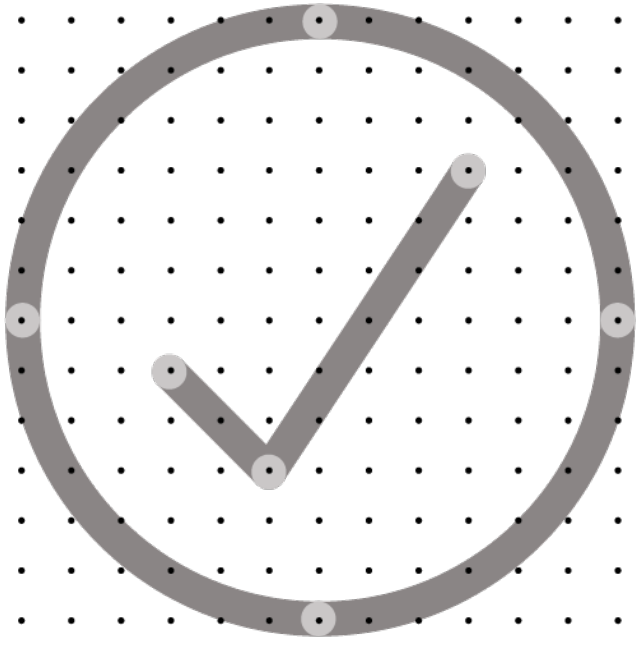
STANDARDS DOCUMENT

MIS 3002: 2025 ISSUE 1.0

MCS 2025

Solar PV: Installation Standard



This Standard was prepared by the MCS Solar Photovoltaic Systems Working Group.

It is published by The MCS Service Company Ltd on behalf of The MCS Charitable Foundation.

Whilst all reasonable care has been taken in the preparation of this document it is provided on an "as is" basis without any guarantee of completeness or accuracy. The MCS Service Company Ltd and The MCS Charitable Foundation (and any related parties) do not accept liability for any errors or omissions in the document nor for the use or application of the information, standards or requirements contained in the document by any third party.

The MCS Service Company Ltd welcomes comments of a technical or editorial nature and these should be sent to *meetings@mcscertified.com*

The MCS Service Company Ltd
Violet 3,
Sci-Tech Daresbury,
Keckwick Lane,
Cheshire WA4 4AB

www.mcscertified.com
hello@mcscertified.com
0333 103 8130

TABLE OF CONTENTS

ABOUT MCS

MCS: Giving everyone confidence in home-grown energy

With energy costs constantly rising and climate change affecting us all – low-carbon technology has a bigger and bigger role to play in the future of UK energy. MCS is here to ensure it's a positive one.

MCS is the UK's quality mark for small-scale renewable energy technologies like solar PV, solar heating, heat pumps, biomass, and battery storage. We have two main roles – setting and maintaining standards, and providing consumer protection.

Our Standards define how certified renewable energy installations should be designed and installed using MCS certified products. They are a benchmark for quality developed in close consultation with industry through independent technical working groups.

The Standards are owned by The MCS Foundation (a charitable trust), but maintained and developed by MCS.

www.mcscertified.com

CHANGES TO STANDARDS

When MCS Standards are revised, the issue number is also revised to indicate the nature of the changes. This can either be a whole new issue or an amendment to the current issue. Details will be posted on the website at www.mcscertified.com

Technical or other significant changes which affect the requirements for the approval or certification of the product or service will result in a new issue. Minor or administrative changes (e.g. corrections of spelling and typographical errors, changes to address and copyright details, the addition of notes for clarification etc.) may be made as amendments.

The issue number is given on the left of the decimal point, and the amendment number on the right. For example, issue 3.2 indicates that it is the third significant version of the document which has had two sets of minor amendments.

Users of this Standard should ensure that they are using the latest issue.

Amendments issued since publication

Issue No.	Amendment details	Date
1.0	First publication for MCS:2025 1.0	01/01/2025

FOREWORD

Compliance with this Standard is mandatory for MCS Contractors certified to MCS: 2025.

The purpose of this Standard is to specify best practice in achieving high-quality low carbon technology installations. Whilst it is not possible to ensure safety, this Standard provides requirements which should help mitigate potential safety risks associated with the design and installation of this technology.

This document contains references to other documents which may be either normative or informative. At the time of publication any editions of those documents, where indicated, were valid. However, as all documents are subject to revision, any users of this document should apply the most recent editions of those referenced documents (unless a dated version is specified).

