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# Renewable Heat Incentive (RHI): Independent Report on Metering Arrangements: Template Pack

# [version 4.1]

**This Template Pack includes:**

* **Introduction to the Report**
* **Template for the Independent Report on Metering Arrangements**
* **Appendix 1 – Instructions on how to complete the Report**
* **Appendix 2 – External piping data**
* **Appendix 3 – Summary of Key Changes from Version 4**

# Introduction

**Purpose of the Report**

The Independent Report on Metering Arrangements (‘the Report’) is intended to verify to Ofgem that an installation seeking accreditation to the Renewable Heat Incentive (RHI) has metering arrangements in place which meet the RHI eligibility requirements, in accordance with the RHI Regulations. The Report will cover the installation’s metering arrangements for RHI purposes, including:

* whether meters and sensors are correctly positioned;
* whether meters and sensors are installed in accordance with the manufacturer’s instructions;
* whether the schematic diagram is an accurate representation of the installation and the heating system of which it forms part.

**Circumstances under which the Report will be required**

Where an installation can be classified as falling into one or more of the following scenarios, Ofgem have the right to require an independent report on metering arrangements, which Ofgem will require to be completed by an independent person. We will require a report for an installation which:

* has a capacity of 1MWth or above; or
* is classed as having a ‘multiple’ metering arrangement for RHI payment purposes; or
* uses steam as the heat transfer medium.

Please note that generally and by default we will not require the following installations to submit an IRMA where:

* they have a capacity of 45kWth or below; or
* they are classed as having standard metering for RHI payment purposes.

However, Ofgem reserves the right to request the submission of an IRMA for such installations if we are not satisfied by the other evidence provided at accreditation that the metering arrangements for the system meet the scheme requirements. Relevant applicants should therefore be prepared to provide such a Report, but the applicant may choose not to obtain this in advance of making his/her accreditation application.

A Report will also be required in the following scenarios:

* where additional RHI capacity[[1]](#footnote-1) takes an accredited installation’s capacity over 1MWth;
* where additional RHI capacity takes an accredited installation’s capacity over 45kWth and the installation is considered to have a ‘multiple’ metering arrangement for RHI payment purposes; or
* where a change is made to the installation/heating system that results in an RHI-accredited installation moving from a standard to multiple metering arrangement classification for RHI payment purposes[[2]](#footnote-2). It will be a condition of accreditation for all participants with accredited installations that should this third scenario arise, the participant will be required to produce an IRMA for their accredited installation.

Further information about additional RHI capacity and standard/multiple metering arrangement classifications can be found in Chapter Seven in Volume Two and Chapter Seven, ‘Metering eligibility requirements’ of Volume One of the Ofgem RHI Guidance, respectively.

**Who may complete the Report**

The Report should be completed by a ‘competent person’, as set out in the Ofgem RHI Guidance Volume One, Chapter Seven. The author must be able to sign the Declaration at the end of the Report.

We have interpreted a “competent person” to mean a person that meets **all** of the following criteria[[3]](#footnote-3):

1.   An experienced and suitably qualified engineer (at least HND or equivalent in an engineering discipline from a recognised academic institution);

2.   Has demonstrable experience and expertise in flow measurement and heat/steam measurement systems demonstrated by training and development records;

3.   Has a relevant background (involved in energy, utilities, building services, heating system design, heating system operation & maintenance);

4.   Covered by Professional Indemnity Insurance of at least £1m (through employer or directly);

5.   Is unbiased and impartial

Note also that the IRMA author must not be the owner of the installation.

**Associated Documents**

Those completing this Report should ensure that they are familiar with the following documents which support this publication:

* [Ofgem RHI Guidance Volumes One and Two](http://www.ofgem.gov.uk/RHI)[[4]](#footnote-4)
* [Energy Act 2008](http://www.decc.gov.uk/en/content/cms/legislation/energy_act_08/energy_act_08.aspx)[[5]](#footnote-5)

Further details on this Report and how installations are classed as ‘standard’ or ‘multiple’ for RHI metering purposes can be found in Chapter Seven of Volume One of the RHI Guidance.

**Where the Report should be submitted**

This Report, once completed, should be provided to the applicant to be submitted by the applicant to Ofgem as part of the RHI accreditation application process, or as otherwise requested.

**How to Complete and Submit this Report**

* The Report should be completed following the instructions given in Appendix 1, and with reference to Associated Documents as mentioned above and referred to specifically throughout the Report template.
* The Report should be provided to the applicant commissioning the Report. The applicant is likely to require a signed copy of the Report in PDF format for electronic submission to Ofgem as part of the RHI application process.
* The Author of this Report will not in general be required to submit this Report to Ofgem, nor will they need any account or relationship with Ofgem for such a purpose.

# Independent Report on Metering Arrangements

**REPORT CONTENTS**

1. Executive Summary and Checklist

2. Details of visit

3. Installation details

* 1. Location details
  2. Installation details
  3. Supporting evidence: installation capacity
  4. Other plant details
  5. Additional comments

4. Heat Use

4.1 Eligible heat uses

4.2 Ineligible heat uses

4.3 Description of buildings in which heat is used

4.4 Supporting evidence: eligible heat use

4.4 Additional comments on heat uses

5. Metering Arrangements

5.1 Heat transfer medium

5.2 Additives to heat medium

5.3 Standard/Multiple?

5.3.1 Defining the level of insulation of external piping

5.3.2 Defining Standard or Multiple metering arrangement

5.4 Heat meter details

5.5 Steam meter details

5.6 Meter readings

5.7 Meter installation/operation

5.8 Details of any plant not being metered directly

5.9 Shared meters – heat generated

5.10 Shared meters – heat used in multiple buildings

5.11 Additional requirements for reversible heat pumps

5.12 Additional requirements for biogas installations

5.13 Steam traps and other devices

5.14 Trace heating

5.15 Additional comments on metering arrangements

6. Measurement details

7. Schematic diagram

8. Documentation review

9. Exception reports

10. Additional evidence

11. Installation good practice guidance for heat meters

Declarations

**REPORT TEMPLATE**

1. **Executive Summary & Checklist**

This section summarises the report findings, and flags areas where exceptions have been raised. Each exception raised should refer to an exception report sheet giving further details; these can be found in Section 9 of this template.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Relevant Report Sections** | **Topic** | **Item** | **Summary**  **[‘...’ indicates values can be selected from a list of options, or entered as free text]** | **Exception raised (and exception report #)** |
| 2 | Details of Visit | Date of visit: | Click to enter a date. | #: |
| 3 | Installation Details | Technology: | ... | #: |
| Installed capacity (kW): | ... |
| Postcode: | ... |
| 4.1, 4.3,4.4 | Eligible heat uses | Number of buildings: | Total separate buildings: ...  Buildings with eligible uses: ... | #: |
| Building type: | ... |
| 4.2 | Ineligible heat uses | Ineligible heat use types: | ... | #: |
| 5.1, 5.2 | Heat transfer medium | Heat transfer medium: | ... | #: |
| Any additives present: | ... |
| 5.3 | Standard/multiple metering | Metering designation: | ... | #: |
| 5.4 | Heat Metering | Number of heat meters | ... | #: |
| Meters eligible | ... |
| 5.5 | Steam Metering | Number of heat meters | ... | #: |
| Meters eligible | ... |
| 5.7 | Meter Installation | All Meters are appropriately installed | ... | #: |
| 5.8-5.14 | Metering | Any other exceptions relating to metering: | ... | #: |
| 6 | Meter Locations | Meters are installed appropriately to provide required heat output data | ... | #: |
| 7 | Schematic Diagram | Schematic is accurate and appropriate: | ... | #: |

1. **Details of Visit**

|  |  |
| --- | --- |
| Date of visit: |  |
| Start time of visit: |  |
| End time of visit: |  |

