EU Commission adopted energy labelling criteria for space heaters

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Energy Labelling Directive (ELD) has recently been adopted in European Union to improve the energy efficiency of appliances sold on the market. Energy labels are aimed to assist consumers in choosing products which save energy. Energy labelling was first addressed on a more general level in REHVA Journal – March 2013 issue. In this article the new Delegated Regulation published on 6 September 2013 in Commission's Official Journal is discussed.

Key words: boiler, space heater, energy labelling, energy labelling directive, boiler regulation, efficiency, seasonal efficiency, ecodesign

Background

Directive 2010/30/EU of the European Parliament and of the Council on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products (ELD) establishes a framework for the Commission to develop regulations for the *labelling* of energy-related products. [1]

The aim of the new Delegated Regulation [2] is to introduce a harmonised scheme for labelling products according to their energy efficiency and energy consumption and providing standard product information for consumers. It complements the Commission's Regulation implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to *ecodesign* requirements for space heaters and combination heaters [3]. It was considered relevant that both regulations are adopted simultaneously. The ecodesign requirements aim to achieve potential for cost-effective improvements in the energy efficiency of heaters, while the labelling scheme creates market transparency for consumers and provides incentives for manufacturers to innovate and invest in energy efficiency. Both Regulations [2] and [3] were published in the Official Journal on 6 September 2013.

This Delegated Regulation [2] sets EU energy labels for stand-alone heaters and for packages of heaters combined with further heating products. It introduces the widely known A-G scale to cover the various types of conventional boilers. Additionally, the dynamic top classes A^{+}, A^{++} and A^{+++} are intended to promote the use of cogeneration and renewable energy sources.

Contents of the regulation

The introduced measure sets out new mandatory labelling and standard product information requirements for suppliers placing on the market and/or putting into service heaters, temperature controls, solar devices (solar-only system, solar collector, solar tank and other solar products placed on the market separately), and for dealers offering stand-alone heaters and packages of heaters, temperature controls and/or solar devices. The scope of the measure is aligned with the scope of parallel ecodesign implementing measure setting ecodesign requirements for the energy efficiency, nitrogen oxide emissions and sound power levels of heaters.

The energy efficiency ranking of heaters is based on the scheme laid down in Directive 2010/30/EU in having a single efficiency scale for space heating, covering boilers, cogeneration, heat pumps and their packages with further products.

The Delegated Regulation enters into force on 26 September 2013 and the requirements will be strengthened gradually. Two years after the entry into force, a scale from G to A for conventional heaters (i.e. presumably G–D for electric boilers, C–B for non-condensing boilers in collective buildings, B–A for condensing boilers) with higher classes A^{+} for cogeneration and A^{++} for heat pumps will be introduced. Six years after the entry into force of the Delegated Regulation, a further class A^{+++} will be added on top of the labelling scale, while classes G to E will be abolished due to more ambitious ecodesign requirements. This will ensure dynamic market transformation toward highly efficient heaters using modern energy technologies.

The water heating energy efficiency class of a combination heater shall be determined on the basis of its water heating energy efficiency. Two years after the entry into force, a scale from G to A will be valid. Six years after the entry into force of the Delegated Regulation, a further higher class A^{+} will be added on top and the lowest class G abolished.

Furthermore, the product label will show the sound power level to end-users (**Figure 1**), standardized product information will be introduced for heaters, such as a product fiche and technical documentation, and requirements will be specified for information to be provided in any form of distance selling of heaters and in any advertisements and technical promotional material for them.

As heaters might be sold in packages with other heating products such as solar devices and temperature controls, a package label and a comprehensible calculation on the fiche are introduced to provide information on the overall efficiency of the package of products to the end-user. The package label is based on energy efficiency classes from G to A^{+++}, reflecting the potentially higher energy efficiency of such packages.

The proposed product and package labels and standardised product information will help overcome the lack of information for people buying heaters and the split incentives for building owners and tenants.

The measurement methods and the verification procedure for market surveillance in this Delegated Regulation are aligned with those in the ecodesign implementing measure.

Technical requirements for boilers

The following definitions are introduced.

'Space heater' means a device that a) provides heat to a water-based central heating system in order to reach and maintain at a desired level the indoor temperature of an enclosed space such as a building, a dwelling or a room; and b) is equipped with one or more heat generators.

