Triple E Eligibility Criteria

***Category:* Refrigeration and Cooling**

***Technology:* Heat Pumps**

Heat Pumps are defined as equipment that is designed to transfer heat from a heat source (such as ground, water or ambient air) to a heat sink (such as indoor air or a water-based heating system) using a refrigeration system.

Heat Pump equipment is considered to include the following:

- **Air-source Heat Pumps**

Air-to-Water heat pumps are products that are specifically designed to transfer heat from the air outside a building to a water-based heating system by means of an electrically driven refrigeration system. Such heat pumps may also provide cooling by reversing the direction of the refrigerant flow. Air-to-water heat pumps can be split[1] or packaged units[2]

Air–to-Air heat pumps are products that are specifically designed to transfer heat from the air outside a building to the air inside a building by means of an electrically driven or gas-fired internal combustion engine refrigeration system. Such heat pumps may also provide cooling by reversing the direction of the refrigerant flow. Air-to-water heat pumps can be split[1] or packaged units[2]. Air-to-Air heat pumps can also incorporate variable refrigerant flow (VRF) which is where the flow of refrigerant is automatically adjusted so that the heat delivered is matched to the demand.

- **Ground Source Heat Pumps**

Brine-to-Water heat pumps are products that are specifically designed to transfer heat from the ground to a water-based heating system by means of an electrically-operated refrigeration system. The heat is collected from the ground by circulating a solution of water and anti-freeze (known as 'brine') through a buried, closed-loop, ground heat exchanger. Such heat pumps may also provide cooling by reversing the direction of the refrigerant flow.

- **Water-Source Heat Pumps**

Are products that are specifically designed to transfer heat from water (in an internal water loop) into the air within the space to be heated by means of an electrically-operated refrigeration system. Such heat pumps may also provide cooling by reversing the direction of the refrigerant flow. Water-source heat pumps can also incorporate variable refrigerant flow (VRF) and are designed to automatically adjust the flow of refrigerant so that the heat delivered is matched to the demand.

[1] **Split type** heat pumps have separate heat collection and rejection units for each space known as 'indoor' and 'outdoor' units. The 'indoor'and 'outdoor'units are specifically designed to be connected together during installation by refrigerant pipe work to form a single functional unit.

[1] **Packaged type** heat pumps are single factory assembled units that incorporate all the elements of the refrigeration system and air distribution mechanisms for space heating.

- **Heat Pump Dehumidifiers**

Heat pump dehumidifiers are products that are specifically designed to remove water vapour from moist air using an electrically driven refrigeration system. They re-circulate the indoor moist air over the evaporator of the refrigeration system which cools the air and causes the water vapour in the air to condense. The resulting condensate is then drained away. These high efficiency products recover both sensible and latent heat released during dehumidification, and use it to heat the air as it leaves the product or for other useful purposes, such as water heating.

Eligibility Criteria Overview

In order to be included on the Triple E Product Register*, the specific Heat Pumps equipment must meet all of the relevant requirements set out below.

Note: *Supporting documentation that clearly demonstrates Triple E compliance according to the conditions below will be required as part of the Triple E checking process. Detailed information on the types of documents accepted can be found in the separate Supporting Documentation guidelines.*

*known as the specified list as per the Finance Act

General Eligibility Criteria

(Applicable to all Heat Pump equipment)

No.	Condition
1.	All equipment and/or components must be CE marked as required by the specific EU directive(s).
2.	All heat pumps must be designed for, and include fittings for permanent installation.

Air-Source & Water-Source Heat Pump specific Eligibility Criteria

(To be met in addition to the general eligibility criteria)

No.	Condition
3.	Incorporate an electrically or gas-fired internal combustion engine-driven refrigeration system
4.	Meet the performance criteria set out in Table 1 below for: •Coefficient of Performance (COP) across the range of connected capacities and including 100% (full) load in heating mode. •Energy Efficiency Ratio (EER) across the range of connected capacities and including 100% (full) load in cooling mode, where the product is designed to provide cooling

Ground-Source Heat Pump specific Eligibility Criteria

(To be met in addition to the general eligibility criteria)

No.	Condition
5.	Incorporate an electrically or gas-fired internal combustion engine-driven refrigeration system
6.	Be designed to use an indirect, closed-loop ground heat exchanger.