Personnel present during visit:

|  |  |  |
| --- | --- | --- |
| Name | Status/responsibility | Contact details |
|  |  |  |
|  |  |  |
|  |  |  |

1. **Details of installation and other plant on the heating system**

**3.1 Location details**

|  |  |
| --- | --- |
| Prospective participant name: |  |
| Contact address (inc post code): |  |
| Contact telephone: |  |
| Contact email: |  |
| Installation Name: |  |
| Installation Address (inc post code) if different from above: |  |

**3.2 Technical details – RHI-eligible installation**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Plant number / identifier | Technology type | Serial number, manufacturer and model | Total installed peak heat output capacity (kWth) | Fully functioning at time of visit? If no, please explain why not |
|  |  |  |  |  |
|  |  |  |  |  |

**3.3 Supporting Evidence – capacity of installation**

Please provide evidence, such as a photograph of the boiler nameplate:

|  |
| --- |
| [paste in directly, or enter evidence reference number and provide evidence in Section 10] |

**3.4 Technical details – other plant providing heat to the system**

Please provide details of other plant, including back-up boilers and immersion heaters:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Plant number / identifier on schematic | Technology type | Serial number, manufacturer and model | Total installed peak heat output capacity (kWth) | Fully functioning at time of visit? If no, please explain why not |
|  |  |  |  |  |
|  |  |  |  |  |

**3.5** Please enter any **additional comments** about the installation below

|  |
| --- |
|  |

1. **Heat Use**

**4.1 Eligible heat uses**

|  |  |
| --- | --- |
| Does the heating system of which the installation forms part supply heat: | Yes/No |
| * To heat a space? |  |
| * To heat water? |  |
| * Heat used otherwise than in a building to carry out a process used for cleaning or drying on a commercial basis? |  |
| * For carrying out a process (other than generating electricity), i.e. to supply process heat? |  |
| * For any other purpose than those listed above? |  |
| * Is all the heat generated and used in the same building? |  |

**4.2 Ineligible heat uses**

|  |  |  |
| --- | --- | --- |
| Does the heating system of which the installation forms part supply heat used to: | Yes / No | If yes, please provide details of the use and describe how the metering arrangement ensures that heat used for this purpose is not included in the figures submitted to Ofgem (with reference to the schematic diagram if appropriate) |
| Generate electricity? |  |  |
| Reject heat directly to the atmosphere, e.g. heat dissipation circuit, heat rejection facility? |  |  |
| Transfer heat between buildings, via any external piping\*? [“External piping” could include: buried or exposed piping, below – or above-ground, whether insulated or non-insulated] |  |  |
| Heat any outdoor space or structures that are not buildings as defined in the RHI regulations? |  |  |
| Any other use that is not eligible for RHI support? |  |  |

**\*External pipework**

For those installations:

* where the pipe work is not relevant for RHI purposes we will **not request completion of section 5.3.1 and Appendix 2 in the IRMA report template**. (eg, cases where heat losses due to pipe work are metered, or circumstances where the meter installation arrangements are such that they only account for the Eligible Heat Output (EHO). The evidence to show level of insulation is not required)
* If there is external piping present in the installation that is relevant for RHI purposes, please provide evidence to show the level of insulation of that external piping. The following sets out a summary of the approach to be taken for both above ground and buried piping:

**- Above ground** piping:

* Provide evidence of the type of insulation used:

1. Insulation conductivity (manufacturer’s specifications)
2. Piping material
3. Declared thickness of insulation
4. Declared pipe diameter – nominal bore can be used for metal pipe but external diameter is needed for plastic pipe
5. Photograph of piping showing full length in meters between buildings
6. Photograph of insulation installed to indicate thickness and surface protection (foil, casing, etc)

**- Buried** piping:

* Provide evidence of the piping system and the insulation:

1. Manufacturer’s specification providing:

* Confimation that piping is pre-insulated and designed to appropriate standards.
* The maximum operating temperature for which the piping is suitable.
* Insulation thickness
* Insulation type

1. Calculation of heat loss rate from supplier
2. Declared heat transfer fluid temperature(s)
3. Photograph of piping showing full length
4. When possible a photograph of insulation being installed to indicate thickness and surface protection. If it is not physically possible to take a photo we would expect the manufacturer´s instructions to provide enough clarity to satisfy the RHI requirements.

Provide the relevant data for all the existing piping branches between different buildings in the tables in **Appendix 2** of this document for above ground piping and buried piping respectively.

**4.3 Description of building(s) in which heat is used**

|  |  |
| --- | --- |
| Enter the ***number*** of buildings separated by external piping: | Number: |
| * In total on the heating system |  |
| * In which heat is generated, by any plant listed in section 3.4? [e.g. boiler rooms, plant rooms] |  |
| * In which heat is used for an eligible purpose? [e.g. office buildings] |  |

|  |  |
| --- | --- |
| For all buildings where heat is being used for an eligible purpose, comment on: | Yes/No [If No, please complete exception report at Section 9]: |
| * Is the building permanent or long lasting? |  |
| * Is the building wholly enclosed? |  |

**4.4 Supporting Evidence – heat uses are within buildings**

Please provide evidence, such as photographs of typical buildings in which heat is used

|  |
| --- |
| [paste in directly, or enter evidence reference number and add to Section 10] |

**4.5 Additional comments on heat uses**

|  |
| --- |
|  |

1. **Metering Arrangements**

**5.1 Heat Transfer Medium**

|  |  |
| --- | --- |
| Please enter the heat transfer medium used by the heating system to which the eligible installation delivers heat (e.g. water, steam, heating oil) |  |

**5.2 Additives to the Heat Transfer Medium**

Are any of the following present in the heating system:

|  |  |  |
| --- | --- | --- |
| Does the heat transfer fluid of which the installation forms part contain: | Yes / No | If yes, please provide details of the additive and describe:   * how the metering arrangement ensures that this has been accounted for in any heating measurements that would be submitted to Ofgem (with reference to the schematic diagram if appropriate) * what sampling, maintenance or operating regimes are in place to control the composition of the heat transfer medium over time * how you have verified that meters are appropriately calibrated for this additive and composition? |
| Any ***additives*** (e.g. corrosion inhibitors)? |  |  |
| Any mixtures with frost prevention or heat transfer fluids (such as glycol/’antifreeze’) |  |  |

**5.3 Standard / Multiple metering arrangements**

This section should be completed in accordance with the data gathered in section 4.3 for external piping and in conjuction with the Volume 1 Guidance, Chapter 7, *How to determine whether external piping is ‘properly insulated’*. Note that if the external piping is not relevant for RHI purposes, section 5.3.1 and Appendix 2 do

not need to be completed.

**5.3.1 Defining the level of insulation of external piping**

If external piping is relevant for RHI purposes, in order to categorise the installation regarding the metering arrangement, the IRMA author must specify the length, the annual heat loss calculation and if the piping is ‘properly insulated’ according to Regulations, for all the piping branches in the system. Please enter the required and relevant information in the table below.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **External piping between different buildings** | | | | | | |
|  | [Label 1] | [Label 2] | [Label 3] | [Label 4] | [Label 5] | | **Total** |
| Length of External piping (m) |  |  |  |  |  | | - |
| Properly Insulated1 (Y/N) |  |  |  |  |  | | - |
| Annual Heat loss calculation for ***properly insulated*** piping2 (kWhth) |  |  |  |  |  | |  |
| Annual Heat loss calculation for ***Non properly insulated*** piping3 (kWhth) |  |  |  |  |  | |  |
| Projected annual output of the plant (KWhth) |  |

Ensure that the labels for the different branches of piping introduced in the table match those in the schematic.

