

Viking WarmSpan²

Version: VIK-WS2-1.1PDS

Introduction:

This Data Sheet is to serve as a reference guide for Viking Roofspec Licensed Installers who are already familiar with Viking Roofspec's systems and are responsible for Viking roof-system installations. The following guide contains precautions, best uses and application procedures for the correct installation of the WarmSpan² System

Viking WarmSpan² system provides full cover, high performance insulation above the structural roof substrate. WarmSpan² can be split into two sub-categories, WarmSpan² Steel and WarmSpan² Timber.

Viking WarmSpan² Timber a fully engineered insulated roof system on a Plywood substrate of minimum 17mm T&G ply (no blocking between sheet joins) or 17mm Square edge ply (block at sheet edges), minimum DD grade and on supports up to maximum .900mm centres. For more information follow the WarmSpan² plywood Substrate Checklist

Viking WarmSpan² Steel a fully engineered insulated roof system, on a 0.55 steel tray substrate of ST900, ST7, Metcom7 and other. These substrates must meet suitability for "Type A" use as classified within the NZ Metal Roofing Code of Practice. Type A roofs are those that are regularly traversed, and roofs used for staging by subsequent trades during installation. For proper substrate installation instructions follow Viking Substrate Checklist WarmSpan² STEEL TRAY.

All NZBC H1 Climate Zones will **require full cover Viking Vapour Barrier** prior to the Viking PIR Polyiso Insulation being installed and fastened through to the supporting substrate using Viking Insulated Plugs. The Viking Cover Board is then adhered to the Polyiso with Viking Soudafoam Adhesive/ Dual Cartridge Fast Adhesive.

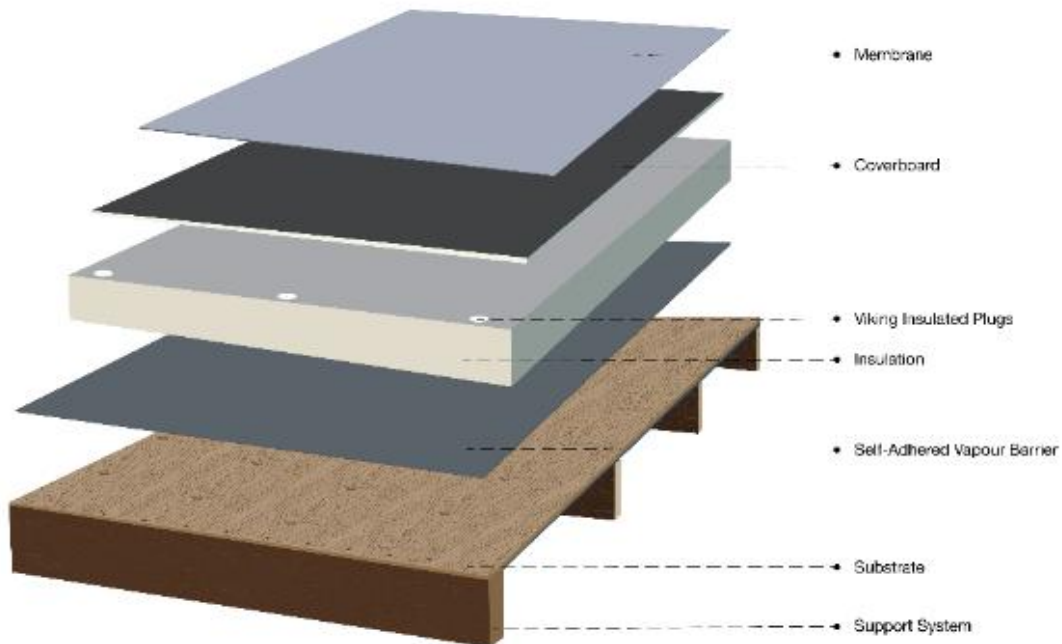
Viking WarmSpan² system may be waterproofed with either Viking Enviroclad or Viking Torch-On or Halley 'P' systems. These membranes will be installed to the Viking Cover Board as they will not adhere directly to the foil-faced PIR.

Protection walkways of Viking Enviroclad Walkway Roll or for Torch-on an additional Cap Sheet in differing colour with Crystal Glaze can be used to highlight safer light access traffic locations.

