

MARINE ENVIRONMENT PROTECTION  
COMMITTEE  
81st session  
Agenda item 4

MEPC 81/4/3  
15 December 2023  
Original: ENGLISH  
Pre-session public release:

## HARMFUL AQUATIC ORGANISMS IN BALLAST WATER

### Proposal for amendments to the Guidance for Administrations on the type approval process for ballast water management systems (BWM.2/Circ.43/Rev.1)

Submitted by Germany, Greece and BEMA

#### SUMMARY

*Executive summary:* This document presents information regarding necessary modifications to a BWMS with existing type approval and proposed amendments to the *Guidance for Administrations on the type approval process for ballast water management systems* (BWM.2/Circ.43/Rev.1) that will support approval of BWMS modifications.

*Strategic direction, 1  
if applicable:*

*Output:* 1.25

*Action to be taken:* Paragraph 21

*Related documents:* MEPC 78/4; MEPC 80/4/10, MEPC 80/4/19, MEPC 80/4/21, MEPC 80/4/22, MEPC 80/INF.18, MEPC 80/WP.13; resolution MEPC.300(72) and BWM.2/Circ.43/Rev.1

#### Introduction

1 On 13 April 2018, the Marine Environment Protection Committee (the Committee) adopted resolution MEPC.300(72), making the 2016 Guidelines (G8) mandatory under the BWM Convention. The resolution, containing the Code for Approval of Ballast Water Management Systems (BWMS Code), set out the requirements for type approval of ballast water management systems (BWMS).

2 The Code is primarily intended to guide initial and/or new type approval of a BWMS. With the exception of a provision that allows BWMS upgrades after type approval that relate to safe BWMS operation (BWMS Code, Annex, Part 1, paragraph 1.12), approval of modifications to a BWMS with existing type approval is not described in the BWMS Code. Further, the current *Guidance for Administrations on the type approval process for ballast water management systems* (BWM.2/Circ.43/Rev.1) lacks guidance for approving changes to a BWMS with existing type approval.

3 This document is submitted with the intention to invite discussion on how to efficiently approve BWMS modifications to components within a BWMS after a Type Approval Certificate has been issued. Background on the various scenarios that necessitate modifications to a type approved BWMS, current challenges to approval of modifications, along with proposed amendments to BWM.2/Circ.43/Rev.1, are provided in this document.

## Discussion

4 As presented in document MEPC 80/INF.18, there are a variety of scenarios that require changes to components within a BWMS that has an existing type approval. Many BWMS components are commercial, marine, off-the-shelf parts which have been used by the BWMS manufacturer during initial design. Over the course of a product's life cycle, these components may be improved, replaced, or made obsolete by the component manufacturer with no input or warning to the BWMS manufacturer. Additionally, a BWMS manufacturer may find better or more suitable components that reduce downtime or address supply chain constraints, but may be unable to easily adapt them into the design owing to the nature of the Type Approval Certificate and the specific list of components associated with the BWMS type approval. Similarly, a BWMS manufacturer may want to improve a BWMS based on operational experience gained and/or industry demands such as addressing ports with challenging water quality (CWQ) or improving energy efficiency.

5 Demands to support shipowners in achieving environmental sustainability goals and address issues such as CWQ are being placed on BWMS manufacturers. To respond to these demands, it is essential that BWMS manufacturers have the ability to modify systems with an existing type approval in a timely and cost effective manner.

6 Type approvals must be amended with each Administration and classification society that a BWMS manufacturer has an approval from. Manufacturers often have approvals from 10 or more Administrations and/or classification societies. Current procedures for amending a type approved BWMS are unclear and inconsistent across Administrations and/or their recognized organizations (RO). Review periods with each entity can be extensive, sometimes requiring one year or more per amendment. These current practices create barriers that hinder technology innovation as well as the ability for BWMS manufacturers to improve a BWMS and respond to industry demands.

7 Redundant testing that does not add value to the type approval or demonstrate additional system capabilities is frequently required at significant cost. Each Administration and classification society charges a fee to review BWMS amendments, often at a cost of tens of thousands of US dollars for each approval. These additional costs ultimately impact ship owners in the form of higher BWMS equipment costs.

8 Considering the need to ensure robust BWMS suitable for worldwide operations are readily available, and considering the implementation experience gained and the points also raised in documents MEPC 80/4/10 and MEPC 80/4/19, the co-sponsors are of the view that guidance for streamlined and harmonized approval processes to evaluate modifications to a BWMS with existing type approval is urgently needed.

