The Certification Mark for Onsite
Sustainable Energy Technologies

Microgeneration Certification Scheme: MCS 007

Product Certification Scheme Requirements:
Heat Pumps

Issue 2.1

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

This document has been prepared by the MCS Working Group 6 'Heat Pumps'

REVISION OF MICROGENERATION INSTALLATION STANDARDS

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

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TABLE OF CONTENTS

1. INTRODUCTION 4
2. SCOPE 4
3. APPLICATIONS TO JOIN THE SCHEME 4
4. MANAGEMENT SYSTEMS CERTIFICATION 5
5. CERTIFICATION AND APPROVAL 5
6. TECHNICAL DOCUMENTATION 6
7. PERFORMANCE CRITERIA 7
8. MAINTENANCE OF CERTIFICATION AND LISTING 11
9. CERTIFICATION MARK AND LABELLING 12
REVISION OF MICROGENERATION CERTIFICATION SCHEME (MCS) REQUIREMENTS 13
AMENDMENTS ISSUED SINCE PUBLICATION 14

1. INTRODUCTION

This scheme document identifies the evaluation and assessment requirements and practices for the purposes of certification and listing of heat pumps. Certification, and listing of products is based on evidence acceptable to the certification body:-

- that the product meets the standard;
- that the manufacturer has staff, processes and systems in place to ensure that the product delivered meets the standard.

and on:

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

2. SCOPE

This scheme provides ongoing independent, third party assessment and approval of companies who wish to demonstrate that their heat pump meets and continues to meet the requirements of

- EN 14511:2007 Parts 1 – 4 ‘Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling’; and
- The performance criteria detailed in Item 7

Products used for the extraction of heat from loft spaces are excluded from this standard.

3. APPLICATIONS TO JOIN THE SCHEME

Applications should be made to an accredited certification body operating this scheme, who will provide the appropriate application form and details of the applicable fees.

4. 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”.

5. CERTIFICATION AND APPROVAL

Certification and approval is based on the following:

a) Evidence of compliance with BS EN14511:2007 Parts 1 – 4 of ‘Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling’.

   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’).

b) Verification of the establishment and maintenance of the manufacturing company’s quality management system in accordance with the Factory Production Control requirements (FPC).

c) Review of the technical documentation relating to the material or product.

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

A certificate is awarded following demonstration of satisfactory compliance with the appropriate standard and this scheme document, taking into account any limitations imposed by the standard and other appropriate guidelines and satisfactory verification/assessment of the manufacturer’s Factory Production Control and technical documentation.

Certificates contain the name and address of the manufacturer, model and reference number of the heat pump, 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 item 8), but remain the property of the issuing certification body.

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

6. TECHNICAL DOCUMENTATION

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

a) Details of intended use, application and classifications (if any) required
b) Manufacturing drawings and/or specifications including tolerances, issue and revision numbers
c) The revision number of the product
d) Raw material and components specifications
e) Details of the quality plan applied during manufacture to ensure ongoing compliance
f) 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)
g) Installation, use and maintenance instructions.

7. PERFORMANCE CRITERIA

For compliance with this scheme, heat pumps must be optimised for heating and must achieve the following minimum Coefficient of Performance (CoP) when tested in accordance with EN 14511-3:2007 at the EN 14511-2:2007 rating conditions shown in the table below, or the specific conditions for swimming pool heat pumps given in the section headed **'Product testing and performance criteria for electrically driven air/water heat pumps designed for use with outdoor swimming pools'.**

Heat Pump Type	Minimum CoP	EN 14511-2 Rating conditions	
Ground/Water	3.5	Table 7	Standard rating conditions – Brine (for floor heating or similar application)
Ground/Air	3.2	Table 5	Standard rating conditions – Brine
Water/Water	3.8	Table 7	Standard rating conditions – Water (for floor heating or similar application)
Water/Air	3.5	Table 5	Standard rating conditions – Water
Air/Water	3.2	Table 9	Standard rating conditions – Outdoor air (for floor heating or similar application)
Air/Air	3.0	Table 3	Outdoor air / recycled air
Exhaust Air			
Air/Water	2.5	Table 9	Exhaust air*
Air/Air	2.5	Table 3	Exhaust air/ recycled air*

*The performance of exhaust air heat pumps should be tested at the minimum air flow rate specified by the manufacturer. This flow rate shall be clearly defined and visible in the product documentation.

