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COMMISSION REGULATION (EU) …/…

of XXX

laying down ecodesign requirements for glandless standalone circulators and glandless circulators integrated in products pursuant to Directive 2009/125/EC of the European Parliament and of the Council,

repealing Commission Regulation (EC) No 641/2009

(Text with EEA relevance)

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(Text with EEA relevance)

Article 1
Subject matter and scope

1. This Regulation establishes ecodesign requirements for the placing on the market or putting into service of glandless standalone circulators and glandless circulators integrated in products.

2. This Regulation shall not apply to:

   (a) drinking water circulators, except as regards the product information requirements of Annex I, point 2(1) (a) (b) and (d);

   (b) circulators to be integrated in products and placed on the market no later than 1 January 2022 as replacement for identical circulators integrated in products placed on the market no later than 1 August 2015 and specifically marketed as such, except as regards the product information requirements of Annex I, point 2(1) (a) (b) and (e).

Article 2
Definitions

For the purposes of this Regulation, the following definitions shall apply:

(1) ‘circulator’ means an impeller pump, with or without pump housing, which has the rated hydraulic output power of between 1 W and 2 500 W and is designed for use in heating systems or in secondary circuits of cooling distribution systems;

(2) ‘glandless circulator’ means a circulator with the rotor directly coupled to the impeller and the rotor immersed in the pumped medium;

(3) ‘standalone circulator’ means a circulator, designed to operate independently from a product;

(4) ‘circulator integrated in a product’ means a circulator designed to operate as part of a product carrying at least one of the following design details:

   (a) the pump housing is designed to be mounted and used inside a product;

   (b) the circulator is designed to be speed controlled by the product;

(c) the circulator is designed for safety features not suitable for standalone operation (ISO IP classes);

(d) the circulator is defined as part of product approval or product CE marking;

(5) ‘product’ means an appliance that generates and/or transfers heat;

(6) ‘drinking water circulator’ means a circulator specifically designed to be in contact with water intended for human consumption as defined in the Article 2 of the Council Directive 98/83/EC[1], with the exclusion of circulators that are also intended for use in heating systems or in secondary circuits of cooling distribution systems;

(7) ‘pump housing’ means the part of an impeller pump which is intended to be connected to the pipe work of the heating systems or secondary circuits of the cooling distribution system.

(8) ‘equivalent model’ means a model which has the same technical characteristics relevant for the technical information to be provided, but which is placed on the market or put into service by the same manufacturer, importer or authorised representative as another model with a different model identifier;

(9) ‘model identifier’ means the code, usually alphanumeric, which distinguishes a specific product model from other models with the same trade mark or the same manufacturer’s, importer’s or authorised representative’s name;

Article 3

Ecodesign requirements

The ecodesign requirements set out in Annex I shall apply from the dates indicated therein.

Article 4

Conformity assessment

1. The conformity assessment procedure referred to in Article 8 of Directive 2009/125/EC shall be the internal design control system set out in Annex IV of that Directive or the management system set out in Annex V of that Directive.

2. For the purposes of the conformity assessment pursuant to Article 8 of Directive 2009/125/EC , the technical documentation of circulators shall contain a copy of the product information provided in accordance with point 2 of Annex I to this Regulation, and the details and results of calculations set out in Annex II to this Regulation.

3. Where the information included in the technical documentation for a particular model has been obtained:

(a) from a model that has the same technical characteristics relevant for the technical information to be provided but is produced by a different manufacturer; or

(b) by calculation on the basis of design or extrapolation from another model of the same or a different manufacturer, or both,

the technical documentation shall include the details of such calculation, the assessment undertaken by the manufacturer to verify the accuracy of the calculation and, where appropriate, the declaration of identity between the models of different manufacturers.

[1] OJ L 330, 5.12.1998, p. 32.

The technical documentation shall include a list of all equivalent models, including the model identifiers.

Article 5

Verification procedure for market surveillance purposes

Member States shall apply the verification procedure laid down in Annex III when performing the market surveillance checks referred to in point 2 of Article 3 of Directive 2009/125/EC.

Article 6

Circumvention and software updates

The manufacturer, importer or authorised representative shall not place on the market products designed to be able to detect they are being tested (e.g. by recognising the test conditions or test cycle), and to react specifically by automatically altering their performance during the test with the aim of reaching a more favourable level for any of the parameters specified in this Regulation or declared by the manufacturer, importer or authorised representative in the technical documentation or included in any of the documentation provided.

The energy consumption of the product and any of the other declared parameters shall not deteriorate after a software or firmware update when measured with the same test standard originally used for the declaration of conformity, except with explicit consent of the end-user prior to the update. No deterioration of performance shall occur as result of rejecting the update.

