Measuring Method and Calculation Formula for the Electricity Consumption of Coffee Machines for Household Use

Contents

Contact:
Topten International Group TIG
c/o Swiss Agency for Efficient Energy Use S.A.F.E.
Schaffhauserstrasse 34
CH–8006 Zurich
Switzerland
Juerg.Nipkow@energieeffizienz.ch

Version dated May 9th, 2009

Introduction

Scope

This Measuring method is applicable to the following category of appliances for household use:

- Bean-to-cup coffee and espresso machines (fully automatic and with piston lever)
- Pad & capsule coffee and espresso machines

The measuring method covers the operating modes ready (water is kept at temperature for an immediate cup of coffee), standby (water is not kept at temperature) and off. Coffee machines without regular ready mode (e.g. with flow-type heater) can also be measured.

Energy saving modes that are not activated in the factory setting but can be activated, can be included in an additional measurement. If a machine has accessory heating elements that can be switched off (e.g. cup warmer, steamer), additional programmable modes can be measured next to the factory setting. The electrical consumption can be measured for coffee machines both with and without auto-power-down function.

The aim of the present measuring method is to identify the total energy consumption (TEC) for the typical use of the machine during 1 year, as it is described under 'Standard use'. This includes the keeping hot of the coffee machine for a certain time (ready mode consumption) as well as the standby mode. The production of coffee is generally not measured, but is accounted for with a standard value, as it requires relatively little energy and the difference from one machine to another is minimal.

Measuring Instruments

- Power and energy meter for 230 V AC:
  - Energy accuracy: 2% (class 2) or better,
    uncertainty for energy measurement ≤ 2% at 5 VA and at 1000 VA
  - Resolution: energy 0.1 Wh, operating threshold ≤ 1.5 VA
- Thermometer, acceptable deviation at 20°C: ± 0.5 °C
- Clock with seconds counter

Because of the temperature control, the energy consumed when the machine is in ready state is only minimally dependent upon mains voltage, frequency and the total harmonic distortion (THD) of the mains voltage. Special power supply specifications are therefore not required. If possible, a stabilised supply voltage of 230 V shall be used.

Definitions

Ready Mode

In the ready mode the machine is ready to produce coffee at the push of a button, without any lag in time. This mode is also referred to as 'keeping hot'. Power input in the ready mode is not constant; when heating it can rise above 1000 W, then sink to low values again between the heating intervals. If the cup warming plate of a machine can be switched on or off in the program menu, this results in two different ready mode values. For machines without regular ready mode (e.g. with flow-type heater), the ready state may look like in a standby mode. Ready mode consumption cf. coffee period.

Standby

When a machine is in standby mode, the water heating elements are inactive. Accordingly, coffee can only be produced after the heating element has been heated up to the temperature needed. The machine's control unit is supplied with electricity, allowing for instance a mode indication to be visible or a time-controlled activation function to operate in the background. Some coffee machines have two different standby values, e.g. before and after the auto-power-down.

Off Mode

Off mode is defined as the state with lowest power input. The mains switch of the machine has been switched off. Some machines lack a hard-off switch. Consequently the machine is not disconnected from the mains and can still consume power when in off mode.

Hard-Off, Soft-Off

A hard-off switch disconnects a machine from the mains, so that power input is zero. With a soft-off switch a machine is switched off electronically and usually keeps up a minimal power input for supplying the electronic circuit. In some cases the type of switch cannot be identified easily, for instance if the machine is being disconnected from the mains by a relay while it is switched on with a smooth-running micro switch.

Coffee Production

Coffee is produced at the push of a button. Usually the machine then activates the heating element for keeping the temperature at level within seconds. After the coffee production has finished, additional heating impulses can be necessary. Because the end of this state cannot be clearly defined, energy consumption during the production of coffee is generally not being measured.

Auto-power-down (Auto-off)

An auto-power-down function automatically terminates the heating of a machine after a certain time of inaction. This function can also be referred to as 'energy saving' in the instruction manual and the program menu. This has to be differentiated from an energy saving mode which reduces temperature (see below). In sales promotion the term 'automatic off' is also used for the comfort function regulating the coffee dispensing.

