



DPC: 25/30469266 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

Date: 29 January 2025

Origin: International

Latest date for receipt of comments: 24 March 2025

Project No. 2023/00274

Responsible committee: SME/32 Ships and marine technology - Steering committee

Interested committees:

Title: Draft BS ISO 6319 Ships and marine technology — Marine environment protection — Conducting and documenting in-water cleaning of ships' biofouling.

Please notify admin.start@bsigroup.com if you are aware of any keywords that might assist in clarifying or identifying the standard or of the content of this standard:

- i) has any issues related to 3rd party IPR, patent or copyright
- ii) affects other national standard(s)
- iii) requires additional national guidance or information

WARNING: THIS IS A DRAFT AND MUST NOT BE REGARDED OR USED AS A BRITISH STANDARD. THIS DRAFT IS NOT CURRENT BEYOND 24 March 2025

This draft is issued to allow comments from interested parties; all comments will be given consideration prior to publication. No acknowledgement will normally be sent. **See overleaf for information on the submission of comments.**

No copying is allowed, in any form, without prior written permission from BSI except as permitted under the Copyright, Designs and Patent Act 1988 or for circulation within a nominating organization for briefing purposes. Electronic circulation is limited to dissemination by e-mail within such an organization by committee members.

Further copies of this draft may be purchased from BSI Shop <http://shop.bsigroup.com> or from BSI Customer Services, Tel: +44(0) 20 8996 9001 or email cservices@bsigroup.com. British, International and foreign standards are also available from BSI Customer Services.

Information on the co-operating organizations represented on the committees referenced above may be obtained from <https://standardsdevelopment.bsigroup.com/>.

E-mail: admin.start@bsigroup.com

Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
------------------	------------------------

1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



DRAFT International Standard

ISO/DIS 6319

Ships and marine technology — Marine environment protection — Conducting and documenting in- water cleaning of ships' biofouling

ICS: 13.020.99; 47.020.99

ISO/TC 8/SC 2

Secretariat: **ANSI**

Voting begins on:
2025-01-29

Voting terminates on:
2025-04-23

This document is circulated as received from the committee secretariat.

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENTS AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

Reference number
ISO/DIS 6319:2025(en)

Full document details: 25/30469266 DC

© ISO 2025  **Documents**
Document Sharing Hub



COPYRIGHT PROTECTED DOCUMENT

© ISO 2025

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Abbreviations	4
5 General preparations	4
5.1 General	4
5.2 Compatibility between AFC and IWC systems	4
5.3 IWC impact on water quality	5
5.4 Training of operators	5
5.5 Contingency plan	6
5.6 Environmental, health and safety plan	6
5.7 Quality management requirements	7
5.8 Biofouling Management Plans and Record Books	7
5.9 Procedure for post-cleaning documentation	7
5.10 Documentation for multiple events approval	7
6 Assessment of hull condition prior to cleaning	8
6.1 General	8
6.2 Workflow for hull condition assessment	8
6.2.1 Review of hull condition documentation	9
6.2.2 Review of ship operations	10
7 Preparations prior to cleaning events	11
7.1 General	11
7.2 Documentation for single event approval	11
7.2.1 Submission of documentation	12
7.2.2 Insufficient documentation of hull condition	12
7.2.3 Insufficient documentation of compatibility	12
7.3 Pre-cleaning coordination	13
8 In-water cleaning operations	13
8.1 General	13
8.2 Operations coordination	13
8.3 General considerations for cleaning of biofouling rating ≤ 1	14
8.4 General considerations for cleaning of biofouling rating >1	14
8.5 Operations monitoring	14
8.6 Identification of areas to be cleaned	15
8.7 Identification of areas to be avoided	15
8.8 Contingency measures	15
8.9 Recording of post-cleaning hull condition	15
8.10 Special considerations: Cleaning of niche areas	16
9 Post-cleaning reporting and documentation	16
9.1 General	16
9.2 Cleaning report	16
9.2.1 General information	17
9.2.2 Description of zones and areas cleaned	17
9.2.3 Pictorial documentation of areas cleaned	17
9.2.4 Details of areas remaining to be cleaned	18
9.2.5 Capture	18
9.2.6 Contingencies	18
9.3 Record keeping	18
Annex A (informative) Example of a biofouling cleaning report	19

Annex B (informative) Visibility	22
Annex C (informative) Documentation recommended for port approvals	23
Annex D (informative) Ship zones	25
Annex E (informative) 2023 IMO Biofouling Guidelines Rating scale to assess the extent of fouling on inspection areas	27
Bibliography	28

