Designation: F3648 – 23

An American National Standard

Standard Guide for Maintenance of Marine Sanitation Devices (MSDs) and the Effects of Cleaning Agents on MSD Operations[1]

This standard is issued under the fixed designation F3648; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 The guide provides information and clarity to support the health and maintenance of Marine Sanitation Devices (MSDs) on maritime vessels and platforms to promote effective operations and performance throughout the lifecycle. This includes identification of chemicals and their derivatives that can be detrimental to proper MSD operations. This guide will promote better understanding of the impacts of certain chemicals on the health and operations of MSD systems, plus provide guidance to inform operators of best practices and procedures for effective operations and maintenance. This guide is designed to assist both operators and MSD Original Equipment Manufacturers (OEMs) in collaboratively working to ensure effective operations and maintenance, and to reduce performance degradations that result from the introduction of harmful chemicals. The primary application of this guide is to Type II MSDs (described in Section 4), installed on larger ships and employing biological treatment of sewage and gray water.

NOTE 1—This guide does not constitute regulations or ship classification society rules, which should be consulted where applicable.

1.2 Manufacturers preparing new product specifications or revising existing ones should follow the practices and procedures outlined herein, and be guided by the latest specifications covering similar commodities. Similarly, vessel owner/operators should consult this guide regarding in-service operations and maintenance.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D1253 Test Method for Residual Chlorine in Water

F1166 Practice for Human Engineering Design for Marine Systems, Equipment, and Facilities

F2363 Specification for Sewage and Graywater Flow Through Treatment Systems

2.2 *IMO Regulations:*[3]

MEPC.227(64)(2012) Guidelines on implementation of effluent standards and performance tests for sewage treatment plants

2.3 *ISO Standards:*[4]

ISO 5815-1 Water quality — Determination of biochemical oxygen demand after n days (BODn) — Part 1: Dilution and seeding method with allylthiourea addition

ISO 15705 Water quality — Determination of the chemical oxygen demand index (ST-COD) — Small-scale sealed-tube method

ISO 14593 Water quality — Evaluation of ultimate aerobic biodegradability of organic compounds in aqueous medium — Method by analysis of inorganic carbon in sealed vessels (CO_2 headspace test) method

2.4 *U.S. Laws and Regulations:*[5]

33 CFR Part 159 Marine sanitation devices

40 CFR Part 136 Guidelines establishing test procedures for the analysis of pollutants

46 CFR Shipping

VIDA Vessel Incidental Discharge Act

Vessel General Permit (VGP)

2.5 *Other Standards:*

SM 4600-Cl Chlorine (residual) — Standard methods for the examination of water and wastewater[6]

[1] This guide is under the jurisdiction of ASTM Committee F25 on Ships and Marine Technology and is the direct responsibility of Subcommittee F25.06 on Marine Environmental Protection.

Current edition approved May 1, 2023. Published June 2023. DOI: 10.1520/F3648-23.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from International Maritime Organization (IMO), 4, Albert Embankment, London SE1 7SR, United Kingdom, http://www.imo.org.

[4] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

[5] Available from Electronic Code of Federal Regulations (ECFR), http://ecfr.gov.

[6] Available from American Public Health Association, 800 I St N.W., Washington, DC 20001-3710, USA, www.standardmethods.org.

3. Terminology

3.1 *Definitions:*

3.1.1 *administrator, n*—the Administrator of the United States Environmental Protection Agency.

3.1.2 *biodegradable, n*—as defined in the Vessel Incidental Discharge Act (VIDA):

(1) for soaps, cleaners, and detergents, a product that demonstrates, within 28 days, either the removal of at least 70 % of Dissolved Organic Carbon (DOC), production of at least 60 % of the theoretical carbon dioxide, or consumption of at least 60 % of the theoretical oxygen demand. ISO 14953 provides test method.

(2) for biocides, a compound or mixture that, within 28 days, demonstrates removal of at least 70 % of DOC and production of at least 60 % of the theoretical carbon dioxide.

3.1.3 *blackwater, n*—see *sewage*.

3.1.4 *captain of the port, n*—as defined in Subpart 3.85 of 46 CFR.

3.1.5 *chlorine, n*—residual disinfectant or by-products associated with the use of chlorine or its compounds.

3.1.6 *coliform, n*—thermotolerant coliform bacteria which produces gas from lactose in 48 h at 44.5 °C.