NOTE:
This MCS Installation Standard makes use of the terms 'must', 'shall' and 'should' when prescribing certain requirements and procedures. In the context of this document:

- the term 'must' identifies a requirement by law at the time of publication;
- the term 'shall' prescribes a requirement or procedure that is intended to be complied with in full and without deviation;
- the term 'should' prescribes a requirement or procedure that is intended to be complied with unless reasonable justification can be given.

Compliance with this MCS Installation Standard does not in itself confer immunity from legal obligations.

1 PURPOSE & SCOPE

This Standard specifies the requirements for MCS Contractors undertaking the supply, design, installation, set to work and commissioning of solar photovoltaic (PV) systems supplying permanent buildings and normally connected in parallel to the electricity distribution network up to a maximum DC output of 50kWp.

2 DEFINITIONS

Refer to Installer Operating Requirements for general definitions (not specific to solar PV). For technical definitions please see below.

Term	Definition
Self-consumption	The amount of electricity on-site which is subsequently used within the building are not exported to the distribution network.

3 DESIGN & INSTALLATION REQUIREMENTS

3.1 LEGISLATION

3.1.1 All applicable legislation and directives must be met in full.

Note: the legislation which applies may be different in England, Wales, Scotland and Northern Ireland.

3.1.2 The MCS Contractor shall ensure the building is assessed by a competent professional experienced in solar photovoltaic systems to ensure that it is suitable for the installation and, by undertaking the proposed works, the building's compliance with the Building Regulations (in particular those relating to energy efficiency) is not compromised.

3.1.3 Suitable and sufficient risk assessments shall be conducted before any work on site commences.

Note: The installation of PV systems presents a unique combination of hazards – due to risk of electric shock, falling and simultaneous manual handling difficulty. All of these hazards are encountered as a matter of course on a building site, but rarely all at once. While roofers may be accustomed to minimising risks of falling or injury due to manual handling problems, they may not be used to dealing with the risk of electric shock. Similarly, electricians would be familiar with electric shock hazards but not with handling large objects at heights.

3.1.4 Where responsible for notification under the Building Regulations, the MCS Contractor shall ensure notification has been completed prior to handing over the installation.

Note: where notification under the Building Regulations is to be undertaken by others (e.g. the developer of a new-build project) then it is permissible for the MCS Contractor to handover the installation immediately following commissioning.

Self-certification, in lieu of building control approval, is only permitted where installation and commissioning is undertaken by an entity registered with a Competent Persons Scheme (CPS) approved by the relevant government department for the scope of work being undertaken. Further details can be found at http://www.competentperson.co.uk.

3.1.5 The MCS Contractor must ensure the installation is compliant with the Electrical Safety, Quality and Continuity Regulations 2002 and, in accordance with Regulation 22(2)(c), must follow the technical requirements and procedures:

- In Engineering Recommendation (EREC) G98 for installations up to and including 16 A per phase
- In EREC G99 for installations exceeding 16 A per phase
- In EREC G100 where the export of power is to be limited

3.1.6 Notification to the Distribution Network Operator (DNO) in accordance with the procedures set out in EREC G98 or EREC G99 (full or fast-track process as appropriate) shall be undertaken by the MCS Contractor.

Note: the 16 A per phase threshold is the total aggregated AC output of all generators. For example, a 3kW solar PV system and a 3kW electrical energy (battery) storage system are connected in parallel to the same single-phase AC supply, gives a combined maximum theoretical output greater than 16 A. In this case EREC G99 applies.

3.2 STANDARDS AND INDUSTRY PRACTICES

3.2.1 Solar PV systems shall be designed and installed in accordance with the 2nd Edition of the IET Code of Practice for Grid Connected Solar Photovoltaic Systems – hereafter referred to as the Code of Practice:

- with the additional requirements given in Sections 3.4 to 3.9 below (inclusive); and
- with the exceptions given in Section 3.3.

3.2.2 For a particular installation, should a conflict arise between specific requirements, then the latest version of BS 7671 shall take precedence.

Note: particular attention is drawn to Part 7-712 Requirements for special installations or locations – solar photovoltaic (PV) power supply systems.

3.2.3 All references in both this Standard, and the Code of Practice, to Harmonized Standards listed in the Official Journal of the European Union for demonstration of conformity to relevant legislation shall be read as a version of that standard listed in the current Official Journal of the European Union, or any replacement standard should that standard have been removed from the Journal.

