

EL307. Liquid Laundry Detergents

[EL307-2008/2/2008-213]



1. Scope

The criteria shall apply to liquid laundry detergent which is used in home washing machines (hereinafter, it will be referred to as “detergent”).

2. Definition

2.1

“Bioconcentration” refers to the phenomenon that a concentration of chemical substances from the tissues of an organism increases relatively as compared with the density of an environmental medium and bioconcentration factor (BCF) which shall be indicated by its concentration ratio.

2.2

“BCF” refers to a concentration ratio of biologic tissue against aqueous concentration when biologic tissue concentration and aqueous concentration of aqueous organism come to a state of equilibrium.

2.3

“N-octanol/water partition coefficient” refers to representing a compound’s concentration ratio melted in water and octanol layers as a partition coefficient when compounds are melted in water and octanol, both being solvents not mixed each other.

2.4

“Function Unit” refers to quantifying the same services, i.e., performances supplied by a product and in this criteria, in the case of detergent for an agitator type washing machine, it is defined with the amount of detergent used on a basis of water of 100L to be used upon laundry and in case of a cylinder type washing machine, it is defined with the amount of detergent used on a basis of the laundry of 10kg.

Note) The value of the function unit for each type of washing machine should be determined on the basis of the amount used as indicated on the detergent package.

2.5

“Agitator Type Washing Machine” refers to a washing machine in which a mixing blade is mounted on the bottom surface and the washing operation is executed according to its agitation movement.

2.6

“Cylinder Type Washing Machine” refers to a washing machine that executes washing by dropping the laundry according to the rotary movement of the horizontal axis of a drum in which condition the laundry is partially submerged under the washing water within the horizontal drum.

2.7

“Alkalescent Detergent” refers to the second type, alkalescent detergent, in accordance with 「Voluntary Safety Confirmation Safety Criterion」 of 「Quality Management and Safety Control of Industrial Products Act」 .

2.8

“Neutral Detergent” refers to a liquefied product out of the second type neutral detergent and the third type neutral detergent in accordance with 「Voluntary Safety Confirmation Safety Criterion」 of 「Quality Management and Safety Control of Industrial Products Act」 .

2.9

“Total Chemical Substances” refers to the total sum [g/wash] of the amount used for all the structure materials except for moisture (including bound water) out of the function units.

2.10

“Aerobic Non-biodegradation Material” refers to the total sum [g/wash] of the amount used for all the structure materials to which biodegradation shall not be applied under an aerobic state out of function units.

2.11

“Anaerobic Non-biodegradation Material” refers to the total sum [g/wash] of the amount used for all the structure materials to which biodegradation shall not be applied under an anaerobic state out of function units.

2.12

“Critical Dilution Volume Toxicity (CDVtox)” refers to the total value [L/wash] obtained by measuring in terms of the quantity of water capable of diluting toxicity contained in a relevant ingredient for each structure material out of function units up to an acceptable level in an environmental aspect.

3. Certification Criteria

3.1 Environmental Criteria

3.1.1

When a product is being manufactured, in regard to the use of chemical substances, the following materials should not be used for constituent ingredients of the product.

3.1.1.1

Alkylphenol Ethoxylates (APEOs) and Alkylphenol Derivative.

3.1.1.2

Phosphast (e.g. phosphate and phosphonate) and Boric Acid.

3.1.1.3

The following synthetic musk and nitro musk

Material Name	CAS – no.	Material Name	CAS – no.
Musk xylene	81-15-2	AHTN	1506-02-1, 21145-77-7
Musk ambrette	83-66-9	HHCB	114109-62-5, 114109-63-6, 1222-05-5, 78448-48-3, 78448-49-4
Moskene	116-66-5		
Musk tibetine	145-39-1		
Musk ketone	81-14-1		

3.1.1.4

Use of the material over the limiting concentration, which must display the H code on the product according to EU Directives 1999/45/EC and UN GHS (Globally Harmonized System).

H code	Description	Critical Concentration [weight %]
H 334	may cause allergy or asthma symptoms or	0.1

	breathing difficulties if inhaled	
H 317	may cause allergic skin reaction	0.1
H 400	very toxic to aquatic life with long-lasting effects	0.25
H 411	toxic to aquatic life with long-lasting effects	2.5
H 412	harmful to aquatic life with long-lasting effects	25

3.1.1.5

In regard to bioconcentration, antiseptic and dyestuff of which BCF is 100 or above 100 and of which N-octanol/water partition coefficient is 3 or above 3.

3.1.2

When said product is being used, in regard to emission of water pollution substances, the total sum and the value for each criteria item calculated according to an appendix should satisfy the following requirements.

Environmental Grade Calculation Table of Liquefied Detergent for Laundry

Reference Item		Critical Limits of X_n	Grade Calculation System	
			Equation	Weights
Alkalescent Detergent	1. Total Chemical Substances	≤ 50	$-0.5X_1 + 27$	3.5
	2. Aerobic Non-biodegradation Material	≤ 6	$-2.3X_2 + 13$	1.5
	3. Anaerobic Non-biodegradation Material	≤ 35	$-0.38X_3 + 15$	3
	4. Critical Dilution Volume Toxicity (CDVtox)	≤ 2000	$-7 \times 10^{-3}X_4 + 19$	7
	Total Sum		≥ 100	
Neutral Detergent	1. Total Chemical Substances	≤ 30	$-0.25X_1 + 11.2$	3.5
	2. Aerobic Non-	≤ 3	$-X_2 + 6.4$	1.5

	biodegradation Material			
	3. Anaerobic Non- biodegradation Material	≤20	$-0.4X_3 + 9.6$	3
	4. Critical Dilution Volume Toxicity (CDVtox)	≤1500	$-3.6 \times 10^{-3}X_4 + 7.3$	7
	Total Sum	≥60		

3.1.3

When the product is being manufactured and when the product is being used, in regard to recycling in terms of resources consumption and at the stage of disposal, packing materials should satisfy the following requirements.

3.1.3.1

“Packing material evaluation index” of the primary packing material for each standard of the present cell should be 11 or below 11.

Note1) The definition of “the primary packing material” should be fulfill the 「Regulation concerning criterion of package material and package method」 of 「Act on the Promotion of Saving and Recycling of Resources」.

Note2) Package material evaluation index [g/wash] =

$$\frac{\text{entire weight of packing material[g]} - \text{weight of use of recycling material[g]}}{\text{the number of function unit out of entire products}}$$

3.1.3.2

In a case where label and shrink film are used, the same or the same kind of materials as the body of a case should be used and metal coating should not be executed. However, an exception should be made in case of in-mold label (PP: white and transparent PE) inserted upon case molding.

3.1.3.3

The product with a present case should have a measuring cup attached indicating the standard amount for use on its cover.

3.1.3.4

In regard to the legibility of the indication of the standard amount for use, the following requirement should be satisfied.

