The Certification Mark for Onsite Sustainable Energy Technologies

Microgeneration Installation Standard MIS 3006

REQUIREMENTS FOR CONTRACTORS UNDERTAKING THE SUPPLY, DESIGN, INSTALLATION, SET TO WORK COMMISSIONING AND HANDOVER OF MICRO-HYDROPOWER SYSTEMS

Issue 2.1

This standard was prepared by the MCS Working Group 4 'Micro-Hydropower'.

REVISION OF MCS INSTALLATION STANDARDS

MCS Installation Standards will be revised by issue of revised editions or amendments. Details will be posted on the website at www.microgenerationcertification.org

Technical or other 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 will be given in decimal format with the integer part giving the edition number and the fractional part giving the number of amendments (e.g. Issue 3.2 indicates that the document is at Issue 3 with 2 amendments).

Users of this Standard should ensure that they possess the latest issue and all amendments.

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1. FOREWORD

This standard identifies the evaluation and assessment practices undertaken by the certification bodies of the MCS for the purposes of approval and listing of contractors undertaking the supply, design installation, set to work, commissioning and handover of hydropower systems. The listing and approval is based on evidence acceptable to the certification body:

- that the system or service meets the standard
- that the contractor has staff, processes and systems in place to ensure that the system or service delivered meets the standard

and on:-

- periodic audits of the Contractor including testing as appropriate
- compliance with the contract for the MCS listing and approval including agreement to rectify faults as appropriate

This standard shall be used in conjunction with MCS 001 scheme document.

Government defines Microgeneration as the production of heat and/or electricity on a small-scale from a low carbon source. The various technologies have the potential to help us achieve our objectives of tackling climate change, ensuring reliable energy and tackling fuel poverty.

The objective of Government's Microgeneration strategy is to create conditions under which Microgeneration becomes a realistic alternative or supplementary energy generation source for the householder, for the community and for small businesses.

NOTES:-

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

Users of MCS Installation Standards should ensure that they possess the latest issue and all amendments.

The Steering Group welcomes comments of a technical or editorial nature and these should be addressed to "The Secretary" at mcs@gemserv.com .

Listed products and services appear in the MCS website:
www.microgenerationcertification.org .

2. SCOPE

This standard specifies the requirements of the MCS for Contractors undertaking the supply, design, installation, set to work, commissioning and handover of micro hydropower systems. For the purposes of this MCS Installation Standard micro-hydropower systems are defined as those having a design output that does not exceed 50kW electrical and are based on-shore.

3. DEFINITIONS

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

Contractor	An individual, body corporate or body incorporate, applying for or holding certification for the services detailed in the Scope.
Customer	An individual, body corporate or body incorporate, with which the contractor has a contract to provide the services detailed in the Scope.
Contract	A written undertaking for the design, supply, installation, set to work and commissioning of a hydropower system and technologies.

Design	The formulation of a written plan including a specific list of products and fixings to form a completed system for a defined Hydropower System, this shall also include a specification of an intended level of performance.
Installation	The activities associated with placement and fixing of a Microgeneration system.
Set to work	The activities necessary to make the Microgeneration system function as a completed system.
Commissioning	The activities to ensure that the installed system operates within the boundaries and conditions of the design and the product manufacturers claims.
Sub-contract	Written contract between a certificated contractor and another party for supply of products and/or services in connection with the fulfilment of a contract.
Handover	The point in a contract where commissioning and certification of the system have been satisfactorily completed to the contract specification so enabling the installation to be formally handed over to the client.
Hydropower System	A device or combination of devices which produces electrical energy from the movement of water. The device or devices are the turbine, generator and associated control equipment.
Hydro Turbine	A device that converts the energy from the movement of water into mechanical energy.
Control Equipment	An arrangement of equipment to control the flow of water through the hydro turbine and load on the hydro turbine / generator such that their operation is safely regulated within design parameters.

4. REQUIREMENTS FOR THE CERTIFICATED CONTRACTOR

4.1 Capability

Certificated contractors shall have the capability to undertake the supply, design, installation, set to work, commissioning and handover of Hydropower Systems.

Where contractors do not engage in the design or supply of micro hydropower systems, but work solely as an installer for a client who has already commissioned a system design; then the contractor must be competent to review and verify that the design would meet the design requirements set out in this standard and this should be recorded.

4.2 Quality management system

Contractors shall operate a satisfactory quality management system which meets the additional requirements set out in the scheme document MCS 001.

4.3 Sub contracting

Any elements of the work that are sub-contracted must be managed through a formal sub-contract agreement between the two parties in accordance with the policies and procedures employed by the certificated Contractor. These procedures shall ensure that the sub-contractor undertakes the work in accordance with the requirements of this standard.

In other situations (for example new build, or for commercial customers), it is permissible for the physical installation, setting to work and commissioning to be undertaken by others (i.e. not sub-contracted to the Contractor) provided that:

4.3.1 A contract between the Contractor and the commercial client details obligations on the client to include that evidence of skills and training of those employed by the client to do elements of work not undertaken by the Contractor are to be made available to the Contractor to ensure that the competence requirements of this standard are met and that access to the site

for training and supervision in accordance with the following sections is agreed in advance.