9 The co-sponsors considered previous submissions detailing the need for streamlined approvals for modifications to ballast water management systems (MEPC 80/4/10), additional comments on strengthening type approval standards and the testing process for BWMS (MEPC 80/4/19), suggestions in document MEPC 80/4/21 for the need for a robust and uniform approval regime for modifications to BWMS which have achieved type approval, and recognition of the potential benefit of a pre-evaluation of the impacts modifications may have to the BWMS (MEPC 80/4/22). The co-sponsors, as invited by the Committee (MEPC 80/17,

---

paragraph 4.35), propose a flow chart for evaluation of modifications and propose a table of example modifications with a proposed amended scope of testing and evaluation for the consideration of Administrations during the type approval process.

10 The review of the BWM Convention is currently underway and a package of amendments to the BWM Convention and/or its instruments will be developed. However, guidance is needed prior to adoption of these amendments, planned for autumn 2026. The co-sponsors suggest that amendments to the existing guidance in BWM.2/Circ.43/Rev.1 offers a possible way forward that can be achieved in a shorter time period. The co-sponsors propose amending the current guidance to include harmonized evaluation of modifications to a BWMS with existing type approval. This evaluation will ensure that any modifications to a BWMS do not negatively impact the major components of the BWMS (as defined by the BWMS Code) or indirectly impact the BWMS' ability to treat ballast water to the requirements of the D-2 standard.

### **The BWMS Code**

11 Through the initial type approval process in resolution MEPC.300(72), BWMS functionality is verified across the range of challenge conditions based upon the system design limitations (SDLs) as stated by the manufacturer. These SDLs may be monitored by one or more components directly or indirectly, which can be related to the disinfection efficiency of the BWMS.

12 The co-sponsors of this document recognize that the BWMS Code defines major components as "those components that directly affect the ability of the system to meet the ballast water performance standard described in regulation D-2". Examples of major components may include filters, ultraviolet modules, electrochlorination cells, etc.

13 A BWMS type approval also evaluates the suitability for service in the marine environment of many other components of the system which may have no direct impact on the disinfection efficiency of the BWMS. Based on the definition of "major components" and use of the term "non-major component" within the BWMS Code, the term "non-major component" is considered to refer to "those components that do not directly affect the ability of the system to meet the performance standard described in regulation D-2". Examples of non-major components may include pumps, valves, common electrical components (e.g. fuses, circuit breakers) and/or cabinetry. Many non-major components within a BWMS are considered common marine equipment and may or may not be marine type approved.

14 Both major and non-major components are listed within the documentation and/or bill of materials submitted for type approval of the BWMS. Therefore, all BWMS components, regardless of function, become an integral part of a BWMS remaining in compliance with its type approval.

15 The BWMS Code refers to upgrades or changes within the requirements for readiness evaluation (paragraphs 1.10, 1.11 and 1.12 of the annex to the BWMS Code). Paragraph 1.12 is the only paragraph which refers to upgrades or changes after type approval, but the paragraph is applicable to upgrades related to safety only.

16 While there is currently no defined process, some Administrations currently conduct evaluations for BWMS modifications based on industry needs. Current practice by Administrations conducting evaluations of modifications to already type approved BWMS are varied and can create significant barriers to the continued development of robust and effective BWMS, particularly in cases of changes to non-major components that do not have the potential to impact biological efficacy, safety or environmental aspects, but would improve the BWMS.

17 Current processes in place by ROs to evaluate BWMS modifications are also not harmonized as each RO may represent multiple Administrations and may have different levels of experience with evaluating changes. This places undue burdens on BWMS manufacturers to supply evidence of equivalency in multiple ways and repeatedly to satisfy multiple ROs and multiple Administrations. By including an IMO-recognized process for approval of BWMS modifications after type approval, evaluations can be harmonized between Administrations and ROs.

#### **BWM.2/Circ.43/Rev.1**

18 BWM.2/Circ.43/Rev.1, *Guidance for Administrations on the type approval process for ballast water management systems*, provides guidance for Administrations on type approval testing requirements, recommendations for facilitating a type approval, the approval process, and reporting on issued type approvals. This circular currently does not provide guidance on evaluating and approving modifications to a BWMS with existing type approval.

19 The co-sponsors suggest that BWM.2/Circ.43/Rev.1 can be amended to include a new section that contains harmonized guidance to support evaluating modifications to a BWMS with existing type approval. Evaluations of BWMS changes should be thorough and can be proportional to the component (major or non-major) being changed. The extent of the evaluation and any required testing can be based upon the component specifications and the potential impacts to the BWMS operation (efficacy, safety and environmental). As an example, approval for replacement of an existing non-major component with one that has similar or higher specifications, has its own type approval certificate and is considered common marine equipment, should be approved based upon a documentation review by the Administration and/or RO.

20 Amendments to BWM.2/Circ.43/Rev.1 can additionally reference the recent GESAMP-BWWG recommendations for re-evaluations related to BWMS that employ Active Substances, when applicable. Background information is presented in document MEPC 78/4/2 and reflected in BWM.2/Circ.13/Rev.5 (chapter 12).

