RESOLUTION MEPC.197(62)
Adopted on 15 July 2011
2011 GUIDELINES FOR THE DEVELOPMENT OF THE INVENTORY
OF HAZARDOUS MATERIALS

**ANNEX 3**

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**Adopted on 15 July 2011**

**2011 GUIDELINES FOR THE DEVELOPMENT OF THE INVENTORY OF HAZARDOUS MATERIALS**

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee conferred upon it by international conventions for the prevention and control of marine pollution,

RECALLING ALSO that the International Conference on the Safe and Environmentally Sound Recycling of Ships held in May 2009 adopted the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009 (the Hong Kong Convention) together with six Conference resolutions,

NOTING that regulations 5.1 and 5.2 of the Annex to the Hong Kong Convention require that ships shall have on board an Inventory of Hazardous Materials which shall be prepared and verified taking into account Guidelines, including any threshold values and exemptions contained in those Guidelines, developed by the Organization,

NOTING ALSO resolution MEPC.179(59) by which the Committee adopted the Guidelines for the development of the inventory of Hazardous Materials,

NOTING FURTHER that, by resolution MEPC.179(59), the Committee resolved to keep the Guidelines under review,

HAVING CONSIDERED, at its sixty-second session, the recommendation made by the Working Group on Guidelines for Ship Recycling,

1. ADOPTS the 2011 Guidelines for the development of the Inventory of Hazardous Materials as set out in the Annex to this resolution;

2. INVITES Member Governments to apply the 2011 Guidelines as soon as possible, or when the Convention becomes applicable to them;

3. AGREES to keep the 2011 Guidelines for the development of the Inventory of Hazardous Materials under review in the light of experience gained;

4. REVOKES the Guidelines adopted by resolution MEPC.179(59).

ANNEX

# 2011 GUIDELINES FOR THE DEVELOPMENT OF THE INVENTORY OF HAZARDOUS MATERIALS

## 1 Introduction

### 1.1 Objectives of the Guidelines

These Guidelines provide recommendations for developing the Inventory of Hazardous Materials (hereinafter referred to as "the Inventory") to assist compliance with regulation 5 (Inventory of Hazardous Materials) of the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009 (hereinafter referred to as "the Convention").

### 1.2 Application of the Guidelines

These Guidelines have been developed to provide relevant stakeholders (e.g., shipbuilders, equipment suppliers, repairers, shipowners and ship management companies) with the essential requirements for practical and logical development of the Inventory.

### 1.3 Objectives of the Inventory

The objectives of the Inventory are to provide ship-specific information on the actual Hazardous Materials present on board, in order to protect health and safety and to prevent environmental pollution at Ship Recycling Facilities. This information will be used by the Ship Recycling Facilities in order to decide how to manage the types and amounts of materials identified in the Inventory of Hazardous Materials (regulation 9).

## 2 Definitions

The terms used in these Guidelines have the same meaning as those defined in the Convention, with the following additional definitions which apply to these Guidelines only.

"Homogeneous material" means a material of uniform composition throughout that cannot be mechanically disjointed into different materials, meaning that the materials cannot, in principle, be separated by mechanical actions such as unscrewing, cutting, crushing, grinding and abrasive processes.

"Product" means machinery, equipment, materials and applied coatings on board a ship.

"Supplier" means a company which provides products; which may be a manufacturer, trader or agency.

"Supply chain" means the series of entities involved in the supply and purchase of materials and goods, from raw materials to final product.

"Threshold level" is defined as the concentration value in homogeneous materials.

## 3 Requirements for the Inventory

### 3.1 Scope of the Inventory

The Inventory consists of:

Part I: Materials contained in ship structure or equipment;
Part II: Operationally generated wastes; and
Part III: Stores.

### 3.2 Materials to be listed in the Inventory

Appendix 1 of the Guidelines, "Items to be listed in the Inventory of Hazardous Materials", provides information on the Hazardous Materials that may be found on board a ship. Materials set out in appendix 1 should be listed in the Inventory. Each item in appendix 1 of these Guidelines is classified under "Table A", "Table B", "Table C" or "Table D" according to its properties:

.1 Table A comprises the materials listed in appendix 1 of the Convention;

.2 Table B comprises the materials listed in appendix 2 of the Convention;

.3 Table C (Potentially hazardous items) comprises items which are potentially hazardous to the environment and human health at Ship Recycling Facilities; and

.4 Table D (Regular Consumable Goods potentially containing Hazardous Materials) comprises goods which are not integral to a ship and are unlikely to be dismantled or treated at a Ship Recycling Facility.

Table A and Table B correspond to Part I of the Inventory. Table C corresponds to Parts II and III and Table D corresponds to Part III.

### 3.3 Materials not required to be listed in the Inventory

Materials listed in Table B that are inherent in solid metals or metal alloys, provided they are used in general construction, such as hull, superstructure, pipes, or housings for equipment and machinery are not required to be listed in the Inventory.

### 3.4 Standard format of the Inventory of Hazardous Materials

The Inventory should be developed on the basis of the standard format set out in appendix 2 of these Guidelines: "Standard format of the Inventory of Hazardous Materials". Examples of how to complete the Inventory are provided for guidance purposes only.

## 4 Requirements for development of the Inventory

### 4.1 Development of Part I of the Inventory for new ships

4.1.1 Part I of the Inventory for new ships should be developed at the design and construction stage.

4.1.2 Checking of materials listed in Table A

During the development of the Inventory (Part I), the presence of materials listed in Table A of appendix 1 should be checked and confirmed; the quantity and location of Table A materials should be listed in Part I of the Inventory. If such materials are used in compliance with the Convention, they should be listed in Part I of the Inventory. Any spare parts containing materials listed in Table A are required to be listed in Part III of the Inventory.

4.1.3 Checking of materials listed in Table B

If materials listed in Table B of appendix 1 are present in products above the threshold levels provided in Table B, the quantity and location of the products and the contents of the materials present in them should be listed in Part I of the Inventory. Any spare parts containing materials listed in Table B are required to be listed in Part III of the Inventory.

4.1.4 Process for checking of materials

The checking of materials as provided in paragraphs 4.1.2 and 4.1.3 above should be based on the "Material Declaration" furnished by the suppliers in the shipbuilding supply chain (e.g., equipment suppliers, parts suppliers, material suppliers).

**4.2 Development of Part I of the Inventory for existing ships**

In order to achieve comparable results for existing ships with respect to Part I of the Inventory, the following procedure should be followed.

The procedure is based on the following steps:

.1 collection of necessary information;

.2 assessment of collected information;

.3 preparation of visual/sampling check plan;

.4 onboard visual check and sampling check; and

.5 preparation of Part I of the Inventory and related documentation.

The determination of Hazardous Materials present on board existing ships should, as far as practicable, be conducted as prescribed for new ships, including the procedures described in section 6 and 7 of these Guidelines. Alternatively the procedures described in subsection 4.2 may be applied for existing ships, but these procedures should not be used for any new installation resulting from the conversion or repair of existing ships after the initial preparation of the Inventory.

The procedures described in subsection 4.2 should be carried out by the shipowner, who may draw upon expert assistance. Such an expert or expert party should not be the same as the person or organization authorized by the Administration to approve the Inventory.

Please refer to appendix 4: "Flow diagram for developing Part I of the Inventory for existing ships"; and appendix 5: "Typical example of development process for Part I of the Inventory for existing ships".

4.2.1 Collection of necessary information (Step 1)

The shipowner should identify, research, request, and procure all reasonably available documentation regarding the ship. Information that will be useful includes maintenance, conversion, and repair documents; certificates, manuals, ship's plans, drawings, and technical specifications; product information data sheets (such as Material Declarations); and hazardous material inventories or recycling information from sister ships. Potential sources of information could include previous shipowners, the ship builder, historical societies, classification society records, and ship recycling facilities with experience working with similar ships.

4.2.2 Assessment of collected information (Step 2)

The information collected in Step 1 above should be assessed. The assessment should cover all materials listed in Table A of appendix 1; materials listed in Table B should be listed as far as practicable. The results of the assessment should be reflected in the visual/sampling check plan.

4.2.3 Preparation of visual/sampling check plan (Step 3)

To specify the materials listed in appendix 1 of these Guidelines a visual/sampling check plan should be prepared taking into account the collated information and any appropriate expertise. The visual/sampling check plan based on the following three lists:

- List of equipment, system and/or area for visual check (any equipment, system and/or area specified regarding the presence of the materials listed in appendix 1 by document analysis should be entered in the List of equipment, system and/or area for visual check);

- List of equipment, system and/or area for sampling check (any equipment, system and/or area which cannot be specified regarding the presence of the materials listed in appendix 1 by document or visual analysis should be entered in the List of equipment, system and/or area as requiring sampling check. A sampling check is the taking of samples to identify the presence or absence of Hazardous Material contained in the equipment, systems, and/or areas, by suitable and generally accepted methods such as laboratory analysis); and

- List of equipment, system and/or area classed as "potentially containing Hazardous Material" (any equipment, system and/or area which cannot be specified regarding the presence of the materials listed in appendix 1 by document analysis may be entered in the List of equipment, system and/or area classed as "potentially containing Hazardous Material" without the sampling check. The prerequisite for this classification is a comprehensible justification such as the impossibility of conducting sampling without compromising the safety of the ship and its operational efficiency).

Visual/sampling checkpoints should be all points where:

- the presence of materials to be considered for the Inventory Part I as listed in appendix 1 is likely;

- the documentation is not specific; or

- materials of uncertain composition were used.

4.2.4 Onboard visual/sampling check (Step 4)

The onboard visual/sampling check should be carried out in accordance with the visual/sampling check plan. When a sampling check is carried out, samples should be taken and the sample points should be clearly marked on the ship plan and the sample results referenced. Materials of the same kind may be sampled in a representative manner. Such materials are to be checked to ensure that they are of the same kind. The sampling check should be carried out drawing upon expert assistance.

Any uncertainty regarding the presence of Hazardous Materials should be clarified by a visual/sampling check. Checkpoints should be documented in the ship's plan and may be supported by photographs.

If the equipment, system and/or area of the ship are not accessible for a visual check or sampling check, they should be classified as "potentially containing Hazardous Material". The prerequisite for such classification should be the same prerequisite as in section 4.2.3. Any equipment, system and/or area classed as "potentially containing Hazardous Material" may be investigated or subjected to a sampling check at the request of the shipowner during a later survey (e.g., during repair, refit or conversion).

4.2.5 Preparation of Part I of the Inventory and related documentation (Step 5)

If any equipment, system and/or area is classed as either "containing Hazardous Material" or "potentially containing Hazardous Material", their approximate quantity and location should be listed in Part I of the Inventory. These two categories should be indicated separately in the remarks column of the Inventory of Hazardous Materials.

4.2.6 Testing methods

Samples may be tested by a variety of methods. "Indicative" or "field tests" may be used when:

- the likelihood of a hazard is high;
- the test is expected to indicate that the hazard exists; and
- the sample is being tested by "specific testing" to show that the hazard is present.

Indicative or field tests are quick, inexpensive and useful onboard the ship or on site, but they cannot be accurately reproduced or repeated, and cannot identify the hazard specifically, and therefore cannot be relied upon except as "indicators".

In all other cases, and in order to avoid dispute, "specific testing" should be used. Specific tests are repeatable, reliable and can demonstrate definitively whether a hazard exists or not. They will also provide a known type of the hazard. The methods indicated are found qualitative and quantitative appropriate and only testing methods to the same effect can be used. Specific tests are to be carried out by a suitably accredited laboratory, working to international standards† or equivalent, which will provide a written report that can be relied upon by all parties.

Specific test methods for appendix 1 materials are provided in appendix 9.

† For example ISO 17025.

4.2.7 Diagram of the location of Hazardous Materials on board a ship

Preparation of a diagram showing the location of the materials listed in Table A is recommended in order to help Ship Recycling Facilities gain a visual understanding of the Inventory.

**4.3 Maintaining and updating Part I of the Inventory during operations**

4.3.1 Part I of the Inventory should be appropriately maintained and updated, especially after any repair or conversion or sale of a ship.

4.3.2 Updating of Part I of the Inventory in the event of new installation

If any machinery or equipment is added to, removed or replaced or the hull coating is renewed, Part I of the Inventory should be updated according to the requirements for new ships as stipulated in subsections 4.1.2 to 4.1.4. Updating is not required if identical parts or coatings are installed or applied.

4.3.3 Continuity of Part I of the Inventory

Part I of the Inventory should belong to the ship and the continuity and conformity of the information it contains should be confirmed, especially if the flag, owner or operator of the ship changes.

**4.4 Development of Part II of the Inventory (operationally generated waste)**

4.4.1 Once the decision to recycle a ship has been taken, Part II of the Inventory should be developed before the final survey, taking into account that a ship destined to be recycled shall conduct operations in the period prior to entering the Ship Recycling Facility in a manner that minimizes the amount of cargo residues, fuel oil and wastes remaining on board (regulation 8.2).

