



EL221. Water-saving Faucets

[EL221-1992/11/2012-126]

1. Scope

The criteria shall apply to single faucet, cold and warm water mixed faucet or stagnant water faucet the water faucet (hereafter referred to as "faucet") used in water supply/bath supply with less than the usage pressure of 7.5kgf/cm^2 735kPa, to the water-saving faucet, which shall be set up at the end of water pipe and have water-saving effect, and to the valve that have water-saving effect through the function of immediate water-stopping, self-closing and fixed-quantity water-stopping. However, faucets for special use such as ones for drinking water, fountain and toilet shall be excluded.

2. Definition

2.1

"Total Water flow" refers to the total amount of water [L] belched out through the faucet during a certain period of time.

2.2

"Water flow rate" refers to the amount of water [L/min] that is belched out per unit time through the faucet.

2.3

"Instantaneous shut-off type" refers to the way that water is automatically stopped by removing hands from the showerhead, after belching water by operating the controlling part such as a valve switch. There are electronic sensor-operated type and foot valve attachment type for instantaneous shut-off type.

2.4

“Electronic sensor-operated type” refers to the way that water is automatically belched or stopped by electronic force when hands or objects are approaching (without touching) or being away from a certain distance, which is a sort of instantaneous shut-off type.

2.5

“Self-closing type” refers to the way that water is belched during a certain period of time and then automatically stopped, after taking hands off from the controlling parts such as a lever/handle.

2.6

“Quantitative shut-off type” refers to the way that the amount of water pre-set in the controlling parts such as a lever/handle is belched out and then automatically stopped, which is mainly for waterspout.

3. Certification Criteria

Note1) Valve with the function of instantaneous shut-off /self-closing/quantitative shut-off shall be respectively in accordance with the standards for instantaneous shut-off /self-closing/quantitative shut-off faucets.

3.1 Environmental Criteria

3.1.1

With respect to the consumption of resource, water-saving capacity of the product shall satisfy the following requirements.

3.1.1.1

The maximum of total Water flow shall satisfy the following requirements by the use of product at the supply water pressure of 1.0kgf/cm² 98kPa. Merely, self-closing type faucets and valves with the function of instantaneous shut-off /self-closing/quantitative shut-off faucets shall be

excluded.

Items	Maximum of total Water flow [L/min]
For kitchen	≥5.5
For face wash	≥6.0
For shower, shower/tub	≥7.0
For public Restroom	≥5.0
Others	≥6.0

Note) With respect to the products for shower/tub, the maximum of total water flow of the faucet for tub shall be excluded.

3.1.1.2

Instantaneous shut-off faucet shall satisfy the following requirements.

3.1.1.2

a) In addition to the opening/closing operation of valve, the product shall have the function to control the amount of total water flow. However, valves with the function of instantaneous shut-off shall be excluded.

b) Water stopping shall be done within 2 seconds after starting instantaneous shut-off equipment.

3.1.1.3

Self-closing faucet shall satisfy the following requirements.

3.1.1.3

a) Faucets with the structure that can control the amount of water flow or the time of water flow from the beginning to the stopping of water flow shall have the function that can stop water even in the middle of belching water. When the amount of total water flow from the beginning to the stopping of belching water at the supply water pressure of 1.0kgf/cm² 98kPa is converted to the

amount of water flow rate, the amount of water flow rate shall be less than 6.0L/min.

b) Faucets with the structure that cannot control the amount of belched water or the time of belched water from the beginning to the stopping of belching water shall take 15~36 seconds from the beginning to the stopping of belching water, When the amount of belched water during the time from the beginning to the end of belching water at the supply water pressure of 98 kPa is converted into the water flow rate, the rate shall be 6.0 L/min or below.

3.1.1.4

Quantitative shut-off faucet shall satisfy the following requirements.

$$\left| \frac{S - A}{S} \right| \leq 0.2$$

S: Set-up amount of belched water

A: Actual-Measured amount of belched water

3.1.1.5

The water flow rate and water temperature of a hot/cold water mixed faucet shall be able to be controlled by a single lever or handle. However, products with a separate temperature adjustment device shall be regarded as satisfying this criterion.

