

Guidelines accompanying

January
2015

Regulations (EU)

No 811 & 812/2013 with regard to

energy labelling of space heaters, combination heaters, packages of space heater, temperature control and solar device and packages of combination heater, temperature control and solar device, and of water heaters, hot water storage tanks and packages of water heater and solar device

and

Regulations (EU) No 813 & 814/2013

with regard to **ecodesign requirements for space heaters and combination heaters, and for water heaters and hot water storage tanks**

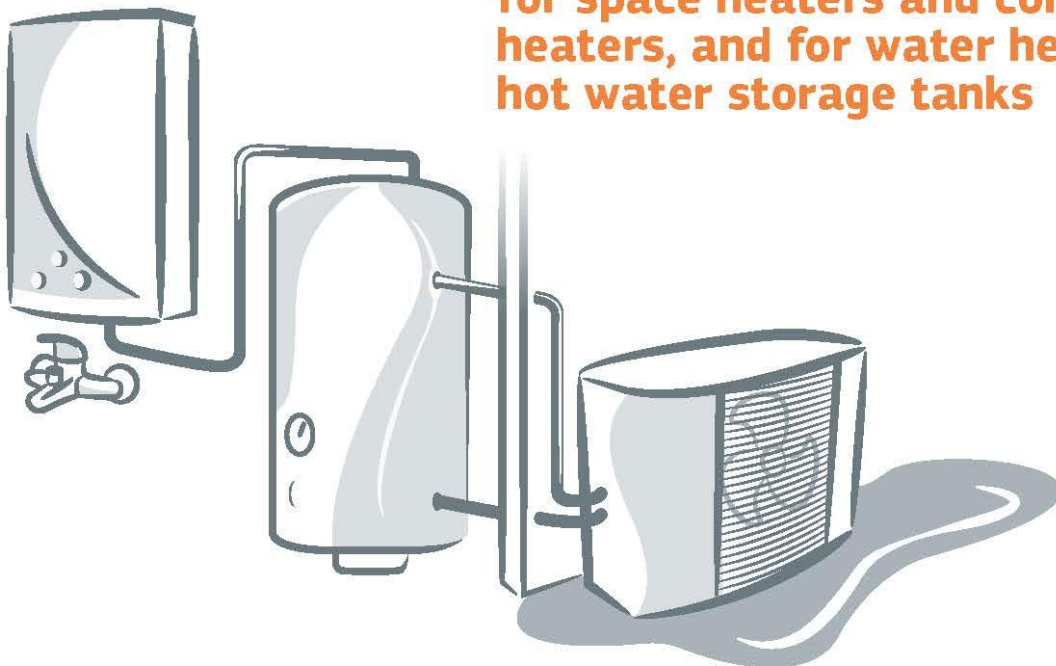


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1. PURPOSE OF THE GUIDELINES AND DISCLAIMER

The Ecodesign and Energy Labelling regulations for space heaters and water heaters were published in 2013. The regulations establish minimum requirements and an energy labelling scheme for the products in their scope. These guidelines aim to help relevant stakeholders, including industry and public authorities, to implement the Regulations in practice. They summarise the most relevant information from the regulations to give SMEs an introduction to the subject matter and answer the most common questions.

The guidelines are intended to be used only for facilitating the implementation of the Regulations. They are not intended to replace the Regulations or to provide “interpretation” beyond their intent. The guidelines only reflect the opinion of the Commission services and are not legally binding. A finally binding legal interpretation of EU legislation may only be provided by the European Court of Justice. The guidelines are without prejudice to the position the Commission might take should an issue arise in a procedure before the European Court of Justice.

1.1. The Regulations

The Commission has published the following regulations concerning space and water heaters:

- Commission Delegated Regulation (EU) No 811/2013 of 18 February 2013 supplementing Directive 2010/30/EU with regard to energy labelling of space heaters, combination heaters, packages of space heater, temperature control and solar device and packages of combination heater, temperature control and solar device¹;
- Commission Delegated Regulation (EU) No 812/2013 of 18 February 2013 supplementing Directive 2010/30/EU with regard to energy labelling of water heaters, hot water storage tanks and packages of water heater and solar device²;
- Commission Regulation (EU) No 813/2013 of 2 August 2013 implementing Directive 2009/125/EC with regard to ecodesign requirements for space heaters and combination heaters;
- Commission Regulation (EU) No 814/2013 of 2 August 2013 implementing Directive 2009/125/EC with regard to ecodesign requirements for water heaters and hot water storage tanks³;
- Commission Delegated Regulation (EU) No 518/2014 of 5 March 2014 amending Commission Delegated Regulations (EU) No 1059/2010, (EU) No 1060/2010, (EU) No 1061/2010, (EU) No 1062/2010, (EU) No 626/2011, (EU) No 392/2012, (EU) No 874/2012, (EU) No 665/2013, (EU) No 811/2013 and (EU) No 812/2013 with regard to labelling of energy-related products on the internet⁴.

2. SCOPE

¹ OJ L 239, 6.9.2013, p. 1.

² OJ L 239, 6.9.2013, p. 83,

³ OJ L 239, 6.9.2013, p. 136.

⁴ OJ L 239, 6.9.2013, p. 162.

2.1. Space Heaters and Combination Heaters

The scope of the Ecodesign and Energy Labelling Regulations on space and combination heaters is different. While the Ecodesign Regulation covers products with a rated output up to 400 kW, the Energy Labelling Regulation covers products with a rated output up to 70 kW.

In both cases, heaters designed for using gaseous or liquid fuels from biomass are excluded⁵. Heaters using solid fuels are also excluded, these will be covered by separate Ecodesign and Energy Labelling measures.

The heaters covered by the Regulations can be classified as follows:

- Fuel boiler space heaters;
- Fuel boiler combination heaters;
- Electric boiler space heaters;
- Electric boiler combination heaters;
- Cogeneration space heaters;
- Cogeneration combination heaters;
- Heat pump space heaters;
- Heat pump space heaters with fuel driven combustion unit;
- Heat pump combination heaters;
- Heat pump combination heaters with fuel driven combustion unit.

2.2. Water Heaters

Regarding Ecodesign and Energy Labelling of water heaters and hot water storage tanks, the scope also differs between the two Regulations. Ecodesign covers water heaters with a rated output equal or below 400 kW and storage tanks with a storage volume up to 2000 litres while the limit values are 70 kW and 500 litres for Energy Labelling respectively.

As for space heaters, products using gaseous or liquid fuels from biomass or solid fuels are excluded from the scope.

The products covered can be classified as follows:

- Water heaters using fossil fuels;
- Electric water heaters;
-
- Heat pump Water heaters;
- Heat pump Water heaters with fuel driven combustion unit;
- Storage water heaters;

⁵ Heaters using liquid or gaseous fuels predominantly produced from biomass are excluded. Other pieces of legislation, such as the Gas Appliances Directive might apply to them as far as appliances burning gaseous fuels are concerned.

- Hot Water Storage Tanks;
- Solar Water Heaters.

3. PRODUCT ENVIRONMENTAL IMPACTS

The preparatory study identified and analysed the relevant environmental impacts of heaters and water heaters. The use phase of the product has been clearly identified as the most important phase in terms of both environmental impacts and having the most potential for improvement. Therefore no specific requirements considering production, transport or end of life were proposed and the regulatory measures focus on the use phase and, for ecodesign also on the end-of-life phase.

As for most of the products subject to ecodesign regulation, the primary energy consumption during the use phase is the source of the primary impact via the (direct and indirect) carbon emissions.

Emissions from the combustion of fuel (e.g. NO_x, SO₂) are also relevant for all heaters and water heaters with a burner. Electric heaters do not directly produce emissions of this kind, so they are not regulated for them.

In addition to the air pollutants, noise is another relevant environmental impact for heat pumps.

There are other environmental impacts associated with these products, such as the use of refrigerants in heat pumps. These impacts can be subject to other existing legislation.

4. STATE OF PLAY OF LEGISLATION

4.1. History of product legislation to date

From the start of the preparatory study, the first formal step in the ecodesign process, in 2006 until the publication of the implementing acts in late 2013, the ecodesign process for heaters and water heaters lasted eight years, mainly due to the complexity of the Regulations which cover products using different technologies and fuels.

4.2. Timetable

- **6 September 2013.** Publication of the Regulations.
- **26 September 2013.** Entry into force of the Regulations.
- **26 September 2015.** Tier 1 requirements regarding energy efficiency come into force for space and water heaters, sound power level requirements, storage volume and information requirements also come into force. Energy Labelling comes into force with a scale of A⁺⁺ to G for space heaters and A to G for water heaters.
- **26 September 2016.** Specific review to analyse the possibility of setting different requirements for different types of water heaters.
- **26 September 2017.** Second tier requirements regarding energy efficiency come into force. The Energy Labelling scale for water heaters is updated to A⁺ to F.