4.4.2 Operationally generated wastes to be listed in the Inventory

If the wastes listed in Part II of the Inventory provided in "Table C (Potentially hazardous items)" of appendix 1 are intended for delivery with the ship to a Ship Recycling Facility, the quantity of the operationally generated wastes should be estimated and their approximate quantities and locations should be listed in Part II of the Inventory.

**4.5 Development of Part III of the Inventory (stores)**

4.5.1 Once the decision to recycle has been taken, Part III of the Inventory should be developed before the final survey, taking into account the fact that a ship destined to be recycled shall minimize the wastes remaining on board (regulation 8.2). Each item listed in Part III should correspond to the ship's operations during its last voyage.

4.5.2 Stores to be listed in the Inventory

If the stores to be listed in Part III of the Inventory provided in Table C of appendix 1 are to be delivered with the ship to a Ship Recycling Facility, the unit (e.g., capacity of cans and cylinders), quantity and location of the stores should be listed in Part III of the Inventory.

4.5.3 Liquids and gases sealed in ship's machinery and equipment to be listed in the Inventory

If any liquids and gases listed in Table C of appendix 1 are integral in machinery and equipment on board a ship, their approximate quantity and location should be listed in Part III of the Inventory. However, small amounts of lubricating oil, anti-seize compounds and grease which are applied to or injected into machinery and equipment to maintain normal performance do not fall within the scope of this provision. For subsequent completion of Part III of the Inventory during the recycling preparation processes, the quantity of liquids and gases listed in Table C of appendix 1 required for normal operation, including the related pipe system volumes, should be prepared and documented at the design and construction stage. This information belongs to the ship, and continuity of this information should be maintained if the flag, owner or operator of the ship changes.

4.5.4 Regular consumable goods to be listed in the Inventory

Regular consumable goods, as provided in Table D of appendix 1should not be listed in Part I or Part II but should be listed in Part III of the Inventory if they are to be delivered with the ship to a Ship Recycling Facility. A general description including the name of item (e.g., TV set), manufacturer, quantity and location should be entered in Part III of the Inventory. The check on materials provided for in paragraphs 4.1.2 and 4.1.3 of the Guidelines does not apply to regular consumable goods.

### 4.6 Description of location of Hazardous Materials on board

The locations of Hazardous Materials on board should be described and identified using the name of location (e.g., second floor of Engine-room, Bridge DK, APT, No.1 Cargo Tank, Frame number) given in the plans (e.g., General Arrangement, Fire and Safety Plan, Machinery Arrangement or Tank Arrangement).

### 4.7 Description of approximate quantity of Hazardous Materials

In order to identify the approximate quantity of Hazardous Materials, the standard unit used for the of Hazardous Materials should be kg, unless other units (e.g., $m^3$ for materials of liquid or gases, $m^2$ for materials used in floors or walls) are considered more appropriate. An approximate quantity should be rounded up to at least two significant figures.

## 5 Requirements for ascertaining the conformity of the Inventory

### 5.1 Design and construction stage

The conformity of Part I of the Inventory at the design and construction stage should be ascertained by reference to the collected "Supplier's Declaration of Conformity" described in section 7 and the related "Material Declarations" collected from suppliers.

### 5.2 Operational stage

Shipowners should implement the following measures in order to ensure the conformity of Part I of the Inventory:

.1 designate a person as responsible for maintaining and updating the Inventory (the designated person may be employed ashore or on board);

.2 the designated person, in order to implement subsection 4.3.2, should establish and supervise a system to ensure the necessary updating of the Inventory in the event of new installation;

.3 to maintain the Inventory including dates of changes or new deleted entries and the signature of the designated person; and

.4 provide related documents as required for the survey or sale of the ship.

## 6 Material Declaration

### 6.1 General

Suppliers to the shipbuilding industry should identify and declare whether or not the materials listed in Table A or Table B are present above the threshold level specified in appendix 1 of these Guidelines. However, this provision does not apply to chemicals which do not constitute a part of the finished product.

### 6.2 Information required in the declaration

At a minimum the following information is required in the Material Declaration:

.1 date of declaration;

.2 Material Declaration identification number;

.3 supplier's name;

.4 product name (common product name or name used by manufacturer);

.5 product number (for identification by manufacturer);

.6 declaration of whether or not the materials listed in Table A and Table B of appendix 1 of these Guidelines are present in the product above the threshold level stipulated in appendix 1 of these Guidelines; and

.7 mass of each constituent material listed in Table A and/or Table B of appendix 1 of these Guidelines if present above threshold level.

An example of a Material Declaration is shown in appendix 6.

## 7 Supplier's Declaration of Conformity

### 7.1 Purpose and scope

The purpose of the Supplier's Declaration of Conformity is to provide assurance that the related Material Declaration conforms to section 6.2, and to identify the responsible entity.

The Supplier's Declaration of Conformity remains valid as long as the products are present on board.

The supplier compiling the Supplier's Declaration of Conformity should establish a company policy‡. The company policy on the management of the chemical substances in products which the supplier manufactures or sells should cover:

.a Compliance with law:

The regulations and requirements governing the management of chemical substances in products should be clearly described in documents which should be kept and maintained; and

.b Obtaining of information on chemical substance content:

In procuring raw materials for components and products, suppliers should be selected following an evaluation, and the information on the chemical substances they supply should be obtained.

### 7.2 Contents and format

The Supplier's Declaration of Conformity should contain the following:

.1 unique identification number;

.2 name and contact address of the issuer;

.3 identification of the subject of the Declaration of Conformity (e.g., name, type, model number, and/or other relevant supplementary information);

.4 statement of conformity;

.5 date and place of issue; and

.6 signature (or equivalent sign of validation), name and function of the authorized person(s) acting on behalf of the issuer.

An example of the Supplier's Declaration of Conformity is shown in appendix 7.

## 8 List of appendices

Appendix 1: Items to be listed in the Inventory of Hazardous Materials

Appendix 2: Standard format of the Inventory of Hazardous Materials

Appendix 3: Example of the development process for Part I of the Inventory for new ships

Appendix 4: Flow diagram for developing Part I of the Inventory for existing ships

Appendix 5: Example of the development process for Part I of the Inventory for existing ships

‡ A recognized quality management system may be utilized.

Appendix 6: Form of Material Declaration

Appendix 7: Form of Supplier's Declaration of Conformity

Appendix 8: Examples of Table A and Table B materials of appendix 1 with CAS-numbers

Appendix 9: Specific test methods

# APPENDIX 1

## ITEMS TO BE LISTED IN THE INVENTORY OF HAZARDOUS MATERIALS

**TABLE A* Materials listed in appendix 1 of the Annex to the Convention**

| No. | Materials | | Inventory | | | Threshold level |
|---|---|---|---|---|---|---|
| | | | Part I | Part II | Part III | |
| A-1 | Asbestos | | x | | | no threshold level |
| A-2 | Polychlorinated biphenyls (PCBs) | | x | | | no threshold level |
| A-3 | Ozone Depleting Substances | CFCs | x | | | no threshold level |
| | | Halons | x | | | |
| | | Other fully halogenated CFCs | x | | | |
| | | Carbon tetrachloride | x | | | |
| | | 1,1,1-Trichloroethane (Methyl chloroform) | x | | | |
| | | Hydrochlorofluorocarbons | x | | | |
| | | Hydrobromofluorocarbons | x | | | |
| | | Methyl bromide | x | | | |
| | | Bromochloromethane | x | | | |
| A-4 | Anti-fouling systems containing organotin compounds as a biocide | | x | | | 2500 mg total tin/kg |

**TABLE B* Materials listed in appendix 2 of the Annex to the Convention**

| No. | Materials | Inventory | | | Threshold level |
|---|---|---|---|---|---|
| | | Part I | Part II | Part III | |
| B-1 | Cadmium and cadmium compounds | x | | | 100 mg/kg |
| B-2 | Hexavalent chromium and hexavalent chromium compounds | x | | | 1,000 mg/kg |
| B-3 | Lead and lead compounds | x | | | 1,000 mg/kg |
| B-4 | Mercury and mercury compounds | x | | | 1,000 mg/kg |
| B-5 | Polybrominated biphenyl (PBBs) | x | | | 1,000 mg/kg |
| B-6 | Polybrominated diphenyl ethers (PBDEs) | x | | | 1,000 mg/kg |
| B-7 | Polychlorinated naphthalenes (more than 3 chlorine atoms) | x | | | no threshold level |
| B-8 | Radioactive substances | x | | | no threshold level§ |
| B-9 | Certain shortchain chlorinated paraffins (Alkanes, C10-C13, chloro) | x | | | 1% |

* For materials in this Table with no threshold level, quantities occurring as unintentional trace contaminants should not be listed in Material Declarations and in the Inventory.

§ However, note that, in order to identify amounts of radioactive substances which could be exempted from the need for regulatory control, "exemption criteria" were established in the IAEA Safety Standards (Safety Series No.115, International Basic Safety Standards for the Protection against Ionizing Radiation and for the Safety of Radiation Sources, Schedule I, p. 81-89; Vienna, 1996. IAEA is currently in the process of updating IAEA Safety Series No.115). For practical purposes, the IAEA defined values (e.g., "exemption levels") that could be considered as "thresholds" below which the substances could be automatically exempted from any control without further consideration. National Regulatory Authorities normally establish exemption levels for radioactive sources and other radioactive materials.

**TABLE C Potentially hazardous items**

| No. | Properties | | Goods | Inventory | | |
|---|---|---|---|---|---|---|
| | | | | Part I | Part II | Part III |
| C-1 | Liquid | Oiliness | Kerosene | | | x |
| C-2 | | | White spirit | | | x |
| C-3 | | | Lubricating oil | | | x |
| C-4 | | | Hydraulic oil | | | x |
| C-5 | | | Anti-seize compounds | | | x |
| C-6 | | | Fuel additive | | | x |
| C-7 | | | Engine coolant additives | | | x |
| C-8 | | | Antifreeze fluids | | | x |
| C-9 | | | Boiler and feed water treatment and test re-agents | | | x |
| C-10 | | | De-ioniser regenerating chemicals | | | x |
| C-11 | | | Evaporator dosing and descaling acids | | | x |
| C-12 | | | Paint stabilizers/rust stabilizers | | | x |
| C-13 | | | Solvents/thinners | | | x |
| C-14 | | | Paints | | | x |
| C-15 | | | Chemical refrigerants | | | x |
| C-16 | | | Battery electrolyte | | | x |
| C-17 | | | Alcohol, methylated spirits | | | x |
| C-18 | Gas | Explosives/ inflammables | Acetylene | | | x |
| C-19 | | | Propane | | | x |
| C-20 | | | Butane | | | x |
| C-21 | | | Oxygen | | | x |
| C-22 | | Green House Gases | $CO_2$ | | | x |
| C-23 | | | Perfluorocarbons (PFCs) | | | x |
| C-24 | | | Methane | | | x |
| C-25 | | | Hydrofluorocarbon (HFCs) | | | x |
| C-27 | | | Nitrous oxide($N_2O$) | | | x |
| C-28 | | | Sulfur hexafluoride ($SF_6$) | | | x |
| C-29 | Liquid | Oiliness | Bunkers: fuel oil | | | x |
| C-30 | | | Grease | | | x |
| C-31 | | | Waste oil (sludge) | | x | |
| C-32 | | | Bilge and/or waste water generated by the after-treatment systems fitted on machineries | | x | |
| C-33 | | | Oily liquid cargo tank residues | | x | |
| C-34 | | | Ballast water | | x | |
| C-35 | | | Raw sewage | | x | |
| C-36 | | | Treated sewage | | x | |
| C-37 | | | Non-oily liquid cargo residues | | x | |
| C-38 | Gas | Explosibility/ inflammability | Fuel gas | | | x |

**TABLE C Potentially hazardous items**

| No. | Properties | Goods | Inventory | | |
|---|---|---|---|---|---|
| | | | Part I | Part II | Part III |
| C-39 | Solid | Dry cargo residues | | x | |
| C-40 | | Medical waste/infectious waste | | x | |
| C-41 | | Incinerator ash[2)] | | x | |
| C-42 | | Garbage[2)] | | x | |
| C-43 | | Fuel tank residues | | x | |
| C-45 | | Oily solid cargo tank residues | | x | |
| C-45 | | Oily or chemical contaminated rags | | x | |
| C-46 | | Batteries (incl. lead acid batteries) | | | x |
| C-47 | | Pesticides/insecticide sprays | | | x |
| C-48 | | Extinguishers | | | x |
| C-49 | | Chemical cleaner (incl. electrical equipment cleaner, carbon remover) | | | x |
| C-50 | | Detergent/bleacher (could be a liquid) | | | x |
| C-51 | | Miscellaneous medicines | | | x |
| C-52 | | Fire fighting clothing and Personal protective equipment | | | x |
| C-53 | | Dry tank residues | | x | |
| C-54 | | Cargo residues | | x | |
| C-55 | | Spare parts which contain materials listed in Table A or Table B | | | x |

2) Definition of garbage is identical to that in MARPOL Annex V. However, incinerator ash is classified separately because it may include hazardous substances or heavy metals.

