Disclaimer
This is a working document supporting the discussion of the revision of REGULATION (EU) 812/2013 laying down energy labelling requirements for water heaters. It sets out a draft version of the revised legal text to support the stakeholders' consultation process, in particular the Consultation Forum meeting of 27 April 2023.
Please note that while this draft document has been prepared by DG ENER staff and its consultants, it is by no means an official document endorsed by the European Commission

DRAFT

COMMISSION DELEGATED REGULATION (EU) No [XXX/XXXX]

of [date]

supplementing Regulation (EU) 2017/1369 of the European Parliament and of the Council with regard to energy labelling of water heaters, hot water storage tanks and packages of water heater and solar device, repealing Commission Regulation (EU) No 812/2013

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU (1[1]), and in particular Article 11(5) and Article 16(1) thereof,

Whereas:,

1)

2)

HAS ADOPTED THIS REGULATION:…

[1] OJ L 198, 28.7.2017, p. 1

Article 1

Subject matter and scope

1) This Regulation establishes requirements for the energy labelling of, and the provision of supplementary product information on, instantaneous water heaters with a rated heat output not exceeding 70 kW, storage water heaters with a storage volume not exceeding 2000 litres, hot water storage tanks with a storage volume not exceeding 2000 litres and water heater packages.

2) This Regulation shall not apply to:

   a) water heaters specifically designed for using gaseous or liquid fuels predominantly produced from biomass and which cannot operate using gaseous or liquid fossil fuels;

   b) water heaters using solid fuels;

   c) water heaters within the scope of Directives 2010/75/EU ([2]) and (EU) 2015/2193 ([3]) of the European Parliament and the Council;

   d) water heaters within the scope Commission Regulation (EU) 2015/1186 ([4]) with regard to energy labelling requirements for local space heaters;

   e) combination heaters as defined in Article 2 of Commission Delegated Regulation (EU) xx/xx on space and combination heaters;

   f) water heaters which cannot provide hot water at least in accordance with at least the load profile with the smallest reference energy as specified in Annex VIII, Table 10;

   g) water heaters intended for making hot drinks and/or preparing food only;

   h) cogeneration water heaters with a maximum electrical capacity of 50 kW or above;

Article 2

Definitions

In addition to the definitions set out in Article 2 of Regulation (EU) 2017/1369, the following definitions shall apply for the purposes of this Regulation:

1) 'instantaneous water heater' means a water heater which heats sanitary water on demand as it flows through the appliance;

2) 'water heater' means a product that:

   a) is permanently connected to a domestic distribution system as defined in Directive (EU) 2020/2184;

   b) is equipped with one or more water heater heat generators;

   c) to heat water for domestic purposes such as, but not limited to, personal hygiene, washing, cleaning or cooking;

   whereby a heat generator for a water heater and a housing designed to be equipped with such a heat generator shall, together, be considered a water heater;

[2] OJ L 334, 17.12.2010, p. 17–119 on industrial emissions (integrated pollution prevention and control)
[3] *OJ L 313, 28.11.2015, p. 1–19 on the limitation of emissions of certain pollutants into the air from medium combustion plants*
[4] *OJ L 193, 21.7.2015, p. 20-42 on* labelling of local space heaters

3) ‘water heater heat generator’ means the part of a water heater that generates heat using one or more of the following processes:

   a) the combustion of liquid and/or gaseous fuels;

   b) the conversion of electricity into heat, without using a thermodynamic cycle;

   c) the capture of ambient, geothermal, and/or waste heat, using a thermodynamic cycle, driven by combustion of fuels or electric energy;

   d) the electrochemical conversion of chemical energy from a fuel and an oxidising agent into heat and power;

4) ‘rated heat output’ ($P_{rated,wh}$) means the heat output of the water heater when providing water heating at standard rating conditions, expressed in kW;

5) ‘water heater housing’ means the part of a water heater designed to have a heat generator fitted;

6) ‘storage water heater’ means a water heater equipped with a hot water storage tank(s) placed on the market as one unit;

7) ‘storage volume’ (V) means the volume of water stored by a storage water heater or in a hot water storage tank for water and/or space heating purposes, or the 'equivalent volume' in case the storage tank contains PCM materials, expressed in litres;

8) ‘PCM material’ means a material that undergoes a transition between liquid and solid states at a temperature higher than the cold water inlet temperature and lower than or equal to the maximum water temperature at which the storage tank is allowed to be operated;

9) ‘equivalent volume’ (V_{eq}) means a representation of the volume of a hot water storage tank containing PCM material, in litres,;

10) ‘hot water storage tank’ means a vessel for storing hot water, including any additives, for water and/or space heating purposes which is not equipped with a heat generator except possibly one or more back-up immersion heaters and which is not inseparable from or tested in unison with (a) solar collector(s);

11) ‘back-up immersion heater’ means a Joule effect electric resistance water heater heat generator in a multivalent tank which generates heat only when the external heat source is disrupted (including during maintenance periods, or when solar irradiance is not sufficient to satisfy required comfort levels) or out of order;

12) ‘biomass fuel’ means a gaseous or liquid fuel produced from biomass;

13) ‘water heater package’ means a configuration of a water heater (instantaneous water heaters with a rated heat output not exceeding 70 kW, storage water heaters with a storage volume not exceeding 2000 litres) combined with solar devices and/or shower water heat recovery devices or a thermosiphon / ICS solar device, possibly combined with a shower water heat recovery device and/or a water heater (instantaneous water heaters with a rated heat output not exceeding 70 kW, storage water heaters with a storage volume not exceeding 2000 litres);

14) ‘solar device’ means the part or parts of a water heater package comprising one or more solar collectors and possibly one or more hot water storage tanks pumps in the collector loop and other parts, which is not equipped with any additional heat generator except possibly one or more back-up immersion heaters;

15) ‘thermosiphon / ICS solar device’ means a solar device with at least a solar thermal collector, a hot water storage tank and a back-up immersion heater, which is not equipped with a water heater, of which the solar collector(s) and hot water storage tank form an inseparable unit or have been tested in unison in order to determine the solar device efficiency, and which is placed on the market as a single unit;

16) ‘shower water heat recovery device’ means that part of the water heating package where heat of spent shower water directed to sewage is transferred instantaneously to incoming cold water supplying the water heater and/or shower tap;

17) ‘standard rating conditions’ means the operating conditions for establishing the rated heat output, water heating energy efficiency, sound power level and nitrogen oxide emissions of water heaters, and for establishing the standing loss of hot water storage tanks;

18) ‘biomass’ means the biodegradable fraction of products, waste and residues from biological origin from agriculture (including vegetal and animal substances), forestry and related industries including fisheries and aquaculture, as well as the biodegradable fraction of industrial and municipal waste;

19) ‘load profile’ means a sequence of water draw-offs, as specified in Annex VIII, Table 10;

20) cogeneration water heater’ (CHPWH) means a water heater that simultaneously produces sanitary hot water and electric energy in a single process

21) ‘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 VIII, Table 10;

22) ‘useful water flow rate’ (f) means the minimum flow rate, expressed in litres per minute, for which heated water is contributing to the reference energy, as specified in Annex VIII, Table 10;

23) ‘useful water temperature’ (Tm), means the water temperature, expressed in degrees Celsius, at which heated water starts contributing to the reference energy, as specified in Annex VIII, Table 10;

24) ‘useful energy content’ (Qtap) means the thermal energy content of heated water, expressed in kWh, provided at a temperature equal to, or above, the useful water temperature, and at water flow rates equal to, or above, the useful water flow rate, as specified in Annex VIII, Table 10;

25) ‘energy content of hot water’ means the product of the specific heat capacity of water, the average temperature difference between the heated water output and cold water input, and the total mass of the hot water delivered;

26) 'peak temperature' (Tpeak) means the water temperature, expressed in degree Celsius, to be achieved during the water draw-off, as specified in Annex VIII, Table 10;

27) ‘reference energy’ (Qref) means the sum of the useful energy content of water draw-offs, expressed in kWh, in a particular load profile, as specified in Annex VIII, Table 10;

28) ‘Electric power output’ means the electric power produced by the cogeneration water heater at nominal heat input;

29) ‘Electric efficiency’ means the electric power produced divided by the fuel power required by the cogeneration water heater at nominal heat input;

30) ‘water heating energy efficiency’ means the ratio between the useful heat provided by a water heater (η_{wh}) or water heater package (η_{pack}) and the energy (as primary energy) required for its generation, expressed in %;

31) ‘sound power level’ (L_{WA}) means the A-weighted sound power level, indoors and/or outdoors, expressed in dB, as set out in Annex III, section 3;

32) ‘standing loss’ (S) means the heating power dissipated from a hot water storage tank at standard rating conditions expressed in W;

33) *‘conversion coefficien*t’ (*CC*) means the default coefficient for primary energy per kWh electricity referred to in Directive 2012/27/EU of the European Parliament and of the Council[5]. The value of the conversion coefficient is *CC* = 1,9.[6]

34) ‘model identifier’ means the code, usually alphanumeric, which distinguishes a specific water heater, hot water storage tank, solar device of shower water heat recovery device from other models with the same trade mark, supplier’s name or dealer’s name;

35) ‘product database’ means a collection of data concerning products, which is arranged in a systematic manner and consists of a consumer-oriented public part, where information concerning individual product parameters is accessible by electronic means, an online portal for accessibility and a compliance part, with clearly specified accessibility and security requirements, as referred to in Regulation (EU) 2017/1369 of the European Parliament and of the Council [7];

For the purposes of Annexes II to IX, additional definitions are set out in Annex I.

Article 3

Obligations of suppliers

1) Suppliers placing water heaters on the market and/or putting them into service shall ensure that:

   a) a printed label in the format and containing the information set out in point 1.a), 2.a) or 3.a) of Annex III is provided, whereby the printed label is provided at least in the packaging of the heat generator;

   b) the parameters of the product information sheet, as set out in Annex IV, are entered into the product database;

   c) if specifically requested by the dealer, the product information sheet shall be made available in printed form;

   d) the content of the technical documentation, as set out in Annex V, is entered into the product database;

   e) any visual advertisement for a specific model of water heater, including on the internet, contains the energy efficiency class and the range of efficiency classes available on the label in accordance with Annex VI and Annex VII;

   f) any technical promotional material concerning a specific model of water heater, including on the internet, which describes its specific technical parameters, includes the energy efficiency class of that model and the range of efficiency classes available on the label, in accordance with Annex VII;

[5] Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC. OJ L 315, 14.11.2012, p. 1–56.
[6] Commission Delegated Regulation (EU) 2022/... on revising the primary energy factor for electricity in application of Directive 2012/27/EU of the European Parliament and of the Council, 15.12.2022
[7] Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU (OJ L 198, 28.7.2017, p. 1).

g) an electronic label in the format and containing the information as set out in point 1.a), point 2.a) or point 3.a) of Annex III, is made available to dealers;

h) an electronic product information sheet, as set out in Table 3 of Annex IV, is made available to dealers;

2) Suppliers placing hot water storage tanks on the market and/or putting them into service shall ensure that:

a) a printed label in the format and containing the information set out in point 5.a) of Annex III is provided;

b) the parameters of the product information sheet, as set out in Table 7 of Annex IV, are entered into the product database;

c) if specifically requested by the dealer, the product information sheet shall be made available in printed form;

d) the content of the technical documentation, as set out in Annex V, is entered into the product database;

e) any visual advertisement for a specific model of hot water storage tank, including on the internet, contains the energy efficiency class and the range of efficiency classes available on the label in accordance with Annex VI and Annex VII;

f) any technical promotional material concerning a specific model of hot water storage tank, including on the internet, which describes its specific technical parameters, includes the energy efficiency class of that model and the range of efficiency classes available on the label, in accordance with Annex VII;

g) an electronic label in the format and containing the information as set out in point 5.a) of Annex III, is made available to dealers;

h) an electronic product information sheet, as set out in Table 7 of Annex V, is made available to dealers;

