TB - 36
Technical Bulletin

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Guide to good practice – steel roofing and photovoltaic/solar panels

Introduction

When installing photovoltaic (PV) / solar panels to roofing made from COLORBOND® prepainted steel or ZINCALUME® aluminium/ zinc/magnesium alloy-coated steel, the following installation and maintenance practices will assist in maintaining the water tightness, functionality and durability of the roof.

This Technical Bulletin relates to the installation of framed PV panels mounted above steel roofing as shown in Figure 1.

For large scale commercial roofs with solar panels, the below guidance will still apply, however additional considerations beyond these may be necessary. This will be the case especially where a large percentage of the roof will be covered by solar panels.

Figure 1. An example of a framed PV panel mounted above a steel roof

PV installation considerations

When installing PV panels, it is important to consider the following:

Clearance between PV panels and the roof

PV panels installed on a COLORBOND® steel or ZINCALUME® steel roof, shield the roof from the sun and prevent beneficial washing from rainfall. Areas on the roof directly beneath the PV panels are considered to be unwashed and may be subject to accelerated corrosion due to an accumulation of dirt, salt, leaves and other airborne contaminants, which may retain moisture for extended periods due to condensation or high humidity. Refer to:

Corrosion Technical Bulletin CTB-8 Product performance considerations for exterior BlueScope coated steel products, for further explanation, and examples, of unwashed areas. The provision of adequate clearance (commonly greater than ~75mm from the top of the profile rib) between PV panels and roofing made from COLORBOND® steel or ZINCALUME® steel will help to:

- Facilitate self-clearing and limit the buildup of leaves and other debris.
- Provide sufficient access for the cleaning and maintenance of the roofing material, including removal of any accumulated contaminants, and fasteners beneath the PV panels.
- Allow air movement to quickly dry areas beneath the PV panels. This may also be beneficial to the performance of the PV panels as electrical output is usually temperature dependent.

Compatibility of materials with roofing made from COLORBOND® steel or ZINCALUME® steel

- Metals, such as stainless steel, lead, brass, copper and copper containing alloys should not be used in direct contact, or contact that could create electrical connection, with roofing made from COLORBOND® steel or ZINCALUME® steel. This also includes conductive seals, washers and gaskets. Refer to:

  Corrosion Technical Bulletin CTB-12 Dissimilar metals.

- Avoid PV panels, or any introduced flashings, which utilise materials such as copper and lead as these materials have the potential to create water run-off onto roofing made from COLORBOND® steel or ZINCALUME® steel resulting in bi-metallic corrosion. Refer to:

  Technical Bulletin TB-8 Flashing Materials for COLORBOND® steel and ZINCALUME® steel sheet.

- Ensure any sealant in contact with roofing made from COLORBOND® steel or ZINCALUME® steel is 'neutral cure'. Avoid acetic acid-based sealants. Refer to:

  Technical Bulletin TB-9 Sealants for exterior BlueScope coated steel products.

Avoiding potential damage to the COLORBOND® steel or ZINCALUME® steel roof

Foot traffic can dent, scuff or scratch the roof sheeting. Please refer to the roofing manufacturer for recommendations relevant to the roof sheeting profile to avoid damage from foot traffic.

- Major dents may need to be rectified to avoid water ponding, which is more likely on low pitched roofs. Ponded water exposes COLORBOND® steel and ZINCALUME® steel to an extended period of wetness which may increase the potential for corrosion or water ingress.
- Scuffing, which is more likely on steeper pitched roofs, is typically an aesthetic issue that is unlikely to have any detrimental effect on the performance of roofing made from COLORBOND® steel or ZINCALUME® steel.
- For information regarding scratches please refer to:

  Technical Bulletin TB-38 Effect of touch-up paint.

Sunscreens

Sunscreens containing semi-conducting metal oxides such as titanium dioxide (TiO_2) and zinc oxide (ZnO) can accelerate the degradation of organic materials, including paint systems. To protect the surface of roofing made from COLORBOND® steel, only organic sunscreens should be used. It is recommended that titanium dioxide (TiO_2) and zinc oxide (ZnO) containing sunscreens DO NOT contact the COLORBOND® steel surface. Refer to:

Technical Bulletin TB-37 Prevention of sunscreen damage.

