



The Certification Mark for Onsite
Sustainable Energy Technologies

MCS: 015

Product Certification Scheme Requirements: Electricity-led micro-cogeneration packages in dwellings

Issue 1.0

This standard has been approved by the Steering Group of the Microgeneration Certification Scheme.

This standard was prepared by the Microgeneration Certification Scheme Working Group 9 'Micro-CHP systems.

REVISION OF MICROGENERATION CERTIFICATION STANDARDS

Microgeneration 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 issue 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.

Issue: 1.0	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: ELECTRICITY-LED MICRO-COGENERATION PACKAGES	MCS: 015
Date: 16/11/10		Page 2 of 15

TABLE OF CONTENTS

1.	INTRODUCTION.....	4
2.	SCOPE.....	4
3.	NORMATIVE REFERENCES	5
4.	DEFINITIONS	6
	4.1 Scope.....	6
	4.2 Electricity-led micro-cogeneration.....	6
	4.3 Cogeneration unit.....	6
	4.4 Electricity-led micro-cogeneration unit	6
	4.5 Dwelling	6
	4.6 Micro-Cogeneration Package	7
	4.7 Producer	7
	4.8 Synchronous mode	7
5.	APPLICATIONS TO JOIN THE SCHEME	8
6.	MANAGEMENT SYSTEMS CERTIFICATION.....	8
7.	CERTIFICATION AND APPROVAL OF THE MICRO-COGENERATION PACKAGE.....	8
	7.1 Acceptance Criteria.....	8
	7.2 Supplementary Explanatory Notes	9
8.	TECHNICAL DOCUMENTATION	10
9.	PERFORMANCE CRITERIA	11
10.	MAINTENANCE OF CERTIFICATION AND LISTING	11
	10.1 Factory Audits.....	12
	10.2 Product Audits.....	12
11.	CERTIFICATION MARK AND LABELLING	12
	ANNEX 1: DOMESTIC HOT WATER ONLY APPLIANCES.....	14
	AMENDMENTS ISSUED SINCE PUBLICATION	15

Issue: 1.0	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: ELECTRICITY-LED MICRO-COGENERATION PACKAGES	MCS: 015
Date: 16/11/10		Page 3 of 15

1. INTRODUCTION

This scheme document identifies the evaluation, assessment requirements and practices for the purposes of certification and listing of electricity-led micro-cogeneration packages. Certification and listing of packages is based on evidence acceptable to the certification body:-

- that the package falls within the scope of this scheme document;
- that the producer has staff, processes and systems in place to ensure that the package placed on the market meets the requirements of this scheme document,

And on:-

- periodic audits of the producer including testing as appropriate;
- compliance with the contract with the certification body for listing and certification including agreement to rectify faults as appropriate

2. SCOPE

This scheme provides ongoing independent, third party assessment and approval of electricity-led micro-cogeneration packages intended for installation in dwellings, where the package:

- A) has a thermal and electrical output of less than 45 kW_t or 50 kW_e respectively,
- B) is fuelled by any of the following – second and third family gas; gas from a bespoke source; hydrogen; mineral oil; other liquid fuels, principally bio-oils; other fuels including unconventional fuels and solid fuels,
- C) is intended to maximise electricity production in response to an electrical demand.
- D) All the co-generated heat recovered will be made use of.

Note: Currently these Scheme Requirements refer to electricity led micro-CHP that use the heat by product for domestic hot water generation only. This will be extended to cover domestic heating as testing methodologies are developed.

Issue: 1.0	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: ELECTRICITY-LED MICRO-COGENERATION PACKAGES	MCS: 015
Date: 16/11/10		Page 4 of 15

3. NORMATIVE REFERENCES

The following referenced documents are indispensable for the application of this scheme document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

PAS 67: 2008, Laboratory tests to determine the heating and electrical performance of heat-led micro-cogeneration packages primarily intended for heating dwellings.

(Note: The standard has been updated in July 2010 to accommodate electricity led packages intended for the production of DHW only. It is intended that the standard will be further updated to accommodate all electricity led mCHP packages in due course.)

G83/1: September 2003, Recommendations for the connection of small-scale embedded generators (up to 16A per phase) in parallel with Public Low-Voltage Distribution Networks

Method to evaluate the annual energy performance of micro-cogeneration heating systems in dwellings, 9 October 2008 Prepared for Sustainable Energy Policy Division, Defra, by John Hayton and Bruce Young, BRE. Available from: <http://projects.bre.co.uk/SAP2005/supporting-technical-documents.html>

Note: This method may be suitable for future versions of this document, and so does not apply at present.

