

Approval of Firms Engaged in Commissioning Testing of Ballast Water Management Systems (BWMS), Etc.

Amended Rules and Guidance

Rules for Approval of Manufacturers and Service Suppliers
Rules for Ballast Water Management Installations
Guidance for Ballast Water Management Installations

Reason for Amendment

An amendment to the Ballast Water Management Convention adopted at the 75th Marine Environment Protection Committee (MEPC75) in November 2020 specifies that commissioning testing (including the sampling and analysis of ballast water) is going to be required for ballast water management systems installed on or after 1 June 2022.

In response to this amendment, IACS established qualification requirements and approval procedures for service suppliers engaged in performing such commissioning testing and added them to IACS Unified Requirement (UR) Z17, which specifies procedural requirements for approval of the service suppliers. This amended version of the UR was adopted by IACS as UR Z17(Rev.16) in August 2021.

Accordingly, relevant requirements are amended to incorporate UR Z17 (Rev.16) and to specify the actual guidance procedures for conducting commissioning testing.

Outline of Amendment

- (1) Specifies approval procedures for firms as service suppliers that perform commissioning testing of ballast water treatment systems in the Rules for Approval of Manufacturers and Service Suppliers.
- (2) Specifies guidance procedures for commissioning testing of ballast water treatment systems in the Rules and Guidance for Ballast Water Management Installations.
- (3) Amends approval procedures for service suppliers (including general requirements) in the Rules for Approval of Manufacturers and Service Suppliers.

“Rules for approval of manufacturers and service suppliers” has been partly amended as follows:

Part 1 GENERAL

Chapter 2 ASSESSMENT

Section 2.3 has been amended as follows.

2.3 Initial Assessments

1 In initial assessments, a manufacturing works or a service supplier will be assessed by the Society, based upon the results of a document examination and field examination as specified in the following:

~~12~~ Document examination

((1) is omitted.)

(2) For service suppliers intended to be approved under the Rules, one copy each of the following documents is to be submitted to the Society for examination to verify whether the quality system, etc. complies with the Rules.

((a) to (c) are omitted.)

(d) For categories of service suppliers that require ~~authorization~~ certification from manufacturers, manufacturer’s documentary evidence that the service supplier has been ~~authorized~~ certified or licensed to service the particular makes and models of equipment for which approval is sought are to be provided.

((e) to (n) are omitted.)

(n) Documentation verifying that operators, technicians, and inspectors engaged in the service being approved have acknowledged the code of conduct

~~(no)~~ Other documents deemed necessary by the Society

~~23~~ Field examinations

When the documents submitted for the Society review specified in ~~12~~ above are deemed satisfactory, a field examination is to be carried out according to the following (1) to (3):

(1) In the field examination, based on the documents that have been submitted and reviewed, the quality system, etc. of manufacturing works is investigated on site to confirm that the quality system, etc. is in conformity with the Rules.

(2) For manufacturing works to which **Chapter 4, Part 2** of the Rules applies, approval tests on the products intended to be approved are to be carried out with satisfactory results.

(3) Field examinations of service suppliers are to be as specified in the following (a) and (b):

(a) The supplier is to be assessed in order to ascertain that they are duly organised and managed in accordance with the submitted documents specified in ~~12~~ above; and

(b) It is to be verified that the supplier is capable of conducting the services for which approval/certification is sought.

Part 2 REQUIREMENTS FOR APPROVAL OF MANUFACTURERS

Chapter 3 QUALITY SYSTEM REQUIREMENTS

3.2 Quality System Elements

3.2.7 Inspection and Testing Control

Sub-paragraph -4(3) has been amended as follows.