**TABLE D• Regular consumable goods potentially containing Hazardous Materials**

| No. | Properties | Example | Inventory | | |
|---|---|---|---|---|---|
| | | | Part I | Part II | Part III |
| D-1 | Domestic and accommodation appliances | Computers, refrigerators, printers, scanners, television sets, radio sets, video cameras, video recorders, telephones, consumer batteries, fluorescent lamps, filament bulbs, lamps | | | x |
| | | | | | |

• This Table does not include ship-specific equipment integral to ship operations, which has to be listed in Part I of the Inventory.

## APPENDIX 2

## STANDARD FORMAT OF THE INVENTORY OF HAZARDOUS MATERIALS

### Part I HAZARDOUS MATERIALS CONTAINED IN THE SHIP'S STRUCTURE AND EQUIPMENT

#### I-1 Paints and coating systems containing materials listed in Table A and Table B of appendix 1 of the Guidelines

| No. | Application of paint | Name of paint | Location | Materials (classification in appendix 1) | Approx. quantity | | Remarks |
|---|---|---|---|---|---|---|---|
| 1 | Anti-drumming compound | Primer, xx Co., xx primer #300 | Hull part | Lead | 35.00 | kg | |
| 2 | Anti-fouling | xx Co., xx coat #100 | Underwater parts | TBT | 120.00 | kg | |
| | | | | | | | |

#### I-2 Equipment and machinery containing materials listed in Table A and Table B of appendix 1 of the Guidelines

| No. | Name of equipment and machinery | Location | Materials (classification in appendix 1) | Parts where used | Approx. quantity | | Remarks |
|---|---|---|---|---|---|---|---|
| 1 | Switch board | Engine control room | Cadmium | Housing coating | 0.02 | kg | |
| | | | Mercury | Heat gauge | <0.01 | kg | less than 0.01kg |
| 2 | ~~Diesel engine, xx Co., xx #150~~ | ~~Engine room~~ | ~~Cadmium~~ | ~~Bearing~~ | ~~0.02~~ | ~~kg~~ | |
| 3 | Diesel engine, xx Co., xx #200 | Engine-room | Cadmium | Bearing | 0.01 | kg | Revised by XXX on Oct. XX, 2008 |
| 4 | Diesel generator (x 3) | Engine-room | Lead | Ingredient of copper compounds | 0.01 | kg | |

### I-3 Structure and hull containing materials listed in Table A and Table B of appendix 1 of the Guidelines

| No. | Name of structural element | Location | Materials (classification in appendix 1) | Parts where used | Approx. quantity | | Remarks |
|---|---|---|---|---|---|---|---|
| 1 | Wall panel | Accommodation | Asbestos | Insulation | 2,500.00 | kg | |
| 2 | Wall insulation | Engine control room | Lead | Perforated plate | 0.01 | kg | cover for insulation material |
| | | | Asbestos | Insulation | 25.00 | kg | under perforated plates |
| 3 | | | | | | | |

## Part II OPERATIONALLY GENERATED WASTE

| No. | Location[1)] | Name of item (classification in appendix 1) and detail (if any) of the item | Approx. quantity | | Remarks |
|---|---|---|---|---|---|
| 1 | Garbage locker | Garbage (food waste) | 35.00 | kg | |
| 2 | Bilge tank | Bilgewater | 15.00 | $m^3$ | |
| 3 | No.1 cargo hold | Dry cargo residues (iron ore) | 110.00 | kg | |
| 4 | No.2 cargo hold | Waste oil (sludge) (crude) | 120.00 | kg | |
| 5 | No.1 ballast tank | Ballast water | 2,500.00 | $m^3$ | |
| | | Sediments | 250.00 | kg | |

## Part III STORES

### III-1 Stores

| No. | Location[1)] | Name of item (classification in appendix 1) | Unit quantity | | Figure | | Approx. quantity | | Remarks[2)] |
|---|---|---|---|---|---|---|---|---|---|
| 1 | No.1 fuel oil tank | Fuel oil (heavy fuel oil) | - | | - | | 100.00 | $m^3$ | |
| 2 | $CO_2$ room | $CO_2$ | 100.00 | kg | 50 | bottles | 5,000.00 | kg | |
| 3 | Workshop | Propane | 20.00 | kg | 10 | pcs | 200.00 | kg | |
| 4 | Medicine locker | Miscellaneous medicines | - | | - | | - | | Details are shown in the attached list. |
| 5 | Paint stores | Paint, xx Co., #600 | 20.00 | kg | 5 | pcs | 100.00 | kg | Cadmium containing. |
| | | | | | | | | | |

### III-2 Liquids sealed in ship's machinery and equipment

| No. | Type of liquids (classification in appendix 1) | Name of machinery or equipment | Location | Approx. quantity | | Remarks |
|---|---|---|---|---|---|---|
| 1 | Hydraulic oil | Deck crane hydraulic oil system | Upper deck | 15.00 | $m^3$ | |
| | | Deck machinery hydraulic oil system | Upper deck and bosun store | 200.00 | $m^3$ | |
| | | Steering gear hydraulic oil system | Steering gear room | 0.55 | $m^3$ | |
| 2 | Lubricating oil | Main engine system | Engine-room | 0.45 | $m^3$ | |
| 3 | Boiler water treatment | Boiler | Engine-room | 0.20 | $m^3$ | |
| | | | | | | |

### III-3 Gases sealed in ship's machinery and equipment

| No. | Type of gases (classification in appendix 1) | Name of machinery or equipment | Location | Approx. quantity | | Remarks |
|---|---|---|---|---|---|---|
| 1 | HFC | AC system | AC room | 100.00 | kg | |
| 2 | HFC | Refrigerated provision chamber machine | AC room | 50.00 | kg | |
| | | | | | | |

### III-4 Regular consumable goods potentially containing Hazardous Materials

| No. | Location[1)] | Name of item | Quantity | Remarks |
|---|---|---|---|---|
| 1 | Accommodation | Refrigerators | 1 | |
| 2 | Accommodation | Personal computers | 2 | |
| | | | | |
| | | | | |
| | | | | |

1) The location of a Part II or Part III item should be entered in order based on its location, from a lower level to an upper level and from a fore part to an aft part. The location of Part I items is recommended to be described similarly, as far as practicable.
2) In column "Remarks" for Part III items, if Hazardous Materials are integrated in products, the approximate amount of the contents should be shown as far as possible.

## APPENDIX 3

## EXAMPLE OF THE DEVELOPMENT PROCESS FOR PART I OF THE INVENTORY FOR NEW SHIPS

### 1 Objective of the typical example

This example has been developed to give guidance and to facilitate understanding of the development process for Part I of the Inventory of Hazardous Materials for new ships.

### 2 Development flow for Part I of the Inventory

Part I of the Inventory should be developed using the following 3 steps. However, the order of these steps is flexible and can be changed depending on the schedule of shipbuilding:

.1 collection of Hazardous Materials information;
.2 utilization of Hazardous Materials information; and
.3 preparation of the Inventory (by filling out standard format).

### 3 Collection of Hazardous Materials information

### 3.1 Data collection process for Hazardous Materials

Materials Declaration (MD) and Supplier's Declaration of Conformity (SDoC) for products from suppliers (tier 1 suppliers) should be requested and collected by the shipbuilding yard. Tier 1 suppliers may request from their suppliers (tier 2 suppliers) the relevant information if they cannot develop the MD based on the information available. Thus the collection of data on Hazardous Materials may involve the entire shipbuilding supply chain (Figure 1).

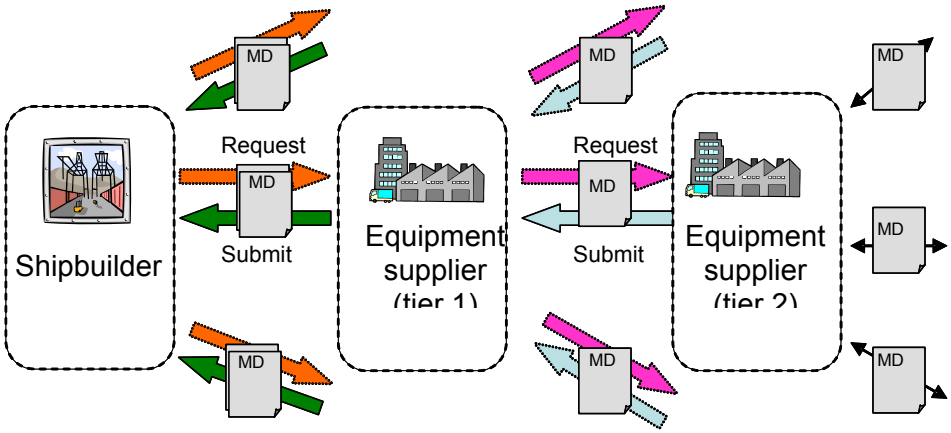



**Figure 1 – Process of MD (and SDoC) collection showing involvement of supply chain**

### 3.2 Declaration of Hazardous Materials

Suppliers should declare whether or not the Hazardous Materials listed in Table A and Table B in the MD are present in concentrations above the threshold levels specified for each "homogeneous material" in a product.

3.2.1 Materials listed in Table A

If one or more materials listed in Table A are found to be present in concentrations above the specified threshold level according to the MD, the products which contain these materials shall not be installed on a ship. However, if the materials are used in a product in accordance with an exemption specified by the Convention (e.g., new installations containing hydrochlorofluorocarbons (HCFCs) before 1 January 2020), the product should be listed in the Inventory.

3.2.2 Materials listed in Table B

If one or more materials listed in Table B are found to be present in concentrations above the specified threshold level according to the MD, the products should be listed in the Inventory.

### 3.3 Example of "Homogeneous Materials"

Figure 2 shows an example of four homogeneous materials which constitute a cable. In this case, sheath, intervention, insulator and conductor are all individual homogeneous materials.

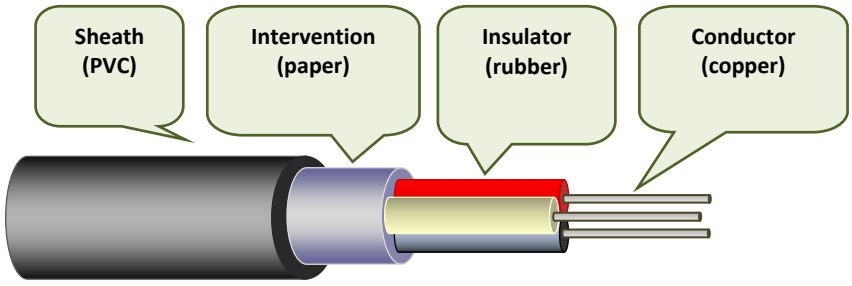



**Figure 2 – Example of Homogeneous Materials (cable)**

## 4 Utilization of Hazardous Materials information

Products which contain Hazardous Materials in concentrations above the specified threshold levels should be clearly identified in the MD. The approximate quantity of the Hazardous Materials should be calculated if the mass data for Hazardous Materials are declared in the MD using a unit which cannot be directly utilized in the Inventory.

## 5 Preparation of Inventory (by filling out standard format)

The information received for the Inventory, as contained in Table A and Table B of appendix 1of these Guidelines, ought to be structured and utilized according to the following categorization for Part I of the Inventory:

1.1 Paints and coating systems;
1.2 Equipment and machinery; and
1.3 Structure and hull.

## 5.1 "Name of equipment and machinery" column

5.1.1 Equipment and machinery

The name of each equipment or machinery should be entered in this column. If more than one Hazardous Material is present in the equipment or machinery, the row relating to that equipment or machinery should be appropriately divided such that all of the Hazardous Materials contained in the piece of equipment or machinery are entered. If more than one item of equipment or machinery is situated in one location, both name and quantity of the equipment or machinery should be entered in the column. For identical common or mass-produced items, such as bolts, nuts and valves, there is no need to list each item individually. An example is shown in Table 1.

**Table 1 – Example showing more than one item of equipment or machinery situated in one location**

| No. | Name of equipment and machinery | Location | Materials (classification in appendix 1) | Parts where used | Approx. quantity | | Remarks |
|---|---|---|---|---|---|---|---|
| | Main engine | Engine-room | Lead | Piston pin bush | 0.75 | kg | |
| | | | Mercury | Thermometer charge air temperature | 0.01 | kg | |
| | Diesel generator (x 3) | Engine-room | Mercury | Thermometer | 0.03 | | |

5.1.2 Pipes and cables

The names of pipes and of systems, including electric cables, which are often situated in more than one compartment of a ship, should be described using the name of the system concerned.
A reference to the compartments where these systems are located is not necessary as long as the system is clearly identified and properly named.

## 5.2 "Approximate quantity" column

The standard unit for approximate quantity of solid Hazardous Materials should be kg. If the Hazardous Materials are liquids or gases, the standard unit should be either $m^3$ or kg. An approximate quantity should be rounded up to at least two significant figures. If the Hazardous Material is less than 10 g, the description of the quantity should read "<0.01 kg".

