

Domestic Renewable Heat Incentive (RHI)

Version 1.0 April 2014



Essential Guide to Metering

Information for applicants and installers about
metering for tariff payments



Essential Guide to Metering

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Part One

For Applicants **and** Installers



Section 1

About This Guide



Who it's for

This guide is about metering for tariff payments which affects some people applying for the Domestic Renewable Heat Incentive (RHI).

It starts with the particular circumstances that mean a heating system must be metered and then splits into information tailored for applicants and installers.

Our other guides

In the Essential Guides series, we also have:

[Essential guide for applicants](#)

[Essential guide for installers](#)

[Essential guide to optional monitoring – Metering and Monitoring Service Package](#)



This guide is for you:

Please feed back any suggestions in how it could be improved, or content you'd like to see added to suggestions.domesticrhi@ofgem.gov.uk We update this guide regularly. Check our website for the latest version, to be sure you're reading the most up-to-date information.



How To Know If You Need Metering



What is metering?

Heat meters are used to measure the amount of heat the renewable heating system produces. Most people won't need to install a meter to join the Domestic Renewable Heat Incentive (RHI) and receive tariff payments based on estimated heat use or generation. For cases where we can't easily estimate this, people need to install meters and submit readings regularly which we use to work out how much to pay them. For those people it's a requirement of joining. For others, whose circumstances change during their participation in the scheme, it may become a condition to carry on receiving tariff payments.

The important thing to know is that whether or not a heating system has to be metered is not a customer choice but depends on specified factors.

Why you should check in advance

This section explains when metering may be needed. It's one of the things people considering applying to the scheme have to check in advance. The application system automatically pulls information from different databases, so in most instances can tell whether a heating system needs to be metered. If the applicant only finds out then, it will hold up their application.



This is because there's a section in the application form with technical questions about metering for which they have to get the answers beforehand from their installer. Until we have those answers we can't make a decision whether to approve their application.

What does need metering?

To establish whether a system requires metering, MCS installers should read this guide alongside [MCS Domestic RHI Metering Guidance](#). If you're an applicant, check that your installer has followed the MCS guidance.

Metering is never required for solar thermal systems.

Biomass and heat pumps must be used as 'space heating' systems (ie, not only for generating domestic hot water to be eligible for the Domestic RHI, meaning they heat rooms in a house typically via your central heating).

You need metering if you have back-up heating

- 🏠 **Where a renewable heating system is installed alongside a fossil fuel space heating system. This would include, for example, where there is a biomass boiler and a back-up oil boiler.**
- 🏠 **Where the heating system combines a heat pump with a fossil-fuel system (like a gas boiler) in the same product. Whether it's fuelled by either gas or oil it will need to be metered, as we need to take into account the non-renewable portion. We do this by measuring:**

 - the combined total of heat produced by the heat pump and the fossil-fuel system
 - the fuel input and the equivalent heat output based on 100% efficiency (subtracting the fossil fuel input from the total heat produced)
 - the renewable heat output only (how much heat the heat pump produces). This would likely require metering in 'the box'.

🏠 **Where your renewable heating system is installed alongside another renewable heating system. There are a few situations where this could apply:**

- where two different types of renewable space-heating system (eg, biomass and a heat pump) are installed in the same property. This applies regardless of whether they were installed at the same or a different time.
- where two of the same type of eligible space-heating system (eg, two air source heat pumps) were commissioned at different times.

If two of the same renewable heating systems are commissioned at the same time (eg two air source heat pumps) we'll consider these as one heating system, so it will not require metering.

Back-up heating that doesn't count:

You don't need metering if your back-up heating is:

- 🏠 **an electric heater controlled by the same system as the renewable system such as an electric fan heater**
- 🏠 **anything designed to provide heat to only a single room, such as a stand alone electric plug-in heater or wood burning stove**
- 🏠 **additional electric immersion heaters for domestic hot water**
- 🏠 **a mechanical ventilation system that heats the incoming fresh air using heat generated by the renewable technology alone (these are popular in the construction of new properties, but if you're not sure, speak with your installer).**

You need metering where you have a biomass heating system that isn't designed to heat the whole property

Biomass systems must meet 100% of the space-heating requirement for the property. Anything less and the heating system will need to be metered, because we can't use the estimated annual heat use figure from the Energy Performance Certificate (EPC) to work out tariff payments. We check the calculations the Microcertification Certification Scheme (MCS) installer completed to see if the system needs to be metered.

This does not apply for people who installed their renewable heating system before the Domestic RHI scheme opened (9 April 2014).

You need metering if the property is occupied for less than half the year

Where the heating system is installed in a domestic property occupied for fewer than 183 days per year, it will need to be metered. This is because it won't be using as much heat as a permanently occupied property, so we can't use the estimated annual heat use figure from the EPC to work out payments. This could apply to properties used as a second home, or rental properties which aren't permanently occupied.

When applying, people have to confirm how many days in the past year the property was occupied. In addition each year they have to tell us how long it was occupied for. Applicants who think the property is likely to be occupied for less than 183 days in any of their seven years of payments may find it worthwhile to install meters when the system is installed.



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Section 3

Useful Links



[MCS Domestic RHI Metering Guidance](#)

For the rules MCS installers need to follow for metering RHI installations

Energy Saving Trust

For free impartial general information on how to save energy in your home

<http://www.energysavingtrust.org.uk/Take-action/Get-free-advice>

For queries regarding Domestic RHI scheme requirements and eligibility:

Energy Saving Advice Service

(England and Wales) **0300 123 1234**

Calls are charged at the national rate.

Home Energy Scotland

(Scotland) **0808 808 2282**

Call are free from landlines and most mobile networks.

Green Deal information

gov.uk site

<https://www.gov.uk/green-deal-energy-saving-measures>

EPC information

Department for Communities and Local Government website

<https://www.gov.uk/buy-sell-your-home/energy-performance-certificates>

Microgeneration Certification Scheme

For a list of MCS-certified products and installers information on MCS standards

<http://www.microgenerationcertification.org>

Products eligibility list

Information on [renewable heating technology products](#) eligible for the Domestic RHI.

To begin a Domestic RHI application

<https://domesticrhi.ofgem.gov.uk/apply>

Non-Domestic RHI Scheme

Those not eligible under Domestic, may wish to consider Non-Domestic.

<https://www.ofgem.gov.uk/environmental-programmes/non-domestic-renewable-heat-incentive-rhi>

Department of Energy and Climate Change

For information on the policy

<https://www.gov.uk/government/policies/increasing-the-use-of-low-carbon-technologies/supporting-pages/renewable-heat-incentive-rhi>

Renewable Energy Consumer Code

For problems with installers <http://www.recc.org.uk>



Part Two

Information for Applicants



Section 4

Overview of Metering



What to do

If you're still not sure whether your heating system has to be metered, discuss it with an MCS installer.

If metering is required, you'll need to have it installed before applying to the Domestic RHI. The meters must meet specific requirements to help make sure we receive accurate information on what we should pay you. This information is included in Part Three of this guide – Information for Installers. Make sure your MCS installer is familiar with these requirements.

What are payments based on?

