



The Certification Mark for Onsite
Sustainable Energy Technologies

MCS: 014

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

Issue 1.2

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 7 '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: 1.2	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: MICRO- COGENERATION PACKAGES	MCS: 014
Date: 18/05/2012		Page 2 of 15

TABLE OF CONTENTS

1.	INTRODUCTION	4
2.	SCOPE.....	4
3.	NORMATIVE REFERENCES	4
4.	DEFINITIONS.....	5
4.1	Categories of Micro-Cogeneration Packages.....	5
4.2	Cogeneration.....	6
4.3	Cogeneration unit	6
4.4	Dwelling.....	6
4.5	Heat-Led Micro-Cogeneration Package	6
4.6	Micro-Cogeneration Package	6
4.7	Micro-Cogeneration Unit.....	7
4.8	Producer.....	7
4.9	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	12
10.1	Factory Audits	12
10.2	Product Audits	12
11.	CERTIFICATION MARK AND LABELLING	13
	ANNEX 1 ADDITIONAL TEST'S FOR STIRLING AND ORGANIC RANKINE CYCLE PACKAGES USING LPG	14
	For the Boiler	14
	For the Cogeneration Unit	14
	AMENDMENTS ISSUED SINCE PUBLICATION	15

Issue: 1.2	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: MICRO- COGENERATION PACKAGES	MCS: 014
Date: 18/05/2012		Page 3 of 15

1. INTRODUCTION

This scheme document identifies the evaluation, assessment requirements and practices for the purposes of certification and listing of heat-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 heat-led micro-cogeneration packages intended for installation in single dwellings as the primary heating system, 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,

Note: This scheme has some additional requirements for roof-integrated solar collectors (see 5b.).

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.

Issue: 1.2	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: MICRO- COGENERATION PACKAGES	MCS: 014
Date: 18/05/2012		Page 4 of 15

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

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

BS EN 15036-1: 2006 , or the latest available version thereof: Heating boilers – Test regulations for airborne noise emissions from heat generators – Part1: Airborne noise emissions from heat generators

Product Characteristics Database, see www.sedbuk.com

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

SAP 2009 or the latest available version thereof: The Government’s standard assessment procedure for energy rating of dwellings

4. DEFINITIONS

4.1 Categories of Micro-Cogeneration Packages

4.1.1 combiPK

micro-cogeneration package for providing space and water heating in which the Domestic Hot Water (DHW) service is provided wholly from within the package

4.1.2 heatPK

micro-cogeneration package for providing space heating only (no DHW service)

Issue: 1.2	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: MICRO- COGENERATION PACKAGES	MCS: 014
Date: 18/05/2012		Page 5 of 15

4.1.3 regPK

micro-cogeneration package for providing space and water heating, intended for connection to a separate DHW storage cylinder of standard specification

4.2 Cogeneration

Combined generation of electricity and heat by an energy conversion system and the concurrent use of electric and thermal energy from the conversion system

4.3 Cogeneration unit

A unit that is capable of cogeneration

4.4 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

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.

4.5 Heat-Led Micro-Cogeneration Package

Micro-cogeneration package the control of which is by heat demand

4.6 Micro-Cogeneration Package

Micro-cogeneration unit with associated equipment as specified by the manufacturer when submitting for testing against PAS 67

Issue: 1.2	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: MICRO- COGENERATION PACKAGES	MCS: 014
Date: 18/05/2012		Page 6 of 15

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

4.7 Micro-Cogeneration Unit

a cogeneration unit with 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 – This concept is sometimes referred to as “domestic CHP” (combined heat and power).

4.8 Producer

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

- a manufacturer of a micro-cogeneration 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 package manufactured by another business; or
- a professional importer introducing a micro-cogeneration package to the UK market

4.9 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: 1.2	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: MICRO- COGENERATION PACKAGES	MCS: 014
Date: 18/05/2012		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 a) and b) 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: 1.2	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: MICRO- COGENERATION PACKAGES	MCS: 014
Date: 18/05/2012		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: 1.2	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: MICRO- COGENERATION PACKAGES	MCS: 014
Date: 18/05/2012		Page 9 of 15

8. TECHNICAL DOCUMENTATION

Technical documentation for the 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) Package name,
- d) Unique package identifier – *shall not be the same as any other package currently listed on the Product Characteristics 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) Category of package – *i.e. combiPK, heatPK, or regPK*
- m) Details of intended use and application - *this must include details of the minimum and maximum design heat loss of the dwelling for which the micro-cogeneration package is suitable and the recommended plant size ratio – the design heat loss is the instantaneous heat loss in kW from the dwelling when the temperature differential between inside and outside is 20°K; the plant size ratio is the nominal rated heat output of the micro-cogeneration package divided by the design heat loss*
- n) A noise test report – *set out in accordance with § 9c of this scheme document*
- o) Manufacturing drawings and/or specifications including tolerances, issue and revision numbers.
- p) Raw material and components specifications.

