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Based on the onboard 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);
- the underlying layers (primers, sealers, TBT containing AFS) should not be sampled if there is no clear evidence of exposure of extended areas; and
- 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 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 at 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 at 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 at 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 analysed 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 analysed in a GC-MS analysis.

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 ship (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 Certificate
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

Reporting authority: _____ District office _____

Address: _____

Telephone/Fax/Mobile: _____

E-mail: _____

Name:
*(duly authorized
inspector of reporting
authority)* _____

Date: _____ Signature: _____

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 BIOCIDES IN ANTI-FOULING SYSTEMS ON SHIP HULLS

RECORD NUMBER		(country-code / IMO number / dd-mm-yy)
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Name of ship _____ IMO number: _____

SAMPLING PARTICULARS

1. **Date & time initiated:** _____
2. **Date & time completed** _____
3. **Name of paint manufacturer:** _____
4. **AFS product name & colour:** _____
5. **Reason for sampling:**

<input type="checkbox"/> Port State control	<input type="checkbox"/> Survey & certification	<input type="checkbox"/> Other flag State compliance inspection
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6. **Sampling method** _____
7. **Hull areas sampled:**

<input type="checkbox"/> Port side	<input type="checkbox"/> Starboard side	<input type="checkbox"/> Bottom
------------------------------------	---	---------------------------------
- Number of sampling points:** _____
8. **Back-up samples' storage location:**
(e.g. port State inspection office) _____
9. **Photos taken of the sample points** Comments: _____
10. **Paint samples (wet)** Comments: _____
11. **Case A - Analysis of organotin only**

<input type="checkbox"/> First-stage analysis for organotin	Comments: _____
<input type="checkbox"/> Second-stage analysis for organotin	Comments: _____
12. **Case B - Analysis of cybutryne only** Comments: _____
One-stage analysis for cybutryne _____
13. **Case C - Simplified approach to detect organotin and cybutryne**
One-stage analysis for organotin and cybutryne _____
14. **Comments concerning sampling procedure** _____
15. **Sampling company**

	Name
	Date
	Signature

PORT STATE PARTICULARS

Reporting authority: _____ **District office:** _____

Address: _____

**Telephone/Fax/
Mobile:** _____

E-mail: _____

Name:
*(duly authorized
inspector of reporting
authority)* _____

Date: _____ **Signature:** _____

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FORM S/3

RECORD NUMBER	
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Name of ship _____ IMO number: _____

METHOD 1 ANALYSIS

Case A - Analysis of organotin only

1.	Instrument I.D.:		Calibration expire date:			
2.	Specimens 'A' results		Total number of specimens 'A' analysed:			
3.	No.	Sample location <i>(frame & distance from boot topping)</i>	mg Sn/kg	No.	Sample location <i>(frame & distance from boot topping)</i>	mg Sn/kg
	1			9		
	2			10		
	3			11		
	4			12		
	5			13		
	6			14		
	7			15		
	8			16		
4.	Results Number of specimens exceeding 2,500 mg/kg: 1 or more specimens exceeding 3,000 mg/kg <input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Step 2 required <input type="checkbox"/> Compliance, no further analysis		
5.	Additional comments concerning analysis of results from Specimens 'A'					
6.	Company			Name: Date: Signature:		

7.	Instrument I.D.:				Calibration expire date:			
8.	Specimens 'B' results				Total number of specimens "B" analysed:			
9.	No.	organotin (mg Sn/kg) as Sn	No.	organotin (mg Sn/kg) as Sn	No.	organotin (mg Sn/kg) as Sn	No.	organotin (mg Sn/kg) as Sn
	1		5		9		13	
	2		6		10		14	
	3		7		11		15	
	4		8		12		16	
10.	Results							
	Number of specimens exceeding 2,500 mg/kg:						<input type="checkbox"/> Non-compliance assumed	
	1 or more specimens exceeding 3,000 mg/kg						<input type="checkbox"/> Compliance assumed	
	<input type="checkbox"/> Yes <input type="checkbox"/> No							
11.	Additional comments concerning analysis of results from Specimens 'B'							
12.	Company				Name:			
					Date:			
					Signature:			

Case B - Analysis of cybutryne only

Gas chromatography/mass spectrophotometry (GC/MS) analysis

1.	Instrument I.D.:				Calibration expire date:			
2.	Specimens 'C' results							
	Total number of specimens 'C' analysed by GC-MS:							
	Average concentration of cybutryne (mg of cybutryne per kg of dry paint):							
3.	Conclusions							
	The average concentration of cybutryne exceeds the threshold of 1,250 mg of cybutryne per kg of dry paint						<input type="checkbox"/> Yes	
							<input type="checkbox"/> No. Compliance assumed.	
4.	Additional comments concerning analysis of results from Specimens 'C'							
5.	Company				Name:			
					Date:			
					Signature:			

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Case C - Simplified approach to detect organotin and cybutryne

Gas chromatography/mass spectrophotometry (GC/MS) analysis

1.	Instrument I.D.:		Calibration expire date:
2.	Specimens 'C' results		
	Total number of specimens 'C' analysed by GC-MS:		
	Average concentration of organotin (mg Sn/kg of dry paint)		
	Average concentration of cybutryne (mg of cybutryne per kg of dry paint):		
3.	Conclusions		
	The average concentration of organotin exceeds the threshold of 3,000 mg Sn per kg of dry paint		<input type="checkbox"/> Yes <input type="checkbox"/> No. Compliance assumed.
	The average concentration of cybutryne exceeds the threshold of 1,250 mg of cybutryne per kg of dry paint		<input type="checkbox"/> Yes <input type="checkbox"/> No. Compliance assumed.
4.	Additional comments concerning analysis of results from Specimens 'C'		
5.	Company	Name: Date: Signature:	

