EUROPEAN
COMMISSION

Brussels, XXX
[…](2025) XXX draft

ANNEXES 1 to 7

ANNEXES

to the

COMMISSION REGULTATION

setting ecodesign requirements for water heaters, solar devices, shower water heat recovery devices, packages of those products and hot water storage tanks, amending and repealing Commission Regulation (EU) 814/2013

ANNEX I

Definitions applicable to Annexes II to VI

1. GENERIC DEFINITIONS

(1) 'declared values' means the stated, calculated or measured values provided in the technical documentation by the manufacturer, importer or authorised representative;

(2) '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 sections 1.7 or 2.3 as another model placed on the market by the same manufacturer, importer or authorised representative.

(3) 'model identifier' means the code, usually alphanumeric, which distinguishes a model from other models with the same brand or trade mark in the product database set under Regulation (EU) 2017/1369 ([1]);

(4) '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, expressed in litres;

(5) 'reference hot water temperature' (Θ_{wh}) 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;

2. DEFINITIONS FOR WATER HEATERS

(6) 'load profile' means a sequence of water draw-offs, as specified in Annex III;

(7) 'water draw-off' means a given combination of useful water flow rate, useful water temperature, useful energy content and peak temperature;

(8) '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;

(9) 'useful water temperature' (T_m), means the water temperature, expressed in degrees Celsius, at which heated water starts contributing to the reference energy;

(10) 'useful energy content' (Q_{tap}) 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;

(11) '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;

(12) 'peak temperature' (T_p) means the average water temperature, expressed in degree Celsius, to be achieved during the water draw-off;

(13) 'reference energy' (Q_{ref}) means the sum of the useful energy content of water draw-offs, expressed in kWh, in a particular load profile;

---

(1) 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; ELI: http://data.europa.eu/eli/reg/2017/1369/oj).

(14) ‘maximum load profile’ means the tapping load profile with the greatest referenceenergy that a water heater is able to provide while fulfilling the temperature and flow rate conditions of that load profile;

(15) ‘climate conditions’ means outdoor air temperature or solar radiation; outdoor air temperatures are provided for in Annex III Table 1;

(16) ‘average climate conditions’, mean the climate conditions characteristic for the city of Strasbourg;

(17) ‘colder climate conditions’ mean the climate conditions characteristic for the city Helsinki;

(18) ‘warmer climate conditions’ mean the climate conditions characteristic for the city of Athens;

(19) ‘water heating energy efficiency’ (η_{wh}) means the ratio between the useful energy provided by a water heater and the energy required for its generation, expressed in %;

(20) ‘sound power level’ (L_{WA}) means the A-weighted sound power level, indoor and/or outdoor, expressed in dB;

(21) ‘conversion coefficient’ (CC) means the default coefficient referred to in Article 31(3) of the Directive (EU) 2023/1791 of the European Parliament and of the Council ([2]) in the version in force on 10 October 2023; the value of the CC is 1,9;

(22) ‘electric storage water heater’ (ESWH) means a storage water heater with a heat generator using the electric Joule effect;

(23) ‘fuel storage water heater’ (FSWH) means a storage water heater with a heat generator using the combustion of gaseous or liquid fuels, and which does not produce electric power or uses ambient energy;

(24) ‘electric instantaneous water heater’ (EIWH) means an instantaneous water heater with a heat generator using the electric Joule effect;

(25) ‘fuel instantaneous water heater’ (FIWH) means an instantaneous water heater with a heat generator using the combustion of gaseous or liquid fuels;

(26) ‘heat pump water heater’ (HPWH) means a water heater that has a heat generator with a heat pump cycle capturing ambient or geothermal energy and/or waste heat for heat generation, possibly supplemented by a back-up water heater;

(27) ‘heat pump heat source’ means the type of heat source or heat exchanger used at the evaporator side of heat pump water heaters: outdoor air, indoor air, non-heated-space air, ventilation exhaust air (‘exhaust air’), ground heat exchanger (brine or water/ground heat exchanger), ground direct exchange (refrigerant/ground heat exchanger);

(28) ‘electric heat pump water heater’ (eHPWH) means a heat pump water heater with a heat generator using electricity, possibly supplemented by an electric back-up water heater;

([2]) Directive (EU) 2023/1791 of the European Parliament and of the Council of 13 September 2023 on energy efficiency and amending Regulation (EU) 2023/955 (OJ L 231, 20.9.2023, p. 1, ELI: http://data.europa.eu/eli/dir/2023/1791/oj).

(29) ‘thermally driven heat pump water heater’ (tdHPWH) means a heat pump water heater with a heat generator using the combustion of fuels, possibly supplemented by a fuel back-up water heater;

(30) ‘standard rated electric power output’ means the electric power output of the cogeneration water heater at nominal fuel input;

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

(32) ‘fuel back-up water heater’ means a backup heater with a heat generator using the combustion of fuels;

(33) ‘standard rated heat output’ means the heat output calculated as the product of the water heating energy efficiency and of the maximum fuel or electric input corrected by the CC factor of 1,9, as defined for each water heater type in Annex IV;

(34) ‘standby mode’ means a condition where the water heater is connected to the mains power source and provides only the following functions, which may persist for an indefinite period of time:

(a) reactivation function, or reactivation function and only an indication of enabled reactivation function;

(b) reactivation function through a connection to a network (‘network standby’);

(c) information or status display;

(35) ‘reactivation function’ means a function that via a remote switch, a remote control, an internal sensor or timer provides a switch from standby mode to another mode, including active mode, providing additional functions;

(36) ‘active mode’ means a condition corresponding to the hours with a heating load for drinking or sanitary water and activated heating function, which for heat pump water heater may involve cycling of the heat pump to reach or maintain a required water temperature;

(37) ‘network’ means a network as defined in Article 2, point (9), of Commission Regulation (EU) 2023/826 ([3]), Article 2 point (9);

(38) ‘standby mode power consumption’ (P_{SB}) means the electric power consumption of a water heater in standby mode, including network standby when the equipment is capable of resuming its function through a remotely initiated trigger from a network connection, expressed in kW;

(39) ‘out of the box mode’ means the standard operating condition, setting or mode set by the manufacturer at factory level, to be active immediately after the water heater installation, suitable for normal use by the end-user according to the maximum load profile;

(40) ‘daily electricity consumption’ (Q_{elec}) means the consumption of electricity for water heating over 24 consecutive hours under the maximum load profile, expressed in kWh in terms of final energy;

([3]) Commission Regulation (EU) 2023/826 of 17 April 2023 laying down ecodesign requirements for off mode, standby mode, and networked standby energy consumption of electrical and electronic household and office equipment pursuant to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulations (EC) No 1275/2008 and (EC) No 107/2009 (OJ L 103, 18.4.2023, p. 29. ELI http://data.europa.eu/eli/reg/2023/826/oj).

(41) ‘daily electricity generation’ (Q_{elec_gen}) means the generation of electricity by cogeneration heat water for water heating over 24 consecutive hours under the maximum load profile, expressed in kWh in terms of final energy;

(42) ‘daily fuel consumption’ (Q_{fuel}) means the consumption of fuels for water heating over 24 consecutive hours under the maximum load profile, expressed in kWh in terms of GCV;

(43) ‘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;

(44) ‘self-learning’ means a function of the water heater that automatically captures the consumers’ use patterns;

(45) ‘adaptive control’ means a control which adapts the temperature of the water stored in the water heater depending on the use patterns captured with the self-learning function of the water heater;

(46) ‘adaptive control factor’ (F_{AC}) means the water heating energy-efficiency gain due to adaptive control;

(47) ‘adapt’ is a Boolean either equal to 0 or to 1;

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

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

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

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

(52) ‘control factor’ (F_{ctrl}) means a factor accounting for the capability of instantaneous water heaters to set the water temperature independently of the water flow;

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

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

(55) ‘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;

(56) ‘off-peak water heater’ means a water heater that is able to work in an off-peak application;

(57) ‘off-peak application’ means the ability of the water heater to be automatically (without the intervention of the end-user each time) energised for a maximum period of eight consecutive hours between 22:00 and 07:00 of the 24-hour tapping pattern in the load profiles, as set out in Annex III, section 3;

(58) ‘maximum ventilation exhaust air flow rate’ ($q_{v,max,wh}$) means the maximum volumetric flow rate of exhaust air at temperature conditions set out in Annex III, Table 2, that is available to heat pump water heaters when establishing its water heating energy efficiency;

(59) ‘spare part’ means a separate part that can replace a part with the same or similar function in a product;

(60) ‘professional repairer’ means an operator or undertaking which provides services of repair and professional maintenance of water heaters or hot water storage tanks;

(61) ‘proprietary tool’ means a tool that is not available for purchase by the general public or for which any applicable patents are not available to licence under fair, reasonable and non-discriminatory terms’;

(62) ‘building automation and control system’ means building automation and control system as defined in Article 2, point (7), of Directive (EU) 2024/1275 of the European Parliament and of the Council ([4]);

(63) ‘energy smart appliance’ means a product whose manufacturer is a signatory of the Code of Conduct on energy management related interoperability of Energy Smart Appliances, and which is compliant with this Code of Conduct;

(64) ‘fluorinated green-house gases’ means the fluorinated green-house gases in scope of Regulation (EU) 2024/573 of the European Parliament and of the Council ([5]);

3. DEFINITIONS RELATED TO PACKAGES

(65) ‘package water heating energy efficiency’ ($\eta_{wh,pack}$) means the ratio between the useful energy provided by a water heating package and the energy required for its generation, expressed in %;

4. DEFINITIONS RELATED TO SOLAR DEVICES

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

(67) ‘gross thermal yield’ (GTY) means the reference annual thermal yield of the collector array of the solar device for a specific climate, in kWh/a, as set out in Annex III, Section 5, calculated as the simple average of the thermal yield for the 25 ºC and 50 ºC collector operating temperature, in kWh/a;

(68) ‘gross area’(A_g) means the maximum projected area covered by the outer dimensions of the collector array, expressed in m²;

([4]) Directive (EU) 2024/1275 of the European Parliament and of the Council of 24 April 2024 on the energy performance of buildings (OJ L, 2024/1275, 8.5.2024, p. 1, ELI: http://data.europa.eu/eli/dir/2024/1275/oj).