#### **Action requested of the Committee**

21 The Committee is invited to consider the proposed amendments to BWM.2/Circ.43/Rev.1 as provided in the annex.

\*\*\*

## ANNEX

### PROPOSED AMENDMENTS TO THE GUIDANCE FOR ADMINISTRATIONS ON THE TYPE APPROVAL PROCESS FOR BALLAST WATER MANAGEMENT SYSTEMS (BWM.2/CIRC.43/REV.1)

Proposed amendments to the guidance are shown as additions / ~~deletions~~.

BWM.2/Circ.43/Rev.2  
XX March 2024

### INTERNATIONAL CONVENTION FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER AND SEDIMENTS, 2004

#### 2024 Guidance for Administrations on the type approval process for ballast water management systems

- 1 The Marine Environment Protection Committee (MEPC), at its sixty-first session (27 September to 1 October 2010), approved the *Guidance for Administrations on the type approval process for ballast water management systems in accordance with Guidelines (G8)*, developed by the Sub-Committee on Bulk Liquids and Gases (BLG) at its fourteenth session (8 to 12 February 2010), disseminated as BWM.2/Circ.28.
- 2 MEPC 65 (13 to 17 May 2013) approved amendments to the Guidance, developed by BLG 17 (4 to 8 February 2013), disseminated as BWM.2/Circ.43, superseding BWM.2/Circ.28.
- 3 MEPC 72 (9 to 13 April 2018) considered and approved a revision of the Guidance in order to reflect the requirements of the *Code for Approval of Ballast Water Management Systems* (resolution MEPC.300(72))<sup>1</sup> ~~as set out in the annex.~~
- 3bis MEPC 81 (18 to 22 March 2023) considered and approved amendments to the Guidance to include harmonized evaluation of modifications to a ballast water management system with existing type approval, as set out in the annex.
- 4 Member Governments and international organizations are invited to bring the annexed Guidance to the attention of all parties concerned.
- 5 This circular ~~supersedes~~ revokes BWM.2/Circ.43/Rev.1.<sup>1</sup>

---

<sup>1</sup> As per paragraph 1.13 of the BWMS Code, the revised Guidance is also applicable to ballast water management systems approved taking into account the 2016 Guidelines (G8) (resolution MEPC.279(70)). Reference may be made to BWM.2/Circ.43 for ballast water management systems approved not later than 28 October 2018 under Guidelines (G8) (resolution MEPC.174(58)), taking into account the revised Guidance as appropriate.

## DRAFT 2024 GUIDANCE FOR ADMINISTRATIONS ON THE TYPE APPROVAL PROCESS FOR BALLAST WATER MANAGEMENT SYSTEMS

### 1 PURPOSE

1.1 This document provides guidance for Administrations on the procedure for evaluating an application for type approval of a ballast water management system (BWMS), in accordance with the Code for Approval of Ballast Water Management Systems (BWMS Code), or evaluating modifications of equipment approved as part of an existing type approved BWMS. The Guidance can act as an aide-memoire for Administrations and is not intended, in any way, to interfere with the authority of an Administration.

1.2 This document provides guidance on interpretation of the BWMS Code and does not replace or supersede the requirements of the Code.

1.3 This document is intended to provide guidance to Administrations on the details of the type approval to be reported to the Committee.

### 2 KEY INSTRUMENTS

In evaluating an application for type approval of a BWMS, the latest version of the following instruments should be consulted:

- .1 International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (BWM Convention);
- ~~.2 *Guidelines for approval of ballast water management systems (G8)* (resolutions MEPC.125(53), MEPC.174(58) and MEPC.279(70));~~
- .3 *Procedure for approval of ballast water management systems that make use of Active Substances (G9)* (resolution MEPC.169(57));
- .4 *Guidelines for ballast water sampling (G2)* (resolution (MEPC.173(58));
- .5 *Code for Approval of Ballast Water Management Systems* (resolution MEPC.300(72));
- .6 *Guidance to ensure safe handling and storage of chemicals and preparations used to treat ballast water and the development of safety procedures for risks to the ship's crew resulting from the treatment process (BWM.2/Circ.20)*;
- .7 *Information reporting on type-approved ballast water management systems* (resolution MEPC.228(65)~~175(58)~~);
- .8 *Methodology for information gathering and conduct of work of the GESAMP-BWWG* (BWM.2/Circ.13, as revised); and
- .9 other pertinent ballast water management related resolutions, guidance and circulars.

