

## **Product Certification for Criteria “Water-Saving Equipment” Version 2.1**

Revised: June 27, 2006

### **1. Supplementation of Environmental Background**

According to "Water Resources in Japan" of the fiscal 2004 issue, 85.9 billion cubic meters of water was used in 2001. This included 16.3 billion cubic meters of water for our daily life, which has remained roughly flat in recent years. The national water consumption average per person a day is 319 liters/person, day, and this is more than 1.5 times of 200 liter-bath tub.

According to a "Survey on water-saving equipment, part 3" of fiscal 1997, the total water consumption in Tokyo is classified as follows: 26% for bath, 24% for toilet, 22% for cooking, 21% for washing clothes, and 7% for washing their faces and other purposes. The minimum quantity of water needed for a citizen would be 179-195 liters per day provided that significant water-saving efforts were made in the present normal conditions (based on that 220 liters of water is presently used by a person a day.) Possibility of water saving is found in washing, and cooking, in a descending order, bathing.

Water saving can be achieved from two viewpoints: water-saving design of equipment and method of using water. Although this category focuses on water-saving designs of equipment, it is also important to save water by suitable methods of using it. Such methods would include reducing the frequency of washing clothes, reducing the frequency of rinsing out, and increasing the frequency of turning off shower and water taps.

Finally, it should be noted that efficient use of water saves water and sewage costs.

### **2. Applicable Products**

In setting up the applicable products for Version 2.0, the products not only already applicable but also un-applicable in Version 1.0 were examined.

- “Water-saving type water closet (flush-valve built-in type)”: It was included in the category of "Water-saving type water closet (flush-valve type)" in Version 1.0. After examined as a new category from the viewpoint of certification, however, it was selected as an item for which other criteria should be established.

- “Water tap with flow-control cap with built-in flow-control valve”: This Version 1.0-applicable product is exempt from Version 2.0 because this type of product no longer exists in the market and flow-control cap itself does not have water-saving performance.

- “Faucet with time-control mechanism”: It is considered to be an applicable product, since it can save water with automatic time-regulation function, unlike “faucet with volume-control mechanism”.

- “Showerhead with function of temporary water stoppage at hand” and “built-in faucet with showerhead with function of temporary water stoppage at hand”: These un-applicable products in Version 1.0 are considered to be applicable in Version 2.0 because of their potential water-saving effect; their easier structure is expected to stop water frequently at hand compared to turning the handle of faucet during washing hair,

etc.

- “Toilet with bidet”: It is considered to be out of applicable product, since it uses small amount of water and its water-saving effect can not be expected. However, one united with closet bowl is considered to be applicable.

- “Water closet (low tank type) with a selector lever depends on user’s awareness”: Already widely used, it is considered to be out of applicable product.

Although significant in saving water, washing machines and tableware washing machines are excluded from this category; they have many items to be studied from the viewpoint of energy saving, and new exclusive WG should be established to study the items in the future.

Attached data - Applicable products: Attachment 1

### 3. Terminology

This category defines effective use of water as "water saving" (reduction of the quantity of water used), "use of substitutive water" (e.g. rain water), and "reuse" (recycled water, multi-stage use, etc.) and water saving as "reduction of water quantity which was used previously while the primary performance is guaranteed, from the viewpoint of rational water use."

Based on the above understanding, the “Terminology” refers to "Survey on Methods of Evaluation of Water Saving Equipment for FY1995-1997, Parts 1~3" by Waterworks Bureau of the Metropolitan Government of Tokyo (Chair F. Kiya). For the names of equipment, reference was made to The Japan Valve Manufacturers Association, The Society of Heating, Air-Conditioning Sanitary Engineer’s of Japan, Japanese Industrial Standards, etc.

### 4. Certification Criteria

#### 4-1. Details of establishing environmental criteria

For setting up the criteria, environmental impact over the whole life cycle of a product was considered, using the table of environmental impacts at each stage of the product life cycle. As a result, environmental impact items which are considered to be important for establishing certification criteria were selected in view of environmental impact over the whole life cycle of the product. For these items, qualitative or quantitative criteria are to be considered.

Environmental impact items considered for the category of "Water-saving Equipment" are as shown in the item selection table of environmental impacts at each stage of the product life cycle (marked with X and XX in the table). Out of these items were finally selected as the environmental criteria: B-1, B-5, B-6, B-7, B-8, D-1, D-2, D-8, and E-8 (XX in the table).

The columns with blank in the table show items which were out of the scope of review or which were reviewed in combination with other items. The details of setting up the environmental criteria are described below.

