

Non-Domestic Renewable Heat Incentive (RHI)

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Easy guide to heat pumps

Background

Ground source, water source and air source heat pumps are eligible for Non-Domestic Renewable Heat Incentive (RHI) support. The RHI Regulations sets out the requirements related to the efficiency of heat pumps that need to be demonstrated at accreditation stage. There are also specific metering requirements for heat pumps. This document will explain the efficiency and metering requirements in relation to heat pumps. Please see our [RHI Guidance Volume 1](#) for other eligibility requirements.

If you have a ground or water source heat pump utilising a shared ground loop and have submitted (or plan to submit) an application to the RHI on or after 22 May 2018, please see our [Easy Guide to Shared Ground Loops](#) for more information.

Eligibility

Applications made before 28 May 2014

- Ground source and water source heat pumps are eligible for RHI support.
- Heat must be sourced from naturally occurring energy stored in the form of heat in the ground, including water in the ground, or surface water.

Applications made on or after 28 May 2014 and the plant first commissioned on or after 4 December 2013

- Air to water source heat pumps are eligible apart from the following exceptions:
 - those that are designed to provide cooling
 - those that are designed to use heat which has been expelled from a building or from a process which generates heat
- The following heat sources may be used by ground-source and water-source heat pumps in addition to using naturally-occurring energy:
 - solar energy gathered by any means (other than by a solar collector which is an accredited RHI installation) and is stored in the ground in the form of heat
 - heat from space cooling or process cooling heat from processes other than heat generation

Coefficient of performance and Seasonal Performance Factor for heat pumps

Coefficient of performance (COP)

COP is defined in the Regulations as ‘the ratio of the amount of heating or cooling in kilowatts provided by a heat pump to the kilowatts of power consumed by the heat pump’. COP is determined by laboratory testing at defined source and heat flow temperatures.

Seasonal Performance Factor (SPF)

SPF is defined in the Regulations as ‘in relation to an air source heat pump or a ground source heat pump, the ratio of its heat output to electricity input expressed as an average over a year’. A heat pump with a higher SPF will be more efficient and will deliver more heat for each unit of electricity used.

What is the difference between ‘design SPF’ and ‘SPF’?

Design SPF

The design SPF will be calculated by the installer or other appropriately qualified professional. It is the expected heat pump efficiency considering site-specific factors.

SPF

The actual SPF is based on quarterly electrical input and heat output measurements. All ground source, water source and air to water heat pump installations submitting applications from 28 May 2014 will need to measure the electrical input to the heat pump.

Electricity meter readings will need to be provided every quarter as part of your periodic data submission. You will not be required to carry out the SPF calculations yourself, this will be calculated automatically. You will not need to install any additional heat meters as part of this requirement.

Will the SPF measurements affect payments?

The design SPF is an eligibility requirement for accreditation and must be a minimum of 2.5. Ongoing measurement of SPF is for monitoring purposes only and will not affect RHI payments.

Minimum requirements

Requirement		Possible forms of evidence
COP	At least 2.9	COP confirmed by manufacturer’s datasheet at rated conditions.
Design SPF	At least 2.5	For installations of 45 kW or less, section 3b of the Installer Declaration should be completed by your installer. For installations greater than 45 kW, section 3a of the Installer Declaration should be completed by your installer and you will need to obtain the supporting calculations from your installer and keep these as they may be checked at accreditation stage or at audit.
SPF	No minimum requirement	Electricity meter readings to be provided on a quarterly basis.

How do I meter my electrical input?

Where the heat pump controller has the capability to log the electrical input this may be used. Alternatively appropriate electricity meter(s) may be installed. Electricity meters should be installed according to best industry practice. Your installer will be able to assist you with selecting appropriate meters.

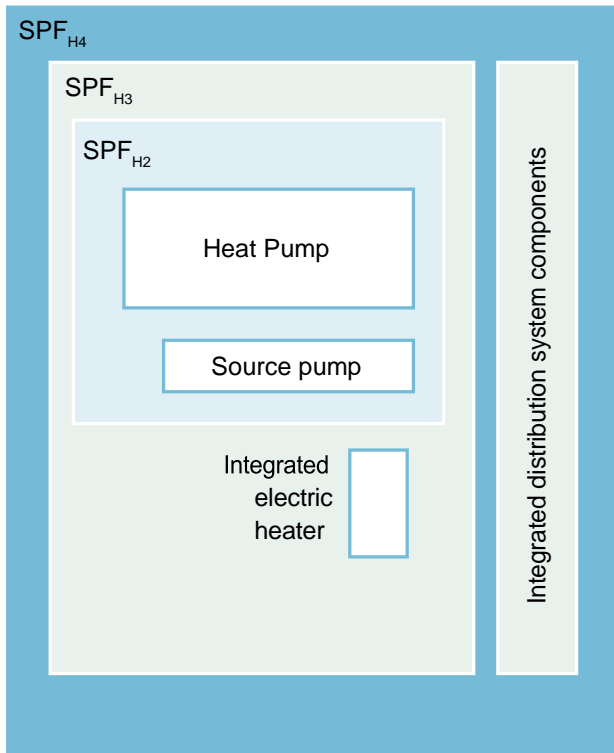
If the heat pump is capable of cooling, the measured electrical input should be for the heating function only, if this is not overly burdensome.

