INTERNATIONAL MARITIME ORGANIZATION

E

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

MEPC.1/Circ.918
29 April 2025

GUIDANCE ON IN-WATER CLEANING OF SHIPS' BIOFOULING

1 The Marine Environment Protection Committee, at its eighty-third session (7 to 11 April 2025), approved *Guidance on in-water cleaning of ships' biofouling*, as set out in the annex, developed by the Sub-Committee on Pollution Prevention and Response, at its twelfth session (27 to 31 January 2025).

2 Member Governments are invited to bring the Guidance to the attention of all parties concerned.

***

ANNEX

GUIDANCE ON IN-WATER CLEANING OF SHIPS' BIOFOULING

TABLE OF CONTENTS

1 INTRODUCTION

1.1 The purpose of this document is to provide guidance on matters relating to in-water cleaning of ships, in line with the *2023 Guidelines for control and management of ships' biofouling to minimize the transfer of invasive aquatic species* (resolution MEPC.378(80)) (hereafter the "2023 Biofouling Guidelines"). In part, this document is intended to support the global availability of safe and environmentally responsible in-water cleaning services so as to support the universal application of the 2023 Biofouling Guidelines.

1.2 This document provides guidance to:

.1 shipowners, charterers, operators, crews and in-water cleaning service providers on safely planning and conducting in-water cleaning operations while addressing risks to the environment and ship coatings, including the conduct of pre-cleaning and post-cleaning inspections, as well as record-keeping and reporting (chapter 4);

.2 relevant authorities in jurisdictions that choose to assess service providers before approving their operations and/or choose to approve the in-water cleaning of individual ships (chapter 5, which may also inform service providers on relevant matters);

.3 manufacturers of in-water cleaning systems (IWCS) on the design, specifications and minimum performance that should be expected of such systems (sections 6.1 and 6.2);

.4 relevant authorities in jurisdictions that choose to assess IWCS before approving their use in local waters, concerning the testing of such systems (section 6.3); and

.5 coating manufacturers, IWCS manufacturers, service providers and ships with respect to determining compatibility between coatings and IWCS, taking into account the fouling ratings of areas to be cleaned (section 6.4).

1.3 Should one entity play multiple roles, the recommended approaches in this Guidance remain the same, with suitable adaptation. For example, in the case of in-water cleaning conducted by the ship’s crew using onboard equipment, the crew may need to undertake those aspects of planning, inspection, monitoring, reporting and record-keeping associated with the service provider's role. Guided by the operation, maintenance and safety manual (OMSM) of the IWCS (see paragraph 6.1.5), the Biofouling Management Plan (BFMP) of such a ship should address these matters as appropriate.

1.4 This Guidance should also be used by classification societies; ship repair, dry-docking and recycling facilities; and any other interested parties as appropriate.

1.5 Even in cases where in-water cleaning would remove biofouling that does not pose a risk of introducing non-native organisms (because it has been accumulated in the same waters as the location of cleaning), following this Guidance mitigates risks to the coatings in the areas being cleaned and limits the release of coating substances to the local environment.

1.6 This Guidance welcomes, and is not intended to limit, the development and use of effective, safe and environmentally responsible in-water cleaning technologies. This Guidance focuses on IWCS that are designed to remove organisms from ship surfaces and does not address systems that are designed to treat organisms without removing them from ship surfaces.

1.7 A separate document contains guidance on matters relating to in-water cleaning of recreational craft less than 24 metres in length, using terminology appropriate for that sector (*Guidance for minimizing the transfer of invasive aquatic species as biofouling (hull fouling) for recreational craft* (MEPC.1/Circ.792)).

2 DEFINITIONS

2.1 For the purposes of this guidance, the following definitions apply in addition to the definitions in the 2023 Biofouling Guidelines:

.1 **Coating damage** means visible defects or harm to a coating, and may include peeling, blistering, flaking, pitting, delamination, brush marks or swirls, scrapes, scratches, linear traction damage, exposed metal, polish-through, and blemishes;

.2 **Compatibility** means that an IWCS can operate on a coating without causing damage, which may vary with the fouling rating of the coated area;

.3 **In-water cleaning system (IWCS)** means a system for removing biofouling from the hull and/or niche areas of a ship that is in the water, with or without capture of waste substances, including any associated equipment;

.4 **Recent inspection** means an inspection that reflects the ship's current condition, having been undertaken within the last 28 days, provided that the ship has not remained in one location (other than in the same waters where cleaning will occur) for more than 7 days since the inspection;

.5 **Relevant authority** means an official or organization that is responsible for approving IWCS, in-water cleaning service providers and/or the cleaning of individual ships as authorized by the State having jurisdiction at the location of cleaning (or an official or organization designated, delegated or recognized for this purpose);

.6 **Same waters** means a zone near a location of cleaning that has been scientifically determined to contain the same aquatic species as that location, to the satisfaction of the relevant authority; and

.7 **Service provider** means an organization that undertakes the in-water cleaning of ships, which may be a separate organization from IWCS manufacturers.

2.2 For greater clarity, in this guidance:

.1 the term "area" refers to a part of a ship or surface (e.g. a part of the hull or a niche area), the term "location" refers to a geographical position (e.g. globally or within a specific port) and the term "local" refers to a jurisdiction in which cleaning takes place (e.g. a State and/or any sub-national jurisdiction);

.2 the term "coating substances" is used when it is necessary to refer to waste substances other than removed biofouling;* and

.3 the term "niche areas" is inclusive of rudders and propellers (see figure 2 of the 2023 Biofouling Guidelines).

3 BACKGROUND

3.1 Anti-fouling coatings

3.1.1 An anti-fouling coating (AFC) is a surface coating or paint designed to prevent, repel or facilitate the detachment of biofouling from hull and niche areas that are typically or occasionally submerged. AFCs are applied during new-build or dry-docking. AFCs are designed to either prevent biofouling attachment (using biocides) or reduce adhesion (fouling release) to wetted surfaces. AFCs may be one part of the anti-fouling system (AFS) of a ship.

3.1.2 In general, most current AFCs may be divided into two major groups: self-polishing AFCs and fouling release AFCs. With respect to these AFCs:

.1 self-polishing AFCs may have biocides that are released as the coating polishes, for example owing to surface hydrolysis, surface erosion or a combination of the two; and

.2 fouling release AFCs, which may be biocidal or non-biocidal, reduce the adhesion strength of biofouling, which is dislodged by hydrodynamic forces as the ship moves through the water.

3.1.3 AFCs may not consistently prevent biofouling accumulation on all ship surfaces over the course of their service lives, particularly if the selected coating is not the optimal product for the ship and its operational profile, or if the ship has extended stationary periods or otherwise varies from its expected operational profile. Even when AFCs are used, there are areas of ships' immersed surfaces that are more prone to biofouling because they:

.1 are not painted (e.g. anodes);

.2 are prone to damage (e.g. bulbous bow, tug and fender points, area below anchor chain);

.3 are challenging to coat (e.g. dry-dock blocking areas); or

.4 are sub-optimal for AFC performance (e.g. gratings, rudders and sea chests).

3.1.4 If biofouling occurs on an AFC, the removal of biofouling through in-water cleaning may renew the coating's anti-fouling effects in addition to removing non-native species that may pose threats to human, animal and plant life, economic, recreational and cultural activities, and the aquatic environment.

* The term "waste substances", as defined in the 2023 Biofouling Guidelines, means "dissolved and particulate materials that may be released or produced during cleaning or maintenance, and may include biocides, metals, organic substances, removed biofouling, pigments, microplastics or other contaminants that could have a negative impact on the environment". In this Guidance, the term "coating substances" refers to all "waste substances" except removed biofouling.

3.2 In-water cleaning

3.2.1 In-water cleaning, described in chapter 9 of the 2023 Biofouling Guidelines, is the removal of biofouling from a ship's hull and niche areas while in the water. In general, in-water cleaning may be conducted proactively (i.e. removing microfouling from a ship's hull and niche areas periodically to prevent or minimize attachment of macrofouling) or reactively (i.e. removing micro- and macrofouling from a ship's hull and niche areas as a corrective action).

3.2.2 IWCS typically involve the use of diver-operated or remotely operated vehicles (i.e. cleaning carts) that remove biofouling from the ship. Different equipment may be used to remove biofouling depending on whether surfaces are flat or curved, or on niche areas.