**Table 2 – Example of a switchboard**

| No. | Name of equipment and machinery | Location | Materials (classification in appendix 1) | Parts where used | Approx. quantity | | Remarks |
|---|---|---|---|---|---|---|---|
| | Switchboard | Engine control room | Cadmium | Housing coating | 0.02 | kg | |
| | | | Mercury | Heat gauge | <0.01 | kg | less than 0.01 kg |

## 5.3 "Location" column

5.3.1 Example of a location list

It is recommended to prepare a location list which covers all compartments of a ship based on the ship's plans (e.g., General Arrangement, Engine-room Arrangement, Accommodation and Tank Plan) and on other documentation on board, including certificates or spare parts' lists. The description of the location should be based on a location such as a deck or room to enable easy identification. The name of the location should correspond to the ship's plans so as to ensure consistency between the Inventory and the ship's plans. Examples of names of locations are shown in Table 3.

**Table 3 – Examples of location names**

| (A) Primary classification | (B) Secondary classification | (C) Name of location |
|---|---|---|
| All over the ship | | |
| Hull part | Fore part | Bosun store |
| | | … |
| | Cargo part | No.1 Cargo Hold/Tank |
| | | No.1 Garage deck |
| | | … |
| | Tank part | Fore Peak Tank |
| | | No.1 WBT |
| | | No.1 FOT |
| | | … |
| | | Aft Peak Tank |
| | Aft part | Steering Gear Room |
| | | Emergency Fire Pump Space |
| | | … |
| | Superstructure | Accommodation |
| | | Compass deck |
| | | Nav. Bridge deck |
| | | … |
| | | Wheel House |
| | | Engine Control Room |
| | | Cargo Control Room |
| | | … |
| | Deck house | Deck House |
| | | … |

| (A) Primary classification | (B) Secondary classification | (C) Name of location |
|---|---|---|
| Machinery part | Engine-room | Engine-room |
| | | Main Floor |
| | | 2nd Floor |
| | | … |
| | | Generator Space/Room |
| | | Purifier Space/Room |
| | | Shaft Space/Room |
| | | Engine Casing |
| | | Funnel |
| | | Engine Control Room |
| | | … |
| | Pump-room | Pump-room |
| | | … |
| Exterior part | Superstructure | Superstructure |
| | Upper deck | Upper deck |
| | Hull shell | Hull shell |
| | | bottom |
| | | under waterline |
| | | … |

5.3.2 Description of location of pipes and electrical systems

Locations of pipes and systems, including electrical systems and cables situated in more than one compartment of a ship, should be described for each system concerned. If they are situated in a number of compartments, the most practical of the following two options should be used:

a) listing of all components in the column; or

b) description of the location of the system using an expression such as those shown under "primary classification" and "secondary classification" in Table 3.

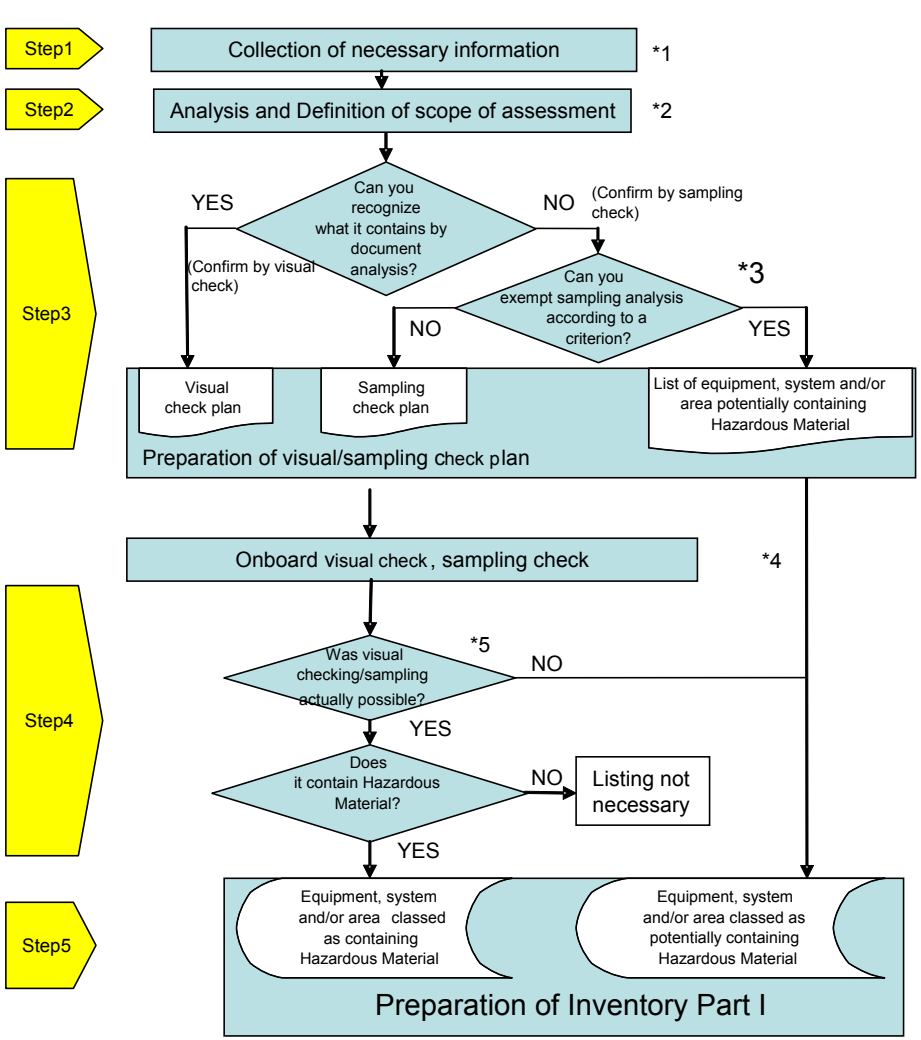
A typical description of a pipe system is shown in Table 4.

**Table 4 – Example of description of a pipe system**

| No. | Name of equipment and machinery | Location | Materials (classification in appendix 1) | Parts where used | Approx. quantity | Remarks |
|---|---|---|---|---|---|---|
| | Ballast water system | Engine-room, Hold parts | | | | |

## APPENDIX 4

## FLOW DIAGRAM FOR DEVELOPING PART I OF THE INVENTORY FOR EXISTING SHIPS




*1 : Documents may include any certificates, manuals, ship's plans drawings, technical specifications and information from sister and/or similar ships.

*2 : The assessment should cover all materials listed in Table A of Appendix 1 of the Guideline; the materials listed in Table B should be listed as far as practicable.
It is impossible to assess all equipment and areas including those which are assumed not to contain Hazardous Materials described above.
Using analysis of available documents based on knowledge and experience, it must be made clear which equipment and/or area should be included in the scope of the assessment.

*3 : Equipment, system and/or areas which cannot be specified as containing materials listed in appendix 1 of these guidelines on the basis of documents can be listed in the List of equipment, system and/or area classed as "potentially containing Hazardous Material" without the sampling check. The prerequisite for this classification is a comprehensible justification of the conclusion, such as the impossibility to conduct samplings without compromising ship safety and operational efficiency.

*4 : Sampling Check. This means sampling and identification of Hazardous Material contained in the equipment, systems, and/or areas, by laboratory analysis. The sampling check should be applied where the presence of Prohibited and Restricted Hazardous Material is assumed but cannot be recognized by analysis of the available documentation.

*5 : When equipment, systems and/or areas of a ship are not accessible for visual check or sampling check, this equipment, system and/or area is classified as "potentially containing Hazardous Material".

## APPENDIX 5

## EXAMPLE OF THE DEVELOPMENT PROCESS FOR PART I OF THE INVENTORY FOR EXISTING SHIPS

### 1 Introduction

In order to develop Part I of the Inventory of Hazardous Materials for existing ships, documents of the individual ship as well as the knowledge and experience of specialist personnel (experts) is required. An example of the development process for Part I of the Inventory of Hazardous Materials for existing ships is useful to understand the basic steps as laid out in the Guidelines and to ensure a unified application. However, attention should be paid to variations in different types of ships[1)].

Compilation of Part I of the Inventory of Hazardous Material for existing ships involves the following 5 steps which are described in paragraph 4.2 and appendix 4 of these Guidelines.

Step 1: Collection of necessary information;
Step 2: Assessment of collected information;
Step 3: Preparation of visual/sampling check plan;
Step 4: Onboard visual/sampling check; and
Step 5: Preparation of Part I of the Inventory and related documentation.

1) The example of a 28,000 gross tonnage bulk carrier constructed in 1985 is used in this appendix.

### 2 Step 1: Collection of necessary information

### 2.1 Sighting of available documents

A practical first step is to collect detailed documents for the ship. The shipowner should try to collate documents normally retained onboard the ship or by the shipping company as well as relevant documents that the shipyard, manufacturers, or classification society may have. The following documents should be used when available:

Ship's specification
General Arrangement
Machinery Arrangement
Spare Parts and Tools List
Piping Arrangement
Accommodation Plan
Fire Control Plan
Fire Protection Plan
Insulation Plan (Hull and Machinery)
International Anti-Fouling System Certificate
Related manuals and drawings
Information from other inventories and/or sister or similar ships, machinery, equipment, materials and coatings
Results of previous visual/sampling checks and other analysis

If the ship has undergone conversions or major repair work, it is necessary to identify as far as possible the modifications from the initial design and specification of the ship.

### 2.2 Indicative list

It is impossible to check all equipment, systems, and/or areas on board the ship to determine the presence or absence of Hazardous Materials. The total number of parts on board may exceed several thousand. In order to take a practical approach, an "Indicative list" should be prepared that identifies the equipment, system, and/or area on board that is presumed to contain Hazardous Materials. Field interviews with the shipyard and suppliers may be necessary to prepare such lists. A typical example of an "Indicative list" is shown below:

#### 2.2.1 Materials to be checked and documented

Hazardous Materials, as identified in appendix 1 of these Guidelines, should be listed in Part I of the Inventory for existing ships. Appendix 1 of the Guidelines contains all the materials concerned. Table A shows those which are required to be listed and Table B shows those which should be listed as far as practical.

#### 2.2.2 Materials listed in Table A

Table A lists the following four materials:

Asbestos
Polychlorinated biphenyls (PCBs)
Ozone depleting substances
Anti-fouling systems containing organotin compounds as a biocide

##### 2.2.2.1 Asbestos

Field interviews were conducted with over 200 Japanese shipyards and suppliers regarding the use of asbestos in production. "Indicative lists" for asbestos developed on the basis of this research are shown below:

| Structure and/or equipment | Component |
|---|---|
| Propeller shafting | Packing with low pressure hydraulic piping flange |
| | Packing with casing |
| | Clutch |
| | Brake lining |
| | Synthetic stern tubes |
| Diesel engine | Packing with piping flange |
| | Lagging material for fuel pipe |
| | Lagging material for exhaust pipe |
| | Lagging material turbocharger |
| Turbine engine | Lagging material for casing |
| | Packing with flange of piping and valve for steam line, exhaust line and drain line |
| | Lagging material for piping and valve of steam line, exhaust line and drain line |

| Structure and/or equipment | Component |
|---|---|
| Boiler | Insulation in combustion chamber |
| | Packing for casing door |
| | Lagging material for exhaust pipe |
| | Gasket for manhole |
| | Gasket for hand hole |
| | Gas shield packing for soot blower and other hole |
| | Packing with flange of piping and valve for steam line, exhaust line, fuel line and drain line |
| | Lagging material for piping and valve of steam line, exhaust line, fuel line and drain line |
| Exhaust gas economizer | Packing for casing door |
| | Packing with manhole |
| | Packing with hand hole |
| | Gas shield packing for soot blower |
| | Packing with flange of piping and valve for steam line, exhaust line, fuel line and drain line |
| | Lagging material for piping and valve of steam line, exhaust line, fuel line and drain line |
| Incinerator | Packing for casing door |
| | Packing with manhole |
| | Packing with hand hole |
| | Lagging material for exhaust pipe |
| Auxiliary machinery (pump, compressor, oil purifier, crane) | Packing for casing door and valve |
| | Gland packing |
| | Brake lining |
| Heat exchanger | Packing with casing |
| | Gland packing for valve |
| | Lagging material and insulation |
| Valve | Gland packing with valve, sheet packing with piping flange |
| | Gasket with flange of high pressure and/or high temperature |
| Pipe, duct | Lagging material and insulation |
| Tank (fuel tank, hot water, tank, condenser), other equipments (fuel strainer, lubricant oil strainer) | Lagging material and insulation |
| Electric equipment | Insulation material |
| Airborne asbestos | Wall, ceiling |
| Ceiling, floor and wall in accommodation area | Ceiling, floor, wall |
| Fire door | Packing, construction and insulation of the fire door |
| Inert gas system | Packing for casing, etc. |
| Air-conditioning system | Sheet packing, lagging material for piping and flexible joint |

| Structure and/or equipment | Component |
|---|---|
| Miscellaneous | Ropes<br>Thermal insulating materials<br>Fire shields/fire proofing<br>Space/duct insulation<br>Electrical cable materials<br>Brake linings<br>Floor tiles/deck underlay<br>Steam/water/vent flange gaskets<br>Adhesives/mastics/fillers<br>Sound damping<br>Moulded plastic products<br>Sealing putty<br>Shaft/valve packing<br>Electrical bulkhead penetration packing<br>Circuit breaker arc chutes<br>Pipe hanger inserts<br>Weld shop protectors/burn covers<br>Fire-fighting blankets/clothing/equipment<br>Concrete ballast |

