

EL229. Bidet [EL229-2011/4/2014-53]



1. Scope

This Criteria applies to the electric bidet that is composed of a water heater, cleaning system and a toilet seat, with electric heat, and directly connects to commercial electric power, as a kind of sanitation instrument for cleaning the user's anus or private parts after using the toilet. However, any system that receives the hot water from another water heating facility is excluded.

2. Definitions

2.1

“Toilet Seat with Electric Heat” means a toilet seat that contains an electric heating system to warm up the skin-contacting parts.

2.2

“Normal State” means that the cleaning water of the toilet seat and hot water tank (instant water heater type bidets excluded) keeps a set temperature suitable for use as the state before using the cleaning function.

2.3

“Standby State” means that power consumption is reduced by keeping the toilet seat and hot water tank's cleaning water temperature to below the setting temperature during the time that the bidet is used less, such as at nights, or after the normal state is kept for over a specific length of time.

Note) Interrupting the toilet seat or cleaning water power by the method using the automatic reset timer, except for instant water heater-type bidets, is not included in the sleep mode function.

2.4

“Instant water heater-type Bidet” means a bidet that heats and uses the toilet seat and cleaning water at a temperature suitable for use in an instant.

2.5

“Monthly Power Consumption” means the monthly power consumed per month when the bidet is used without using the sleep mode function in the defined conditions.

2.6

“Monthly Sleep Mode Power Consumption” means the monthly power consumed per month when the defined sleep mode function is used.

3. Certification Criteria

3.1 Environmental Criteria

3.1.1

With respect to use of chemical substances in manufacturing process and recyclability of the parts of the product at disposal stage, the product shall comply with the following requirements.

Note) This Criteria shall not applied on materials which are exempted from Hazardous Substances Restriction lists on EU Directive 2002/95/EC and lead in solder of printed circuit board (PCB). However, in case of revision of EU Directive 2002/95/EC, this shall follow revised EU Directive which is applicable at the time the application for eco-label certification.

3.1.1.1

Content of lead (Pb), cadmium (Cd), mercury (Hg) and hexavalent chromium (Cr⁶⁺) in the parts of the product shall comply with the following requirements. However, when the applicant has an appropriate system to control the content of hazardous substances as following requirements, it shall be deemed to have satisfied such requirements.

Item	Pb	Cd	Hg	Cr ⁶⁺
Criteria [mg/kg]	≤ 1000	≤ 100	≤ 1000	≤ 1000

Note) In case the content of total chromium (Cr) is 1000 mg/kg or less, it is regarded as equivalent.

3.1.1.2

PBBs (polybrominated biphenyls), PBDEs (polybrominated diphenylethers) and short-chain chlorinated paraffin (C= 10~13) whose chlorine concentration is 50% or more shall not be used in the product.

3.1.1.3

Halogenated plastics such as PVC shall not be used for the plastic case parts weighing 25g or more, and also halogenated compounds shall not be contained in the plastic parts. Exempted from this criterion are the fluorogranic additives with less than 0.5 wt% (e.g. anti-dripping).

3.1.2

With respect to the energy consumption at the use phase, the product's monthly power consumption must be below 23kWh/month. Also, the testing result for the monthly sleep mode power consumption (limited to an applicable product, and the recommendation is below 18kWh/month) must be submitted.

Note) With regard to draining time of the flushed cleaning water and amount of water usage that have a direct impact on the test results of the product's monthly power consumption, the conditions submitted at the time of certification approval should be maintained; any change in the conditions shall be considered a modification of the product.

3.1.3

With respect to recycling in the manufacturing process or recyclability of the product in disposal, the following requirements shall be satisfied.

3.1.3.1

Separable plastic parts (weighing 25g or more and covering a flat surface of 200mm² or more) shall be visibly marked with material identification to facilitate separation and collection in disposal.

3.1.3.2

Shock-absorbing materials in packaging shall be made of recycled pulp or paper such as pulp mold. However, following materials are regarded as equivalent.

a) Shock-absorbing materials certified according to 'EL 606. Packaging Materials'

b) Shock-absorbing materials manufactured by using more than 50wt% of recycled plastics

c) EPS (expanded polystyrene), EPE (expanded polyethylene) and EPP (expanded

polypropylene) whose foaming agent has zero ODP

d) Air cell packing bubble wrap that injects air into synthetic resins.

