MICROGENERATION INSTALLATION STANDARD: MIS 3007 - 2

Requirements for MCS Contractors Undertaking The Design, Supply, Installation, Set to Work, Commissioning, and Handover of a Heating System Containing an Electricity Led Micro-Cogeneration Package or Add-On Unit(s)
This document was prepared by the Microgeneration Certification Scheme Working Group 7 ‘Micro-CHP systems’.

This document has been approved by the Standards Management Group of the Microgeneration Certification Scheme.

**REVISION OF MICROGENERATION INSTALLATION STANDARDS**

Installation Standards will be revised by issue of revised editions or amendments. Details will be posted on the website at www.mcscertified.com

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.
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FOREWORD

The following document contains provisions, which, through reference in this text, constitute normative or informative provisions of this document MIS 3007-2. At the time of publication, the editions indicated were valid. All documents are subject to revision, and parties applying this document MIS 3007-2 are encouraged to investigate the possibility of applying the most recent editions of the documents referenced.

The following document MIS 3007-2 Issue 2.4 is a minor update to MIS 3007-2 Issue 2.3. It is available for reference from the date of publication (12/11/2018). MCS Contractors of microgeneration systems who are certificated in accordance with MIS 3007-2 may commence working in accordance with this update from the date of publication (12/11/2018). MCS Contractors of microgeneration systems who are certificated in accordance with MIS 3007-2 shall commence working in accordance with this update from the date of implementation (12/03/2019).

Note for information only: The eligibility criteria for the Feed in Tariff (FIT) are due to be updated to refer to MIS 3007-2 Issue 2.4. However, this update has not yet taken effect. Accordingly, to meet the relevant FIT eligibility criteria to enable the system owner to claim the Feed in Tariff, any Micro CHP systems installed and commissioned before 12/03/2019 shall be installed in accordance with Issue 2.3 of MIS 3007-2 and any Micro CHP systems installed and commissioned on or after 12/03/2019 shall be installed in accordance with MIS 3007-2 Issue 2.4.

This Standard identifies the evaluation and assessment practices undertaken by certification bodies of the Microgeneration Certification Scheme (MCS) for the purposes of approval and listing of MCS Contractors undertaking the design, supply, installation, set to work, commissioning and handover of a heating system containing a Micro-Cogeneration Package, or Add-On Unit(s). The listing and approval are based on evidence acceptable to the certification body:

- that the MCS Contractor has staff, processes and systems in place to ensure that the system or service delivered will meet the requirements of this Standard;

And on:

- periodic audits of the MCS Contractor including testing as appropriate; and

- 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 document MCS 001 (see section 8).

NOTES:-

This 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

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

The Steering Group welcomes comments of a technical or editorial nature and these should be addressed to ‘The Secretariat’ at mcsmeetings@mcscertified.com

Listed products and services appear at www.mcscertified.com
1. SCOPE

1.1 This Standard specifies the requirements of the Microgeneration Certification Scheme (MCS) for the approval and listing of MCS Contractors undertaking the design, supply, installation, set to work, commissioning and handover of a heating system containing a Micro-Cogeneration Package, or Add-On Unit(s) where a Micro Cogeneration Unit/Package has been added on to an existing heating system.

1.2 The Micro-Cogeneration Packages, or Add-On Unit covered by this Standard are those described in the MCS Product Certification Scheme requirements MCS 015 (see Section 8).

