

Is your roof ready for solar panels?

Solar panels on flat roofs with
non-combustible ROCKWOOL insulation





Introduction

Whether you are the owner of a building, a tenant, a resident, or an architect working on a project, there's a good chance solar panels (photovoltaic panels) will be on the roof of your building in the coming years.

And there are good reasons for that.

The large and typically unused rooftop area allows easy access to the sun's energy. And today's solar panels are more durable, efficient and less expensive than ever. Matched with energy efficiency measures like insulation, buildings can significantly reduce their energy bills and dependence on fossil fuel-based energy.

This is also why the European Union – as a part of its building renovation wave – has made installation of rooftop solar into law, with rolling deadlines for different building types starting as early as 2027.

So what does this all mean for you?

It depends on your situation. Maybe you're already planning a solar installation on a new or existing building. Or perhaps your building is planning a large renovation that will include the roof or a significant repair or replacement of the building's roof.

If any of those apply to you, this brochure can help. What condition is the roof in now? Is it strong enough to support installation of solar panels? Solar panels add fire risk, is the roof made with non-combustible materials? What do insurance companies advise? What other risks need to be addressed?

These are just some of the questions that will need to be asked, some of which we answer in this brochure.

It was written it to give you an overview of what to consider if rooftop solar is or could be in your building's future, so you make the most of your investment while keeping people and property safe and sound.

We hope you find it useful.

A timeline for rooftop solar

On a global scale, demand for both greater use of renewable energy resources and energy efficiency are increasing, and buildings have a starring role to play in both cases.

In Europe, the Energy Performance of Buildings Directive (EPBD) includes legal requirements for buildings to meet stepwise improvements in energy efficiency (with among other things, insulation) and to install rooftop solar panels on different building types by certain dates.

As a result, there will be phased-in obligations to install solar panels in Europe on the following building types:

- From 2027, all new public and commercial buildings > 250 m²
- From 2028, all existing public buildings > 2000 m², existing non-residential buildings > 500 m²
- From 2029, all existing public buildings > 750 m²
- From 2030, all new residential buildings and all new roofed carparks physically adjacent to buildings
- From 2031, all existing public buildings > 250 m²

The obligation to install solar panels is only one part of the European strategy, which also includes such measures as decarbonising industry, diversifying and changing the gas supply, and considering hydrogen power.

For existing buildings, key considerations

For buildings already standing today – whether in Europe or not – a few critical questions should be answered first before going ahead with plans for rooftop solar installation.

First, what is the current condition of the roof? Is it strong enough for a solar panel installation? And if so, how long until it needs to be replaced?

You don't want to install the same solar panels twice. To avoid extra costs and hassle, carefully consider the amount of time left in the roof – and if in Europe, the approaching solar installation deadline – before proceeding with the installation. If necessary, renovate the roof ahead of schedule.

That leads to the next critical question. What kind of materials are in the roof? Solar panels add fire risk to a building so it matters what's underneath them.

The world's leading insurance companies advise only using non-combustible materials under rooftop solar installations to mitigate that risk.

We cover fire, load and installation risks that come with rooftop solar installations in more detail in the next section.



Risks associated with solar panel (PV) installations on flat roofs

Fire risk

One of the main risks linked to solar panel installations, especially on flat roofs, is fire safety. A recent study completed by the ZAG institute highlights several risk areas:

■ Solar panels can act as an ignition source for flat roof fires

More specifically, it is the isolators, inverters, combiner boxes, fuses and connectors that potentially serve as ignition sources. Such an event could be due to poor workmanship or a lack of sufficient maintenance in combination with the weather (UV, wind, rain) impacting the system components.

■ Solar panels can radiate heat back to the roof structure

When a fire occurs beneath installed solar panels, the heat will be radiated back to the underlying construction, which will add to the fire load, increasing the fire spread and intensity.

■ Solar panel fires on flat roofs are difficult to extinguish

Fire fighters can have issues reaching the actual fire as it is partially covered by the panels. Then there is their safety. Firefighters must consider the risk of the roof collapsing as well as electrocution, since solar panels cannot be turned off.

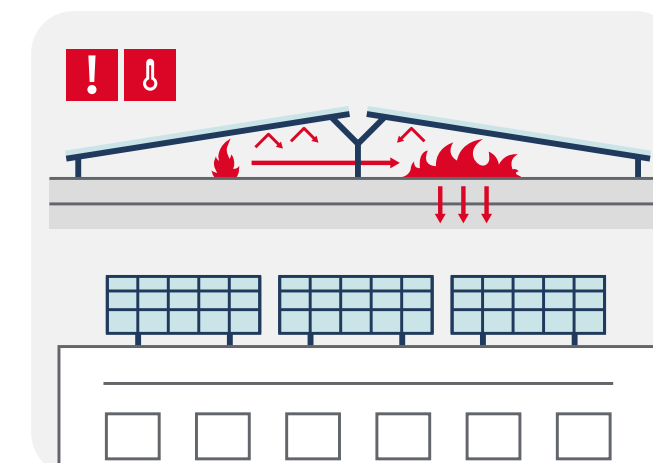
Note: Solar panels are not considered to be part of the building structure in many countries, so they are not included in the fire regulations for buildings. This also means that there are no standardised fire tests for solar panels.

Is the roof strong enough?

Installing solar panels on flat roofs can also increase the risks associated with mechanical loads on the underlying roof construction.

■ Potential damage to the roof membrane

The structure that supports the solar panels is placed on the roof construction as a point-, line- or area- load and has the potential of deforming or even damaging the roof membrane or underlying insulation layer.