3) Suppliers placing water heater packages on the market and/or putting them into service shall ensure that:

a) a printed label in the format and containing the information as set out in point 1 of Annex III is provided, whereby the printed label is provided at least in the packaging of the heat generator;

b) the parameters of the product information sheet, as set out in Table 6 Annex V, are entered into the product database;

c) if specifically requested by the dealer, the product information sheet shall be made available in printed form;

d) the content of the technical documentation, as set out in Annex V, is entered into the product database;

e) any visual advertisement for a specific water heater package, including on the internet, contains the energy efficiency class and the range of efficiency classes available on the label in accordance with Annex VI and Annex VII;

f) any technical promotional material concerning a specific water heater package, including on the internet, which describes its specific technical parameters, includes the energy efficiency class of that package and the range of efficiency classes available on the label, in accordance with Annex VII;

g) an electronic label in the format and containing the information as set out in point 1 of Annex III, is made available to dealers;

h) an electronic product information sheet, as set out in Table 6 of Annex IV, is made available to dealers;

4) Suppliers placing solar devices on the market and/or putting them into service shall ensure that:

a) the parameters of the product information sheet, as set out in Table 4 Annex IV, are entered into the product database;

b) if specifically requested by the dealer, the product information sheet shall be made available in printed form;

c) the content of the technical documentation, as set out in Annex V, is entered into the product database ;

5) Suppliers placing shower water heat recovery devices on the market and/or putting them into service shall ensure that:

a) the parameters of the product information sheet, as set out in Table 5 Annex IV, are entered into the product database;

b) if specifically requested by the dealer, the product information sheet shall be made available in printed form;

c) the content of the technical documentation, as set out in Annex V, is entered into the product database;

Article 4

Obligations of dealers

1) Dealers of water heaters shall ensure that

a) each water heater, at the point of sale, including at trade fairs, bears the label provided by suppliers in accordance with point 1.a) of Article 3, in such a way as to be clearly visible;

b) any visual advertisement for a specific model of water heater contains the energy efficiency class of that model and the range of energy efficiency classes available on the label, in accordance with Annex VI;

c) in the event of distance selling, the label and product information sheet are provided in accordance with Annex VII;

d) any technical promotional material concerning a specific model of water heater, including on the internet, which describes its specific technical parameters, includes the energy efficiency class of that model and the range of energy efficiency classes available on the label, in accordance with Annex VII;

2) Dealers of hot water storage tanks shall ensure that

a) each hot water storage tank, at the point of sale, including at trade fairs, bears the label provided by suppliers in accordance with point 2.a) of Article 3, in such a way as to be clearly visible;

b) any visual advertisement for a specific model of hot water storage tank contains the energy efficiency class of that model and the range of energy efficiency classes available on the label, in accordance with Annex VI;

c) in the event of distance selling, the label and product information sheet are provided in accordance with Annex VII;

d) any technical promotional material concerning a specific model of hot water storage tank, including on the internet, which describes its specific technical parameters, includes the energy efficiency class of that model and the range of energy efficiency classes available on the label, in accordance with Annex VII;

3) Dealers of water heater packages shall ensure that

a) each water heater package, at the point of sale, including at trade fairs, bears the label provided by suppliers in accordance with point 1(a) of Article 3, in such a way as to be clearly visible;

b) any visual advertisement for a specific model of water heater package contains the energy efficiency class of that model and the range of energy efficiency classes available on the label, in accordance with Annex VI;

c) in the event of distance selling, the label and product information sheet are provided in accordance with Annex VII;

d) any technical promotional material concerning a specific model of water heater package, including on the internet, which describes its specific technical parameters, includes the energy efficiency class of that model and the range of energy efficiency classes available on the label, in accordance with Annex VII;

e) where the dealer makes an offer for a package not placed on the market as such by a single supplier:

i) this package bears a label in accordance with point 1(a) of Article 3, in such a way as to be clearly visible, based upon information provided by suppliers under Article 3.1.b), 3.2.b), 3.3.b), 3.4.a) and/or 3.5.a). The dealer can use software for this purpose provided by third parties in accordance with Annex VIII. The dealer shall ensure that the model identifiers of the parts that make up the specific package are shown on the label;

ii) the obligations under b) to d) of this point are also met.

Article 5

Measurement and calculation methods

Information to be provided pursuant to Articles 3 and 4 shall be obtained by reliable, accurate and reproducible measurement and calculation methods which take into account the recognised state-of-the-art measurement and calculation methods, as set out in Annex VIII, following transitional provisions as indicated in Annex IX as appropriate.

Article 6

Verification procedure for market surveillance purposes

Member States shall apply the verification procedure laid down in Annex X when performing the market surveillance checks referred to in paragraph 3 of Article 8 of Regulation (EU) 2017/1369.

Article 7

Review

The Commission shall review this Regulation in the light of technological progress and present the results of this review including, if appropriate, a draft revision proposal, to the Consultation Forum no later than five years from the date of entry into force of this Regulation.

In particular, the review shall include an assessment of the following aspects:

- significant changes in sales and market shares, and energy aspects of different types of water heaters, hot water storage tanks, solar devices and/or shower water heat recovery devices and more specifically;
    - the appropriateness of setting stricter ecodesign requirements for water heating energy efficiency, sound power level and emissions of nitrogen oxides;
    - the appropriateness of setting stricter ecodesign requirements for the standing losses of storage tanks;
    - the appropriateness of setting ecodesign requirements for heaters specifically designed for using gaseous or liquid fuels predominantly produced from biomass;
- the energy classes of water heaters, hot water storage tanks and water heater packages, and the design of the energy label;
- the effectiveness of existing measures in achieving changes in end-user behaviour in purchasing more energy and resource efficient appliances and using more energy and resource efficient programmes;
- the possibility to address circular economy aspects;
- the validity of the conversion coefficient value (CC);
- the appropriateness of third-party certification and monitoring.

Article 8

Repeal

Commission Delegated Regulation (EU) No 812/2013 shall be repealed.

Article 9

Transitional measures

Until [*one day before date entry into force*] the product fiche required under Article 3, point (b), of Delegated Regulation (EU) No 812/213 may be made available through the product database instead of being provided in printed form with the product. However, where the dealer so requests, the supplier shall ensure that the product fiche is made available in printed form.

Article 10

Entry into force

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

It shall apply from date of application 1 September 2025. However, Article 10 shall apply from *(OJ office to include date of entry into force)* and Article 3(1), points (a) and (b), shall apply from four months before date of application (1 May 2025).

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

Done at Brussels, XX Month XXXX.

For the Commission

The President

Ursula VON DER LEYEN

ANNEX I

Definitions applicable for the Annexes

For the purposes of Annexes II to IX the following definitions shall apply,

Definitions related to water heaters and hot water storage tanks

1) 'electric storage water heater' (ESWH) means a storage water heater using the electric Joule effect for heating sanitary water;

2) ‘fuel storage water heater’(FSWH) is a storage water heater using the combustion of gaseous or liquid fuels for heating sanitary water, and which does not produce electric power or uses ambient energy for heating sanitary water;

3) 'electric instantaneous water heater' (EIWH) is an instantaneous water heater using the electric Joule effect for heating sanitary water;

4) ‘fuel instantaneous water heater’(FIWH) is an instantaneous water heater using the combustion of gaseous or liquid fuels for heating sanitary water ;

5) ‘heat pump water heater’ (HPWH) means a water heater using a thermodynamic cycle capturing ambient or geothermal energy and/or waste heat for heat generation, possibly supplemented by an electric resistance back-up heater;

6) ‘electric heat pump water heater’ (eHPWH) means a heat pump water heater the thermodynamic cycle of which is driven by an electric motor;

7) ‘thermally driven heat pump water heater’ (tdHPWH) means a heat pump water heater the thermodynamic cycle of which driven by heat from the combustion of fuels;

8) ‘conventional water heater’ means a water heater that generates heat using the combustion of fuels and/or the Joule effect in electric resistance heating elements;

9) ‘declared load profile’ means the load profile used for conformity assessment when determining water heating energy efficiency, as set out in Annex VIII, Table 10;

10) ‘daily electricity consumption’ (Q_{elec}) means the consumption of electricity over 24 consecutive hours under the declared load profile, expressed in kWh in terms of final energy, as set out in Annex VIII, section 4, sub (a);

11) ‘daily fuel consumption’ (Q_{fuel}) means the consumption of fuels over 24 consecutive hours under the declared load profile, expressed in kWh in terms of GCV, as set out in Annex VIII, section 4, sub (a);

12) ‘gross calorific value’ (GCV) means the total amount of heat released by a unit quantity of fuel when it is burned completely with oxygen and when the products of combustion are returned to ambient temperature; this quantity includes the condensation heat of any water vapour contained in the fuel and of the water vapour formed by the combustion of any hydrogen contained in the fuel;

13) ‘smart control’ means a device that automatically adapts the water heating process to individual usage conditions with the aim of reducing energy consumption;

14) ‘smart control compliance’ (*smart*) means the measure of whether a water heater equipped with smart control fulfils the criterion set out in Annex VIII, section 4, sub (d);

15) ‘smart control factor’ (*SCF*) means the water heating energy efficiency gain due to smart control under the conditions set out in Annex VIII, section 4, sub (d);

16) ‘weekly electricity consumption with smart controls’ ($Q_{elec,week,smart}$) means the weekly electricity consumption of a water heater with the smart control function enabled, expressed in kWh in terms of final energy;

17) ‘weekly fuel consumption with smart controls’ ($Q_{fuel,week,smart}$) means the weekly fuel consumption of a water heater with the smart control function enabled, expressed in kWh in terms of GCV;

18) ‘weekly electricity consumption without smart controls’ ($Q_{elec,week}$) means the weekly electricity consumption of a water heater with the smart control function disabled, expressed in kWh in terms of final energy;

19) ‘weekly fuel consumption without smart controls’ ($Q_{fuel,week}$) means the weekly fuel consumption of a water heater with the smart control function disabled, expressed in kWh in terms of GCV;

20) ‘annual electricity consumption’ (AEC) means the annual electricity consumption of a water heater under the declared load profile and under given climate conditions, expressed in kWh in terms of final energy;

21) ‘annual fuel consumption’ (AFC) means the annual fossil and/or biomass fuel consumption of a water heater under the declared load profile and under given climate conditions, expressed in kWh in terms of GCV;

22) ‘ambient correction term’ (Q_{cor}) means a term which takes into account the fact that the place where the water heater is installed is not an isothermal place, expressed in kWh;

23) ‘average climate conditions’(A), ‘colder climate conditions’(C) and ‘warmer climate conditions’(W) means for heat pump water heaters the temperatures of the heat source expressed as air temperature, inlet/outlet temperatures or bath temperatures, as defined in Table xx, and for solar devices the climate conditions for Würzburg, Stockholm and Athens respectively, as referenced in the relevant methods referenced in Annex IX;

24) 'off-peak water heater' means a water heater that is energised for a maximum period of 8 consecutive hours between 22:00 and 07:00 of the 24-hour tapping pattern in the load profiles.

25) ‘equivalent model’ means a model placed on the market with the same technical parameters set out in the applicable product information requirements of Annex II as another model placed on the market by the same manufacturer;

26) ‘Air flow rate’ (q_v) means the volumetric flow rate of air over the evaporator of outdoor air-to-water / indoor air-to-water / exhaust air-to-water heat pump water heaters as used to establish its water heating energy efficiency, at conditions as presented in Table 8 of Annex VIII;

27) ‘maximum ventilation exhaust air flow rate’ ($q_{v,maxw}$) means the maximum volumetric flow rate of exhaust air at temperature conditions set out in Annex VIII, Table 4, that is available to heat pump water heaters when establishing its water heating energy efficiency;

28) ‘temperature/flow dependency factor’ (F_{ctrl}) means a correction factor in the calculation of the water heater energy efficiency to account for the capability of the water heater to maintain a set water temperature independent of the water volume flow rate provided, as set out in Annex VIII, section 4, sub (a);

Definitions related to heat pump water heaters

29) ‘outdoor air-to-water’ means a heat pump water heater which captures aerothermal heat from outdoor air.;

30) ‘indoor air-to-water’ means a heat pump water heater which captures aerothermal heat from indoor air, including heated spaces;

31) ‘exhaust air-to-water’ means a heat pump water heater which captures aerothermal heat from ventilation exhaust air;

32) ‘brine-to-water’ means a heat pump water heater which captures geothermal heat using a fluid the temperature of which can be below 1°C;

33) ‘water-to-water’ means a heat pump water heater which captures geothermal or hydrothermal heat using a fluid the temperature of which cannot be below 1°C;

34) ‘direct exchange-to-water’ means a heat pump water heater which captures geothermal heat by direct heat exchange with the refrigerant;

Definitions related to hot water storage tanks

35) ‘standing loss’ (S) means the heating power dissipated from a hot water storage tank at standard rating conditions, expressed in W;

