



The Certification Mark for Onsite
Sustainable Energy Technologies

MGD 002 – For MIS 3005 v3.1a

Guidance for MIS 3005 v3.1a

TABLE OF CONTENTS

1.	INTRODUCTION	3
2.	GUIDANCE & CLARIFICATION	4
	2.1 Clause 4.2.1 (Page 11-13).....	4
	2.2 Clause 4.2.3 (Page 17).....	6
	2.3 Clause 4.2.6 (Page 17).....	6
	2.4 Clause 4.2.12	7
	2.5 Clause 4.2.14	7
	2.6 Clause 4.2.18 (Page 23).....	8
	2.7 Clause 4.3 (Page 26).....	8
3.	General questions	9
	3.1 I have completed my heat loss calculation and it requires a plant-size-ratio in SAP that is greater than 2. What do I do?	9
	3.2 Is there any advice on assessing ground thermal conductivity?.....	9
	3.3 Are there any requirements on grouting boreholes?	10
	3.4 What building types is a BS EN 12831 elemental heat loss calculator appropriate for?	10
	AMENDMENTS ISSUED SINCE PUBLICATION	11

Issue 1.1	MGD 002 – For MIS 3005 v3.1a	MGD 002
Date: 20/02/2012		Page 2 of 11

1. INTRODUCTION

This guidance document has been produced to go with MIS 3005 v3.1 the MCS installation standard for heat pump systems.

This document is guidance only and is not to be used as the actual MIS 3005 v3.1 standard. This has been prepared by the MCS Heat Pumps Working Group and Certification Bodies on the Scheme and is to provide installation companies with further information on MIS 3005 v3.1.

Issue 1.1	MGD 002 – For MIS 3005 v3.1a	MGD 002
Date: 20/02/2012		Page 3 of 11

2. GUIDANCE & CLARIFICATION

2.1 Clause 4.2.1 (Page 11-13)

4.2.1 a) “A heat loss calculation should be performed on the building using a method that complies with BS EN 12831.”

Methods that comply or which are in line, are the CIBSE Design Guide, BENTLEY HEVACOMP, TAS, IES, freely available MCS heat loss calculator. SAP should not be used to calculate a peak heat loss as it uses mean values for the whole house rather than accurate room by room calculations. Only compliant tools will enable accurate sizing.

4.2.1 b) ”Heat loss through the floor shall be determined using the local annual average external air temperature in appendix B.”

The following guidance applies to methods that are based on CIBSE Guide A and BS EN 12831 section 7.

When calculating the heat loss through a **solid floor in contact with the ground**, the temperature difference to be used is the internal design room temperature (Table 1) minus the local **annual average** external air temperature (Appendix B).

When calculating the heat loss through a **suspended floor**, the temperature difference to be used is the internal design room temperature (Table 1) minus the **design** external air temperature (Table 2).

4.2.1 c) “A heat pump shall be selected that will provide at least 100% of the calculated design space heating power requirement at the selected internal and external temperatures, the selection being made after taking into consideration the space heating flow temperature assumed in the heat emitter circuit and any variation in heat pump performance that may result. Where clause 4.2.1c and/or 4.2.1d cannot be met, then clause 4.2.1e shall apply.”

This is generally covered by the bi-valence criteria. If a dwelling has insufficient electrical power for a heat pump to achieve 100%, it can use another heat source

Issue 1.1	MGD 002 – For MIS 3005 v3.1a	MGD 002
Date: 20/02/2012		Page 4 of 11

provided that they have an integrated heating system. If the proposed solution is, for example, a domestic biomass system, then this is unlikely to be possible.

4.2.1 e) “For installations where other heat sources are available to the same building, the heat sources shall be fully and correctly integrated into a single control system.”

Where a dwelling uses a different heating strategy (e.g. for upstairs and downstairs zones direct acting heaters in bedrooms and low temperature wet system downstairs), controls are required for each zone which prioritise the lower carbon heat source and reflect the effects of heating a common space, e.g. a landing.

If a zone is heated by a combined system then it needs to have an integrated system control.

A bivalent or multivalent heating system must be on a single integrated control circuit and cannot have any monoenergetic space heating above the geographical design temperature. An immersion heater can be used for hot water heating as long as the local building regulations and standards are taken into account. Local regulations normally require the lowest carbon heat source to provide the load and the supplementary heat to source to be used as a back-up.