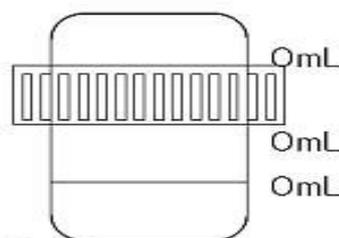
a) In regard to the standard amount for use, the following types of information including “table indicating standard use”, “a measuring cup indicating a capacity (case cover)” and “recommendations standard usage” should be prescribed.

“Please keep the standard amount of use”

The Laundry Weight [kg] Or water quantity used [L]	The amount used [mL]	Case[on a basis of a measuring cup]
≥ 0	0	
0 ~ 0	0	
≤ 0	0	

“Please keep the standard amount of use”

The Laundry Weight [kg] Or water quantity used [L]	The amount Used [mL]
≥ 0	0
0 ~ 0	0
≤ 0	0



* Case Cover:
a scale mark is approximately
0 mL.

b) Any indication recommending more than the standard usage should be avoided.

3.1.3.5

The sum of a lead (Pb), a cadmium (Cd), a mercury (Hg) and a hexavalent chromium (Cr^{+6}), contained in a package material, should be 100 mg/kg or below 100 mg/kg.

3.2 Quality Criteria

3.2.1

The detergency of the product should be equivalent to the detergency of index detergent or more.

3.2.2

The product should be satisfied in accordance with the 「 Voluntary Safety Confirmation Safety Criterion 」 of 「 Quality Management and Safety Control of Industrial Product Act 」 .

3.3 Consumer information

Indicate those items that contribute to the reasons for certification of the relevant product, (less harmful effects on human body, less water pollution and environmental friendly package materials)

4. Test Methods

Certification Criteria			Test method and verification method
Environmental Criteria	3.1.1	3.1.1.1~ 3.1.1.4	Confirmation of submitted documents and actual location .
		3.1.1.5	Authorized test institution test reports pursuant to the following test methods or confirmation of submitted document. <ul style="list-style-type: none"> ▪ BCF: OECD 305 (Bioconcentration: Flow: Flow-through Fish Test through Fish Test) ▪ N-octanol/water partition coefficient: OECD 107 (Partition Coefficient (n-octano/water): Shake flask method) or 117 (Patition coefficient (n-octanol/water), High performance liquid chromatography (HPLC) method)
	3.1.2		Confirmation of submitted documents and actual location.
	3.1.3	3.1.3.1~3.1.3.4	Confirmation of submitted documents
		3.1.3.5	Authorized test institution test reports pursuant to the volume2006-143 [announcement of recommendation standard of heavy metal content of package material and its test method] notice by Ministry of Environment.

Quality Criteria	3.2.1	<ul style="list-style-type: none"> Authorized test institution test reports pursuant to (1) and (2) confirmation and test methods.
	3.2.2	Authorized test institution test reports pursuant to the corresponding voluntary Safety Confirmation Safety Criterion or certificates for the same or higher criteria.
Consumer Information		Confirmation of submitted documents

4.1 General Matters

4.1.1 Make it a principle to take two test samples per product under application.

However, where more than one test is required, additional products shall be provided for testing.

4.1.2

Environmental labeling certification institutions shall conduct random sampling of test samples among the products commercially available or kept in production locations.

At this time, in order to test detergency, an optical whitening agent and enzyme used in a sample detergent will be collected from an actual production site and then entrusted to a test institute.

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. Detergency Evaluation Method

Note) Other detailed matters not suggested in the present evaluation method shall be in accord with section 8. Detergency evaluation method of KS M 2709 (Testing methods for synthetic detergent).

4.2.1 Principle: When a testing fabric prescribed in section 8.1.2. is washed with a sample detergent, the detergency against index detergent for valuating detergency should be valuated in use of a photoelectric colorimeter.

4.2.2 Test Equipment and Materials

4.2.2.1

Testing body: JIS C 9606 (Electric washing machine)

4.2.2.2

Agitator type detergency tester

a) Equipment: Agitator type detergency tester (Terg-O-Tometer) of 8.1.3. Apparatus and Instrument of KS M 2709 (Testing methods for synthetic detergent).

b) Driving conditions: 100 ± 5 rpm, used water 25 ± 2 °C

4.2.2.3

Cylinder type detergency tester

a) Equipment: Laundrometer according to ISO 105-C01-6, 8 (Textiles – tests for color fastness).

b) Driving conditions: 40 ± 2 rpm, used water 40 ± 2 °C

4.2.3 Preparation of Test

4.2.3.1

The testing body should be prepared 48 ea which are cut by 5x5 cm with a soiled fabric, per one testing time.

4.2.3.2.

Preparation of index detergent for valuating detergency: It should be prepared according to the followings of section 8.1.4. a) preparation of test of KS M 2709 (Testing methods for synthetic detergent): b) preparation of index detergent for valuating detergency and 2) alkalescent detergent. However, in a case where an optical whitening agent and an enzyme from the components of the sample detergent are contained, the prepared detergent index should have the same kind and the same quantity used.

4.2.3.3.

Water to be used should be applied identically to the method of KS M 2709 (Testing

methods for synthetic detergent).

4.2.3.4

Sample solution should be applied identically to the method of KS M 2709 (Testing methods for synthetic detergent).

4.2.4. Washing operation in the use of the detergent

4.2.4.1

16 testing fabrics were prepared according to (1) of section 8.1.4., 8 testing fabrics are inserted into the index detergent solution for valuating detergency, and a sample solution is inserted into the (agitator type/cylinder type) water detergency tester, respectively 1L (agitator type) and 0.3L(cylinder type), thereby the executing washing operation for a 10 minute duration. In this regard, a weighting ratio of each index detergent solution for detergency evaluation and testing fabric is 100:1. However, in a case where the weight of testing fabric is small, the corresponding weighting ratio can be corrected with the use of a cotton fabric prescribed in KS K 0905. In addition, such an operation is repeated three times and thus, all 24 testing fabrics should be washed once.

Classification	For agitator type washing machine	For cylinder type washing machine
Amount used of index detergent	1.33 g/L	1.75g/L x 0.3L
Amount used of sample detergent	Standard amount used indicated on a product	[Standard amount used indicated on a product by the criteria 3% or below 3% of the amount used / 18L] ×0.3L

4.2.4.2

The testing fabrics are collected after washing and then, slightly compressed by hand so that the percentage of its moisture content is 200% or below 200%. Thereafter, it should be inserted into water (e.g., agitator type: 1L and cylinder type:0.3L) and then, the rinsing operation should be executed for a 10 minute duration in an agitator type and 30 minutes in a cylinder type, respectively. Such an operation should be repeated twice.

