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from: Secretary-General of the European Commission,
signed by Mr Jordi AYET PUIGARNAU, Director

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to: Mr Uwe CORSEPIUS, Secretary-General of the Council of the European
Union

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Subject: Commission Delegated Regulation (EU) No .../.. of XXX supplementing
Directive 2010/30/EU of the European Parliament and of the Council with
regard to the energy labelling of water heaters, hot water storage tanks and
packages of water heater and solar device

Delegations will find attached Commission document C(2013) 818 final Part 6.

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Part 6/6

COMMISSION DELEGATED REGULATION (EU) No .../..

of XXX

**supplementing Directive 2010/30/EU of the European Parliament and of the Council
with regard to the energy labelling of water heaters, hot water storage tanks and
packages of water heater and solar device**

(Text with EEA relevance)

ANNEX IV Product Fiche

1. Water heaters

1.1. The information in the product fiche of the water heater shall be provided in the following order and shall be included in the product brochure or other literature provided with the product:

- (a) supplier's name or trade mark;
- (b) supplier's model identifier;
- (c) the declared load profile, expressed by the appropriate letter and typical usage in accordance with Table 3 of Annex VII;
- (d) the water heating energy efficiency class of the model, determined in accordance with point 1 of Annex II, whereby: for solar water heaters and heat pump water heaters, under average climate conditions;
- (e) the water heating energy efficiency in %, rounded to the nearest integer and calculated in accordance with point 3 of Annex VIII, whereby: for solar water heaters and heat pump water heaters, under average climate conditions;
- (f) the annual electricity consumption in kWh in terms of final energy and/or the annual fuel consumption in GJ in terms of GCV , rounded to the nearest integer and calculated in accordance with point 4 of Annex VIII, whereby: for solar water heaters and heat pump water heaters, under average climate conditions;
- (g) if applicable, other load profiles for which the water heater is suitable to use and the corresponding water heating energy efficiency and annual electricity consumption as set out in points (e) and (f);
- (h) the thermostat temperature settings of the water heater, as placed on the market by the supplier;
- (i) the sound power level L_{WA} , indoors, in dB, rounded to the nearest integer (for heat pump water heaters if applicable);
- (j) if applicable, an indication that the water heater is able to work only during off-peak hours;
- (k) any specific precautions that shall be taken when the water heater is assembled, installed or maintained;
- (l) where the value of *smart* is declared as being '1', an indication that the information on water heating energy efficiency, annual electricity and fuel consumption, as applicable, relate to enabled smart control settings only;

in addition, for solar water heaters and heat pump water heaters:

- (m) the water heating energy efficiency in %, under colder and warmer climate conditions, rounded to the nearest integer and calculated in accordance with point 3 of Annex VIII;
- (n) the annual electricity consumption in kWh in terms of final energy and/or the annual fuel consumption in GJ in terms of *GCV*, under colder and warmer climate conditions, rounded to the nearest integer and calculated in accordance with point 4 of Annex VIII;

in addition, for solar water heaters:

- (o) the collector aperture area in m², to two decimal places;
- (p) the zero-loss efficiency, to three decimal places;
- (q) the first-order coefficient in W/(m² K), to two decimal places;
- (r) the second-order coefficient in W/(m² K²), to three decimal places;
- (s) the incidence angle modifier, to two decimal places;
- (t) the storage volume in litres, rounded to the nearest integer;
- (u) the pump power consumption in W, rounded to the nearest integer;
- (v) the standby power consumption in W, to two decimal places;

in addition, for heat pump water heaters:

- (w) the sound power level L_{WA} , outdoors, in dB, rounded to the nearest integer.

1.2. One fiche may cover a number of water heater models supplied by the same supplier.

1.3. The information contained in the fiche may be given in the form of a copy of the label, either in colour or in black and white. Where this is the case, the information listed in point 1.1 not already displayed on the label shall also be provided.