The Householder can also have a wood stove or other manual heating system separate from the main heating system but any auxiliary heat sources can only be included in the mono-to-multivalent heating design load temperatures if they are automatically controlled by the integrated heating control circuit. All automatically controlled heat sources must be fully interlocked.

Definitions¹ to assist installers:

- **Monovalent** = Heat pump heats the building alone, without help.
- **Bivalent** = Heat pump operates with support from an additional heater. Two methods are described below:

¹ Taken and adapted from Heat Pumps for the Home written by John Cantor

Issue 1.1	MGD 002 – For MIS 3005 v3.1a	MGD 002
Date: 20/02/2012		Page 5 of 11

- **Bivalent parallel:** Heat pump continues to operate alongside secondary heater
- **Bivalent- alternative:** Heat pump stops and alternative heater takes full heating load
- **Mono-energetic** = This is a bivalent parallel system where secondary heater is electric. Therefore there is only one energetic source: electricity.
- **Bivalent point** = Outside temperature below which the back-up may be required. This setting is a parameter configured into the controller.

2.2 Clause 4.2.3 (Page 17)

“Domestic hot water services design should be based on an accurate assessment of the number and types of points of use and anticipated consumption within the property, making appropriate adjustments for the intended domestic hot water storage temperature and domestic hot water cylinder recovery rate.”

A suitable method for assessing cylinder volume and energy consumption is # bedrooms + 1 x 45ltrs/day @ 60°C. This may need to be adjusted for different achievable cylinder temperatures from the heat pump, and additional outlets as defined within the CIBSE guide.

2.3 Clause 4.2.6 (Page 17)

“The contractor shall communicate and explain to the customer the implications of the space heating and domestic hot water system design on the costs associated with providing space heating and domestic hot water to the building.”

A freely available energy estimating tool is available on the MCS website. Please see: <http://www.microgenerationcertification.org>.

This estimating tool will provide an approximate cost but subject to customer’s circumstances. In addition the installation company must ensure they are still meeting the requirements of the REAL Assurance Consumer Code (*Section 5.3 Performance Information and Predictions*):

Issue 1.1	MGD 002 – For MIS 3005 v3.1a	MGD 002
Date: 20/02/2012		Page 6 of 11

“Proposals to consumers must only include estimates of savings, periods of recovery ('payback') or other measures of financial effectiveness based on the consumer's actual energy use. Any assumptions that have been made (for example, of energy prices, interest rates or inflation) must be set out and clearly explained. These estimates should not mislead the consumer in such a way as to affect their economic behaviour. Members may, however, publish case studies showing the effectiveness of previous installations, as long as they give full details of the size and type of the energy generator supplied, the type of property which it was used for, as well as the energy costs (and resale price where appropriate).”

2.4 Clause 4.2.12 (Page 19)

“Manufacturers’ in-house software or other commercial software packages (such as EED, GLHEPRO, and GLD) may be used to design the ground heat exchanger provided that the software is validated for UK use and the following parameters are used for each installation:”

This clause refers to the use of software which is “validated for UK use”. In the absence of a detailed specification against which software can be measured, MCS Certification Bodies will verify whether software used by MCS installation companies meets the requirements detailed in MIS 3005 v3.1 (i.e. Clause 4.2.12 which includes the list of parameters which should be inputted into the software).

MCS is working to detail the specification that software must meet and will make this available in this Guidance document at a later date, with an accepted tolerance level for any deviation from expected results.

2.5 Clause 4.2.14 (Page 20)

“Simplified design methods, including look-up tables and nomograms, should only be used where these have been designed and validated for UK ground conditions and installation practices and comply with clauses 4.2.12 and 4.2.13 in this standard.”

As with 2.4 above, for clause 4.2.14, in the absence of a specification and accepted tolerance level for design methods to be verified against within this Guidance, the

Issue 1.1	MGD 002 – For MIS 3005 v3.1a	MGD 002
Date: 20/02/2012		Page 7 of 11

MCS Certification Body will verify whether that design method and installation practices meet the requirements of MIS 3005 v3.1 (i.e. clauses 4.2.12 and 4.2.13).

2.6 Clause 4.2.18 (Page 23)

“For all installations, the hydraulic layout of the ground loop system shall be such that the overall closed-loop ground collector system pumping power at the lowest operating temperature is less than 2.5% of the heat pump heating capacity.”

Additional guidance will be published on the MCS website in due course.