3.2.3 In general, in-water cleaning with capture of waste substances, which may be used for both proactive and reactive cleaning, is intended to protect the environment from the release of coating substances and non-native organisms in removed biofouling. In-water cleaning without capture should only be used to clean areas with a fouling rating less than 2 (see table 1 of the 2023 Biofouling Guidelines).

3.2.4 This Guidance addresses inadvertent environmental harms that may still arise when cleaning with capture is used, due to (a) incomplete capture of waste substances by the cleaning unit; and (b) release of untreated or incompletely treated effluent from processing of captured waste substances.

3.2.5 More specifically, the main environmental and AFC performance risks addressed in this Guidance include:

.1 discharge of biocides, plastics and microplastics to ambient waters;

.2 release of biofouling organisms, their propagules, or pathogens, into the aquatic environment; and

.3 negative effects on AFC condition and service life (e.g. reduction in dry-film thickness or coating damage).

3.2.6 Hard, inert coatings with no anti-fouling properties are commonly used in cold climates because they are relatively resistant to mechanical damage (e.g. from ice). Such coatings may foul relatively quickly and can withstand frequent cleaning as a fouling prevention strategy. Despite paragraph 3.2.3, some jurisdictions may allow macrofouling that has accumulated in the same waters to be cleaned from such coatings without capture because of a reduced risk of releasing coating substances.

3.2.7 Other risks of in-water cleaning that are addressed by this guidance include occupational health and safety risks (e.g. of diving operations) and risks associated with other damage to the ship and its equipment.

3.2.8 This Guidance emphasizes that IWCS, with or without capture, should be compatible with the coating on the surface being cleaned (see section 6.4). This will assist in mitigating risks identified in paragraphs 3.2.3 to 3.2.5. The fouling rating, the condition of the coating and the prevailing conditions at the cleaning location (e.g. visibility, currents and water depth) should also be taken into account. Some coatings require a curing time during operation before they are compatible with cleaning, which should be noted in the BFMP.

4 IN-WATER CLEANING OPERATIONS

4.1 Arranging for in-water cleaning

4.1.1 In-water cleaning is a management action that may be taken in line with the BFMP when biofouling is identified during scheduled inspections (chapter 8 of the 2023 Biofouling Guidelines) or as a contingency action (chapter 7 of the 2023 Biofouling Guidelines). Cleaning should be done in a safe and responsible manner, avoiding unnecessary wear or damage to coatings, and minimizing the release of waste substances. Cleaning should conform to all local regulations and requirements, including the approval of the relevant authority where required.

Selection of IWCS

4.1.2 Cleaning with capture may be used to remove microfouling or macrofouling, as it may pose lower environmental risks than cleaning without capture. Cleaning without capture should only be performed if allowed by local regulations and requirements, if any, in a location accepted by the relevant authority:

.1 on ship areas with a fouling rating less than 2, or

.2 on ship areas with a fouling rating greater than 1, provided that the BFMP and Biofouling Record Book (BFRB) establish, to the satisfaction of the relevant authority, that:

.1 such areas are coated with a non-biocidal hard coating that is in good condition; and

.2 the biofouling was accumulated in the same waters as defined in paragraph 2.1.6.

4.1.3 Selected IWCS, with or without capture, should:

.1 be well-suited to the ship's type, BFMP, operational profile and availability (i.e. time at berth or anchorage), as well as the location of cleaning and the prevailing environmental conditions (e.g. wave surges, wind speeds, flow velocities, weather, visibility);

.2 be compatible with the surface material, coating type and fouling rating of areas to be cleaned (see paragraph 6.4.10), or, in the case of areas with no coating installed (e.g. propeller, anodes), be suitable for the fouling rating of the area;

.3 not cause unnecessary wear or damage to ship coatings, considering the biofouling to be removed; and

.4 be suitable for the geometry, coating, AFS and fouling rating of any niche areas to be cleaned (which may be coated differently from other parts of the ship).

Information exchange between ship and service provider

4.1.4 When the decision to clean the ship's hull and/or niche areas has been taken, the shipowner should provide the following information to a potential service provider:

.1 date, time and location (e.g. port berth or anchorage), and amount of available time for cleaning;

.2 details of AFS on board and coatings in use, including the type of any coating, date of application, service life, records of prior damage, and its manufacturer's advice on cleaning;

.3 the area(s) to be cleaned and avoided, including a drawing of relevant areas (e.g. anodes and instruments, differing coating types), and details of any prior partial cleaning;

.4 if niche areas need to be cleaned, information should be provided in the following categories:

.1 niche areas present on the vertical side or the bottom of the ship that can be readily cleaned; and

.2 niche areas that need special in-water cleaning equipment and procedures (e.g. propellers);

.5 latest inspection, cleaning and dry-dock reports;

.6 other operations planned by the ship, such as maintenance activities, repairs, bunkering, storing, etc.;

.7 any planned transfer of the ship within the port location, alongside and at anchorage, if relevant; and

.8 any other relevant information, such as idle periods, special safety precautions to be taken while cleaning, etc.

4.1.5 The service provider should inform the shipowner about the following:

.1 areas that the service provider can clean, taking into account the coatings and AFS of the ship, such as:

.1 hull and niche areas present on the vertical side or the bottom of the ship; and

.2 any niche areas or hull areas that need special cleaning equipment and/or procedures (e.g. bends, turns, propellers, rudder blades);

.2 the equipment that will be used for cleaning the ship's hull and/or niche areas such as the IWCS model, configuration and components (e.g. cleaning units, brushes, blades, water jets, umbilical, control unit, separation and treatment unit), including an outline of any capture, separation, treatment and the use of any active substances;

.3 arrangements for disposal of captured waste substances;

.4 any local regulations and requirements, any local in-water cleaning permit needed (issued by the relevant authority) and/or information on the environmental performance of the IWCS (e.g. IWCS testing results);

.5 logistical information, including: the specific location of cleaning (e.g. alongside and/or anchorage), the required length of time to conduct the cleaning, and any environmental conditions in which the service provider can or cannot operate (e.g. tides, currents, weather conditions, visibility, under-keel clearance, night operations);

.6 any support required by the service provider from the ship (e.g. footprint and weight of any IWCS equipment to be brought on board, requirements for ship power, and use of any auxiliary equipment such as cranes);

.7 limitations associated with performing the cleaning (e.g. areas the IWCS may not be able to clean); and

.8 any other relevant information.

4.1.6 Where local regulations and requirements require that in-water cleaning be approved on a case-by-case basis (see section 5.2), the service provider should request the necessary approval and/or permits from the relevant authority. A sample form for conveying the cleaning request is provided in the appendix. In the case of an in-water cleaning to be conducted by the ship's crew using onboard equipment, the approval should be requested by the master, the shipowner or their local representative as appropriate.

4.2 Pre-cleaning preparations and inspection

4.2.1 The areas to be cleaned should be clearly identified during the pre-work communications and the scope of work should be documented so that all stakeholders are informed of the intended operation.

4.2.2 Prior to the cleaning, the ship and the service provider should coordinate to:

.1 determine appropriate safety parameters and relevant information, including on how to access niche areas;

.2 consider the condition of the coating and its compatibility with the IWCS (see section 6.4);

.3 agree upon a plan of cleaning specific to the ship and circumstances which, inter alia, minimizes the risks of pollution and introduction of non-native species;

.4 identify and agree upon contingency measures for the cleaning operation; and

.5 address any other relevant issues, including coordination with any other planned maintenance or repair work.

Planning

4.2.3 The service provider should plan the cleaning to ensure that the process is undertaken efficiently, safely and in an environmentally sound manner. The plan should ensure the safety of personnel, equipment and the ship during the entire operation, taking into account the safety management system of the ship. Resources should be planned to avoid/minimize breakdowns/interruptions.

