



TECHNICAL CIRCULAR No. 544 of 08th March 2019

To: All Surveyors/Auditors

Applicable to flag: All Flags

Sewage Chlorination Without De-chlorination

Reference: MARPOL An. IV

Sewage Chlorination Without De-chlorination

The approval regime has served well to safety equipment, but can the same be said when it comes to environmental technologies? Some publications suggested far reaching consequence of poorly enforced marine sewage rules.

There is an unanswered question: How can the approval assessment bodies have certified an impossible feature for sewage disinfection that they would not do for ballast water disinfection? Some may argue the existing sewage guidelines are vague and weak, but it is no excuse for the marine industry to be served with what is scientifically impossible.

Chlorination has been used to prevent the spread of waterborne diseases such as cholera, dysentery, and typhoid. As one of the greatest advances of the modern era, it has saved millions of lives. Today, despite concerns regarding disinfection by-products (DBP) and the advance of other disinfection technologies, such as UV, it continues to be commonly used, especially when a residual is required to control the risk of microbial re-growth.

Wastewater Chlorination

International shipping involves tens of thousands of ships drawing from and discharging into the sea. The sewage from ships includes that from onboard hospitals. The coliform limits set in the marine rules are more stringent than those for equivalent coastal wastewater discharges from land.

So, what does it take to reach the 100 counts/100ml limit specified in the MEPC.227(64) Guidelines? The effectiveness of chlorination depends on the wastewater quality, and the chlorine dosage that follows a time-concentration relationship. The removal of organics and particles from wastewater prior to disinfection is desirable if not essential. Other influential factors include the pH, the temperature, and the presence of ammonia, etc. Wastewater can contain more than 10⁶~10⁷ counts/100ml of faecal coliforms. Conventional treatment processes can achieve 90 percent, or a one log, reduction. But a further 99.9 percent ~99.99 percent removal, or 3~4 log-kill, is needed. To achieve this, a chlorine dosage of 5-20 mg/l is required with a chlorine contact time of 30 minutes.

De-chlorination

Since the 1970s, chlorine and other disinfectants have been found to form DBP that may be carcinogenic or harmful to the environment. Residual disinfectants themselves also cause harm to aquatic species. This has led to the adoption of a maximum residual chlorine target of 0.5 mg/l, as

*Customer Service Center
5201 Blue Lagoon Drive, 9TH. Floor,
Miami, Fl., 33126
Tel: 1 (305) 716 4116,
Fax: 1 (305) 716 4117,
E-Mail:*

joel@conarinagroup.com

*Technical Head Office
7111 Dekadine Ct.
Spring, Tx., 77379
Tel: 1 (832) 451 0185,
1 (713) 204 6380*

E-Mail: vbozenovici@vcmaritime.com

specified in MEPC.227(64). Although chlorine decays naturally, it takes many hours if not days. The contact time in a sewage treatment plant is typically less than 30 minutes at its designed peak flow capacity. A chlorine concentration of 5-20 mg/l will not drop below the 0.5 mg/l limit in such a short time without a de-chlorination step. De-chlorination is a must prior to discharge. Otherwise, it is impossible to satisfy both microbial and residual chlorine limits, no matter how well the plant is operated.

Non-conformity

However, de-chlorination is absent in some marine sewage treatment plants that use chlorination disinfection. The approval assessment bodies have accredited such equipment with IMO and MED certificates, based on "good laboratory results." Thus, they have certified impossibilities. These "magic boxes" contravene science. These are non-conformities, and they turn certificates into licenses to pollute.

Over the years, such "magic boxes" have found their way onto many ships, contributing to the poor performance status of the sewage treatment plants. They set the "bar," putting conforming technologies under "competitive" pressure by forcing them into a race towards the lowest levels of functionalities. Coliform concentrations in treated effluent have been found to exceed the limits by a long way across all kinds of disinfection technologies employed in marine sewage treatment plants. Ballast water management systems (BWMS), which perform less arduous disinfection duties than sewage treatment plants, may lend a useful reference. Chlorination-based BWMS have target chlorine concentrations ranging from 3 to 20 mg/l. Almost all of them incorporated de-chlorination prior to de-ballasting. Those that do not are subject to a certified minimum hold time of many days. The apparent inconsistencies between the approval processes of these two marine environmental products are hard to comprehend.

There is a lot at stake. It may be time for the IMO, its Member States, and the assigned approval assessment bodies to acknowledge this issue, to undertake transparent and timely reviews, to identify the root cause and to prevent such non-conformities from reoccurring.

REFERENCES:

- MARPOL Annex IV, MEPC. 227(64)

- ATTACHMENTS: No

Kindest Regards,
Val Bozenovici
Naval Architect – Conarina Technical Director

*Customer Service Center
5201 Blue Lagoon Drive, 9TH. Floor,
Miami, Fl., 33126
Tel: 1 (305) 716 4116,
Fax: 1 (305) 716 4117,
E-Mail:*

joel@conarinagroup.com

*Technical Head Office
7111 Dekadine Ct.
Spring, Tx., 77379
Tel: 1 (832) 451 0185,
1 (713) 204 6380*

E-Mail: vbozenovici@vcmaritime.com