### 3 RECOMMENDATIONS FOR REQUIREMENTS OF MANUFACTURERS OR THEIR AGENTS

3.1 To facilitate ~~the~~ an initial or new type approval of a BWMS, the Administration should ensure that the manufacturers, or their agents have, at a minimum:

- .1 been informed if the Administration delegates to or utilizes the services of a third party quality assurance organization (e.g. recognized organization, nominated body, classification society, surveyors, etc.) in some, or all of the type approval processes;
- .2 understood the steps and requirements of the processes outlined in the instruments listed in section 2 of this Guidance;
- .3 a fully working system built that can be used in the type approval process. It should be noted that the construction procedures and materials for the unit tested need to be the same as for the follow-on production units;
- .4 undertaken preliminary testing to ensure that their BWMS is viable, will meet the D-2 standard of the BWM Convention, will work on board a ship and has been determined not to pose any unacceptable risk to the environment;
- .5 understood the extent of testing that needs to be completed by a recognized testing facility, including toxicity analysis;
- .6 provided a description of the preliminary test to the Administration that should at least include the following:
  - .1 the test set-up, including sampling points;
  - .2 responsible persons/organizations for all or portions of the preliminary testing;
  - .3 possible Quality Management Plan (QMP) of the testing facility;
  - .4 testing laboratories that will be used;
  - .5 Quality Assurance Project Plan (QAPP) for the preliminary test; and
  - .6 provision for survey of the test facility, if required;
- .7 provided a detailed report of the preliminary test results including, at least:
  - .1 toxicity data;
  - .2 Active Substances if relevant; and
  - .3 any Other Chemicals generated during the process;
- .8 an understanding of whether the system under consideration uses an Active Substance as defined in the BWM Convention. If it utilizes an Active Substance, the system will require additional approval under Procedure (G9), whilst the systems not using an Active Substance only need approval under the BWMS Code;

- .9 a contractual agreement to undertake the shipboard testing needed under the BWMS Code with the owner of a suitable ship;
- .10 arranged for a trained person from the land-based testing facility to operate the equipment being type approved and ensure that for the shipboard test the ship's crew is familiar with the equipment and sufficiently trained to operate the equipment;
- .11 consulted with the classification society that the ship undertaking the shipboard testing is being registered, where necessary, and obtained approval for installation of the BWMS;
- .12 demonstrated by using mathematical modelling and/or calculations or by full-scale shipboard testing, that any up or down scaling will not affect the ultimate functioning and effectiveness on board a ship of the type and size for which the equipment will be certified. In doing so, the manufacturers should take into account all relevant guidance developed by the Organization;
- .13 prepared a type approval application in compliance with the BWMS Code, annex, part 1, which includes at least the following:
  - .1 detailed description of the design, construction, operation and functioning of the BWMS;
  - .2 preliminary assessment of the corrosion effects of the system proposed, if applicable;
  - .3 preliminary test results;
  - .4 technical manual;
  - .5 BWMS piping and instrumentation diagram (P&ID);
  - .6 link to the provisions required in a ballast water management plan;
  - .7 environmental and public health effects; and
  - .8 specific salinities to be tested;
- .14 provided the following, when submitting the type approval application:
  - .1 sufficient information to verify operation in different salinity ranges (fresh, brackish and marine water) in which the BWMS will operate;
  - .2 sufficient information to verify operation in the different temperature ranges (cold, temperate and tropical) in which the BWMS will operate;
  - .3 sufficient information to verify operation with the different sediment loads under which the BWMS will operate;



- .4 sufficient information to verify operation of the minimum effective treatment flow rate as well as the maximum Treatment Rated Capacity (TRC) including the duration of these tests; and
- .5 suggestions for improvements of the installation related to safety or additional testing R&D;
- .15 made all laboratory-scale and, if appropriate, full-scale land-based test results and documentation, including all unsuccessful, failed and invalid tests, available to the Administration; and
- .16 made all shipboard test results and documents, including all unsuccessful, failed and invalid tests, as well as detailed information of the test set up and flow rate at each test cycle, available to the Administration.

3.2 In accordance with paragraphs 4.17 to 4.22 of the Code for Approval of Ballast Water Management Systems (BWMS Code), Administrations should ensure that type-approved BWMS have a suitable self-monitoring system that will monitor and record sufficient data to verify correct operation of the system. Administrations should make every effort to ensure that newly installed BWMS that have already been granted type approval meet this recommendation within one year following approval of this Guidance. Administrations should issue treatment system particulars, including details of the self-monitoring system (as described in document MEPC 61/INF.19 and BWM.2/Circ.69, as may be revised), for all type approved systems.