BS EN 15036-1: 2006 Heating boilers – Test regulations for airborne noise emissions from heat generators – Part1: Airborne noise emissions from heat generators

EU Cogeneration Directive 204/8/EC

Boiler Efficiency Database, see www.sedbuk.com

CEN/TR 1749: 2005, European scheme for the classification of gas appliances according to the method of evacuation of the combustion products (types)

MIS 3007-2 Requirements for contractors undertaking the design, supply, installation, set of work, commissioning and handover of a domestic hot water system containing an electricity-led micro-cogeneration package.

Issue: 1.0	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: ELECTRICITY-LED MICRO-COGENERATION PACKAGES	MCS: 015
Date: 16/11/10		Page 5 of 15

4. DEFINITIONS

4.1 Scope

An electricity-led micro-cogeneration package whose prime mover is intended primarily to generate electricity and produces heat as a by-product.

4.2 Electricity-led micro-cogeneration

Installation and operation of a micro-cogeneration package within a dwelling resulting in:

1. Electricity production exceeding or contributing to the dwelling's annual requirements, and
2. Thermal production equal to or less than the dwelling's annual requirements, for Domestic Hot Water (DHW) Service as tested in accordance with Annex 1.

4.3 Cogeneration unit

A unit that is capable of cogeneration.;

4.4 Electricity-led micro-cogeneration unit

A micro-cogeneration unit whose primary purpose is to generate electricity and whose secondary purpose is to generate heat. Unit is controlled so as to prevent heat being generated in excess of the dwelling's requirements.

4.5 Dwelling

A unit of residential accommodation including residential park homes, flats, maisonettes, terraced, semi-detached and detached houses (including all such residential accommodation situated within or forming part of commercial or industrial or agricultural premises) and leisure accommodation

Issue: 1.0	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: ELECTRICITY-LED MICRO-COGENERATION PACKAGES	MCS: 015
Date: 16/11/10		Page 6 of 15

Note. It is recognised that this definition can be applied to premises such as those supplying a small number of clients on a bed and breakfast basis.

4.6 Micro-Cogeneration Package

Micro-cogeneration unit as specified by the manufacturer when submitting for testing against PAS 67 whose use means that the dwelling may become a net exporter of electricity in addition to partially or wholly satisfying the thermal demands of the dwelling. A thermal and electrical output of less than 45 kW_t or 50 kW_e respectively suitable for connection in parallel with the UK public low voltage distribution network in accordance with G83/1

Note: Manufacturer is the organization that submitted the package for testing against PAS 67

Important note: Whilst the manufacturer may supply a package for testing under PAS 67, they may only market a unit and specify what components the installer needs to source to comprise the package, The specification of these components are to be detailed in the producer's instruction manual and approved by the Certification Body.

4.7 Producer

For the purposes of this scheme document, a producer is:

- a manufacturer of a micro-cogeneration unit or package selling under his own brand in the UK; or
- a business based in the UK selling under his own brand (or another brand under licence) a micro-cogeneration unit or package manufactured by another business; or
- a professional importer introducing a micro-cogeneration unit or package to the UK market

4.8 Synchronous mode

Operation of a micro-cogeneration package connected to a public alternating current (AC) electricity distribution network and capable of exporting electrical power to it.

Issue: 1.0	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: ELECTRICITY-LED MICRO-COGENERATION PACKAGES	MCS: 015
Date: 16/11/10		Page 7 of 15

5. APPLICATIONS TO JOIN THE SCHEME

Applications should be made to a certification body licensed to operate this scheme. The certification body will provide the appropriate application form and details of the applicable fees.

6. MANAGEMENT SYSTEMS CERTIFICATION

Manufacturers shall operate a certified documented manufacturing quality control system, in accordance with the requirements of MCS 010 “Generic Factory Production Control Requirements”

7. CERTIFICATION AND APPROVAL OF THE MICRO-COGENERATION PACKAGE

This section sets out the criteria against which the Certification Body will assess the micro-cogeneration package as suitable for certification and approval together with some supplementary explanatory notes.

