Submission by the Government of Japan for
“Further work made at the sixth session of the Intergovernmental Negotiation Committee”

In response to the request from the secretariat to Governments to submit information relating to the development of guidance on a number of Articles under the Convention, the Government of Japan submits relevant information on Article 10.

Technical standards for the storage and transportation of mercury. (Example of “Poisonous and Deleterious Substances Control Act”)

Technical standards for the storage and transportation of Poisonous and Deleterious Substances under the Poisonous and Deleterious Substances Control Act are summarized in Table 1 and Table 2.

Table 1: Technical standards for the storage of Poisonous and Deleterious Substances under the Poisonous and Deleterious Substances Control Act

<table>
<thead>
<tr>
<th>Item</th>
<th>Technical standards on storage under the Poisonous and Deleterious Substances Control Act</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responsible party</td>
<td>Business operators involved with Poisonous and Deleterious Substances*, Researchers involved with specified Poisonous Substances**</td>
</tr>
</tbody>
</table>
| Target substances (regarding mercury and its compounds targeted in the Minamata Convention) | • Poisonous substances ² : mercury, mercury oxide, formulations containing more than 5% mercury oxide, mercuric sulfate and formulations containing mercuric sulfate, mercuric nitrate and formulations containing mercuric nitrate  
  • Deleterious substances : mercurous chloride and formulations containing mercurous chloride, formulations containing 5% or less of mercury oxide  
  *Mercury sulfide (cinnabar) is exempted. |
| Container | General provisions | • Prohibition on the use of any item that is usually used as a |

¹ http://www.japaneselawtranslation.go.jp/law/detail/?id=2300&vm=04&re=02  
² As per the Poisonous and Deleterious Substances Control Act, mercury is designated as a poisonous substance. Further, as per Poisonous and Deleterious Substances Ordinance, mercury compounds and formulations containing mercury compounds are designated as poisonous substances (Exemptions: aminomercuric chloride and its formulations, mercurous chloride and its formulations, mercury oleate and its formulations, formulations with 5% or less of mercury oxide, mercurous iodide and its formulations, mercury (II) fulminated and its formulations, mercuric sulfide and its formulations).
<table>
<thead>
<tr>
<th>Item</th>
<th>Technical standards on storage under the Poisonous and Deleterious Substances Control Act</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>container for foods and drinks, as the container for Poisonous Substances, or the Deleterious Substances</td>
</tr>
<tr>
<td></td>
<td>• Containers should not have the risk of scattering, leaking, draining or seeping of mercury</td>
</tr>
<tr>
<td>Labelling on the container</td>
<td>• Indicate, on the containers and packaging of any Poisonous Substance or Deleterious Substance, the letters &quot;医薬用外 (not for medical use)&quot; and, in the case of a Poisonous Substance the letters &quot;毒物 (Poisonous Substance)&quot; in white on red background or in the case of a Deleterious Substance the letters &quot;劇物 (Deleterious Substance)&quot; in red on white background</td>
</tr>
<tr>
<td></td>
<td>• Indicate the name, ingredients and their respective contents and manufacturer of the substances</td>
</tr>
<tr>
<td>Storage facility</td>
<td>General provisions</td>
</tr>
<tr>
<td></td>
<td>• A storage facility should have a lock or should be surrounded by a robust fence</td>
</tr>
<tr>
<td></td>
<td>• The storage area should have a lock or should be surrounded by a robust fence</td>
</tr>
<tr>
<td>Storage method</td>
<td>Should be able to store Poisonous and Deleterious Substances by separating from other materials</td>
</tr>
<tr>
<td>Display on the storage facility</td>
<td>• Indicate, at the place where Poisonous Substances or Deleterious Substances are stored or displayed, the letters &quot;医薬用外 (not for medical use)&quot; and, in the case of a Poisonous Substance the letters &quot;毒物 (Poisonous Substance)&quot; and in the case of a Deleterious Substance the letters &quot;劇物 (Deleterious Substance)&quot;.</td>
</tr>
<tr>
<td>Information Management</td>
<td>• Record the name, amount, date of the substance sold or given, and name, profession and address the recipient of the substance</td>
</tr>
<tr>
<td></td>
<td>• Keep the record for 5 years from the day the substance is sold or given</td>
</tr>
<tr>
<td>Necessary measures</td>
<td>Measures during an accident</td>
</tr>
</tbody>
</table>
|      | • Immediately notify the health center, police station, or fire defense organization, while taking emergency measures necessary to prevent public health hazards, if the Poisonous Substance or Deleterious Substance which they handle scatters, leaks, drains, seeps out, or seeps underground, and there is a risk of public health hazards to unspecified or
many persons
• Immediately notify the police station if any of the Poisonous Substances or Deleterious Substances which they handle is stolen or lost

* “Business operators involved with poisonous and deleterious substances” means manufacturers, importers or vendors of the poisonous or deleterious substances.

** “Researchers involved with specified poisonous substances” means personnel who have been permitted by the prefectural governors to manufacture or use specified poisonous substances for the purpose of academic research.