'Combination heater' means a space heater that is designed to also provide heat to deliver hot drinking or sanitary water at a given temperature levels, quantities and flow rates during given intervals, and is connected to an external supply of drinking sanitary water.

'Seasonal space heating energy efficiency' is in a key role as a base for labelling classification. It is defined as the ratio between the space heating demand for a designated heating season, supplied by a heater and the annual energy consumption required to meet this demand, expressed in %.

The calculation formula for fuel boiler space heaters and fuel boiler combination heaters is:

$$\eta_s = 0.85\eta_1 + 0.15\eta_4 - \Sigma F(i)$$

where:

- η_s is seasonal space heating energy efficiency, expressed in %,
- η_1 is useful efficiency at 30% of the rated heat output, expressed in %,
- η_4 is useful efficiency at rated heat output, expressed in %,
- $F(i)$ are relevant corrections. See [5] for details.

Efficiencies are determined based on respective CEN standards for boilers. All corrections F(i) relevant for boilers, e.g. due to auxiliary electricity consumption or due to standby loss, are negative. Different dedicated standards apply for determination of annual efficiencies of cogeneration devices and heat pumps. Additionally, for cogeneration devices one positive correction $F(i)$ is applied due to electricity produced by the device itself. This makes it possible for a device to achieve efficiency exceeding 100%. A 'conversion coefficient' (CC=2.5) is

used, reflecting the estimated 40% average EU generation efficiency referred to in Directive 2012/27/EU of the European Parliament and of the Council.

The calculation formula for the annual efficiency is not provided in the Regulation itself but in an accompanying draft document [6], and it was discussed in the previous article on ecodesign requirements [5]. An official document further elaborating on determination of annual efficiency is expected to be published by the Commission in the near future.

This Delegated Regulation [2] establishes requirements for the energy labelling of, and the provision of supplementary product information on, space heaters and combination heaters with a rated heat output ≤ 70 kW, packages of space heater ≤ 70 kW, temperature control and solar device and packages of combination heater ≤ 70 kW, temperature control and solar device.

Annual efficiency requirements serving as a basis for classification of boilers are given in **Table 1**.

Table 1. Seasonal space heating energy efficiency requirements serving as a basis for classification of heaters and combination heaters.

Seasonal space heating energy efficiency class	Seasonal space heating energy efficiency η_s in %
A^{+++}	$\eta_s \geq 150$
A^{++}	$125 \leq \eta_s < 150$
A^{+}	$98 \leq \eta_s < 125$
A	$90 \leq \eta_s < 98$
B	$82 \leq \eta_s < 90$
C	$75 \leq \eta_s < 82$
D	$36 \leq \eta_s < 75$
E	$34 \leq \eta_s < 36$
F	$30 \leq \eta_s < 34$
G	$\eta_s < 30$

'Water heating energy efficiency' means the ratio between the useful energy in the drinking or sanitary water provided by a combination heater and the energy required for its generation, expressed in %. This table serves as a basis for labelling classes regarding water heating function for combination heaters. The classification is presented in **Table 2**. Sizes 3XS – XL of combination heaters are defined by 'load profile', that means a given sequence of water draw-offs, as specified in Annex VII, Table 15; each combination heater meets at least one load profile; [2]

'Water draw-off' means a given combination of useful water flow rate, useful water temperature, useful energy content and peak temperature, as specified in Annex VII, Table 15; [2]

Table 2. Water heating efficiency classes of small combination heaters classified by declared profile of sizes 3XS–XL.