4.2.4.3

When the washing operation is finished the testing fabric is slightly compressed by hand identical to the method of (2) of section 8.1.5 and then, cotton fabrics prescribed in KS K 0905 are set up and down the relevant testing fabric, respectively. Thereafter, the testing fabric should be ironed until it is completely dried. It should then be used for the evaluation of detergency.

4.2.5 Evaluation

4.2.5.1

The brightness of the testing fabric before washing should be calculated by the following equation after measuring values of L, a and b in use of photoelectric colorimeter in regard to surface color of testing fabric. In this regard, light sources equivalent to C2 which is CIE standard illuminant should be used. In addition, upon measuring the values of L, a and b, the central portions of front and back surfaces are respectively measured to calculate the brightness and the average of the values should be determined for the brightness of the corresponding testing fabric before washing.

$$W = 100 - \sqrt{(100 - L)^2 + (a)^2 + (b)^2}$$

4.2.5.2

In regard to each of the 24 testing fabrics when washing is finished, the brightness shall be calculated according to the same method as that of 8.1.6 (1).

4.2.5.3. Analysis of evaluation of results

The brightness of each of the 24 testing fabrics is calculated by 8.1.6. (1) and 8.1.6 (2) shall be calculated with wash-out rates for each testing fabric using the following equation. And thus, Wash-out rates on the index detergent solution for valuating detergency and the sample solution shall be compared. In this regard, in order to valuate the detergency of the sample detergent equivalent to the index detergent or more as compared with the index detergent, it should be assumed that significance testing based on a t-inspection will be executed.

$$Wash - outrates[\%] = \frac{W_0 - W_b}{W_0 - W_s} \times 100$$

Herein, W_0 is brightness of cotton fabric before pollution,
 W_b is brightness of testing fabric before washing and
 W_s is brightness of testing fabric after washing.

4.2.6

The test report should include the following matters.

4.2.6.1

Test method and reference standards

4.2.6.2

Details on the components used upon manufacturing the index detergent

4.2.6.3

Individual test data and standard deviation

5. Reasons for Certification:

“Less harmful effects on human body, Less water pollution, Environmental friendly package materials”

[Annex] Verification Methods of the Correlations of Detergents and Clearing Agents with Water Pollution

A. Purpose

This Annex is aimed to describe how to verify the correlations of detergents and clearing agents (EL301 - EL309) with water pollution.

B. Definitions

(1) "AC (Active Contents)" refers to the total weight of chemical substances, excluding water, which compose a product [mg].

(2) "Readily biodegradable" refers to the biodegradability for each test method conforming to the following in the general micro-organic degradability test which has a reduced opportunity for degradation compared to the practical environment, to examine whether chemicals are easily micro-organically degradable in the environment.

Bio-degradability test method	Bio-degradability	Bio-degradability test method	Bio-degradability
OECD 301 A (DOC Die-away test)	≥70 %	OECD 301 D (Closed bottle test)	≥60 %
KS M ISO 7827		KS M ISO 10707	
OECD 301 B (CO ₂ Evolution test)	≥60 %	OECD 301 E (Modified OECD screening test)	≥70 %
KS M ISO 9439		KS M ISO 7827	
OECD 301 C [Modified MITI test(I)]	≥60 %	OECD 301 F (Manometric respirometry test)	≥60 %
KS M ISO 14851		KS M ISO 9408	

Note) Standard names

- KS M ISO 7827 (How to Evaluate the Final Aerobic Biodegradability in Water-Liquid Media-How to Analyze Dissolved Organic Carbon)
- KS M ISO 9439 (How to Evaluate the Final Aerobic Biodegradability in Water-Liquid Media-How to Test the Generation of Carbon Dioxide)
- KS M ISO 14851(Measurement of the Final Aerobic Biodegradability of Plastic Materials in the Water Liquid Media – Measurement of Oxygen Quantity Consumed by the Airtight Respiratory Organ)
- KS M ISO 10707 (How to Evaluate the "Final" Aerobic Biodegradability in Water-Liquid Media-How to

Analyze Biochemical Oxygen Demand (BOD) (Airtight Bottle Test)

- KS M ISO 9408 (Water - Evaluation of the Aerobic Final Biodegradability of Organic Compounds in Liquefied Media by Measurement of the Biological Oxygen Demand (BOD) with an Airtight Breathalyzer)

(3) "Inherently biodegradable" refers to that the biodegradability for each test method conforming to the following in the general microorganism degradability test performed in the conditions, which has the reduced opportunity of degradation compared to the practical environment, to examine whether chemicals are easily micro-organically degradable in the environment.

Bio-degradability test method	Bio-degradability	Bio-degradability test method	Bio-degradability
OECD 302 A (Modified SCAS test)	≥70 %	OECD 302 B (Zahn-Wellens/EMPA test)	≥70 %
KS M 9138			
OECD 302 C (Modified MITI test(II))		KS M ISO 9888	

Note) Standard names

- KS M 9138 (How to Evaluate the Aerobic Biological Oxygen Degradation (BOD) of Organic Compounds in Water [Semi-continuous Activated Sludge (SCAS) Process])
- KS M ISO 9888 (How to Measure the Aerobic Degradability of Organic Compounds in the Water-Liquid Media (Static Method: Zahn-Wellens Method))

(4) "DF (Degradation factor)" "DF" refers to a coefficient for the biodegradability of each material, with the biodegradability divided into easily biodegradable, inherently biodegradable and not biodegradable.

(5) "TF (Toxicity factor)" "TF" refers to a coefficient standing for the toxicity of a substance as a value obtained by dividing acute toxicity data(LC50 and EC50) by uncertainty factor (SF).

(6) "The acute toxicity" refers to a toxicity that appears when a chemical substance is administered (processed) to a test animal once or a few times within 24, 72 and 96 hours, or when an inhalable substance is exposed to a test animal once during a limited time that does not exceed 24, 72 and 96 hours.

(7) "The chronic toxicity" refers to a general toxicity that occurs as a result of repeated administration or exposure during a considerable or whole period of the test animal's life expectancy. However, it excludes reproductive toxicity, genetic toxicity and cancer-causing properties.

C. Calculation Methods

(1) X_n Calculation Methods

With regard to the emission of water pollutants in the use phase that applies to the detergents and cleaning agents (EL301 - EL309) under the middle classification of the 「Environmental Mark Products and Certification Criteria」, calculate the value for each environmental influence item X_n in accordance with Appendix Table 1 using the DID in Appendix Table 2 and based on the calculation methods presented in (A) to (D). Calculate the value of the constituent substances not included in DID after building the data in accordance with Appendix Table 3. Calculate the score for each item down to one decimal place.

(A) Total chemical substance (X_1)[g/wash] : Total the use amounts [g/wash(i)] of the contents [%] for all the chemical constituents exclusive of water [inclusive of bound water].

(B) Aerobic non-biodegradable substance (X_2) [g/wash]: Total the use amounts [g/wash (i)] of the contents [%] for aerobic non-biodegradable constituents in the DID list.