- **26 September 2018.** Requirements regarding emissions of NO_x come into force. Tier 3 requirements regarding the energy efficiency of water heaters start to apply. A review of the Regulations is to be presented.
- **26 September 2019.** The Energy Labelling scale for space heaters is updated to A⁺⁺⁺ to D.

In addition, Article 8 of the Ecodesign regulation establishes that Member States may allow the placing on the market and/or putting into service of heaters and water heaters which comply with the national provisions in force when the Regulation was adopted regarding seasonal space heating energy efficiency, water heating energy efficiency and sound power level. The deadline for the end of this provision is 26 September 2015.

Furthermore, placing on the market and/or putting into service of heaters and water heaters, which comply with the national provisions in force when this Regulation was adopted regarding emissions of nitrogen oxides may be allowed until 26 September 2018.

4.3. Review

A review of the four Regulations is foreseen in 2018.

The review of the Ecodesign Regulations shall assess:

- The appropriateness of setting ecodesign requirements for greenhouse gas emissions related to refrigerants;
- The level of the ecodesign requirements for emissions of carbon monoxide, hydrocarbons and particulate matter that may be introduced;
- The appropriateness of setting ecodesign requirements for heaters specifically designed for using gaseous fuels or liquid fuels predominantly produced from biomass;
- The validity of the conversion coefficient value;
- The appropriateness of introducing third party certification.

In addition, before September 2016 the appropriateness of setting separate ecodesign requirements for different types of water heaters shall be evaluated.

Regarding Energy Labelling, the following aspects need to be evaluated:

- Any significant change in the market share of various types of heaters related to the labels;
- The feasibility and usefulness of indicating heater efficiency in the label;
- The appropriateness of the package fiches and labels;
- The appropriateness of including passive flue recovery devices in the scope of Regulation 811/2013.

5. KEY REQUIREMENTS

5.1. Ecodesign requirements

For space and combination heaters, the space heating energy efficiency is the key parameter. As heating demand is not constant over the year, the share of part load operation has to be reflected in the performance criterion.

The space heating energy efficiency class reflects these seasonal differences in one aggregated indicator. For fuel driven heaters, as well as for cogeneration heaters with supplementary heaters, the part-load behaviour has to be considered, whereas for electric boiler heaters as well as cogeneration heaters without supplementary heaters, only the efficiency at rated output is taken into account. The requirements for the space heating energy efficiency are independent of the size or the power of the heater in question. The requirement is set as an efficiency criterion for all boiler sizes.

For combination heaters and water heaters, the water heating energy efficiency is the essential parameter for indicating the efficiency of the hot water generation. The requirements for the water heating energy efficiency are set according to the heater's output power. The heaters have been distinguished in classes from 3XS to 4XL with the efficiency requirements rising with the size of the heater.

In addition to the energy efficiency criteria, the regulation defines additional compliance criteria aimed at reducing other relevant environmental impacts, including:

- The sound level, which is only relevant for heat pumps;
- Nitrogen oxide emissions for fuel based space and combination heaters, as well as heat pumps with supplementary fuel based heaters;
- Storage volume for storage water heaters;
- Standing losses for hot water storage tanks.

For the sound level, the requirements are size dependant; the heat pumps are classified according to their power output. The limit values are given as absolute values of indoor and outdoor sound power levels in A-weighted decibels.

For nitrogen oxides, the regulation prescribes emission levels in relation to the fuel input ($\text{mg NO}_{2\text{equ}}/\text{kWh}_{\text{GCV}}$).

For the storage volume criterion, the regulation prescribes a minimum load of the storage compartment. This minimum storage is differentiated between the size categories used for water heating efficiency and is given in litres.

The maximum standing losses are defined as a power (in Watts) expressed as a function of the storage capacity.

The following table gives an overview of the criteria to be fulfilled as well as the dates on which these criteria come into force.

	Space Heating Energy Efficiency	Water Heating Energy Efficiency	Sound Power Level	Emissions of Nitrogen oxides	Standing Losses
TIER I	26.09.2015	26.09.2015	26.09.2015	26.09.2018	26.09.2017
TIER II	26.09.2017	26.09.2017			
TIER III		26.09.2018			
Fuel boiler space heaters					
Electric boiler space heaters					
Heat pump space heaters					
Heat pump space heaters with fuel driven combustion unit					
Fuel boiler combination heaters					
Electric boiler combination heaters					
Cogeneration space heaters					
Cogeneration combination heaters					
Heat pump combination heaters					
Heat pump combination heaters with fuel driven combustion unit					
Water heaters using fossil fuels					
Electric water heaters					
Heat pump Water heaters					
Heat pump water heaters with fuel driven combustion unit					
Hot Water Storage Tanks					
Storage water heaters					
Solar water heaters					

For most of the criteria the requirements have been differentiated according to the size of the product.

5.2. Labelling requirements

The labelling requirements address manufacturers as well as dealers to ensure the correct and consistent use of the label throughout the supply chain.

For space heaters, the energy efficiency labels coming into force in 2015 go from G to A⁺⁺. In 2019, after the review of the Regulation, a new A⁺⁺⁺ class will be added. In addition, the ecodesign requirements should lead to the lowest scoring products becoming obsolete.

In the case of water heaters, or combination heaters (for the water heating energy efficiency) the energy labelling scheme coming into force in 2015 goes from G to A, being modified to F to A⁺ in 2017.

From 26 September, 2015 manufacturers have to consider the following issues regarding labelling and information:

- For each space heater, a printed energy label in accordance with the regulation has to be provided. There are special provisions for several categories of space heaters defined in the regulation.
- A product fiche has to be provided. This product fiche shall be included in the product brochure or other literature provided with the product.
- Technical documentation in accordance with the regulation has to be provided to the Commission or to the market surveillance authorities on request.
- Product advertisements are required to reference the seasonal space heating energy efficiency class.
- Technical promotional material is also required to reference the seasonal heating energy efficiency class.
- According to Regulation 518/2014 with regard to labelling of energy-related products on the internet⁶ manufacturers have to make the label and the fiche available to dealers in electronic format for each model.

The obligations for dealers are:

- At the point of sale, each space heater on display shall be equipped with the respective printed energy label.
- Products marketed without the end user being able to see the label shall be accompanied with the relevant information laid down in the product fiche provided by the manufacturer.
- Advertisements are required to reference the seasonal space heating energy efficiency class.
- Technical promotional material is also required to reference the seasonal heating energy efficiency class.
- Regulation 518/2014 establishes that dealers, for selling through the internet must show the label and the fiche made available in electronic format by manufacturers.

The dealer must be provided with the label and the additional information by the distributor / manufacturer in such a way, that they are able to provide the necessary information to the customers. The technical parameters to be communicated are defined in Annex V of the respective energy labelling regulation and in Annex II of the respective ecodesign regulation.

5.3. Labelling requirements for packages

For packages of space or combination heaters with temperature control and/or solar devices as well as for packages for water heaters and solar devices a customized label to ensure sufficient information for the end user has to be provided.

⁶ OJ L 147, 17.5.2014, p. 1.

The packages are defined in the Energy Labelling Regulations:

- In the case of Regulation 811/2013 they always contain a space heater or a combination heater, and a temperature control and / or a solar device.
- In the case of Regulation 812/2013 they always contain a water heater and a solar device.
- According to the relevant definitions in the Regulations, a solar device is made up of a solar collector, a solar hot water storage tank or a pump in the collector loop. A solar hot water storage tank is defined as a hot water storage tank storing heat energy produced by one or more solar collectors. This means that a solar device always contains a solar collector.

The dealer is defined in the Energy Labelling Directive as a retailer or other person who sells, hires, offers for hire-purchase or displays products to end users.

This means than in cases where the dealer is selling a space heater and combining it with controls, a package label has to be provided. The same applies to water heaters combined with solar devices. The different components of the package do not need to come from the same supplier. The package label has to be displayed with the package and the fiche has to be provided to end consumers. This obligation apply in cases where packages are being offered to the final user.

In the heating sector, the dealer is usually the person that is in the best position to advice end users on the different existing solutions for fulfilling their heating needs and their relative efficiency. In order to provide better information to consumers and recognising that not only the individual components of an installation are important but that the combination of them with temperature controls and/or solar devices can greatly increase their efficiency a package label has been introduced for space and water heaters.

The information provided by this “package label” is based on the information provided by the suppliers for the individual components of the package which needs to be readily available for dealers in the technical documentation of the products.

The overall efficiency of the package has to be calculated in accordance with the Regulations. For the different combinations the regulation provides a calculation scheme for the dealers to determine the efficiency class of the package. The following table gives an overview of the calculation methods depending on the preferential heater. The appropriate calculation method has to be chosen according to the type of package.

Type of preferential heater	Space heating efficiency class calculation scheme	Water heating efficiency class calculation scheme
Space heater or combination heater	Figure 1 (811/2013)	
Cogeneration space heater	Figure 2 (811/2013)	
Heat Pump space heater	Figure 3 (811/2013)	
Low-Temperature Heat Pump space heater	Figure 4 (811/2013)	Figure 5 (811/2013) (for combination heaters)
Water heater	Not applicable	Figure 1 (812/2013)

With the energy efficiency class resulting from the calculations, the package label can be completed appropriately.