If your heating system is metered, you'll receive quarterly scheme payments based on the amount of renewable heat it produces. We work this out by taking the total heat generated by your heating system, and in some situations we must also deduct any heat from non-renewable sources, such as the electricity input for heat pumps, or the contribution of any backup heating system.

Your quarterly payments will be based on the total eligible renewable heat generated by your heating system.

You'll need to take quarterly readings of one or more of your heat meters, and any other electricity, gas or oil meters you have, depending on your heating system. You submit them to us using our online meter reading portal on MyRHI. It calculates payments automatically.

The maximum we pay you is 'capped' so it will never exceed the amount we'd have paid if your system had not been metered and payments were instead based on your property's estimated annual heat use. We work this out from your EPC plus information on the MCS database.



Who Can Install Meters?



Must be MCS-certified

You must use an MCS-certified installer to install all meters¹. This could be the person who installed your heating system, or someone different. If you choose someone different, they must be MCS certified to install the type of heating system that you have.

There are specific technical requirements that meters need to meet. You don't need to know these yourself, but make sure that your installer is aware of this. If you do want to read the technical requirements, see Annex 5.

If you installed before scheme opening

You may already have meters in place, or you may need to get an MCS installer to fit them to your heating system. If they're already in place an MCS installer must check they're installed to the correct specifications, and are arranged to meet Domestic RHI requirements.

Things to expect from your metering installer

While the meters (heat meters and any other necessary electricity, gas or oil meters) are being installed you should make sure your installer:

- 1 Labels all your meters** and that you understand what each label refers to. Frequently used abbreviations are: HM for a heat meter, EM for an electricity meter, GM for a gas meter and OM for an oil meter. In some cases the installer may also have written a number next to the reference letters because there is more than one of that type of meter (HM1, HM2 etc).
- 2 Hands you a signed, completed paper copy of the 'Installer Metering Questions'** before they leave the site. This is essential as you will need their answers to complete the metering questions in your application. You can download the document from our website and ask your installer to complete it. There are versions for [biomass](#) or [heat pumps](#).

¹A scheme with functions equivalent to MCS and accredited under EN 45011 or EN 150/IEC 17065:2012

3 Completes the declarations at the end of the 'Installer Metering Questions' confirming that the meters have been arranged in such a way that they are eligible for the Domestic RHI, and meet the necessary standards.

4 Gives you the initial meter reading(s) for each meter once the system has been commissioned (when they test and sign off the heating system). Make sure they write it into the installer metering questions document. Without this reading we can't start paying you. The meter reading is valid only for the next two weeks. If you apply to the Domestic RHI later than that, you'll have to take a new reading yourself.

5 Demonstrates how to read the meters for your first meter reading so that you know how to take future readings and informs you when you should do this. They should also show you how to compare future readings against the first.

6 Has told you what units your meter is reading in. Your heat and electricity meters should be in kWh. Gas and oil meters should be in m³ or litres.

7 Has told you if your installation requires 'Alternative Metering Arrangements'. If it does, download our template, make sure they complete it and return it to you, as you'll need it for your application. There are versions for [biomass](#) or [heat pumps](#). It has to contain a simple schematic showing the meter placement and a description of why the heat output from your heating system cannot be metered alone. More detail is in page 14 and section 12.

8 Gives you photos of your meters, showing their labelling, Measuring Instruments Directive (MID) compliance and initial readings. You should also ask for any other tips on taking meter readings.

9 Provides you with a handover document pack containing:

- 🏠 **a paper copy of the installer metering questions**
- 🏠 **a process to follow to check that the meter is operating**
- 🏠 **any maintenance requirements**
- 🏠 **calibration requirements**
- 🏠 **meter instructions.**

In addition, we recommend you ask your installer whether they have read the information in Part Three of this guide – **Information for Installers** and to confirm in writing that the heating system and meters they're installing are intended to be eligible for the Domestic RHI.





When You're Ready To Apply



Metering questions in the application form

You will be asked questions about 'Metering for Payment' as part of your online application. You'll be asked these if:

- 1 You declare that your heating system needs to be metered.**
- 2 You confirm that the property the heating system is in has been occupied for fewer than 183 days of the previous year.**
- 3 Your MCS number triggers the questions,** based on the answers your installer gave when registering your heating system on the MCS database.

To answer the questions, use the Installer Metering Questions document that your installer signed and gave you (you'll probably find it in your handover pack). Copy the answers into the metering application questions – the questions will be identical.

If you don't have the answers

We recommend that you complete the section on metering questions when you apply. If you don't have the answers to use from the Installer Metering Questions document, you can complete the rest of the application form and submit it. Note though that we can't process your application until you supply the missing information.

You can enter the answers to the metering questions at a later date by signing in to the MyRHI portal on the Domestic RHI website. You must complete them within three months of application and must provide a baseline meter reading from the date you initially applied. If you don't your application will be rejected.

Future meter readings

Once you're approved for the scheme, you can sign in to MyRHI to submit meter readings every quarter. It will automatically show the different meters you need to submit readings for.

When you'll need alternative metering arrangements

If your installer says your heating system requires an alternative metering arrangement, make sure they give you a completed Alternative Metering Arrangements document. There are versions for [biomass](#) or [heat pumps](#).

The three most likely scenarios are:

- 1 **You have a backup fossil fuel heating system.** The renewable system itself can't be metered (eg, due to space constraints) so the total heat produced must be metered. But because this total may include heat from the fossil fuel system, meters are required to measure the non-renewable input so it can be deducted from the total heat produced.
- 2 **You have a heat pump that you intend to use to provide cooling in summer.** The meter logging the electricity use when in heating mode will continue to work over summer when in cooling mode. You'd therefore be subtracting more than necessary from your renewable heat output figure. This would reduce your payments, so you may wish to have an alternative metering arrangement to account for it.
- 3 **You have a heating system that combines a heat pump with a fossil-fuel system (like a gas boiler) in the same product** (as described on page 6).

Where your heating system falls into one of these scenarios and requires additional supporting information at application, you will not initially be able to use the MyRHI portal to submit your meter readings (see section 7). Instead, you'll need to submit your readings using a meter readings spreadsheet, which we'll send you.

How payments are calculated for metered systems

The formula for these payments will vary depending upon the setup of your heating system. We assign this formula based on the answers to your installer metering questions, which contain the most common variables of metering a renewable heating system. You see the formula after you answer the installer metering questions in the online application form. If you're unsure what your formula means, or what variables have been accounted for, see Annexe 2 and discuss with your installer.

An example payment formula for a heat pump might be:

$$\text{Renewable Heat Payment} = \text{Tariff} \times (\text{HM1} - \text{EM1})$$

HM1 = total heat generated in that meter period by the heat pump

EM1 = electricity used by the heat pump





Section 7

Submitting Your Meter Readings



Using MyRHI

If your heating system is approved for the scheme, you'll be able to sign in to the MyRHI area of the Domestic RHI website to submit your meter readings every quarter (except for alternative arrangements as detailed at the end of section 6). Submitting a meter reading will calculate the payment owed to you for the preceding quarter.

