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**'I' ITEM NOTE**

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From: General Secretariat of the Council  
To: Permanent Representatives Committee (Part 1)  
No. Cion doc.: 14983/21  
Subject: Draft submission by Member States and the Commission to the ninth session of the International Maritime Organization's Sub-Committee for Pollution Prevention and Response suggesting to update three guidelines linked to the International Convention on the Control of Harmful Anti-fouling Systems in Ships  
– *Endorsement*

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**I. INTRODUCTION**

1. On 13 December 2021, the Commission transmitted to the Council a Staff Working Document containing a draft submission to the 9th session of the Sub-Committee on Pollution Prevention and Response (PPR 9) of the International Maritime Organization (IMO) suggesting to update three guidelines linked to the International Convention on the Control of Harmful Anti-fouling Systems in Ships, 2001 (AFS Convention) as a consequence of introducing controls on cybutryne. The deadline for transmitting the draft submission to the IMO Secretariat is 24 December 2021.

2. Cybutryne has been found by several scientific studies to be toxic and persistent and harmful to the marine environment. In the EU, the making available on the market and the use of anti-fouling paints containing cybutryne are prohibited<sup>1</sup>.
3. The draft submission suggests to modify the three guidelines associated with the AFS Convention. It follows up on several previous proposals from the Member States and the Commission to IMO since 2017 to amend annex 1 to the AFS Convention in order to include controls of cybutryne in annex 1 to the AFS Convention. The 76<sup>th</sup> session of the IMO Marine Environment Protection Committee (June 2021) adopted amendments banning the anti-fouling agent cybutryne. The EU supported the amendments, with a position established by Council Decision (EU) 2021/778<sup>2</sup>.
4. The three guidelines to be updated are: the *Guidelines for brief sampling of anti-fouling systems on ships* (resolution MEPC.104(49)); the *Guidelines for survey and certification of anti-fouling systems on ships*, 2010 (resolution MEPC.195(61)); and the *Guidelines for inspection of anti-fouling systems on ships*, 2011 (resolution MEPC.208(62)).

## **II. WORK WITHIN THE COUNCIL**

5. The draft submission was briefly presented by the Commission to the Shipping Working Party at its meeting on 7 December 2021. It was examined at the informal meeting of the members of the Shipping Working Party on 13 December 2021, based on an advance copy of the Commission Staff Working Document and a document from the Presidency suggesting some procedural and editorial modifications<sup>3</sup>.

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<sup>1</sup> Commission Implementing Decision (EU) 2016/107 of 27 January 2016 not approving cybutryne as an existing active substance for use in biocidal products for product-type 21 (OJ L 21, 28.1.2016, p. 81).

<sup>2</sup> Council Decision (EU) 2021/778 of 6 May 2021 on the position to be taken on behalf of the European Union during the 103<sup>rd</sup> session of the Maritime Safety Committee of the International Maritime Organization and the 76<sup>th</sup> session of the Marine Environment Protection Committee of the International Maritime Organization, on the adoption of amendments to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, the International Code on the Enhanced Programme of Inspections during Surveys of Bulk Carriers and Oil Tankers, the International Code for Fire Safety Systems and the International Convention on the Control of Harmful Anti-fouling Systems on Ships (OJ L 167, 12.5.2021, p. 40).

<sup>3</sup> WK 15195/21.

6. Taking into account written and oral comments by delegations, a revised Presidency document was issued<sup>4</sup>, with an invitation to delegations to provide further comments. No further comments were received and the Presidency therefore concluded that consensus had been reached on the text as set out in the Annex. It was also agreed that the Presidency would be allowed to indicate at the time of transmission that the document may be released to the public by the IMO secretariat prior to PPR 9.
7. However, there is no agreement on who should submit the draft submission. The Commission maintains the view that the draft submission should be made by "the European Commission on behalf of the European Union", while the Member States consider that it should be made by the Member States and the European Commission.
8. Given the urgency and importance of the matter, it was agreed at working party level to propose to transmit the submission in the name of the Member States and the European Commission, while taking good note of the position of the Commission.
9. Finally, the Shipping Working Party reiterates its request to the Commission that proposals for submissions to the IMO should be presented timely so as to allow for a proper examination of procedural and substantive issues in at least two working party meetings.

### **III. CONCLUSION**

10. In the light of the above, the Permanent Representatives Committee is invited to endorse the text of the draft submission in the annex, with a view to its transmission by the Presidency to the International Maritime Organization by 7 January 2021.

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<sup>4</sup>

WK 15195/21 REV 1.

## ANNEX

SUB-COMMITTEE ON POLLUTION  
PREVENTION AND RESPONSE  
9th session  
Agenda item 6

PPR 9/6/XX  
Document date, i.e. XX XXXX XXXX  
Original: ENGLISH  
Pre-session public release:

### **REVISION OF GUIDELINES ASSOCIATED WITH THE AFS CONVENTION AS A CONSEQUENCE OF THE INTRODUCTION OF CONTROLS ON CYBUTRYNE**

**Proposal to revise the *Guidelines for brief sampling of anti-fouling systems on ships*, the *Guidelines for survey and certification of anti-fouling systems on ships* and the *Guidelines for inspection of anti-fouling systems on ships***

**Submitted by Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the European Commission**

#### **SUMMARY**

**Executive summary:** This document suggests modifications to the three guidelines associated with the AFS Convention, as a consequence of introducing controls on cybutryne:

- The *Guidelines for brief sampling of anti-fouling systems on ships* (resolution MEPC.104(49));
- The 2010 *Guidelines for survey and certification of anti-fouling systems on ships* (resolution MEPC.195(61)); and
- The 2011 *Guidelines for inspection of anti-fouling systems on ships* (resolution MEPC.208(62)).

**Strategic direction, if 2 applicable:**

**Output:** 2.19

**Action to be taken:** Paragraph 4

**Related documents:** Resolution MEPC.104(49), Resolution MEPC.195(61), Resolution MEPC.208(62), PPR 6/INF.7, PPR 6/20, PPR 7/22, MEPC 75/18 (paragraph 10.17 and Annex 7), MEPC 76/3/3

## **Background**

1 The Marine Environment Protection Committee (MEPC 76) adopted the amendments to the Annex 1 to the AFS Convention at its meeting in June 2021. The controls on cybutryne will enter into force on 1 January 2023.

2 In view of the introduction of controls on cybutryne, three different guidelines need to be revised: the *Guidelines for brief sampling of anti-fouling systems on ships* (resolution MEPC.104(49)); the *2010 Guidelines for survey and certification of anti-fouling systems on ships* (resolution MEPC.195(61)); the *2011 Guidelines for inspection of anti-fouling systems on ships* (resolution MEPC.208(62)).

3 This document suggests modifications to the three guidelines. Annex 1 to this document contains suggested text amendments to the *Guidelines for brief sampling of anti-fouling systems on ships*. Annex 2 to this document contains suggested text amendments to the *Guidelines for inspection of anti-fouling systems on ships*. Annex 3 to this document contains suggested modifications to the *Guidelines for survey and certification of anti-fouling systems on ships*. All suggested changes have been highlighted using the standard grey shading for additions and strikethrough for deletions.

## **Action requested of the Sub-Committee**

4 The Sub-Committee is invited to consider the suggested modifications to the three guidelines and take action, as appropriate.

## **Annex 1 – Suggested text amendments to the guidelines for brief sampling of anti-fouling systems on ships**

### **GUIDELINES FOR BRIEF SAMPLING OF ANTI-FOULING SYSTEMS ON SHIPS**

#### Table of contents

##### 1. General

Purpose

Structure of these Guidelines

##### 2. Definitions

##### 3. Personnel safety when sampling

Health

Safety

##### 4. Sampling and Analysis

Sampling methods

Technical aspects

Sampling strategy and number of samples

Analysis

##### 5. Thresholds and tolerance limits

Thresholds

Tolerance range

##### 6. Definition of compliance

##### 7. Documentation and recording of information

### **APPENDICES to Annex 1 - Possible methods for brief sampling and analysis of anti-fouling systems on ships**

1	Method 1	2	
3	Appendix method 1	to 4	Record sheet for the brief sampling procedure for compliance with the Convention in terms of the presence of organotin and/or cybutryne acting as a biocide in anti-fouling systems on ship hulls
5	Method 2	6	
7	Appendix method 2	to 8	Record sheet for the sampling and analysis of anti-fouling systems on ship hulls - organotin and/or cybutryne compounds

## **1. General**

### **Purpose**

1.1 Article 11 of the International Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001, hereinafter referred to as "the Convention", and resolution [MEPC.102(48) to be updated] Guidelines for Survey and Certification of Anti-Fouling Systems on Ships refer to sampling as a method of verification of compliance of a ship's anti-fouling system with the Convention for inspection and survey.

1.2 The "Guidelines for Brief Sampling of Anti-Fouling Systems on Ships", hereinafter referred to as "the Guidelines", provide procedures for sampling to support the effectiveness of survey and inspection to ensure that a ship's anti-fouling system complies with the Convention and thus assists:

- .1 Administrations and recognized organizations (ROs) in the uniform application of the provisions of the Convention;
- .2 port State control officers with guidance on methods and handling of brief sampling in accordance with Article 11 (1)(b) of the Convention; and
- .3 companies, shipbuilders, manufacturers of anti-fouling systems, as well as any other interested parties in understanding the process of sampling as required in terms of the Convention.

1.3 However, inspections or surveys do not necessarily always need to include sampling of anti-fouling system.

1.4 These Guidelines apply to surveys and inspections of ships subject to the Convention.

1.5 The sole purpose of the sampling activities described in the Guidelines is to verify compliance with the provisions of the Convention. Consequently, such activities do not relate to any aspect not regulated by the Convention, (even if such aspects relate to the performance of an anti-fouling system on the hull of a ship, including the quality of workmanship).

### **Structure of these Guidelines**

1.6 These Guidelines contain:

- .1 a main body covering aspects of general nature common to "sampling" procedures related to the regulation of anti-fouling systems controlled by the Convention; and
- .2 appendices describing the unique procedures associated with the sampling and analysis of anti-fouling systems controlled by the Convention. These appendices only serve as examples of sampling and analytical methods and other sampling methods not described in an appendix may be used subject to the satisfaction of the Administration or the port State, as appropriate.

1.7 For reasons including the event of ~~other further~~ anti-fouling systems becoming controlled under the Convention, or in the light of new experience acquired, these Guidelines may need to be reviewed or amended in the future.

## **2. Definitions**

For the purposes of these Guidelines:

2.1 "Administration" means the Government of the State under whose authority the ship is operating. With respect to a ship entitled to fly a flag of a State, the Administration is the Government of that State. With respect to fixed or floating platforms engaged in exploration and exploitation of the sea-bed and subsoil thereof adjacent to the coast over which the coastal State exercises sovereign rights for the purposes of exploration and exploitation of their natural resources, the Administration is the Government of the coastal State concerned.

2.2 "Anti-fouling system" means a coating, paint, surface treatment, surface or device that is used on a ship in order to control or prevent attachment of unwanted organisms.

2.3 "Threshold value" means the concentration limit of the chemical under investigation below which compliance with the relevant provisions of the Convention may be assumed.

2.4 "Company" means the owner of the ship or any other organization or person such as the manager or the bareboat charterer, who has assumed the responsibility for the operation of the ship from the owner of the ship and who, on assuming such responsibility, has agreed to take over all duties and responsibilities imposed by the International Safety Management (ISM) Code.

2.5 "Length" means the length as defined in the International Convention on Load Lines, 1966, as modified by the Protocol of 1988 relating thereto, or any successor Convention.

2.6 "Tolerance range" means the numerical range added to the threshold value indicating the range where detected concentrations above the threshold value are acceptable due to recognised analytical inaccuracy and thus do not compromise the assumption of compliance.

## **3. Personnel safety when sampling**

### **Health**

3.1 Persons carrying out sampling should be aware that solvents or other materials used for sampling may be harmful. Wet paint which is sampled may also be harmful. In these cases the material safety data sheet (MSDS) for the solvent or paint should be read and appropriate precautions should be taken. This will normally include the wearing of long sleeve solvent resistant gloves of suitable impervious material -e.g. nitrile rubber.

3.2 Quantities of dry anti-fouling paint removed during sampling from ships' hulls will normally be too small to cause significant health effects.

## **Safety**

3.3 Access to ships to carry out sampling safely may be difficult. If a ship is moored alongside persons carrying out sampling must ensure they have safe access to reach the hull from e.g. platforms, crane baskets, cherry-pickers, gangways. They must ensure that they are protected by railings or a climbing harness or take other precautions so that they cannot fall into the water between the quay and the ship. If in doubt a lifejacket and possibly a safety line, should be worn when sampling.

3.4 Access to ships in dry-dock should be made by secure means. Scaffolding should be securely constructed and cherry-pickers or dock-arms should be properly constructed and maintained if they are to be used to gain access. There should be a system to record the presence of the inspector in the dock area, and he should preferably be accompanied. Safety harnesses should be worn in cherry-picker baskets, if used.

## **4. Sampling and Analysis**

### **Sampling methods**

4.1 During sampling, care should be taken not to affect the integrity or operation of the anti-fouling system.

4.2 Sampling where the anti-fouling coating is visibly damaged<sup>5</sup> or on block mark areas on the flat bottom of the ship (where the intact anti-fouling system is not applied) should be avoided. Sampling adjacent to or below areas where the anti-fouling system is damaged should also be avoided. When a sample point on the hull has been selected, any fouling present should be removed with water and a soft sponge/cloth before taking a specimen of the anti-fouling system (to avoid contamination of sample). Where possible, if carried out in dry-dock, sampling should be carried out after the hull has been water-washed.

4.3 The materials required for brief sampling methodologies should ideally be inexpensive, widely available and therefore readily accessible, irrespective of sampling conditions and/or location.

4.4 The sampling procedure should ideally be easily and reliably undertaken. Persons conducting sampling should receive appropriate training in sampling methods.

### **Technical aspects**

4.5 The sampling method should take into account the type of anti-fouling system used on the ship (taking into account that different parts of the hull may be treated with different anti-fouling systems);

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<sup>5</sup> During in-service periods, anti-fouling coatings on ships' hulls often become damaged. The extent of damage varies between ships and damaged areas can be visually recognised. Typically damage can be restricted to localised areas e.g. anchor chain damage (bow region), fender damage (vertical sides of hull), 'rust through areas' (underlying rust causing coating failure) or in some cases be in smaller areas scattered over larger areas of the hull (usually older ships where over-coating of original system has taken place many times).

4.6 Sampling and analysis of the ship's anti-fouling system could be related to only one or to all of the substances listed in Annex 1 of the AFS Convention. The following cases could be considered:

Case A. Analysis of organotin only

Case B. Analysis of cybutryne only

Case C. Simplified approach to detect organotin and cybutryne

4.7 Depending on the case, the number of samples, analysis, and definition of compliance will differ.

4.64.8 Specimens of paint for analysis during survey and certification can be taken either as wet paint<sup>6</sup> from product containers, or dry paint film sampled from the hull.

### **Sampling strategy and number of samples**

4.74.9 The sampling strategy is dependent on the precision of the sampling method, the analytical requirements, costs, and required time and the purpose of the sampling. The number of paint specimens taken of each sample should allow for a retention quantity for back-up/storage in the event of a dispute. For dry samples, triplicate specimens of paint at each sampling point should be taken in close proximity to each other on the hull (e.g. within 10 cm of each other).

4.84.10 In cases where it is recognized that more than one type of anti-fouling system is present on the hull, where access can be gained, samples should be taken from each type of system:

- .1 for survey purposes or for more thorough inspections pursuant to article 11 (2) of the Convention, in order to verify the compliance of an anti-fouling system, the number of sample points should reflect representative areas of the ship's hull; and
- .2 for inspection purposes pursuant to article 11(1) of the Convention sample points on the hull should be selected covering representative areas where the anti-fouling system is intact. Depending on the size of the vessel and accessibility to the hull, at least four sample points should be equally spaced down the length of the hull. If sampling is undertaken in dry-dock, flat bottom areas of the hull should be sampled in addition to vertical sides as different anti-fouling systems can be present on these different areas.