3.2.4 All references in both this Standard, and the Code of Practice, to other national or international standards shall be read as the latest version of that national or international standard, or any superseding standard should the standard be withdrawn.

3.3 EXCEPTIONS TO THE REQUIREMENTS IN THE CODE OF PRACTICE

3.3.1 Section 11.4.1 in the Code of Practice states that roof brackets used to fix a PV system to a slate or tiled roof shall not impose any load on the slates or tiles (page 129 paragraph (c)). Where the roof brackets are designed to transfer an evenly distributed load to the roof covering that does not cause damage, then this requirement in the Code of Practice does not apply.

Note: such brackets shall have demonstrated that they do not cause damage by certification to MCS 012 and specifically tested to be compliant with MCS 012 Clause 7.7.2 sub-paragraph b).

3.3.2 Section 5.13.2 in the Code of Practice (Figure 5.7 option d)) allows for the system designer to specify if the array frame requires earthing. Where the decision is taken by the system designer to not provide either protective or functional earthing, justification shall be recorded.

Note: Correct application of the decision tree in Figure 5.7 would normally lead to the requirement to provide either protective or functional earthing of the array frame.

3.3.3 Section 6.2 in the Code of Practice advocates for a risk assessment for lightning protection and a decision to be taken. BS7671:2018+A2:2022 (regulation 443.4.1) stipulates the circumstances when protection against transient overvoltage must be provided. Even when those circumstances do not apply protection must still be provided unless the owner of the installation is prepared to tolerate the risk.

Note: some inverters may incorporate the type of protection necessary to comply, but this should not be assumed.

3.4 MANUFACTURER'S INSTRUCTIONS

3.4.1 All equipment should be installed in accordance with its manufacturer's instructions.

3.4.2 Where the manufacturer's instructions conflict with the requirements of this Standard then the requirements of this Standard take precedence unless it can be proven that system performance, safety and durability are no worse than if the requirements of this Standard are followed.

3.5 EQUIPMENT CERTIFICATION AND LISTING

3.5.1 The solar PV modules installed shall be listed on the MCS website (www.mcscertified.com). These listings include solar PV products both MCS certified (against MCS 005 or MCS 017) and by other schemes that MCS considers equivalent.

3.5.2 Solar PV systems mounted above, or integrated into, pitched roofs shall utilise products tested and certified according to MCS 012 Pitched Roof Installation Kits.

3.5.3 All components used to mount the system shall be specifically approved to work together unless described by the manufacturer as universally compatible with other manufacturers' components.

3.5.4 Where mounting systems are certified or listed using a named PV module or modules then only those modules shall be used.

3.5.5 Where there are no MCS 012 certified mounting systems suitable for a given installation, a custom designed mounting system may be used subject to the following being met:

a) The system is compliant with current Building Regulations for weather-tightness, fire and wind resistance.
b) The system designer and/or fixing supplier must confirm in writing that the final installation is in accordance with a) above and its instructions.

3.5.6 All installed equipment:

a) Shall be fit for its purpose in the installation;
b) Has completed the conformity assessment process and is appropriately marked by a Notified Body in compliance with the relevant legislation.

Note: for example, this means the CE mark but could change as the UK leaves the EU.

3.6 DESIGN AND INSTALLATION

3.6.1 All work under this Standard work shall be carried out:

a) with adequate and proper materials which
   i) are appropriate for the circumstances in which they are used;
   ii) are adequately mixed or prepared; and
   iii) are applied, used or fixed so as adequately to perform the functions for which they are designed; and
b) in a workmanlike manner.

3.6.2 Module layout should allow access for maintenance and emergency services.

Note: The larger the installation the more care is required and Solar Energy UK is developing comprehensive guidance on this subject. Consideration should be given to:

- *the provision of access/walkway around the perimeter of the array*
- *arranging larger arrays into smaller blocks with access corridors between*
- *the provision of permanent protection over fragile roof elements such as skylights*
- *the provision and type of permanent access ladders*

3.6.3 PV array DC plug and socket connectors should be protected from water ingress for the lifetime of the system.

Note: For example, connectors should not be installed in such a way that they could stand in any permanent or regularly occurring bodies of water. Raising the connector out of the water, locating the connector away from a potential body of water and installing a drip-loop are all measures that should be considered where practicable.

3.6.4 PV array DC plug and socket connectors shall be assembled with the correct tools and procedures to minimise the risk of failure.

Note: use of incorrect tools for crimping and assembling of DC connectors has been identified as a significant contributing factor to connection failure and even fires.