#### 2.2.2.2 Polychlorinated biphenyl (PCBs)

Worldwide restriction of PCBs began on 17 May 2004 as a result of the implementation of the Stockholm Convention, which aims to eliminate or restrict the production and use of persistent organic pollutants. In Japan, domestic control began in 1973, with the prohibition of all activities relating to the production, use and import of PCBs. Japanese suppliers can provide accurate information concerning their products. The "Indicative list" of PCBs has been developed as shown below:

| Equipment | Component of equipment |
|---|---|
| Transformer | Insulating oil |
| Condenser | Insulating oil |
| Fuel heater | Heating medium |
| Electric cable | Covering, insulating tape |
| Lubricating oil | |
| Heat oil | Thermometers, sensors, indicators |
| Rubber/felt gaskets | |
| Rubber hose | |
| Plastic foam insulation | |
| Thermal insulating materials | |
| Voltage regulators | |
| Switches/reclosers/bushings | |
| Electromagnets | |
| Adhesives/tapes | |
| Surface contamination of machinery | |
| Oil-based paint | |
| Caulking | |
| Rubber isolation mounts | |
| Pipe hangers | |

| Equipment | Component of equipment |
|---|---|
| Light ballasts (component within fluorescent light fixtures) | |
| Plasticizers | |
| Felt under septum plates on top of hull bottom | |

#### 2.2.2.3 Ozone depleting substances

The "Indicative list" for Ozone depleting substances is shown below. Ozone depleting substances have been controlled according to the Montreal Protocol and MARPOL Convention. Although almost all substances have been banned since 1996, HCFC can still be used until 2020.

| Materials | Component of equipment | Period for use of ODS in Japan |
|---|---|---|
| CFCs (R11, R12) | Refrigerant for refrigerators | Until 1996 |
| CFCs | Urethane formed material | Until 1996 |
| | Blowing agent for insulation of LNG carriers | Until 1996 |
| Halons | Extinguishing agent | Until 1994 |
| Other fully halogenated CFCs | The possibility of usage in ships is low | Until 1996 |
| Carbon tetrachloride | The possibility of usage in ships is low | Until 1996 |
| 1,1,1-Trichloroethane (Methyl chloroform) | The possibility of usage in ships is low | Until 1996 |
| HCFC (R22, R141b) | Refrigerant for refrigerating machine | It is possible to use it until 2020 |
| HBFC | The possibility of usage in ships is low | Until 1996 |
| Methyl bromide | The possibility of usage in ships is low | Until 2005 |

#### 2.2.2.4 Organotin compounds

Organotin compounds include Tributyl tins (TBT), Triphenyl tins (TPT) and Tributyl tin oxide (TBTO). Organotin compounds have been used as anti-fouling paint on ships' bottoms and the International Convention on the Control of Harmful Anti-Fouling Systems on Ships (AFS Convention) stipulates that all ships shall not apply or re-apply organotin compounds after 1 January 2003, and that, after 1 January 2008, all ships shall either not bear such compounds on their hulls or shall bear a coating that forms a barrier preventing such compounds from leaching into the sea. The above-mentioned dates may have been extended by permission of the Administration bearing in mind that the AFS Convention entered into force on 17 September 2008.

### 2.2.3 Materials listed in Table B

For existing ships it is not obligatory for materials listed in Table B to be listed in Part I of the Inventory. However, if they can be identified in a practical way, they should be listed in the Inventory, because the information will be used to support ship recycling processes. The Indicative list of materials listed in Table B is shown below:

| Materials | Component of equipment |
|---|---|
| Cadmium and cadmium compounds | Nickel-cadmium battery, plating film, bearing |
| Hexavalent chromium compounds | Plating film |
| Mercury and mercury compounds | Fluorescent light, mercury lamp, mercury cell, liquid-level switch, gyro compass, thermometer, measuring tool, manganese cell, pressure sensors, light fittings, electrical switches, fire detectors |
| Lead and lead compounds | Lead-acid storage battery, corrosion-resistant primer, solder (almost all electric appliances contain solder), paints, preservative coatings, cable insulation, lead ballast, generators |
| Polybrominated biphenyls (PBBs) | Non-flammable plastics |
| Polybrominated diphenyl ethers (PBDE) | Non-flammable plastics |
| Polychlorinated naphthalenes | Paint, lubricating oil |
| Radioactive substances | Fluorescent paint, ionic type smoke detector, level gauge |
| Certain shortchain chlorinated paraffins | Non-flammable plastics |

## 3 Step 2: Assessment of collected information

Preparation of a checklist is an efficient method for developing the Inventory for existing ships in order to clarify the results of each step. Based on collected information including the "Indicative list" mentioned in Step 1, all equipment, systems, and/or areas onboard assumed to contain Hazardous Materials listed in Tables A and B should be included in the checklist. Each listed equipment, system, and/or area on board should be analysed and assessed for its Hazardous Materials content.

The existence and volume of Hazardous Materials may be judged and calculated from the Spare parts and tools list and the Maker's drawings. The existence of asbestos contained in floors, ceilings and walls may be identified from Fire Protection Plans, while the existence of TBT in coatings can be identified from the International Anti-Fouling System Certificate, Coating scheme and the History of Paint.

**Example of weight calculation**

| No. | Hazardous Materials | Location/Equipment/ Component | Reference | Calculation |
|---|---|---|---|---|
| 1.1-2 | TBT | Flat bottom/paint | History of coatings | |
| 1.2-1 | Asbestos | Main engine/ Exh. pipe packing | Spare parts and tools list | 250 g x 14 sheet = 3.50 kg |
| 1.2-3 | HCFC | Ref. provision plant | Maker's drawings | 20 kg x 1 cylinder = 20 kg |
| 1.2-4 | Lead | Batteries | Maker's drawings | 6 kg x 16 unit = 96 kg |
| 1.3-1 | Asbestos | Engine-room ceiling | Accommodation plan | |

When a component or coating is determined to contain Hazardous Materials, a "Y" should be entered in the column for "Result of document analysis" in the checklist, to denote "Contained". Likewise, when an item is determined not to contain Hazardous Materials, the entry "N" should be made in the column to denote "Not contained". When a determination cannot be made as to the Hazardous Materials content, the column should be completed with the entry "Unknown".

## Checklist (Step 2)

### ANALYSIS AND DEFINITION OF SCOPE OF ASSESSMENT FOR "SAMPLE SHIP"

| No. | Tbl A/B | Hazardous Materials *1 | Location | Name of equipment | Component | Quantity | | | Manufacturer/brand name | Result of DOC *2 | Procedure of check *3 | Result of check *4 | Reference/DWG No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Unit (kg) | No. | Total (kg) | | | | | |
| Inventory Part I-1 | | | | | | | | | | | | | |
| 1 | A | TBT | Top side | Painting & coating | A/F paints | | | NIL | Paints Co./marine P1000 | N | | | On Aug. 200X, sealer coat applied to all over submerged area before tin free coating. |
| 2 | A | TBT | Flat bottom | | | | 3000m$^2$ | | Unknown AF | Unknown | | | |
| | | | | | | | | | | | | | |
| Inventory Part I-2 | | | | | | | | | | | | | |
| 1 | A | Asbestos | Lower deck | Main engine | Exh.pipe packing | 0.25 | 14 | | Diesel Co. | Y | | | M-100 |
| 2 | A | Asbestos | 3rd deck | Aux.boiler | Lagging | | 12 | | Unknown lagging | Unknown | | | M-300 |
| 3 | A | Asbestos | Engine room | Piping/flange | Packing | | | | | PCHM | | | |
| 4 | A | HCFC | 2nd deck | Ref. provision plant | Refrigerant (R22) | 20.00 | 1 | | Reito Co. | Y | | | Maker's dwg |
| 5 | B | Lead | Nav. Br.deck | Batteries | | 6 | 16 | | Denchi Co. | Y | | | E-300 |
| | | | | | | | | | | | | | |
| Inventory Part I-3 | | | | | | | | | | | | | |
| 1 | A | Asbestos | Upper deck | Back deck ceilings | Engine room ceiling | | 20m$^2$ | | Unknown ceiling | Unknown | | | O-25 |
| | | | | | | | | | | | | | |

Notes

*1 Hazardous Materials: Material classification
*2 Result of documents analysis: Y=Contained, N=Not contained, Unknown, PCHM=potentially containing Hazardous Material.
*3 Procedure of check: V=Visual check, S=Sampling check
*4 Result of check: Y=Contained, N=Not contained, PCHM

## 4 Step 3: Preparation of visual/sampling check plan

Each item classified as "Contained" or "Not contained" in Step 2 should be subjected to a visual check on board, and the entry "V" should be made in the "Check procedure" column to denote "Visual check".

For each item categorized as "unknown", a decision should be made as to whether to apply a sampling check. However, any item categorized as "unknown" may be classed as "potentially containing Hazardous Material" provided comprehensive justification is given, or if it can be assumed that there will be little or no effect on disassembly as a unit and later ship recycling and disposal operations. For example, in the following checklist, in order to carry out a sampling check for "Packing with aux. boiler" the shipowner needs to disassemble the auxiliary boiler in a repair yard. The costs of this check are significantly higher than the later disposal costs at a Ship Recycling Facility. In this case, therefore, the classification as "potentially containing Hazardous Material" is justifiable.

## Checklist (Step 3)

### ANALYSIS AND DEFINITION OF SCOPE OF ASSESSMENT FOR "SAMPLE SHIP"

| No. | Tbl A/B | Hazardous Materials *1 | Location | Name of Equipment | Component | Quantity | | | Manufacturer/Brand name | Result of DOC *2 | Procedure of check *3 | Result of check *4 | Reference/DWG No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Unit (kg) | No. | Total (kg) | | | | | |
| Inventory Part I-1 | | | | | | | | | | | | | |
| 1 | A | TBT | Top side | Painting & coating | A/F paints | | | NIL | Paints Co./marine P1000 | N | V | | On Aug. 200X, sealer coat applied to all over submerged area before tin free coating. |
| 2 | A | TBT | Flat bottom | | | | 3000m$^2$ | | Unknown AF | Unknown | S | | |
| | | | | | | | | | | | | | |
| Inventory Part I-2 | | | | | | | | | | | | | |
| 1 | A | Asbestos | Lower deck | Main engine | Exh.pipe packing | 0.25 | 14 | | Diesel Co. | Y | V | | M-100 |
| 2 | A | Asbestos | 3rd deck | Aux.boiler | Lagging | | 12 | | Unknown lagging | Unknown | S | | M-300 |
| 3 | A | Asbestos | Engine room | Piping/flange | Packing | | | | | PCHM | V | | |
| 4 | A | HCFC | 2nd deck | Ref. provision plant | Refrigerant (R22) | 20.00 | 1 | | Reito Co. | Y | V | | Maker's dwg |
| 5 | B | Lead | Nav. Br.deck | Batteries | | 6 | 16 | | Denchi Co. | Y | V | | E-300 |
| | | | | | | | | | | | | | |
| Inventory Part I-3 | | | | | | | | | | | | | |
| 1 | A | Asbestos | Upper deck | Back deck ceilings | Engine room ceiling | | 20m$^2$ | | Unknown ceiling | Unknown | S | | O-25 |
| | | | | | | | | | | | | | |

Notes

*1 Hazardous Materials: Material classification
*2 Result of documents analysis: Y=Contained, N=Not contained, Unknown, PCHM=potentially containing Hazardous Material
*3 Procedure of check: V=Visual check, S=Sampling check
*4 Result of check: Y=Contained, N=Not contained, PCHM

Before any visual/sampling check on board is conducted, a "visual/sampling check plan" should be prepared. An example of such a plan is shown below.

To prevent any incidents during the visual/sampling check, a schedule should be established to eliminate interference with other ongoing work on board. To prevent potential exposure to Hazardous Materials during the visual/sampling check, safety precautions should be in place on board. For example, sampling of potential asbestos containing materials could release fibres into the atmosphere. Therefore, appropriate personnel safety and containment procedures should be implemented prior to sampling.

Items listed in the visual/sampling check should be arranged in sequence so that the onboard check is conducted in a structured manner (e.g., from a lower level to an upper level and from a fore part to an aft part).

