INTERNATIONAL MARITIME ORGANIZATION

E

4 ALBERT EMBANKMENT
LONDON SE1 7SR
Telephone: +44 (0)20 7735 7611 Fax: +44 (0)20 7587 3210

BWM.2/Circ.43/Rev.2*
24 October 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)).

4 MEPC 82 (30 September to 4 October 2024) considered and approved a revision of the Guidance to support harmonized evaluation by Administrations of modifications to a ballast water management system with existing type approval, as set out in the annex.

5 Member Governments and international organizations are invited to bring the annexed Guidance to the attention of all parties concerned.

6 This circular revokes BWM.2/Circ.28, BWM.2/Circ.43 and BWM.2/Circ.43/Rev.1.

***

* Reissued on 4 February 2025 to correct the reference to the BWMS Code in paragraph 5.2.3 of the Guidance.

NAVIGATING THE FUTURE: SAFETY FIRST!

ANNEX

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)[1], or evaluating modifications to an existing type approved BWMS that are proposed by the manufacturer. 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 Modifications to an existing type approved BWMS may be to major components, as defined in the BWMS Code, or to minor components, as defined herein. Examples of major and minor components are provided in the appendix, tables 1 and 3, respectively. This document provides:

.1 information to support a determination of the design and type of component that a BWMS manufacturer is proposing to modify (e.g. major or minor; refer to figure 1); and

.2 procedural guidance to support an evaluation and approval of BWMS modifications.

1.3 For modifications to major components, Administrations should follow the BWMS Code and guidelines developed by the Organization to determine any associated testing requirements (for decision support see examples in table 2 in the appendix).

1.4 There is no requirement for existing BWMS installations with a valid Type Approval Certificate to be retroactively upgraded should a BWMS with an existing type approval obtain approval of modifications.

1.5 A BWMS originally type approved and installed taking into account Guidelines (G8) (i.e. resolutions MEPC.125(53), MEPC.174(58) and MEPC.279(70)), and before entry into effect of the BWMS Code, can undergo modifications to minor components following this guidance and does not require a shipowner or BWMS manufacturer to retroactively apply BWMS Code requirements to that installation.

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

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

[1] References to the BWMS Code are understood to refer to any revisions of the Code that may be in effect and applicable at the time of implementation of this Guidance by an Administration.

2 KEY INSTRUMENTS

In evaluating an application for type approval of a BWMS, or an application from a manufacturer for modification to a BWMS with an existing type approval, 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 *Procedure for approval of ballast water management systems that make use of Active Substances* (G9) (resolution MEPC.169(57));

.3 *Guidelines for ballast water sampling* (G2) (resolution (MEPC.173(58));

.4 *Code for Approval of Ballast Water Management Systems* (resolution MEPC.300(72)) and *Guidelines for approval of ballast water management systems* (G8) (resolutions MEPC.125(53), MEPC.174(58) and MEPC.279(70)), as may be appropriate;

.5 *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);

.6 *Methodology for information gathering and conduct of work of the GESAMP-BWWG* (BWM.2/Circ.13, as revised); and

.7 other pertinent ballast water management related resolutions, guidance and circulars.

3 RECOMMENDATIONS FOR REQUIREMENTS OF MANUFACTURERS OR THEIR AGENTS

3.1 To facilitate 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 guidelines 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 a list of major components, as defined in the BWMS Code, that are included in the BWMS design (for decision support see examples in table 1 in the appendix);

.3 preliminary assessment of the corrosion effects of the system proposed, if applicable;

.4 preliminary test results;

.5 technical manual;

.6 BWMS piping and instrumentation diagram (P&ID);

.7 link to the provisions required in a ballast water management plan;

.8 environmental and public health effects;

.9 specific salinities to be tested; and

.10 a list of necessary measures for the safe operation of the BWMS;

.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 and a technical description including the main characteristics of the current BWMS component(s), a comparative evaluation of the appropriateness of the new component(s), and all relevant documentation;

.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 taking into account 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 the BWMS Code (resolution MEPC.300(72)), part 7, 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, taking into account 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), 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 for BWMS that the Administration determines are not subject to Procedure (G9), as provided in paragraph 2.19 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 the 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 the list of major components, as defined in the BWMS Code, that are included in the BWMS design;

.12 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;

.13 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);

.14 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 crew health and safety; and

.2 references to the classification society safety and hazard rules and recommendations;

.15 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

.16 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 system design limitations (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.

6 EVALUATION OF MODIFICATIONS TO BWMS WITH EXISTING TYPE APPROVAL

6.1 During the life cycle of a BWMS type approval, it may become necessary, due to supply chain issues, obsolescence, life cycle performance, and/or ability, to improve the performance or cost efficiency of a system that modifications to a type approved BWMS are needed. Modifications may include BWMS design and/or operational parameters, treatment processes, or components included within a type approved BWMS that need to be upgraded, changed or replaced. When evaluating BWMS modifications, the type of component (major or minor) being modified determines the extent of the evaluation necessary to ensure continued effective operation of the BWMS.