4.2.4 The service provider should submit a copy of the plan to the ship and the relevant authority, including at least the following information:

.1 with respect to the cleaning operation:

.1 the specific location of cleaning, which should be selected with regard to expected environmental conditions (e.g. weather conditions, wave height, current, tidal patterns and depth) and local regulations and requirements;

.2 areas to be cleaned, including for each area: the expected fouling rating (to be verified during the pre-cleaning inspection), the IWCS to be used, the condition of the coating and a rationale for compatibility between the ship's coating and the IWCS (see paragraph 6.4.10);

.3 areas to be avoided and the reason for avoidance, which might include areas with: increased fouling, damaged coating, coating types incompatible with the IWCS, unsuitable geometry for the IWCS, risks to equipment or divers, and/or boundaries outside of the scope of work;

.4 communication between the ship and personnel controlling the cleaning unit, including procedures for tracking the position of the cleaning operation on the hull relative to the cleaning route and areas to be cleaned and avoided; and

.5 in the case of cleaning with capture, a plan for the disposal of waste substances in accordance with local regulations and requirements;

.2 with respect to safety:

.1 procedures (including a timeline) for securing key systems and equipment during cleaning activities (e.g. immobilizing the propeller, powering off any cathodic hull protection system) and for protecting personnel, the IWCS, associated equipment and underwater fixtures and surfaces of the ship;

.2 safety checklists dependent on diving equipment and local regulations and requirements;

.3 procedures to ensure that all systems and equipment, including personal protective equipment, are functional and still within their operational life;

.4 approach to mitigate specific risks and hazards associated with any cleaning of niche areas of the ship; and

.5 procedures for the conclusion of the cleaning activity, to ensure that the ship is safely reinstated to normal operational status; and

.3 with respect to contingency measures, plans and procedures for informing and cooperating with relevant stakeholders to:

.1 respond to diver safety risks, incidents or accidents (e.g. measures to shut down or decrease suction);

.2 address operational factors that may affect the cleaning operation, such as weather-related risks, tidal factors influencing clearance under the ship, simultaneous operations (e.g. bunkering, ballasting/ deballasting, movement of cranes), cargo operations (including related emergencies), ship schedule changes and the mooring, movement or operation of other ships;

.3 monitor, prevent and mitigate the exceedance of any safety and/or environmental parameters (including any conditions imposed by a relevant authority), and ensure that the cleaning operations are suspended and remain suspended until such parameters are safely restored;

.4 respond to observations during the cleaning of damage to the ship's AFS or changes in fouling that were not identified in prior inspections and/or reports;

.5 address equipment malfunctions and implement emergency shutdowns, including measures to prevent or mitigate any unintended release of waste substances; and

.6 any other factor that could delay the completion of cleaning or the ship's departure.

4.2.5 The underwater cleaning route should be well-planned to avoid losing orientation underwater and take into consideration as a minimum: water visibility, current, tidal variations, weather conditions, simultaneous operations (e.g. bunkering, ballasting/deballasting, movement of cranes), obstructions at the quay such as fenders, mooring dolphins, other ships at the location, pinch points and location of surface support (e.g. for diver's emergency evacuation).

4.2.6 Cameras used for video and photographs during cleaning and inspections should be able to obtain high-definition colour digital images of the relevant process while underwater (i.e. at least 1280 x 720 pixels), and to time- and date-stamp images or capture this information in the digital file. Ship-specific markings (e.g. draught marks) should be included in photos and videos to identify the ship and area. Videos should be taken at a slow enough pace to ensure blurring does not occur.

Inspection

4.2.7 Prior to cleaning any surfaces of the ship, a pre-cleaning inspection of the areas to be cleaned should be conducted by the service provider to verify the condition of the hull and identify any additional areas to be avoided. Alternatively, the service provider should review the report of a recent post-cleaning inspection (or the report of a recent inspection in line with paragraphs 7.5 or 8.2 of the 2023 Biofouling Guidelines) that is equivalent to a pre-cleaning inspection.

4.2.8 The service provider should ensure that the condition of the coating is acceptable for cleaning, so as to mitigate the risk of coating damage and the release of coating substances at the location of cleaning. Areas found to have a fouling rating greater than 1 should not be cleaned without capture (except as described in paragraph 4.1.2.2). The plan should be amended accordingly based on the result of the inspection.

4.2.9 Biofouling and coating substances should not be dislodged from ship surfaces during inspections.

4.2.10 The pre-cleaning inspection should include appropriately angled photographs and/or videos that clearly depict biofouling and the condition of the coating in the entirety of the area to be cleaned. In order for the fouling rating and the condition of the coating to be determined, sufficient lighting and footage quality should be provided, as well as a clear size reference scale.

4.2.11 With the approval of the relevant authority, the pre-cleaning inspection may be carried out simultaneously with the cleaning operation (by the diver performing the cleaning, an operator assessing live video, or automatically by the IWCS). In such cases:

.1 the ship and service provider should coordinate and take care to ensure that there are no safety risks associated with a simultaneous inspection and cleaning (e.g. surface structure of the hull, open gratings, presence of special attachments such as fishing nets);

.2 the inspection should be conducted systematically, having regard to its orientation and position on the ship;

.3 the inspection should be of sufficient quality to document the condition of all surfaces prior to their cleaning;

.4 the inspection should be closely monitored, and effective procedures should be in place to ensure that the cleaning operation is immediately and safely suspended whenever warranted during the inspection; and

.5 in the case of cleaning without capture:

.1 recent inspection reports and/or the BFMP and BFRB of the ship should establish, to the satisfaction of the relevant authority, that the areas to be cleaned are expected to have a fouling rating less than 2 (except as described in paragraph 4.1.2.2); and

.2 if any macrofouling is found to be present, then cleaning operations in those areas should be suspended until a separate inspection can be completed.

4.2.12 In some cases, very low underwater visibility (or other conditions, such as short distances between ship and sediment, or when the deepest point of the hull is in the fluid mud) limits the ability of the service provider to distinguish between fouling ratings, to identify damaged coatings, or to adequately visualize and record the hull condition and plan the cleaning. As cleaning without an adequate pre-inspection should not be performed, alternatives may include:

.1 relying upon the report of a recent post-cleaning inspection (or the report of a recent inspection in line with paragraphs 7.5 or 8.2 of the 2023 Biofouling Guidelines);

.2 conducting a non-visual inspection using a suitable alternative technology (i.e. one validated to provide a representative assessment of the fouling rating and coating condition of the areas to be cleaned);

.3 conducting the inspection at a more favourable location; or

.4 rescheduling the inspection to a different time (e.g. later tide, next day, next trip).

4.2.13 All relevant regulations and requirements in relation to underwater work should be strictly adhered to.

4.2.14 The service provider should not clean any area if it suspects that the type or coverage of biofouling on that area is outside the capability of its IWCS.

Pre-cleaning checks

4.2.15 Functional checks and pre-dive checks of the cleaning and capture system plus the associated ancillary equipment should be conducted by the service provider before the planned operation. An approved pre-dive checklist developed by the service provider should be used and cross-checked with the record of any defects and recent repairs.

4.2.16 The condition of the equipment should be verified and corrected by the service provider, if required, so as to minimize coating wear or the risk of coating damage (e.g. rough edges on wheels or other parts of the equipment that touch the ship's coating during cleaning).

4.2.17 Recording equipment, such as video cameras, should be function tested by the operator, including the media where the recording will be stored.

4.2.18 Immediately prior to beginning any cleaning, the ship representative and cleaning service provider should coordinate and deconflict any operations as necessary to ensure the timely completion of cleaning. Points of contact, emergency protocols and pre-arranged conditions requiring the shutdown of operations should be reviewed prior to commencement of cleaning.

4.2.19 Lock-out and tag-out procedures should be conducted in accordance with both the ship's safety procedures and the safety requirements of the service provider. The diver and/or dive supervisor, if present, should witness the locking and tagging of equipment prior to entering the water.

4.2.20 For cleaning that extends over more than one day, operations coordination as outlined in this section should be conducted each day before the start of cleaning.

4.3 Conducting in-water cleaning

4.3.1 Cleaning should be conducted in accordance with local regulations and requirements, and with the approval of the relevant authority, if applicable (section 5.2).

4.3.2 During the implementation of the cleaning plan, the service provider should actively monitor all aspects of the cleaning operation, continuously evaluate the operational location, and maintain situational awareness with respect to environmental conditions and nearby operations. This will maximize cleaning efficacy and minimize the risk to any in-water personnel, the risk of coating damage and the risk of unintended release of waste substances into the aquatic environment.

4.3.3 This monitoring should at least:

.1 establish that safe conditions for cleaning are present, including:

.1 suitable visibility and environmental conditions (e.g. weather, waves and currents);

.2 enough clearance to clean the side of the ship (e.g. quay side clearance, fenders, barge operations);

.3 enough under-keel clearance throughout the operation (taking into consideration the expected rise and fall of tide and change in the draught of the ship); and

.4 that potential movements of other ships will not affect the cleaning operation.