You'll be presented with separate text boxes for each of your meters. The system knows how many meters you have and their type based on the answers on your application form (using the Installer Metering Questions document).

The system will record your previous meter readings, so you can check whether the new reading seems sensible. The system will warn you if they appear unlikely.

Other uses of MyRHI

In MyRHI you'll also be able to:

- 🏠 **view your installer's details**
- 🏠 **view all your previous meter reading submissions**
- 🏠 **view information about your payment formula (heat equation)**
- 🏠 **check when your next meter reading is due**
- 🏠 **enter your metering questions, if you weren't able to at the point of application**

When to submit meter readings

The first meter reading(s) you submit as part of your application provides us with a baseline figure to make your first quarterly payment. You must take this baseline reading at application and can do it up to two weeks before the date you apply².

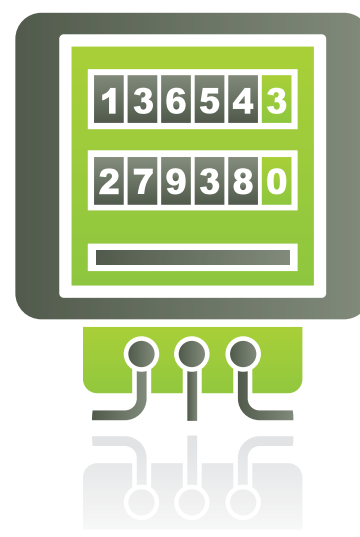
You have to take and submit readings every three months within a specific window. This will be a four-week period, from one week before the quarterly meter reading date and up to three weeks after. The exact dates depend on when you're accepted to join the scheme. These meter reading dates are confirmed at the point of approval.

You'll need to submit 28 quarterly meter readings over the seven years of the scheme. You'll receive an email reminder one week before your window opens, and subsequent reminders if you haven't sent your readings, up to its end.

If you forget to submit a reading

If you forget to submit a meter reading or are away over your four-week window then you'll have to submit the readings in the next quarterly window. Once you do this, you'll be paid for the previous two quarters in one go.

You'll only be allowed to miss one meter reading window submission. If you fail to provide the subsequent meter reading then we'll treat this as non-compliance with the scheme rules, which could lead to the suspension of payments.



² However we'll pro-rate your first quarter's payment to account for meter readings taken from before the date you apply.



Section 8

If A Meter Breaks



Notifying us

If one of your meters breaks, and this will stop you taking or submitting your next set of readings, you must tell us within 28 days of discovering the damage.

What to do

You should still submit meter readings for any other meters that are not broken. We'll make a payment for the quarter based on an estimated meter reading.

In the next quarter, you must provide the opening meter reading (the new baseline) from the fixed or new meter. As payments are always made for the preceding quarter, we're unlikely to be able to pay you for actual heat use, in which case we'll make another estimated payment. After that, we'll return to precise payments.

If a meter needs to be replaced

If the broken meter cannot be fixed and needs to be replaced (or if just one component of a heat meter needs replacing, such as the pair of temperature sensors or a flow meter), you'll need to submit the details of this new meter to us.



Part Three

Information for Installers



Overview Of Metering



If metering is required

If metering is required then your customer will need to enter technical information relating to their meters and their arrangement when completing their application. You provide the answers by completing and giving to your customer the 'Installer Metering Questions' document at the time of installation. Download the document – there are version for [biomass](#) or [heat pumps](#). The questions on the Domestic RHI application mirror those in the document – all your customer has to do is copy in your answers.

Payments for metered applicants

Metered applicants approved for the scheme have to submit quarterly meter readings to us using an online portal. Their payments are based on a heat equation specific to each metered installation. They will never receive more than had they not been metered. Payments are capped at the amount of their estimated annual renewable heat use, calculated using the heat load figure from their EPC.

Metering questions' documents

Installer metering questions are required when:

- 🏠 **installing meters for a new system**
- 🏠 **retrofitting meters to an existing system**
- 🏠 **when verifying metering arrangements, see section 10.**

In some cases you must also complete and give to your customer the 'Alternative Metering Arrangements Template', but it's required only for a specific set of circumstances. See section 10.



Section 10

The Design Stage



MCS certification

To install any meters in situations where your customer is applying for the Domestic RHI and needs to be metered for payments, you must be an MCS installer and certified to install their specific technology. This applies to both new applicants and when retrofitting meters for legacy applicants.

If the installation already had meters installed

An MCS certified installer would need to be accountable for the meter specifications, and their arrangement. It's fine if the original meter installer was MCS-certified and is satisfied the metering meets the Domestic RHI requirements. If the original installer was not MCS-certified then an MCS installer must verify that the meter arrangement is in line with the [MCS Domestic RHI Metering Guidance](#). This verification means that they assume responsibility that the metering arrangement is correct and will be the first point of contact is the customer has any problems.

Metering arrangements

A minimum of one heat meter must measure the eligible renewable heat output from any Domestic RHI biomass or heat pump installation. Additionally, a minimum of one electricity meter must measure the electricity consumed by ALL heat pump installations to produce the heat output. This will be subtracted from their total heat output figure. This is known as 'standard' metering which should be suitable for the majority of installations.

What else?

There are certain instances where the installation can't have a standard metering arrangement and requires an alternative arrangement.

Examples are:

- 🏠 **when an additional technology contributes to the metered heat output of the Domestic RHI installation – such as electric input prior to a DHW cyclinder**
- 🏠 **to avoid including electrical input when a heat pump is used for cooling.**

In these cases you will have to provide your customer with additional supporting information so we can verify it for their Domestic RHI application. For more information about alternative metering arrangements, see Section 12.

Standard metering arrangement's design

Standard metering for air source or ground source heat pumps:

Where a heat pump installation needs to be metered for payments, and standard metering can be used, a minimum of both one heat meter and one electricity meter should be installed so the eligible renewable heat output from the Domestic RHI heat pump alone is measured.

The number of **heat meters** required will depend upon the number of heating circuits that the heat pump is feeding, and whether meters can be installed directly as flow and return pipes enter/exit the unit. If this is not possible due to physical constraints, they must be installed after the pipework diverges.

You need to ensure that all electrical input to the system that may influence the heat output are metered. The number of **electricity meters** required will depend on whether the electricity supplying the heat pump uses one connection for all necessary components, or whether two or more connections are required.

This will always, as a minimum, supply the compressor but may also supply one or more of any internal or external supplementary heater(s), an immersion heater(s), any circulation pump(s), a ground loop circulation pump (for ground source heat pumps) or an evaporator fan (for air source heat pumps). Make sure you're aware of what the electricity supply is feeding, as your applicant will be asked this in their application.

Standard metering for biomass boilers or stoves:

Where a biomass installation needs to be metered for payments, and 'standard' metering can be used, a minimum of one heat meter should be installed as close to the biomass boiler heat output (flow and return pipes) as possible, depending upon the number of heating circuits exiting or entering the biomass boiler.

These meters should be installed to enable the eligible renewable heat output from the Domestic RHI technology alone to be measured.

