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BWM.2/Circ.34/Rev.13  
24 October 2024

**INTERNATIONAL CONVENTION FOR THE CONTROL AND MANAGEMENT OF SHIPS'  
BALLAST WATER AND SEDIMENTS, 2004**

**List of ballast water management systems that make use of Active Substances  
which received Basic and Final Approval**

- 1 The Ballast Water Management Convention (BWM Convention) provides in its regulation D-3.2 that ballast water management systems that make use of Active Substances to comply with the Convention shall be approved by IMO based on a procedure developed by the Organization. According to regulation A-1.7 of the same Convention, an active substance is a substance or organism, including a virus or a fungus, that has a general or specific action on or against harmful aquatic organisms and pathogens.
- 2 The Marine Environment Protection Committee (MEPC), at its fifty-third session (July 2005), adopted the *Procedure for approval of ballast water management systems that make use of Active Substances* (G9) by resolution MEPC.126(53). At the same session, MEPC agreed with the establishment of a technical group (GESAMP-Ballast Water Working Group) under the auspices of GESAMP,<sup>\*</sup> to evaluate such systems and advise the Committee accordingly.
- 3 MEPC 57 (April 2008) adopted resolution MEPC.169(57), which revokes resolution MEPC.126(53) and contains the revised *Procedure for approval of ballast water management systems that make use of Active Substances* (G9).
- 4 Section 8 of Procedure (G9) sets out the methodology to be followed for the two-tier approval of ballast water management systems that make use of Active Substances and requests IMO to record the Basic and Final Approvals and to circulate the list once a year.
- 5 Following the consideration of the relevant reports of the GESAMP-BWWG, the Committee, at its eighty-first and eighty-second sessions (March and October 2024, respectively) granted one Basic Approval and one Final Approval to ballast water management systems that make use of Active Substances. The annexes to this circular contain relevant information on the ballast water management systems that received Basic and Final Approval from March 2006 until October 2024.
- 6 Information regarding the systems that received type approval certification can be found on the IMO website at <https://www.imo.org/en/OurWork/Environment/Pages/BWMTechnologies.aspx>
- 7 Member Governments are invited to bring this circular to the attention of all the parties concerned.
- 8 This circular supersedes BWM.2/Circ.34/Rev.12.

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\* GESAMP stands for IMO/FAO/UNESCO-IOC/WMO/IAEA/UN/UNDP/UN Environment/UNIDO/ISA Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection.

**ANNEX 1**

**LIST OF BALLAST WATER MANAGEMENT SYSTEMS THAT MAKE USE OF ACTIVE SUBSTANCES WHICH RECEIVED BASIC APPROVAL IN ACCORDANCE WITH PROCEDURE (G9)**

| Name of the system and MEPC document related to the proposal for Basic Approval   | Name of manufacturer  | Relevant GESAMP-Ballast Water Working Group report | Date of Basic Approval    | Specifications  |
|---|---|--|---------------------------|---|
| 1. Peraclean® Ocean (subsequently changed to SEDNA® Ballast Water Management System (using Peraclean® Ocean))<br><br>MEPC 53/2/12 (Germany) | Degussa GmbH, Germany   | MEPC 54/2/12, annex 5                              | 24 March 2006 (MEPC 54)   | Flag State Administration was invited to authorize onboard testing only when the concerns identified in annex 5 of the report of the first meeting of the GESAMP-BWWG (MEPC 54/2/12) had been addressed to its complete satisfaction. |
| 2. Electro-Clean (electrolytic disinfection) system (subsequently changed to Electro-Cleen™)<br><br>MEPC 54/2/3 (Republic of Korea)         | Techcross Ltd. and Korea Ocean Research and Development Institute (KORDI) | MEPC 54/2/12, annex 6                              | 24 March 2006 (MEPC 54)   | Flag State Administration was invited to authorize onboard testing only when the concerns identified in annex 6 of the report of the first meeting of the GESAMP-BWWG (MEPC 54/2/12) had been addressed to its complete satisfaction. |
| 3. Special Pipe Ballast Water Management System (combined with Ozone treatment)<br><br>MEPC 55/2 (Japan)                                    | Japan Association of Marine Safety (JAMS)                                 | MEPC 55/2/16, annex 5                              | 13 October 2006 (MEPC 55) | Flag State Administration was invited to take into account all the recommendations indicated in annex 5 of the report of the second meeting of the GESAMP-BWWG (MEPC 55/2/16) during further development of the system.               |
| 4. EctoSys™ electrochemical system<br><br>MEPC 55/2/4 (Sweden)  | Permascand AB, Sweden, subsequently acquired by RWO GmbH, Germany         | MEPC 55/2/16, annex 7                              | 13 October 2006 (MEPC 55) | Flag State Administration was invited to take into account all the recommendations indicated in annex 7 of the report of the second meeting of the GESAMP-BWWG (MEPC 55/2/16) during further development of the system.               |
| 5. PureBallast System<br><br>MEPC 55/2/5 (Sweden)   | Alfa Laval/Wallenius Water AB   | MEPC 56/2/2, annex 5                               | 13 July 2007 (MEPC 56)    | Not applicable.   |

| Name of the system and MEPC document related to the proposal for Basic Approval   | Name of manufacturer   | Relevant GESAMP-Ballast Water Working Group report | Date of Basic Approval           | Specifications  |
|---|--|--|----------------------------------|---|
| <p>6. NK Ballast Water Treatment System (subsequently changed to NK-O3 BlueBallast System (Ozone), subsequently changed to NK-O3 BlueBallast II Plus)</p> <p>MEPC 55/2/3 and MEPC 55/2/27 (Republic of Korea)</p> | <p>NK Company Ltd., Republic of Korea</p>  | <p>MEPC 56/2/2, annex 6</p>                        | <p>13 July 2007 (MEPC 56)</p>    | <p>Flag State Administration was invited to take into account all the recommendations indicated in annex 6 of the report of the third meeting of the GESAMP-BWWG (MEPC 56/2/2) during further development of the system.</p>        |
| <p>7. Hitachi Ballast Water Purification System (ClearBallast)</p> <p>MEPC 57/2/2 (Japan)</p>   | <p>Hitachi, Ltd./Hitachi Plant Technologies, Ltd.</p>                                    | <p>MEPC 57/2, annex 5</p>                          | <p>4 April 2008 (MEPC 57)</p>    | <p>Flag State Administration was invited to take into account all the recommendations indicated in annex 5 of the report of the fourth meeting of the GESAMP-BWWG (MEPC 57/2) during further development of the system.</p>         |
| <p>8. Resource Ballast Technologies System</p> <p>MEPC 56/2/3 (South Africa)</p>  | <p>Resource Ballast Technologies (Pty) Ltd.</p>  | <p>MEPC 57/2/10, annex 5</p>                       | <p>4 April 2008 (MEPC 57)</p>    | <p>Flag State Administration was invited to take into account all the recommendations indicated in annex 5 of the report of the fifth meeting of the GESAMP-BWWG Group (MEPC 57/2/10) during further development of the system.</p> |
| <p>9. GloEn-Patrol™ Ballast Water Management System</p> <p>MEPC 57/2/4 (Republic of Korea)</p>  | <p>Panasia Co., Ltd.</p>   | <p>MEPC 57/2/10, annex 6</p>                       | <p>4 April 2008 (MEPC 57)</p>    | <p>Flag State Administration was invited to take into account all the recommendations indicated in annex 6 of the report of the fifth meeting of the GESAMP-BWWG (MEPC 57/2/10) during further development of the system.</p>       |
| <p>10. OceanSaver® Ballast Water Management System</p> <p>MEPC 57/2/6 (Norway)</p>  | <p>MetaFil AS (subsequently changed to OceanSaver AS)</p>                                | <p>MEPC 57/2/10, annex 8</p>                       | <p>4 April 2008 (MEPC 57)</p>    | <p>Flag State Administration was invited to take into account all the recommendations indicated in annex 8 of the report of the fifth meeting of the GESAMP-BWWG (MEPC 57/2/10) during further development of the system.</p>       |
| <p>11. TG Ballastcleaner and TG Environmentalguard System (subsequently changed to JFE BallastAce® Ballast Water Management System)</p> <p>MEPC 57/2/8 (Japan)</p>  | <p>The Toagosei Group (TG Corporation, Toagosei Co. Ltd. and Tsurumi Soda Co., Ltd.)</p> | <p>MEPC 58/2/7, annex 5</p>                        | <p>10 October 2008 (MEPC 58)</p> | <p>Flag State Administration was invited to take into account all the recommendations indicated in annex 5 of the report of the sixth meeting of the GESAMP-BWWG (MEPC 58/2/7) during further development of the system.</p>        |