2. Hot water storage tanks

2.1. The information in the product fiche of the hot water storage tank shall be provided in the following order and shall be included in the product brochure or other literature provided with the product:

- (a) supplier's name or trade mark;
- (b) supplier's model identifier;
- (c) the energy efficiency class of the model, determined in accordance with point 2 of Annex II;
- (d) the standing loss in W, rounded to the nearest integer;
- (e) the storage volume in litres, rounded to the nearest integer.

2.2. One fiche may cover a number of hot water storage tank models supplied by the same supplier.

2.3. The information contained in the fiche may be given in the form of a copy of the label, either in colour or in black and white. Where this is the case, the information listed in point 2.1 not already displayed on the label shall also be provided.

3. Solar devices

3.1. The information in the product fiche of the solar device shall be provided in the following order and shall be included in the product brochure or other literature provided with the product (for pumps in the collector loop if applicable):

- (a) supplier's name or trade mark;
- (b) supplier's model identifier;
- (c) the collector aperture area in m^2 , to two decimal places;
- (d) the zero-loss efficiency, to three decimal places;
- (e) the first-order coefficient in $\text{W}/(\text{m}^2 \text{K})$, to two decimal places;
- (f) the second-order coefficient in $\text{W}/(\text{m}^2 \text{K}^2)$, to three decimal places;
- (g) the incidence angle modifier, to two decimal places;
- (h) the storage volume in litres, rounded to the nearest integer;
- (i) the annual non-solar heat contribution Q_{nonsol} in kWh in terms of primary energy for electricity and/or in kWh in terms of *GCV* for fuels, for the load profiles M, L, XL and XXL under average climate conditions, rounded to the nearest integer;
- (j) the pump power consumption in W, rounded to the nearest integer;
- (k) the standby power consumption in W, to two decimal places;
- (l) the annual auxiliary electricity consumption Q_{aux} in kWh in terms of final energy, rounded to the nearest integer.

3.2. One fiche may cover a number of solar device models supplied by the same supplier.

4. Packages of water heater and solar device

The fiche for packages of water heater and solar device shall contain the elements set out in Figure 1 for evaluating the water heating energy efficiency of a package of water heater and solar device, where the following information shall be included:

- I: the value of the water heating energy efficiency of the water heater, expressed in %;

- II: the value of the mathematical expression $(220 \cdot Q_{ref})/Q_{nonsol}$, where Q_{ref} is taken from Table 3 in Annex VII and Q_{nonsol} from the product fiche of the solar device for the declared load profile M, L, XL or XXL of the water heater;
- III: the value of the mathematical expression $(Q_{aux} \cdot 2,5)/(220 \cdot Q_{ref})$, expressed in %, where Q_{aux} is taken from the product fiche of the solar device and Q_{ref} from Table 3 in Annex VII for the declared load profile M, L, XL or XXL.

Figure 1: Fiche for a package of water heater and solar device indicating the water heating energy efficiency of the package offered

Water heating energy efficiency of water heater ① %
I %

Declared load profile:

Solar contribution
 From fiche of solar device

$$(1,1 \times \text{'I'} - 10\%) \times \text{'II'} - \text{'III'} - \text{'I'} = + \text{②} \%$$

Auxiliary electricity

Water heating energy efficiency of package under average climate ③ %
 %

Water heating energy efficiency class of package under average climate

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

Water heating energy efficiency under colder and warmer climate conditions

Colder: $\text{③} - 0,2 \times \text{②} = \text{ } \%$

Warmer: $\text{③} + 0,4 \times \text{②} = \text{ } \%$

The energy efficiency of the package of products provided for in this fiche may not correspond to its actual energy efficiency once installed in a building, as this efficiency is influenced by further factors such as heat loss in the distribution system and the dimensioning of the products in relation to building size and characteristics.