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO *had not* received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 2, *Marine environment protection*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Preventing and removing biofouling on ships' hulls limits the spread of invasive aquatic species (IAS). Indeed, ships' biofouling is recognised as an important potential sub-vector to translocate IAS (e.g. [1], [2], [3], [4]). Such translocation threatens coastal environments by disrupting ecological systems, which can also negatively affect fisheries, aquaculture, and tourism. Additionally, biofouling increases frictional drag on hulls and decreases the propeller efficiency, in turn increasing fuel consumption, greenhouse gas (GHG) emissions and air pollution from ships. Not only is biofouling estimated to increase a ship's fuel consumption by on average 9 %, [5] this added fuel consumption costs the shipping industry billions of USD yearly. Therefore, improving biofouling management across the global shipping fleet will have considerable benefits, both from an environmental standpoint and also from an economic standpoint.

The most common way of controlling hull biofouling is applying coatings containing biocides, however, if the anti-fouling system (AFS) fails or if the ship's operational profile or environmental conditions deviate from the coating specification, removing biofouling by cleaning the hull may become necessary. Traditionally, service providers have offered in-water cleaning (IWC) services using brush-based IWC systems operated by human divers, with considerable variation among systems. More recently, IWC Remotely Operated Vehicles (ROVs) using brush or water-jetting technology and autonomous systems as well as crew-operated systems have become available for in-port and in-transit cleaning. IWC may be conducted with or without capturing the materials liberated from the ship surface.

IWC can help to protect the environment from both IAS and harmful emissions by reducing the number of heavily fouled ships in international trade that may spread IAS during operation and idle periods. However, an inherent risk of IWC is that the cleaning operation itself may result in the release of IAS and contaminants into the local environment. The aim of this document is to provide best practices to ensure that IWC operations not only effectively achieve a clean hull, but simultaneously ensure that these measures are conducted safely, meaning that they protect human life and the environment. Environmentally sound IWC operations strive for little to no impact to marine ecosystems and avoid damage to ships' AFCs to facilitate their optimal performance.

This document aligns with, and supplements, the International Maritime Organization's (IMO) *2023 Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species*, henceforth referred to as 2023 IMO Biofouling Guidelines. [6] This document directs that cleaning of microfouling (biofouling rating 1 or less) does not require use of a capture system, while cleaning of macrofouling (biofouling rating 2 or higher) requires use of a capture system (see [Annex E](#)). At present, comprehensive biofouling management policies are not widespread, and the few jurisdictions that have such policies use varying procedures. [7] This document aims to provide a level playing field by contributing to globally harmonised practices. By specifying a methodology for safe and sustainable IWC processes, procedures are provided to ports and other relevant authorities facing requests for IWC when a ship is in port or at anchorage. Furthermore, this information will provide confidence to shipowners that cleaning services are performed according to a set of standard practices regardless of location. This document also informs a range of other stakeholders including ship biofouling IWC service providers, inspection service providers, IWC equipment manufacturers and coating manufacturers.

Through a stepwise approach, this standard describes the IWC process chronologically. First, all relevant, preparatory aspects—such as general preparations, the assessment of the hull prior to the IWC operation, and preparations associated with any single cleaning event—are considered, then the cleaning operation itself is discussed, which is followed by considerations of post-cleaning processes and reporting. Questions of *why* and *when* cleaning is necessary, including the establishment of proactive or reactive cleaning regimes, are beyond the scope of this document. Rather, this document focuses on the questions of *how* the IWC preparations and operations should take place, and how they should be documented.

Ships and marine technology — Marine environment protection — Conducting and documenting in-water cleaning of ships' biofouling

1 Scope

This document provides best practices for planning and conducting in-water cleaning (IWC) operations safely, efficiently and in an environmentally sound manner. Additionally, this document provides best practices for reporting on the effectiveness of IWC operations.

This document addresses all forms of IWC of external submerged surfaces, which are hull and niche areas, all types and levels of biofouling, which means biofilms, microfouling and macrofouling, conducted both with or without capture. It does not address internal piping.

The document has been established to inform ports, regulatory agencies, ship biofouling IWC service providers, inspection service providers, IWC equipment manufacturers, coating manufacturers, shipowners, ship managers, ship operators and other relevant stakeholders.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 20679, *Ships and marine technology – Marine environment protection – Testing of ship biofouling in-water cleaning systems [the document is currently being prepared for publication and should be published by the time the DIS ballot begins]*

3 Terms and definitions

In this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1 antifouling coating

AFC

surface coating designed to prevent, repel or facilitate the detachment of *biofouling* (3.3) from *hull* (3.7) and *niche areas* (3.13) that are typically or occasionally submerged

Note 1 to entry: AFC includes both biocidal and non-biocidal coatings.