| Name of the system and MEPC document related to the proposal for Basic Approval   | Name of manufacturer   | Relevant GESAMP-Ballast Water Working Group report | Date of Basic Approval    | Specifications  |
|---|--|--|---------------------------|---|
| 12. Greenship Sedinox Ballast Water Management System<br><br>MEPC 57/2/7 (Netherlands)  | Greenship Ltd.   | MEPC 58/2/7, annex 6                               | 10 October 2008 (MEPC 58) | Flag State Administration was invited to take into account all the recommendations indicated in annex 6 of the report of the sixth meeting of the GESAMP-BWWG (MEPC 58/2/7) during further development of the system.     |
| 13. Ecochlor® Ballast Water Treatment System<br><br>MEPC 58/2/2 (Germany)   | Ecochlor, INC, Acton (USA)   | MEPC 58/2/8, annex 5                               | 10 October 2008 (MEPC 58) | Flag State Administration was invited to take into account all the recommendations indicated in annex 5 of the report of the seventh meeting of the GESAMP-BWWG (MEPC 58/2/8) during further development of the system.   |
| 14. Blue Ocean Shield Ballast Water Management System<br><br>MEPC 59/2/2 (China)  | China Ocean Shipping (Group) Company (COSCO)                                       | MEPC 59/2/16, annex 7                              | 17 July 2009 (MEPC 59)    | Flag State Administration was invited to take into account all the recommendations indicated in annex 7 of the report of the eighth meeting of the GESAMP-BWWG (MEPC 59/2/16) during further development of the system.   |
| 15. Hyundai Heavy Industries Co., Ltd. (HHI) Ballast Water Management System (EcoBallast)<br><br>MEPC 59/2/4 (Republic of Korea)        | Hyundai Heavy Industries Co., Ltd., Republic of Korea                              | MEPC 59/2/16, annex 8                              | 17 July 2009 (MEPC 59)    | Flag State Administration was invited to take into account all the recommendations indicated in annex 8 of the report of the eighth meeting of the GESAMP-BWWG (MEPC 59/2/16) during further development of the system.   |
| 16. AquaTriComb™ Ballast Water Treatment System<br><br>MEPC 59/2/8 (Germany)  | Aquaworx ATC GmbH  | MEPC 59/2/19, annex 6                              | 17 July 2009 (MEPC 59)    | Flag State Administration was invited to take into account all the recommendations indicated in annex 6 of the report of the ninth meeting of the GESAMP-BWWG (MEPC 59/2/19) during further development of the system.    |
| 17. SiCURE™ Ballast Water Management System (subsequently changed to SeaCURE® BWMS)<br><br>MEPC 59/2/11 (Germany)                       | Siemens Water Technologies (subsequently changed to Evoqua Water Technologies Ltd) | MEPC 60/2/11, annex 6                              | 26 March 2010 (MEPC 60)   | Flag State Administration was invited to take into account all the recommendations indicated in annex 6 of the report of the tenth meeting of the GESAMP-BWWG (MEPC 60/2/11) during further development of the system.    |
| 18. Sunrui Ballast Water Management System (subsequently changed to BalClor Ballast Water Management System)<br><br>MEPC 60/2/3 (China) | Qingdao Sunrui Corrosion and Fouling Control Company                               | MEPC 60/2/12, annex 6                              | 26 March 2010 (MEPC 60)   | Flag State Administration was invited to take into account all the recommendations indicated in annex 6 of the report of the eleventh meeting of the GESAMP-BWWG (MEPC 60/2/12) during further development of the system. |

| Name of the system and MEPC document related to the proposal for Basic Approval  | Name of manufacturer                                  | Relevant GESAMP-Ballast Water Working Group report | Date of Basic Approval  | Specifications  |
|--|---|--|-------------------------|---|
| 19. DESMI Ocean Guard Ballast Water Management System<br><br>MEPC 60/2/4 (Denmark)   | DESMI Ocean Guard A/S                                 | MEPC 60/2/12, annex 7                              | 26 March 2010 (MEPC 60) | Flag State Administration was invited to take into account all the recommendations indicated in annex 7 of the report of the eleventh meeting of the GESAMP-BWWG (MEPC 60/2/12) during further development of the system. |
| 20. Blue Ocean Guardian Ballast Water Management System (subsequently changed to "ARA Ballast" Ballast Water Management System)<br><br>MEPC 60/2/5 (Republic of Korea) | 21st Century Shipbuilding Co., Ltd.                   | MEPC 60/2/12, annex 8                              | 26 March 2010 (MEPC 60) | Flag State Administration was invited to take into account all the recommendations indicated in annex 8 of the report of the eleventh meeting of the GESAMP-BWWG (MEPC 60/2/12) during further development of the system. |
| 21. HiBallast™ (Hyundai Heavy Industries Co., Ltd. (HHI) Ballast Water Management System (HiBallast))<br><br>MEPC 60/2/6 (Republic of Korea)                           | Hyundai Heavy Industries Co., Ltd., Republic of Korea | MEPC 60/2/16, annex 4                              | 26 March 2010 (MEPC 60) | Flag State Administration was invited to take into account all the recommendations indicated in annex 4 of the report of the twelfth meeting of the GESAMP-BWWG (MEPC 60/2/16) during further development of the system.  |
| 22. Kwang San Co., Ltd. (KS) Ballast Water Management System "En-Ballast"<br><br>MEPC 60/2/7 (Republic of Korea)   | Kwang San Co., Ltd.                                   | MEPC 60/2/16, annex 5                              | 26 March 2010 (MEPC 60) | Flag State Administration was invited to take into account all the recommendations indicated in annex 5 of the report of the twelfth meeting of the GESAMP-BWWG (MEPC 60/2/16) during further development of the system.  |
| 23. OceanGuard™ Ballast Water Management System<br><br>MEPC 60/2/8 (Norway)  | Qingdao Headway Technology Co., Ltd.                  | MEPC 60/2/16, annex 6                              | 26 March 2010 (MEPC 60) | Flag State Administration was invited to take into account all the recommendations indicated in annex 6 of the report of the twelfth meeting of the GESAMP-BWWG (MEPC 60/2/16) during further development of the system.  |