.2 ensure the normal functioning of the IWCS (e.g. suction pressure, flow rate, filters and discharge water, capture process, separation and treatment unit, influent and effluent water);

.3 track progress in the sequence of cleaning, noting any areas of concern identified during cleaning and deviations from planned procedures; and

.4 assess and record the cleaning itself using live video, with a view to documenting it and identifying new areas to be avoided, such as by:

.1 identifying any discrepancies between the records on the ship and the actual condition of underwater hull or niche areas of the ship;

.2 identifying instances of AFS or coating damage, including establishing if the cleaning should proceed; and

.3 ensuring that only areas or zones with a fouling rating less than two are cleaned, in the case of cleaning without capture (except as described in paragraph 4.1.2.2).

4.3.4 The service provider should post appropriate signage, maintain communication with the ship, port and other relevant authorities throughout the cleaning operation and comply with any instructions in accordance with operational protocols specific to the ship and the port. The service provider should maintain communication with the ship and divers during any diving operations.

4.3.5 The service provider should exercise due diligence and care in operating the IWCS and related equipment to avoid environmental risks, and in order to avoid any impact to areas not being cleaned, including proper handling of hoses and cleaning units. This includes minimizing the risk of loss of waste substances when cleaning with capture in complex areas, e.g. in the vicinity of bends, turns, etc.

4.3.6 The service provider should implement plans to stop operations if unexpected conditions occur (see paragraph 4.2.4.3).

4.3.7 The service provider should notify the ship and the relevant authority of any deviations from the plan.

4.4 Post-cleaning activities

Inspection

4.4.1 A post-cleaning inspection should be conducted by the service provider to document the outcome of cleaning. The post-cleaning inspection may be carried out simultaneously with the cleaning operation (by the diver performing the cleaning, an operator assessing live video, or automatically by the IWCS). If a simultaneous post-cleaning inspection cannot be achieved, then the service provider should conduct a post-cleaning inspection after the cleaning activity is completed.

4.4.2 The inspection should include appropriately angled photographs and/or videos that clearly depict any remaining biofouling and the condition of the coating in the entirety of the cleaned area, for the purpose of collecting and retaining evidence of the cleaning activity, the condition of ship surfaces, and demonstrating that effective removal of biofouling has taken place. In order for the cleanliness of the surface and the condition of the coating to be determined, sufficient lighting and footage quality should be provided, as well as a clear size reference scale.

4.4.3 In some cases, very low underwater visibility (or other conditions, such as short distances between ship and sediment, or when the deepest point of the hull is in the fluid mud) limits the ability of the service provider to adequately visualize and document the post-cleaning condition of the ship. In such cases, alternatives (which should be noted in the BFRB) may include:

.1 conducting a non-visual inspection using a suitable alternative technology (i.e. one validated to provide a representative assessment of the fouling rating and coating condition of the areas to be cleaned);

.2 conducting the inspection at a more favourable location; or

.3 rescheduling the inspection to a different time (e.g. later tide, next day, next trip).

Ship operations

4.4.4 Post-cleaning communication between the service provider and the ship should confirm that the planned procedures for concluding the cleaning have been completed and that the ship's equipment and machinery can be reinstated to normal operational status.

4.4.5 At least the following should be checked and confirmed before locked out or tagged out systems are released and the ship subsequently returns to normal operations:

.1 all underwater gratings have been safely restored to their original state;

.2 all personnel are out of the water; and

.3 all relevant equipment has been removed from the water.

Cleaning equipment

4.4.6 The IWCS and associated cleaning equipment (including hoses, separation and treatment units) should be checked, cleaned and properly stored to avoid the risk of returning residual waste substances into the aquatic environment.

4.5 Reporting and record-keeping

Reporting

4.5.1 The service provider should prepare a biofouling cleaning report and provide it to the ship in line with paragraph 9.13 and appendix 2 of the 2023 Biofouling Guidelines. In line with the introduction to table 4 of appendix 2 of the 2023 Biofouling Guidelines, that table should form a part of the cleaning report, if applicable. The items relevant to paragraph 4.4.5 should be noted in the report.

4.5.2 If the cleaning activity did not cover the entire planned area or areas, the report should indicate where the cleaning started, where it stopped and why it was not completed. This documentation should be sufficiently detailed to enable another service provider to continue the cleaning. Any areas avoided within the overall areas being cleaned (e.g. owing to the condition of coatings) should also be identified in the report.

Record-keeping

4.5.3 The service provider should maintain appropriate records for at least two years after a cleaning and make them available for official inspection by relevant authorities as appropriate, including at least:

.1 records of operational coordination between stakeholders (e.g. cleaning request, contract, cleaning plan, written records associated with the cleaning process, post-cleaning inspection results and any cleaning report);

.2 recorded video and photographs from the pre-cleaning inspection, cleaning process and post-cleaning inspection of sufficient quality to identify the fouling rating and any damage or deterioration of coatings, individually labelled to indicate the ship name, date and area of the ship shown in the image; and

.3 documentation associated with the disposal of waste substances in accordance with all local regulations and requirements.

4.5.4 The ship should make appropriate entries in its BFRB in line with paragraph 9.14 and appendix 4 of the 2023 Biofouling Guidelines, including retaining references to any supporting evidence/reports of the cleaning (e.g. report from supplier, photographs/videos and/or receipts).

4.5.5 Full inspection reports with photos and separate video files should be stored on board the ship or by the ship owner or ship operator until a new hull coating is applied.

4.6 Partial cleanings

4.6.1 In the case of a cleaning operation that is planned to be conducted in parts across multiple separate occasions (e.g. through partial cleanings conducted during successive port calls):

.1 either a single cleaning plan may be prepared for the overall cleaning operation, or a separate cleaning plan may be prepared for each occasion, as appropriate;

.2 the area to be cleaned on any specific occasion should have been the subject of a recent pre-cleaning inspection, or a new pre-cleaning inspection of the area to be cleaned should be undertaken at the time of cleaning to ensure the fouling rating and the condition of the coating are appropriate to the planned operation;

.3 post-cleaning inspections of the areas cleaned should be undertaken as part of each occasion to document the outcome of cleaning and the condition of the coating;

.4 separate post-cleaning reports may be prepared for each occasion, or a single report may be developed over time by aggregating date-stamped information from successive occasions;

.5 the BFRB of the ship should be updated on each occasion so that it remains a reliable source of information on the current state of the ship (including the progress of the overall cleaning operation); and

.6 the retention period of records associated with any occasion should be measured from the date of completion of the cleaning plan referred to in sub-paragraph 1.

4.6.2 A ship that regularly manages its biofouling through partial cleanings should describe this process in its BFMP, taking into account paragraph 4.6.1.

5 APPROVAL OF CLEANING OPERATIONS

5.1 In-water cleaning service providers

5.1.1 In some jurisdictions, a relevant authority assesses service providers before approving their operations. This section contains considerations that such authorities may take into account. In jurisdictions where this is not the case, service providers should consider this section in planning their operations.

5.1.2 A service provider should:

.1 utilize IWCS tested in line with section 6.3 of this guidance, maintaining copies of the system's testing report demonstrating that the discharge meets all local regulations and requirements (see chapter 6);

.2 operate in a suitable location, considering factors such as:

.1 the specifications and limitations of the IWCS, taking into account prevailing environmental conditions;

.2 the availability of facilities to store and/or appropriately dispose of waste substances;

.3 the ability to contain a spill or release of waste substances on land or in the aquatic environment;

.4 existing water contamination levels (based on the best available information); and

.5 proximity to threatened species and populations (based on the best available information), sensitive habitat, Particularly Sensitive Sea Areas and/or Marine Protected Areas;

.3 make arrangements to mitigate environmental risks and meet all local regulations and requirements for the storage, treatment and proper disposal of waste substances, including preparing to control and mitigate any accidental spills of such substances;

.4 only offer and conduct cleaning of ship surfaces whose fouling rating, coating type and coating condition are compatible with the provider's IWCS and cleaning procedures (see section 6.4.9);

.5 develop and use a service quality management plan (see paragraph 5.1.4);

.6 develop and use a safety management plan for its entire operation, including divers and operators; and

.7 employ personnel with suitable training, qualifications and experience regarding the procedures, methods and equipment used (e.g. divers, remotely operated vehicle operators, and/or their supervisors), and maintain suitable records accordingly.