In some cases, packages can include already installed appliances, in these cases, the complete package is not being placed on the market in the sense of the Regulations and in consequence it is not mandatory to provide a package label as no package as defined by the relevant Regulations is being placed on the market.

Together with these guidelines, a tool for calculation the energy efficiency class of packages has been developed.

5.3.1. *Calculation of space heating energy efficiency of packages*

5.3.1.1. Seasonal space heating energy efficiency (I)

The value to be introduced is the seasonal space heating energy efficiency of the preferential heater, which can be a space heater, a combination heater, a cogeneration space heater, a heat pump space heater or a low-temperature heat pump space heater.

This information can be found on the product fiche that needs to be provided by the supplier with the product.

Packages can also include a supplementary heater; in which case, the seasonal space heating energy efficiency of the supplementary heater is also needed. This value is to be found on the fiche of this supplementary heater.

5.3.1.2. Temperature control

Depending on the temperature control class, different correction factors are used, defined in classes. The class of the temperature control can be found on the fiche of the temperature control.

- Class I - On/off Room Thermostat: A room thermostat that controls the on/off operation of a heater. Performance parameters, including switching differential and room temperature control accuracy are determined by the thermostat's mechanical construction.
- Class II - Weather compensator control, for use with modulating heaters: A heater flow temperature control that varies the set point of the flow temperature of water leaving the heater dependent upon prevailing outside temperature and selected weather compensation curve. Control is achieved by modulating the output of the heater.
- Class III - Weather compensator control, for use with on/off output heaters: A heater flow temperature control that varies the set point of the flow temperature of water leaving the heater dependent upon prevailing outside temperature and selected weather compensation curve. Heater flow temperature is varied by controlling the on/off operation of the heater.
- Class IV - TPI room thermostat, for use with on/off output heaters: An electronic room thermostat that controls both thermostat cycle rate and in-cycle on/off ratio of the heater proportional to room temperature. TPI control strategy reduces mean water temperature, improves room temperature control accuracy and enhances system efficiency.
- Class V - Modulating room thermostat, for use with modulating heaters: An electronic room thermostat that varies the flow temperature of the water leaving the heater dependent upon measured room temperature deviation from room thermostat set point. Control is achieved by modulating the output of the heater.

- Class VI - Weather compensator and room sensor, for use with modulating heaters: A heater flow temperature control that varies the flow temperature of water leaving the heater dependent upon prevailing outside temperature and selected weather compensation curve. A room temperature sensor monitors room temperature and adjusts the compensation curve parallel displacement to improve room comfort. Control is achieved by modulating the output of the heater.
- Class VII - Weather compensator and room sensor, for use with on/off output heaters: A heater flow temperature control that varies the flow temperature of water leaving the heater dependent upon prevailing outside temperature and selected weather compensation curve. A room temperature sensor monitors room temperature and adjusts the compensation curve parallel displacement to improve room comfort. Heater flow temperature is varied by controlling the on/off operation of the heater.
- Class VIII – Multi-sensor room temperature control, for use with modulating heaters: An electronic control, equipped with 3 or more room sensors that varies the flow temperature of the water leaving the heater dependent upon the aggregated measured room temperature deviation from room sensor set points. Control is achieved by modulating the output of the heater.

The correction factor per class is:

Class I	Class II	Class III	Class IV	Class V	Class VI	Class VII	Class VIII
1%	2%	1.5%	2%	3%	4%	3.5%	5%

5.3.1.3. Weighting of the heat output of preferential and supplementary heaters (II)

This weighting factor depends on the results of the expressions:

$$II = \frac{P_{sup}}{P_{rated} + P_{sup}} \text{ or } \frac{P_{rated}}{P_{rated} + P_{sup}}$$

P_{sup} means the declared heat output of the supplementary heater while P_{rated} refers to the preferential heater.

Depending on the result of the above expression and on the presence of a storage tank, element “II” is provided in the Regulations.

For preferential boiler space heaters or boiler combination heaters the following table shall be used:

$P_{sup} / (P_{rated} + P_{sup})$	Without storage tank	With storage tank
0	0	0
0,1	0,30	0,37
0,2	0,55	0,7
0,3	0,75	0,85
0,4	0,85	0,94
0,5	0,95	0,98
0,6	0,98	1,00
>0,7	1,00	1,00

For preferential cogeneration space heaters, heat pump space heaters, heat pump combination heaters or low-temperature heat-pumps the following table shall be used:

$P_{rated} / (P_{rated} + P_{sup})$	Without storage tank	With storage tank
0	1,00	1,00
0,1	0,70	0,63
0,2	0,45	0,30

0,3	0,25	0,15
0,4	0,15	0,06
0,5	0,05	0,02
0,6	0,02	0
>0,7	0	0

In the calculation of the efficiency of the packages with preferential heaters other than boilers (figures 2, 3 and 4) the contribution of the supplementary heater is to be subtracted in step 3. These figures anticipate that the result of step 3 usually will be negative because the efficiency of the supplementary heater is supposed to be lower than the efficiency of the preferential heater. However, if the result of step 3 is positive, its contribution may be added to the package efficiency, not subtracted.

5.3.1.4. Solar contribution factors (III and IV)

Elements III and IV are calculated as follows:

$$III = \frac{294}{11 \cdot P_{rated}}$$

$$IV = \frac{115}{11 \cdot P_{rated}}$$

These values are combined with the collector size in m², the tank volume in m³ and the collector efficiency in %. All these values are to be found in the solar device fiche.

A factor depending on the energy efficiency class of the tank is also to be used:

A ⁺	0.95
A	0.91
B	0.86
C	0.83
D-G	0.81

5.3.1.5. Factors for heat pumps (V and VI)

For heat pumps the following values need also to be included:

- V. Difference between the seasonal space heating energy efficiencies under average and colder climate conditions, expressed in %.
- VI. Difference between the seasonal space heating energy efficiency under warmer and average climate conditions, expressed in %.

5.3.1.6. Space heating energy efficiency class of the package

The space heating energy efficiency class of the package is calculated according to the following table:

A+++ ⁷	≥ 150%
A++	≥ 125%
A+	≥ 98%
A	≥ 90%
B	≥ 82%
C	≥ 75%
D	≥ 36%
E	≥ 34%
F	≥ 30%

⁷ A+++ class only applies after 26 September 2019.

5.3.2. Calculation of water heating energy efficiency of packages

5.3.2.1. Seasonal water heating energy efficiency (I)

The value to be introduced is the seasonal space heating energy efficiency of the preferential heater, which can be a space heater, a combination heater, a cogeneration space heater, a heat pump space heater or a low-temperature heat pump space heater.

This information can be found on the product fiche that needs to be provided by the supplier of the product.

5.3.2.2. Solar contribution factors (II and III)

Elements II and III are calculated as follows:

$$II = \frac{220 \cdot Q_{ref}}{Q_{nonsol}}$$

$$III = \frac{Q_{aux} \cdot 2.5}{220 \cdot Q_{ref}}$$

Q_{ref} depends on the declared load profile.

	M	L	XL	XXL
Q_{ref}	5,845	11,655	19,07	24,53

Q_{nonsol} and Q_{aux} are to be found on the product fiche of the solar device.

For combinations of space heater, temperature control and solar device including a storage tank, η_{wh} is tested as indicated in the relevant Regulation, transitional methods, and when available, harmonised standards.

Figure 1 (811/2013): Calculation scheme for preferential boiler heaters (space heating energy efficiency)