Table Environmental impacts at each stage of the product life cycle

Environmental impact	Stage of product life cycle					
	A. Resource extraction	B. Manufac- turing	C. Distribution	D. Use/ Consumpti- on	E. Dis- posal	F. Recycling
1. Resource consumption	X	XX		XX		
2. Emission of substances affecting global warming	X			XX		
3. Emission of ozone-layer-depleting substances	X					
4. Deterioration of the ecosystem	X					
5. Emission of air pollutants		XX				
6. Emission of water pollutants		XX				
7. Waste and its disposal	X	XX				X
8. Use and emission of hazardous substances	X	XX		XX	XX	
9. Other environmental impacts		X				

## A Resource Extraction Stage

### A-1 Resource consumption

The following point was reviewed in this item:

- (1) Using recycled resources as much as possible. Consuming resources which are likely to be depleted as less as possible

Regarding (1), copper alloy, mainly used for faucet metal, is used as recycled resource, but since collection/recycling system for copper alloy has already established, this item was not selected as an item for which criteria should be established.

### A-2 Emission of substances affecting global warming

The following point was reviewed in this item:

- (1) Using fossil fuels as less as possible at resource extraction and transportation

Regarding (1), this item was not selected as an item for which criteria should be established because manufacturers of water saving equipment do not participate in resource extraction.

### A-3 Emission of ozone-layer-depleting substances

The following point was reviewed in this item:

- (1) Never discharging specified chlorofluorocarbon (CFC) and hydrochlorofluorocarbon (HCFC) at extraction stage

(1) Same as A-2

**A-4 Deterioration of the ecosystem**

The following point was reviewed in this item:

(1) Not deteriorating the ecosystem at resource extraction stage

(1) Same as A-2

**A-7 Waste and its disposal**

The following point was reviewed in this item:

(1) Disposing by-product as less as possible at resource extraction stage

(1) Same as A-2

**A-8 Use and emission of hazardous substances**

The following point was reviewed in this item:

(1) No liquating out heavy metals, etc. to underground or outside of the site at resource extraction stage

(1) Same as A-2

**B Manufacturing Stage**

**B-1 Resource consumption**

The following points were reviewed in this item:

(1) Reducing resource consumption by reuse of by-products produced during manufacturing

(2) Effectively using resources by promoting 3R-sensitive design

Regarding (1), observance of applicable environmental laws and regulations as well as agreements on pollution protection will contribute to reducing the environmental impacts, so this item was selected in Version 1.0 as an item for which criteria should be established. In Version 2.0, this item was also selected based on the same reason as above.

(2) is examined in B-7 (1).

**B-5 Emission of air pollutants**

The following point was reviewed in this item:

(1) It shall conform to relevant environmental regulations and agreements on environmental pollution control regarding air pollution, water contamination, noise, odor and emission of hazardous materials.

(1) Same as B-1

**B-6 Emission of water pollutants**

The following point was reviewed in this item:

(1) It shall conform to relevant environmental regulations and agreements on environmental pollution control regarding air pollution, water contamination, noise, odor and emission of hazardous materials.

(1) Same as B-1

#### B-7 Waste and its disposal

The following point was reviewed in this item:

(1) Efforts for improving the yield and other efforts for reducing waste shall be made in manufacturing processes.

Regarding (1), although these efforts have long been made by manufactures, it was concluded that observance of applicable environmental laws and regulations as well as agreements on pollution protection will contribute to reducing the environmental impact, so this item was selected in Version 1.0 as an item for which criteria should be established. In Version 2.0, this item was also selected based on the same reason as above.

#### B-8 Use and emission of hazardous substances

The following point was reviewed in this item:

(1) Hazardous substances shall be processed in a safe manner.

(1) Same as B-7

#### B-9 Other environmental impacts

The following point was reviewed in this item:

(1) Activities to obtain ISO14001 certification or same level of activities shall be conducted.

Regarding (1), there are some items adopted by the other certification criteria of Eco Mark, but it can be considered a barrier for international manufacturers to apply Eco Mark. Therefore, this item was not selected as an item for which criteria should be established.

### D Use/consumption Stage

#### D-1 Resource consumption

The following points were reviewed in this item:

- (1) Saving household water will contribute to saving the resources consumption (in connection with other environmental impacts.)
- (2) Building a theoretical system which defines water-saving equipment in this

category, focusing on "effective use" or "rational use" of water; specifically, "utilization of sewage cascade" and "reducing the required quantity of water"  
(3) It should be confirmed that required water quantity is less than before.  
(Required water quantity decreases while maintaining the primary performance.)  
(4) Long service life (For example, the construction allows exchanging spare parts easily, a well organized spare parts supply system allows users or suppliers to repair easily.)

Regarding (1), in the examination for Version 1.0, conversion of natural water circulation into artificial circulation causes environmental impact, such as energy consumption, so it was concluded to select water saving as an item for which criteria should be set up. In Version 2.0, this item was also selected based on the same reason as above.