Protection from construction traffic, materials storage and scaffold feet must be managed by the main-contractor and all trades by use of well-placed temporary access boards for later removal. Engineers must determine roof load limits for permanent in-service use or temporary construction use such as scaffolding or construction materials.

Properties

- **One of Viking's CodeMark Membrane Systems** (Enviroclad or Viking Torch-On)
- **Cover Board** (Adhered to PIR)
- **Viking Insulated plugs** (mechanical fixings for PIR)
- **PIR – Rigid insulation panels** (Foil-faced PIR boards)
- **Self-adhered Vapour Barrier** (Self-sealing SBS bitumen)
- **T & G Plywood** (H1.2 minimum treatment) or **Steel tray** substrate (ST7, ST900, or Metcom 7)
- **Structural Supports** (up to 900mm centers for ply substrate; 1800mm centers for steel tray)



System Components					
Product	Thickness	Size (m)	Weight per m ²	Initial R Value	LTTR value
Viking Soudafoam	25mm Bead	50% Coverage	N/A	0.0468	0.0468
Cover Board	6.4 mm	2.44 x 1.22	5.97 Kg	0.05	0.05
Polyiso	140 mm	2.40 x 1.20	6.01 Kg	6.83	6.55
Polyiso	85 mm	2.40 x 1.20	3.63 Kg	4.14	3.9
Insulated plugs	3mm (Flange)	65mm or 105mm long	0.13	N/A	N/A
Vapour Barrier	1.52mm	30.40 x 1.00	1.5 Kg	N/A	N/A
Plywood T&G	17mm	2.4 x 1.2	9.53Kg	0.136	0.136
Steel	0.55mm	Cut to Length (38mm high seams)	6.08 Kg	N/A	N/A

Substrates

- Refer to Viking WarmSpan² Timber or Steel Tray Substrate specifications / Checklist.
- The following information is the minimum requirement to be used with the WarmSpan² systems.
- If a thicker Plywood is specified, the screw length will need to increase and match the Plywood requirements.

Plywood

Tongue & Groove Plywood		
	Plywood (H3.2)	Plywood (H1.2)
Screw Size	10g x 50mm	10g x 50mm
Screw Composition	Stainless Steel	Zinc plated or Galvanized
Fixing Pattern	150mm centers throughout the body	150mm centers throughout the body
Rafter Spacings	Up to 900mm centers	Up to 900mm centers
Sheet edges (end sheets)	Sheet ends need to be supported	Sheet ends need to be supported
Nogs	N/A	N/A
Based on 17mm Plywood thickness as minimum requirement		

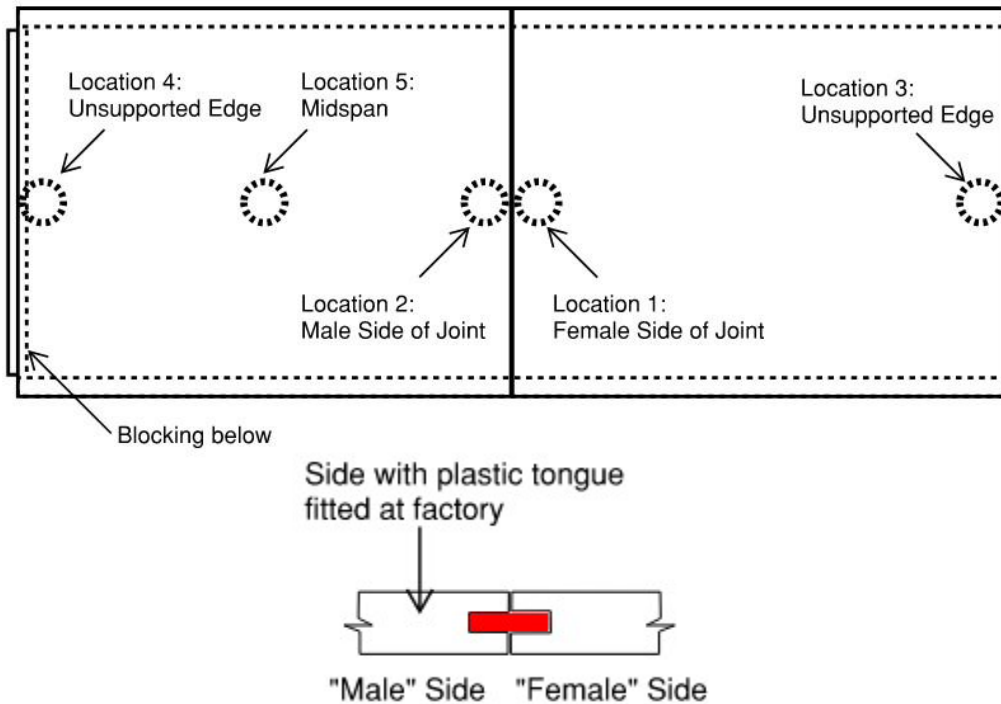
Straight Edge Plywood		
	Plywood (H3.2)	Plywood (H1.2)
Screw Size	10g x 50mm	10g x 50mm
Screw Composition	Stainless Steel	Zinc plated or Galvanized
Fixing Pattern	150mm centers for perimeter 200mm centers throughout the body	150mm centers for perimeter 200mm centers throughout the body
Rafter Spacings	Up to 900mm centers	Up to 900mm centers
Nogs / Support	All edges to be supported	All edges to be supported
Based on 17mm Plywood thickness as minimum requirement		

