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Non Domestic Renewable Heat Incentive (RHI) Stakeholders

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Our response on heat meter eligibility in the Non-Domestic RHI scheme: heat meters with strap-on temperature sensors

This document summarises the key issues raised in response to Ofgem's consultation on the eligibility of heat meters with strap-on temperature sensors in the Non-Domestic Renewable Heat Incentive (RHI) scheme. We will also explain what our position is on the eligibility of these meters into the scheme.

We would like to thank all respondents for their considered and thoughtful feedback.

Consultation Process

On 14 July 2014, we opened a consultation process on the eligibility of heat meters with externally mounted temperature sensors (eg strap-on sensors) in the Non-Domestic RHI Scheme to meet the requirements of the Renewable Heat Incentive (RHI) Scheme Regulations 2011, as amended (RHI Regulations). We aimed to examine whether these temperature sensors provide sufficiently accurate measurements to satisfy the scheme requirements and outlined the standards[1] we currently seek from applicants. We invited comments on the applicability of these standards and/or any equivalent standard that could be applied to satisfy the RHI requirements for these sensors. Heat meter manufacturers, authors of independent report of metering arrangements (IRMA), consultants, and other interested parties were invited to comment on the consultation which closed on 14 August 2014. Eight respondents commented and provided feedback to the consultation. The responses received varied from a range of stakeholders, comprising:

- four consultants/installers that have interactions with the process of application for accreditation to the Non Domestic RHI Scheme,
- two applicants to the Non domestic RHI Scheme with externally mounted temperature sensors and
- two heat meter manufacturers (including a heat meter manufacturer which supplies externally mounted temperature sensors as part of its product portfolio).

[1] We indicated in the consultation letter that, to satisfy the relevant requirements of the RHI Regulations for heat meters (including heat meters with externally mounted temperature sensors), we seek evidence from applicants that satisfy the standards in EN 1434: 2007 Heat Meters; OIML R75, or an equivalent standard or test (approved by a notified body in the form of a MID EC Type (or Design) examination certificate for Annex B (MI-004) under the MID).

The consultation explained the **current standards** that are applied to heat meters to assess whether they comply with the scheme requirements (eg Class 2 heat meter as defined in the RHI Regulations). It welcomed comments on the applicability of the current standards to assess the eligibility of externally mounted temperature sensors in the Non-Domestic RHI scheme. We summarise stakeholder responses to the consultation in **Annex 1**: "*Summary of Responses to the consultation"* of this document and further details regarding Ofgem's actions in response to the consultation are found in **Annex 2**: *"Ofgem's response to the consultation*". The main outcomes of the response to the consultation are described below.

Response to the consultation

In line with the responses from stakeholders to the consultation (Annex 1), and due to the technical complexity of the metrological issues raised, we commissioned an independent technical report from the National Measurement Office (NMO)[2]. We had also considered commissioning laboratory testing, as we noted in the consultation letter. However, this was not required as the responses to the consultation and the independent report commissioned from the National Measurement Office have enabled us to address the question of eligibility of heat meters with externally mounted temperature sensors on the Non-Domestic RHI scheme.

In light of this evidence, **Ofgem can confirm that**:

