

Accelerated Capital Allowances Eligibility Criteria

Category: Refrigeration and Cooling Systems

***Technology:* Refrigeration System Controls**

Refrigeration System Controls are defined as equipment that controls and optimises the temperatures and pressures in a refrigeration system, and automatically adjusts the refrigeration system's operation to minimise its energy consumption, while maintaining within predefined temperature limits the spaces, processes or equipment being refrigerated, and reflecting changes in load, weather conditions and operating requirements.

Refrigeration System Controls equipment is considered to include the following:

- **System management package** consisting of one or more control units or modules that are designed to optimise an entire refrigeration system, including the operation of refrigeration compressor(s), evaporator(s) and condenser(s)
- **'Add-on' controllers** that are designed to be used in conjunction with a specific system management unit or package, and enable the operation of additional refrigeration compressors, evaporators and condensers to be optimised

Eligibility criteria

To be included on the ACA Specified List, the specific Refrigeration System Controls equipment must meet *all* the relevant requirements set out below.

General Eligibility Criteria

(Applicable to all Refrigeration System Controls equipment)

No.	Condition
1.	All equipment and/or components must be CE marked as required by the specific EU directive(s).
2.	Must comply with the relevant requirements, as set out in Tables 1 to 3 below, for products that directly control by means of an analogue or digital signal connection: <ul style="list-style-type: none"> a) Evaporators (see Table 1) b) Condensers (see Table 2) c) Compressors (see Table 3)

3.	<p>Products must incorporate a microprocessor-based controller that is pre-programmed to automatically control the rate of flow of refrigerant through, and/or operating temperature of, at least one of the following types of refrigeration equipment:</p> <ul style="list-style-type: none"> a) Evaporators b) Condensers c) Compressors
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System management package specific Eligibility Criteria

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

No.	Condition
4.	Must automatically adjust the system operating set points in a manner that minimises the refrigeration system's energy consumption under different operating loads, weather conditions and surrounding air temperatures
5.	<p>Is pre-programmed to undertake one or more of the following:</p> <ul style="list-style-type: none"> i. Monitor temperatures and/or pressures around the refrigeration system, and automatically initiate defrost cycles, or inhibit (or delay) scheduled defrost cycles, within individual parts of the refrigeration system, as required, to optimise the overall performance of the refrigeration system ii. Monitor refrigeration system energy input (kWh) and generate a visual or audible alarm when system power consumption exceeds a pre-defined limit, or when system efficiency degradation is preventing automatic adjustment iii. Automatically, in accordance with a pre-defined weekly time schedule, turn off, or turn down, ancillary power loads around the refrigeration system (such as lighting in display cabinets, trim heaters or fans), or activate night blinds, in order to reduce system energy consumption
6.	Must provide facilities that enable system managers to define the default set points, and alarm limits, for each item of refrigeration equipment controlled.

'Add-on' controller specific Eligibility Criteria

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

No.	Condition
7.	Must automatically accept instructions from the system manager to change its operating set points or alarm limits, or to initiate or inhibit a defrost cycle.
8.	Must automatically transmit data on operating temperatures, pressures, or flow rates to the system manager at intervals not exceeding 10 minutes.

Table 1: Control of evaporators

All products that directly control evaporators must:

No.	Requirement
a.	Be designed to directly measure evaporator pressure or temperature by means of a sensor, and automatically adjust the flow of refrigerant through the evaporator to maintain the refrigerated space within pre-defined operating limits.
b.	Automatically terminate its defrost cycle when: <ul style="list-style-type: none"> • The temperature of the evaporator or refrigerated space exceeds a preset value. • A maximum defrost time consistent with sensor failure has been exceeded.
c.	Provide facilities that enable system managers to define separate temperature set points and alarm limits for each evaporator being controlled.
d.	Provide facilities that enable system managers to take the equipment out of service for cleaning or maintenance.
e.	Generate an alarm signal when the temperature of the refrigerated space is in danger of straying outside, or has strayed outside, its pre-defined safe operating limits.