Auto-power-down Delay (Switch-off Delay)

Delay to activation of the auto-power-down after the machine has last been active or manipulated. Usually different delay times can be programmed in the menu.

Activating

'Waking up' the machine from standby mode. The machine will be ready after heating up and possibly rinsing. Machines without ready mode shall be waked up preparing a cup of coffee.

Rinse, Rinse function

Many coffee machines automatically dispense a small amount of water after heating up, in order to clean and warm the dispensing canals. Possibly this function can be switched on or off in the program menu. In some cases the rinse function has to be confirmed by pushing a button after a request on the display. Since for the measurement the rinse function is considered part of the heating process, it shall be confirmed immediately in order not to prolong the heating up interval.

Energy Saving Mode

Some coffee machines have a special energy saving mode or eco-mode which can be programmed in the menu or is factory set. This mode lowers the temperature of the heating element after a certain time (e.g. 20 minutes), e.g. to 60°C from 90°C. The machine then is no longer in the ready mode which has been defined here, but requires some heating time before dispensing coffee. It takes less timer however than when heating up from the cold state. In order to measure a machine's energy consumption in programmed modes differing from factory setting, a complete cycle has to be measured with the corresponding setting in the program menu.

Coffee Period

The coffee period is defined as a standard usage of the coffee machine; the energy consumption of 730 coffee periods accounts for the ready mode consumption in the total energy consumption (TEC). The coffee period lasts 1 hour plus the auto-power-down delay; the machine is activated 3 times: at 0, 30 and 60 minutes. The energy consumption during a coffee period is characterized as 'ready mode consumption' (E_{ready}), as it does not contain any coffee production. For machines without regular ready mode a coffee period energy consumption (E_{coff-p}) including 3 cups of coffee will be determined.

Notes on the Measuring Instructions

Because coffee machines generally have a power input of over 1000 watts when heating up, but use very little energy in standby or off mode, the operating modes used for the measurement must be carefully defined. When the machine is in ready mode, it is often difficult to tell whether it is currently heating up (keeping at temperature is usually effected by pulses lasting several seconds and at intervals of several minutes).

Therefore in the measuring instructions all the required steps are described in detail. In the annex there is a detailed report form including every step of the instructions. For passing on the results the shorter form on page 9 can be used, e.g. if the longer form is not being used every time when measuring several machines.

A spreadsheet form allowing an easy calculation of the energy consumption according to the standard use is available (www.topten.info).

Tolerances and Control Methods

If a machine is inspected for verification purposes, the energy-relevant values (power input on standby, energy consumption during coffee period according to standard use) must lie within a tolerance range of +10% of the values declared by the manufacturer. If this tolerance level is not adhered to, three further machines selected randomly will be examined, whereby the average of each of the energy-relevant values must be below +5% of the value declared by the manufacturer.

When examining it is assumed that the actual factory settings correspond to the ones in the instruction manual. In case of doubt, the settings resulting in a higher consumption shall be used for the examinations.

Measuring Instructions (cf. Report Form and Annex)

1. Preparation

a) The ambient temperature must lie between 22 and 24 °C, measured halfway up the coffee machine with a clearance to the machine of 0.5 m.

b) Unpack the coffee machine, look for the nameplate (possibly underneath or in the maintenance compartment), note down the model and power information (W, kW).

c) Plug the machine in, with the meter interconnected. Switch the machine on as stated in the instruction manual. The temperature of the water in the tank shall lie between 22 and 24 °C. Generally, no coffee should be used for the measurements, but the piston should be installed for hand-operated machines.

d) Check the instruction manual for 'automatic switch-off', 'auto-power-down', 'auto-off' 'energy-saving' etc. and note the programmable delay times or shut-off delay and whether the function can be deactivated. Check the factory settings using the programming mode and record these. A test during the preparation phase can determine whether there is a delay time before the machine switches to standby which has not been declared.
Check the instruction manual for further energy saving options, such as reducing temperature in the ready mode, and note them down. Also verify and note the factory settings in the program mode.