Steel Tray

Fixings min. C4 Galv	Timber Purlin	Steel Purlin
Fixings through every Pan (trough) into every purlin	VWS130	VWS131
Unitite Hex Washer Head with Seal	12G x55	12G x35
Metal sheets to be inverted so that rib now becomes the Pan See illustrations on page 5	12G = 5.5mm	12G = 5.5mm

Plywood

Point Load Testing

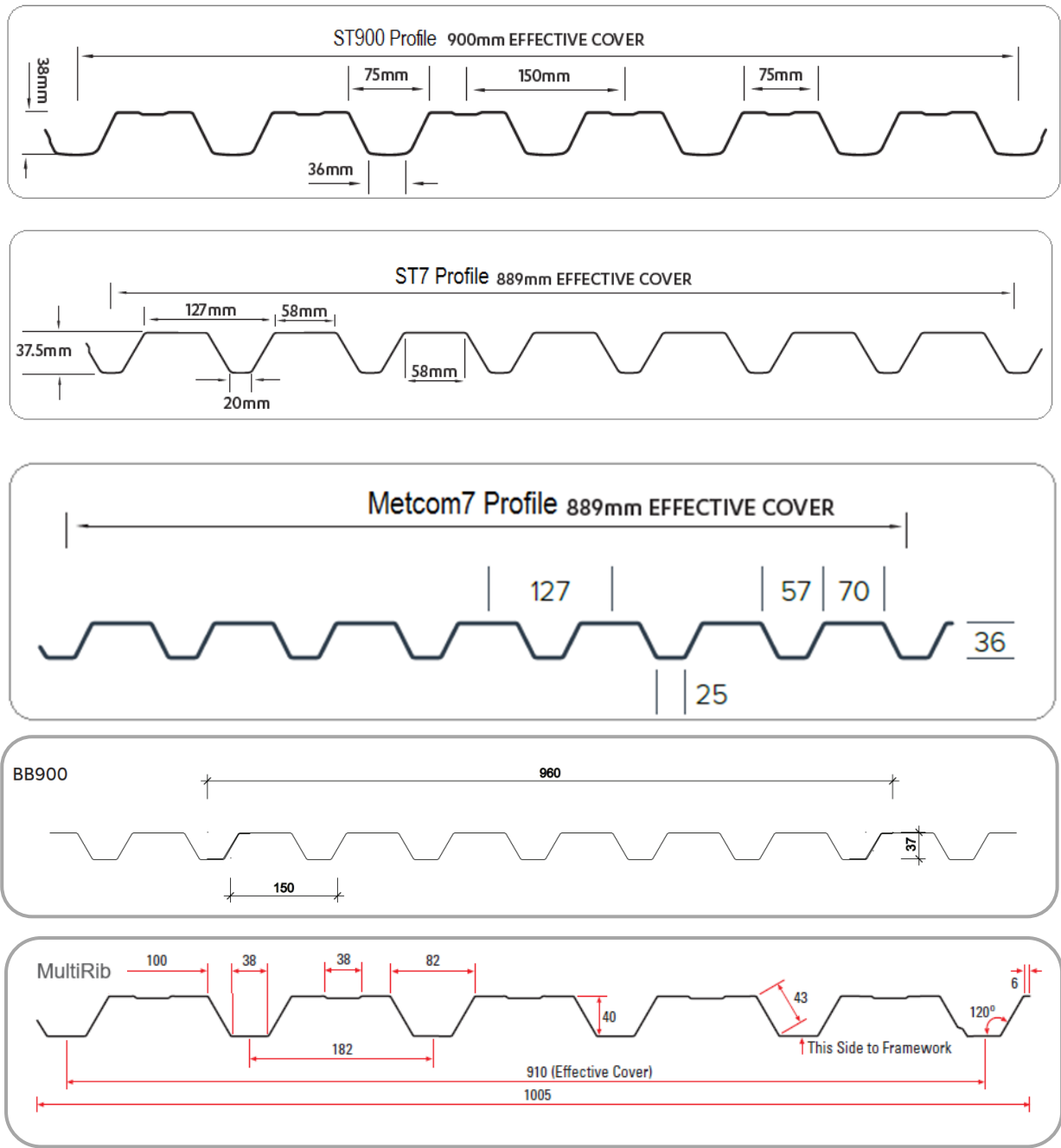


Parameter	Location 1	Location 2	Location 3	Location 4
	(Female side of joint)	(Male side of joint)	(Unsupported Edge)	(Midspan)
Max Loaded SLS Deflection	7.8mm	7.6mm	17.5mm	8.2mm
SLS Residual Deflection (mm)	0.2mm	0.2mm	0.4mm	0.3mm
