

EL305. Multipurpose Cleaner

【EL305-1999/7/2007-186】



1. Scope

This standard applies to cleaners composed of surface active agents as the main ingredients and

used to remove general soils chiefly found in the home, office, and other work places. However, this scope does not include products with a specific use for removing specific soils, such as sewer

cleaners, products with additional polishing functions, products with abrasives, or products with cleaners absorbed in the tissues or sponges.

2. Definitions

2.1

“Abrasive” describes a material with high hardness levels, and which is used to grind or smooth the surface of metals etc. In this standard, abrasive indicates an ingredient, such as aluminum oxide powder, added to cleaners for the purposes of removing dirt through physical abrasion.

2.2

“FWAs (Fluorescent Whitening Agents)” are materials that increase the overall the white appearance by absorbing ultraviolet rays among the rays of light, and by re-emitting fluorescent light.

2.3

“Ethanol equivalent concentration” refers to the concentration converted to weight % of ethanol by multiplying weight % of each alcohol (not diols or triols) in the concentrated liquid with the factor considering inhaled toxicity, and its formula is as follows:

$$* \text{ Ethanol equivalent concentration [\%] } = \sum [\text{weight \% of alcohol (not diols or triols) in concentrated liquid} \times \text{factor}]$$

Note) The factors of monovalent alcohol which are used to calculate the ‘ethanol equivalent concentration’, are as the following table, and the factors of monovalent alcohol which are not shown in the table shall be separately indicated by ‘Deliberation Committee for the Certification of Environmental Label’.

Types	methanol	ethanol	isopropanol	tert-butanol
Applicable factor to calculate ‘ethanol equivalent concentration’	5	1	2.5	10

2.4

“FWAs (Fluorescent Whitening Agents)” are materials that increase the overall the white appearance by absorbing ultraviolet rays among the rays of light, and by re-emitting fluorescent light.

2.5

“VACs (Volatile Aromatic Hydrocarbons)” are aromatic hydrocarbons contained in VOCs (Volatile Organic Compounds).

Note) In this standard, only benzene, toluene, xylene, ethyl benzene, 1,4-dichlorobenzene, and styrene are temporarily classified as VACs.

2.6

“ODP (Ozone Depletion Potential)” is the value that indicates the relative impact of materials in terms of ozone depletion, provided that the ozone depletion impact of CFC-11 indicates one (1).

2.7

“GWP (Global Warming Potential)” is the value that indicates the relative impact of materials in terms of global warming, provided that the global warming impact of CO₂ indicates one (1).

Note) In this standard, GWP with a duration of 100 years is applied according to the Fourth Assessment Report: Climate Change 2007, as prepared by the IPCC, (Intergovernmental Panel on Climate Change).

2.8

“Dilutable cleaner” refers to a material that is produced for the dilution with water or other elements in the final stages of use to increase the efficiency of the packaging and transportation processes, by decreasing the volume of the product.

3. Certification Criteria

3.1 Environmental criteria

3.1.1

The manufacturing processes related to the use of chemicals shall conform to the following Standards

3.1.1.1

APEOs (alkylphenol ethoxylates), alkylphenol derivatives, ammonia, quaternary ammonium salt, formaldehyde, ethylene glycol, or fluorescent whitening agents should not be used;

3.1.1.2

Hypochlorous acid and its salts, chlorous acid and its salts, chlorine dioxide, or triclosane should not be used

3.1.1.3

Nitrilotriacetic acid and its salts should not be used;

3.1.1.4

Nitromusks, polycyclic musks, diethyl phthalate, and dibutyl phthalate should not be used;

3.1.1.5

Chemicals belonging to the following H code class according to the UN GHS(Globally Harmonized System) of Classification and Labeling of Chemicals should not be used.

Note: EU Regulation (EC) No. 1272/2008 Annex VI Part 3, (Harmonized Classification and Labeling Tables) will be tentatively applied to the material list.