Issue: 1.2	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: MICRO- COGENERATION PACKAGES	MCS: 014
Date: 18/05/2012		Page 10 of 15

- q) Details of the quality plan applied during manufacture to ensure ongoing compliance,
- r) 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).
- s) Installation, use and maintenance instructions.

9. PERFORMANCE CRITERIA

For compliance with this scheme, micro-cogeneration packages 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 PAS 67 appropriate for the intended application of the micro-cogeneration package
- b) *have;*
 - 1. *a full set of data produced from the annual energy performance evaluation method for micro-cogeneration packages recorded in the Product Characteristics Database.*

NOTE 1: For information on the “full set of data” required for inclusion in the database producers should contact the Database Operator GASTEC at CRE Ltd, The Orchard Business Centre, Stoke Orchard, Cheltenham, Gloucester, GL52 7RZ (phone 01242 677877).

AND

- 2. a Table in their installation instructions of the HPER value for plant size ratios between 0.5 and 4.0 in steps of 0.1

Issue: 1.2	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: MICRO- COGENERATION PACKAGES	MCS: 014
Date: 18/05/2012		Page 11 of 15

NOTE 1: HPER results can be determined using the APM [Annual Energy Performance Method] calculator (an Excel workbook called "PAS 67 Declarations and Test Results Tables rev 4e 2-10-2008") available on the website <http://projects.bre.co.uk/sap2005/supporting-technical-documents.html>

NOTE 2: A micro-cogeneration package qualifies for the micro-cogeneration MCS "Installation Standard MIS 3007" for all plant size ratios where the HPER is ≤ 0.230 kgCO₂/kWh (see MIS 3007 clause **B.3.5**)

NOTE 3: If there is a minimum and maximum plant size ratio for which the HPER complies, then the margin by which the μ CHP outperforms a SEDBUK 86% efficient boiler will be greatest when the plant size ratio is approximately in the centre of the range.

- c) 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:

10.1 Factory Audits

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

10.2 Product Audits

Package audits will be conducted as follows:

Issue: 1.2	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: MICRO- COGENERATION PACKAGES	MCS: 014
Date: 18/05/2012		Page 12 of 15

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 packages listed under this scheme shall be marked with a label to confirm that the 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 014

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: 1.2	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: MICRO- COGENERATION PACKAGES	MCS: 014
Date: 18/05/2012		Page 13 of 15

ANNEX 1 ADDITIONAL TEST'S FOR STIRLING AND ORGANIC RANKINE CYCLE PACKAGES USING LPG

Where a Stirling or Organic Rankine Cycle package has received MCS approval using natural gas, an LPG fuel variant can be considered as also having MCS approval if its performance is similar. The parameters for acceptable performance, and the method for measuring them, are detailed below.

For the Boiler

Refer to SAP 2009, Section D4 and use the method for calculating seasonal efficiency for boilers fuelled by LPG but tested with natural gas.

For the Cogeneration Unit

Units with continuous flames e.g. Stirling engines and Organic Rankine Cycle Packages. If the following criteria are met the PAS 67/APM data obtained with G20 is acceptable:-

- a) The net energy input is within +/-5%
- b) The change between the two fuels is technically simple e.g. change of injector
- c) The excess air rate is with +/-5%
- d) A full output test in accord with PAS 67(2008) Section 12.2 over 4 hours indicates a net electrical production efficiency expressed as a percentage of gas input energy as between -1.0% and +3.0% of the value obtained with G20 on the same appliance. The tests shall be carried out consecutively. This test shall be witnessed by a Notified Body approved to both the GAD and BED.

Issue: 1.2	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: MICRO- COGENERATION PACKAGES	MCS: 014
Date: 18/05/2012		Page 14 of 15

AMENDMENTS ISSUED SINCE PUBLICATION

Document Number:	Amendment Details:	Date:
1.0	First Issue	10/07/2009
1.1	Added annex 1 for LPG fuel variant	07/02/2011
1.2	Updated references to read "or latest available version thereof" Updated boiler efficiency database to read "product characteristics database".	18/05/2012

Issue: 1.2	PRODUCT CERTIFICATION SCHEME REQUIREMENTS: MICRO- COGENERATION PACKAGES	MCS: 014
Date: 18/05/2012		Page 15 of 15