- Ofgem's role is to administer the RHI Regulations. The Department of Energy and Climate Change (DECC) develops the policy framework and supporting legislation. We are sharing the results of this consultation with DECC, but as the administrator we will continue to assess the eligibility of heat meters with the requirements of the Renewable Heat Incentive Scheme Regulations 2011, as amended (RHI Regulations).
- The standards EN 1434[3] and OIML R75[4] do not cover the use of externally mounted temperature sensors and so cannot be used to assess the conformity of externally mounted temperature sensors with the MID.
- To demonstrate that an externally mounted temperature sensor complies with MI-004 of the MID and RHI requirements, a manufacturer or authorised representative would need to undertake the appropriate conformity assessment procedure(s) of the MID, conducted by, or under the supervision of, a Notified Body such as the National Measurement Office in the UK (or an equivalent in another member State). Those procedures are B + D, B + F or H1, where B is EC Type Examination, D is Declaration of Conformity to Type based on Quality Assurance of the Production Process (colloquially known as 'self-verification'), F is Declaration of Conformity based on Product Verification, and H1 is Declaration of Conformity based on Full Quality Assurance plus Design Examination.
- We expect that after successful completion of the conformity assessment procedure(s) a heat meter manufacturer intending to use externally mounted temperature sensors would be issued with either i) a MID EC Type (or design) Examination Certificate for the externally mounted temperature sensor sub-assembly of the heat meter, or ii) a MID EC Type (or design) Examination Certificate for the

[2]**National Measurement Office (NMO)**. The National Measurement Office (NMO) is an Executive Agency of the Department for Business, Innovation and Skills with responsibility for the regulation of the majority of weighing and measuring instrument used in legally controlled applications. NMO also operates as a Notified Body providing a range of conformity assessment activities under the Measuring Instruments Directive (MID), 2004/22/EC, and is also the UK Issuing Authority for OIML Certificates of Conformity.
[3] EN 1434 Parts 1 to 5: 2007 Heat Meters: http://www.en-standard.eu/
[4] OIML R75 Parts 1, 2 and 3: http://www.oiml.org/en/files/pdf

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whole meter (including the flow sensor, calculator and the externally mounted temperature sensors) by a Notified Body.

At this stage, we have not received evidence which satisfies us that heat meters with externally mounted sensors (eg strap-on sensors) meet the requirements of the RHI Regulations.

Next steps

To satisfy us that a meter with externally mounted temperature sensors is eligible for the RHI, we need evidence of conformity assessment procedures demonstrating compliance with the MID have been done by, or under the supervision by, a Notified Body (such as the NMO in the UK) in the form of a MID EC type (or design) examination certificate as above.

On this basis, **we cannot accredit installations using meters with externally mounted temperature sensors (eg strap on sensors),** because they are not MID compliant, **unless appropriate independent evidence** (meeting the requirements set out above and detailed further in Annex 2 of this document) is provided to demonstrate that they are compliant.

We will contact current applicants individually with the options available to them to progress their applications for accreditation.

We are aware that some current participants in the scheme have installed externally mounted temperature sensors. We are expecting to conduct further investigations that may lead us to consider measures in the future to mitigate meter inaccuracy on such accredited installations. We intend to contact these participants to advise them of the current position.

Please address any queries regarding this document to James Woods-Segura (**james.woods-segura@ofgem.gov.uk**) in the first instance.

Yours faithfully

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Annex 1. Summary of responses to the consultation

Ofgem have received 8 responses to the consultation addressing a range of different questions about using externally mounted temperature sensors in the Non-Domestic RHI scheme[5]. We have found that the respondents commented in 4 main categories.

- **Applicability of the Measuring Instruments Directive (MID) and EN 1434 and OIML R75 standards** to assess the eligibility of heat meters in the RHI scheme.

    - Two respondents (an affected applicant and a heat meter manufacturer with strap on sensors in its product portfolio) raised questions on why the MID is used in UK for heat meters and commented on the requirements of EN 1434.They suggested that use of the MID fell outside of UK law, and that the Weights and Measures Act applied instead.
    - These two respondents stated that the MID does not have installation requirements for heat meters (and/or sub-assemblies) and that it does not prohibit the use of externally mounted temperature sensors. They commented that the standard used to test heat meters within the MID is the EN 1434 and that this standard allows the use of temperature sensors for mounting with or without pockets. However, other responses stated that EN 1434 is applicable to analogue devices only and that digital technology is not covered by this standard.
    - The heat meter manufacturer with strap-on sensors in its product portfolio commented on the better accuracy and reliability of digital sensors when compared with analogue sensors, and stated that the National Measurement Office confirmed verbally that no test procedure is in place to test digital sensors.
    - The affected applicant asserted that Ofgem's guidance allows for strap-on temperature sensors to be accepted onto the RHI scheme accompanied by a manufacturer's certificate of conformity and without the supervision of a Notified Body.
    - Another respondent (a different heat meter manufacturer) stated that strap-on temperature sensors are not MID-approved and that they are not EN 1434-compliant.