7.	Meet the performance criteria set out in Table 1 below for: ●Coefficient of Performance (COP) across the range of connected capacities and including 100% (full) load in heating mode. ●Energy Efficiency Ratio (EER) across the range of connected capacities and including 100% (full) load in cooling mode, where the product is designed to provide cooling

Heat Pump Dehumidifiers specific Eligibility Criteria
(To be met in addition to the general eligibility criteria)

No.	Condition
8.	Incorporate an electrically driven refrigeration system that is designed to remove water vapour from the surrounding atmosphere, as the air is recirculated through the product.
9.	Recover both sensible and latent heat released during dehumidification, and use it to heat the air as it leaves the product and/or for other useful purposes (such as water heating).
10.	Incorporate a control system that monitors the relative humidity of the surrounding atmosphere, and automatically switches off dehumidification, or modulates the rate of dehumidification, when the relative humidity falls below a preset value.
11.	Have a dehumidification capacity that is greater than or equal to (≥) 0.625 litres per hour.
12.	**Not** be designed to be connected to compressed air systems.
13.	Have a dehumidification efficiency ratio (DER) equal to or greater than the thresholds set out in Table 2 below, which depend on the dehumidification capacity (C) of the product.

Table 1: Performance thresholds for Heat Pumps

Product Category	Heating mode (COP)	Cooling mode (EER)
Air Source		
Air-to-water	> 4.00	> 3.10
Air-to-Air packaged	> 3.20	> 2.80
Air-to-Air split and multi-split	> 3.70	> 3.30
Air-to-Air gas engine driven (GED)	> 1.30	> 1.10
Ground Source		
Brine-to-water heat pumps	> 4.00	> 3.20
Water Source		
Split and multi-split heat pumps	> 4.10	> 3.50

Table 2: Performance test points for Heat pump dehumidifiers

Dehumidification capacity (C) (Litres/hour)	Dehumidification efficiency ratio (DER) (Litres/kWh)
≥ 0.625 and < 1.5	≥ 1.40
≥ 1.5 and < 2.3	≥ 1.80
≥ 2.3	≥ 2.30

Notes:

Energy Efficiency Ratio (EER) in the context of heat pumps is an index used to indicate the efficiency of the equipment in cooling mode and is calculated as follows:

$$EER = \frac{\text{Net cooling capacity (kW)}}{\text{Effective power input (kW)}}$$

Coefficient of Performance (COP) in the context of heat pumps is an index used to indicate the efficiency of the equipment in heating mode and is calculated as follows:

$$COP = \frac{\text{Net heating capacity (kW)}}{\text{Effective power input (kW)}}$$

For the avoidance of doubt test data should be presented to two decimal places.
As an example, in Table 1: Air-to-water heat pump with a heating mode COP of 4.00 would be deemed to be a fail.

---------- End of Triple E eligibility criteria ----------

Please see next section for technical detail submission and supporting documentation guidance

The following information is not part of the official criteria document published within the relevant statutory Instrument; it has been added here for guidance purposes only in order to provide assistance with the submission of product details and the provision of the required supporting documentation.

Note: *All information contained within this guidance document is subject to change without notice.*

Technical information required in product submission

The following are the specific technical values required as part of the product submission for this technology:

Heat Pumps product type

As part of the product submission you must first select which type of Heat Pump your product is. Only one type can be chosen per product.

Thermal capacity

The thermal capacity in kW of the heat pump product is required as a value for the product submission. It must be entered as whole number only (do not include kW symbol). There should also be no spaces or full stops after the number submitted.

COP and EER

The COP (and EER where applicable) for the product is required as a value for the product submission. It must be entered as number only without units. There should also be no spaces or full stops after the number submitted. The figure must comply with the criteria requirements for minimum COP and EER values.

Supporting documentation required

Described below is the list of documents that are accepted as proof of compliance for the Heat Pumps Equipment condition.

Note: This information will only be requested AFTER you submit your product's basic details online

Important Notes to Product Providers
Please ensure that you read the "Important Notes to Product Providers" section at the end of this document prior to submitting documentation.