	3XS	S	M	L	XL
A+++	$\eta_{wh} \geq 62$	$\eta_{wh} \geq 90$	$\eta_{wh} \geq 163$	$\eta_{wh} \geq 188$	$\eta_{wh} \geq 200$
A++	$53 \leq \eta_{wh} < 62$	$72 \leq \eta_{wh} < 90$	$130 \leq \eta_{wh} < 163$	$150 \leq \eta_{wh} < 188$	$160 \leq \eta_{wh} < 200$
A+	$44 \leq \eta_{wh} < 53$	$55 \leq \eta_{wh} < 72$	$100 \leq \eta_{wh} < 130$	$115 \leq \eta_{wh} < 150$	$123 \leq \eta_{wh} < 160$
A	$35 \leq \eta_{wh} < 44$	$38 \leq \eta_{wh} < 55$	$65 \leq \eta_{wh} < 100$	$75 \leq \eta_{wh} < 115$	$80 \leq \eta_{wh} << 123$
B	$32 \leq \eta_{wh} < 35$	$35 \leq \eta_{wh} < 38$	$39 \leq \eta_{wh} < 65$	$50 \leq \eta_{wh} < 75$	$55 \leq \eta_{wh} < 80$
C	$29 \leq \eta_{wh} < 32$	$32 \leq \eta_{wh} < 35$	$36 \leq \eta_{wh} < 39$	$37 \leq \eta_{wh} < 50$	$38 \leq \eta_{wh} < 55$
D	$26 \leq \eta_{wh} < 29$	$29 \leq \eta_{wh} < 32$	$33 \leq \eta_{wh} < 36$	$34 \leq \eta_{wh} < 37$	$35 \leq \eta_{wh} < 38$
E	$22 \leq \eta_{wh} < 26$	$26 \leq \eta_{wh} < 29$	$30 \leq \eta_{wh} < 33$	$30 \leq \eta_{wh} < 34$	$30 \leq\leq \eta_{wh} < 35$
F	$19 \leq \eta_{wh} < 22$	$23 \leq \eta_{wh} < 26$	$27 \leq \eta_{wh} < 30$	$27 \leq \eta_{wh} < 30$	$27 \leq \eta_{wh} < 30$
G	$\eta_{wh} < 19$	$\eta_{wh} < 23$	$\eta_{wh} < 27$	$\eta_{wh} < 27$	$\eta_{wh} < 27$

Examples of the labels for combination boilers are depicted in **Figure 1**.

Icons in **Figure 1** have the following meaning [2]:

I. supplier's name or trade mark;
II. supplier's model identifier;
III. the space heating function and the water heating function, including the declared load profile expressed as the appropriate letter in accordance with Table 15 of Annex VII [2];EN 6.9.2013 Official Journal of the European Union L 239/25
IV. the seasonal space heating energy efficiency class and the water heating energy efficiency class, determined in accordance with points 1 and 2 of Annex II; the head of the arrows containing the seasonal space heating energy efficiency class and water heating energy efficiency class of the boiler combination heater shall be placed at the same height as the head of the relevant energy efficiency class;
V. the rated heat output in kW, rounded to the nearest integer;
VI. the sound power level LWA , indoors, in dB, rounded to the nearest integer.
VII. for boiler combination heaters able to work only during off-peak hours, the pictogram referred to in point 9(d)(11) of this Annex may be added [2]

Expected impact

According to the impact assessment, heaters are responsible for about 16% of the total gross energy consumption of the EU–27. The aim of this regulation is to reduce the energy consumption of these appliances. It is estimated that the combined effect of the proposed new ecodesign requirements and the new labelling scheme set out in this proposal would lead to an annual reduction of about 1 900 PJ (45 Mtoe) by 2020, corresponding to about 110 Mt CO_2 emissions.

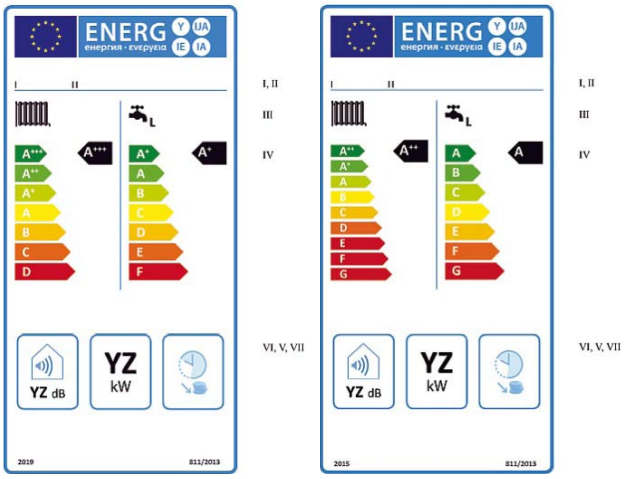

Figure 1. Labels for boiler combination heaters: valid between 26 September 2015 and 26 September 2019 (left) and since 26 September 2019 forward (right).

The impacts of policy scenarios for introducing energy labels were assessed against the 'business as usual' scenario. Based on an assessment of costs and benefits, a combination of ecodesign requirements, labelling and system requirements for the energy performance of buildings was identified as the preferred option to solve the problem of market failure in the take-up of heaters with improved environmental performance, as that combination best meets the requirements of the Ecodesign and Energy Labelling Directives. ■

References

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