BSESPV03

Inspect and test Solar PV and EESS Systems

Overview

This standard is for people who inspect and test Solar PV and Electrical Energy Storage System (EESS) systems and equipment.

The person undertaking this work must be suitably competent and able to comply with the processes and procedures for initial and periodic inspection and testing of a Solar PV and EESS system in accordance with the current versions of the appropriate industry standards and regulations, the specification, industry recognised working practices, the working environment and the natural environment.

They must know, understand and apply the correct methods and procedures for the inspection and testing of Solar PV and EESS systems and equipment, including the:

- identification and use of the correct test equipment / instruments
- completion of the relevant certification / documentation
- recording of relevant data and information.

Performance criteria

You must be able to:

1. confirm a suitable programme of work with the relevant people in accordance with organisational procedures
2. determine and obtain the resources required, as relevant, to undertake:
   - initial verification inspection and testing
   - periodic inspection and testing
3. select the correct test equipment / instruments to be used for undertaking the relevant tests
4. confirm that the test equipment / instruments are fit for purpose, accurate and have a current calibration certificate
5. conduct a visual inspection on the assemblies and enclosures for cables, conductors and wiring systems to confirm they are:
   - located and secured correctly
   - of the appropriate electrical and mechanical integrity
6. conduct a visual inspection on the electrical cable, conductor and wiring systems to confirm they are:
   - located and secured correctly
   - identified and/or labelled correctly
7. conduct a visual inspection on the assemblies, equipment, accessories and components to confirm they are:
   - located and secured correctly
   - identified and/or labelled correctly
8. comply with industry practices and organisational procedures to ensure the co-ordination of site services and the activities of other trades affected by:
   - the inspection process and procedures
   - the testing process and procedures
9. identify the correct means of electrical isolation for both the AC and DC supplies prior to commencing the inspection and/or testing process
10. complete safe isolation procedures as and when required to ensure the safe inspection and testing of electrical cables, conductors and/or wiring system and the associated equipment, accessories and components
11. perform the tests in the correct sequence for initial verification testing to ensure safety and correct operation of the Solar PV and EESS system
12. undertake appropriate inspection sampling and perform the appropriate tests for

periodic testing to ensure safe and efficient operation of the Solar PV and EESS system

13. comply with organisational procedures for:

- completion of the relevant certification / documentation
- the recording of relevant data and information
- informing relevant people
- addressing issues and problems identified

Knowledge and understanding

You need to know and understand:

1. the operation, applications, advantages and limitations of different Solar PV and EESS systems
2. the organisational procedures to confirm a programme of work with the relevant people
3. how to determine and obtain the resources required, as relevant, to undertake:
   - initial verification inspection and testing
   - periodic inspection and testing
4. how to select the correct test equipment / instruments to be used for undertaking relevant tests
5. how to confirm that the test equipment / instruments are fit for purpose, accurate and have a current calibration certificate
6. the methods and procedures for conducting a visual inspection on the enclosures for cables, conductors and wiring systems to confirm they are:
   - located and secured correctly
   - of the appropriate electrical and mechanical integrity
7. the methods and procedures for conducting a visual inspection on the electrical cable, conductor and wiring systems to confirm they are:
   - located and secured correctly
   - identified and/or labelled correctly
8. the methods and procedures for conducting a visual inspection on the equipment, accessories and components to confirm they are:
   - located and secured correctly
   - identified and/or labelled correctly
9. the industry practices and organisational procedures to ensure the co-ordination of site services and the activities of other trades affected by:
   - the inspection process and procedures
   - the testing process and procedures
10. the correct procedures for safe isolation for AC and DC systems
11. the methods and processes to undertake the tests that ensure safety and efficient operation of the Solar PV and EESS system
12. the organisational procedures for:
   - completion of the relevant certification / documentation
   - the recording of relevant data and information

- informing relevant people
- addressing issues and problems identified

Scope/range

Working environments (internal and/or external)

- domestic
- non-domestic
  - commercial
  - industrial
  - agricultural
  - horticultural
  - leisure and entertainment
  - residential medical and care facilities
  - public highways and parks
  - public services establishments
  - pre-1919 traditional/historic buildings

Solar PV and EESS system

- Panels/arrays
- Panel support systems
- Charge controller
- Battery bank
- Inverter/power optimiser
- Power meter
- SMART controls/technology

Organisation procedures

- information management
- project management
- risk assessment
- risk management
- implementing and monitoring health and safety requirements and issues
- implementing and monitoring issues relating to the natural environment
- customer services
- emergencies
- communication with relevant people

Resources

- labour
- plant and equipment
- instruments
- finance
- IT
- materials and other consumables

Site services

- electricity
- water
- gas
- oil
- drainage
- telecommunications
- data transmission either underground or overhead

Relevant people

- customers/clients
- client representatives
- supervisors
- site/contract manager
- other contractors/trades
- members of the public
- work colleagues

Tests (AC and/or DC)

- continuity of protective conductors
- insulation resistance
- polarity
- earth fault loop impedance
- prospective fault current
- RCD operation
- phase rotation
- functional testing
- VOC tests

- ISC Test
- Irradiance
- Other as relevant (e.g. Thermal Imaging, IV Curve tracing etc)

Enclosures for cables, conductors and wiring systems

- PVC and steel conduit
- PVC and steel trunking
- cable tray
- basket and ladder systems
- ducting systems
- bus-bar trunking
- pre-fabricated conductor, cable and wiring systems

Electrical cable, conductors and wiring systems

- thermosetting insulated cables including flexes
- single and multicore thermoplastic and thermosetting insulated cables
- flat profile cable
- mineral insulated cables
- single wire armoured cables
- armoured/braided flexible cables and cords
- data cables
- pre-fabricated conductor, cable and wiring systems
- fibre optic cable
- fire resistant cable
- bus-bar trunking

Assemblies, equipment, accessories and components

- arc fault detection devices (AFDDs)
- cable glands
- circuit breakers
- consumer units
- control devices – electrical; electronic; electro-mechanical
- control panels – alarms; emergency lighting; environmental control
- distribution boards and/or panels
- earthing protection
- fuses

- isolators
- luminaires
- micro-wind turbine control equipment
- motor control equipment
- socket-outlets
- solar photovoltaic panels – control equipment, components and accessories
- surge protection devices (SPDs)
- switches

Documentation

- electrical installation certificates
- electrical installation condition reports
- minor electrical installation works certificates
- schedules of inspections
- schedules of circuit details and test results as required:

o PV Array test results
o PV Array Inspection Checklist
o MCS Certificate
o PV Array Frame Calculations (Wind/Structure)

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