



EL610. Deicer
[EL610-2008/5/2014-164]

1. Scope

This criteria shall apply to deicer that is spread on roads, which lowers the freezing point of snow or ice and melts it by causing a chemical reaction or a change of vapor pressure.

Note) The target 'deicing performance' in this criteria is limited to ice in order to secure reproducibility in the lab environment. Therefore, the deicing performance specified in this criteria shall be used only for the purpose of comparison in specific conditions, and shall not apply generally to all cases that require the use of deicers.

2. Definitions

2.1

"Biodegradability" refers to the numerical degree which indicates the disassembly of organic compounds by microbes.

2.2

"Median Effective Concentration (EC50)" refers to the concentration of a sample which prevents 50% of tested organisms from swimming for a certain test period.

2.3

"Sodium Chloride" refers to sodium chloride, one of the reference materials, with purity over 98% and a particle size of 0.2 ~ 0.3 mm.

2.4

"Calcium Chloride" refers to calcium chloride of reagent grade, one of the reference materials, with purity over 90% and a particle size of 2 ~ 3 mm.

2.5

"Solid Deicer" refers to a deicer in solid phase for all of its elements.

2.6

“Liquid Deicer” refers to a deicer in liquid phase.

3. Certification Criteria

3.1 Environmental Criteria

3.1.1

The name of the element (or substance) contained in the raw material used in the manufacturing process shall be presented accurately. However, an amount of errors considered to be inevitable in the manufacturing process shall be allowed within the range that is acceptable based on the current level of technology. If there is any change from the specified substances and contents in the raw material without a valid reason, it is considered that the criteria are not satisfied, irrespective of the conformance of other items.

3.1.2

Ethylene glycol shall not be used as raw material in the manufacturing stage.

3.1.3

With respect to emission of harmful substances during the use and disposal stage, the product shall satisfy the following requirements.

3.1.3.1

With respect to moisture dry contents, hazardous substances shall satisfy the following requirements.

Item	Pb	As	Cd	Hg	Cr	Cu	Ni	Zn
Criteria [mg/kg]	≤ 5	≤ 2.5	≤ 0.05	≤ 0.05	≤ 15	≤ 20	≤ 2.5	≤ 50

3.1.3.2

With regard to the corrosion effects on steel materials, the relative corrosiveness after one week shall be less than 30%.

3.1.3.3

The relative loss in relation to the effect of 10 cycles of freezing and thawing of concrete shall be less than 50%.

3.1.4

The product shall satisfy the following requirements in relation to the emission of hydrosphere and earth pollutants during the disposal stage.

3.1.4.1

Organic compounds included in the raw material of deicer shall be readily biodegradable. The substance is considered as being biodegradable if one of the following requirements is satisfied.

Test Method	Biodegradability
KS I ISO 7827 / 9888, KS I 3221	≥ 70%
KS I ISO 11733	≥ 80%
KS I IO 9408 / 9439 / 10707 / 10708 / 14593	≥ 60%

Note) Culturing shall be carried out for 28 days.

3.1.3.2

Substances classified as environmentally harmful substances under the 'Regulations on harmfulness assessment of chemicals' according to the 'Toxic Chemicals Control Act' should not be used. (This rule is applicable until Dec 31, 2014.)

3.1.3.3

Substances classified as class 1 harmful substances to the aquatic environment under the 'Regulations on harmfulness assessment of chemicals' according to the 'Toxic Chemicals Control Act' should not be used. (This is applicable from Jan 1, 2015.)

3.1.3.4

In an acute toxicity test for 48 hours using *Daphnia magna*, the value of toxicity represented by EC50 should be 100 mg/L or more.

3.2 Quality Criteria

3.2.1

Deicing performance shall satisfy one of the following requirements depending on the applicable temperature range. However, calcium chloride shall be used as a reference material for -3°C and 7°C, and mixture of sodium chloride and calcium chloride in the ratio of 70% and 30% in weight shall be used as a reference material for -12°C and -15°C for comparative evaluation, and test time shall be 15, 30 and 60 minutes for each test condition.

