



Europump Guide

Guideline on the application of COMMISSION REGULATION (EU) N° 547/2012 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for water pumps

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Introduction

Europump welcomes the aim of the European Commission to reduce the eco-impact of products in the European Union. Europump is fully aware of the eco-impact of pumps in Europe. For many years the Ecopump initiative has been one of the strategic pillars in the work of Europump. On 1 January 2013, a new regulation will enter into force concerning minimum required efficiencies of rotodynamic water pumps. The regulation sets minimum efficiency requirements on water pumps set out under the Ecodesign Directive for energy related products. This regulation mainly addresses manufacturers of water pumps placing these products on the European market. However customers may also be affected by this regulation. It is the task of this document to clarify questions which may arise with the entry into force of the water pump regulation EU 547/2012. Since July 2011 a regulation for minimum efficiency requirements on standard motors has been in force throughout Europe. Although these kinds of motors are used in pumps, the document does not deal with regulation 640/2009.

General

Regulation EU 547/2012 is available in all European community languages. In case of doubt concerning the content of a translated version of the regulation EUROPUMP expects the original English version to be the only valid one.

Scope-related topics

Pumps in the scope

Article 1 of the regulation describes the applicable scope:

“This Regulation establishes ecodesign requirements for the placing on the market of rotodynamic water pumps for pumping clean water, including where integrated in other products.”

A definition in Article 2 of Regulation EU 547/2012 of the term ‘water pump’ specifies this scope further.

“ ‘water pump’ is the hydraulic part of a device that moves clean water by physical or mechanical action and is of one of the following designs:

- *End suction own bearing (ESOB);*
- *End suction close coupled (ESCC);*
- *End suction close coupled inline (ESCCi);*
- *Vertical multistage (MS-V);*
- *Submersible multistage (MSS);”*

Consequently this would mean any pump of such a design would be in the scope. Hence a more specific definition of the five listed pump types is given later in the text (see Article 2 of the regulation).

In particular the scope includes the following:

- ESOB, ESCC, ESCCi water pumps must be designed for pressures up to 16 bar, with a specific speed n_s between 6 and 80 rpm, a minimum rated flow of 6 m³/h (1,667·10⁻³ m³/s), a maximum shaft power of 150 kW, a maximum head of 90 m at nominal speed of 1450 rpm and a maximum head of 140 m at nominal speed of 2900 rpm;
Europump concludes the limits as absolute limits

- Maximum shaft power of 150kW whatever the nominal speed
 - delivery head of 90 m with nominal speed of 1450 rpm
 - delivery head of 140 m with nominal speed of 2900 rpm
- MS-V must be a glanded multi stage ($i > 1$) rotodynamic water pump in which the impellers are assembled on a vertical rotating shaft, which is designed for pressures up to 25 bar, with a nominal speed of 2900 rpm and a maximum flow of 100 m³/h ($27,78 \cdot 10^{-3}$ m³/s);
 - MSS must be a multi-stage ($i > 1$) rotodynamic water pump with a nominal outer diameter of 4" (10.16 cm) or 6" (15.24 cm) designed to be operated in a borehole at nominal speed of 2900 rpm, at operating temperatures within a range of 0°C to 90°C.

A list of pump types exempted from efficiency requirements or completely excluded is given under Article 1:

"This Regulation shall not apply to:

- (a) water pumps designed specifically for pumping clean water at temperatures below -10°C or above 120°C, except with regard to the information requirements of Annex II, points 2(11) to 2(13);*
- (b) water pumps designed only for fire-fighting applications;*
- (c) displacement water pumps;*
- (d) self-priming water pumps."*

Hence Europump concludes that pumps which are included in this exemption list or which do not fall within the specified technical boundaries described under Article 2 are exempted from this regulation.

Pumps not mentioned or defined but understood as being in or out of the scope

- **Pumps with specific hygienic requirements (e.g. food pumps)**

Although efficiency is important for such pumps, it is not the main driving parameter in the design of these products. Hygienic design is more important in order to protect public health. In particular, biological growth inside the pump is considerably reduced when special design parameters are followed. In addition, the use of specific materials may lead to different designs and hence may result in lower efficiencies than for standard water pumps. Europump concludes that specifically designed hygienic pumps for food processing and pharmaceutical applications falling under Annex I.2 'SUPPLEMENTARY ESSENTIAL HEALTH AND SAFETY REQUIREMENTS FOR CERTAIN CATEGORIES OF MACHINERY' of the 'DIRECTIVE 2006/42/EC of 17 May 2006 on machinery' are exempted from efficiency requirements of Regulation EU 547/2012.