2. DEFINITIONS

<table>
<thead>
<tr>
<th>Commissioning</th>
<th>The advancement of an installation from the state of setting to work of an installation, the regulation of the system and the fine tuning of the static completion to full working order to the specified requirements. Commissioning includes recording all relevant measurements, flow rates and/or test results, and includes the preparation and submission of a commissioning report or certificate as required by the relevant technology Standard that shall confirm that the system is capable of delivering the performance quoted to the customer.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract</td>
<td>An undertaking for the design, supply, installation, set to work, commissioning and handover of systems covered by the relevant technology Standard. All contracts must be written to be compliant with MCS requirements.</td>
</tr>
<tr>
<td>Design</td>
<td>The formulation of a written plan including a specific list of products and fixings to form a completed heating water system containing a defined Electricity-Led Micro-Cogeneration Unit or Package or Add-On Unit installation in a building.</td>
</tr>
<tr>
<td>Handover</td>
<td>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 explained and handed over to the client.</td>
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<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>Installation</td>
<td>The activities associated with placement and fixing of a Microgeneration system.</td>
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<tr>
<td>MCS Contractor</td>
<td>An individual, body corporate or body incorporate, applying for or holding MCS certification for delivery of supply, design and / or design review, installation, set to work, commissioning services and handover for systems covered by the relevant technology Standard.</td>
</tr>
<tr>
<td>Set to work</td>
<td>The activities necessary to make the installed equipment function as a completed system prior to commissioning.</td>
</tr>
<tr>
<td>Subcontract</td>
<td>A written contract between an MCS Contractor and another firm for the supply of products and services in connection with the fulfilment of a contract.</td>
</tr>
<tr>
<td>Add-On Micro-Cogeneration Package</td>
<td>Micro-Cogeneration Unit with associated equipment as specified by the manufacturer when submitting for testing.</td>
</tr>
<tr>
<td>Add-On Micro-Cogeneration Unit</td>
<td>A lead device added to or replacing part of a building’s existing heating system which responds to a thermal or electrical demand signal and controls operation of the existing heating plant as necessary to meet the building’s heat requirements.</td>
</tr>
<tr>
<td>combiPK</td>
<td>A Micro-Cogeneration Package for providing space and water heating in which the Domestic Hot Water (DHW) service is provided wholly from within the package.</td>
</tr>
<tr>
<td>DHWPK</td>
<td>A Micro-Cogeneration Package for the provision of hot water heating alone for residential or commercial buildings.</td>
</tr>
</tbody>
</table>
3. REQUIREMENTS FOR THE MCS CONTRACTOR

3.1 CAPABILITY

3.1.1 MCS Contractors shall have the capability and capacity to undertake the supply, design, installation, set to work, commissioning and handover of the heating system containing the Micro-Cogeneration Unit or Package, including Add-On Unit(s) to existing heating systems.

3.1.2 Where MCS Contractors do not engage in the design or supply of such systems, but work solely as an MCS Contractor for a client who has already commissioned a system design; then the MCS Contractor shall be competent to review and verify that the design will meet the design requirements set out in this scheme document and this should be recorded.

3.2 QUALITY MANAGEMENT SYSTEM

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

3.3 SUBCONTRACTING

3.3.1 In installations for private customers, any work within the scope of the scheme not undertaken by employees of the MCS Contractor shall be managed through a formal subcontract agreement between the two parties in accordance with the policies and procedures employed by the certificated MCS Contractor. These procedures shall ensure that the subcontractor undertakes the work in accordance with the requirements of this Standard.

3.3.2 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 subcontracted to the MCS Contractor) provided that:

3.3.3 A contract between the MCS 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 MCS Contractor. This is to be made available to the MCS 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.

3.3.4 The MCS Contractor provides additional product-specific training for those undertaking the work not undertaken by the MCS Contractor.
3.3.5 The MCS 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).

3.3.6 The MCS Contractor assumes responsibility at handover that the installation is in full compliance with the Standard.

3.4 CONSUMER CODE OF PRACTICE

3.4.1 The MCS Contractor shall be a member of and, when dealing with domestic consumers, 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 Chartered Trading Standards Institute (CTSI) or formally approved under the Office of Fair Trading (OFT) prior to April 1st 2013.
4. DESIGN AND INSTALLATION, SET TO WORK, COMMISSIONING, HANDOVER AND EQUIPMENT REQUIREMENTS

4.1 REGULATIONS

4.1.1 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. MCS Contractors shall ensure they have a system to identify all applicable regulations and changes to them.