General Conditions

(Applicable to all Refrigeration and Cooling: Heat Pump equipment)

No.	Condition	Supporting Documentation Requirement
1.	All equipment and/or components must be CE-marked as required by the specific EU directive(s).	Official and published manufacturer's technical data sheet or brochure that demonstrates CE-marking compliance. **OR** A copy of an official signed declaration on headed paper which confirms CE-marking compliance. Official declarations should explicitly state the product for which CE-marking is being confirmed (i.e. do not provide a letter simply stating general compliance with the relevant Triple E Condition). Where a document is used to demonstrate conformance for a number of products or range of products it should clearly specify each individual product covered by that document.
2.	All heat pumps must be designed for, and include fittings for, permanent installation.	Official and published manufacturer's technical data sheet or brochure that demonstrates compliance with the requirements of the condition.

Air-Source & Ground Source Brine-to-water & Water source Heat Pumps specific Eligibility Criteria

(To be met in addition to the general eligibility criteria)

<table>
<tr><th>No.</th><th>Condition</th><th>Supporting Documentation Requirement</th></tr>
<tr><td>3.</td><td>Incorporate a gas or electrically-driven refrigeration system.</td><td>Official and published manufacturer's technical data sheet or brochure that demonstrates compliance with the requirements of the condition.</td></tr>
<tr><td>4.</td><td>Meet the performance criteria set out in Table 1 for:

•Coefficient of Performance (COP) across the range of connected capacities and including 100% (full) load in heating mode.

•Energy Efficiency Ratio (EER) across the range of connected capacities and including 100% (full) load in cooling mode, where the product is designed to provide cooling.</td><td>Accredited certification that the equipment COP/EER values have been obtained by testing according to the named standard.
<u>OR</u>
Evidence of official testing by manufacturer or independent test lab carried out according to the principles outlined in the named standard. Test reports should be of the format described in the 'Important notes to Product Providers' section of this document.
See note on 'Scientific Equivalence' in the Important notes to Product Providers section of this document.

Electrically Driven Heat Pumps:
All products must be tested in accordance with the procedures laid down in the following standard:
• EN 14511:2007 (or EN 14511:2004). Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling

The standard rating conditions are set out in the Table below.
<table>
<tr><th>Product Category</th><th>Heating mode (COP)</th><th>Cooling mode (EER)</th></tr>
<tr><td colspan="3">• Air Source:</td></tr>
<tr><td>Air-to-Water</td><td>EN 14511-2:2007 Table 9 Standard rating conditions, Outdoor air (for floor heating or similar application)</td><td>EN 14511-2:2007 Table 10 Standard rating conditions, water (for floor cooling or similar application)</td></tr>
<tr><td>Air-to-Air packaged, single split VRF & single split non VRF</td><td>EN 14511-2:2007 Table 3 Standard rating Conditions, Outside air/recycled air</td><td>EN 14511-2:2007 Table 4 Standard rating Conditions, Comfort Outside air/recycled air</td></tr>
<tr><td>Air-to-Air dual and multi-split VRF & non VRF</td><td>EN 14511-2:2007 Table 13 Standard rating Conditions.</td><td>EN 14511-2:2007 Table 14 Standard rating Conditions.</td></tr>
<tr><td colspan="3">• Water Source:</td></tr>
<tr><td>Single split VRF and non-VRF</td><td>EN 14511-2:2007 Table 5 Standard rating Conditions, Water loop.</td><td>EN 14511-2:2007 Table 6 Standard rating Conditions, Comfort.</td></tr>
<tr><td>Dual and multi-split VRF and non VRF</td><td>EN 14511-2:2007 Table 16 Standard rating Conditions, Water loop.</td><td>EN 14511-2:2007 Table 17 Standard rating Conditions.</td></tr>
</table>
</td></tr>
</table>

Gas Engine Driven Heat Pumps:

All products must be tested in accordance with the procedures laid down in the following standards:

● JIS B 8627-1: 2006, —Gas engine driven heat pump air conditioners – Part 1 General requirements.

● JIS B 8627-2: 2000 —Gas engine driven heat pump air conditioners – Part 2: non-ducted gas engine driven heat pump air conditioners – Testing and rating for performance.

● JIS B 8627-3: 2000 —Gas engine driven heat pump air conditioners – Part 3: Ducted gas engine driven heat pump air conditioners – Testing and rating for performance

The standard rating conditions are set out in the Table below.