4 Inspection and testing required by the Rules of the Society

- (1) In in-process and final inspection and testing of the products, all inspection and tests required by the Rules of the Society are to be included, and the inspection and testing methods as well as the evaluation criteria are subject to approval of the Society. The results of such inspection and tests are also to be confirmed by the Surveyors of the Society. On these occasions the Surveyors will be present at the inspection and tests considered necessary by the Society.
- (2) Necessary preparations are to be made for the inspection or tests as specified in (1) above, in case the Surveyor of the Society is present. On such an occasion, personnel who has full knowledge of the inspection or tests and can supervise these preparations is also to be present at the inspection or tests.
- (3) In cases where non-destructive ~~inspection~~ testing is required by the Rules of the Society, the operator is to have a qualification considered appropriate by the Society.

Paragraph 3.2.12 has been amended as follows.

3.2.12 Training

All personnel who are engaged in ~~the~~ activities which can affect quality of the products are to be properly trained. On such occasions, for persons~~nel~~ ~~who are~~ engaged in specific assigned tasks such as welding, non-destructive ~~inspection~~ testing, etc., special consideration is to be given to maintaining and improving their abilities through recognition of qualifications, etc.

Part 3 REQUIREMENTS FOR APPROVAL OF SERVICE SUPPLIERS

Chapter 1 GENERAL

1.1 General

Paragraph 1.1.1 has been amended as follows.

1.1.1 Application

1 This part applies to service suppliers listed as follows:

((1) to (16) are omitted.)

(17) Firms engaged in Commissioning Testing of Ballast Water Management System (BWMS)

~~(178)~~ Firms other than those listed in (1) to ~~(167)~~ above

2 Firms listed in -1(1) through ~~(167)~~ are to comply with the requirements in this Part as well as the requirements in **Part 1**.

3 Firms listed in -1~~(178)~~ are to comply with the requirements deemed appropriate by the Society as well as the requirements in **Part 1**.

4 When several servicing stations are owned by firms listed in -1(1) through ~~(167)~~, each station is to be assessed and approved, except as specified in **1.2.5-6 to -9**.

Chapter 11 FIRMS ENGAGED IN EXAMINATION OF THE BOW DOORS, STERN DOORS, SIDE DOORS AND INNER DOORS OF RO-RO SHIPS

11.3 Operators and Supervisors

Paragraph 11.3.1 has been amended as follows.

11.3.1 Qualifications

1 Operators carrying out non-destructive ~~examinations~~ tests (~~NDET~~) are to be qualified to a recognised National or International Standard for the methods used.

2 Supervisors carrying out ~~examinations~~ tests are to have the following competence and experience:

- (1) Supervisors ~~is~~ are to have had a minimum of two years of experience as operators/technicians/inspectors within the activity.
- (2) Supervisors ~~is~~ are to have a minimum two years related education from a technical school.

Paragraph 11.4.1 has been amended as follows.

11.4.1 Equipment

1 Suppliers engaged in the inspection of supporting securing and locking devices, as well as hinges and bearings are to possess the following equipment for use in said inspections:

- (1) Equipment for measuring clearances (i.e. feeler gauges, vernier calipers, micrometers).
- (2) Equipment for non-destructive ~~examination~~ tests (i.e. dye penetrant, magnetic particle inspection)

Chapter 16 FIRMS ENGAGED IN SURVEY USING REMOTE INSPECTION TECHNIQUES AS AN ALTERNATIVE MEANS FOR CLOSE-UP SURVEY OF THE STRUCTURE OF SHIPS AND MOBILE OFFSHORE UNITS

16.3 Operators and Supervisors

16.3.1 Training Procedures

Sub-paragraph (5) has been amended as follows.

The documented training procedures specified in **1.2.2** are to at least include information on ways to acquire knowledge about the following items:

((1) to (4) are omitted.)

- (5) Thickness measurements and non-destructive ~~examination~~ tests in accordance with a recognized National or International Industrial ~~NDET~~ Standard when these are part of the service.

Title of Chapter 17 has been amended as follows.

Chapter 17 FIRMS ENGAGED IN WATERTIGHT CABLE PENETRATION INSPECTION ON SHIPS AND MOBILE OFFSHORE UNITS

Section 17.1 has been amended as follows.