4.1.2 All work, and working practices, must be in compliance with all relevant health and safety regulations and a risk assessment shall be conducted before any work on site is commenced.

4.1.3 All MCS Contractors shall make their customers aware of all permissions and approvals required for the installation.

4.1.4 The MCS Contractor shall assess the building using a competent professional experienced in Micro-Cogeneration Units or Packages to ensure that the site is suitable for the installation and that the building will meet the requirements of the Building Regulations (in particular those relating to energy efficiency) and other regulations applicable to their work during and following installation.

4.1.5 Where required, planning permission shall be obtained before work is commenced.

4.1.6 Where work is undertaken that is notifiable under the Building Regulations it shall be made clear to the customer who shall be responsible for this notification.

4.1.7 The MCS Contractor shall ensure that this notification has been completed prior to handing over the installation. Self-certification, in lieu of building control approval, is only permitted where installation and commissioning is undertaken by a person deemed competent and registered with a Competent Persons Scheme (CPS) approved by the Department for Communities and Local Government (DCLG) for the scope of work being undertaken. Further details can be found at http://www.competentperson.co.uk.
4.2 DESIGN AND INSTALLATION

4.2.1 The areas of competence relevant to the design and installation of Electricity-Led Micro-Cogeneration Package or Add-On Micro-Cogeneration Unit systems in buildings are included in Clause 5. The following principles shall be met when selecting, designing, specifying and installing such systems.

4.2.2 The environmental performance of the Micro-Cogeneration Unit or Package shall be better than would be achieved by a boiler using the same fuel and grid supplied electricity. Where a Micro-Cogeneration Add-On Unit is installed then the heating system environmental performance shall be better than before installation. This shall be determined by the method set out in Appendix B of this document.

4.2.3 The design of the installation shall ensure that it complies with the following fundamental assumptions:

a) Either the Micro-Cogeneration Package is a standalone electricity led system for the building,

b) Or where an Add-On Micro-Cogeneration Unit(s) is installed to a new or existing heating system then it shall be the lead appliance for the system (i.e. it will operate with the existing heating plant as the lead appliance to provide heating and/or hot water demand);

c) The Package is controlled by electric demand (i.e. it is "electricity-led");

d) Heat is never wasted; and

e) Electricity is never wasted, and any that is not used in the building is always exported to the grid.

4.2.4 The design of the Micro-Cogeneration Package or Add-On Unit system shall be in compliance with the Micro-Cogeneration Unit or Package manufacturer’s specification and shall be clearly documented so that such compliance may be demonstrated.

4.2.5 The Micro-Cogeneration Unit or Package system shall be installed such that all the manufacturer’s instructions are followed.

4.2.6 The Micro-Cogeneration Unit or Package shall be connected to the domestic electrical installation (in parallel with the mains supply) by following the appropriate guidance contained in the
Guide prepared by the Electrical Safety Council “Connecting a microgeneration system to a domestic or similar electrical installation (in parallel with the mains supply)” (see Section 8).

4.2.7 a) For new build the MCS Contractor shall provide evidence of consultation and compliance with the requirements of the designers and MCS Contractor of the building’s energy system regarding specification and performance to ensure the correct and efficient operation of the system as a whole. This shall cover the selection of a Micro-Cogeneration Package or Add-On Unit(s) combined with other heating plant is of appropriate output for the building, and the design of hot water and/or heat distribution systems and controls compatible with efficient operation.

b) When replacing or adding to an existing hot water system the MCS Contractor shall provide evidence that the Micro-Cogeneration Unit or Package or Add-On Units(s) combined with other heating plant and associated components selected is of appropriate output for the building, (and/or hot water system if applicable), and that the design of the heat distribution systems and controls is compatible with efficient operation of the package and the system as a whole.

4.2.8 The MCS 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 MCS Contractor will ensure the customer has the opportunity to take account of this when awarding the contract.