([5]) Regulation (EU) 2024/573 of the European Parliament and of the Council of 7 February 2024 on fluorinated greenhouse gases, amending Directive (EU) 2019/1937 and repealing Regulation (EU) No 517/2014 (OJ L, 2024/573, 20.2.2024, ELI: http://data.europa.eu/eli/reg/2024/573/oj).

(69) ‘solar device efficiency for water heating’ ($\eta_{sol,wh}$) means the efficiency of a solar device for water heating, considering the energy-efficiency class of the tank if applicable, calculated by multiplying the solar-device factor with the tank-correction factor, and expressed in %;

(70) ‘solar device factor for water heating’ ($f_{sol,wh}$), means a factor (>1) representing the contribution of a solar device to the water heating efficiency of a package of water heater and solar device, as set out in Annex III, section 5.2;

(71) ‘tank factor’ (f_{tank}) means a factor in the calculation of the solar device efficiency that depends on the energy-efficiency class of the solar hot-water storage tank, as set out in Annex III, Section 5.2;

(72) ‘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, in kWh/a;

(73) ‘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;

(74) ‘solar heat delivered’ (Q_{sol}) is the part of the annual water-heating demand that is covered by the solar-device yield, in kWh/a;

5. DEFINITIONS RELATED TO HEAT RECOVERY DEVICES FOR SHOWERS

(75) ‘shower water heat recovery device factor’ ($f_{SWHRD,lp}$) means a factor representing the water-heating energy-efficiency gains of a water heater package comprising a shower-water heat-recovery device for a specific load profile;

(76) ‘shower water heat recovery efficiency’ ($\eta_{SWHRD,lp}$) 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 for a specific load profile;

6. DEFINITIONS RELATED TO HOT WATER STORAGE TANKS

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

(78) ‘multivalent tank’ means a hot water storage tank that has at least 6 points of connection allowing for cold water inflow, hot water outflow and/or hot water circulation;

ANNEX II

Ecodesign requirements

1. ECODESIGN REQUIREMENTS FOR WATER HEATERS

1.1. LOAD PROFILE

The load profile for the calculation of the energy efficiency shall be the maximum load profile. For heat pump water heaters using outdoor air, the load profiles may be different for the three (average, colder and warmer) climate conditions.

1.2. MINIMUM WATER HEATING ENERGY EFFICIENCY REQUIREMENTS

The water heating energy efficiency of water heaters shall not be less than the values (in %) set out in Table 1 per load profile.

Table 1

Minimum water heating energy efficiency

<table>
<tr><th></th><th>3XS-S</th><th>M</th><th>L</th><th>XL</th><th>XXL</th><th>3XL - 4XL</th></tr>
<tr><td>EIWH</td><td>42 %</td><td colspan="3">49.7 %</td><td rowspan="2">83 %</td><td rowspan="2">88 %</td></tr>
<tr><td>ESWH and eHPWH</td><td>42 %</td><td>47.5 %</td><td>48.6 %</td><td>48.6 %</td></tr>
<tr><td>FIWH, FSWH, tdHPWH and CHPWH</td><td>45 %</td><td>70 %</td><td>75 %</td><td>80 %</td><td>83 %</td><td>88 %</td></tr>
</table>

1.3. REQUIREMENTS FOR MAXIMUM SOUND POWER LEVELS

The sound power level of water heaters shall not exceed the values (in dB) indicated in Table 2.

Table 2

Maximum sound power levels

Standard rated heat output	**Sound power level (L_{WA}), indoor**	**Sound power level (L_{WA}), outdoor**
≤ 6 kW	60 dB	65 dB
> 6 kW and ≤ 12 kW	65 dB	70 dB
> 12 kW and ≤ 30 kW	70 dB	78 dB
> 30 kW and ≤ 70 kW	80 dB	88 dB

1.4. REQUIREMENTS RELATED TO EMISSIONS OF NITROGEN OXIDES

Emissions of nitrogen oxides of water heaters using gaseous or liquid fuels shall not exceed the values indicated in Table 3 when tested with respectively G20, G25, G30 or G31 reference gas or liquid fuel.

Table 3

Maximum emissions of nitrogen oxides (NOx)

Water heater type	Fuel type			
	gas G20 or G25	gas G30	gas G31	liquid fuel
	Maximum NOx emissions (mg / kWh fuel input)			
FIWH and FSWH	56	73	67	92
tdHPWH and CHPWH				
- using external combustion	70	91	84	92
- using internal combustion	240	312	288	392

1.5. FUNCTIONAL REQUIREMENTS

1.5.1. Water supply at 50 °C requirement

Water heaters shall be able to supply water at 50 °C in 'out of the box mode' when required in the load profile. For outdoor air heat pump water heaters, this requirement shall also apply for warmer and colder climate conditions.

1.5.2. Requirements for storage volume of storage water heaters with maximum load profiles 3XS - S

The storage volume of storage water heaters with maximum load profiles 3XS - S shall not exceed the values indicated in Table 4.

Table 4

Maximum storage volume of storage water heaters with maximum load profiles 3XS-S

Maximum load profile	Maximum storage volume (litres)
3XS	7
XXS	15
XS	15
S	36

1.5.3. Requirements for the minimum amount of mixed water at 40 °C for storage water heaters with maximum load profiles M-4XL

For storage water heaters with a maximum load profile M to 4XL, the amount of mixed water at 40 °C that can be provided by the storage water heater shall not fall below the values indicated in Table 5.

Table 5

Minimum amount of mixed water at 40°C

	maximum load profile

	M	L	XL	XXL	3XL	4XL
Minimum amount of mixed water at 40 ºC (litres)	65	130	210	300	520	1040

1.5.4. Requirements for electric indoor heated air heat pump water heaters

Electric heat pump water heaters that are tested using 'indoor heated air' shall fulfil the following functional requirements:

1. they shall be functional when supplied with an air temperature of 7 °C or higher;
2. they shall have an average electric input power of 300 Watt or less when tested to establish its water heating energy efficiency;
3. they shall not be equipped with a 4-way reversing valve and/or a hot gas bypass valve;
4. they shall have a storage volume of 140 litres or less.

1.6. REQUIREMENTS FOR MATERIAL RESOURCE EFFICIENCY FOR WATER HEATERS WITH A STANDARD RATED HEAT OUTPUT OF 70 KW OR LESS)

1.6.1. Scope of the material resource efficiency requirements

Requirements set out in this section shall apply to water heaters with a standard rated heat output of 70 kW or less.

1.6.2. Availability of spare parts

1. For all models of water heaters with a standard rated heat output of 70 kW or less, units of which are placed on the market as from *(OP to include a date 24 months after the entry into force of the present Regulation*), manufacturers, importers or authorised representatives shall make available to professional repairers, at least, the following spare parts:
    (a) sacrificial (anode) rods,
    (b) circulator and its parts (including for flow rate control),
    (c) ignition spark plugs,
    (d) sensors (including thermostats, pressure gauge, control sensors, other sensors for temperature or pressure),
    (e) electric fuses (separately or bundled together),
    (f) proprietary seals and connection means (including special bolts, nuts, washers, and clamps),
    (g) fans or fan assemblies (including fan motors and fan wheels),
    (h) compressors and their parts,
    (i) burners,
    (j) flow meters,
    (k) printed circuit boards,

(l) valves and actuators, (including electrically operated valves, 3-way valves, and gas valves),

(m) water heater housing and its parts,

(n) heat generators and their parts,

(o) heat exchanger,

(p) piping,

(q) gaskets and seals,

(r) switches, buttons, and knobs,

(s) impellers,

(t) cables and plugs,

(u) displays and status indicators,

(v) software and firmware, including reset software.

2. Manufacturers, authorised representatives or importers shall make available to general public, at least, the following spare part:

(a) remote control.

3. Availability of spare parts referred to in points 1 and 2 of the present section shall be ensured for a minimum period that starts either on dd.mm.yyyy *[the date = 24 months after the date of entry into force of this Regulation – OP – Please insert reference]* or when the first unit of the concerned model is placed on the market or put into service, whichever is the latest, and ends at least, ten years after the last unit of that model is placed on the market or put into service (the 'minimum period').

4. To ensure such availability for the entire minimum period, manufacturers, their authorised representatives or importers shall provide a list of spare parts indicative pre-tax prices, at least in euro, for all spare parts listed in points 1 and 2 of the present section, including the indicative pre-tax price of fasteners and tools, if supplied with the spare part, and the instructions for ordering them and on the free access website of the manufacturer, authorised representative or importer.

5. Manufacturers, authorised representatives or importers of residential water heaters shall ensure that the spare parts mentioned in points 1 and 2 can be replaced without tools or with the use of tools that are not proprietary tools.

6. When manufacturers, authorised representatives or importers make available software and firmware updates for residential water heaters using software, these shall remain available for a minimum of ten years after the placing of the last unit of that water heater on the market, and those updates shall be provided free of charge.

1.6.3. Maximum delivery time of spare parts

During the minimum period, manufacturers, importers or authorised representatives shall ensure the delivery of the spare parts within 15 working days after having received the order.

1.6.4. Access to repair and maintenance information

1. Manufacturers, importers or authorised representatives shall from the date of placing on the market of the first unit of the concerned model, until at least, the end of the minimum period mentioned in point 3 of section 1.6.2 provide access to repair and maintenance information to professional repairers under the following conditions:

(a) the manufacturer's, importer's or authorised representative's website shall indicate the process for professional repairers to request access to the repair and maintenance information; to accept such a request, manufacturers, importers or authorised representatives may only require the professional repairer to demonstrate that:

(i) the professional repairer has the technical skill to repair water heaters and complies with the applicable rules for repairers of water heaters in the Member States where it operates; reference to an official registration system as professional repairer, where such system exists in the Member States concerned, shall be accepted as proof of compliance with this point;

(ii) the professional repairer is covered by insurance covering liabilities resulting from its activity regardless of whether this is required by the Member State.