| Name of the system and MEPC document related to the proposal for Basic Approval  | Name of manufacturer  | Relevant GESAMP-Ballast Water Working Group report | Date of Basic Approval   | Specifications  |
|--|---|--|--------------------------|---|
| 24. Severn Trent De Nora BalPure® Ballast Water Management System (subsequently changed to BalPure® BP-500, subsequently changed to BALPURE®)<br><br>MEPC 60/2/9 (Germany)           | Severn Trent De Nora (STDN), LLC subsequently changed to De Nora Water Technologies (DNWT)) | MEPC 60/2/16, annex 7                              | 26 March 2010 (MEPC 60)  | Flag State Administration was invited to take into account all the recommendations indicated in annex 7 of the report of the twelfth meeting of the GESAMP-BWWG (MEPC 60/2/16) during further development of the system.    |
| 25. Techwin Eco Co., Ltd. (TWECO) Ballast Water Management System (Purimar) (subsequently changed to Purimar™)<br><br>MEPC 61/2 (Republic of Korea)                                  | Techwin Eco Co., Ltd.   | MEPC 61/2/15, annex 4                              | 1 October 2010 (MEPC 61) | Flag State Administration was invited to take into account all the recommendations indicated in annex 4 of the report of the thirteenth meeting of the GESAMP-BWWG (MEPC 61/2/15) during further development of the system. |
| 26. AquaStar Ballast Water Management System (subsequently changed to AquaStar™ BWMS, MACGREGOR WATER BALLAST TREATMENT SYSTEM and AQUASTAR™)<br><br>MEPC 61/2/1 (Republic of Korea) | AQUA Eng. Co., Ltd.   | MEPC 61/2/15, annex 5                              | 1 October 2010 (MEPC 61) | Flag State Administration was invited to take into account all the recommendations indicated in annex 5 of the report of the thirteenth meeting of the GESAMP-BWWG (MEPC 61/2/15) during further development of the system. |
| 27. Kuraray Ballast Water Management System (subsequently changed to MICROFADE™ Ballast Water Management System)<br><br>MEPC 61/2/6 (Japan)  | Kuraray Co., Ltd.   | MEPC 61/2/21, annex 4                              | 1 October 2010 (MEPC 61) | Flag State Administration was invited to take into account all the recommendations indicated in annex 4 of the report of the fourteenth meeting of the GESAMP-BWWG (MEPC 61/2/21) during further development of the system. |
| 28. ERMA FIRST Ballast Water Management System (subsequently changed to ERMA FIRST BWTS)<br><br>MEPC 61/2/11 (Greece)  | ERMA FIRST ESK ENGINEERING SOLUTIONS S.A.   | MEPC 62/2/11, annex 5                              | 15 July 2011 (MEPC 62)   | Flag State Administration was invited to take into account all the recommendations indicated in annex 5 of the report of the fifteenth meeting of the GESAMP-BWWG (MEPC 62/2/11) during further development of the system.  |

| Name of the system and MEPC document related to the proposal for Basic Approval                | Name of manufacturer                 | Relevant GESAMP-Ballast Water Working Group report | Date of Basic Approval | Specifications  |
|--|--------------------------------------|--|------------------------|---|
| 29. BlueSeas Ballast Water Management System<br><br>MEPC 61/2/12 (Singapore)                   | Envirotech and Consultancy Pte. Ltd. | MEPC 62/2/11, annex 6                              | 15 July 2011 (MEPC 62) | Flag State Administration was invited to take into account all the recommendations indicated in annex 6 of the report of the fifteenth meeting of the GESAMP-BWWG (MEPC 62/2/11) during further development of the system.  |
| 30. SKY-SYSTEM® with Peraclean® Ocean Ballast Water Management System<br><br>MEPC 62/2 (Japan) | Katayama Chemical, Inc.              | MEPC 62/2/12, annex 4                              | 15 July 2011 (MEPC 62) | Flag State Administration was invited to take into account all the recommendations indicated in annex 4 of the report of the sixteenth meeting of the GESAMP-BWWG (MEPC 62/2/12) during further development of the system.  |
| 31. JFE BallastAce® that makes use of NEO-CHLOR MARINE®<br><br>MEPC 62/2/1 (Japan)             | JFE Engineering Corporation          | MEPC 62/2/12, annex 5                              | 15 July 2011 (MEPC 62) | Flag State Administration was invited to take into account all the recommendations indicated in annex 5 of the report of the sixteenth meeting of the GESAMP-BWWG (MEPC 62/2/12) during further development of the system.  |
| 32. BallastMaster Ballast Water Management System<br><br>MEPC 62/2/2 (Germany)                 | GEA Westfalia Separator Systems GmbH | MEPC 62/2/12, annex 6                              | 15 July 2011 (MEPC 62) | Flag State Administration was invited to take into account all the recommendations indicated in annex 6 of the report of the sixteenth meeting of the GESAMP-BWWG (MEPC 62/2/12) during further development of the system.  |
| 33. BlueWorld Ballast Water Management System<br><br>MEPC 62/2/3 (Singapore)                   | Envirotech and Consultancy Pte. Ltd. | MEPC 62/2/12, annex 7                              | 15 July 2011 (MEPC 62) | Flag State Administration was invited to take into account all the recommendations indicated in annex 7 of the report of the sixteenth meeting of the GESAMP-BWWG (MEPC 62/2/12) during further development of the system.  |
| 34. Neo-Purimar™ Ballast Water Management System<br><br>MEPC 62/2/7 (Republic of Korea)        | SAMSUNG HEAVY INDUSTRIES Co., Ltd.   | MEPC 62/2/18, annex 7                              | 15 July 2011 (MEPC 62) | Flag State Administration was invited to take into account all the recommendations indicated in annex 7 of the report of the sixteenth meeting of the GESAMP-BWWG (MEPC 62/2/18) during further development of the system.  |
| 35. "Smart Ballast" Ballast Water Management System<br><br>MEPC 62/2/8 (Republic of Korea)     | STX Metal Co., Ltd.                  | MEPC 63/2/10, annex 4                              | 2 March 2012 (MEPC 63) | Flag State Administration was invited to take into account all the recommendations indicated in annex 4 of the report of the eighteenth meeting of the GESAMP-BWWG (MEPC 63/2/10) during further development of the system. |
| 36. DMU ·OH Ballast Water Management System<br><br>MEPC 63/2 (China)                           | Dalian Maritime University           | MEPC 63/2/11, annex 4                              | 2 March 2012 (MEPC 63) | Flag State Administration was invited to take into account all the recommendations indicated in annex 4 of the report of the nineteenth meeting of the GESAMP-BWWG (MEPC 63/2/11) during further development of the system. |