3.3 To facilitate an evaluation of modifications to a BWMS with an existing type approval, the Administration should ensure that the manufacturers or their agents have:

- .1 a BWMS with an existing type approval;
- .2 been informed if the Administration delegates to or utilizes the services of a third party quality assurance organization (e.g. recognized organization, nominated body, classification society, surveyors, etc.) in some or all of the type approval processes;
- .3 received all relevant information to understand the steps and requirements of the processes outlined in the instruments listed in section 2 of this Guidance;
- .4 provided a clear description of the BWMS modifications, including a technical description and the main characteristics of the current BWMS component(s), a comparative evaluation of the appropriateness of the new component(s), and all relevant documentation such as marine certifications and type approval certificates for the new component(s);
- .5 received all relevant information to understand which documents to submit for enabling the administration to assess if the modification is a change to a major component in accordance with the definition in paragraph 3.9 of the BWMS Code;

.6 for modifications to major components, received all relevant information to understand the extent of any testing that the Administration may require to be completed by an independent testing facility accepted by the Administration to allow full evaluation of the BWMS modification, including any analysis related to Final Approval in accordance with Procedure (G9); and

.7 made all reports of any required testing and documentation to support evaluation of the BWMS modification(s) available to the Administration.

#### **4 RECOMMENDATIONS FOR FACILITATING TYPE APPROVAL EVALUATION**

4.1 For those Administrations using third party quality assurance organizations, due care should be taken to ensure all such arrangements are in place prior to initiating the type approval programme.

4.2 The Administration should provide the applicant with a document outlining contact details, the expected amount of time between submission and decision and any other requirements separate from the procedures and requirements outlined in the instruments listed in section 2 of this Guidance.

4.3 The Administration should verify that any recommendations made by MEPC during Basic and Final Approval have been addressed prior to issuing the Type Approval Certificate. In accordance with *Information reporting on type-approved ballast water management systems* (resolution MEPC.228(65)~~475(58)~~), the Administration should submit the final report of land-based and shipboard tests with the notification of type approval to the Organization. The reports should be available to Member States.

4.4 The Administration may certify a range of the BWMS capacities employing the same principles and technology, but due consideration should be given to limitations on performance which might arise from scaling up or scaling down.

4.5 The Administration should, in particular, review Standard Operating Procedures (SOP) for which an international standard has yet not been established.

#### **5 APPROVAL PROCESS**

5.1 Under the provisions of the BWM Convention, a BWMS is to be approved in accordance with the BWMS Code and, where appropriate, Procedure (G9).

5.2 The Administration should verify that the following issues have been specifically addressed by the manufacturer and, if the evaluation of the system is carried out by a third party organization, these issues should be relayed to the Administration to enable a decision on:

- .1 a comprehensive explanation of the physical and/or biochemical treatment processes used by the BWMS to meet the D-2 Standard in the BWM Convention. This should be undertaken by the manufacturer and any supporting data should be submitted in writing. Any system which makes use of, or generates, Active Substances, Relevant Chemicals, or free radicals during the treatment process to eliminate organisms in order to comply with the Convention should be submitted to the Organization for review under Procedure (G9), (Procedure (G9), paragraph 3.3);

- .2 whether a BWMS makes use of an Active Substance or not remains the prerogative of the responsible Administration. In making that determination, Administrations should take into account relevant GESAMP-BWWG recommendations and MEPC decisions as to whether a system should be subject to approval under Procedure (G9). When an Administration is unsure of whether a BWMS is subject to Procedure (G9), it may choose to submit such system for review under that Procedure (MEPC 59/24, paragraph 2.16);
- .3 the BWMS that the Administration determines are not subject to Procedure (G9), as provided in paragraph 2.4.11 of the annex to the BWMS Code, the toxicity testing procedures in paragraphs 5.2.2 to 5.2.7 of Procedure (G9) should be used when the system could reasonably be expected to result in changes to the treated water such that adverse impacts to receiving waters might occur upon discharge;
- .4 the approval documents that should include a piping and instrumentation diagram (P&ID) with parts list and material specification. Furthermore, wiring diagrams, function description of the control and monitoring equipment and description of regulator circuit of the BWMS;
- .5 information on the preliminary testing (methodology, test water composition, salinities tested, sampling, analysis laboratories, etc.);
- .6 accreditation of the BWMS Code land-based testing facility or body including their quality management plan (QMP) and quality assurance project plan (QAPP) to be used by the manufacturer for land-based testing;
- .7 approval and subsequent verification of the design, construction, operation and functioning of the equipment used for land-based and shipboard testing;
- .8 approval and subsequent verification of the land-based and shipboard test methodology, including the composition of the test water, and specific salinities to be tested which should be in line with the BWMS Code, Procedure (G9) and the Methodology for information gathering and conduct of work of the GESAMP-BWWG, as appropriate (waiver for multiple testing required);
- .9 approval and subsequent verification of the methodology used to take and store samples, the laboratory testing, the frequency of sampling and the analysis procedure for samples from land-based and shipboard testing;
- .10 approval and subsequent verification of the design, construction, operation and functioning of the equipment used for testing;
- .11 if the system is using an Active Substance, the applications for Final Approval will have to be checked and approved by the Administration prior to making a proposal for approval to the Organization. In addition, the cost-recovery fee for the scientific services provided by the GESAMP-BWWG will have to be submitted;
- .12 a safety assessment of the storage and handling of any chemicals is undertaken and approved in line with the technical guidance developed by the Organization (BWM.2/Circ.20);