H 310 : fatal in contact with skin

H 330 : fatal if inhaled(gas, vapour, dust/mist)

H 340 : may cause genetic defects

H 350 : may cause cancer

H 350i : may cause cancer by inhalation

H 360F : may damage fertility

H 360FD : may damage fertility, may damage the unborn child

3.1.1.6

Surface active agents with 90% or higher biodegradability should be used.

3.1.2

The use/emission of harmful substances in the process of manufacturing and use shall conform to the following standards. In the case of dilutable or soluble products, the dilution ratio or solution ratio as marked on the product shall be applied

3.1.2.1

For a liquid cleaner, the content of monohydric alcohol and VACs shall conform to the following standards:

Item	Ethanol equivalent concentration	VACs
Standard [weight %]	1.0 or below	0.1 or below

3.1.2.2

The pH of the product shall be 2.0 or higher, but 11.5 or lower.

3.1.3

The capacity for recycling of the packaging materials in the disposal phase shall conform to the following standards

3.1.3.1

The containers and labels of the product shall not contain halogenated synthetic resins, such as PVC (polyvinyl chloride);

3.1.3.2

Labels, marks, and stickers attached to the containers shall be the same material as the containers, or shall be able to be separated from the containers for ease of recycling.

3.1.4

During the use and disposal phases, spray-type products emitting ozone-depleting and/or global-warming substances shall contain spray agents of zero (0) for ODP, and 3,000 or less for GWP.

3.2 Quality Criteria

3.2.1

The cleaning capabilities of the cleaner shall be the same as, or higher than, those of the standard reference cleaner when a capability test is conducted, according to the test method outlined in <Attachment 1>, or according to equivalent methods.

3.2.2

The product shall conform to the standards specified in "Chemical Products – Part 1. Organic Surface-Active Agent" of the [Self-regulatory Safety Inspection and Safety Standards], pursuant to the [Quality Management and Safety Control of Industrial Products Act].

3.3 Consumer Information

3.3.1

Essential information, such as standard dosage levels and the dilution ratio shall be marked on the packaging materials in order to decrease environmental overload involved in the use of water and cleaners during the product consumption phase

3.3.2

Precautions for Use (Refer to the example below)

ex) During the use of spray-type products, “Do not inhale,” “Keep away from children,” and “Do not mix this product with other cleaning products.” shall be displayed.

3.3.3

To express the cleaning capabilities of the product on strong specific dirt, such as old soils or carbonized soils at high temperatures, verification of the cleaning capabilities are required, according to the test method as stipulated in <Attachment 1>.

3.3.4

Expression of the contributing basis for certification, (contribution to the decrease of the toxins exposed to the human body or the ecosystem, and decreases of water pollution) during the consumption phase of the product

4. Test Methods

Certification Criteria		Testing and Verification Methods
Environment-related Criteria	3.1.1.1 ~ 3.1.1.5	Verification of submitted documents
	3.1.1.6	Verification of submitted documents or test report issued by an official institution, according to KS M 2714 (Test method of the biodegradability of synthetic detergents) being established
	3.1.2.1	Test report issued by an official institution according to KS M 0027 (Methods and general rules of gas chromatograph mass analysis), and KS M 0031 (General rules of gas chromatograph analysis)
	3.1.2.2	Test report issued by an official institution according to KS M 0011 (pH measurement method of aqueous solutions)
	3.1.3 ~ 3.1.4	Verification of submitted documents
Quality-	3.2.1	Test report issued by an official institution according to <Attachment 1>

related Criteria	3.2.2	Test report issued by an official institution based on a corresponding self-regulatory safety inspection and the safety standards or certificate of standards for the same or higher standard
Consumer information		Submitted documents being checked

4.1 General Matters

4.1.1 The number of test samples shall be one sample a product applied in principle. However, in case that more than one sample is required, it shall make an exception.

4.1.2 The test sample shall be randomly sampled out of the commercial products and the products kept in the producing center by an entrusted institution of eco label certification.

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).