The number of **heat meters** required will depend upon the number of heating circuits that the system is feeding; and whether meters can be installed directly as flow and return pipes exit/enter the biomass installation. If this is not possible due to physical constraints, meters must be installed after the pipework diverges.

Biomass systems that use electricity, gas or oil purely for ignition purposes can ignore the additional fuel input, as it does not need to be accounted for in the metered eligible renewable heat output.

For heat pumps and biomass boilers or stoves:

The number of meters and complexity of the arrangement will vary from one installation to another. See Annex C of the [MCS Domestic RHI Metering Guidance](#) for examples of meter installation locations and also Appendix 3 for some of the most commonly anticipated metering scenarios. Note, they are simplified.

If an applicant doesn't want to meter a loop that the system is feeding (eg a circuit heating a small porch) then they don't have to install a heat meter if it doesn't make financial sense (if the cost of the meter exceeds the likely level of Domestic RHI payments).



Section 11

When Installing The Meters



During and following installation of the meters:

Requirements

You must choose and install all necessary meters in line with the requirements set out both in this guide and the [MCS Domestic RHI Metering Guidance](#).

There are various accuracy, physical and installation requirements for all types of meters – heat meters and any other necessary electricity, gas or oil meters. Whatever the type, all must meet the minimum standard required by the Measuring Instruments Directive (MID) in conjunction with other specific requirements. For specific details, see Appendix 5.

Calibration

You must calibrate meters correctly for the heating system where they are being installed. For example, if the heating system uses glycol rather than water as the heat circulating medium then any meters should be calibrated accordingly.

Preferably, select meters that don't need to be re-calibrated during the seven year payment period of Domestic RHI. If you select meters that do need re-calibrating you should make sure your customer knows when it must be done.

Be aware that if meters are found to not be properly calibrated, we would treat this as a non-compliance which could lead to us withholding scheme payments from your customer.

Properly installed meters

All heat meters must be properly installed and in good working order. To ensure this, you should follow the [MCS Domestic RHI Metering Guidance](#). In most situations we would expect installers to install meters in line with manufacturer's instructions, unless there is good reason not to.

On the Non-Domestic RHI we have found a number of instances of:

- 🏠 **meters installed too close to bends (refer to Annexe 5 of this document or section 5.1 of the MCS Domestic RHI Metering Guidance Document for 'good practice' space requirements for meter placement)**
- 🏠 **meters installed too close to valves (refer to Annexe 5 of this document or section 5.1 of the MCS Domestic RHI Metering Guidance Document for 'good practice' space requirements for meter placement)**
- 🏠 **flow meters wrongly orientated**
- 🏠 **flow meters installed in the flow pipe rather than the return pipe**
- 🏠 **temperature sensors not installed to enable good thermal contact with the thermal transfer fluid (Note standard components should be used, do not fabricate your own).**

This can affect the accuracy of meter readings which may result in a non-compliance which could lead to suspension of payments for your customer.

Meter seals

We recommend all heat meters are appropriately sealed. This is useful for you as an installer and helpful for us if we decide to carry out any audits to detect any post installation tampering.

Meter display

Meters should be selected to read:

- 🏠 **Heat meters: kWh or MWh**
- 🏠 **Electricity meters: kWh**
- 🏠 **Gas meters: m3 or litres**
- 🏠 **Oil meters: m3 or litres.**

Labelling

When meters are installed, they should all have clear labels (sticky labels or permanent marker) next to/on them, along the lines of:

- 🏠 **'HM1' for a heat meter ('HM2' for a second heat meter etc);**
- 🏠 **'EM1' for an electricity meter ('EM2' for a second electricity meter etc);**
- 🏠 **'GM1' for a gas meter ('GM2' for a second gas meter etc);**
- 🏠 **'OM1' for an oil meter ('OM2' for a second oil meter etc)**

Customer education

You have an important role to play in showing your customers how to read their meters and to understand the labelling. Generally they will be unfamiliar with heat meters, especially if there is more than one, or a variety of heat meters and electricity and or gas/oil meters.

Once you've completed commissioning, make sure that the installed meters are functioning properly and show your customer how to take a meter reading from all relevant meters. Write the initial meter readings in the 'Installer Metering Questions' document. There are different versions for [biomass](#) or [heat pumps](#).

If taken within two weeks of your customer applying to the Domestic RHI, they can use them as their baseline or opening meter readings. If they apply later than this, they'll need to take a revised set of readings on the day themselves. This is preferable, otherwise we'll have to estimate the amount we have to subtract from their Domestic RHI payments to account for the number of days between when the readings were taken and the date they applied.



Installer metering questions document

After showing your customer how to take readings, you must complete and sign a paper copy of the 'Installer Metering Questions' document and give it to them. There are different versions for [biomass](#) or [heat pumps](#). It provides all the information they need to complete the section about metering on the Domestic RHI application form. Your customer will copy your answers. In addition to the technical information, it includes your contact details and MCS number should there be an issue after they've been approved for the scheme. You will be the first point of contact if there's a problem.

At the end of the document, you will be asked to confirm a number of 'declarations'. That:

- 🏠 **all meters have been labelled appropriately (ie HM1, 2 etc for heat meters and EM1, 2 etc for any necessary electricity meters)**
- 🏠 **all heat meters installed are MID class 3 compliant**
- 🏠 **all electricity meters installed are MID class A compliant**
- 🏠 **all meters are properly calibrated**
- 🏠 **all meters have been properly installed in accordance with manufacturer's instructions**
- 🏠 **to the best of your knowledge the arrangement complies with the [MCS Domestic RHI Guidance](#) and will as such be eligible to be accredited under the Domestic RHI**
- 🏠 **you have advised the customer on the correct procedure to read the meters**
- 🏠 **you have advised the customer of their obligation to provide ongoing quarterly meter readings and the implications if they fail to do so.**

Customer handover

Following completion of the declarations on the previous page, you should provide your customer with a handover pack that contains:

- 🏠 **a paper copy of the completed installer metering questions document**
- 🏠 **an alternative metering arrangement template (if relevant – see section 12)**
- 🏠 **a description of how to check that the meter is operating**
- 🏠 **any maintenance requirements**
- 🏠 **calibration requirements**
- 🏠 **instruction on how to use the meter(s)**
- 🏠 **photos and any helpful information**
- 🏠 **baseline meter reading(s) (contained within the installer metering questions document).**

After your customer has applied

Be available to answer technical queries, metering reading issues or other questions your customer may have. Provide support should amendments to the metering solution be required.





Section 12

Alternative Metering Arrangements



When it's required

There are certain instances where the installation can't have a standard metering arrangement and requires an alternative arrangement. In these cases you'll have to provide your customer with additional supporting information so we can verify it for their Domestic RHI application.

These scenarios include where your customer has:

1 An additional technology contributing to the metered heat output figure of their Domestic RHI installation: where the metered heat output from the Domestic RHI technology includes heat from an additional ineligible technology also on the heating system. This might be where a heat meter has been installed *after* a standalone DHW cylinder³ and where the stand-alone DHW cylinder uses some form of supplementary input (electric immersion heater or a twin coil cylinder with the secondary coil fed from an ineligible technology such as a gas or oil boiler); or where an ineligible heat source is simply contributing to the metered heat output; see Annexe 4 for example schematics. Note a buffer tank should not be confused with a DHW cylinder. It makes no difference to the metering requirements whether a meter is installed before or after a buffer tank.