- .13 a safety and hazard assessment of the installation, operation and maintenance of the BWMS on the shipboard test is undertaken and approved in line with the technical guidance developed by the Organization (BWM.2/Circ.20), and includes as a minimum:
  - .1 any potential impact on the crew health and safety; and
  - .2 references to the classification society safety and hazard rules and recommendations;
- .14 all electrical equipment used to operate the BWMS should be of a certified safety type required by the applicable national or international standard in respect of the hazardous areas where it is located; and
- .15 results of environmental testing as specified in part 3 of the annex to the BWMS Code.

5.3 For issuance of the Type Approval Certificate, the Administration should set the following requirements and provisions:

- .1 the validity of the approval should be revisited as appropriate;
- .2 in due time before the expiration of the approval, the manufacturer should prepare a report detailing the experiences with the system, including the results of any scientific research relevant to the system, as well as any results of port State controls, if available;
- .3 the occurrence of any unexpected harmful consequences of the operation of the BWMS should be reported by the manufacturer to the Administration immediately;
- .4 in accordance with the BWMS Code, the Type Approval Certificate should include details on all limiting operating conditions, restrictions and/or SDL determined by the Administration for the operation of the BWMS;
- .5 an annex to the Type Approval Certificate should contain the test results of each land-based and shipboard test run. Such test results should include at least the numerical salinity, temperature, flow rates, and where appropriate UV transmittance. In addition, these test results should include all other relevant variables;
- .6 the Type Approval Certificate should specify the components of the BWMS that are type approved, including the manufacturer of each component; their operating ranges, including temperature, specific salinity and specify the possibility to use other similar components (e.g. filters) and the criteria for allowing such use;
- .7 a separate Type Approval Certificate should be provided for each type or model of the BWMS. However, if Administrations wish to do otherwise, it is recommended that the different types and models are clearly stated and the test each type and model has undergone clearly referred to with test results, operating ranges, salinity, TRC, etc.;

- .8 all accidents (e.g. accidental exposure, leakage) related to the BWMS should be reported;
- .9 any indications that the system is not performing to the standards set by the BWM Convention, the BWMS Code and/or any additional provisions set by the Administration should be reported by the manufacturer to the Administration immediately;
- .10 the Administration should have the opportunity to revoke the approval if these requirements are not met; and
- .11 MSC.1/Circ.1221 on *Validity of Type Approval Certification for marine products* should apply.

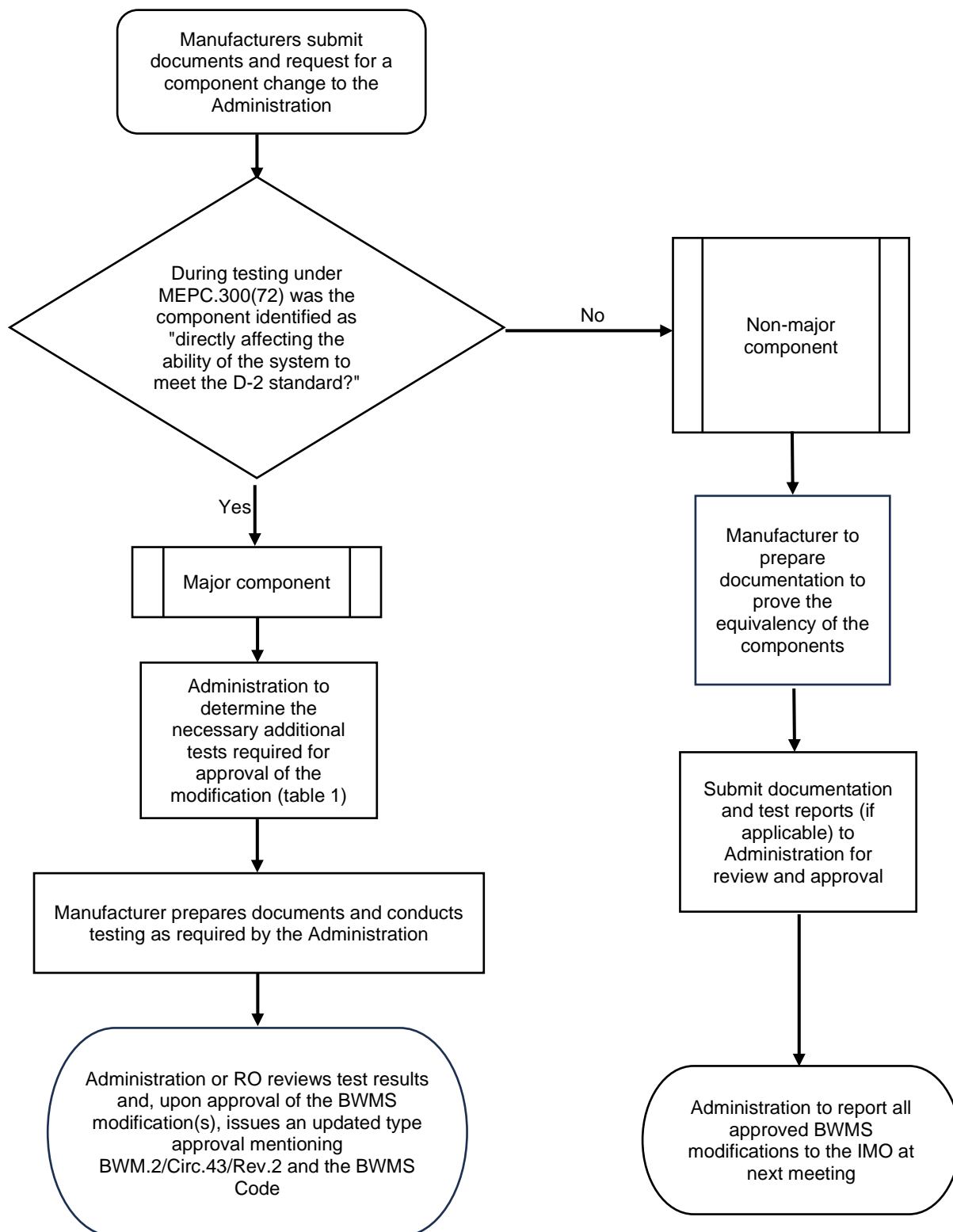
### **5bis EVALUATION OF MODIFICATIONS TO BWMS WITH EXISTING TYPE APPROVAL**