Table 2: Control of condensers

All products that directly control Condensers must:

No.	Requirement
a.	Be designed to directly measure condenser pressure or temperature by means of a sensor, and automatically adjust the airflow across the condenser(s) in a manner that maintains condensation at the rate required to maintain the thermal balance of the refrigeration system under different operating loads and weather conditions.
b.	Allow the compressor discharge (head) pressure to 'float' with ambient temperature down to the minimum safe level for the particular refrigeration system for maximum system efficiency.
c.	Provide facilities that enable system managers to define separate temperature set points and alarm limits for each condenser being controlled.
d.	Generate an alarm signal when the condensing pressure or temperature is in danger of straying outside, or has strayed outside, the predefined limits for safety or efficiency.

Table 3: Control of compressors

All products that directly control Compressors must:

No.	Requirement
a.	Be able to control the operation of at least two refrigeration compressors.
b.	Incorporate automatic control algorithms that monitor rate of change in system suction pressure or refrigerant temperature to prevent compressors from unnecessarily being controlled to load or unload in response to small fluctuations in cooling demand.

Where:

- Automatic control may be implemented either directly by means of an analogue or digital signal connection, or indirectly by means of another control device or network.
- A mechanism is defined as “any sequence of pre-defined actions that performs a given function, where an action can be defined in hardware and/or software”.
- An algorithm is defined as “a mechanism that is defined in software”.
- The product’s control strategy is the combination of automatic control functions, mechanisms and facilities specified for the particular equipment controlled. In this context, products may be pre-programmed in one of the following ways:
 - a) One or more fixed control strategies that are designed to control a specific set of equipment that can be selected during commissioning
 - b) One or more flexible control strategies that can be configured to control different equipment, as part of a clearly defined commissioning procedure

----- *End of ACA eligibility criteria* -----

Please see next section for guidance on:

- 1. Technical details required in product submission**
- 2. Supporting documentation required**

Guidance on product details and supporting documentation

NOTE: 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 help you to provide (a) product details and (b) the required supporting documentation.

All information contained in 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:

Refrigeration Systems Controls type

As part of the product submission you must first select which type of equipment your product is. Only one type can be chosen per product. The product must be one of the following equipment types

- System Management Unit or Package
- Add-on Controller

Refrigeration Product Controlled by System

The products that the control system chosen is able to control must be chosen. At least one of the following product types must be chosen.

- Evaporators
- Condensers
- Compressors

Supporting documentation required

Described below is the list of documents that are accepted as proof of compliance for the specific Refrigeration and Cooling RSC 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 for Product Providers" section at the end of this document prior to submitting documentation.

General conditions

(Applicable to all Refrigeration System Controls equipment)

No.	Condition	Supporting Documentation Requirement
1	All equipment and/or components must be CE marked as required by the specific EU directive(s).	<p>Official and published manufacturer's technical data sheet or brochure that demonstrates CE marking compliance</p> <p>OR</p> <p>A copy of an official signed declaration on headed paper that confirms CE marking compliance</p> <p><i>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 ACA condition).</i></p> <p><i>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.</i></p>
2	<p>Must comply with the relevant requirements, as set out in Tables 1 to 3 below, for products that directly control by means of an analogue or digital signal connection:</p> <ul style="list-style-type: none"> a) Evaporators (see Table 1) b) Condensers (see Table 2) c) Compressors (see Table 3) 	Official and published manufacturer's technical data sheet, or brochure, that demonstrates compliance with the requirements of the condition

No.	Condition	Supporting Documentation Requirement
3	<p>Products must incorporate a microprocessor-based controller that is pre-programmed to automatically control the rate of flow of refrigerant through, and/or operating temperature of, at least one of the following types of refrigeration equipment:</p> <ul style="list-style-type: none"> a) Evaporators b) Condensers c) Compressors 	<p>Official and published manufacturer's technical data sheet, or brochure, that demonstrates compliance with the requirements of the condition</p>

System management package specific Eligibility Criteria

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

No.	Condition	Supporting Documentation Requirement
4	<p>Must automatically adjust the system operating set points in a manner that minimises the refrigeration system's energy consumption under different operating loads, weather conditions and surrounding air temperatures</p>	<p>Official and published manufacturer's technical data sheet, or brochure, that demonstrates compliance with the requirements of the condition</p>