What to do for periodic data submissions

Each quarter, the kWh of electricity input to the equipment within the boundary will need to be recorded.

Measurement approach

We will need to know which components are included in your measurement of electricity consumption and heat output. To do this we will ask you to tell us which of these three common system boundaries reflect your heat pump arrangements.



- | SPF _{H2} |
|--|
| <ul style="list-style-type: none"> • heat pump unit • equipment required to make use of the source energy, e.g. pump or fan |
| SPF _{H3} |
| <ul style="list-style-type: none"> • heat pump unit • equipment required to make use of the source energy, e.g. pump or fan • integrated electric heater |
| SPF _{H4} |
| <ul style="list-style-type: none"> • heat pump unit • equipment required to make use of the source energy, e.g. pump or fan • integrated electric heater (if present) • internal distribution system components such as circulation pump and motorised valves. |

Heat pumps capable of cooling

Is my heat pump eligible?

Ground source and water source heat pumps that are capable of cooling are eligible technologies, though only heat generated is eligible for RHI support.

Air to water heat pumps that are capable of cooling are not an eligible technology.

What capacity should I enter on the RHI application form?

For heat pumps capable of cooling the capacity submitted must be the 'design heat load'. This is defined in the Regulations as "in relation to ground source heat pumps that are capable of heating and cooling, the heat flow required to achieve the planned heating requirements for that plant". In other words, the capacity of the heat pump associated to the heating function, and not including the cooling function.

Your installer should calculate your design heat load and enter this into section 2 of the [Installer Declaration](#). They should also provide you with the supporting calculations which you must retain as this may be checked at accreditation stage or at audit.

What do I need to prove?

You need to ensure that your metering arrangement will not be affected by the cooling function. You should write a statement at question HK120 of the RHI application form to explain how you will ensure the meters are not affected by the cooling function. You must then demonstrate this on your schematic by clearly distinguishing between the heating and the cooling circuits.

Additional information for heat pump applications made before 28 May 2014 or with a commissioning date before 4 December 2013

If your heat pump is capable of cooling and is going to be transferring heat back to the ground loop during a cooling cycle then some amount of this heat will be available for later use during heating operation. This must be deducted as it is not considered to be an eligible source of heat for applications made before 28 May 2014 or where the plant is first commissioned before 4 December 2013.

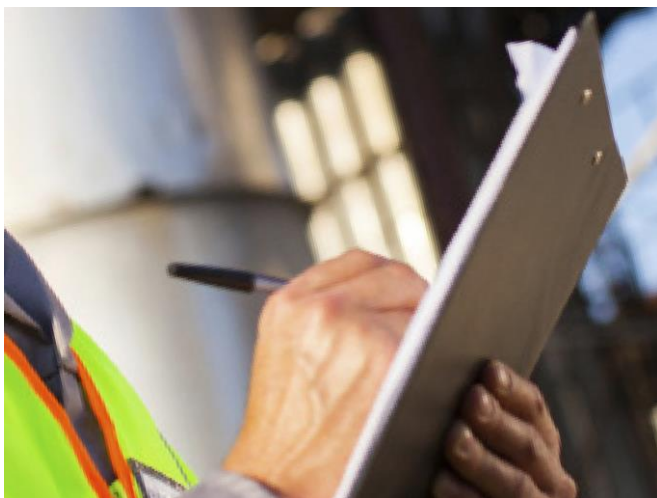
Integrated immersion heaters

Introduction

For the purpose of the Non-Domestic RHI, the term 'integrated immersion heater' refers to immersion heaters which are incorporated within the heat pump unit itself¹.

This section explains the additional requirements for RHI applicants resulting from the use of heat pumps with integrated immersion heaters. Text in bold refers to wording which will appear on the 'Renewable Heat Incentive Register'².

