

**Partial Revision of Eco Mark Product Category
No. 110 “Biodegradable Lubricating Oil Version 2.1”**

Regarding to the Eco Mark Product Category No. 110 “Biodegradable Lubricating Oil Version 2.1” (Established: January 10, 2004), the following minor revisions are made, for the purpose of approving the tests using water accommodated fraction (WAF) and water-soluble fraction (WSF) for fish acute toxicity tests having regard to the fact that lubricating oil is water-insoluble substance. (== text is deleted, and the underlined text is added).

Minor revisions are made for “2. Terminology” and “4. Certification Criteria, 4-1 (8)” of the Certification Criteria; and “3. Terminology” and “4. Certification Criteria, 4-1 Environmental criteria, D-4” of the Interpretation.

*** Certification Criteria**

2. Terminology

LL₅₀ value: 50% fatal density loading rate. Percentage of test substances in water affecting half of the parent population regarded as homogeneous to be killed. It is used for toxicity tests using water accommodated fraction (WAF) and water-soluble fraction (WSF) which are applied for water-insoluble substances. The water on the above means water used for preparing extract.

WAF (water accommodated fraction): It shows the fraction to accommodate with water among multi-component mixture. After agitating at a controlled condition, it is paused for a moment to be separated. It includes water, water-soluble component, and water-insoluble droplet.

WSF (water-soluble fraction): It shows the filtrate of water accommodated fraction (WAF). It includes all components of WAF except separated water-insoluble droplet.

4. Certification Criteria

4-1. Environmental criteria

(8) As for influence of the product on the ecosystem, the 96-hour LC₅₀ value shall be 100 mg/liter or above in acute toxic tests by fish measured by one of the following

tests.

*JIS (Japan Industrial Standards)

- K 0102 (Plant Sewage Test Method)
- K 0420-71 series (10, 20, 30)

(Measurement of acute toxicity of chemical substances for water quality-fresh water fish [zebra fish (bony fish, cyprinid) – Part 1: Stationary water, Part 2: Semi-stationary water, Part 3: Flowing water]

*OECD

- 203 (Fish Acute Toxicity Test)

In implementing the mobility inhibition test for products with low solubility, WAF and WSF prepared in accordance with ASTM D6081 (standard implementation method for toxic tests of lubricating oil in water environment: preparation of sample and interpretation of results) can be used as samples. In this case, the 96-hour LL₅₀ value shall be 100 mg/liter or above.

<Additional note>

In addition to the acute toxicity tests by fish, the condition of satisfying “48-hour EC₅₀ value to be 100 mg/liter or above in tests for determination of the inhibition of the mobility of Daphnia by chemicals measured by one of the following methods” shall continue to be reviewed. (Omission)

In implementing the mobility inhibition test for products with low solubility, ~~liquid extract made by~~ WAF and WSF prepared in accordance with ASTM D6081 (standard implementation method for toxic tests of lubricating oil in water environment: preparation of sample and interpretation of results) can be used as samples. In this case, the 48-hour EL₅₀ Value shall be 100 mg/liter or above.

* Interpretation

3. Terminology

LC₅₀ (median lethal concentration) is used in the concept which is the same as LD₅₀ (median lethal dose). The smaller the numerical value of LC₅₀ is, the stronger the toxicity is. Similarly, the level of toxicity of EC₅₀ (50% influence concentration) is conversely proportionate to its numerical value. In case of conducting acute toxicity tests by fish using ~~extract~~ WAF and WSF, use LL₅₀ value instead of LC₅₀ value, and to conduct acute toxicity tests in Daphnia, use EL₅₀ value instead of EC₅₀ value. Refer to definition of ASTM D6081.

4. Certification Criteria

4-1. Environmental criteria

D-4 (Destruction of eco system)

The following point was reviewed under this item:

(1) By having low toxicity on the ecosystem and biodegradability, it shall not affect the ecosystem during use and leakage.

As for (1), it was decided to adopt a biodegradability examination and a toxicity examination to the index which evaluates an ecology influence. (Omission)

For toxicity, the fish acute toxicity tests were adopted following Version 1.0 in accordance with JIS K 0102, JIS K 0420-71 series, and OECD 203. In addition, the test results shown by LL₅₀ value which were obtained from the tests using WAF and WSF have been adopted after the partial revision in September 8, 2005. Lubricating oil and grease are multi-component mixture and water-insoluble substances. The traditional method in Japan to conduct examination for water-insoluble substances was to use emulsion dispersant for dispersing them into water. However, by following examples from other countries, it has been popular in recent years in Japan to use the method to conduct examination below water solubility without using emulsion dispersant except substances such as agrichemicals to be discharged into environment with emulsion dispersant. Especially in the US, the test method to use WAF and WSF prepared in accordance with ASTM D6081 is common for water-insoluble chemical substances including lubricating oil. This concept has been adopted in OECD. The test method on the above is to conduct exposure by getting the fraction which is dispersed or soluble in water out of the multi-component water-insoluble substances. However, it is difficult to specify and measure the concentration of the substances in the fraction, since the component in the fraction is not single substance and very small amount of the component element is dispersed or soluble. Therefore, the method using loading rate of test substances to show the result instead of using concentration has been adopted, and LL₅₀ value is derived from the loading rate. The test method using dispersant to disperse test substances into water, and the test method using WAF and WSF; these two methods on the above are difficult to compare to each other and cannot be judged which method is suitable for the test of lubricating oil. However, both methods, considered to be valid evaluation method, are adopted in this revision.

Revised: September 8, 2005