• **Air Source**		
Product Category	Heating mode (COP)	Cooling mode (EER)
Air-to Air: Split and Multi Split	JIS B 8627-1:2006 Table 1.1 Heating standard test	JIS B 8627-1:2006 Table 1.1 Cooling standard test

Notes

1. The heating standard test requires an entering air temperature on the indoor side of 20°C (Dry-bulb), and an entering air temperature on the outdoor side of 7°C (Dry-bulb) and 6°C (Wet bulb).
2. The cooling standard test required an entering air temperature on the indoor side of 27°C (Dry-bulb), and 19°C (Wet-bulb), an entering air temperature on the outdoor side of 35°C (Dry-bulb).

Ground-Source: Brine-to-Water Heat Pumps specific Eligibility Criteria

(To be met in addition to the general eligibility criteria)

<table>
<tr><th>No.</th><th>Condition</th><th>Supporting Documentation Requirement</th></tr>
<tr><td>5.</td><td>Incorporate an electrically-driven refrigeration system.</td><td>Official and published manufacturer's technical data sheet or brochure that demonstrates compliance with the requirements of the condition.</td></tr>
<tr><td>6..</td><td>Be designed to use an indirect, closed-loop ground heat exchanger.</td><td>Official and published manufacturer's technical data sheet or brochure that demonstrates compliance with the requirements of the condition.</td></tr>
<tr><td>7.</td><td>Meet the performance criteria set out in Table 1 for:

●Coefficient of Performance (COP) across the range of connected capacities and including 100% (full) load in heating mode.

●Energy Efficiency Ratio (EER) across the range of connected capacities and including 100% (full) load in cooling mode, where the product is designed to provide cooling.</td><td>Accredited certification that the equipment COP/EER values have been obtained by testing according to the named standard.
<u>OR</u>
Evidence of official testing by manufacturer or independent test lab carried out according to the principles outlined in the named standard. Test reports should be of the format described in the 'Important notes to Product Providers' section of this document.

See note on 'Scientific Equivalence' in the Important notes to Product Providers section of this document.

All products must be tested in accordance with the procedures laid down in the following standard:
• EN 14511:2007 (or EN 14511:2004). Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling

The standard rating conditions are set out in the Table below.
<table>
<tr><td colspan="3">• Ground Source</td></tr>
<tr><td>Product Category</td><td>Heating mode (COP)</td><td>Cooling mode (EER)</td></tr>
<tr><td>-Brine to Water</td><td>EN 14511-2:2007 Table 7 Standard rating Conditions, Brine (for floor heating or similar application)</td><td>EN 14511-2:2007 Table 8 Standard rating Conditions, Water to water and brine to water (for floor heating or similar application)</td></tr>
</table>
</td></tr>
</table>

Heat Pump Dehumidifiers specific Eligibility Criteria

(To be met in addition to the general eligibility criteria)

No.	Condition	Supporting Documentation Requirement
8.	**Either** be a single packaged unit **or** consist of two or more factory built sub-assemblies that are designed to be connected together during installation.	Official and published manufacturer's technical data sheet or brochure that demonstrates compliance with the requirements of the condition.
9.	Incorporate an electrically driven refrigeration system that is designed to remove water vapour from the surrounding atmosphere, as the air is recirculated through the product.	Official and published manufacturer's technical data sheet or brochure that demonstrates compliance with the requirements of the condition.
10.	Recover both sensible and latent heat released during dehumidification, and use it to heat the air as it leaves the product and/or for other useful purposes (such as water heating).	Official and published manufacturer's technical data sheet or brochure that demonstrates compliance with the requirements of the condition.
11..	Incorporate a control system that monitors the relative humidity of the surrounding atmosphere, and automatically switches off dehumidification, or modulates the rate of dehumidification, when the relative humidity falls below a preset value.	Official and published manufacturer's technical data sheet or brochure that demonstrates compliance with the requirements of the condition.
12.	Have a dehumidification capacity that is greater than or equal to (>=) 0.625 litres per hour.	Accredited certification that the equipment dehumidification capacity has been obtained by testing according to the named standard. **OR** Evidence of official testing by manufacturer or independent test lab carried out according to the principles outlined in the named standard. Test reports should be of the format described in the 'Important notes to Product Providers' section of this document. See note on 'Scientific Equivalence' in the Important notes to Product Providers section of this document. All products must be tested in accordance with the procedures laid down in EN 810:1997.- Dehumidifiers with electrically driven compressors The dehumidification capacity must be determined at the appropriate rating test conditions for the type of product (or intended application) as set out in Tables 2, 3 and 4 of EN 810:1997.
13.	**Not** be designed to be connected to compressed air systems.	Official and published manufacturer's technical data sheet or brochure that demonstrates compliance with the requirements of the condition.
14.	Have a dehumidification efficiency ratio (DER) equal to or greater than the thresholds set out in Table 2, which depend on the dehumidification capacity (C) of the product.	Accredited certification that the equipment DER value has been obtained by testing according to the named standard. **OR** Evidence of official testing by manufacturer or independent test lab carried out according to the principles outlined in the named standard. Test reports should be of the format described in the 'Important notes to Product Providers' section of this document.