Regarding (2) and (3), these were selected as items for which criteria should be set up. In Version 2.0, these were also selected based on the same reason as above. The following shows the details of the reasons for selection.

"Water-saving type water closet (low tank type)", "water-saving type water closet (flush valve type, handled as a complete set with a water-saving type flush valve)" and "water-saving type water closet (flush-valve built-in type)" contribute to saving water which washes, discharges, and transport filth (reducing the required water quantity).

"Water-saving flush valve" is handled as a set with a water-saving type water closet because the valve alone does not contribute to water saving.

"Built- in urinal with automatic washing device with flow control" and "automatic washing device with flow control for urinal" contribute to water saving by reducing the quantity and time of washing water. When continually used at a terminal station, it is especially effective in the sense of reducing the required water quantity.

"Water-saving top and faucet with built-in water-saving top" are designed to save water discharge.

"Flow-control valve and faucet with built-in flow-control valve" are effective in reducing waste water discharge within a certain limit, so they contribute to saving waste of water. In view of this, after clarifying the range of adequate water discharge flow, such products that meet this range should be included in this category.

Specifically, 5 to 8 liters/min (standard 6 liters/min) was employed for washing hands, washing face, and washing tableware, based on "Study on Feeling of Use of Hot Water Supply Equipment" (summary), issued by Air Conditioning and Sanitary Engineering Association in February 1991 and "Survey on Methods of Evaluation of Water Saving Equipment for FY1995-1997, Parts 1~3" by Waterworks Bureau of the Metropolitan Government of Tokyo.

"Aerator cap and water taps with aerator function" are convenient for washing a small number of pieces and can save water, although this is not convenient for washing a lot of pieces. We studied this item in the same manner as "water-saving top".

"Combination faucets (thermostat type, single-lever type)" contribute to saving water in the sense of preventing waste of water. Single-lever combination faucets were included in this category on the condition that water flow can be easily regulated; however, it was concluded that use in a bathroom should not be recognized for preventing accidents.

"Faucet with volume-control mechanism" and "faucet with time-control mechanism" can save water in terms of preventing water overflow when the tap is kept open at filling a bath.

"Self-closing faucets" save water in terms of preventing water overflow in a public bath. However, since water cannot be stopped while it is discharged, water more than

necessary may be discharged for people who are conscious of saving water. Therefore it has been decided to include self-closing faucets into this category on the condition that the faucets can be closed even while water is discharged.

“Automatic faucets” are useful for saving water at airports and terminal rail stations, by preventing excess water flow. Since water saving is not achieved by any users, we have decided to include automatic faucets into this category only for frequent use.

“Showerhead with function of temporary water stoppage at hand” and “built-in faucet with showerhead with function of temporary water stoppage at hand” can save water by temporarily stopping water at hand.

Regarding (4), it was selected as an item for which criteria should be set up in Version 1.0 based on the condition that a design facilitating repairing and replacing spare parts and also an organized spare parts supply system are confirmed at the time of application for Eco Mark. In Version 2.0, this item was also selected based on the same reason as above.

#### D-2 Emission of substances affecting global warming

The following point was reviewed in this item:

(1) Reducing CO <sub>2</sub> emission by saving water
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For (1), reducing use of water consumption contributes to saving energy which is used for water purification. This item has been selected as an item for which criteria should be set up in Version 1.0. In Version 2.0, this item was also selected based on the same reason as above.

According to data issued by the Environmental Agency, 0.16 kg CO<sub>2</sub> is discharged for 1 m<sup>3</sup> household water. For example, reducing waste of shower water by 3 minutes at each time of taking shower results in 15.3 kg CO<sub>2</sub> reduction per year. Reducing waste of water used for washing face and teeth by 2 minutes a day results in 1.5 kg CO<sub>2</sub> reduction per year.

#### D-8 Use and emission of hazardous substances

The following points were reviewed in this item:

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| (1) Metals that may leach out should never contaminate drinking water.<br>(2) Use of flame-retardant agent at the location with electronics/electric device<br>(3) Use of antibacterial agent |
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Regarding (1), it was selected as an item for which criteria should be set up in Version 1.0 based on the regulation of Water Works Law. In Version 2.0, this item was also selected based on the same reason as above. Concretely, it was examined that it shall not contain heavy metals and harmful chemical substances which were described in the industrial self-standard as prescribed components. In addition, for parts with plastic, the following items are listed as items; 1) it shall conform to the positive list of plastic coloring agents for industrial self-standard, and 2) regarding contained/eluted amount of heavy metals, it shall meet the “standard criteria for coloring agents” of industrial self-standard. However, for heavy metals and harmful chemical substances, there are regulations from the viewpoint of elution in Water Works Law. Therefore, the positive list on the above was not adopted at this time, since the reason to select this item is “metals that may leach out should never contaminate drinking water”. The

purpose of selecting this item can be accomplished by conforming the standards for leaching performance in Water Works Law. Therefore, this item is substituted by conforming to the Article 5 of Water Works Law “Standard for structure of domestic water supply equipment and materials” in “4-2. Quality criteria”.