17.1 General

17.1.1 Application

This chapter applies to firms engaged in the inspection of watertight cable penetrations (including penetrating cable types, dimensions, fill ration and insulation details, as applicable) on ships and mobile offshore units for compliance with the relevant approval certificates and product installation manuals made by manufacturers.

17.1.2 Approval

1 The procedures of this chapter apply equally to manufacturers or shipyards when they are acting as service suppliers.

2 Any service supplier engaged in the inspection of watertight cable penetrations is to be qualified in such inspections for each make and type of equipment for which they provide said service, and provide manufacturers with documentary evidence that they have been so authorised or certified in accordance with an established system for training and authorisation.

3 In cases where an equipment manufacturer is no longer in business or no longer provides technical support, service suppliers may be authorised for the equipment on the basis of prior authorisation for the equipment as well as their long-term experience and demonstrated expertise as an authorised service provider.

Section 17.2 has been amended as follows.

17.2 Quality Systems

17.2.1 Qualifications and Education, etc. for Personnel

1 Certification of personnel

Personnel are to be trained and qualified in accordance with a recognised national, international or industry standard as applicable, or a manufacturer's established certification program. In either case, the certification program is to be based on the provisions of this chapter for each make and type of equipment for which service is to be provided.

2 Education and training of personnel

- (1) The education for initial certification of personnel is to be documented and address, as a minimum, the following (a) to (d):
 - (a) procedures and instructions for the inspection of watertight cable penetrations;
 - (b) common problems found with the initial installation and in-service inspections of watertight cable penetrations;
 - (c) relevant rules and regulations, including international conventions; and
 - (d) procedures for reporting on initial installation and in-service inspections of watertight cable penetrations in the watertight cable penetration register.
- (2) Education and training for personnel are to include practical technical training on actual

inspection using the watertight cable penetrations for which the personnel are to be certified. The technical training is to include disassembly, reassembly and adjustment of the equipment. Classroom training is to be supplemented by field experience in the operations for which certification is necessary, under the supervision of an experienced senior certified person.

3 Initial certification and renewal of certification

At the time of initial certification and at each renewal of certification, the supplier is to provide documentation to verify an individual's satisfactory completion of a competency assessment using the equipment for which the personnel are certified.

4 Training for renewal of certification

The service supplier is to require refresher training as appropriate to renew the certification.

17.2.2 Requirements for firms

1 The service supplier is to have access to the following (1) and (2):

- (1) manufacturer servicing manuals, servicing bulletins, instructions and training manuals as appropriate; and
- (2) type approval certificates showing any conditions that may be appropriate during the installation or maintenance of the watertight cable penetration.

2 The service supplier is to have access to sufficient tools, in particular any specialized tools as needed, for work to be carried out on board ship.

Section 17.3 has been amended as follows.

17.3 Reporting

17.3.1 Reporting

On completion of inspection, the service supplier is to issue a report confirming the condition of the watertight cable penetration. In addition, the service supplier is to record the results of the inspection in the watertight cable penetration register.

Chapter 18 has been added as follows.

Chapter 18 FIRMS ENGAGED IN COMMISSIONING TESTING OF BALLAST WATER MANAGEMENT SYSTEM (BWMS)

18.1 General

18.1.1 Application

1 This chapter applies to firms engaged in the services specified in the following (1) and (2) during commissioning testing of ballast water management systems (hereinafter referred to as “BWMS”) for statutory purposes. Service suppliers are expected to be able to perform both the following services.

- (1) Sampling and analysis of ballast water
- (2) Verification of self-monitoring equipment

2 Attention is to be paid to complying with the applicable national regulations, if any.

18.1.2 General Qualifications for Service Suppliers

1 Service suppliers are to be familiar with BWMS operations (including features and limits of each treatment technology and self-monitoring parameters).

2 Service suppliers (including the laboratories conducting sample enumeration) are to be accredited to relevant standards such as ISO/IEC 17025 (as amended) or the equivalent, as applicable.