(C) Anaerobic non-biodegradable substance (X_3)[g/wash]: Total the use amounts [g/wash(i)] for the contents [%] for anaerobic non-biodegradable constituents in the DID list.

(D) Critical dilution volume, toxicity (CDVtox, X_4)[L/wash] : Calculate the CDVtox(i) for all the substances in the DID list using TF values, DF values and use amounts [g/wash(i)] of contents [%] and then total the values.

(2) Calculation Methods of the Total Scores

(A) Multiply the results from “(1) X_n Calculation Methods “ by the added values for standard items and then total them.

(B) Calculation examples

$$1) \text{ Total} = (aX_1 + b \times 3.5) + (cX_2 + d \times 1.5) + (eX_3 + f \times 3) + (gX_4 + h \times 7)$$

<Appendix Table 1> Document Form for Submission

A. General matters

- (1) The environmental labeling application products shall be distributed and sold in certain scopes or higher and equipped with the distribution and sales conditions as well as production processes.
- (2) The submitted documents shall not be used for other purposes than as evidence to decide whether products conform to criteria.

B. How to write the document forms for submission

- (1) Submit the data of all the substances composing each product in accordance with the following form, and using the substances DID does not contain, write (B) in (C) Document Form for Submission based on the methods presented in Appendix 3, write it in (A) and submit the document.
- (2) However, if any substance not on the DID list corresponds to the following, you may only list the total chemical substance item without building a separate data pursuant to the presentation method in Appendix 3.
 - (A) Any substance whose natural extracts are less than 1% of the valid substances. However, when using the solvents except water in extracting natural substances, you may use nothing but the solvents on the DID list.

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

(B) Active Contents(AC) Substances under 1%, and Chemicals belonging to the following class and label according to the UN Globally Harmonized System of Classification and Labeling of Chemicals

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

- H340 : may cause genetic defects
- H341 : suspected of causing genetic defects
- H350 : may cause cancer
- H350i : may cause cancer by inhalation
- H351 : suspected of causing cancer
- H360F : may impair fertility
- H360FD : may damage fertility, may damage the unborn child
- H361f : suspected of damaging fertility
- H360Fd : may damage fertility, suspected of damaging the unborn child

- H362 : may cause harm to breast-fed children
- H400 : very toxic to aquatic life
- H411 : toxic to aquatic life with long-lasting effects
- H412 : harmful to aquatic life with long-lasting effects
- H413 : may cause long-lasting harmful effects to aquatic life

(3) Fix the content of water based on the KS M 2709 (5.21.1 How to Heat and Add Weight), and record the value, inclusive of that of bound water, into the following table.

C. Document forms for submission

(1) Product composition data

(A) Make it a principle to build the data of all the individual substances composing a product. However, the principle may apply to the total chemical substance in the substances (2) below 1 % which corresponds to B. (2). At this time, convert mL labeled on the product into g.

DID No.	Use material name	Content [%] ^{Note)}	TF	DF	Total chemical substance [g/wash]	Aerobic non-biodegradable substance [g/wash]	Anaerobic non-biodegradable substance [g/wash]	Critical dilution volume [L/wash]

Note) Regard the total of chemical substances, excluding water, in the product as 100 % and insert them.

(B) Results from the quantification of constituents:

1) In the case of quantification test data of constituents by chemical substance analysis, provide the test results of approved test institutions or the following internal data (within recent three months).

2) However, in the case where substances are undetectable even with the in-house test records, verify the data by confirming the input quantity of the materials recorded in electronic data or production diary through field survey.

(2) Data of the substances not included in DID

(A) Secure the following data and then build the data not included in DID using the methods in Appendix 3.

1) Toxicity: LC50, EC50 recorded in MSDS, Risk assessment report etc pursuant to OECD 201 (Alga, Growth Inhibition Test), 202 (Daphnia sp. Acute Immobilization Test), 203 (Fish, Acute Toxicity Test) or the same test methods.

<Appendix Table 2> DID (detergent ingredients database)

A. General matters

(1) This database is not a list of substances that are available for products, and may include a list of substances prohibited from use or detection in accordance with the certification criteria for environmental labeling products.

(2) In case of O(No test) regarding the biodegradable ability, biodegrade/ non-biodegrade can be applied depending on the test results when submitting the actual test data for the respective substances.

(3) Compounds and Mixture Application Method

a) If an individually used substance exists in the final product

1) DID No. is applied based on the substance remaining in the final product. However, in case of an individual substance remaining after the chemical reaction DID No. is applied for the chemical substance before the compound by the remaining amount.

2) Application example : In case fatty acid used to make soap compounds, if 70% only is neutralized and 30% of the usage remains in the final product, 70% for soap(DID No.12) and 30% for fatty acid(DID No.123) are applied in calculation.

b) Mixture

1) In case we can acquire appropriate toxic data for substances of 2 types or more among mixture, the toxicity addition value of such substances is calculated based on the constant formula as follows and this calculated value can be used.

2) In case of applying the following constant formula among mixture, the toxicity of mixture is calculated using the toxicity value of each substance for the same life type(That is, fish, water flea or green algae), the smallest toxicity value among the calculations (That is, the value acquired from the most sensitive type among 3 life types) is adopted.

$\frac{\sum C_i}{L(E)C_{50m}} = \sum \frac{C_i}{L(E)C_{50i}}$	<p>C_i = Concentration of substance i (Weight %)</p> <p>$L(E)C_{50i}$ = LC_{50} or EC_{50} of substance i (mg / L)</p> <p>N = Substance number (i has 1~ n value)</p> <p>$L(E)C_{50m}$ = $L(E)C_{50}$ in the part where the test data exist among mixtures</p>
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※ Application Example (cetearyl alcohol)

Calculation and application by applying the calculated values of 0.287 if mixed by 5:5, and 0.37 if mixed by 2:8, using the toxic data of the same biospecies of Cetyl Alcohol and Stearyl Alcohol

CAS NO	Substance Name	96 hours EC_{50} algae	SF(acute)	TF(acute)
36653-82-4	Cetyl Alcohol	676	10000	0.0676
112-92-5	Stearyl Alcohol	235	1000	0.235