ANNEX V

Technical documentation

1. Water heaters

For water heaters, the technical documentation referred to in Article 3(1)(c) shall include:

- (a) the name and address of the supplier;
- (b) a description of the water heater model sufficient for its unambiguous identification;
- (c) where appropriate, the references of the harmonised standards applied;
- (d) where appropriate, the other technical standards and specifications used;
- (e) the identification and signature of the person empowered to bind the supplier;
- (f) the results of the measurements for the technical parameters specified in point 7 of Annex VII;
- (g) the results of the calculations for the technical parameters specified in point 2 of Annex VIII;
- (h) any specific precautions that shall be taken when the water heater is assembled, installed or maintained.

2. Hot water storage tanks

For hot water storage tanks, the technical documentation referred to in Article 3(2)(c) shall include:

- (a) the name and address of the supplier;
- (b) a description of the hot water storage tank model sufficient for its unambiguous identification;
- (c) where appropriate, the references of the harmonised standards applied;
- (d) where appropriate, the other technical standards and specifications used;
- (e) the identification and signature of the person empowered to bind the supplier;
- (f) the results of the measurements for the technical parameters specified in point 8 of Annex VII;
- (g) any specific precautions that shall be taken when the hot water storage tank is assembled, installed or maintained.

3. Solar devices

The technical documentation of solar devices referred to in Article 3(3)(b) shall include:

- (a) the name and address of the supplier;
- (b) a description of the solar device model sufficient for its unambiguous identification;
- (c) where appropriate, the references of the harmonised standards applied;
- (d) where appropriate, the other technical standards and specifications used;
- (e) the identification and signature of the person empowered to bind the supplier;
- (f) the results of the measurements for the technical parameters as specified in point 9 of Annex VII;
- (g) any specific precautions that shall be taken when the solar device is assembled, installed or maintained.

4. Packages of water heater and solar device

For packages of water heater and solar device, the technical documentation referred to in Article 3(4)(c) shall include:

- (a) the name and address of the supplier;
- (b) a description of the package of water heater and solar device model sufficient for its unambiguous identification;
- (c) where appropriate, the references of the harmonised standards applied;
- (d) where appropriate, the other technical standards and specifications used;
- (e) the identification and signature of the person empowered to bind the supplier;
- (f) technical parameters:
 - the water heating energy efficiency in %, rounded to the nearest integer;
 - the technical parameters set out in points 1, 2 and 3 of this Annex;
- (g) any specific precautions that shall be taken when the package of water heater and solar device is assembled, installed or maintained.

ANNEX VI

Information to be provided in cases where end-users cannot be expected to see the product displayed

1. Water heaters
 - 1.1. The information referred to in Article 4(1)(b) shall be provided in the following order:
 - (a) the declared load profile, expressed by the appropriate letter and typical usage in accordance with Table 3 of Annex VII;
 - (b) the water heating energy efficiency class of the model, under average climate conditions, in accordance with point 1 of Annex II;
 - (c) the water heating energy efficiency in %, under average climate conditions, rounded to the nearest integer and calculated in accordance with point 3 of Annex VIII;
 - (d) the annual electricity consumption in kWh in terms of final energy and/or the annual fuel consumption in GJ in terms of *GCV*, under average climate conditions, rounded to the nearest integer and calculated in accordance with point 4 of Annex VIII;
 - (e) the sound power level, indoors, in dB, rounded to the nearest integer (for heat pump water heaters, if applicable);

in addition, for solar water heaters and heat pump water heaters:

- (f) the water heating energy efficiency in %, under colder and warmer climate conditions, rounded to the nearest integer and calculated in accordance with point 3 of Annex VIII;
- (g) the annual electricity consumption in kWh in terms of final energy and/or the annual fuel consumption in GJ in terms of *GCV*, under colder and warmer climate conditions, rounded to the nearest integer and calculated in accordance with point 4 of Annex VIII;

in addition, for solar water heaters:

- (h) the collector aperture area in m², to two decimal places;
- (i) the storage volume in litres, rounded to the nearest integer;

in addition, for heat pump water heaters:

- (j) the sound power level, outdoors, in dB, rounded to the nearest integer.