e) Check the instruction manual for whether and how the machine can be switched to standby (without waiting for the switch-off delay) and test the machine accordingly. Does the machine show that it is on standby, and if so, how?
Check the instruction manual for whether and how the machine can be activated or 'woken up' from standby (without dispensing coffee, cf. 2.b) and test the machine accordingly. Describe in brief, how the machine shows that it is ready.

f) Check the instruction manual for whether the brewing temperature can be programmed; if the factory setting is given, note it and then verify it on the machine.
Check the instruction manual for whether the rinsing function can be programmed; if the factory setting is given, note it and then verify it on the machine.

g) If the machine has an electrically heated warming plate, check the instruction manual for whether this can be switched on and off using one of the programming options. Note the factory setting according to the manual then verify the setting as well as programming options on the machine and record the result.

2. Measuring the Energy used in Standby and Ready Modes

To ensure that the machine has cooled down sufficiently, it must be switched to standby or energy-saving mode at least 6 hours before the energy used in ready mode is measured. During this time it may not be allowed to heat up. Longer standby times (over night) will not affect the results and are therefore permitted. The time required for the machine to cool down can be used to establish the energy used in standby mode. To simply note the power reading on the meter is not sufficient.

Coffee machines without regular ready mode (e.g. with flow-type heater) shall be measured according to item no. 5 below.

a) Switch the machine to standby or (if this is not possible) wait for the machine to switch to standby automatically. When standby mode starts turn the energy indicator (Wh) on the meter to zero or note the reading. Record the time and ambient temperature.

b) After at least 6 hours: Record the ambient temperature, the energy reading on the meter $E(t_{act})$ and the exact time that the machine was switched to ready mode (t_{act}). Then immediately activate the machine to ready mode as per the instruction manual, e.g. by pressing a button. Do not dispense any coffee (or water)! Machines with a rinse function which can be switched off should be left on the factory setting (as per the instruction manual), which should be recorded. **NB:** It may be necessary to press a button ('rinse') after warming up to activate ready mode; press immediately to ensure that the time for heating is as low as possible.

c) As soon as the machine is in the ready mode, immediately record the time that the machine switched to ready and the energy reading (the heating up time is of interest).

d) Set the machine to standby mode 30 minutes after activating it, wait for 5 seconds, and activate again. If the rinse function is activated, confirm it immediately. 60 minutes after the first activating the machine put it into standby mode again, wait for 5 seconds, then activate again. If the rinse function is activated, confirm it immediately.

e) If the machine switches off automatically (find out the switching off time to be expected beforehand, see 1.d) immediately note the time t_{off} and the energy displayed on the meter (Wh) as well as ambient temperature. The ready mode energy E_{ready} consumed during the coffee period (including initial heating up) can now be expressed as:

$$E_{ready} = E(t_{off}) - E(t_{act})$$

Machines without regular ready mode (e.g. with flow-type heater): t_{off} signifies the moment when after the 3rd coffee production the lowest standby mode is attained (cf. item no. 5).

Note: the energy supply in ready mode is normally effectuated by short pulses of the full power of the heating element (mostly above 1000 W). Therefore an average power consumption value can only be measured during a reference period. Some energy-efficient coffee machines have very short auto-power-down delays (e.g. 15 minutes); measurement of average power consumption in ready mode would then be problematic. Anyway, it is not necessary to determine the total energy consumption as the ready mode consumption E_{ready} covers this state.

3. Energy Relevant Options, Such as Warming Plate

Where the coffee machine has a warming plate which can be switched on and off (instruction manual) the energy required by this feature can also be declared. To measure the energy consumption, step 2 above should be carried out again using the warming plate option not set by the factory.

For other options influencing energy consumption (e.g. energy saving mode with reduced temperature), measurements can be carried out according to step 2, too.