Table 2  Technical standards for the transportation of Poisonous and Deleterious Substances in the Poisonous and Deleterious Substances Control Act

<table>
<thead>
<tr>
<th>Item</th>
<th>Technical standards on the transportation under the Poisonous and Deleterious Substances Control Act</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responsible party</td>
<td>Not specified (Required when there is a necessity to prevent harm from the viewpoint of health and hygiene)</td>
</tr>
<tr>
<td>Target substances (regarding mercury and its compounds targeted under the Minamata Convention)</td>
<td>Same as the standards for storage</td>
</tr>
</tbody>
</table>
| Usage of containers or packaging          | • Placed in a container or in enveloping packaging  
• Container or enveloping packaging to be sealed tight  
• When transporting 1,000 kg or more at a time, indicate the name and ingredients of the substance as a label on the outside part of the container or the enveloping packaging |
| Container General provisions              | • No leakage or breakage due to changes in pressure, temperature or humidity  
• There is no compromise in safety due to degradation of chemical changes of the substance  
• Protect the inner container made of glass by using cushioning |
| Quality of material                       | • The type of container, quality, maximum interior volume and maximum storage weight to satisfy the requirement of the standard.  
• Item that has been confirmed to satisfy the stipulation as |
<table>
<thead>
<tr>
<th>Item</th>
<th>Technical standards on the transportation under the Poisonous and Deleterious Substances Control Act required by the section on “test of containers”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shape or form</td>
<td>Same as above</td>
</tr>
</tbody>
</table>
| Method of storage                   | • To be sealed  
• Storage rate to be 98% or less at 55°C and airspace to be left  
• The exterior container not to be mixed and placed with other materials |
| Performance testing                 | • Needs to pass the performance test (drop, air tightness, hydraulic pressure, stacking)                                               |
| Labelling on the container          | • The fact that the container has passed the performance test to be labelled on the container                                         |
| Transport                           |                                                                                                                                               |
| General provisions                  | • Prevention of friction and agitation  
• Protective equipment to be made available when transporting 5 tons or more at a time                                                    |
| Vehicle                             | • Vehicle with no risk of scattering or leaking                                                                                             |
| Mode of loading                     | • Prevention of breakage, toppling over or drop  
• Not to exceed the length and width of the loading equipment  
• Opening of the housing to be facing upwards  
• Stock height to be 3m or less  
• To be loaded without exceeding the length and width of the vehicle  
• Prevent the leaking of rain water or direct sunlight to the container                                        |
| Display on the vehicle              | • Include marking on the vehicle when transporting 5 tons or more at a time                                                                   |
| Information Management              | • Record the name, amount, date of the substance sold or given, and name, profession and address the recipient of the substance  
• Keep the record for 5 years from the day the substance is sold or given                                                                           |
<p>| Necessary measures                  |                                                                                                                                               |
| Measures during an accident         | • Immediately notify the health center, police station, or fire defense organization, while taking emergency measures necessary to prevent public health hazards, if the Poisonous Substance or Deleterious Substance which they handle scatters, leaks, drains, seeps out, or seeps |</p>
<table>
<thead>
<tr>
<th>Item</th>
<th>Technical standards on the transportation under the Poisonous and Deleterious Substances Control Act</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>underground, and there is a risk of public health hazards to unspecified or many persons</td>
</tr>
<tr>
<td></td>
<td>• Immediately notify the police station if any of the Poisonous Substances or Deleterious Substances which they handle is stolen or lost</td>
</tr>
</tbody>
</table>
In response to the request from the secretariat to Governments to submit information relating to the development of guidance on a number of Articles under the Convention, the Government of Japan submits relevant information on paragraph 5 (a) of Article 3 and Article 10.1.

In June 2015, Japan promulgated a new act (Act on Preventing Environmental Pollution of Mercury, hereinafter referred to as “the new act”) to implement the Minamata Convention coupled with other existing laws, regulations and their amendments. Chapter 7 (Measures for storage of mercury and mercury compounds) of the new act provides a basic framework to implement Article 10 of the Minamata Convention (hereinafter referred to as “the Convention”), and it also contributes to implement the paragraph 5(a) of Article 3 of the Convention by an annual reporting obligation on storage of mercury and mercury compounds.

As provided in Article 21 of the new act, Japan will develop technical guidelines for storage of mercury and mercury compounds taking into account the technical standards for the storage of mercury under the Poisonous and Deleterious Substances Control Act. The technical guidelines will include 1) storage of mercury and mercury compounds in containers having no risk of scattering, leaking, or seeping of the contents, 2) labelling of the containers with name, ingredients and contents, 3) placement of the containers in a storage facility with a lock or surrounded by a robust fence, and 4) provision of necessary information from the owner of mercury or mercury compounds to an entity consigned for their storage. When the guidelines on environmentally sound storage of mercury or mercury compounds are adopted by the COP under the paragraph 3 of Article 10 of the Convention, Japan will revise the national technical guidelines accordingly.

Japan has introduced an annual reporting obligation on storage of mercury and mercury compounds as provided in Article 22, Chapter 7 of the new act in order to ensure the environmentally sound interim storage to implement Article 10 of the Convention. This obligation, estimated to require annual report of the mercury and mercury compounds storage of 30kg or more each, can contribute to identifying individual stocks of mercury and mercury compounds and possible sources of mercury supply as provided in paragraph 5(a) of Article 3 of the Convention. The report includes conditions, purposes, amount used by purposes, amount transferred to waste of the storage.

1 Although the Government of Japan has already submitted relevant information on Article 10 based on an existing law which specify technical standards for the storage of mercury, the information is updated based on a new act Japan recently promulgated to implement the Minamata Convention.
(Guidelines for storage)

Article 21.
1. The competent minister shall develop and publish technical guidelines for those carrying out storage of mercury and mercury compounds (hereinafter referred to as “those involved in storage of mercury and mercury compounds”) ² to take measures to prevent environmental pollution by the storage of mercury and mercury compounds.

2. The competent minister, after publishing the technical guidelines specified in the previous clause, when the minister finds it necessary in order to prevent environmental pollution, may recommend those involved in storage of mercury and mercury compounds, after taking into consideration the technical guidelines, the measures to be taken in order to prevent environmental pollution of mercury and mercury compounds.

3. The Minister of the Environment and the Minister of Economy, Trade and Industry, in regards to the implementation of the recommendation mentioned in the previous clause, may state their opinions to the competent minister mentioned in the previous clause.