6.2 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.

6.3 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", also referred to as a "minor 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 minor components may include pumps, valves, common electrical components (e.g. fuses, circuit breakers), common sensors (e.g. temperature, pressure, salinity, see also appendix, table 3), and cabinetry. Many minor 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.

6.4 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 minor component.

6.5 The extent of evaluation for BWMS modifications should be proportional to the modification (e.g. greater potential impact of the modification on BWMS effectiveness, safety or environmental aspects may have more detailed evaluations and/or testing). For minor component modifications when the evaluation indicates that there are no identified direct impacts to the ability of a BWMS to meet the performance standards, no identified impacts to normal BWMS operation, no compromise to ship safety, or no identified impacts to Final Approval aspects under Procedure (G9), a streamlined evaluation process that facilitates time efficient type approval amendments should be implemented. Review of proposed modifications to minor components by the Administration should confirm that normal BWMS operation and/or ship safety will not be compromised. Additional testing and/or evaluation should only be required when functional equivalency has not been demonstrated, or if the review indicates there may be impacts to normal BWMS operation and/or ship safety.

6.6 When evaluating modifications to a BWMS that employs an Active Substance, Administrations should follow BWM.2/Circ.13/Rev.5, annex, section 12, as may be revised.

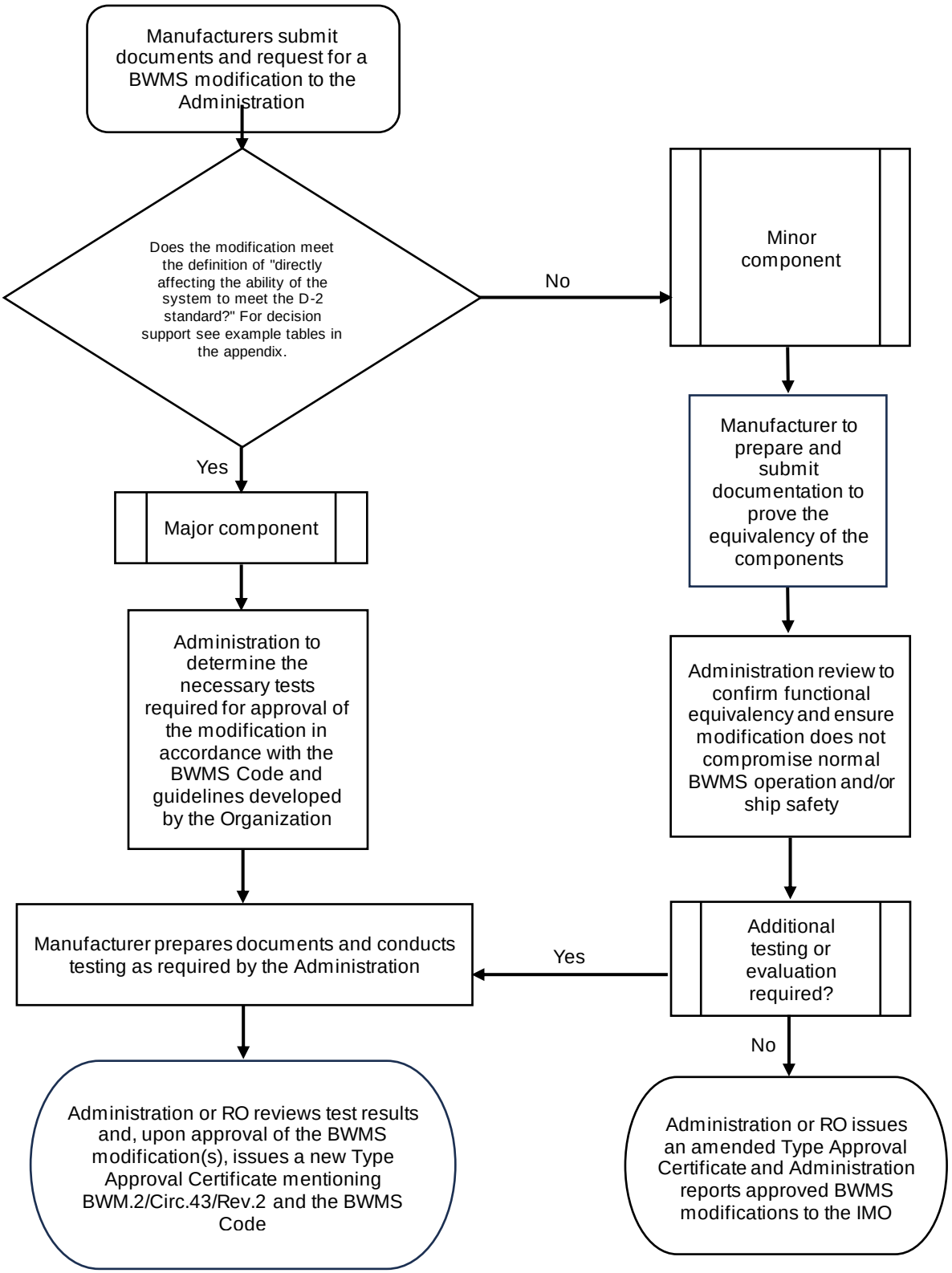

Figure 1: Process for evaluation of modifications to a BWMS with an existing type approval

