

Viking Technical Series - Suitable Substrate Options Viking Roofspec Membranes

Brief

A 9 min overview of suitable substrate options for membrane roofing by Viking Roofspec.

A brief to outline general advantages and uses of the various substrates.

1. INTRO

Specifiers are often interested in hearing about alternative substrates to plywood or concrete. Which is why this information may be of practical use to you as an overview. This information may be specific to Viking Roofspec.

2. Agenda or options

Plywood 17mm/ StrandSarking 16.3mm / Concrete / Compressed Fibre-cement sheet 18mm / Metal Deck with PIR Insulation / PIR Insulation / EPS for Tapered roofs
These substrates can be used under our Viking membrane systems. Each of which I'll cover-off the Pros - Cons.

3. Substrate Checklists

For more detail and correct use and installation you can download the substrate checklists for you project.
<https://www.vikingroofspec.co.nz/details-documents/>

4. Plywood has been the traditional Substrate of choice. Like Concrete it is covered in E2/AS1.

So Plywood is commonly used and well understood. Plywood is included in E2/AS1 8.5.5.1 Plywood. **min 17mm thickness** which very conservatively **limits supports spacing's at only 400mm apart** with nogs at 1.2mt centres to support plywood sheet edges.

The costs of using ply or most sheet substrates are...

A/ the amount of timber support required and time to construct
B/ challenges in keeping the substrate dry during construction.

5. Alternative support spacing's. 600mm

For savings in timber costs some designers would like to specify 600mm distance between timber supports for the ply.

This can be justified by referring to the Ecoply specification guide. **Table 15C which allows 19mm plywood at supports 600mm apart.**

6. StrandSarking is a Non-Oriented Stand Board Treated to H3.1

With BRANZ Appraisal and CodeMark Certification for use as a substrate for Low Slope membrane ROOFS. **But Not decks at this stage.**

Viking Roofspec will accept this as a roofing substrate all of our Roofing membranes. And we would generally treat similarly to ply.

Advantages:

A/ 2 good faces as no C vs D grades as per plywood

B/ Non-directional so unlike ply the StrandSarking sheets can be installed in the same direction as the main supports

C/ Treatment is right through the board which doesn't require special treatment of cut edges.

D/ No delamination or face checking in the panel

Limitations:

NOT accepted yet as a Trafficable Deck substrate.

StrandSarking must have supports at 400mm centres and span at least 3 supports but this may increase to wider spans dependant on testing

Watch the fixing centres for various wind zones. EG: 100mm centres through-out the body of the sheet and 150mm around sheet edge.

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7. **Concrete:** We may see Concrete as a substrate in perhaps 10% of cases. Sometimes as upstands or Parapets.
Challenges are.

- a) Concrete must be min. 28 days old.
- b) Seal concrete with 2 coats of Vikings Surface Sealer a HydrEpoxy creating a barrier that won't interfere with the adhesion of the applied membrane or insulation.
- c) Torch-on membrane will use our standard BITUMEN primer with a Vented Base sheet before installing the Cap sheet layer.
- d) Falls within new or existing concrete roofs or decks can be created with suitable cement-based Screeds and Floor Levelling Compounds (FLC's)

8. Compressed Fibre Cement Sheet

Almost as heavy as concrete...We have 18mm Compressed Fibre Cement Sheet weighing in at 33kg / M2 it's no lightweight compared to 17mm plywood at 9.2kg/M2.

When compared to other substrates Compressed Sheets are quite expensive, needing specialised tooling and installation. It offers no guarantees against substrate movement.

Would be used where fire protection is required between boundaries. As compressed sheets can offer Fire Resistance classified as a Group 1 material (check with the particular manufacturer on their testing).

9. Biggest savings are made with WARMSPAN

Metal profiled substrate being a trapezoidal long-run profile in .55g used with our Insulated Roof System (WarmRoof).

Not engineered for use on trafficable decks.

Use of a Metal profile have several advantages over other substrates:

- a) Savings on construction materials and labour. With reduced needs for timber supports.
- b) Support spans can be up-to 3.6mt apart but typically at 1.8mt – 2.2mt vs 400mm – 600mm for plywood or other substrates.
- c) Metal will not absorb moisture so will dry faster. Easier to manage
- d) Faster installation quicker close-in. When metal profile is down the construction is already 80% waterproof.

Note that metal flashings are not water-proof.

10. FAST Adhered PIR Insulation Sheet to the Metal Profile

The metal profile is not the substrate for membranes. It is there to support the PIR Insulation sheet. Adhesive fixing the PIR minimises thermal bridging created by mechanical fasteners

11. WarmSpan is Fire Tested Group 1-S. (ISO9705)

- a. This means the WarmSpan system can be the ceiling and the roof saving further costs if required.

12. PIR Insulation sheet. Brendon Sutton covers off more information about warm roofs in another Technical Series.

This is Vikings WarmRoof Insulation Sheet. This is included with our WarmSpan Substrate checklist.

Viking supply Kingspan's TR27 which is a high performing, fibre-free rigid thermoset insulation, faced on both sides with a coated glass tissue. It can be Adhesive fixed over any of the substrates already mentioned.

Note that a Vapour Barrier is prudent between the substrate and the Insulation. But would always be required in climate Zone 3.

Various thicknesses of 25mm / 50mm / 75mm and 100mm providing R1 per 25mm.

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The 25mm will span 75mm across the profiled pan. Thicker PIR panels will span a little further but it is not like ply. It is not designed to be self-supporting between timber supports for example. It will need a metal profile, plywood or similar for structural support.

As mentioned we would typically adhesive fix our PIR sheets to the Substrate. Minimising thermal bridging created by mechanical fasteners. Though mechanical fixings are allowed and sometimes more practical for roof pitches from 15° up.

13. EPS Expanded Polystyrene. Note that XPS cannot be cut to form tapers.

Like most substrates this is one that Viking do not supply. The builder or water-proofer would source this from the likes of Expol or Styrobeck who are EPS Suppliers.

This will most likely be used where you want to improve the overall falls in an existing roof. Note that waterproofing membranes cannot be directly applied to EPS so we will still need to adhere a PIR sheet over the EPS.

Although Vikings WarmRoof and WarmSpan systems have been tested to 6kPa uplift this would not apply is using EPS. Nor will the ISO9705 fire test if you required it.

FYI All Foam products used for construction in NZ are manufactured to *AS1366 meaning that they meet the AS1530 Non-combustibility.

EPS has a reasonably low melt temp of around 90°C. Unlike PIR which as a 'thermoset foam' take a great deal of heat.

**AS1366 Rigid cellular plastics sheets for thermal insulation - Rigid cellular polystyrene - moulded*

AS1530 Methods for fire tests on building materials, components and structures - Part 1: Combustibility test for materials

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