3.6.5 The appropriate Ingress Protection (IP) rating of all components shall be maintained for the location.

Note: for external installations in particular this will require cable entry into the bottom of enclosures, use of a drip-loop, and a single cable per gland.

3.6.6 Solar PV systems shall not be connected to the AC output of any form of voltage management device without consent of the DNO.

Note: See clause 7.6 in EREC G98 or 7.7 in EREC G99.

3.6.7 Where present, any arc fault detection function within the inverter shall be enabled.

3.6.8 The cables used for the AC circuit shall be sized to minimise voltage drop as far as is reasonably practicable.

Note:

When calculating the voltage drop the reference points are between the "Service Head" (suppliers cut out) and the AC input terminals of the inverter.

Minimising voltage drop is important both to optimise system performance (reducing losses) and to prevent inverters nuisance-tripping due to over-voltage.

For most domestic small scale installations a voltage drop of 1% is considered practicable, whereas for larger systems and/or those with long cable runs, up to 3% may be more practicable.

3.7 METERING & COMMUNICATION

Metering

3.7.1 A means of recording and displaying the total AC generation of the system shall be installed.

3.7.2 If required for billing and / or payment purposes, the means of recording AC generation of the system shall be a meter approved under the European Measuring Instruments Directive (MID) showing the serial number on the front panel where it could be photographed alongside the make, model and meter reading.

Note: Installation of a MID approved meter would also satisfy clause 3.7.1.

3.7.3 The means of recording AC generation, be it a dedicated meter or otherwise, should be accessible and readable by the customer without requiring the use of a tool, ladder or torch.

3.7.4 Where energy is taken from the grid to be stored in an EESS and later returned to the grid or installation, that energy shall not affect the veracity of any meters recording energy generated, imported or exported where those meters are used for billing or payment.

Note: An example would include the meter recording total generation of the solar PV system where the recorded energy is used for payment of financial incentives such as the Feed-in Tariff. Any error in that reading could cause a claim for payment to be inaccurate and fraudulent. For the avoidance of doubt this clause allows for the correct recording by the supply meter of the energy taken from the grid to be stored in the EESS.

Examples of different metering arrangements which do and do not satisfy this clause are given in the Ofgem document: Guidance for generators: Co-location of electricity storage facilities with renewable generation supported under the Renewables Obligation or Feed-in Tariff schemes.

Data, communication & security

3.7.5 A means of notifying the customer within 48 hours of the system ceasing to operate, or beginning to operate abnormally, should be provided.

Note: The installation of a MID approved meter installed in accordance with clause 3.7.2 could satisfy this requirement.

3.7.6 The data privacy and security of the site's home area network shall be maintained. Where the installation comprises of any internet connected devices:

- The device's network access credentials (username & passwords) shall be updated in consultation with the customer; and
- Relevant components in the solar PV system should comply with the technical specification ETSI Technical Specification 103 645 Cyber Security for Consumer Internet of Things.

3.7.7 For installations requiring local area network, home area network, and/or internet access in commercial and industrial premises, permission shall be obtained from those responsible for the client organisation's information technology and information security policies and procedures.

3.8 SAFETY AND DURABILITY

3.8.1 The MCS Contractor shall be able to demonstrate that the installation of the modules has not affected the fire performance of the roof.

Note: This can be demonstrated by:

a) Mounting above an existing non-combustible roof covering (pitched roofs);
b) Where in-roof (forming the main roof covering) using an in-roof kit with the appropriate fire performance rating for the proposed location of the array. See Appendix C for a worked example and guidance on fire classification relevant to distance from boundaries reproduced from Approved Document B applying in England & Wales.

3.9 SITE SPECIFIC ISSUES

3.9.1 PV systems should not adversely affect the weather tightness or structural integrity of the building to which they are fitted. The system should be designed and installed to ensure this is maintained for the life of the system.

3.9.2 Where the existing roof covering is under warranty, then the roof warranty provider should be consulted to establish if warranties will be invalidated by the installation.

Installation on pitched roofs

Pitched roofs are defined as those with an angle greater than 10° but less than 70° to the horizontal.

3.9.3 The MCS Contractor shall ensure that the roof structure is checked by a suitably competent person to ensure it can withstand the loads imposed by the solar PV system.