3 Service suppliers are (irrespective of 1.2.8-1) to be independent of BWMS manufacturers or suppliers (including shipyards).

4 Service suppliers may be required to present their confidential internal procedures for conducting the indicative testing to a Society surveyor.

5 Service suppliers are to have documents that prove the requirements for operators are satisfied in accordance with 18.3.1.

6 Commissioning testing of BWMS is to be performed by the operators qualified in accordance with 18.3.

18.2 Quality Systems

18.2.1 Work Procedures

At least the items specified in the following (1) to (4) are to be included in work procedures in accordance with 1.2.4:

- (1) procedures outlining how ballast water sampling and analysis is conducted with respect to each size class of organisms;
- (2) procedures for assessment of BWMS correct operations;
- (3) procedures for documenting and reporting BWMS correct operations; and
- (4) operating procedures for equipment used for tests (including its calibration, adjustment and maintenance).

18.2.2 Training Procedures

At least the items specified in 18.3.1 are to be included in training procedures in accordance with 1.2.2.

18.2.3 Reference Documents

Service suppliers are to have access to the documents listed in the following (1) to (8), as may be amended.

- (1) Res. MEPC.300(72)
- (2) Res. MEPC.173(58)
- (3) BWM.2/Circ.42/Rev.2
- (4) BWM.2/Circ.70/Rev.1
- (5) BWM.2/Circ.61
- (6) BWM.2/Circ.69
- (7) Res. MEPC.279(70)
- (8) Res. A.1120(30)

18.3 Operators

18.3.1 Training and Qualifications

1 Operators are to satisfy the following (1) to (3):

- (1) being able to demonstrate the knowledge in the use of different ballast water testing equipment for the purpose of assessing biological efficacy;
- (2) having documented evidence of sufficient engineering and biological knowledge to conduct the commissioning testing; and
- (3) having the knowledge of the documents referred to as 18.2.3(3) and (4).

2 In addition to -1 above, the operators who perform the analysis of ballast water as specified in 18.1.1(1) are to satisfy the following (1) to (4):

- (1) be trained in the proper use of portable indicative analysis equipment (review of training records and/or interviews may be conducted to confirm the proper use of equipment during the testing);
- (2) be familiar with the design concepts of the sampling devices as per the document referred to as 18.2.3(2) installed on the vessel's BWMS and well understanding the need for maintaining such sampling devices clean and free of contaminants and the importance of controlling the ballast water sample flow rates from them (to avoid organism mortality in the sample);
- (3) be familiar with the technologies utilized by the indicative sampling equipment and understanding water quality issues that are both conducive to successful use of the equipment and circumstances that could challenge the use of the equipment; and
- (4) be trained in the proper disposal procedures for water samples following the commissioning testing.

3 In addition to -1 above, the operators who perform the verification of self-monitoring parameters of the BWMS as specified in 18.1.1(2) are to satisfy the following (1) to (3):

- (1) having the knowledge of SDL referred to in 2.1.1(26), Chapter 2, Part 1 of Rules for Ballast Water Management Installations, self-monitoring parameters (such as flow rate, pressure, Total Residual Oxidants (TRO), UV intensity etc.) and how the BWMS notifies the operator in case it is operated outside its SDL. This knowledge is relevant for evaluating whether the self-monitoring equipment of the BWMS indicates correct operation of the BWMS;
- (2) in case the service suppliers are not present during ballasting operations, the service suppliers are to have knowledge of how to access the BWMS log to evaluate its proper operation during such operations; and
- (3) having a procedure and knowledge to assess the applicable self-monitoring parameters such as flow rate, pressure, Total Residual Oxidants (TRO), UV intensity etc) of the BWMS, taking into account its SDL.

18.4 Records and Reporting

18.4.1 Records

Service suppliers are to maintain a record of the following:

- (1) Operation of the *BWMS* during test period, including any recorded data or operator observations associated with the performance deviations, alarms or abnormal/unexpected operations; and
- (2) Applicable self-monitoring parameters

18.4.2 Reporting

1 Service suppliers are to provide reports detailing the results of sampling and analysis of ballast water and assessment of self-monitoring parameters during commissioning testing.