	Lower limit of deicing performance [%]		Lower limit of deicing performance [%]	
	-3 °C	-7 °C	-12 °C	-15 °C
Class 1	100	100	N/A	N/A
Class 2	100	100	100	100
Class 3	N/A	N/A	100	100

Note) Solid phase reference material shall be used for solid deicer and liquid phase reference material shall be used for liquid deicer.

3.2.2

With respect to the particle size of solid deicer, the weight ratio of the residual quantity of solid deicer shall be 0% and 98% after passing through sifter of 13.0 mm and 0.6 mm, respectively.

3.3 Information for Consumers

3.3.1

Type of product: classification by solid/liquid phase and by type (based on temperature of use)

Example) Solid deicer class 1

3.3.2

Indication about the items that contributes to the certification reasons (less ecosystem toxicity, less corrosion occurrence) of the corresponding product during the stage of consumption.

3.3.3

Caution in storage of product: For solid deicer, instructions shall be provided about the method of storing the product to prevent lumps from forming.

4. Test Methods

Certification Criteria		Test and Verification Methods
Environmental Criteria	3.1.1	Verification of submitted documents. However, a test report by an accredited testing laboratory in accordance with KS M 0016 (General rules for the atomic absorption spectrometric method), KS M 0032

		(General rules for the spectroscopic analysis of high frequency inductive coupling plasma emissions), and the inductive coupling plasma mass analysis method (ICP-MS) may be required, if applicable.
	3.1.2	Verification of submitted document
	3.1.3	3.1.3.1 Test report issued by the relevant accredited testing laboratory in accordance with '4.1 and KS M 0010 (Moisture measurement for chemical products), KS M 0016 (General rules for the atomic absorption spectrometric method), KS M 0032 (General rules for the spectroscopic analysis of high frequency inductive coupling plasma emissions), and the inductive coupling plasma mass analysis method (ICP-MS)'
		3.1.3.2 Test report issue by an accredited testing laboratory in accordance with the 'Annex Table EM502-1 Performance Evaluation of Deicer – Test Method of Steel Corrosion Effects'
		3.1.3.3 Test report issue by an accredited testing laboratory in accordance with the 'Annex Table EM502-2 Performance Evaluation of Deicer – Test Method of Concrete Freezing and Thawing Effects'
	3.1.4	3.1.4.1 Verification of submitted document or a Test report issued by the relevant accredited testing laboratory ^{Note 1)}
		3.1.4.2 Verification of submitted document
		3.1.4.3 Test report by an accredited testing laboratory in accordance with 4.1 and 'criteria for official water pollution test' (ES 04751.1 'Acute toxicity test using Daphnia magna' ^{note 2)})
Quality Criteria	3.2.1	Test report issue by an accredited testing laboratory in accordance with the 'Annex Table EM502-3 Performance Evaluation of Deicer – Test Method of Deicing Performance'
	3.2.2	Test report issued by the relevant accredited testing laboratory in accordance with KS F 2502 (Standard test method for sieve analysis of fine and coarse aggregates)
	3.2.3	Test report issued by the relevant accredited testing laboratory in accordance with '4.1 and KS H 7101 (Edible salts)'
	3.2.4	Test report by the relevant accredited testing laboratory in accordance with the relevant standards, or certificate of equivalent standards or higher
Consumer Information		Verification of submitted documents

Note1)

Deliberation of the E-mark certification deliberation committee shall be required if the appropriateness of a test report issued by overseas office test and verification laboratories or a test report submitted on the basis that the test method is equivalent to the specified test method must be proved. However, another test report that complies with the specified test method shall be submitted again if the deliberation

committee determines that the submitted test is not appropriate.

Note 2)

The test time shall be 48 hours.

4.1 General Matters

4.1.1

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

4.1.2

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

4.1.3

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

4.1.4

For solid deicer that contains various sizes of particles, a 1 kg sample shall be analyzed based on the method specified in KS F 2502 (Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates) and the required amount measured in weight % shall be mixed and used for actual application. The unit of weight for sieving shall be [g] and the size of sieve mesh shall be 13.0, 8.0, 4.75, 2 and 0.6mm, as a general rule. However, it is also acceptable to produce and use a specified concentration when there is a sufficiently large amount in which the differences in particle size can be ignored without sieving.

5. Reasons for Certification

“Less ecosystem toxicity, Less corrosion occurrence”