SLS Test	Pass	Pass	Pass	Pass
Maximum Load Achieved (kN)	2.41 kN	2.41 kN	2.41 kN	2.41 kN
Deflection at Max Load (mm)	14.6mm	13.8mm	31.7mm	14.4mm
ULS Test	Pass	Pass	Pass	Pass

***For more information regarding the testing refer to Holmes Solutions Engineering report*

Steel Tray Option

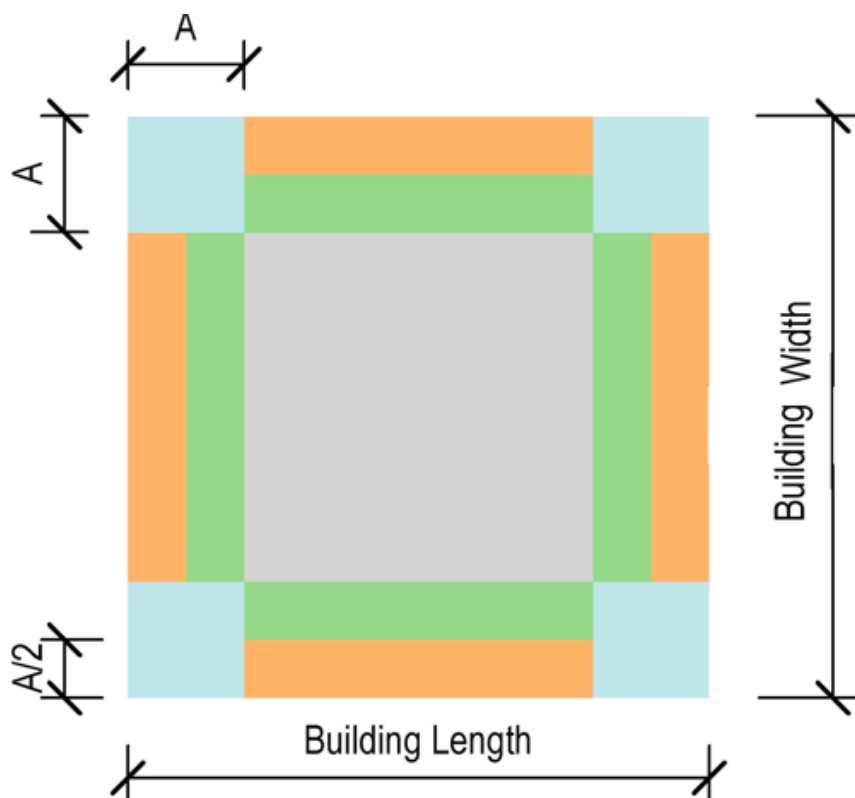
PROFILES AS INVERTED



Profiles (location where profile is formed)	Mid-Span	End-Span
ST900 .55g Steel & Tube	1.800mt	1.800mt
ST7 .55g Steel & Tube	1.800mt	1.800mt
Metcom7 .55g Metalcraft	1.800mt	1.800mt
BB900 .55g Dimond Roofing	1.800mt	1.800mt
MultiRib .55g Roof Industries	1.800mt	1.800mt