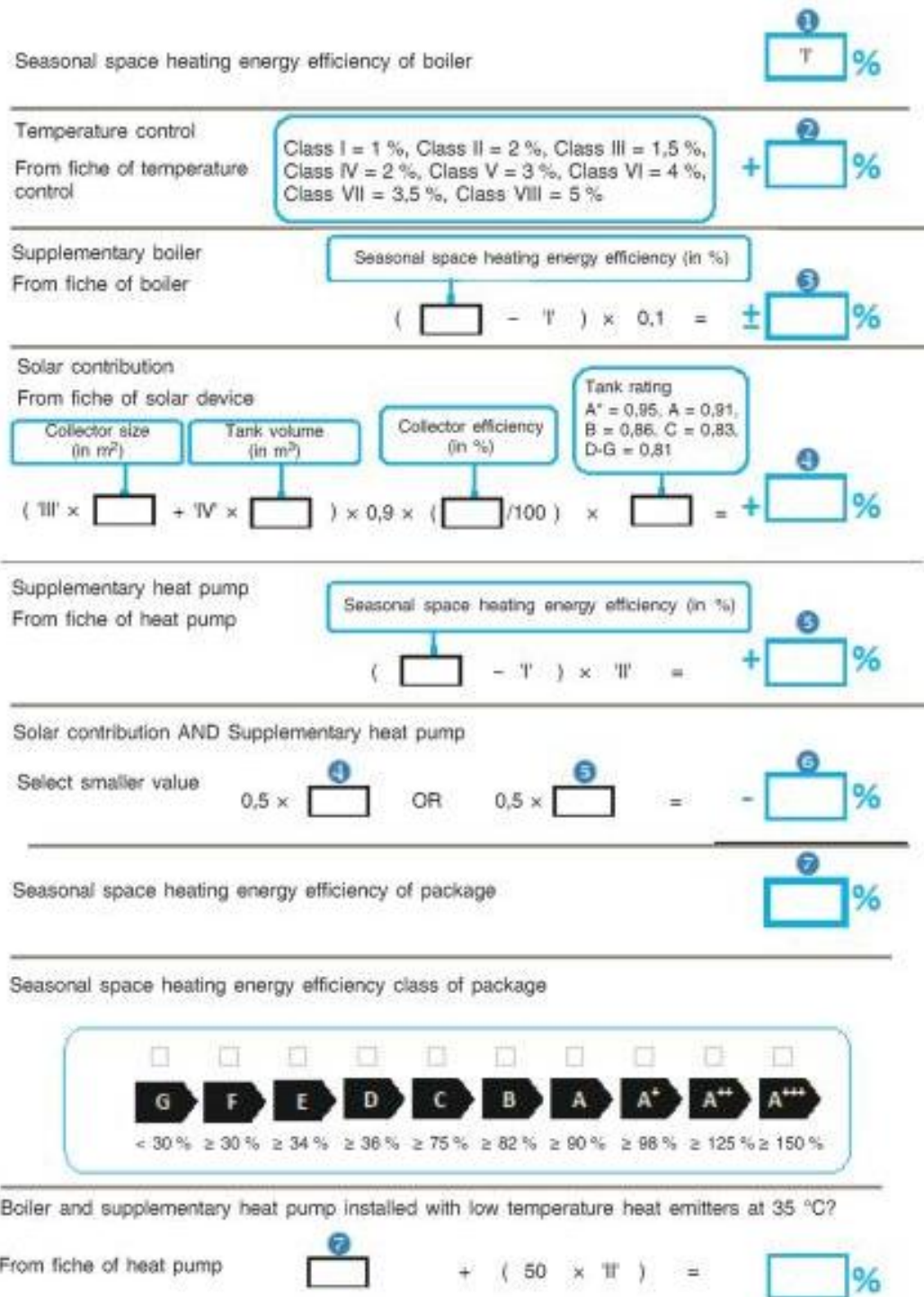


Figure 2 (811/2013): Calculation scheme for preferential cogeneration space heaters (space heating energy efficiency)

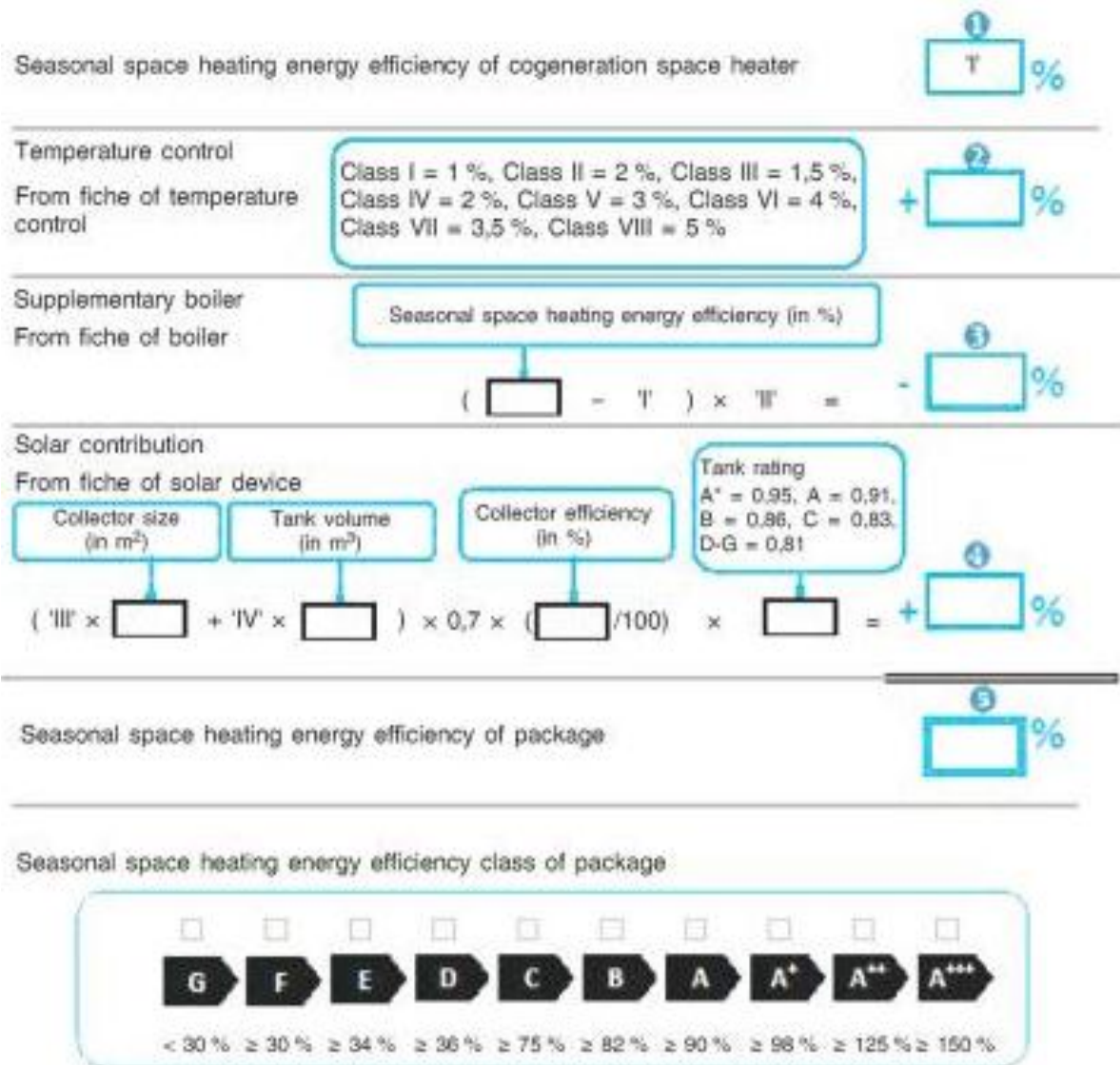


Figure 3 (811/2013): Calculation scheme for preferential heat pump heaters (space heating energy efficiency)