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<sup>6</sup> In order to prevent contamination, wet paint samples should be taken from a newly opened container. Paint should be stirred to ensure even consistency before sampling and all equipment used should be cleaned prior to use. Liquid paint samples should be stored in appropriate sealed packaging which will not react with or contaminate the sample. In the case of multi-component coatings (where on-site mixing of several components is required prior to application), samples of each component should be taken and the required mixing ratio recorded. When a sample of wet paint is taken from a container, details of the paint should be recorded e.g. details required for the IAFC Certificate along with a batch number for the product.

4.11 The distribution of any remaining anti-fouling paint in the hull surface may not be uniform. Therefore, it is important that the sampling is representative of the hull status; see Guidelines for survey and certification of anti-fouling systems on ships, APPENDIX I, point 2).

## Analysis

4.9 4.12 The analysis of the anti-fouling system should ideally involve minimal analytical effort and economic cost.

4.10 4.13 The analysis should be conducted by a recognized laboratory meeting the ISO 17025 standard or another appropriate facility at the discretion of the Administration or the port State.

4.11 4.14 The analytical process should be expeditious, such that results are rapidly communicated to the officers authorized to enforce the Convention.

4.12 4.15 The analysis should produce unambiguous results expressed in units consistent with the Convention and its associated Guidelines. For example, for organotin, results should be expressed as: mg tin (Sn) per kg of dry paint and, for cybutryne: mg of cybutryne per kg of dry paint.

NOTE: Compound-specific sampling and analytical methodologies are described in the appendices to these Guidelines.

## 5. Thresholds and tolerance limits

### Thresholds

5.1 The analysis should be quantitative to the point of being able to accurately verify the threshold limits within the given tolerance.

5.2 In cases where compliance with acceptable limits, or lack thereof, is unclear, additional sampling or other methodologies for sampling should be considered.

### Tolerance range

5.3 Statistical reliability for each (compound-specific) brief sampling procedure should be documented. The analysis should be quantitative to the point of being able to accurately verify the threshold limits within the given tolerance. On the basis of these data a compound-specific tolerance range should be derived and stated compound-specific in the method description. In general, the tolerance range should not be higher than the standard deviation under typical conditions for testing and should under no circumstances go beyond 30%.

## 6. Definition of compliance

6.1 Compliance with Annex 1 of the Convention is assumed if the anti-fouling system contains:

.1 organotin at a level which does not provide a biocidal effect. In practice organotin compounds should not be present above 2,500 mg organotin (measured as Sn) per kg of dry paint.

.2 cybutryne at a level which does not provide a biocidal effect. It should not be present above 1,000 mg of cybutryne per kg of dry paint.

6.2 Compliance is largely dependent on the results of sampling and subsequent analysis. As every method of sampling and analysis has its specific accuracy, a compound-specific tolerance level may be applied in borderline cases with concentrations very close to the threshold level.

6.3 In general, compliance is assumed when the samples yield results below the threshold value.

## **7. Documentation and recording of information**

7.1 The results of the sampling procedure should be fully documented on a method-specific record sheet. Examples are provided in the appendices to these Guidelines.

7.2 Such record sheets should be completed by the sampler and should be submitted to the competent authority of the Port State or Administration.

## **APPENDICES to Annex 1 - Possible methods for brief sampling and analysis of anti-fouling systems on ships**

### **- ORGANOTIN AND/OR CYBUTRYNE -**

#### **METHOD 1**

##### **1. Purpose of this method concerning brief sampling and analysis of anti-fouling systems**

1.1 This method has been developed in order to describe a rapid methodology appropriate for the identification of anti-fouling systems on ship hulls containing organotin compounds and/or cybutryne acting as biocide. This method has been designed such that sealers should not be affected, and any underlying anti-fouling agent (or primer) is not taken up in the sampling procedure. The method is not recommended for silicon-based anti-fouling systems.

1.2 This method for organotin compounds (Case A under paragraph 4.6 of the Guidelines) is based on a two-step analysis. The first step detects total tin as an indicator for organotin; the second step, detecting specific organotin compounds, is only necessary in the case of the first step proving positive.

1.3 The method for cybutryne (Case B under paragraph 4.6. of the Guidelines) is based on a one step analysis.

1.4 The simplified approach (Case C under paragraph 4.6. of the Guidelines) to detect organotin compounds and cybutryne is based on a one step analysis.

#### **2. Sampling device and materials**

2.1 The sampling device is constructed in a way that only the upper layer of paint is removed, thereby leaving any underlying paint (sealer, primer etc.) intact. This result is achieved through the use of a moving disk, (eccentric rotation) which is covered by an abrasive material like quartz or glass fibre fabric. This abrasive material has to be suitable for its use as a supporting material for the removed paint.

2.2 The device fulfils the following requirements:

- .1 the device has to work independently from any stationary power supply. The device may be driven by an electrical motor (battery-driven) or may be mechanically driven by a clockwork-like spring, provided it is able to sustain the movement over the required time period;
- .2 the applied force has to be constant during the operation, and the area for paint removal has to be defined;
- .3 the abrasive material has to be inert against chemical solvents and acids and must not contain more than trace amounts of tin or tin compounds and/or cybutryne; and
- .4 the amount of paint removed after a regular operation of the device has to be shown to exceed 20 mg per sample.

2.3 The device as described in the following section has been shown to be suitable for the brief sampling procedure. Any other device may be used however, provided such a device has proven to meet all the above-mentioned requirements.

2.4 The sampling device described here consists of a polyethylene disk, on which fibre glass fabric can be mounted by the use of an O-ring. The disk is moved on an eccentrically rotating axis.

### 3. Sampling procedure

3.1 The sampling procedure should be performed in the following manner:

- .1 control samples should be taken through the entire sampling and analytical process to account for possible contamination;
  - .2 the mass of the fibre glass pads is weighed with a precision of at least 1 mg. The weight should be documented for each sample;
  - .3 the fabric should be moistened thoroughly with isopropanol (0.7ml per sample) immediately before sampling;
  - .4 when a sample point on the hull has been selected, any fouling present should be removed with water and a soft sponge/cloth before taking a specimen of the anti-fouling system (to avoid contamination of sample). Where possible, if carried out in dry-dock, sampling should be carried out after the hull has been water-washed;
  - .5 the sampling device is then held against the surface to be sampled for a period of 5 seconds, prior to the sampling device being switched on;
  - .6 the sampling device is switched on, thereby removing paint by the circular motion of the fibre glass fabric against the surface of the ship;
  - .7 the sampling device should be applied to the surface of the hull for a suitable period of time, such that at least 20 mg of paint is taken up by the pad. As a general rule, if the pad colour after sampling matches the colour of the hull coating a sufficient sample has been taken;
  - .8 ~~the two-step analysis procedure requires that every sample should be taken in triplicate. Two of the specimens should be labelled Specimen 'A' and Specimen 'B'. In addition a third specimen for storage/back-up should be taken. These~~ The specimens should be taken as close to each other as possible, but without overlap.
  - .9 upon completion of the sampling, the fibre glass fabric pads should be left to dry, and re-weighed.
- .10 The number of samples will differ depending on the substances target as listed in Annex 1 of the AFS Convention.

Case A. Analysis of organotin only, every sample should be taken in triplicate.

Specimen 'A' – for STEP 1

Specimen 'B' – for STEP 2

Specimen 'X' – for storage/back-up

Case B. Analysis of cybutryne only, every sample should be taken in duplicate.

Specimen 'C' – for a one-step analysis  
Specimen 'X' – for storage/back-up

Case C. Simplified approach to detect organotin and cybutryne, every sample should be taken in duplicate.

Specimen 'C' – for a one-step analysis  
Specimen 'X' – for storage/back-up

3.2 Samples should be stored in appropriate sealed packaging, which will not react with or contaminate the sample.

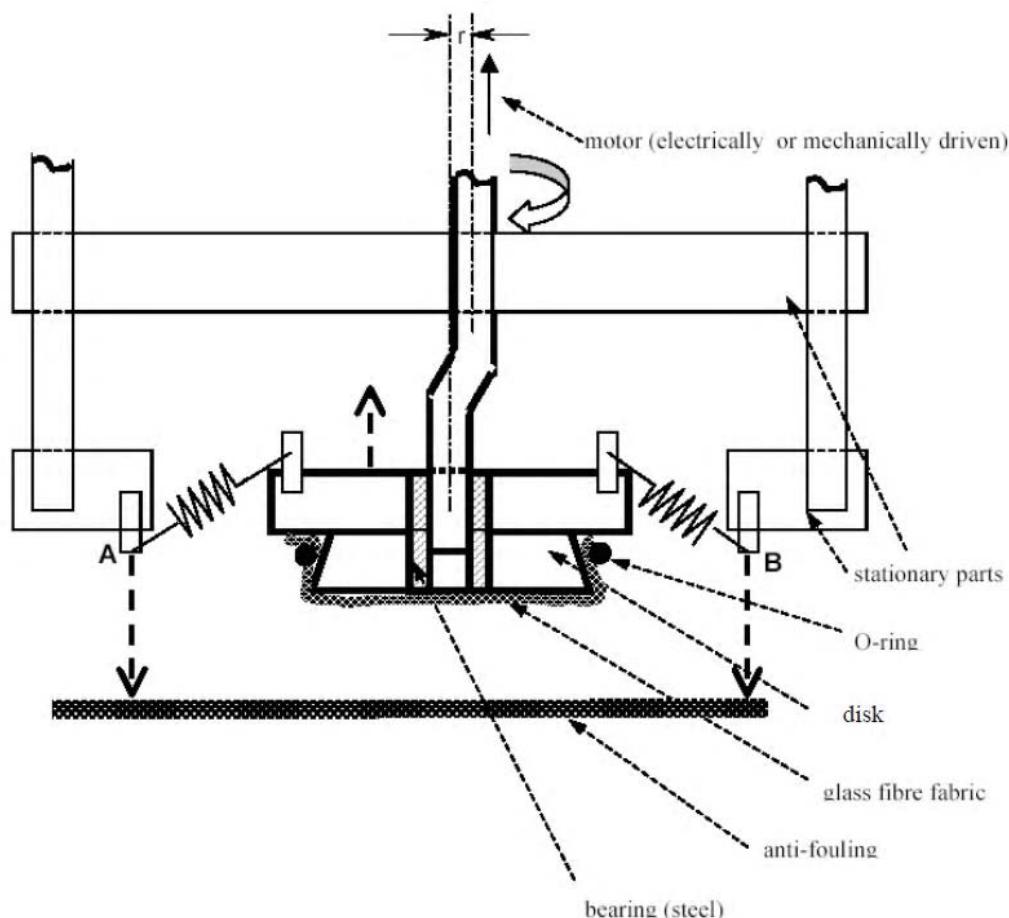


DIAGRAM A: Schematic cross section of the sampling device

The indicated points A and B are to be pressed against the surface. The polyethylene disk, covered with the glass fibre fabric, is moved with an amplitude of  $2r$  ( $r = 1,0 \text{ cm}$ ) on the surface.

**Specific data:**

Force applied on the paint surface:	25N (Newton)
Effective diameter of the disk:	5cm
Frequency of rotation:	6 rotations/s
Solvent used	isopropanol (0.8ml per sample).

#### 4. Sampling strategy

- 4.1 Sampling should be conducted in accordance with paragraph 4 of the Guidelines.
- 4.2 For inspection purposes in most cases accessibility to all parts of the hull will not be given. A minimum number of eight independent samples should be taken from different accessible parts of the hull.

#### 5. Analytical procedure

- 5.1 The analytical procedure will differ depending on the substances targeted as listed in Annex 1 of the AFS Convention.

##### **Case A. Analysis of organotin only**

5.1 5.2 The two components comprising the analytical procedure are illustrated in the flow diagram B. The two components, or steps, are as follows:

- .1 (STEP 1) - An analysis of Specimen A for the presence of total tin; and
- .2 (STEP 2) - A more cost- and time-consuming analysis of Specimen B, that is applied only when Step 1 produces positive results. This test involves organotin analysis by gas chromatography/mass spectrophotometry (GC/MS) after derivatisation and provides specific data on the respective organotin species.

##### **STEP 1: Investigation of total tin content in Specimen 'A'**

##### **Analysis of Specimen 'A'**

5.2 5.3 Specimen 'A' is analysed for mass of total tin per kilogram of dry paint (or mass of tin per sample) by applying inductively coupled plasma/mass spectrometry (ICP/MS), once the material had been solubilized by digestion using aqua regia. It should be noted that any other scientifically recognized procedure for tin analysis (such as AAS, XRF and ICP-OES) is acceptable.

##### **STEP 2: Characterization of organotin in Specimen 'B'**

##### **Analysis of Specimen 'B'**

**5.3** **5.4** Should Specimen 'A' produce positive results, organotin compounds should be identified and quantified in Specimen 'B'. Specimen 'B' may be analysed using the following procedure:

- .1 solvent extraction of Specimen 'B' as supported by sonication in an ultrasonic bath;
- .2 derivatisation with ethylmagnesium bromide;
- .3 clean-up of the extract;
- .4 analysis using high resolution gas chromatography/mass spectrophotometry (GC/MS); and
- .5 quantifications using tripropyltin as a standard.

**5.5** Any equally reliable method for the chemical identification and quantification of organotin compounds is acceptable.

#### **Case B. Analysis of cybutryne only**

**5.6** A one-step analysis of 'Specimen C' for determining the amount of cybutryne, using gas chromatography/mass spectrophotometry (GC/MS).

#### **ONE-STEP analysis: Characterisation of cybutryne in 'Specimen C'**

##### **Analysis of 'Specimen C'**

**5.7** 'Specimen C' should be analysed using the following procedure:

- .1 Sample extraction using ethyl acetate with added internal standard (ametryn) using an ultrasonic bath for 15 minutes;
- .2 Centrifugation of the samples at 600 rcf for 5 minutes;
- .3 Analysis of the supernatant using high resolution capillary GC/MS, with the MS operating in SIM mode;
- .4 Quantification using reference cybutryne solutions and an internal standard normalization procedure;
- .5 Modified GC/MS methods resulting in an expanded measurement uncertainty ( $k=2$ ; 95% confidence) of 25% are acceptable.

**5.8** Other methods for the chemical identification and quantification of cybutryne, if proven equally reliable, could be accepted by the Administration or the port State.

#### **Case C. simplified approach to detect organotin and cybutryne**

**5.9** A one-step analysis of 'Specimen C' for determining the amount of organotin and cybutryne using gas chromatography/mass spectrophotometry (GC/MS).

## **ONE-STEP analysis: Characterisation of organotin and cybutryne in 'Specimen C'**

- .1 Sample extraction using toluene with added internal standard (ametryn) using an ultrasonic bath for 15 minutes;
- .2 derivatisation with ethylmagnesium bromide;
- .3 clean-up of the extract;
- .4 Centrifugation of the samples at 600 rcf for 5 minutes;
- .5 Analysis of the supernatant using high resolution capillary GC/MS, with the MS operating in SIM mode;
- .6 Cybutryne quantification using reference cybutryne solutions and an internal standard normalization procedure. Organotin quantification using tripropyltin as the internal standard.
- .7 Modified GC/MS methods resulting in an expanded measurement uncertainty ( $k=2$ ; 95% confidence) of 25% are acceptable.

5.10 Other methods for the chemical identification and quantification of organotin and cybutryne, if proven equally reliable, could be accepted by the Administration or the port State.

## **6. Threshold and tolerance range**

6.1 The threshold value for organotin compounds for the brief sampling method as described here is:

"2,500 mg tin (Sn) per kg of dry paint."

6.2 The threshold value for cybutryne for the brief sampling method as described here is:

"1,000 mg of cybutryne per kg of dry paint."

### **Tolerance range**

6.2 6.3 The tolerance range is 500 mg Sn / kg of dry paint (20%) in addition to the threshold value.

6.4 The tolerance range is 250 mg cybutryne / kg of dry paint (25%) in addition to the threshold value.

### **Organotin containing compounds acting as biocides or catalysts**

**6.3 6.5** As stated in the appendix of resolution MEPC.102(48) to be updated, for the purposes of defining compliance with annex 1 of the Convention, it should be noted that small quantities of organotin compounds, acting as chemical catalysts (such as mono- and di-substituted organotin compounds) are allowed, provided they are not acting as a biocide.

**6.4 6.6** Inorganic impurities in the constituents of the paints should be considered.

**6.5 6.7** At present neither organotin catalysts nor inorganic impurities are found at concentrations which will be close to the threshold level (2,500 mg Sn/kg of dry paint) or higher. However, organotin-containing compounds, when present in paint in order to act as a biocide, were found in concentrations up to 50,000mg Sn/kg of dry paint. Thus the discrimination between anti-fouling systems containing organotin compounds acting as a biocide and anti-fouling systems not containing these compounds or not containing these compounds at concentrations where they act as a biocide, is reliably possible.