5. Reason for Certification: “Decrease of toxins exposed to the human body and the ecosystem”

<Attachment 1> Test method for cleaning capabilities of multipurpose cleaners [Related to (A) of “D. (2) Quality-Related Standards”]

1. Cleaners that require separate rinsing after use

Note) Cleaners that require separate rinsing with water include cleaning products with specific uses for building floors, kitchen appliances, sinks, or bathrooms.

A. Testing Apparatus and Materials

(1) Soils are prepared appropriately as shown below.

a) Ingredients and content used for soils

Ingredients		Target Weight [g]
Synthetic sebum soil	Palmitic acid 10%, Stearic acid 5%, Coconut oil 15%, Parafin wax 10%, Hexadecyl hexadecanoate 15%, Olive oil 20%, Squalene 5%, Cholesterol 5%, Oleic acid 10%, Linoleic acid 5%	4.5
Stearate premix	Calcium stearate 53%, Magnesium stearate 26%, Iron stearate 21%	3.0
Granular soil	Natural humic soil 38.0%, Parafin oil 1.0%, Used engine oil 1.5%, Portland cement 17.7%, Silica 18.0%, Carbon black 1.5%, Iron oxide 0.3%, Clay 18.0%, Stearic acid 2.0%, Oleic acid 2.0%	1.5
Carbon black		0.6
Sodium stearate solution		300.0

b) Preparing soils

- 1) Mix and dry each ingredient of granular materials, and crush them with mortar and pestle. Pass them through a 300-mesh sieve.
- 2) Prepare sodium stearate solution by adding 40g of sodium stearate to 260g of distilled water, and have the solution completely dissolved at a temperature of 75°C.
- 3) Prepare the stearic acid mixture by crushing each ingredient to an even degree with mortar and pestle. Iron stearate, formed from ferric chloride and sodium stearate, may be used.
- 4) To prepare synthetic sebum soils, add the powdered ingredients to oil ingredients and dissolve the powder. Add paraffin wax and hexadecyl hexadecanoate to the solution, and have it completely dissolved and solidified at a temperature of 2°C.
- 5) Prepare the final solution by using the target weight as follows:

- i) In a 1L beaker of water at a temperature of 65 - 75°C, liquefy the synthetic sebum substance and then add the stearic acid compound, carbon black, and granular soil in an orderly manner, stirring the mixture to obtain a homogenous appearance.
- ii) Prepare the final solution by adding 20g of sodium stearate slowly, stirring the solution so as to prevent it from solidification, maintaining the temperature at 75 - 80°C.

(2) The standard reference cleaner shall be prepared appropriately as shown below:

a) Standard reference cleaner to be used to evaluate liquid cleaners

CAS No.	Ingredients	Ratio [weight %]	
		Strong soil	General soil
1310-73-2	sodium hydroxyde, 50% aqueous solution	0.78	0.78
27176-87-0	alkylbenzene sulfonic acid C10-13 (active component: 96%)	6.00	3.00
67701-01-3	fatty acid C12-18	1.00	1.00
68551-12-2	fatty alcohol ethoxylate C12-18, 7 EO (active component: 90%)	4.00	2.00
9004-82-4	fatty alcohol ether sulfate C12-14, 2 EO, Na salt (active component: 70%)	3.00	1.50
111-30-8	glutaraldehyde, 50% aqueous solution	0.02	0.02
-	deionized water	85.2	91.7

b) Standard reference cleaner to be used to evaluate powdered or granular cleaners

CAS No.	Ingredients	Ratio [weight %]
497-19-8	sodium carbonate	49.50
15630-89-4	sodium percarbonate	49.50
27176-87-0	alkylbenzene sulfonic acid C10-13 (active component: 96%)	1.00

(3) The surface of the tested material shall be glazed white tiles, (width 45 cm x height 13.5 cm), without any defects. Use ten (10) tiles cleaned using general dish-washing detergent, and naturally dried for 24 hours.