4.3 COMMISSIONING

4.3.1 The Micro-Cogeneration Package or Add-On Unit(s) system shall be commissioned according to the manufacturer’s requirements.

4.4 EQUIPMENT

4.4.1 When making installations in accordance with this Standard the Micro-Cogeneration Package or Add-On Unit(s) used in installations shall be listed under the MCS ([http://www.mcscertified.com/](http://www.mcscertified.com)).

4.4.2 All Micro-Cogeneration Packages or Add-On Units that are installed within the European Union must be CE marked in compliance with the relevant European Directives.
5. ROLES AND COMPETENCY REQUIREMENTS

5.1 All personnel employed by, or sub-contracted to, the MCS Contractor shall be able to
demonstrate that they are competent in the disciplines and skills, appropriate to the activities
required for their role, in accordance with this Standard.

5.2 Complete records of training (where appropriate) and competence skills of personnel shall be
maintained by the MCS Contractor, in particular:

- Design staff, carrying out full conceptual design, shall be able to demonstrate a thorough
  knowledge of the technologies involved and the interaction of associated technologies;

- All personnel engaged in the actual installation are expected to have technical knowledge
  and installation skills, to install components and equipment within the designed system, in
  accordance with all appropriate codes of practice, manufacturer’s specifications and
  regulations. As a minimum MCS Contractors should have proven current training /
  experience with relevant Electricity-Led Micro-Cogeneration systems as shown in Appendix
  A.

- All personnel engaged in the final inspection, commissioning, or repair shall have a
  comprehensive technical knowledge of the products, interfacing services and structures to
  complete the specified processes.

5.3 Please see Appendix A below which contains the required roles which will need to be fulfilled by
the MCS Contractor for this MIS 3007-2 Standard.

5.4 The competence criteria to be demonstrated by the MCS Contractor can be found via the MCS
website (www.mscertified.com). In addition to this, the MCS Contractor guidance on how to
achieve compliance and the descriptions of the required roles which will need to be fulfilled can also
be found on the MCS website.
6. HANDOVER

6.1 MCS Contractors shall provide the client with a comprehensive document pack and that pack should contain at least:

- The system maintenance requirements and the maintenance services available;
- The Micro-Cogeneration Unit/Package or Add-On Unit(s) manufacturer’s User and Installation and Service Instructions;
- A certificate signed by the MCS Contractor containing at least the following:
  - a statement confirming that the Micro-Cogeneration Package or Add-On Unit(s) system installation meets the requirements of this Standard;
  - Client name and address;
  - Site address (if different);
  - MCS Contractors name, address etc.;
  - List of key components installed; and
  - A description of the system performance including those parameters applicable to the specific installation listed in 4.2.3.

6.2 All MCS Installations shall be registered to the MCS Licensee through the MCS Installation Database. A certificate shall be obtained from the MCS Installation Database for each installation showing that the installation has been registered with the Scheme and shall be provided to the customer no later than 10 working days after the date of commissioning the system; on provision of the certificate the customer shall be instructed to include it within the handover pack.

6.3 The generation of the certificate shall be undertaken in full compliance with the terms and conditions of use of the MCS Installation Database1 and the registration of the system on the MCS installation database shall only be undertaken after the system has been fully installed and commissioned.

6.4 A “per installation” fee is levied on MCS Contractors for each registration added to the database. Details of any such fee will be advised from time to time through MCS Certification Bodies.

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1The terms and conditions of use can be found on the MCS Installation Database website.
7. REGIONAL OFFICES

7.1 Where the MCS Contractor wishes to design, install and commission under the Certification Scheme in regional offices, then these offices shall meet the requirements of this Standard to be eligible for Certification.
8. PUBLICATIONS FOR REFERENCE & FURTHER READING

8.1 The below list is provided so that MCS Contractors know which documents have been used as a basis for the development of the requirements of this MIS Standard and they are able to further research topics if they need to do so.