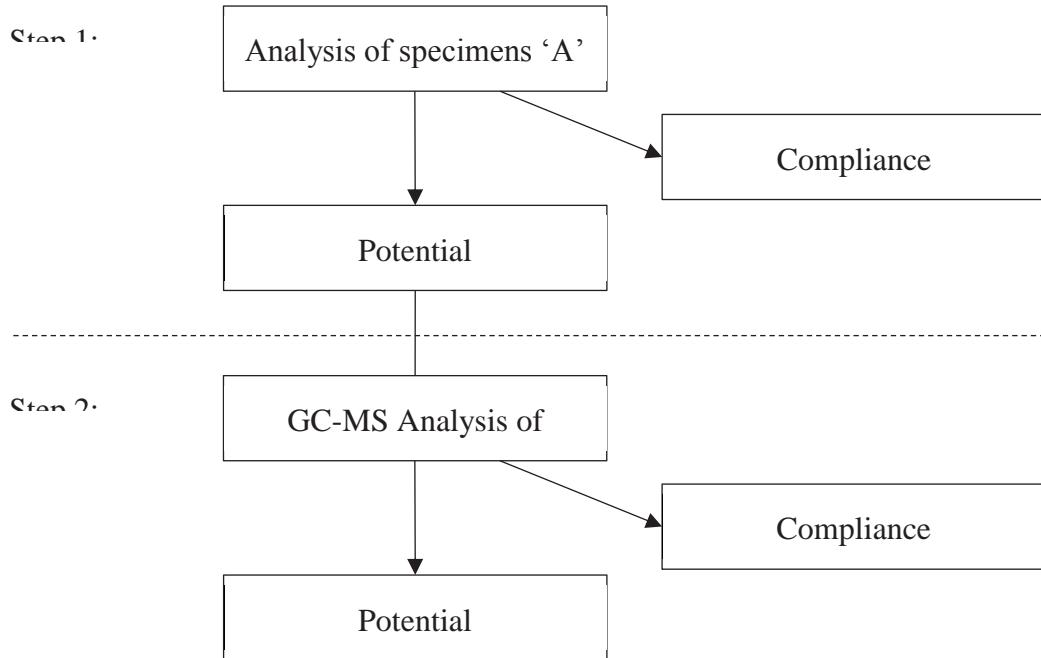
## **7. Definition of compliance**

**7.1** The analytical verification of the compliance will differ depending on the substances targeted as listed in Annex 1 of the AFS Convention.

### **Case A. Analysis of organotin only**

#### **Two-step procedure**

**7.4 7.2** The analytical verification of the compliance with the Convention for organotin compounds is performed in a two-step procedure according to the flow-diagram (diagram B).



**DIAGRAM B:** Flow diagram illustrating the two-step analysis procedure for organotin compounds

#### Compliance with the criteria at the 'STEP 1-level'

**7.2 7.3** Compliance with the Convention is assumed when the results from the specimens 'A', analysed in step 1, meet the following:

- .1 no more than 25% of the total number of samples yield results above 2,500 milligrams total tin per kilogram dry paint (2,500 mg Sn/kg of dry paint); and
- .2 no sample of the total number of at least eight samples shows a concentration of total tin higher than the sum of threshold value plus the tolerance range, i.e. no sample must exceed the concentration 3,000 mg Sn/kg of dry paint.

**7.3 7.4** If the results in specimen 'A' indicate that no organotin acting as biocide is present, then performing step 2 is not necessary.

#### Non-compliance with the criteria at the 'STEP 1-level'

**7.4 7.5** A positive result (non-compliance) is indicated if provisions of paragraph 7.23 are not met.

**7.5 7.6** A positive result at step 1 (specimen 'A') would indicate that step 2 should be undertaken, and those samples labelled specimen 'B' should be analysed in order to determine and characterize the organotin present (see diagram B).

## **Compliance with the criteria at the 'STEP 2-level'**

**7.6 7.7** Compliance with the Convention is assumed when the results from the specimens 'B', analysed in step 2, meet the following requirements at the same time:

- .1 no more than 25% of the total number of samples yield results above 2,500 milligrams total tin per kilogram dry paint (2,500 mg Sn/kg of dry paint); and
- .2 no sample of the total number of at least eight samples shows a concentration of total tin higher than the sum of threshold value plus the tolerance range, i.e., no sample must exceed the concentration 3,000 mg Sn/kg of dry paint.

## **Non-compliance at 'STEP 2-level'**

**7.7 7.8** A positive result in step 2 indicates non-compliance if the provisions of paragraph 7.67 are not met. Such results should be interpreted to mean that organotin compounds are present in the anti-fouling system at a level at which it would act as a biocide.

## **Case B. Analysis of cybutryne only**

**7.9** Compliance with the Convention is assumed when the results from specimen 'C', analysed in a one-step analysis for cybutryne, meet the following requirement:

- .1 The average value of the total number of specimens shows a concentration below the threshold plus the tolerance range i.e. 1,250 mg of cybutryne per kg of dry paint.

## **Non-compliance at the one-step analysis for cybutryne**

**7.10** An average value of the total number of specimens showing a concentration above the threshold plus the tolerance range i.e. 1,250 mg of cybutryne per kg of dry paint indicates non-compliance.

## **Case C. Simplified approach to detect organotin and cybutryne**

**7.11** Compliance with the Convention is assumed when the results from specimen 'C', analysed in a one-step analysis for organotin and cybutryne, meet the two conditions below:

requirement:

- .1 For organotin, the average value of the total number of specimens shows a concentration below the threshold plus the tolerance range i.e., 3 000 mg Sn/kg of dry paint,  
and
- .2 For cybutryne, the average value of the total number of specimens shows a concentration below the threshold plus the tolerance range i.e. 1 250 mg of cybutryne per kg of dry paint

## **Non-compliance at the one-step analysis for organotin and cybutryne**

7.12 If one of the conditions set out in paragraph 7.11 above is not met, this indicates non-compliance. Such results should be interpreted to mean that cybutryne or organotin is present in the anti-fouling system at a level at which it would act as a biocide.

**APPENDIX TO METHOD 1 - RECORD SHEET FOR THE BRIEF SAMPLING PROCEDURE  
FOR COMPLIANCE WITH THE CONVENTION IN TERMS OF THE PRESENCE OF  
ORGANOTIN AND/OR CYBUTRYNE ACTING AS A BIOCIDE IN ANTI-FOULING  
SYSTEMS ON SHIP HULLS**

<b>9 RECORD SHEET: 10 GUIDELINES FOR BRIEF SAMPLING OF ANTI-FOULING SYSTEMS ON SHIP - ORGANOTINS AND CYBUTRYNE</b>	<b>11 RECORD NUMBER:</b>	
<b>12 SECTION A1: Administration</b>		
<b>13 1. Country</b>	<b>14 2. Name of Port</b>	<b>15 3. Date</b>
<b>16 4. Reason for sampling</b>	<b>17</b>	<b>18</b>
19 <input type="checkbox"/> Port State control	20 <input type="checkbox"/> Survey & certification	21 <input type="checkbox"/> Other flag state compliance inspection
<b>22 5. Company details:</b>		<b>24 6. Inspecting official's details</b>
25 1. Name of ship:	26	27 1. Name:
28 2. Distinctive number or letters:	29	30 2. Comments:
31 3. Port of registry	32	33
34 4. Gross tonnage:	35	36
37 5. IMO number	38	39
<b>40 SECTION B2: sampling</b>		
41 1. Time sampling procedure initiated:		
42 2. Description of location from where samples were taken (frame number and distance from boot topping, refer to paragraph 3.2):		
43 3. Number of samples taken (three <i>or two</i> specimens per sample):		
44 4. Photographs taken of the sample point prior to sampling?		
45	46 <input type="checkbox"/> Yes	47 <input type="checkbox"/> No
48 5. Time sampling procedure completed:		

49 6. Additional comments concerning sampling procedure:

50 **SECTION C3: Analysis and results**

51 **Case A. Analysis of organotin only**

52 1. Step 1 total tin analysis:

53 Company 54

name:

55 Analyst 56 57 Date 58  
responsible:  
:

59 2.Specime 'A' results: 60 Total number of specimens 'A' analysed:

61 o.	62 mg Sn / kg	63 o.	64 mg Sn / kg	65 o.	66 mg Sn / kg	67 o.	68 mg Sn / kg
69	70	71	72	73	74	75 3	76
77	78	79	80	81 0	82	83 4	84
85	86	87	88	89 1	90	91 5	92
93	94	95	96	97 2	98	99 6	100

101 Number of specimens exceeding 2,500 102  
mg/kg:

103 1 or more specimens exceeding 3,000 104  yes 105  no  
mg/kg:

106 Conclusion: 107 Step 2 required 108

109 110 Compliance, Further analysis 111   
unnecessary:

112 3. Additional comments concerning analysis of results from Specimens 'A':

113 4. Organotin analysis undertaken by:

114 Company 115

name:

116 Analyst 117 118 Date 119  
responsible:  
:

120 5.Specime 'B' results: 121 Total number of specimens 'B' analysed:

122 o.	123 mg Sn / kg	124 o.	125 mg Sn / kg	126 o.	127 mg Sn / kg	128 o.	129 mg Sn / kg
130	131	132	133	134	135	136 3	137
138	139	140	141	142 0	143	144 4	145
146	147	148	149	150 1	151	152 5	153

154	155	156	157	158 2	159	160 6	161	
162 Number of specimens exceeding 2,500 mg/kg:	163							
164 1 or more specimens exceeding mg/kg:	165	166	167 Conclusion:	168 Non-compliance	169	170	171 Compliance, Further analysis unnecessary:	172
<b>173 6. Additional comments concerning analysis of results from Specimens 'B':</b>								

<b>174 Case B. Analysis of cybutryne only</b>							
<b>175 1. A ONE-STEP analysis using gas chromatography/mass spectrophotometry (GC/MS)</b>							
176 Company name:	177	178 Analyst responsible:	179	180 Date :	181		
<b>182 2.Specime 'C' results:</b>				183			
184 Total number of specimens 'C' analysed by GC-MS:	185						
186 Average concentration of cybutryne (mg of cybutryne per kg of dry paint):	187						
<b>188 3. Conclusions:</b>				189	190		
191 The average concentration of cybutryne exceeds the threshold of 1,250 mg of cybutryne per kg of dry paint	192	<input type="checkbox"/> yes	193	<input type="checkbox"/> no			
<b>194 4. Additional comments concerning analysis of results from Specimens 'C':</b>							

<b>195 Case C. Simplified approach to detect organotin and cybutryne</b>							
<b>196 1. A ONE-STEP analysis using gas chromatography/mass spectrophotometry (GC/MS) analysis</b>							
197 Company name:	198	199 Analyst responsible:	200	201 Date :	202		
<b>203 2.Specime 'C' results:</b>				204			
205 Total number of specimens 'C' analysed by GC-MS:	206						
207 Average concentration of organotin (mg Sn per kg of dry paint)	208						
209 Average concentration of cybutryne (mg of cybutryne per kg of dry paint):	210						
211	212						

<b>213 3. Conclusions:</b>	214	215
216 The average concentration of organotin exceeds the threshold of 3 000 mg Sn/kg of dry paint	217 <input type="checkbox"/> yes	218 <input type="checkbox"/> no
219 The average concentration of cybutryne exceeds the threshold of 1,250 mg of cybutryne/kg of dry paint	220 <input type="checkbox"/> yes	221 <input type="checkbox"/> no
<b>222 4. Additional comments concerning analysis of results from Specimens 'C':</b>		

<b>223 SECTION 4: Final conclusion</b>	224		
<b>225 7. Summarised conclusion:</b>			
226	227 Compliance with AFS Convention assumed	228 <input type="checkbox"/>	
229	230 Non-compliance with AFS Convention assumed	231 <input type="checkbox"/>	
<b>232 THIS IS TO CERTIFY that this Record is correct in all respects.</b>			
233 Issued at	2: 235	236 237	238 239
240	241 (Place of issue of Record)		
242 243	2: 245	246 247	248 249
250 (Date of issue)	251 (Printed name and signature of authorized official issuing the Record)		
252 253	2: 255	256 257	258 259
260 261	262 (Seal or stamp of the authority/organization)		

## METHOD 2

### 1. Purpose of this method

1.1 This method provides sampling and analysis procedures to identify the presence of organotin compounds and/or cybutryne in the anti-fouling systems on ships. The method is designed such that the sampling and the first stage analysis could be carried out by ship surveyors or port State control officers (PSCOs) on the survey/inspection site, e.g. at a dry dock.

1.2 This method for organotin compounds is based on a two-stage analysis (case A under paragraph 4.6 of the Guidelines). The first stage detects total tin as an indicator for the presence of organotin and the second stage is necessary only in the case that the first stage analysis providing a positive result to detect specific organotin compounds.

1.3 The method for cybutryne analysis (case B under paragraph 4.6 of the Guidelines) is based on a one step analysis based on the gas chromatography/mass spectrometry analytical method (GC/MS).

1.4 A Simplified approach to detect organotin and cybutryne (case C under paragraph 4.6 of the Guidelines) is based on a one step analysis using the gas chromatography/mass spectrometry analytical method (GC/MS).

### 2. Sampling

2.1 The sampling is carried out by using abrasive paper rubbing on the surface of the anti-fouling system. This results in collection of paint fragment of the anti-fouling system from thin area, less than several micrometer in depth from the surface, which do not affect the coatings lying underneath such as sealers.

2.2 Abrasive paper is pasted on a disc of approximately 10 mm in diameter. Rubbing the surface of the anti-fouling system with the disc collects several milligrams of the sample on to the abrasive paper.

2.3 The sampling device consists of an electric motor, two (or three) rotating rods on each of which a disc is attached, and a battery for electric power supply. The discs are pressed on to the surface of ship's hull by spring coils. The disks rotate counter-clockwise while the rods turn clockwise around the centre of the device. Schematic diagram is illustrated in figure 1.

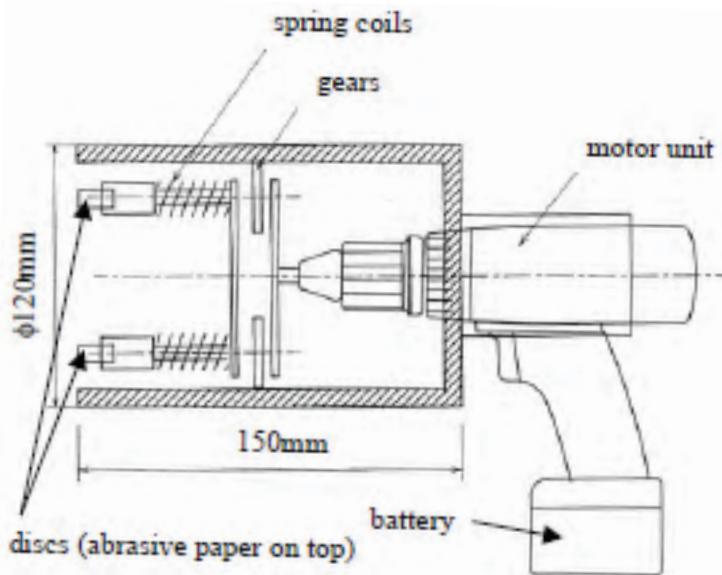


Figure 1. Schematic diagram of sampling device

2.4 Sampling point is selected such that the anti-fouling system is intact over an area of approximately 50 cm x 50 cm or more.

2.5 Depending on the substances targeted as listed in Annex 1 of the AFS Convention:

- A. For the analysis of organotin only, at each sampling point, three sets of sampling, or more if necessary, should be carried out to obtain at least six specimens.
- B. For the analysis of cybutryne only, at each sampling point, three sets of sampling, or more if necessary, should be carried out to obtain at least six specimens.
- C. For the analysis of organotin and cybutryne, at each sampling point, three sets of sampling, or more if necessary, should be carried out to obtain at least six specimens.

2.5 2.6 The device is pressed on the ship's hull where it is appropriate to be sampled and held by hand. The electric motor is switched on to slide along the painted surface to lightly scrape off the fragments of the paint onto the abrasive paper. After the sample collection, each disc is removed from the device and stored in an inert container.