(4) Prepare the washing apparatus as follows:

- a) Prepare a polyurethane sponge ^{Note)} with a density range of 30 - 32 kg/m³, cut it into a size that fits into the cleaning capability tester, and clean and dry it.

Note) Sponges available on the market for dishwashing purposes may also be used.

- b) Wrap the cleaning side of the sponge in double with cotton cloth Number 3, as specified in KS K 0905 (White cloth used to test colorfastness), submerge the sponge and cloth in synthetic hard water ^{Note)}, and then squeeze out the water by hand.

Note) Dissolve 59 mg of CaCO₃ · 2H₂O and 27.2 mg of MgCl₂ · 6H₂O in 1L of water.

- (5) The cleaning tester shall be prepared according to Test Classification Method 3351 (Testing methods for the cleaning capability of paints) of KS M 5000 (Testing methods for paints and raw materials).

B. Cleaning Capability Test

(1) General Matters

- a) On the reverse side of the tiles prepared for the test material, set three measurement points spaced 1.5cm apart, that are positioned 14cm away horizontally from the center of the left vertical axis in order to measure the reflectance level at each point by using a reflectometer.
- b) When measuring the reflectance level of the cleaned substrate surface, use clean tiles that have been rinsed in softly running tap water at a temperature of 25°C, and dried naturally.
- c) For dilutable or soluble cleaners, the dilution ratio or solution ratio marked on the product shall be applied.

(2) Determination of the standard number of cycles and the calculation of cleaning efficiency of the standard reference cleaner to be used to evaluate liquid cleaners

- a) Measure the original reflectance level of the tested substrate (tile).
- b) Apply 4 – 5g of the final solution on the hot tile, heated at 105°C in an oven for 30 minutes or more. Spread the solution at a thickness of 100 μm on the bottom from the center by using the film applicator, (at a width of 8.8 cm or more), as specified in KS M 5000-1121. Place the tile in an oven and have it heated at a temperature of 70 - 80°C for one (1) hour.
- c) Remove the tile and cool it for 12 hours or longer, visually inspect its homogeneity, and measure the reflectance level on the surface of the soiled substrate.
- d) Evenly apply 0.5g of the standard reference liquid cleaner by using the evaluating liquid cleaners, to the center of the surface of the sponge, using a disposable pipet.
- e) Turn on the cleaning capability tester and set the cycle at a speed of 37±2 strokes per minute. Check the initial number of cycles until 75% of the soil is removed, and measure the reflectance level on the cleaned surface of the substrate.

- f) Repeat the procedures described in a) – e) for the five (5) prepared tiles. If all titles have been cleaned after the initial cycle speed that removed 75% of the soils from each of the five (5) titles, this initial number, t, is determined as the standard number of cycles.
- (3) Calculation of the standard reference cleaner to be used to evaluate powdered or granular cleaners
- Conduct the procedures outlined in (2) (A) – (D).
 - Dissolve 5g of standard powdered or granular cleaner in 1L of water, and evenly apply 3g of the solution at the center of a sponge face, using a disposable pipet.
 - Operate the tester at the speed and with the standard cycle as determined in item (2) above, and measure the reflectance level on the cleaned surface of the substrate.
 - Repeat the procedures outlined in (A) – (C) for the five (5) prepared tiles.
- (4) Cleaning operation with the test cleaner: Repeat the procedures outlined in (2) or (3), according to the type of the test cleaners with the five (5) prepared tiles, and measure the reflectance level on the cleaned surface of the substrate. At the speed and with the standard number of cycles as determined in (2), conduct the test with the test cleaner rather than the standard reference cleaner.
- (5) Calculation of cleaning efficiency and evaluation of cleaning capability
- Using the reflectance level measured at each stage in (2) – (4) above, calculate the cleaning efficiency of the standard reference cleaner and test cleaner for each of the 15 measurement points.

$$\text{Cleaning efficiency (\%)} = \frac{R_c - R_s}{R_o - R_s} \times 100$$

Where, R_c = Reflectance level on the cleaned surface of the substrate

R_o = Original reflectance level on the surface of the substrate

R_s = Reflectance level on the surface of the soiled substrate

- Compare the cleaning efficiency of the standard reference cleaner and the test cleaner. To evaluate the cleaning efficiency of the test cleaner at the same level as that of the standard reference cleaner or higher, an evaluation of significance by t-test should be applied.