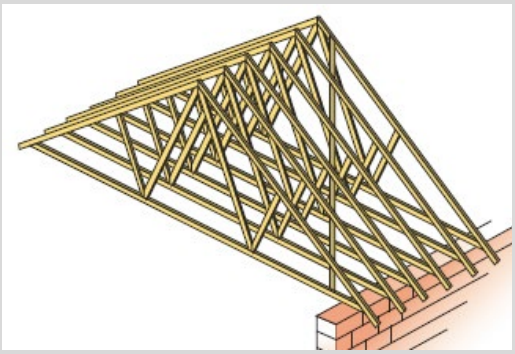
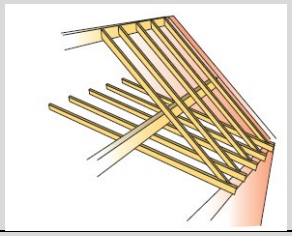
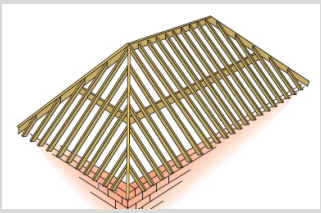
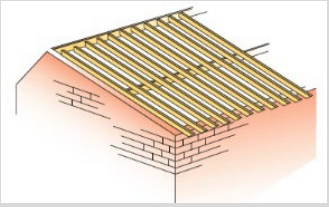
3.9.4 For the typical roof structure types shown in Table 1, the calculation methodologies given should be used.

3.9.5 Where the roof structure is in any way unusual, or there is any doubt whatsoever, a **qualified structural engineer** shall be consulted.

Note: An unusual roof structure would include any that:

- *Is not shown in* Table 1
- *Shows signs of structural distress*
- *Shows signs of post construction modification (e.g. removal of timbers, notching, change of roof covering to a heavier material),*
- *Where the roof pitch is particularly shallow (i.e. less than 30° to the horizontal)*
- *The roof design has increased potential for snow build-up (e.g. dormers, valleys, parapets etc)*

Table 1

Diagram	Construction type of roof	Typical methodologies
Roof constructed from Timber Trussed Rafters 		Method 1: Assuming a typical **design dead load** of 0.785kN/m^2, deduct the load of the existing roof covering to give the maximum allowable residual load available for the solar array.
		Method 2 (not generally applicable where the roof pitch exceeds 60°): Assuming a typical **design imposed load** of 0.75kN/m^2, deduct the likely snow load for the location taken from Eurocode-1 (BS EN 1991-1) to give the maximum allowable residual load available for the solar array.
	Traditional cut roofs constructed from timber rafters/purlins - gable ended	Calculate the maximum dead load for the rafters and purlins using the timber research and development association (TRADA) Span tables; deduct the load of the existing roof covering to give the maximum allowable residual load available for the solar array.
	Traditional cut roofs constructed from timber rafters/purlins – with hips and/or valleys	Consult a structural engineer
	Asymmetric duo-pitched roofs constructed from rafters and purlins	Consult a structural engineer

3.9.6 Solar PV modules should not be mounted within 400mm from any edge of a domestic roof unless specific measures are taken to:

- Resist the increased wind uplift forces in the edge zone through additional fixings and, where necessary, additional roof timbers for those fixings
- Ensure ridge-tiles remain secure
- Ensure rainwater run-off patterns are not affected
- Ensure build-up and shedding of snow cannot cause injury or property damage
- Reduce nuisance from wind noise

3.9.7 Where necessary to ensure rooftiles or slates are not displaced creating gaps greater than those pre-existing the installation, then those tiles or slates shall be notched or flashed as appropriate.

3.9.8 When screw-fixing brackets directly to metal roof cladding the roof-sheet thickness shall be checked to ensure that it is compatible with the fixing bracket and screws and it can withstand the additional wind uplift introduced by the solar PV system.

3.9.9 The fixing of the metal roof cladding to the main roof structure shall be checked to ensure that it is capable of transferring the imposed and wind uplift loads introduced by the solar PV system.

Installation on flat roofs

3.9.10 Flat roofs are defined as those with an angle less than 10° to the horizontal.

3.9.11 For mechanically fixed systems:

a) When fixing to an existing solid deck (e.g. concrete, brick or similar), a condition survey should be carried out and pull out tests undertaken.
b) Where it is not possible to reliably calculate the pull-out value, for example, concrete roof or where the roof build-up is not possible to ascertain the roof structure from the survey, pull out tests should be undertaken in accordance with the technical guidance published by the Single Ply Roofing Association "Site pull-out test protocol for flat roofs" (S15-19).