**Example of visual/sampling check plan**

| | |
|---|---|
| Name of ship | XXXXXXXXXX |
| IMO Number | XXXXXXXXXX |
| Gross Tonnage | 28,000 GT |
| L x B x D | xxx.xx × xx.xx × xx.xx m |
| Date of delivery | dd.mm.1987 |
| Shipowner | XXXXXXXXXX |
| Contact point<br>(Tel.,Fax, E-mail, address) | XXXXXXXXXX<br>Tel: XXXX-XXXX<br>Fax: XXXX-XXXX<br>E-mail: abcdefg@hijk.co.net |
| Check schedule | Visual check： dd, mm, 20XX<br>Sampling check：dd, mm, 20XX |
| Site of check | XX shipyard, No. Dock |
| In charge of check | XXXX XXXX |
| Check engineer | XXXX XXXX, YYYY YYYY, ZZZZ ZZZZ |
| Sampling engineer | Person with specialized knowledge of sampling |
| Sampling method and anti-scattering measure for asbestos | Wet the sampling location prior to cutting and allow it to harden after cutting to prevent scatter.<br>Notes: Workers performing sampling activities shall wear protective equipment. |
| Sampling of fragments of paints | Paints suspected to contain TBT should be collected and analysed from load line, directly under bilge keel and flat bottom near amidships. |
| Laboratory | QQQQ QQQQ |
| Chemical analysis method | Method by ISO/DIS 22262-1 Bulk materials--Part 1: Sampling and qualitative determination of asbestos in commercial bulk materials and ISO/CD 22262-2 Bulk materials – Part 2: Quantitative determination of asbestos by gravimetric and microscopic methods.<br>ICP Luminous analysis (TBT) |
| Location of visual/sampling check | Refer to lists for visual/sampling check |

| Listing for equipment, system and/or area for visual check |
|---|
| See attached "Analysis and definition of scope of investigation for sample ship" |

| List of equipment, system and/or area for sampling check | | | | |
|---|---|---|---|---|
| Location | Equipment, machinery and/or zone | Name of parts | Materials | Result of doc. checking |
| Upper Deck | Back deck ceilings | Engine-room ceiling | Asbestos | Unknown |
| Engine-room | Exhaust gas pipe | Insulation | Asbestos | Unknown |
| Engine-room | Pipe/flange | Gasket | Asbestos | Unknown |
| | | | | |
| Refer to attached "Analysis and definition of scope of investigation for sample ship" and "Location plan of Hazardous Materials for sample ship" | | | | |

| List of equipment, system and/or area classed as PCHM | | | | |
|---|---|---|---|---|
| Location | Equipment, machinery and/or zone | Name of part | Material | Result of doc. checking |
| Floor | Propeller cap | Gasket | Asbestos | PCHM |
| Engine-room | Air operated shut-off valve | Gland packing | Asbestos | PCHM |
| | | | | |
| Refer to attached "Analysis and definition of scope of investigation for sample ship" and "Location plan of Hazardous Materials for sample ship" | | | | |

This plan is established in accordance with the Guidelines for the development of the Inventory of
Hazardous Materials

Prepared by : XXXX XXXX

Tel. : YYYY-YYYY

E-Mail : XXXX@ZZZZ.co.net

・Document check・date/place:
dd, mm, 20XX at XX Lines Co. Ltd.

・Preparation date of plan: dd. mm, 20XX

## 5 Step 4: Onboard visual/sampling check

The visual/sampling check should be conducted according to the plan. Check points should be marked in the ship's plan or recorded with photographs.

A person taking samples should be protected by the appropriate safety equipment relevant to the suspected type of hazardous materials encountered. Appropriate safety precautions should also be in place for passengers, crewmembers and other persons on board, to minimize the potential exposure to hazardous materials. Safety precautions could include the posting of signs or other verbal or written notification for personnel to avoid such areas during sampling. The personnel taking samples should ensure compliance with relevant national regulations.

The results of visual/sampling checks should be recorded in the checklist. Any equipment, systems and/or areas of the ship that cannot be accessed for checks should be classified as "potentially containing Hazardous Material". In this case, the entry in the "Result of check" column should be "PCHM".

## 6 Step 5: Preparation of Part I of the Inventory and related documentation

### 6.1 Development of Part I of the Inventory

The results of the check and the estimated quantity of Hazardous Materials should be recorded on the checklist. Part I of the Inventory should be developed with reference to the checklist.

### 6.2 Development of location diagram of Hazardous Materials

With respect to Part I of the Inventory, the development of a location diagram of Hazardous Materials is recommended in order to help the Ship Recycling Facility gain a visual understanding of the Inventory.

## Checklist (Step 4 and Step 5)

ANALYSIS AND DEFINITION OF SCOPE OF ASSESSMENT FOR "SAMPLE SHIP"

| No. | Tbl A/B | Hazardous Materials *1 | Location | Name of equipment | Component | Quantity | | | Manufacturer/brand name | Result of DOC *2 | Procedure of check *3 | Result of check *4 | Reference/DWG No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Unit (kg) | No. | Total (kg) | | | | | |
| Inventory Part I-1 | | | | | | | | | | | | | |
| 1 | A | TBT | Top side | Painting & coating | A/F paints | | | NIL | Paints Co./marine P1000 | N | V | N | On Aug. 200X, sealer coat applied to all over submerged area before tin free coating. |
| 2 | A | TBT | Flat bottom | | | 0.02 | 3000$m^2$ | 60.00 | Unknown AF | Unknown | S | Y | |
| | | | | | | | | | | | | | |
| Inventory Part I-2 | | | | | | | | | | | | | |
| 1 | A | Asbestos | Lower deck | Main engine | Exh.pipe packing | 0.25 | 14 | 3.50 | Diesel Co. | Y | V | Y | M-100 |
| 2 | A | Asbestos | 3rd deck | Aux.boiler | Lagging | | 12 | | Unknown lagging | Unknown | S | N | M-300 |
| 3 | A | Asbestos | Engine room | Piping/flange | Packing | | | | | PCHM | V | PCHM | |
| 4 | A | HCFC | 2nd deck | Ref. provision plant | Refrigerant (R22) | 20.00 | 1 | 20.00 | Reito Co. | Y | V | Y | Maker's dwg |
| 5 | B | Lead | Nav. Br.deck | Batteries | | 6 | 16 | 96.00 | Denchi Co. | Y | V | Y | E-300 |
| | | | | | | | | | | | | | |
| Inventory Part I-3 | | | | | | | | | | | | | |
| 1 | A | Asbestos | Upper deck | Back deck ceilings | Engine room ceiling | 0.19 | 20$m^2$ | 3.80 | Unknown ceiling | Unknown | S | Y | O-25 |
| | | | | | | | | | | | | | |

Notes

*1 Hazardous Materials: Material classification
*2 Result of documents analysis: Y=Contained, N=Not contained, Unknown, PCHM=potentially containing Hazardous Material
*3 Procedure of check: V=Visual check, S=Sampling check
*4 Result of check: Y=Contained, N=Not contained, PCHM

**Example of the Inventory for existing ships**

**Inventory of Hazardous Materials**
**for "Sample Ship"**

Particulars of the "Sample Ship"

| | |
|---|---|
| Distinctive number or letters | XXXXNNN |
| Port of registry | Port of World |
| Type of vessel | Bulk carrier |
| Gross Tonnage | 28,000 GT |
| IMO number<br>Name of shipbuilder | NNNNNNN<br>xx Shipbuilding Co. Ltd |
| Name of shipowner | yy Maritime SA |
| Date of delivery | MM/DD/1988 |

This inventory was developed in accordance with the Guidelines for the development of the Inventory of Hazardous Materials.

Attachment:
1: Inventory of Hazardous Materials
2: Assessment of collected information
3: Location diagram of Hazardous Materials

* Prepared by XYZ (Name & address)(mm/dd/20XX)

## Inventory of Hazardous Materials: "Sample Ship"

## Part I HAZARDOUS MATERIALS CONTAINED IN THE SHIP'S STRUCTURE AND EQUIPMENT

### I-1 Paints and coating systems containing materials listed in Table A and Table B of appendix 1 of the Guidelines

| No. | Application of paint | Name of paint | Location *1 | Materials (classification in appendix 1) | Approx. quantity | | Remarks |
|---|---|---|---|---|---|---|---|
| 1 | AF paint | Unknown paints | Flat bottom | TBT | 60.00 | kg | Confirmed by sampling |
| 2 | | | | | | | |
| 3 | | | | | | | |

### I-2 Equipment and machinery containing materials listed in Table A and Table B of appendix 1 of the Guidelines

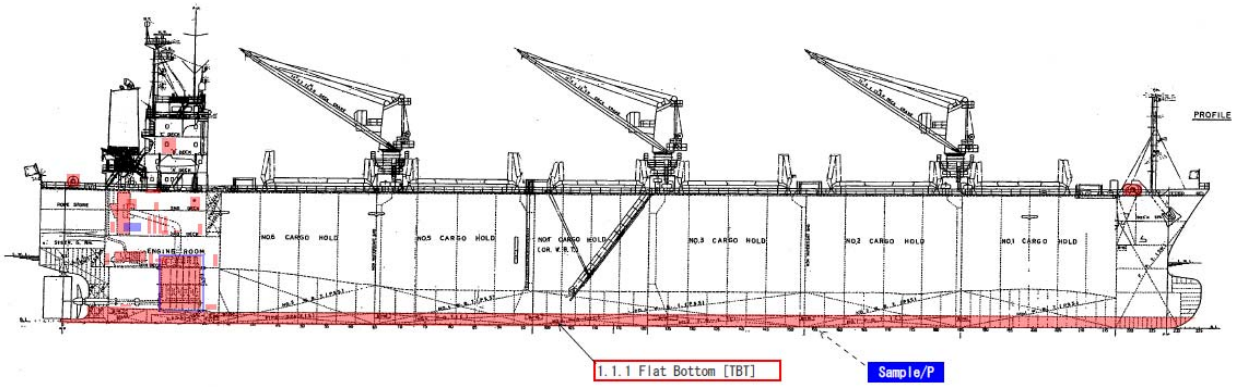
| No. | Name of equipment and machinery | Location *1 | Materials (classification in appendix 1) | Parts where used | Approx. quantity | | Remarks |
|---|---|---|---|---|---|---|---|
| 1 | Main engine | Lower floor | Asbestos | Exh. pipe packing | 3.50 | kg | |
| 2 | Aux. boiler | 3rd deck | Asbestos | Unknown packing | 10.00 | kg | PCHM (potentially containing Hazardous Material) |
| 3 | Piping/flange | Engine-room | Asbestos | Packing | 50.00 | kg | PCHM |
| 4 | Ref. provision plant | 2nd deck | HCFC | Refrigerant (R22) | 20.00 | kg | |
| 5 | Batteries | Navig. Bridge deck | Lead | | 96.00 | kg | |
| | | | | | | | |

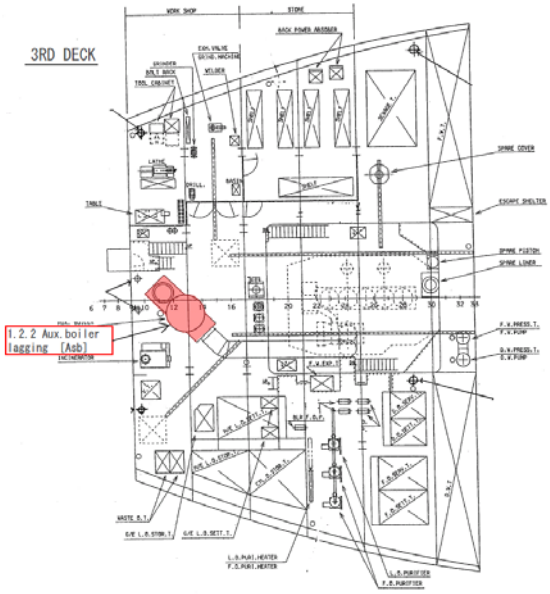
### I-3 Structure and hull containing materials listed in Table A and Table B of appendix 1 of the Guidelines

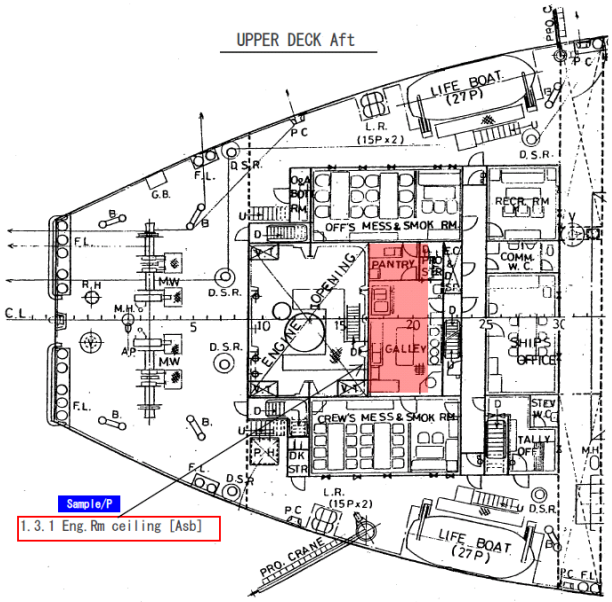
| No. | Name of structural element | Location *1 | Materials (classification in appendix 1) | Parts where used | Approx. quantity | | Remarks |
|---|---|---|---|---|---|---|---|
| 1 | Back deck ceiling | Upper deck | Asbestos | Engine-room ceiling (A class) | 3.80 | kg | Confirmed by sampling |
| 2 | | | | | | | |
| 3 | | | | | | | |

*1 Each item should be entered in order based on its location, from a lower level to an upper level and from a fore part to an aft part.

