Accelerated Capital Allowances Eligibility Criteria

Category: **Process and Heating, Ventilation and Air-conditioning (HVAC) Control Systems**

Technology: Pumps

A high efficiency pump is defined as a machine designed for the energy-efficient on-site transfer of liquid, and which works by adding energy to the liquid by increasing its velocity and / or increasing its pressure, thus raising its kinetic (velocity) energy and/or potential (pressure) energy.

Pumps Eligibility Criteria:
In order to be included on the ACA Specified List, a Pump must meet *all* of the requirements set out below.

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

No.	Condition
1.	Must have a power rating greater than 1.1kW
2.	Must fall under one of the pump type categories as outlined in Table 1
3.	Must be tested in accordance with ISO 9906 grade 2., or scientific equivalent.
4.	Must have an efficiency level greater than that calculated using Equation 2 & 3, Table 2 and the appropriate C value specified for the specific pump type in Table 1
5.	All equipment and/or components must be CE marked as required by the specific EU directive(s).
6.	Pump curve plots and appropriate operating & maintenance manuals must be available for the end-user as part of the main contract of sale in order to optimise the achievement of any potential efficiency improvements.

Table 1.: Eligible pump categories

Type	Sub-type	Speed (rpm)	Max C Value	Characteristics	Limits
Single stage end suction water pumps	End suction own bearing (ESOB)	1450	122.94	Operating temperature -10 to +120°C; Single suction, single impeller. All efficiencies based on full (untrimmed) impeller.	$Q_{bep\ min}$=6m³/h $n_{s\ min}$= 6 rpm $n_{s\ max}$= 80 rpm P_{max}= 150 kW H_{max}= 90 m at 1450rpm H_{max}= 140 m at 2900rpm
		2900	125.34		
	End suction close coupled (ESCC)	1450	124.07		
		2900	126.54		
	End suction close coupled in-line (ESCCI)	1450	127.30		
		2900	128.14		

Table 2.: Eligible pump categories (contd.)

Type	Sub-type	Speed (rpm)	Max C Value	Characteristics	Limits
Vertical multistage (MS) water pumps	All	1450	123.93	Operating temperature -10 to +120°C. Vertical multistage pumps in in-line and ring section design. Efficiency is measured and judged on the basis of a 3 stage pump	$Q_{bep} \leq 100$ m³/h n = 2900 rpm
		2900	127.75		
Submersible multistage (MSS)	All	2900	122.05	Pumps with nominal size 4" and 6"	n/a

Where:

C value = an efficiency correction factor which takes into account the fall off in efficiency when the pump is not operating at its exact "specific speed".

n = Rotational speed (rpm)

n_s = Pump specific speed (rpm) as calculated

Q_{bep} = Flow at best efficiency point (m^3/h)

P = Power (kW)

H = Head (m)

Table 2. : Rel

Eqn No.	Equation description
1	**n_s :** Specific pump speed (rpm) at the best Efficiency point $$n_s = n * \frac{\left(Q_{bep}/3600\right)^{0.5}}{\left(H_{bep}/i\right)^{0.75}}$$
2	**$\eta_{BOT\text{-}bep}$:** Minimum pump efficiency (%) level at the best efficiency point $$\eta_{BOT-bep} = -11.48x^2 - 0.85y^2 - 0.38xy + 88.59x + 13.46y - C$$
3	**$\eta_{BOT\text{-}pl}$:** Minimum pump efficiency (%) level at part load $$\eta_{BOT-pl} = 0.947\eta_{BOT-bep}$$

Where:

$x = \ln(n_s)$

$y = \ln(Q_{bep})$

$Q_{pl} = 0.75\ Q_{bep}$

i = Number of stages

H_{bep} = Head at best efficiency point (m)

$\eta_{pl.}$ = Efficiency at part load (%)

---------- End of ACA 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:

Pump type

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

Input power rating

The input power rating in kW of the pump 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. The figure must comply with the criteria requirements for minimum power rating values.

Efficiency

The efficiency of the pump product is required as a value for the product submission. It must be entered as number only (do not include units). There should also be no spaces or full stops after the number submitted. The figure must comply with the criteria requirements for minimum efficiency values.

Supporting documentation required

Described below is the list of documents that are accepted as proof of compliance for the specific pumps conditions.

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

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

No.	Condition	Supporting Documentation Requirement
1.	Must have a power rating greater than 1.1kW	Official and published manufacturer's technical data sheet or brochure that demonstrates compliance with the requirements of the condition.
2.	Must fall under one of the pump type categories as outlined in Table 1	Official and published manufacturer's technical data sheet or brochure that demonstrates compliance with the requirements of the condition.
3.	Must be tested in accordance with ISO 9906 grade 2, or scientific equivalent.	Accredited certification that the product has been tested in accordance with ISO 9906 grade 2. **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.

No.	Condition	Supporting Documentation Requirement
4.	Must have an efficiency level greater than that calculated using Equation 2 & 3, Table 2 and the appropriate C value specified for the specific pump type in Table 1	Values used for calculations described in official and published manufacturer's technical data sheet or brochure. **AND** • Calculation sheet from a manufacturers test or equivalent, verifying that the unit achieves the stated efficiency, and accompanied by a signed declaration on headed paper to this effect. **OR** • Evidence of official testing by manufacturer or independent test lab verifying that the unit achieves the stated efficiency. Test reports should be of the format described in the 'Important notes to product providers' section of this document. **Note:** Calculation sheet or test report must show that: **ηbep > ηBOT-bep AND ηpl > ηBOT-pl** using the following procedure: 1. Calculate ηBOT-bep (Calculated as per Equation 2, Table 2). (State value) 2. Show where this efficiency (ηbep) is shown to be exceeded by reference to pump curve (Highlight on the pump curve and state value) 3. Calculate ηBOT-pl (Calculated as per Equation 3, Table 2). (State value) Show where this efficiency (ηpl) is shown to be exceeded by reference to pump curve (Highlight on the pump curve and state value).
5.	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 ACA 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.

No.	Condition	Supporting Documentation Requirement
6.	Pump curve plots and appropriate operating & maintenance manuals must be available for the end-user as part of the main contract of sale in order to optimise the achievement of any potential efficiency improvements.	A copy of an official signed declaration on headed paper statement confirming that the appropriate pump curve plots, O&M operating and maintenance manuals are provided. Where applicable, information on the availability of technical documentation to download online should be given. **NB:** A signed declaration is required to comply with this condition in all cases. Submitting copies of user manuals is not sufficient and not required by this condition.

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 ACA 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 ACA.

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 ACA 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 ACA 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 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 utilised once agreed in advance with SEI. 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.