3.1.3.3

Applicants shall establish and implement a collecting and recycling system for waste products (including shock-absorbing material for packaging). In case that an applicant manages the system by assigning a specialized company, submission of relevant documents proving it shall be a sufficient proof of compliance.

3.1.4

To reduce environmental impact through its life cycle, the product shall be designed and produced in consideration of resource and energy-saving, reducing pollutants and hazardous substance use, using recycled materials, improving recyclability and durability, etc.

3.2 Quality Criteria

3.2.1

The product shall satisfy the relevant items of safety standard of electric appliances in accordance with 「Electric Appliances Safety Control Act」.

3.2.2

The product shall satisfy the criteria of KS C IEC 60335-2-84 (Safety of home or similar electric appliances –2-84: Individual requirement of electric appliances for toilet) "Durability, Temperature Performance, Hot Air Performance, Water Resistance Performance"

3.2.3

The product's cleaning performance should be good enough to clean waste with an area of about 13mm in diameter when the test is performed in accordance with "4. Test Method."

3.2.4

The difference between the temperature of a toilet seat and cleaning water at the phase of the product's highest temperature and the temperature suggested by the manufacturer must be below $\pm 1^{\circ}\text{C}$.

3.3 Consumer Information

3.3.1

A product's monthly power consumption and monthly sleep mode power consumption (only for applicable products)

3.3.2

Toilet seat and cleaning water temperature as well as standard cleaning time and water usage amount by the product's control phase.

3.3.3

Labeling of matters in which a product contributes to the certification reasons (less harmful substances, energy-saving, less waste).

3.3.4 Usage and process to conserve energy

Note) It is recommended to provide specific information including usage of power saving mode and effectiveness of power saving function as well as comparison of differences in power consumption depending on the temperature set up for hot water or toilet seat, drying or other function.

4. Test Method

Certification Criteria		Test and verification methods	
Environmental Criteria	3.1.1	3.1.1.1	Verification of submitted documents
		3.1.1.2	Submitted documents in accordance with '4.2 verification and test method
		3.1.1.3	Verification of submitted documents
	3.1.2	Test report by an accredited testing laboratory in accordance with '4.1 and 4.3 Test method	
	3.1.3~3.1.4	Verification of submitted documents	
Quality	3.2.1	Test report by an accredited testing laboratory in accordance with	

Criteria		「Electric Appliances Safety Control Act」 or certificate of equivalent
	3.2.2	Test report by an accredited testing laboratory in accordance with KS C IEC 60335-2-84 (Safety of home or similar electric appliances – 2-84: Individual requirement of electric appliances for toilet) or certificate of equivalent.
	3.2.3	Test report by an accredited testing laboratory in accordance with '4.1 and 4.4 Test method
	3.2.4	Test report by an accredited testing laboratory in accordance with "(1) and (5) Test Method"
Consumer Information		Verification of submitted documents

4.1 General matters

4.1.1

One test sample shall be required for each applied product. However, in case that more than one test is needed, it shall not be required.

4.1.2

Test samples shall be collected at random by a certification institute from products in market or those in storage at the production site.

4.1.3

Test result shall be numerically set according to KS Q 5002 (Statistical interpretation method of the data – Part 1: Statistical description of the data).

4.2 Compliance verification and test method regarding the control of hazardous substances

4.2.1

Verification method for the hazardous substance management system

Note) This is the method to verify the compliance with the requirement of the restriction of the use of lead, cadmium, mercury and their compounds, and hexavalent chromium compounds in the parts of the product. This method is applicable to verify that the applicant properly controls PBBs (polybrominated biphenyls), PBDEs (polybrominated diphenylethers) and short-chain chlorinated paraffins (C=10~13).

4.2.1.1

Compliance verification shall be done by one of the following documents or more.

a) Explanatory note on the management system, established by the manufacturer on purpose to control the hazardous substances when each part of the product is supplied from the suppliers, and relevant documents

b) Test result conducted by the manufacturer in order to control the hazardous substances when each part of the product is supplied from the suppliers (In this case, test method including pre-conditioning method applied shall be specified in detail)

c) Certificate issued by the accredited third party showing that each part of the product satisfies the relevant requirements (e.g. Certificate of eco-label according to 'EL 763. Electric and Electronic Parts')

d) Other documents showing that the manufacturer properly controls the hazardous substances when each part of the product is supplied from the suppliers.

