 0.01	10-30mm airgap (non-reflective) ▼
R-value: 0.13	
Thermal Break :	Insulation :
generic - Airgap, upward heatflow (ceiling) 10-40mm ▼	7.4
R-value: 0.13	
Ceiling Lining :	
generic - gypsum Plasterboard 13mm ▼	
R-value: 0.06	
internal surface 0.09	
Non-IC-rated recessed downlights	
Ceiling Area [m²]:	Number of downlights:
	Clearance from lamp holder side [m]:
	i

R-value only valid for H/AS1 Edition 5 and H1/AS2 Edition 1 compliance calculations.
Construction R-value calculated by DesignNavigator ©