(b) manufacturers, importers or authorised representatives shall accept or refuse the request within five working days;

(c) manufacturers, importers or authorized representatives may charge reasonable and proportionate fees for access to the repair and maintenance information or for providing regular updates; a fee shall be considered reasonable only if it does not discourage access by failing to take into account the extent to which the professional repairer uses the information;

(d) once the request is accepted, a professional repairer shall have access, within one working day, to the requested repair and maintenance information, which may concern an equivalent model or model of the same family, if relevant;

(e) the repair and maintenance information referred to in point 1 shall at least, include:

(i) the unequivocal water heater identification;

(ii) a disassembly map or exploded view;

(iii) a technical manual of instructions for repair;

(iv) a list of necessary repair and test equipment;

(v) component and diagnosis information (such as minimum and maximum theoretical values for measurements);

(vi) wiring and connection diagrams;

(vii) diagnostic fault and error codes (including manufacturer-specific codes, where applicable);

(viii) instructions for installation of relevant software and firmware including reset software;

(ix) information on how to access data stored on the water heater, including records of reported failure incidents (where applicable); and

(x) electronic board diagrams.

2. Without prejudice to intellectual property rights, third parties shall be allowed to use and publish unaltered repair and maintenance information initially published by the manufacturer, importer or authorised representative and covered by point (e) of

section 1.6.4.1 once the manufacturer, importer or authorised representative terminates access to that information following the end of the period of access to repair and maintenance information.

1.6.5. Dismantling for material recovery and recycling while avoiding pollution

Manufacturers, importers or authorised representatives shall ensure that water heaters and hot water storage tanks are designed in such a way that the materials and components referred to in Annex VII to Directive 2012/19/EU of the European Parliament and of the Council ([6]) can be removed without tools or with the use of tools that are not proprietary tools.

1.7. PRODUCT INFORMATION REQUIREMENTS

1. The information on products set out in point 2 of this section including and where relevant information on interoperability of smart appliances and self-monitoring requirements for water heaters shall be:

   (a) included in the technical documentation for the purposes of conformity assessment pursuant to Article 4, and the verification procedure in Annex V;

   (b) included in the user manual supplied with the product;

   (c) visibly displayed on the free access websites of the manufacturer, its authorised representative or the importer, for a period of at least 10 years after the placing on the market of the last unit of the model concerned.

2. The product information indicated in point 1 above, shall cover the following:

   (a) for water heaters:

      (i) the information in Table 6; for heat pump water heaters using outdoor air as heat source and for packages containing heat pump water heaters, this information shall be provided for average climate conditions, for colder climate conditions and for warmer climate conditions;

      (ii) any specific precautions that are to be taken in order to the water heater to be assembled, installed or maintained;

      (iii) link to the free access website mentioned in point 1.6.2.4 where spare parts list, indicative pre-tax prices and the procedure to order them, are available;

      (iv) information relevant for disassembly, recycling and/or disposal at end-of-life;

      (v) the availability of specific operating modes such as ‘eco mode’ or ‘low noise mode’, together with an indication of the impact of such mode on water heating energy efficiency, standard rated heat output and V40 values, calculated using the measurement and calculation methods set out in Annexes III and IV;

([6]) Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (OJ L 197, 24.7.2 2012, p. 38. ELI: http://data.europa.eu/eli/dir/2012/19/oj).

(vi) Additionally, in case the manufacturer includes the interoperability logo set out in the Commission Delegated Regulation (EU) 2026/xxx ([7]), the information in Table 10 part A.

(vii) as from the dates specified in Article 11 (2), information on self-monitoring requirements namely on the way customers shall be provided access to stored self-monitored data and on the way third parties' access to self-monitored data may be granted or revoked by customers.

(b) for solar devices, the information in Table 7. This information should be provided for average climate conditions, for colder climate conditions and for warmer climate conditions;

(c) for shower water heat recovery devices, the information in Table 8;

(d) for packages the information in Table 9; in the case of packages including heat pumps and solar devices, this information shall be provided for average climate conditions, for colder climate conditions and for warmer climate conditions;

(e) for products and packages submitted to energy labelling requirements pursuant to the Commission Delegated Regulation (EU) 2026/xxx ([7]), the link to the model of the product or of the package as registered in the European Product Registry for Energy Labelling (EPREL) as a human-readable Uniform Resource Locator (URL) or as QR code or the product or package registration number.

3. In case a parameter included in Tables 6 to 9 below is not relevant to the specific product, the respective cell in the table shall include the expression "N/A".

Table 6

Product Information for water heaters

Brand or trademark:							
Model identifier:							
Maximum load profile: [3XS / XXS / XS / S / M / L / XL / XXL / 3XL / 4XL]							
Parameters for water heater types	**EIWH**	**ESWH**	**FIWH**	**FSWH**	**CHPWH**	**eHPWH**	**tdHPWH**
Energy label class Based on energy label Regulation [2026, xxx] ([7])	[A..G]	[A..G]	[A..G]	[A..G]	[A..G]	[A..G]	[A..G]
Water heater energy efficiency (%)	x,x	x,x	x,x	x,x	x,x	x,x	x,x

([7]) Commission Delegated Regulation (EU) …/2026 of XXX supplementing Regulation (EU) 2017/1369 of the European Parliament and of the Council with regard to the energy labelling of water heaters, solar devices, shower water heat recovery devices, packages of those products and hot water storage tanks, and amending and repealing Commission Delegated Regulation (EU) No 812/2013 *[the publication reference of the sister regulation on energy labelling that will be published on the same date – OP – Please insert reference]*.

Standard rated heat output (kW)	x,x	x,x	x,x	x,x	x,x	x,x	x,x
Storage volume (litres)	N/A	x	N/A	x	x	x	x
Mixed water at 40 ºC (litres)	N/A	x,x	N/A	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)	N/A	N/A	x,x	x,x	x,x	N/A	x,x
Type of fuel (gas G20 or G25, gas G30 or gas G31, liquid fuel)	N/A	N/A				N/A	
NOx emissions (mg / kWh fuel input)	N/A	N/A	x,x	x,x	x,x	N/A	x,x
Annual electricity consumption (AEC, kWh/y)	x	x	x	x	x	x	x
Annual fuel consumption (AEF, kWh/y in GCV)	N/A	N/A	x	x	x	N/A	x
Off-peak water heater	N/A	[y/n]	N/A	N/A	N/A	[y/n]	N/A
Independent temperature / flow control	[y/n]	N/A	[y/n]	N/A	N/A	N/A	N/A
Adaptive control	N/A	[y/n]	N/A	N/A	N/A	[y/n]	N/A
Adaptive control factor (F_{AC})	N/A	x,xxx	N/A	N/A	N/A	x,xxx	N/A
Timer	[y/n]	[y/n]	[y/n]	[y/n]	[y/n]	[y/n]	[y/n]
For heat pumps, heat source type* *[outdoor air-to-water / indoor air-to-water / non-heated space air / exhaust air-to-water / brine-to-water / direct exchange-to-water]	N/A	N/A	N/A	N/A	N/A	[heat source]	[heat source]
Climate for outdoor air heat pumps (average / colder / warmer)	N/A	N/A	N/A	N/A	N/A	[climate]	[climate]
Ventilation exhaust air flow rate (m^3/h)* **=if ventilation air source heat pump*	N/A	N/A	N/A	N/A	N/A	x	x
Sound power level, in dB(A), indoor	x	x	x	x	x	x	x
Sound power level, in dB(A), outdoor	N/A	N/A	x	x	x	x	x
Electric power output (kW)	N/A	N/A	N/A	N/A	x,x	N/A	N/A
Electric efficiency (%)	N/A	N/A	N/A	N/A	x,x	N/A	N/A

Table 7

Product information on solar devices

Solar device								
Brand or trademark:			Model identifier:					
Solar device factor for water heating								
Climate	**Number of solar collectors**	**Gross area of collector array [m^2]**	**Load profile of the water heater included in the package***					
			M	**L**	**XL**	**XXL**	**3XL**	**4XL**
			Solar device factor for water heating (per climate, chosen collector surface and load profile, in % points)**					
Average	x	x,x	x,x	x,x	x,x	x,x	x,x	x,x
Warmer			x,x	x,x	x,x	x,x	x,x	x,x
Colder			[…]***	x,x	x,x	x,x	x,x	x,x

* The list of profiles is an example and can be shorter or longer.

** Not less than 100 % and not more than 240 % for colder climate conditions, 450 % for average climate conditions and 500 % for warmer climate conditions.

*** The " […] " notation also indicates that the table may be extended with additional rows below for a larger number of solar collectors and gross area of collector array.

Table 8

Product information on devices for recovering heat from shower water solar devices

Shower-water heat-recovery device								
Brand or trademark:	Model identifier:							
Load profile of water heater included in the package	XS	S	M	L	XL	XXL	3XL	4XL
Shower water heat recovery device factor $f_{SWHRD,lp}$	x,x	x,x	x,x	x,x	x,x	x,x	x,x	x,x
Shower water heat recovery device efficiency $\eta_{SWHRD,lp}$	x,x	x,x	x,x	x,x	x,x	x,x	x,x	x,x
$\eta_{12.5}$	x,x	x,x	x,x	x,x	x,x	x,x	x,x	x,x
η_i	x,x	x,x	x,x	x,x	x,x	x,x	x,x	x,x

q_i	x,x	x,x	x,x	x,x	x,x	x,x	x,x	x,x

Table 9

Information on packages

Package					
Brand or trademark:	Model identifier:				
Package parameters					
Climate conditions: average □ warmer □ colder □					
Water heating					
Parameter	**Value**	**Unit**	**Parameter**	**Value**	**Unit**
Load profile (climate)		-	Water-heating energy efficiency (climate)		%
Package elements					
Water heater included in the package					
Type of heater:			**Parameter**	**Value**	**Unit**
ESWH □ FSWH □ CHPWH □ eHPWH □ tdHPWH □			Water-heating energy efficiency (climate)		%
Link to product database for the water heater model included in the package:			https://eprel.ec.europa.eu/qr/*EPREL identifier*		
Other elements of the package					
Solar device □			**Parameter**	**Value**	**Unit**
Number of products in the package:			Solar-device factor for water heating (climate)		%
Link to product database for the solar device model included in the package:			https://eprel.ec.europa.eu/qr/*EPREL identifier*		
Shower-water heat-recovery device □			**Parameter**	**Value**	**Unit**
Number of products in the package:			Shower water heat recovery device factor		**% points**