7.1 Acceptance Criteria

Acceptance of documented evidence will be at the discretion of the Certification Body providing the certification, but at least the following criteria shall be applied:

- a. Evidence of compliance with conditions of the Scope of this scheme document
- b. Evidence of compliance with the relevant requirements of applicable European directives and UK regulations
- c. Evidence of compliance with the technical requirements for connection and operation as a fixed micro-cogeneration package when installed in parallel

Issue: 1.0	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: ELECTRICITY-LED MICRO-COGENERATION PACKAGES	MCS: 015
Date: 16/11/10		Page 8 of 15

with the UK public low voltage distribution network (synchronous mode) in accordance with G83/1,

- d. Evidence of compliance with the performance criteria listed in § 9 of this scheme document
- e. Verification of the establishment and maintenance of the manufacturing company's quality management system in accordance with the Factory Production Control Requirements (FPC) detailed in § 6 of this scheme document.
- f. Satisfactory review of the technical documentation relating to the package.

7.2 Supplementary Explanatory Notes

Applications for a range of common packages (package families) will be dealt with on a case by case basis. For example, where one or more characteristics are the same for packages with similar design, construction and functionality then the results of tests for these characteristics on one package may be applied to other similar products

A certificate is awarded following demonstration of satisfactory compliance with this scheme document, i.e. package performance; FPC; and technical documentation.

Certificates contain the name and address of the manufacturer, model and reference number of the micro-cogeneration package, a unique certificate reference number and the issue number and date.

Certificates are valid from the date of issue and are maintained and held in force subject to satisfactory completion of the requirements for maintenance of certification (see § 10), but remain the property of the issuing certification body.

Details of the manufacturer and the certificated product(s) are listed on the MCS website www.microgenerationcertification.org.

Issue: 1.0	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: ELECTRICITY-LED MICRO-COGENERATION PACKAGES	MCS: 015
Date: 16/11/10		Page 9 of 15

8. TECHNICAL DOCUMENTATION

The producer may produce only the unit but have it tested with another component to create a package as in the case of the domestic hot water storage cylinder. As part of the instructions, the producer will detail the specification of the other component in order that the installed package is the same as the one tested under PAS 67.

Technical documentation for the unit or package must be submitted for review. This documentation shall be presented in English and shall be such that it can be assured that the package submitted for test is equivalent to those that are to be manufactured for normal production. The documentation must consist of the following as a minimum;

- a) Manufacturer's name,
- b) Brand name,
- c) Unit or package name,
- d) Unique unit or package identifier – *shall not be the same as any other unit or package currently listed on the Boiler Efficiency Database,*
- e) Nominal rated heat output,
- f) Nominal maximum electrical output,
- g) Electrical specification – *either 230V 50Hz synchronous single phase or 400V 50Hz synchronous three phase (3 wire or 4 wire)*
- h) Description of prime mover – *e.g. internal combustion engine, external combustion engine, fuel cell, or other (if other an amplified description is required)*
- i) Type of fuel used – *where fuel is unconventional a full description is required*
- j) Whether condensing or non-condensing,
- k) Type of flue system – *designated in accordance with CEN/TR 1749*
- l) Details of intended use and application.
- m) A noise test report – *set out in accordance with § 9c of this scheme document*
- n) Manufacturing drawings and/or specifications including tolerances, issue and revision numbers necessary to establish the build status of the unit or package
- o) Raw material and components specifications necessary to establish the build status of the unit or package.
- p) Details of the quality plan applied during manufacture to ensure ongoing compliance,

Issue: 1.0	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: ELECTRICITY-LED MICRO-COGENERATION PACKAGES	MCS: 015
Date: 16/11/10		Page 10 of 15

- q) Where historical test data is requested to be considered for the application, full test report and details of any existing approvals (Note: each application will be dealt with on a case by case basis and further information about the acceptance of previous testing is available on request).
- r) Installation, use and maintenance instructions.

9. PERFORMANCE CRITERIA

For compliance with this scheme, the micro-cogeneration unit or package must be able to demonstrate the listed performance criteria. Evidence of compliance is generally accepted as independent third party testing by a UKAS (or equivalent) accredited test laboratory. However, other evidence of compliance may be considered at the discretion of the certification body (see document MCS 011 'Testing acceptance criteria').

