

Roof Mounted Photovoltaic Solar Panel Systems - Installed and Ongoing Care

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Roof mounted solar arrays are present on many buildings and becoming more common. From planning to have them through to their end of life, these power generating devices present many additional hazards and exposures to a property. This document is one of a series, to provide guidance to identify and mitigate the risks associated with these arrays.



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Introduction

Once the solar array has been installed, successfully commissioned, and formally handed over (with appropriate O&M manuals, and other documentation), regardless of the nature of the roof and its slope, the end-to-end system requires:

- ✓ Inspection
- ✓ Cleaning
- ✓ Testing
- ✓ Servicing and maintenance to ensure the panels operate safely at their optimum capacity with the appropriate reliability.



This should be completed by competent and qualified engineers, in line with the OEM and MCS guidance, at a minimum. Your Property Insurer may require additional tasks to be completed or tasks to be completed at an increased frequency based on individual circumstances and exposures. Understanding this, ensuring there is regular safe roof access is critical. The MCS guidance states the minimum responsibilities of the Building Owner and the OEM, maintenance, servicing provider.

It is not acceptable to have a roof mounted solar array and not care for it in line with published guidance.

Whenever there are any inspections, cleaning, testing, servicing, or maintenance completed, this should be formally recorded. Where appropriate, more detailed reports may be needed. In either case, there needs to be a mechanism to raise concerns with the array and/or its performance, that can be tracked through to completion. In some instances, Property Insurers may request to see these records.

In addition to the General Considerations, Planning for Installation and the Installation and Construction Loss Prevention Standards, this standard outlines Risk Management advice for those property risks that have an operational roof mounted solar array.

Formal Array Inspections

Are required:

- ✓ Initially, 6 months after hand over.
 - Only if an installation conformity certificate or similar has been provided by the installer.
 - If not, then after 3 months.
- ✓ Annually thereafter if there are no concerns.
 - If concerns around the status or performance of the array exist, then this frequency should be increased.

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Aerial Inspections - Drone Surveys

If roof access is an issue, some tasks can be *supplemented* by drone surveys. However, these will not remove the need for regular formal and recorded visual inspections and hands on maintenance and servicing activities.

Drone surveys, while very valuable, only provide a limited amount of information and they should be considered as part of the overall inspection and maintenance proposition. They should never be considered as the entire solution. As an example, DC corrosion or the condition of the cables, connections etc., one needs to be up close to visually see this.

Drone surveys are a powerful supplementary tool when they are combined with thermographic imaging. This type of provision will help identify microcracks, damage or hot spots, cell failure in the panel etc. Depending on the nature of the building, the size of the array, and the exposure, this may be recommended to be completed at a minimum at least annually to every six months.

Aviva has a drone proposition that can be accessed by its customers as required. Please speak to your local Aviva representative.

[Drones - Aviva Risk Management Solutions](#)

Remote Crawler Inspections

Some companies offer a similar service to a drone survey, but instead of flying above the panels, remote devices 'crawl' below the panels and use technology to enable a pilot to observe this area. This again can be used to supplement a wider inspection, testing, maintenance, and servicing programme.

An example of such provision is: [Uplink Robotics Inspection Crawler](#)

Thermographic Surveys

Aviva recommends that all electrical systems are surveyed with a thermographic camera at least annually. This is a powerful, low cost, non-destructive, and non-intrusive tool that could be considered as part of the maintenance strategy on any site.

Pass, an Aviva Specialist Partner, can provide appropriate support in this area, if needed [PASS - Aviva Risk Management Solutions](#).

This should include the solar PV panels themselves and the associated infrastructure, inverter, and any string combiner boxes.

Note: Where there are enhanced exposures such as mass timber/timber frame or other combustible construction, this frequency should be increased to every 6 months.

Regular Visual Self Inspections

In addition to formal inspections, servicing, and maintenance, regular visual inspections need to be completed for signs of wear, tear, damage, water ingress etc. To help support this, the regular self-inspections should focus on:

- ✓ Panel surface damage or contamination e.g., stone strike, tree sap, perimeter seal damage.
- ✓ Fixings and securement e.g., bolts and securement movement, or loose.
- ✓ Cables and connections e.g., UV damage or wear/cuts to cable insulation; broken/loose connections.
- ✓ Loose items or waste materials on the roof:
 - These should not be allowed to accumulate as they can be lifted in winds and cause mechanical or impact damage.
 - Consider any close deciduous trees, especially in the autumn.
 - The roof should be maintained clean and sterile.
- ✓ Bird nests below the panels – **it's** warm and attracts the animals.
 - If this is an exposure, then appropriate pest control measures should be taken.
- ✓ Rodent nests below the panels or in the wiring/panel network – **it's** warm and attracts the animals.
 - If this is an exposure, then appropriate pest control measures should be taken.