Link to product database for the shower water heat recovery device model included in the package:	https://eprel.ec.europa.eu/qr/*EPREL identifier*

1.8. ADDITIONAL INFORMATION TO BE INCLUDED IN THE TECHNICAL DOCUMENTATION

The technical documentation for the purposes of conformity assessment pursuant to Article 4 and of the verification procedure set out in Annex V shall, in addition to the information listed in point 1.7.2, contain the following elements:

1. a general description of the model, allowing it to be unequivocally and easily identified, and of its intended use;
2. references to the harmonised standards applied or other measurement standards used;
3. specific precautions to be taken when the product is assembled, installed, maintained or tested,
4. the details and the results of calculations performed in accordance with Annex III;
5. testing conditions, where they are not described sufficiently in the references provided pursuant to point 2;
6. a list of all equivalent models, including the model identifier;
7. where the information included in the technical documentation for a particular model has been obtained either from a model that has the same technical characteristics relevant for the technical information to be provided but is produced by a different manufacturer, or by calculation based on design or extrapolation from another model of the same or a different manufacturer, or both, the following:
    (a) the details of the calculation, including a detailed mathematical model;
    (b) the details of the assessment undertaken by the manufacturer to verify the accuracy of the calculation, including detailed description of any tests undertaken to verify the accuracy of the calculation;
    (c) where appropriate, the declaration of identity between the models of different manufacturers.
8. The information on interoperability of products set out in Table 10, parts A and B, shall be part of the technical documentation for the purposes of conformity assessment procedures and the verification procedure in Annex V;

The technical documentation shall include the information in the order and as set out in Annex V of the Commission delegated regulation (EU) …/2026 of XXX ([7]*[- OP – Please insert reference]*).

1.9. INFORMATION TO BE PROVIDED REGARDING THE INTEROPERABILITY OF THE ENERGY SMART APPLIANCES

1. In case the interoperability logo set out in Annex III, Section 1(a)(X) of Commission delegated regulation (EU) …/2026 of XXX ([7]*[- OP – Please insert reference]*) is affixed on the product, on the packaging and/or in the instructions manual, it shall be:
    (a) clearly visible, indelible;

(b) shall have a height of at least 5 mm when affixed to the nameplate, or 7 mm when affixed to the enclosure, packaging or the instruction manual. If the logo is enlarged, the proportions set out in the drawings shall be maintained;

(c) the reference colours for the interoperability logo shall be black and white and the font used in the logo shall be Quicksand Bold;

However, if the product nameplate, enclosure, packaging, or instruction manual provide for a dark background, the interoperability logo may use a negative format using the same background colour. If the product nameplate, enclosure, packaging, or instruction manual only use a black and white format or other analogous monochrome formats, the interoperability logo may use those colours.

The information on energy smart appliances set in table 10 is to be included in user manuals and free access websites as established in sections 1.7 and 1.8 of the present Annex.

Table 10

Energy Smart Appliances

Energy Smart Appliances	
Part A – Information for technical documents instruction manuals and free access websites	
Manufacturer's name or trademark, commercial registration number and address	
Model identifier	
Appliance compliant with the EU Code of Conduct for the interoperability of Energy Smart Appliances	□ Appliance compliant
How does the appliance achieve compliance with the Code of Conduct? ([8])	□ Dongle/adaptor □ Cloud connection □ Built in the appliance
Which use cases does the appliance implement? ([9])	□ Flexible start □ Power Consumption Monitoring □ Power Consumption Limitation □ Incentive Table-based Power Consumption Management □ Manual operation □ Future use cases ([10])
Manufacturer's link to free access website with end-user information	

([8]) Only one can be selected.
([9]) More than one option can be selected.
([10]) Future use cases can be considered when the Code of Conduct is updated, as new versions will integrate evolving solutions and protocols to address emerging needs.

Part B – Information to be added in the technical documentation	
Communication Protocol used to implement the use cases:	□ SPINE □ SPINE IoT □ Matter □ Home Connectivity Alliance □ S2 □ Others (please specify) [_.....__]

1.10. SELF-MONITORING REQUIREMENTS FOR WATER HEATERS WITH LOAD PROFILES 3XL AND 4XL

1.10.1. Scope of the self-monitoring requirements

Requirements set out in this section shall only apply to water heaters (including those integrated in packages) with load profiles 3XL and 4XL.

1.10.2. Data covered by self monitoring requirements

Depending on its type, the water heater shall determine, store and display at least the following data:

(a) the energy input to the water heater (electricity, gaseous or liquid fuels); in case several types of energy sources are used by the unit, energy input for each and for all energy sources must be determined;

(b) the thermal energy output for water heating;

(c) for cogeneration water heaters, the electrical energy output;

(d) the energy efficiency (the ratio of thermal energy output and electrical energy output to energy input); in order to calculate it, electricity must be converted to primary energy with a CC equal to 1,9 for consumed electricity and a coefficient of 2,65 for cogenerated electricity and using fuel gross calorific value (GCV).

1.10.3. Requirements related to data display

1. Instantaneous values shall be displayed at a sample rate of a maximum of 1 minute.

2. The display option shall be available from the main menu of the end-user interface.

3. Instantaneous and average data referred to in point 1.10.4 shall be displayed on the display of the water heater or remotely (for example by means of a computer application, mobile application, website, or dedicated separate display).

1.10.4. Requirements related to data storage

1. The values mentioned in Subsection 1.10.2 shall be stored with the following frequency: instantaneous values for two days, average values of any hour, day, week, month and year, covering the period of at least, the previous 24 months or the period since the heater installation, whichever period is shorter.

2. For water heaters which allow for communication with a building automation and control system, data referred to in the first paragraph may be stored in the building automation and control system.

3. Data stored in accordance with the first paragraph shall be accessible to end-user or third parties by means of a standard interface, such as for example USB port, SD-card or WiFi connection, in machine-readable format (such as for example a csv or xml file) without undue delay.

2. ECODESIGN REQUIREMENTS FOR HOT WATER STORAGE TANKS

2.1. REQUIREMENT FOR MAXIMUM STANDING LOSS

The standing loss S of hot water storage tanks (in Watts) shall not exceed:

(a) from dd.mm.yyyy [OP, please insert the date = 24 months after the date of entry into force of this Regulation], the values laid down in Table 11;

Table 11

Maximum standing loss of hot water storage tanks from dd.mm.yyyy *[the date = 24 months after the date of entry into force of this Regulation – OP – Please insert reference]*

Storage tank type and volume	Hot water storage tanks with storage volume of more than 500 L	Hot water storage tanks with storage volume of 500 L or less (except multivalent tanks with a storage volume ≥ 80 L)	Multivalent tanks with a volume ≥ 80 L
Maximum standing loss S (in Watts)	$16.66+ 8.33*V^{0,4}$	$12+ 5.93*V^{0,4}$	$12+ 6.43*V^{0,4}$

(a) from dd.mm.yyyy [OP, please insert the date= 48 months after the date of entry into force of this Regulation], the values set out in Table 12

Table 12

Maximum standing loss of hot water storage tanks from dd.mm.yyyy *[the date = 48 months after the date of entry into force of this Regulation – OP – Please insert reference]*

Storage tank type and volume	Hot water storage tanks with storage volume of more than 500 L	Hot water storage tanks with storage volume of 500 L or less (except multivalent tanks with a storage volume ≥ 80 L)	Multivalent tanks with a volume ≥ 80 L
Maximum standing loss S (in Watts)	$12+ 5.93*V^{0,4}$	$12+ 5.93*V^{0,4}$	$12+ 6.43*V^{0,4}$

*Where V is tank storage volume or equivalent volume Veq, expressed in litres.

2.2. REQUIREMENTS FOR MATERIAL RESOURCE EFFICIENCY FOR HOT WATER STORAGE TANKS

2.2.1. Availability of spare parts for hot water storage tanks:

1. For all models of hot water storage tanks, units of which are placed on the market as from *[a date 24 months after the entry into force of the present Regulation – OP –*

Please insert reference] manufacturers, importers or authorised representatives shall make available to professional repairers at least, the following spare parts:

(a) heat exchanger and its parts;

(b) sacrificial (anode) rods;

(c) pumps and their parts;

(d) displays and status indicators;

(e) valves and actuators;

(f) sensors, including sensors for temperature or pressure,

(g) switches;

(h) gaskets and seals;

(i) buttons and knobs.

2. Spare parts mentioned in point 1 shall be made available for a minimum period that begins either dd.mm.yyyy *[the date = 24 months after the date of entry into force of this Regulation – OP – Please insert reference]* or at the time when the first unit of the model is placed on the market or put into service , whichever comes later, and that ends at least, ten years after the last unit of the model concerned is placed on the market (the 'minimum period').

3. To ensure such availability, the manufacturer, importer, or authorised representative shall provide the list of spare parts and the instructions for ordering them on a free-access website at least, for the entire minimum period. During the minimum period referred to in point 2 of this section, manufacturers, importers or authorised representatives shall provide indicative pre-tax prices at least in euro for spare parts listed in point 1, including the indicative pre-tax price of fasteners and tools, if supplied with the spare part, on the free access website of the manufacturer, importer or authorised representative;

4. Manufacturers, importers or authorised representatives shall ensure that the spare parts mentioned in point 1 can be replaced without tools or with the use of tools that are not proprietary tools and without permanent damage to the hot water storage tank.

5. Manufacturers, importers or authorised representatives shall make available free of charge software and firmware updates for hot water storage tanks using software, for a minimum of ten years after placing the product on the market.

2.2.2. Maximum delivery time of spare parts

During the minimum period referred to in point 2 of section 2.2.1, the manufacturer, importer or authorised representative shall ensure the delivery of the spare parts within 15 working days after having received the order.