2 A heat pump capable of cooling: where your customer is likely to use the heat pump in cooling mode during the summer months. This would reduce their scheme payments due to the additional metered electrical consumption recorded and subtracted from the heat output figure. However, this decision is ultimately up to your customer.

For either of these scenarios you need to complete and give to your customer the 'Alternative Metering Arrangement Template'. There are different versions for [biomass](#) or [heat pumps](#).

³ Domestic Hot Water cylinder used to heat a store of water [using a coil fed by the Domestic RHI technology and sometimes an additional heat source ie, an immersion heater or additional heating coil fed by a fossil fuel back-up heat source].

Process for designing alternative metering arrangements

Option 1 – Additional technology contributing to the metered heat output figure of the Domestic RHI installation:

Install one or more heat meters to measure the total **combined** heat output from the eligible installation **and** the additional ineligible technology; plus one of the following options:

A Install a heat meter to measure the **heat output** being contributed to the heating system by the additional ineligible technology so it can be subtracted from the total combined heat output

or

B Install one or more gas/oil or electricity meters as necessary to measure the **fuel input** to the additional technology (includes electric immersion heaters) so a calculation can be worked out for the equivalent heat energy output based on a 100% boiler/immersion heater efficiency. This will enable this figure to be subtracted from the total combined heat output.

Complete the 'Alternative Metering Arrangement Template' - there are versions for [biomass](#) or [heat pumps](#), and give it to your customer for their Domestic RHI application along with the answers to the Installer Metering Questions document.

For the template you must provide:

- 1 **a written description** as to why the heat output from the Domestic RHI technology alone cannot be metered (for example due to space implications) and how the metering arrangement you are proposing will get around this problem using one of the methods ('A' or 'B') as described left.
- 2 **a simple schematic** showing the proposed metering arrangement including all necessary heat meters and any electricity, gas or oil meters to enable only the eligible renewable heat output to be measured. Refer to the list of what is required for a 'simplified schematic'; on page 29. Use the format shown in Annexe 4.
- 3 **details of the additional heat source** to enable us to factor in any effect on the payment calculation.

This will allow us to check the proposed metering arrangement and assign a heat equation to be used for all future payments.

Where the fuel input is being measured instead of the heat output from the additional plant (see option 'B' left), the equivalent heat output figure will be calculated using fuel Gross Calorific Values selected from DECC's published calorific values in DUKES (Digest of UK Energy Statistics), Annex A1⁴: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/225067/DUKES_2013_published_version.pdf

The equivalent heat output calculation assumes a 100% boiler/immersion heater efficiency figure (100% of the fuel input being converted to heat output).

⁴ Within the DUKES report we will use the following fuel inputs: LPG, we will use Propane/Butane (LPG); for oil, we will use burning oil, which is the large majority of all oil used for domestic heating; for natural gas, we will use natural gas consumed.

Option 2 – For air source and ground source heat pumps capable of cooling

Where a heat pump is capable of providing cooling and it's likely that your customer will use it for this purpose, they are likely to be under compensated for the heat generated by it. This is because a Domestic RHI applicant will only be paid for the metered heating function of the heat pump. When they use it in cooling mode the input electricity consumption will continue to be being metered for subtraction which will reduce their payments.

If your customer does not want to be under compensated, they can choose an alternative metering arrangement to enable only the eligible renewable heat output to be metered.

This could be done in either of the following ways:

A Install a bi-directional or an additional heat meter to enable the cooling load to be measured. By using the design COP of the heat pump we will work out the proportion of electricity used against the metered heating load. We will estimate how much electricity must be subtracted from the eligible heat output figure ensuring that the proportion being used when the heat pump is in cooling mode is not included.

or

B For ground source: install a heat meter in the ground loop to measure the heat being extracted from the ground only and base payments for the participant on that.

Complete the 'Alternative Metering Arrangement Template'. There are versions for [biomass](#) or [heat pumps](#). Give it to your customer along with the answers for the the Installer Metering Questions document for their Domestic RHI application.

For the template you must provide:

- 1 **A written description** as to why you feel that the applicant will be under compensated if the heat pump is used for cooling during the summer months. In some cases the cost of an additional meter may outweigh the amount of money that the applicant maybe undercompensated by. You will also be requested to provide details of the metering arrangement you are proposing and whether you are using one of the preferred solutions detailed above.
- 2 **A simple schematic** showing the proposed metering arrangement including all necessary heat meters and any other electricity meters to enable only the eligible renewable heat output to be measured. Refer to the list of what is required for a 'simplified schematic' on page 29 which should be based on the formats shown in Annexe 4.

Both of these methods will allow us to manually check the proposed metering arrangement and assign a heat equation for all future payments.



Requirements for simplified schematics

You provide a simplified schematic as part of the alternative metering arrangement template which your customer needs for their Domestic RHI application. We review it as part of the application assessment process. See example schematics in Annexe 4. Your simple schematic must show:

- 🏠 **all energy feeding into the heating system** (the Domestic RHI installation plus any additional technologies including any immersion heaters)
- 🏠 **any Domestic Hot Water (DHW) cylinders located on the system**, where the heat meter is installed after the DHW cylinder
- 🏠 **the placement of all heat meters** - to measure total heat output from the Domestic RHI installation; and to measure any heat contribution by additional plant where the heat output from the Domestic RHI installation could not be measured separately
- 🏠 **the placement of any other electricity meters** (for example immersion heaters where a heat meter is installed *after* the DHW cylinder)
- 🏠 **the placement of any gas or oil meters - applicable where hybrid heat pumps have been used.** Or where the additional plant is a gas and oil system contributing heat to the heating system, where the heat output from the Domestic RHI installation, or the additional plant, cannot be measured separately. In this case the fuel input must be calculated, on which the calculation for the equivalent heat output is based
- 🏠 **flow and return piping used on the system;** (including red/blue colouring or directional arrows)

Note: Do not show any valves or other engineering symbols. It isn't necessary to show the heat uses on the illustration, however you must provide summary details of them in the Installer Metering Questions document.



Part Four

Annexes to Part Three

Annexe 1 - Installer metering questions

[Installer metering questions for biomass](#)

[Installer metering questions for heat pumps](#)

[Alternative metering arrangements template for biomass](#)

[Alternative metering arrangements template for heat pumps](#)

Annexe 2 - Additional factors considered when calculating payments

Additional factors will need to be taken into account by Ofgem when we calculate the relevant payment for your customer and, as such, should be considered during the design of the metering arrangement. [We will get this information from the Installer Metering Questions (IMOs) which you provide to your customer upon completion of the metering installation.]