2. Cleaners that do not require separate rinsing after use

Note) Cleaners that do not require separate rinsing after use include cleaners for glass, electrical appliances, and furniture.

A. Testing apparatus and materials

(1) Soils solutions are prepared appropriately as shown below:

Ingredients		Target Weight [g]
Synthetic sebum soil	Palmitic acid 10%, Stearic acid 5%, Coconut oil 15%, Parafin wax 10%, Hexadecyl hexadecanoate 15%, Olive oil 20%, Squalene 5%, Cholesterol 5%, Oleic acid 10%, Linoleic acid 5%	0.50
Mineral oil (Ligroin, CAS No. 8032-32-4)		0.50
Carbon black		0.50
Perchloroethylene (CAS No. 127-18-4)		98.50

(2) Standard reference cleaners shall be prepared as per the following:

CAS No.	Ingredients	Ratio [weight %]
9004-82-4	fatty alcohol ether sulfate C12-14, 2 EO, Na salt (active component: 70%)	1.00
111-76-2	2-butoxyethanol	2.00
64-17-5	ethyl alcohol (95%)	2.00
-	deionized water	95.00

(3) Prepare glass panes, (width 45cm, height 13.5cm), with an even surface as the substrate to be cleaned. Using a hydrocarbon-based cleaning agent, clean ten (10) glass panes thoroughly and then rinse them with water and dry them with a cotton cloth.

(4) The cleaning test shall be conducted according to Test classification method 3351 (Test methods for cleaning capability of paints) of KS M 5000 (Test methods for paints and related materials).

B. Cleaning Capability Test

(1) Cleaning Operation

a) Prepare a synthetic sheet, (at least 1mm in thickness), or corrugated cardboard of the same size as the glass panes, as the substrate to be cleaned. Create a frame by cutting the center of the sheet or cardboard of the size of 35cm wide and 8cm high.

b) Place the frame on the glass pane and then use a test tube to spray 10g of the solution inside the frame evenly.

- c) Remove the frame and have the soiled glass pane dry for two (2) hours at room temperature, exercising caution not to allow the soil to run.
- d) Place the frame on the dried soiled glass pane and put 1g of standard reference cleaner in a test tube to spray evenly, and have it penetrated for 30 seconds.
- e) Wrap the cleaning side of the sponge doubled-over with cotton cloth Number 3, as specified in KS K 0905 (White cloth used to test colorfastness). Set the cleaning capability tester at a speed of 37 ± 1 strokes per minute, and apply five (5) cycles to clean the soil.
- f) Remove the cleaned glass pane to rinse it with running tap water at 25°C, and have it dried naturally.
- g) Repeat these procedures a) – b) five (5) times, and use them to evaluate the cleaning capabilities.
- h) Using the test cleaner rather than the standard reference cleaner, repeat the procedures a)– b) five (5) times, and use them to evaluate the cleaning capabilities. In the case of a dilutable cleaner, apply the dilution ratio as marked on the product.

(2) Evaluation of Cleaning Capability

Evaluate the cleaning capability by summarizing the scores of soil-removing capabilities, according to the following table. Where the score of the test cleaner is the same as, or higher than, the score of the reference cleaner, or where the score is lower with no significant differences found as a result of conducting a t-test with a 5% level of significance, the cleaning capability of the test cleaner is evaluated as the same as, or higher than, the reference cleaner.

<Table> Evaluation of cleaning capability of soils on the glass pane

Evaluation Standard	Assessment	Score
Soil-Removing Capability	Removed completely	+ 2
	Good	+ 1
	Normal	0
	Deficient	- 1
	Very deficient	- 2

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.