4.3.2 The certificated Contractor provides additional product-specific training for those undertaking the work not undertaken by the certificated Contractor.

4.3.3 The certificated Contractor assesses a sample number of installations under the contract which is not less than the square root of the number of installations rounded up to the nearest whole number (e.g. a new build site of 50 installations then a minimum of 8 are assessed).

4.3.4 The certificated Contractor assumes responsibility at handover that the installation is in full compliance with the standard.

4.4 Consumer code of practice

The Contractor shall be a member of and shall comply with a code of practice (consumer code), which is relevant to the scope of their business in the Microgeneration sector and which is approved by the Office of Fair Trading (OFT). (e.g. REAL Code).

5. DESIGN AND INSTALLATION REQUIREMENTS

5.1 Regulations

All applicable regulations and directives must be met in full. It should be noted that regulations that must be applied may be different in England and Wales, Scotland and Northern Ireland. Some guidance on applicable regulations is given in the guidance document MCS 002. This guidance is not necessarily exhaustive and may change from time to time. Certificated contractors must ensure they have a system to identify all applicable regulations and changes to them.

5.1.1 All work, and working practices, shall be in compliance with all relevant Health and Safety regulations and a risk assessment shall be conducted before any work on site is commenced to safeguard against pressures exceeding the pressure rating of the weakest component.

5.1.2 to comply with the provisions of the Reservoirs Act 1975 when a reservoir (>25,000 ^{m3}) is utilised

5.2 Design and installation

Systems shall be designed and installed in accordance with but not exclusive to:

- the manufacturer's instructions.
- provision for safe de-commissioning.
- the current issue of Environment Agency Hydropower Guidelines; or Guidelines for Low-Head Hydropower Installations; or SEPA Hydro Power Guidelines and the British Hydropower Association Mini Hydro Development Guide.
- the relevant provisions of BS:EN61116.

5.3 System Performance

5.3.1 The maximum hydro turbine flow rate should be related to the long-term annual mean flow available at the site, and the relationship should be demonstrated. A calculation, or series of calculations, should be clearly presented to explain how the maximum hydro turbine flow rate was determined from the flow data. The source of the flow data shall be stated and justified in the calculations for the site. This should include a clear statement of the percentage of an 'average flow' year that the hydro turbine would be operating at its maximum flow rate, the percentage it would be operating at a part flow rate, and the percentage of the year the hydro turbine would be shut down due to insufficient flow. Any assumed Environment Agency (EA), Scottish Environment Protection Agency (SEPA) or The Northern Ireland Environment Agency (NIEA) compensation flows should be clearly stated. The design (rated) flow rate shall be stated to the customer and shall be appropriate for the water course.

5.3.2 Installers shall provide an estimate of average energy performance based on the system design and specification, the flow duration curve and head duration curve of the watercourse.

5.3.3 Installers must list all known EA, SEPA or NIEA constrictions of system usage on the specific watercourse and include restrictions in the overall performance estimation.

5.3.4 *It is incumbent on the installer to explain to the customer that the performance of a Hydropower System in any one year is impossible to predict with certainty due to the variability in the amount of rainfall for location-to-location and year-to-year*.

5.4 Site Planning

The following issues should be addressed in the design of hydropower systems

5.4.1 The EA, SEPA or the NIEA must be consulted at the initial design stage of the development.

5.4.2 The system shall be designed in accordance with the current issue of Environment Agency Hydropower Guidelines or SEPA Hydro Power Guidelines and the British Hydropower Association Mini Hydro Development Guide.

5.4.3 Depending on the sensitivity of the site and size of the development the EA or SEPA may issue:

- Land drainage consent
- Impoundment licence
- Abstraction licence
- Controlled Activity Regulations (CAR) Licence (Scotland)
- Consent for affecting the watercourse and/or flood defences.
- Engineering Works licence

5.4.4 Planning Permission may be required from the Local Authority

5.4.5 The Contractor shall survey the site using a suitably qualified person and/or a professional experienced in Hydropower Systems to ensure that the site is suitable for the installation and that the civil works will meet the requirements of the building regulations and other applicable regulations during and following installation. All Contractors shall make their customers aware of all permissions approvals and licences required for the installation. Where required the contractor shall ensure that these permissions approvals or licences have been obtained before work is commenced.

5.4.6 The Contractor shall ensure the customer is aware from the outset that metering will be required if the customer wishes to access certain financial

incentive schemes. The contractor will ensure the customer has the opportunity to take account of this when awarding the contract.