36) ‘multivalent tank’ means a hot water storage tank that allows heating its contents using at least two or more different heat exchangers or heat generators;

37) ‘mixed water at 40 °C’ (V40) means the quantity of water at 40 °C, which has the same heat content (enthalpy) as the heated water which is delivered above 40 °C by a hot water storage tank or storage water heater, measured using the same settings used for establishing the water heating efficiency of a water heater or standing losses of a storage tank, expressed in litres, as set out in Annex VIII, section 3, sub (j) and section 4, sub (c);

38) ‘reference hot water temperature’ (Θwh) means the temperature determined as the mean temperature value of the average temperatures during one single draw-off which ends when the hot water temperature is below 40 °C, measured simultaneously with the 'mixed water at 40°C, expressed in °C;

Definitions related to solar devices

39) ‘solar collector’ means a device designed to absorb solar irradiance and to transfer the thermal energy so produced to a fluid passing through it;

40) 'Gross Thermal Yield' (GTY) means the reference annual thermal yield of the collector array of the solar device for a specific climate calculated as the simple average of the thermal yield for the 25ºC and 50ºC collector operating temperature, in kWh/a;

41) ‘gross area’(*Ag*) means the maximum projected area covered by the outer dimensions of the collector array of the water heater package, expressed in m²;

42) ‘solar device efficiency factor’ ($\eta_{sol,wh}$) means a factor (>1) representing the contribution of a solar device to the water heating efficiency of a water heater package, as set out in Annex VIII, section 5;

43) ‘solar tank correction factor’ (f_{tank}) means a factor in the calculation of the solar device efficiency factor that depends on the energy efficiency class of the hot water storage tank of the solar device, as set out in Annex VIII, section 8;

44) 'non solar heat required' Q_{nonsol} is the part of the annual water heating demand which is not covered by the solar device yield and therefore must be provided by the water heater or back-up immersion heater, in kWh/a;

45) 'annual solar water heating demand' $Q_{wh,sol}$ is the water heating demand per year to be met by the combination of solar device and water heater, in kWh/a.

46) 'solar heat delivered' Q_{sol} is the part of the annual water heating demand which is covered by the solar device yield, in kWh/a

Definitions related to shower water heat recovery devices

47) ‘shower water heat recovery device factor’ (f_{SWHRD}) means a factor representing the water heating energy efficiency gains of a water heater package comprising a shower water heat recovery device;

48) 'shower water heat recovery efficiency' (ηSWHRD) means the thermal efficiency of the shower water heat recovery device calculated as the ratio of the heat recovered by the device divided by the heat supplied to the device;

ANNEX II

Energy efficiency classes

1. ENERGY LABEL CLASSES FOR WATER HEATERS AND WATER HEATER PACKAGES

The water heating energy efficiency class of a water heater shall be determined on the basis of its water heating energy efficiency as set out in Table 1.

The water heating energy efficiency of a water heater shall be calculated as set out in Annex VIII for the Average climate conditions.

Table 1 Water heating energy efficiency classes of water heaters, by declared load profiles, η_{wh} in %

Energy label class	**Declared tapping profiles**			
	3XS-XXS	**XS-S**	**M**	**L-XL-XXL 3XL-4XL**
A	$\eta wh \geq 55$	$\eta wh \geq 77$	$\eta wh \geq 177$	$\eta wh \geq 221$
B	$50 \leq \eta wh < 55$	$50 < \eta wh < 77$	$133 < \eta wh < 177$	$177 < \eta wh < 221$
C	$46 \leq \eta wh < 50$	$46 < \eta wh < 50$	$111 < \eta wh < 133$	$133 < \eta wh < 177$
D	$43 \leq \eta wh < 46$	$43 < \eta wh < 46$	$90 < \eta wh < 111$	$111 < \eta wh < 133$
E	$\eta wh < 43$	$\eta wh < 43$	$70 < \eta wh < 90$	$90 < \eta wh < 111$
F			$50 < \eta wh < 70$	$50 < \eta wh < 90$
G			$\eta wh < 50$	$\eta wh < 50$

Note to CF: The last two classes of 3XS-XXS are void because the products are EIWH/ESWH with a theoretical limit on one hand and a minimum efficiency on the other hand. Furthermore, the verification tolerance is 8% and there should be no 2-class jumps within that limit.

2. ENERGY LABEL CLASSES OF HOT WATER STORAGE TANKS

The energy label class of a hot water storage tank shall be determined on the basis of its standing loss as set out in Table 2

Table 2 Energy label classes of hot water storage tanks

Energy label class	**Standing loss S in Watts, with storage volume V in litres**	
	hot water storage tanks except multivalent tanks with a volume $\geq$ 80 L	**multivalent tanks with a volume $\geq$ 80 L**
A	$S < 3 + 2.5 * V^{0,4}$	$S < 3 + 3.0 * V^{0,4}$
B	$3 + 2.5 * V^{0,4} \leq S \leq 5,5 + 3.16 * V^{0,4}$	$3 + 3.0 * V^{0,4} \leq S \leq 5,5 + 3.66 * V^{0,4}$
C	$5,5 + 3.16 * V^{0,4} \leq S < 8,5 + 4,25 * V^{0,4}$	$5,5 + 3.66 * V^{0,4} \leq S < 8,5 + 4,75 * V^{0,4}$
D	$8,5 + 4,25 * V^{0,4} \leq S$	$8,5 + 4,75 * V^{0,4} \leq S$

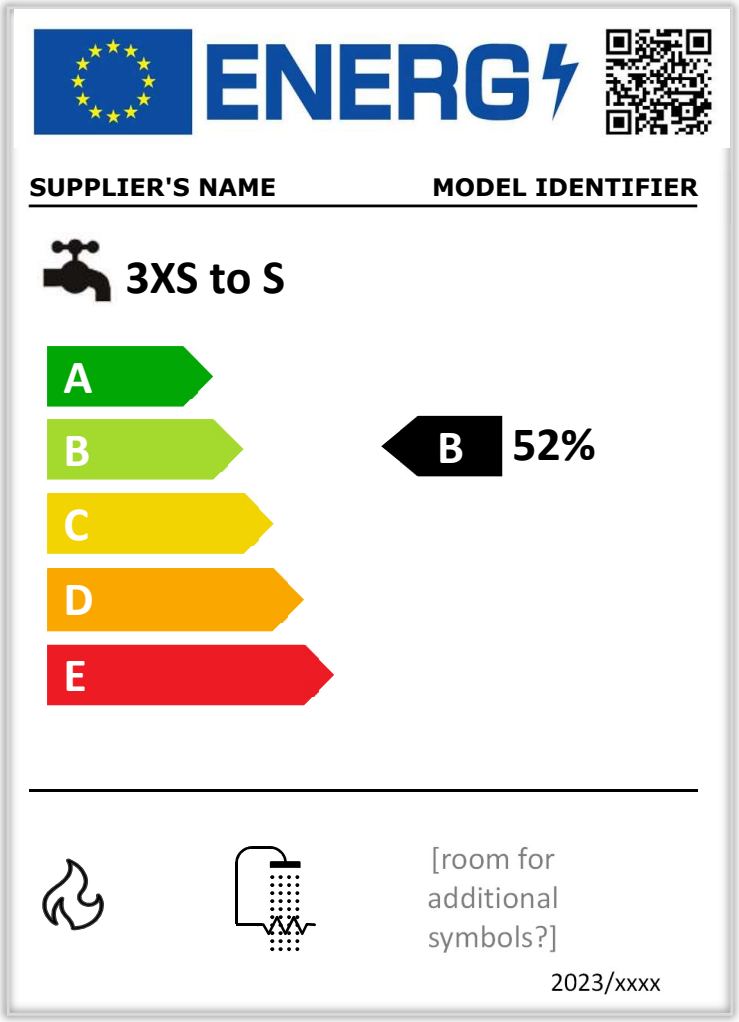
ANNEX III

Labels for water heaters, storage tanks and water heater packages

1) Label for water heater or water heater packages with a declared load profile 3XS to S

a) Label:

Figure 1 Label for water heater or water heater package with a declared load profile 3XS to S



b) The following information shall be included in the label:

I. QR code

II. supplier's name or trade mark;

III. supplier's model identifier;

IV. scale of energy efficiency classes from A to G;

V. the energy efficiency class determined in accordance with Annex II;

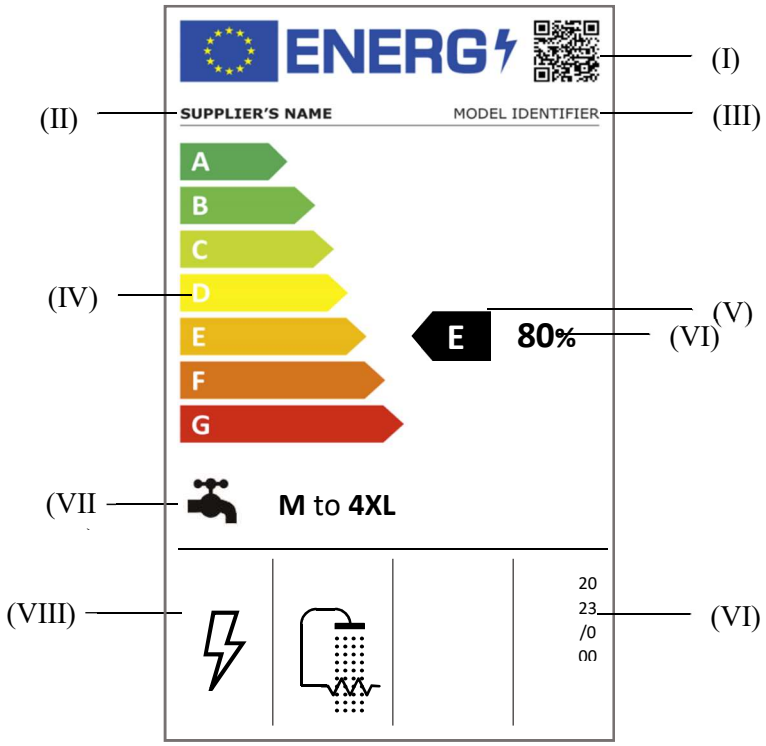
VI. the energy efficiency value determined in accordance with Annex II;

pictogram for water heating, plus load profile;

2) Label for water heater or water heater package without solar devices, with a declared load profile M to 4XL

a) Label:

Figure 2 Label for water heater or water heater package without solar devices, for declared load profile M to 4XL



b) The following information shall be included in the label:

VII. QR code

VIII. supplier's name or trade mark;

IX. supplier's model identifier;

X. scale of energy efficiency classes from A to G;

XI. the energy efficiency class determined in accordance with Annex II;

XII. the energy efficiency value determined in accordance with Annex II;

XIII. pictogram for water heating, plus load profile;

XIV. pictograms for additional functionality and performance as presented under point 3. when applicable, taking into account that:

a. only the relevant pictograms, as set out in point 4, shall be shown and centred between the internal divider below the energy efficiency classes and the bottom of the energy label, multiple pictograms shall be evenly spaced;

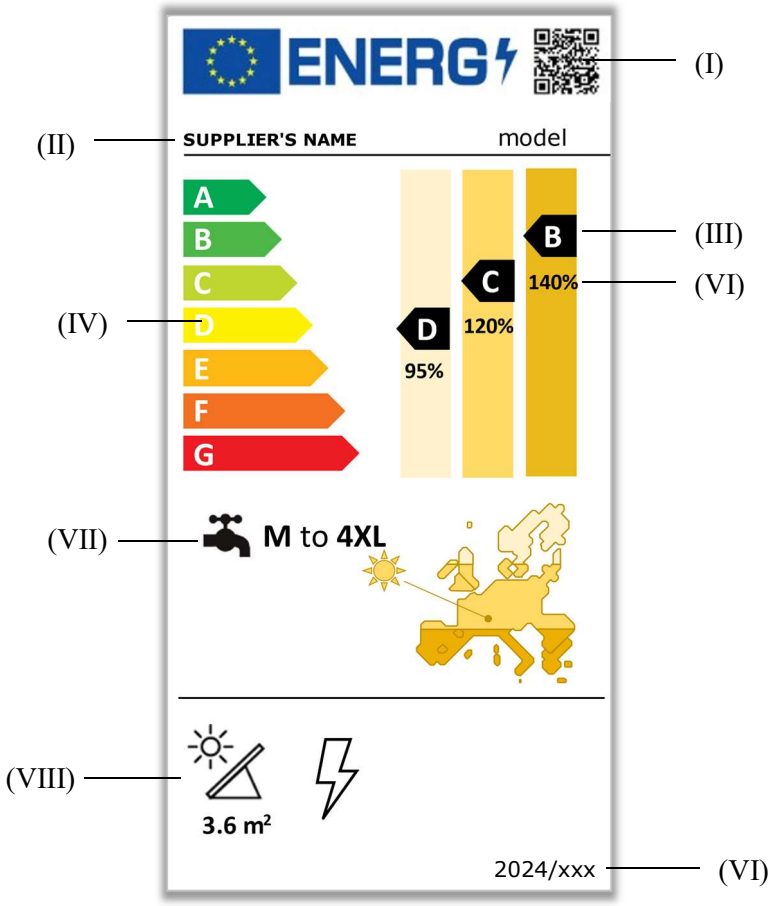
b. the height of the label shall be extended to ensure sufficient space around the symbols.