1**Properly insulated**: For external piping to be classified as ´properly insulated´the Regulations require that the piping is insulated so that the relevant maximum permissible heat losses set out in BS5422:2009 are not exceeded where heat losses are calculated in accordance with the equations listed in and following the principles described in the BS EN ISO 12241:2008. (See Guidance Volume 1, Chapter 7 for further information). The IRMA author must verify that:

* data input into question 1 of the *heat loss assessment* Excel spreadsheet from Ofgem (availablevia www.ofgem.gov.uk/rhi) is consistent with the gathered data in section 5.3 of this report with regards the external piping; and
* the heat losses for the installation do not exceed the maximum permissible value in the standards as set out above

Currently, it is only external over ground pipes which can be considered as being properly insulated in accordance with standard BS5422:2009. Please note that this standard does not cover external underground pipes and therefore such pipes cannot currently be considered properly insulated.

2**Annual heat loss calculation for properly insulated piping greater than 10 meters**: Where the installation uses one or more individual lengths of external piping greater than 10 meters and each length is ´properly insulated´, please provide the total annual heat loss calculation from all such piping (ie, all individual lengths >10 meters). You should also indicate below whether the figure exceeds 3% of the projected annual output of the plant (kWhth).

3**Annual heat loss calculation for Non properly insulated piping**: Where the installation uses one or more individual lengths of external piping that are not properly insulated, and a heat loss calculation is to be submitted instead of installing additional meters, please provide the total annual heat loss calculation from all such piping.

Note that the prefered method for performing the heat loss calculation is to use Ofgem’s Excel spreadsheets ‘PI Calculator’ and ´Non PI Calculator´. These are

standalone worksheets contained within the main *heat loss assessment* Excel spreadsheet workbook. The calculator spreadsheet has been created by Ofgem in line with the definition of a “heat loss calculation” defined in Chapter 7 of Volume One of the Ofgem Guidance. It was created by technical experts and has been reviewed by industry peers.

If you choose not to use Ofgem’s automatic heat loss calculator you should perform your own bespoke calculation based upon CIBSE Guide C heat loss calculation methodology. It is essential that this be a robust and verifiable calculation. See Guidance Volume One, Chapter 7 for further information.

Please provide an answer to the following two questions and then go to section 5.3.2 to define if installation is Standard or Multiple. Note that if the answer to any of the questions below is positive and the prefered option is to complete a heat loss calculation in place of installing additional heat meters, the installation will be classed as Multiple.

|  |  |
| --- | --- |
| **Summary of heat loss assessment** | **Y/N** |
| Are any piping lengths *not* properly insulated? |  |
| Is the total annual heat loss calculation of all properly insulated piping (with lengths >10 meters) greater than 3% of the projected annual output of the plant (kWhth)? |  |

**5.3.2 Defining Standard or Multiple metering arrangement for RHI Payment Purposes**

Please refer to ‘Draft Renewable Heat Incentive Guidance: Non-domestic scheme

Volume One: Eligibility and how to apply (Version 3)’, [Chapter 7, paragraphs 7.70 onwards], for information on how to work out whether a system uses a ‘Standard’ or ‘Multiple’ metering arrangement for RHI payment purposes.

Please tick **one** of the boxes below:

*Metering arrangement for RHI Payment Purposes:*

|  |  |
| --- | --- |
| Standard | : |
| Multiple | : |

The document ‘Draft Renewable Heat Incentive Guidance: Non-domestic scheme Metering Placement Examples’ also gives a number of examples to help you work out more specifically how meters should be arranged to satisfy RHI requirements.

**5.4 Heat meters**

**Table 1 – heat meter details**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Label on schematic** | **‘Compact’ meter or separate components[[6]](#footnote-6)** | **Meter / component serial number** | **Describe what is being measured by this meter** | **Make & Model** | **Installed in accordance with manufacturer’s instructions?** | **Year of manu-facture** | **Select eligibility category [if \*\*, further details are required below]** |
| HM1 | Separate components | Flow meter: AB1234  Temperature sensors: AB1234  Digital integrator: AB1234 | Measures heat generated by biomass boiler A | Flow meter: A.N.Other1  Model X  Temperature sensors:  A.N.Other2  Model Y  Digital integrator: A.N.Other 3  Model Z | Yes  Yes  Yes | 2008 | Options:  “MID”-stamped, “Class 2”-labelled compact meter  “MID”-stamped, “Class 2”-labelled flow sensor and “MID”-stamped digital integrator  Other\*\* |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

**Table 1a – heat meter details – evidence for non-standard meters**

Please provide photographic evidence (either documentation or as-installed components)

|  |  |  |  |
| --- | --- | --- | --- |
| **Label on schematic** | **‘Compact’ meter or separate components[[7]](#footnote-7)** | **Evidence for accuracy class [compact unit/flow sensor component]** | **Evidence for MID conformity or equivalent [compact unit/at least flow sensor and digital integrator components** |
| HM1 | Separate components | “MID”-stamped digital integrator  ISO 4064 Class B flow meter, supported by photo showing faceplate inscriptions:  [photo] | “MID”-stamped digital integrator  ISO 4064 Class B flow sensor, and I can confirm that this meter has been sized appropriately so that it is generally operating above the transition flow value, and is appropriate for the temperature of the liquid that it is metering |
|  |  |  |  |

**Table 2 – heat meter calibration details and operating ranges**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Label on sche-matic** | **Meter Serial number (use flow meter serial number if not an integrated meter)** | **Date of most recent system calibration and result[[8]](#footnote-8)** | **Date of most recent digital integrator calibration and result** | **Date of most recent flow meter calibration and result** | **Date of most recent calibration of temperature sensors and result** | **Nominal flow rate**  **(m3/hr)** | **Maximum flow rate**  **(m3/hr)** | **Minimum flow rate**  **(m3/hr)** | **Temperature range**  **(0C)** |
| HM1 | Flow meter: AB1234 | 23/11/2010 – Passed | N/A | N/A | N/A | 2.5 | 5 | 0.025 | 5 - 130 |
| HM2 | Flow meter: AB9876 | N/A | 15/09/2008 – Passed | 12/09/2010 - Passed | 23/09/2010 - Passed | 6 | 12 | 0.06 | 5 - 130 |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |

**5.5 Steam meters**

**Table 3 – steam meter details and calibration information**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Label on sche-matic** | **Meter / component serial number** | **Meter / Component description** | **Meter / component type make & model** | **Installed in accordance with manufacturer’s instructions?** | **Year of manufacture** | **Date of most recent system calibration and result** | **Design accuracy** | **Date of most recent calibration of temperature sensors and result** | **Date of most recent calibration of pressure sensors and result** |
| SM1 | Flow meter: BC1234  Temperature sensor: BC1234  Pressure sensor: BC1234  Digital integrator: BC1234 | Measures steam generated by biomass boiler C | Orifice plate: A.N.Other1  Model A  Temperature sensor:  A.N. Other2  Model B  Pressure sensor:  A.N.Other3  Model C  Digital integrator: A.N.Other4  Model D | Yes  Yes  Yes  Yes | 2007 | 22/3/2010 - Passed | +/- x% (System)  In accordance with ISO 5167 | 22/9/2010 - Passed | 22/9/2010 - Passed |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |

**Table 4 – steam meter operating ranges**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Label on schematic** | **Meter serial number** | **Meter min flow rate** | **Meter max flow rate** | **Temperature range** | **Pressure range** |
| SM1 | BC1234 | 150 m3/hr | 600m3/hr | 100-200 ºC | 2-10 Bar |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

**Table 5 – other meters or proxy measures used to provide RHI-relevant information[[9]](#footnote-9)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Label on sche-matic** | **Meter / component serial number** | **Meter / Component description** | **Meter / component type make & model** | **Installed in accordance with manufacturer’s instructions?** | **Year of manufacture** | **Appears to be operating correctly** |
| IM1 | Clip-on meter | Measures electrical input from immersion heater | Clip-on: A.N.Other1  Model A | Yes | 2007 | Yes – observed correct increase in measured output |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