Wind Uplift

Roof Layout for Polyiso



- Corner
- Edge 1
- Edge 2
- Typical / Field

A = Minimum of 0.2W, 0.2L, 1.0H

For example, if building is 10m wide, 20m long and 12m high, and in a high wind zone.

- i. Corner/edge region, "a", is defined as the minimum of 0.2x10m, 0.2x20m, or 1x12m (=min(2m,4m,12m)) = 2m
- ii. Within "A" (2m) from each corner of the roof, a minimum of 12 fasteners per 1.2 x 2.3m sheet is required
- iii. Within "A/2" (1m) from the roof edge ("Edge 1"), sheets are required to have a minimum of 10 fasteners.
- iv. Between 1m and 2m from the roof edge ("Edge 2" region), and for the remainder of the roof, a minimum of 8 fasteners per sheet is required

NZS 3604 Wind Zone	Corner [no. off]	Edge 1 [no. off]	Edge 2 [no. off]	Typical [no. off]
Low	8	8	8	8
Medium	9	8	8	8
High	12	10	8	8
Very High	15	13	10	8
Extra High	18	15	12	8

**NZS 3604:2011 wind zones and corresponding roof wind pressure

NZS 3604 Wind Zones	Wind Speed [m/s]	Corner [kPa]	Edge 1 [kPa]	Edge 2 [kPa]	Typical [kPa]
Low	32	1.53	1.28	0.96	0.64
Medium	37	2.05	1.71	1.28	0.85
High	44	2.9	2.42	1.81	1.21
Very High	50	3.75	3.12	2.34	1.56
Extra High	55	4.53	3.78	2.83	1.89

****For more information regarding the testing refer to Holmes Solutions Engineering report**

**** For a 6.5KPa uplift requirement please refer to Holmes Solutions Engineering report**

Installation

Installation of Viking Vapour Barrier:

- Lay Viking Vapour Barrier over entire substrate roof area, include upstands and corners to ensure an airtight and water impermeable layer. Allow 50mm laps on the joins. Refer Viking Product Data Sheet Viking Vapour Barrier VWR725a
- Have the builder install any required plinths for later fixings and seal with the Vapour Barrier. An example would be safety anchors or mechanical plant etc.
- No Vapour Barrier primer required to the substrate if PIR Insulation is immediately installed by mechanical fasteners.
- If Viking Vapour Barrier is left exposed overnight dry the entire area to ensure there is no moisture on the surface prior application of PIR.
- No weathering or moisture must enter the roof system before completion.

*Refer to Viking Vapour Barrier PDS

Installation Of Viking PIR Polyiso Insulation & Cover Board

- Pre-drill PIR sheets for Viking Insulation Plugs at the prescribed set-out for wind-pressure.
- Refer Detail Viking PIR Polyiso Insulation Attachment Pattern and WarmSpan2 engineering report.
- 16mm Ø holes at 100mm depth for 105mm plugs / 60mm depth for 65mm plugs.
- Ensure sheets are thoroughly cleaned of any PIR swarf.
- Place Viking PIR Polyiso sheets in a brick bond pattern over the dry vapour barrier membrane, making relief cuts in the PIR sheets at any changes of pitch at ridges, hips, or valleys.
- Mechanical Fixings: Insert Viking Insulation Plug and Fixing through the top of the Polyiso and screw everything down into the substrate. As you tighten the screw allow for the plug to pull flush with the top of the PIR Polyiso foil facer.
- Ensuring Cover Board sheet joins are off set from the PIR sheet joins below adhere to the PIR using Viking Soudafoam Adhesive with 25mm wet bead at 300mm spaced ribbons.
- Where there are no parapets, install a hard-edge timber batten around the perimeter as a protective frame for PIR sheet edge.
- All Cover Board and PIR Insulation sheets must be fully covered and secured before the end of each day and be fully protected from water ingress or showers throughout the day. PIR and Cover Board stored on site should be under cover protection from direct sun and rain. Plastic film around the PIR or Cover Board should be removed to protect product from 'sweating' or condensation.