(Reporting on storage)

Article 22.
1. Those involved in storage of mercury and mercury compounds, if the storage amount of mercury and mercury compounds over the each requirement set by the competent ministerial ordinance, as provided for by the ordinance, shall periodically report on the items concerning the storage of mercury and mercury compounds required by the ordinance to the competent minister.

2. The competent minister, after receiving the report provided in the previous clause, is promptly to send a copy of the report to the Minister of the Environment and the Minister of Economy, Trade and Industry.

Chapter 10: Penal provision

Article 33.
Any person who falls under any of the following items is punished with a fine not exceeding 300,000

² Mercury and mercury compounds are limited to those specified by the government ordinance as specially requiring regulations for storage. Recyclable resources containing mercury and waste provided by Article 2 paragraph (1) of the Wastes Disposal and Public Cleansing Act are excluded. Similar definition applies to the following sections.
Japanese yen.

(ii). A person who has failed to report, as provided for in paragraph (1) of Article 22, or made a false report.
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In response to the request from the secretariat to Governments to submit information relating to the development of guidance on a number of Articles under the Convention, the Government of Japan submits relevant information on Article 11.

Japan’s submission on thresholds of mercury wastes

Japan has the following three types of thresholds of mercury wastes under the current legislation.

I. Thresholds for the specified hazardous wastes subject to the import/export regulations under the Basel Convention
II. Thresholds for the specially-controlled industrial wastes subject to special management under the Waste Management and Public Cleansing Law
III. Thresholds for the treated wastes that are required to be disposed of in landfills for hazardous industrial wastes (isolated type)

Since recyclable/reusable substances or objects those have values in Japan but are regarded as hazardous wastes under the Basel Convention are not categorized as wastes under Japan’s waste management law (see the figure below), Japan is planning to designate those materials as “recyclable materials containing mercury” that are subject to new regulation to ensure their environmentally sound management provided by the Minamata Convention.
Figure: Relationship between wastes defined by the Japan's waste law and mercury wastes targeted under the Minamata Convention
Table: Thresholds of mercury wastes in Japan

<table>
<thead>
<tr>
<th>Category of waste</th>
<th>Thresholds</th>
<th>Legal bases</th>
<th>Analysis methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Materials which fall under the category of specified hazardous wastes and other wastes based on the Law for the Control of Export, Import &amp; Others of Specified Hazardous Wastes and Other Wastes (Article 2, paragraph (1), item (i) (a) and the item No. 27 set forth in Appended Table 3 of the law), and are subject to import and export regulations set forth in the Basel Convention.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Specified mercury compounds(^1)</td>
<td>0.1 wt% or more</td>
<td>The law stated above</td>
<td></td>
</tr>
<tr>
<td>(2) Wastes containing Mercury nucleate, Mercurous acetate, Phenylmercury acetate, Phenylmercuric nitrate, Thimerosal</td>
<td>1 wt% or more</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Wastes containing mercury compounds other than those listed in items (1) and (2)</td>
<td>No threshold</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Wastes in solid form to be exported or imported for the purpose of disposal operations listed in D1 to D4 or R10 of Annex IV of the Convention</td>
<td>Total mercury: Over 0.0005 mg per liter Alkyl mercury: Detected</td>
<td>The environmental conditions set forth in Appended Table of the Ambient Soil Quality Standards</td>
<td>Total mercury: (1) Reduction – CVAAS, or (2) Dithizone extraction - heating vaporized AAS Alkyl mercury: (1) Gas Chromatography, or</td>
</tr>
</tbody>
</table>

\(^1\) Wastes containing Mercury, Mercury benzoate, Ethylmercury chloride, Mercurous chloride, Mercuric chloride, Mercury ammonium chloride, Methylmercuric chloride, Mercuric oxycyanide, Mercury oleate, Mercury gluconate, Mercury acetate, Mercury salicylate, Mercuric oxide, Mercury cyanide, Mercuric potassium cyanide, Diethyl mercury, Dimethyl mercury, Mercuric bromide, Mercurous nitrate, Mercuric nitrate, Phenylmercuric hydroxide, Mercuric thiocyanate, Mercuric arsenate, Mercuric iodide, Mercuric potassium iodide, Mercury fulminate, Mercury sulphide, Mercurous sulfate, Mercuric sulfate
<table>
<thead>
<tr>
<th>Category of waste</th>
<th>Thresholds</th>
<th>Legal bases</th>
<th>Analysis methods</th>
</tr>
</thead>
</table>
| (5) Wastes in liquid form to be exported or imported for the purpose of disposal operations listed in D1 to D4 or R10 of Annex IV of the Convention | **Mercury, alkyl mercury and the other mercury compounds:** Over 0.0005 mg Hg per liter  
**Alkyl mercury compounds:** Over 0.0005 mg Alkyl Hg per liter | The requirements prescribed in Article 6-2 of the Enforcement Ordinance for the Water Pollution Prevention Law | (2) Thin-layer chromatograph separation – AAS  
(See Annex 1) |
|                                                                                   |                                                                                                      |                                                                                                  | Total mercury:                                                                                         |
|                                                                                   |                                                                                                      |                                                                                                  | (1) Reduction – CVAAS, or                                                                                |
|                                                                                   |                                                                                                      |                                                                                                  | (2) Dithizone extraction - heating vaporized AAS                                                        |
|                                                                                   |                                                                                                      |                                                                                                  | Alkyl mercury:                                                                                         |
|                                                                                   |                                                                                                      |                                                                                                  | (1) Gas Chromatography, or                                                                               |
|                                                                                   |                                                                                                      |                                                                                                  | (2) Thin-layer chromatograph separation – AAS (See Annex 2)                                            |
| (6) Wastes in solid form to be exported or imported for purposes of disposal operations other than those listed in item (5) | **Mercury or its compounds:** Over 0.0005 mg Hg per liter  
**Alkyl mercury compounds:** Detected | The standards listed in Appended Table 3 of the Verification Standards for Industrial Wastes  
(For sample preparation, see section B) ocean disposal in Annex 3) | Total mercury:                                                                                         |
<p>|                                                                                   |                                                                                                      |                                                                                                  | (1) Reduction – CVAAS, or                                                                                |
|                                                                                   |                                                                                                      |                                                                                                  | (2) Dithizone extraction - heating vaporized AAS                                                        |
|                                                                                   |                                                                                                      |                                                                                                  | Alkyl mercury:                                                                                         |
|                                                                                   |                                                                                                      |                                                                                                  | (1) Gas Chromatography, or                                                                               |
|                                                                                   |                                                                                                      |                                                                                                  | (2) Thin-layer chromatograph separation – AAS (See Annex 3)                                            |
| (7) Wastes in liquid form to be exported or imported for purposes of disposal operations other than those listed in item (5) | <strong>Mercury, alkyl mercury and the other mercury compounds:</strong> Over 0.005 mg Hg per liter | The standards listed in Appended Table 1 of the Effluent Quality Standards | Total mercury:                                                                                         |
|                                                                                   |                                                                                                      |                                                                                                  | (1) Reduction – CVAAS, or                                                                                |
|                                                                                   |                                                                                                      |                                                                                                  | (2) Dithizone extraction - heating vaporized AAS                                                        |</p>
<table>
<thead>
<tr>
<th>Category of waste</th>
<th>Thresholds</th>
<th>Legal bases</th>
<th>Analysis methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkyl mercury compounds: Detected</td>
<td></td>
<td></td>
<td>Alkyl mercury: (1) Gas Chromatography, or (2) Thin-layer chromatograph separation – AAS (See Annex 4)</td>
</tr>
</tbody>
</table>