Product testing and performance criteria for electrically driven air/water heat pumps designed for use with outdoor swimming pools.

The heat pump will operate with water flowing from swimming pool filtration systems and so will require a heat exchanger designed and constructed to resist erosion and chemical corrosion from swimming pool water. Materials commonly used for heat exchangers in contact with swimming pool water include stainless steel, cupro-nickel and titanium. This heat exchanger may be fitted directly to the heat pump or may be fitted as an additional heat exchanger after a heat exchanger, that is not suitable for use with swimming pool water, fitted directly to the heat pump.

The test methodology is that described in EN14511-3:2007.

Test Conditions

The test conditions for air-source heat pumps used to heat swimming pools are as defined below.

Outdoor heat exchanger air inlet dry bulb temperature	15°C
Outdoor heat exchanger air inlet wet bulb temperature	12°C
Swimming pool heat exchanger inlet water temperature	23°C
Swimming pool heat exchanger outlet water temperature	26°C

Measurement of the outlet water temperature should be performed as follows:

a. For heat pumps fitted with a heat exchanger suitable for use with swimming pool water the heat exchanger water outlet temperature should be measured directly.

b. For heat pumps that require an additional heat exchanger after the heat pump heat exchanger, the outlet water temperature to the swimming pool should be measured at the outlet of the additional heat exchanger.

Performance Requirement

When tested under the above conditions air-source heat pumps used for heating swimming pools must achieve a minimum COP of 3.6

Product testing and performance criteria for electrically driven air to water and water/brine to water heat pumps, which use CO_2 as a refrigerant.

This document only applies to units using transcritical cycles, and self-sealed units.

Test Conditions and performance requirements – Water/brine to water heat pumps

		Outdoor heat exchanger		Indoor heat exchanger		
	Source	Inlet temperature (°C)	Outlet temperature (°C)	Inlet temperature (°C)	Outlet temperature (°C)	Minimum COP
Under floor heating	Water	10	7	25	35	3.8
	Brine	0	-3	25	35	3.6
Low temperature hot water	Water	10	7	30	50	3.5
	Brine	0	-3	30	50	3.2
Sanitary hot water	Water	10	7	15	65	3.8
	Brine	0	-3	15	65	3.6

Test Conditions and performance requirements – Air to water heat pumps

	Outdoor heat exchanger		Indoor heat exchanger		
	Air on dry bulb temperature (°C)	Air on wet bulb temperature (°C)	Inlet temperature (°C)	Outlet temperature (°C)	Minimum COP
Under floor heating	7	6	25	35	3.5
Low temperature hot water	7	6	30	50	3.2
Sanitary hot water	7	6	15	65	3.2

The test methodology is that described in EN14511-3:2007.

8. 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:

8.1 Factory audits

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

8.2 Product audits

Product audits will be conducted as follows:

8.2.1 review of the product technical data files including materials

8.2.2 review of end of line tests in accordance with the manufacturer's quality plan

8.2.3 repeat testing of elements from the product standard as appropriate to confirm that the product continues to meet the requirements for certification and listing

9. CERTIFICATION MARK AND LABELLING

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

The manufacturer 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 Number MCS "XXX"

"Description of the Technology certificated"

Where 'XXX' is the certificate number and the logo of the certification body issuing the certification would sit in the right hand box.

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

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AMENDMENTS ISSUED SINCE PUBLICATION

DOCUMENT NO.	AMENDMENT DETAILS	DATE
1.1	'UK' removed from scheme name; 'Department of Trade and Industry' MCS mark replaced by 'BERR ' MCS mark	11/01/2008
1.2	Revision details added; BRE Certification Limited mark replaced by BRE Global mark.	25/02/2008
1.3	Gemserv details added as Licensee. Document reformatted to reflect brand update. References to BERR updated to DECC, MCS logo updated accordingly. Website and email addresses updated to reflect new name.	01/12/2008
1.4	Quality review	10/01/2009
1.5	New MCS logo added	15/02/2009
2.0	Assessment and performance criteria for exhaust air and swimming pool heat pumps added Version of EN 14511 updated to 2007 (from 2004)	15/12/2009

2.1	Updated to add in section for certification of CO_2 Heat Pumps on pages 9 and 10.	26/10/2011