**5.6 Meter readings**

**Table 6 - start and end meter readings**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Label on sche-matic** | **Meter Serial number (use flow meter serial number if not an integrated meter)** | **Time**  **START** | **Time**  **END** | **HEAT METERS**  Cumulative reading (kWhth/MWhth)  START | **HEAT METERS**  Cumulative reading (kWhth/MWhth)  END | **STEAM METERS**  Cumulative reading (MWh / tonnes)  START | **STEAM METERS**  Cumulative reading (MWh / tonnes)  END | **STEAM METERS**  Temperature  (Degrees Centigrade) | **STEAM METERS**  Pressure  (Bar) |
| HM1 | AB1234 | 10:23 | 11:04 | 123456 kWhth | 123466 kWhth |  |  |  |  |
| HM2 | AB9876 | 11:10 | 12:00 | 987654 kWhth | 987664 kWhth |  |  |  |  |
| SM1 | BC1234 | 10:45 | 11:15 |  |  | 234567 MWh | 234577 MWh | 100 | 3 |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |

\* Meter readings shall be taken on arrival and at the end of the site visit (IRMA author should at least wait until the digits tick over)

**5.7 All meters: meter installation/operation**

|  |  |
| --- | --- |
| Are you satisfied with the installation of the RHI-relevant meters listed above? If no, please explain why not. |  |
| Are the RHI-relevant meters listed above operating correctly to the best of your knowledge? If no, please explain why not. |  |
| Please describe the extent to which meters have been appropriately sealed or tamper-proofed. |  |
| (Steam systems only) Are you content that the fluid returned from the eligible use(s) is consistent with the type of meter measuring the energy in this fluid? |  |

**5.8 Plant which are not being metered**

This section should be completed for any plant detailed in section 3.4, for which the plant output is not being metered directly using an RHI-eligible meter as detailed above.

|  |  |  |  |
| --- | --- | --- | --- |
| Plant number / identifier on schematic | Technology type (e.g. oil boiler/ immersion heater) | Total installed peak heat output capacity (kWth) | Describe how the configuration of the system will ensure that this cannot provide heat that could be registered by any RHI-relevant meter including a detailed control description of the system |
|  |  |  |  |
|  |  |  |  |

**5.9 Shared Meters – heat generated**

This section should **only** be completed if the heat generated by two or more plants is being measured by a single, i.e. shared, meter.

Please provide a brief description of the relevant plants that share a meter in the space provided and confirm that, in your opinion, the heat generated by these plants is being directly measured by the shared meter.

|  |
| --- |
|  |

**5.10 Shared Meters – heat used for eligible purposes in more than one building**

This section should **only** be completed if the heat used for eligible purposes in more than one building is being measured using a single meter.

Please provide a brief description of the relevant buildings in which heat is used solely for eligible purposes that share a meter. Please also confirm that, in your opinion, it would be unduly burdensome to meter individual buildings, and the grounds on which you have reached this decision.

You should also summarise the manner in which the relevant heat quantities would be determined using such calculations, and ensure that this is clear based on labels on the schematic.

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**5.11 Additional requirements for reversible heat pumps**

This section should **only** be completed if one or more of the plants comprising the installation is a heat pump that will be used to generate cooling as well as heating.

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**5.12 Additional requirements for biogas installations**

This section should **only** be completed for biogas installations.

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**5.13 Steam traps, safety release valves and other devices**

This section should **only** be completed where steam traps, safety release valves and other devices have been observed.

Please detail any observations that relate to steam traps, safety release valves or related devices:

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|  |

**5.14 Trace heating**

This section should **only** be completed where trace heating has been observed.

Please detail any observations that relate to trace heating:

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**5.15 Additional comments on metering arrangements**

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1. **Measurement details**

Please only complete one section, in accordance with the classification (Standard or Multiple) made in Section 5.3 of this Report. For further guidance on completing this section, please refer to RHI Guidance Volume Two, Chapter 5.

***Standard metering installations***

For ‘Standard’ metering, one ‘quantity’ of heat is required to be measured/metered to calculate the eligible heat output (EHO)

|  |  |
| --- | --- |
| *Metering Quantity for RHI Purposes* | *Combination of Meter labels as per schematic* |
| **Eligible Heat Output (EHO)** | [e.g. HM1] |

***Multiple metering installations***

Two or more ‘quantities’ of heat are required to be measured/metered and then combined as follows to calculate the eligible heat output (EHO) from the installation:

|  |  |
| --- | --- |
| *Periodic support payment formula component (‘quantity’)* | *Meter labels as per schematic* |
| * **Eligible Heat Generated** | [e.g. HM1] |
| **AND** | |
| * **Eligible Heat Used** | [e.g. HM2] |
| **AND**  **EITHER:** | |
| * *Total Heat Generated* | [e.g. HM3] |
| **OR:** | |
| * *Total Heat Used* | [e.g. HM4] |

Which gives the overall formula for calculating the Eligible Heat Output (EHO) as:

|  |  |
| --- | --- |
| Eligible Heat Output (EHO) | [e.g. HM2 x (HM1/HM3)] or  [e.g. HM1 x (HM2/HM4)] |

1. **Schematic Diagram (see instructions in Appendix 1 for further details)**

Please upload a schematic diagram, annotated as per the instructions in Appendix 1:

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|  |

1. **Documentation Review (see instructions in Appendix 1 for further details)**

Please list further documentation as per the description in Appendix 1. This will be in addition to the mandatory evidence requirements provided elsewhere within this report.

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1. **Exception Report**

For each Exception raised during the completion of this report, please complete an Exception summary table for each issue. This should be referenced in the Executive Summary for the relevant section.

|  |  |
| --- | --- |
| **Exception #** |  |
| **Relevant Section of Metering Report** |  |
| **Detailed description of issue** |  |
| **Evidence provided [paste here or upload to Additional Evidence, Section 10]** |  |
| **Recommended actions to achieve RHI Eligibility on this point** |  |

|  |  |
| --- | --- |
| **Exception #** |  |
| **Relevant Section of Metering Report** |  |
| **Detailed description of issue** |  |
| **Evidence provided [paste here or upload to Additional Evidence, Section 10]** |  |
| **Recommended actions to achieve RHI Eligibility on this point** |  |

**...**

1. **Additional Evidence**

Please provide in this section any Additional Evidence, as referenced in the relevant section of the report with an Additional Evidence Number.

|  |  |
| --- | --- |
| **Exception #** |  |
| **Relevant Section of Metering Report** |  |
| **Detailed description of evidence, and what it supports** |  |
| **Evidence provided [paste photographs or scans here]** |  |