II. Specially-controlled industrial wastes subject to special management under the Waste Management and Public Cleansing Law

(1) Waste except acid and alkali (dusts, sludge or slag or their treated materials for disposal, or treated waste acid and alkali) from specified facilities (see Annex 5) which fall under the category of specially-controlled industrial wastes

<table>
<thead>
<tr>
<th>Mercury or its compounds: Over 0.005 mg Hg per liter</th>
<th>The judgement standards for specially-controlled industrial wastes</th>
<th>Total mercury: (1) Reduction – CVAAS, or (2) Dithizone extraction - heating vaporized AAS Alkyl mercury: (1) Gas Chromatography, or (2) Thin-layer chromatograph separation – AAS (See Annex 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkyl mercury compounds: Detected</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(2) Waste acid and alkali (including treated dusts, sludge and slag) from specified facilities (see Annex 5) or their treated materials for disposal which fall under the category of specially-controlled industrial wastes

<table>
<thead>
<tr>
<th>Mercury or its compounds: Over 0.05 mg Hg per liter</th>
<th>The judgement standards for specially controlled industrial wastes</th>
<th>Total mercury: (1) Reduction – CVAAS, or (2) Dithizone extraction - heating vaporized AAS Alkyl mercury: (1) Gas Chromatography, or (2) Thin-layer chromatograph separation – AAS (See Annex 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkyl mercury compounds: Detected</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

III. Treated wastes that are required to be disposed of in landfills for hazardous industrial wastes (isolated type)
<table>
<thead>
<tr>
<th>Category of waste</th>
<th>Thresholds</th>
<th>Legal bases</th>
<th>Analysis methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3) Treated burnt residues, dusts and sludge for disposal which are required to</td>
<td>Mercury or its compounds : Over 0.005 mg Hg per</td>
<td>The Verification Standards for Industrial</td>
<td>Total mercury :</td>
</tr>
<tr>
<td>be disposed of in landfills for hazardous industrial wastes (isolated type)</td>
<td>liter</td>
<td>Wastes</td>
<td>(1) Reduction – CVAAS, or</td>
</tr>
<tr>
<td></td>
<td>Alkyl mercury compounds : Detected</td>
<td></td>
<td>(2) Dithizone extraction - heating vaporized AAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Alkyl mercury :</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1) Gas Chromatography, or</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(2) Thin-layer chromatograph separation – AAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(See Annex 3)</td>
</tr>
</tbody>
</table>
Annex 1 The verification methods set forth in Appended Table of the Ambient Soil Quality Standards

[Sample preparation]

Soil sample

- Air-dry

- Remove medium and small gravel, wooden pieces, etc.

- Crush clods and aggregates.

- Pass the sample through a 2 mm mesh non-metal sieve and mix the retained sample well.

Mix the sample (g) and solvent*1 (ml) at a rate of 10 w/v % to make a total volume of 500 ml or more.

Dissolution*2

*2 Dissolution conditions:

- At room temperature (about 20°C)
- Under normal pressure (about 1 atm)
- 200 shaking/min
- Wise of shaking: 4 cm to 5 cm
- Duration: 6 hours

Allow to stand for about 10-30 min.

Centrifugal separation*3

*3 Conditions of centrifugal separation:

- Number of rotations: About 3,000 rpm
- Duration: 20 minutes

Filtration*4

*4 Filter the supernatant with a 0.45 μm membrane filter.

Test solution

*1 Add HCl to distilled water and make its pH value of 5.8-6.3.
[Analysis method]

1. Total mercury
A) Reduction - cold vapor atomic absorption spectrometry (CVAAS)

Test solution*  *Determination range: ≤0.002mg Hg
  
  Add water to make a total volume of about 200mL.