		See note on 'Scientific Equivalence' in the Important notes to Product Providers section of this document. All products must be tested in accordance with the procedures laid down in EN 810:1997 - Dehumidifiers with electrically driven compressors The dehumidification efficiency ratio must be determined at an air inlet temperature of 27 degrees Centigrade (dry bulb) and 21 degrees Centigrade (wet bulb) and, where applicable, include the corrections for the power input of fans and water pumps specified in section 4.1 of EN 810:1997.

Important Notes to Product Providers

General

There should be a clear link between all supporting documentation supplied and the product being submitted. This will typically take the form of a product code or product name that can be cross referenced between the submitted product and relevant supporting documentation. If product codes / names have been changed since publication of the supporting documentation, then official evidence of this must be provided with the supporting documentation supplied.

Any deviation from these requirements will result in the supporting documentation not being considered adequate for the purposes of demonstrating compliance with the criteria conditions. This will in turn delay the submission and/or result in the product not being considered eligible.

Where the Triple E criteria or help documentation reference compliance to appropriate rather than specific standards, the onus is on the product provider to ensure that supporting documentation supplied references recognised standards that apply to the submitted product, i.e. the product must be covered under the scope of a recognised standard.

If any product submitted is later found not to meet the performance or specification criteria, then this product will cease to be considered eligible for the Triple E.

Note: When supplying the supporting documentation through the online process you must ensure that the correct page number(s) of the document is referenced when compliance with the relevant condition is being demonstrated. An explanatory note should also be given where more than one page number is referenced.

Test Report

A test report must comprise of the following elements:
An outline of the complete test including introduction, details on test conditions, the specific model details of the product tested, the steps taken in the test, the results, graphical representations, and a conclusion. All documents should be on headed paper and the document should be officially signed-off. **All documentation must be in English**, or include adequate translation.

Certification

Where certificates are provided, all tests must be carried out by an organisation that is accredited by a national accreditation body recognised via the European Cooperation for Accreditation (preferred) or the International Accreditation Forum. **All documentation must be in English**, or include adequate translation.

Scientific Equivalence

Some Triple E criteria conditions allow for scientifically equivalent tests and/or standards to be used. In the event that a product has not been designed, manufactured or tested to the specific standard named, then documentation relating to an equivalent internationally recognised standard may be used (where the phrase 'Or scientific equivalent' is included in the Triple E condition or help documentation). In such applications, the onus will be on the product submitter to demonstrate satisfactory equivalence of the standards. However, submissions which reference such supporting documentation may take longer to process, and if

the product provider does not provide satisfactory evidence of equivalence, then the product will not be considered eligible for the Triple E. **All documentation must be in English**, or include adequate translation.

Note: Where specific standards are cited in a condition or in the Triple E help documentation, then documentation demonstrating that the relevant products have been designed, manufactured or tested to these specific standards is preferred. Scientific equivalence is considered the exception rather than the norm.

Representative testing

Where test information is required for a range of technically similar products (e.g. configurations of one base product) then in exceptional instances a form of representative testing may be utilised once agreed in advance with SEAI. Such testing is where only representative products are tested from a technically similar group or range of products. Provided a clear correlation can be demonstrated between the tested product and technically similar non-tested product, and that such a correlation clearly demonstrates the compliance of the non-tested product, representative testing may form an acceptable basis for supporting documentation.

Note: Where representative testing is used for a group or range of products, if the tested or representative product is removed from the list of eligible products then all related products are also removed.