## Example of location diagram of Hazardous Materials



# APPENDIX 6

# FORM OF MATERIAL DECLARATION

**<Date of declaration>**

| Date | |
|---|---|

**<MD ID number>**

| MD- ID-No. | |
|---|---|

**<Other information>**

| Remark 1 | |
|---|---|
| Remark 2 | |
| Remark 3 | |

**<Supplier (respondent) information>**

| Company name | |
|---|---|
| Division name | |
| Address | |
| Contact person | |
| Telephone number | |
| Fax number | |
| E-mail address | |
| SDoC ID no.: | |

**<Product information>**

| Product name | Product number | Delivered unit | | | Product information |
|---|---|---|---|---|---|
| | | Amount | Unit | | |
| | | | | | |

**<Materials information>**

| | Unit |
|---|---|
| This materials information shows the amount of hazardous materials contained in | 1 | | (unit: piece, kg, m, $m^2$, $m^3$, etc) of the product. |

| Table | Material name | | Threshold level | Present above threshold level | If yes, material mass | | If yes, information on where it is used |
|---|---|---|---|---|---|---|---|
| | | | | Yes / No | Mass | Unit | |
| Table A (materials listed in appendix 1 of the Convention) | Asbestos | Asbestos | no threshold level | | | | |
| | Polychlorinated biphenyls (PCBs) | Polychlorinated biphenyls (PCBs) | no threshold level | | | | |
| | Ozone depleting substance | Chlorofluorocaobons (CFCs) | no threshold level | | | | |
| | | Halons | | | | | |
| | | Other fully halogenated CFCs | | | | | |
| | | Carbon tetrachloride | | | | | |
| | | 1,1,1-Trichloroethane | | | | | |
| | | Hydrochlorofluorocaobons | | | | | |
| | | Hydrobromofluorocaobons | | | | | |
| | | Methyl bromide | | | | | |
| | | Bromochloromethane | | | | | |
| | Anti-fouling systems containing organotin compounds as a biocide | | 2,500 mg total tin/kg | | | | |

| Table | Material name | Threshold level | Present above threshold level | If yes, material mass | | If yes, information on where it is used |
|---|---|---|---|---|---|---|
| | | | Yes / No | Mass | Unit | |
| Table B (materials listed in appendix 2 of the Convention) | Cadmium and cadmium compounds | 100 mg/kg | | | | |
| | Hexavalent chromium and hexavalent chromium compounds | 1,000 mg/kg | | | | |
| | Lead and lead compounds | 1,000 mg/kg | | | | |
| | Mercury and mercury compounds | 1,000 mg/kg | | | | |
| | Polybrominated biphenyl (PBBs) | 1,000 mg/kg | | | | |
| | Polybrominated dephenyl ethers (PBDEs) | 1,000 mg/kg | | | | |
| | Polychloronaphthalenes (Cl >= 3) | no threshold level | | | | |
| | Radioactive substances | no threshold level | | | | |
| | Certain shortchain chlorinated paraffins | 1% | | | | |

**APPENDIX 7**

**FORM OF SUPPLIER'S DECLARATION OF CONFORMITY**

## Supplier's Declaration of Conformity for Material Declaration management

1) Identification number: _____

2) Issuer's name: _____

Issuer's address: _____

3) Object(s) of the declaration: _____

_____

_____

4) The object(s) of the declaration described above is in conformity with the following documents：

| | Document No.: | Title: | Edition/date of issue |
|---|---|---|---|
| 5) | _____ | _____ | _____ |
| | _____ | _____ | _____ |
| | _____ | _____ | _____ |

6) Additional information： _____

_____

Signed for and on behalf of:

_____

_____

(Place and date of issue)

7) _____ _____

(Name, function) (Signature)

## APPENDIX 8

## EXAMPLES OF TABLE A AND TABLE B MATERIALS OF APPENDIX 1 WITH CAS NUMBERS

*This list is developed with reference to Joint Industry Guide No.101.

* This list is not exhaustive; it represents examples of chemicals with known CAS numbers and may require periodical updating.

| Table | Material Category | Substances | CAS Numbers |
|---|---|---|---|
| Table A (materials listed in appendix 1 of the Convention) | Asbestos | Asbestos | 1332-21-4 |
| | | Actinolite | 77536-66-4 |
| | | Amosite (Grunerite) | 12172-73-5 |
| | | Anthophyllite | 77536-67-5 |
| | | Chrysotile | 12001-29-5 |
| | | Crocidolite | 12001-28-4 |
| | | Tremolite | 77536-68-6 |
| | Polychlorinated biphenyls (PCBs) | Polychlorinated biphenyls | 1336-36-3 |
| | | Aroclor | 12767-79-2 |
| | | Chlorodiphenyl (Aroclor 1260) | 11096-82-5 |
| | | Kanechlor 500 | 27323-18-8 |
| | | Aroclor 1254 | 11097-69-1 |
| | Ozone depleting substances/ isomers (they may contain isomers that are not listed here) | Trichlorofluoromethane (CFC11) | 75-69-4 |
| | | Dichlorodifluoromethane (CFC12) | 75-71-8 |
| | | Chlorotrifluoromethane (CFC 13) | 75-72-9 |
| | | Pentachlorofluoroethane (CFC 111) | 354-56-3 |
| | | Tetrachlorodifluoroethane (CFC 112) | 76-12-0 |
| | | Trichlorotrifluoroethane (CFC 113) | 354-58-5 |
| | | 1,1,2 Trichloro-1,2,2 trifluoroethane | 76-13-1 |
| | | Dichlorotetrafluoroethane (CFC 114) | 76-14-2 |
| | | Monochloropentafluoroethane (CFC 115) | 76-15-3 |
| | | Heptachlorofluoropropane (CFC 211) | 422-78-6 |
| | | | 135401-87-5 |
| | | Hexachlorodifluoropropane (CFC 212) | 3182-26-1 |
| | | Pentachlorotrifluoropropane (CFC 213) | 2354-06-5 |
| | | | 134237-31-3 |
| | | Tetrachlorotetrafluoropropane (CFC 214)<br>1,1,1,3-Tetrachlorotetrafluoropropane | 29255-31-0<br>2268-46-4 |
| | | Trichloropentafluoropropane (CFC 215)<br>1,1,1-Trichloropentafluoropropane<br>1,2,3-Trichloropentafluoropropane | 1599-41-3<br>4259-43-2<br>76-17-5 |
| | | Dichlorohexafluoropropane (CFC 216) | 661-97-2 |
| | | Monochloroheptafluoropropane (CFC 217) | 422-86-6 |
| | | Bromochlorodifluoromethane (Halon 1211) | 353-59-3 |
| | | Bromotrifluoromethane (Halon 1301) | 75-63-8 |
| | | Dibromotetrafluoroethane (Halon 2402) | 124-73-2 |
| | | Carbon tetrachloride (Tetrachloromethane) | 56-23-5 |
| | | 1,1,1, - Trichloroethane (methyl chloroform) and its isomers except 1,1,2-trichloroethane | 71-55-6 |
| | | Bromomethane (Methyl bromide) | 74-83-9 |
| | | Bromodifluoromethane and isomers (HBFC's) | 1511-62-2 |
| | | Dichlorofluoromethane (HCFC 21) | 75-43-4 |
| | | Chlorodifluoromethane (HCFC 22) | 75-45-6 |
| | | Chlorofluoromethane (HCFC 31) | 593-70-4 |
| | | Tetrachlorofluoroethane (HCFC 121)<br>1,1,1,2-tetrachloro-2-fluoroethane (HCFC 121a)<br>1,1,2,2-tetracloro-1-fluoroethane | 134237-32-4<br>354-11-0<br>354-14-3 |
| | | Trichlorodifluoroethane (HCFC 122)<br>1,2,2-trichloro-1,1-difluoroethane | 41834-16-6<br>354-21-2 |

*This list is developed with reference to Joint Industry Guide No.101.

* This list is not exhaustive; it represents examples of chemicals with known CAS numbers and may require periodical updating.

| Table | Material Category | Substances | CAS Numbers |
|---|---|---|---|
| | | Dichlorotrifluoroethane(HCFC 123) | 34077-87-7 |
| | | Dichloro-1,1,2-trifluoroethane | 90454-18-5 |
| | | 2,2-dichloro-1,1,1-trifluroethane | 306-83-2 |
| | | 1,2-dichloro-1,1,2-trifluroethane (HCFC-123a) | 354-23-4 |
| | | 1,1-dichloro-1,2,2-trifluroethane (HCFC-123b) | 812-04-4 |
| | | 2,2-dichloro-1,1,2-trifluroethane (HCFC-123b) | 812-04-4 |
| | | Chlorotetrafluoroethane (HCFC 124) | 63938-10-3 |
| | | 2-chloro-1,1,1,2-tetrafluoroethane | 2837-89-0 |
| | | 1-chloro-1,1,2,2-tetrafluoroethane (HCFC 124a) | 354-25-6 |
| | | Trichlorofluoroethane (HCFC 131) | 27154-33-2; (134237-34-6) |
| | | 1-Fluoro-1,2,2-trichloroethane | 359-28-4 |
| | | 1,1,1-trichloro-2-fluoroethane (HCFC131b) | 811-95-0 |
| | | Dichlorodifluoroethane (HCFC 132) | 25915-78-0 |
| | | 1,2-dichloro-1,1-difluoroethane (HCFC 132b) | 1649-08-7 |
| | | 1,1-dichloro-1,2-difluoroethane (HFCF 132c) | 1842-05-3 |
| | | 1,1-dichloro-2,2-difluoroethane | 471-43-2 |
| | | 1,2-dichloro-1,2-difluoroethane | 431-06-1 |
| | | Chlorotrifluoroethane (HCFC 133) | 1330-45-6 |
| | | 1-chloro-1,2,2-trifluoroethane | 1330-45-6 |
| | | 2-chloro-1,1,1-trifluoroethane (HCFC-133a) | 75-88-7 |
| | | Dichlorofluoroethane(HCFC 141) | 1717-00-6; (25167-88-8) |
| | | 1,1-dichloro-1-fluoroethane (HCFC-141b) | 1717-00-6 |
| | | 1,2-dichloro-1-fluoroethane | 430-57-9 |
| | | Chlorodifluoroethane (HCFC 142) | 25497-29-4 |
| | | 1-chloro-1,1-difluoroethane (HCFC142b) | 75-68-3 |
| | | 1-chloro-1,2-difluoroethane (HCFC142a) | 25497-29-4 |
| | | Hexachlorofluoropropane (HCFC 221) | 134237-35-7 |
| | | Pentachlorodifluoropropane (HCFC 222) | 134237-36-8 |
| | | Tetrachlorotrifluropropane (HCFC 223) | 134237-37-9 |
| | | Trichlorotetrafluoropropane (HCFC 224) | 134237-38-0 |
| | | Dichloropentafluoropropane, (Ethyne, fluoro-) (HCFC 225) | 127564-92-5; (2713-09-9) |
| | | 2,2-Dichloro-1,1,1,3,3-pentafluoropropane(HCFC 225aa) | 128903-21-9 |
| | | 2,3-Dichloro-1,1,1,2,3-pentafluoropropane (HCFC 225ba) | 422-48-0 |
| | | 1,2-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC 225bb) | 422-44-6 |
| | | 3,3-Dichloro-1,1,1,2,2-pentafluoropropane (HCFC 225ca) | 422-56-0 |
| | | 1,3-Dichloro-1,1,2,2,3-pentafluoropropane (HCFC 225cb) | 507-55-1 |
| | | 1,1-Dichloro-1,2,2,3,3-pentafluoropropane(HCFC 225cc) | 13474-88-9 |
| | | 1,2-Dichloro-1,1,3,3,3-pentafluoropropane (HCFC 225da) | 431-86-7 |
| | | 1,3-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC 225ea) | 136013-79-1 |
| | | 1,1-Dichloro-1,2,3,3,3-pentafluoropropane(HCFC 225eb) | 111512-56-2 |
| | | Chlorohexafluoropropane (HCFC 226) | 134308-72-8 |
| | | Pentachlorofluoropropane (HCFC 231) | 134190-48-0 |
| | | Tetrachlorodifluoropropane (HCFC 232) | 134237-39-1 |
| | | Trichlorotrifluoropropane (HCFC 233) | 134237-40-4 |
| | | 1,1,1-Trichloro-3,3,3-trifluoropropane | 7125-83-9 |
| | | Dichlorotetrafluoropropane (HCFC 234) | 127564-83-4 |
| | | Chloropentafluoropropane (HCFC 235) | 134237-41-5 |
| | | 1-Chloro-1,1,3,3,3-pentafluoropropane | 460-92-4 |
| | | Tetrachlorofluoropropane (HCFC 241) | 134190-49-1 |
| | | Trichlorodifluoropropane (HCFC 242) | 134237-42-6 |
| | | Dichlorotrifluoropropane (HCFC 243) | 134237-43-7 |
| | | 1,1-dichloro-1,2,2-trifluoropropane | 7125-99-7 |
| | | 2,3-dichloro-1,1,1-trifluoropropane | 338-75-0 |
| | | 3,3-Dichloro-1,1,1-trifluoropropane | 460-69-5 |
| | | Chlorotetrafluoropropane (HCFC 244) | 134190-50-4 |
| | | 3-chloro-1,1,2,2-tetrafluoropropane | 679-85-6 |

*This list is developed with reference to Joint Industry Guide No.101.