Reduction flask (350mL)
  
  H₂SO₄ 10mL
  HNO₃ 5mL
  KMnO₄ (5g/100mL) 20mL

Let stand for 15 min.
*Maintain red color for 15 min.

K₂S₂O₈ solution (50g/L) 10mL

Immerse the flask in a hot bath (about 95℃) for 2hr.

Cool it to room temperature.

NH₂OH.HCl(10g/100mL) 8mL

Decoloring

Add water to 250mL line.
SnCl₂ (10g/100mL) 10mL

Connect to a reduction-vaporized unit.
(Closed circulation or open air flow system)

Run circulation pump.

Measure absorbance at 253.7mm by AAS
B) Dithizone extraction - heating vaporized AAS

<table>
<thead>
<tr>
<th>Test solution*</th>
<th>*Determination range: ≤0.002mg Hg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add water to make a total volume of about 200mL.</td>
<td></td>
</tr>
</tbody>
</table>

Conical flask

- H₂SO₄ 10mL
- HNO₃ 5mL
- KMnO₄ (5g/100mL) 20mL

Let stand for 15 min.

*Maintain red color for 15 min.

Immerse the flask in a hot bath (about 95°C) for 2hr.

Cool it to room temperature.

- NH₂OH.HCl(10g/100mL) 8mL

Decoloring

500ml separating funnel

- Dithizone – CHCl₃ (200mg/L) 5mL

Extraction (Shake (2min.))

CHCl₃ layer (A) Water layer

Dithizone – CHCl₃ (200mg/L) 5mL

Extraction

Repeat until color of dithizone layer does not change any more.

Add (B) to (A), and top up.

Take a certain amount and put it into a porcelain board. (* )

- BAL – CHCl₃ (0.1mL/100mL) 0.1mL

Vaporize the solvent by aeration.

Insert the sample into a heating vaporization system.

Measure absorbance at 253.7mm by AAS

---

2 This method may be used alternatively in case where determination precision by Reduction – CVAAS method is not sufficient due to coexisting materials like organic substances with complex constituents.
2. Alkyl mercury
A) Gas Chromatography (GC)

For samples which have a high content of \(S^-\) or \(CNS^-\):

- Add CuCl (powder) 0.1g to (1).
- Mix
- Allow to stand.
- Filtration
- Clean the residue by HCl (1+5) a couple of times.
- Add washings to filtrate.

**Test solution 200ml**

- 500ml separating funnel
- Neutralization
- Add HCl to make 2mol/L HCl (1)
- Benzene 50mL
- Shake (2min.)

**Benzene layer**

- NaCl (200g/L) 20mL
- Shake (1min.)

**Water layer**

- Benzene 50mL
- Shake (2min.)

**Benzene layer**

- Water layer
- L-cysteine – sodium acetate solution 8mL
- Shake (2min.)

**Water layer**

- Discard

**Benzene layer**

- 20~30mL separating funnel
- HCl 2mL
- Benzene 5mL
- Shake (2min.)

**Water layer**

- Discard

A
A

Benzene layer

Water layer

Na₂SO₄ (anhydrous)

Discard

Dehydration

Stoppered test tube

Take a certain amount (2) using a micro syringe.

GC

Stoppered test tube

L-cysteine – sodium acetate solution 1mL

Shake (2min.)

Benzene Layer

Water Layer

Take the same amount as (2).

Discard

GC - ECD

Confirm no peaks appear.
B) Thin-layer chromatograph separation – AAS

Test solution 200ml
→ 500ml separating funnel

Ammonia water or HCl

Neutralization

Add 40ml HCl to make the sample 2mol/L HCl.

Benzene 50ml

Shake (2min.)

Benzene layer
→ HCl (1+50) 20mL

Shake (1min.)

Benzene layer
→ Water layer

Discard

Column concentration (benzene layer)

Pour benzene layer into an alumina column at a rate of 10mL/min.

Alumina column

Benzene 10mL

2cm from the top of the column

50ml separating funnel

HCl (1+10) 5mL

CHCl₃ 3mL

Shake (3min.)
Spot 1.5mL at several points.
Spot 100μL CH$_3$HgCl or C$_2$H$_5$HgCl standard solution as a reference (Rf).

Development (15cm)
Air-dry the plate.
Spray dithizone-chloroform solution (50mg/L). Check Rf value.

Take silica gel at the correspondence position with the CH$_3$HgCl or C$_2$H$_5$HgCl Rf value.

Reduction flask
Reduction and cold vapor atomic absorption spectrometry (CVAAS).

Porcelain board
Analyze the sample by the method described after (*) in Dithizone extraction - heating vaporized AAS method for total mercury.
Annex 2 The verification methods set forth in Article 6-2 of the Enforcement Ordinance for the Water Pollution Prevention Law

[Sample preparation]
Not necessary.

[Analysis method]
The methods are the same as ones described in Annex 1.
Annex 3 The verification methods set forth in the Verification Standards for Industrial Wastes

[Sample preparation]
A) Heavy metals

Sample preparation

A) Burnt residues, sludge and fall dusts
Take a sample as its shape is retained, and remove foreign substances (e.g. pebbles).

B) Industrial wastes other than burnt residues, sludge and fall dusts
  ➢ 5 mm or less in diameter – Take as it is.
  ➢ The others – Take as it is, and crush it. Then pass it through 0.5 mm and 4.75 mm mesh sieves.

Add distilled water.

A) For landfill except for sea area landfill:
Mix the sample and solvent (distilled water) at a rate of 10 w/v % to make a total volume of 500 ml or more.

B) For sea area landfill of treated wastes (burnt residues, sludge, slag and fall dusts) and slag:
Mix the sample and solvent (distilled water) at a rate of 10 w/v % to make a total volume of 500 ml or more.