Note: for guidance on metering requirements please follow MCS Metering Guidance v1.0, available from the Standards section of http://www.microgenerationcertification.org/

5.5 Commissioning

5.5.1 Hydropower systems shall be commissioned according to the manufacturer's instructions.

5.5.2 The system performance shall be tested and assessed against the design specification.

5.6 Documentation

In addition to the annual energy performance calculation certificated contractors shall provide customers with a comprehensive document pack in English language which, as a minimum, shall include the following:

- Manufacturer installation and user instructions including warranties for all installed equipment. This should include support structures, lifting equipment, loads, weights, specialised tools, lifting points and handling requirements.
- System operating and Maintenance manual including maintenance schedule.
- Details of Emergency Procedures.
- An ‘as fitted’ system schematic plan of the electrical systems - detailing all functioning components of the hydropower system.
- G83/1 or G59 commissioning certificate, where grid connected.
- Proof of compliance to G83/1 or G59/1 (including network operator consent), where grid connected.
- Warning label according to G83/1 or G59/1, section 6.2, where grid connected.
- All licences, planning and other permissions.
- Details of all warranties

5.7 Equipment

Hydropower Systems shall be listed under the MCS or equivalent.

Equipment shall be suitable for its application and equipment shall have a manufacturer’s declaration of conformity for the appropriate standard.

All equipment comprising the hydropower system must be in compliance with the applicable European Directives.

5.8 ‘As new’ Hydro Equipment

‘As new’ hydro equipment, which is certificated to the ‘As new’ hydro product standard may be used. If this product is being installed for with the intension of claiming the Clean Energy Cash Back (Feed-In Tariff) then it must have been originally installed prior to the 1st October 1990, if removed to undergo remanufacturing it must replaced in the same site

6. COMPETENCE OF STAFF

All personnel employed (directly or by sub-contract) shall be able to demonstrate that they are fully trained and competent in the disciplines and skills appropriate to their role. Complete records of training and competence skills of personnel employed directly shall be maintained by the certificated contractor, in particular:

- Staff that carry out design shall be trained and be able to demonstrate a thorough knowledge of the technologies involved and the interaction with associated technologies.
- All personnel engaged in the actual installation are expected to have undertaken training and competence assessment and have records of all training qualifications obtained.
- All personnel engaged in the final inspection and commissioning shall be trained and assessed, and have a comprehensive technical knowledge of the products and interfacing services and structures.

For more information on qualifications of staff please see appendix A

Note: due to the current development of the Sector Skills Agreement and the review in progress of the National Occupational Standards for this technology. The indicated suggested scope in Appendix A may change.

7. HANDOVER REQUIREMENTS

At the point at which the Hydropower System is handed over to the customer, the documentation as detailed in 5.6 should be provided and explained along with:

- a certificate signed by the Contractor to confirm that the Hydropower System has met the requirements of this standard. The certificate shall contain the following as a minimum:
    - Customer name and address
    - Site address (if different)
    - Contractors name, address etc.
    - List of key components installed
    - Annual energy capture
- Warning label according to G83/1 or G59/1 as appropriate.
- EA, SEPA or NIEA information and licences
- All other required permissions, approvals and licences.
- Maintenance requirements and maintenance services, if available.
- System warranty
- A certificate obtained from the MCS Installation Database, showing that the installation has been registered with the scheme (to be provided within 10 working days of the commissioning date).

Note: all MCS Installations must be notified to the MCS Licensee through the MCS Installation Database, where a certificate will be generated and sent to the customer. There is a £5 per installation fee levied on installers for each installation added to the database.

8. REGIONAL OFFICES

Where the firm wishes to design and commission under the Certification Scheme in regional offices, then these offices shall meet the requirements of this standard to be eligible for Certification.

9. PUBLICATIONS REFERRED TO

The following list implies the latest edition and amendments:

- MCS 001 – Microgeneration Certification Scheme - Installer certification scheme document. Available from www.microgenerationcertification.org
- MCS 002 – Guidance on regulations and directives for microgeneration installations. Available from www.microgenerationcertification.org
- G83/1 – Recommendations for the connection of small-scale embedded generators (up to 16A per phase) in parallel with public low voltage distribution networks.
- G59/1 – Recommendations for the connection of embedded generating plant to the public Electricity Suppliers distribution systems.
- BS:EN 61116 – Electromechanical equipment guide for small hydro installations
- Health and Safety at Work etc. Act 1974
- Electricity at Work Regulations
- Environment Agency Hydropower Guidelines
- SEPA Hydro Power Guidelines
- British Hydropower Association Mini Hydro Development Guide
- MCS Metering Guidance

APPENDIX A: QUALIFICATIONS OF STAFF

The following qualifications may be suitable to satisfy the training requirements detailed under Clause 5:

- Accreditation from a relevant training course – relevance of the course would require independent verification
- Membership of a relevant Competent Person Scheme – relevance of the Competent Person Scheme would require independent verification
- Manufacturer's product training – Would be product specific and require independent verification
- Experience gained through a mentoring process – would require independent verification
- Demonstrable track record of successful installation – would require independent verification

Note: Independent verification can be carried out by the Certification Body during assessment

AMENDMENTS ISSUED SINCE PUBLICATION

Document Number:	Amendment Details:	Date:
1.1	The following updates have been made; The definition of Hydro Turbine has been update Formatting corrections The reference to Pressure Equipment Regulations 1999 has been removed -	16/09/2010
2.0	Addition of text under section 5.4.6 regarding metering requirements and also an addition under section 7 with regards to MCS Certificates and the MCS Installation Database, as agreed at by the MCS Steering Group.	20/09/2010
2.1	Reference to the Hydro 'As new' Product Standard included	28/10/2010