For biomass boilers or stoves:

- If a Biomass Stove (ie rather than a Biomass Boiler) a 1.2 multiplier factor will be applied to the metered heat output figure;
- If a heat meter has been installed after the DHW (Domestic Hot Water) Cylinder a multiplier factor of 1.43 will be applied to the heat output figure to take account of DHW cylinder heat losses;
- Subtraction of any heat contribution from any additional plant* where this is included in the total heat output figure (ie the Domestic RHI installation cannot be metered alone);
- Where any additional plant is included in the total heat output figure and it is an ASHP that uses a defrost coil that specifically uses re-circulated heat from the dwelling where there is not additional energy input/ heating coil, a multiplier factor of 0.97 should be applied to the heat output figure of the additional plant*.

For heat pumps:

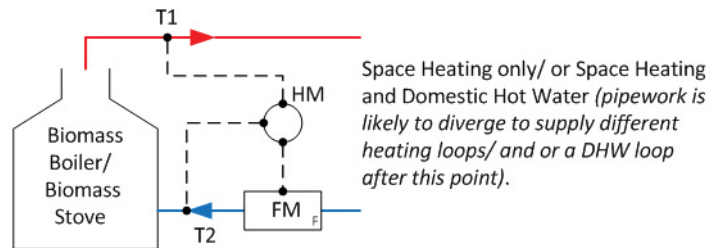
- ASHP which use a defrost coil that specifically uses re-circulated heat from the dwelling where there is no additional energy input/ heating coil will have a multiplier factor of 0.97 applied to the heat output figure;
- If a heat meter has been installed after the DHW (Domestic Hot Water) Cylinder a multiplier factor of 1.43 will be applied to the heat output figure to take account of DHW cylinder heat losses;
- Subtraction of any heat contribution from any additional plant* where this is included in the total heat output figure (ie the Domestic RHI installation cannot be metered alone);
- Where any additional plant is included in the total heat output figure and it is an ASHP that uses a defrost coil that specifically uses re-circulated heat from the dwelling where there is not additional energy input/ heating coil, a multiplier factor of 0.97 should be applied to the heat output figure of the additional plant.

*(If additional plant is a solar thermal system, an immersion heater for a DHW cylinder; a heat transfer system using heated air expelled from the domestic properly to fresh air entering the property and the plant does not have a heating element; or is an internal or supplementary auxiliary electric heater controlled by the same control system as that governing the Domestic RHI installation; or is only providing heat to heat one room then the installation does not need to be metered.).

Annexe 3 – Standard schematics

Illustration 1: Biomass Installation using x1 Heat Meter

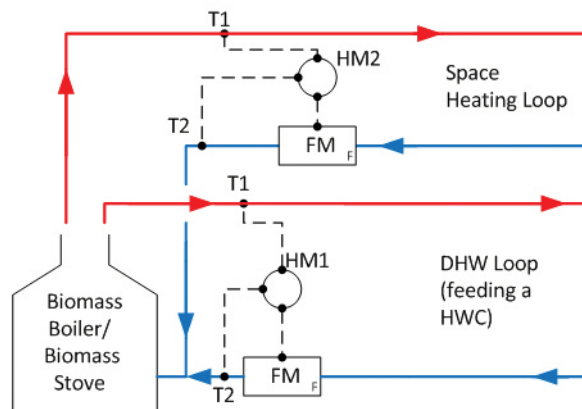
NOTE: This is a biomass system which may be supplying hot water to multiple heating loops; ie the pipes might diverge after the heat meter. It may not always be possible to install a x1 heat meter before the pipes diverge and therefore multiple meters may be required.



T1 = Temperature Sensor Flow Pipe
 T2 = Temperature Sensor Return Pipe
 FM = Flow Meter
 HM = Heat Meter Digital Calculator

Illustration 2: Biomass Installation using x2 heat meters

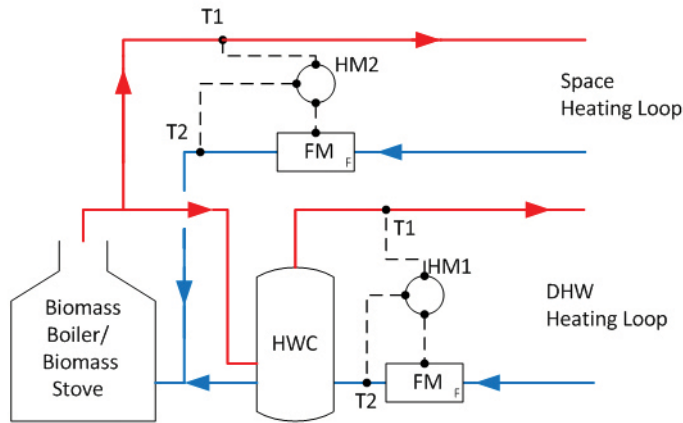
NOTE: This is a 3-pipe biomass installation using x2 flow pipes and x1 common return. It requires the installation of x2 heat meters.



T1 = Temperature Sensor Flow Pipe
 T2 = Temperature Sensor Return Pipe
 FM = Flow Meter
 HM = Heat Meter Digital Calculator
 HWC = Hot Water Cylinder

Illustration 3: Biomass Installation using x2 heat meters

NOTE: This 2-pipe biomass installation uses x1 flow pipe and x1 return pipe. The pipes diverge after they exit the boiler to feed a Space Heating Loop and a DHW Loop. Due to physical/ space constraints 1 heat meter alone cannot be installed before the DHW cylinder and as such must be installed just after. In this example, the HWC does not use any sort of additional heating source (ie an electric immersion or is a twin coil) and therefore this is a standard metering arrangement. If it did use an additional heating source you should follow the alternative metering arrangements requirements (see illustration 9).

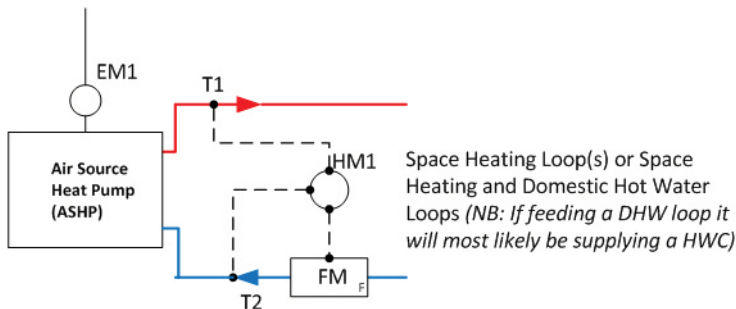


T1 = Temperature Sensor Flow Pipe
 T2 = Temperature Sensor Return Pipe
 FM = Flow Meter
 HM = Heat Meter Digital Calculator
 HWC = Hot Water Cylinder

Illustration 4: ASHP unit using x1 heat meter & x1 electricity meter

NOTE: The pipes may diverge after they exit the ASHP to feed one (or multiple) space heating loops or a combination of space heating and domestic hot water heating loops.

A minimum of one electricity meter is required to measure the input electricity required to run the heat pump compressor and any other electrical input (ie for hot water boosting, evaporator fans etc) that has gone into the generated heat output. Potentially more than one electricity meter may be required.