- 1.2. Where other information contained in the product fiche is also provided, it shall be in the form and order specified in point 1 of Annex IV.
- 1.3. The size and font in which the information referred in points 1.1 and 1.2 is printed or shown shall be legible.
2. Hot water storage tanks
 - 2.1. The information referred to in Article 4(2)(b) shall be provided in the following order:
 - (a) the energy efficiency class of the model, determined in accordance with point 2 of Annex II;
 - (b) the standing loss in W, rounded to the nearest integer;
 - (c) the storage volume in litres, rounded to the nearest integer;
 - 2.2. The size and font in which the information referred in point 2.1 is printed or shown shall be legible.
3. Packages of water heater and solar device
 - 3.1. The information referred to in Article 4(3)(b) shall be provided in the following order:
 - (a) the water heating energy efficiency class of the model, determined in accordance with point 1 of Annex II;
 - (b) the water heating energy efficiency in %, rounded to the nearest integer;
 - (c) the elements set out in Figure 1 of Annex IV.
 - 3.2. The size and font in which the information referred in point 3.1 is printed or shown shall be legible.

ANNEX VII Measurements

1. For the purposes of compliance and verification of compliance with the requirements of this Regulation, measurements 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 measurement methods that take into account the generally recognised state-of-the-art methods. They shall meet the conditions and technical parameters set out in points 2 to 9.
2. General conditions for testing water heaters:
 - (a) measurements shall be carried out using the load profiles set out in Table 3;
 - (b) measurements shall be carried out using a 24-hour measurement cycle as follows:
 - 00:00 to 06:59: no water draw-off;
 - from 07:00: water draw-offs according to the declared load profile;
 - from end of last water draw-off until 24:00: no water draw-off;
 - (c) the declared load profile shall be the maximum load profile or the load profile one below the maximum load profile.

Table 3: Load profiles of water heaters

h	3XS			XXS			XS			S			
	Q_{tap}	f	T_m	Q_{tap}	f	T_m	Q_{tap}	f	T_m	Q_{tap}	f	T_m	T_p
	kWh	l/min	°C	kWh	l/min	°C	kWh	l/min	°C	kWh	l/min	°C	°C
07:00	0,015	2	25	0,105	2	25				0,105	3	25	
07:05	0,015	2	25										
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	
07:45													
08:01													
08:05													
08:15													
08:25													
08:30				0,105	2	25				0,105	3	25	
08:45													
09:00	0,015	2	25										
09:30	0,015	2	25	0,105	2	25				0,105	3	25	
10:00													
10:30													
11:00													
11:30	0,015	2	25	0,105	2	25				0,105	3	25	
11:45	0,015	2	25	0,105	2	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	55
14:30	0,015	2	25										
15:00	0,015	2	25										
15:30	0,015	2	25										
16:00	0,015	2	25										
16:30													
17:00													
18:00				0,105	2	25				0,105	3	25	
18:15				0,105	2	25				0,105	3	40	
18:30	0,015	2	25	0,105	2	25							
19:00	0,015	2	25	0,105	2	25							
19:30	0,015	2	25	0,105	2	25							
20:00				0,105	2	25							
20:30							1,05	3	35	0,42	4	10	55
20:45				0,105	2	25							
20:46													
21:00				0,105	2	25							
21:15	0,015	2	25	0,105	2	25							
21:30	0,015	2	25							0,525	5	45	
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			