2 Information and reference to the acceptance documents for the equipment used for the testing should be included in the report.

3 The format of the report is to be acceptable to Society and contain the following information as a minimum:

- (1) Manufacturer's name of the *BWMS*
- (2) Model name of the *BWMS*
- (3) *SDL* and the *BWMS* technology limiting operating conditions
- (4) Operation required (e.g., ballasting, de-ballast, circulation, one pass, in tank, etc)
- (5) Treatment rated capacity of the *BWMS* (m^3/h)
- (6) Relevant performance parameters (e.g. flow rate, pressure, Total Residual Oxidants (*TRO*), *UV* intensity, *UV* dose, or other relevant parameters)
- (7) Alarms developed during the testing
- (8) Installation location the *BWMS*
- (9) Type Approval issued by and Certificate No. of the *BWMS*
- (10) Installation date of the *BWMS*
- (11) Method used for the testing
- (12) Results of sample analysis (includes the record as specified in 18.4.1 and the raw data generated from the used testing equipment)
- (13) Flow rate of ballast pump and volume of ballast tanks, used for the testing
- (14) Comments/Notes (information on filter and other major components and process measurements etc.)

“Rules for ballast water management installations” has been partly amended as follows:

Part 2 SURVEYS

Chapter 2 REGISTRATION SURVEYS

2.1 Registration Surveys during Construction

2.1.3 Inspections of Equipment

Sub-paragraph -2 has been amended as follows.

2 For ships conducting the ballast water management specified in **Chapter 3, Part 3 of the Rules**, the following inspections are to be carried out:

- (1) Confirmation that installations for ballast water treatment (ballast water management system, ballast pump and ballast piping, etc.) are located in their proper positions based upon approved drawings;
- (2) Confirmation that the *BWMS* is in good working order (in principle, includes operation tests associated with ballasting and de-ballasting at rated capacity);
- (3) Confirmation that any consumables such as active substances and preparations necessary for conducting ballast water treatment are provided on board under appropriate controls;
- (4) Confirmation that the *BWMS* is the same as that listed on the certificate for type approval specified in **2.1.2-2(1)**;
- (5) For *BWMS* which make use of active substances or preparations, confirmation that the type of said *BWMS* complies with **3.3-1(2), Part 3 of the Rules**;
- (6) Confirmation that the recording devices for control and monitoring equipment are operable and that sufficient supply of any consumables necessary for the recording devices is provided on board;
- (7) For *BWMS* generating by-products such as sediments, dedicated installations to store such by-products are provided on board; ~~and~~
- (8) The workmanship of the installation is satisfactory and, in particular, that any bulkhead penetrations or penetrations of the ballast system piping are to the relevant approved standards; ~~and~~
- (9) The installation commissioning procedures have been completed;
- (10) For ships that complete their registration surveys on or after 1 June 2022, ~~the sampling and analysis of ballast water~~ commissioning testing of the ballast water management system (*BWMS*) has been completed by service suppliers accepted by the Administration or approved by the Society in accordance with the **Rules for Approval of Manufacturers and Service Suppliers**; and
- (11) Other inspections deemed necessary by the Society.

Chapter 3 REGISTRATION MAINTENANCE SURVEYS

3.1 Annual Surveys

3.1.2 Inspections of Equipment

Sub-paragraph -3 has been added as follows.

3 For ships undergoing any installation, change, or replacement of their *BWMS*, the surveys described in 2.1.3 are to be carried out. For ships whose completion dates for such surveys are on or after 1 June 2022, the confirmation inspection required by 2.1.3-2(10) is to be included therein.

Chapter 4 OCCASIONAL SURVEYS

Section 4.1 has been amended as follows.