2.6 2.7 Sampling should normally be carried out with the sampling device. However, in the case that accessibility to the sampling point is poor, it is acceptable to collect samples with the discs by hand if necessary.

### 3. Analysis

#### Case A. Analysis of organotin only

3.1 The first-stage analysis

- .1 The first-stage analysis is assumed to be carried out on the spot of the survey or inspection, e.g. dry docks and sea ports. In order to accomplish the on-site analysis, X-ray fluorescence analysis (XRF) is used in this method to detect total tin content.
- .2 Analytical characteristics, such as detection limit and accuracy, are highly dependent on the type of the instrument, i.e. type of X-ray tube, spectrometer, optical arrangement (filters or collimators), etc. Among several types of the XRF instruments, an energy-dispersive spectrometer with a silicon drift detector (SDD), which is compact in size and be able to be operated without liquid nitrogen, is preferable to the present analytical system for a field use, whereas wave-length dispersion system or solid-state detector are also available if the analysis carried out at laboratories.
- .3 Software customized for the tin analysis is prepared to assist the operator, who is assumed to be a ship surveyor or PSCO, to detect total tin in the specimens.

- .4 The customized software may in advance need a calibration curve of the characteristic X-ray intensity of tin in relation to the tin content particularly in the range of 0.1 to 0.5%.
- .5 After the preparation including the warming-up of the XRF instrument and starting-up of the computer, a specimen (sampling disc) is placed on the sample stage of the instrument. Afterwards, analysis is executed by the customized software. A single batch of analysis for one specimen normally takes 5 minutes and the result is shown on a display automatically.
- 6. Since the XRF analysis does not affect any properties of the specimens, all of the collected specimens (six to nine specimens), including those for the second analysis and storage, are able to be used for this analysis.

#### **4. 3.2 Interpretation of the result at the first-stage analysis**

- .1 Following the procedures above, XRF data of six, or nine, specimens are obtained for each sampling point. Omitting the maximum and minimum values from the data, an average of the tin content is calculated from the intermediate values for the representing value of the sampling point.
- .2 Compliance with the Convention is assumed when none of the tin contents (average values) from the samples do not exceed the sum of the threshold (2,500 mg per kg) and a tolerance (500 mg per kg).
- .3 When one or more average values of samples from different sampling points do not meet the above criteria, the samples should be sent to a laboratory for the second stage analysis. Regardless of the results, it is also possible to undergo the second stage analysis when the surveyor or PSCO considers that it is necessary to do so.

#### **5. 3.3 Second-stage analysis**

- .1 Since the second-stage analysis provides the final and definitive results of the samples, the method should be thoroughly reviewed by experts based on scientific evidence. The following is a brief summary of a tentative methodology for the second stage analysis.
- .2 The collected paint specimens are removed from the abrasive paper and total mass is measured with an electronic balance to an order of 0.1 mg. The specimens are hydrolysed with sodium hydroxide aqueous solution, extracted with organic solvent, and then derivatised with propylmagnesium bromide. After cleaning up the extract, analysis using high resolution gas chromatography/mass spectrometry (GC/MS) is carried out. For quantification analysis, tetrabutyl tin d36 is added as the internal standard.
- .3 These analyses provide the data of chemical species and their content (mg per kg of the specimens). The content of organotin is obtained in a unit of mg per kg of dry paint.

#### **Case B. For the analysis of cybutryne only**

3.4 The collected paint specimens are removed from the abrasive paper and total mass is measured with an electronic balance to an order of 0.1 mg. The following procedure is proposed for determining the concentration of cybutryne:

- .1 Sample extraction using ethyl acetate with added internal standard (ametryn) using an ultrasonic bath for 15 minutes;
- .2 Centrifugation of the samples at 600 rcf for 5 minutes;
- .3 Analysis of the supernatant using high resolution capillary GC/MS, with the MS operating in SIM mode;
- .4 Quantification using reference cybutryne solutions and an internal standard normalization procedure;
- .5 Modified GC/MS methods resulting in an expanded measurement uncertainty ( $k=2$ ; 95% confidence) of 25% are acceptable.

#### **Case C. Simplified approach to detect organotin and cybutryne**

3.5 The collected paint specimens are removed from the abrasive paper and total mass is measured with an electronic balance to an order of 0.1 mg. The following procedure is proposed for determining the concentration of organotin and cybutryne:

- .1 Sample extraction using toluene with added internal standard (ametryn) using an ultrasonic bath for 15 minutes;
- .2 Addition of sodium hydroxide aqueous solution to hydrolyse the sample and to facilitate the extraction to the toluene.
- .3 Centrifugation of the samples at 600 rcf for 5 minutes;
- .4 Collection of the supernatant and derivatisation with propylmagnesium bromide
- .5 clean-up of the extract;
- .6 Analysis of the toluene solution using high resolution capillary GC/MS, with the MS operating in SIM mode;
- .7 Cybutryne quantification using reference cybutryne solutions and an internal standard normalization procedure; Organotin quantification using tetrabutyl tin d36 is added as the internal standard
- .8 Modified GC/MS methods resulting in an expanded measurement uncertainty ( $k=2$ ; 95% confidence) of 25% are acceptable.

#### **6 4. Compliance with the Convention**

##### **Case A. Analysis of organotin only**

6.1 4.1 Compliance with the Convention for organotin compounds is assumed when the results from the second-stage analysis meet the following requirements at the same time:

- .1 no more than 25% of the total number of samples yield results above 2,500 milligrams tin as organic form per kilogram dry paint (2,500 mg Sn/kg of dry paint); and
- .2 no sample of the total number of specimens shows a concentration of tin as organic form higher than the sum of the threshold value plus the tolerance range, i.e., no sample must exceed the concentration 3,000 mg Sn/kg dry paint.

6.1 4.2 When the result does not meet the above criteria, it is interpreted to mean that organotin compounds are present in the anti-fouling system at a level where they would act as a biocide.

#### **Case B. Analysis of cybutryne only**

4.3 Compliance with the Convention for cybutryne is assumed when the results from the cybutryne analysis meets the following criteria:

- .1 The average value of the total number of specimens shows a concentration below the threshold plus the tolerance range i.e. 1,250 mg of cybutryne per kg of dry paint.

4.4 When the result does not meet the above criteria, it is interpreted to mean that cybutryne is present in the anti-fouling system at a level where they would act as a biocide.

#### **Case C. simplified approach to detect organotin and cybutryne**

4.5 Compliance with the Convention for organotin compounds and cybutryne is assumed when the results from the cybutryne and organotin analysis meets the two conditions below:

- .1 For organotin, the average value of the total number of specimens shows a concentration below the threshold plus the tolerance range i.e., 3 000 mg Sn/kg of dry paint.

and

- .2 For cybutryne, the average value of the total number of specimens shows a concentration below the threshold plus the tolerance range i.e. 1,250 mg of cybutryne per kg of dry paint.

4.6 When the results do not meet one of the conditions above, it is interpreted to mean that organotin compounds or cybutryne is present in the anti-fouling system at a level where they would act as a biocide.

## APPENDIX TO METHOD 2

**Record sheet for the sampling and analysis of anti-fouling systems on ship hulls - organotin compounds and/or cybutryne**

263	264	265 Record Number:
<b>266 Section A 1: Administration</b>		
267 1. Country	268 2. Location	
269 3. Date		
270 4. Reason for Survey/Inspection		
271 5. Details of the ship		
272 273 5.1 Name of Ship		
274 275 5.2 Distinctive Number or letters		
276 277 5.3 Gross tonnage	278 5.4. Year of built	
279 280 5.5 Owner or Operator of Ship	281	
282 283 5.6 Flag State	284 5.7 Class of ship	
285 286 5.8 Authority of AFS certificate	287	
288 289 5.9 Date of Issue	290	
291 292 5.10 Date of last endorsement	293	
294 295 5.11 IMO number	296	
297 298 5.12 Name of shipmaster	299	
300 301 5.13 Product Name of Anti-fouling system	302	
303 304 5.14 Name of manufacturer	305	
306 307 5.15 Name of Shipyard where applied	308	
309 310 5.16 Comments	311	
312 6. Inspecting Official's Details		
313 314 6.1 Name		315

**319 Section 2 – Sampling and analysis**

320

**321 Case A. Analysis of organotin only**

322

323

<b>324 Record Number</b>	<b>325</b>
--------------------------	------------

**326 Section B: Sampling and Stage 1-one Analysis (X-ray Fluorescence Analysis)**

327 Date:	328 Instrument I.D.	329 330	331	332	333	334	335	336	345 Average
337 Sample location	338 Specimen I.D.	340 Sample Dis	342 Content of Tin (mg/kg)	343 ax	344 in				
346 347	348 1	349 abrasive	350	351	352	353			
354 355	356 2	357 metal	358	359	360	361			
362 363	364 3	365 others	366	367	368	369	Averag		
370 371	372 4	373 abrasive	374	375	376	377			
378 379	380 5	381 metal	382	383	384	385	mg/kg		
386 387	388 6	389 others	390	391	392	393	>2,500 mg/kg		
394 395	396 7	397 abrasive	398	399	400	401	>3,000 mg/kg		
402 403	404 8	405 metal	406	407	408	409			
410 411	412 9	413 others	414	415	416	417			
418 419	420 1	421 abrasive	422	423	424	425			
426 427	428 2	429 metal	430	431	432	433			
434 435	436 3	437 others	438	439	440	441	Averag		
442 443	444 4	445 abrasive	446	447	448	449			
450 451	452 5	453 metal	454	455	456	457	mg/kg		
458 459	460 6	461 others	462	463	464	465	>2,500 mg/kg		
466 467	468 7	469 abrasive	470	471	472	473	>3,000 mg/kg		
474 475	476 8	477 metal	478	479	480	481			
482 483	484 9	485 others	486	487	488	489			

490	491	492	C 1	493 abrasive	<input type="checkbox"/>	494	495	496	497
498	499	500	C 2	501 metal	<input type="checkbox"/>	502	503	504	505
506	507	508	C 3	509 others	<input type="checkbox"/>	510	511	512	513 Averag
514	515	516	C 4	517 abrasive	<input type="checkbox"/>	518	519	520	521
522	523	524	C 5	525 metal	<input type="checkbox"/>	526	527	528	529 mg/kg
530	531	532	C 6	533 others	<input type="checkbox"/>	534	535	536	537 <2,5
538	539	540	C 7	541 abrasive	<input type="checkbox"/>	542	543	544	545 >3,0
546	547	548	C 8	549 metal	<input type="checkbox"/>	550	551	552	553
554	555	556	C 9	557 others	<input type="checkbox"/>	558	559	560	561
562	563	564	D 1	565 abrasive	<input type="checkbox"/>	566	567	568	569
570	571	572	D 2	573 metal	<input type="checkbox"/>	574	575	576	577
578	579	580	D 3	581 others	<input type="checkbox"/>	582	583	584	585 Averag
586	587	588	D 4	589 abrasive	<input type="checkbox"/>	590	591	592	593
594	595	596	D 5	597 metal	<input type="checkbox"/>	598	599	600	601 mg/kg
602	603	604	D 6	605 others	<input type="checkbox"/>	606	607	608	609 >2,5
610	611	612	D 7	613 abrasive	<input type="checkbox"/>	614	615	616	617 >3,0
618	619	620	D 8	621 metal	<input type="checkbox"/>	622	623	624	625
626	627	628	D 9	629 others	<input type="checkbox"/>	630	631	632	633

634

635	<input type="checkbox"/> Stage II required	636 <input type="checkbox"/> samples out of 2,500 mg/kg	are above	637 <input type="checkbox"/> Compliant
638		<input type="checkbox"/> sample(s) 3,000 mg/kg	is (are) above	
639	Sampled by	640	641 Analysed by	642
643	Signature	644	645 Signature	646

647	648 Record Number:
<b><u>Section C: Stage II two Analysis (Gas Chromatography Mass Spectrometry)</u></b>	
650	Date

651	Instrument I.D.			
652	Comments on the method			
653 ample I.D.	654 pecimen Used	655 ontent of Tin (XFR analysis) (mg/kg)	656 ontent of Tin (as organotin) (mg/kg)	657 ompliance
658	659	660	661	662 >2,500 mg/kg 663 >3,000 mg/kg
664	665	666	667	668 >2,500 mg/kg 669 >3,000 mg/kg
670	671	672	673	674 >2,500 mg/kg 675 >3,000 mg/kg
676	677	678	679	680 >2,500 mg/kg 681 >3,000 mg/kg
682	4. Conclusion	683	684	
685	<input type="checkbox"/> Not compliant	686	_____ samples out of _____ are above 2,500 mg/kg	
688	<input checked="" type="checkbox"/> Compliant	687	_____ sample(s) _____ is (are) above 3,000 mg/kg	
690	5. Additional comments	691		
692	6. Laboratory Name	693		
694	7. Analysed by	695	696	8. Signature
			697	

## 698 Case B. Analysis of cybutryne only

699

700

701 Record  
Number

702

703 Sampling and Gas Chromatography Mass Spectrometry analysis		704 Date:		705 Instrument I.D.	706	707	708	709	710	711	71	713
714	Sample location	715	Specime n	716	Sampl e	717	718	719	Comments to the samples and sampling procedure	720	Comments to the sample location	
721	A	722	723	A1		724	<input type="checkbox"/>	725		726		
727		728	729	A2		730	<input type="checkbox"/>	731		732		
733		734	735	A3		736	<input type="checkbox"/>	737		738		
739		740	741	A4		742	<input type="checkbox"/>	743		744		
745		746	747	A5		748	<input type="checkbox"/>	749		750		
751		752	753	A6		754	<input type="checkbox"/>	755		756		
757		758	759	A7		760	<input type="checkbox"/>	761		762		
763		764	765	A8		766	<input type="checkbox"/>	767		768		
769		770	771	A9		772	<input type="checkbox"/>	773		774		
775	B	776	777	B1		778	<input type="checkbox"/>	779		780		
781		782	783	B2		784	<input type="checkbox"/>	785		786		
787		788	789	B3		790	<input type="checkbox"/>	791		792		
793		794	795	B4		796	<input type="checkbox"/>	797		798		
799		800	801	B5		802	<input type="checkbox"/>	803		804		
805		806	807	B6		808	<input type="checkbox"/>	809		810		
811		812	813	B7		814	<input type="checkbox"/>	815		816		
817		818	819	B8		820	<input type="checkbox"/>	821		822		
823		824	825	B9		826	<input type="checkbox"/>	827		828		
829	C	830	831	C1		832	<input type="checkbox"/>	833		834		
835		836	837	C2		838	<input type="checkbox"/>	839		840		

841	842	843 C3	844 <input type="checkbox"/> others	845	846
847	848	849 C4	850 <input type="checkbox"/> abrasive	851	852
853	854	855 C5	856 <input type="checkbox"/> metal	857	858
859	860	861 C6	862 <input type="checkbox"/> others	863	864
865	866	867 C7	868 <input type="checkbox"/> abrasive	869	870
871	872	873 C8	874 <input type="checkbox"/> metal	875	876
877	878	879 C9	880 <input type="checkbox"/> others	881	882
883 D	884	885 D1	886 <input type="checkbox"/> abrasive	887	888
889	890	891 D2	892 <input type="checkbox"/> metal	893	894
895	896	897 D3	898 <input type="checkbox"/> others	899	900
901	902	903 D4	904 <input type="checkbox"/> abrasive	905	906
907	908	909 D5	910 <input type="checkbox"/> metal	911	912
913	914	915 D6	916 <input type="checkbox"/> others	917	918
919	920	921 D7	922 <input type="checkbox"/> abrasive	923	924
925	926	927 D8	928 <input type="checkbox"/> metal	929	930
931	932	933 D9	934 <input type="checkbox"/> others	935	936

937

938 Average concentration of cybutryne (mg of cybutryne per kg of dry paint)	939
940 Sample d by	941 942 Analysed by
944 Signatur e	945 946 Signature 947

## 948 Case C. Simplified approach to detect organotin and cybutryne

949	950 Record Number	951					
<b>952 Sampling and Gas Chromatography Mass Spectrometry analysis</b>							
953 Date:		954 Instrument I.D.					
955	956	957	958	959	960	96	962
963 Sample location	964 Specime n	965 I.D.	966 Sampl e	967 Disc	968 Comment s to the samples and sampling procedure	969 Comment s to the sample location	970
A	971	972 A1	973 <input type="checkbox"/>	974	975		