B. List

DID No.	Materials	Acute toxicity			Chronic toxicity			Biodegradability		
		LC50/EC50	SF (Safety Factor)	TF (Toxicity Factor)	NOEC(*)	SF* (Safety Factor)	TF (Toxicity Factor)	DF (Degradation factor)	aerobic	anaerobic
	Anionic surfactants									
1	Linear alkyl benzene sulphonates 11,5-11,8 (LAS)	4.1	1000	0.0041	0.69	10	0.069	0.05	R	N
2	LAS (C10-13 alkyl) triethanolamine salt	4.2	1000	0.0042	3.4	100	0.034	0.05	R	O
3	C 14/17 Alkyl sulphonate	6.7	5000	0.00134	0.44	10	0.044	0.05	R	N
4	C 8/10 Alkyl sulphate	132	5000	0.0264			0.0264	0.05	R	Y
5	C 12/14 Alkyl sulphate (AS)	2.8	1000	0.0028	2	100	0.02	0.05	R	Y
6	C 12/18 Alkyl sulphate (AS) (#)			0.0149			0.027	0.05	R	Y
7	C 16/18 Fatty alcohol sulphate (FAS)	27	1000	0.027	1.7	50	0.034	0.05	R	Y
8	C 12/15 A 1-3 EO sulphate	4.6	1000	0.0046	0.1	10	0.01	0.05	R	Y
9	C 16/18 A 3-4 EO sulphate	0.57	10000	0.000057			0.000057	0.05	R	Y
10	Dialkyl sulpho succinate	15.7	1000	0.0157			0.0157	0.5	I	N
11	C 12/14 Sulpho- fatty acid methylester	9	10000	0.0009	0.23	50	0.0046	0.05	R	N
12	C 16/18 Sulpho- fatty acid methylester	0.51	5000	0.000102	0.2	50	0.004	0.05	R	N
13	C 14/16 aDFa Olefin sulphonate	3.3	10000	0.00033			0.00033	0.05	R	N
14	C 14/18 aDFa Olefin sulphonate	0.5	5000	0.0001			0.0001	0.05	R	N
15	Soap C>12-22	22	1000	0.022	10	100	0.1	0.05	R	Y
16	Lauroyl Sarcosinate	56	10000	0.0056			0.0056	0.05	R	Y
17	C9/11 2-10 EO Carboxymethylated, sodium salt or acid	100	10000	0.01			0.01	0.05	R	O
18	C12/18 2-10 EO Carboxymethylated, sodium salt or acid	8.8	1000	0.0088	5	100	0.05	0.05	R	O
19	C 12/18 Alkyl phosphate esters	38	1000	0.038			0.038	0.05	R	N
54	AES (C 15, 5 EO)			0.016	1.6	100	0.016	0.05	R	Y
	Non-ionic surfactants									
20	C8 A 1-5 EO	7.8	1000	0.0078			0.0078	0.05	R	Y

DID No.	Materials	Acute toxicity			Chronic toxicity			Biodegradability		
		LC50/EC50	SF (Safety Factor)	TF (Toxicity Factor)	NOEC(*)	SF* (Safety Factor)	TF (Toxicity Factor)	DF (Degradation factor)	aerobic	anaerobic
21	C 9/11 A, >3-6 EO predominantly linear	5.6	1000	0.0056			0.0056	0.05	R	Y
22	C 9/11 A, >6-10 EO predominantly linear	5	1000	0.005			0.005	0.05	R	Y
23	C 9/11 A, 5-11 EO multibranched	1	1000	0.001			0.001	0.05	R	O
24	C10 A, 5-11 EO multi br. (Trimer-propen-oxo-alcohol)	10	1000	0.01			0.01	0.05	R	Y
25	C 12/15 A, 2-6 EO predominantly linear	0.43	1000	0.00043	0.18	50	0.0036	0.05	R	Y
26	C12/14 5-8 EO 1 t-BuO (endcapped)	0.23	1000	0.00023	0.18	100	0.0018	0.05	R	O
27	C 12/15 A, 3-12 EO multibranched	1	1000	0.001	3.2	100	0.032	0.05	R	O
28	C 12/15 (mean value C<14) A, >6-9 EO	0.63	1000	0.00063	0.24	10	0.024	0.05	R	Y
29	C 12/15 (mean value C>14) A, >6-9 EO	0.4	1000	0.0004	0.17	10	0.017	0.05	R	Y
30	C 12/15 A, >9-12 EO	1.1	1000	0.0011			0.017	0.05	R	Y
31	C 12/15 A >12-20 EO	0.7	1000	0.0007			0.0007	0.05	R	O
32	C 12/15 A >20-30 EO	13	1000	0.013	10	100	0.1	0.05	R	O
33	C 12/15 A, >30 EO	130	1000	0.13			0.13	0.5	I	O
34	C 12/18 A, 0-3 EO	0.3	1000	0.0003			0.0003	0.05	R	Y
35	C 12/18 A, 5-10 EO	1	1000	0.001	0.35	100	0.0035	0.05	R	O
36	C 12/18 A, >10-20 EO	1	1000	0.001			0.0035	0.05	R	O
37	C 16/18 A, 2-8 EO	3.2	1000	0.0032	0.4	100	0.004	0.05	R	Y
38	C 16/18 A, >9-18 EO	0.72	1000	0.00072	0.32	10	0.032	0.05	R	Y
39	C 16/18 A, 20-30 EO	4.1	1000	0.0041			0.0041	0.05	R	Y
40	C 16/18 A, >30 EO	30	1000	0.03			0.03	0.5	I	Y
41	C12-15 A 2-6 EO 2-6 PO	0.78	1000	0.00078	0.36	100	0.0036	0.05	R	O
42	C10-16 A 0-3 PO 6-7 EO	3.2	5000	0.00064	1	100	0.01	0.05	R	O
43	Glycerin (1-5 EO) cocoate	16	1000	0.016	6.3	100	0.063	0.05	R	Y
44	Glycerin (6-17 EO) cocoate	100	1000	0.1			0.1	0.05	R	Y
45	C 12/14 Glucose amide	13	1000	0.013	4.3	50	0.086	0.05	R	Y
46	C 16/18 Glucose amide	1	1000	0.001	0.33	50	0.0066	0.05	R	Y