* This list is not exhaustive; it represents examples of chemicals with known CAS numbers and may require periodical updating.

| Table | Material Category | Substances | CAS Numbers |
|---|---|---|---|
| | | Trichlorofluoropropane (HCFC 251) | 134190-51-5 |
| | | 1,1,3-trichloro-1-fluoropropane | 818-99-5 |
| | | Dichlorodifluoropropane (HCFC 252) | 134190-52-6 |
| | | Chlorotrifluoropropane (HCFC 253) | 134237-44-8 |
| | | 3-chloro-1,1,1-trifluoropropane (HCFC 253fb) | 460-35-5 |
| | | Dichlorofluoropropane (HCFC 261) | 134237-45-9 |
| | | 1,1-dichloro-1-fluoropropane | 7799-56-6 |
| | | Chlorodifluoropropane (HCFC 262) | 134190-53-7 |
| | | 2-chloro-1,3-difluoropropane | 102738-79-4 |
| | | Chlorofluoropropane (HCFC 271) | 134190-54-8 |
| | | 2-chloro-2-fluoropropane | 420-44-0 |
| | Organotin compounds (tributyl tin, triphenyl tin, tributyl tin oxide) | Bis(tri-n-butyltin) oxide | 56-35-9 |
| | | Triphenyltin N,N'-dimethyldithiocarbamate | 1803-12-9 |
| | | Triphenyltin fluoride | 379-52-2 |
| | | Triphenyltin acetate | 900-95-8 |
| | | Triphenyltin chloride | 639-58-7 |
| | | Triphenyltin hydroxide | 76-87-9 |
| | | Triphenyltin fatty acid salts (C=9-11) | 47672-31-1 |
| | | Triphenyltin chloroacetate | 7094-94-2 |
| | | Tributyltin methacrylate | 2155-70-6 |
| | | Bis(tributyltin) fumarate | 6454-35-9 |
| | | Tributyltin fluoride | 1983-10-4 |
| | | Bis(tributyltin) 2,3-dibromosuccinate | 31732-71-5 |
| | | Tributyltin acetate | 56-36-0 |
| | | Tributyltin laurate | 3090-36-6 |
| | | Bis(tributyltin) phthalate | 4782-29-0 |
| | | Copolymer of alkyl acrylate, methyl methacrylate and tributyltin methacrylate(alkyl; C=8) | - |
| | | Tributyltin sulfamate | 6517-25-5 |
| | | Bis(tributyltin) maleate | 14275-57-1 |
| | | Tributyltin chloride | 1461-22-9 |
| | | Mixture of tributyltin cyclopentanecarboxylate and its analogs (Tributyltin naphthenate) | - |
| | | Mixture of tributyltin 1,2,3,4,4a, 4b, 5,6,10,10adecahydro-7-isopropyl-1, 4a-dimethyl-1-phenanthlenecarboxylate and its analogs (Tributyltin rosin salt) | - |
| | | Other tributyl tins & triphenyl tins | - |
| Table B (Materials listed in appendix 2 of the Convention) | Cadmium/ cadmium compounds | Cadmium | 7440-43-9 |
| | | Cadmium oxide | 1306-19-0 |
| | | Cadmium sulfide | 1306-23-6 |
| | | Cadmium chloride | 10108-64-2 |
| | | Cadmium sulfate | 10124-36-4 |
| | | Other cadmium compounds | - |
| | Chromium VI compounds | Chromium (VI) oxide | 1333-82-0 |
| | | Barium chromate | 10294-40-3 |
| | | Calcium chromate | 13765-19-0 |
| | | Chromium trioxide | 1333-82-0 |
| | | Lead (II) chromate | 7758-97-6 |
| | | Sodium chromate | 7775-11-3 |
| | | Sodium dichromate | 10588-01-9 |
| | | Strontium chromate | 7789-06-2 |
| | | Potassium dichromate | 7778-50-9 |
| | | Potassium chromate | 7789-00-6 |
| | | Zinc chromate | 13530-65-9 |
| | | Other hexavalent chromium compounds | - |

*This list is developed with reference to Joint Industry Guide No.101.

* This list is not exhaustive; it represents examples of chemicals with known CAS numbers and may require periodical updating.

| Table | Material Category | Substances | CAS Numbers |
|---|---|---|---|
| | Lead/lead compounds | Lead | 7439-92-1 |
| | | Lead (II) sulfate | 7446-14-2 |
| | | Lead (II) carbonate | 598-63-0 |
| | | Lead hydrocarbonate | 1319-46-6 |
| | | Lead acetate | 301-04-2 |
| | | Lead (II) acetate, trihydrate | 6080-56-4 |
| | | Lead phosphate | 7446-27-7 |
| | | Lead selenide | 12069-00-0 |
| | | Lead (IV) oxide | 1309-60-0 |
| | | Lead (II,IV) oxide | 1314-41-6 |
| | | Lead (II) sulfide | 1314-87-0 |
| | | Lead (II) oxide | 1317-36-8 |
| | | Lead (II) carbonate basic | 1319-46-6 |
| | | Lead hydroxidcarbonate | 1344-36-1 |
| | | Lead (II) phosphate | 7446-27-7 |
| | | Lead (II) chromate | 7758-97-6 |
| | | Lead (II) titanate | 12060-00-3 |
| | | Lead sulfate, sulphuric acid, lead salt | 15739-80-7 |
| | | Lead sulphate, tribasic | 12202-17-4 |
| | | Lead stearate | 1072-35-1 |
| | | Other lead compounds | - |
| | Mercury/ mercury compounds | Mercury | 7439-97-6 |
| | | Mercuric chloride | 33631-63-9 |
| | | Mercury (II) chloride | 7487-94-7 |
| | | Mercuric sulfate | 7783-35-9 |
| | | Mercuric nitrate | 10045-94-0 |
| | | Mercuric (II) oxide | 21908-53-2 |
| | | Mercuric sulfide | 1344-48-5 |
| | | Other mercury compounds | - |
| | Polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs) | Bromobiphenyl and its ethers | 2052-07-5 (2-Bromobiphenyl) |
| | | | 2113-57-7 (3-Bromobiphenyl |
| | | | 92-66-0 (4-Bromobiphenyl) |
| | | | 101-55-3 (ether) |
| | | Decabromobiphenyl and its ethers | 13654-09-6 |
| | | | 1163-19-5 (ether) |
| | | Dibromobiphenyl and its ethers | 92-86-4 |
| | | | 2050-47-7 (ether) |
| | | Heptabromobiphenylether | 68928-80-3 |
| | | Hexabromobiphenyl and its ethers | 59080-40-9 |
| | | | 36355-01-8 (hexabromo-1,1'-biphenyl) |
| | | | 67774-32-7 (Firemaster FF-1) |
| | | | 36483-60-0 (ether) |
| | | Nonabromobiphenylether | 63936-56-1 |
| | | Octabromobiphenyl and its ethers | 61288-13-9 |
| | | | 32536-52-0 (ether) |
| | | Pentabromobidphenyl ether (note: commercially available PeBDPO is a complex reaction mixture containing a variety of brominated diphenyloxides. | 32534-81-9 (CAS number used for commercial grades of PeBDPO) |
| | | Polybrominated biphenyls | 59536-65-1 |
| | | Tetrabromobiphenyl and its ethers | 40088-45-7 |
| | | | 40088-47-9 (ether) |
| | | Tribromobiphenyl ether | 49690-94-0 |
| | Polychlorinated naphthalenes | Polychlorinated naphthalenes | 70776-03-3 |
| | | Other polychlorinated naphthalenes | - |

*This list is developed with reference to Joint Industry Guide No.101.

* This list is not exhaustive; it represents examples of chemicals with known CAS numbers and may require periodical updating.

| Table | Material Category | Substances | CAS Numbers |
|---|---|---|---|
| | Radioactive substances | Uranium | - |
| | | Plutonium | - |
| | | Radon | - |
| | | Americium | - |
| | | Thorium | - |
| | | Cesium | 7440-46-2 |
| | | Strontium | 7440-24-6 |
| | | Other radioactive substances | - |
| | Certain shortchain chlorinated paraffins (with carbon length of 10-13 atoms) | Chlorinated paraffins (C10-13) | 85535-84-8 |
| | | Other short chain chlorinated paraffins | - |

## APPENDIX 9

## SPECIFIC TEST METHODS

### 1 Asbestos

**Types to test for**: as per resolution MEPC.179(59); Actinolite CAS 77536-66-4 Amosite (Grunerite) CAS 12172-73-5 Anthophyllite CAS 77536-67-5 Chrysotile CAS 12001-29-5 Crocidolite CAS 12001-28-4 Asbestos Tremolite CAS 77536-68-6.

**Specific testing techniques**: Polarized Light Microscopy (PLM), electron microscope techniques and/or X-Ray Diffraction (XRD) as applicable.

**Specific reporting information**: The presence/no presence of asbestos, indicate the concentration range, and state the type when necessary.

Notes:

.1 The suggested three kinds of testing techniques are most commonly used methods when analysing asbestos and each of them has its limitation. Laboratories should choose the most suitable methods to determine, and in most cases, two or more techniques should be utilized together.

.2 The quantification of asbestos is difficult at this stage, although the XRD technique is applicable. Only a few laboratories conduct the quantification rather than the qualification, especially when a precise number is required. Considering the demand from the operators and ship recycling parties, the precise concentration is not strictly required. Thereby, the concentration range is recommended to report, and the recommended range division according to standard VDI 3866 is as follows:

- Asbestos not detected
- Traces of asbestos detected
- Asbestos content approx. 1% to 15% by mass
- Asbestos content approx. 15% to 40% by mass
- Asbestos content greater than 40% by mass

Results that specified more precisely must be provided with a reasoned statement on the uncertainty.

.3 As to the asbestos types, to distinguish all six different types is time consuming and in some cases not feasible by current techniques; while on the practical side, the treatment of different types of asbestos is the same. Therefore, it is suggested to report the type when necessary.

### 2 Polychlorinated biphenyls (PCBs)

Note: there are 209 different congeners (forms) of PCB of it is impracticable to test for all. Various organizations have developed lists of PCBs to test for as indicators. In this instance two alternative approaches are recommended. Method 1 identifies the seven congeners used by the International Council for the Exploration of the Sea (ICES). Method 2 identifies 19 congeners and 7 types of aroclor (PCB mixtures commonly found in solid shipboard materials containing PCBs). Laboratories should be familiar with the requirements and consequences for each of these lists.

**Types to test for**: Method 1: ICES7 congeners (28, 52, 101, 118, 138, 153, 180). Method 2: 19 congeners and 7 types of aroclor, using the US EPA 8082a test.

**Specific testing technique**: GC-MS (congener specific) or GC-ECD or GC-ELCD for applicable mixtures such as aroclors. Note: standard samples must be used for each type.

**Sample Preparation**: It is important to properly prepare PCB samples prior to testing. For solid materials (cables, rubber, paint, etc.), it is especially critical to select the proper extraction procedure in order to release PCBs since they are chemically bound within the product.

**Specific reporting information**: PCB congener, ppm per congener in sample, and for Method 2, ppm per aroclor in sample should also be reported.

Notes:

1 Certain field or indicator tests are suitable for detecting PCBs in liquids or surfaces. However, there are currently no such tests that can accurately identify PCBs in solid shipboard materials. It is also noted that many of these tests rely on the identification of free chlorine ions and are thus highly susceptible to chlorine contamination and false readings in a marine environment where all surfaces are highly contaminated with chlorine ions from the sea water and atmosphere.

2 Several congeners are tested for as "indicator" congeners. They are used because their presence often indicates the likelihood of other congeners in greater quantities (many PCBs are mixes, many mixes use a limited number of PCBs in small quantities, therefore the presence of these small quantities indicates the potential for a mix containing far higher quantities of other PCBs).

3 Many reports refer to "total PCB", which is often a scaled figure to represent likely total PCBs based on the sample and the common ratios of PCB mixes. Where this is done the exact scaling technique must be stated, and is for information only and does not form part of the specific technique.

## 3 Ozone Depleting Substances

**Types to test for**: as per appendix 8 of these guidelines all the listed CFCs, Halons, HCFCs and other listed substance as required by Montreal Protocol.

**Specific testing technique**: Gas Chromatography-Mass Spectrometry (GC-MS), coupled Electron Capture Detectors (GC-ECD) and Electrolytic Conductivity Detectors (GC-ELCD).

**Specific reporting information**: Type and concentration of ODS.

## 4 Anti-fouling systems containing organotin compounds as a biocide

**Types to test for**: Anti-fouling compounds and systems regulated under Annex I to the International Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001 (AFS Convention), including: Tributyl tins (TBT), Triphenyl tins (TPT) and Tributyl tin oxide (TBTO).

**Specific testing technique**: As per resolution MEPC.104(49) (Guidelines for Brief Sampling of Anti-Fouling Systems on Ships), adopted 18 July 2003, using ICPOES, ICP, AAS, XRF, GC-MS as applicable.

**Specific reporting information**: Type and concentration of organotin compound.

Note: For "field" or "indicative" testing it may be acceptable to simply identify presence of tin, due to the expected good documentation on anti fouling systems.

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