*Refer to Viking Cover Board PDS

Installation Of Waterproofing Membrane

Install Viking waterproofing membrane system in accordance with Viking Application Handbooks and Viking Specification.

Membrane Options:

- Enviroclad TPO
- Torch-On Bitumen Membrane
- Halley P "No Flame" Bitumen Membrane
- Epiclاد

*Refer to Viking Roofspec Waterproofing Membrane Literature

Precautions

- Understanding the aesthetics
- Cover Board sheet joins may be seen under most waterproofing membranes. Taking care to ensure good alignment will minimise the overall visual impact.
- Timber edging to gutter or drip-edges are to be installed by the builder to protect insulation edges from crushing.
- Advise finished hard-edge height to be same height as PIR insulation. Better to be 1mm lower than 1mm higher than the finished height of the PIR to allow for watershed. The Viking Cover Board can finish beyond the PIR to finish on to the timber hard-edge.
- Vapour Barrier: If exposed to the weather then leaving an escape at the low point will allow for watershed drainage prior to installation of the following layers of PIR, Cover Board and waterproofing membrane. Ensure this relief point is sealed with Viking Vapour Barrier before fully closing the area.
- Installing the Vapour Barrier at the bottom edge last, into gutters or drip-edges will allow water or overnight dew to drain away without being held back.
- PIR: If you are unlikely to finish a roof face in one day, install the PIR from the ridge down. If you need to stop midway, you are better able to temporarily close-off the roof for weatherproofing.
- PIR: Hips and Valleys require extra attention and precision when cutting the PIR and Cover Board. Imperfections in the hip or valley are more obvious so extra care getting these angles and cuts to meet perfectly on either side is the aim. Installing one side, marking with a chalk-line and clean cutting with a circular-saw set to correct angle has been a successful method. Otherwise cutting through the top edge and filling any gaps with Viking Soudafoam Adhesive. Eye protection must be worn and wear a mask so not to breathe dust.
- Cover Board: Cut board in half-length ways. Eye protection must be worn and wear a mask so not to breathe dust. Start with your "half sheet" for first row at the top of the ridge and the full sheet in the second row, in a brick bond pattern. This will help with offsetting the sheet edges to PIR to minimise thermal bridging.
- Ensure Cover Board is as dust free as possible before you start installing the Viking waterproofing membrane. Start installing waterproofing membrane before risking exposure of Cover Board to incoming showers, otherwise ensure you have temporary covers ready.

JOB COMPLETION

- Inspect all completed works to ensure all detailing is completed and watertight, check for damage or any risk of water ingress. Have main contractor accept works as complete and undamaged.
- Make very clear to the Main Contractor and all trades that once an area is completed there must be no unprotected construction traffic or storage of construction materials.

CONSTRUCTION DAMAGE

- Damage will often occur, from other trades after the waterproofing had been completed, from unprotected areas of construction traffic, materials storage or scaffolding breakdown.
- There are considerable costs in repair with potential for water ingress which would prove difficult to remove.
- Standard method of protection from construction traffic over finished areas is for the Main-Contractor to provide SOFT-PROTECTION (Viking Protection Mat) underneath a HARD PROTECTION (17mm Plywood).

Standard Method of repair due to construction damaged areas of WarmSpan² Steel completed sections.

- Check lowest areas of roof for ponding water.
- By removing Waterproofing Membrane / Cover Board and PIR
- Dry out any water if present.
- Repair or replace any removed vapour barrier a. Follow repairs instruction on Viking PDS Viking Vapour Barrier VWR725a
- Reinststate to specification PIR, Cover Board and Waterproofing Membrane

*Any such repair must first be sanctioned in writing by Viking Roofs spec, Main Contractor, any project managers, or designers via the appropriate channels to prove acceptance.

Storage

Handling and storage of all materials whether on or off site is under the control of the Viking Roofs spec Licensed and Trained Installers. Dry storage must be provided for all products, do not let products get crushed under weight of stacking pallets on top of each other.

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