5bis.1 During the lifecycle of a BWMS type approval, it may become necessary due to supply chain issues, obsolescence, lifecycle performance, and/or ability to improve the performance or cost efficiency of a system that components included within a type approved BWMS need to be upgraded, changed or replaced. When evaluating BWMS modifications, the type of component (major or non-major) being modified can be used to determine the extent of the evaluation necessary to ensure continued effective operation of the BWMS.

5bis.2 Resolution MEPC.300(72) defines "major component" as "...those components that directly affect the ability of the system to meet the ballast water performance standard described in regulation D-2". Examples of major components may include filters, ultraviolet modules, electrochlorination cells, dosing units, etc.

5bis.3 Resolution MEPC.300(72) incorporates the term "non-major component" but does not provide a definition. Based on the definition of "major component" and for the purposes of this guidance, "non-major component" means "those components that do not directly affect the ability of the system to meet the performance standard described in regulation D-2". Examples of non-major components may include pumps, valves, common electrical components (e.g. fuses, circuit breakers), process sensors, and cabinetry. Many non-major components within a BWMS are considered common marine equipment and may have marine type approval certificates and/or testing reports following IACS UR E10, as applicable.

5bis.4 The manufacturer, Administration, and, if applicable, the third-party quality assurance organization (e.g. recognized organization, nominated body, classification society, etc.) are encouraged to use figure 1 as a means to identify whether a component is a major or non-major component.



**Figure 1: Process for evaluation of modifications to an existing BWMS type approval**

5bis.5 The extent of evaluation for BWMS modifications should be proportional to the function and specifications of the component(s) to be changed (e.g. greater potential impact of the modification on BWMS effectiveness, safety or environmental aspects may have more detailed evaluations and/or testing). For non-major component modifications when there is no

direct impact to the ability of a BWMS to meet the performance standards or impact Final Approval aspects under Procedure (G9), a streamlined evaluation process that facilitates time efficient type approval amendments should be implemented.

5bis.6 When evaluating modifications to a BWMS that employs an Active Substance, Administrations are also encouraged to consider BWM.2/Circ.13/Rev.5, annex, section 12, as may be revised.

5bis.7 Regardless of the type of BWMS modification, the manufacturer should provide to the approving Administration:

- .1 information on the identification of the component as either major or non-major;
- .2 the specifications of the current component(s) in the existing BWMS type approval;
- .3 the specifications of the proposed new component(s); and
- .4 a comparative evaluation to demonstrate the suitability of the modification.

5bis.8 If the BWMS modification involves a major component, the Administration is encouraged to determine the necessary tests for type approval of each modification to BWMS major components, considering the tests shown in table 1. This may include land-based and/or shipboard testing of the BWMS (full, reduced or modified scope of BWMS Code testing requirements), environmental testing, disinfection by-product and/or aquatic toxicity testing (as may be applicable to BWMS having Final Approval), operational testing, and/or SDL verification, as presented in table 1.