XV. the number of this Regulation, that is 'xxxx/xxxx'

3) Label for water heater packages with a solar device (climate dependent) with a declared load profile M to 4XL

a) Label:

Figure 3 Label for water heater packages with a solar device, for declared load profile M to 4XL



b) The following information shall be included in the label:

I. QR code

II. supplier's name or trade mark;

III. supplier's model identifier;

IV. scale of energy efficiency classes from A to G;

V. the energy efficiency class determined in accordance with Annex II, for **warmer** climate, plus the efficiency value in %;

VI. the energy efficiency class determined in accordance with Annex II, for **average** climate, plus the efficiency value in %;

VII. the energy efficiency class determined in accordance with Annex II, for **colder** climate, plus the efficiency value in %;

VIII. symbol for water heating, plus load profile;

IX. pictogram for the EU map showing three climate conditions in geographic zones;

X. pictograms for additional functionality and performance as presented under point 3. when applicable, taking into account that:

a. only the relevant pictograms, as set out in point 4, shall be shown and centred between the internal divider below the energy efficiency classes and the bottom of the energy label, multiple pictograms shall be evenly spaced;

b. the height of the label shall be extended to ensure sufficient space around the symbols.

XI. the number of this Regulation, that is 'xxxx/xxxx'

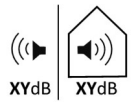
4) Additional pictograms for the label

1.1. Additional pictograms to be added below the horizontal division line in Figure 1, 2 and 3 of Annex III, where applicable:

I. Pictogram for solar device



II. Pictogram for sound power outdoor | indoor, with values in dB



III. Pictogram for ventilation exhaust air flow rate (for e/td HPWHs using ventilation air)



IV. Pictogram for off-peak water heater



V. Pictogram for 'Smart Control'



VI. Pictogram for shower water heat recovery



VII. Pictogram for energy source used



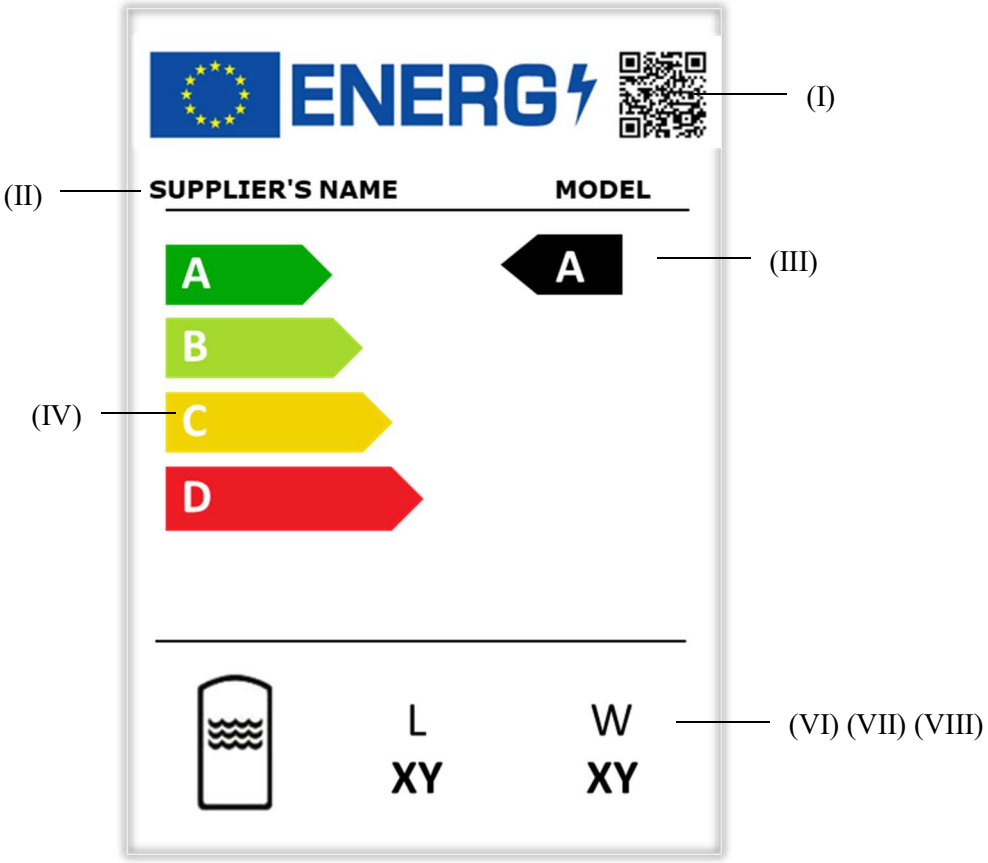
VIII. Pictogram for a cogeneration water heater, showing electric efficiency and electric power output in kW



5) Label for hot water storage tank

1.2. Label:

Figure 4 Label hot water storage tank



1.3. The following information shall be included in the label:

I. QR code

II. supplier's name or trade mark;

III. supplier's model identifier;

IV. scale of energy efficiency classes from A to D;

V. the energy efficiency class determined in accordance with Annex II;

VI. Pictogram of storage tank;

VII. storage volume (in litres);

VIII. standing loss (in W);

IX. the number of this Regulation, that is ‘xxxx/xxxx’

6) Label designs [to be updated once final label design is decided]

a) Label design for water heater or package of water heater with solar device, hot water storage tank and/or shower water heat recovery device (not climate dependent)

b) Label design for water heater or package of water heater with solar device, hot water storage tank and/or shower water heat recovery device (climate dependent)

c) Label design for additional pictograms;

d) Label design for hot water storage tanks;

e) Whereby:

i) The labels shall be at least 96 mm wide and 192 mm high. Where the label is printed in a larger format, its content shall nevertheless remain proportionate to the specifications above.

ii) The background of the label shall be 100 % white.

iii) The typefaces shall be Verdana and Calibri.

iv) The dimensions and specifications of the elements constituting the label shall be as indicated in the label designs in points 4.1 to 4.3.

v) Colours shall be CMYK – cyan, magenta, yellow and black, following this example: 0,70,100,0: 0 % cyan, 70 % magenta, 100 % yellow, 0 % black.

vi) The labels shall fulfil all the following requirements (numbers refer to the figures above):

❶ the colours of the EU logo shall be as follows:

— the background: 100,80,0,0;
— the stars: 0,0,100,0;

❷ the colour of the energy logo shall be: 100,80,0,0;
❸ the QR code shall be 100 % black;
❹ the supplier's name shall be 100 % black and in Verdana Bold, 9 pt;
❺ the model identifier shall be 100 % black and in Verdana Regular 9 pt;
❻ the A to G scale shall be as follows:

- the letters of the energy efficiency scale shall be 100 % white and in Calibri Bold 19 pt; the letters shall be centred on an axis at 4,5 mm from the left side of the arrows;
- the colours of the A to G scale arrows shall be as follows:
  - A-class: 100,0,100,0;
  - B-class: 70,0,100,0;
  - C-class: 30,0,100,0;
  - D-class: 0,0,100,0;
  - E-class: 0,30,100,0;
  - F-class: 0,70,100,0;
  - G-class: 0,100,100,0;

❼ the internal dividers shall have a weight of 0,5 pt and the colour shall be 100 % black;
❽ the letter of the energy efficiency class shall be 100 % white and in Calibri Bold 33 pt. The energy efficiency class arrow and the corresponding arrow in the A to G scale shall be

positioned in such a way that their tips are aligned. The letter in the energy efficiency class arrow shall be positioned in the centre of the rectangular part of the arrow which shall be 100 % black;

❾ the annual energy consumption value shall be in Verdana Bold 28 pt; ‘kWh/annum’ shall be in Verdana Regular 18 pt. They shall be centred and 100 % black;

❿ the pictograms shall be as shown as in the label designs and as follows:

- the pictograms' lines shall have a weight of 1,2 pt and they and the texts (numbers and units) shall be 100 % black;
- the numbers under the pictograms shall be in Verdana Bold 16 pt with the units in Verdana Regular 12 pt and they shall be centred under the pictograms;
- the [unit] values shall be in Verdana Bold 12 pt with the ‘XX’ in Verdana Regular 12 pt and they shall be placed either on the right side of the xx pictogram or inside the pictogram representing the xx;
- for [product x]: if the appliance contains [select], only the relevant pictograms, as set out in point 3, shall be shown and centred between the internal divider below the water heating pictogram or energy consumption and the bottom of the energy label;

⓫ the number of the regulation shall be 100 % black and in Verdana Regular 6 pt.

ANNEX IV

Product information sheet

1) The content, order and format of the product information sheet of products according to Table 3 to Table 7, pursuant to point 1.f), 2.h), 3.h), 4.b), 5.b) of Article 3, shall be entered into the product database by the supplier, insofar applicable to the model described.

2) The user manual or other literature provided with the product shall clearly indicate the link to the model in the product database as a human-readable Uniform Resource Locator (URL) or as QR-code or by providing the product registration number.

3) One product information sheet may cover multiple similar models supplied by the same supplier;

Table 3 Product information sheet for water heaters

Water heaters							
Supplier's name or trademark:							
Model identifier:							
Declared load profile: [3XS / XXS / XS / S / M / L / XL / XXL / 3XL / 4XL]							
	Type:						
Parameters	**EIWH**	**ESWH**	**FIWH**	**FSWH**	**mCHPWH**	**eHPWH**	**tdHPWH**
Energy label class (Average climate)	[A..G]	[A..G]	[A..G]	[A..G]	[A..G]	[A..G]	[A..G]
Water heater energy efficiency (Average climate, %)	x,x	x,x	x,x	x,x	x,x	x,x	x,x
Rated heat output (kW)	x,x	x,x	x,x	x,x	x,x	x,x	x,x
Storage volume (litres)	-	x	-	x	x	x	x
Mixed water at 40ºC (litres)	-	x,x	-	x,x	x,x	x,x	x,x
Daily electricity consumption (Qelec, kWhe/d)	x,x	x,x	x,x	x,x	x,x	x,x	x,x
Daily fuel consumption (Qfuel, kWh GCV/d)	-	-	x,x	x,x	x,x	-	x,x
Annual electricity consumption (AEC, kWh/y)	x	x	x	x	x	x	x
Annual fuel consumption (AEF, kWh/y in GCV)			x	x	x		x
Off-peak water heater	-	[y/n]	-	-	-	[y/n]	-
Smart control	-	[y/n]	-	-	-	[y/n]	-
Smart control factor (SCF)	x,xxx	x,xxx	x,xxx	x,xxx	x,xxx	x,xxx	x,xxx
For heat pumps, heat source type	-	-	-	-	-	[indicate]	[indicate]
	[outdoor air-to-water / indoor air-to-water / exhaust air-to-water / brine-to-water / water-to-water / direct exchange-to-water]						
Sound power level, in dB(A), indoor	-	-	x/x	x/x	x/x	x/x	x/x
Sound power level, in dB(A), outdoor	-	-	-	-	x/x	x/x	x/x
Ventilation air flow rate (m^3/h)	-	-	-	-	-	x	x
** supplementary outdoor air flow rate **							
Electric power output (kW)	-	-	-	-	x,x	-	-
Electric efficiency (%)	-	-	-	-	x,x	-	-

* In case a supplementary outdoor air flow rate is used, this shall be indicated as well.