| Name of the system and MEPC document related to the proposal for Basic Approval            | Name of manufacturer                                       | Relevant GESAMP-Ballast Water Working Group report | Date of Basic Approval      | Specifications  |
|--|--|--|-----------------------------|---|
| 37. EcoGuardian™ Ballast Water Management System<br><br>MEPC 63/2/4<br>(Republic of Korea) | Hanla IMS Co., Ltd.  | MEPC 63/2/21,<br>annex 4                           | 2 March 2012<br>(MEPC 63)   | Flag State Administration was invited to take into account all the recommendations indicated in annex 4 of the report of the twentieth meeting of the GESAMP-BWWG (MEPC 63/2/21) during further development of the system.    |
| 38. KTM-Ballast Water Management System<br><br>MEPC 63/2/8<br>(Republic of Korea)          | Korea Top Marine (KT Marine) Co., Ltd.                     | MEPC 64/2/6,<br>annex 5                            | 5 October 2012<br>(MEPC 64) | Flag State Administration was invited to take into account all the recommendations indicated in annex 5 of the report of the twenty-first meeting of the GESAMP-BWWG (MEPC 64/2/6) during further development of the system.  |
| 39. Hamworthy Aquarius™-EC BWMS<br><br>MEPC 63/2/9<br>(Netherlands)                        | Hamworthy Water Systems Ltd.                               | MEPC 64/2/6,<br>annex 6                            | 5 October 2012<br>(MEPC 64) | Flag State Administration was invited to take into account all the recommendations indicated in annex 6 of the report of the twenty-first meeting of the GESAMP-BWWG (MEPC 64/2/6) during further development of the system.  |
| 40. OceanDoctor Ballast Water Management System<br><br>MEPC 64/2 (China)                   | Jiujiang Precision Measuring Technology Research Institute | MEPC 64/2/7,<br>annex 4                            | 5 October 2012<br>(MEPC 64) | Flag State Administration was invited to take into account all the recommendations indicated in annex 4 of the report of the twenty-second meeting of the GESAMP-BWWG (MEPC 64/2/7) during further development of the system. |
| 41. HS-BALLAST Ballast Water Management System<br><br>MEPC 64/2/3<br>(Republic of Korea)   | HWASEUNG R&A Co., Ltd.                                     | MEPC 64/2/19,<br>annex 4                           | 5 October 2012<br>(MEPC 64) | Flag State Administration was invited to take into account all the recommendations indicated in annex 4 of the report of the twenty-third meeting of the GESAMP-BWWG (MEPC 64/2/19) during further development of the system. |
| 42. GloEn-Saver™ Ballast Water Management System<br><br>MEPC 64/2/4<br>(Republic of Korea) | PANASIA Co., Ltd.  | MEPC 64/2/19,<br>annex 5                           | 5 October 2012<br>(MEPC 64) | Flag State Administration was invited to take into account all the recommendations indicated in annex 5 of the report of the twenty-third meeting of the GESAMP-BWWG (MEPC 64/2/19) during further development of the system. |
| 43. Van Oord Ballast Water Management System<br><br>MEPC 65/2/2<br>(Netherlands)           | Van Oord B.V.  | MEPC 65/2/9,<br>annex 6                            | 17 May 2013<br>(MEPC 65)    | Flag State Administration was invited to take into account all the limitations indicated in annex 6 of the report of the twenty-fourth meeting of the GESAMP-BWWG (MEPC 65/2/9) during further development of the system.     |



| Name of the system and MEPC document related to the proposal for Basic Approval                         | Name of manufacturer  | Relevant GESAMP-Ballast Water Working Group report | Date of Basic Approval    | Specifications  |
|---|---|--|---------------------------|---|
| 44. REDOX AS Ballast Water Management System<br><br>MEPC 65/2/3 (Norway)                                | REDOX Maritime Technologies AS  | MEPC 65/2/19, annex 4                              | 17 May 2013 (MEPC 65)     | Flag State Administration was invited to take into account all the recommendations indicated in annex 4 of the report of the twenty-fifth meeting of the GESAMP-BWWG (MEPC 65/2/19) during further development of the system.   |
| 45. Blue Zone™ Ballast Water Management System<br><br>MEPC 65/2/5 (the Republic of Korea)               | SUNBO INDUSTRIES Co., Ltd., DSEC Co., Ltd., and the Korean Institute of Machinery & Material (KIMM) | MEPC 65/2/19, annex 6                              | 17 May 2013 (MEPC 65)     | Flag State Administration was invited to take into account all the recommendations indicated in annex 6 of the report of the twenty-fifth meeting of the GESAMP-BWWG (MEPC 65/2/19) during further development of the system.   |
| 46. ECOLCELL BTs Ballast Water Management System<br><br>MEPC 66/2/1 (Italy)                             | Azienda Chimica Genovese  | MEPC 66/2/7, annex 5                               | 4 April 2014 (MEPC 66)    | Flag State Administration was invited to take into account all the recommendations indicated in annex 5 of the report of the twenty-sixth meeting of the GESAMP-BWWG (MEPC 66/2/7) during further development of the system.    |
| 47. ATPS-BLUE <sub>sys</sub> Ballast Water Management System<br><br>MEPC 66/2/2 (Japan)                 | Panasonic Environmental Systems & Engineering Co., Ltd.   | MEPC 66/2/7, annex 6                               | 4 April 2014 (MEPC 66)    | Flag State Administration was invited to take into account all the recommendations indicated in annex 6 of the report of the twenty-sixth meeting of the GESAMP-BWWG (MEPC 66/2/7) during further development of the system.    |
| 48. Ecomarine-EC Ballast Water Management System<br><br>MEPC 66/2/3 (Japan)                             | Ecomarine Technology Research Association   | MEPC 66/2/7, annex 7                               | 4 April 2014 (MEPC 66)    | Flag State Administration was invited to take into account all the recommendations indicated in annex 7 of the report of the twenty-sixth meeting of the GESAMP-BWWG (MEPC 66/2/7) during further development of the system.    |
| 49. KURITA™ Ballast Water Management System (subsequently changed to Senza BWMS)<br>MEPC 66/2/4 (Japan) | Kurita Water Industries Ltd.  | MEPC 66/2/10, annex 4                              | 4 April 2014 (MEPC 66)    | Flag State Administration was invited to take into account all the recommendations indicated in annex 4 of the report of the twenty-seventh meeting of the GESAMP-BWWG (MEPC 66/2/10) during further development of the system. |
| 50. ElysisGuard Ballast Water Management System<br><br>MEPC 67/2/3 (Singapore)                          | KALF Engineering Pte. Ltd.  | MEPC 67/2/9, annex 4                               | 17 October 2014 (MEPC 67) | Flag State Administration was invited to take into account all the recommendations indicated in annex 4 of the report of the twenty-ninth meeting of the GESAMP-BWWG (MEPC 67/2/9) during further development of the system.    |
| 51. NK-CI BlueBallast System<br><br>MEPC 68/2 (Republic of Korea)                                       | NK Company Ltd.   | MEPC 68/2/10, annex 4                              | 15 May 2015 (MEPC 68)     | Flag State Administration was invited to take into account all the recommendations indicated in annex 4 of the report of the thirtieth meeting of the GESAMP-BWWG (MEPC 68/2/10) during further development of the system.      |

