



Pitch Perfect

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What the MCS012 regulations mean for roof integrated solar panels.

The Microgeneration Certification Scheme is introducing tighter standards for pitched roofing installation of solar panels from May 2nd 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 changes is a test procedure called MCS012, which defines a series of tests that can be used to assess the performance of pitched roofing installations in three main areas

- 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.

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



Clearline Fusion achieved the highest possible wind resistance during testing for MCS012

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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.

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.

Viridian Solar has produced a simple-to-use wind loading calculator for installers in spreadsheet form, to help them easily comply with this requirement.

See also our briefing on [wind loading of solar panels](#).

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 briefing on [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.

Pitched Roof Wind Loading Calculator

PROJECT
Project number
Project Name
Client

SITE
Basic wind speed (from map) 22-24 m/s
Site altitude above sea level 50 m
Distance from the sea 2-30 km
Location type Country
Note: Country includes sites less than 8.3km inside town boundary

INSTALLATION
Ridge height 10 m
Roof pitch angle 30 degrees
Panel Type In-roof

SELECT ROOF ZONE
Monopitch Dupitch Hipped

RESULTS
Peak velocity pressure (q_p) 1,022 Pa
Wind load negative pressure -613 Pa
Wind load positive pressure 409 Pa
Load partial safety factor 1.35

Design load
(-) -828 Pa
(+) 552 Pa

Solar Panel Design Resistance
(including partial safety factor)

	Clearline [®]	Clearline PV [®]	Hightline [®]	Clearline [®] Fusion
Fusion	(-) -5200	(+) 2400	OK	
Clearline	-2400	2400	OK	
Clearline PV	-2400	2400	OK	
Hightline	-763	763	NA	

Clearline and Clearline PV design resistance was tested on a representative roof structure and includes material/partial safety factors. See MCS012 certification for more details.

Hightline has been tested under EN12475 to 1,100 Pa, which corresponds to 1020Pa with partial safety factor of 1.4.

Worst Case Negative Pressure Coefficient C_s -0.50
Worst Case Positive Pressure Coefficient C_s 0.40
(According to Eurocode 1, EN 1991-1-4)

The calculation is based on the simplified wind loading method in BS2: digest 455. Topography is assumed to be insignificant, marked edge zones of pitched roofs are assumed avoided. Viridian Solar offers no warranty as to the accuracy of this tool. If in doubt, consult a structural engineer.

For use with Viridian Solar Clearline, Clearline PV and Hightline solar panels only.

Viridian Solar provides installers with a simple wind uplift calculator to easily demonstrate compliance

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.

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