DID No.	Materials	Acute toxicity			Chronic toxicity			Biodegradability		
		LC50/EC50	SF (Safety Factor)	TF (Toxicity Factor)	NOEC(*)	SF(*) (Safety Factor)	TF (Toxicity Factor)	DF (Degradation factor)	aerobic	anaerobic
47	C 8/10 Alkyl polyglycoside	28	1000	0.028	5.7	100	0.057	0.05	R	Y
48	C8/12 Alkyl polyglycoside, branched	480	1000	0.48	100	100	1	0.05	R	N
49	C 8/16 or C12-14 Alkyl polyglycoside	5.3	1000	0.0053	1	10	0.1	0.05	R	Y
50	Coconut fatty acid monoethanolamide	9.5	1000	0.0095	1	100	0.01	0.05	R	Y
51	Coconut fatty acid monoethanolamide 4-5 EO	17	10000	0.0017			0.0017	0.05	R	Y
52	Coconut fatty acid diethanolamide	2	1000	0.002	0.3	100	0.003	0.05	R	O
53	PEG-4 Rapeseed amide	7	1000	0.007			0.007	0.05	R	Y
55	AE (C 6~12, 10~15 EO 8~12 PO)			0.02	1	50	0.02	1	P	N
	Amphoteric surfactants									
60	C12/15 Alkyl dimethylbetaine	1.7	1000	0.0017	0.1	100	0.001	0.05	R	O
61	alkyl C12/18 Amidopropylbetaine	1.8	1000	0.0018	0.09	100	0.0009	0.05	R	Y
62	C12/18 Alkyl amine oxide	0.3	1000	0.0003			0.0003	0.05	R	Y
	Cationic surfactants									
70	Alkyl trimethyl ammonium salts	0.1	1000	0.0001	0.046	100	0.00046	0.5	I	O
71	Alkyl ester ammonium salts	2.9	1000	0.0029	1	10	0.1	0.05	R	Y
	Preservatives									
80	1,2-Benzisothiazol-3-one	0.15	1000	0.00015			0.00015	0.5	I	N
81	Benzyl alcohol	360	1000	0.36			0.36	0.05	R	Y
82	5-bromo-5-nitro-1,3-dioxane	0.4	5000	0.00008			0.00008	1	P	O
83	2-bromo-2-nitropropane-1,3-diol	0.78	1000	0.00078	0.2	100	0.002	0.5	I	O
84	Chloroacetamide	55.6	10000	0.00556			0.00556	1	O	O
85	Diazolinidylurea	35	5000	0.007			0.007	1	P	O
86	Formaldehyde	2	1000	0.002			0.002	0.05	R	O
87	Glutaraldehyde	0.31	1000	0.00031			0.00031	0.05	R	O

DID No.	Materials	Acute toxicity			Chronic toxicity			Biodegradability		
		LC50/EC50	SF (Safety Factor)	TF (Toxicity Factor)	NOEC(*)	SF* (Safety Factor)	TF (Toxicity Factor)	DF (Degradation factor)	aerobic	anaerobic
88	Guanidine, hexamethylene-, homopolymer	0.18	1000	0.00018	0.024	100	0.00024	1	P	O
89	CMI + MIT in mixture 3:1 (§)	0.0067	1000	0.0000067	0.0057	50	0.000114	0.5	I	O
90	2-Methyl-2H-isothiazol-3-one (MIT)	0.06	1000	0.00006			0.00006	0.5	I	O
91	Methyldibromoglutaronitrile	0.15	1000	0.00015			0.00015	0.05	R	O
92	ε-phtaloimidoperoxyhexanoic acid	0.59	5000	0.000118			0.000118	1	P	O
93	Methyl-, Ethyl- and Propylparaben	15.4	5000	0.00308			0.00308	0.05	R	N
94	o-Phenylphenol	0.92	1000	0.00092			0.00092	0.05	R	O
95	Sodium benzoate	128	1000	0.128			0.128	0.05	R	Y
96	Sodium hydroxy methyl glycinate	36.5	5000	0.0073			0.0073	1	O	O
97	Sodium Nitrite	87	10000	0.0087			0.0087	1	NA	NA
98	Triclosan	0.0014	1000	0.0000014	0.00069	10	0.000069	0.5	I	O
99	Phenoxy-ethanol	344	1000	0.344	200	100	2	0.05	R	O
	Other ingredients									
110	Silicon	250	1000	0.25			0.25	1	P	N
111	Paraffin	1000	10000	0.1			0.1	1	P	O
112	Glycerol	4400	5000	0.88			0.88	0.05	R	Y
113	Phosphate, as STPP(sodium tripolyphosphate)	1000	1000	1			1	0.15	NA	NA
114	Zeolite (Insoluble Inorganic)	1000	1000	1	175	50	3.5	1	NA	NA
115	Citrate and citric acid	825	1000	0.825	80	50	1.6	0.05	R	Y
116	Polycarboxylates	200	1000	0.2	106	10	10.6	1	P	N
117	Nitrilotriacetat (NTA)	494	1000	0.494	64	50	1.28	0.05	R	O
118	Ethylenediaminetetraacetic acid (EDTA)	121	1000	0.121	22	50	0.44	0.5	I	N
119	Phosphonates	650	1000	0.65	25	50	0.5	1	P	N
120	Ethylenediaminedisuccinate (EDDS)	320	1000	0.32	32	50	0.64	0.05	R	N
121	Clay (Insoluble Inorganic)	1000	1000	1			1	1	NA	NA
122	Carbonates	250	1000	0.25			0.25	0.15	NA	NA
123	Fatty acids C>=14	3.7	5000	0.00074			0.00074	0.05	R	Y
124	Silicates	250	1000	0.25			0.25	1	NA	NA

DID No.	Materials	Acute toxicity			Chronic toxicity			Biodegradability		
		LC50/EC50	SF (Safety Factor)	TF (Toxicity Factor)	NOEC(*)	SF(*) (Safety Factor)	TF (Toxicity Factor)	DF (Degradation factor)	aerobic	anaerobic
125	Polyasparaginic acid, Na-salt	410	1000	0.41			0.41	0.05	R	N
126	Perborates (as Boron)	14	1000	0.014			0.014	1	NA	NA
127	Percarbonate (See carbonate)	250	1000	0.25			0.25	0,15	NA	NA
128	Tetraacetylenediamine (TAED)	250	1000	0.25	500	100	5	0.05	R	O
129	C1-C4 alcohols	1000	1000	1			1	0.05	R	Y
130	Mono-, di- and triethanol amine	90	1000	0.09	0.78	100	0.0078	0.05	R	Y
131	Polyvinylpyrrolidon (PVP)	1000	1000	1			1	0.5	I	N
132	Carboxymethylcellulose (CMC)	250	5000	0.05			0.05	0.5	I	N
133	Sodium and magnesium sulphate	1000	1000	1	100	100	1	1	NA	NA
134	Calcium- and sodiumchloride	1000	1000	1	100	100	1	1	NA	NA
135	Urea	1000	5000	0.2			0.2	1	NA	NA
136	Silicon dioxide, quartz	1000	1000	1			1	1	NA	NA
137	Polyethylene glycol, MW>4000	1000	10000	0.1			0.1	1	P	N
138	Polyethylene glycol, MW<4000	1000	10000	0.1			0.1	0.05	R	O
139	Cumene sulphonates	450	1000	0.45			0.45	0.5	I	N
140	Na-/Mg-/KOH	30	1000	0.03			0.03	0,05	NA	NA
141	Enzymes/proteins	25	5000	0.005			0.005	0.05	R	Y
142	Perfume, if not other specified (**)	2	1000	0.002			0.002	0.5	I	N
143	Dyes, if not other specified (**)	10	1000	0.01			0.01	1	P	N
144	Starch	100	1000	0.1			0.1	0.05	R	Y
145	Anionic polyester	655	1000	0.655			0.655	1	P	N
146	poly-2-vinylpyridine-N-oxide (PVNO) Povidone-iodine (PVIPI)	530	1000	0.53			0.53	1	P	N
147	Zn Ftalocyanin sulphonate	0.2	1000	0.0002	0.16	100	0.0016	1	P	N
148	Iminodisuccinat	81	1000	0.081	17	100	0.17	0.05	R	N
149	FWA 1	11	1000	0.011	10	100	0.1	1	P	N
150	FWA 5	10	1000	0.01	1	10	0.1	1	P	N
151	1-decanol	2.3	5000	0.00046			0.00046	0.05	R	O
152	Methyl laurate	1360	10000	0.136			0.136	0.05	R	O