4. Measuring Power Input in Off Mode

Power input in the off mode is not required for identifying power consumption in standard use. Still it can be of interest for users. In oder to find a possible hidden energy consumption in the off mode: Plug the machine into the measuring instrument and the measuring instrument into the mains and switch the machine off (main switch or button). Note the energy reading on the meter during at least 1 hour in the off mode (as for standby mode, Wh with 1 decimal place). If the machine has both a hard-off switch and an on/off switch (soft-off), measure the power input under both conditions.

5. Measuring of Machines without Regular Ready Mode

Coffee machines without ready mode (i.e. heating up and a 'ready' display is not possible without coffee production) have to be measured by producing 3 portions of coffee in intervals (0, 30, 60 minutes). For relevant measurement report lines see annexed detailed report form, item 5.

a. Prepare machine and switch to standby according to item 2a) above. Turn the energy indicator (Wh) on the meter to zero or note the reading. Record the time and ambient temperature.

b. After at least 6 hours (or 2 hours if machine was not heated up): Record the ambient temperature, the exact time that the machine was switched to ready mode (t_{act}) and the energy reading on the meter. Then immediately activate the machine by preparing a cup of coffee (insert a capsule or pad if necessary). If the size of the portion can be set, choose medium (70 to 90 ml), if no 'medium' choose 2x large + 1x small or 1x large + 2x small, whatever results nearest to a total of 240 ml.

c. When coffee production is completed (including possible rinsing; no more sound, no power consumption), record the time, the energy meter reading and amount of produced coffee (net, cup has to be balanced before).

d. Produce 2 more cups of coffee 30 and 60 minutes after the first activating. Energy consumption has to be measured until the machine passes into the lowest standby state after the 3rd cup (t_{off}). The mean production energy consumption is to be normalized for standardized cup size and inserted according to the standard use, instead of ready mode plus standardized coffee production energy (cf. standard use).

Measurement Report, Coffee Machine: _____

All W, Wh and °C readings shall be recorded with 1 decimal place

cf. instructions		
	Place	
	Date	
	Name of person measuring the machine	
1.b	Make, model, code, category of machine (pad/capsule, fully automatic, with piston), poss. year of manufacture	
	Power according to nameplate (possibly under the machine or in a maintenance compartment)	W, ev. kW
1.d to g	Factory settings: Auto-power-down, auto-off, energy saving mode: - Switch-off delay (h, min) Brewing temperature, if programmable: - Settings (e.g. low, medium, high) Rinse function: - Does the machine rinse automatically? (y/n) - Must the rinse function be confirmed manually? (y/n) Cup warming plate, if any: - activated? (y/n) - Warming programmable? (y/n)	
2.a, b	Standby mode (at least 6 hrs): - Duration (h, min) - Power consumption in this interval ⇒ Power input standby mode	hh:mm Wh W
2.c	Heating after activating, where applicable after confirming the automatic rinse function: - Time when 'ready', since activating - Energy (activation till after rinse / ready)	mm:ss Wh
2.d	Energy consumption activation up to standby after 30 min Energy consumption first activation up to standby after 60 min	Wh Wh
2.e	Switch-off delay (from '60 min' up to automatic standby) Energy consumption first activation up to autom. standby	hh:mm Wh
4	Does the machine have a hard-off (switch?) (y/n) (Power input must be zero!) Energy consumption during 1h off	Wh

Use new forms for possible additional measurements with different energy relevant settings.

Standard use and Calculation of Power Consumption

For measuring energy consumption, the following typical usage pattern is assumed:

- The coffee machine is being used in the factory setting.
- Twice a day, 3 cups of coffee are produced within 1 hour ('coffee period').
- 2190 cups are being produced per year (at an energy consumption of 9.13 Wh each, average of espresso and large cup, resulting in 20 kWh p.a.). The number of cups has been identified in a representative survey in Switzerland in 2002 [1].
- The coffee period is being simulated as follows:
  - Minute 0: switching on, heating up, possibly rinsing
  - Minute 30: setting to standby, waiting for 5 s, activating
  - Minute 60: setting to standby, waiting for 5 s, activating
  - Waiting for auto-power-down

  For measuring the ready mode energy consumption, activate without preparing coffee (except machines without regular ready mode).
- Accordingly, duration of the ready mode is 1 hour plus switch-off delay for every coffee period. Machines with a switch-off delay shorter than 30 minutes have intervals in the standby instead of the ready mode also during the coffee period (see chart in appendix). These intervals are not being considered as part of the standby duration when calculating standard energy consumption for one year (see below), but are considered as part of the ready-mode interval and energy.
- Coffee machines without an auto-power-down function are in ready mode for 12 hours per day.