Table 4 Product information sheet for solar devices

Solar devices

Supplier's name or trademark:							
Model identifier:							
Solar device efficiency for water heating, in percentages [note: the values in cells below are examples and actual values shall be used by the supplier]							
Climate [a]	**Number of solar collectors / module or gross area of collector array [a]**	**M [a]**	**L**	**XL**	**XXL**	**3XL**	**4XL**
Average	e.g. 2 collectors / 4 m²	x %	x %	x %	x %	minimum is 100%	
	e.g. 3 collectors / 6 m²	etc.	etc.	etc.	etc.	etc.	etc.
	etc.	maximum is 450%		x %	x %	x %	x %
Warmer	e.g. 2 collectors / 4 m²	for each applicable combination of number of collectors, load profile and climate, the Solar device efficiency factor for water heating shall be provided (see example for 'Average' climate) Consider the minimum and maximum values for solar device efficiency indicated in Annex VIII					
	e.g. 3 collectors / 6 m²						
	etc.						
Colder	e.g. 2 collectors / 4 m²	etc. Consider the minimum and maximum values for solar device efficiency indicated in Annex VIII					
	e.g. 3 collectors / 6 m²						
	etc.						
Gross area of single collector / module (m²)							x,x m²
Solar tank correction factor f_{tank}, if applicable							x,xx

[a] The supplier of the solar device chooses for which climates, number of collectors (array) and load profiles the solar device efficiency shall be declared.

Table 5 Product information sheet for shower water heat recovery devices

Shower water heat recovery device								
Supplier's name or trademark:								
Model identifier:								
Shower water heat recovery device factor (f_{SWHRD}), in decimals, per applicable load profile (to be used by dealers to calculate water heating energy efficiency of water heater package)								
Load profile	XS	S	M	L	XL	XXL	3XL	4XL
f_{SWHRD}	x	x	x	x	x	x	x	x
Shower water heat recovery efficiency, as tested, per flow rate							flow rate (l/min)	efficiency (%)
(results for sole, or highest, flow rate)							x	x,xx%
(optional: if tested at lower flow rate as well)							x	x,xx%

Table 6 Product information sheet for water heater packages

Package of water heater, solar device and/or shower water heat recovery device

If the water heater package is placed on the market by a single supplier:

Supplier's name or trademark:			
Model identifier:			
Water heater type:	[EIWH/ ESWH/ FIWH/ FSWH / eHPWH/ tdHPWH/ mCHPWH]		
Declared load profile (XS or larger)	[XS / S / M / L / XL / XXL / 3XL / 4XL]		
Climate (if applicable)	Average (if applicable)	Warmer (if applicable)	Colder (if applicable)
Water heater energy efficiency (η_{wh})	x%	x%	x%
if applicable: Solar device GTY (kWh/array)	x	x	x
if applicable: Solar device efficiency ($\eta_{sol,wh}$) of package	x%	x%	x%
if applicable: Shower water heat recovery device factor (f_{SWHRD})	x%	x%	x%
Water heating energy efficiency of Water heater **package** (η_{pack})	x%	x%	x%
Energy label class of Water heater **package**	[A.. G]	[A.. G]	[A.. G]
Sound power level indoor	dB(A)		

For water heater packages incorporating heat pump water heaters

Sound power level outdoor (e/td)HPWH only	dB(A)
Heat source	[outdoor air-to-water / indoor air-to-water / exhaust air-to-water / brine-to-water / water-to-water / direct exchange-to-water]

Table 7 Product information sheet for hot water storage tanks

Hot water storage tank

Supplier's name or trademark:	..	
Model identifier:	..	
Parameter	**Unit**	**Decimals** (if applicable)
Storage volume (or 'equivalent volume')	L	x
Volume of mixed water at 40°C	L	x
Standing loss	W	x
Multivalent tank		[y/n]
Energy label class		[A..D]

ANNEX V

Technical documentation

1) The technical documentation referred to in point 1(d) of Article 3(2)(c) shall include:

   a) the information as set out in Annex IV

   b) the name and address of the supplier;

   c) a description of the model sufficient for its unambiguous identification;

   d) a list of all equivalent models including the model identifier;

   e) the details and the results of calculations performed in accordance with Annex VIII - Measurement and Calculations;

   f) where appropriate, the references of the harmonised standards applied;

   g) where appropriate, the other technical standards and specifications used;

   h) the identification and signature of the person empowered to bind the supplier;

   i) any specific precautions that shall be taken when the water heater is assembled, installed or maintained.

   j) Furthermore, depending on the product, the technical documentation referred to in Article 3(2)(c) shall also include:

   for water heaters

   (a) the results of the measurements for the technical parameters specified in point 2 of Annex IV;

   (b) the results of the calculations for the technical parameters specified in point 2 of Annex VIII;

1. for hot water storage tanks

   (g) the results of the measurements for the technical parameters specified in point 3 of Annex IV;

2. For solar devices

   (g) the results of the measurements for the technical parameters as specified in point 4 of Annex IV;

3. For packages of water heater and solar device

   (g) Technical parameters:

   – The water heating efficiency in %, rounded to the nearest integer;

   – The technical parameters set out in points 1 to 4 of this Annex, as appropriate.

ANNEX VI

Information to be provided in visual advertisements, in technical promotional material or other promotional material, in distance selling except distance selling on the internet

(1) In visual advertisements for water heaters, hot water storage tanks and water heater packages, for the purposes of ensuring conformity with the requirements laid down in point 1(e) Article 3 and point (c) of Article 4, the energy efficiency class and the range of energy efficiency classes available on the label shall be shown as set out in point 4 of this Annex.

(2) In technical promotional material or other promotional material for water heaters, hot water storage tanks and/or water heater packages, for the purposes of ensuring conformity with the requirements laid down in point 1(f) Article 3 and point (d) of Article 4 the energy efficiency class and the range of energy efficiency classes available on the label shall be shown as set out in point 4 of this Annex.

(3) Any paper based distance selling of water heaters, hot water storage tanks and/or water heater packages must show the energy efficiency class and the range of energy efficiency classes available on the label as set out in point 4 of this Annex.

(4) The energy efficiency class and the range of energy efficiency classes shall be shown, as indicated in Figure 4, with:

(a) an arrow containing the letter of the energy efficiency class, in white, Calibri Bold and in a font size at least equivalent to that of the price, if the price is shown, in all other cases clearly visible and legible font size;

(b) the colour of the arrow matching the colour of the energy efficiency class;

(c) the range of available energy efficiency classes if the label class rating is not climate dependent or the applicable climate if the label class rating is climate dependent in 100 % black; and

(d) the size shall be such that the arrow is clearly visible and legible. The letter in the energy efficiency class arrow shall be positioned in the centre of the rectangular part of the arrow, with a border of 0,5 pt in black around the arrow and the letter of the energy efficiency class.

By derogation, if the visual advertisement, technical promotional material or other promotional material or paper based distance selling is printed in monochrome, the arrow can be in monochrome in that visual advertisement, technical promotional material, other promotional material or paper based distance selling.

Figure 5 Coloured/monochrome left/right arrow, if not climate dependent

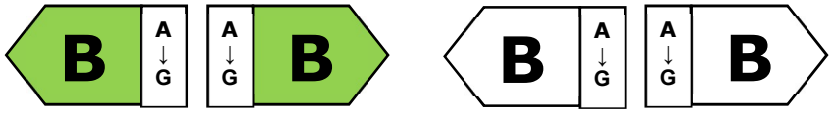


Figure 6 Coloured/monochrome left/right arrow, if climate dependent



5) Telemarketing based distance selling must specifically inform the customer of the energy efficiency class of the product and of the range of energy efficiency classes available on the label, and that the customer can access the full label and the product information sheet through a free access website, or by requesting a printed copy.

6) For all the situations mentioned in points 1 to 3 and 5, it must be possible for the customer to obtain, on request, a printed copy of the label and the product information sheet.

ANNEX VII

Information to be provided in the case of distance selling through the internet

1) The appropriate label made available by suppliers in accordance with point 1(g) of Article 3 shall be shown on the display mechanism in proximity to the price of the product, if the price is shown, and in all other cases in proximity to the product. The size shall be such that the label is clearly visible and legible and shall be proportionate to the size specified in point 4 of Annex III. The label may be displayed using a nested display, in which case the image used for accessing the label shall comply with the specifications laid down in point 3 of this Annex. If nested display is applied, the label shall appear on the first mouse click, mouse roll-over or tactile screen expansion on the image.

2) The image used for accessing the label in the case of a nested display, as indicated in Figure 2, shall:

   a) be an arrow in the colour corresponding to the energy efficiency class of the product on the label;

   b) indicate the energy efficiency class of the product on the arrow in white, Calibri Bold and in a font size equivalent to that of the price, if the price is shown, in all other cases a clearly visible and legible font size; and

   c) have the range of available energy efficiency classes in 100 % black; and,

   d) have one of the following two formats, and its size shall be such that the arrow is clearly visible and legible. The letter in the energy efficiency class arrow shall be positioned in the centre of the rectangular part of the arrow, with a visible border in 100 % black placed around the arrow and the letter of the energy efficiency class:

Figure 7 Coloured/monochrome left/right arrow, if not climate dependent

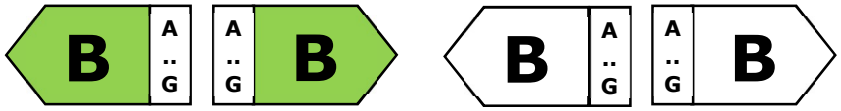
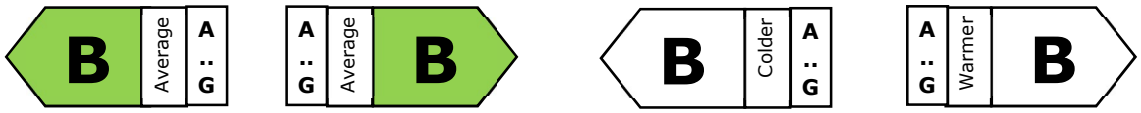


Figure 8 Coloured/monochrome left/right arrow, if climate dependent



(Example shows "Average" in coloured arrows, and "Colder" and "Warmer" in monochrome arrows)

3) In the case of a nested display, the sequence of display of the label shall be as follows:

   a) the image referred to in point 2 of this Annex shall be shown on the display mechanism in proximity to the price of the product, if the price is shown, and in all other cases in proximity to the product;

   b) the image shall link to the label set out in Annex III;

   c) the label shall be displayed after a mouse click, mouse roll-over or tactile screen expansion on the image;

   d) the label shall be displayed by pop up, new tab, new page or inset screen display;

   e) for magnification of the label on tactile screens, the device conventions for tactile magnification shall apply;

f) the label shall cease to be displayed by means of a close option or other standard closing mechanism;

g) the alternative text for the graphic, to be displayed on failure to display the label, shall be the energy efficiency class of the product in a font size equivalent to that of the price, if the price is shown, and in all other cases a clearly visible and legible font size.

4) The electronic product information sheet made available by suppliers in accordance with point 1(h) of Article 3 shall be shown on the display mechanism in proximity to the price of the product, if the price is shown, and in all other cases in proximity to the product. The size shall be such that the product information sheet is clearly visible and legible. The product information sheet may be displayed using a nested display or by referring to the product database, in which case the link used for accessing the product information sheet shall clearly and legibly indicate 'Product information sheet'. If a nested display is used, the product information sheet shall appear on the first mouse click, mouse roll-over or tactile screen expansion on the link.

ANNEX VIII

Measurements and calculations

1. For the purposes of compliance and verification of compliance with the requirements of this Regulation, measurements (and calculations) shall be made using harmonised standards the reference numbers of which have been published for this purpose in the Official Journal of the European Union, and in line with the following provisions.

2. In the absence of existing relevant standards and until the publication of the references of the relevant harmonised standards in the Official Journal, the transitional testing methods set out in Annex IX or other reliable, accurate and reproducible methods, which take into account the generally recognised state-of-the-art, shall be used.

3. TEST CONDITIONS

(a) For all water heaters, the measurements shall be carried out for the load profile with the largest reference energy (Q_{ref}) that can be supplied by the water heater, or the load profile with a reference energy just below the largest that can be supplied, as set out in Table 10;

(b) for measurements under (a), the cold sanitary water inlet temperature is +10 °C and the ambient temperature is +20 °C if the water heater is designated for use in a heated space. If the water heater is designated for use in an unheated space, then it shall be tested at +7°C.