Continued Table 3: Load profiles of water heaters

h	M				L				XL			
	Q_{tap}	f	T_m	T_p	Q_{tap}	f	T_m	T_p	Q_{tap}	f	T_m	T_p
	kWh	l/mn	°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		1,4	6	40					
07:15									1,82	6	40	
07:26									0,105	3	25	
07:30	0,105	3	25		0,105	3	25					
07:45					0,105	3	25		4,42	10	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	
09:30	0,105	3	25		0,105	3	25		0,105	3	25	
10:00									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	
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	
12:00												
12:30												
12:45	0,315	4	10	55	0,315	4	10	55	0,735	4	10	55
14:30	0,105	3	25		0,105	3	25		0,105	3	25	
15:00									0,105	3	25	
15:30	0,105	3	25		0,105	3	25		0,105	3	25	
16:00									0,105	3	25	
16:30	0,105	3	25		0,105	3	25		0,105	3	25	
17:00									0,105	3	25	
18:00	0,105	3	25		0,105	3	25		0,105	3	25	
18:15	0,105	3	40		0,105	3	40		0,105	3	40	
18:30	0,105	3	40		0,105	3	40		0,105	3	40	
19:00	0,105	3	25		0,105	3	25		0,105	3	25	
19:30												
20:00												
20:30	0,735	4	10	55	0,735	4	10	55	0,735	4	10	55
20:45												
20:46									4,42	10	10	40
21:00					3,605	10	10	40				
21:15	0,105	3	25						0,105	3	25	
21:30	1,4	6	40		0,105	3	25		4,42	10	10	40
21:35												
21:45												
Q_{ref}	5,845				11,655				19,07			

Continued Table 3: Load profiles of water heaters

h	XXL			
	Q_{tap}	f	T_m	T_p
	kWh	l/min	°C	°C
07:00	0,105	3	25	
07:05				
07:15	1,82	6	40	
07:26	0,105	3	25	
07:30				
07:45	6,24	16	10	40
08:01	0,105	3	25	
08:05				
08:15	0,105	3	25	
08:25				
08:30	0,105	3	25	
08:45	0,105	3	25	
09:00	0,105	3	25	
09:30	0,105	3	25	
10:00	0,105	3	25	
10:30	0,105	3	10	40
11:00	0,105	3	25	
11:30	0,105	3	25	
11:45	0,105	3	25	
12:00				
12:30				
12:45	0,735	4	10	55
14:30	0,105	3	25	
15:00	0,105	3	25	
15:30	0,105	3	25	
16:00	0,105	3	25	
16:30	0,105	3	25	
17:00	0,105	3	25	
18:00	0,105	3	25	
18:15	0,105	3	40	
18:30	0,105	3	40	
19:00	0,105	3	25	
19:30				
20:00				
20:30	0,735	4	10	55
20:45				
20:46	6,24	16	10	40
21:00				
21:15	0,105	3	25	
21:30	6,24	16	10	40
21:35				
21:45				
Q_{ref}	24,53			

3. Conditions for testing the smart control compliance (*smart*) of water heaters

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

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

4. Conditions for testing solar water heaters

The solar collector, solar hot water storage tank, pump in the collector loop (if applicable) and heat generator shall be tested separately. Where the solar collector and solar hot water storage tank cannot be tested separately, they shall be tested in combination. The heat generator shall be tested under the conditions set out in point 2 of this Annex.

The results shall be used for the calculations set out in point 3(b) of Annex VIII under the conditions set out in Tables 4 and 5. For the purpose of establishing Q_{total} the efficiency of the heat generator using the Joule effect in electric resistance heating elements is assumed to be 100/CC, expressed in %.

5. Conditions for testing heat pump water heaters

- Heat pump water heaters shall be tested under the conditions set out in Table 6;
- Heat pump water heaters which use ventilation exhaust air as the heat source shall be tested under the conditions set out in Table 7.

6. Conditions for testing solar devices

The solar collector, solar hot water storage tank and pump in the collector loop (if applicable) shall be tested separately. Where the solar collector and solar hot water storage tank cannot be tested separately, they shall be tested in combination.

The results shall be used for the calculations of Q_{nonsol} for the load profiles M, L, XL and XXL under the average climate conditions set out in Tables 4 and 5 and Q_{aux} .