Maintaining the water tightness of the existing roof made from COLORBOND® steel or ZINCALUME® steel

- The installation of PV panels should allow free drainage of moisture from all surfaces and avoid the ponding of water.
- Any penetrations through the roof should be placed in such a manner to minimise the risk of water ingress. Penetrations through the roofing sheet should be properly sealed using appropriate flashings and sleeves, and/or neutral-cure sealants. Refer to:

  Technical Bulletin TB-8 Flashing materials for COLORBOND® steel and ZINCALUME® steel sheet, and relevant industry standards.

- Avoid valley fixing or valley holes for electrical cables.
- PV fasteners and brackets should be installed away from sheet side laps as they may distort the profile and interfere with the specifically designed anti-capillary laps, leading to the ingress of water.

Rainwater collection

If rainwater from the roof is collected for domestic use, check with the supplier of the PV system to ensure that it does not interfere with the required water quality.

Fasteners and brackets

Fasteners and brackets used in the installation of the PV panel should have a service life comparable with the expected performance of the roofing made from COLORBOND® steel or ZINCALUME® steel and be appropriate for the PV panels. This includes the replacement of any corroded roofing fasteners that will be located beneath the new PV panels. Refer to fastener manufacturer recommendations.

Swarf

During the installation of the PV panels or ancillary items, daily removal of swarf should be conducted. Refer to:

Technical Bulletin TB-5 Swarf staining of steel profiles.

Electrical cables

Electrical cables should not sit directly upon the roof as this may lead to the accumulation of dirt, salt and other airborne contaminants. Alternatively, affix cables to the PV panel support structure.

Earthing

Ensure appropriate earthing of the PV system. Stray currents to the metal roof sheets may accelerate corrosion. Refer to Australian and New Zealand Standard AS/NZS 5033:2021 *Installation and safety requirements for photovoltaic (PV) arrays*.

Safety

- For both the installation of PV panels and ongoing maintenance, BlueScope recommends working safely in accordance with relevant state legislation.
- Precautions should be taken to ensure that any worker or equipment does not come in contact with overhead power lines or other electrical items.
- The surface of roofs can be slippery when wet, hence working on a wet roof is not recommended.

Maintenance

As unwashed areas have an increased risk of corrosion compared to washed areas, regular cleaning is recommended. Generally, unwashed areas should be cleaned with fresh water, at least every 3 months for coastal or industrial areas and at least every 6 months in other applications. This may coincide with any periodic or scheduled PV panel cleaning. Further guidance for maintaining unwashed areas is contained in:

Technical Bulletin TB-4 Maintenance of exterior BlueScope coated steel products.

Maintenance should also include an inspection of the condition of the roofing fasteners, as well as the surface condition of roofing made from COLORBOND® steel or ZINCALUME® steel. This will allow a review of the washing frequency, whether any fasteners require replacement and if remedial work is required to the roof sheeting.

The recommendations above regarding potential damage to the COLORBOND® steel or ZINCALUME® steel roof also apply to maintenance work conducted on the roof.

Other maintenance considerations include (but are not limited to):

- ensuring that maintenance can be conducted safely.
- ensuring that any washing does not flood the eaves of the building, which could cause damage to ceilings.
- adhering to relevant State/Territory/Municipality water restrictions.
- ensuring that runoff from any washing does not contaminate rainwater collected in tanks or local water courses.

Note: For further details and guidelines about installing PV systems refer to the website of the Clean Energy Council: http://www.cleanenergycouncil.org.au/

Related BlueScope Technical Bulletins

Technical Bulletin TB-4 Maintenance of exterior BlueScope coated steel products

Technical Bulletin TB-5 Swarf staining of steel profiles

Technical Bulletin TB-8 Flashing materials for COLORBOND® steel and ZINCALUME® steel sheet

Technical Bulletin TB-9 Sealants for exterior BlueScope coated steel products

Technical Bulletin TB-37 Prevention of sunscreen damage

Technical Bulletin TB-38 Effect of touch-up paint

Corrosion Technical Bulletin CTB-8 Product performance considerations for exterior BlueScope coated steel products

Corrosion Technical Bulletin CTB-12 Dissimilar metals

Referenced Australian Standards

AS/NZS 5033:2021 Installation and safety requirements for photovoltaic (PV) arrays