| Name of the system and MEPC document related to the proposal for Basic Approval                  | Name of manufacturer  | Relevant GESAMP-Ballast Water Working Group report | Date of Basic Approval       | Specifications  |
|--|---|--|------------------------------|---|
| 52. ECS HYCHLOR™ System<br><br>MEPC 68/2/1<br>(Republic of Korea)                                | TECHCROSS Inc.  | MEPC 68/2/10,<br>annex 5                           | 15 May 2015<br>(MEPC 68)     | Flag State Administration was invited to take into account all the recommendations indicated in annex 5 of the report of the thirtieth meeting of the GESAMP-BWWG (MEPC 68/2/10) during further development of the system.    |
| 53. ECS HYCHEM™ System<br><br>MEPC 68/2/2<br>(Republic of Korea)                                 | TECHCROSS Inc.  | MEPC 68/2/10,<br>annex 6                           | 15 May 2015<br>(MEPC 68)     | Flag State Administration was invited to take into account all the recommendations indicated in annex 6 of the report of the thirtieth meeting of the GESAMP-BWWG (MEPC 68/2/10) during further development of the system.    |
| 54. ECS HYBRID™ System<br><br>MEPC 68/2/3<br>(Republic of Korea)                                 | TECHCROSS Inc.  | MEPC 68/2/10,<br>annex 7                           | 15 May 2015<br>(MEPC 68)     | Flag State Administration was invited to take into account all the recommendations indicated in annex 7 of the report of the thirtieth meeting of the GESAMP-BWWG (MEPC 68/2/10) during further development of the system.    |
| 55. VARUNA Ballast Water Treatment System<br><br>MEPC 68/2/6 (Singapore)                         | Kadalneer Technologies Pte. Ltd.  | MEPC 68/2/21,<br>annex 6                           | 15 May 2015<br>(MEPC 68)     | Flag State Administration was invited to take into account all the recommendations indicated in annex 6 of the report of the thirty-first meeting of the GESAMP-BWWG (MEPC 68/2/21) during further development of the system. |
| 56. ClearBal BWMS<br><br>MEPC 70/4 (Denmark)   | University of Strathclyde   | MEPC 70/4/6,<br>annex 4                            | 28 October 2016<br>(MEPC 70) | Flag State Administration was invited to take into account all the recommendations indicated in annex 4 of the report of the thirty-third meeting of the GESAMP-BWWG (MEPC 70/4/6) during further development of the system.  |
| 57. MICROFADE II Ballast Water Management System<br><br>MEPC 71/4 (Netherlands)                  | Kashiwa Co., Ltd. and Kuraray Co., Ltd.                                 | MEPC 71/4/3,<br>annex 4                            | 7 July 2017<br>(MEPC 71)     | Flag State Administration was invited to take into account all the recommendations indicated in annex 4 of the report of the thirty-fourth meeting of the GESAMP-BWWG (MEPC 71/4/3) during further development of the system. |
| 58. Envirocleanse inTank™ BWTS (subsequently changed to inTank BWTS)<br><br>MEPC 71/4/2 (Norway) | Envirocleanse, LLC (ownership subsequently transferred to Scienco/FAST) | MEPC 71/4/3,<br>annex 6                            | 7 July 2017<br>(MEPC 71)     | Flag State Administration was invited to take into account all the recommendations indicated in annex 6 of the report of the thirty-fourth meeting of the GESAMP-BWWG (MEPC 71/4/3) during further development of the system. |
| 59. BIOBALLAST 1000<br><br>MEPC 73/4 (Germany)   | Biomarine S.r.l.  | MEPC 73/4/2,<br>annex 4                            | 26 October 2018<br>(MEPC 73) | Flag State Administration was invited to take into account all the recommendations indicated in annex 4 of the report of the thirty-sixth meeting of the GESAMP-BWWG (MEPC 73/4/2) during further development of the system.  |

| Name of the system and MEPC document related to the proposal for Basic Approval | Name of manufacturer                          | Relevant GESAMP-Ballast Water Working Group report | Date of Basic Approval        | Specifications   |
|---|---|--|-------------------------------|--|
| 60. CleanBallast® - Ocean Barrier System<br>MEPC 74/4/1 (Norway)                | Veolia Water Technologies<br>Deutschland GmbH | MEPC 74/4/6,<br>annex 5                            | 17 May 2019<br>(MEPC 74)      | Flag State Administration was invited to take into account all the recommendations indicated in annex 5 of the report of the thirty-seventh meeting of the GESAMP-BWWG (MEPC 74/4/6) during further development of the system. |
| 61. FlowSafe<br>MEPC 74/4/5 (Cyprus)  | Flowater Technologies Ltd.                    | MEPC 74/4/9,<br>annex 5                            | 17 May 2019<br>(MEPC 74)      | Flag State Administration was invited to take into account all the recommendations indicated in annex 5 of the report of the thirty-eighth meeting of the GESAMP-BWWG (MEPC 74/4/9) during further development of the system.  |
| 62. RADClean® BWMS<br>MEPC 77/4 (Islamic Republic of Iran)                      | Rahavaran Ayandeh Darya Company, RAD Co.      | MEPC 77/4/4,<br>annex 5                            | 26 November 2021<br>(MEPC 77) | Flag State Administration was invited to take into account all the recommendations indicated in annex 5 of the report of the forty-first meeting of the GESAMP-BWWG (MEPC 77/4/4) during further development of the system.    |
| 63. HiBallast 2.0™ BWMS<br>MEPC 80/4/3 (Republic of Korea)                      | Hyundai Heavy Industries (HHI)                | MEPC 80/4/9,<br>annex 6                            | 7 July 2023<br>(MEPC 80)      | Flag State Administration was invited to take into account all the recommendations indicated in annex 6 of the report of the forty-third meeting of the GESAMP-BWWG (MEPC 80/4/9) during further development of the system.    |
| 64. ERMA FIRST FLOW<br>MEPC 81/4 (Denmark)                                      | ERMA FIRST ESK Engineering Solutions SA       | MEPC 81/4/1,<br>annex 4                            | 22 March 2024<br>(MEPC 81)    | Flag State Administration was invited to take into account all the recommendations indicated in annex 4 of the report of the forty-fourth meeting of the GESAMP-BWWG (MEPC 81/4/1) during further development of the system.   |

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**ANNEX 2**

**LIST OF BALLAST WATER MANAGEMENT SYSTEMS THAT MAKE USE OF ACTIVE SUBSTANCES WHICH RECEIVED FINAL APPROVAL IN ACCORDANCE WITH PROCEDURE (G9)**

| Name of the system and MEPC document related to the proposal for Final Approval                               | Name of manufacturer   | Relevant GESAMP-Ballast Water Working Group report     | Date of Final Approval  | Specifications  | Remarks   |
|---|--|--|---|---|---|
| 1. PureBallast System<br><br>MEPC 56/2/1<br>(Norway)  | Alfa Laval/<br>Wallenius Water<br>AB   | MEPC 56/2/2,<br>annex 5                                | 13 July 2007<br>(MEPC 56)   | Flag State Administration was invited to verify that the concerns raised in annex 5 of the report of the third meeting of the GESAMP-BWWG (MEPC 56/2/2) with regard to ship and crew safety have been fully addressed prior to the issuance of Type Approval certificate. | Type Approved by Norway<br>June 2008  |
| 2. SEDNA®<br>Ballast Water Management System<br>(Using Peraclean® Ocean)<br><br>MEPC 57/2/5<br>(Germany)      | Degussa GmbH,<br>Germany   | MEPC 57/2/10,<br>annex 7                               | 4 April 2008<br>(MEPC 57)   | Flag State Administration was invited to take into account all the recommendations contained in annex 7 of the report of the fifth meeting of the GESAMP-BWWG (MEPC 57/2/10) prior to the issuance of Type Approval Certificate.  | Type Approved by Germany<br>10 June 2008  |
| 3. Electro-Cleen™<br>System<br><br>MEPC 58/2<br>(Republic of Korea)<br><br>MEPC 75/4/2<br>(Republic of Korea) | Techcross Ltd.<br>and Korea Ocean Research and Development Institute (KORDI) | MEPC 58/2/7,<br>annex 7<br><br>MEPC 75/4/6,<br>annex 8 | 10 October 2008<br>(MEPC 58)<br><br>20 November 2020<br>(MEPC 75) | Not applicable.<br><br>Final Approval extended for use in fresh water.  | Type Approved by the Republic of Korea<br>31 December 2008<br><br>Type Approval amended<br>7 September 2020 |