3.1.2

With respect to the release of harmful substance in the use stage, the following criteria shall be complied with.

3.1.2.1

Copper materials used on the part touching tap water streamed should comply with any one of

the following.

- a) When liquating in the following conditions, the amount of lead in the leaching solution shall be 'less than 1 $\mu\text{g}/\text{mL}$.

Leaching Solution	Amount of Leaching Solution per Touching Area	Temperature and Time
Water	2mL/cm ²	Maintaining 95°C for 30 minutes

Note) The requirement is equal to the requirement of lead leaching on the 'corrosion-resistant' copper alloy of environmental criteria on copper alloy for hardening (EL741) or casting (EL742) of certification criteria by environmental mark product

- b) Materials certified with environmental mark of 'lead-free corrosion-resistant', 'lead-free' or 'corrosion-resistant' copper alloy of copper alloy for hardening(EL741) or casting(EL742) as copper alloy material used for the part touching tap water, shall be used.

3.1.2.2.

In the case the product is subject to the standards for hygiene and safety in accordance with the Water Supply and Waterworks Installation Act, the leachate by the material of the faucet's part with which city water comes into contact shall satisfy the relevant standards.

3.2 Quality Criteria

3.2.1

With respect to surface processing, structure, operation function, internal pressure function, water shock marginal function, durability function and counter-current proof ability of faucet, the product shall satisfy KS B 2331(faucet) regarding the relevant items. However, the durability function of immediate water-stopping faucets shall be excluded.

3.2.2

Electricity shall not be used except for instantaneous shut-off faucets. With respect to instantaneous shut-off faucets using electricity, the product shall satisfy the following requirements.

3.2.2.1

External power (alternating current 220V etc.) shall not be directly used for prevention of safety accident. Ground voltage of power shall be less than 24V.

3.2.2.2

With respect to use of battery, the life span of battery shall be more than 2 years during the standard use stage.

3.2.3

Faucets building in additional appliances/equipments or water-saving accessory shall be easily attached to existing equipments and able to be disassembled and mended in preparation to breakdown.

3.3 Information for Consumers

3.3.1

Additional water-saving effect in accordance with the maximum of total water flow (which shall be in accordance with the result of the objective test) at the water pressure of 1kgf/cm^2 98kPa or the way of water-saving.

3.3.2

Amount of eluted lead, level of corrosion, etc.

3.3.3

Attention to set-up and usage of the product

4. Test Methods

Certification Criteria	Test and Verification Methods		
Environmental Criteria	3.1.1		<ul style="list-style-type: none"> • Test report by an accredited testing laboratory in accordance with 3.1.1.1, 3.1.1.3, 3.1.1.4, 3.1.1.5.1: KS B 2331(faucet) • Test report by an accredited testing laboratory in accordance with 3.1.1.2.2: 'Test Methods 4.1 and 4.2.' • 3.1.1.2.1, 3.1.1.5.2~3: Verification of submitted documents
	3.1.2	3.1.2.1	<p>a) Test report by an accredited testing laboratory in accordance with the test methods 4.1 and 4.3.'</p>
		b)	Verification of submitted documents
	3.1.2.2	Test report by an accredited testing laboratory in accordance with hygiene and safety standards for materials and products related to water supply or the certificate of standards equivalent or higher.	
Quality Criteria	3.2.1		Test report by an accredited testing laboratory in accordance with KS B 2331 (faucet) or certificate of equivalent
	3.2.2 ~ 3.2.3		Verification of submitted documents
Consumer Information	Verification of submitted documents		

Note) Valves with the function of instantaneous shut-off /self-closing/quantitative shut-off shall be tested and verified respectively in accordance with instantaneous shut-off /self-closing/quantitative shut-off faucet

4.1 General Matters

4.1.1

Two test samples shall be required for each applied product.