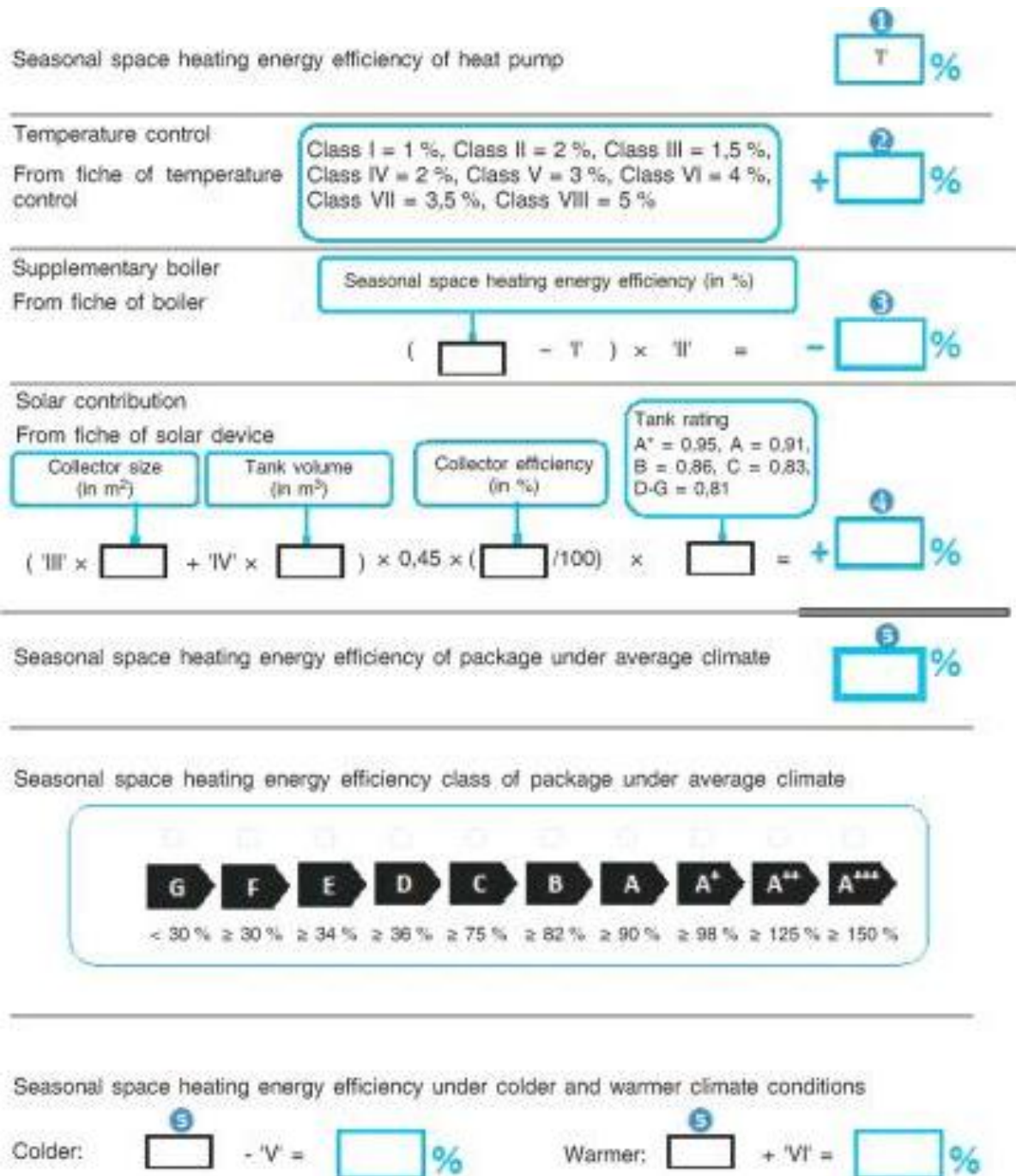


Figure 4 (811/2013): Calculation scheme for preferential low-temperature heat pump heaters (space heating energy efficiency)

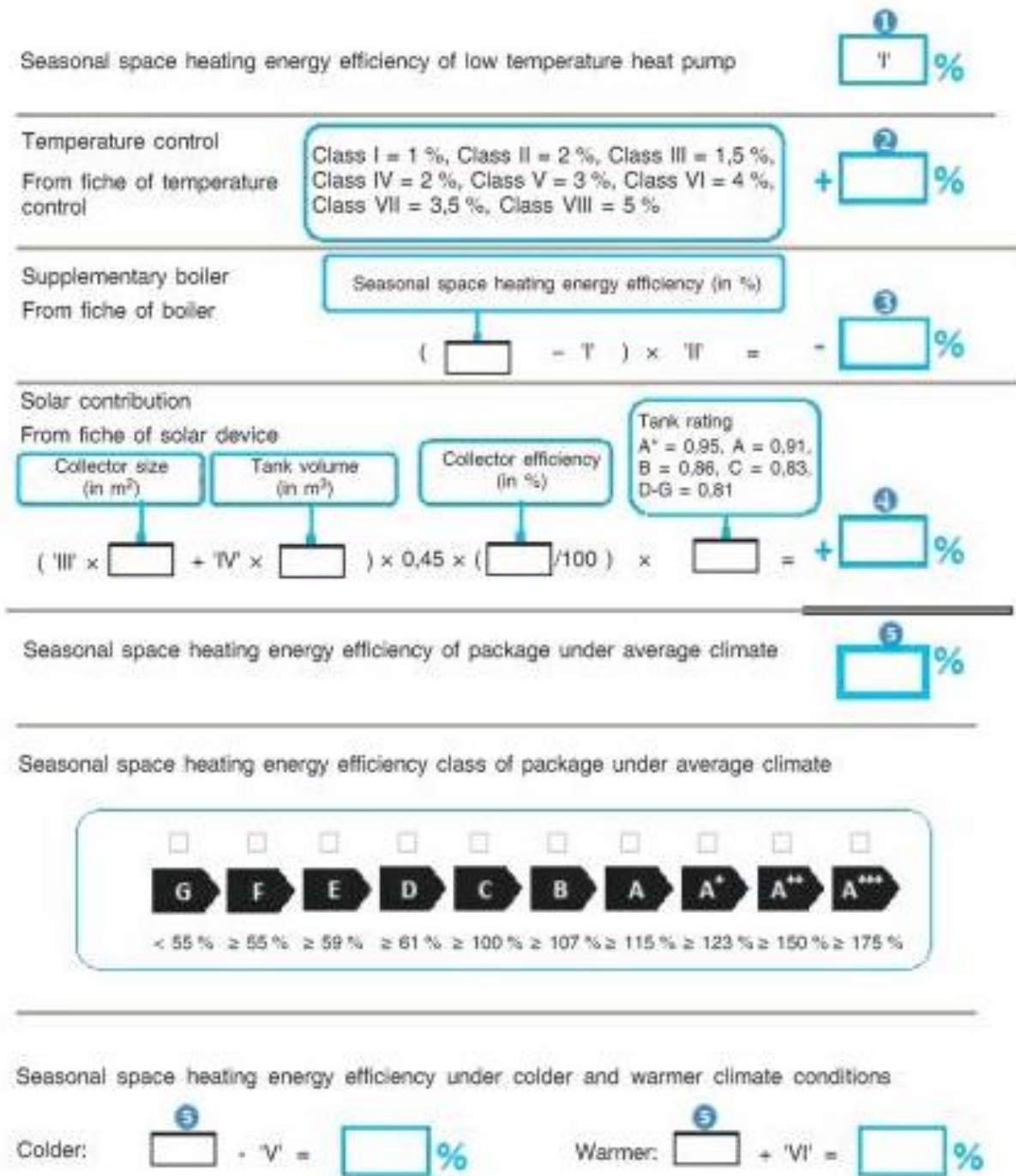
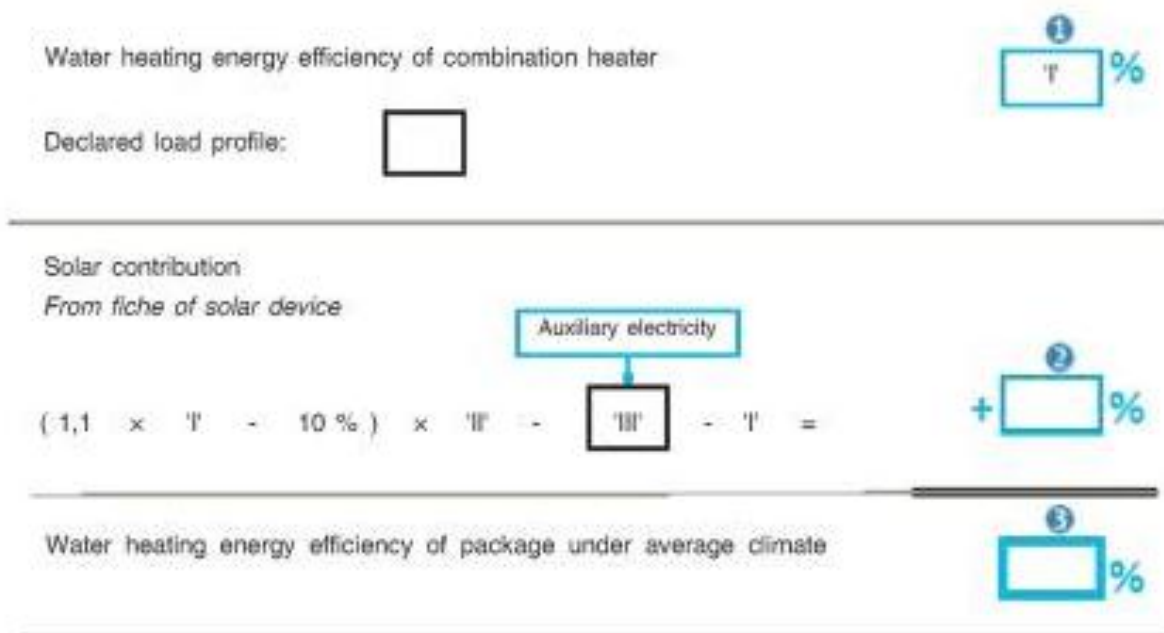


Figure 5 (811/2013): Calculation scheme for preferential boiler combination heaters (water heating energy efficiency)



Water heating energy efficiency class of package under average climate

		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		G	F	E	D	C	B	A	A ⁺	A ⁺⁺
<input type="checkbox"/> M	< 27 %	≥ 27 %	≥ 30 %	≥ 33 %	≥ 36 %	≥ 39 %	≥ 65 %	≥ 100 %	≥ 130 %	≥ 163 %
<input type="checkbox"/> L	< 27 %	≥ 27 %	≥ 30 %	≥ 34 %	≥ 37 %	≥ 50 %	≥ 75 %	≥ 115 %	≥ 150 %	≥ 188 %
<input type="checkbox"/> XL	< 27 %	≥ 27 %	≥ 30 %	≥ 35 %	≥ 38 %	≥ 55 %	≥ 80 %	≥ 123 %	≥ 160 %	≥ 200 %
<input type="checkbox"/> XXL	< 28 %	≥ 28 %	≥ 32 %	≥ 36 %	≥ 40 %	≥ 60 %	≥ 85 %	≥ 131 %	≥ 170 %	≥ 213 %

Water heating energy efficiency under colder and warmer climate conditions

Colder: $\eta \times 0,2 + \eta' = \eta''$ ③ %

Warmer: $\eta \times 0,4 + \eta' = \eta''$ ③ %

5.4. Packages where not all information is available

In the case of packages providing domestic hot water using a space heater the water heating energy efficiency might not be available, or might only be available for a combination of the space heater with a specific hot water storage tank (tested at the appliance level).