3.2 antifouling system

AFS

coating, paint, surface treatment, surface or device that is used on a ship to control or prevent attachment of unwanted organisms

3.3

biofouling

accumulation of aquatic organisms such as microorganisms, plants and animals on surfaces and structures immersed in or exposed to the aquatic environment

Note 1 to entry: Biofouling can include pathogens.

[SOURCE: 2023 IMO Biofouling Guidelines]

3.4

capture

process of containment, collection and removal of biofouling material and *waste substances* (3.21) surfaces during cleaning in water or in dry-dock

[SOURCE: 2023 IMO Biofouling Guidelines]

3.5

compatibility

state in which an IWC system can operate on an *AFC* (3.5) without causing damage that may reduce its performance and reduce its lifetime, both of which may contribute to a higher risk of *biofouling* (3.7)

3.6

fouling rating

allocation of a number for a defined inspection area of the ship surface based on a visual assessment, including description of *biofouling* (3.7) present and percentage of *macrofouling* (3.15) coverage

[SOURCE: 2023 IMO Biofouling Guidelines]

3.7

hull

underwater area of a ship (3.24), including *niche areas* (3.18)

3.8

invasive aquatic species

non-native species to a particular ecosystem which may pose threats to human, animal and plant life, economic and cultural activities and the aquatic environment

[SOURCE: 2023 IMO Biofouling Guidelines]

3.9

in-water cleaning

IWC

removal of biofouling from a ship's *hull* (3.11) including *niche areas* (3.13) while in the water

3.10

macrofouling

biofouling caused by the attachment and subsequent growth of visible plants and animals on structures and ships exposed to water

Note 1 to entry: Macrofouling is large, distinct multicellular individual or colonial organisms visible to the human eye such as barnacles, tubeworms, mussels, fronds/filaments of algae, bryozoans, sea squirts and other large attached, encrusting or mobile organisms.

[SOURCE: 2023 IMO Biofouling Guidelines]

3.11

microfouling

biofouling caused by bacteria, fungi, microalgae, protozoans and other microscopic organisms, that creates a biofilm also called a slime layer

[SOURCE: 2023 IMO Biofouling Guidelines]

3.12

multiple events approval

fundamental approvals from ports and other relevant authorities allowing service providers to conduct multiple *IWC* ([3.14](#)) operations over a time period

Note 1 to entry: Commonly called licence or permit.

3.13

niche areas

submerged surface areas on a ship that may be more susceptible to biofouling than the main hull due to structural complexity, different or variable hydrodynamic forces, susceptibility to AFC wear or damage, inadequate or no protection by AFS

[SOURCE: 2023 IMO Biofouling Guidelines]

3.14

operator

actor who operates the cleaning or inspection unit

3.15

proactive cleaning

periodic removal of *microfouling* ([3.11](#)) on ships' hulls to prevent or minimize attachment of *macrofouling* ([3.10](#))

[SOURCE: 2023 IMO Biofouling Guidelines]

3.16

reactive cleaning

corrective action during which *biofouling* ([3.3](#)) is removed from a ship's *hull* ([3.7](#))

[SOURCE: 2023 IMO Biofouling Guidelines]

3.17

service provider

person or organisation that supplies the cleaning service

Note 1 to entry: In some cases the same organisation as the *technology provider* ([3.20](#)).

3.18

single event approval

approvals from ports and other relevant authorities to *service providers* ([3.17](#)) for conducting a single IWC event

3.19

ship

vessel of any type whatsoever operating in the aquatic environment and includes hydrofoil boats, air-cushion vehicles, submersibles, floating craft, fixed or floating platforms, floating storage units (FSUs) and floating production storage and off-loading units (FPSOs)

[SOURCE: 2023 IMO Biofouling Guidelines]

3.20

technology provider

person or organisation that supplies the IWC technology to a *service provider* ([3.17](#))

Note 1 to entry: In some cases the same organisation as the *service provider* ([3.17](#)).

3.21

waste substances

dissolved and particulate materials that may be released or produced during cleaning or maintenance, and may include biocides, metals, organic substances, removed *biofouling* ([3.3](#)), pigments, microplastics or other contaminants that could have a negative impact on the environment

[SOURCE: 2023 IMO Biofouling Guidelines]