3.9.12 For ballasted systems:

c) The pressure coefficients shall be taken from BRE digest 489 or from recognised test data commissioned for the specific purpose of determining the wind loads on solar systems.
d) A protection/slip layer shall be used which is confirmed as compatible with the waterproofing layer(s).
e) The calculation of resistance to sliding for ballasted mounting systems shall use a co-efficient of friction of 0.3 unless the material combination (including slip layer) has been tested in accordance with Appendix D in which case the test results shall be used.
f) Where installed on granular substrates (e.g. gravel or green roofs) the calculation of resistance to sliding shall use a test value in accordance with Appendix D or shall be mechanically restrained against sliding (see note).
g) The wind resistance calculation shall declare the coefficient of friction used and where the coefficient of friction is greater than 0.3 the value should be evidenced by a test report.
h) A qualified structural engineer shall be consulted to ensure the roof is able to withstand the imposed load from both the solar PV system and the proposed ballast.

Note: Methods to mechanically restrain the system against sliding include the installation of a kerb in front of the PV systems or to use tether cables attached to an appropriate fixed point on the roof.

4 COMMISSIONING

4.1 COMMISSIONING

4.1.1 The solar PV system shall be commissioned according to a documented procedure to ensure that the system is safe, has been installed in accordance with the requirements of this Standard and the manufacturers' requirements, and is operating correctly in accordance with the system design.

4.1.2 The system shall be inspected and tested in accordance with Section 16 of the Code of Practice except 16.4.

Note: For information, suitable test and verification reports from BS EN 62446-1 are reproduced in Appendix E with the permission of BSI.

5 PUBLICATIONS, REFERENCE AND FURTHER READING

The below list are provided so that MCS Contractors know which documents have been used as a basis for the development of the requirements of this MIS standard and they are able to further research topics if they need to do so:

- BS 7671:2018 Requirements for Electrical Installations (IET Wiring Regulations Eighteenth Edition). Available from British Standards Institution (BSI): www.bsi-global.com or The Institution of Engineering and Technology (IET): www.theiet.org/publications/
- IET Code of Practice for Grid Connected Solar Photovoltaic Systems (IET publication ISBN 978-1-84919-721-2 Paperback, 978-1-84919-722-9 Electronic)
- Engineering Recommendation G99 Issue 1 – Amendment 1 published May 2018 - 'Requirements for the connection of generation equipment in parallel with public distribution networks on or after 27 April 2019'
- Engineering Recommendation G98 Issue 1 – Amendment 1 published May 2018 - 'Requirements for the connection of Fully Type Tested Micro-generators (up to and including 16 A per phase) in parallel with public Low Voltage Distribution Networks on or after 27 April 2019'
- Engineering Recommendation G100 Issue 1 – Amendment 2 May 2018 - 'Technical Requirements for Customer Export Limiting Schemes'
- BRE Digest 489 Wind loads on roof-based photovoltaic systems.
- BRE Digest 495 Mechanical installation of roof-mounted photovoltaic systems.
- BS EN 50549-1:2019 Requirements for generating plants to be connected in parallel with distribution networks. Connection to a LV distribution network. Generating plants up to and including Type B
- BS EN 1991-1-1:2002 Eurocode 1. Actions on structures. General Actions. Densities, self-weight, imposed loads for buildings.
- BS EN 13374:2013+A1 Temporary edge protection systems. Product specification. Test methods.
- BS EN 62446-1:2016+A1:2018 Photovoltaic (PV) systems. Requirements for testing, documentation and maintenance. Grid connected systems. Documentation, commissioning tests and inspection.
- BS EN 10088-1:2005 Stainless steels. List of stainless steels.
- BS EN 12975-2:2006 Thermal solar systems and components – Solar collectors – Part 2 Test methods.
- BS EN ISO 14713-1:2017 Zinc coatings. Guidelines and recommendations for the protection against corrosion of iron and steel structures. General principles of design and corrosion resistance.
- ETSI TS 103 645 Cyber Security for Consumer Internet of Things.
- Ofgem: Guidance for generators: o-location of electricity storage facilities with renewable generation supported under the Renewables Obligation or Feed-in Tariff schemes (version 2).