**Declarations**

|  |
| --- |
| **Independence**  The IRMA author must not be the owner of the installation.  **Author Requirements Statements**  The IRMA author must confirm **all** the following statements:   1. The author has read and is familiar with the RHI Guidance documents and RHI Scheme Regulations 2011, in particular the metering requirements; 2. The author is able to detect meters which have been fitted and/or located incorrectly alongside any other defects or system configurations which could adversely affect the meter’s ability to accurately measure heat production; 3. The author is familiar with the metering requirements of the MID Annex 1 and is able to determine whether or not a meter is compliant with MID Class 2 metering requirements; 4. The author understands the difference between ‘standard’ and ‘multiple’ metering arrangements as specified in the RHI Guidance documents and is able to determine which of these arrangements applies to the applicant’s circumstances; and 5. The author is able to determine whether or not a schematic diagram accurately reflects (in sufficient detail) the applicant’s physical installation and heating systems.   **Competency Criteria**  According to the Regulations, only a “competent person” can complete this report. We have interpreted a “competent person” to mean a person that meets **all** of the following criteria[[10]](#footnote-10):  1.   An experienced and suitably qualified engineer (at least HND or equivalent in an engineering discipline from a recognised academic institution);  2.   Has demonstrable experience and expertise in flow measurement and heat/steam measurement systems demonstrated by training and development records;  3.   Has a relevant background (involved in energy, utilities, building services, heating system design, heating system operation & maintenance);  4.   Covered by Professional Indemnity Insurance of at least £1m (through employer or directly);  5.   Is unbiased and impartial |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Signed Declaration**  I **{competent person}** [of **{company name}]** confirm that, to the best of my knowledge and belief, I meet Competency Criteria 1 to 5 above and am a competent person as defined by Ofgem in relation to the completion of this report. I agree to provide, at Ofgem’s request, evidence which is sufficient to satisfy Ofgem that I meet the competency criteria and am a competent person as so defined. I have confirmed to the applicant that I meet the Author Requirements listed above as author statements (a) to (e). I confirm that I am not the owner of the installation.  I can confirm that the installation has met the RHI eligibility requirements as set out in the RHI Guidance documents and the RHI Scheme Regulations 2011 and as subsequently amended. This includes confirmation that:   * meters and sensors are correctly positioned and any other defects or system configurations which could adversely affect the meter’s ability to accurately measure heat production have been identified; * meters and sensors are installed in accordance with the manufacturer’s instructions; * meters are compliant with the MID Class 2 accuracy requirements; * meters and sensors meet the scheme technical requirements as set out in the Guidance and Regulations; * the author has checked the classification of the site under Volume 1 of the RHI Guidance document and confirmed that it is classed as standard or multiple; and the schematic diagram is an accurate representation of the installation, showing details of the heating system of which the eligible installation forms part, including all plants generating and supplying heat to that heating system, all purposes for which heat supplied by that heating system is used, the location of meters and associated components and such other details as may be specified by Ofgem   I certify at the behest of **{participant}** that the **{technology type(s)}** installation at **{complete address}** has been commissioned and that appropriate RHI-relevant meters have been installed in a manner that meets the metering requirements of the RHI scheme. I confirm that I have read the Ofgem RHI Guidance and Regulations, and that all information and statements contained in this report are accurate to the best of my knowledge and belief. I acknowledge that Ofgem is entitled to rely on this report in considering an application for accreditation under the RHI scheme in respect of the above installation.  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  **Signature** **Date**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  **Print Name [Print company name (if applicable)]**   |  |  | | --- | --- | | **Address** |  | | **Postcode** |  | | **Contact Telephone** |  | | **Email Address** |  | |

**Author training and assessment record**

If you [the IRMA author] have received training and / or undergone an assessment relating specifically to the completion of the RHI IRMA, you may provide details below of the provider, the date that you underwent the training/ assessment and the title and nature of that training or assessment.

|  |  |
| --- | --- |
| Training provider/trade body name: |  |
| Contact address (inc post code): |  |
| Brief description of training/assessment courses (including dates attended/assessed) |  |
| Contact telephone: |  |

If you are happy to be contacted direct by Ofgem based on the content of this Report, please check this box:

**Author sharing information with Ofgem. Voluntary section.**

If you [the IRMA author] have received training and / or undergone an assessment relating specifically to the completion of the RHI IRMA, and you would like Ofgem to share information with you or your trade body regarding the different items listed in the signed declaration above, please check the boxes below.

If you consent to being contacted direct by Ofgem based on the content of this Report, please check this box:

If you consent for your trade body, training provider or assessment body to be contacted direct by Ofgem based on the content of this Report, please check this box:

# Appendix 1 – Instructions for those completing the Independent Report on Metering Arrangements

These instructions should be read in conjunction with Chapter Seven of Volume One of the Guidance and the Regulations which provide additional information on the specific technical metering requirements for the RHI, and appropriate meter placement.

The first section of this Appendix provides some general guidance on completing the Report, and the remainder of the Appendix provides guidance on each section of the Report in turn.

**General guidance:**

(i) All questions, apart from those marked as required for specific installations only and the comment boxes, must be completed. If it is not possible for you to answer a specific question, please clearly explain why.

(ii) Items marked with ‘**?**’ should be answered with **Y** (Yes), **N** (No), **N/A** (Not Applicable) or **N/E** (Not Examined)

(iii) Any observations needing clarification should be marked ‘\*’ and an explanation or action included. For example, items marked **N/E** (Not Examined) will normally require further explanation. Please include an exception report to all those sections flagged as “\*exception” in main report.

(iv) Please clearly label any additional pages with the installation name and the date, and attach them securely to the rest of the Report.

**Section 2: Details of visit**

Please provide the date and start and end times of your visit to the installation and the specified information for each person who was present during your visit.

**Section 3: Details of installation**

3.1 Please provide the specified information for the installation that you visited. The name of the installation is chosen by the participant, and is simply a reference used by the RHI IT system. The name entered on this report should therefore be the same as the installation name that will be entered as part of the application for accreditation.

3.2 Use separate rows to enter details of each plant when an installation is comprised of multiple component plants. Please provide the specified technical information for each plant that comprises the installation – for example, where the installation comprises 2 x 600kWth biomass boilers, please enter the information for each boiler. This information does **not** need to be entered for any other plants connected to the heating system (e.g. back up boilers).

* The **plant number/identifier** is the tag that will enable the plant to be identified on the schematic diagram. This can be chosen by the prospective participant.
* The **technology type** must be one of the following:
  + solid biomass (please indicate whether it is a CHP plant)
  + municipal solid waste (please indicate whether it is a CHP plant)
  + biogas (please indicate whether it is a CHP plant)
  + geothermal (please indicate whether it is a CHP plant)
  + ground source heat pump (please indicate if this will be used to generate cooling as well as heating)
  + water source heat pump (please indicate if this will be used to generate cooling as well as heating)
  + solar thermal.
* NB This report is not required for biomethane plants.
* The **total installed peak heat output capacity** of each plant should be simple to establish as it will be part of the information provided by the manufacturer. If the equipment is bespoke and you are unable to ascertain the total installed peak heat output capacity, please enter “bespoke” and explain in the comments box why you were unable to ascertain its capacity.
* **Please note** that biogas and solar thermal installations are not eligible for the RHI if they have a total installed peak heat output capacity above 200kWth.

3.4 Use separate rows to enter details of each plant connected to the heating system, following the same approach as outlined in 3.2 above.

3.5 In the additional comments box, please add any additional relevant information, such as any further explanation of the plants’ configuration to assist in interpreting the schematic diagram. If the installation is a CHP system, please also indicate here if it is eligible to use existing meters in accordance with Regulation 19 (see Appendix 3). Further information can be found in Chapter Eight of Volume One of the Guidance.

**Section 4: Heat use**

4.1/4.2 Please indicate in the tables provided which eligible and ineligible heat uses (if any) are supplied with heat from the heating system of which the installation forms part. Chapter Six of Volume One of the Guidance provides further information about what constitutes eligible and ineligible heat uses.

4.3 Please provide a brief description of the building(s) in which the heat is used for eligible purposes, stating clearly the number of buildings in which heat is used for eligible purposes.

Only heat that is used for ‘eligible purposes’, is eligible for RHI support. These eligible purposes include, heating a space, heating water, and carrying out a process – and note that these purposes are only eligible where the heat is used in a building. Note that, as of such date at which Renewable Heat Incentive Scheme (Amendment No. 2) Regulations 2013 may come into force, heat used for cleaning or drying for a commercial purpose may be eligible outwith a building. Further information about what eligible purposes, including what constitutes a “building” for RHI purposes is provided in Chapter Six of Volume One of the Guidance.

Heating of open air, e.g. heat loss from external heat distribution piping or partially enclosed swimming pools; heating of open external spaces, e.g. recreational facility; or heat loss from external buried heat distribution piping would not be eligible for the RHI. However note that for accreditations after the 24th September 2013, in certain circumstances if the external heat distribution (buried or above ground) piping between buildings is ‘properly insulated’ the associated heat loss can be ‘disregarded’; see Chapter Seven of Volume One of the Guidance for further information.