- **Accuracy of externally mounted sensors.** Seven respondents commented on the accuracy of externally mounted sensors.

    - Five respondents indicated that at present (and in its current version) there is little chance of externally mounted temperature sensors being accurate within the MID requirements. This is due to different factors such as:
        - the externally mounted temperature sensor not measuring the actual temperature of the flow;
        - variability of the results, inconsistency in the installation of the temperature sensors;
        - poor adherence to the pipe;
        - the impact on accuracy from external heat sources; and
        - issues with the speed of response to changing fluid temperature.

[5] Where responses were not requested to be kept private, they are available on our website: https://www.ofgem.gov.uk/publications-and-updates/non-domestic-rhi-consultation-heat-meters-strap-temperature-sensors

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- Another respondent commented that accuracy could be achieved with strap-on temperature sensors, however, this would require significant logical open-source calculations to be performed.
- Another respondent stated that having carried out basic tests to compare external sensors with immersion sensors, the accuracy of the external sensors was not very good.
- Two respondents suggested that strap-on sensors should be considered accurate and that digital technology is highly accurate and reliable when compared with analogue technology. In line with this response, they confirmed that Ofgem has been supplied by a heat meter manufacturer with explanations of methods of calibration for strap on sensors and how this meets the MID standards.

- **Robustness against tampering of externally mounted sensors.** Two respondents commented on the possibility for these sensors to be tampered with. One respondent indicated concern with the security seal sticker supplied with strap-on temperature sensors, suggesting that the security seal can be easily removed and replaced. The other suggested that only immersion temperature sensors should be used due to accuracy and the possibility of tampering with external temperature sensors.

- **Ofgem handling process for accreditation of applications with externally mounted sensors**. Three respondents (comprising two affected applicants and a heat meter manufacturer) commented on how Ofgem has handled applications with externally mounted temperature sensors. The three respondents commented that the approach that Ofgem has taken to handle this issue has been inconsistent and that we have not acted with transparency. Two of the respondents stated that we have not followed our guidance and that we have accepted the certificate of conformity from the manufacturer as proof of compliance for strap-on sensors in some cases, but not in others. They also stated that Ofgem did not engage with heat meter manufacturers on this issue.

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Annex 2. Ofgem's response to the consultation

This section provides a response to the consultation following consideration of the points raised by respondents, providing a summary of our position with regards to the eligibility of meters using externally mounted sensors in the Non-Domestic RHI scheme.

1. Applicability of the Measuring Instruments Directive (MID) for heat meters in the Non-Domestic RHI (including those with externally mounted temperature sensors)

We cannot act beyond the scope of the powers provided in the RHI Regulations. Under the RHI Regulations, all installations are required to have a class 2 heat meter.

The RHI regulations defines "class 2 heat meter" as a heat meter which

a) complies with the relevant requirements set out in Annex 1 to the Measuring Instruments Directive,
b) complies with the specific requirements listed in Annex MI-004 to that Directive, and
c) falls within accuracy class 2 as defined in Annex MI-004 to that Directive.

Our role is to administer the RHI Regulations. The Department of Energy and Climate Change (DECC) develops the policy framework and supporting legislation. This means we cannot comment on government policy and we will assess the eligibility of heat meters against the requirements of the RHI Regulations.