6.7 Regardless of the type of BWMS modification, the manufacturer should provide to the approving Administration:

.1 a clear description of the BWMS modification and technical information to support an evaluation of the appropriateness of the modification;

.2 information on the identification of the component as either major or minor, as applicable;

.3 the specifications of the current component(s) in the existing BWMS type approval, as applicable;

.4 the specifications of the proposed new component(s), as applicable; and

.5 a comparative evaluation to demonstrate the suitability of the modification.

6.8 If the modification involves any major component of the BWMS, the Administration should determine the necessary tests for type approval of the modified BWMS, consistent with the BWMS Code and guidelines developed by the Organization. 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 whole effluent toxicity testing (as may be applicable to BWMS having Final Approval), operational testing, and/or SDL verification. Approval of the modified BWMS should be based on testing data related to the modified BWMS. A modified BWMS type approval should not be based on prior type approval testing data that is no longer representative of the modified BWMS.

6.9 If the BWMS modification involves a minor component, the Administration should verify that the following items have been addressed by the manufacturer:

.1 information on type approvals of the proposed new component(s); and

.2 description demonstrating that 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.

6.10 To allow for an efficient documentation and reporting process for BWMS manufacturers with multiple type approvals, the Administration should provide a Type Approval Certificate that includes the approved BWMS modifications. Type Approval 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 inspections and/or flag State surveys.

6.11 To eliminate duplication of environmental testing of individual components by multiple BWMS manufacturers, environmental testing carried out by another BWMS manufacturer or the original equipment manufacturer (OEM) of individual components should be submitted as part of the evaluation required under paragraphs 6.8 and 6.9 provided that testing meets the requirements of part 3 of the BWMS Code.

6.12 Following completion of modifications to an existing type approval by the issuing Administration, and provided that the review process in figure 1 and the applicable requirements of the BWMS Code and guidelines developed by the Organization have been followed and the BWMS modifications have been determined acceptable, other Administrations, class societies and recognized organizations are encouraged to provide mutual recognition of the modification. Also refer to paragraph 6.9 of the BWMS Code.

6.13 This Guidance should be kept under review, and modified if necessary, considering the experience gained regarding modifications to BWMS with an existing type approval and, in particular, with respect to the identification of major and minor components.

7 REPORTING OF THE TYPE APPROVAL

7.1 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.

7.2 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 taking into account Procedure (G9).

APPENDIX

To provide additional clarity on the types of components identified as "major components" (BWMS Code, definition 3.9) and "minor components" within this Guidance, the following tables of examples have been developed for consideration. The examples are not intended to be exhaustive or representative of all technologies and all components that may be associated with a particular BWMS; however, examples of common components are provided.

Table 1
Example major components

Chemical injection	Electrochlorination	Mechanical separation	Ultraviolet irradiation
• TRO or relevant sensor (if a part of the system)	• Electrolytic chamber/cell (if modification alters the technical specification, e.g. geometry anode, chlorine production) • TRO sensor	• Filter (if modification alters the technical specification, e.g. mesh, self-cleaning technology)	• UV chamber (if modification alters the technical specification of the UV chamber, e.g. geometry, inner surface reflective ability, UV lamp arrangement) • UV intensity or UV transmittance sensor (as applicable) • UV lamps • UV quartz sleeves

Table 2
Examples of changes or modifications affecting major components

Chemical injection	Electrochlorination	Mechanical separation	Ultraviolet irradiation
• Active substance formulation • Software* • Dosage	• Software* • Dosage	• Filter mesh design • Filter mesh size • Filter manufacturer or separation technology • Self-cleaning technology • Removal of filter • Filter surface area	• Software* • Dosage

* Only software modifications that have the potential to directly impact biological efficacy are considered modifications to a major component.

Table 3
Example minor components, similar technical specifications provided

- Actuation switch
- Actuation/activation button
- Alarm horn
- Cabling
- Circuit breakers
- Cleaning-in-place unit
- Conductivity sensor
- Conductivity transmitter
- Dilution blower
- Electrical cabinetry
- Filter backflush pump
- Filter index arm motor
- Flow meter
- Fuses
- Gas detector
- Heat exchanger (non-pasteurization)
- HMI screen
- Junction box
- Mixing, circulation or injection pump
- Piping materials
- Pressure transmitter
- Program Logic Controller
- Rectifier
- Remote operation panel
- Salinity transmitter
- Sensor, differential pressure
- Sensor, temperature
- Signage
- Switch, temperature
- Terminal blocks
- Touch panel
- Transformer
- Valves
- Water level switch

Components in table 3 may not be considered minor if the Administration determines that they might affect the BWMS' ability to meet the D-2 standard.

_____