The frequency of the above will be based on the exposure and nature of the installation but should be completed at least monthly.

Surface Contamination & Cleaning

Depending on the location of the site, contamination of the panels from bird droppings or tree sap, may or may not be a problem. Panel contamination impacts performance of the panel and therefore in some areas, at certain times of the year will require regular panel surface cleaning. A panel surface should be cleaned in line with the OEM guidance and a frequency that keeps contamination to a minimum.

- Also consider the impact of street art/graffiti on solar panels and their performance and the potential for this to occur.

Note: Cleaning PV panels using pressurised water jets should not be completed. Cleaning PV panels should only be conducted in accordance with the OEM guidance.

- This includes any arrays with insufficient spacing between rows, which is most common on slanted residential installations.
- This pressurised water jet can jeopardise the module junction box.

Weather Events

Once installed, the action of rain, wind, hail, ice, snow etc, has the potential to impact the performance and/or damage the panels.

- ✓ In colder months, inspections of the array are required to ensure snow and ice accumulations are not occurring.
- ✓ Ahead of any high wind or storm events the array should be visually checked to ensure everything is fixed and secured, and there are no loose items or waste on the roof.
- ✓ After any high wind or storm events the array should be visually checked to ensure everything is fixed and secured.
- ✓ After any hail events the panels should be visually checked to ensure everything is damage free.

If there is any doubt about weather related damage, then the panels should be safely isolated, and a thorough inspection and even thermographic survey considered.

Note: One also needs to consider the impact of high temperatures or long sunny periods and the impact of UV damage on the cables. This impact is accumulative and so needs to be monitored on an ongoing basis. Thermographic imaging can help identify when cable insulation breakdown.

Inverter & Isolators

The area of the building housing the DC isolator(s) and inverter(s) should be inspected regularly (at least monthly) to ensure they are:

- ✓ Readily accessible.
- ✓ Clear from combustible materials and located in a sterile area.
- ✓ Have the appropriate air movement around them and ventilation to ensure they can cool down.
 - This is especially important in warmer months of the year.
- ✓ There are no alarms or fault lights.

Specialist Partner Solutions

Aviva Risk Management Solutions can offer access to a wide range of risk management products and services at preferential rates via our network of Specialist Partners, including:

- Electrical inspections and thermographic imaging: [Bureau Veritas](#)
- Fire stopping and passive protection: [Checkmate Fire](#)
- Thermographic imaging and PAT testing: [PASS](#)
- Automatic fire detection and portable extinguishers: [SECOM](#)
- Security marking: [Selectamark](#)

For more information please visit:

[Aviva Risk Management Solutions – Specialist Partners](#)

Sources and Useful Links

- Guide to the Installation of Photovoltaic Systems: Published by the Microgeneration Certification Scheme (MCS) <https://mcscertified.com/>
- [Drones - Aviva Risk Management Solutions](#)

Additional Information

Relevant Loss Prevention Standards include:

- Contamination Following a Fire
- Control and Management of Combustible Waste Materials
- Electrical Installations – Inspection and Testing
- Emergency Response Teams
- External and Internal Third Party Exposures – Property Protection
- External Wall Insulation Systems
- Fire Compartmentation
- Fire Safety Inspections
- Heat and Smoke Venting Systems
- Housekeeping – Fire Prevention
- Managing Change – Property
- Managing Contractors
- Smoke Contamination
- Smoking and the Workplace
- Thermographic Surveys

To find out more, please visit [Aviva Risk Management Solutions](#) or speak to one of our advisors.

Email us at riskadvice@aviva.com or call 0345 366 6666.*

*The cost of calls to 03 prefixed numbers are charged at national call rates (charges may vary dependent on your network provider) and are usually included in inclusive minute plans from landlines and mobiles. For our joint protection telephone calls may be recorded and/or monitored.



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