HARMFUL AQUATIC ORGANISMS IN BALLAST WATER

Compatibility between ballast water management systems and ballast tank coatings

Submitted by the International Paint and Printing Ink Council (IPPIC)

SUMMARY

Executive summary: This document provides information about ongoing tests on representative epoxy coatings according to ISO 2812-2 with the aim of establishing a test protocol for ballast water management systems. The document proposes that the effect of some ballast water management systems need not be tested for their corrosivity as regards the ballast water tank coating. IPPIC also offers to provide coating expert opinions at any meeting or for any working group aiming to facilitate the development and approval of ballast water management systems.

Strategic direction: 7.1
High-level action: 7.1.2
Planned output: 7.1.2.4
Action to be taken: Paragraph 24
Related documents: DE 48/25; MEPC 53/24 and MEPC 59/2/16

Introduction

1 The International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 regulates discharges of ballast water and reduces the risk of introducing harmful aquatic organisms and pathogens through ships' ballast water and sediments.

2 The Convention will apply to all vessels active in international trade designed or constructed to carry ballast water. The Convention will apply to new vessels as well as to existing vessels by means of retrofit.

3 After the Convention enters into force, ships will be required to comply with the ballast water performance standard (regulation D-2). The exact timeline for compliance depends on ballast water capacity and construction date of each individual ship.
4 Meeting the ballast water performance standard will require installation of equipment
to treat ballast water (upon intake and/or discharge) in new buildings as well as in existing
vessels. In general, there are three different systems that have been developed which are
currently available: (i) mechanical systems, (ii) physical disinfection, and (iii) chemical
treatment. All of these systems will have some effect on the physical environment in the
ballast water tanks of vessels.

5 Ballast water tanks are critical areas for the safety of the vessel and
resolution MSC.215(82) requires reliable anti-corrosive protection by a suitable coating
system. It is paramount that the change in conditions caused by ballast water management
systems will not have a detrimental effect on the applied coating system.

6 The interaction between ballast water management systems and materials used in
ballast water tanks has been discussed at MEPC meetings. Nevertheless, coating
manufacturers are facing a number of questions surrounding these systems. This information
document has been written in order to provide background information on the matter from a
coating manufacturer's perspective. Furthermore, the document is providing information
about ongoing tests on representative epoxy coatings according to ISO 2812-2 with the aim
of establishing a test protocol. IPPIC is supporting that the effect of some ballast water
management systems need not be tested for their corrosivity as regards the ballast water
tank coating, and IPPIC also offers to provide coating expert opinions at any meeting or for
any working group aiming to facilitate the development and approval of ballast water
management systems.

Background

7 During the development of the Guidelines for uniform implementation of the
Ballast Water Management Convention, the interaction between ballast water management
systems and the coating system in the ballast water tanks has been discussed on several
occasions.

8 Decisions and recommendations on the issue are reflected in the following
IMO documents:

.1 DE 48/25 – 5 March 2005

12.4 The Sub-Committee agreed to advise the MEPC that
IMO procedures for the approval of Active Substances (G9), currently
under development, should take into account that the relevant
substances/chemicals are compatible with the coating system.

.2 MEPC 53/24 – 25 July 2005

2.4 The Committee endorsed the recommendation of DE 48 regarding
the compatibility between the coating systems and the Active Substances
used for ballast water management, and noted that this recommendation
was taken into account by the intersessional BWWG.
5.1 Recommendations for corrosion testing

5.1.1 The Group recommended that applicants should take account of the following points related to corrosivity testing:

1. testing should include uncoated substrates and marine epoxy coated steel (in accordance with IMO PSPC);

4. testing of coated substrates should be conducted using ISO 2812-2:2007;

5. testing should be conducted at intermittent exposure of the specimens at the maximum treatment concentration of the ballast water management system;

6. test duration should not be less than six months;

8. evaluation of coated materials based upon adhesion, blistering, rusting, cracking, flaking and delamination.

9. Based on these indications, we understand that the supplier of a ballast water management system should confirm that a specific system is compatible with the related coating systems. In order to get an approval the supplier should ensure that relevant testing has been performed. Evaluation of the testing and related test results is part of the approval process as done by IMO and the Administrations.

Concerns and recommendations

10. The rules imply that it is the responsibility of the manufacturer of the ballast water management system to confirm compatibility with the coating system. This is considered the reason why the marine coatings industry is more and more frequently approached by manufacturers of ballast water management systems, by shipowners and by shipyards for information about the possible effect of these systems on ballast tank coatings.