- MIS 3012 – MCS – The Battery Standard
- IET Code of Practice for Electrical Energy Storage Systems (IET publication ISBN 978-1-78561-278-7 Paperback, 978-1-78561-279-4 Electronic)
- Single Ply Roofing Association "Site pull-out test protocol for flat roofs" (S15-19)

APPENDIX A – FIRE RATING WORKED EXAMPLE

Approved Document B (2019 edition) applicable in England & Wales provides the following table:

Table 12.1 Limitations on roof coverings

Designation[1] of covering of roof or part of roof	Distance from any point on relevant boundary			
	Less than 6m	At least 6m	At least 12m	At least 20m
B_{ROOF}(t4)	●	●	●	●
C_{ROOF}(t4)	○	●	●	●
D_{ROOF}(t4)	○	●(2)(3)	●(2)	●
E_{ROOF}(t4)	○	●(2)(3)	●(2)	●(2)
F_{ROOF}(t4)	○	○	○	●(2)(3)

● Acceptable.

○ Not acceptable.

NOTES:

Separation distances do not apply to the boundary between roofs of a pair of semi-detached dwellinghouses and to enclosed/covered walkways. However, see Diagram 5.2 if the roof passes over the top of a compartment wall.

Polycarbonate and uPVC rooflights that achieve a class C-s3, d2 rating by test may be regarded as having a B_{ROOF}(t4) designation.

1. The designation of external roof surfaces is explained in Appendix B.
2. Not acceptable on any of the following buildings.
   a. Dwellinghouses in terraces of three or more dwellinghouses.
   b. Any other buildings with a cubic capacity of more than 1500m^3.
3. Acceptable on buildings not listed in (1) if both of the following apply.
   a. Part of the roof has a maximum area of 3m^2 and is a minimum of 1500mm from any similar part.
   b. The roof between the parts is covered with a material rated class A2-s3, d2 or better.

A developer wants to install solar panels onto a pair of semi-detached houses which has a cubic capacity of 1000m^3 and 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 centre-line of the road.

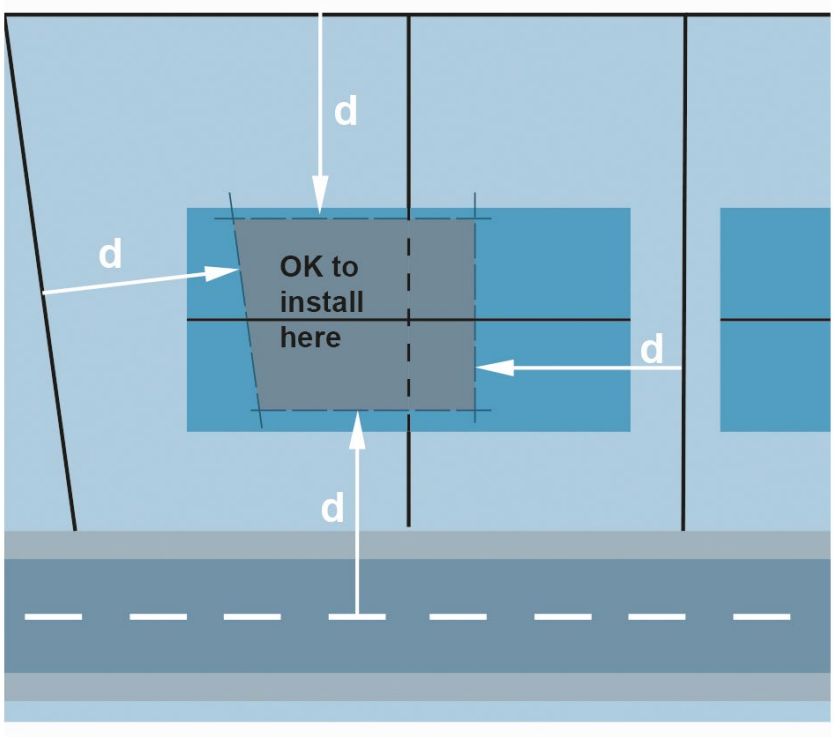


Figure 1

1. B_{roof} rated solar kit - the solar panels can be installed anywhere and in any amount of roof covering.
2. C_{roof} rated solar kit - the panels can be installed within a bounded area with the distance d ≥ 6m.
3. D_{roof} and E_{roof} rated solar kit – the panels can be installed within a bounded area with the distance (because in this example footnote 2 in the table is satisfied):
    a. d ≥ 6m and < 12m provided that the panels are installed in areas no bigger than $3m^2$ with a gap of 1.5m covered with tiles between areas which themselves have a classification no less than A2-s3, or d2 or
    b. d ≥ 12m
4. F_{roof} rated solar kit – the panels can be installed as in point 3b. above but within a bounded area with the distance d ≥ 20m

APPENDIX B – ESTABLISHING THE COEFFICIENT OF FRICTION

Principle of the Test

A horizontal force is applied to a specified weight resting on a level platform – see Figure 2. The applied force is steadily increased until the specified weight starts to move. The horizontal force required to initiate movement is used in calculating the coefficient of static friction between the weight and the level platform.