5.1.3 The relevant authority should request and consider at least the following documentation:

.1 a description of the services for which approval is sought;

.2 the service quality management plan (see paragraph 5.1.4);

.3 the testing reports for each IWCS to be used by the provider (see paragraph 6.3.19); and

.4 the service provider's prior experience regarding in-water cleaning, including with respect to specific ship types, hull forms, coating types, propellers and niche areas, as well as a summary of cleaning operations undertaken over the past year.

5.1.4 The service quality management plan should include at least:

.1 an outline of the organization, management structure and quality assurance system of the service provider, including any subsidiaries, together with information on agreements, arrangements and oversight of any parts of the service provided by subcontractors, including quality management;

.2 a description of the IWCS (including its capabilities, specifications, operational requirements and limitations) and associated equipment used in the cleaning process (including but not limited to IWCS components such as cleaning units, hoses, cables, surface units, separation and treatment units; communication devices; and recording devices such as cameras) together with the manufacturer's technical documentary evidence where applicable to the operations being carried out (e.g. filter sizes);

.3 an environmental, health and safety plan;

.4 a procedure for assessing compatibility between IWCS and ship coatings (see paragraph 6.4.10);

.5 operational procedures for cleaning, including at least:

.1 procedures for communication between all stakeholders (e.g. cleaning personnel, the ship, relevant authority, port officials);

.2 procedures for using cleaning equipment, guiding divers along the hull, avoiding areas unsuitable to the IWCS and for camera and/or video operation;

.3 procedures for the operation of any remotely operated vehicle, including methods and equipment to ensure the operator can determine its position and orientation in relation to the ship;

.4 in the case of cleaning with capture, procedures for handling captured waste substances, including disposal or alternative arrangements in accordance with all local regulations and requirements;

.5 a supervision and verification process to ensure compliance with operational procedures; and

.6 contingency plans based on risk analysis for breakdowns, accidental discharges and any other untoward incident that the service provider anticipates during the cleaning process;

.6 procedures for record-keeping and reporting, including at least:

.1 provisions for recording and reporting of information such as IWCS equipment settings and modes, collection of photographs of AFS condition, fouling rating, development of cleaning and service reports;

.2 a standard biofouling cleaning report form that aligns with section 3 of appendix 2 of the 2023 Biofouling Guidelines, as well as table 4 of that appendix when applicable; and

.3 the process for issuance, maintenance and control of documents;

.7 maintenance and calibration procedures for equipment being used in accordance with the instructions of the manufacturer, including procedures for reducing risk using any available self-checks and/or testing or monitoring of the IWCS on an ongoing basis, together with associated reporting;

.8 training, qualifications and experience requirements for operators, technicians, inspectors and divers, including regarding:

.1 technical understanding of the IWCS and its principles of operation, as well as the processes and procedures necessary to operate it to reach the manufacturer's specified levels of performance;

.2 the prevention of biological and chemical contamination of the environment, including contingency response and any local regulations and requirements;

.3 knowledge of and ability to assess biofouling encountered during the normal course of operation;

.4 awareness of AFS types and working knowledge of associated cleaning procedures;

.5 equipment and procedures necessary to conduct the work safely (e.g. cranes, barge operations, storage units, ship-to-ship transfer);

.6 operation of any underwater communication system as well as underwater video monitoring systems (e.g. still cameras, video cameras, TV monitors on deck); and

.7 the operation and maintenance of the IWCS and its components (e.g. surface units, separation and treatment units); and

.9 a periodic review of near misses, work processes, procedures, complaints, corrective and preventive actions.

5.1.5 A relevant authority that approves service providers to operate should issue suitable documentation certifying that local regulations and requirements are met to its satisfaction, based on equipment test results and assessment of relevant documentation. The validity period, specifics of the authorized services, IWCS to be used and any limiting conditions should be noted. In cases when such approval is not provided, or should an approval be suspended or withdrawn, a rationale should be provided in writing.

5.1.6 Service providers should notify the relevant authority of any material changes to plans and procedures outlined in this section to prompt any necessary reassessment and reapproval required by the relevant authority.

5.2 Ship cleaning requests

5.2.1 In some jurisdictions, a relevant authority assesses in-water cleaning requests on a case-by-case basis, considering factors specific to the service provider and the ship, to minimize the release of any waste substances during cleaning. When operating in other jurisdictions, a service provider should take this section into account in considering its capacity to clean a ship safely and with minimal risk to the aquatic environment.

5.2.2 In considering requests for in-water cleaning, the relevant authority should be provided with and take into account the following information:

.1 pertinent information relating to the ship, including:

.1 its type, size and operating profile;

.2 ports of call since the last cleaning, including, if applicable, the dates and locations where the ship was stationary for more than 7 days (e.g. in open anchorage or berthed at a port);

.3 its BFMP and BFRB;

.4 the report of the last cleaning, or the report of the last inspection in line with paragraphs 7.5 or 8.2 of the 2023 Biofouling Guidelines;

.5 its coatings, their service life and condition, the type of any biocides in use, safety data sheets and any required International Anti-Fouling System Certificate of the ship; and

.6 the rating and degree of coverage of the biofouling in the areas to be cleaned, and whether the biofouling accumulated in the same waters as the location of cleaning;

.2 pertinent information relating to the service provider, including:

.1 the date and location of proposed cleaning;

.2 IWCS to be used, together with documentation of compatibility with the fouling rating and the coating type and condition of the areas of the ship to be cleaned (see paragraph 6.4.10); and

.3 in the case of cleaning with capture, information on the separation capacity and secondary treatment method of the IWCS and arrangements for the storage and disposal of waste substances;

.3 the cleaning plan (see paragraph 4.2.4); and

.4 any other relevant information.

5.2.3 A sample form that may be considered by relevant authorities for requesting information on proposed in-water cleaning activities is provided in the appendix.

5.2.4 The relevant authority should review the information provided by the ship and service provider to ensure that:

.1 the information is complete and valid supporting documentation is provided;

.2 the ship's coating in the area to be cleaned is within its manufacturer-recommended service life and is compatible with the IWCS (see paragraph 6.4.10);

.3 cleaning without capture will only be performed in line with paragraph 4.1.2;

.4 the location is appropriate for in-water cleaning (see paragraph 5.1.2.2); and

.5 the expected environmental conditions at the time of cleaning are appropriate to the capabilities and limitations of the IWCS and the cleaning operation to be performed, taking into account matters such as safety (e.g. nearby ships, port operations, dredging), weather conditions (e.g. height of waves, visibility) and any ecological or environmental concerns (e.g. higher than normal pollution levels, nearby marine mammals).

5.2.5 If a ship to be cleaned without capture only has microfouling on the hull but has macrofouling on niche areas, the relevant authority should consider whether the niche areas are likely to be affected by the IWCS.

5.2.6 In response to a request for ship cleaning, the relevant authority should convey any notice of approval, rejection, postponement, or request for additional information in writing to the master of the ship and the service provider. If the response is other than approval, this notice should include an explanation.

6 IN-WATER CLEANING SYSTEMS

6.1 System design and specification

6.1.1 IWCS may be composed of several units:

.1 a **cleaning unit** or method that removes biofouling from submerged surfaces of a ship, and includes any equipment for the capture of waste substances;

.2 a **storage unit** (e.g. a barge) that is used by some IWCS to hold captured waste substances and seawater for subsequent separation and/or treatment;

.3 a **separation unit** that filters and removes captured waste substances from influent seawater; and

.4 a **treatment unit**, separate or integral to the separation unit, that further treats the influent water after the separation unit (e.g. using heat, biocides or sorbent media) to comply with the minimum performance standard of this guidance and all local regulations and requirements.

6.1.2 IWCS may be located on a floating platform, on a jetty or pier, or installed on board a ship. Cleaning units may be either diver-operated, remotely operated vehicles or fully autonomous systems.