4.1 ~~General~~ Occasional Surveys

4.1.1 General

1 At Occasional Surveys, inspections are to be carried out on the relevant items of the requirements specified in 3.1.2 and 3.1.3. In addition, Registration Surveys for such installations are to be carried out mutatis mutandis according to the degree of repairs or modifications made to the ballast water management installation and its relevant equipment. To implement the survey, in lieu of the traditional ordinary surveys where a surveyor is in attendance, the Society may approve survey methods which it considers to be appropriate.

2 For ships undergoing any installation, change, and replacement of their *BWMS*, the Occasional Surveys described in 2.1.3 are to be carried out.

3 For ships carrying out the Occasional Surveys described in 2.1.3 according to -2 above for which the completion date is on or after 1 June 2022, the confirmation inspection required by 2.1.3-2(10) is to be included therein.

“Guidance for ballast water management installations” has been partly amended as follows:

Part 2 SURVEYS

Chapter 2 REGISTRATION SURVEYS

2.1 Registration Surveys during Construction

2.1.3 Inspections of Equipment

Sub-paragraph -1 has been amended as follows.

1 For the purpose of **2.1.3-2(10), Part 2 of the Rules**, ~~inspections are~~ commissioning testing of *BWMS* is to be carried out after all equipment (including associated piping, etc.) has been fully installed on board in consideration of BWM.2/Circ.70/Rev.1 2020 *Guidance for the Commissioning Testing of Ballast Water Management Systems* and in accordance with **Annex 2.1.3-2(10) “Guidance Procedure for Commissioning Testing”**.

Sub-paragraph -2 has been deleted.

~~**2** During the inspections specified in **1** above, in addition to BWM.2/Circ.70/Rev.1 2020 *Guidance for the Commissioning Testing of Ballast Water Management Systems*, the following are to be undertaken for the sampling and analysis of the *BWMS* referred to in **2.1.3-1(10), Part 2 of the Rules**:~~

~~(1) Collection of representative samples~~

~~(a) Representative samples are to be collected from the sampling facilities specified in **1.5, Part 3 of the Rules** during the corresponding ballast water discharge after the full treatment has been applied.~~

~~(b) The total sample volume is to be at least 1 m³; a smaller volume, however, may be used in cases where it is validated to ensure representative sampling of organisms.~~

~~(c) The applicable self-monitoring parameters (e.g. flow rate, pressure, TRO concentration, UV transmittance/intensity) of the *BWMS* are to also be assessed, taking into account the system design limitations of the *BWMS*; in addition, the correct operation of all sensors and related equipment is to be confirmed.~~

~~(2) Analysis of representative samples~~

~~Representative samples are to be analysed for its compliance with the requirements specified in **(1) and (2) of 3.2, Part 3 of the Rules**, using the indicative analysis methods listed in BWM.2/Circ.42/Rev.2, as may be amended.~~

Chapter 4 OCCASIONAL SURVEYS

Section 4.1 has been amended as follows.

4.1 ~~General~~ Occasional Surveys

4.1.1 General

1 The wording “the Society may approve the survey methods which it considers to be appropriate.” in **4.1, Part 2 of the Rules** means survey methods which the Society considers to be able to obtain information equivalent to that obtained through traditional ordinary surveys where a surveyor is in attendance.

Annex 2.1.3-2(10) has been added as follows.

Annex 2.1.3-2(10) “Guidance Procedure for Commissioning Testing”