4.5 Please enter any additional comments about the heat uses supplied by the heating system of which the installation forms part.

**Section 5: Metering arrangements**

**5.1/5.2 – Heat transfer medium**

Please enter the heat transfer medium used in the heating system of which the installation forms part. Only liquids (such as water, water-ethylene glycol mix, oil) or steam are eligible heat transfer media for the RHI. Other media, such as hot air, are not eligible. If the heat transfer medium is a fluid containing additives or mixtures, provide further details in section 5.2.

**5.3 - Standard/ Multiple metering arrangements**

The Regulations require all eligible installations to have a minimum of one class 2 heat meter (or, where the heat is delivered by steam, such steam measuring equipment as may be necessary and such class 2 heat meters to measure condensate returning to the plant as may be necessary) installed to enable *“the kWhth of heat generated by the plant which is used for eligible purposes to be determined”[[11]](#footnote-11).* This is referred to as the **‘eligible heat output’ (EHO).**

The Regulations specify that necessary meters and/ or steam measuring equipment must be positioned to provide accurate measurements to be eligible for accreditation under the RHI[[12]](#footnote-12). Where meters are positioned in order to fulfil these requirements will determine the number of ‘quantities’ (see definition detailed in Appendix 5 of the Glossary to RHI Guidance Volume One) to be measured in order to determine the EHO for RHI payment purposes.

The number of ‘quantities’ of heat required to calculate the EHO will determine whether Ofgem categorises an installation as using a ‘standard’ or ‘multiple’ metering arrangement (see definitions detailed in Appendix 5 the Glossary of RHI Guidance Volume One) for RHI payment purposes. These terms ‘standard’ and ‘multiple’ are explained in more detail in the subsequent sections and are used to determine the relevant RHI payment calculation as set out in Chapter Five, ‘Tariffs and Periodic support payments’ in Volume Two of the Guidance.

Please indicate whether the installation is classed as ‘standard’ or ‘multiple’ for RHI payment purposes, having careful regard to RHI Guidance Volume One, and RHI Guidance ‘Draft Renewable Heat Incentive Guidance: Non-domestic scheme Metering Placement Examples’ to support your assessment.

**5.4 - Heat meters**

For systems where there are RHI-relevant heat meters, please complete Tables 1 and 2 for each RHI-relevant heat meter. Where meters have been purchased as individual components, i.e. flow meter, matched pair of temperature sensors and digital integrator/calculator, please list in Table 1 the serial numbers and make/model for each component (as shown in the examples provided). Where meters do not conform to ‘standard’ types, Table 1a will also need to be completed.

Further information about each item listed in the tables is provided below.

**Table 1 – heat meter details**

* **Meter/component Serial Number**: Normally fixed to the meter or its components (data badge or etched) or with accompanying product documentation.
* **Meter/component description**: This should be a brief description of what the meter is designed to measure and the source of heat it is intended to measure.
* **Make and Model**: Normally fixed to the meter or its components (data badge or etched) or with accompanying product documentation
* **Installed in accordance with manufacturer’s instructions?:** Compare installation with instructions supplied with the meter or components or with accompanying product documentation.
* **Year of manufacture**: This will usually be with accompanying documentation
* **Accuracy range:** Normally fixed to the meter or its components (data badge or etched) or with accompanying product documentation
* **Class 2 Evidence:** This should confirm that the meter meets the technical requirements for the RHI, as set out in Chapter Seven of Volume One of the Guidance.

**Table 2 – heat meter calibration details and operating ranges**

* **Meter Serial Number**: Normally fixed to the meter or its components (data badge or etched) or with accompanying product documentation; this should be as in Table 1 and where the sub components were purchased separately, should be the serial number of the flow meter
* **Date of most recent System Calibration and result:** Test certificate showing date of calibration with statement showing conformance against Class 2 requirements for the complete heat metering system
* **Date of most recent digital integrator calibration and result:** Test certificate showing date of calibration with statement showing conformance against accuracy requirements needed to ensure the full heat metering system meets Class 2 requirements
* **Date of most recent flow meter calibration and result:** Test certificate showing date of calibration with statement showing conformance against accuracy requirements needed to ensure the full heat metering system meets Class 2 requirements
* **Date of most recent temperature sensor calibrations and results:** Test certificate showing date of calibrations with statement showing conformance against accuracy requirements needed to ensure the full heat metering system meets Class 2 requirements
* **Nominal flow rate:** Normally fixed to the meter or its components (data badge or etched) or with accompanying product documentation
* **Maximum flow rate:** Normally fixed to the meter or its components (data badge or etched) or with accompanying product documentation
* **Minimum flow rate:** Normally fixed to the meter or its components (data badge or etched) or with accompanying product documentation
* **Temperature range:** Normally fixed to the meter or its components (data badge or etched) or with accompanying product documentation

**5.5 – Steam meters and other meters**

For heating systems where there are RHI-relevant steam meters, please complete Tables 3 and 4 for each RHI-relevant steam meter. Where meters have been purchased as individual components, i.e. flow meter, temperature sensor, pressure sensor and digital integrator/calculator, please list each component in “meter/component description” box, and provide the serial numbers and make/model for each component as shown in the example.

Further information about each item listed in the tables is provided below.

**Table 3 – steam meter details and calibration information**

* **Meter/component Serial Number**: Normally fixed to the meter or its components (data badge or etched) or with accompanying product documentation
* **Meter/component description**: This should be a brief description of the what the meter is designed to measure and the source of heat it is intended to measure
* **Make and Model**: Normally fixed to the meter or its components (data badge or etched) or with accompanying product documentation
* **Installed in accordance with manufacturer’s instructions:** Compare installation with instructions supplied with the meter or components or with accompanying product documentation
* **Year of manufacture**: This will usually be with accompanying documentation
* **Date of most recent System Calibration and result:** Test certificate showing date of calibration
* **Design Accuracy:** Normally fixed to the meter or its components (data badge or etched) or with accompanying product documentation
* **Date of most recent temperature sensor calibrations and results:** Test certificate showing date of calibrations
* **Date of most recent pressure sensor calibrations and results:** Test certificate showing date of calibrations

**Table 4 – steam meter operating ranges**

* **Meter Serial Number**: Normally fixed to the meter or its components (data badge or etched) or with accompanying product documentation
* **Minimum flow rate:** Normally fixed to the meter or its components (data badge or etched) or with accompanying product documentation
* **Maximum flow rate:** Normally fixed to the meter or its components (data badge or etched) or with accompanying product documentation
* **Temperature range:** Normally fixed to the meter or its components (data badge or etched) or with accompanying product documentation
* **Pressure range:** Normally fixed to the meter or its components (data badge or etched) or with accompanying product documentation

**Table 5 – other meters or proxy measures used to provide RHI-relevant information**

* **Meter/component Serial Number**: Normally fixed to the meter or its components (data badge or etched) or with accompanying product documentation
* **Meter/component description**: This should be a brief description of the what the meter is designed to measure and the source of heat it is intended to measure
* **Meter/component type make and model**: Normally fixed to the meter or its components (data badge or etched) or with accompanying product documentation
* **Installed in accordance with manufacturer’s instructions?:** Compare installation with instructions supplied with the meter or components or with accompanying product documentation.
* **Year of manufacture**: This will usually be with accompanying documentation
* **Appears to be operating correctly:** If yes, please provide basis for this observation. If no, please complete an exception report at section 9

**5.6 - Meter readings**

Please take meter readings for all RHI-relevant heat and steam meters listed in Tables 1, 3 and 5.

