

## Installation of PV solar system on NT Eternit/Euronit fibre cement profile sheets

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### 1. Introduction

This technical note has been written as a guide to the principles of installing PV Solar Panel Systems on NT Eternit/Euronit fibre cement profile sheets. It is valid both for new and existing roofs. It can be used to assist and minimise risks for the PV Panel Installer by explaining the requirements needed when installing on a NT Eternit/Euronit fibre cement sheeted roof.

### 2. Safety

#### Adding a PV panel system to a new roof

While working at height on roofs, SAFETY is paramount. Incorporating any PV panel system on a new building when it is being constructed may influence the safety plan and measures being used during the construction.

#### Adding a PV panel system to an existing roof

Adding a PV panel system over an existing roof can present its own safety issues. A full risk analysis should be undertaken by a competent person to ensure suitability of the existing roof to receive the PV panel system. This includes a structural engineer to calculate the additional load for the substructure to ensure that the purlins are adequately sized. This is also required on a new roof if the PV installation was not planned from the outset.

All local safety regulations and guidelines for working on existing fibre cement roofs must be fully adhered to. The fibre cement panels must not be walked on directly by the PV panel installers or anyone else. The use of appropriate crawling/walking boards is required.

It is important to plan for safe access to the roof for future maintenance of the PV panels.

#### Weight of PV panels

Under no circumstances should any extra weight and/or any mechanical stress from the PV panel system be placed on the NT Eternit/Euronit fibre cement profile sheets.

All weight must be safely transferred directly to the building structure, normally to the purlins via special fixings/brackets.



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### 3. Design Advice

#### Roof pitch

The pitch is a factor in determining a roof's suitability. Should the roof pitch not be at its ideal angle then the PV panels may need additional framing that tilts the PV panels to give optimal performance.

#### Orientation of the roof slope

Orientation of the roof slope is also critical to ensure optimal performance. The advice of the PV panel suppliers should be sought.

#### New roof

When designing a new roof, attention should be given to the setting out of the PV panels to suit the NT Eternit/Euronit fibre cement profile sheets, especially the location of the PV panel frame fixings. The PV panel frame fixings should coincide with the fixing locations for the profile sheet. The extra weight caused by the PV panels and support frame must be designed into the structural calculations.

#### Retrofitting PV panels

Where PV systems are to be retrofitted, the calculations and static load-bearing capacity of the existing substructure must be checked by a competent engineer. Reference to standards EN 1991 and EN 1995 are made. It is important to refer to local country annex in the standards.

This also applies to new buildings if the PV system was not planned from the outset.

#### EN 1991-1-4:2005

Eurocode 1: Actions on Structures –  
Part 1-4: General Actions – Wind Actions.

#### EN 1993-1-1:2005

Eurocode 3: Design of Steel Structure

#### EN 1995-1-2:2005

Eurocode 5: Design of Timber Structures –  
Part 1-2: General – Structural Fire Design.

#### Before installation of the PV panels

Any build-up of moss, fungi or lichen should be safely removed before installation of the PV panels commences. Where necessary repair any leaks, damaged sheets or loose flashings before PV panels are installed.

#### Consideration

Should a PV panel system be installed at a later date, it is advisable to plan this work as soon as possible after the NT Eternit/Euronit profile sheets have been installed. Installing a PV system at a later stage increases the risk of damage to the roofing during PV panel installation.

### 4. Position of PV Panels

#### Rain

Provide sufficient space between the NT Eternit/Euronit fibre cement profile sheets and the PV panel frame so it does not hinder the free drainage of water from the roof. Ensure that the space is adequate to prevent a build up of leaves which could restrict water flow. Any accumulations of leaves or substrates that could restrict water flow must be removed immediately.

#### Snow

In regions which receive snow fall, ensure that there is no risk of additional snow build-up around the edges of the PV panels caused by drifting snow. If this is a risk then ensure the roof sub-structure is adequate and can safely support such additional weight.

#### Moss

Ensure sufficient space is provided under the PV panels to safely remove any build-up of mosses or fungal growths.

#### Detailing

Make sure that the installation of PV panels does not affect the proper functioning of the roof details, such as air inlet or outlet openings, flue gas ducts, etc.

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### 5. Fixing the PV Panel Frame

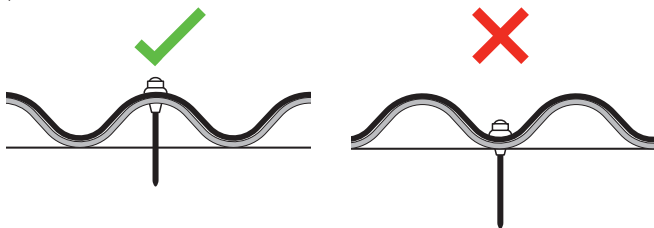
#### PV Panel supplier

It is the responsibility of the PV Panel supplier to provide suitable fixings that do not impact negatively on the NT Eternit/Euronit fibre cement profile sheets.

#### Location of PV panel frame fixings

Always position the PV panel frame fixing at the apex or the top of the wave of the NT Eternit/Euronit fibre cement profile sheets.

Never place a PV panel frame fixing in the valley or in the sides of the wave of the NT Eternit/Euronit fibre cement profile sheets.



Depending on the NT Eternit/Euronit fibre cement profile sheets and the wind load calculations the position of fixings may differ. Due to engineering calculation of wind loads, extra purlins may be required to install extra PV support rails. If this is the case, fixings must stay in the same wave as the sheet fixings.