The electricity consumed when the machine is used typically is calculated using the following formulas:

Evaluation of the Measured Values from the Report

P_{stb}	Power input in standby from energy measurement $\geq$6 hrs standby P_{stb} = E(duration-standby) / duration-standby	W
E_{ready}	Ready mode energy during coffee period, including heating up from cold state, as per instructions 2.c/d/e and formula 2.e	Wh

(for formulas cf. instructions)

Standard Values for Use

Length of the period of use	1 hour + switch-off delay
Periods of use: 2 per day, ca. 52 weeks (@ 7 days)	730/year

If the machine is never switched off completely, total standby time therefore equals

$$t_{stb} = 8760 - 730 * (t_{off} - t_{act}) \quad \text{hrs}$$

Example:

Including 1 hr switch-off delay the coffee period ($t_{off} - t_{act}$) equals	2 hrs
Total standby time (8760 – 730 * 2) =	7300 hrs/year
Energy per cup of coffee (average in daily use, espresso/normal)	9.13 Wh
Number of cups per year	2190
Thus Energy consumption for 2190 cups of coffee	20 kWh/year

The resulting standard energy consumption for one year is therefore equal to:

730 * energy in ready mode during coffee period

+ duration standby * standby power

+ standardized energy consumption for 2190 cups (20 kWh)

$$E_{tot} = (730 * E_{ready} + t_{stb} * P_{stb})/ 1000 + 20 \quad \text{in kWh}$$

Coffee Machines without an Auto-power-down Function

The following standard values are assumed for the use of household coffee machines without an auto-power-down function, to enable a calculation of comparable energy consumption values:

Operating time including keeping machine at temperature (including heating up once)	12 hrs/day
Thus total period of ready mode = 12 x 365 =	*4380 hrs/year*
Thus total period of standby mode = 8760 - 4380	*4380 hrs/year*

$$E_{tot} = (365 * E_{12h\text{-}ready} + 4380 * P_{stb})/ 1000 + 20 \quad \text{in kWh}$$

Whereby $E_{12h\text{-}ready}$ shall be measured directly during 12 hours.

The following standard values should be assumed for household coffee machines which are used in a semi-commercial environment, such as an office of 10 people:

Operating time including keeping machine at temperature (no-one switches the machine off)	24 hrs/day
Set 2 * $E_{12hready}$ in formula above, simplifying.	
There is therefore no operating time in standby mode.	
Coffee productions should be assumed at	5000 cups
Energy for 5000 cups p.a.	45 kWh/year

Coffee Machines without Regular Ready Mode (e.g. with Flow-type heater)

The energy consumption of coffee machines without ready mode is measured according to the measuring instructions 5.b/c/d (3 cups) and has to be normalized to a standard cup size of 80 g or 80 ml (EN 60661: large cup = 125 ml, espresso = 35 ml). Because structure materials have to be heated up as well, a base value of 15 Wh is exempted from normalization (cf. note).