2.2.3. Access to repair and maintenance information

1. Manufacturers, importers or authorised representatives shall from the date of placing on the market of the first unit of the model, until at least the end of the minimum period, provide access to repair and maintenance information to professional repairers under the following conditions:

(a) the manufacturer's, importer's or authorised representative's website shall indicate the process for professional repairers to request access to information;

to accept such a request, the manufacturers, importers or authorised representatives may only require the professional repairer to demonstrate that:

(i) the professional repairer has the technical skill to repair relevant hot water storage tanks and complies with the applicable rules for repairers of hot water storage tanks in the Member States where it operates; reference to an official registration system as professional repairer, where such system exists in the Member States concerned, shall be accepted as proof of compliance with this point;

(ii) the professional repairer is covered by insurance covering liabilities resulting from its activity, regardless of whether this is required by the Member State.

(b) Manufacturers, importers or authorised representatives shall accept or refuse the request referred to in point (a) within 5 working days.

(c) Manufacturers, importers or authorised representatives may charge reasonable and proportionate fees for access to the repair and maintenance information or for receiving regular updates. A fee shall be considered reasonable only if it does not discourage access by failing to take into account the extent to which the professional repairer uses the information;

(d) once the request is accepted, a professional repairer shall have access, within one working day, to the requested repair and maintenance information, which may concern an equivalent model or model of the same family, if relevant;

(e) the repair and maintenance information referred to in point 1 shall include at least:

(1) the unequivocal hot water storage tank identification;

(2) a disassembly map or exploded view;

(3) technical manual of instructions for repair;

(4) list of necessary repair and test equipment;

(5) component and diagnosis information (such as minimum and maximum theoretical values for measurements);

(6) wiring and connection diagrams;

(7) diagnostic fault and error codes (including manufacturer-specific codes, where applicable);

(8) instructions for installation of relevant software and firmware including reset software;

(9) information on how to access data stored on the hot water storage tank, including records of reported failure incidents (where applicable);

(10) electronic board diagrams.

2. Without prejudice to intellectual property rights, third parties shall be allowed to use and publish unaltered repair and maintenance information initially published by the manufacturer, importer or authorised representative and covered by point (vii) of Section 2.2.3.1 once the manufacturer, importer or authorised representative terminates access to that information after the end of the minimum period of access to repair and maintenance information.

2.2.4. Dismantling for material recovery and recycling while avoiding pollution

Manufacturers, importers or authorised representatives shall ensure that hot water storage tanks are designed in such a way that the materials and components referred to in Annex VII to Directive 2012/19/EU of the European Parliament and of the Council can be removed. without tools or with the use of tools that are not proprietary tools.

2.3. INFORMATION REQUIREMENTS FOR HOT WATER STORAGE TANKS

1. The information on hot water storage tanks set out in point 2 of this section shall be included or visible displayed:

(a) in the technical documentation for the purposes of conformity assessment pursuant to Article 4, and the verification procedure in Annex V;

(b) in the user manual supplied with the product;

(c) on the free access websites of the manufacturer, its authorised representative or the importer for a period of at least, 10 years after the placing on the market of the last unit of the model concerned.

2. The information shall contain the following elements:

(a) the information referred to in Table 13;

(b) link to the free access website mentioned in section 2.2.1.3 where spare parts list; indicative pre-tax prices and the procedure to order them are available;

(c) for hot water storage tanks in the scope of the energy label Regulation [2026, xxx] ([7]), the link to the model of the product or to the model of the package in the European Product Registry for Energy Labelling (EPREL) as a human-readable Uniform Resource Locator (URL) or as QR code or by providing the product or package registration number.

(d) any specific precautions that are to be taken when the hot water storage tank is assembled, installed or maintained;

(e) information relevant for disassembly, recycling and/or disposal at end-of-life.

Table 13 Product information for storage tanks

Storage tank		
Brand or trademark:		
Model identifier:		
Parameter	**Unit**	**Decimals**
Storage volume (or 'equivalent volume')	L	x
Volume of mixed water at 40°C	L	x
Standing loss	W	x,x
Multivalent tank		[y/n]
Energy label class		[A..D]
Information relevant for waste treatment		

Tank material (of the volume(s) that contain(s) drinking and/or system water)	(state material(s))
Thermal insulation (the type of the materials used for thermal insulation)	(state material(s))

2.4. TECHNICAL DOCUMENTATION FOR THE PURPOSES OF CONFORMITY ASSESSMENT AND OF THE VERIFICATION PROCEDURE

The technical documentation for the purposes of conformity assessment pursuant to Article 4 and of the verification procedure set out in Annex V shall contain as relevant the following elements:

1. a general description of the model, allowing it to be unequivocally and easily identified, and of its intended use;
2. references to the harmonised standards applied or other measurement standards used;
3. specific precautions to be taken when the product is assembled, installed, maintained or tested,
4. the details and the results of calculations performed in accordance with Annex III;
5. testing conditions, where they are not described sufficiently in the references provided pursuant to point 2;
6. a list of all equivalent models, including the model identifier;
7. the declared values for the relevant technical parameters indicated in Table 13 of Annex II Section 2.3 of this Regulation;
8. a list of all equivalent models, including their model identifier;
9. where the information included in the technical documentation for a particular model has been obtained from either from a model that has the same technical characteristics relevant for the technical information to be provided but is produced by a different manufacturer, or by calculation based on design or extrapolation from another model of the same or a different manufacturer, or both, the technical documentation must include the following:
   (a) the details of the calculation, including a detailed mathematical model;
   (b) the details of the assessment undertaken by the manufacturer to verify the accuracy of the calculation, including detailed description of any tests undertaken to verify this accuracy;
   (c) where appropriate, the declaration of identity between the models of different manufacturers.

ANNEX III

Measurements and calculations

1. INTRODUCTION

For the purposes of verification of conformity and of compliance with the requirements of this Regulation, measurements and calculations shall be made using harmonised standards the reference numbers of which have been published for this purpose in the *Official Journal of the European Union*, or using other reliable, accurate and reproducible methods that consider the generally recognised state-of-the-art methods and are in conformity with the provisions of Annexes III and IV.

2. TEST CONDITIONS FOR WATER HEATERS

The following test conditions apply:

(a) The declared load profile of the water heater shall be the maximum load profile that can be reached for the given climate condition.

(b) The water-heating tests shall be performed in the 'out of the box mode'. The only alteration allowed is to enable the measurement of the adaptive-control factor. If the water heater is supplemented by a back-up heater, the back-up heater shall be connected to the control of the water heater during the entire test. The measured energy consumption of the back-up heater shall be accounted for during the test.

(c) The declared load profile of a water heater and the ability of a water heater to supply water at 50 °C for all shall be verified by tests, before proceeding with the remaining water heating measurements.

(d) The measurements for all water heaters shall be carried out for the load profile with the largest reference energy (Qref) that can be supplied by the water heater, as set out in Table 3.

(e) For measurements under point d, the cold sanitary water inlet temperature shall be +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, it shall be tested at the ambient temperature outdoors or, for heat-pump water heaters, at the source air temperature of Table 1.

(f) The tests to determine energy efficiency and performance shall be subject to the following conditions as applicable:

  (i) measurements are carried out using the load profiles set out in Table 3;

  (ii) measurements are 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 maximum load profile;

    – from end of last water draw-off until 24:00: no water draw-off.

  (iii) if the water heater has a network standby mode, the network standby mode shall be used during the test.

(g) Heat pump water heaters shall be tested under the conditions set out in Table 1. For electric heat pump water heaters, the 'indoor air' rating condition indicated in Table

1 shall be used only if the functional requirements of Annex II Section 1.5.4 are satisfied, otherwise the 'outdoor air' rating condition shall be used.

(h) Exhaust air-to-water heat pump water heaters shall be tested under the maximum air flow conditions set out in Table 2, whereby an alternate source is to be used and declared, if and in as much as the ventilation exhaust air is not enough to perform the requirements of the maximum load profile.

(i) Water heaters classified as off-peak water heaters shall be energised for a maximum period of eight 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 shall be energised till the end of the step;

Table 1 Standard rating conditions for heat pump water heaters

Heat source	**Outdoor air (dry/wet)**	**Indoor air (dry/wet)**	**Non-heated space air (dry/wet)**	**Ventilation exhaust air (dry/wet)**	**Ground source (inlet/outlet)**	**Direct exchange (bath)**
Temperature	Average: +7 °C /+6 °C Colder: +2 °C / +1 °C Warmer: +14 °C/ +12 °C	+20 °C / maximum +15 °C	+15 °C / +12 °C	+20 °C / +15 °C	+5 °C/ +2 °C	+4°C

Table 2 Maximum ventilation exhaust air flow rate

Maximum load profile	**S**	**M**	**L**	**XL**	**XXL**	**3XL**	**4XL**
Ventilation exhaust air flow rate available $q_{v,max,wh}$ in m³/h	80	160	190	600	900	1700	3500

(a) For calculating the adaptive control factor F_{AC}, measurements of the weekly electricity and/or fuel consumption with or without adaptive controls shall be carried out using a two-week measurement cycle as follows:

(i) days 1 to 5: random sequence of load profiles chosen from the maximum load profile and the load profile one below the maximum load profile, self-learning function enabled, and adaptive control disabled;

(ii) days 6 and 7: no water draw-offs, self-learning function enabled, and adaptive control disabled;

(iii) days 8 to 12: repetition of the same sequence applied for days 1 to 5, and adaptive control enabled;

(iv) days 13 and 14: no water draw-offs, and adaptive control enabled;

(v) 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 maximum load profile.

(b) The sound power level of heat pump water heaters shall be measured at standard rated heat output.

(c) 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 IV, whereby for a storage water heater:

(i) (i) the product shall be kept at its nominal operating temperature set point (in °C) for at least 12 consecutive hours;

(ii) (ii) at the end of the first thermostat cut-out thereafter, it shall be switched off and the water shall be withdrawn at the maximum flow rate in the maximum load profile until the water temperature at the outlet, measured and registered at the most at every 3 seconds, drops below 40 °C;

(d) For test conditions not mentioned in this Section, the transitional methods mentioned in Annex IV shall apply, as appropriate.