A software update shall never have the effect of changing the product's performance in a way that makes it non-compliant with the ecodesign requirements applicable for the declaration of conformity.

Article 7

Benchmarks

The benchmarks for the best-performing circulators available at the time of adopting this Regulation are set out in Annex IV.

Article 8

Review

The Commission shall review this Regulation in the light of technological progress and shall present the results of this assessment, including, if appropriate, a draft revision proposal, to the Consultation Forum no later than *[OP - please insert date – 4 years after its entry into force]*.

This review shall in particular address the appropriateness of:

(1) setting additional resource efficiency requirements in accordance with the objectives of the circular economy;

(2) the level of verification tolerances;

(3) setting stricter ecodesign requirements;

(4) including drinking water circulators.

Article 9

Repeal

Regulation (EC) No 641/2009 is repealed as from [*OP please insert the date of entry into force of this Regulation*], with exeption of the product information requirements set out in Annex I (2), which are repealed as from 1/1/2022.

Article 12

Entry into force and application

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union.*

It shall apply from [*OP please insert the date of entry into force of this Regulation*], with the excpetion of the product informaiton set out in Annex I (2), which shall apply as of 1/1/2022.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels,

For the Commission
The President

ANNEX I

ECODESIGN REQUIREMENTS FOR CIRCULATORS

1. ENERGY EFFICIENCY REQUIREMENTS

From [*OP please insert the date of entry into force of this Regulation*], glandless standalone circulators and glandless circulators integrated in products shall have an energy efficiency index (EEI) of not more than 0.23, determined in accordance with Annex II.

2. PRODUCT INFORMATION REQUIREMENTS

From 01/01/2022, the product information requirements set out in points (a) to (e) below shall be visibly displayed on:

(1) for standalone circulators: the technical data sheet or user manual supplied with the circulator;

(2) for circulators integrated in products: the technical data sheet or user manual supplied with products in which the circulator is incorporated;

(3) the technical documentation for the purposes of conformity assessment pursuant to Article 4;

(4) free access websites of the manufacturer of the circulator, its authorised representative or the importer;

(5) catalogues and;

(6) the packaging of the circulator.

(a) manufacturer's name or trade mark, commercial registration number and address;

(b) product's model identifier;

(c) the energy efficiency index determined in accordance with Annex II, indicated as follows: 'EEI ≤ 0,[xx]';

(d) for drinking water circulators, the following information: 'This circulator is suitable for drinking water only' and the pictogram described in Annex V;

(e) for circulators to be integrated in products and placed on the market no later than 1 January 2022 as replacement for identical circulators integrated in products placed on the market no later than 1 August 2015, an indication of the product(s) for which it is intended. This information needs to be provided on free access websites or catalogues only to the extent that the concerned circulators are present on these free access websites or catalogues.

The information referred to in points (a) to (c) as well as the year of manufacture, and, where applicble the pictogram referred to in point (d), shall be durably marked on or near the rating plate of the circulator.

Manufacturers shall provide information on how to install, use and maintain the circulator in order to minimise its impact on the environment.

ANNEX II
MEASUREMENT METHODS AND CALCULATIONS

For the purposes of compliance and verification of compliance with the requirements of this Regulation, measurements and calculations shall be made using harmonised standards the reference numbers of which have been published for this purpose in the *Official Journal of the European Union,* or other reliable, accurate and reproducible methods, which take into account the generally recognised state-of-the-art, and in line with the following provisions:

The methodology for calculating the energy efficiency index (EEI) for circulators is as follows:

1. Standalone circulators with pump housing shall be measured as a complete unit;

   Standalone circulators without pump housing shall be measured with pump housing identical to the pump housing in which they are intended to be used;

   Circulators integrated in products shall be dismantled from the product and measured with a reference pump housing;

   Circulators without pump housing intended to be integrated in a product shall be measured with a reference pump housing;

   where '*reference pump housing*' means a pump housing supplied by the manufacturer with inlet and outlet ports on the same axis and designed to be connected to the pipework of a heating system or secondary circuit of a cooling distribution system.

2. Where a circulator has more than one setting of head and flow, measure the circulator at the maximum setting.

   'Head' (H) means head (in metres) produced by the circulator at the specified point of operation.

   'Flow' (Q) means the volume flow rate of water through the circulator (m^3/hr).

3. Find the point where $Q \cdot H$ is maximum and define the flow and head at this point as: $Q_{100\%}$ and $H_{100\%}$.

4. Calculate the hydraulic power P_{hyd} at this point.

   'Hydraulic power' means an expression of the arithmetic product of the flow (Q), Head (H) and a constant.

   'P_{hyd}' means hydraulic power delivered by the circulator to the fluid being pumped at the specified point of operation (in watts).