Apparatus

- A plate A: 300 mm long × 100 mm wide and with the necessary thickness to be representative of the material to be tested.
- A block of mass 50 kg which can be supported on the plate A.
- A platform surfaced with the material B with the necessary thickness to be representative of the material to be tested.

Procedure

Support the platform surfaced with B horizontally and level to within ± 0.5 degrees. Prevent movement of the platform in the direction of the applied force. Place the plate A on the platform and load it with the 50 kg block.

Apply the horizontal force F to the 50 kg block in increments of 50 N (see Figure 2) as close as possible to the underside of the plate A. Perform the test in both wet and dry conditions and the coefficient of friction declared is the lower of the two.

Test records

Record the force at which the specified weight moves at least 10 mm along the platform.

Evaluation of test records

The coefficient of static friction, μ, shall be calculated for each test using the equation:

$$\text{Coefficient of static friction, } \mu = F / (M + m) \times g \quad \text{(A.1)}$$

Where:
F = force in Newton
M = mass 50 kg
m = mass of the plate
g = 9.81 ms^{-2}

Calculate the arithmetic average of μ from a minimum of four tests. This average value shall be taken as the characteristic coefficient of static friction, μ, between the plate A and the surface B.

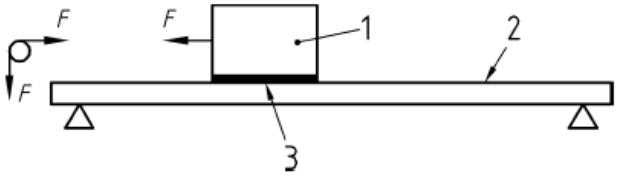


Figure 2: Test to establish coefficient of friction

Key

- 1 Kentledge on upper plate
- 2 Lower surface
- 3 Upper surface as a plate

APPENDIX C – COMMISSIONING TEMPLATES

The following are adapted from Annexes A and C from BS EN 62446-1 with permission from BSI

Model Handover Document

PV System Verification Certificate	☐ Initial verification ☐ Periodic verification

Client	
Installation Address	
Test Date	

Description of installation (key components installed)	
Rated power (kW DC)	
Location	
Estimated system performance	
Circuits tested	

Contractor's name and address	
MCS Contact	Telephone: 0333 103 8130 Email: hello@mcscertified.com

IEC 60364-6 inspection report reference	
IEC 60364-6 test report reference	
PV array inspection report reference:	
PV array test report reference:	

DESIGN, CONSTRUCTION, INSPECTION AND TESTING

I/we being the person(s) responsible for the design, construction, inspection and testing of the electrical installation (as indicated by the signatures below), particulars of which are described above, having exercised reasonable skill and care when carrying out the design, construction, inspection and testing, hereby certify that the said work for which I/we have been responsible is, to the best of my/our knowledge and belief, in accordance with MCS Installation Standard MIS 3002.

Signature(s): Name(s): Date: (The extent of liability of the signatory(s) is limited to the work described above)	Next inspection recommended after not more than:	Years
	Comments:	

Model PV array test report

PV System Verification Certificate	☐ Initial verification ☐ Periodic verification

Installation address	Reference:
	Date:
Description of work under test	Inspector:
	Test Instruments:

String	String reference	1	2	3	4		n
	Module						
	Quantity						
Array parameters (as specified)	V_{oc} (STC)						
	I_{sc} (STC)						
String overcurrent protection device	Type						
	Rating (A)						
	DC rating (V)						
	Capacity (kA)						
String wiring	Type						
	Phase CSA (mm^2)						
	Earth CSA (mm^2)						
String test	V_{oc} (STC)						
	I_{sc} (STC)						
	Irradiance						
Polarity check							
Array Insulation resistance	Test Voltage (V)						
	Pos – Earth (MΩ)						
	Neg – Earth (MΩ)						
Earth continuity (where fitted)							
Array Isolator	Rating (A)						
	Rating (V)						
	Location						
	Functional check						
Inverter	Make and model						
	Serial number						
	Functional check						

Comments: