

Eco Mark Product Category No. 504

“Ammonia Production Process  
through Recycling of Plastic Containers and  
Wrapping Version 1.0”  
Certification Criteria

- Applicable Scope-

A series of processes intended to recycle, by a chemical recycling method (gasification), plastic container and wrapping wastes collected according to the Containers and Packaging Recycling Act and to use them as a part of raw materials to produce a chemical product (ammonia). Note, however, that a process mainly intended to utilize them as fuel is excluded.

Established: June 1, 2015

Japan Environment Association

Expiration date: May 31, 2022

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.

## Eco Mark Product Category No.504

# **“Ammonia Production Process through Recycling of Plastic Containers and Wrapping Version 1.0” Certification Criteria**

Japan Environment Association  
Eco Mark Office

### **1. Purpose of Establishing Criteria**

Omitted.

### **2. Applicable Scope**

A series of processes intended to recycle, by a chemical recycling method (gasification), plastic container and wrapping wastes collected according to the Containers and Packaging Recycling Act and to use them as a part of raw materials to produce a chemical product (ammonia). Note, however, that a process mainly intended to utilize them as fuel is excluded.

### **3. Terminology**

Omitted.

### **4. Certification Criteria and Certification Procedure**

The Applicant shall check off/write down in the entry columns of the Attached Certificate, place the applying company seal (square seal) and submit the Attached Certificate.

#### **4-1. Environmental Criteria and Certification Procedure**

##### **4-1-1 Resource saving and resource recycling**

(1) Criteria on visualization of budget and effective utilization of the entire process

The Applicant shall keep track of the material balance and energy balance of the entire applied process and attempt to achieve the efficient operation.

In addition, the Applicant shall disclose information on the fact that plastic

container and wrapping wastes sorted/discharged by consumers are effectively utilized in the process to produce a chemical product. As an indicator to confirm the effective utilization thereof, the Applicant shall calculate, as a raw material effective utilization rate, a ratio of carbon monoxide that is oxidized and contributes to generation of H<sub>2</sub> in the aqueous gas shift reaction (CO + H<sub>2</sub>O → H<sub>2</sub> + CO<sub>2</sub>) that generates hydrogen (H<sub>2</sub>), of carbon monoxide that is contained in synthetic gas generated from plastic container and wrapping wastes and that is derived from carbon (C) in the plastic containers and wrapping.

[Certification Procedure]

[1] The Applicant shall submit a process flow diagram that clearly shows the following on the material balance and energy balance of the entire applied process.

- Raw fuel (including plastic containers and wrapping) to be charged into the process, and a chemical product to be generated (including a by-product and discharges);

- Devices that comprise the process; and

- A description of chemical processing or physical processing in the process (including a reaction formula involved in the chemical processing).

In addition, the process/a group of devices that involve chemical manipulation for chemical recycling shall be clearly indicated by, for example, being enclosed by a frame, in the process flow diagram. In addition, the Applicant shall submit an explanatory document on the material balance (including all chemical products and by-products to be produced, or discharges) and energy balance of the applied process, volume of sales/shipment of each chemical product, etc.

[2] The Applicant shall submit any data or explanatory document (copies of a pamphlet, web site, etc.) that clearly shows content of the information disclosure. In addition, for the raw material effective utilization rate, the Applicant shall submit an exhibit that shows a calculation result with the following calculation formula and grounds for calculation, based on the actual values of the material balance of the previous year.

[calculation formula]

$$R = \left[ \frac{Q_1^{CO}}{Q_1^{CO} + Q_1^{CO_2}} - \frac{Q_2^{CO}}{Q_2^{CO} + Q_2^{CO_2}} \right] \times Y_1 \times 100$$

$R$  : Raw material effective utilization rate

$Q_1^x$  : Flow rate (amount of carbon) of material X at the outlet of the synthetic gasification process

$Q_2^x$  : Flow rate (amount of carbon) of material X at the outlet of low-temperature CO conversion process

$Y_l$  : Ratio of C to be converted into synthesis gas of C contained in plastic container and wrapping wastes

(2) Criteria on the effect of reduction of raw fuel to be charged other than plastic container and wrapping wastes

The consumption of raw fuel (excluding auxiliary materials such as air, steam, oxygen, etc.) that is charged into the applied process other than the plastic containers and wrapping wastes shall be reduced by 11 GJ/t or more per unit charged amount, when compared with the raw fuel consumption when it is assumed that no plastic container and wrapping wastes are charged

[Certification Procedure]

The consumption of raw fuel other than the plastic container and wrapping wastes shall be calculated based on the actually recorded value of the material balance of the previous year. Then, the Applicant shall submit an explanatory document on a reduction amount per 1 ton of charged plastic container and wrapping wastes and a process to calculate the reduction amount.

(3) Criteria on effective utilization of by-products or discharges

Any by-products or discharges that are generated during the applied process shall be recycled. In addition, any part that cannot be recycled shall be processed appropriately.

[Certification Procedure]

The Applicant shall submit a document explaining about the amount (actually recorded values of the previous year) and applications of recycled by-products or discharges, and that the system of processing/disposal (processing capacity, content of processing, etc.) of any part which cannot be recycled has been developed.

#### 4-1-2 Prevention of Global Warming

## (4) Criteria on the effect of environmental burden reduction

The Applicant shall carry out the life cycle assessment (LCA) (on the assumption that plastic container and wrapping wastes are simply incinerated) that compares the applied process with a general process for producing the chemical products and confirm that the applied process has the effect of reducing the environmental burden (conversion into CO<sub>2</sub>)

## [Certification Procedure]

The Applicant shall submit a document explaining the assessment result (conversion into CO<sub>2</sub>) of LCA. On the idea of the review range (system boundary) of LCA, see “Review of Environmental Burden, etc. of Plastic Container and Wrapping Recycling Methods (The Japan Containers And Packaging Recycling Association, Review Committee on Environmental Burden of Plastic Container and Wrapping Recycling Methods, June 2012)

## 4-1-3 Restriction and Control of Hazardous Substances

## (5) Criteria on following the Environmental Laws

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 having the applied 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 having the applied 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).

#### 4-1-4 Information provision to users

##### (6) Criteria on Consumer Awareness

The Applicant shall continuously receive observers to their plants having the applied process in order to introduce recycling of the applied process to them in an easy to understand manner. In addition, the Applicant shall disclose information on the fact that plastic container and wrapping wastes sorted/discharged by consumers are used as a raw material in the applied process and what products they are recycled to.

##### [Certification Procedure]

The Applicant shall submit any data or explanatory document that clearly shows records and content of receipt for implementation of receipt of observers. In addition, the Applicant shall submit any data or explanatory document (copies of pamphlet, web site, etc.) that clearly shows content of disclosure of information on consumer awareness.

##### (7) Criteria on Communications with Consumers

The Applicant shall continuously carry out one or more activities, as described below, as communications with consumers on the theme of the environment.

##### (Examples)

- Environment conservation activity in the surrounding area (cleaning,

improvement of habitats of living creatures, protection of natural environment, etc.);

- Environmental activities with an autonomous body, community group, or NGO (campaign, event, delivery lecture, etc.); and
- Establishment of, support to, or donation to an environment-related fund or organization.

[Certification Procedure]

The Applicant shall submit any data or explanatory document that clearly shows the activities they have been involved in, actual records of implementation, and contents (photographs, etc. shall be attached).

#### 4-1-5 Business Operation

##### (8) Criteria on Container and Packaging Recycling Act and Yield

The Applicant shall be a registered recycling operator of the Japan Containers And Packaging Recycling Association. In addition, the Applicant shall satisfy the yield criteria in the Container and Packaging Recycling Act.

[Certification Procedure]

The Applicant shall obtain a copy of a list of the corresponding registered operators of the application year released on the web site of the same Association and submit it. In addition, the Applicant shall submit a document indicating the yield (actual value) calculated in accordance with the “Plastic Container and Wrapping Recycling Guideline” published by the same Association.

##### (9) Criteria on the environment management system

The plant having the applied process shall have acquired the Environment Management System Certification (ISO 14001, etc.) or have the internal standards that conform thereto and are operated in an appropriate manner.

[Certification Procedure]

The Applicant shall submit a copy of ISO 14001 or of a certification if the Applicant has acquired the other third-party certification of the environment management system, and a certificate issued by Plant Manager indicating that the Environment Management System is under operation based on the internal standards.

#### 4-2. Quality Criteria and Certification Procedure

(10) Criteria on the quality management system

In order to control the quality of chemical products to be produced, the Applicant shall have acquired the Quality Management System Certification (ISO 9001, etc.) or have the internal standards that conform thereto and are operated in an appropriate manner.

[Certification Procedure]

The Applicant shall submit a copy of ISO 9001 or of a certification if the Applicant has acquired the other third-party certification of the quality management system, or a certificate issued by Plant Manager indicating that the Quality Management System is under operation based on the internal standards.

5. Product Classification, Indication and Others

Omitted.

---

June 1, 2015 :	Established (Version1)
May 31, 2022 :	Expiration date

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