**Table 1: Actions for type approval of modifications to BWMS major components**

<u>BWMS component or treatment process</u>	<u>BWMS modification</u>	<u>Type approval actions</u>
<u>Filters</u>	<u>Removing filter</u>	<u>BWMS testing scope to be in accordance with the BWMS Code</u>
	<u>Adding an alternate filter with similar technical specifications</u>	<u>BWMS needs to undergo land-based test (3 salinities, 2 test cycles per salinity)</u>
	<u>Filter micron rating change, lower micron rating (smaller dimension)</u>	<u>BWMS to undergo shipboard testing as per the BWMS Code</u>
<u>UV</u>	<u>Increasing UV dose</u>	<u>Operational testing data for suitability and function to be provided to the Administration</u>
	<u>Decreasing UV dose</u>	<u>BWMS needs to undergo land-based testing as per the BWMS Code</u>

<u>BWMS component or treatment process</u>	<u>BWMS modification</u>	<u>Type approval actions</u>
	<u>Change of UV intensity sensor</u>	<u>Functional testing to verify equivalency of sensor performance (e.g. opening angle, spectrum, max. intensity) and integration with control systems</u>
	<u>Change of UV chamber</u>	<u>BWMS to undergo shipboard testing as per the BWMS Code</u>
	<u>Change of UV lamp manufacturer</u>	<u>Comparison of spectral analysis, radiation angle and intensity for equivalency and environmental testing of new lamp design</u>
<u>Injection of Active Substance (independent from in-situ production or on-board carriage of AS)</u>	<u>Increasing dose</u>	<u>Testing for equipment function and assessment of potential changes to the levels of disinfection by-products and/or relevant chemicals in accordance with the Methodology, as may be revised</u>
	<u>Decreasing dose</u>	<u>BWMS needs to undergo land-based testing as per the BWMS Code</u>
	<u>Change of Active Substance used</u>	<u>BWMS testing scope to be in accordance with the BWMS Code</u>
<u>Electrolysis</u>	<u>Increasing dose</u>	<u>Testing for equipment function and assessment of potential changes to the levels of disinfection by-products and/or relevant chemicals in accordance with the Methodology, as may be revised.</u>
	<u>Decreasing dose</u>	<u>BWMS needs to undergo land-based testing as per the BWMS Code</u>
	<u>Change of electrode</u>	<u>Land-based tests (3 salinities, 2 test cycles per salinity) following comparison of performance of production of the new electrode for function, suitability, and environmental testing of new electrodes according to the BWMS Code including considerations relating to Procedure (G9)</u>
<u>TRO</u>	<u>Change TRO sensor technology</u>	<u>Follow guidance in BWM.2/Circ.13/Rev.5, as may be amended; perform functional testing to verify sensor performance and integration with BWMS control system</u>
<u>Control systems</u>	<u>Program logic controller</u>	<u>Functional testing to verify equivalency of PLC performance and integration with approved software</u>



<u>BWMS component or treatment process</u>	<u>BWMS modification</u>	<u>Type approval actions</u>
	<u>HMI touchscreen</u>	<u>Functional testing to verify equivalency of HMI performance and integration with PLC control and installed software</u>
	<u>Software</u>	<u>BWMS testing scope to be agreed upon with the Administration including considerations relating to Procedure (G9) based on the specific modifications proposed</u>  <u>If the treatment process is directly impacted by the changes, the BWMS to undergo land-based testing as per the BWMS Code</u>

5bis.9 If the BWMS modification involves a non-major component, the Administration should verify that the following items have been specifically addressed by the manufacturer:

- .1 information on type approvals of the proposed new component(s); and
- .2 description of how the new component does not interfere with the BWMS' ability to meet the D-2 standard and the overall function of the system in the shipboard environment.

5bis.10 To allow for an efficient documentation and reporting process for BWMS manufacturers with multiple type approvals, the Administration should provide a new certificate that includes the approved BWMS modifications. Amended certificates should be maintained by the BWMS manufacturer and provided to ships to which the BWMS modifications are applicable for review during port State control and/or flag State inspections.

5bis.11 Following completion of modifications to an existing type approval by the issuing Administration, other Administrations, class societies and recognized organizations are encouraged to provide mutual recognition of the modification without further review and testing, provided that the requirements of table 1 are followed. This will facilitate time efficient availability of the latest BWMS technology to ship owners. Also refer to paragraph 6.9 of the BWMS Code.

## **6 REPORTING OF THE TYPE APPROVAL**

6.1 The Administration should forward a report of the type approval process to the Organization, including the relevant documentation as specified in part 7 of the annex to the BWMS Code.

6.2 In particular, where under Procedure (G9) the Final Approval has been granted with recommendations by the GESAMP-BWWG, evidence that these recommendations have been satisfactorily addressed at type approval should be provided to the Organization. The report should specify the findings of the Administration together with any non-confidential information according to Procedure (G9).