8.2 It is not a scheme requirement for MCS Contractors to own or have immediate access to the documents referenced unless this MIS Standard does not adequately cover off the aspects required.


- MCS 015 – Microgeneration Certification Scheme - Product certification scheme requirements Electricity-led Micro-Cogeneration Packages or Add-On Units in buildings - Available from www.mcs-certified.com

- PAS 67: 2013 or the latest available version thereof – Publicly Available Specification 67 - Laboratory tests to determine the heating and electrical performance of heat-led micro-cogeneration packages primarily intended for heating dwellings – Available from BSI Customer Services Tel: +44 (0)20 8996 9001

- The Products Characteristics Database – see http://www.ncm-pcdb.org.uk/sap/searchpod.jsp?id=177


- “Connecting a microgeneration system to a domestic or similar electrical installation (in parallel with the mains supply)” – Best Practice Guide produced by the Electrical Safety Council – see http://rexel.tamba.co.uk/client_files/Files/NE/BestPracticeGuide3.pdf

• IGE/UP/3 Edition 3 *Gas fuelled spark ignition and dual fuel engines*

• ACS Module CGFE1 (Commercial Gas Fired Engines)

• *Domestic Heating Design Guide* published by CIBSE

• MCS Metering Guidance v1.0.
# APPENDIX A: ROLES AND COMPETENCY REQUIREMENTS

<table>
<thead>
<tr>
<th>ROLES</th>
<th>3001</th>
<th>3002</th>
<th>3003</th>
<th>3004</th>
<th>3005 HEAT PUMPS</th>
<th>3007 CHP (HEAT)</th>
<th>3007-2</th>
<th>300X INNOVATIVE TECHNOLOGY</th>
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<tr>
<td>Nominee</td>
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<td>Nominated Technical Person(s)</td>
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<td>Health and Safety co-ordinator</td>
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<td>Designer(s) Full scope</td>
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<td>Designer(s) Limited scope</td>
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<td>Electrical competencies</td>
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<td>Plumbing competencies</td>
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<tr>
<td>Specialist competencies</td>
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</tbody>
</table>

Required for the technology
× Not required for the technology
* If applicable to the technology
** For further details please see the MCS Change Process and the Competence Criteria on the MCS website: [www.mcs-certified.com](http://www.mcs-certified.com).

☐ A change of staff fulfilling this role would require notification to the Certification Body.
Note – 1) MCS Contractors undertaking work on systems covered by The Gas Safety (Installation and Use) Regulations 1998 MUST ensure that the individuals undertaking the work hold the appropriate qualifications and their business is registered with the appropriate body appointed by Health and Safety Executive currently Gas Safe Register.
APPENDIX B: ENVIRONMENTAL PERFORMANCE

B.1 STANDARD OF COMPARISON WHERE A COMBIPK MICRO-COGENERATION PACKAGE REPLACES THE EXISTING HEATING PLANT

B.1.1 The environmental performance of the Micro-Cogeneration Package shall be evaluated and compared with that of a boiler using the same fuel and grid supplied electricity.

B.1.2 For a Micro-Cogeneration Package fuelled by natural gas, LPG, or oil, the standard for comparison shall be a boiler using the same fuel with a SAP 2009/2012 annual efficiency of at least 86 (%) and a Comparative hot water efficiency of at least 65.5 %, representative of good quality products readily available in the market.

B.1.3 For a Micro-Cogeneration Package not covered by B.1.2, the standard for comparison shall be a boiler using the same fuel and compliant with building regulations in respect of energy performance.

B.1.4 Compliance of the environmental performance of the combiPK Micro-Cogeneration Package to MCS standards shall be established by an acceptable carbon emissions value (C) following laboratory testing as stated in the manufacturer installation documentation or by the installer using either of the two methods stated below.

B.1.5 Performance shall be established by either the SAP method described in B.2 or by the Heating Plant Emission Rate (HPER) method described in B.3.

For new buildings, the SAP method shall be used.