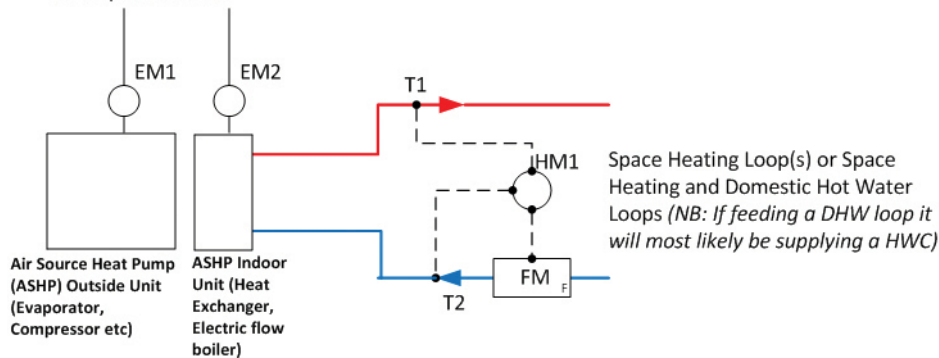


T1 = Temperature Sensor Flow Pipe
 T2 = Temperature Sensor Return Pipe
 FM = Flow Meter
 HM = Heat Meter Digital Calculator
 EM = Electricity Meter

Illustration 5: ASHP unit (with separate Outdoor & Indoor Units) using x1 heat meter and x1 electricity meter

NOTE: The pipes may diverge after they exit the ASHP to feed one (or multiple) space heating loops or a combination of space heating and domestic hot water heating loops.

One electricity meter is required to measure the input electricity required to run the heat pump compressor (outdoor unit) plus one additional electricity meter required to measure the electrical input into the indoor unit to run the electric back up flow boiler.

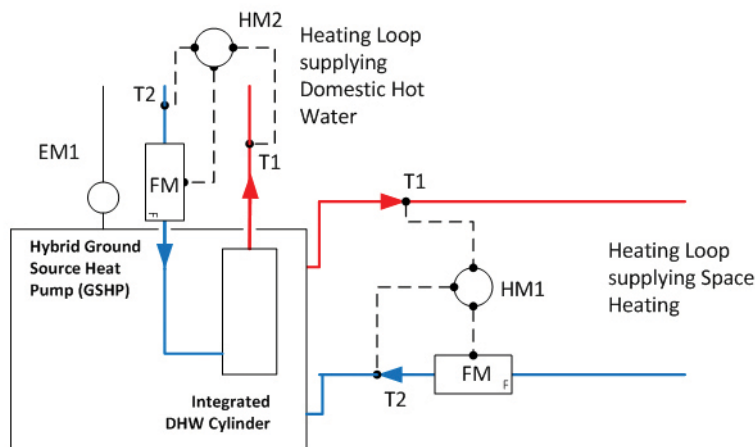


T1 = Temperature Sensor Flow Pipe
 T2 = Temperature Sensor Return Pipe
 FM = Flow Meter
 HM = Heat Meter Digital Calculator
 EM = Electricity Meter

Illustration 6: GSHP unit using x2 heat meters and x1 electricity meters

NOTE: Two heating loops exit the GSHP given that it contains an integrated DHW Cylinder (with no immersion heater). One loop feeds the DHW and the other the space heating.

A minimum of one electricity meter is required to measure the input electricity required to run the heat pump compressor and any other electrical input (ie ground loop circulation pumps etc).

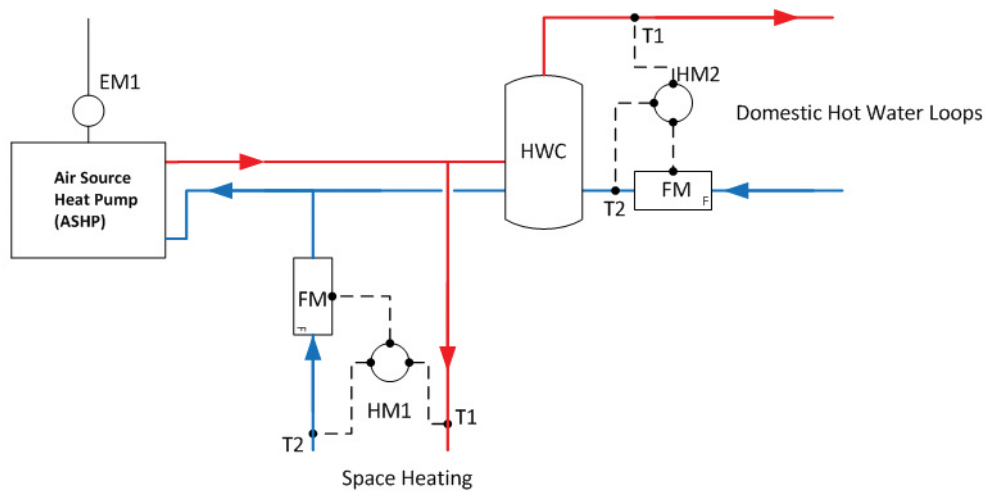


T1 = Temperature Sensor Flow Pipe
 T2 = Temperature Sensor Return Pipe
 FM = Flow Meter
 HM = Heat Meter Digital Calculator
 EM = Electricity Meter
 GM = Gas Meter

Annexe 4 – Alternative metering schematics

Illustration 7: ASHP unit using x2 heat meters and x1 electricity meter

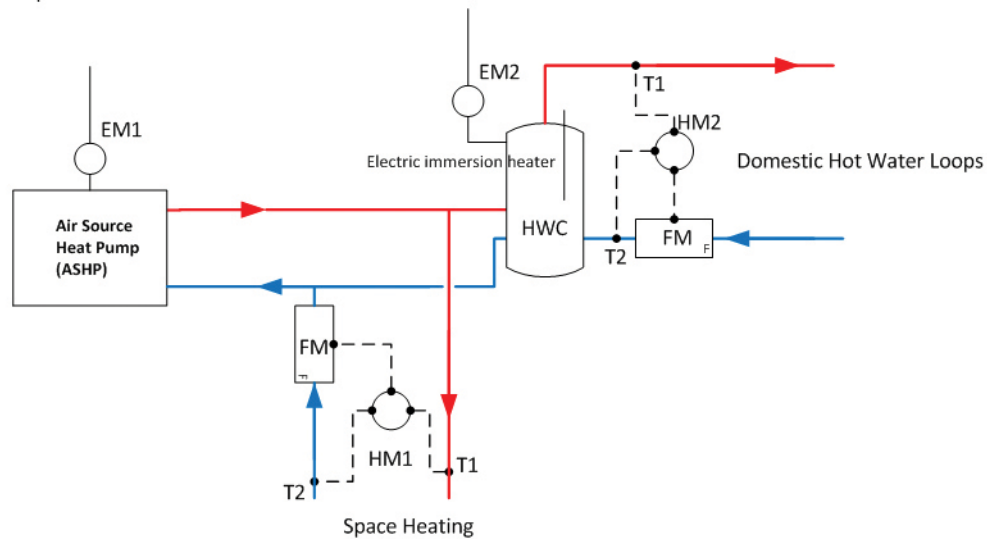
NOTE: One heat meter cannot be installed at the point that the pipes exit the ASHP due to physical constraints therefore must be installed as shown. A minimum of one electricity meter is required to measure the input electricity required to run the heat pump compressor and any other electrical input (ie for hot water boosting, evaporator fans etc) that has gone into the generated heat output. Potentially more than one electricity meter may be required.