976	977		978 A2	abrasive	980	981
979				<input type="checkbox"/>		
982	983		984 A3	metal	986	987
985				<input type="checkbox"/>		
988	989		990 A4	others	992	993
991				<input type="checkbox"/>		
994	995		996 A5	abrasive	998	999
997				<input type="checkbox"/>		
1000	1001		1002 A6	metal	1004	1005
1003				<input type="checkbox"/>		
1006	1007		1008 A7	others	1010	1011
1009				<input type="checkbox"/>		
1012	1013		1014 A8	abrasive	1016	1017
1015				<input type="checkbox"/>		
1018	1019		1020 A9	metal	1022	1023
1021				<input type="checkbox"/>		
1024	B	1025	1026 B1	others	1028	1029
1027				<input type="checkbox"/>		
1030	1031		1032 B2	abrasive	1034	1035
1033				<input type="checkbox"/>		
1036	1037		1038 B3	metal	1040	1041
1039				<input type="checkbox"/>		
1042	1043		1044 B4	others	1046	1047
1045				<input type="checkbox"/>		
1048	1049		1050 B5	abrasive	1052	1053
1051				<input type="checkbox"/>		
1054	1055		1056 B6	metal	1058	1059
1057				<input type="checkbox"/>		
1060	1061		1062 B7	others	1064	1065
1063				<input type="checkbox"/>		
1066	1067		1068 B8	abrasive	1070	1071
1069				<input type="checkbox"/>		
1072	1073		1074 B9	metal	1076	1077
1075				<input type="checkbox"/>		
1078	C	1079	1080 C1	others	1082	1083
1081				<input type="checkbox"/>		
1084	1085		1086 C2	abrasive	1088	1089
1087				<input type="checkbox"/>		
1090	1091		1092 C3	metal	1094	1095
1093				<input type="checkbox"/>		
1096	1097		1098 C4	others	1100	1101
1099				<input type="checkbox"/>		
1102	1103		1104 C5	abrasive	1106	1107
1105				<input type="checkbox"/>		
1108	1109		1110 C6	metal	1112	1113
1111				<input type="checkbox"/>		
1114	1115		1116 C7	others	1118	1119
1117				<input type="checkbox"/>		
1120	1121		1122 C8	abrasive	1124	1125
1123				<input type="checkbox"/>		
metal						

<b>1126</b>	<b>1127</b>	<b>1128 C9</b>	<b>1129</b> <input type="checkbox"/> others	<b>1130</b>	<b>1131</b>
<b>1132 D</b>	<b>1133</b>	<b>1134 D1</b>	<b>1135</b> <input type="checkbox"/> abrasive	<b>1136</b>	<b>1137</b>
<b>1138</b>	<b>1139</b>	<b>1140 D2</b>	<b>1141</b> <input type="checkbox"/> metal	<b>1142</b>	<b>1143</b>
<b>1144</b>	<b>1145</b>	<b>1146 D3</b>	<b>1147</b> <input type="checkbox"/> others	<b>1148</b>	<b>1149</b>
<b>1150</b>	<b>1151</b>	<b>1152 D4</b>	<b>1153</b> <input type="checkbox"/> abrasive	<b>1154</b>	<b>1155</b>
<b>1156</b>	<b>1157</b>	<b>1158 D5</b>	<b>1159</b> <input type="checkbox"/> metal	<b>1160</b>	<b>1161</b>
<b>1162</b>	<b>1163</b>	<b>1164 D6</b>	<b>1165</b> <input type="checkbox"/> others	<b>1166</b>	<b>1167</b>
<b>1168</b>	<b>1169</b>	<b>1170 D7</b>	<b>1171</b> <input type="checkbox"/> abrasive	<b>1172</b>	<b>1173</b>
<b>1174</b>	<b>1175</b>	<b>1176 D8</b>	<b>1177</b> <input type="checkbox"/> metal	<b>1178</b>	<b>1179</b>
<b>1180</b>	<b>1181</b>	<b>1182 D9</b>	<b>1183</b> <input type="checkbox"/> others	<b>1184</b>	<b>1185</b>

<b>1186</b>	<b>1187 Average content of organotin (mg of organotin per kg of dry paint)</b>	<b>1188</b>
<b>1189 Average concentration of cybutryne (mg of cybutryne per kg of dry paint)</b>		<b>1190</b>
<b>1191 Sample d by</b>	<b>1192</b>	<b>1193 Analysed by</b>
<b>1195 Signatur e</b>	<b>1196</b>	<b>1197 Signature</b>
		<b>1194</b>
		<b>1198</b>

## **1199 Section D 3: Final Conclusion**

<b>1200</b>	<b>1. Conclusion</b>	
<b>1201</b>	<b>1202</b>	<input type="checkbox"/> Anti-fouling system is compliant with the AFS Convention 2001.
<b>1203</b>	<b>1204</b>	<input type="checkbox"/> Anti-fouling system is NOT compliant with the AFS Convention 2001.
<b>1205</b>	<b>2. Comments</b>	
<b>1206</b>	<b>3. Processed Official</b>	
<b>1207</b>	<b>3.1 Name</b>	<b>1208 Date</b>
<b>1209</b>	<b>3.3 Signature</b>	<b>3.2</b>
<b>1210</b>	<b>4. Authorized Administrator</b>	
<b>1211</b>	<b>4.1 Name</b>	<b>1212 Date</b>
<b>1213</b>	<b>4.3 Signature</b>	<b>4.2</b>

## **Annex 2 – Suggested text amendments to the guidelines for inspection of antifouling systems on ships**

### **2011 GUIDELINES FOR INSPECTION OF ANTI-FOULING SYSTEMS ON SHIPS**

#### **1 INTRODUCTION**

1.1 The right of the port State to conduct inspections of anti-fouling systems on ships is laid down in Article 11 of the AFS Convention. The guidelines for conducting these inspections are described below.

1.2 Ships of 400 gross tonnage and above engaged in international voyages (excluding fixed or floating platforms, FSUs and FPSOs) will be required to undergo an initial survey before the ship is put into service or before the International Anti-fouling System Certificate (IAFS) is issued for the first time; and a survey should be carried out when the anti-fouling systems are changed or replaced.

1.3 Ships of 24 metres in length or more but less than 400 gross tonnage engaged in international voyages (excluding fixed or floating platforms, FSUs and FPSOs) will have to carry a Declaration on Anti-fouling Systems signed by the owner or authorized agent. Such declaration shall be accompanied by appropriate documentation (such as a paint receipt or a contractor invoice) or contain appropriate endorsement.

#### **2 INITIAL INSPECTION**

##### **2.1 Ships required to carry an IAFS Certificate or Declaration on Anti-Fouling Systems (Parties of the AFS Convention)**

2.1.1 The PSCO should check the validity of the IAFS Certificate or Declaration on Anti-Fouling Systems, and the attached Record of Anti-Fouling Systems, if appropriate.

2.1.2 The only practical way to apply paint to the ship's bottom (underwater part) is in a dry dock. This means that the date of application of paint on the IAFS Certificate should be checked by comparing the period of dry-docking with the date on the certificate.

2.1.3 If the paint has been applied during a scheduled dry-dock period, it has to be registered in the ship's logbook (~~in order to be legal~~). Furthermore, this scheduled dry-docking can be verified by the endorsement date on the (statutory) ~~Cargo Ship Safety Construction Certificate or the Cargo Ship Safety Certificate (SOLAS, regulation I/12(a) (v)) and Passenger Ship Safety Certificate (SOLAS, regulation I/7)~~.

2.1.4 In case of an unscheduled dry-dock period, it could be verified by the registration in the ship's logbook (~~in order to be legal~~).

2.1.5 It can be additionally verified by the endorsement date on the (Class) Hull Certificate, the dates on the Manufacturer's Declaration or by confirmation of the shipyard.

2.1.6 The IAFS Certificate includes a series of tick boxes indicating ~~for each of the anti-fouling systems, describing the following situations:~~

- .1 if an anti-fouling system controlled under Annex 1 of the AFS Convention has or has not been applied during or after construction of this ship; removed or been covered with a sealer coat;
- .2 if an anti-fouling system controlled under Annex 1 of the AFS Convention was applied on the ship prior to 1 January 2003 or a later date if specified by the Administration has been applied on this ship previously, but has been removed; and;
- .3 if an anti-fouling system controlled under Annex 1 of the AFS Convention was applied on the ship on/after 1 January 2003 or a later date if specified by the Administration has been applied on this ship previously, but has been covered with a sealer coat;
- .4 if an anti-fouling system controlled under Annex 1 of the AFS Convention has been applied on this ship previously, but is not in the external coating layer of the hull or external parts or surfaces on 1 January 2023 (not applicable for organotin); and
- .5 if an anti-fouling system controlled under Annex 1 of the AFS Convention was applied on this ship prior to date 1 January 2023, but must be removed or covered with a sealer coat no later than 60 months following the last application to the ship of an anti-fouling systems containing cybutryne (not applicable for organotin).

2.1.7 Particular attention should be given to verifying that the survey for issuance of the current IAFS Certificate matches the dry-dock period listed in the ship's log(s) and that only one tick box is marked for each of the substances controlled under Annex 1.

2.1.8 The Record of Anti-Fouling Systems should be attached to the IAFS Certificate and be up to date. The most recent record should agree with the tick box on the front of the IAFS Certificate. The issuing of the IAFS certificate should be in accordance with Regulation 2(3) of Annex 4 of the AFS Convention.

## 2.2 Ships of non-Parties to the AFS Convention

2.2.1 Ships of non-Parties to the AFS Convention are not entitled to be issued with an IAFS Certificate. Therefore the PSCO should ask for documentation that contains the same information as in an IAFS Certificate and take this into account in determining compliance with the requirements.

2.2.2 If the existing anti-fouling system is declared not to be controlled under Annex 1 of the Convention, without being documented by an International Anti-Fouling System Certificate, verification should be carried out to confirm that the anti-fouling system complies with the requirements of the Convention. This verification may be based on sampling and/or testing and/or reliable documentation, as deemed necessary, based on experience gained and the existing circumstances. Documentation for verification could be, e.g., MSDSs (Material Safety Data Sheets), or similar, a declaration of compliance from the anti-fouling system manufacturer, invoices from the shipyard and/or the anti-fouling system manufacturer.

2.2.3 Ships of non-Parties may have Statements of Compliance issued in order to comply with regional requirements, for example, Regulation (EC) 782/2003 as amended by Regulation (EC) 536/2008, which could be considered as providing sufficient evidence of compliance for organotin compounds.

2.2.4 In all other aspects the PSCO should be guided by the procedures for ships required to carry an IAFS Certificate.

2.2.5 The PSCO should ensure that no more favourable treatment is applied to ships of non-Parties to the AFS Convention.

### **3 MORE DETAILED INSPECTION**

#### **3.1 Clear ground**

3.1.1 A more detailed inspection may be carried out when there has been clear grounds to believe that the ship does not substantially meet the requirements of the AFS Convention. Clear grounds for a more detailed inspection may be when:

- .1 the ship is from a flag of a non-Party to the Convention and there is no AFS documentation;
- .2 the ship is from a flag of a Party to the Convention but there is no valid IAFS Certificate;
- .3 the painting date shown on the IAFS Certificate does not match the dry-dock period of the ship;
- .4 the ship's hull shows excessive patches of different paints; and
- .5 the IAFS Certificate is not properly completed.

3.1.2 If the IAFS Certificate is not properly completed, the following questions may be pertinent:

- .1 "When was the ship's anti-fouling system last applied?";
- .2 "If the anti-fouling system is controlled under Annex 1 to the AFS Convention and was removed, what was the name of the facility and date of the work performed?";
- .3 "If the anti-fouling system is controlled under Annex 1 of the AFS Convention and has been covered by a sealer coat, what was the name of the facility and date applied?";
- .4 "What is the name of the anti-fouling/sealer products and the manufacturer or distributor for the existing anti-fouling system?"; and
- .5 "If the current anti-fouling system was changed from the previous system, what was the type of anti-fouling system and name of the previous manufacturer or distributor?".

### **3.2 Sampling**

3.2.1 A more detailed inspection may include sampling and analysis of the ship's anti-fouling system, if necessary, to establish whether or not the ship complies with the AFS Convention. Such sampling and analysis may involve the use of laboratories and detailed scientific testing procedures.

3.2.2 If sampling is carried out, the time to process the samples cannot be used as a reason to delay the ship.

3.2.3 Any decision to carry out sampling should be subject to practical feasibility or to constraints relating to the safety of persons, the ship or the port (see appendix 1 for sampling procedures; an AFS Inspection Report template for sampling and analysis is attached to the Guidelines).

### **3.3 Action taken under the AFS Convention**

#### **Detention**

3.3.1 The port State could decide to detain the ship following detection of deficiencies during an inspection on board.

3.3.2 Detention could be appropriate in any of the following cases:

- .1 certification is invalid or missing;
- .2 the ship admits it does not comply (thereby removing the need to prove by sampling); and
- .3 sampling proves it is non-compliant within the ports jurisdiction.

3.3.3 Further action would depend on whether the problem is with the certification or the anti-fouling system itself.

3.3.4 If there are no facilities in the port of detention to bring the ship into compliance, the port State could allow the ship to sail to another port to bring the anti-fouling system into compliance. This would require an agreement of that port.

#### **Dismissal**

3.3.5 The port State could dismiss the ship, meaning that the port State demands that the ship leaves port – for example if the ship chooses not to bring the AFS into compliance but the port State is concerned that the ship is leaching tributyltin (TBTs) or cybutryne into its waters.

3.3.6 Dismissal could be appropriate if the ship admits it does not comply or sampling proves it is non-compliant while the ship is still in port. Since this would also be a detainable deficiency the PSCO can detain first and require rectification before release. However, there may not be available facilities for rectification in the port of detention. In this case the port State could allow the ship to sail to another port to bring the anti-fouling system into compliance. This could require agreement of that port.

3.3.7 Dismissal could be appropriate in any of the following cases:

- .1 certification is invalid or missing;
- .2 the ship admits it does not comply (thereby removing the need to collect proof by sampling; and
- .3 sampling proves that the ship is non-compliant within the ports jurisdiction.

3.3.8 In these cases the ship will probably already have been detained. However, detention does not force the ship to bring the AFS into compliance (only if it wants to depart). In such a situation the port State may be concerned that the ship is leaching TBTs or cybutryne while it remains in its waters.

### **Exclusion**

3.3.9 The port State could decide to exclude the ship to prevent it entering its waters. Exclusion could be appropriate if sampling proves that the ship is non-compliant but the results have been obtained after it has sailed or after it has been dismissed.

3.3.10 Exclusion could be appropriate if sampling proves that the ship is non-compliant but the results have been obtained after it has sailed or after it has been dismissed. Article 11(3) of the AFS Convention only mentions that the "party carrying out the inspection" may take such steps. This means that, if a port State excludes a ship, the exclusion cannot be automatically applied by other port States.

3.3.11 In accordance with Procedures for Port State Control (resolution A.787(19) A.1138(31), as amended), where deficiencies cannot be remedied at the port of inspection, the PSCO may allow the ship to proceed to another port, subject to any appropriate conditions determined. In such circumstances, the PSCO should ensure that the competent authority of the next port of call and the flag State are notified.

### **Reporting to flag State**

3.3.12 Article 11(3) of the AFS Convention requires that when a ship is detained, dismissed or excluded from a port for violation of the Convention, the Party taking such action shall immediately inform the flag Administration of the ship and any Recognized Organization which has issued a relevant certificate.

## **4 AFS REPORT TO FLAG STATE IN RESPONSE TO ALLEGED CONTRAVENTIONS**

4.1 Article 11(4) of the AFS Convention allows Parties to inspect ships at the request of another Party, if sufficient evidence that the ship is operating or has operated in violation of the Convention is provided. Article 12(2) permits port States conducting the inspection to send the Administration (flag State) of the ship concerned any information and evidence it has that a violation has occurred. Information sent to the flag State is often inadequate for a prosecution. The following paragraphs detail the sort of information needed.

4.2 The report to the authorities of the port or coastal State should include as much as possible the information listed in section 3. The information in the report should be supported by facts which, when considered as a whole, would lead the port or coastal State to believe a contravention had occurred.