DID No.	Materials	Acute toxicity			Chronic toxicity			Biodegradability		
		LC50/EC50	SF (Safety Factor)	TF (Toxicity Factor)	NOEC(*)	SF* (Safety Factor)	TF (Toxicity Factor)	DF (Degradation factor)	aerobic	anaerobic
153	Formic acid (Ca salt)	100	1000	0.1			0.1	0.05	R	Y
154	Adipic acid	31	1000	0.031			0.031	0.05	R	O
155	Maleic acid	106	1000	0.106			0.106	0.05	R	Y
156	Malic acid	106	1000	0.106			0.106	0.05	R	O
157	Tartaric acid	200	10000	0.02			0.02	0.05	R	O
158	Phosphoric acid	138	1000	0.138			0.138	0.15	NA	NA
159	Oxalic acid	128	5000	0.0256			0.0256	0.05	R	O
160	Acetic acid	30	1000	0.03			0.03	0.05	R	Y
161	Lactic acid	130	1000	0.13			0.13	0.05	R	Y
162	Sulphamic acid	75	1000	0.075			0.075	1	NA	NA
163	Salicylic acid	46	1000	0.046			0.046	0.15	R	O
164	Glycolic acid	141	5000	0.0282			0.0282	0.05	R	O
165	Glutaric acid	208	5000	0.0416			0.0416	0.05	R	O
166	Malonic acid	95	5000	0.019			0.019	0.05	R	O
167	Ethylene glycol	6500	1000	6.5			6.5	0.05	R	Y
168	Ethylene glycol monobutyl ether	747	5000	0.1494			0.1494	0.05	R	O
169	Diethylene glycol	4400	10000	0.44			0.44	0.05	R	Y
170	Diethylene glycol monomethyl ether	500	1000	0.5			0.5	0.15	R	O
171	Diethylene glycol monoethyl ether	3940	5000	0.788			0.788	0.05	R	O
172	Diethylene glycol monobutyl ether	1254	1000	1.254			1254	0.05	R	O
173	Diethylene glycol dimethyl ether	2000	10000	0.2			0.2	0.5	I	O
174	Propylene glycol	32000	1000	32			32	0.15	R	Y
175	Propylene glycol monomethyl ether	12700	5000	2.54			2.54	0.05	R	O
176	Propylene glycol monobutyl ether	748	5000	0.1496			0.1496	0.05	R	O
177	Dipropylene glycol	1625	10000	0.1625			0.1625	0.05	R	O
178	Dipropylene glycol monomethyl ether	1919	5000	0.3838			0.3838	0.05	R	O
179	Dipropylene glycol monobutyl ether	841	5000	0.1682			0.1682	0.05	R	O
180	Dipropylene glycol dimethyl ether	1000	5000	0.2			0.2	0.5	I	O

DID No.	Materials	Acute toxicity			Chronic toxicity			Biodegradability		
		LC50/EC50	SF (Safety Factor)	TF (Toxicity Factor)	NOEC(*)	SF(*) (Safety Factor)	TF (Toxicity Factor)	DF (Degradation factor)	aerobic	anaerobic
181	Triethylene glycol	4400	1000	4.4			4.4	0.5	I	O
182	Tall oil	1.8	1000	0.0018			0.0018	0.5	I	O
183	Ethylenebisstearamides	140	5000	0.028			0.028	0.5	I	O
184	Sodium gluconate	10000	10000	1			1	0.05	R	O
185	Glycol distearate	100	5000	0.02			0.02	0.05	R	Y
186	Hydroxyl ethyl cellulose	209	5000	0.0418			0.0418	1	P	O
187	Hydroxy propyl methyl cellulose	188	5000	0.0376			0.0376	1	P	O
188	1-methyl-2-pyrrolidone	500	1000	0.5			0.5	0.05	R	O
189	Xanthan gum	490	1000	0.49			0.49	0.05	R	O
190	Trimethyl Pentanediol mono-isobutyrate	18	1000	0.018	3.3	100	0.033	0.05	R	O
191	Benzotriazole	29	1000	0.029			0.029	1	P	O
192	Piperidinol-propanetricarboxylate salt	100	1000	0.1	120	100	1.2	0.5	I	O
193	Diethylaminopropyl-DAS	120	1000	0.12	120	100	1.2	1	P	O
194	Methylbenzamide-DAS	120	1000	0.12	120	100	1.2	0.5	I	O
195	Pentaerythritol-tetrakis-phenol-propionate		1000	0.038			0.038	1	P	O
196	Block polymers (***)	100	5000	0.02			0.02	1	P	N
197	Denatonium benzoate	13	5000	0.0026			0.0026	1	O	O
198	Succinate	374	10000	0.0374			0.0374	0.05	R	O
199	Polyaspartic acid	528	1000	0.528			0.528	0.05	R	N
200	Xylene Sulphonate	230	1000	0.23	31	100	0.31	0.5	I	N
201	Proteinhydrolyzates, wheatgluten	113	5000	0.023			0.023	0.05	R	O
202	Fatty acid, C6-12 methyl ester	21	10000	0.0021			0.0021	0.05	R	O
203	Mn-Saltren (CAS 61007-89-4)	39	1000	0.039	4.3	100	0.043	0.5	I	O
204	Tri-Sodium methylglycine diacetat	100	1000	0.1	16.7	50	0.334	0.05	R	O
205	Disilicates	1000	10	100				0.05	R	Y
206	Triethanolamine			0.078	0.78	10	0.078	0.05	R	Y
207	Calcium formiate			10				0.05	R	Y
208	Silica			10				0.05	R	Y
209	PEG, high MW (MW>4000)			10				1	P	Y
210	PEG, low MW (MW<4000)			10				0.05	R	Y

DID No.	Materials	Acute toxicity			Chronic toxicity			Biodegradability		
		LC50/EC50	SF (Safety Factor)	TF (Toxicity Factor)	NOEC(*)	SF(*) (Safety Factor)	TF (Toxicity Factor)	DF (Degradation factor)	aerobic	anaerobic
211	Cumene sulfonate	66	100	0.66				0.05	R	N
212	Toluene sulfonate	66	100	0.66				0.05	R	N
213	Monosaccharides (mannitol, sorbitol)	40000	5000	8				0.05	R	Y
214	Hydrogen peroxide			0.016	1.6	100	0.016	0.05	R	Y
215	Magnesium chloride	32	5000	0.0064				0.05	R	Y
216	Ammonium chloride	109	5000	0.0218				0.05	R	Y
217	Boric acid			0.1	10	100	0.1	0.05	R	Y
218	Butylene glycol	1070	1000	1.07				0.05	R	Y

Note) Abbreviation

<Insoluble inorganic substance> Inorganic substance have no or a very low possibility of solution.

