

Eco Mark Product Category No.110

“Biodegradable Lubricating Oil Version2.4”

Certification Criteria

Established: January 10, 2004

Term of validity: January 31, 2012

Japan Environment Association

Eco Mark Office

NOTE: This document is a translation of the criteria written in Japanese. In the event of dispute, the original document should be taken as authoritative.

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Certification Criteria

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1. Purpose of Establishing Certification Criteria

Lubricating oil is classified into two basic categories based on how it is used, namely, open system (2-cycle engine oil, grease, chain saw oil etc.) and closed system (hydraulic oil, 4-cycle engine oil, grease, etc.). It could be said that the former, open system oil, will affect the environment considerably, since most of the oil will be emitted into the nature. The latter, closed system oil, is also likely to be emitted into the nature by accident. Typical oils of closed system that will greatly affect the environment for animals and plants are hydraulic oil used for construction machinery, 4-cycle engine oil and grease.

Sales of lubricating oil in 2001 amounted to 2.09 million kiloliters (excluding grease), and the amount of oil waste generated totaled 1.20 million kiloliters, of which 0.88 million kiloliters were thought to be recycled or disposed after being collected by collection businesses, and 0.32 million kiloliters were recycled or incinerated by generators themselves within the company. For lubricating oil not taken as waste oil, it is estimated that a large amount is discharged into the environment through open use and accidents.

Various additives are used in lubricating oil and grease in order to improve their quality, but these additives might have a negative effect on the environment because some additives contain hazardous materials even though they are in tiny amount. Furthermore, chlorinated additives may cause the generation of dioxins during energy recovery of waste oil and incineration.

It is therefore of great significance to certify lubricating oil with high biodegradability that uses or discharges few harmful substances as environmental load with the Eco Mark, and spread awareness and use of these products. Biodegradable lubricating oil that gives consideration to the environment in terms of manufacturing, distribution, and consumption was therefore included in this product category.

2. Applicable Scope

Hydraulic oil, 2-cycle engine oil, grease and other lubricating oil in the following.

Excluding spray type oils;

(1) Hydraulic oil:

“Machinery oil” included in “lubricating oil” designated as the object items of

survey in the” Dynamic statistics of supply and demand of petroleum products concerning petroleum related products (designated statistics No. 51).” Or, “hydraulic oil” out of (high-grade) lubricating oil and machinery oil included in “lubricating oil and grease,” “lubricating oil and grease” in accordance with the “Standard Commodity Classification for Japan” issued by the General Affairs Agency.

(2) 2-cycle engine oil:

“Gasoline engine oil” included in “lubricating oil” designated as the object items of survey in the “Dynamic statistics of supply and demand of petroleum products concerning petroleum related products (designated statistics No. 51).” Or, “2-cycle engine oil” out of “(high quality) lubricating oil,” “gasoline engine oil” included in “lubricating oil and grease” in accordance with the “Standard Commodity Classification for Japan” issued by the General Affairs Agency.

(3) Grease:

“Grease” designated as the object items of survey in the “Dynamic statistics of supply and demand of petroleum products concerning petroleum related products (designated statistics No. 51)” or “grease” out of “lubricating oil and grease” in accordance with the “Standard Commodity Classification for Japan.”

(4) Other lubricating oil:

“Lubricating oil” other than the above mentioned “hydraulic oil,” “2-cycle engine oil” and “grease,” out of “lubricating oil” and “grease” designated as the object items of survey in the “Dynamic statistics of supply and demand of petroleum products concerning related petroleum products (designated statistics No. 51),” or out of “lubricating oil and grease” in accordance with the “Japan Standard Commodity Classification” issued by the General Affairs Agency.

3. Terminology

Base oil	the main component of lubricating oil. With general lubricating oil, mineral oil is mainly used; examples of base oil for lubricating oil with high biodegradability include vegetable oil, synthetic ester, PAG (polyalkylene glycol), etc.
Additive	added to base oil to give new properties to products or complement insufficient properties. There are various types according to purpose.
Prescribed Constituents	Components intentionally added with the purpose of providing specific characteristics to the product. Impurities that inevitably enter during the manufacturing process are excluded.
Biodegradability	the extent by which organic compound is biodegraded by microbes to be finally converted into inorganic compound, or the degree of difficulty of biodegradability. In other words, carbon and hydrogen, which organic compound is composed of, are biodegraded into carbon dioxide and water.
LC ₅₀ value	50% fatal density. Volume (density) of a substance in the solution which will kill half of an animal population regarded as homogeneous.

LL ₅₀ 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.
EC ₅₀ value	50% influential concentration. Amount (concentration) of substances in liquid affecting half of parent population considered as consistent.
EL ₅₀ value	50% influential concentration load rate. Percentage of test substances in water affecting half of the parent population considered as consistent. Used when creating liquid extract of soluble components from hardly soluble substances, and performing toxic tests. (*Refer to definition of ASTM D6081.)
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 and Certification Procedure

(1) In manufacturing the applied product, related environmental laws and regulations and pollution control agreement (hereinafter referred to as the “Environmental Laws, etc.”) must be followed with respect to air pollution, water contamination, noise, offensive odor, and emission of hazardous substances in the area where the plant performing the final manufacturing process is located.

In addition, the state of compliance with the Environmental Laws, etc. for the past five years from the date of application (whether there is any violation) must be reported. If there is any violation, proper remedies and preventive measures shall have been already taken, and the related Environmental Laws, etc. must thereafter be followed appropriately.

[Certification Procedure]

With respect to the compliance with the Environmental Laws, etc. in the area where the plant performing the final manufacturing process is located, a certificate issued by the representative of the business of manufacturing the applied product or the relevant plant manager (entry or attachment of a list of names of the Environmental Laws, etc.) must be submitted.

In addition, the applicants shall report whether there is any violation in the past five years, including a violation subject to administrative punishment or administrative guidance, and if there is, the following documents in a and b must be submitted:

- a. With respect to the fact of violation, guidance documents from administrative agencies (including order of correction and warning) and copies of written answers (including those reporting causes and results of correction) to such documents (clearly indicating a series of communication);
- b. Following materials (copies of recording documents, etc.) concerning the management system for compliance with the Environmental Laws, etc. in 1)-5):
 - 1) List of the Environmental Laws, etc. related to the area where the plant is located;
 - 2) Implementation system (organizational chart with roles, etc.);
 - 3) Bylaws stipulating retention of recording documents;
 - 4) Recurrence prevention measures (future preventive measures)
 - 5) State of implementation based on recurrence prevention measures (result of checking of the state of compliance, including the result of onsite inspection).

(2) In manufacturing, the use of chemical substances must be managed appropriately. Specifically, submit MSDSs (Material Safety Data Sheets) of products based on PRTR Law (Law Concerning Reporting, etc. of Release to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management).

[Certification Procedure]

The MSDS issued by the manufacturer shall be submitted

(3) EDTA (ethylenediaminetetraacetic acid) and alkylphenol ethoxylates whose number of carbon atoms attached to the alkyl group are 5 to 9 shall not be added as constituents.

[Certification Procedure]

Lists indicating whether the corresponding substances are added shall be submitted.

(4) If the product uses Class 1 specified chemical substances in the PRTR Law, this shall be reported. However, this does not apply to substances containing less than 1% for both base oil and additives.

[Certification Procedure]

Lists indicating whether the corresponding substances are added shall be submitted.

(5) Chlorinated additives shall not be added to the product as constituents.

[Certification Procedure]

Lists indicating whether the corresponding substances are added shall be submitted.

(6) For products using the following mineral oil as the base oil, the mineral oil shall not be classified as carcinogenic by the OSHA HCS (the Hazard Communication Standard issued by the Occupational Safety and Health Administration,

Department of Labor, U.S.A.) and EU Directive 94/69/EC (laws, regulations, and administrative standards on classification, packaging, and labeling of hazardous substances, corresponding protocols for 21st technical adaptation in directive 67/548/EEC).