4.3 The report should be supplemented by documents such as:

- .1 the port State report on deficiencies;
- .2 a statement by the PSCO, including his rank and organization, about the suspected non-conforming anti-fouling system. In addition to the information required in section 3, the statement should include the grounds the PSCO had for carrying out a more detailed inspection;
- .3 a statement about any sampling of the anti-fouling system including:
  - .1 the ship's location;
  - .2 where the sample was taken from the hull, including the vertical distance from the boot topping;
  - .3 the time of sampling;
- .4 person(s) taking the samples; and
- .5 receipts identifying the persons having custody and receiving transfer of the samples;
- .4 reports of the analyses of any samples including:
  - .1 the results of the analyses;
  - .2 the method employed;
  - .3 reference to or copies of scientific documentation attesting the accuracy and validity of the method employed;
  - .4 the names of persons performing the analyses and their experience; and
  - .5 a description of the quality assurance measures of the analyses;
- .5 statements of persons questioned;
- .6 statements of witnesses;
- .7 photographs of the hull and sample areas; and
- .8 a copy of the IAFS Certificate, including copies of relevant pages of the Record of Anti-fouling Systems, log books, MSDS or similar, declaration of compliance from the anti-fouling system manufacturer, invoices from the shipyard and other dry dock records pertaining to the anti-fouling system.

4.4 All observations, photographs and documentation should be supported by a signed verification of their authenticity. All certifications, authentications or verifications should be in

accordance with the laws of the State preparing them. All statements should be signed and dated by the person making them, with their name printed clearly above or below the signature.

4.5 The reports referred to under paragraphs 2 and 3 of this section should be sent to the flag State. If the coastal State observing the contravention and the port State carrying out the investigation on board are not the same, the port State carrying out the investigation should also send a copy of its findings to the coastal State.

## **APPENDIX 1 to Annex 2**

### **SAMPLING**

Considerations related to brief sampling may be found in section 2.1 of Guidelines for brief sampling of anti-fouling systems on ships (~~resolution MEPC.104(49)~~) (to be updated).

Any obligation to take a sample should be subject to practical feasibility or to constraints relating to the safety of persons, the ship or the port.

The PSCO should consider the following:

- liaise with the ship on the location and time needed to take samples; the PSCO should verify that the time required will not unduly prevent the loading/unloading, movement or departure of the ship;
- do not expect the ship to arrange safe access but liaise with the ship over the arrangements that the port State competent authority has made, for example boat, cherry-picker, staging, etc.;
- select sampling points covering representative areas;
- take photographs of the hull, sample areas and sampling process;
- avoid making judgements on the quality of the paint (e.g., surface, condition, thickness, application);
- the need of inviting the ship representative's presence during brief sampling to ensure that the evidence is legally obtained;
- complete and sign the inspection report form together with the included sampling record sheets (to be filled in by the sampler), as far as possible, and leave a copy with the ship as a proof of inspection/sampling;
- inform the next port State where the inspected ship is to call;
- agree with or advise the ship on to whom the ship's copy of the finalized inspection report will be sent in cases when it cannot be completed in the course of the inspection; and
- ensure that receipts identifying the persons having custody and receiving transfer of the samples accompany the samples are filled in to reflect the transfer chain of the samples. PSCOs are reminded that the procedures set in national legislation regarding custody of evidence are not affected by the regulation. These guidelines therefore do not address this issue in detail.

### **1 Sampling methodologies**

It is to the discretion of the port State to choose the sampling methodology. The Guidelines for brief sampling of anti-fouling systems on ships adopted by ~~resolution MEPC.104(49)~~ (to be updated) allow that any other scientifically recognized method of sampling and analysis of AFS

controlled by under the Convention than those described in the appendix to the Guidelines may be used (subject to the satisfaction of the Administration or the port State). The sampling methodology will depend, *inter alia*, on the surface hardness of the paint, which may vary considerably. The amount of paint mass removed may vary correspondingly.

Based on the on-board International Anti-fouling System Certificate or a Declaration on Anti-fouling System, the port state competent authority would decide if the brief sampling analysis should focus on only organotin, cybutryne or both and apply the appropriate methodology including: the number of samples, analysis, and definition of compliance.

Sampling procedures, based on the removal of paint material from the hull, require the determination of paint mass. It is important that procedures used are validated, produce unambiguous results and contain an adequate control.

The competent port State authority can decide to contract specialist companies to carry out sampling. In this case the PSCO should attend the ship during the sampling procedure to ensure the liaison and arrangements mentioned above are in place.

If a specialist company is not used, the port State competent authority should provide appropriate training to the PSCO in the available sampling methods and procedures and ensure that agreed procedures are followed.

The following general terms should be observed:

- the PSCO should choose a number of sample points preferably covering all the representative areas of the hull, but it is desirable to have at least eight (8) sample points equally spaced down and over the length of the hull, if possible divided over PS and SB (keeping in mind that different parts of the hull may be treated with different anti-fouling systems);
- triplicate specimens of paint at each sampling point should be taken in close proximity to each other on the hull (e.g., within 10 cm of each other);
- contamination of the samples should be avoided, which normally includes the wearing of non-sterilized non-powdered disposable gloves of suitable impervious material – e.g., nitrile rubber;
- the samples should be collected and stored in an inert container (e.g., containers should not consist of materials containing organotins and cybutryne or have the capacity to absorb organotins and cybutryne);
- samples should be taken from an area where the surface of the anti-fouling system is intact, clean and free of fouling;
- loose paint chips coming from detached, peeled or blistered hull areas should not be used for sampling;
- samples should not be taken from a heated or area where the paint is otherwise softened (e.g., heavy fuel tanks); and
- the underlying layers (primers, sealers, TBT containing AFS) should not be sampled if there is no clear evidence of exposure of extended areas.

- Ships bearing an anti-fouling system that does not contain cybutryne in the external coating layer are not required to be controlled under annex 1 of the Convention. Such ships carrying an IAFS Certificate indicating the situation described in paragraph 2.1.6.4 of these Guidelines should be deemed compliant with the Convention except if there is a doubt on the validity of the IAFS Certificate.

## **2 Validity of the sampling**

In order to safeguard the validity of the sampling as evidence of non-compliance, the following should be considered:

- only samples taken directly from the hull and free of possible contamination should be used;
- all samples should be stored in containers, marked and annotated on the record sheet. This record sheet should be submitted to the Administration;
- the receipts identifying the persons having custody and receiving transfer of the samples should be filled in and accompany the samples to reflect the transfer chain of the samples;
- the PSCO should verify the validity of the instrument's calibration validity date (according to the manufacturer instruction);
- in cases when a contracted specialist company is used for carrying out sampling, the PSCO should accompany its representative to verify sampling; and
- photographs of the hull, sample areas and sampling process could serve as additional proof.

It is also the case that sampling companies and/or procedures can be certified.

## **3 Health and safety when sampling**

Any obligation to take a sample should be subject to practical feasibility or any constraints relating to the safety of persons, the ship or the port.

The PSCO is advised to ensure their safety taking the following points into account:

- general requirements enforced by the terminal or port authority and national health, safety and environmental policy;
- condition of the ship (ballast condition, ship's operations, mooring, anchorage, etc.);
- surroundings (position of ship, traffic, ships movement, quay operations, barges or other floating vessels alongside);
- safety measures for the use of access equipment (platforms, cherry picker, staging, ladders, railings, climbing harness, etc.), e.g., ISO 18001;

- weather (sea state, wind, rain, temperature, etc.); and
- precautions to avoid falling into the water between the quay and the ship. If in doubt, a lifejacket and if possible a safety line, should be worn when sampling.

Any adverse situation encountered during sampling that could endanger the safety of personnel, shall be reported to the safety coordinator.

Care should be taken to avoid contact of the removed paint with the skin and the eyes, and no particles should be swallowed or come into contact with foodstuffs. Eating or drinking during sampling is prohibited and hands should be cleaned afterwards. Persons carrying out sampling should be aware that the AFS and solvents or other materials used for sampling may be harmful and appropriate precautions should be taken. Personal protection should be considered by using long sleeve solvent-resistant gloves, dust mask, safety glasses, etc.

Standard (and specific, if applicable) laboratory safety procedures should be followed at all times when undertaking the sampling procedures and subsequent analysis.

#### **4 Conducting analyses**

The Guidelines for brief sampling of anti-fouling systems on ships envisage a two-stage analysis of samples for organotin analysis for both methods presented in the appendix to the Guidelines. The first stage is a basic test, which can be carried out on site as in the case of Method 2. The second stage is carried out when the first stage results are positive. It is noted that in the IMO Guidelines, these stages are referred to as Steps 1 and 2 as in the case of Method 1. It is to the discretion of the port State competent authorities to choose which analysis methods are used.

The method for cybutryne determination is based on a one step analysis.

The following points are presented for port State consideration:

- approval procedure for the recognition of laboratories meeting ISO 17025 standards or other appropriate facilities should be set up by the port State competent authorities. These procedures should define the recognition criteria. Exchange of information between port States on these procedures, criteria and laboratories/facilities would be beneficial, i.e. for the purposes of exchange of best practices and possible cross-border recognition and provision of services;
- the company that undertakes the analysis and/or samples should comply with national regulations and be independent from paint manufacturers;
- the PSCO carrying out the AFS inspection of a ship should verify the validity of the ISO 17025 certificate and/or the recognition of the laboratory;
- if more time is needed for analysis than available considering the ship's scheduled time of departure, the PSCO shall inform the ship and report the situation to the port State competent authority. However, the time needed for analysis does not warrant undue delay of the ship; and
- PSCOs should ensure completion of the record sheets for the sampling

procedure as proof of analysis. In cases when the laboratory procedures prescribe presentation of the analyses' results in a different format, this technical report could be added to the record sheets.

## **5 The first-stage analysis for organotin**

The first-stage analysis serves to detect the total amount of tin in the AFS applied.

It is to the discretion of the port State competent authority to choose the first-stage analysis methodology. However, the use of a portable X-ray fluorescence analyser (mentioned under Method 2) or any other scientifically justified method allowing the conduction of first-stage analyses on site could be considered best practice.

The port State competent authority has to decide whether the first-stage analysis should be carried out by PSCOs or by contracted companies.

The port State competent authority could provide PSCOs with this equipment (e.g., portable X-ray fluorescence analyser) and provide the appropriate training.

## **6 The second-stage analysis for organotin**

The second-stage (final) analysis is used to verify whether or not the AFS system complies with the Convention requirements, i.e. whether organotin compounds are present in the AFS at a level which would act as a biocide.

The port State could consider implementing only a second-stage analysis.

It is to the discretion of the Authority to choose the second-stage analysis methodology. In this respect it is hereby noted that the second-stage analysis methodology for sampling Method 2 provided in the Guidelines is only tentative and "should be thoroughly reviewed by experts based on scientific evidence" (section 5.1 of Method 2).

## **7 One stage analysis for cybutryne**

For cybutryne a one stage analysis is described in both method 1 and method 2 of the brief sampling guidelines. The specimens are to be analyzed in a GC-MS analysis. The procedure is the same for both methods.

## **8. One stage analysis for cybutryne and organotin**

For cybutryne and organotin a one stage analysis is described in both method 1 and method 2 of the brief sampling guidelines. The specimens are to be analyzed in a GC-MS analysis.

## **7.9 Conclusions on compliance**

The Authority should only make conclusions on compliance based on the second-stage analysis of the sample (organotin). In case the results indicate non-compliance at that stage, there are clear grounds to take further steps.

For cybutryne the authority could make conclusions on compliance based on the one stage analysis.

If considered necessary, more thorough sampling can be also carried out in addition or instead of brief sampling.

Sampling results should be communicated as soon as possible to the vessel (as part of the inspection report) and in the case of non-compliance also to the flag State and Recognized Organization acting on behalf of the flag State if relevant.

Authorities should, in accordance with section 5.2 of the Guidelines for brief sampling of anti-fouling systems on ships, develop and adopt procedures to be followed for those cases where compliance with acceptable limits or lack thereof, is unclear, considering additional sampling or other methodologies for sampling.

## FORM S/1

### REPORT OF INSPECTION of a ship's anti-fouling system (AFS)

#### SHIP PARTICULARS

1. Name of ship: \_\_\_\_\_ 2. IMO number: \_\_\_\_\_  
3. Type of ship: \_\_\_\_\_ 4. Call sign: \_\_\_\_\_  
5. Flag of ship: \_\_\_\_\_ 6. Gross tonnage: \_\_\_\_\_  
7. Date keel laid / major conversion commenced: \_\_\_\_\_

#### INSPECTION PARTICULARS

8. Date & time: \_\_\_\_\_  
9. Name of facility:  
(dry-dock, quay, location) \_\_\_\_\_  
Place & country: \_\_\_\_\_  
10. Areas inspected  Ship's logbook  Certificates  Ship's hull  
11. Relevant certificate(s)  

(a) title	(b) issuing authority	(c) dates of issue
1. IAFS Cert.		
2. Record of AFS		
3. Declaration of AFS		
4.		

  
12. Dry-dock period AFS applied: \_\_\_\_\_  
13. Name of facility AFS applied: \_\_\_\_\_  
14. Place & country AFS applied: \_\_\_\_\_  
15. AFS samples taken  No  Yes Nature of sampling:  Brief  Extent  
16. Reason for sampling of AFS: \_\_\_\_\_  
  
17. Record sheet attached :  
(country-code / IMO number /  
dd-mm-yy) \_\_\_\_\_  
18. Copy to:  PSCO  Flag State  Recognized Organization  
Head office  Master  Other: \_\_\_\_\_

## **PORT STATE PARTICULARS**

1214 Reporting authority:	1215	1216 District office	1217
1218 Address:	1219		
1220	1221		
1222	1223		
1224 Telephone/Fax/ Mobile:	1225		
1226 E-mail:	1227		
1228	1229		
1230 Name: <i>1231 (duly authorized inspector of reporting authority)</i>	1232		
1233	1234	1235	1236
1237 Date:	1238	1239 Signature:	1240

## FORM S/2

**Record sheet for the sampling procedure for compliance with the Convention in terms of the presence of organotin and/or cybutryne acting as a biocide in anti-fouling systems on ship hulls**

1241 RECORD NUMBER	1242	1243 (country-code / IMO number / dd-mm-yy)
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1244 Name of ship      1245      1246 IMO number:      1247

### **SAMPLING PARTICULARS**

1248 1.	1249 Date & time initiated:	1250 2.	1251 Date & time completed	
1252 3.	1253 Name of paint manufacturer:	1254		
1255 4.	1256 AFS product name & colour:	1257	1258	
1259 5.	1260 Reason for Sampling:	1261 <input type="checkbox"/> Port State 1262 Control	1263 <input type="checkbox"/> Survey Certification	& 1264 <input type="checkbox"/> flag compliance inspection Other State
1265 6.	1266 Sampling Method	1267		
1268 7.	1269 Hull areas sampled:	1270 <input type="checkbox"/> Port Side	1271 <input type="checkbox"/> Side	Starboard 1272 <input type="checkbox"/> Bottom
1273	1274 Number of sampling points:	1275	1276	1277 121279
1280 8.	1281 Back-up samples' storage location: <i>(e.g., Port State inspection office)</i>	1282	1283	
1284 9.	1285 Photos taken of the sample points	1286 Comments:	1287	
1288 10.	1289 Paint samples (wet)	1290 Comments:	1291	
1292 11.	1293 Case A - Analysis of organotin only	1294	1295	
1296	1297 First-stage analysis for organotin	1298 Comments:	1299	
1300	1301 Second-stage analysis for organotin	1302 Comments:	1303	
1304 12.	1305 Case B - Analysis of cybutryne only	1306 Comments:	1307	
1308	1309 One stage analysis for cybutryne	1310	1311	
1312 13.	1313 Case C - Simplified approach to detect organotin and cybutryne	1314	1315	
1316	1317 One-stage analysis for organotin and cybutryne	1318	1319	
1320		1321	1322	1323

**1324 13.14. 1325 Comments concerning sampling procedure**

<b>1326 14.15</b>	<b>1327 Sampling company</b>	1328	<b>1329 Name</b>
<b>1330</b>	1331	1332	<b>1333 Date</b>
<b>1335</b>	1336	1337	<b>1334</b>
<b>1339</b>	1340	1341	<b>1338 Signature</b>
<b>1343</b>	1344	1345	1342
			1346