- **Multiple media pumping**

In the European market pumps are sold for several different applications, usually listed in manufacturers' catalogues. If the intended use of a pump is to pump clean water it falls under regulation EC 547/2012. The same pump might also be used with pumped liquid different from the defined clean water in Regulation EC 547/2012. Consequently Europump concludes

that this type of pump is in the scope as it still could be used for clean water pumping described in Regulation EC 547/2012. Pumps specifically designed to pump liquids other than water are excluded (e.g. petrochemical oil pumps, chemical pumps, pulp and paper etc.).

- **Product Integrated Water Pumps**

Water pumps are within the scope of Regulation EU 547/2012 as stand-alone products but also as products to be integrated in other machinery. The latest revision of EN 809 considers pumps as machinery under the terms of the Machinery Directive 2006/64/EC.

Consequently there is no difference between an integrated or stand-alone water pump from the perspective of the Regulation.

For those cases where a pump is delivered as partly completed machinery, a declaration of incorporation needs to be issued. In parallel a declaration of conformity according to the ErP Directive needs to be issued by the pump manufacturer.

For these cases Europump strongly recommends that a complete declaration of conformity has to be issued for all relevant directives. Customers should be made aware of possible formal changes but also of changes in the product into which the pump will be integrated.

- **Pumps with a nominal speed other than 1450 or 2900**

For pumps with a nominal speed other than 1450 or 2900rpm, usually for 6 pole motor-driven pumps or permanent magnet motor-driven pumps, one of the following two options for testing shall be applied:

1) Pumps are tested at their nominal speed. The calculation of the minimum required efficiency or Minimum Efficiency Index shall be made on the basis of the respective equation in Regulation EU 547/2012. The C-value in the corresponding table shall be taken for 1450 min^{-1} or 2900 min^{-1} , whichever is closer to the nominal speed of the tested pump size.

2) Pumps are tested at 1450 min^{-1} or 2900 min^{-1} . The corresponding C values from the c-value table shall be taken.

- **Twin Head Pumps / Double Pumps**

Twin head pumps shall be tested by incorporating one of the driver/impeller sets into an adequate pump casing of ESCCi type. The C-value (from table....) shall be taken for the corresponding ESCCi pump type and speed.

Pumps with single suction and two back-to-back impellers are exempted from the scope.

- **Pumps corresponding to more than one type definition**

For pumps where more than one type definition is applicable, the type of pump casing shall determine which C value (from table....) has to be taken.

- **Submersible Pumps**

Submersible borehole multistage pumps designed with an outer diameter of 4" or 6" are covered by Regulation 547/2012. Submersible pumps which have a different design are exempted from the scope of Regulation 547/2012. A *submersible pump* is defined as a close-coupled pump/motor unit designed to operate submerged in the pumped liquid. This definition includes submersible pumps operating in either a wet-pit or dry-pit environment.

- **Horizontal Multistage and comparable Designs for Centrifugal Water Pumps**

Europump considers horizontal multistage pumps as outside the scope of Regulation EU 547/2012. Pumps with single suction and two back-to-back impellers are exempted from the scope as well.

Application of Regulation

Regulation EU 547/2012 requires minimum efficiencies for the placing on the market of water pumps expressed by an index called MEI. Products already placed on the market and serviced or maintained are considered outside the scope.

- **CE marking & Declaration of Conformity**

- Pumps within the scope of this regulation cannot be CE marked if they do not fulfill the ecodesign and product information requirements (either within or outside the EU).
- Pumps outside the scope of this regulation can be CE marked if they fulfill all other relevant directives.
- Pumps outside the scope of this regulation except for the product information requirement (water pumps designed for below -10°C or above 120°C) can be CE marked with reference to this regulation.
- The harmonised test standard for Regulation EU 547/2012 is EN16480.
- As stipulated in Article 5 of the ErP Directive 2009/125/EC, a declaration of conformity according to Annex VI of the same Directive must be issued in order to place on the market a pump within the scope of Regulation EU 547/2012.
- The declaration of conformity must refer to the ErP Directive 2009/125/EC implemented by Regulation EU 547/2012.

- **Placing of pumps on the market**

The ErP Directive 2009/125/EC defines the term “placing on the market” as follows:

“ ‘Placing on the market’ means making a product available for the first time on the Community market with a view to its distribution or use within the Community, whether for reward or free of charge and irrespective of the selling technique;”

The European Commission blue book¹, in line with what is stated in the ErP Directive, defines the term ‘*placing on the market*’ in a very similar way to the definition above:

“Placing on the market is the initial action of making a product available for the first time on the Community market, with a view to distribution or use in the Community. Making available can be either for payment or free of charge.”