**Table 5 – start and end meter readings**

* **Time (Start):** Time when initial meter reading was taken
* **Time (End):** Time when final meter reading was taken
* **Cumulative Heat Meter Reading** **(Start)**: Initial reading taken at time (start)
* **Cumulative Heat Meter Reading** **(End)**: Final meter reading taken at time (end)
* **Cumulative Steam Meter reading** **(Start)**: Initial reading taken at time (start)
* **Cumulative Steam Meter Reading** **(End)**: Final meter reading taken at time (end)
* **Steam meters -- Temperature:** Average temperature of steam registered during inspection
* **Steam meters -- Pressure:** Average pressure of steam registered during inspection

**5.7 – Meter installation and operation**

Please complete this table on the basis of your inspection of all the heat and/or steam meters listed in Tables 1 and 3 above.

Please confirm that you are satisfied that all RHI-relevant heat and/or steam meters have been installed correctly in line with manufacturer’s instructions to the best of your knowledge. If you are not satisfied, please explain why not, or, if you have identified any areas of potential concern or uncertainty, please describe these with comments on their likely impacts on installation data.

The Regulations require participants to keep their meters operating continuously, properly maintained and periodically checked for errors. Please confirm that the RHI-relevant meters are operating correctly to the best of your knowledge. If you are not satisfied, please explain why not with reference to specific meters listed in the tables in Sections 4.1 and 4.2.

For steam systems, please confirm that the fluid returned from the eligible use(s) is consistent with the type of meter measuring the energy in this fluid.

**5.8 – Plant which are not being metered**

Please complete this table to provide details of any plant which are not regarded as being relevant to the RHI for metering purposes. This should include a technical justification of the factors governing that the plant cannot contribute to any RHI-relevant meter, including those located on other parts of the wider heating system.

**5.9 – Shared meters – heat generated**

Please **only** complete this section if the heat generated by two or more plants is being measured by a single meter.

The Regulations allow Ofgem discretion to permit the heat output of two or more plants comprising one eligible installation to be measured by a single meter under certain circumstances, as outlined in Chapter Seven of Volume One of the Guidance.

Please provide a brief description of the relevant plants that share a meter in the space provided and confirm that, in your opinion, the heat generated by these plants is being directly measured by the shared meter.

**5.10 – Shared meters – heat used for eligible purposes in more than one building**

This will only apply to multiple metering arrangement installations.

Chapter Seven of Volume One of the Guidance outlines that in exceptional circumstances, we may permit the heat used for eligible purposes in more than one building to be measured using a single meter, where an agreed percentage is deducted from the eligible heat use figure to represent heat lost between buildings.

Please provide a brief description of the relevant buildings in which heat is used solely for eligible purposes that share a meter. Please also confirm that, in your opinion, it would be unduly burdensome to meter individual buildings, and the grounds on which you have reached this decision.

**5.11 - Additional requirements for reversible heat pumps**

Please **only** complete this section if the installation or any component plant is a heat pump that will also operate in reverse to generate cooling.

The Regulations impose additional requirements where participants use heat pumps to provide both heating and cooling. Participants must ensure that their meters enable them to –

1. measure heat used for eligible purposes only, and
2. where appropriate, discount any cooling generated by the reverse operation of the heat pump

Please explain in the space provided how the metering arrangements enable the participant to discount any cooling generated by the reverse operation of the heat pump, where appropriate. You may refer to the schematic diagram in your explanation if helpful.

**5.12 – Additional requirements for biogas installations**

Please **only** complete this section for biogas installations.

The Regulations require heat meters to be installed to meter any heat directed from the plant combusting the biogas to the biogas production plant, and any heat supplied to the biogas production plant from any source other than the plant combusting the biogas.

Where external heat (e.g. from a fossil fuel boiler or solar thermal panels) is being used at the biogas production plant, please confirm it is metered separately from the installation for which RHI support is sought and that the meters are correctly positioned. You may refer to the schematic diagram in your explanation if helpful.

**5.13 Steam traps, safety release valves and other devices**

This section should **only** be completed where steam traps, safety release valves and other devices have been observed.

Where steam traps and related devices are well maintained and are appropriate to the system, Ofgem would not consider these devices to be an ineligible use for metering purposes. However, poorly maintained devices or devices venting inappropriately would not be regarded as an eligible use, and this would impact on the metering requirements for the system. Where such devices have been observed, please comment on these in box 4.11, referring to a schematic where appropriate.

**5.14 Trace heating**

This section should **only** be completed where trace heating has been observed.

Trace heating of piping will in general be regarded as an eligible use. However, trace heating of poorly insulated or unlagged piping would not be regarded as an eligible use, and this would impact on the metering requirements for the system. Where trace heating of poorly insulated or unlagged piping has been observed, please comment on this in box 4.12, referring to a schematic where appropriate.

**5.15 – Additional comments on metering arrangements**

Please add any additional comments on the metering arrangements in the space provided.

**Section 6 – Measurement details**

This section should explain how each of the elements of the relevant periodic support payment calculation formula will be measured by the RHI-relevant meters listed in Section 5.

Please complete one of the tables, in accordance with whether you classed the installation as ‘standard’ or ‘multiple’ in Section 5.3. Please list the appropriate meter labels in the table, identifying what the meter is measuring in relation to the RHI periodic support payment formula.

The meter labels used should correspond to those in the tables in Section 5, and used on the schematic diagram. Further information about the tariff calculation formula can be found in Volume Two of the Guidance. Any meter that is listed in this Section must be listed in Table 1, Table 3, or Table 5, as appropriate.

**Section 7 – Schematic diagram**

Please attach a copy of the schematic diagram, dated and signed by you, verifying the diagram is an accurate representation of the installation and other plant(s) delivering heat to the heating system, and that you are satisfied, as far as reasonably practical, that:

* the meter/meter components are positioned and present in sufficient numbers to directly meter the heat flows required for the RHI periodic support payment formula
* all plants providing heat to the heating system, whether eligible or ineligible for RHI support, are shown
* the installation/plant positions are correctly represented on the diagram,
* all uses supplied with heat from the heating system, both eligible and ineligible, are shown
* the relevant piping connections between all plants and heat uses are included
* the positions of relevant heat and steam meters and their associated components are shown.

Please note that meters should be labelled on the schematic diagram with their serial number. Please enter any additional comments about the schematic diagram in the space provided on the Report.

**Section 8 – Documentation review**

As well as inspecting the relevant meters, we also expect you to review the listed documents to ascertain whether those meters meet the technical eligibility requirements for the RHI.

Please describe the approach you took to verifying key documents, i.e. which documents and what proportion of the documents did you review, and whether or not the documents were satisfactory, in the space provided below.

We would expect you to review the following documents or records:

* manufacturer’s or installer’s certification relating to the meters and/or meter components as appropriate
* declaration that the meter conforms to the requirements set out in the RHI guidance (heat meters) or accords with industry good practice (please refer to the RHI guidance document for further details)
* installation design (with meter/ sensors requirements)
* specifications of installed meter and sensors
* most recent calibration certificates (meters, temperature sensors and, where applicable, pressure sensors) and
* any relevant commissioning reports.

If any of the records listed above were not available for review, please explain why in the space below.

We would expect a sample of the following documents or reports to be reviewed:

* historical calibration records
* maintenance records - for example, fault or planned replacement;
* records of any repair work carried out
* equipment or component manufacturer’s instructions
* operational inspections and any corrective actions relating to the meters; and
* functional checks on the meter (not necessarily a calibration).

**Section 9**

For each Exception raised during the completion of this report, please complete an Exception summary table for each issue. This should be referenced in the Executive Summary for the relevant section.