6.1.3 The IWCS manufacturer is expected to ensure that an IWCS intended to be used in connection with the 2023 Biofouling Guidelines should:

.1 be designed and constructed for robust and suitable operation in its intended operating environment, using materials compatible with the substances used and the environmental conditions and working conditions to which it will be subjected;

.2 be designed and constructed so as not to endanger the health and safety of personnel;

.3 not contain or use any substance of a dangerous nature, unless adequate risk mitigation measures are incorporated for storage, application, installation and safe handling;

.4 be provided with simple and effective means for its operation and control;

.5 include any necessary operating parameters for removing specific fouling ratings;

.6 include a continuous self-monitoring function that records the proper functioning or failure of the IWCS (including capture and other processes) together with facilities to produce (e.g. display, print or export) a report for maintenance purposes or later review by the relevant authority;

.7 give audible and visual alarms at all stations from which the IWCS may be controlled to signal any failure that may compromise the proper operation of the IWCS, including any failure that may lead to accidental discharge of waste substances where applicable, together with a means to minimize such discharges (e.g. automatic shutdown);

.8 be designed and constructed to minimize possible damage to coatings; and

.9 be provided with an OMSM that includes, inter alia, routine maintenance and troubleshooting procedures, and which documents any settings and operational modes for varying biofouling, environmental and ship-specific conditions.

6.1.4 An IWCS with capture should mechanically, physically, chemically and/or biologically process effluent released to the environment, in order to minimize the risk of introducing non-native organisms.

6.1.5 Certain IWCS are intended to be installed on board a ship and operated by the crew independently of any service provider (see paragraph 1.3). In such cases, the OMSM of the IWCS should include information and guidance needed by the crew to address matters otherwise within the service provider's role (e.g. appropriate locations and conditions for cleaning, proper disposal of waste substances, addressing local regulations and requirements). The information and guidance in the OMSM should support the inclusion of procedures within the ship's BFMP regarding at least:

.1 crew training;

.2 relevant matters from paragraphs 5.1.2 and 5.1.4;

.3 compliance with any local regulations and requirements (e.g. relating to approvals, permits, cleaning, IWCS effluent and the disposal of waste substances);

.4 pre-cleaning and post-cleaning inspections; and

.5 record-keeping in the BFRB.

6.2 Minimum performance standard

6.2.1 IWCS used in connection with the 2023 Biofouling Guidelines should:

.1 produce clean surfaces having a fouling rating less than or equal to 1;

.2 not visibly damage compatible coating types (paragraph 6.2.4);

.3 in the case of cleaning without capture, not significantly increase dissolved biocides, particulate biocides, plastics or microplastics near the cleaning unit, relative to ambient levels; and

.4 in the case of cleaning with capture:

.1 not significantly increase suspended solids, dissolved biocides, particulate biocides, plastics or microplastics near the cleaning unit or in any released effluent, relative to ambient levels; and

.2 only release captured particles, including organisms, that are less than 10 µm in all dimensions.

6.2.2 The phrase "not significantly increase" in paragraph 6.2.1 refers to a one-tailed statistical comparison establishing, to the satisfaction of the relevant authority, that there is no statistically significant difference between the levels of a substance measured at a specified location and ambient levels.

6.2.3 The term "ambient levels" refers to levels of the same substance measured during the cleaning and at the ship surface where levels of that substance are not impacted by the cleaning.

6.2.4 IWCS, with or without capture, should only be used on compatible coating types. The compatibility between an IWCS and a coating, or a type of coating, should be determined and documented based on independent testing at specified fouling ratings (see section 6.4).

6.3 System approval

6.3.1 In some jurisdictions, a relevant authority assesses the testing of IWCS before approving the use of such systems in local waters. Developers of IWCS should take this section into account when designing their systems and documenting their testing with a view to demonstrating that systems clean ships safely and with minimal risk to the aquatic environment.

6.3.2 In general, the assessment of an IWCS should unfold through the following steps:

.1 the relevant authority should assess the readiness of the IWCS for in situ testing, based on documentation, including the results of ex situ tests;

.2 in situ testing of an IWCS should be planned by an independent test organization;

.3 with the approval of the relevant authority, the independent test organization should carry out the testing, evaluate the results and prepare a report; and

.4 the report should be reviewed by the relevant authority to ensure that local regulations and requirements are met to its satisfaction prior to the issuance of any approval and/or certificates.

Readiness

6.3.3 To prevent unintended release of waste substances, IWCS should be pre-tested ex situ (i.e. in laboratory or land-based testing) before being tested in the natural aquatic environment. During ex situ testing, visual observation as well as quantitative sampling and analysis should indicate that:

.1 in the case of cleaning with capture, the system effectively captures waste substances associated with the cleaning of an underwater surface without returning it to the aquatic environment; and

.2 in the case of cleaning without capture, the system does not significantly increase the coating substances listed in paragraph 6.2.1.3, relative to pretest conditions.

6.3.4 The relevant authority should evaluate the readiness of the IWCS to be approved, which should include reviewing the following documents provided by the system manufacturer:

.1 drawings and descriptions of the IWCS and its components and associated equipment (including but not limited to any cleaning, storage, separation and treatment units and their components, hoses, cables and recording devices such as cameras) in sufficient detail to support the testing (however, proprietary and commercially sensitive information regarding the design of the IWCS may be omitted);

.2 an OMSM for the IWCS, including safety provisions for the operator and any divers and the information in paragraph 6.1.5;

.3 a declaration of the capabilities, specifications and operational requirements of the IWCS covering at least the following topics, together with supporting documentation:

.1 the fouling ratings the system is designed to clean, specifying the range of parameters and equipment used to remove various fouling ratings;

.2 the coating types the system is designed to be compatible with;

.3 the areas of ships that the system is designed to clean;

.4 in the case of cleaning with capture, the minimum flow rate necessary to ensure proper capture;

.5 any special requirements, adaptations or equipment necessary for cleaning specific areas (e.g. niche areas and/or propellers) where the system is designed to do so;

.6 any limitations regarding the above capabilities that should be taken into account, such as ship types, areas (e.g. surface curvatures, distances to bilge keels), hull materials, fouling ratings and/or coating types that are not to be cleaned using the system; and

.7 any operational limitations regarding the use of the system, such as visibility, or its appropriateness to port, coastal, or open sea conditions; and

.4 the results of any ex situ testing, and any relevant results on the performance of the IWCS during research and development phase to support the readiness of the IWCS for testing.

Planning

6.3.5 Testing of an IWCS should be planned and undertaken by a third-party laboratory or facility (the "testing organization") that is independent of the service provider and the manufacturer, vendor or supplier of the IWCS (or its major components) and the coatings being tested and that is approved, certified and audited by an independent accreditation body to conform to relevant standards (e.g. ISO/IEC 17025).

6.3.6 In general, testing of an IWCS should be planned to establish that the standards in section 6.2 and the declared capabilities of the system are achieved. While it is not feasible to test all possible conditions, parameters and variables that can impact cleaning performance, testing should assess system performance in different operations, applications and environmental conditions to the extent practicable.

6.3.7 The experimental design, planning and execution of testing may take into account any relevant standards acceptable to the Administration (e.g. ISO 20679 or other recognized standards).

6.3.8 All IWCS should undergo in situ testing on surfaces of at least three different ships. Each ship is considered to be a separate test. On each ship, the system should be tested on each type of surface that it is designed to clean. If a system is capable of cleaning both with and without capture, both modes should be tested on each ship and appropriate surface type. The set of test ships should present:

.1 distinct coating types, including the softest type of coating the technology is designed to clean, and a hard non-biocidal coating if applicable to the IWCS;

.2 various levels of biofouling, including areas fouled to the highest level that the technology is designed to clean; and

.3 different environmental conditions, including the most challenging conditions for which the technology is designed (e.g. peak tidal flow), and, if possible, different temperatures and salinities.

