

SOLAR ROOFTOP INSTALLATION GUIDELINES ON CORROSION



Steel roofing systems are available with three main categories of protective coating.

1. Galvanized
2. 55% Aluminium/zinc coated.
3. Colour coated derivatives of 1 & 2

The durability of a metallic coating in a given environment is proportional to its thickness whereas that of a paint coating is determined by its thickness and formulation. However, not all coatings have the same corrosion resistant properties in a given environment. It is therefore vitally important to establish the durability of a coating in an environment. Important to verify your coating before starting. Ensure all roof surfaces are painted before starting your planning. Never install a system on a unpainted roof surface.

Coatings

1. Galvanized - Z275= Zinc 275g/m²
2. Chromadek - Z275= 19µm Galvanized, 24µm of paint
3. Allu-Zinc - AZ150= 19µm “less grams but same thickness due to aluminium being lighter than Zinc” which can also be painted.

Roof sheet design life

Roof sheeting is effected mainly by the environment such as high corrosive coastal areas and industrial areas due to industrial fall out, traffic fumes and general contaminates dust. The wear and tear due to traffic on the roof during installations is also a main factor in the design life on a roof, roof sheets typically have a design life of 15 years, this period can be prolonged with proper maintenance and painting the roof. It is generally recognised that any product used for the mounting of your solar system would generally outlast the roof sheet, so it is more important to carefully consider your roof life during your planning.

Important Considerations

Once your solar system is installed on your roof, it will restrict access to do roof maintenance and therefore it is critically that your solar systems would have minimal impact on the long term life of your roof sheet. In reality while installing the solar system you are putting unusual wear and tear on your roof and its corrosion protection system. Also the roof can be left with general dents and scratches, each one of those will have a long term impact on the life of the roof. Care should be taken during your installation as to minimize damage of any kind.

General wear and tear

General walking on the roof will wear down the coating on the corners of the profile where it is already reduced due to the bending process.

1. Dents caused by your installation could lead to the build-up of dirt and water which could cause extreme crevice corrosion problems, which is when water, dust and run off molecule particles are trapped between two surfaces that are permanently fixed together. This will cause corrosion between any materials, however the use of dissimilar metals (zinc-aluminium) will cause a galvanic reaction. These are both very aggressive stimulators of corrosion and must be taken seriously.
2. Scratches can also catch microscopic harmful elements which could lead to faster corrosion in those areas.

Mounting system types

1. Galvanized (HDG 55µm)
2. Aluminium

On the galvanic chart HDG (Zinc) is one of the most sacrificial materials on the chart and will always sacrifice itself for aluminium or your roof sheet. Aluminium being higher on the chart will not sacrifice itself for Zinc (Galvanizing) and therefore place your roof at risk.

Installation example

A galvanized roof clamp, clamps on a roof sheet and damages the surface of the roof sheet. The zinc of the clamp will sacrifice itself to heal the roof sheets and as the clamp has 55µm of zinc versus 19µm it will be a good long term partner for your roof.

An aluminium clamp on a zinc roof will cause the roof to sacrifice itself for the aluminium clamp. As the aluminium is much thicker than the roof the self-sacrificing zinc of the roof will be depleted leading to accelerated corrosion. This is definitely not recommended.

Run-off corrosion

As material slowly deteriorates over time the microscopic particles that are freed from aluminium roof clamps, rails and module clamps could through rain and wind be deposited onto the roof sheet. These deposits can be caught in exposed areas, crevices, dents or scratches on the roof and long term exposure would lead to the roof sacrificing itself to this contaminated run-off material. Run-off corrosion is something that is not usually considered when planning the installation of solar systems but plays a major role in the deteriorating the life expectancy of your roof sheeting.

General rule

HDG(zinc) can run-off onto aluminium as the zinc would sacrifice itself to the roof sheet but aluminium should never be placed anywhere on a roof where the particles could run onto any coated roof type. This is to ensure the maximum life of your roof. This is a very important factor as you only get one chance of getting it right and making the wrong decisions will reduce the life of the roof especially due to the fact that minimal maintenance can be done under the solar structures once your solar installation is completed.

Recommended solutions

The safest and recommended solution is using galvanized/zinc roof clamps, rails and module clamp products for your installations. Care and must also be taken for your earthing and trunking systems. Aluminium or copper earth cable must be lagged to ensure that there is no contact or run-off onto your roof sheet. Prevention is better than cure.

This document is intended as a guideline to maximising the life of your roof and has been done in consultation with Mr Dennis White of SAMCRA. SAMCRA can be contacted should you require any information regarding the extension of your roof life for solar installations on the details below.

Dennis White - Director: Southern African Metal Cladding and Roofing Association
Cell: +27 82 568 1421 | Tel: +27 11 726 6111 | E-mail: dennis@saisc.co.za



Colin Muller
CEO - PiA Solar SA