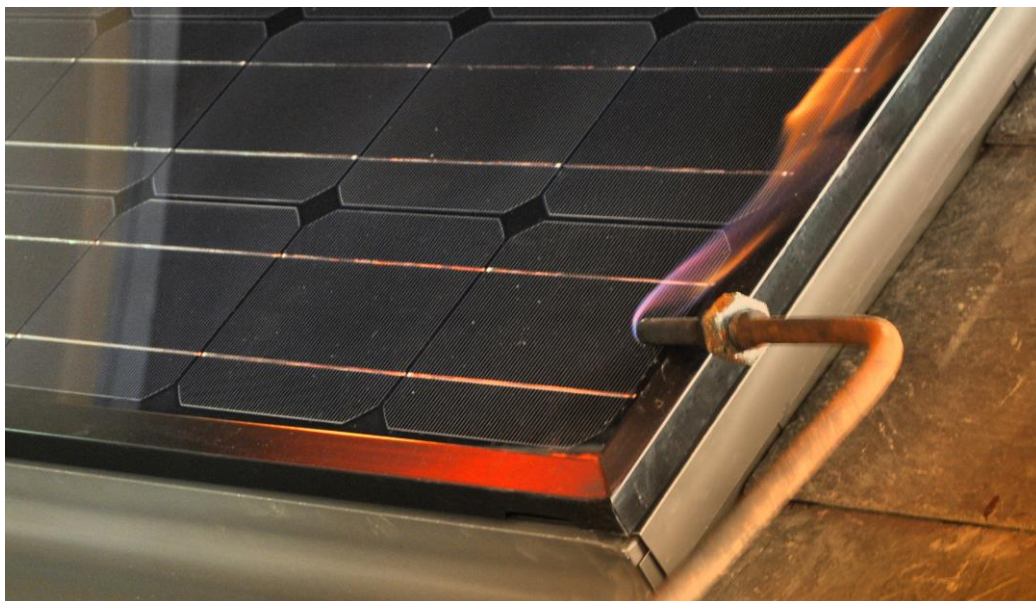


MCS GUIDANCE DOCUMENT

MCS 012 and the Fire Performance
of Pitched Roof Mounted Solar
Systems Briefing

COMPLYING WITH BUILDING REGULATIONS FOR FIRE WHEN INSTALLING IN-ROOF SOLAR PANELS



MCS 012 will become a mandatory requirement for MCS compliant solar photovoltaic (PV) installations on pitched roofs from May 2016. Both solar thermal and solar PV installations must meet the building regulations.

MCS 012 provides a way to help solar MCS Contractors demonstrate that their installation complies with building regulations. This document explains the requirements for resistance to the spread of fire.

Building regulations in the UK require buildings to be constructed in ways that resist the spread of fire between buildings. Acceptable ways of meeting the requirements as set out in the national regulations are described in the relevant guidance documents.¹

For roofing, the focus is on preventing fire spreading from the outside to the inside of the building. If next door is on fire and flames and burning materials are landing on the roof then the roof covering has a critical role to play in stopping the fire spreading down the street. The regulations place restrictions on where products with different fire performance can be used and how large a continuous area of roof can be covered.

The way the rules work in England and Wales are illustrated below. Regulations in Scotland, Wales and Ireland differ slightly in detail but follow a similar concept.

¹In England & Wales, Approved documents B; in Scotland, Technical Handbook, Section 2, and in Northern Ireland, Technical Booklet E

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Solar PV installed correctly above non-flammable roof coverings should not affect the fire performance of the roof. Installations in-roof, effectively the replacement of part of the roof covering, may affect the roof's overall fire performance such that it does not comply with the regulations.

MCS 012 requires pitched roof kits that replace the roof covering to be tested and for manufacturers to declare their fire performance rating.

It is important to note that MCS 012 is a *test and declare* standard. There is no pass or fail level, so just because a product is in possession of an MCS 012 certificate is not to say that a product can be used anywhere. It is up to the installer to assess whether the declared fire performance is adequate for the installation.

IN-ROOF SOLAR SYSTEMS THAT USE INTERCHANGEABLE PV MODULES

Some roof integrated solar kits are intended to allow the use of interchangeable solar modules. If the kit relies on the fire performance of the solar module for the overall fire performance of the system then this raises the question of the fire performance of different PV modules.

Evidence has emerged from MCS 012 testing that the response of apparently similar PV modules to fire tests can be radically different. Some modules are able to achieve a good resistance to fire whereas others experience failures such as shattering of the glass coversheet or ignition and burning of sealant material to a sufficient extent as to lower the fire classification.

MCS has chosen to adopt a precautionary approach. In the latest version of MCS 012 (issue 2.0) this approach has been clarified. Where an in-roof kit relies on the fire performance of the solar PV module to achieve its fire classification, the classification is valid only when that roofing kit is used with the family, or families, of solar modules with which it was tested. In such cases the MCS 012 certificate will state both the fire classification achieved and the family or families of solar modules with which the kit achieves this classification.