(c) The tests to determine energy efficiency and performance are subject to the following conditions:

- measurements shall be carried out using the load profiles set out in Table 10;
- measurements shall be carried out using a 24-hour measurement cycle as follows:
  - 00:00 to 06:59: no water draw-off;
  - from 07:00: water draw-offs according to the declared load profile;
  - from end of last water draw-off until 24:00: no water draw-off;

(d) heat pump water heaters shall be tested under the conditions set out in Table 3, whereby indoor air shall only be used as a rating condition for electric heat pump water heaters if they are functional when supplied with an air temperature of 7°C or higher and have a rated electric input power of 300 Watt or smaller , have a maximum tank volume of 140 L, and for a Q*ref* not exceeding that for load profile M. Heat pump water heaters not fulfilling any of these conditions shall not be tested under the 'indoor air' condition.;

(e) Exhaust air-to-water heat pump water heaters shall be tested under the conditions set out in Table 8, whereby if the ventilation exhaust air flow rate does not suffice to fulfill the requirements of the declared load profile a supplementary outdoor air heat source can used and declared;

(f) water heaters classified as off-peak water heaters are energised for a maximum period of 8 consecutive hours between 22:00 and 07:00 of the 24-hour tapping pattern. At the end of the 24-hour tapping pattern the water heaters are energised till the end of the step;

Table 8 Standard rating conditions for heat pump water heaters

Temperature conditions for heat pump water heaters		**For climate conditions**		
		Average	**Warmer**	**Colder**
Outdoor air-to-water	dry/wet	+7 °C / +6 °C	+14 °C / +13 °C	+2 °C / +1 °C
Indoor air-to-water	dry/wet	+20 °C / max. +15 °C		
Exhaust air-to-water*	dry/wet	+20 °C / +15 °C		
Brine-to-water	inlet/outlet	+5 °C / +2 °C		
Water-to-water	inlet/outlet	+10 °C / +7 °C		
Direct exchange-to-water	bath	+4ºC		

Table 9 Maximum ventilation exhaust air flow rate available for water heating [$q_{v,max\ w}$]

Declared tapping profile	**S**	**M**	**L**	**XL**	**XXL**	**3XL**	**4XL**
Ventilation exhaust air flow rate available for water heating $q_{v,max\ w}$ in m³/h *	80	160	190	700	900	1700	3500

* The temperature of the exhaust air flow rate shall be in accordance with Table 8.

(g) Where the manufacturer deems it appropriate to declare the value of smart as being '1', measurements of the weekly electricity and/or fuel consumption with or without smart controls shall be carried out using a two-week measurement cycle as follows:

- days 1 to 5: random sequence of load profiles chosen from the declared load profile and the load profile one below the declared load profile, and smart control disabled,
- days 6 and 7: no water draw-offs, and smart control disabled,
- days 8 to 12: repetition of the same sequence applied for days 1 to 5, and smart control enabled,
- days 13 and 14: no water draw-offs, and smart control enabled,
- the difference between the useful energy content measured during days 1 to 7 and the useful energy content measured during days 8 to 14 shall not exceed 2 % of Q_{ref} of the declared load profile.

(h) The sound power level of heat pump water heaters is to be measured at rated heat output;

(i) Standing loss of hot water storage tanks shall be measured at ambient temperature of 20 °C and a storage temperature of 65 °C to be achieved and maintained during the test;

(j) The mixed water at 40°C (V40) of a storage water heater or storage tank shall be assessed using methods laid down in the relevant standards identified in Annex IIIa. These shall take into account a temperature setpoint of 65°C of the storage water heater or storage tank and a cold water inlet temperature of 10°C.

(k) For tests and test conditions not mentioned in the present Annex, the transitional methods mentioned in Annex IX apply, as appropriate.

Table 10 Tapping (load) profiles

h	3XS			XXS			XS			S				M			
	Q_{tap}	f	T_m	Q_{tap}	f	T_m	Q_{tap}	f	T_m	Q_{tap}	f	T_m	T_p	Q_{tap}	f	T_m	T_p
	kWh	l/ min	°C	kWh	l/ min	°C	kWh	l/ min	°C	kWh	l/ min	°C	°C	kWh	l/ min	°C	°C
07:00	**0,015**	2	25	**0,105**	**2**	**25**				**0,105**	3	25		**0,105**	3	25	
07:05	**0,015**	2	25											**1,4**	6	40	
07:15	**0,015**	2	25														
07:26	**0,015**	2	25														
07:30	**0,015**	2	25	**0,105**	**2**	**25**	**0,525**	3	35	**0,105**	3	25		**0,105**	3	25	
08:01														**0,105**	3	25	
08:15														**0,105**	3	25	
08:30				**0,105**	2	25				**0,105**	3	25		**0,105**	3	25	
08:45														**0,105**	3	25	
09:00	**0,015**	2	25											**0,105**	3	25	
09:30	**0,015**	2	25	**0,105**	2	25				**0,105**	3	25		**0,105**	3	25	
11:30	**0,015**	2	25	**0,105**	2	25				**0,105**	3	25		**0,105**	3	10	40
11:45	**0,015**	2	25	**0,105**	2	25				**0,105**	3	25		**0,105**	3	25	
12:00	**0,015**	2	25	**0,105**	2	25								**0,105**	3	25	
12:30	**0,015**	2	25	**0,105**	2	25											
12:45	**0,015**	2	25	**0,105**	2	25	**0,525**	3	35	**0,315**	4	10	55	**0,315**	4	10	55
14:30	**0,015**	2	25											**0,105**	3	25	
15:00	**0,015**	2	25														
15:30	**0,015**	2	25											**0,105**	3	25	
16:00	**0,015**	2	25														
16:30														**0,105**	3	25	
18:00				**0,105**	2	25				**0,105**	3	25		**0,105**	3	25	
18:15				**0,105**	2	25				**0,105**	3	40		**0,105**	3	40	
18:30	**0,015**	2	25	**0,105**	2	25								**0,105**	3	40	
19:00	**0,015**	2	25	**0,105**	2	25								**0,105**	3	25	
19:30	**0,015**	2	25	**0,105**	2	25											
20:00				**0,105**	2	25											
20:30							**1,05**	3	35	**0,42**	4	10	55	**0,735**	4	10	55
20:45				**0,105**	2	25											
21:00				**0,105**	2	25											
21:15	**0,015**	2	25	**0,105**	2	25								**0,105**	3	25	
21:30	**0,015**	2	25							**0,525**	5	45		**1,4**	6	40	
21:35	**0,015**	2	25	**0,105**	2	25											

h	L				XL				XXL				3XL			
	Q_{tap}	f	T_m	T_p	Q_{tap}	f	T_m	Q_{tap}	f	T_m	f	T_m	Q_{tap}	f	T_m	T_p
	kWh	l/ min	°C	°C	kWh	l/ min	°C	°C	kWh	l/ min	°C	°C	kWh	l/ min	°C	°C
07:00	**0,105**	3	25		**0,105**	3	25		**0,105**	3	25		**11,2**	48	40	
07:05	**1,4**	6	40										**5,04**	24	25	
07:15					**1,82**	6	40		**1,82**	6	40		**1,68**	24	25	
07:26					**0,105**	3	25		**0,105**	3	25		**0,84**	24	10	40
07:30	**0,105**	3	25										**1,68**	24	25	
07:45	**0,105**	3	25		**4,42**	10	10	40	**6,24**	16	10	40	**2,52**	32	10	55
08:01					**0,105**	3	25		**0,105**	3	25		**2,52**	24	25	
08:05	**3,605**	10	10	40									**3,36**	24	25	
08:15					**0,105**	3	25		**0,105**	3	25		**5,88**	32	10	55
08:25	**0,105**	3	25										**12,04**	48	40	
08:30	**0,105**	3	25		**0,105**	3	25		**0,105**	3	25		Q_{ref}	**46,76**		
08:45	**0,105**	3	25		**0,105**	3	25		**0,105**	3	25					
09:00	**0,105**	3	25		**0,105**	3	25		**0,105**	3	25					
09:30	**0,105**	3	25		**0,105**	3	25		**0,105**	3	25					
10:00					**0,105**	3	25		**0,105**	3	25					
10:30	**0,105**	3	10	40	**0,105**	3	10	40	**0,105**	3	10	40				
11:00					**0,105**	3	25		**0,105**	3	25					
11:30	**0,105**	3	25		**0,105**	3	25		**0,105**	3	25					
11:45	**0,105**	3	25		**0,105**	3	25		**0,105**	3	25					
12:45	**0,315**	4	10	55	**0,735**	4	10	55	**0,735**	4	10	55				
14:30	**0,105**	3	25		**0,105**	3	25		**0,105**	3	25					
15:00					**0,105**	3	25		**0,105**	3	25					
15:30	**0,105**	3	25		**0,105**	3	25		**0,105**	3	25					
16:00					**0,105**	3	25		**0,105**	3	25					
16:30	**0,105**	3	25		**0,105**	3	25		**0,105**	3	25					
17:00					**0,105**	3	25		**0,105**	3	25					
18:00	**0,105**	3	25		**0,105**	3	25		**0,105**	3	25					
18:15	**0,105**	3	40		**0,105**	3	40		**0,105**	3	40					
18:30	**0,105**	3	40		**0,105**	3	40		**0,105**	3	40					
19:00	**0,105**	3	25		**0,105**	3	25		**0,105**	3	25					
20:30	**0,735**	4	10	55	**0,735**	4	10	55	**0,735**	4	10	55				
20:46					**4,42**	10	10	40	**6,24**	16	10	40				
21:00	**3,605**	10	10	40												

h	4XL			
	Q_{tap}	f	T_m	T_p
	kWh	l/ min	°C	°C
07:00	**22,4**	96	40	
08:01	**10,08**	48	25	
09:00	**3,36**	48	25	
10:30	**1,68**	48	10	40
11:45	**3,36**	48	25	
12:45	**5,04**	64	10	55
15:30	**5,04**	48	25	
18:30	**6,72**	48	25	
20:30	**11,76**	64	10	55
21:30	**24,08**	96	40	
Q_{ref}	**93,52**			

Legend:
Qtap: kWh energy
f : flow rate
Tm: minimum temp.
Tp: peak temp

21:45	**0,015**	2	25	**0,105**	2	25						**21:15**				**0,105**	3	25		**0,105**	3	25			
												21:30	**0,105**	3	25	**4,42**	10	10	40	**6,24**	16	10	40		
Q_{ref}	**0,345**			**2,100**			**2,100**	**2,100**		**5,845**		Q_{ref}	**11,655**			**19,07**				**24,53**					

4. WATER HEATING ENERGY EFFICIENCY

(a) The water heating energy efficiency η_{wh}, in %, of a water heater, except for a thermosiphon / ICS solar device with an immersion element, shall be calculated as the ratio between the reference energy Q_{ref} of the declared tapping load profile and the (primary) energy required for its generation based on GCV and including primary energy for electricity:

$$\eta_{wh} = \frac{Q_{ref}}{\left(Q_{fuel} + CC \cdot Q_{elec}\right) \cdot (1 - SCF \cdot smart) + Q_{cor}} \cdot F_{ctrl} \cdot 100$$

where

- Q_{ref} is the total energy delivered by the load profile used, value from Table 10, in kWh;
- Q_{elec} is the consumption of electricity for water heating over 24 consecutive hours under the declared load profile, expressed in kWh, in terms of final energy, corrected also for electricity use of auxiliary components that are necessary for testing the load profile but not delivered with the product;
- Q_{fuel} is the daily fuel consumption for hot water over 24 consecutive hours at the declared load profile, expressed in kWh, in terms of GCV;
- SCF smart control factor (*SCF*) means the water heating energy efficiency gain due to smart control, as set out in point (b) hereafter;
- *smart* is the smart control coefficient, is equal to 0 without smart control or 1 with smart control;
- Q_{cor} is the ambient correction term and is equal to 0 for load profiles XXL to 4XL, and for load profiles S to XL with
  - conventional water heaters using fuels

    $Q_{cor} = -0{,}23 \cdot (Q_{fuel} \cdot (1 - SCF \cdot smart) - Q_{ref}$;
  - conventional water heaters using electricity

    $Q_{cor} = -0{,}23 \cdot (CC \cdot Q_{elec} \cdot (1 - SCF \cdot smart) - Q_{ref}$;
  - heat pump water heaters

    $Q_{cor} = -k \times 24h \times P_{stby}$
- F_{ctrl} is 1.00 if the water heater can maintain a set water temperature independent of the water volume flow rate supplied by the water heater, to be determined using methods described in Annex IIIa, and 0.95 if it cannot;

(b) For water heater packages consisting of thermosiphon / ICS solar devices with a back-up immersion heater the η_{wh} to be applied shall be 1/CC.