FORM S/4

RECORD NUMBER	
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Name of ship _____ IMO number: _____

METHOD 2 ANALYSIS

Case A - Analysis of organotin only

First stage

1.	Instrument I.D.:	Calibration expire date:
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2.	Sample location (frame & distance from boot topping)	Specimen I.D.	Sample disc	Content of tin (mg/ kg)	max	min	Average
A		A1	<input type="checkbox"/> abrasive				
		A2	<input type="checkbox"/> metal				
		A3	<input type="checkbox"/> others				Average
		A4	<input type="checkbox"/> abrasive				
		A5	<input type="checkbox"/> metal				mg/kg
		A6	<input type="checkbox"/> others				<input type="checkbox"/> >2,500 mg/kg
		A7	<input type="checkbox"/> abrasive				<input type="checkbox"/> >3,000 mg/kg
		A8	<input type="checkbox"/> metal				
		A9	<input type="checkbox"/> others				
B		B1	<input type="checkbox"/> abrasive				
		B2	<input type="checkbox"/> metal				
		B3	<input type="checkbox"/> others				Average
		B4	<input type="checkbox"/> abrasive				
		B5	<input type="checkbox"/> metal				mg/kg
		B6	<input type="checkbox"/> others				<input type="checkbox"/> >2,500 mg/kg
		B7	<input type="checkbox"/> abrasive				<input type="checkbox"/> >3,000 mg/kg
		B8	<input type="checkbox"/> metal				
		B9	<input type="checkbox"/> others				
C		C1	<input type="checkbox"/> abrasive				
		C2	<input type="checkbox"/> metal				
		C3	<input type="checkbox"/> others				Average
		C4	<input type="checkbox"/> abrasive				
		C5	<input type="checkbox"/> metal				mg/kg
		C6	<input type="checkbox"/> others				<input type="checkbox"/> >2,500 mg/kg
		C7	<input type="checkbox"/> abrasive				<input type="checkbox"/> >3,000 mg/kg
		C8	<input type="checkbox"/> metal				
		C9	<input type="checkbox"/> others				
D		D1	<input type="checkbox"/> abrasive				
		D2	<input type="checkbox"/> metal				
		D3	<input type="checkbox"/> others				Average
		D4	<input type="checkbox"/> abrasive				
		D5	<input type="checkbox"/> metal				mg/kg

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	D6	<input type="checkbox"/> others			<input type="checkbox"/> >2,500 mg/kg
	D7	<input type="checkbox"/> abrasive			<input type="checkbox"/> >3,000 mg/kg
	D8	<input type="checkbox"/> metal			
	D9	<input type="checkbox"/> others			
3.	Results first-stage analysis				
	<input type="checkbox"/> ___ samples out of ___ are above 2,500 mg/kg <input type="checkbox"/> sample(s) ___ is (are) above 3,000 mg/kg				<input type="checkbox"/> Compliant <input type="checkbox"/> Second stage required
4.	Comments				
5.	Company		Name		
			Date		
			Signature		

Second stage

1.	Instrument I.D.:		Calibration expire date:		
2.	Specimen used <i>(Specimen I.D.)</i>	Content of tin first stage <i>(XRF analysis)</i> <i>(mg Sn/kg)</i>	Content of tin second stage <i>(as organotin)</i> (mg Sn/kg)	Compliance	
A				<input type="checkbox"/> >2,500 mg/kg <input type="checkbox"/> >3,000 mg/kg	
B				<input type="checkbox"/> >2,500 mg/kg <input type="checkbox"/> >3,000 mg/kg	
C				<input type="checkbox"/> >2,500 mg/kg <input type="checkbox"/> >3,000 mg/kg	
D				<input type="checkbox"/> >2,500 mg/kg <input type="checkbox"/> >3,000 mg/kg	
3.	Results second stage analysis				
	<input type="checkbox"/> ___ samples out of ___ are above 2,500 mg/kg (dry paint) <input type="checkbox"/> sample(s) ___ is (are) above 3,000 mg/kg (dry paint)				<input type="checkbox"/> Compliant <input type="checkbox"/> Not compliant
4.	Comments				
5.	Company		Name		
			Date		
			Signature		

Case B – Analysis of cybutryne only

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

1.	Instrument I.D.:	Calibration expire date:
2.	Results of GC-MS analysis	
	Average concentration (mg of cybutryne per kg of dry paint)	<input type="checkbox"/> Compliant <input type="checkbox"/> Not compliant
3.	Comments	
4.	Company	Name
		Date

Case C – Simplified approach to detect organotin and cybutryne

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

1.	Instrument I.D.:	Calibration expire date:
2.	Results of GC-MS analysis	
	Average concentration of organotin (mg Sn/kg)	<input type="checkbox"/> Compliant <input type="checkbox"/> Not compliant
	Average concentration of cybutryne (mg of cybutryne per kg of dry paint)	<input type="checkbox"/> Compliant
		<input type="checkbox"/> Not compliant
3.	Comments	
4.	Company	Name
		Date

PORT STATE PARTICULARS

Reporting authority:

District office:

Address:

Telephone/Fax/Mobile:

E-mail:

Name:

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*(duly authorized
inspector of reporting
authority)*

Date:

Signature:

APPENDIX 2

AFS INSPECTION PROCESS