Combining such a kit with a PV module from a different product family would result in a roofing system without a fire classification. The only way to ensure compliance with building regulations and therefore to meet MCS requirements would be for the solar installer to make additional works to give the roof behind the solar roofing kit a suitable fire rating in its own right. This could be achieved, for example, by installing a barrier material that already has a roofing fire classification suitable for building regulations behind the solar roofing kit.

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If kit producers wish to achieve a wider scope without such barrier materials they could:

- Carry out fire testing using PV modules from specific product families and gain an extension to their certification
- Modify their kit to achieve a suitable fire resistance without the PV module in place and demonstrate this by testing.

FUTURE DEVELOPMENT OF THE STANDARD

MCS has commissioned research into the fire performance of solar panels to investigate whether solar panels can be grouped into families of similar fire performance according to identifiable features.

This work will allow manufacturers of roofing kits that rely on interchangeable panels for fire performance to test and declare for each family based on testing a limited range of PV modules.

HOW TO MAKE SURE AN INSTALLATION COMPLIES

Table 5 from Approved Document B (for England and Wales) is reproduced below and shows how the fire classification achieved might restrict the use of an in-roof solar panel system.

Table 5 Limitations of Roof Coverings

Designation of Roof Covering		Minimum distance from any point on relevant boundary				● Acceptable ○ Not acceptable
National Class	European Class	Less than 6m	At least 6m	At least 12m	At least 20m	
AA, AB or AC	B _{ROOF} (t4)	●	●	●	●	
BA, BB or BC	C _{ROOF} (t4)	○	●	●	●	
CA, CB or CC	D _{ROOF} (t4)	○	● 1, 2	● 1	●	
AD, BD or CD	E _{ROOF} (t4)	○	● 1, 2	● 1	● 1	
DA, DB, DC or DD	F _{ROOF} (t4)	○	○	○	● 1, 2	

NOTES

1. Not acceptable on houses in terraces of three or more houses, or houses larger than 1500m³
2. Acceptable if solar panel kit area is smaller than 3m² and separated from other solar panel kits by more than 1500mm

Solar panel installation kits that achieve an AA, AB or AC rating can be used anywhere on the roof and without limitation to the area covered. If a solar kit with a lower fire rating is used, then the distance of the installation from the 'relevant boundaries' of the building must exceed the distance given in the table. In some circumstances there are also limitations placed on the maximum area given over to the solar panels in any one continuous section and minimum distances between such sections.

Products without classification, apart from exceptions for some natural materials cannot be used.

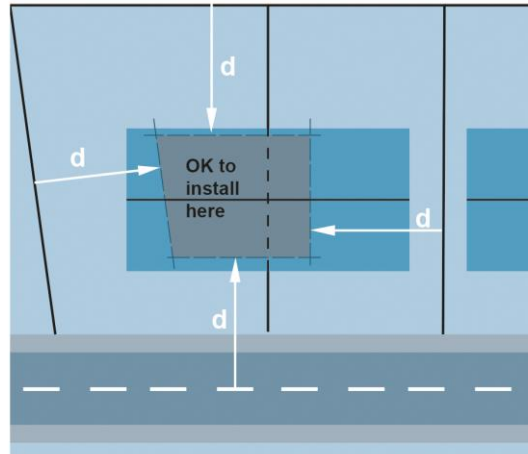
The 'relevant boundary' is the boundary towards which a given wall of the building faces. The boundary is generally the site boundary, but in the case of a road, river, railway or canal forming the boundary, the center line of this can be taken.

The example below shows how the requirements apply to a solar panel installation.

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EXAMPLE

A developer wants to install solar panels onto a pair of semi-detached houses, bounded on three sides by other properties and the fourth by a road as shown in the diagram. The relevant boundaries are with the adjoining properties and the center-line of the road.



1. AA, AB, AC rated solar kit - the solar panels can be installed anywhere and in any amount of roof covering.
2. BA, BB, BC rated solar kit - the panels can be installed within a bounded area with the distance $d=6m$.
3. CA, CB, CC, AD, BD, CD rated kit - either $d=6m$ and the panels are installed in areas no bigger than $3m^2$ with a gap of $1.5m$ covered with tiles between these areas, or $d=12m$ with no restriction on panel area.
4. DA, DB, DC, DD rated kit - $d = 20m$ and the panels are installed in areas no bigger than $3m^2$ with a gap of $1.5m$ covered with tiles between areas of solar.

AMENDMENTS ISSUED SINCE PUBLICATION

Document no.	Approval	Amendment details	Date
1.0		First issue.	05/04/2016
1.1		Updated for the replacement of brand elements including fonts and logos.	09/07/2019

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