In this case, the dealer would not be able to provide the package label unless certain assumptions are made to estimate η_{wh} of a standard boilers used in solar packages.

The methods presented in this chapter are for use with solar packages and are not intended to be used as a way of labelling a space heater for its potential water heating efficiency when used with a conventional single coil cylinder.

5.4.1. Packages of water heater and solar device

For packages using a boiler space heater, the following calculation method is proposed.

$$\eta_{wh_calc} = \frac{Q_{ref}}{Q_{fuel} + CC \cdot Q_{elec} + Q_{cor}}$$
$$Q_{fuel} = \left(Q_{ref} + \left(24 - \frac{Q_{ref}}{P_4} \right) \cdot P_{stby} \right) \cdot \left(\frac{100}{\eta_4} \right)$$
$$Q_{elec} = Q_{elec,on} + Q_{elec,stby} = (24 - t_{on}) \cdot PSB + t_{on} \cdot el_{max}$$
$$t_{on} = \left(Q_{ref} + \left(24 - \frac{Q_{ref}}{P_4} \right) \cdot P_{stby} \right) \cdot \frac{1}{P_4}$$

All the necessary data can be found in the relevant Annexes of the Regulations or in the data sheet of the boiler.

This method makes a series of simplifications:

- The smart control factor is not used as it does not apply in this context;
- The tank losses are set to 0 as they are already considered in the SOLCAL method.

This method is only applicable to packages with a load profile M, L, XL and XXL.

Several tests have been carried out in order to verify the applicability of the proposed method, the results of which are shown below.



In order not to create an incentive driving the market towards calculation instead of measurements and to ensure that adequate information is provided to consumers the water heating energy efficiency to be used for the purposes of the package label when the calculation method is being used shall be corrected using the formula below:

$$\eta_{wh} = \eta_{wh_calc} \cdot 0.95$$

The graphic presented above is based on a series of 30 tests carried out according to EN 13203-2:2006 and the calculation method presented above.

If a normal error distribution is presumed, the correction applied to calculated results makes them more conservative than measured ones in around 90% of the cases.

5.4.2. Packages of heat pump and solar device

For packages using a heat pump space heater, the following calculation method is proposed:

$$\eta_{wh_calc} = f \cdot \frac{COP_N}{CC} \cdot \frac{Q_{ref}}{Q_{ref} + S \cdot 24h}$$

All the necessary data can be found in the relevant Annexes of the Regulations or in the data sheet of the heat pump.

The adjustment factor f is to be chosen according to the table below:

Type	Outdoor air		Exhaust air	Brine	Water
	Colder	Warmer	All		
Climate	Average	Colder	Warmer	All	All
f	0.919	0.840	1.059	0.888	0.914

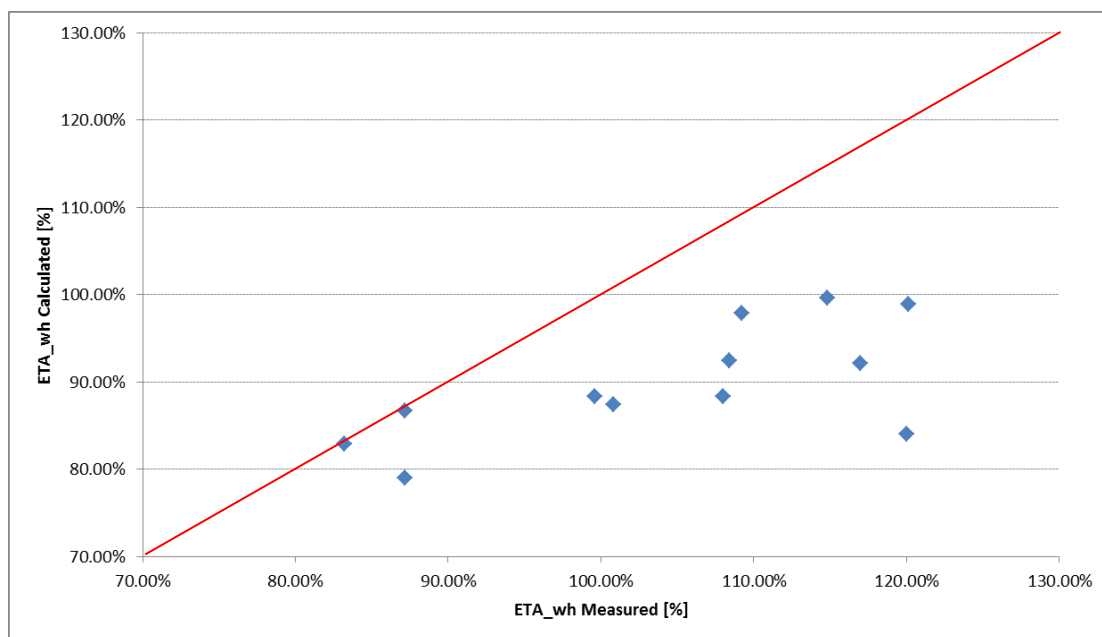
This method makes a series of simplifications:

- The total energy demand is provided by charging the tank at 60°C, in consequence, this method does not apply to low-temperature heat pumps;

- At least 0.25 m² of heat exchanger surface are used per kW of thermal capacity;
- The storage losses are pre-determined by standard measurement at a storage temperature of 65°C;
- The smart factor is not taken into consideration;
- The approach is suitable for heat pumps with electrically driven compressors.

The load profile to be selected is to be done according to the table below according to the storage capacity. The load profile to be selected is the next smaller one.

Profile	Capacity @ 40°C	Minimum volume [55°C]
L	130	87
XL	210	140
XXL	300	200
3XL	520	347
4XL	1040	693



In order not to create an incentive driving the market towards calculation instead of measurements and to ensure that adequate information is provided to consumers the water heating energy efficiency to be used for the purposes of the package label when the calculation method is being used shall be corrected using the formula below:

$$\eta_{wh} = \eta_{wh_calc} \cdot 0.95$$

The graphic presented above is based on a series of 13 tests carried out according to EN 16147:2011 and the calculation method presented above.

If a normal error distribution is presumed, the correction applied to calculated results makes them more conservative than measured ones in around 94% of the cases.

6. FREQUENTLY ASKED QUESTIONS

Use and obligations regarding the label

1. *Is voluntary application of the label before the official introduction admitted? How to ensure uniform application in the EU?*

Voluntary application of the label before the official implementation date is not allowed under the Energy Labelling Directive which establishes that the supply and subsequent display of a label before the date specified in a delegated act falls under "unauthorized use" of the label, which is defined in Article 2(k) of the Directive as the use of the label, other than by Member State authorities or EU institutions, in a manner not provided for in the Directive or in a delegated act. Delegated acts specify the date from which a particular label shall be supplied. If it is supplied and subsequently displayed before that date the label is thus used in a manner not provided for in the delegated act.

Label classes (e.g. A⁺⁺⁺), that are subject to further regulatory measures, must not be used before the date of coming into force of that specific label.

It is to be recognised that manufacturers need time to prepare for the coming into force of the requirements. In this respect, the Commission services would not recommend market surveillance authorities to take actions against a manufacturer providing the label through its distribution chain a reasonable amount of time before the date of application of the requirements (i.e. 26 September 2015).

2. *Can the energy label be displayed before application at trade fairs, where products are not sold and end-users do not have access (the fairs are only for professional intermediates, such as installers)?*

The energy labelling Regulations establish that the dealer has to ensure that each space or water heater bears the label at the point of sale. During a trade fair, placing on the market is not taking place, there is no obligation to display the label and at the same time information can be provided to professionals about the energy labelling class of the product. Even if no energy labelling legal requirements apply, common sense dictates that in order to provide accurate information, the labels displayed shall be in line with the relevant regulations.

3. *Should the energy label be delivered together with the heater (space heater, combination heater, water heater), inside the box, or could it be "provided for each space heater" by means of separate literature regarding the product, websites, brochures, evidence at sales point, etc.?*

According to Article 3 of Regulation 811/2013, the label shall be printed; there is no specific indication on where providing it, but Websites cannot be used to provide "printed" labels. It is to be understood that the dealer has to be provided with correct and clear information on the energy performance of heaters. The label may be delivered together with supplementary material and does not have to be delivered with each product as long as a sufficient number of labels are provided. For heat pump space heaters there is a specific provision indicating that the label has to be provided at least in the packaging of the heat generator.

4. ***With regard to the obligation to communicate the efficiency class, the definitions of energy related information and technical parameters are unclear (e.g. are dimensions technical parameters?).***

Dealers are obliged to provide information on the energy efficiency of the product together with any technical promotional material or together with information describing the technical parameters of the product. The technical parameters are reflected in Annex V of the Regulations. Dimensions are not listed as technical parameters.