(*) If there is no chronic data, leave this column blank. In this case, identify TF(chronic) value with TF(acute)

(**) According to the general approval rules, be sure to use the data in this DID list. However, exclude incense and dyes. If a certification applicant submits toxicity data values, the submitted data may be used to calculate TF values or decide degradability. Otherwise, use the values in the list.

(***) Apply the application data on the aerobic biodegradation of DID no196 block polymer after presenting a test report

(#) Calculate TF value as an average of C 12/14 Alkyl sulphate (AS) and C 16/18 Alkyl sulphate (AS) for the lack of toxicity results.

(§) Mix 5-Chloro-2-Methyl-4-isothiazolin-3-one with 2-Methyl-4-isothiazolin-3-one at a rate of 3:1.

NOEC : No observed effect concentration, concentration having no influence on dosage concentration

EO : ethylene oxide

PO : propylene oxide

FWA 1 : disodium 4,4'-bis(4-anilino-5-morpholino-1,3,5-triazin-2-yl) amino stilbene-2, 2'-disulfonate

FWA 5 : disodium 4,4'-bis(2-sulfostryryl) biphenyl

<Aerobic degradation>

R : Means being easily biodegradable pursuant to the OECD Directives

I : Means being inherently biodegradable pursuant to the OECD Directives

P : Not biodegradable Failure in the test of inherent biodegradation

O : Test not performed

NA : Not applicable

<Anaerobic degradation>

Y : Biodegradable under aerobic conditions

N : Not biodegradable under aerobic conditions

O : Test not performed

NA : Not applicable

Appendix 3. Data on Construction Methods not Existing in DID [Related to 3. Certification Standard (1)]

A. General Matters

(1) Data supporting documents for materials not existing in DID shall include authorized laboratory test reports, the company's internal experimental data, and LC50 and EC 50 data described in MSDS, risk assessment report, etc.

(2) However, in the event that a company's internal experiment data, experimental resources, and the data related to MSDS and risk assessment report are submitted, verification shall be conducted by the Eco-label certification review committee.

B. Data Construction Method

(1) Toxic Factor (TF)

(a) TF value shall be constructed by dividing the median value of numerical multiple toxicity tests [mg/L] by the uncertainty factor (SF). Herein, for the purpose of constructing the ecotoxicological assessment data, the acute or chronic toxicity data affecting green algae, daphnia and fish shall be considered.

Toxicity Data	Uncertainty Factor
Case in which NOEC data related to green algae, daphnia and fish exist	10
Case in which NOEC data exists for two of green algae, daphnia and fish	50
Case in which NOEC data exists for either green algae, daphnia or fish	100
Case in which L(E)C50 data related to green algae, daphnia and fish exist	1000
Case in which L(E)C50 data exist for two of green algae, daphnia and fish exist	5000
Case in which L(E)C50 data exist for either green algae, daphnia or fish	10000

Note1) In regard to the testing method, the following test method or equivalent methods can be applicable to OECD 201 green algae toxicity tests, OECD 202 daphnia toxicity tests, OECD 203, 204 fish toxicity tests: Regulations regarding the designation of research institutes of hazardous of chemical substances, <Appendix 2> Chemical substances testing method, 2. Ecological effect test, 1. Algae growth inhibition test, 2. Daphnia acute toxicity test, and 3. Fish acute toxicity test.

Note 2) The data extracted from QSARs (Quantitative Structure Activity Relationship)-(referring

to the following 1) can be used. However, there shall be 1 or two L(E)C 50 fish toxicity (LC50), green algae, daphnia and fish toxicity (EC50) data. In addition, you shall prove that the substance having L (E) C50 data shows the lowest toxicity value using NOEC of other homologue substance-(referring to the following 2) through quantitative structure activity relationships with the species.

1) QSAR represents an attempt to statistically correlate a descriptor (hydrophobicity, shape, electronic properties and spatial layout of the atom) on the chemical structure and properties of the mixture and activity (including chemical measurement and biological analysis). The object of QSAR is to search for substances including potential toxicity in light of ecological and public health needs and limited testing resources. If the characteristics of a compound are known, it will be possible to easily find suitable candidate material for the purpose using the characteristics identified through QSAR.

2) This refers to a group of compounds differentiated by CH_2 in the composition of organic compounds. The homologue substances include the very similar chemical properties and show the same reaction depending on the common functional groups. In addition, the physical properties such as melting point and boiling point vary regularly according to the increase of the number of carbon atoms. For example, LAS refers to the LAS including a different carbon coefficient, and AE refers to the AE including different added moles.

(2) Partition coefficient (DF)

(A) General Matters

Division	DF
Readily biodegradable - referring to note 1)	0.05
Readily biodegradable - referring to note 2)	0.15
Inherently biodegradable	0.5
Non-biodegradable	1

Note 1) In the following cases, although 10% or more of a 10-day window is non-biodegradable, it shall be considered as being readily biodegradable.

- Surfactant
- Substances composed of homologous substances and meeting the final biodegradation requirements (during 28 days, biodegradable of 60 to 70% or more)

Note 2) Case in which the final 28 days biodegradation is 60% or more, but non-biodegradation is 10% or more within 10 days.

(B) Inorganic substances

Division	DF
Biodegradable within 5 days	0.05
Biodegradable within 15 days	0.15
Biodegradable within 50 days	0.5

(C) Aerobic biodegradation ability

Division	Indication
Readily biodegradable	R
Inherently biodegradable, but not readily biodegradable	I
Persistent	P
Not tested for aerobic biodegradability	0

(4) Anaerobic biodegradation ability

Test or Non-test	Division	Indication
○	Not anaerobically biodegradable	N
	Anaerobically biodegradable	Y
X	There is no test result, but it will be verified by analogy. (e.g: The result of biodegradation prediction program developed by EPA such as BIOWIN)	
	-	0

Note 1) Name of Specifications

- KS M ISO 11734 [Water quality - Evaluation of the ultimate anaerobic biodegradability of organic compounds in digested sludge method by measurement of the biogas production]
- ECETOC Anaerobic biodegradation test (Technical Report No28, Evaluation of Anaerobic Biodegradation, 1988), or, OECD 311 (ready anaerobic biodegradability : gas production form diluted anaerobic sewage sludge)

Note 2) Explanation of Terms

- BIOWIN™: Estimates aerobic and anaerobic biodegradability of organic chemicals using 7 different models; two of these are the original Biodegradation Probability Program (BPP™). The seventh and newest model estimates anaerobic biodegradation potential.

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.