2.7 Clause 4.3 (Page 26)

“An estimate of annual energy performance shall be calculated or obtained and shall be communicated in writing to the client at or before the point at which the contract is awarded. Separate calculations for space heating and for hot water shall be performed and subsequently added together to give a combined annual energy performance figure”

Separate energy performance calculations for space heating and domestic hot water heating must be produced, as the efficiency at which these are performed is likely to vary.

For space heating, the SPF relating to the appropriate heating water flow temperature for the type of heat emitter installed should be selected from the Domestic Heat Emitter Guide and this figure multiplied by the annual energy consumption figure calculated for space heating in the installation (kWh/yr).

For production of domestic hot water, it must be clearly stated at what temperature water will be stored within the cylinder in normal operation and the heat pump flow temperature which is required to achieve this (e.g. 50°C flow temperature required to achieve 45°C stored water temperature). The annual energy consumption to achieve this on a daily basis should then be calculated based on the appropriate heat pump water flow temperature from the Domestic Heat Emitter Guide, in this case 3.4 for a ground source and 2.7 for an air source heat pump.

Additionally it must be clearly stated the frequency at which Legionella pasteurisation will be performed (e.g. daily/weekly), to what temperature the stored hot water temperature will be raised and the means by which this will be achieved. Where this is achieved using a direct electric immersion heater, an SPF of 1.0 should be used for this element of the energy calculation. Where this is achieved by a high temperature heat pump able to raise the stored water temperature to the required Legionella pasteurisation temperature without the need for

Issue 1.1	MGD 002 – For MIS 3005 v3.1a	MGD 002
Date: 20/02/2012		Page 8 of 11

an electric immersion heater, an SPF of 1.8 for air source and 2.5 for ground source should be assumed.

3. General questions

3.1 I have completed my heat loss calculation and it requires a plant-size-ratio in SAP that is greater than 2. What do I do?

There are some important differences between SAP, which is an assessment tool, and BS EN 12831, which is a design standard. BS EN 12831, for instance, assumes that party walls have unheated spaces on the other side of them whereas SAP assumed those spaces are heated. Air change rates are also different. The internal and external temperatures you are required to use in MIS 3005 and SAP are different as well. This means that the heat loss calculated in SAP is very unlikely to be exactly the same as the heat loss you calculate using BS EN 12831. However, it is also unlikely that BS EN 12831 will give an answer that is twice as big as a SAP calculation and therefore, if you are faced with this situation, you should check to see if you or someone else has made a mistake in one or both calculations.

In some situations you may want to install a heat pump with a high plant-size-ratio. It is unlikely this is a result of the new issue of MIS 3005 on its own. Members of the MCS heat pump working group are in contact with the authors of SAP to find a solution to this potential issue.

3.2 Is there any advice on assessing ground thermal conductivity?

Assessing the thermal conductivity of the ground isn't easy because it can change over short distances and depends on things like moisture content, which vary throughout the year. This is why MIS 3005 issue 3 calls for the installer to be conservative if he or she cannot determine a reliable value. Your Certification Body will be looking for evidence that you have evaluated the thermal conductivity specifically for the site you are installing at. This evidence may include:

- An estimate from a BGS report
- Use of a consultant geologist or hydrogeologist
- Use of a geologist or hydrogeologist working inside your organisation
- Recorded observations from test pits

Issue 1.1	MGD 002 – For MIS 3005 v3.1a	MGD 002
Date: 20/02/2012		Page 9 of 11

- Experience from a nearby site and confirmation of consistent geology in the area.

3.3 Are there any requirements on grouting boreholes?

All boreholes should be grouted, The Ground Source Heat Pump Association also has a Vertical Borehole Standard which can be found by visiting:

<http://www.gshp.org.uk/Standards.html>

3.4 What building types is a BS EN 12831 elemental heat loss calculator appropriate for?

The CIBSE Domestic Heating Design Guide is a fabric and ventilation heat loss calculator that will adequately represent an existing property built before 2000. As the property becomes more complex, with either very high levels of insulation or with large areas of south facing windows, extra elements such as thermal bridging or solar gains should be included in the calculation process.

Issue 1.1	MGD 002 – For MIS 3005 v3.1a	MGD 002
Date: 20/02/2012		Page 10 of 11

AMENDMENTS ISSUED SINCE PUBLICATION

Document Number:	Amendment Details:	Date:
1.0	First Issue	01/02/2012
1.1	Updated document to reference MIS 3005 v3.1a	20/02/2012

Issue 1.1	MGD 002 – For MIS 3005 v3.1a	MGD 002
Date: 20/02/2012		Page 11 of 11