3.1.7 *conventional pollutants, n*—the list of pollutants listed in 40 CFR 401.16.

3.1.8 *cruise vessel, n*—a passenger vessel as defined in section 2101(31) of Title 46, United States Code. The term does not include a vessel of the United States operated by the federal government or a vessel owned and operated by the government of a State.

3.1.9 *dilution, n*—process water added to the treatment system.

3.1.10 *discharge, n*—a release, however caused, from a vessel, and includes, any escape, disposal, spilling, leaking, pumping, emitting or emptying.

3.1.11 *effluent, n*—liquid containing sewage, graywater, or other wastes, whether treated or untreated, flowing out of the treatment system or holding tank usually to be discharged. See Fig. 1.

3.1.12 *environmental compliance records, n*—the Sewage and Graywater Discharge Record Book, all discharge reports, all discharge sampling test results, as well as any other records.

3.1.13 *graywater, n*—gallery, dishwasher, bath, and laundry waste water. The term does not include other wastes or waste streams.

3.1.14 *influent, n*—liquid containing sewage, graywater, or other wastes, whether treated or untreated, flowing into the treatment system or holding tank. See Fig. 1.

3.1.15 *minimally toxic, phosphate free and biodegradable soaps, cleaners and detergents, n*—properties of a substance or mixture of substances that:

(1) have an acute aquatic toxicity value corresponding to a concentration greater than 10 ppm (generally, the concentration required to kill 50 % of the test organisms must be greater than 10 mg/L);

(2) do not produce residuals with an LC50 less than 10 ppm;

(3) are "not bioaccumulative", as defined in the Vessel General Permit for Discharges Incidental to the Normal Operation of Vessels (VGP);

(4) do not cause the pH of the receiving water to go below 6.0 or above 9.0;

(5) contain, by weight, 0.5 % or less of phosphates or derivatives of phosphate; and

(6) are *biodegradable*.

3.1.16 *navigable waters, n*—has the same meaning as in section 502 of the Federal Water Pollution Control Act, as amended.

3.1.17 *priority pollutant, n*—the list of toxic pollutants listed in 40 CFR 401.15.

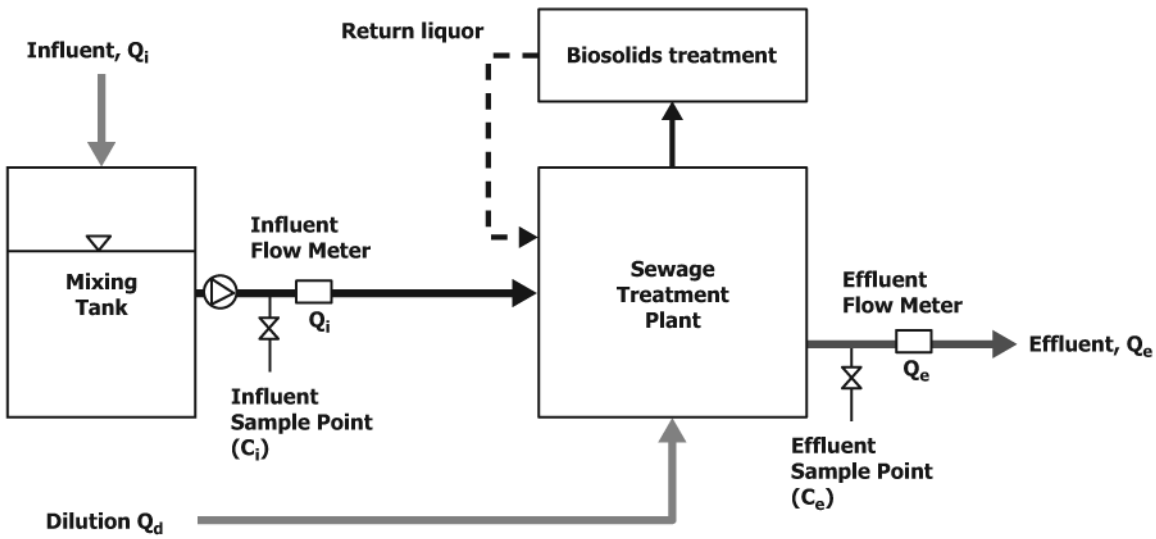

FIG. 1 System Diagram of a Sewage Treatment Plant