The blue book discusses this action more detailed.

¹ Guide to the implementation of directives based on the New Approach and the Global Approach – European Commission, 2000 - ISBN 92-828-7500-8

“A product is placed on the Community market when it is made available for the first time. This is considered to take place when a product is transferred from the stage of manufacture with the intention of distribution or use on the Community market. Moreover, the concept of placing on the market refers to each individual product, not to a type of product, and whether it was manufactured as an individual unit or in series.”

Furthermore it is specified that:

*“Placing on the market is considered **not** to take place where a product is:*

- transferred from the manufacturer in a third country to an authorised representative in the Community whom the manufacturer has engaged to ensure that the product complies with the directive;
- transferred to a manufacturer for further measures (for example assembling, packaging, processing or labelling);
- not (yet) granted release for free circulation by customs, or has been placed under another customs procedure (for example transit, warehousing or temporary importation), or is in a free zone;
- manufactured in a Member State with a view to exporting it to a third country;
- displayed at trade fairs, exhibitions or demonstrations;
- or in the stocks of the manufacturer, or the authorized representative established in the Community, where the product is not yet made available, unless otherwise provided for in the applicable directives.”

EUROPUMP recommends following these interpretations and definitions of the blue book guide. In the absence of other official sources of information from the European Commission on the definition of “placing on the market”, Europump considers these documents as valid.

- **Minimum Efficiency Index – MEI**

Water pumps differ greatly in efficiency depending on their size and their design. Larger pumps have a higher potential to achieve better efficiencies. If efficiencies are printed on water pumps, efficiency-focused customers may overestimate the size of pump required. In order to achieve a comparable efficiency threshold-value across all legally covered water pumps, an index of pump size, specific speed and rotational speed has been created - the MEI. MEI covers best point, part load and overload efficiencies as water pumps may be chosen with safety margins and hence do not run at best efficiency point. This ensures high and flat efficiency curves and consequently an efficient operation in real life.

- **Service and maintenance**

Regulation EU 547/2012 makes no mention of service or maintenance.

Nevertheless, covered water pumps are usually more expensive than consumer products. Hence maintenance and regular service may be necessary to extend the life of the pump to an economically acceptable extent for the customer. Following the entry into force of

Regulation EU 547/2012, the availability of spare parts may decrease significantly as pump manufacturers may be forced to redesign parts of their pump families and hence change geometries etc. of existing pumps in order to adapt to efficiency requirements.

In some cases this may decrease the overall lifespan of the pump installation as a complete replacement of the water pump is needed.

Products placed on the market before the entry into force of Regulation EU 547/2012 are not subject to the requirements of this Regulation when they are serviced or maintained.

Products placed on the market after the entry into force of Regulation EU 547/2012 shall be serviced or maintained with components which conform to the regulation requirements.

Maintenance with non-genuine components requires an assessment by the manufacturer of these components to check that they comply with Regulation 547/2012.

Product Information Requirements

Regulation EU 547/2012 stipulates several product information requirements which must be placed on the name plate and/or in the documentation of the water pump. Documentation means, where applicable, the website of the manufacturer, catalogues, manuals etc.

- **Order of Appearance of Product Information Requirements**

Regulation EU 547/2012 requires that the product '*information shall be provided in the order as presented in points (1) to (15).*'

Depending on the pump type, some of this information may be unreasonable or misleading if not applicable to the specific pump type described.

Europump therefore concludes that the information (1) to (15) shall be given *if and where applicable*. Otherwise it should not be mentioned (e.g. a water pump for use in normal temperatures does not need documentation for points 11 to 13).

- The regulation requires that product information is placed in selected different locations such as name plates and / or documentation and websites, so there is no real order that can be followed throughout points 1) to 15).
- Europump therefore recommends the following:
 - Websites may document in any order as they possess no (linear) order. Information may be given at any place on the website. The only requirement is that the information must clearly be recognisable and exhaustive according to the regulation.
 - To avoid unnecessary use of paper in catalogues, redundant information may be given once in this documentation rather than for each pump type or size (e.g. standard clauses about trimmed impellers etc.).
 - In order to present benchmark efficiency graphs in an understandable way, these need to be enlarged to a certain size. Two graphs are required per pump type. Printing the same graphs numerous times affords no additional value to the customer and is a waste of paper. EUROPUMP therefore recommends using these graphs once in an introductory section of the catalogue or documentation or in a link to the EUROPUMP website where these graphs can be found (see below). A translation of these graphs into other languages is not necessary.