5. Calculate the reference power as:

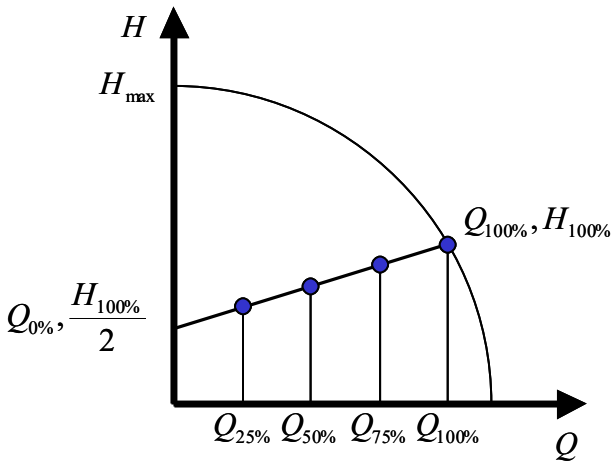
   $$P_{ref} = 1.7 \cdot P_{hyd} + 17 \cdot \left(1 - e^{-0.3 \cdot P_{hyd}}\right), \quad 1\text{W} \le \text{P}_{\text{hyd}} \le 2500\text{W}$$

   'Reference power' means a relation between hydraulic power and power consumption of a circulator, taking into account the dependency between circulator efficiency and size.

   'P_{ref}' means the reference power (in watts) of the circulator in a given head and flow.

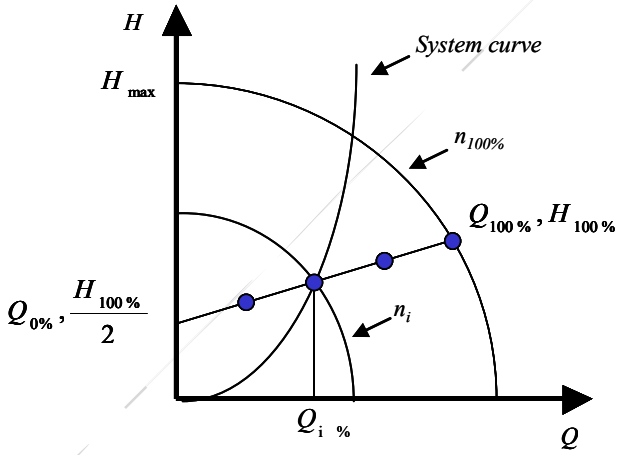
6. Define the reference control curve as the straight line between the points:

   $$(Q_{100\%}, H_{100\%}) \text{ and } \left(Q_{0\%}, \frac{H_{100\%}}{2}\right)$$



7. Select a setting of the circulator ensuring that the circulator on the selected curve reaches $Q \cdot H$ = *max point*. For circulators integrated in products follow the reference control curve by adjusting the system curve and speed of the circulator.

   'System curve' means a relationship between flow and head (H = f(Q)) resulting from friction in the heating system or cooling distribution system, as presented in the following graph:



8. Measure P_1 and H at the flows:

   $Q_{100\%}, 0.75 \cdot Q_{100\%}, 0.5 \cdot Q_{100\%}, 0.25 \cdot Q_{100\%}$.

   'P_1' means the electrical power (in watts) consumed by the circulator at the specified point of operation.

9. Calculate P_L as follows:

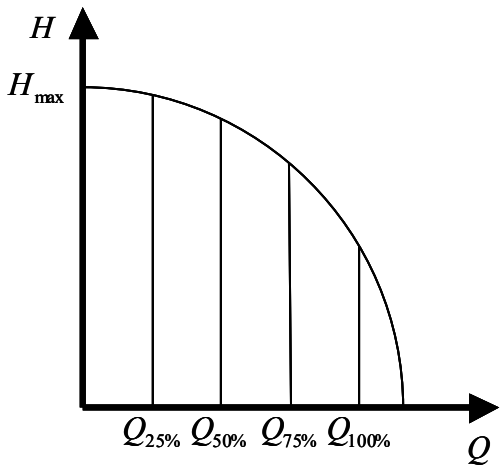
$$P_L = \frac{H_{ref}}{H_{meas}} \cdot P_{1,meas} \quad , if \quad H_{meas} \leq H_{ref}$$

$$P_L = P_{1,meas} \quad , if \quad H_{meas} > H_{ref}$$

   Where H_{ref} is the head on the reference control curve at the different flows.