“Oil obtained by the reduced-pressure distillation of the sediments of atmospheric distillation of crude oil, oil obtained by refining this (including brightstock) where kinematic viscosity in 40°C is 7 mm²/s or above. Aluminum rolling oil obtained by re-distilling light oil and kerosene is excluded. Synthetic oil is also not included in this definition.”

[Certification Procedure]

The type of base oil shall be reported. If base oil prescribed in 4-1(6) is used, documents certifying that the base oil is not carcinogenic in accordance with OSHA HCS and the results of the IP346 test (measuring method of polycyclic aromatic in oil residue not containing unused lubricating base oil and asphaltene-dimethylsulfoxide extract refraction rate method), DMSO (dimethylsulfoxide extract amount) shall be submitted.

(7) Biodegradability of products measured by one of the following methods shall be 60% or more within 28 days. However, 10-d window does not apply to these methods.

*OECD (Organization for Economic Cooperation and Development) Chemical Product Test Guidelines

- 301B (CO₂ Evolution)
- 301C (Modified MITI(I))
- 301F (Manometric Respirometry)

*ASTM(American Material Test Association)

- D 5864 (Standard test method determining aerobic biodegradability of lubricating oil and lubricating oil components)
- D 6731 (Standard test method determining aerobic biodegradability of lubricating oil or lubricating oil components sealed in the respirometer in water.)

[Certification Procedure]

Certificates of test results implemented by a third party test organization or public test organization shall be submitted.

(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 in 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 acute toxicity tests in 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.

This item shall not be applied at this time; the starting date of application shall be reviewed and notified when set. Notification shall be done at least 6 months prior to the starting date.

***JIS**

- K 0229 (Testing methods for determination of the inhibition of the mobility of Daphnia by chemicals)

***OECD**

- 202 Part I (test for determination of the inhibition of the mobility of Daphnia by chemicals and multiplication part 1 “24 hours EC₅₀ mobility inhibition test”)

In implementing the mobility inhibition test for products with low solubility, WAF(water accommodated fraction) and WSF (water-soluble fraction) 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 must be 100mg/liter or above.

[Certification Procedure]

Certificates of test results implemented by a third party test organization or public test organization shall be submitted.

(9) Precautions on the appropriate handling of products, such as “biodegradable oil has little impact on the environment compared to normal oil, but this does not mean that it has none. Minimize discharge and leakage into the environment” and precautions on waste disposal such as “appropriate waste disposal required also for biodegradable oil” shall be indicated on MSDS, containers, and labels (PL labels) for users.

[Certification Procedure]

Design samples of labels and containers shall be submitted.

(10) Plastic materials used for containers and packaging shall not contain resins

made of halogenides and organic halogenides as constituents.

[Certification Procedure]

Lists indicating whether the corresponding substances are added, packaging of the product and the raw material of packaging shall be submitted.

4-2. Quality criteria

(1) Hydraulic oil:

Products with JIS standards shall conform to the corresponding JIS standards. If the above standard does not apply to the product, it shall be of a quality conforming a standard similar to JIS, etc. standards.

(12) 2-cycle engine oil:

Oil shall conform to one of the following standards (a), (b) and (c).

(a) JASO (Japan Automobile Standards) M345:2002 (lubricating oil for 2 stroke cycle gasoline) FC grade and above

(b) NMMA (National Marine Manufacturers Association) TC-W3TM (certification test of lubricating oil for 2 stroke cycle gasoline)

If the above provisions do not apply to the product, it shall be of a quality conforming to a standard similar to the JIS standard.

(13) Grease:

Grease shall conform “JIS K 2220 (Grease)” If the above provision is not applied to the product, it shall be of a quality conforming to a standard similar to the JIS standard.

(14) Other lubricating oil:

The products to which the Japan Industrial Standard (JIS) applies shall conform to the provisions of the JIS. If the above provision does not apply to the product, it shall be of a quality conforming to a standard similar to the JIS standard.

[Certification Procedure]

Certificates that the product conforms to the applicable quality standard or equivalents shall be submitted.

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The Certification Criteria for the Product Category will be revised when necessary.