(c)

(d) For heat pump water heaters, if during a tapping the Tpeak of 55°C in the load profiles of table 9 cannot be achieved by the heat pump, the average of the measured hot water temperature over the tapping shall not be lower than 52ºC and the water heating efficiency ηwh shall be lowered by 2 percentage points;

(e) Where the manufacturer deems it appropriate to declare the value of smart as being '1', measurements of the weekly electricity and/or fuel consumption with or without smart

controls shall be carried out using a two-week measurement cycle as indicated in section 3, sub (g) of this Annex.

The smart control factor (*SCF*) is calculated as

$$SCF = 1 - \frac{Q_{fuel,week,smart} + CC \times Q_{elec,week,smart}}{Q_{fuel,week} + CC \times Q_{elec,week}}$$

If SCF ≥ 0,07 the value of smart shall be 1. If SCF < 0,07 the value of smart shall be 0.

5. SOLAR DEVICE EFFICIENCY FOR WATER HEATING

(a) Solar device testing

The solar collector(s) and, if applicable, the hot water storage tank(s), shall be tested separately, except when the performance of the solar device depends on the integral assessment of the solar collector in combination with hot water storage tank (such as with thermosiphon / ICS solar device).

The standards as referenced in Annex IX shall be applied. The climate data to be used for determining GTY shall relate to the location of Helsinki for the colder climate, Strasbourg for the average climate, and Athens for the warmer climate. The orientation for non-tracking collectors shall be South for all locations. The inclination for non-tracking collectors shall be 45º for the colder climate, 35º for the average climate and 25º for the warmer climate. For collectors designed to track the path of the sun, the optimal tracking parameters for the above locations, as declared by the manufacturer, shall be used.

When performing tests of solar collectors and/or subsequent calculations, the volume of the hot water storage tank shall be no less than 0,07 litre per kWh of GTY of the collector array.

(b) Solar device efficiency for water heating

1) The GTY of a solar device, the solar collector(s) of which was tested independent from the hot water storage tank, shall be established using the measurement and calculation methods referenced in Annex IX.

2) The GTY of a thermosiphon / ICS solar device, is the amount of heat delivered by the solar device Q_{sol} determined for the smallest load profile where the Q_{nonsol} for the 'warmer' climate is equal to or higher than the limit values shown in the table below.

Where:

a) The limit value for Q_{nonsol} is, in kWh/a:

Table 11 Limit value for Q_{nonsol}

Load profile	**M**	**L**	**XL**	**XXL**	**3XL**	**4XL**
Limit value	520	950	1510	1910	3570	7060

b) The non-solar heat required Q_{nonsol}, in kWh/a

$$Q_{nonsol} = Q_{wh,sol} - Q_{sol}$$

c) The annual solar water heating demand $Q_{wh,sol}$, in kWh/a

$$Q_{wh,sol} = 0.6 * 366 * \left(Q_{ref} + 1.09\right)$$, in kWh/a;

d) The solar heat delivered Q_{sol} is established using standards referenced in Annex IX, in kWh/a;

3) The solar device efficiency for water heating $\eta_{sol,wh,lp}$ per climate condition and load profile is calculated as:

$$\eta_{sol,wh,lp} = \left(a * \left(\frac{GTY}{Q_{wh,sol}}\right)^2 + \left(b + d * f_{profile}\right) * \frac{GTY}{Q_{wh,sol}} + c\right) * f_{tank}$$

with:

- *GTY* is the Gross Thermal Yield per year (kWh/yr) of the solar device as established under point 1) or point 2), for the applicable climate condition;
- *Qwh,sol* see point 2)c) above, for the applicable load profile;
- *Coefficient a, b, c and d* as per Table 12 below;
- $f_{profile}$ as per Table 13 below, where '$_{profile}$' signifies the applicable load profile: M, L, XL, etc.;

Table 12 Coefficient a, b, c, and d for solar device efficiency for water heating

Solar device water heating efficiency coefficients per climate	**a**	**b**	**c**	**d**
Average	-0.22	1.93	0.55	0.36
Colder	-0.52	1.94	0.60	0.28
Warmer	1.17	0.59	0.83	0.50

Table 13 Coefficient $f_{profile}$ for solar device efficiency for water heating

Load profile	**M**	**L**	**XL**	**XXL**	**3XL**	**4XL**
$f_{profile}$ (-)	f_M	f_L	f_{XL}	f_{XXL}	f_{3XL}	f_{4XL}
	0	0.92	1.38	1.64	2.43	3.56

The solar device efficiency as calculated for a combination of climate and load profile shall not be less than 100 % and exceed 240 %, 450 % and 500 % for the Colder, Average and Warmer climate respectively.

– f_{tank}– Solar tank correction factor for the hot water storage tank in the solar device, specified for the energy efficiency class of the hot water storage tank, taken from the product information sheet of the hot water storage tank.

Table 14 Solar tank correction factor f_{tank}

Hot water storage tank energy label class	**A**	**B**	**C**	**D**

Solar tank correction factor f_{tank}	1.20	1.15	1.1	1.05

6. SHOWER WATER HEAT RECOVERY DEVICE FACTOR

1) The efficiency of a shower water heat recovery device shall be established in accordance with the appropriate measurement methods in Annex IX, whereby the shower water flow rate and the incoming cold water flow rate are matched, the shower water flow rate has a temperature between 35 and 40°C and the incoming cold water a temperature of 10°C;

2) The shower water heat recovery device factor $f_{SWHRD,lp}$ is calculated for the declared load profile of the water heater package as:

$$f_{WWHRD,lp} = \frac{1}{\left(1 - \left(\eta_{WWHRD,lp} * 0.64\right)\right)}$$

Where[8]:

- $\eta_{SWHRD,lp}$ is the shower water heat recovery device efficiency for the declared load profile, calculated in accordance with point 3);

3) The shower water heat recovery device efficiency for a load profile $\eta_{SWHRD,lp}$ is calculated as:

a) If the shower water heat recovery device efficiency ηi has been established at a flow rate q_i equal to the load profile flow rate $q_{V,lp}$ the $\eta_{SWHRD,lp}$ for the declared load profile is the ηi .

b) If the shower water heat recovery device efficiency has been established at a flow rate of 12.5 l/min ($\eta_{12.5}$) and the applicable load profile flow rate $q_{V,lp}$ is lower, the $\eta_{SWHRD,lp}$ for the declared load profile is calculated as:

$$\eta_{WWHRD,lp} = \eta_{12.5} + \left(0.8 * 0.01 * (12.5 - q_{V,lp})\right)$$

c) If the shower water heat recovery device efficiency has been established at two flow rates, one of which is 12.5 l/min ($\eta_{12.5}$) and the other is lower (η_i), and the applicable load profile flow rate $q_{V,lp}$ is below 12.5 l/min, the $\eta_{SWHRD,lp}$ for the declared load profile is calculated as:

$$\eta_{WWHRD,lp} = \eta_{12.5} + \left(0.8 * \frac{\eta_{12.5} - \eta_i}{q_{V,12.5} - q_{V,i}} * (q_{V,lp} - 12.5)\right)$$

d) where:

- $\eta_{12.5}$ is the shower water heat recovery device efficiency established in a test at a flow rate of 12.5 l/min;
- η_i is the shower water heat recovery device efficiency established in a test at a flow rate 'i' other than 12.5 l/min;
- $q_{12.5}$ is the water flow rate of 12.5 l/min used in the test;
- q_i is the water flow rate other than 12.5 l/min used in the test;
- $q_{V,lp}$ is the applicable load profile flow rate according Table 15:

[8] The value of 0.64 represents the share of recoverable thermal energy from the reference energy Qref, taking into account various thermal losses and a suboptimal connection to heaters and taps.

Table 15 Load profile flow rate

Load profile	**3XS to XXS**	**XS**	**S**	**M**	**L**	**XL**	**XXL**	**3XL**	**4XL**
$q_{V,lp}$ (l/min)	(not applicable)	3	5	6	8	8	12	48	96

4) The supplier of the package shall ensure that the sum (the combined volume flow rates) of the highest flow rates at which the SWHRDs supplied in the package have been tested exceeds the load profile flow rate for the water heater package as indicated in Table 15. The $\eta_{SWHRD,lp}$ for this package shall be the flow rate weighted average of the efficiencies established for the individual shower water heat recovery devices.

7. STANDING LOSS OF HOT WATER STORAGE TANKS

1) The standing loss of a hot water storage tank shall be determined with the store temperature set and stabilised at 65ºC and an ambient temperature of 20ºC.

2) Heat exchangers shall be filled with system or sanitary water (whichever applies) where it can be assumed that the filled condition contributes significantly to standing loss measured, such as heat exchangers located on the perimeter of the hot water storage tank.

3) The standing loss S of storage tanks shall be the energy required to keep the storage tank contents at the required temperature divided by the test duration.

4) The equivalent volume of a storage tank containing PCM material Veq is calculated as:,

$$V_{eq} = V40 \times \frac{30}{(\Theta_{wh} - 10)} \div 0.85$$

Where:

- V40 is the volume of mixed water of the storage tank in litres, established in accordance with methods identified in Annex IX
- Θ_{wh} is the reference hot water temperature in °C,established in accordance with methods identified in Annex IX

8. WATER HEATER PACKAGES

1) In case an outdoor air-to-water heat pump water heater is combined with a solar device, the water heating energy efficiency of the outdoor air-to-water heat pump water heater and the solar device efficiency shall be established under the same climate conditions.

2) The water heating energy efficiency of water heater packages is calculated, for each applicable climate condition, as:

$$\eta_{pack} = \eta_{wh} * \eta_{sol,wh} * f_{wwhrd}$$

with

– η_{pack} is the water heating energy efficiency of the water heater package in climate condition Average, warmer or colder, in %;

- η_{wh} is energy efficiency of the water heater;
- $\eta_{sol,wh}$ is solar device efficiency for water heating, established in accordance with point 5 of Annex VIII for the applicable climate condition, in % (if applicable: if no solar device is present this factor is omitted) ,;
- f_{SWHRD} is the shower water heat recovery device factor, in accordance with point 6 of Annex VIII, in %, (if applicable: if no SWHRD is present this factor is omitted)

ANNEX IX

Transitional Methods

1. LIST OF REFERENCED STANDARDS AND COMMENTS

Table 16 References and qualifying notes for water heaters and hot water storage tanks

Parameter	**Source**	**Reference Test Method / Ttile**	**Notes**
Electric instantaneous water heaters			
Rated heat output, Prated		EN 50193-1:2016/A1:2020 Clause 5.1.2	The value of Pnom is the power consumption of the appliance measured after a minimum of 30 minutes of operation under full load conditions
Water heating energy efficiency η_{wh}		EN 50193-1:2016/A1:2020 Electric instantaneous water heaters - Methods for measuring the Performance - Part 1: General requirements 5.2.4	
Sound power level (L_{WA})			It is assumed that values are not significant
Daily electricity consumption Qelec		5.2.2	
Weekly electricity consumption Qelec,week		5.1.4	By default the standard assumes SCF=0 (as there are no efficiency gains to be achieved for smart control)
Weekly electricity consumption 'smart' enabled Qelec,week,smart		5.1.4	
SCF		5.1.4	
Electric storage water heater			
Rated heat output, Prated			EN 50440 does not present a method for determining Prated. EN 16147:2017 Clause 7.14.1 determines the effective thermal capacity (when fully charged) divided by the time required to charge the product as in EN 16147:2017 Clause 7.7.
Water heating energy efficiency η_{wh}		EN 50440:2015+A1:2020 Efficiency of domestic	

		electrical storage water heaters and testing methods A.2	
Sound power level (L_{WA})			It is assumed that values are not significant
Storage volume		EN 50440:2015+A1:2020, Clause 9.1.4	
Mixed water at 40 °C		EN 50440:2015+A1:2020, Clause 9.1.10	
Daily electricity consumption Qelec		EN 50440:2015+A1:2020, Clause 9.1.8.	
Weekly electricity consumption Qelec,week		EN 50440:2015+A1:2020, Clause 9.2	
Weekly electricity consumption 'smart' enabled Qelec,week,smart		EN 50440:2015+A1:2020, Clause 9.2	
SCF		EN 50440:2015+A1:2020, Clause 9.2.	
Fuel instantaneous water heater			
Rated heat output, Prated			Prated is called nominal useful output Pn in EN26 but that standard does not describe a measurement method. Proposed is to define Prated as the nominal fuel input multiplied by the nominal efficiency from EN26:2017 Clause 7.3.2 corrected for GCV.of the fuel.
Water heating energy efficiency η_{wh}		gaseous fuels: prEN13203:2017 Clause 7.1 liquid fuels: prEN 303-6:2017 Clause 10.1	
Sound power level (L_{WA})		FprEN 26:2021 Clause 11.	
NOx emissions / gaseous		FprEN 26:2021 Clause 10.	
NOx emissions / liquid		EN 267:2020 Automatic forced draught burners for liquid fuels; Clause 5. Testing. ANNEX B	Tests to be performed at nominal conditions (80/60 supply/return and maximum capacity)
Daily electricity consumption Qelec		prEN13203:2017 Clause 5.5	
Daily fuel consumption Qfuel		prEN13203:2017 Clause 7.1	