10. Using the measured values of P_L and this load profile:

Flow [%]	Time [%]
100	6
75	15
50	35
25	44



Calculate the weighted average power $P_{L,avg}$ as:

$P_{L,avg} = 0.06 \cdot P_{L,\,100\%} + 0.15 \cdot P_{L,75\%} + 0.35 \cdot P_{L,\,50\%} + 0.44 \cdot P_{L,25\%}$

Calculate the energy efficiency index[2] as:

$$EEI = \frac{P_{L,avg}}{P_{ref}} \cdot C_{20\%} \text{ , where } C_{20\%} = 0.49$$

Except for circulators integrated in products designed for primary circuits of thermal solar systems and for heat pumps, where the energy efficiency index is calculated as:

$$EEI = \frac{P_{L,avg}}{P_{ref}} \cdot C_{20\%} \cdot (1 - e^{\left(-3{,}8 \cdot \left(\frac{n_s}{30}\right)^{1{,}36}\right)})$$

where $C_{20\%}$=0,49 and n_s is the specific speed defined as

$$n_s = \frac{n_{100\%}}{60} \cdot \frac{\sqrt{Q_{100\%}}}{H_{100\%}^{\;0{,}75}}$$

where

n_s [rpm] is specific speed of a circulator;

$n_{100\%}$ is rotational speed in rpm in this duty defined at $Q_{100\%}$ and $H_{100\%}$.

[2] $C_{XX\%}$ means a scaling factor that ensures that at the time of defining the scaling factor only XX% of circulators of a certain type have an EEI ≤ 0.20.

ANNEX III

VERIFICATION PROCEDURE FOR MARKET SURVEILLANCE PURPOSES

The verification tolerances defined in this Annex relate only to the verification of the measured parameters by Member State authorities and shall not be used by the manufacturer, importer or authorised representative as an allowed tolerance to establish the values in the technical documentation or in interpreting these values with a view to achieving compliance or to communicate better performance by any means.

Where a model has been designed to be able to detect it is being tested (e.g. by recognizing the test conditions or test cycle), and to react specifically by automatically altering its performance during the test with the objective of reaching a more favourable level for any of the parameters specified in this Regulation or included in the technical documentation or included in any of the documentation provided, the model and all equivalent models shall be considered not compliant.

When verifying that a product model complies with the requirements laid down in this Regulation pursuant to Article 3(2) of Directive 2009/125/EC the authorities of the Member States shall apply the following procedure for the requirements referred to in Annex I.

(1) The Member State authorities shall verify one single unit of the model.

(2) The model shall be considered to comply with the applicable requirements if:

(a) the values given in the technical documentation pursuant to point 2 of Annex IV to Directive 2009/125/EC (declared values) and where applicable the values used to calculate these values are not more favourable for the manufacturer, importer or authorised representative than the results of the corresponding measurements carried out pursuant to point (g) thereof; and

(b) the declared values meet any requirements laid down in this Regulation and any required product information published by the manufacturer, importer or authorised representative does not contain values that are more favourable for the manufacturer, importer or authorised representative than the declared values; and

(c) when the Member State authorities test the unit of the model, the determined values (the values of the relevant parameters as measured in testing and the values calculated from these measurements) comply with the respective verification tolerances as set out in Table 1.

(3) If the results referred to in points (2)(a) or (2)(b) are not achieved the model and all equivalent models shall be considered not to comply with this Regulation.

(4) If the result referred to in point (2)(c) is not achieved;

(a) for models that are produced in quantities of less than five per year including equivalent models, the model and all equivalent models shall be considered not to comply with this Regulation;

(b) for models that are produced in quantities of five or more per year including equivalent models, the Member State authorities shall select three additional units of the same model for testing. As an alternative, the three additional units selected may be one or more of equivalent models.

(5) The model shall be considered to comply with the applicable requirements if for these three units the arithmetical mean of the determined values complies with the respective verification tolerances given in Table 1.

(6) If the result referred to in point (5) is not achieved the model and all equivalent models shall be considered not to comply with this Regulation.

(7) The Member State authorities shall provide all relevant information to the authorities of the other Member States and to the Commission without delay after a decision is taken on the non-compliance of the model according to points (3) or (6).

The Member State authorities shall use the measurement and calculation methods set out in Annex II.

The Member State authorities shall only apply the tolerances set out in Table 1 and shall only use the procedure described in points (1) to (7) for the requirements referred to in this Annex. For the parameters in Table 1, no other tolerances such as those set out in harmonised standards or in any other measurement method shall be applied.

Table 1 — Verification tolerances

Parameter	*Verification tolerance*
Energy efficiency index	The determined value* shall not exceed the declared value by more than 7 %.

* In the case of three additional units tested as prescribed in point 4 (b), the determined value means the arithmetical mean of the values determined for these three additional units.

ANNEX IV

INDICATIVE BENCHMARKS

At the time of adoption of this Regulation the best available technology on the market for the environmental aspects that were considered significant and are quantifiable is EEI ≤ 0.17.

ANNEX V

PICTOGRAM FOR DRINKING WATER CIRCULATORS

(pictogram to be added)