| Name of the system and MEPC document related to the proposal for Final Approval   | Name of manufacturer                            | Relevant GESAMP-Ballast Water Working Group report       | Date of Final Approval   | Specifications   | Remarks   |
|---|---|--|--|--|---|
| 4. OceanSaver® Ballast Water Management System<br><br>MEPC 58/2/1<br>(Norway)   | OceanSaver AS                                   | MEPC 58/2/8,<br>annex 4                                  | 10 October 2008<br>(MEPC 58)                                   | Flag State Administration was invited to verify that all the recommendations contained in annex 4 of the report of the seventh meeting of the GESAMP-BWWG (MEPC 58/2/8) have been fully addressed prior to the issuance of a Type Approval Certificate.  | Type Approved by Norway<br>17 April 2009<br><br>Type Approval amended<br>22 December 2011<br>and<br>15 January 2020 |
| 5. RWO Ballast Water Management System (CleanBallast)<br><br>MEPC 59/2<br>(Germany)   | RWO GmbH<br>Marine Water Technology,<br>Germany | MEPC 59/2/16,<br>annex 5                                 | 17 July 2009<br>(MEPC 59)                                      | Flag State Administration was invited to verify that all the recommendations contained in annex 5 of the report of the eighth meeting of the GESAMP-BWWG (MEPC 59/2/16) have been fully addressed prior to the issuance of a Type Approval Certificate.  | Type Approved by Germany<br>1 September 2010  |
| 6. NK-O3 BlueBallast System (Ozone) (subsequently changed to: NK-O3 BlueBallast II Plus)<br><br>MEPC 59/2/3<br>(Republic of Korea)<br><br>MEPC 75/4/10<br>(Liberia) | NK Company Ltd.,                                | MEPC 59/2/16,<br>annex 6<br><br>MEPC 75/4/12,<br>annex 6 | 17 July 2009<br>(MEPC 59)<br><br>20 November 2020<br>(MEPC 75) | Flag State Administration was invited to verify that all the recommendations contained in annex 6 of the report of the eighth meeting of the GESAMP-BWWG (MEPC 59/2/16) have been fully addressed prior to the issuance of a Type Approval Certificate.<br><br>Final Approval extended for use in fresh water. | Type Approved by the Republic of Korea<br>24 November 2009<br><br>Type Approved by Liberia<br>1 September 2022      |

| Name of the system and MEPC document related to the proposal for Final Approval         | Name of manufacturer                               | Relevant GESAMP-Ballast Water Working Group report | Date of Final Approval  | Specifications   | Remarks   |
|---|--|--|-------------------------|--|---|
| 7. Hitachi Ballast Water Purification System (ClearBallast)<br><br>MEPC 59/2/5 (Japan)  | Hitachi, Ltd.<br>/Hitachi Plant Technologies, Ltd. | MEPC 59/2/19, annex 4                              | 17 July 2009 (MEPC 59)  | Flag State Administration was invited to verify that all the recommendations contained in annex 4 of the report of the ninth meeting of the GESAMP-BWWG (MEPC 59/2/19) have been fully addressed prior to the issuance of a Type Approval Certificate. | Type Approved by Japan<br>5 March 2010                    |
| 8. Greenship Sedinox Ballast Water Management System<br><br>MEPC 59/2/6 (Netherlands)   | Greenship Ltd.                                     | MEPC 59/2/19, annex 5                              | 17 July 2009 (MEPC 59)  | Flag State Administration was invited to verify that all the recommendations contained in annex 5 of the report of the ninth meeting of the GESAMP-BWWG (MEPC 59/2/19) have been fully addressed prior to the issuance of a Type Approval Certificate. |   |
| 9. GloEn-Patrol™ Ballast Water Management System<br><br>MEPC 59/2/7 (Republic of Korea) | Panasia Co., Ltd.                                  | MEPC 60/2/11, annex 4                              | 26 March 2010 (MEPC 60) | Flag State Administration was invited to verify that all the recommendations contained in annex 4 of the report of the tenth meeting of the GESAMP-BWWG (MEPC 60/2/11) have been fully addressed prior to the issuance of a Type Approval Certificate. | Type Approved by the Republic of Korea<br>4 December 2009 |
| 10. Resource Ballast Technologies System<br><br>MEPC 59/2/10 (South Africa)             | Resource Ballast Technologies (Pty) Ltd.           | MEPC 60/2/11, annex 7                              | 26 March 2010 (MEPC 60) | Flag State Administration was invited to verify that all the recommendations contained in annex 7 of the report of the tenth meeting of the GESAMP-BWWG (MEPC 60/2/11) have been fully addressed prior to the issuance of a Type Approval Certificate. | Type Approved by South Africa<br>19 April 2011            |

| Name of the system and MEPC document related to the proposal for Final Approval  | Name of manufacturer                        | Relevant GESAMP-Ballast Water Working Group report | Date of Final Approval      | Specifications  | Remarks  |
|--|---|--|-----------------------------|---|--|
| 11. JFE BallastAce®<br>Ballast Water Management System<br><br>MEPC 60/2/2<br>(Japan)   | JFE Engineering Corporation                 | MEPC 60/2/12,<br>annex 5                           | 26 March 2010<br>(MEPC 60)  | Flag State Administration was invited to verify that all the recommendations contained in annex 5 of the report of the eleventh meeting of the GESAMP-BWWG (MEPC 60/2/12) have been fully addressed prior to the issuance of a Type Approval Certificate.   | Type Approved by Japan<br>26 May 2010<br><br>Type Approval amended<br>25 March 2011<br>and<br>15 December 2020 |
| 12. Hyundai Heavy Industries Co., Ltd. (HHI) Ballast Water Management System (EcoBallast)<br><br>MEPC 60/2/1<br>(Republic of Korea)                        | Hyundai Heavy Industries Co., Ltd.          | MEPC 59/2/16,<br>annex 8                           | 26 March 2010<br>(MEPC 60)  | Flag State Administration was invited to verify that all the recommendations contained in annex 8 of the report of the eighth meeting of the GESAMP-BWWG (MEPC 59/2/16) have been fully addressed prior to the issuance of a Type Approval Certificate.     | Type Approved by the Republic of Korea<br>16 March 2011  |
| 13. Special Pipe Hybrid Ballast Water Management System combined with Ozone treatment version (SP-Hybrid BWMS Ozone version)<br><br>MEPC 61/2/2<br>(Japan) | Mitsui Engineering & Shipbuilding Co., Ltd. | MEPC 61/2/15,<br>annex 6                           | 1 October 2010<br>(MEPC 61) | Flag State Administration was invited to verify that all the recommendations contained in annex 6 of the report of the thirteenth meeting of the GESAMP-BWWG (MEPC 61/2/15) have been fully addressed prior to the issuance of a Type Approval Certificate. | Type Approved by Japan<br>6 June 2011  |
| 14. "ARA Ballast" Ballast Water Management System<br><br>MEPC 61/2/5<br>(Republic of Korea)  | 21st Century Shipbuilding Co., Ltd.         | MEPC 61/2/15,<br>annex 8                           | 1 October 2010<br>(MEPC 61) | Flag State Administration was invited to verify that all the recommendations contained in annex 8 of the report of the thirteenth meeting of the GESAMP-BWWG (MEPC 61/2/15) have been fully addressed prior to the issuance of a Type Approval Certificate. | Type Approved by the Republic of Korea<br>12 July 2012   |