In our role as administrators of the RHI Scheme, we are responsible for publishing guidance, including on our approach to ensuring compliance with the RHI eligibility requirements. Our current RHI Guidance Volume One[6] (paragraphs 13.17-13.25 refer) provides general guidance on the information that may be supplied when applying for accreditation to satisfy the Class 2 heat meter eligibility requirements, but we have not previously provided any specific guidance relating to meters with externally mounted temperature sensors.[7] In all cases, when considering an application to the scheme, we have an obligation to ensure that all heat meters meet the relevant requirements under the Regulations. Where we do not have sufficient evidence to satisfy us about the eligibility of a particular installation, we may ask for more information from the applicant to demonstrate that the eligibility criteria has been met. In addition to publishing the outcomes of this consultation here, we will also update our external Guidance in due course.

2. Applicability of the EN1434 and OIML R75 to assess eligibility of heat meters.

Due to the technical nature of the issues raised in the responses to the consultation, we asked the National Measurement Office (NMO) for an independent external report on the applicability of the standards "***EN 1434: Heat Meters Part 1 to 5***" and "***OIML R75***" and other ways to demonstrate the eligibility of heat meters into the Non-Domestic RHI scheme. This report is published alongside the responses to the consultation, at:

https://www.ofgem.gov.uk/ofgem-publications/90820/nmoreportfinalversion.pdf

[6] https://www.ofgem.gov.uk/publications-and-updates/guidance-volume-one-two-and-fuel-measurement-and-sampling-guidance.

[7] For heat meters used for RHI purposes, we have also previously indicated that a copy of the manufacturer's declaration of conformity could be used as one form of evidence we may consider. However, we also set out that we may, where appropriate, request other certificates (for example, Volume One, paragraph 13.22 refers).

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2.1 Evidence to demonstrate eligibility of heat meters in the Non-Domestic RHI scheme

As set out in the independent report commissioned from the National Measurement Office (NMO), in order to determine that any meter would meet the test of a "class 2 heat meter" as defined in regulation 2 of the RHI Regulations 2011 as amended, and the MID, NMO would expect the following information to be provided:

- A copy of a valid MID EC Type (or Design) Examination Certificate for the meter (or all of the sub-assemblies) issued by a Notified Body, or
- A copy of a valid EEC Type Examination certificate for the meter (or all of the sub-assemblies), or
- A copy of a valid OIML R75 Certificate of Conformity issued by NMO (or any other body with issuing authority for OIML R75), or
- A copy of a test report and checklist, issued by a UKAS[8] (or equivalent) accredited test laboratory[9], in accordance with the applicable parts of EN 1434.

These information requirements would apply to any meter, either a compact meter manufactured as a single unit, or to a meter comprising sub-assemblies that include a flow sensor, integrator, and a matched pair of temperature sensors. Our guidance states that we may request a copy of any of the certificates mentioned above, where appropriate, for any heat meter used for RHI purposes.

2.2 Applicability of standards for heat meters with externally mounted temperature sensors.

The National Measurement Office has confirmed that:

- the way of installing these sensors (eg externally mounted) is not covered by EN 1434 and when reference is made in OIML R75 to "with or without pockets" that this is referring to either "in the direct flow" (without pocket) or mounted in a pocket
- EN 1434 and OIML R75 do not cover the use of strap-on temperature sensors, however conformity to the essential requirements of the MID can be demonstrated by other means
- to demonstrate compliance with MI-004 of the MID (and RHI requirements) a manufacturer (either within the UK or the rest of the EU) would need to undertake the appropriate conformity assessment procedure(s)[10]. These conformity assessment activities need to be conducted by, or under the supervision of, a Notified Body such as NMO (or an equivalent in another member State).

Regardless of the technology (eg analogue or digital) and type of meter used we have an obligation under the RHI Regulations to ensure that all heat meters meet the relevant requirements under the Regulations.

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[8] UKAS, the United Kingdom Accreditation Service, is currently the sole national accreditation body recognized by government to assess, against internationally agreed standards, organizations that provide certification, testing, inspection and calibration services.