3. WATER HEATING ENERGY EFFICIENCY

(a) The water heating energy efficiency η_{wh}, expressed in %, of a water heater shall be calculated as the ratio between the reference energy Q_{ref} of the maximum load profile and the energy required for its generation based on GCV and including primary energy for electricity, calculated as:

$$\eta_{wh} = \frac{Q_{ref} + Q_{elec\_gen} \cdot 2{,}65}{\left(Q_{fuel} + CC \cdot Q_{elec}\right) \cdot (1 - F_{AC}.adapt) + Q_{cor}} \cdot Fctrl \cdot 100$$

where:

– Q_{ref} is the total energy delivered by the load profile used, value from Table 7, in kWh;

– Q_{elec} is the consumption of electricity for water heating over 24 consecutive hours under the maximum load profile, expressed in kWh, in terms of final energy, including the electricity use of auxiliary components that are necessary for testing the load profile but not delivered with the product (except the water circulator(s));

– Q_{elec_gen} is electricity generation by cogeneration water heater for water heating over 24 consecutive hours under the maximum load profile, expressed in kWh in terms of final energy;

– Q_{fuel} is the daily fuel consumption for domestic hot water over 24 consecutive hours under the maximum load profile, expressed in kWh, in terms of GCV;

– F_{AC} is the adaptive control factor, as set out in point (b);

– *adapt* is a Boolean either equal to 0 or to 1;

– Q_{cor} is the ambient correction term, as set out in point (c);

– *Fctrl* is the factor accounting for the capability of water heaters to set the water temperature independently of the water flow.

(b) The adaptive-control term:

(i) for EIWH and FIWH, *adapt* shall be equal to 0;

(ii) for water heaters without adaptive control, *adapt* shall be equal to 0;

(iii) for water heaters with adaptive control, F_{AC} shall be calculated in the following way:

$$F_{AC} = 1 - \frac{Q_{fuel,week,adaptive} + CC \cdot Q_{elec,week,adaptive}}{Q_{fuel,week} + CC \cdot Q_{elec,week}}$$

(iv) if the condition $F_{AC} \geq 0{,}07$ is satisfied, and if the difference between the useful energy content measured during days 1 to 7 and the useful energy content measured during days 8 to 14 does not exceed 2 % of Q_{ref} of the maximum load profile, *adapt* shall be 1, and in other cases, *adapt* shall be 0;

Measurements Qfuel,week,adaptive, Qelec,week,adaptive, Qfuel,week and Qelec,week shall be carried out in accordance with Section 2, point (j).

(c) Qcor:

(i) for water heaters with load profiles XL to 4XL shall be equal to 0;

(ii) for water heaters with load profiles S to L shall be calculated in the following way:

- for heat-pump water heaters: $Q_{cor} = -0{,}23 \times 24h \times P_{stby}$

- for water heaters other than heat-pumps, using fuel combustion for heating sanitary water:

$$Q_{cor} = -0{,}23 \cdot (Q_{fuel} \cdot (1 - F_{AC}.adapt) - Q_{ref})$$

- for water heaters other than heat-pumps, using the electric Joule effect for heating sanitary water:

$$Q_{cor} = -0{,}23 \cdot (CC \cdot Q_{elec} \cdot (1 - F_{AC}.adapt) - Q_{ref})$$

(d) Fctrl:

(i) for storage water heaters, Fctrl shall be equal to 1;

(ii) for EIWH and FIWH, Fctrl shall be equal to 1 for water heaters that can control the water temperature independently from the water flow and shall be equal to 0,95 otherwise.

Table 3 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	

	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	
07:05	**1.4**	6	40									
07:15					**1.82**	6	40		**1.82**	6	40	
07:26					**0.105**	3	25		**0.105**	3	25	
07:30	**0.105**	3	25									
07:45	**0.105**	3	25		**4.42**	10	10	40	**6.24**	16	10	40
08:01					**0.105**	3	25		**0.105**	3	25	
08:05	**3.605**	10	10	40								
08:15					**0.105**	3	25		**0.105**	3	25	
08:25	**0.105**	3	25									
08:30	**0.105**	3	25		**0.105**	3	25		**0.105**	3	25	
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	

	kWh	l/min	°C	°C
07:00	**11.2**	48	40	
08:01	**5.04**	24	25	
09:00	**1.68**	24	25	
10:30	**0.84**	24	10	40
11:45	**1.68**	24	25	
12:45	**2.52**	32	10	50
15:30	**2.52**	24	25	
18:30	**3.36**	24	25	
20:30	**5.88**	32	10	50
21:30	**12.04**	48	40	
Q_{ref}	**46.76**			
h	**4XL**			

10:30					**0.105** 3 10 40
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			
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 50	**0.315** 4 10 50
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			

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 50	**0.735** 4 10 50	**0.735** 4 10 50
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

	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	50
15:30	**5.04**	48	25	
18:30	**6.72**	48	25	
20:30	**11.76**	64	10	50
21:30	**24.08**	96	40	
Q_{ref}	**93.52**			

Legend:

20:30			**1.05** 3 35	**0.42** 4 10 50	**0.735** 4 10 50
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 40	**1.4** 6 40
21:35	**0.015** 2 25	**0.105** 2 25			
21:45	**0.015** 2 25	**0.105** 2 25			
Q_{ref}	**0.345**	**2.100**	**2.100**	**2.100**	**5.845**

19:00	**0.105** 3 25	**0.105** 3 25	**0.105** 3 25
20:30	**0.735** 4 10 50	**0.735** 4 10 50	**0.735** 4 10 50
20:46		**4.42** 10 10 40	**6.24** 16 10 40
21:00	**3.605** 10 10 40		
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}	**11.655**	**19.07**	**24.53**

Qtap: energy content

f : flow rate

Tm: minimum temperature

Tp: peak temperature

4. WATER HEATING EFFICIENCY OF A PACKAGE

The water-heating efficiency of a package shall be calculated per climate condition:

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

where:

- $\eta_{sol,wh,lp}$ is the solar-device efficiency for water heating of the solar device included in the package, in %, indicated in the product information sheet for the solar device included in the package;
- $\eta_{wh,lp}$ is the water-heating energy efficiency of the water heater included in the package, indicated in the product-information sheet for this water heater; in case of a package made of a thermosiphon ICS solar device with no other heat generator than the solar device and a backup immersion heater, $\eta_{wh,lp}$ should be equal to *1/CC*, with *CC* the conversion coefficient;
- $f_{SWHRD,lp}$ is the shower-water heat-recovery device factor of the shower-water heat-recovery device included in the package, indicated in the product-information sheet for this shower-water heat-recovery device.

5. SOLAR DEVICE

5.1. Solar device testing

(a) The solar collector(s) and, if applicable, the solar hot water storage tank(s) of the solar device, shall be tested separately, except for a solar device for which the solar collector(s) and hot-water storage tank(s) form an inseparable unit or need to be tested together in order to determine the solar-device efficiency, and which is placed on the market as a single unit.

(b) The standards as referenced in Annex IV shall be applied.

(c) The weather data to be used for determining GTY shall relate to the location of:

(i) Helsinki or Stockholm for the colder climate;

(ii) Strasbourg or Würzburg for the average climate; and

(iii) Athens for the warmer climate.

(d) The orientation for non-tracking collectors shall be south for all locations.

(e) The inclination for non-tracking collectors shall be:

(i) 45º for the colder climate;

(ii) 35º for the average climate; and

(iii) 25º for the warmer climate.

(f) For collectors designed to track the path of the sun, the optimal tracking parameters declared by the manufacturer for the locations indicated in point (c) shall be used.

(g) When performing tests of solar collectors and/or subsequent calculations, the volume of the solar storage tank shall not be less than 0.06 litre of water per kWh of GTY of the collector array.

5.2. Solar device efficiency for water heating

(a) The solar device efficiency for water heating $\eta_{sol,wh}$ shall be calculated per climate condition and load profile as:

$$\eta_{sol,wh} = f_{\text{sol},wh} \times f_{\text{tank}}$$

where:

- f_{tank} is the tank factor, as set out in Table 4, specified for the energy-efficiency class of the storage tank as indicated in the product-information sheet of the storage tank;
- $f_{\text{sol,wh,}}$ is the solar-device factor, calculated in accordance with point (b).

(b) The solar device factor $f_{\text{sol,wh}}$ shall be calculated per climate condition in the following way:

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

where:

- *GTY* is the climate-specific gross thermal yield per year (kWh/yr) of the solar device, calculated in accordance with point (c);
- $Q_{wh,sol}$ means the annual solar water heating demand, for the applicable load profile, calculated in accordance with point (d);
- coefficient *a*, *b*, *c* and *d* are the solar device water heating efficiency coefficients per climate condition, set out in Table 4;
- $f_{profile}$ is tapping load profile specific coefficient as set out in Table 5.

The solar-device efficiency for water heating $\eta_{sol,wh}$ as calculated for the combinations of *GTY* and Q_{ref} shall not be less than 100 % and not more than the upper limits 240 %, 450 % and 500 % for the colder, average and warmer climate respectively.

Table 4

Tank factor

Storage-tank energy-label class	**A**	**B**	**C**	**D**
Storage-tank correction factor f_{tank}	1.20	1.15	1.1	1.05

Table 5

Coefficients for calculation of $\eta_{sol,wh}$

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 6

Load profile specific coefficient for calculation of $\eta_{sol,wh}$

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

(a) The GTY of a solar device shall be calculated in the following way:

(i) if the solar collector(s) of the solar device were tested separately from the hot water storage tank of the solar device, the GTY shall be calculated using the calculation method referred to in Annex IV;

(ii) if the solar collector(s) and the hot water storage tank of the solar device were tested together, the GTY shall be equal to the amount of solar heat delivered (Q_{sol}), determined for the smallest load profile, for which the non-solar heat required (Q_{nonsol}) for the 'warmer' climate conditions is equal to or higher than the minimum values shown in Table 7.