Table 4: Average daytime temperature [°C]

	January	February	March	April	May	June	July	August	September	October	November	December
Average climate conditions	+ 2,8	+ 2,6	+ 7,4	+ 12,2	+ 16,3	+ 19,8	+ 21,0	+ 22,0	+ 17,0	+ 11,9	+ 5,6	+ 3,2
Colder climate conditions	- 3,8	- 4,1	- 0,6	+ 5,2	+ 11,0	+ 16,5	+ 19,3	+ 18,4	+ 12,8	+ 6,7	+ 1,2	- 3,5
Warmer climate conditions	+ 9,5	+ 10,1	+ 11,6	+ 15,3	+ 21,4	+ 26,5	+ 28,8	+ 27,9	+ 23,6	+ 19,0	+ 14,5	+ 10,4

Table 5: Average global solar irradiance [W/m²]

	January	February	March	April	May	June	July	August	September	October	November	December
Average climate conditions	70	104	149	192	221	222	232	217	176	129	80	56
Colder climate conditions	22	75	124	192	234	237	238	181	120	64	23	13
Warmer climate conditions	128	137	182	227	248	268	268	263	243	175	126	109

Table 6: Standard rating conditions for heat pump water heaters, temperatures in dry bulb air temperature (wet bulb air temperature in brackets)

Heat source	Outdoor air			Indoor air	Exhaust air	Brine	Water
	Average climate conditions	Colder climate conditions	Warmer climate conditions				
Climate conditions				Not applicable	All climate conditions		
Temperature	+ 7°C (+ 6°C)	+ 2°C (+ 1°C)	+ 14°C (+ 13°C)	+ 20°C (maximum + 15°C)	+ 20°C (+ 12°C)	0°C (inlet) / - 3°C (outlet)	+ 10°C (inlet) / + 7°C (outlet)

Table 7: Maximum ventilation exhaust air available [m^3/h], at a temperature of 20°C and with humidity of $5,5 \text{ g}/\text{m}^3$

Declared load profile	XXS	XS	S	M	L	XL	XXL
Maximum ventilation exhaust air available	109	128	128	159	190	870	1021

7. Technical parameters of water heaters

The following parameters shall be established for water heaters:

- (a) the daily electricity consumption Q_{elec} in kWh, rounded to three decimal places;
- (b) the declared load profile, expressed by the appropriate letter in accordance with Table 3 of this Annex;
- (c) the sound power level in dB, indoors, rounded to the nearest integer (for heat pump water heaters, if applicable);

in addition, for water heaters using fossil and/or biomass fuels:

- (d) the daily fuel consumption Q_{fuel} in kWh in terms of GCV , rounded to three decimal places;

in addition, for water heaters for which the value of smart is declared as being ‘1’:

- (e) the weekly fuel consumption with smart controls $Q_{fuel,week,smart}$ in kWh in terms of GCV , rounded to three decimal places;
- (f) the weekly electricity consumption with smart controls $Q_{elec,week,smart}$ in kWh, rounded to three decimal places;
- (g) the weekly fuel consumption without smart controls $Q_{fuel,week}$ in kWh in terms of GCV , rounded to three decimal places;
- (h) the weekly electricity consumption without smart controls $Q_{elec,week}$ in kWh, rounded to three decimal places;

in addition, for solar water heaters:

- (i) the collector aperture area A_{sol} in m^2 , rounded to two decimal places;
- (j) the zero-loss efficiency η_0 , rounded to three decimal places;
- (k) the first-order coefficient a_1 in $\text{W}/(\text{m}^2 \text{K})$, rounded to two decimal places;
- (l) the second-order coefficient a_2 in $\text{W}/(\text{m}^2 \text{K}^2)$, rounded to three decimal places;
- (m) the incidence angle modifier IAM , rounded to two decimal places;
- (n) the pump power consumption $solpump$ in W, rounded to two decimal places;

- (o) the standby power consumption $solstandby$ in W, rounded to two decimal places;

in addition, for heat pump water heaters:

- (p) the sound power level L_{WA} in dB, outdoors, rounded to the nearest integer.