Weekly electricity consumption Qelec,week			Smart control is not covered by standards for fuel fired appliances
Weekly electricity consumption 'smart' enabled Qelec,week,smart			
Weekly fuel consumption Qfuel,week			
Weekly fuel consumption 'smart' enabled Qfuel,week,smart			
SCF			
Fuel storage water heater			
Rated heat output, Prated			Prated is called nominal useful output Pn in EN89 but that standard does not describe a measurement method. Proposed is to define Prated as the nominal fuel input multiplied by the nominal efficiency from EN89:2015 Clause 7.1.2.2 corrected for GCV.of the fuel.
Water heating energy efficiency η_{wh}		gaseous fuels: EN 89:2015 Gas-fired storage water heaters for the production of domestic hot water liquid fuels: prEN 303-6:2017 Clause 10.1	refers to prEN13203:2017 Clause 7.1
Sound power level (L_{WA})		EN 89:2015 Gas-fired storage water heaters for the production of domestic hot water Clause 11.	
NOx emissions / gaseous		EN 89:2015 Clause 10	
NOx emissions / liquid		EN 267:2020 Automatic forced draught burners for liquid fuels; § 5. Testing. ANNEX B	Tests to be performed at nominal conditions (80/60 supply/return and maximum capacity)
Storage volume		EN 89:2015 Clause 6.11	Referred to as nominal capacity
mixed water at 40 °C		EN 89:2015 Clause 7.4	
Daily electricity consumption Qelec		prEN13203:2017 Clause 5.5	
Daily fuel consumption Qfuel		prEN13203:2017 Clause 7.1	
Weekly electricity consumption Qelec,week			

Weekly electricity consumption 'smart' enabled Qelec,week,smart			Smart control is not covered by standards for fuel fired appliances
Weekly fuel consumption Qfuel,week			
Weekly fuel consumption 'smart' enabled Qfuel,week,smart			
SCF			
Electric heat pump water heater			
Rated heat output / water heating (Prated)		EN 16147:2017 Clause 7.14.1	With V40 as established using the same settings as during the tests for water heating energy efficiency
Water heating energy efficiency η_{wh}		EN 16147:2017 Heat pumps with electrically driven compressors - Testing, performance rating and requirements for marking of domestic hot water units Clause 7.13	
Sound power level (L_{WA})		EN 12102-2:xx	
Storage volume		EN 16147:2017 Clause 7.6	"Rated volume"
mixed water at 40 °C		EN 16147:2017 Clause 7.10	
Electric input power			Use electrical energy consumption W_{EL-LP} (Clause 7.9.2) divided by 24h
Daily electricity consumption Qelec		EN 16147:2017 Clause 7.13.1	
Weekly electricity consumption Qelec,week			
Weekly electricity consumption 'smart' enabled Qelec,week,smart		EN 16147:2017 Clause 7.11.2	
SCF			
Pstby		EN 16147:2017 Clause 7.8	
Thermally driven heat pump water heater			
Rated heat output / water heating (Prated)			There is currently no procedure described in existing standards for establishing the Prated for thermally driven dedicated tdHPWH (only for space heating).

			The same calculation method as in EN 16147:2017 Clause 7.14.1 shall be applied.
Water heating energy efficiency η_{wh}		prEN 13203-6:2020 Clause 7.1	
Sound power level (L_{WA})		prEN 12102-2:2016 Clause 10.1.3.2	
NOx emissions / gaseous		EN12309-2:2015 Clause 7.3.13	Important! No correction for 3rd family gases shall be applied whatsoever (this is already taken into account in the ecodesign requirements)
NOx emissions / liquid		EN 267:2020 Automatic forced draught burners for liquid fuels; § 5. Testing. ANNEX B	Tests to be performed at nominal conditions (80/60 supply/return and maximum capacity)
Storage volume		prEN 13203-6:2020 Clause 5.1.1	
mixed water at 40 °C		prEN13203-4:2020 Clause 7.5	
Daily electricity consumption Qelec		prEN 13203-6:2020 Clause 5.7	Refers to prEN13203-2:2020 Clause 5.7
Daily fuel consumption Qfuel		prEN13203-6:2012 Clause 7.1	
Weekly electricity consumption Qelec,week		prEN13203-6:2012 Clause 7.1	
Weekly electricity consumption 'smart' enabled Qelec,week,smart			
Weekly fuel consumption Qfuel,week			
Weekly fuel consumption 'smart' enabled Qfuel,week,smart			
SCF			
Pstby			Determination of Pstby is not covered in prEN13203-6:2020. A procedure similar to EN 16147:2017 Clause 7.8 can be applied.
Cogeneration water heater			
Rated heat output, Prated		EN 50465:2015 Clause 6.3.4	This clause does not describe actual measurement but a verification that the fuel input multiplied by overall efficiency is not less than the nominal overall thermal and

			electric output. In this regulation the Prated of cogeneration water heaters shall be the product of nominal heat input and overall efficiency
Water heating energy efficiency η_{wh}			The standard prEN 13203-4:2020 describes the correct test set-up but in Clause 7.1 the net delivered electrical energy is subtracted from the fuel input, whereas the Regulation requires consideration of electric output in the numerator using a factor 2.65
Sound power level (L_{WA})		EN 15036 - 1:2006 Heating boilers - Test regulations for airborne noise emissions from heat generators	
NOx emissions / gaseous		EN 50465:2015 Clause 7.8.2 NOx (Other pollutants)	The clause describes the correct measurement set-up and calculations for NOx emissions for space heating, but prescribes output capacities relevant for space heating. For water heating the conditions in Clause 7.3.1 shall apply.
NOx emissions / liquid		EN 267	
Storage volume		prEN 13203-4:2020 Clause 5.1	
mixed water at 40 °C		EN 89:2015 Clause 6.11	There is no determination of storage volume in prEN13203-4:2020 not its 'mother' standard prEN13203-2:2020. Instead reference is made to EN 89:2015
Daily electricity consumption Qelec		prEN 13203-4:2020 Clause 5.5	Referred to as Eelecco
Daily fuel consumption Qfuel		prEN 13203-4:2020 Clause 7.1	
Weekly electricity consumption Qelec,week		prEN 13203-4:2020 Clause 7.2	
Weekly electricity consumption 'smart' enabled Qelec,week,smart			

Weekly fuel consumption Qfuel,week			
Weekly fuel consumption 'smart' enabled Qfuel,week,smart			
SCF			
Solar devices			
Gross Thermal Yield (GTY) of solar devices the solar collectors of which are tested separately		ScenoCalc v6.1, using inputs from ISO 9806:2017 Use prEN 12975:2021, Annex B, Clause B.2.1 for calculation of GTY, Clause B.1.2 and B.3 for the climate reference conditions.	The calculation of GTY shall be climate specific (warmer, average, colder) and take into account orientation and inclination as indicated in Annex VIII point 5. The GTY is calculated as the average thermal yield of collector operating temperatures of 25ºC and 50ºC.
Solar heat delivered (QL) of solar devices the solar collectors and hot water storage tanks of which are tested in an integral assessment.		Use EN 12976-2:2019, section 5.9, referring to ISO 9459-5:2007 (STB). Note that: - Table B.5 of EN 12976-2:2019 gives the draw-offs to use to calculate the annual performance when using ISO 9459-5:2007. - Table B.5 of EN 12976-2:2019 gives references for three ErP climate regions (average:Strasbourg, colder:Helsinki and warmer:Athens). Hourly files are available from Solar Heat Europe	
Correction factor $f_{profile}$		This document, Table 7	
Correction factor a, b, c and d, for water heating		This document, Table 6	
Solar device efficiency for water heating $\eta_{sol,wh}$		This document, Annex VIII, section 5, b), 3)	The value is determined for the applicable climates and load profile
Tank factor f_{tank}		This document, Annex VIII, section 8	
Hot water storage tanks			

Storage volume		FprEN 15332:2019 Clause 5.4 EN 12897:2016+A1:2020 Clause 6.2.2	All volumes relevant for providing the effective thermal capacity (here: for water heating) and relevant for determining the standing loss must be included in the measurement, for example: If the tank is filled with primary water only, and uses a heat exchanger to extract heat for domestic hot water (DE: Hygiene-speicher), the primary side has to be filled as well. The storage volume of PCM tanks is the equivalent volume; see the calculation under point 7 of Annex VIII
Mixed water at 40 °C		EN 12897:2016+A1:2020 Clause 6.2.4 and Annex A.4.3	
Reference temperature ϕp		EN 12897:2016+A1:2020 Clause xx FprEN 15332:2019, Clause xx	
Standing loss		FprEN 15332:2019 Clause 5.3 EN 12897:2016+A1:2020 Clause 6.2.2 Annex B EN 12977-3:2018 Annex F.2	When determining standing loss using EN 12897 all relevant volumes, for both/either primary side and domestic side should be filled and heated to required storage temperatures, similar as how the tank would be used in real-life. See EN 15332 for instructions.
Equivalent volume			See calculation in Annex VIII, point 7
Shower water heat recovery device			

shower water heat recovery device efficiency (%)		NEN 7120:2011/C2:2011 NTA8800:2020, Bijlage U CSTB Protocole RECADO 2015	All three test standards may be accepted as method to determine shower water heat recovery device efficiency, as long as the test conditions in ANNEX VII, point 4 are met. The efficiency to use in calculations should be determined using shower water flow rates equal to the water flow rates.

ANNEX X

Verification procedure for market surveillance purposes

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

As part of verifying the compliance of a product with the requirements laid down in this Regulation pursuant to Article 3(2) of Directive 2009/125/EC, for the requirements referred to in this Annex, the authorities of the Member States shall apply the following procedure:

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

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

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

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

(c) when the Member State authorities test the unit of the model, the determined values (the values of the relevant parameters as measured in testing and the values calculated from these measurements) comply with the respective verification tolerances as given in Table 7.

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

(4) If the result referred to in point 2(c) is not achieved, the Member State authorities shall select three additional units of the same model for testing. As an alternative, the three additional units selected may be of one or more different equivalent models.

(5) The model shall be considered to comply with the applicable requirements if, for these three units, the arithmetical mean of the determined values complies with the respective verification tolerances given in Table 7.

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

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

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

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

Table 17 Verification tolerances

Parameters	**Verification tolerances**
Water-heating energy efficiency, η_{wh}	The determined value shall not be more than 8 % lower than the declared value
Sound power level, L_{WA}	The determined value shall not exceed the declared value by more than 2 dB(A).
Daily electricity consumption, Q_{elec}	The determined value shall not exceed the declared value by more than 5 %
Daily fuel consumption, Q_{fuel}	The determined value shall not exceed the declared value by more than 5 %
Weekly fuel consumption without smart controls, $Q_{fuel,week}$	The determined value shall not exceed the declared value by more than 5 %
Weekly fuel consumption with smart controls, $Q_{fuel,week,smart}$	The determined value shall not exceed the declared value by more than 5 %
Weekly electricity consumption without smart controls, $Q_{elec,week}$	The determined value shall not exceed the declared value by more than 5 %
Weekly electricity consumption with smart controls, $Q_{elec,week,smart}$	The determined value shall not exceed the declared value by more than 5 %
Storage volume, V	The determined value shall not be lower than the declared value by more than 2 %.
Mixed water at 40 °C, $V40$	The determined value shall not be lower than the declared value by more than 3 %.
Reference hot water temperature, Θ_{wh}	The determined value shall not exceed the declared value by more than 5 %.
Standing loss, S	The determined value shall not exceed the declared value by more than 20 %