| Name of the system and MEPC document related to the proposal for Final Approval | Name of manufacturer                                 | Relevant GESAMP-Ballast Water Working Group report | Date of Final Approval   | Specifications  | Remarks  |
|---|--|--|--------------------------|---|--|
| 15. BalClor Ballast Water Management System<br><br>MEPC 61/2/4<br>(China)       | Qingdao Sunrui Corrosion and Fouling Control Company | MEPC 61/2/15, annex 9                              | 1 October 2010 (MEPC 61) | Flag State Administration was invited to verify that all the recommendations contained in annex 9 of the report of the thirteenth meeting of the GESAMP-BWWG (MEPC 61/2/15) have been fully addressed prior to the issuance of a Type Approval Certificate. | Type Approved by China<br>28 January 2011<br><br>Type Approved by Norway<br>6 April 2018<br>and amended<br>20 December 2018    |
| 16. OceanGuard™ Ballast Water Management System<br><br>MEPC 61/2/7<br>(Norway)  | Qingdao Headway Technology Co., Ltd.                 | MEPC 61/2/21, annex 5                              | 1 October 2010 (MEPC 61) | Flag State Administration was invited to verify that all the recommendations contained in annex 5 of the report of the fourteenth meeting of the GESAMP-BWWG (MEPC 61/2/21) have been fully addressed prior to the issuance of a Type Approval Certificate. | Type Approved by Norway<br>7 November 2011<br><br>Type Approval amended<br>14 December 2018                                    |
| 17. Ecochlor® Ballast Water Management System<br><br>MEPC 61/2/8<br>(Germany)   | Ecochlor, Inc, Acton, United States                  | MEPC 61/2/21, annex 6                              | 1 October 2010 (MEPC 61) | Flag State Administration was invited to verify that all the recommendations contained in annex 6 of the report of the fourteenth meeting of the GESAMP-BWWG (MEPC 61/2/21) have been fully addressed prior to the issuance of a Type Approval Certificate. | Type Approved by Germany<br>4 November 2011<br><br>Type Approved by Norway<br>3 August 2020<br>and amended<br>6 September 2021 |



| Name of the system and MEPC document related to the proposal for Final Approval   | Name of manufacturer  | Relevant GESAMP-Ballast Water Working Group report       | Date of Final Approval  | Specifications   | Remarks  |
|---|---|--|---|--|--|
| <p>18. Severn Trent De Nora BalPure® Ballast Water Management System (subsequently changed to BalPure® BP-500, subsequently changed to BALPURE®)</p> <p>MEPC 61/2/9 (Germany)</p> <p>MEPC 75/4/4 (United Kingdom)</p> | <p>Severn Trent De Nora (STDN), LLC (subsequently changed to De Nora Water Technologies (DNWT))</p> | <p>MEPC 61/2/21, annex 7</p> <p>MEPC 75/4/6, annex 9</p> | <p>1 October 2010 (MEPC 61)</p> <p>20 November 2020 (MEPC 75)</p> | <p>Flag State Administration was invited to verify that all the recommendations contained in annex 7 of the report of the fourteenth meeting of the GESAMP-BWWG (MEPC 61/2/21) have been fully addressed prior to the issuance of a Type Approval Certificate.</p> <p>Final Approval extended for use in fresh water.</p>  | <p>Type Approved by Germany 27 July 2011</p>   |
| <p>19. HiBallast™ MEPC 62/2/5 (Republic of Korea)</p> <p>MEPC 75/4/1 (Republic of Korea)</p>  | <p>Hyundai Heavy Industries Co., Ltd.</p>   | <p>MEPC 62/2/18, annex 5</p> <p>MEPC 75/4/6, annex 7</p> | <p>15 July 2011 (MEPC 62)</p> <p>20 November 2020 (MEPC 75)</p>   | <p>Flag State Administration was invited to verify that all the recommendations contained in annex 5 of the report of the seventeenth meeting of the GESAMP-BWWG (MEPC 62/2/18) have been fully addressed prior to the issuance of a Type Approval Certificate.</p> <p>Final Approval extended for use in fresh water.</p> | <p>Type Approved by the Republic of Korea 11 November 2011</p> <p>Type Approved by Norway 19 December 2018</p> |

| Name of the system and MEPC document related to the proposal for Final Approval  | Name of manufacturer   | Relevant GESAMP-Ballast Water Working Group report | Date of Final Approval                                   | Specifications   | Remarks  |
|--|--|--|--|--|--|
| 20. Purimar™ Ballast Water Management System<br><br>MEPC 62/2/6 (Republic of Korea)<br><br>MEPC 74/4/3 (Republic of Korea)                     | Samsung Heavy Industries Co., Ltd. (SHI)   | MEPC 62/2/18, annex 6<br><br>MEPC 74/4/9, annex 6  | 15 July 2011 (MEPC 62)<br><br>17 May 2019 (MEPC 74)      | Flag State Administration was invited to verify that all the recommendations contained in annex 6 of the report of the seventeenth meeting of the GESAMP-BWWG (MEPC 62/2/18) have been fully addressed prior to the issuance of a Type Approval Certificate.<br><br>Final Approval extended for use in fresh water.  | Type Approved by the Republic of Korea<br>31 October 2011<br><br>Type Approval amended<br>7 September 2020 |
| 21. SiCURE™ Ballast Water Management System (subsequently changed to SeaCURE® BWMS)<br><br>MEPC 62/2/10 (Germany)<br><br>MEPC 75/4/9 (Liberia) | Siemens Water Technologies (subsequently changed to Evoqua Water Technologies Ltd) | MEPC 63/2/10, annex 6<br><br>MEPC 75/4/12, annex 4 | 2 March 2012 (MEPC 63)<br><br>20 November 2020 (MEPC 75) | Flag State Administration was invited to verify that all the recommendations contained in annex 6 of the report of the eighteenth meeting of the GESAMP-BWWG (MEPC 63/2/10) have been fully addressed prior to the issuance of a Type Approval Certificate.<br><br>Flag State Administration was invited to verify that all the recommendations contained in annex 4 of the report of the fortieth meeting of the GESAMP-BWWG (MEPC 75/4/12) have been fully addressed prior to the issuance of a Type Approval Certificate. | Type Approved by Germany<br>24 February 2014<br><br>Type Approved by Liberia<br>20 April 2021              |