C) For sea area landfill of burnt residues, sludge, fall dusts, and treated sludge (burnt residues, slag and fall dusts), and for ocean disposal of inorganic sludge:
Add solvent (distilled water) to the sample at a rate of 3 w/v % based on the solid content to make a total volume of 500 ml or more.

*1 Dissolution conditions:
  ➢ Horizontally shaking
  ➢ At room temperature (about 20°C)
  ➢ Under normal pressure (about 1 atm)
  ➢ 200 shaking/min
  ➢ Wise of shaking: 4 cm to 5 cm
  ➢ Duration of shaking: 6 hours

*2 Conditions of centrifugal separation:
  ➢ Centrifugal acceleration: 3,000G
  ➢ Duration: 20 minutes

*3 Filter the supernatant with a 1μm membrane filter to make a sample for analysis.

G=1.118×R×N²×10⁻⁸
G: centrifugal acceleration (G)
R: radius of gyration (cm)
N: number of rotations (rpm)
B) Wastes to be disposed of into ocean

- Organic sludge to be disposed of into ocean (except for test for PCB, VOC, pesticides and organic chloride compounds)

  **Sample preparation**

  Add distilled water. → [Organic sludge and ground animal/plant residues]
  
  Take a sample as its shape is retained, and crush it using a non-metal spatula. Pass it through a non-metal 2 mm mesh sieve. Take 200g or more from the retained sample, and add distilled water to make a total volume of 1L.

  Shake it vigorously until it becomes uniform.

  Take required volume for analysis.

- Waste acid and alkali, and livestock excreta to be disposed of into ocean

  **Sample preparation**

  Add distilled water. → [Waste acid and alkali, and livestock excreta]
  
  Take 200 ml or more from a sample as its shape is retained, and add distilled waste to make a total volume of 1L.

  Shake it vigorously until it becomes uniform.

  Take required volume for analysis.

[Analysis method]
The methods are the same as ones described in Annex 1.
Annex 4 The verification methods set forth in the Effluent Quality Standards

[Sample preparation]
Not necessary.

[Analysis method]
The methods are the same as ones described in Annex 1.
### Annex 5 Specified facilities listed in Waste Management and Public Cleansing Law

#### [Dusts]

<table>
<thead>
<tr>
<th>No.</th>
<th>Facilities</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Roasters, sintering furnaces and calcining furnaces for metal refining or inorganic chemical product manufacturing</td>
<td>Raw material treatment capacity: 1t/h or more</td>
</tr>
</tbody>
</table>
| 2   | Melting furnaces for metal refining or casting                             | a) Fire grate area: 1m\(^2\) or more,  
      b) Cross-sectional area of tuyere: 0.5m\(^2\) or more,  
      c) Burner combustion capacity: heavy oil 50L/h or more, OR  
      d) Transformer rating capacity: 200 KVA or more. |
| 3   | Reactors or direct heating furnaces for inorganic chemical product or food manufacturing | a) Fire grate area: 1m\(^2\) or more,  
      b) Burner combustion capacity: heavy oil 50L/h or more, OR  
      c) Transformer rating capacity: 200 KVA or more. |
| 4   | Dry kilns (excluding kilns used for Cu, Pb or Zn refining)                 |                                                                      |

#### [Sludge, and Waste acid and alkali]

<table>
<thead>
<tr>
<th>No.</th>
<th>Category of industry</th>
<th>Facilities</th>
</tr>
</thead>
</table>
| 1   | Caustic soda or caustic potash manufacturing by mercury electrolysis process          | a) Salt water purification facilities  
     b) Electrolysis facilities                                                      |
| 2   | Inorganic pigment manufacturing                                                     | a) Cleaning facilities  
     b) Filtering facilities  
     c) Waste gas cleaning facilities                                                |
| 3   | Inorganic chemical product manufacturing excluding those corresponding to the preceding two items | a) Filtering facilities  
     b) Centrifuge  
     c) Waste gas cleaning facilities  
     d) Wet dust collection facilities                                               |
| 4   | Acetylene derivative manufacturing by calcium carbide method                          | Vinyl chloride monomer cleaning facilities                                 |
| 5   | Organic chemical product manufacturing excluding those listed at *1                  | a) Rinsing facilities  
     b) Filtering facilities  
     c) Waste gas facilities                                                       |
<p>| 6   | Medicine manufacturing                                                              | a) Filtering facilities                                                   |</p>
<table>
<thead>
<tr>
<th>No.</th>
<th>Category of industry</th>
<th>Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Reagent*2 manufacturing</td>
<td>b) Separating facilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c) Mixing facilities</td>
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<tr>
<td></td>
<td></td>
<td>d) Waste gas cleaning facilities</td>
</tr>
<tr>
<td>8</td>
<td>Non-ferrous metal manufacturing</td>
<td>a) Mercury refining facilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Waste gas cleaning facilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c) Wet dust collection facilities</td>
</tr>
<tr>
<td>9</td>
<td>Metal product manufacturing or instrument manufacturing</td>
<td>a) Mercury refining facilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Waste gas cleaning facilities</td>
</tr>
<tr>
<td>10</td>
<td>Facilities installed in organizations which are specified by an Ordinance of the Ministry of the Environment*3 and conduct research, experiments, inspection or professional education regarding science and technology</td>
<td>a) Cleaning facilities</td>
</tr>
<tr>
<td>11</td>
<td>Acetylene refining facilities</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Designated sewage sludge</td>
<td></td>
</tr>
</tbody>
</table>