Heat pumps with integrated immersion heaters are not excluded from the RHI. However, the primary legislation which underpins the scheme³ only allows support for the 'renewable generation of heat'. Therefore, the heat generated by the integrated immersion heater must be appropriately accounted for. This heat will not be eligible for RHI payments. Due to the technically challenging nature of measuring this heat by means of a heat meter, alternative means of measuring the heat from the integrated immersion are considered acceptable. These are detailed below.



¹An immersion heater located within a hot water cylinder, or in-line heater in the central heating circuit / buffer, would not be considered 'integrated' for RHI purposes. Heat from such immersion heaters may be required to be metered dependent on the metering classification of the installation and heating system layout.

²The RHIIT system used for making applications to the scheme and submitting periodic data

³The Energy Act 2008, section 100.

⁴Monthly for installations with a capacity ≥ 1 MWth

⁵Kilowatt-electric

⁶Otherwise in this situation we may require you to make a conservative assumption that the maximum-rated immersion heater was in use at all times.

⁷Since 100% of the electrical energy provided to the immersion is assumed to be converted to heat energy.

How can I measure heat produced by an integrated immersion heater?

The principal two methods by which heat from an integrated immersion heater could be measured are:

1. Heat Pump Controller:

Where the heat pump control unit has the capability to log the number of hours the immersion heater is used in a given time period, the heat produced can be calculated by recording this 'total hours of immersion use' figure for the quarterly submission period⁴ and multiplying by the rating of the immersion in kW_e⁵ to represent the heat produced from the integrated immersion heater in kilowatt-hours (kWh).

Where a unit has more than one integrated immersion, with different ratings, the control unit would have to be able to log the number of hours each different immersion heater has been utilised in order to use this approach⁶. If this is not the case and you wish to use this approach please make contact with the RHI operational team.

2. CT Monitoring Coil

A 'clip on' current transformer (CT) monitoring coil connected to a kWh meter can be applied to the internal wiring for the immersion heater(s). This should be fitted by a qualified electrician or heat pump engineer in order to ensure this is undertaken safely and is located correctly.

The kWh figure measured by either of these methods will be used to represent the heat output from the integrated immersion⁷ for the quarterly periodic data submission period. You are welcome to propose an alternative methodology and we will consider these on a case by case basis. If you wish to propose an alternative approach, please make contact with us prior to submitting your application for accreditation.

N.B. CT monitoring coils are not required to be of any given standard or brand. Our only requirement is that they must be able to provide a kWh reading for the electrical input to the immersion heater(s).

What to do for periodic data submissions

Each quarter the kWh of heat provided by the integrated immersion heater will need to be calculated, in line with the approach outlined in your application, and submitted as part of your periodic data submission. This is made via the 'Renewable Heat Incentive Register'.

In completing this take account of the following instructions:

- The measured figure for heat produced from the integrated immersion heater should be provided within the 'Back-up heaters integral to the heat pump system' field.
- Subtract this figure from the metered heat from the heat pump installation for the quarterly periodic data submission period.
- Provide the result of this subtraction to the 'Heat generated by the installation' field. For complex installations where other plant supplying heat to the heating system have been metered, this subtraction should not be reflected in the 'Heat generated by all the plants supplying heat to the heating system' field.

Upon accreditation any specific requirements regarding the submission of periodic data will be communicated by Ofgem within your conditions of accreditation.



⁸This applies for simple or complex installations, which is only relevant to those who submitted their application before 24 September 2013.

Easy guides series

[Easy Guide to the Non-Domestic RHI](#)

[Easy Guide to Eligibility](#)

[Easy Guide to Applying](#)

[Easy Guide to Metering Requirements](#)

[Easy Guide to Compliance](#)

[Easy Guide to Periodic Data Submissions](#)

[Easy Guide to Sustainability](#)

[Easy Guide to Heat Pumps](#)

[Guide to Tariff Guarantees](#)

This Easy Guide is applicable to applicants and participants on the GB Non-Domestic scheme. If you're an applicant or participant on the Northern Ireland Non-Domestic scheme then please refer to the [Northern Ireland Renewable Heat Incentive](#).

Contact us

Help is at hand if you need it. Our enquiries staff are experts on the RHI and can help advise you.

Ofgem.gov.uk/RHI Telephone: 0300 003 2289 Email: rhi.enquiry@ofgem.gov.uk

RHI enquiry line open Monday to Thursday 9am-5pm and to 4.30pm on Fridays. Note: Calls may be recorded.