5. ***Is a price list of the supplier, which is used for dealers only, defined as technical promotional material?***

Any advertisement relating to a specific product and containing price information has to include a reference to the efficiency of the product. As price lists obviously include information on prices, they are covered by this obligation.

6. ***For combination boilers with components delivered separately, should the manufacturer use one or two labels when bringing the products to the market? What if components are then sold separately by anybody in the distribution chain?***

If the boiler and the domestic hot water tank are sold under two different model identifiers, then the domestic hot water tank is considered as a hot water storage tank and the two components shall be labelled separately. They also need to be tested as individual products and meet the minimum requirements set for them.

7. ***How to deal with the labelling and ErP requirements of hybrid products made by the combination of two or more technologies in one casing, delivered on the market by one supplier? How to deal with heat pump integrating a fossil fuel supplementary heater?***

A “hybrid” put on the market consisting of two or more technologies integrated in one casing would be considered a “product”. A hybrid consisting of a heat pump and a gas boiler is to be considered a heat pump as boiler space heaters are defined as space heaters that generate heat using the combustion of fuel and / or the Joule effect.

In the absence of a calculation methodology for heat pumps integrating a fossil fuel supplementary heater, suppliers can use the same methodology proposed by EN 14825 for electrical supplementary heaters by replacing performances of electrical supplementary heater with the performances of fossil fuel supplementary heater. It is up to the standardisation process to develop specific standards for these hybrid products.

8. ***How can cogeneration space heaters that also provide domestic hot water be labelled?***

Cogeneration space heaters are defined as space heaters that simultaneously generate heat and electricity in a single process. In principle, they can also be designed to also provide heat to deliver hot drinking or sanitary water at given temperature levels, quantities and flow rates during given intervals and be connected to an external supply of drinking or sanitary water.

In such cases, information about their water heating energy efficiency shall also be provided in the energy label, by using one of the following two options:

- Use the labels foreseen in Regulation 811/2013 for cogeneration space heaters and for combination heaters.
- Use the label foreseen in Regulation 811/2013 for combination heaters including the pictogram corresponding to the electricity function.

It is to be noted that the seasonal space heating energy efficiency of combination heaters needs to be determined according to point 3 of Annex VII of Regulation 811/2013. In the case of their water heating energy efficiency, point 5 needs to be applied, which mean that their electrical efficiency is only taken into account for the determination of their seasonal space heating energy efficiency. When the review of the Regulations is carried out, this point is to be taken into account.

9. ***Have solar hot water storage tanks (solar devices designed to be connected to solar collectors) to comply with ErP requirements and to be labelled as hot water storage tanks?***

A solar hot water storage tank is a subcategory of a hot water storage tank and has in consequence to meet the relevant requirements under the Regulations.

10. ***How to label a water heater with a rated heat output < 70 kW, declared ErP compliant according to load profile 4XL (Reg. 814/2013). Is it correct to label this appliance using load profile 2XL (the highest one given by the Labelling regulation 812/2013)?***

The water heater is in the scope of the energy labelling Regulation and in consequence needs to be labelled. The load profile to be used is one of the load profiles provided in such Regulation.

11. ***Is it mandatory to label a solar natural circulation system as a hot water storage tank?***

A natural circulation system consists of a solar hot water storage tank specifically designed to be connected to one or more solar collectors. The product is only able to work in this specific configuration and is sold using a single model identifier.

The natural circulation system is a solar only system. If the tank is never sold as a single device, it does no need to be labelled as a hot water storage tank. The necessary information for issuing the package label shall be provided.

12. ***Can the symbol of the sound power level be removed from the label of conventional or solar water heaters (not subject to Ecodesign requirements on sound power level)?***

The format of the label shall be respected, the symbol cannot be removed. The transitional methods (2014/C 207/3) provide information about the determination of the sound power level of different types of water heaters.

13. ***Does a manufacturer that is placing a package on the market need to provide both the package label and the product label?***

Yes. Any economic actor that is placing a package on the market has to fulfil the obligations set out by the Regulation and needs to provide the package label. If in addition it is also placing the different components on the market, it also needs to provide the product labels.

14. *How to deal with packages of space heater, temperature control and solar device made with storage tanks larger than 500 l ?*

Energy label classes are only provided for storage tanks with a capacity up to 500 l. Packages incorporating a storage tank with a volume larger than 500 l and a space heater or water heater with a capacity below 70 kW are in principle covered by the definitions of the Regulations.

In order to properly calculate the solar contribution, the tank rating can be calculated according to the standing loss S using table 4 of Regulation (EU) 811/2013.

15. *When a heater or combination heater is sold for use only outdoors, what should be shown on the Energy Label and the product fiche regarding indoor sound power level?*

In this case, indoor sound power level is not applicable.

16. *Shall the energy label and the product fiche include information for the colder climate conditions even if the product is not intended to be used under such conditions?*

Single market rules establish that products can move freely through the EU, it is in consequence necessary to provide information for the different climate conditions independently of where the product will be placed on the market. The Regulations do not establish that any climate condition is optional.

17. *Model series of heat pumps that consists of e.g. 3 to 5 different outdoor units of various heat capacities may be combined with several indoor units, normally containing a storage tank, supplementary heater and a control. Each part can be sold as a spare part or be used in combination with one or several other parts. Each part is however not intended to be used on its own. The final decision on which parts to combine is made by the installer on the basis of the heat demand and other technical requirements. When these types of products are sold through wholesalers the manufacturer does not know which units that will be combined at the point of sale to the end consumer. Under these circumstances clarity should be provided regarding what labels need to be provided by the manufacturer.*

Article 3 “Responsibilities of suppliers and timetable” of the Directive states that for heat pump space heaters and heat pump combination heaters, an energy label has to be provided with the heat generator. It does not say that the supplier is obliged to provide all possible labels that may apply to the product in the packaging. The supplier may choose to deliver one label of on possible combination and it is reasonable that this label should reflect the most common combination and that the packaging should contain information on where and how information on all other combinations and respective labels may be found. The label should clearly show in the field for the model identifier, what combination it represents.

Article 3 does not restrict the supplier to provide only one label. The supplier may provide a space heater product label, as well as a combination heater product label and package label for common combinations.

If the indoor unit is not intended to be used on its own, but only in combination with a specific type of heat generator, it should not be treated as a product on its own and does thus not require an energy label. However if the indoor unit is a storage tank that may be used in combination with any type of boiler or heat pump it has to be labelled as a storage tank.

- 18. *Shall the negative contribution $F(1)=3\%$ be used even though the product has an integrated control and is therefore not intended to be used in a package with any further control?***

Yes. Otherwise there is risk for misuse of the bonus values for the different controls, that they are added on the package label by the dealer, even though no reduction of $F(1)=3\%$ had been done on the declaration on the product label.

- 19. *In addition to the product label, is it also possible to put a package label (heat pump + temperature control) on the unit, for which the bonus value for the temperature control (1,5 – 5%) is added to the etas value? If not, the brine-to-water heat pumps will not be able to benefit from advanced temperature controls.***

It is possible for the manufacturer (supplier) to prepare a package label for different combinations of the heat pump space heater and different types of control and distribute them with the space heater. Then the dealer can select and fill in the appropriate number on the package label and fiche for the control system he/she sells or offers the consumer together with the heat pump space heater. The appropriate number and type of sensors and/or thermostats for the selected temperature control class shall be included in the package. If the manufacturer or supplier fill in and finalize the package label and fiche, the appropriate number of sensors must be sold together with the space heater and temperature control.

- 20. *In the case of products that can be marketed and used in more than one way (for instance indoor units of heat pumps or water storage tanks that can be connected to different hydronic heat sources, how should they be labelled?***

They shall be labelled according to how they are marketed. This means that the same product can be marketed and labelled in two or more different ways. The product also needs to fulfil the ecodesign requirements for the different applications.

If two different labels apply, both can be shown.

- 21. *How shall the dealer declare and label combinations of more than two space heaters?***

If more than two heat pumps are installed together, it is sufficient that the separate space heaters are labelled with a product label. The dealer can of course calculate the expected performance of the package and include that in the offer (but not on a package label as this combination is not covered by its definition).

22. ***In the heat pump and solar system labels, there are "European temperature maps" and "European solar maps" displaying three zones. Where can we find a precise definition of these zones?***

These zones were defined during the development of Regulation 206/2012 on air conditioners and are based on the climatic conditions of Strasbourg, Helsinki and Athens. Nevertheless, these zones are only indicative.

23. ***Are templates of the labels available for stakeholders to download?***

Templates for the labels are available on the DG ENER Website.

http://ec.europa.eu/energy/efficiency/labelling/labelling_en.htm

24. ***If a heat pump combination heater is labelled with domestic hot water efficiency for a given profile, does it mean that the capacity and the efficiency for the space heating mode must be declared for the same ventilation exhaust rate?***

No, different ventilation exhaust rates can be used if the heat pump has been tested for them and if they apply to the different operation modes.