Regarding toilet bowls, the application of the Article 5 of Water Works Law was examined. However, it is not water-supply equipment, so the condition of leaching out at discharging water and disposal was considered, and the following requirements were adopted. As for parts other than water-supply parts, these shall conform to the requirements for the following 10 harmful substances given in Attachment 2, which are provided in the detailed enforcement regulations (Ministry of the Environment Ordinance No. 29, December 26, 2002) of the Soil Pollution Control Law, namely: cadmium, lead, hexavalent chromium, arsenic, total mercury, PCB, benzene, selenium, boron and fluorine. Note that these 10 substances are set for products which contain pottery and plastic.

Regarding (2), use of flame-retardant agent at the location with electronics/electric device was approved, based on the guideline of Eco Mark project. This is for fire prevention in case of short-circuit of electronics/electric device. Flame-retardant agents such as polybromobiphenyl (PBB), polybromodiphenylether (PBDE), and short-chain chlorinated paraffin (with 10-13 chained Cs and 50% or higher in chlorine concentration) are not approved to use.

For (3), antibacterial agents are allowed to be added to the following products from the sanitary control perspective; water closets (including toilet seats, tanks and hand-washing parts) for toilet-related products, showerheads (excluding spout parts) for bathroom-related products, and faucet handles and levers for kitchen-related products. For the use of antibacterial agent, however, the requirements in “Annex 1 -Use of Antibacterial Agent to Water-saving Equipment” shall be satisfied. Since a hot-water washing toilet seat is generally united with a toilet seat, its operation panel is judged as a part of a toilet (toilet seat). In addition, the recent development of barrier-free environment makes it possible for the operation panel to be separated from a toilet seat, which is sometimes placed on a wall, but it is still considered to be a part of a toilet.

## **E. Disposal Stage**

### **E-8 Use and emission of hazardous substances**

The following points were reviewed in this item:

- (1) Avoid using environmental pollution substances and no emission of hazardous substances at disposal stage
- (2) Regarding use of halogen-group plastic, etc. in plastic materials

Regarding (1), sanitary ware, etc. were examined if they cause soil contamination at disposal stage. As a result, it was not selected as an item for which criteria should be set up, because of the following reasons; 1) sanitary ware, etc. were fired with high temperature and they would not discharge soil contamination substances, and 2) Article 5 Government ordinance of Water Works Law refers to harmful substances, and it is considered that no problem would happen as far as conforming this regulation.

Regarding (2), for “products to be general waste at disposal stage”, the products with halogen-group plastic such as polyvinylidene chloride, etc. are excluded from the scope of



certification in Eco Mark Product Category No. 118 “Plastics Using Recycled Materials”, because inadequate burning of these products would cause belching dioxin. Therefore, plastic materials composed of halogen-group plastics and organic halogen compounds shall not be added as prescribed constituents in this product category based on the above understandings. However, for drainage connection parts for water closet and urinal, resin connecting trap of urinal and shower-hose of water faucet, they are approved to use, because currently no alternative materials exist. In addition, fluorine compounds such as fluorine rubber, etc. are confirmed to have excellent durability, and no alternative material can be found for long-term use. Therefore, fluorine compounds were excluded from the application of criteria regarding halogen compounds. (for use in water, basically).

## **F. Recycling Stage**

### **F-7 Waste and its disposal**

The following point was reviewed in this item:

(1) Name of raw material should be marked for easy source sorting.
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Regarding (1), in the examination for Version 1.0, it was decided to select this item as an item for which criteria should be set up, on the condition that raw material names shall be reported to the Eco Mark office when the application for the Eco Mark is submitted, in order to encourage the applicant to perform product development and system organization from the viewpoint of this item. In the examination for Version 2.0, there were some opinions that material indication of plastic resin is required for recycling, but it was not selected, since the concrete size of plastic resin part for indication can not be decided at this moment.

## **5. Quality criteria**

It is required to follow Article 5 Government ordinance of Water Works Law "Standard for structure of domestic water supply equipment". Conformity with the criteria for leaching performance applies to drinking-water supply equipment. Japanese Industrial Standards, Approval Criteria for Better Housing Parts under the CENTER FOR BETTER LIVING Certification Standards, and other applicable standards should be followed