M_{3C} = total amount of 3 produced cups (g net)

$$E_{coff\text{-}p} = 15 + (E_{coff\text{-}p\text{-}3C} - 15) * (240 / M_{3C})$$

P_{stb}	Power input in standby from energy measurement ≥2 hrs standby P_{stb} = E(duration-standby) / duration-standby	W
$E_{coff\text{-}p\text{-}3C}$	Energy during coffee period: 3 cups at 30 minutes intervals, incl. once from cold state, according to measuring instructions 5.b/c/d and formula 2.e.	Wh
$E_{coff\text{-}p}$	Energy during coffee period (3 cups), normalized	Wh

The duration of the standby period is calculated as for other coffee machines; where t_{off} is the time when the machine passes into the lowest standby state after the 3rd cup prepared.

$$t_{stb} = 8760 - 730 * (t_{off} - t_{act}) \quad \text{hrs}$$

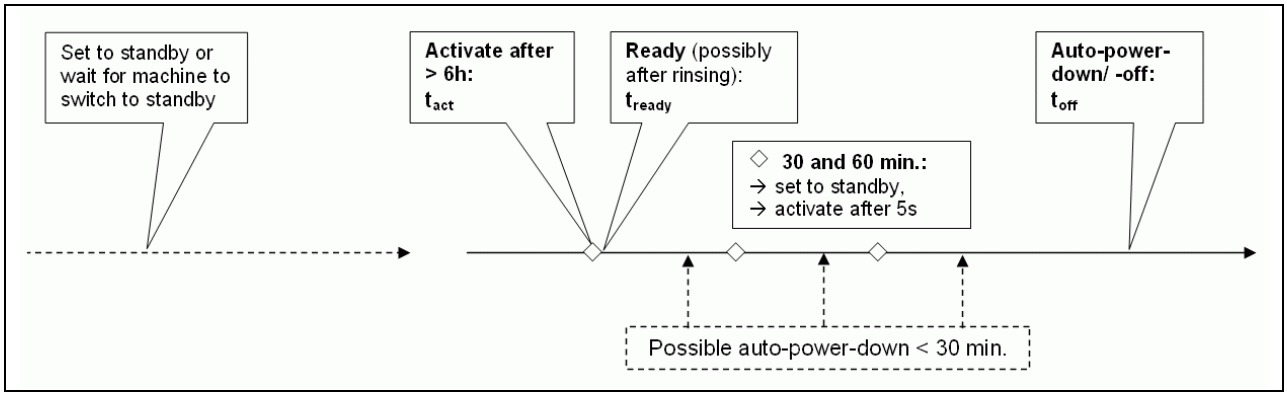
The total energy consumption of coffee machines with flow-type heater is calculated as follows:

$$E_{tot} = (730 * E_{coff\text{-}p} + t_{stb} * P_{stb})/ 1000 \quad \text{in kWh}$$

Note: Because energy consumption for heating up structure materials is independent of produced amount of coffee, a base value of 15 Wh for heating up 3 times (at 30 min. intervals) is not to be normalized. The value of 15 Wh influences only the normalizing correction, i.e. at exactly 240 g the base value has no impact at all.

Appendix

Flow chart showing the testing of coffee machines



Glossary of Formulas

t_{act}	Time of activation ('wake-up')
t_{ready}	Time when machine signals readiness (light, display)
t_{off}	Time when machine automatically switches to standby or off mode (auto-power-down)
P_{stb}	Average power input in standby mode
$E(t_{off})$, $E(t_{act})$, $E(t_{ready})$	Energy reading on meter at the respective time
E_{coff-p}	Energy consumption coffee period, including heating up once
$E_{12h-ready}$	Energy consumption over 12 hours in ready mode, including heating up once
E_{tot}	Total energy consumption (TEC) for 1 year with standard use

References

[1] Nipkow, Jürg, Eric Bush: Standby consumption of household appliances. On behalf of the SFOE Swiss Federal Office of Energy, Berne, 2003.

[2] Nipkow, Jürg, Eric Bush: Energy Label for Coffee Machines. EEDAL Conference paper ID 130, London 2006.

[3] Bush, Eric, Jürg Nipkow, Barbara Josephy: Strategies to Enhance Energy Efficiency of Coffee Machines. EEDAL Conference paper ID 075, Berlin 2009.

Measurement Report, Coffee Machine: _____

Detail form.

All W, Wh and °C readings shall be recorded with 1 decimal place.