- **What is meant by “[--.]” ?**

A product information requirement for the pump name plate is set out in ANNEX II.2 of the regulation as follows:

- “(6) *Hydraulic pump efficiency (%) with trimmed impeller [xx.x], or, alternatively, the indication [--.];*”
- This means that either a manufacturer lists the actual maximum efficiency (best efficiency point) of the (delivered trimmed or full impeller) pump in percentage terms rounded to one decimal point, OR the manufacturer puts these exact 4 characters “--.” on the name plate to indicate that he does not provide this value. Hence the manufacturer must print something on the name plate for trimmed impeller pump types.

- **What is meant by efficiency characteristics and pump performance curves?**

A product information requirement for the name plate of the pump is set out in ANNEX II.2 of the regulation as follows:“(7) *Pump performance curves for the pump, including efficiency characteristics;*” Within the pump industry there are numerous ways of describing pump performance curves. The most common is the pressure-vs.-flow diagram to show the performance of the pump. The spirit of Regulation EU 547/2012 is to indicate the efficiency of these pumps to the customer. Hence Europump concludes that the best way for manufacturers to comply with Regulation EU 547/2012 is to indicate the H-Q-curve and at least the three relevant Q-H- η points in part-load (75% flow), at best point (100% flow) and overload (110%) flow for full impeller size. Complete efficiency curves or iso-efficiency lines for full impeller-size are not necessary but do fulfil the requirements and may help the customer.

- **MEI on the name plate - what is allowed / required ?**

- Regulation EU 547/2012 requires the MEI to be indicated in a certain manner on the pump name plate (“*MEI \geq [x.xx];*”). This means that the minimum efficiency index must be indicated following one of the options below
 - The name plate indicates compliance with the regulation by showing at least “*MEI \geq 0.10*” at the latest on 1 January 2013 and “*MEI \geq 0.40*” at the latest on 1 January 2015, tested according to prEN 16480
 - The name plate indicates the actual MEI according to prEN 16480 with two decimal points, e.g. “*MEI \geq 0.46*”

- **Maximum Impeller Diameter or ‘Full impeller’**

Regulation EU 547/2012 defines ‘full impeller’ as the impeller with the maximum diameter for which performance characteristics are given for a pump size in the catalogues of a water pump manufacturer. In practice this is the largest available impeller diameter for a pump size. There are products offered by manufacturers with different maximum impeller sizes. This occurs if a manufacturer uses different impeller sizes with unchanged pump housings. There might be a better choice in terms of efficiency in the market at given duty

point. Consequently these pumps are considered to be a pump type on their own and have their 'own' maximum impeller size.

- **Benchmark efficiency graphs**

These graphs are permanently available at
www.europump.org/efficiencycharts

To avoid unnecessary use of paper, EUROPUMP suggests printing a link to this website in the documentation.

- **'Hydraulic Pump Efficiency'**

Europump believes that the term 'hydraulic pump efficiency' is used in the regulation to make clear that the scope of this regulation is for the water pump (hydraulic part) only. Generally this term describes 'pump efficiency'.

- **Product information requirement No. 10**

Point 10 of the product information requires 'information relevant for disassembly, recycling or disposal at end-of-life'.

Europump believes that this information might be generally valid for all type of pumps presented in the catalogue. Consequently it may be supplied once only instead of for each type of pump. Some manufacturers have specific disassembly and recycling documentation. Hence Europump considers that a reference in the product documentation to this specific document provided to or accessible by the customer is enough to comply with this regulation.

- **Product information requirement No. 13**

Point 13 of the product information requires a description of 'the relevant technical parameters and characteristics used' to make a pump capable of operating above 120°C or below -10°C.

Europump believes that this is required in order to avoid a loop hole and to limit this exception to pumps which have a specific design for these temperatures with a trade-off in efficiency.

The pump manufacturer shall give generic information only about the main differences between standard pumps and high or low temperature products.

- **'Commercial Registration Number'**

A product information requirement for the pump name plate is set out in ANNEX II.2 of regulation as follows:

"(4) Manufacturer's name or trade mark, commercial registration number and place of manufacture,"

If the trade mark of the manufacturer (or distributor) on the name plate is a registered trade mark of the European Union, a commercial registration number can be omitted because the manufacturer is easily identifiable with the database of the Office for Harmonisation in the Internal Market (<http://oami.europa.eu>)

- **What is a “drive”?**

Regulation EU No. 547/2012 uses the term ‘drive’ in the preamble. A drive is understood to be a variable speed control.