1.1 Equipment

1.1.1 General

- 1 Testing are to be conducted using indicative analysis equipment accepted by the Society.
- 2 Information and reference to the acceptance documents for the equipment used are to be submitted to the Society in the report which includes the results from the commissioning test performed in accordance with *BWM.2/Circ.70/Rev.1*(as amended).
- 3 In case the indicative analysis equipment used at the testing has not previously been accepted by the Society, the following information is to be submitted to the Society:
 - (1) Equipment information (type, model, technology used, evidence of calibration, detection range, organism type/size classes that can be analyzed);
 - (2) Test results conduct for the verification of accuracy, detection range and repeatability; and
 - (3) Certificate of standards, if applicable
- 4 In case the commissioning test requires the operators to work in hazardous areas (e.g., pump room for tankers, etc.), the service suppliers are either to have the equipment certified for use in such spaces or to provide the surveyor with a list of vessels for which they would not be able to conduct testing.
- 5 For indicative analysis equipment planned to be used, the equipment *OEM* instruction manuals are to be available.
- 6 The manuals specified in -5 above is to include, at least, clear guidance for the proper storage, handling, operation, maintenance, repair, and calibration of the equipment.
- 7 Service suppliers may use specialty devices (e.g., sieves, screens, etc.) to separate the different organism sizes classes (i.e., $\geq 10 \mu m$ to $< 50 \mu m$, and $\geq 50 \mu m$, and indicator microbes) to support analysis of each size class.
- 8 Equipment used for the analysis of physical and/or chemical water parameters other than those specified in **Table 1.1** is to be suitable for the intended use.
- 9 Indicative analysis equipment is to be properly stored or transported to avoid damage and disturbance to calibrations, etc. when transporting from the service suppliers’ facilities to the vessels.

Table 1.1

<u>Sizes of viable organisms</u>	<u>Number of viable organisms</u>
<u>Greater than or equal to $50 \mu m$</u>	<u>less than $10 /m^3$</u>
<u>less than $50 \mu m$ and greater than or equal to $10 \mu m$</u>	<u>less than $10/ml$</u>

1.2 Sampling and Analysis of Ballast Water

1.2.1 Sampling

- 1 Service suppliers are to follow relevant guidelines on sampling of ballast water.
- 2 A standard operating procedure is to be defined for sampling of uptake water. Discharge sampling are to follow *IMO Res. MEPC.173(58)*.

1.2.2 Analysis

1 The representative samples are, at least, to be analyzed with indicative analysis methods if the standards as per Table 1.1 are met.

2 Detailed analysis of all organism type/size classes or combination of detail and indicative analysis can also be performed.

3 In such cases as specified in -2 above, equipment, procedures and methods for such analysis, where applicable, are to be in accordance with relevant international standard and/or industry standards accepted by the Society. For all equipment planned to be used, the instruction manuals are to be available.

1.3 Records and Reporting

1.3.1 Records

Service suppliers are to maintain a record of the following:

- (1) Operation of the BWMS during test period, including any recorded data or operator observations associated with the performance deviations, alarms or abnormal/unexpected operations; and
- (2) Applicable self-monitoring parameters

1.3.2 Reporting

1 Service suppliers are to provide reports detailing the results of sampling and analysis of ballast water and assessment of self-monitoring parameters during commissioning testing.

2 Information and reference to the acceptance documents for the equipment used for the testing should be included in the report.

3 The format of the report is to be acceptable to Society and contain the following information as a minimum:

- (1) Manufacturer's name of the BWMS
- (2) Model name of the BWMS
- (3) SDL and the BWMS technology limiting operating conditions
- (4) Operation required (e.g., ballasting, de-ballast, circulation, one pass, in tank, etc)
- (5) Treatment rated capacity of the BWMS (m^3/h)
- (6) Relevant performance parameters (e.g. flow rate, pressure, Total Residual Oxidants (TRO), UV intensity, UV dose, or other relevant parameters)
- (7) Alarms developed during the testing
- (8) Installation location the BWMS
- (9) Type Approval issued by and Certificate No . of the BWMS
- (10) Installation date of the BWMS
- (11) Method used for the testing
- (12) Results of sample analysis (includes the record as specified in 1.3.1 and the raw data generated from the used testing equipment)
- (13) Flow rate of ballast pump and volume of ballast tanks, used for the testing
- (14) Comments/Notes (information on filter and other major components and process measurements etc.)

1.4 Other

1.4.1 General

For commissioning testing, attention is to be paid to complying with national regulations of the flag states in which the ships are registered, if any.