

Pitch perfect

What the MCS012 regulations mean for roof integrated solar panels.

THE MICROGENERATION CERTIFICATION SCHEME

The Microgeneration Certification Scheme introduced tighter standards for pitched roofing installation of solar panels in 2016. It could be argued, though, that these requirements have always been there because of the need for every installation to comply with UK Building Regulations.

Underpinning the scheme is a test procedure called MCS012, which defines a series of tests that can be used to assess the performance of pitched roofing installations for three main criteria:

- ▲ weather tightness
- ▲ wind uplift resistance
- ▲ external spread of flame

The testing regime is designed to ensure that solar installers have all the information in their hands to demonstrate that their installations do not impair the weather tightness of the roof, have adequate resistance to wind suction forces and comply with building regulations on the fire performance of roof coverings

Systems and system components that are used to install solar panels above an existing pitched roof covering (on-roof systems) do not need to be tested for either weather tightness or external spread of flame, so long as they can demonstrate that the roof covering is not affected by the installation, for example, if the gaps between tiles are increased. By contrast, systems that integrate and replace the roof covering (in-roof systems) are tested for all three aspects.



MEASURE AND DECLARE

It is important to recognise that MCS012 sets no minimum requirement for wind resistance or fire rating, instead it takes a 'measure and declare' approach. It is up to the installer to check that the declared wind resistance is higher than the expected loads, and that limitations imposed by building regulations on the use of systems with lower fire ratings are observed.

HOW THE STANDARDS CALL UP MCS012

If the MCS012 standard itself is only a description of a test, where does the requirement to use MCS012 accredited products arise? The answer is found in the installer standards - MIS3001 for solar thermal and MIS3002 for solar PV.

MIS 3002 mandates that Solar PV Microgeneration systems must be designed and installed in accordance with the "Guide to the Installation of Photovoltaic Systems", a joint publication by MCS and ECA.

Section 4.3.10 of the Guide mandates the use of MCS012 for pitched roof installations.

By contrast, the solar thermal standard - MIS 3001 - does not require the installer to use products that have been tested to MCS012. However for in-roof systems solar installers will find it much easier to demonstrate compliance with the requirements of the standard by choosing an MCS012 accredited system.

Both MIS3001 and MIS3002 make explicit the requirement for the installer to meet building regulations. In England and Wales approved document B deals with fire safety. Roofing materials (including roof-integrated solar panels) must have a fire rating, and depending on the fire rating achieved by the product, limitations may be placed on the size of the solar system or its maximum distance from the property boundary.



Marley SolarTile® (a Clearline Fusion product) achieved the highest possible wind resistance during testing for MCS012

PRACTICAL IMPACT ON INSTALLERS

If you thought that getting ready for MCS012 was only a matter of using products that have the accreditation, think again. The test certificate merely provides the installer with declared performance values. There's no minimum standard, no pass or fail. The wind resistance might be really high, or it might be so low you can only use the system in areas with the lowest wind speed. The fire rating might mean you can use the system anywhere on the roof, or it might mean you can only use it for a small area in the middle of the roof.

The installer is required to calculate the design wind uplift pressure for the installation taking into account the building location, roof height and shape, and panel location on the roof. The Guide provides a simplified methodology for doing this, based on Eurocode 1. The installer must then select or design a system where the declared failure load of each component exceeds the calculated design load, plus a safety factor.

Installers can utilise the simple-to-use wind loading calculator to help them easily comply with this requirement.

The requirement to comply with the building regulations also includes fire safety. Roofing materials (including roof integrated systems that replace the roof covering) must be tested for their resistance to the spread of flame. Depending on the declared performance, restrictions are placed on how much of the roof can be given over to the solar panels and how close to the boundary they can be installed.

For more details, see our 'Fire Safety' fact sheet covering fire regulations for solar installations.

MCS012 has clarified that roof integration systems for use with interchangeable solar modules that rely on the module itself for the fire rating, only have a valid fire-rating when used with the module type with which it was tested. If an installer were to use a system like this with a different module, then the installation would have no fire rating and cannot comply with the building regulations. The only option is for the installer to install a fire barrier with an independent fire rating behind the system.

CONCLUSION

The MCS012 standard has forced solar manufacturers to test their products for wind resistance, fire performance and weathertightness. However, just because a product has done the testing does not mean you can use it wherever you want and be compliant with the regulations.

The responsibility to check that the wind resistance and fire performance of products is high enough for where they are being used rests firmly with the installer.

Some will complain that this is yet more bureaucracy emanating from MCS but building regulations have always been a requirement for solar installations, all MCS012 does is provide a clear route to demonstrating compliance.

Pitched Roof Wind Loading Calculator

PROJECT
Project number
Project Name
Client

SITE
Site
Basic wind speed (from map): 22.34 m/s
Site altitude above sea level: 50 m
Distance from the sea: 2.28 km
Location type: Country
Note: Country includes sites less than 0.5km from town boundary

INSTALLATION
Roof height: 10 m
Roof pitch angle: 20 degrees
Panel Type: In-roof

SELECT ROOF ZONE

Monopitch, Durgitch, Hipend

Gridified method ensuring solar panel avoids edge zones, where:
a = greater of L/10 or 1/10
b = smaller of B/10 or 1/10

Wind Case Negative Pressure Coefficient: C_{pe} 0.60
Wind Case Positive Pressure Coefficient: C_{pi} 0.40
(According to Eurocode 1, EN 1991-1-4)

RESULTS

Peak velocity pressure (q_p): 1.52 Pa
Wind load negative pressure: 413 Pa
Wind load positive pressure: 433 Pa
Load partial safety factor: 1.35

Design load
(-) 528 Pa
(+) 552 Pa

Solar Panel Design Resistance
(including partial safety factor)

	Clearline [®]	Clearline PV [®]	Hipline [®]	Clearline [®] on-tile
1-1	(+)			
2-2	4520	2408	2408	OK
3-3	2408	2408	2408	OK
4-4	2408	2408	2408	OK
5-5	2408	2408	2408	OK

Clearline and Clearline PV design resistance values based on a 1000mm x 1000mm test specimen and a 1000mm x 1000mm test specimen. See MCS012 certification for more details.

Hipline has been tested under EN12512 to 1.100 Pa, which corresponds to 10 m/s with partial safety factor of 1.40.

The calculation is based on the simplified wind loading method in BS5400:4. Topography is assumed to be insignificant, marked edge zones of pitched roofs are assumed avoided. Wind direction offers no warranty as to the accuracy of the result. You should consult a structural engineer.

For use with: Clearline, Clearline PV and Hipline solar panels only.

This simple wind uplift calculator is an easy way for installers to demonstrate compliance.


Tell me more

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Or visit marley.co.uk/solar

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*Marley Solar is Clearline Fusion a Viridian Solar product

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