4.2.1.2

In case the compliance of the management system cannot be verified by '4.2.1.1' or the test result for specific parts of the product is required by deliberation committee of eco-label certification, compliance verification shall be done by the following '4.2.2 Test method for measuring the content of the hazardous substances' for the parts collected at random by eco-label certification body.

4.2.2

Test method for measuring the content of the hazardous substances

Note) This is one of the test methods applicable to verify the content of lead (Pb), cadmium (Cd), mercury (Hg) and hexavalent chromium (Cr^{6+}) contained in the parts of the product. The content of the hazardous substances can be also verified according to the internationally recognized test methods. In this case, test method including pre-conditioning method shall be specified in detail and the specified test method shall be approved by deliberation committee of eco-label certification.

4.2.2.1

Test samples shall be homogenized by pre-conditioning method such as pulverization of each part.

4.2.2.2

Analysis method of lead (Pb), cadmium (Cd), mercury (Hg), hexavalent chromium (Cr^{+6}), total chromium (Cr)

a) Lead (Pb), cadmium (Cd): KS M 0016 (General rules for atomic absorption spectrochemical analysis), KS M 0032 (General rules for ICP emission spectrochemical analysis) and Inductively coupled plasma mass spectrometry (ICP-MS)

b) Mercury (Hg): Atomic absorption spectrochemical analysis by using gold amalgamation method and KS M 0016 (General rules for atomic absorption spectrochemical analysis)

c) Hexavalent chromium (Cr^{6+}): Ultraviolet spectrophotometric analysis by diphenylcarbazide and Ultraviolet spectrophotometric analysis by lead acetate trihydrate

d) Total chromium (Cr): KS M 0016 (General rules for atomic absorption spectrochemical analysis), KS M 0032 (General rules for ICP emission spectrochemical analysis) and inductively coupled plasma mass spectrometry (ICP-MS)

4.3 Power consumption testing methods

4.3.1

Except for specially-defined cases, the testing conditions are follows:

4.3.1.1

The power's rated voltage must be within $220\pm 1\text{V}$, and the power frequency must be 60Hz.

4.3.1.2

The ambient temperature for testing must be $15\pm 1^{\circ}\text{C}$, and the surroundings of the equipment must not be directly impacted by forced convection.

4.3.1.3

The temperature of water supplied to the product must be 15°C , and the water pressure must be $0.2\pm 0.05\text{MPa}$.

4.3.1.4

The cleaning water's temperature must be set to 37°C . However, if it cannot be set to 37°C , the temperature must be set to the closest temperature possible.

Note) The cleaning water's temperature must measure the average temperature in the shortest time by filling all cleaning water from the nozzle cleaning in a container to use the lower coefficient of the heat transfer of materials.

4.3.1.5

The bidet must be installed and tested in the toilet with a normal state presented by the manufacturer in principle. However, it can be installed in the toilet with other methods that are deemed to be capable of maintaining the state similar to the installation in the toilet and have no impact on the test results.

4.3.2

Cleaning mode power consumption (PA) measuring method

4.3.2.1

When the cleaning function is used, the power consumption is measured with the product's power input part as follows:

Note) This is for calculating the total power consumption to comply with use of cleaning function in 12 times a day that is the value to multiply the measuring power consumption when operate a cleaning function in three times an hour by 4 hours.

4.3.2.2

The cleaning water discharge time is set to the default operation time as defined in the initial conditions presented by the manufacturer per product, and the water pressure is set to the middle phase. However, if the water pressure intervals were given even

numbers, the water pressure shall be set to the larger step close to middle phase.

4.3.2.3

The toilet seat's temperature is set to the adequate equipment's highest temperature.

4.3.2.4

After starting power consumption measurement, the touch sensor is activated for about 2 minutes and the cleaning function is activated.

4.3.2.5

The touch sensor is stopped after confirming that the cleaning water discharge and any automatically activated additional functions (dry function, etc.) are stopped.

4.3.2.6

The power consumed until a total of 1 hour has elapsed after doing this operation twice or more at intervals of 20 minutes is called 'cleaning mode power consumption (PA[Wh])'.

Note) This test will implement after lifting a sleep-mode, and the product, heating a toilet seat or a flushing water temperature up to the setting temperature after working a seating sensor, will be operated flushing after confirming a stable status of power consumption.

4.3.2.7

During the test, the toilet seat cover must be opened, and whether the supply water temperature and the cleaning water temperature meet the threshold temperature must be checked.