Table 7

The minimum value for Q_{nonsol}

	M	L	XL	XXL	3XL	4XL
Limit value (kWh/a)	520	950	1510	1910	3570	7060

(b) The non-solar heat required (Q_{nonsol}), expressed in kWh/a, shall be calculated in the following way:

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

where:

– $Q_{wh,sol}$ is the annual solar water heating demand, calculated in accordance with point (3), and expressed in kWh/a;

– Q_{sol} is the solar heat delivered, determined using standards referred to in Annex IV, and expressed in kWh/a;

(c) The annual solar-water-heating demand ($Q_{wh,sol}$) shall be calculated in the following way:

$$Q_{wh,sol} = 0.6 * 366 * \left(Q_{ref} + 1.09\right)$$

6. SHOWER WATER HEAT RECOVERY DEVICE

6.1. Testing of the shower-water heat-recovery device

(a) The shower water flow rate and the incoming cold water flow rate shall be matched.

(b) The shower water flow rate shall have a temperature between 35 and 40 °C and the incoming cold water a temperature of 10 °C.

(c) The sum of the highest flow rates at which the shower water heat recovery devices supplied in the package have been tested shall exceed the load profile flow rate for the water heater package as indicated in Table 8.

6.2. Shower-water heat-recovery device factor

(a) The shower water heat recovery device factor $f_{SWHRD,lp}$ shall be calculated, in % as:

$$f_{SWHRD,lp} = \frac{100}{\left(100 - \left(\eta_{SWHRD,lp} * 0.64\right)\right)}$$

where ηSWHRD,lp is the shower water heat recovery device efficiency for the maximum load profile of the water heater included in the package, calculated as set out in point (b) or (c) accordingly. If the package includes more than one shower-water heat-recovery device, the shower-water heat-recovery device efficiency is calculated in accordance with point (d).

(b) The shower-water heat-recovery device efficiency for a load profile $\eta_{SWHRD,lp}$, established at one flow rate, shall be calculated in the following way:

(i) if the shower-water heat-recovery device efficiency η_i 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 maximum load profile shall be $\eta_{i;}$

(ii) 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 maximum load profile shall be calculated as:

(iii) $\eta_{SWHRD,lp} = \eta_{12.5} + \left(0{,}8 * 0.01 * (12{,}5 - q_{V,lp})\right)$

(c) The shower water heat recovery device efficiency for a load profile $\eta_{SWHRD,lp}$, 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, shall be calculated in the following way:

$$\eta_{SWHRD,lp} = \eta_{12,5} + \left(0.8 * \frac{\eta_{12,5} - \eta_i}{q_{V,12,5} - q_{V,i}} * (q_{V,lp} - 12{,}5)\right)$$

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 efficiency of the shower-water heat-recovery device efficiency established in a test at a flow rate other than 12.5 l/min;

– $q_{12,5}$ is the water flow rate of 12.5 l/min used in the test;

– $q_{V,i}$ 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 indicated in Table 8.

(d) The $\eta_{SWHRD,lp}$ for a package including multiple shower water heat recovery devices shall be calculated as the flow rate weighted average of the efficiencies established for the individual shower water heat recovery devices.

Table 8

Flow rate $q_{V,lp}$ per load profile

Load profile	**XS**	**S**	**M**	**L**	**XL**	**XXL**	**3XL**	**4XL**
$q_{V,lp}$ (l/min)	3	5	6	8	8	12	48	96

7. STANDING LOSS OF HOT WATER STORAGE TANKS

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

(b) 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.

(c) 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.

(d) The equivalent volume of a storage tank containing PCM material Veq shall be calculated as:

$$V_{eq} = V_{40} * \frac{30}{\Theta_{\mathrm{wh}} - 10} \div 0.85$$

where:

– V40 is the volume of mixed water, established in accordance with methods identified in Annex IV;

– Θ_{wh} is the reference hot water temperature, established in accordance with methods identified in Annex IV.

ANNEX IV

Transitional methods

(The source of all references is CEN unless otherwise indicated)

Parameter	Reference/ Title	Notes and short description

1. ELECTRIC INSTANTANEOUS WATER HEATERS

Standard rated heat output, Prated	EN 50193-1:2016/A1:2020 Electric instantaneous water heaters - Methods for measuring the Performance - Part 1: General requirements 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}	Clause 5.2.4	
Sound power level indoor (L_{WA})		Test method / default numerical value required for product information.
Daily electricity consumption Qelec	Clause 5.2.2	
Weekly electricity consumption Qelec,week	Clause 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	Clause 5.1.4	
SCF	Clause 5.1.4	
Fctrl		The ability to control the water temperature independently of the flow is measured by comparing the energy supplied to the water for a given load profile in two different situations: (1) with the set point adapted to the temperature required for each tapping of the specific load profile (which gives a reference time required to reach the required energy supply by tapping), and (2) with the maximum temperature set

		point (to be held for the reference time established in (1)). The ratio between these two energy quantities is then compared to pre-established thresholds.

2. ELECTRIC STORAGE WATER HEATER

Standard rated heat output, Prated		Calculate Prated as product of: Prated=η_{wh}*CC*P_{nom} where P_{nom} is the nominal electric power indicated on the product rating plate and checked as part of verifications led under the Low Voltage Directive.
Water heating energy efficiency η_{wh}	EN 50440:2015+A1:2020 Efficiency of domestic electrical storage water heaters and testing methods Annex A.2	
Sound power level (L_{WA})		Test method / default numerical value required for product information.
Storage volume	Clause 9.1.4	
Mixed water at 40 °C	Clause 9.1.10	
Daily electricity consumption Qelec	Clause 9.1.8.	
Weekly electricity consumption Qelec,week	Clause 9.2	
Weekly electricity consumption 'smart' enabled Qelec,week,smart	Clause 9.2	
SCF	Clause 9.2.	

3. FUEL INSTANTANEOUS WATER HEATER

Standard rated heat output, Prated		Prated is called nominal useful output Pn but standards do not

		describe a measurement method. It is proposed to define Prated as the nominal fuel input multiplied by the nominal efficiency from: - for gaseous fuel - EN26:2023 Clause 7.3.2 corrected for GCV of the fuel; - for liquid fuel - EN 303-6:2019 – Clause 6.4.3.1 corrected for GCV of the fuel.
Water heating energy efficiency η_{wh}	gaseous fuels: EN13203-2:2022 - Gas-fired domestic appliances producing hot water - Part 2: Assessment of energy consumption. Clause 7.1 Gaseous fuels with passive flux heat recovery device: EN13203-7:2022 - Gas-fired domestic appliances producing hot water - Part 2: Assessment of energy consumption. Clause 7.1 Liquid fuels: EN 303-6:2019 - Heating boilers - Part 6: Heating boilers with forced draught burners - Specific requirements for the domestic hot water operation and energy performance of water heaters and combination boilers with atomizing oil burners of nominal heat input not exceeding 70 kW Clause 10.1	
Sound power level (L_{WA})	EN 26:2023 – Gas-fired instantaneous water heaters for the production of domestic water heaters Clause 11.	Not covered for liquid fuel appliance.
NOx emissions /	EN 26:2023	

gaseous	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	EN 13203-2:2022 Clause 5.5	
Daily fuel consumption Qfuel	EN 13203-2:2022 Clause 7.1	
Weekly electricity consumption Qelec,week		Not covered by standards EN 13203-2, EN13203-7 and EN303-6:2019.
Weekly electricity consumption 'smart' enabled Qelec,week,smart		
Weekly fuel consumption Qfuel,week		
Weekly fuel consumption 'smart' enabled Qfuel,week,smart		
SCF		
Fctrl		The ability to control the water temperature independently of the flow is measured by comparing the energy supplied to the water for a given load profile in two different situations: (1) with the set point adapted to the temperature required for each tapping of the specific load profile (which gives a reference time required to reach the required energy supply by tapping), and (2) with the maximum temperature set point (to be held for the reference time established in (1)). The ratio between these two energy quantities is then compared to pre-established

		thresholds.

4. FUEL STORAGE WATER HEATER

Standard rated heat output, Prated		Prated is called nominal useful output Pn but standards do not describe a measurement method. It is proposed to define Prated as the nominal fuel input multiplied by the nominal efficiency from: - for gaseous fuel – EN 89:2015 Clause 7.1.2.2 corrected for GCV of the fuel; - for liquid fuel - EN 303-6:2019 – Clause 6.4.3.1 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: EN 303-6:2019 Clause 10.1	EN 89:2015 refers to EN13203-2 (undated) Clause 7.1
Sound power level (L_{WA})	EN 89:2015 Clause 11	Not covered for liquid fuel appliance.
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	EN13203-2:2022 Clause 5.5	
Daily fuel consumption Qfuel	EN13203-2:2022 Clause 7.1	
Weekly electricity consumption		Not covered.

Qelec,week		
Weekly electricity consumption 'smart' enabled Qelec,week,smart		
Weekly fuel consumption Qfuel,week		
Weekly fuel consumption 'smart' enabled Qfuel,week,smart		
SCF		

5. ELECTRIC HEAT PUMP WATER HEATER

Standard rated heat output / water heating (Prated)	EN 16147:2017+A1:2022 - Heat pumps with electrically driven compressors - Testing, performance rating and requirements for marking of domestic hot water units Clause 7.14.1	Prated calculate in Clause 7.14.1 must be applied 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+A1:2022 Clause 7.13	
Sound power level (L_{WA})	EN 12102-2:2019 Clause 10.1.3.2	
Storage volume	EN 16147:2017+A1:2022 Clause 7.6	"Rated volume"
Mixed water at 40 °C	EN 16147:2017+A1:2022 Clause 7.10	
Electric input power		Use electrical energy consumption W_{EL-LP} (EN 16147:2017+A1:2022 Clause 7.9.2) divided by 24h
Daily electricity consumption Qelec	EN 16147:2017+A1:2022 Clause 7.13.1	
Weekly electricity consumption Qelec,week	EN 16147:2017+A1:2022 Clause 7.11.2	

Weekly electricity consumption 'smart' enabled Qelec,week,smart		
SCF		
Pstby	EN 16147:2017+A1:2022 Clause 7.8	

6. THERMALLY DRIVEN HEAT PUMP WATER HEATER

Standard rated heat output / water heating (Prated)		There is currently no procedure described in existing standards for establishing the Prated for tdHPWH (only for space heating). The same calculation method as in EN 16147:2017+A1:2022 Clause 7.14.1 must be applied.
Water heating energy efficiency η_{wh}	EN 13203-6:2022 Gas-fired domestic appliances producing hot water - Part 6: Assessment of energy consumption of adsorption and absorption heat pumps Clause 7.1	
Sound power level (L_{WA})	EN 12102-2:2019 Clause 10.1.3.2	
NOx emissions / gaseous	EN12309-2:2015 Clause 7.3.13	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	EN 13203-6:2022 Clause 5.1.1	
mixed water at 40 °C	EN13203-4:2022 Clause 7.5	
Daily electricity consumption Qelec	EN 13203-6:2022 Clause 5.7	Refers to EN13203-2:2022 Clause 5.7
Daily fuel	EN13203-6:2022	

consumption Qfuel	Clause 7.1	
Weekly electricity consumption Qelec,week	EN13203-6:2022 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 EN13203-6:2022 A procedure similar to EN 16147:2017 Clause 7.8 must be applied.