- *1 Acetylene derivative manufacturing by calcium carbide method/ coal tar product manufacturing/ fermentation industry/ methane derivative manufacturing/ organic pigments or synthetic dye manufacturing/ synthetic resin manufacturing/ synthetic rubber manufacturing/ organic rubber chemical manufacturing/ synthetic detergent manufacturing/ petrochemical industry excluding those corresponding to the preceding six categories and oil refineries/ soap manufacturing/ surfactant manufacturing/ hardened oil manufacturing/ fatty acid manufacturing/ spice manufacturing/ gelatin or glue manufacturing/ photographic film manufacturing/ natural resin product manufacturing/ wood chemical industry

- *2 Reagents containing cadmium and its compounds, cyanogen compounds, organophosphorous compounds (limited to diethyl paranimotrophenyl thiophosphate (alias parathion), dimethylparanitrophenyl thiophosphate (alias parathion-methyl), dimethylethylmercaptop ethylthiophosphate (alias demeton-methyl) and ethylparanitrophenylthiono benzenephosphonate (alias EPN), lead and its compounds, hexavalent chromium compounds, arsenic and its compounds, mercury, alkyl mercury and the other mercury compounds, polychlorobiphenyl, trichloroethylene, tetrachloroethylene, dichloroethylene, carbon tetrachloride, 1, 2 - dichloroethane, 1, 1 - dichloroethylene, 1, 2 – dichloroethylene, 1, 1, 1 – trichloroethane, 1, 1, 2 – trichloroethane, 1, 3 – dichloropropene, tetramethylthiuram disulfide (alias thiuram), 2-chloro-4,6-bis (ethylamino)- S-Triazine (alias simazine), N,N-Diethylthiocarbamic acid S- (4-chlorobenzyl) ester (alias
Thiobencarb), benzene, selenium and its compounds, boron and its compounds, fluorine and its compounds, ammonia, ammonium compounds, nitrous acid compounds and nitric acid compounds, vinyl chloride monomer, and 1, 4-dioxane

*3

1. National or local government research and development institutes (excluding those pertaining only to humanities and social sciences)
2. Universities and research and development institutes affiliated with the universities (excluding those pertaining only to humanities and social sciences)
3. Institutes conducting research and development related to academic research (excluding those pertaining only to humanities and social sciences), product manufacturing, or technology improvement, device or invention (excluding institutes corresponding to the preceding two items)
4. High schools, colleges of technology, specialized training colleges, schools for specialized education, employee training facilities or vocational training facilities conducting professional education including courses related to agriculture, fisheries or industries
5. Health centers
6. Quarantine stations
7. Animal quarantine stations
8. Plant protection stations
9. Livestock hygiene service centers
10. Work places belong to inspection business
11. Work places belong to commodity inspection business
12. Work places belong to clinical inspection business
13. Criminal identification facilities
In response to the request from the secretariat to Governments to submit information relating to the compilation and analysis of the means of obtaining monitoring data for consideration by the committee at its seventh session, with an emphasis given to the capacity-building needs of developing countries and countries with economies in transition; to the role played by regional activities; and to the value of partnerships.

Japan has various mercury monitoring schemes including both mandatory and voluntary programmes. National government and local governments are undertaking mercury monitoring of ambient air, public water body, bio-samples, food, etc. following tables summarize the monitoring media/substances, analytical methods, monitoring sites, period and frequency and responsible parties of the monitoring.
## Mercury Monitoring in Japan

<table>
<thead>
<tr>
<th>Media &amp; Substance</th>
<th>Measuring Method / Analytical Method</th>
<th>Monitoring Site / number of samples</th>
<th>Monitoring Period &amp; Frequency</th>
<th>Responsible party</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Kashiwazaki (Niigata pref.)</td>
<td>2013.Nov.1 - Dec.17</td>
<td>NIES / Niigata Institute of Technology</td>
<td></td>
</tr>
<tr>
<td>Wet deposition Total Mercury (THg)</td>
<td>Filter Pack Method</td>
<td>Cape Hedo (Okinawa pref.)</td>
<td>Since 2008 Apr., Weekly</td>
<td>MOE / NIES</td>
<td></td>
</tr>
<tr>
<td>Wet deposition Total Mercury (THg)</td>
<td>Filter Pack Method</td>
<td>Oga Peninsula (Akita pref.)</td>
<td>Since 2014 Sep., Weekly</td>
<td>MOE / (NIES)</td>
<td></td>
</tr>
<tr>
<td>Wet deposition Total Mercury (THg)</td>
<td>Filter Pack Method</td>
<td>Fukuoka (Fukuoka pref.)</td>
<td>Since 2013 Jun., Weekly</td>
<td>NIMD</td>
<td></td>
</tr>
<tr>
<td>Media &amp; Substance</td>
<td>Measuring Method / Analytical Method</td>
<td>Monitoring Site/ number of samples</td>
<td>Monitoring Period &amp; Frequency</td>
<td>Responsible party</td>
<td>Note</td>
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<tr>
<td>Wet Deposition</td>
<td>Minamitorishima (Tokyo Metropolitan)</td>
<td></td>
<td>Since 1996 Jan., Daily</td>
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</tr>
<tr>
<td>Surface Seawater, Sediment</td>
<td>Seawater: Atomic fluorescence spectrometry (Cold vapor method), with hydride generation and gold trap separation Sediment: Atomic absorption spectrophotometry (Cold vapor method) with heating vaporization, and gold trap separation</td>
<td>12 coastal seas (including Tokyo bay, Ise bay, and Osaka Bay)</td>
<td>Since 1973</td>
<td>Japan Coast Guard</td>
<td>&quot;Report of Marine Pollution Surveys&quot; The Hydrographic and Oceanographic Department, Japan Coast Guard website &quot;Results of Marine Pollution Surveys&quot; URL: <a href="http://www1.koilo.mlit.go.jp/XANKO/0SEN/osen.html">http://www1.koilo.mlit.go.jp/XANKO/0SEN/osen.html</a> in Japanese</td>
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<tr>
<td>Human Blood THg</td>
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<tr>
<td>Umbilical Blood, Urine, Breast Milk, Hair THg</td>
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<tr>
<td>Human Blood THg</td>
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<tr>
<td>Food (Fishery Product) THg and MeHg</td>
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<tr>
<td>Food (Agricultural Product) THg</td>
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<tr>
<td>Food (Canned Vegetable) Mercury</td>
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<tr>
<td>Food (Fishery Product) THg and MeHg</td>
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</tr>
</tbody>
</table>