4.3.2.7.1

The water temperature fluctuation shall be kept within ± 0.1 °C while the test is being performed. If it is difficult to be kept within this range, the test operator should be able to accurately calculate the average water temperature.

4.3.2.7.2

The amount of cleaning water per minute is calculated by dividing the measured amount of water by discharge time after the temperature of the cleaning water is measured.

4.3.2.8

If the supply water temperature and the cleaning water temperature do not meet the threshold temperature, the cleaning mode power consumption (P_{A1} [Wh]) measured in the adequate conditions is the value that calibrates the power consumption to 22K (37°C - 15°C), the base for the cleaning water temperature rise. The calibration is calculated by the following formula, through using the value (P_H [Wh]) that divides the supply water temperature (T_{IN} [$^{\circ}\text{C}$]), which is averaged by measuring the temperature at every cleaning function activation, the cleaning water temperature (T_{OUT} [$^{\circ}\text{C}$]) and the hot water heating part power consumption measured for the cleaning mode power consumption (P_{A1}) measuring time in triplicate.

$$P_A = P_{A1} - \left[\left(\frac{P_H}{T_{OUT} - T_N} \right) \times (T_{OUT} - T_N - 22) \times 3 \right]$$

4.3.3 Normal mode power consumption (P_B) measuring method

4.3.3.1

The normal mode power consumption is the consumed power measured for 1 hour as follows, as the product's power to be consumed in the normal mode:

4.3.3.2

The toilet seat cover must be closed. The product whose toilet seat temperature is automatically converted into below 30°C when the toilet seat cover is closed should be measured while opening the toilet seat cover.

4.3.3.3

The toilet seat temperature must be set to the highest temperature of the adequate product and the cleaning water temperature must be set to a temperature as close as possible to 37°C . The product must be measured after saturating at the surrounding temperature.

4.3.3.4

Testing is done for 1 hour, but if it is deemed that the test cannot sufficiently produce reproducible results in terms of the product's features, the power consumption is converted into the average power consumption per hour through testing for the hour corresponding to a multiple of 1.

4.3.4

Sleep mode power consumption (PC) is calculated as follows:

4.3.4.1

Sleep mode power consumption is the power consumption per hour measured in the following ways, as the power consumed in the automatic sleep mode when the product's power consumption is the lowest. However, stopping the cleaning water or toilet seat heating function perfectly, and not the quick heating type, is not included in the sleep mode in this test.

4.3.4.2

The toilet seat temperature before converting into the sleep mode must be set to the equipment's highest temperature, and the cleaning water temperature must be set to the temperature as close as possible to 37°C. Then, it saturates at the ambient temperature while opening the toilet seat cover.

4.3.4.3

After confirming that the product saturates in the normal usage conditions after activating the touch sensor, the touch sensor is stopped. After confirming that the function is perfectly finished after the cleaning function, the toilet seat cover is closed and 1 hour's power consumption is measured.

4.3.5

Monthly power consumption [P] is calculated according to the following formula:

$$P = (P_A \times 4 + P_B \times 20) \times \frac{365}{12} \times 10^{-3}$$

P: Monthly power consumption [kWh/month]

P_A: Cleaning-mode power consumption [Wh]

P_B: Normal state power consumption [Wh]

Note) Content of the test results shall include average water consumption per cleaning as well as cleaning water temperature. If supplied water or cleaning water temperature fails to meet the required criteria, the measurement of its respective temperature shall be included as well.

4.3.6

Monthly rated power consumption [PS] is calculated according to the following formula:

$$P_s = (P_A \times 4 + P_C \times 20) \times \frac{365}{12} \times 10^{-3}$$

P_s : Monthly sleep-mode power consumption [kWh/month]

P_A : Cleaning-mode power consumption [Wh]

P_C : Sleep-mode power consumption [Wh]

4.4 Test Methods for Cleaning Performance

4.4.1

The test of cleaning performance shall be performed on the same sample used in the test of monthly power consumption, and except for the conditions specified otherwise as below, shall comply with the cleaning performance test specified in KS C IEC60335-2-84 (Safety of home or similar electric appliances – 2-84: Individual requirement of electric appliances for toilet).

4.4.2

With regard to substitute of waste, use a prescribed mix that was made by mixing white reagent Vaseline and carbon black pigment specified in KS M 5114 with a weight ratio of 1:10.

4.4.3

The product's cleaning performance shall be tested by using a flat, transparent glass test sample that is covered with a uniform layer of waste substitute with a diameter of 20mm and thickness of 0.2mm.