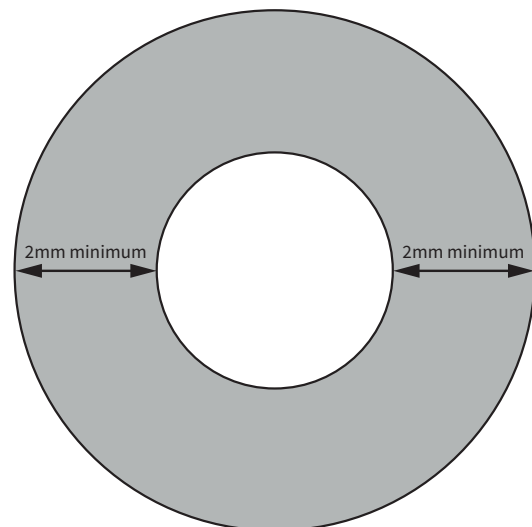
#### Timber purlins

If the PV panel frame fixings are to be inserted in the original hole position in a timber purlin construction, the PV panel installer must ensure that the new fixings provide adequate pull out resistance. This is best achieved by using new fixings with an increased length compared to previous fixings. As a minimum, new screws should be 30mm longer than previously used screws.

#### Oversize hole

As the additional fixing will be supporting the additional weight of the PV panel and will be subjected to additional forces, any fixing hole in the NT Eternit/Euronit fibre cement profile sheets must be a minimum of 4mm bigger than the diameter of the PV frame fixing. All holes must be predrilled.

Please note that this requirement may be greater than local regulations for fixing the NT Eternit/Euronit fibre cement profile sheets. This requirement is to ensure that no added stress will be caused by the PV frame support fixings.



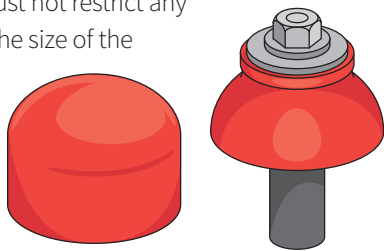
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### Maintain Weathertightness

Any fixing used to support the PV frame must have a suitable mushroom type sealing washer to prevent moisture ingress via the oversized hole.

This sealing washer must not restrict any movement or reduce the size of the oversized hole.

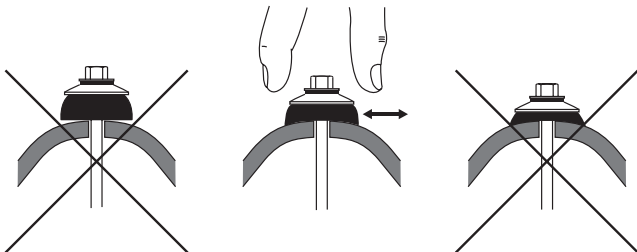


### Position of the fixing

Do not under tighten or overtighten the PV panel frame fixing as the building structure must be allowed to move and remain weathertight. Overtightening could cause the NT Eternit/Euronit fibre cement profile sheets to crack.

The sealing washer element should be slightly compressed and the sealing element connection immobilized in rotation.

Incorrect tightening of the PV panel frame fixing can lead to roof leaks. Centralise the PV panel support rail fixing in the oversized predrilled hole.



### Substitution of standard Eternit/Euronit fibre profile cement sheets fixings

In instances where a PV panel frame fixing is to be used instead of the standard NT Eternit/Euronit fibre cement profile sheet fixing; This substitute fixing must have the same performance in terms of pull out resistance and provide the same level of wind load resistance as the standard NT Eternit/Euronit fibre cement profile sheet fixing.

### Type of fixing –

#### Stud screw forming a spacer

The more common fixing is the stud screw system which passes through the oversized predrilled hole in the NT Eternit/Euronit fibre cement profile sheet into the purlin below. A series of nuts allows the sealing washer to cover the hole in the NT Eternit/Euronit fibre cement profile sheet and also support the PV panel frame above and away from the roof covering.



#### Type of fixing – Dedicated PV support brackets

Systems are available with dedicated PV support brackets which are designed to fit the NT Euronit/Eternit sheets corrugated profile while transferring the addition load of the PV system to the primary structure.

The system must maintain the free drainage of the NT Eternit/Euronit fibre cement profile sheet.

The upper part of the bracket facilitates the connection of the PV panel frame.

Any dedicated PV support brackets used must:

- be positioned directly over the purlin,
- not reduce the water shedding capabilities of the roof
- be guaranteed by the manufacturer, and installed correctly, so that the additional loads of the PV system are transferred entirely upon the purlin substructure and not placed upon the corrugated sheet.





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### 6. PV Panel Electrics

All design and installation of the complete electrical system including all wiring, and connections is the responsibility of the PV panel Installer.

The positioning of any electrical components must not present a risk to the animals or have an adverse effect on the health of the animals.

Where possible, plan the route for any cables to ensure they run at the wall gables or eaves, so the cables do not have to pass through the roofing sheets. If penetration through the NT Eternit/Euronit fibre cement profile sheets is required, minimise this where possible and ensure penetrations are sealed. Any penetration must be in the apex of the NT Eternit/Euronit fibre cement profile sheet wave only.

Cables must not pass through the overlap between two rows of NT Eternit/Euronit fibre cement profile sheets.

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