### **PORT STATE PARTICULARS**

<b>1347 Reporting authority:</b>	1348	<b>1349 District office:</b>	1350
<b>1351 Address:</b>	1352		
<b>1353</b>	1354		
<b>1355</b>	1356		
<b>1357 Telephone/Fax/ Mobile:</b>	1358		
<b>1359 E-mail:</b>	1360		
<b>1361</b>	1362		
<b>1363 Name:</b>			
<b>1364 (duly authorized inspector of reporting authority)</b>	1365		
<b>1366</b>	1367	1368	1369
<b>1370 Date:</b>	1371	<b>1372 Signature:</b>	1373

**FORM S/3**

1374 RECORD NUMBER	1375	1376 1377
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1378 Name of ship 1379 1380 IMO number: 1381

**METHOD 1 ANALYSIS**

**Case A - Analysis of organotin only**

1382 1.	1383 Instrument I.D.:	1384	1385 Calibration Expire Date:	1386		
1387 2.	1388 Specimens "A" results		1389 total number of specimens "A" analysed:	1390		
1391 3.	1392 No.	1393 Sample location 1394 (Frame & Distance from boot topping)	1395 mg Sn/ kg	1396 No.	1397 Sample location 1398 (Frame & distance from boot topping)	1399 mg Sn/ kg
1400	1401 1	1402	1403	1404 9	1405	1406
1407	1408 2	1409	1410	1411 10	1412	1413
1414	1415 3	1416	1417	1418 11	1419	1420
1421	1422 4	1423	1424	1425 12	1426	1427
1428	1429 5	1430	1431	1432 13	1433	1434
1435	1436 6	1437	1438	1439 14	1440	1441
1442	1443 7	1444	1445	1446 15	1447	1448
1449	1450 8	1451	1452	1453 16	1454	1455
1456 4.	1457 Results	1458	1459	1460	1464 <input type="checkbox"/> Step required	2
1461	1462	1463 Number of specimens exceeding 2,500 mg/kg:		1465	1468	
1465	1466	1467		1469	1472	
1469	1470	1471		1473	1477 <input type="checkbox"/> Compliance, NO further analysis	
1473	1474	1475 1 or more specimens exceeding 3,000 mg/kg		1476 <input type="checkbox"/> Yes <input type="checkbox"/> No	1478	
1479 5.	1480 Additional comments concerning analysis of results from Specimens "A"					
1481	1482					
1483	1484					
1485 6.	1486 Company	1487 Name:	1488			
1489	1490	1491	1492			
1493	1494	1495 Date:	1496			
1497	1498	1499	1500			
1501	1502	1503 Signature:	1504			
1505	1506	1507	1508			

1509 7	1510 Instrument I.D.:	1511			1512 Calibration Expire Date:	1513	
1514 8	1515 Specimens "B" results					1516 total number of specimens "B" analysed:	1517
1518 9	1519 N o.	1520 organ otin (mg Sn/kg) as Sn	1521 N o.	1522 organ otin (mg Sn/kg) as Sn	1523 N o.	1524 organ otin (mg Sn/kg) as Sn	1525 N o. 1526 organ otin (mg Sn/kg) as Sn
1527	1528 1	1529	1530 5	1531	1532 9	1533	1534 1 3 1535
1536	1537 2	1538	1539 6	1540	1541 1 0	1542	1543 1 4 1544
1545	1546 3	1547	1548 7	1549	1550 1 1	1551	1552 1 5 1553
1554	1555 4	1556	1557 8	1558	1559 1 2	1560	1561 1 6 1562
1563 1 0.	1564 Results 1565 1566					1567	
1568	1569	1570 Number of specimens exceeding 2,500 mg/kg:					1571 <input type="checkbox"/> Non-compliance assumed
1572	1573	1574					1575
1576	1577	1578					1579
1580	1581	1582 1 or more specimens exceeding 3,000 mg/kg 1583 <input type="checkbox"/> Yes <input type="checkbox"/> No					1584 <input type="checkbox"/> Compliance, assumed
1585 1 1.	1586 Additional comments concerning analysis of results from Specimens "B"						
1587	1588						
1589	1590						
1591 1 2.	1592 Company			1593 Name:	1594		
1595	1596				1597	1598	
1599	1600				1601 Date:	1602	
1603	1604				1605	1606	
1607	1608				1609 Signature:	1610	
1611	1612				1613	1614	

### Case B - Analysis of cybutryne only

Gas chromatography/mass spectrophotometry (GC/MS) analysis

1615 1.	1616 Instrument I.D.:	1617	1618 Calibration Expire Date:	1619
1620 2.	1621 Specimens "C" results			
1622	1623 total number of specimens "C" analysed by GC-MS:			
1625	1626 Average concentration of cybutryne (mg of cybutryne per kg of dry paint):			
1628 4.	1629 Conclusions	1630	1631	1632
1633	1634 The average concentration of cybutryne exceeds the threshold of 1,250 mg of cybutryne per kg of dry paint			
1636				
1638 5.	1639 Additional comments concerning analysis of results from Specimens "C"			
1640	1641			
1642	1643			
1644 6.	1645 Company	1646 Name:	1647	1651
1648	1649	1650		

1652	1653	1654 Date:	1655
1656	1657	1658	1659
1660	1661	1662 Signature:	1663
1664	1665	1666	1667

### Case C - Simplified approach to detect organotin and cybutryne

Gas chromatography/mass spectrometry (GC/MS) analysis

1668 1.	1669 Instrument I.D.:	1670	1671 Calibration Expire Date:	1672
1673 2.	1674 Specimens "C" results			
1675	1676 total number of specimens "C" analysed by GC-MS: 1677			
1678	1679 Average concentration of organotin (mg Sn/kg of dry paint) 1680			
1681	1682 Average concentration of cybutryne (mg of cybutryne per kg of dry paint): 1683			
1684 4.	1685 Conclusions	1686	1687	
1688	1689 The average concentration of organotin exceeds the threshold of 3 000 mg Sn per kg of dry paint			1690 <input type="checkbox"/> yes
1691				1692 <input type="checkbox"/> No. Compliance assumed.
1693	1694 The average concentration of cybutryne exceeds the threshold of 1,250 mg of cybutryne per kg of dry paint			1695 <input type="checkbox"/> yes
1696				1697 <input type="checkbox"/> No. Compliance assumed.
1698 5.	1699 Additional comments concerning analysis of results from Specimens "C"			
1700	1701	1706 Name:	1707	
1702	1703	1710	1711	
1704 6.	1705 Company	1714 Date:	1715	
1708	1709	1718	1719	
1712	1713	1722 Signature:	1723	
1716	1717			
1720	1721			

**FORM S/4**

1724 RECORD NUMBER	1725	1726
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1727 Name of ship      1728      1729 IMO number:      1730

**METHOD 2**

**Case A - Analysis of organotin only**  
**FIRST-STAGE ANALYSIS FOR ORGANOTIN ANALYSIS**

1731 1.	1732 Instrument I.D.:	1733	1734 Calibration Expire Date:	1735
---------	-----------------------	------	-------------------------------	------

1730 .	1737 Sample location (Frame & distance from boot topping)	1738 Specimen I.D.	1740 Sample Disc	1742 Content of Tin (mg/kg)	1743 rax	1744 in	1745 Average
174€ 1747	1748 A1	1749 <input type="checkbox"/> abrasive	1750	1751	1752	1753	
175€ 1755	1756 A2	1757 <input type="checkbox"/> metal	1758	1759	1760	1761	
176€ 1763	1764 A3	1765 <input type="checkbox"/> others	1766	1767	1768	1769	Average
177€ 1771	1772 A4	1773 <input type="checkbox"/> abrasive	1774	1775	1776	1777	
177€ 1779	1780 A5	1781 <input type="checkbox"/> metal	1782	1783	1784	1785 mg/kg	
178€ 1787	1788 A6	1789 <input type="checkbox"/> others	1790	1791	1792	1793 <input type="checkbox"/> >2,500 mg/kg	
179€ 1795	1796 A7	1797 <input type="checkbox"/> abrasive	1798	1799	1800	1801 <input type="checkbox"/> >3,000 mg/kg	
180€ 1803	1804 A8	1805 <input type="checkbox"/> metal	1806	1807	1808	1809	
181€ 1811	1812 A9	1813 <input type="checkbox"/> others	1814	1815	1816	1817	
181€ 1819	1820 B1	1821 <input type="checkbox"/> abrasive	1822	1823	1824	1825	
182€ 1827	1828 B2	1829 <input type="checkbox"/> metal	1830	1831	1832	1833	
183€ 1835	1836 B3	1837 <input type="checkbox"/> others	1838	1839	1840	1841 Average	
184€ 1843	1844 B4	1845 <input type="checkbox"/> abrasive	1846	1847	1848	1849	
185€ 1851	1852 B5	1853 <input type="checkbox"/> metal	1854	1855	1856	1857 mg/kg	
185€ 1859	1860 B6	1861 <input type="checkbox"/> others	1862	1863	1864	1865 <input type="checkbox"/> >2,500 mg/kg	
186€ 1867	1868 B7	1869 <input type="checkbox"/> abrasive	1870	1871	1872	1873 <input type="checkbox"/> >3,000 mg/kg	
187€ 1875	1876 B8	1877 <input type="checkbox"/>	1878	1879	1880	1881	

		metal				
1881	1883	1884 B9	1885 <input type="checkbox"/> others	1886	1887	1888 1889
1890	1891	1892 C1	1893 <input type="checkbox"/> abrasive	1894	1895	1896 1897
1898	1899	1900 C2	1901 <input type="checkbox"/> metal	1902	1903	1904 1905
1906	1907	1908 C3	1909 <input type="checkbox"/> others	1910	1911	1912 1913 Average
1914	1915	1916 C4	1917 <input type="checkbox"/> abrasive	1918	1919	1920 1921
1921	1923	1924 C5	1925 <input type="checkbox"/> metal	1926	1927	1928 1929 mg/kg
1930	1931	1932 C6	1933 <input type="checkbox"/> others	1934	1935	1936 1937 <input type="checkbox"/> >2,500 mg/kg
1938	1939	1940 C7	1941 <input type="checkbox"/> abrasive	1942	1943	1944 1945 <input type="checkbox"/> >3,000 mg/kg
1946	1947	1948 C8	1949 <input type="checkbox"/> metal	1950	1951	1952 1953
1954	1955	1956 C9	1957 <input type="checkbox"/> others	1958	1959	1960 1961
1962	1963	1964 D1	1965 <input type="checkbox"/> abrasive	1966	1967	1968 1969
1970	1971	1972 D2	1973 <input type="checkbox"/> metal	1974	1975	1976 1977
1978	1979	1980 D3	1981 <input type="checkbox"/> others	1982	1983	1984 1985 Average
1986	1987	1988 D4	1989 <input type="checkbox"/> abrasive	1990	1991	1992 1993
1994	1995	1996 D5	1997 <input type="checkbox"/> metal	1998	1999	2000 2001 mg/kg
2002	2003	2004 D6	2005 <input type="checkbox"/> others	2006	2007	2008 2009 <input type="checkbox"/> >2,500 mg/kg
2010	2011	2012 D7	2013 <input type="checkbox"/> abrasive	2014	2015	2016 2017 <input type="checkbox"/> >3,000 mg/kg
2018	2019	2020 D8	2021 <input type="checkbox"/> metal	2022	2023	2024 2025
2026	2027	2028 D9	2029 <input type="checkbox"/> others	2030	2031	2032 2033
2034	<b>2035 Results First-Stage Analysis</b>				2036	
2037	2038	2039 <input type="checkbox"/> samples out of mg/kg	are above 2,500		2040 <input type="checkbox"/> Compliant	
2041	2042	2043 <input type="checkbox"/> sample(s)	is (are) above 3,000 mg/kg		2044 <input type="checkbox"/> <b>Second-stage required</b>	
2045	<b>2046 Comments</b>				2047	2048 2049
2050	2051 Company			2052 Name		
2053	2054			2055 Date		
2056	2057			2058 Signature		

**FORM S/5**

2059 RECORD NUMBER	2060
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2061

2062 Name of ship 2063

2064 IMO number:

2065

**METHOD 2 SECOND-STAGE ANALYSIS FOR ORGANOTIN ANALYSIS**

2066 1.	2067 Instrument I.D.:	2068	2069 Calibration Expire Date:	2070
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2071	2072 Specimen used (Specimen I.D.)	2073 Content of Tin First-Stage 2074 (XRF Analysis) 2075 (mg Sn/kg)	2076 Content of Tin Second-Stage 2077 (as organotin) (mg Sn/kg)	2078 Compliance
2079	2080	2081	2082	2083
2084	2085	2086	2087	2088 <input type="checkbox"/> >2,500 mg/kg
2089	2090	2091	2092	2093 <input type="checkbox"/> >3,000 mg/kg
2094	2095	2096	2097	2098
2099	2100	2101	2102	2103 <input type="checkbox"/> >2,500 mg/kg
2104	2105	2106	2107	2108 <input type="checkbox"/> >3,000 mg/kg
2109	2110	2111	2112	2113
2114	2115	2116	2117	2118 <input type="checkbox"/> >2,500 mg/kg
2119	2120	2121	2122	2123 <input type="checkbox"/> >3,000 mg/kg
2124	2125	2126	2127	2128
2129	2130	2131	2132	2133 <input type="checkbox"/> >2,500 mg/kg
2134	2135	2136	2137	2138 <input type="checkbox"/> >3,000 mg/kg
2139	<b>2140 Results Second-Stage Analysis</b>			2141
2142	2143	2144 <input type="checkbox"/> samples out of 2,500 mg/kg	are above	2146 <input type="checkbox"/> Compliant
2147	2148	2149 <input type="checkbox"/> sample(s) 3,000 mg/kg	2145 (dry paint) is (are) above 2150 (dry paint)	2151 <input type="checkbox"/> <b>NOT compliant</b>
2152	<b>2153 Comments</b>	2154	2155	2156
2157	2158 Company		2159 Name	
2160	2161		2162 Date	
2163	2164		2165 Signature	

**Case B - Analysis of cybutryne only**

Gas chromatography/mass spectrophotometry (GC/MS) analysis for cybutryne determination

2166 1.	2167 Instrument I.D.:	2168	2169 Calibration Expire Date:	2170
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2171	2172 Results of GC-MS analysis			
2173	2174 Average concentration (mg of cybutryne per kg of dry paint)	2175	2176 <input type="checkbox"/> Compliant	2177 <input type="checkbox"/> NOT compliant
2179	2180 Comments 2181 2182 2183			
2184	2185 Company 2188	2186 Name	2189 Date	

**Case C - Simplified approach to detect organotin and cybutryne**

Gas chromatography/mass spectrophotometry (GC/MS) analysis for cybutryne and organotin determination

2190 1.	2191 Instrument I.D.:	2192	2193 Calibration Expire Date:	2194
---------	-----------------------	------	----------------------------------	------

2195	2196 Results of GC-MS analysis			
2197	2198 Average concentration of organotin (mg Sn/kg)	2199	2200 <input type="checkbox"/> Compliant	2201 <input type="checkbox"/> NOT compliant
2203	2204 Average concentration of cybutryne (mg of cybutryne per kg of dry paint)	2205	2206 <input type="checkbox"/> Compliant	2207 <input type="checkbox"/> NOT compliant
2208	2209 Comments 2210 2211 2212			
2213	2214 Company 2217	2215 Name	2218 Date	