Note) It is recommended to make a test sample by fixing a 0.2mm-thick hardwood panel on the surface of the glass and spreading the waste substitute on it with a shoe knife or equivalent.

4.4.4

Install a panel made of transparent material (such as acrylic) between the bidet and toilet that can hold the test sample in a fixed location over the course of test. A hole with a diameter of about 50mm shall be cut in the panel so that cleaning water may go through it to the test sample unhindered.

4.4.5

The test sample shall be placed at a point on the panel specified in (d) where the approximate center of the spray of cleaning water and that of the test sample are aligned together, while it shall be fixed tight as well to prevent it from being dislocated by the spray of cleaning water.

4.4.6

The cleaning performance test shall be performed under the same conditions as with the monthly power consumption test with regard to cleaning time, cleaning water pressure and temperature.

4.4.7

The product shall be considered to have passed the cleaning performance test if a waste substitute with an approximate diameter of bigger than 13mm was confirmed visually to have been eliminated.

Note) The product's cleaning performance is assessed by placing a circle with a diameter of 13mm on the spot where the waste substitute is eliminated. If the eliminated area is not the shape of perfect circle, the cleaning performance is assessed by measuring the area of an approximate circle.4.4.8

4.4.8

The product is considered to have passed the test only after it passed three consecutive tests.

4.5 Accuracy testing method of the toilet seat and cleaning water average temperature display

4.5.1

Testing conditions shall follow 4.3.1. However, the ambient temperature must be set to $20\pm 3^{\circ}\text{C}$ during the test.

Note) Contents of the test results shall include the manufacturer's suggested temperature as well as actual measurements in the high temperature phases.

4.5.2

Electric heating toilet seat average temperature measuring method

4.5.2.1

Measurements are conducted over the six parts stated in "Measure Point of a Bidet's Surface Temperature (Figure A.3)" of KS C IEC 60335-2-84 (Safety of home or similar electric appliances – 2-84: Individual requirement of electric appliances for toilet).

4.5.2.2

After confirming that each part's temperature rise is almost fixed, 10-minute measured values (approximate median when the temperature is periodically changed) are averaged.

4.5.2.3

For the upper part of the heat sink connected to the measuring part, the limit of heat protection, with respect to usage conditions, may be considered.

4.5.3

Cleaning water average temperature measuring method

4.5.3.1

With regard to the cleaning water average temperature, take a value as measured by the method in 4.3.1.

5. Reasons for certification

“Less harmful substances, Energy-saving, Less waste”

Common Criteria, Notice No. 2012-36, the Ministry of Environment

1. Eco-label products must follow the following provisions with regard to the proper treatment of environmental pollution substances, such as air and water wastes and noxious chemical substances emitted in the process of manufacturing or service operation.

A. When first applying for certification, the product manufacturer should observe the environment related laws and agreements pertaining to the region where the production factory or the place of service operation is located for a period of one year prior to the date of application. Any case of violation of the penalty clause will be verified by confirming documents involved during a period of one year to the date of application. Regarding any violation not related to the penalty clause, confirmation will be made on the completion of appropriate measures.

B. A person who has received a certification of eco-labeling shall observe the environment related laws and agreements pertaining to the region where the production factory or the place of service operation is located during the period of certification. However, regarding any violation besides a penalty, confirmation will be made on the completion of appropriate measures.

2. As a general rule, information for consumers shall be indicated on the surface of the product in such a way not to be easily erased. However, in case that indication on the surface of the product is impossible or undesirable, it can be indicated on the appropriate part such as product packaging, product guidebook and user's manual that consumers can recognize. However, the service information should be indicated inside and outside of the place of service operation. In case that indication inside and

outside of the place of service operation is impossible or undesirable, it can be indicated on the appropriate part such as an agreement, letter of delivery, letter of guarantee, and PR materials that consumers can recognize.

3. In order to establish fair trade and to protect consumer, the applicant for eco-label and the holder of eco-label license shall observe the Act on the Fairness of Indication and Advertisement with respect to the environmental aspects of the product.

4. For Various standards referred in the certification criteria by target product, the latest revised edition applies at the date of application, if not specified otherwise.

5. In applying the quality related criteria for each target product, if no standard is available that can be applied as the quality criteria, the president of Korea Environmental Industry & Technology Institute (KEITI) (hereafter referred to as "president of KEITI") may establish and operate the quality criteria for the product involved after review by a competent committee.