No.	Condition	Supporting Documentation Requirement
5	<p>Is pre-programmed to undertake one or more of the following:</p> <ul style="list-style-type: none"> i. Monitor temperatures and/or pressures around the refrigeration system, and automatically initiate defrost cycles, or inhibit (or delay) scheduled defrost cycles, within individual parts of the refrigeration system, as required, to optimise the overall performance of the refrigeration system ii. Monitor refrigeration system energy input (kWh) and generate a visual or audible alarm when system power consumption exceeds a pre-defined limit, or when system efficiency degradation is preventing automatic adjustment iii. Automatically, in accordance with a pre-defined weekly time schedule, turn off, or turn down, ancillary power loads around the refrigeration system (such as lighting in display cabinets, trim heaters or fans), or activate night blinds, in order to reduce system energy consumption 	<p>Official and published manufacturer's technical data sheet, or brochure, that demonstrates compliance with the requirements of the condition</p>
6	<p>Must provide facilities that enable system managers to define the default set points, and alarm limits, for each item of refrigeration equipment controlled.</p>	<p>Official and published manufacturer's technical data sheet, or brochure, that demonstrates compliance with the requirements of the condition</p>

Add-on Controllers – specific eligibility criteria

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

No.	Condition	Supporting Documentation Requirement
7	Must automatically accept instructions from the system manager to change its operating set points or alarm limits, or to initiate or inhibit a defrost cycle.	Official and published manufacturer's technical data sheet, or brochure, that demonstrates compliance with the requirements of the condition
8	Must automatically transmits data on operating temperatures, pressures, or flow rates to the system manager at intervals not exceeding 10 minutes.	Official and published manufacturer's technical data sheet, or brochure, that demonstrates compliance with the requirements of the condition

Component List

The component list contains details and part numbers of any ancillary equipment that may be supplied to a customer as an additional component to the overall submitted system. It must be formatted according to the ACA component list template.

When components are detailed in a component list, reference must be made to official and published brochures or data sheets where these components are described. These brochures/datasheets must then be supplied in addition to the component list.

Any equipment listed in a component list that is subject to separate eligibility conditions requires that the appropriate documentation for that piece of equipment is supplied when submitting documentation for the specific condition(s).

Important notes for product providers

General

There should be a clear link between the product submitted and all supporting documentation. This will typically take the form of a *product code* or *product name* that can be cross-referenced between the submitted product and the relevant supporting documentation.

If product codes/names have been changed since publication of the supporting documentation, then you must provide official evidence of this with the supporting documentation supplied.

If there is any deviation from these requirements, the supporting documentation will not be 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 ACA criteria or help documentation makes reference to compliance with appropriate rather than specific standards, the onus is on the product provider to ensure that the 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 it is subsequently found that any product submitted does not meet the performance or specification criteria, it will cease to be considered eligible for the ACA.

Note: When supplying the supporting documentation through the online process, you must ensure, when demonstrating compliance with the relevant condition, that the correct page number(s) of the document is referenced. When referencing more than one page number, add an explanatory note.

Test report

A test report must include 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
- √ 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 ACA criteria conditions allow for scientifically equivalent tests and/or standards to be used.

If 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 ACA condition or help documentation.

In such applications, the onus is on the product submitter to demonstrate satisfactory equivalence of the standards. Submissions which reference such supporting documentation may take longer to process. If the product provider does not provide satisfactory evidence of equivalence, then the product will not be considered eligible for the ACA. **All documentation must be in English**, or include adequate translation.

Note: Where specific standards are cited in a condition or in the ACA 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 used once *agreed in advance* with SEAI.

Such testing is where only representative products are tested from a technically similar group or range of products. Representative testing may form an acceptable basis for supporting documentation if:

- A clear correlation can be demonstrated between the tested product and a technically similar non-tested product
- and*
- Such a correlation clearly demonstrates the compliance of the non-tested product

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.