* **Exception #:** These should be entered sequentially, beginning with 001.
* **Relevant Section of Metering Report:** Reference to the section from which this exception report is referred.
* **Detailed description of issue**: To include an assessment of the situation, and include a comprehensive list of discrepancies versus the RHI Regulations and published Ofgem Guidance materials.
* **Evidence provided**: This should be pasted in, or am “Additional Evidence Number” provided to the relevant document in Section 10.
* **Recommended actions to achieve RHI Eligibility on this point**: This should include a detailed summary of actions that could be taken, in order for eligibility to be attained. Ofgem would recommend the author of the Report discuss these action with the owner of the installation, such that these are addressed before a final report is provided, and prior to the application for RHI accreditation being submitted to Ofgem.

**Section 10**

Please provide in this section any Additional Evidence, as referenced in the relevant section of the report with an Additional Evidence Number.

This table should be copied and pasted as many times as required, in order to capture all relevant evidence as separately referenced throughout the report.

**Declarations**

|  |
| --- |
| **Competency Criteria**  According to the Regulations, only a “competent person” can complete this report. We have interpreted a “competent person” to mean a person that meets **all** of the following criteria[[13]](#footnote-13):  1.   An experienced and suitably qualified engineer (at least HND or equivalent in an engineering discipline from a recognised academic institution);  2.   Has demonstrable experience and expertise in flow measurement and heat/steam measurement systems demonstrated by training and development records;  3.   Has a relevant background (involved in energy, utilities, building services, heating system design, heating system operation & maintenance);  4.   Covered by Professional Indemnity Insurance of at least £1m (through employer or directly);  5.   Is unbiased and impartial |
|  |

**Section 11**

**Installation Good Practice**

A complete manual on how to install a heat meter would be a substantial document as each type of meter has different requirements. The following is intended to form a set of general principles that work for most meters and cover some of the items not covered by the meter manufacturer’s guide as they are to do with the heating system design.

**System design**

* Install a de-aerator and ensure that the system can be vented at all high points
* Ensure the static pressure at the meter is above the minium pressure recommended by the manufacturer. This should be the static pressure at the highest anticipated operating point within the meters measurement range.
* Install a side stream filter within the heating circuit.
* Install a fine mesh strainer immediately before the flow meter.
* Install meters in accordance with manufacturer’s guidance, but in general:
* Ensure the flow meter is installed 20 pipe diameters downstream, and 10 pipe diameters up stream, of bends, valves or other fittings. Where a meter is installed downstream of a double bend then it should be at least 50 pipe diameter downstream.
* Do not install meters downstream of pumps or fast acting valves that could set up pulsating flow.
* Do not install meters at high points in piping.
* Do not install meters on vertical piping with upward flow.
* Ensure the meter has the same diameter as the piping. If a reducer or expander is required these should be at least 20 pipe diameters up stream and 10 pipe diameters downstream of the meter.
* Ensure gaskets are correctly fitted where meters are connected with flange joints. The gasket should not protrude into the water flow.
* Ensure temperature sensors are installed in the correctly sized pocket so that the sensor is in the main flow
* Use a suitable thermal grease to pack temperature sensor pockets.
* Avoid exposed lengths of temperature probe or uninsulated areas of pipe around the probe.
* Ensure that both temperature sensors have the same length of communication cable and that these are within the length limits stated by the manufacturer/supplier.
* Ensure power cables are not routed near meter components or communication cables other than the necessary power connection for the meters.

# Appendix 2. External piping data

1. **Above ground piping**

|  |  |  |  |
| --- | --- | --- | --- |
| **Branches between different buildings** | | | |
| **Above ground piping** | **Label1** | **Label 2** | **Label 3** | **Label 4** |
| Length (m) |  |  |  |  |
| Insulation conductivity (W/mK) |  |  |  |  |
| Thickness of insulation (mm) |  |  |  |  |
| Pipe diameter (mm) |  |  |  |  |
| Photograph of pipe showing full length provided (Y/N) |  |  |  |  |

Please provide photographic evidence.

1. **Buried piping**

|  |  |  |  |
| --- | --- | --- | --- |
| **Branches between different buildings** | | | |
| **Buried piping** | **Label 1** | **Label 2** | **Label 3** | **Label 4** |
| Length (m) |  |  |  |  |
| Piping pre-insulated (Y/N) |  |  |  |  |
| Thickness of insulation (mm) |  |  |  |  |
| Insulation type |  |  |  |  |
| Maximum operating temperature for which piping is suitable (C) |  |  |  |  |
| Heat loss rate from supplier (W/mK) |  |  |  |  |
| Declared heat transfer fluid temperature (C) |  |  |  |  |
| Photograph of pipe showing full length provided (Y/N) |  |  |  |  |

When possible a photograph of insulation being installed to indicate thickness and surface protection. If it is not physically possible to take a photo we would expect the manufacturer´s instructions to provide enough clarity to satisfy the RHI requirements.

# Appendix 3 – Summary of Key Changes

The following sections, highlighted with the symbol “^”, contain changes versus version 4 of the template.

1. Executive Summary and Checklist

2. Details of visit

3. Installation details

* 1. Location details
  2. Installation details
  3. Supporting evidence: installation capacity
  4. Other plant details
  5. Additional comments

4. Heat Use

4.1 Eligible heat uses

4.2 Ineligible heat uses

4.3 Description of buildings in which heat is used

4.4 Supporting evidence: eligible heat use^

4.4 Additional comments on heat uses

5. Metering Arrangements

5.1 Heat transfer medium

5.2 Additives to heat medium

5.3 Standard/Multiple?^

5.3.1 Defining the level of insulation of external piping^

5.3.2 Defining Standard or Multiple metering arrangement^

5.4 Heat meter details

5.5 Steam meter details

5.6 Meter readings

5.7 Meter installation/operation

5.8 Details of any plant not being metered directly

5.9 Shared meters – heat generated

5.10 Shared meters – heat used in multiple buildings

5.11 Additional requirements for reversible heat pumps

5.12 Additional requirements for biogas installations

5.13 Steam traps and other devices

5.14 Trace heating

5.15 Additional comments on metering arrangements

6. Measurement details

7. Schematic diagram

8. Documentation review

9. Exception Reports

10. Additional Evidence

11. Installation good practice guidance for heat meters

Declarations

1. ‘Additional RHI capacity’ is defined in the Regulations (Part 6, Regulation 43(2)) as a plant which is—

   (a) first commissioned after the date on which an accredited RHI installation (‘the original installation’) was first commissioned;

   (b) uses the same source of energy and technology as the original installation; and

   (c) supplies heat to the same heating system as that of which the original installation forms part. [↑](#footnote-ref-1)
2. Regulations, Part 2, 39(A) “Periodic support payments for new accredited RHI installations” [↑](#footnote-ref-2)
3. Please see Chapter 7 of Volume One of the Guidance for further details of the competency criteria. [↑](#footnote-ref-3)
4. http://www.ofgem.gov.uk/RHI [↑](#footnote-ref-4)
5. http://www.decc.gov.uk/en/content/cms/legislation/energy\_act\_08/energy\_act\_08.aspx [↑](#footnote-ref-5)
6. If the meter is comprised of separate components, details must be provided for at least the flow sensor ***and*** digital integrator components [↑](#footnote-ref-6)
7. If the meter is comprised of separate components, details must be provided for at least the flow sensor ***and*** calculator components [↑](#footnote-ref-7)
8. If the meter was externally calibrated (e.g. by the manufacturer), and was installed new, you may enter the date of manufacture here [↑](#footnote-ref-8)
9. This would need to be accompanied by an exception report, outlining the reasons why metering was not employed in this case [↑](#footnote-ref-9)
10. Please see Chapter 7 of Volume One of the Guidance for further details of the competency criteria. [↑](#footnote-ref-10)
11. Regulations, Part 2, Chapter 3, Regulation 17A [↑](#footnote-ref-11)
12. Regulations, Part 2, Chapter 3, Regulation 17A and Part 5, Regulation 42A [↑](#footnote-ref-12)
13. Please see Chapter 7 of Volume One of the Guidance for further details of the competency criteria. [↑](#footnote-ref-13)