For existing buildings in which the Micro-Cogeneration Package is fuelled by natural gas, LPG, or oil, either the SAP method or the HPER methods may be used. For existing dwellings in which the Micro-Cogeneration Package uses a fuel other than natural gas, LPG, or oil, the SAP method shall be used.

B.1.6 When communicated to the client, the estimate of performance shall be accompanied by the following disclaimer:

‘The performance of micro-cogeneration systems is difficult to predict with certainty due to the variability of customer expectations and usage and the subsequent effect on both heat demand and electricity supply and demand. This estimate is based upon the best available information but is given as guidance only and should not be considered as a guarantee.’

<table>
<thead>
<tr>
<th>Issue: 2.5</th>
<th>MCS</th>
<th>MIS3007-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date: 16/07/2019</td>
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</tr>
</tbody>
</table>
B.2  THE SAP METHOD, WHERE A COMBIPK MICRO-COGENERATION PACKAGE REPLACES THE EXISTING HEATING PLANT

B.2.1  The measure of environmental performance is the Dwelling CO₂ Emission Rate (DER), expressed in units of kgCO₂/m²/year to two decimal places, as calculated by the current version of SAP. SAP assessments of the building in which the Micro-Cogeneration Package is to be installed shall be carried out by a qualified SAP assessor.

B.2.2  The SAP assessment shall be carried out for the particular Micro-Cogeneration Package (identified by manufacturer, brand, and model name) to be installed. This can be done only if the Micro-Cogeneration Package has previously been registered in the Product Characteristics Database. The DER produced by the SAP assessment shall be recorded.

B.2.3  A second SAP assessment for the same building shall be carried out in which a boiler is substituted for the Micro-Cogeneration Package, using the same fuel. The energy performance of the boiler shall meet the requirements of B.1.2 or B.1.3 as appropriate. The boiler, which may be a combi boiler, shall also be specified as providing hot water service. No other changes to the data for the SAP assessment are allowed. The DER produced by SAP shall be recorded.

B.2.4  If the DER for the SAP assessment with the Micro-Cogeneration Package is less than or equal to the DER for the SAP assessment with the boiler, the environmental performance of the Micro-Cogeneration Package may be regarded as acceptable for the purpose of the MCS Scheme.
B.3 THE HPER METHOD, WHERE A COMBIPK MICRO-COGENERATION PACKAGE REPLACES THE EXISTING HEATING PLANT

B.3.1 The measure of environmental performance is the Heating Plant CO₂ Emission Rate (HPER) in units of kgCO₂/kWh. Calculation of the HPER requires:

- the design heat loss of the building in Watts
- the nominal rated heat output of the Micro-Cogeneration Package in Watts (and confirmed by PAS 67 tests)
- the plant size ratio (as calculated in B.3.3)
- the independently verified Micro-Cogeneration Package annual energy data provided by the manufacturer, obtained from test results in accordance with PAS 67 and the annual performance method.

*Note - it is preferable to take the annual energy data from the Product Characteristics Database as this has been independently verified by the Boiler Database administrator.*

B.3.2 The design heat loss of the building shall be estimated using one of the following procedures:

(i) The Whole House Boiler Sizing Method for houses and flats. Available in printable form at: http://www.domestic-gas.co.uk/documents/CE54.pdf. The design heat loss in Watts shall be taken as the sum of boxes E and F only (the additional figure for water heating in section 7 is ignored).

(ii) “The Domestic Heating Design Guide” published by CIBSE. The design heat loss is calculated on Worksheet 1 in Appendix F as the sum of the heat losses from each room, with final adjustments for exposed location, high ceilings, etc.

(iii) The HHIC Heat loss calculator & Radiator Selector published by the Heating and Hot water Industry Council. The design heat loss is calculated as the sum of the heat losses from each room.

B.3.3 The plant size ratio shall be calculated as the nominal rated heat output of the Micro-Cogeneration Package in Watts divided by the design heat loss in Watts.