T1 = Temperature Sensor Flow Pipe
T2 = Temperature Sensor Return Pipe
FM = Flow Meter
HM = Heat Meter Digital Calculator
EM = Electricity Meter

Illustration 8: ASHP unit using x2 heat meters and x1 electricity meters (an Alternative metering arrangements)

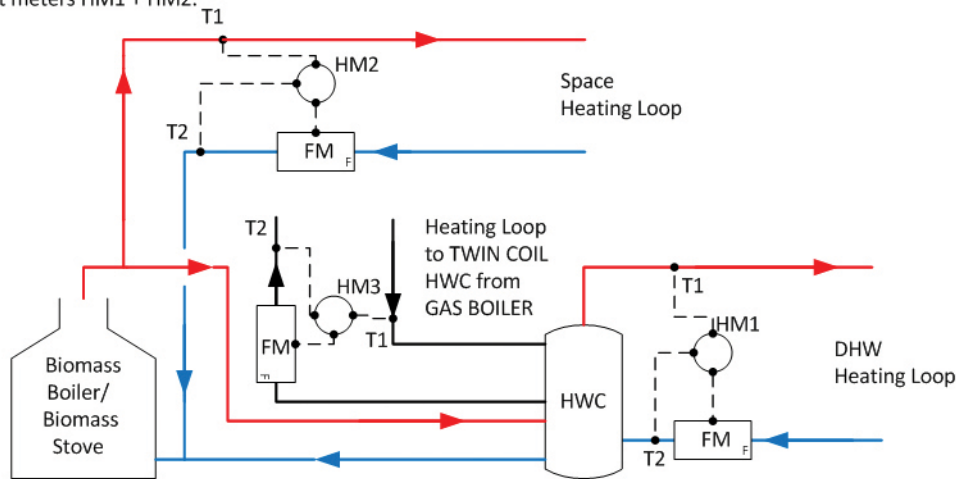
NOTE: One heat meter cannot be installed at the point that the pipes exit the ASHP due to physical constraints therefore must be installed as shown. One electricity meter is required to measure the input electricity required to run the heat pump compressor and any other electrical input plus given that the DHW cylinder has an additional electrical immersion heater it requires an additional electricity meter to record this electrical contribution to the metered heat output.



T1 = Temperature Sensor Flow Pipe
T2 = Temperature Sensor Return Pipe
FM = Flow Meter
HM = Heat Meter Digital Calculator
EM = Electricity Meter

Illustration 9: Biomass Installation using x3 heat meters (an Alternative Metering Arrangement)

NOTE: This 2-pipe biomass installation uses x1 flow pipe and x1 return pipe feeding a Space Heating and a DHW loop. Due to physical/ space constraints the meters cannot be installed where the pipes feed the heating loops and as such one of the meters must be installed after the DHW Cylinder. The hot water cylinder is a twin coil cylinder with a secondary hot water loop being fed from a gas boiler. This loop must be metered (using HM3) as per the alternative metering arrangements requirements to allow this figure to be subtracted from the total heat output figure calculated using heat meters HM1 + HM2.



- T1 = Temperature Sensor Flow Pipe
- T2 = Temperature Sensor Return Pipe
- FM = Flow Meter
- HM = Heat Meter Digital Calculator
- HWC = Hot Water Cylinder (Twin Coil)

Annexe 5 – Technical requirements for meters for the Domestic RHI

Heat meters:

Accuracy Requirements:

- Comply with the relevant requirements set out in Annex I to the 2004 Measuring Instruments Directive (MID);
- Comply with the specific requirements listed in Annex MI-004 of the MID;
- Fall within accuracy Class 3 or better* as defined in Annex MI-004 of the MID;

*Although the Domestic RHI Regulations specify that all heat meters must be of Class 3 accuracy or better, it should be noted that 'the better' option is definitely preferable. Class 2 heat meters are likely to last longer (ie past the end of the 7 years of payments) than Class 3 heat meters which may well need to be replaced after 5 years meaning the customer may have to pay for a second meter rather than just choosing to install a slightly more expensive meter (a Class 2 meter) at the outset.

Physical Requirements:

- a flow meter,
- a matched pair of temperature sensors; and
- a digital calculator

Meter Installation Advice:

These are areas that we'd like to highlight as having a significant impact upon meter readings and as such would recommend particular attention is given at installation:

- Correct installation of temperature sensors, including appropriate mounting to ensure good thermal contact with the thermal transfer fluid, appropriate insulation and sensor cables to be run independently of power cables to limit interference. Sensor cable lengths shall be compliant with manufacturer's guidance. Where sensor pockets are used then the manufacturer's thermal transfer compound shall be used if specified;
- Appropriate selection of heat meters (including consideration of the meter manufacturer's limit of operating temperature difference and sizing of the meter to suit the heating system's flow rate and pressure drop);
- Caution when fitting meters on the suction side of pumps. This should only be carried out in a manner that is compliant with heat meter manufacturer's instructions;
- Wiring of the heat meter calculator;
- Placement of heat meters so that the meter display is visible to the customer and easy to read.

Best Practice Heat Meter Installation Space Requirements:

These are purely 'best practice' or rule of thumb requirements; requirements set out in the manufacturer's requirements should be followed as closely as possible.

Pipe Diameter	Total length of straight pipework required in return pipe (mm)	Total length of straight pipework required in flow pipe (mm)
15	300	175
22	440	175
28	560	175
35	700	175
42	840	175

Electricity meters:**Accuracy Requirements:**

- Comply with the relevant requirements set out in Annex I to the 2004 Measuring Instruments Directive (MID);
- Comply with the specific requirements listed in Annex MI-003 of the MID;
- Fall within accuracy Class A or better as defined in Annex MI-003 of the MID;
- Must be installed by a competent, suitably qualified and registered person in accordance with industry standards and manufacturer's instructions, including with respect to safety requirements.

Gas meters (if required):**Accuracy Requirements:**

- Comply with the relevant requirements set out in Annex I to the 2004 Measuring Instruments Directive (MID);
- Comply with the specific requirements listed in Annex MI-002 of the MID;
- Fall within accuracy Class 1.5 or better as defined in Annex MI-002 of the MID;
- Must be installed by a competent, suitably qualified and registered person in accordance with the requirements of the Gas Safety (Installation and Use) Regulations 1998, industry standards and manufacturers' instructions, particularly with respect to safety requirements.

Oil meters (if required):

Accuracy Requirements:

- Comply with the relevant requirements set out in Annex I to the 2004 Measuring Instruments Directive (MID);
- Comply with the specific requirements listed in Annex MI-005 of the MID;
- Fall within accuracy Class 1 or better as defined in Annex MI-005 of the MID;
- Must be installed by a competent, suitably qualified and registered person in accordance with industry standards and manufacturer's instructions, including with respect to safety requirements

Solid Fuel Energy Outputs:

- See note on section 6.2 page 17 of the MCS Domestic RHI Metering Guidance

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