6.3.9 A detailed Test Quality Assurance Plan (TQAP) should be prepared by the testing organization and be approved by the relevant authority for the specific IWCS, ship and occasion of testing. The TQAP should at least:

.1 identify all organizations involved in the test;

.2 outline the experimental design for validating the performance claims and limitations of the IWCS;

.3 specify the number, position, dimension, coating type and cleaning duration of test areas, which should include the following areas if relevant to the IWCS:

.1 areas of flat hull;

.2 curved areas (e.g. the turn of bilge and angles where the orientation of the surface changes abruptly, such as the chine, keel and skegs); and

.3 niche areas (e.g. propellers, propeller shafts, rudders, anodes and gratings);

.4 specify the suspended solids, dissolved biocides, particulate biocides, plastics or microplastics to be assessed with respect to paragraphs 6.2.1.3 and 6.2.1.4.1, which should at least include copper and zinc if present in the coating;

.5 include a methodology for qualifying and quantifying impacts on the coating of test areas caused by the cleaning (e.g. observation of visible damage and dry-film thickness testing);

.6 govern the identification, collection, preservation, integrity, chain of custody, transportation and processing of samples, including the cleanliness of any containers used and procedures relating to compromised samples;

.7 set out quality assurance procedures for written and electronic data, including the quantitative and qualitative data to be recorded and data analyses to be undertaken (including appropriate statistical analysis);

.8 identify any environmental or other conditions that should be verified at the time of testing to ensure that results will be representative (e.g. background levels of suspended solids and plastics);

.9 be sufficient to establish that the discharge will meet all local regulations and requirements of jurisdictions where cleaning may take place, including with respect to biological and chemical parameters; and

.10 identify how results will be reported.

6.3.10 During each cleaning event, each test area should be cleaned for at least 90 minutes with the IWCS operating in a normal, defined cleaning mode for the conditions presented. In the case of niche areas having shorter cleaning times, at least 30 minutes of cleaning should be conducted, whenever possible. For all tests during each cleaning event, there should be no repeated cleaning of the test area, beyond that which is part of normal operations.

6.3.11 At least one test area on one test ship should be representative of the expected typical application of the IWCS and involve the cleaning of a substantial area (e.g. at least one third of the test ship) over a realistic time frame (e.g. several hours).

Testing

6.3.12 The testing organization should independently conduct the testing of IWCS in accordance with the approved TQAP and with the permission of the relevant authority. During testing, the IWCS should be operated by the intended system user (i.e. a trained service provider, or a trained ship's crew, as appropriate).

6.3.13 The following information should be documented in a report by the testing organization for each ship tested:

.1 an executive summary;

.2 the time, date, location and duration of the test cleaning;

.3 information about the testing organization, including any relevant accreditations;

.4 a list of the people taking part in the test and operation (e.g. handlers, workers, controllers and/or divers), including their roles and responsibilities and operator/diver skill and experience;

.5 information regarding the ship, including at least:

.1 ship type, together with details of its design and niche areas;

.2 coating types, date of application, remaining service life and condition;

.3 description, type, rating and coverage of biofouling on relevant surfaces (e.g. hull and niche areas);

.4 operational profile, together with its history of cleaning since last dry-docking; and

.5 whether the ship underwent a full or partial clean;

.6 information regarding the environmental conditions during the test, including at least:

.1 water depth and under-keel clearance;

.2 water visibility;

.3 currents, wind and waves;

.4 water quality parameters referenced in paragraph 6.2.1 and additional parameters of interest (e.g. salinity, temperature, total organic carbon); and

.5 ambient levels of suspended solids, biocides, plastics and microplastics;

.7 information regarding the IWCS, including at least:

.1 IWCS design, including any mode of attachment to and movement over the ship, and associated equipment or attachments (e.g. cleaning brushes, blades or water jets and type, amount, configuration);

.2 the diameter of the hose from the cleaning unit to any treatment and/or separation unit and the declared flow rate;

.3 IWCS mode of operation (capture or non-capture), various preset modes of operations and operational adjustments during cleaning, together with the details of any capture methods (e.g. cleaning unit shroud and suction); and

.4 IWCS operations, including procedures followed during set up, planned and actual rate of movement of cleaning unit over the test area, number and overlap of passes (accuracy of surface coverage), whether a diver or remotely operated vehicle undertook the cleaning, and procedures for winding down of the test;

.8 information regarding the actual performance of the IWCS, including at least:

.1 actual flow rate of influent water including waste substances;

.2 the claimed maximum curvature and the maximum curvature where cleaning was carried out successfully during the test without loss of waste substances into the water column;

.3 a characterization of any effluent to be released by the IWCS, including with respect to the number and size of organisms and the substances referenced in paragraph 6.2.1.4.1; and

.4 any implementation of contingency plans and response to IWCS failures;

.9 information regarding the conduct and outcome of cleaning in each test area, including at least:

.1 description of any variations or deviations in application of the test relative to the TQAP;

.2 the duration of cleaning of the area, as well as the rate of cleaning expressed in m^2/unit time;

.3 the fouling rating and coating film thickness, before and after cleaning;

.4 all raw data and logged instrument data (regarding the IWCS, the cleaning or the environment) that was collected;

.5 results of the tests and analyses referred to in paragraph 6.3.9.7, including the methods of analysis and detection limits;

.6 a description and evidence of residual biofouling (microfouling or macrofouling) observed in images of each treated area;

.7 the assessment of the impact of cleaning on the coating in each test area referred to in paragraph 6.3.9.5, including images and documentation of wear and/or damage to the coating; and

.8 a discussion of the efficacy of the IWCS;

.10 an itemized assessment of the IWCS against the standards in section 6.2 and the declared capabilities of the system (paragraph 6.3.4.3), including whether or not the system passed each criterion assessed during the test; and

.11 any safety issues encountered during the test, which should be addressed before any further testing occurs.

6.3.14 In the case of a system capable of cleaning both with and without capture, results for both modes should be presented and discussed separately in reports.

6.3.15 All data including video footage and still photographs taken during the test should be archived for reporting.

6.3.16 Should damage to a ship's coating occur during a test, a correction plan should be developed, accepted by the relevant authority and implemented before any further testing takes place.

Evaluation and reporting

6.3.17 The data archived during the verification phase should be processed and analysed by the testing organization to assess the claims and limitations of the IWCS.

6.3.18 Testing should culminate in a full, clear and transparent final report that includes the qualitative and quantitative data gathered during the process regarding the cleaning and capture efficacy, as well as a discussion. The rationale for any deviation from the approved TQAP should be reported.

6.3.19 A final report should be prepared by the testing organization and should include at least the following information:

.1 an executive summary;

.2 a description of the testing organization;

.3 an overview of the approach taken to testing the IWCS;

.4 the executive summary of the report of the cleaning of each test ship (paragraph 6.3.13.1);

.5 an overall discussion of the efficacy and operation of the IWCS across the tests;

.6 an itemized assessment of the IWCS against the minimum performance standard (section 6.2), including whether or not the system passed each criterion;

.7 an itemized assessment of the declared capabilities of the IWCS (paragraph 6.3.4.3), including whether the testing established that each capability was or was not met;

.8 any limitations identified regarding the IWCS; and

.9 relevant annexes, including at least:

.1 the TQAP (paragraph 6.3.9);

.2 the report of the cleaning of each test ship (paragraph 6.3.13); and

.3 an itemized list of supporting information provided along with the report, including archived photos and videos.

Approval and certification

6.3.20 A relevant authority that approves the use of an IWCS in its jurisdiction should issue a suitable document certifying that local regulations and requirements are met to its satisfaction, based on the documentation provided by the manufacturer and the test report. In cases when such approval is not provided, or should an approval be suspended or withdrawn, a rationale should be provided in writing. The relevant authority should review any future system alterations that would affect the test results.

6.3.21 The certification document issued by the relevant authority should at least state the fouling ratings, areas (e.g. flat and/or curved hull surfaces, niche areas) and coating types that the IWCS is approved to clean and any limiting conditions. It should also state a validity period (normally no longer than five years).

6.3.22 A relevant authority considering the approval of an IWCS in its jurisdiction should take into account the report of any relevant testing carried out under the supervision of another State.

6.4 Coating compatibility

6.4.1 During in-water cleaning, IWCS used should be compatible with the ship's coating and fouling rating to minimize the risk of coating damage, which could lead to environmental impacts (e.g. from waste substances released during cleaning) and reduced coating performance and service life. This section explains the roles of coating manufacturers, IWCS manufacturers, service providers and ships in establishing compatibility before cleaning takes place.

Coating manufacturers

6.4.2 Coating manufacturers should make key information on each coating widely available to IWCS manufacturers, service providers, ships, relevant authorities and the public in line with paragraphs 6.3.2 and 6.3.5 of the 2023 Biofouling Guidelines.

6.4.3 This information should include information on biocides used and coating type, together with recommended methods and techniques for cleaning the coating, methods and techniques that should not be used for cleaning, and any contraindications to cleaning (e.g. owing to the actual condition of a ship's coating).