B.3.4 The HPER shall be determined for the particular Micro-Cogeneration Package and plant size ratio. This shall be done either by:

(i) Calculation by the annual performance method using data from PAS 67 tests; or
(ii) Finding the HPER from the relevant entry in the Boiler Efficiency Database for the nearest plant size ratio below, and nearest plant size ratio above, and linear interpolating for the plant size ratio that applies to the particular dwelling in which the Micro-Cogeneration Package is to be installed.

B.3.5 To be acceptable for the purposes of the Microgeneration Certification Scheme the HPER shall be ≤ 0.251 kgCO₂/kWh.

Note: A HPER of 0.251 kgCO₂/kWh is considered to be equivalent to a gas boiler of SAP annual efficiency of 86 (%) with a plant size ratio of 1.5 and has been derived from a combination of experimental and analytical work.

This figure has been calculated using CO₂ emission figures for gas and electricity taken from Table 12 of SAP 2012 and is subject to change in future versions of SAP.
B.4 THE HPER METHOD, FOR DHWPKS WHERE A MICRO-COGENERATION PACKAGE REPLACES THE EXISTING HEATING PLANT

B.4.1 Compliance of the environmental performance of the DHWPK Micro-Cogeneration Package to MCS standards shall be established by an acceptable HPER value following laboratory testing in accordance with the current versions of the PAS67 and within the limits as stated in the manufacturer installation documentation.

B.4.2 To be acceptable for the purpose of the Microgeneration Certification Scheme the HPER shall be less than the corresponding DHW tapping cycle values shown in Table 1.

| TABLE 1: MAXIMUM PERMITTED CO₂ HPER (KGCO₂/KWH) FOR DHWPK |
|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| S               | M              | L              | XL             | XXL            | 3XL            | 4XL            |
| 0.346           | 0.289          | 0.271          | 0.262          | 0.260          | 0.255          | 0.252          |
B.5 ADD-ON MICRO-COGENERATION UNIT(S) OR DHWPKS ADDED TO EXISTING HEATING PLANT

B.5.1 The environmental performance of the Add-On Micro-Cogeneration Package or DHWPK shall be evaluated and compared to that prior to installation of the Add-On Unit.

B.5.2 The manufacturer of Add-On Micro-Cogeneration Unit(s) shall provide within its installation and commissioning instructions, details of the environmental performance of the Add-On Unit(s) when combined with different heating plant. The environmental information within the manufacturer’s instructions shall be derived from the Micro-Cogeneration Add-On-Test Package: Test methodology based on PAS 67: 2013 and state the limits in heating plant size that are acceptable for the add-on.

B.5.3 To be acceptable for the purpose of the Microgeneration Certification Scheme the heating system environmental performance shall be better than before installation.
# Amendments Issued Since Publication

<table>
<thead>
<tr>
<th>Document No:</th>
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<tbody>
<tr>
<td>1.0</td>
<td>First Issue</td>
<td>16/11/2010</td>
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<tr>
<td>1.1</td>
<td>Extension to include electricity-led microCHP providing domestic heating</td>
<td>30/01/2012</td>
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| 2.0          | - Definition of co-generated heat added.  
- Updated references to read “or latest version thereof”.  
- Updated boiler efficiency database to read “product characteristics database".  
- Revision to 4.2 Design and Installation.  
- Updated references in Section 7 Publications referred to and Appendix B Environmental Performance.  
- Addition of Appendix C for domestic hot water test. | 25/02/2012 |
| 2.1          | Update to Section 4.4, Section 5, and Appendix A | 16/12/2013 |
| 2.2          | Update to definitions | 01/05/2015 |
| 2.3          | Minor corrections to cross referencing | 06/05/2015 |
| 2.4          | Minor update to include space heating provision, combiPK, DHWPK and Add-On Unit(s).  
Update to definitions and references.  
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| Issue 2.5 | Rebranding of document, update of email and website addresses and cosmetic changes | 16/07/2019 |

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