11. IPPIC appreciates that the marine industry is preparing itself for the flood of new and novel ballast water management systems. For this reason IPPIC believes that the ballast water treatment suppliers should perform appropriate testing during the development phase of their equipment. It is of concern to IPPIC that the MEPC has only given general guidelines for the ballast water treatment suppliers for compatibility tests with coatings. In order to give more clarity on potential effects it is imperative that test protocols are standardized, described, and thoroughly verified.

12. There are currently over 60 manufacturers selling a variety of systems (in various stages of their IMO and Administration approval). The different systems all create a specific physical or chemical environment in the ballast water tanks, the effect of which will require specialized knowledge. Such specialized knowledge on the various technologies and the capability to create their specific requirements under laboratory conditions must be provided by the manufacturers of the systems to support the timely installation and retrofitting of their systems to meet the timetable of the Convention.
13 IPPIC acknowledges that the GESAMP-BWWG is performing a detailed evaluation of the dossiers of the ballast water management system manufacturers. IPPIC recommends that the work of the GESAMP-BWWG include an intensified evaluation of compatibility testing between the systems and coatings as well as other materials.

14 There are a range of technologies used by ballast water management system manufacturers. IPPIC believes that the systems that only work on physical techniques (mechanical systems and physical disinfection, e.g. filtration, cyclonic separation, UV light, cavitation, deoxygenation) and the inclusion of these systems' by-products by way of free radicals, bromine, etc., in minute amounts, will not pose a significant safety risk to ballast water tank coating systems in accordance with IMO PSPC or epoxy coatings applied before the introduction of PSPC.

15 The systems that work with chemicals (such as electrolysis systems, chlorine dioxide, sodium hypochlorite, peroxyacetic acid or ozone) have a direct effect on organic material. Depending on the concentration and exact environment created there could be an impact on the coating system.

16 Based on current data available, IPPIC believes that any system solely using chlorine as an Active Substance in maximum concentrations up to 8 mg/L in treated water entering the ballast tanks does not pose a significant risk of having a detrimental effect on most coating systems. We believe this coincides with the position of the GESAMP-BWWG. Therefore, it is important that the system is installed, operated and maintained such that levels above are not generated. It is likely that with more experience over time this recommendation will evolve further.

17 In order to provide support to the industry, IPPIC has taken initiatives to explore a test method which can provide information on the compatibility of chemicals used by ballast water management systems with generic ballast water tank coating systems. The set-up follows the recommendations of MEPC on compatibility testing with coatings. The method has been widely used in the industry for chemical resistance testing for several decades. It is felt that with this type of test the boundaries can be identified within which related chemicals can be used without affecting the function of ballast water tank coatings currently used in the industry. The tests were initiated rather recently and no conclusions are available yet. However, IPPIC is available to explain the test set-up, and preliminary results may be available before MEPC 63.

18 For other systems working with different chemicals than active chlorine, it is the opinion of IPPIC that proper testing and evaluation must be carried out as part of the approval process whenever possible, according to the recommendations of the MEPC (ISO 2812-2) and aiming to define boundaries of acceptable concentration of Active Substances within which equipment manufacturers do not have to carry out additional testing of coatings.

19 In order to improve transparency of the compatibility of ballast water management systems and coatings it is important to standardize the required test method. It is advised that this standardized test method should be accepted by the MEPC, and evaluation of the results included in the approval process. With this information the marine industry will know exactly what testing has been performed and can be assured that the related ballast water management system is compatible with ballast water coating systems.
20. IPPIC would welcome the opportunity to work with and serve as a resource to the parties involved in test set-up and the development of suitable test methods. IPPIC offers to provide coating expert opinions at any meeting or for any working group aiming to facilitate the development and approval of ballast water management systems.

Conclusions

21. IPPIC finds that additional support by the coating manufacturers would benefit the Ballast Water Management Convention. Accordingly, IPPIC has already initiated tests to the effect of active chlorine in amounts exceeding 10 mg/L with the aim of having intermediate results for MEPC 63.

22. IPPIC recognizes that any system solely using chlorine as an Active Substance in maximum concentrations up to 8 mg/L in treated water entering the ballast tanks does not pose a significant risk of having a detrimental effect on most coating systems.

23. IPPIC is available to any party that requires more detailed information in relation to coatings used in ballast water tanks.

Action requested of the Committee

24. The Committee is invited to note the information contained in this document.