[9] **Accredited test laboratory.** The test house should have accreditation to ISO 17025 by UKAS (or an equivalent Accreditation Body that has signed the ILAC MRA), with the scope of the accreditation covering the testing of heat meters in accordance with the applicable standard (EN 1434)

[10] These are B + D, B + F or H1, where B is EC Type Examination, D is Declaration of Conformity to Type based on Quality Assurance of the Production Process (colloquially known as 'self-verification'), F is Declaration of Conformity based on Product Verification and H1 is Declaration of Conformity based on Full Quality Assurance plus Design Examination

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2.3 Evidence received by Ofgem

At this stage we have not received evidence in the form of:

- a MID EC Type (or design) Examination Certificate for the externally mounted temperature sensor sub-assembly of the heat meter, or
- a MID EC Type (or design) Examination Certificate for the whole meter (including the flow sensor, calculator and the externally mounted temperature sensors)

that could demonstrate that a heat meter with externally mounted sensors meet the MID requirements. We continue to welcome such evidence, meeting the requirements set out above, as may be provided in support of an application to the scheme.

3. Accuracy and robustness against tampering of externally mounted sensors

Most of the responses from stakeholders questioned the accuracy of externally mounted temperature sensors to meet the accuracy levels of the MID due to installation factors, and the fact that the temperature sensor is not installed inside the pipe and will therefore not measure the actual temperature of the flow. Two responses recognised the possibility for external mounted sensors to be tampered with.

These responses are supported by the report from the National Measurement Office, which summarises the main factors to consider for an external mounted sensors to meet the requirements of the MID:

- **Temperature sensor installation**: The bonding/contact of the temperature sensor to the pipe. How the consistency is ensured in the installation of the temperature sensor.
- **Outside influences**: What effects will outside temperature sources have on the sensors, positioning near heaters or boilers may affect readings.
- **Risk of fraud**: With exposed sensors these could easily be influenced by outside temperature sources.
- **Sealing of temperature sensors:** These would be required to be sealed in position.

Responses in support of the accuracy of externally mounted temperature sensors did not provide any evidence of the kind outlined in section 2.1 supporting the accuracy of these sensors.

4. Our handling process for accreditation of applications with externally mounted sensors

We have a duty to operate within our legal powers and duties. In considering each accreditation application, we must be satisfied that the RHI Regulations requirements are met before we can accredit an installation onto the RHI scheme. If we do not have sufficient evidence to satisfy us about a particular eligibility, we may ask for more information from the applicant. The Regulations are framed in relation to the owner of the installation applying for accreditation so we seek evidence from them, as applicants, rather than directly from the manufacturers of the meters they have used. The accreditation application process is ongoing until we make a decision to approve or reject an application and during this process we are obliged to make enquiries into any information that raises eligibility issues.

We have an obligation under the RHI Regulations to ensure that, in relation to applications, all heat meters meet the requirements under the regulations regardless of the technology (digital or analogue) and type of meter used. We have to administer the RHI scheme in line with the RHI Regulations and so we must make sure metering eligibility requirements as

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set out in the RHI Regulations are met before accrediting an installation. We do not have statutory powers to accredit any installation that does not meet the eligibility criteria.

Each application for accreditation is considered on its merits, and we cannot discuss details of any individual application other than with the applicant. Our enquiries on externally mounted sensors (eg strap on temperature sensors) are ongoing for all current applicants.

We have current participants in the scheme that may have installed externally mounted temperature sensors. We intend to contact these participants to advise them of the current position as set out in this document regarding our approach to meters with externally mounted temperature sensors. We note also that this approach will apply to any situation where we are assessing the eligibility of a heat meter. We will also advise that we are expecting to conduct further investigations into the accuracy of externally mounted temperature sensors, and depending on the outcomes of that investigation, we may need to consider measures in the future to mitigate meter inaccuracy.

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