For machines without regular ready mode fill in item 1 - 4 as far as meaningful.
Item 2b - e shall be replaced by 5b - d.

cf. instructions	Place	
	Date	
	Name of person measuring the machine	
	Measuring instrument used (make, model)	
1.b	Make, model, code, category of machine (pad/capsule, fully automatic, with piston), poss. year of manufacture	
	Power according to nameplate (possibly under the machine or in a maintenance compartment)	W, ev. kW
1.a, c	Ambient temperature halfway up the machine with a clearance to the machine of 0.5m (permissible values 22 - 24°C)	°C
	Temperature of the water in tank (permissible values 22 - 24°C)	°C
	Pump pressure according to producer's manual	bar
	Piston installed (for hand-operated machines)? (y/n)	
1.d	Auto-power-down, auto-off, energy-saving mode: Information as per instruction manual - programmable values from / to (h or min) - Interim values (h or min) - Can be deactivated (y/n) - Factory setting as per instruction manual - Factory settings effective when the programme is first started	
1.e	Can the machine be switched to standby manually (y/n), if yes, how? (short description) Is standby mode displayed (y/n); if yes, how? (display, illuminated button etc.)	
	How can the machine be activated? (short description)	
	How can you tell that the machine is ready? (short description)	

1.f	Brewing temperature Information as per instruction manual: - programmable? (y/n), - Settings (e.g. low, medium, high) - Factory setting (to be used!) - Factory settings effective when the programme is first started	
	Rinse function Information as per instruction manual: - Does the machine rinse automatically? (y/n) - Must the rinse function be confirmed manually? (y/n) - If yes: How? (short description) - Can the rinse function be switched off? (y/n) - Factory setting (to be used!) Factory settings effective when the programme is first started	
1.g	Cup warming plate Does the machine have a cup warming plate? (y/n) If yes: Information as per instruction manual: - Warming programmable? (y/n) Please note: if it can be switched off, further measure-ments at other setting may be necessary. - Factory setting as per instruction manual (on/off), has to be used for this test. - Factory settings effective when the programme is first consulted	
2.a	Switch to standby: - Ambient temperature - Time - Energy reading (set to zero if possible)	℃ hh.mm.ss Wh
2.b	Activated after at least 6 hrs: - Ambient temperature - Time - Energy reading	℃ hh.mm.ss Wh
2.c	Ready (poss. after confirming automatic rinse): - Time - Energy reading	hh:mm:ss Wh
2.d	After 30 min energy reading After 60 min energy reading	Wh Wh
2.e	After auto-power-down: - Time - Energy reading - Ambient temperature	hh:mm:ss Wh C°

4	Does the machine have a hard-off (switch)? (y/n) (Power input has to be zero!) Does it have a (soft-off) on/off switch? (y/n)	
	Power input in soft-off - Energy reading when switching off - Energy reading after 1h	 Wh Wh

5	**Machines without regular ready mode:** (Fill in item 1 to 4 above as applicable).	
5.a	Switch to standby: - Ambient temperature - Time - Energy reading (set to zero if possible)	 ℃ hh.mm.ss Wh
5.b	Activate or produce a cup of coffee after at least 6 hrs or 2 hrs when machine was not heated up. Values before activating: - Ambient temperature - Time - Energy reading	 ℃ hh.mm.ss Wh
5.c	When coffee production is completed (incl. rinsing if relevant; no more noise, no power consumption): - Time - Energy reading - Amount of coffee in cup (net weight in grams)	 hh.mm.ss Wh g
5.d	30 minutes after first activating prepare another portion. Values before activating: - Ambient temperature - Time - Energy reading	 ℃ hh.mm.ss Wh
	When coffee production is completed (incl. rinsing if relevant; no more noise, no power consumption): - Time - Energy reading - Amount of coffee in cup (net weight in grams)	 hh.mm.ss Wh g
	60 minutes after first activating prepare a third portion. Values when production is completed and the machine passed into the lowest standby state: - Ambient temperature - Time - Energy reading - Amount of coffee in cup (net weight in grams)	 ℃ hh.mm.ss Wh g

Use new forms for possible additional measurements with different energy relevant settings.