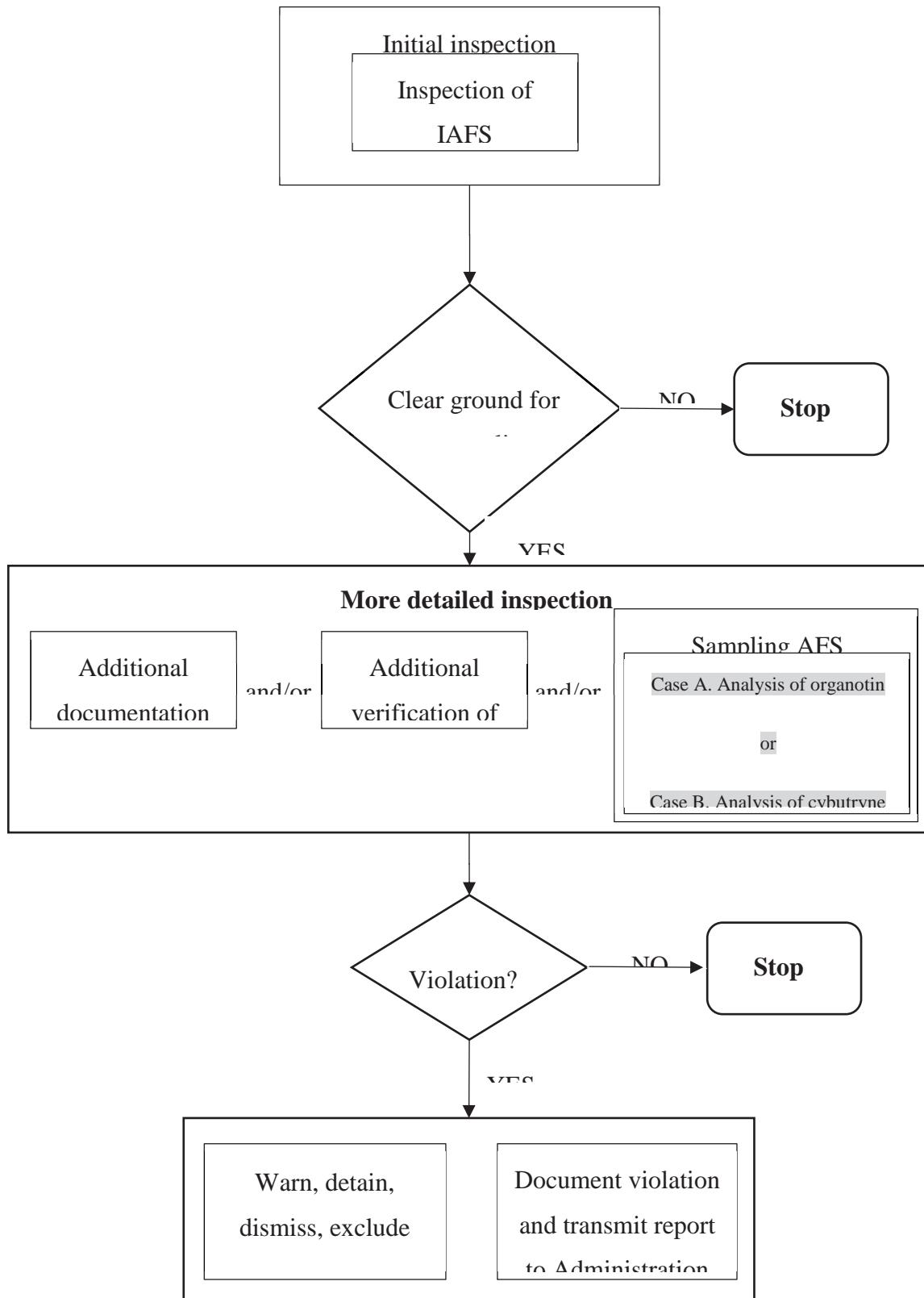
**PORT STATE PARTICULARS**

2219 Reporting authority:	2220	2221 District office	2222
2223 Address:	2224		
2225	2226		
2227	2228		

2229 Telephone/Fax/ Mobile:	2230		
2231 E-mail:	2232		
2233	2234		
2235 Name: <i>2236 (duly authorized inspector of reporting authority)</i>	2237		
2238	2239	2240	2241
2242 Date:	2243	2244 Signature:	2245

## APPENDIX 2 to Annex 2

### AFS INSPECTION PROCESS



## **Annex 3 – Suggested text amendments to the Guidelines for survey and certification of anti-fouling systems on ships**

### **2010-GUIDELINES FOR SURVEY AND CERTIFICATION OF ANTI-FOULING SYSTEMS ON SHIPS**

#### **1 General**

1.1 Article 10 of the International Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001, hereinafter referred to as "the Convention", prescribes that ships shall be surveyed and certified in accordance with the regulations of annex 4 of the Convention. The purpose of this document is to provide the Guidelines for Surveys and Certification of Anti-fouling Systems on Ships referred to in regulation 1(4)(a) of annex 4, hereinafter referred to as the "Guidelines", that will assist the Administrations and recognized organizations, in the uniform application of the provisions of the Convention and assist companies, shipbuilders, manufacturers of anti-fouling systems, as well as other interested parties to understand the process of the surveys and issuance and endorsement of the certificates.

1.2 These Guidelines provide the procedures for survey to ensure that a ship's anti-fouling system complies with the Convention, and those necessary for issuance and endorsement of an International Anti-fouling System Certificate. A guidance for compliant anti-fouling systems is given in the Appendix I to this annex.

1.3 These Guidelines apply to surveys of ships of 400 gross tonnage and above engaged in international voyages, excluding fixed or floating platforms, floating storage units (FSUs), and floating production storage and off-loading units (FPSOs), as specified in regulation 1(1) of annex 4 to the Convention.

1.4 The sole purpose of the survey activities described in these Guidelines is to verify compliance with the provisions of the Convention. Consequently, such surveys do not relate to any aspect not regulated by the Convention even if such aspects relate to the performance of an anti-fouling system on the hull of a ship, including the quality of workmanship during the application process.

1.5 In the event that a new survey method is developed, or in the event that the use of a certain anti-fouling system is prohibited and/or restricted, or in the light of experience gained, these Guidelines may need to be revised in the future.

#### **2 Definitions**

For the purposes of these guidelines:

2.1 "Administration" means the Government of the State under whose authority the ship is operating. With respect to a ship entitled to fly a flag of a State, the Administration is the Government of that State. With respect to fixed or floating platforms engaged in exploration and exploitation of the sea-bed and subsoil thereof adjacent to the coast over which the coastal State exercises sovereign rights for the purposes of exploration and exploitation of their natural resources, the Administration is the Government of the coastal State concerned.

2.2 "Anti-fouling system" means a coating, paint, surface treatment, surface, or device that is used on a ship to control or prevent attachment of unwanted organisms.

2.3 "Company" means the owner of the ship or any other organization or person such as the manager or the bareboat charterer, who has assumed the responsibility for the operation of the ship from the owner of the ship and who, on assuming such responsibility, has agreed to take over all duties and responsibilities imposed by the International Safety Management (ISM) Code.

2.4 "Gross tonnage" means the gross tonnage calculated in accordance with the tonnage measurement regulations contained in annex 1 to the International Convention on Tonnage Measurement of Ships, 1969, or any successor Convention.

2.5 "International voyage" means a voyage by a ship entitled to fly the flag of one State to or from a port, shipyard, or offshore terminal under the jurisdiction of another State.

2.6 "Length" means the length as defined in the International Convention on Load Lines, 1966, as modified by the Protocol of 1988 relating thereto, or any successor Convention.

2.7 "Ship" means a vessel of any type whatsoever operating in the marine environment and includes hydrofoil boats, air-cushion vehicles, submersibles, floating craft, fixed or floating platforms, floating storage units (FSUs) and floating production storage and off-loading units (FPSOs).

### **3 General requirements for surveys**

3.1 An initial survey covering at least the scope as in paragraph 1 of appendix II of these Guidelines should be held before the ship is put into service and the International Anti-fouling System Certificate required under regulation 2 or 3 of annex 4 to the Convention is issued for the first time.

3.2 A survey should be carried out whenever an anti-fouling system is changed or replaced. Such surveys should cover the scope as in paragraph 2 of appendix II to these Guidelines.

3.3 A major conversion affecting the anti-fouling system of a ship may be considered as a newbuilding as determined by the Administration.

3.4 Repairs generally do not require a survey. However, repairs affecting approximately twenty-five (25) per cent or more of the anti-fouling system, should be considered as a change or replacement of the anti-fouling system.

3.5 A non-compliant anti-fouling system controlled under annex 1 of the Convention, that undergoes repair must be repaired, or replaced with a compliant anti-fouling system.

### **4 Request for survey**

4.1 Prior to any survey, a request for survey should be submitted by the Company to the Administration, or to a recognized organization along with the ship's data required in the International Anti-fouling System Certificate as listed:

.1 Name of ship

.2 Distinctive number or letters

.3 Port of registry

.4 Gross tonnage

.5 IMO number.

4.2 A request for survey should be supplemented by a declaration and supporting information from the anti-fouling system manufacturer, confirming that the anti-fouling system applied, or intended to be applied to the ship is in compliance with the requirements of the Convention (with an identification of the version of the Convention referred to). Such declaration should provide the following information contained in the Record of Anti-fouling System, as can be found in appendix 1 to annex 4 to the Convention:

.1 Type of anti-fouling system<sup>7</sup>

.2 Name of anti-fouling system manufacturer

.3 Name and colour of anti-fouling system

.4 Active ingredient(s) and their Chemical Abstract Service Registry Number (CAS number(s)).

Information required by the surveyor regarding compliance of product with the Convention should be found in a declaration from the anti-fouling system manufacturer which may be provided on the anti-fouling system container and/or on supportive documentation (such as Material Safety Data Sheets (MSDSs), or similar). A link between the supportive documentation and the relevant container should exist.

## 5 Conduct of surveys

5.1 **Initial Surveys** (Surveys in accordance with regulation 1(1)(a) of annex 4 to the Convention)

- .1 The initial survey should verify that all applicable requirements of the Convention are complied with.
- .2 As part of the survey, it should be verified that the anti-fouling system specified by the documentation submitted with the request for survey complies with the Convention. The survey should include verification that the anti-fouling system applied is identical to the system specified in the request for survey.
- .3 Taking into account experience gained and the prevailing circumstances, the initial survey should include the tasks as listed in paragraph 1 of appendix II to these Guidelines.
- .4 The verification tasks set out in paragraph 5.1.2 should be conducted at any time, either before, during, or after the anti-fouling system has been applied to the ship, as deemed necessary to verify compliance. No checks or tests must affect the integrity, structure or operation of the anti-fouling system.

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<sup>7</sup> Examples of suitable wording could be: Organotin-free self polishing type, Organotin-free ablative type, Organotin-free Conventional, Biocide-free silicon type paint, others. In the case of an anti-fouling system containing no active ingredients, the words "biocide-free" should be used.

**5.2 Surveys when the anti-fouling systems are changed or replaced** (Surveys in accordance with regulation 1(1)(b) of Annex 4 to the Convention)

- .1 If the existing anti-fouling system is confirmed by an International Anti-fouling System Certificate not to be controlled under annex 1 of the Convention, the provisions described in paragraph 5.1 and 5.2 apply.
- .2 If the existing anti-fouling system is declared not to be controlled under annex 1 of the Convention, without being documented by an International Anti-fouling System Certificate, a verification should be carried out to confirm that the anti-fouling system complies with the requirements of the Convention. This verification may be based on sampling and/or testing and/or reliable documentation, as deemed necessary based on experience gained and the existing circumstances. Documentation for verification could, e.g., be MSDSs, or similar, a declaration of compliance from the anti-fouling system manufacturer, invoices from the shipyard and/or the anti-fouling system manufacturer. To verify the new anti-fouling system, the provisions described in paragraph 5.1 apply.
- .3 If the existing anti-fouling system has been removed, the removal should be verified in addition to the provisions described in paragraph 5.1.
- .4 If a sealer coat has been applied, a verification should be carried out to confirm that the name, type and colour of the sealer coat applied to the ship match those specified in the request for survey, and that the existing anti-fouling system has been covered with that sealer coat. Additionally the provisions described in paragraph 5.1 apply.
- .5 An existing anti-fouling system controlled under annex 1 of the Convention, containing organotin:
  - .1 ~~applied on/after 1 January 2003 or a later date if specified by the Administration, should be removed according to subparagraph 5.2.3;~~
  - .2 ~~applied before 1 January 2003 or a later date if specified by the Administration, should be must have been removed or covered by a sealer coat according to subparagraph 5.2.4, not later than 60 months after its application and latest on 1 January 2008.~~
- .6 An existing anti-fouling system controlled under annex 1 of the Convention, containing cybutryne in the external coating layer:
  - .2 ~~applied before date 1 January 2023, should be removed or covered by a sealer coat according to subparagraph 5.2.4.~~
- .6 .7 The survey should include the tasks as listed in paragraph 2 of Appendix II to these Guidelines.

**5.3 Surveys of existing ships requesting only an International Anti-fouling System Certificate**

- .1 If the existing anti-fouling system is declared not to be controlled under annex 1 of the Convention, a verification should be carried out to confirm that the anti-fouling system complies with the requirements of the Convention. This verification may be based on sampling and/or testing and/or reliable documentation, as deemed necessary based on experience gained and the existing circumstances. Such documentation could be MSDSs or similar, a declaration of compliance from the anti-fouling system manufacturer, invoices from the shipyard and/or the anti-fouling system manufacturer. If this information raises no reasonable doubt that the system applied is compliant with annex 1 of the Convention, the International Anti-fouling System Certificate may be issued on this basis.

**6 Issuing or endorsing the International Anti-fouling System Certificate**

6.1 The International Anti-fouling System Certificate along with the Record of Anti-fouling Systems should be:

- .1 issued upon satisfactory completion of the initial survey;
- .2 issued upon acceptance of another Party's International Anti-fouling System Certificate; or
- .3 endorsed upon satisfactory completion of a survey for change or replacement of an anti-fouling system.

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## **APPENDIX I to Annex 3**

### *Guidance for compliant anti-fouling systems*

1. For the purpose of compliance with annex 1 of the Convention, small quantities of organotin compounds acting as a chemical catalyst (such as mono- and di- substituted organotin compounds) are allowed, provided that they are present at a level which does not provide a biocidal effect to the coating. On a practical level, when used as a catalyst, an organotin compound should not be present above 2,500 mg total tin per kilogram of dry paint.

2. For the purpose of compliance with annex 1 of the Convention in respect to cybutryne, it could be expected that the distribution of the remaining anti-fouling paint in the hull surface is not uniform. Due to hull design and consequent action of the sea water during the service life of the paint, the paint may not have uniformly eroded, some parts in the hull may still have some paint, other parts may not have any paint left. Therefore, the brief samples taken from the hull surface should be representative of the anti-fouling system applied. Average values of cybutryne should not be present above 1,000 mg of cybutryne per kilogram of dry paint. Below this level any remaining cybutryne is expected not to create a negative impact to the marine environment.

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## **APENDIX II to Annex 3**

Guidance for surveys under the International Convention on the Control of Harmful Anti-fouling Systems on Ships (AFS 2001)

- (FI) 1 Initial survey (AFS 2001, annex 4, regulation 1(1)(a))
  - (FI) 1.1 confirming that a Declaration and supporting information from the anti-fouling system manufacturer, specifying that the anti-fouling system and, where applicable, the sealer coat intended to be applied to the ship are in compliance with the requirements of the Convention, is provided (AFS 2001);
  - (FI) 1.2 verifying that the relevant containers of the anti-fouling system show same data as the supporting information (AFS 2001);
  - (FI) 1.3 confirming that the existing anti-fouling system, if controlled under annex 1 of the Convention, has been removed or that a sealer coat has been applied (AFS 2001);
  - (FI) 1.4 verifying, where applicable, that the relevant containers of the sealer coat applied show same data as the supporting information (AFS 2001);
  - (FI) 1.5 where supporting information from the anti-fouling system manufacturer is not available or does not provide sufficient information, sampling or testing or other checks conducted on site, of the anti-fouling system;
  - (FI) 1.6 for ship of 24 m or more in length but less than 400 GT and engaged in international voyages, confirming that the owner or owner's authorized agent has completed a Declaration on Anti-fouling System (AFS 2001).
- (FR) 2 Surveys when anti-fouling systems are changed or replaced (AFS 2001, annex 4, regulation 1(1)(b))
  - (FR) 2.1 confirming that a Declaration and supporting information from the anti-fouling system manufacturer, specifying that the anti-fouling system and, where applicable, the sealer coat intended to be applied to the ship are in compliance with the requirements of the Convention, is provided (AFS 2001);
  - (FR) 2.2 verifying that the relevant containers of the anti-fouling system show same data as the supporting information (AFS 2001);
  - (FR) 2.3 confirming that the existing anti-fouling system, if controlled under annex 1 of the Convention, has been removed or that a sealer coat has been applied (AFS 2001);
  - (FR) 2.4 verifying, where applicable, that the relevant containers of the sealer coat applied show same data as the supporting information (AFS 2001);

- (FR) 2.5 for ship of 24 m or more in length but less than 400 GT, confirming that the owner or owner's authorized agent has completed a Declaration on Anti-fouling System (AFS 2001);
- (FR) 2.6 endorsement of the Record of Anti-fouling Systems.

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