### Human Blood THg

**Measuring Method / Analytical Method:**
- Approx. 100,000 expecting mothers
- Since 2014
- MOE

**Responsible party:**
- MOE

**Note:**

### Surface and Deep Seawater

**Measuring Method / Analytical Method:**
- Cold vapor atomic absorption spectrophotometry with hydride generation and gold trap separation

**Monitoring Site/ number of samples:**
- Coastal sea and offshore deep sea area around Japan
- Sea area around Japan and the western North Pacific (long.137E and 165E observation lines).

**Monitoring Period & Frequency:**
- Since 1972 (Reliable data are available since 1990)

**Responsible party:**
- MOE
- Japan Meteorological Agency (JMA)

**Note:**

### Surface Seawater, Sediment

**Measuring Method / Analytical Method:**
- Seawater: Atomic fluorescence spectrometry (Cold vapor method), with hydride generation and gold trap separation
- Sediment: Atomic absorption spectrophotometry (Cold vapor method) with heating vaporization, and gold trap separation

**Monitoring Site/ number of samples:**
- 12 coastal seas (including Tokyo bay, Ise bay, and Osaka Bay)

**Monitoring Period & Frequency:**
- Since 1973

**Responsible party:**
- Japan Coast Guard

**Note:**
- "Report of Marine Pollution Surveys" The Hydrographic and Oceanographic Department, Japan Coast Guard website "Results of Marine Pollution Surveys" URL: [http://www1.koilo.mlit.go.jp/XANKO/0SEN/osen.html](http://www1.koilo.mlit.go.jp/XANKO/0SEN/osen.html) in Japanese

### Human Blood THg

**Measuring Method / Analytical Method:**
- Approx. 100,000 expecting mothers
- Since 2014
- MOE

**Responsible party:**
- MOE

**Note:**

### Food (Fishery Product) THg and MeHg

**Measuring Method / Analytical Method:**
- Total 501 samples (15 fish species)
- FY2002~2004
- Fisheries Agency

**Responsible party:**
- MAFF official site: "Substances contained in Fishery Products that can cause health deterioration" URL: [http://www.maff.go.jp/j/souyou/tikuzai/gyoukoku/g_kenko/butsu/index.html](http://www.maff.go.jp/j/souyou/tikuzai/gyoukoku/g_kenko/butsu/index.html)

**Responsible party:**
- MAFF

**Note:**

### Food (Agricultural Product) THg

**Measuring Method / Analytical Method:**
- Total 4024 samples (cereal grains, pulses, vegetables, fruits, edible fungi: 31 commodities)
- FY2003~2010

**Responsible party:**
- MAFF

**Note:**

### Food (Canned Vegetable) Mercury

**Measuring Method / Analytical Method:**
- Sweet corn: 39 samples
- Red beans: 39 samples
- Tomatoes: 53 samples
- FY2011

**Responsible party:**
- MAFF

**Note:**

### Food (Fishery Product) THg and MeHg

**Measuring Method / Analytical Method:**
- Total 16,437 samples (453 fish species)
- FY2002~2010

**Responsible party:**
- Ministry of Health, Labour and Welfare, Local Governments

**Note:**
- Hand out of section meeting for veterinary and fishery food, Subcommittee for food sanitation, Pharmaceutical Affairs and Food Sanitation Council held in May 2010
<table>
<thead>
<tr>
<th>Media &amp; Substance</th>
<th>Measuring Method / Analytical Method</th>
<th>Monitoring Sites/ number of samples</th>
<th>Monitoring Period &amp; Frequency</th>
<th>Responsible party</th>
<th>Note</th>
</tr>
</thead>
</table>
| Tap water THg     | The method determined by the Minister of Health, Labour and Welfare on the basis of the Ordinance of the provisions relating to water quality standards (Ministry of Health, Labour and Welfare Notification No. 261, 2003) | Raw water: 5,206 sites (Surface Stream Water, Lake/Reservoir, Ground Water)
Clarified water: 5,357 sites (Surface Stream Water, Lake/Reservoir, Ground Water) | Annual | Public Water Supplier | Cabinet Office, Food Safety Commission
The 7th Executive Board Meeting of Expert Panel for Chemical Substance and Contaminated Substance
Handout No.1: the Evaluation Report on Soft Drink (draft) –Mercury P25
URL: [https://www.fsc.go.jp/fscis/meetingMaterial/show/kai20120127ka1]. in Japanese
“Inspection Method for Water Quality Standards”
URL: [http://www.mhlw.go.jp/stf/seisakunitsuite/bunya/topics/bukyoku/kenkou/suido/suishitsu/06.html]. in Japanese |
<table>
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<tr>
<th>Media &amp; Substance</th>
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<th>Monitoring Period &amp; Frequency</th>
<th>Responsible party</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish</td>
<td>Agano river 3 sites, total 45 samples</td>
<td>Since 2014</td>
<td>Niigata Prefectural Government, Niigata Prefectural Institute of Public Health and Environmental Science</td>
<td>&quot;Mercury Content Survey in Fish at the Agano River&quot; <a href="http://www.pref.niigata.lg.jp/hokkenko/1356782993697.html">URL</a>, in Japanese</td>
</tr>
</tbody>
</table>