- a) have an attributable, independently verified, energy performance report produced from the comprehensive set of test conditions detailed in Annex 1 appropriate for the intended application of the micro-cogeneration package
- b) have; fulfilled the necessary requirements set out in the EU Cogeneration Directive 2004/8/EC
- c) Has a carbon emissions value (C) 10% less than that for the reference a SEDBUK efficiency greater than or equal to SEDBUK 2005 – 90%/SEDBUK 2009 – 88%, rated condensing boiler as described in Annex 1.
- d) have an attributable, independently verified, noise test report as described in section 6 of BS EN 15036-1: 2006 produced from the test conditions set out in that standard appropriate to the package under test

10. MAINTENANCE OF CERTIFICATION AND LISTING

Certificates and listing are maintained and held in force subject to satisfactory completion of the following requirements for maintenance of certification:

Issue: 1.0	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: ELECTRICITY-LED MICRO-COGENERATION PACKAGES	MCS: 015
Date: 16/11/10		Page 11 of 15

10.1 Factory Audits

Certification is maintained through annual FPC quality system audits, which shall include a detailed check that the unit being manufactured is to the same specification as the unit tested.

10.2 Product Audits

Unit audits will be conducted as follows:

10.2.1 Review of the product technical data files including materials

10.2.2 Review of end of line tests in accordance with the manufacturer's quality plan

10.2.3 In exceptional circumstances, justified by the certification body, repeat testing of elements from § 9 a) of this scheme document to confirm that the package continues to meet the minimum performance requirements for certification and listing

11. CERTIFICATION MARK AND LABELLING

All approved units and packages listed under this scheme shall be marked with a label to confirm that the unit or package has been tested and certificated in accordance with the requirements of this scheme document. See below for details.

The producer shall use certification mark(s) only in accordance with the certification body's instructions. An example of a certification mark that can be used for this scheme is as follows:



Certificate No. XXX, approved to MCS 015

Issue: 1.0	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: ELECTRICITY-LED MICRO-COGENERATION PACKAGES	MCS: 015
Date: 16/11/10		Page 12 of 15

Where “XXX” is the certificate number and the logo of the certification body issuing the certification would sit to the right of the MCS logo.

Producers may only use the mark while the certification is maintained.

Issue: 1.0	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: ELECTRICITY-LED MICRO-COGENERATION PACKAGES	MCS: 015
Date: 16/11/10		Page 13 of 15

ANNEX 1: DOMESTIC HOT WATER ONLY APPLIANCES

Where a microgenerator consists of a prime mover (typically a fuel cell) which is intended only for the production of electricity and domestic hot water (i.e. not space heating) it shall be tested in accordance with this Annex 1 and the PAS67 domestic hot water only test methodology in clause 12.7 of that standard with the proviso that the definition of a CombiPK package shall be extended to include hot water storage sizes larger than 15 litres. The domestic hot water draw off pattern(s) shall be those specified in PAS67.

The carbon emission value (C) for the microgenerator must be at least 10% less than that measured in an identical test on a SEDBUK 2005 – 90%/SEDBUK 2009 – 88% rated condensing boiler.

The carbon emission value (C) shall be calculated using the following formula:

$$C \text{ (total carbon emissions)} = (Q_{\text{fuel}} \times \text{carbon intensity of fuel used}) - ((E_{\text{out}} - E_{\text{in}}) \times \text{carbon intensity of grid electricity}) + ((H_1 - H_2) \times \text{carbon intensity of electricity})$$

where:

H_1	=	Heat content of domestic hot water draw off required as per the specified hot water draw off pattern in kWh
H_2	=	Heat content of domestic hot water draw off delivered in kWh
E_{out}	=	Electricity production during the 24 hour test period
E_{in}	=	Electricity consumption during the 24 hour test period
Q_{fuel}	=	Total gas fuel consumption during 24 hour test period

Note: If $H_2 > H_1$ then H_1 will be deemed to equal H_2 so that $(H_1 - H_2)$ can never give a result which is less than zero.

Issue: 1.0	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: ELECTRICITY-LED MICRO-COGENERATION PACKAGES	MCS: 015
Date: 16/11/10		Page 14 of 15

AMENDMENTS ISSUED SINCE PUBLICATION

Document Number:	Amendment Details:	Date:
V1.0	First Issue	16/11/2010

Issue: 1.0	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: ELECTRICITY-LED MICRO-COGENERATION PACKAGES	MCS: 015
Date: 16/11/10		Page 15 of 15