8. Technical parameters of hot water storage tanks

The following parameters shall be established for hot water storage tanks:

- (a) the storage volume V in litres, rounded to one decimal place;
- (b) the standing loss S in W, rounded to one decimal place.

9. Technical parameters of solar devices

The following parameters shall be established for solar devices:

- (a) the collector aperture area A_{sol} in m^2 , rounded to two decimal places;
- (b) the zero-loss efficiency η_0 , rounded to three decimal places;
- (c) the first-order coefficient a_1 in $W/(m^2 K)$, rounded to two decimal places;
- (d) the second-order coefficient a_2 in $W/(m^2 K^2)$, rounded to three decimal places;
- (e) the incidence angle modifier IAM , rounded to two decimal place;
- (f) the pump power consumption $solpump$ in W, rounded to two decimal places;
- (g) the standby power consumption, $solstandby$ in W, rounded to two decimal places.

ANNEX VIII

Method for calculating the water heating energy efficiency of water heaters

1. For the purposes of compliance and verification of compliance with the requirements of this Regulation, 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 appropriate calculation methods that take into account the generally recognised state-of-the-art methods. They shall meet the technical parameters and calculations set out in points 2 to 6.

Technical parameters used for the calculations shall be measured in accordance with Annex VII.

2. Technical parameters of water heaters

The following parameters shall be calculated for water heaters under average climate conditions:

- (a) the water heating energy efficiency η_{wh} in %, rounded to one decimal place;
- (b) the annual electricity consumption AEC in kWh in terms of final energy, rounded to the nearest integer;

in addition, for water heaters using fuels under average climate conditions:

- (c) the annual fuel consumption AFC in kWh in terms of GCV , rounded to the nearest integer;

in addition, for solar water heaters under average climate conditions:

- (d) the heat generator water heating energy efficiency $\eta_{wh,nonsol}$ in %, rounded to one decimal place;
- (e) the annual auxiliary electricity consumption Q_{aux} in kWh in terms of final energy, rounded to one decimal place.

in addition, for solar water heaters and heat pump water heaters under colder and warmer climate conditions:

- (f) the parameters set out in points (a) to (c);

in addition for solar water heaters under average, colder and warmer climate conditions:

- (g) the annual non-solar heat contribution Q_{nonsol} in kWh in terms of primary energy for electricity and/or in kWh in terms of GCV for fuels, rounded to one decimal place;

3. Calculation of the water heating energy efficiency η_{wh}

- (a) Conventional water heaters and heat pump water heaters:

The water heating energy efficiency is calculated as follows:

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

For water-/brine-to-water heat pump water heaters, the electricity consumption of one or more ground water pumps shall be taken into account.

- (b) Solar water heaters:

The water heating energy efficiency is calculated as follows:

$$\eta_{wh} = \frac{0,6 \cdot 366 \cdot Q_{ref}}{Q_{tota}}$$

Where:

$$Q_{tota} = \frac{Q_{nonsol}}{1,1 \cdot \eta_{wh,nonsol} - 0,1} + Q_{aux} \cdot CC$$

4. Calculation of the annual electricity consumption AEC and the annual fuel consumption AFC

- (a) Conventional water heaters and heat pump water heaters:

The annual electricity consumption *AEC* in kWh in terms of final energy is calculated as follows:

$$AEC = 0,6 \cdot 366 \cdot \left(Q_{elec} \cdot (1 - SCF \cdot smart) + \frac{Q_{cor}}{CC} \right)$$

The annual fuel consumption *AFC* in GJ in terms of *GCV* is calculated as follows:

$$AFC = 0,6 \cdot 366 \cdot (Q_{fuel} \cdot (1 - SCF \cdot smart) + Q_{cor})$$

- (b) Solar water heaters:

The annual electricity consumption *AEC* in kWh in terms of final energy is calculated as follows:

$$AEC = \frac{CC \cdot Q_{elec}}{Q_{fuel} + CC \cdot Q_{elec}} \cdot \frac{Q_{tota}}{CC}$$

The annual fuel consumption *AFC* in GJ in terms of *GCV* is calculated as follows:

$$AFC = \frac{Q_{fuel}}{Q_{fuel} + CC \cdot Q_{elec}} \cdot Q_{tota}$$

5. Determination of the smart control factor SCF and of smart control compliance $smart$

(a) The smart control factor is calculated as follows:

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

(b) If $SCF \geq 0,07$, the value of $smart$ shall be 1. In all other cases, the value of $smart$ shall be 0.

6. Determination of the ambient correction term Q_{cor}

The ambient correction term is calculated as follows:

(a) for conventional water heaters using electricity:

$$Q_{cor} = -k \cdot (CC \cdot (Q_{elec} \cdot (1 - SCF \cdot smart) - Q_{ref}))$$

(b) for conventional water heaters using fuels:

$$Q_{cor} = -k \cdot (Q_{fuel} \cdot (1 - SCF \cdot smart) - Q_{ref})$$

(c) for heat pump water heaters:

$$Q_{cor} = -k \cdot 24h \cdot P_{stby}$$

Where:

the k-values are given in Table 8 for each load profile.

Table 8: k-values

	3XS	XXS	XS	S	M	L	XL	XXL
k	0,23	0,23	0,23	0,23	0,23	0,23	0,23	0,0

ANNEX IX
Verification procedure for market surveillance purposes

For the purposes of assessing the conformity with the requirements laid down in Articles 3 and 4, Member State authorities shall test a single water heater, hot water storage tank, solar device or package of water heater and solar device and provide the information on the test results to the authorities of the other Member States. If the measured parameters do not meet the values declared by the supplier within the ranges set out in Table 9, the measurement shall be carried out on three additional water heaters, hot water storage tanks, solar devices or packages of water heater and solar device and the information on the test results shall be provided to the authorities of the other Member States and to the Commission within one month of testing. The arithmetic mean of the measured values of these three water heaters, hot water storage tanks, solar devices or packages of water heater and solar device shall meet the values declared by the supplier within the range set out in Table 9.

Otherwise, the model and all other equivalent water heater models, hot water storage tanks models, solar device models or package of water heater and solar device models shall be considered not to comply.

Member State authorities shall use the procedures set out in Annexes VII and VIII.

Table 9: Verification tolerances

Measured parameter	Verification tolerance
Daily electricity consumption Q_{elec}	The measured value shall not be more than 5 % higher than the rated value (*).
Sound power level L_{WA} , indoors and/or outdoors	The measured value shall not be more than 2 dB higher than the rated value.
Daily fuel consumption Q_{fuel}	The measured value shall not be more than 5 % higher than the rated value.
Weekly fuel consumption with smart controls $Q_{fuel,week,smart}$	The measured value shall not be more than 5 % higher than the rated value.
Weekly fuel consumption without smart controls $Q_{fuel,week}$	The measured value shall not be more than 5 % higher than the rated value.
Weekly electricity consumption with smart controls $Q_{elec,week,smart}$	The measured value shall not be more than 5 % higher than the rated value.
Weekly electricity consumption without smart controls $Q_{elec,week}$	The measured value shall not be more than 5 % higher than the rated value.
Collector aperture area A_{sol}	The measured value shall not be more than 2 % lower than the rated value.
Pump power consumption sol_{pump}	The measured value shall not be more than 3 % higher than the rated value.

Standby power consumption <i>solstandby</i>	The measured value shall not be more than 5% higher than the rated value.
Storage volume <i>V</i>	The measured value shall not be more than 2% lower than the rated value.
Standing loss <i>S</i>	The measured value shall not be more than 5% higher than the rated value.

(*) 'Rated value' means the value declared by the supplier.