7. COGENERATION WATER HEATER

Standard rated heat output, Prated	EN 50465:2015+A1:2019 Gas appliances - Combined heat and power appliance of nominal heat input inferior or equal to 70 kW 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 must be the product of nominal heat input and the water heating energy efficiency.
Water heating energy efficiency η_{wh}	EN 13203-4:2022 Gas-fired domestic appliances producing hot water - Part 4: Assessment of energy consumption of gas combined heat and power appliances (mCHP) producing hot water and electricity	The standard EN 13203-4:2022 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 And EN 15036-2:2006 Heating boilers - Test regulations for airborne noise emissions from heat generators - Part 2: Flue gas noise emissions at the outlet of the heat generator	
NOx emissions / gaseous	EN 50465:2015+A1:2019 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 267:2020 Automatic forced draught burners for liquid fuels	
Storage volume	EN 13203-4:2022 Clause 5.1	
Mixed water at 40 °C	EN 89:2015 Gas-fired storage water heaters for the production of domestic hot water Clause 6.11	There is no determination of storage volume in EN13203-4:2022 nor in its 'mother' standard EN13203-2:2022.
Daily electricity consumption Qelec	EN 13203-4:2022 Clause 5.5	Referred to as Eelecco
Daily fuel consumption Qfuel	EN 13203-4:2022 Clause 7.1	
Weekly electricity consumption Qelec,week	EN 13203-4:2022 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		

8. HOT WATER STORAGE TANKS

Storage volume	EN 15332:2019 Heating boilers – Energy assessment of hot water storage tanks Clause 5.4 EN 12897:2016+A1:2020 Water supply - Specification for indirectly heated unvented (closed) storage water heaters 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.
Indirectly heated unvented storage volume	EN 17692:2025 Central heating boilers - Specification for indirectly heated unvented (closed) pressurized buffer tanks - Requirements, testing and marking	Refers to EN 15332:2019 for determination of standing loss and storage volume, to EN 15332:2019 and EN 12897:2016+A1:2020 for determination of storage volume and mixed water at 40 °C.
Mixed water at 40 °C	EN 12897:2016+A1:2020 Clause 6.2.2 Annex A.4.3	
Reference hot water temperature Θ_{wh}	EN 12897:2016+A1:2020 Annex A.4.3	The reference hot water temperature is noted Θ_p.
Standing loss	EN 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 losses using EN 12897 all relevant volumes, for both/either system water side and domestic hot water side should be filled and heated to required storage temperatures as prescribed in EN 15332.
Equivalent storage volume OR thermal capacity		See calculation in Annex III, point 7

9. SHOWER WATER HEAT RECOVERY DEVICES

Shower water heat recovery device efficiency (%)	NEN 7120:2011/C2:2011 NTA8800:2020, Bijlage U CSTB Protocol RECADO 2015	All three test standards may be accepted as method to determine shower 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 or larger than the water flow rates shown in the table (combination of devices to achieve sufficient capacity is allowed)

10. SOLAR DEVICES

Measurement of solar collectors	ISO 9806:2017	Tests produces the input-parameters for the GTY calculation below
Storage tank standing losses (used in tank factor *f*)	EN 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 losses 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.
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 (Helsinki/Stockholm, Strasbourg/Würzburg, and/or Athens) and consider orientation and inclination as indicated in Annex VII. The GTY calculated is the summation of the Gross Thermal Yield (GTY) and Gross Electric Yield (GEY) for the average of collector mean temperatures of 25 ºC and 50 ºC.
Correction factor $f_{profile}$	ISO 9806:2017	
Correction factor *a, b, c* and *d*, for water heating		
Solar device		

efficiency for water heating $\eta_{sol,wh,clim}$		
Solar-assisted water heating energy efficiency η_{wh+sol}		

11. ACCURACY OF MONITORING

1. The measurement of monitoring accuracy may be established by comparing the monitored values to the values measured with laboratory equipment during tests performed to establish the compliance of the product with the minimum energy efficiency requirements.

2. The measurement of monitoring accuracy may also be established by using standardised accuracy proofs from EN standards indicated in Table 1 and by showing that the corresponding accuracy level(s) imply that the requirements for accuracy of monitoring of this Regulation are respected.

Table 1

Accuracy of monitoring

Gas metering accuracy	EN 14236:2018	Ultrasonic domestic gas meters
	EN 1359:2017	Diaphragm gas meters
Electricity metering accuracy- acceptance inspection	EN 62058-11:2010	Acceptance inspection – Part 11: General acceptance inspection methods
	EN 62058-21:2010	Part 21: Particular requirements for electromechanical meters
	EN 62058-31:2010	Part 31: Particular requirements for static meters
	EN 62058-32-1:2012	Part 32-1: Durability – Testing … by applying elevated temperatures
Heat metering	EN1434-1:2015	Part 1: General requirements

ANNEX V

Verification procedure for market surveillance

1. INTRODUCTION

The verification tolerances set out 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: (i) determine the values in the technical documentation or in interpreting these values with a view to achieving compliance; or (ii) communicate better performance by any means.

Where a model is not in conformity with the requirements laid down in Article 40 of Regulation 2024/1781, the model and all its equivalent models shall be considered not compliant with the ecodesign requirements of Annex II.

2. PROCEDURE

As part of verifying the compliance of a product with the requirements laid down in Annex II of this Regulation, the authorities of the Member States shall apply the procedure set out in the points (a, (b), (c) and (d) below:

a. The Member State authorities shall verify one single unit of the model.

b. The model shall be considered to comply with the applicable requirements if it meets all the following requirements:

   (i) 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 using the calculation methods set out in Annex III;

   (ii) the declared values meet all 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;

   (iii) 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 set out in Table 1.

e. If one of the conditions (i), (ii) or (iii) in point (b) 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. The model shall be considered to comply with the applicable requirements if, for those three units, the arithmetical mean of the determined values complies with the respective verification tolerances set out in Table 1. If that is not the case, the model and all its equivalent models shall be considered not to comply with this Regulation. 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.

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

3. VERIFICATION TOLERANCES

The Member State authorities shall only apply the verification tolerances that are set out in Table 1 and shall only use the procedure described in points (a) to (d) 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 1 Verification tolerances

Parameters	**Verification tolerances**
Water-heating energy efficiency, η_{wh}	The determined value must not be more than 8 % lower than the declared value.
Sound power level, L_{WA}	The determined value must not exceed the declared value by more than 2 dB(A).
Daily electricity consumption, Q_{elec}	The determined value must not exceed the declared value by more than 5 %
Daily electricity generation, Q_{elec_gen}	The determined value must not exceed the declared value by more than 5 %
Daily fuel consumption, Q_{fuel}	The determined value must not exceed the declared value by more than 5 %
Weekly fuel consumption without smart controls, $Q_{fuel,week}$	The determined value must not exceed the declared value by more than 5 %
Weekly fuel consumption with smart controls, $Q_{fuel,week,smart}$	The determined value must not exceed the declared value by more than 5 %
Weekly electricity consumption without smart controls, $Q_{elec,week}$	The determined value must not exceed the declared value by more than 5 %
Weekly electricity consumption with smart controls, $Q_{elec,week,smart}$	The determined value must not exceed the declared value by more than 5 %
Storage volume, *V*	The determined value must not be lower than the declared value by more than 2 %.
Mixed water at 40 °C, *V40*	The determined value must not be lower than the declared value by more than 3 %.
Standing loss (*S)*	The determined value must not exceed the declared value by more than 5 % or 5 W, whichever figure is higher.
Emissions of nitrogen oxides	The determined value shall not exceed the declared value by more than 20 %.
Self-measurement	For the measurement of water heating energy output, the tolerance (expressed in %) shall be ± 15 %. For the assessment of electricity and fuel consumption, and electrical energy output of cogeneration heaters, a tolerance of ± 10 % shall apply. Tolerances related to self-measurement shall be verified against performance measurements conducted in laboratory tests specifically related to evaluate water heating energy efficiency in average climate conditions. Values may be derived from the measurement of relevant technical

	parameters and/or calculation, as long as the values are within the tolerance.

ANNEX VI

Indicative benchmarks

This Annex sets out indicative benchmarks for water heating energy efficiency.

Table 1

Indicative benchmarks for water heating energy efficiency

Maximum load profiles			
3XS-XS	**S**	**M**	**L-4XL**
$\eta_{wh} \geq 46$	$\eta_{wh} \geq 90$	$\eta_{wh} \geq 120$	$\eta_{wh} \geq 120$

ANNEX VII

Amendments to Commission Regulation (EU) N° 814/2013

Commission Regulation (EU) N° 814/2013 is amended as follows:

1. In Annex I, the following definition is inserted after point (1):

   (2) 'out of the box mode' means the standard operating condition, setting or mode set by the manufacturer at factory level, to be active immediately after the appliance installation, suitable for normal use by the customer according to the water tapping pattern for which the product has been designed and placed on the market. Any change to a different operating condition, setting or mode, if applicable, shall be the result of an intentional intervention by the end-user, and cannot be automatically modified by the water heater at any time, except for smart control function adapting the water heating process to individual usage conditions with the aim of reducing energy consumption.';

2. In Annex III, the text in letter (a) of point 2 on "General conditions for testing water heaters", is replaced by the following:

   '(a) Water-heating tests shall be performed in the 'out of the box mode'. Measurements shall be carried out using the load profiles in Table 1;'.