6.4.4 This information should be based on the knowledge and expertise of the coating manufacturer and any necessary tests. The level of detail provided should be consistent with the needs of IWCS manufacturers, service providers, ships and relevant authorities as described in this guidance. However, the information provided by coating manufacturers is not expected to be specific to individual IWCS or ships. Coating manufacturers should remain aware of developments in the IWCS market and update the information they provide accordingly.

In-water cleaning system manufacturers

6.4.5 IWCS manufacturers should make information on each IWCS widely available to coating manufacturers, service providers, ships and relevant authorities through public guidance in line with paragraphs 6.3.2 and 6.3.5 of the 2023 Biofouling Guidelines.

6.4.6 The guidance provided by the IWCS manufacturer should include information on the coatings and fouling ratings on which that manufacturer's equipment has been independently tested, the results of the testing, and recommendations as to the compatibility of the IWCS with coatings of the same type. In the interests of protecting ships and the environment, the recommendations should reflect various IWCS cleaning tools and modes, various coating types, and should be impartial with respect to coating manufacturers. The level of detail provided should be consistent with the needs of service providers, ships and relevant authorities as described herein. However, the guidance provided by IWCS manufacturers is not expected to be specific to individual ships or to cover every coating.

6.4.7 While it is not practicable to test an IWCS on every coating, the IWCS manufacturer should commission independent in situ or ex situ compatibility testing for a variety of coating types on surfaces with various fouling ratings.

6.4.8 IWCS manufacturers should remain aware of developments in the coatings market and in particular the relevant safety and technical information published by coating manufacturers (paragraph 6.4.2). IWCS manufacturers should also remain aware of reports from service providers of unexpected coating damage. The guidance provided by an IWCS manufacturer should be revised and/or additional compatibility testing should be undertaken when appropriate.

Service providers

6.4.9 The service provider should remain familiar with, and retain on file, the most recent safety and technical information provided by coating manufacturers (paragraph 6.4.2) and the most recent guidance provided by manufacturers of the IWCS used by the service provider (paragraph 6.4.5).

6.4.10 When considering or planning the cleaning of a specific ship, the service provider should consider at least the following information in documenting the areas with which an IWCS is compatible:

.1 the information provided by the coating manufacturer (paragraph 6.4.2) establishing that the provider's cleaning methods and techniques are suited to the coating and that there are no contraindications to cleaning;

.2 the guidance provided by the IWCS manufacturer (paragraph 6.4.5) establishing that the IWCS has been tested on the coating, or the type of coating, used on the ship; and

.3 relevant information submitted by the ship (paragraph 4.1.4.2) and the results of the pre-cleaning inspection (paragraph 4.2.7) establishing that the actual condition of the coating and fouling rating are suitable for cleaning using the IWCS.

Ship

6.4.11 The ship should consider the information provided by the coating manufacturer (paragraph 6.4.2), the guidance provided by the IWCS manufacturer (paragraph 6.4.5), and the documentation from the service provider (paragraph 6.4.10) in connection with the ship's decision to proceed with cleaning.

APPENDIX

IN-WATER CLEANING REQUEST FORM

This form can help relevant authorities apply the *2023 Guidelines for control and management of ships' biofouling to minimize the transfer of invasive aquatic species* (resolution MEPC.378(80)) and process cleaning requests in their jurisdiction. For more information about this form, please refer to the *Guidance on in-water cleaning of ships' biofouling* (MEPC.1/Circ.918, as may be amended).

A - TO BE COMPLETED BY THE MASTER ON BEHALF OF THE SHIPOWNER/OPERATOR			
GENERAL INFORMATION			
Proposed location of cleaning Click here to enter text.		Proposed date of cleaning Click here to enter a date.	
SHIP INFORMATION			
Name of ship Click here to enter text.	Flag Click here to enter text.	IMO Number, Official Number (if applicable), or other distinctive number or letter Click here to enter text.	Type of ship Click here to enter text.
Shipowner or operator or ISM Company Number (if applicable) Click here to enter text.	Ship's agent Click here to enter text.	Length overall Click here to enter text.	Beam or ship's breadth Click here to enter text.
Choose the best description for the ship's operating profile: ☐ Domestic ☐ Transoceanic ☐ International coastal ☐ Other, please specify: Click here to enter text.			
ATTACHED DOCUMENTATION			
Which of the following are included in this request? Select all that apply: ☐ Biofouling Management Plan ☐ Biofouling Record Book ☐ International Anti-fouling System Certificate ☐ Photos or videos from recent inspection ☐ Reports from previous cleanings ☐ Documentation from recent inspection ☐ Ports of call since the last complete cleaning (including dates and locations of any stationary period over 7days) ☐ Other, please specify: Enter text.			
BIOFOULING INFORMATION			
Date of delivery, last complete cleaning or dry-docking (whichever is more recent) Choose an item. Click here to enter a date.		Date of last underwater hull inspection Click here to enter a date.	
Type of fouling in area that will be cleaned ☐ Microfouling ☐ Macrofouling	Origin of fouling ☐ Same waters ☐ Other (if same waters, provide supporting information)	By percentage, estimated amount of the ship covered in macrofouling Click here to enter text.	
PRIMARY COATING INFORMATION			
Manufacturer Click here to enter text.	Type/name of commercial product Click here to enter text.	Primary biocidal compound (if any) Click here to enter text.	
Date of application Click here to enter a date.	Remaining service life (in months) Click here to enter text.	Did most recent inspection find the coating in good condition? ☐ Yes ☐ No	
Area of application ☐ Whole hull ☐ Other, please specify: Enter text.	Does the ship have more than one coating? ☐ Yes ☐ No	Details of secondary coating (if any) Click here to enter text.	
MASTER'S DECLARATION			
I certify that the information listed in section A is true and correct			
Name of master Click here to enter text.	Signature Click here to enter text.	Date Click here to enter a date.	
Email: Click here to enter text.		Phone number: Click here to enter text.	

B - TO BE COMPLETED BY THE SERVICE PROVIDER		
CLEANING SPECIFICATIONS		
Manufacturer and model of IWCS to be used: Click here to enter text. Date the relevant authority gave approval to operate (attach documentation): Click here to enter a date.	Type of service: ☐ Cleaning with capture ☐ Cleaning without capture Will niche areas be cleaned? ☐ Yes ☐ No	
If performing cleaning with capture, are particles over 10 µm separated from the effluent during treatment? ☐ Yes ☐ No ☐ N/A		
If particles smaller than 10 µm are separated from the effluent during treatment, to what size (in µm) Click here to enter text.		
Type of secondary treatment is used to reduce the risk of introducing non-native organisms: ☐ None ☐ UV ☐ Chemical ☐ Heat ☐ Other: Enter text.		
Is the cleaning plan attached to this form? ☐ Yes ☐ No		
COATING COMPATIBILITY		
Does *information provided by the coating manufacturer* establish that the cleaning methods and techniques are suited to the coating and that there are no contraindications to cleaning? ☐ Yes ☐ No, explain: Click here to enter text.		
Does *guidance provided by the IWCS manufacturer* establish that the IWCS has been independently tested on the coating, or the type of coating, used on the ship? ☐ Yes ☐ No, explain: Click here to enter text.		
What information establishes that the *actual condition of the coating and fouling rating* are suitable for cleaning using the IWCS? ☐ Information submitted by the ship ☐ Completed pre-cleaning inspection ☐ Pre-cleaning inspection to be done during cleaning ☐ Other, explain: Click here to enter text.		
SERVICE PROVIDER DECLARATION		
I certify that the information listed in section B is true and correct		
Name of service provider Click here to enter text.		Name of staff Click here to enter text.
Job title Click here to enter text.	Signature	Date Click here to enter a date.
Email: Click here to enter text.		Phone number: Click here to enter text.

C - TO BE COMPLETED BY RELEVANT AUTHORITY			
☐ Cleaning request approved	☐ Cleaning request rejected	☐ Need more details - resubmit	☐ Postpone cleaning
Notes: (Any conditions of approval. Reasons why a cleaning request was rejected, needs resubmission, or has been postponed.) Click here to enter text.			
Name of relevant authority Click here to enter text.		Name of staff Click here to enter text.	
Job title Click here to enter text.	Signature	Date Click here to enter a date.	