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

The final evaluation of the test results for both samples shall comply with the certification criteria.

4.1.4

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 Methods of Measuring Time to the Water-stopping of Instantaneous Shut-off Faucet

4.2.1

Set up an instantaneous shut-off faucet on pipes, maintain the supply water pressure at 1.0kgf/cm² 98kPa, and set total water flow rate of the product at the optimum condition.

4.2.2

Start to tape the controlling parts or sensing parts of instantaneous shut-off equipment and the belching part of faucet with a video camera, which can be seen at the same time on the screen. At this time, tape the micro chronometer at the same time.

4.2.3

After belching by operating controlling parts, analyze the filmed videotape until stopping water will be automatically done by taking off hands or being away from the sensing parts.

4.2.3.1

Time to water stopping shall be the time being spent from the moment of taking hands off or being away from the controlling parts the moment of watercourse stopping at the belching part.

4.2.3.2

At this time, water drop from the belching part can be neglected in the aspect of the amount of water flow, so it shall be excluded from the time calculation to water stopping.

4.2.4

Repeat the 4.2.2 ~ 4.2.3 process five times, exclude the highest and lowest value and calculate the average value of the rest figures to the unit of 0.1 second.

4.3 Test Methods of Lead Elution with Water Leaching Solution

Note) The methods are transformed and arranged in order to apply the '6. Apparatus and vessel & packaging criteria & standard, 3. Test methods, 6. Test methods of metal product, 2) Elution test' of Food Industry Standard to the criteria of certification.

4.3.1 Specimen

In case of picking specimen, one of the following ways may be used.

4.3.1.1

Processed product whose area of part touching water and hydrophilic fluid is measured

4.3.1.2

Test sample taken by cutting some part of processed product or material. However, the test sample taken by cutting some of processed product or material, shall be taken from the part with the same quality as the surface of processed product touching directly water and hydrophilic fluid.

4.3.2 Manufacture of Test Solution

4.3.2.1

Specimen shall be used after washing its surface with hydrophilic organic solution ^{note1)} first, and wash out well with water ^{note2)} and then dry.

Note 1) For hydrophilic organic solution, isopropyl alcohol or one with more than equivalent cleaning performance of organic material shall be used.

Note 2) For water used in the test, 'distilled water' or 'purified water with less than 2 μ S/cm electricity conductive level' shall be used.

Note 3) Instead of cleaning manipulation using organic solvent, it may be cleaned by using supersonic cleanser for 10 minutes. At this time, diluted detergent water shall be used as cleaning solution.

4.3.2.2

Make the specimen touch the leaching solution heated to 95°C in the ratio of 2mL per 1 cm² of the surface area.

4.3.2.3

Maintain the temperature of leaching solution at 95°C (or 60°C), liquate for 30 minutes and then use it as test solution.

4.3.3

Measurement of absorbance by using atomic absorption spectrometer (AAS)

4.3.3.1

Turn on light source lamp of AAS (use lead cavity cathod lamp) and control it to appropriate electric current number. Ignite acetylene gas or hydrogen gas, control the flowing amount of gas and compressed air and then spray some of test solution respectively on flame.

4.3.3.2

Measure the absorbance at the wavelength of 283.5nm.

4.3.3.3

In case of lead standard solution, the absorbance of lead standard solution processed in the same manner as each test solution shall be measured.

Note) Preparation of lead standard solution(5 $\mu\text{g}/\text{mL}$): Dissolve 159.8mg lead nitrate in 0.1N nitric acid to make it 1,000mL. Take the solution by 5mL and add 0.1N nitric acid to it to make it 100mL.

4.3.4

The amount of lead elution shall be calculated in accordance of the following equation.

$$\text{Lead Liquefaction Amount } [\mu\text{g}/\text{mL}] = 5 [\text{mg}/\text{mL}] \times \frac{SA}{ST}$$

ST: Peak height of standard solution

SA: Peak height of test solution

5. Reason for Certification

“Reduced harmful substances, water-saving”

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.