Conformity assessment

25. ***For boilers, which items are covered by third party certification under Article 7(2) and 8 and Annexes III to V of Council Directive 92/42/EEC?***

According to Regulation (EU) 813/2013, all the items applicable under Articles 7(2) and 8 and of Annexes III to V of the Boiler Efficiency Directive 92/42/EEC (BED) shall be identical to the scope of Council Directive 92/42/EEC. In effect, this means that third party certification only applies to the energy efficiency of boilers fired by liquid or gaseous fuels which were previously covered by the BED.

Third party certification should therefore only apply to the efficiency values like the values declared in the BED, so that the existing conformity assessments delivered by Notified Bodies under the BED – i.e. calculated value out of the measured full load efficiency and part load efficiency – are still valid (or default values can be applied as stated in the transitional methods).

26. ***For boilers which items are applicable under Articles 7(2) and 8 of and Annexes III to V of Council Directive 92/42/EEC?***

All the items applicable under Articles 7(2) and 8 of and Annexes III to V of Council Directive 92/42/EEC shall be identical to the scope of Council Directive 92/42/EEC. In effect, this means hot-water boilers fired by liquid or gaseous fuels, covering the parameters covered in the past. In consequence the full load efficiency and the part load efficiency are the covered items.

27. ***Which Bodies can act as a Notified Body using Regulation 813/2013 and what are the notification criteria?***

Clause 8 and Annex V of Council Directive 92/42/EEC continue to apply and therefore Notified Bodies continue to exist under Council Directive 92/42/EEC. Applications of new Bodies looking to become a Notified Bodies shall be based upon clause 8 & Annex V of Council Directive 92/42/EEC. Member states repealing Council Directive 92/42/EEC (with the exception of

Articles 7(2) and 8 of and Annexes III to V), shall continue the notification of Notified Bodies under Directive 92/42/EEC. For this, Notified Bodies shall comply with the minimum criteria as given in Annex V of 92/42/EEC.

28. *What is the authorization of a Notified Body in respect to Regulation 813/2013?*

A Notified Body notified under Directive 92/42/EEC is authorized to perform: The conformity procedure in accordance with module B as described in Annex III of Directive 92/42/EEC. Where the type meets the efficiency requirements of Regulation 813/2013 the Notified Body issues an EC type-examination certificate using Regulation 813/2013 as the reference (instead of 92/42/EEC).

The conformity procedure in accordance with module C, D or E as described in Annex IV.

Other questions

29. *Can it be indicated that electric instantaneous electronically controlled water heaters are more efficient than electric instantaneous hydraulically controlled water heaters?*

The calculation of the water heating energy efficiency of water heaters is based on the tapping profiles provided in the Regulations. These tapping profiles are based on the energy content of the withdrawn water.

In the case of electric instantaneous water heaters (EIWH) different technologies exist, hydraulically and electronically controlled products. Electronic electric instantaneous water heaters (EEIWH), through an electronic control system are better able to fine-tune the electrical power consumption to heat up the water to the requested water temperature, without the need of mixing cold water. This results in a reduction of the energy consumption when comparing EEIWHs to simple hydraulic electric instantaneous water heaters (HEIWH) for a real daily usage.

If cases where EEIWHs save energy compared with HEIWHs, manufacturers of EEIWHs might indicate that the product saves energy when compared with hydraulic electric instantaneous water heaters (HEIWH).

30. *How to define a product made by a solar hot water storage tank specifically designed and connected with a solar collector, an electrical resistance and a bracket, put on the market as one single unit?*

If the electrical resistance operates as a backup immersion heater for the purpose of safety only (e.g. avoiding frosting), then the product is a solar only system.

If the electrical resistance is used for satisfying the required comfort levels, this product must be considered as a solar water heater.

31. *How to define a product made by a solar hot water storage tank with a pump and a controller placed on the market as one single unit? How shall it be labelled?*

It is a solar hot water storage tank, with a pump and a controller as defined by Regulation 812/2013 Annex I, point 39. It cannot be considered as solar only

system because solar collectors are missing. In consequence, the product shall be labelled as a hot water storage tank.

32. ***For heat pump water heaters which use ventilation exhaust air or indoor air or brine or water as the heat source, how to fill in the data for the colder and warmer conditions (these conditions do not apply to these kinds of products)?***

In the case of heat pump water heaters using indoor air, exhaust air, brine or water as a heat source, there is no possible differentiation according to climate conditions. However, to determine the efficiency, the different loads might apply, resulting in different outlet temperatures. As such, the efficiency for each climate could be different and in this case, data for of climates is needed. In cases where there is no differentiation between climates, all 3 fields can be filled with the same values.

33. ***What is the maximum tapping profile to be used to test water heaters < 400kW having a rated capacity exceeding tapping profile 4XL?***

The water heater is in the scope of Regulation 814/2013 and in consequence needs to meet the minimum requirements set. The water heater is to be tested with the highest declared tapping profile (e.g. 4XL).

34. ***A hot water storage tank isn't included in the definitions of package in article 2 of Regulation 811/2013 but is included in the description of packages in Annex III. Do a space or combination heater, a hot water storage tank and a solar device and / or temperature controls make a package too?***

Yes, the definitions of packages indicate that they must include a space or combination heater combined with solar device and / or temperature controls. A hot water storage tank does not prevent a package meeting the above definition to be considered as such.

35. ***The product fiches describe in Regulations (EU) 811/2013 and 812/2013 are slightly different. How could we have a harmonisation to make the document management easier?***

The format of the fiches provided in the Regulations is indicative. The key requirement is that the information requested is made available by the supplier. Therefore, the supplier can always construct a single fiche covering all the necessary information. Other information, considered relevant by the supplier, might also be provided.

36. ***How can the manufacturer of "boilers" put on the market without burner verify and declare the compliance of the boiler to the ecodesign and labelling requirements?***

"Boilers" not equipped with a burner (heat generator) are excluded from the scope of the Regulations according to the definition of "space heater". However, burners (heat generators) are included into the scope unless they are covered by the exclusion given in Article 1 of Regulation 813/2013 and 814/2013.

37. ***What is the definition of preferential heater?***

A preferential heater is a heater that generates heat in cases where the heat demand is lower than or equal to its rated output.

In general, a preferential heater is a heater which is to be switched on first (usually because it gives the best efficiency). Only if the heat demand exceeds the output of the preferential heater, the supplementary heater is switched on.

38. ***In Regulation 811/2013, manufacturers have to indicate the “annual energy consumption” in the product fiche based on the “annual heating demand”. The annual heating demand is defined only for heat pumps, not for boilers. Is Q_{HE} mandatory for boilers? If yes, how should it be calculated?***

The methodology for calculating Q_{HE} is to be reflected in the relevant standards that are currently under development. TC 109/WG1 has developed the following methodology.

The reference annual energy consumption Q_{HE} of space heating for boilers for average climate condition, expressed in GJ is calculated according to the formula below:

$$Q_{HE} = \frac{H_{eh} \times P_{design}}{\eta_s} \times \frac{3,6}{1000}$$

H_{eh} is 2066 number of hours per year as equivalent number of hours used for calculation of reference heating season (A) average H;

P_{design} is the nominal output P_n multiplied by 800 and divided by 2066 or the arithmetic mean of the maximum and minimum useful heat output P_a multiplied by 800 and divided by 2066, expressed in kilowatts (kW).

39. ***Should a burner used for replacement comply with ecodesign requirements after 26 September 2018?***

A burner (heat generator) used for replacement is out of the scope of the regulation from the moment if designed for replacing an identical heat generator used in a heater or heater housing placed on the market before 1 January 2018.

40. ***In the load profiles S-XXL for water heaters, there is a parameter T_p , ‘peak temperature’, that should be achieved during tapping. The definition of T_p is as follows: “‘peak temperature’ (T_p) means the minimum water temperature, expressed in degrees Celsius, to be achieved during water draw-off, as specified in Annex III, Table 1”. For how long time should T_p be achieved during tapping? Should it be during the whole tapping, or is it enough with a few seconds?***

Peak temperature (T_p) means the minimum water temperature, expressed in degrees Celsius, to be achieved during water draw-off, as specified in Annex III, table 1. The peak temperature T_p shall be calculated as a mean value over the water draw-offs with a minimum value as specified in the tapping cycles.

In cases where the peak temperature is not reached, the relevant standards need to correct the energy consumption of the water heater by assuming an additional electricity consumption in order to reach this temperature.

41. *How should water heaters that are installed together with a mixing valve be tested?*

As indicated in the transitional methods, water heaters have to be tested in the “out of the box” mode, this means that if the water heater is delivered with the mixing valve or it is indicated that it must be used, the water heater is to be tested with the mixing valve.

42. *Which heat output shall be given on the energy label for a heat pump with variable heat capacity?*

The heat output on the energy label is the design load for heating P_{designh} for which the η_s value had been calculated for.