■ Wind displacement

Particularly in coastal areas and on high buildings, strong winds mean that solar panels might need additional fixings or ballast on their support frames to keep them securely in place. This can add to the total weight or dynamic load on the roof and needs to be considered during the design.

■ Snow accumulation

After snow fall, the additional weight on the panels needs to be transferred through the support structure. If the snow slides from the panels and gathers within the walk-areas between the solar panels, this can impact the roof construction as well as the support structure.

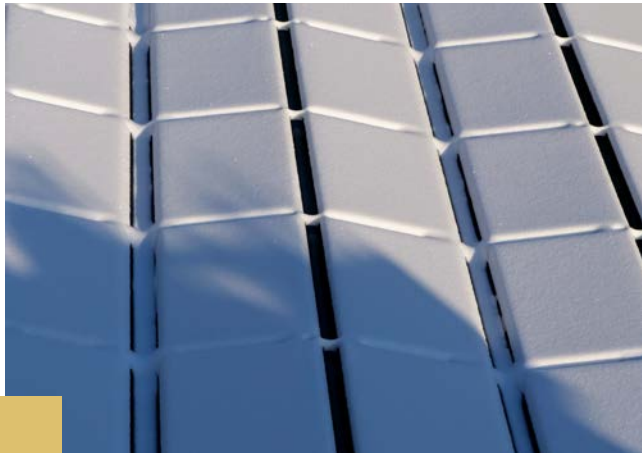
The mechanical loads impacting the integrity of the roof structure need to be carefully considered when designing a new roof or retrofitting an existing one.

Installation risk

During the installation process, extra care needs to be taken to ensure that the roof is not damaged.

■ Storage

Storing solar panels and materials on top of the roof before installation can impact the integrity of the roof membrane and result in severe long-term damage to the whole construction.



■ Placement

Installing solar panels means extra work taking place on top of a finished roof. Once again, this can result in damage to the roof membrane, affecting the entire building.

"PV panels should not be located on combustible roofs or roofs with combustible insulation".

RSA, Risk Control Guide, Photovoltaic Panels

ROCKWOOL flat roof solutions & benefits

Solar power adoption is rising rapidly, with more rooftops featuring solar installations. Is your roof next? Is it ready? We can help you understand the fire risk associated with rooftop solar installations and how ROCKWOOL products can help protect your people and property.

Fire safety

In recent years, high-profile building fires have led to increased scrutiny of the fire safety of our buildings.

As a result, many countries have strengthened requirements for the fire properties of building materials.

At the same time, a lack of standardised fire regulation for solar panels on flat roofs means building owners, architects and insurance companies cannot only rely on authorities to ensure the added fire risk is adequately accounted for.

The impact of fire on a roof is significant due to business and logistics interruption. It can even lead to discontinuity of business. Fire safe constructions can help limit fire spread, giving peace of mind to building owners and the people that use those spaces.

Our ROCKWOOL non-combustible stone wool insulation is fire resilient, withstanding temperatures of over 1000 °C, helping contain a fire and prevent its spread.

In fact, many insurance companies recommend the use of non-combustible insulation materials together with solar panel installations, with some large companies and building owners insisting that ROCKWOOL roofboard insulation be used in such cases.



Mechanical performance

The load resulting from solar panels and eventual accumulated snow is transferred to the roof structure through the support frames. The most commonly used frames are those that transfer the load through rail profiles, which is known as line load distribution. Alternatively, the substructure can be fully supported by tiles to create a full load distribution, or by using small feet or pods, to create a point load distribution.

Our ROCKWOOL PV-ready flat roof products come with support load information specific to the support method used, allowing maximum design freedom.

Depending on the location, size and height of the building, wind can cause issues with solar panel installations. Particularly problematic for the roof edges of high buildings or on structures in coastal regions that typically experience stronger winds, this can lead to the underlying construction being damaged. In line with building traditions, a wind-safe fixing method needs to be selected.

Our ROCKWOOL non-combustible roof insulation is designed to work flexibly with different fixing methods.

To ensure optimal functionality, solar panels require occasional maintenance. Their layout could also need alteration in the case of other roof installations being installed, such as AC equipment or extra skylights.

Our ROCKWOOL flat roof boards come with the necessary mechanical properties to accommodate the solar maintenance needs. In the case of roof alterations the insulation is easily removed, replaced or cut to size.

Installation security

Solar panels are not entirely new to the flat roof market, meaning that many of the ROCKWOOL flat roof boards available have been adapted to meet these specific needs. However, there is an increased focus on performance and safety, both during the installation of solar panel arrays as well as over the lifetime of a building.

When solar panels are installed, additional materials are placed on the roof and extra care needs to be taken to avoid damage to the underlying construction. While installation experience is increasing, precautionary measures should be taken to ensure that the roof membrane and insulation is protected from damage during installation.

A protective layer on top of the roof membrane, such as rubber mats or wooden planking, will prevent membrane damage from pallets or other storage materials. This also avoids long-term damage due to water penetration into the underlying roof construction or even the rooms below.

Extra attention to keep the work area clean and tidy while installing, such as removing sharp objects and small metal pieces, will help avoid potential damage to the roof construction.

"ROCKWOOL non-combustible insulation is the safest choice for flat roofs with solar panels".

Su Min Woo, Group Product Manager

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More information

[More information can be found on our website.](http://www.rockwool.com)

Contact your local ROCKWOOL offices to acquire detailed product proposal and installation advice.

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