| Name of the system and MEPC document related to the proposal for Final Approval  | Name of manufacturer                         | Relevant GESAMP-Ballast Water Working Group report | Date of Final Approval                              | Specifications   | Remarks  |
|--|--|--|---|--|--|
| 22. ERMA FIRST Ballast Water Management System (subsequently changed to ERMA FIRST BWTS)<br><br>MEPC 63/2/1 (Greece)<br><br>MEPC 80/4 (Greece)                                 | ERMA FIRST E.S.K. Engineering Solutions S.A. | MEPC 63/2/11, annex 5<br><br>MEPC 80/4/9, annex 7  | 2 March 2012 (MEPC 63)<br><br>7 July 2023 (MEPC 80) | Flag State Administration was invited to verify that all the recommendations contained in annex 5 of the report of the nineteenth meeting of the GESAMP-BWWG (MEPC 63/2/11) have been fully addressed prior to the issuance of a Type Approval Certificate.<br><br>Final approval extended for use in fresh water. | Type Approved by Greece<br>10 May 2012<br><br>Type Approval amended<br>18 October 2018 and<br>27 June 2019 |
| 23. MICROFADE™ Ballast Water Management System<br><br>MEPC 63/2/2 (Japan)  | Kuraray Co., Ltd.                            | MEPC 63/2/11, annex 6                              | 2 March 2012 (MEPC 63)                              | Flag State Administration was invited to verify that all the recommendations contained in annex 6 of the report of the nineteenth meeting of the GESAMP-BWWG (MEPC 63/2/11) have been fully addressed prior to the issuance of a Type Approval Certificate.  | Type Approved by Japan<br>30 May 2012  |
| 24. AquaStar™ Ballast Water Management (subsequently changed to AquaStar™ BWMS, MACGREGOR WATER BALLAST TREATMENT SYSTEM and AQUASTAR™)<br><br>MEPC 63/2/3 (Republic of Korea) | AQUA Eng. Co.                                | MEPC 63/2/11, annex 7                              | 2 March 2012 (MEPC 63)                              | Flag State Administration was invited to verify that all the recommendations contained in annex 7 of the report of the nineteenth meeting of the GESAMP-BWWG (MEPC 63/2/11) have been fully addressed prior to the issuance of a Type Approval Certificate.  | Type Approved by the Republic of Korea<br>15 June 2012<br><br>Type Approval amended<br>17 May 2022         |

| Name of the system and MEPC document related to the proposal for Final Approval   | Name of manufacturer                     | Relevant GESAMP-Ballast Water Working Group report | Date of Final Approval   | Specifications   | Remarks                                     |
|---|--|--|--|--|---|
| 25. Neo-Purimar™<br>Ballast Water Management System<br><br>MEPC 63/2/6<br>(Republic of Korea)                               | Samsung Heavy Industries Co., Ltd. (SHI) | MEPC 63/2/21, annex 6                              | 2 March 2012<br>(MEPC 63)  | Flag State Administration was invited to verify that all the recommendations contained in annex 6 of the report of the twentieth meeting of the GESAMP-BWWG (MEPC 63/2/21) have been fully addressed prior to the issuance of a Type Approval Certificate.   |   |
| 26. DESMI Ocean Guard BWMS<br><br>MEPC 63/2/7<br>(Denmark)  | DESMI Ocean Guard A/S                    | MEPC 64/2/6, annex 4                               | 5 October 2012<br>(MEPC 64)                                      | Flag State Administration was invited to verify that all the recommendations contained in annex 4 of the report of the twenty-first meeting of the GESAMP-BWWG (MEPC 64/2/6) have been fully addressed prior to the issuance of a Type Approval Certificate.   | Type Approved by Denmark<br>7 November 2012 |
| 27. JFE BallastAce that makes use of NEO-CHLOR MARINE®<br><br>MEPC 64/2/1<br>(Japan)<br><br>(Revised in MEPC 77/4/1, Japan) | JFE Engineering Corporation              | MEPC 64/2/7, annex 5                               | 5 October 2012<br>(MEPC 64)<br><br>26 November 2021<br>(MEPC 77) | Flag State Administration was invited to verify that all the recommendations contained in annex 5 of the report of the twenty-second meeting of the GESAMP-BWWG (MEPC 64/2/7) have been fully addressed prior to the issuance of a Type Approval Certificate.<br><br>Flag State Administration was invited to verify that all the recommendations contained in annex 6 of the report of the forty-first meeting of the GESAMP-BWWG (MEPC 77/4/4) have been fully addressed prior to the issuance of a Type Approval Certificate. | Type Approved by Japan<br>26 June 2013      |
| 28. Smart Ballast BWMS<br><br>MEPC 64/2/2<br>(Republic of Korea)  | STX Metal Co., Ltd.                      | MEPC 64/2/7, annex 6                               | 5 October 2012<br>(MEPC 64)                                      | Flag State Administration was invited to verify that all the recommendations contained in annex 6 of the report of the twenty-second meeting of the GESAMP-BWWG (MEPC 64/2/7) have been fully addressed prior to the issuance of a Type Approval Certificate.  |   |

| Name of the system and MEPC document related to the proposal for Final Approval   | Name of manufacturer   | Relevant GESAMP-Ballast Water Working Group report | Date of Final Approval                                  | Specifications   | Remarks   |
|---|--|--|---|--|---|
| 29. AQUARIUS® EC Ballast Water Management System (subsequently changed to Wärtsilä Aquarius EC BWMS)<br><br>MEPC 65/2/1 (Netherlands) | Wärtsilä Water Systems Limited   | MEPC 65/2/9, annex 5                               | 17 May 2013 (MEPC 65)                                   | Flag State Administration was invited to verify that all the recommendations contained in annex 5 of the report of the twenty-fourth meeting of the GESAMP-BWWG (MEPC 65/2/9) have been fully addressed prior to the issuance of a Type Approval Certificate.  | Type Approved by Norway<br>12 June 2020   |
| 30. EcoGuardian™ Ballast Water Management System<br><br>MEPC 65/2/4 (Republic of Korea)<br><br>MEPC 75/4 (Republic of Korea)          | Hanla IMS Co. Ltd.   | MEPC 65/2/19, annex 5<br><br>MEPC 75/4/6, annex 6  | 17 May 2013 (MEPC 65)<br><br>20 November 2020 (MEPC 75) | Flag State Administration was invited to verify that all the recommendations contained in annex 5 of the report of the twenty-fifth meeting of the GESAMP-BWWG (MEPC 65/2/19) have been fully addressed prior to the issuance of a Type Approval Certificate.<br><br>Final Approval extended for use in fresh water. | Type Approved by the Republic of Korea<br>8 May 2015<br><br>Type Approval amended<br>7 September 2020 |
| 31. OceanDoctor Ballast Water Management System<br><br>MEPC 65/2/6 (China)  | Jiujiang Precision Measuring Technology Research Institute and Institute of Marine Materials Science and Engineering of Shanghai Maritime University | MEPC 65/2/19, annex 7                              | 17 May 2013 (MEPC 65)                                   | Flag State Administration was invited to verify that all the recommendations contained in annex 7 of the report of the twenty-fifth meeting of the GESAMP-BWWG (MEPC 65/2/19) have been fully addressed prior to the issuance of a Type Approval Certificate.  | Type Approved by China<br>17 November 2014  |

| Name of the system and MEPC document related to the proposal for Final Approval                  | Name of manufacturer   | Relevant GESAMP-Ballast Water Working Group report | Date of Final Approval    | Specifications  | Remarks  |
|--|--|--|---------------------------|---|--|
| 32. Ballast Water Management System with PERACLEAN® Ocean (SKY-SYSTEM®)<br><br>MEPC 66/2 (Japan) | Nippon Yuka Kogyo co. Ltd (Yuka) and Katayama Chemical, Inc. | MEPC 66/2/7, annex 4                               | 4 April 2014 (MEPC 66)    | Flag State Administration was invited to verify that all the recommendations contained in annex 4 of the report of the twenty-sixth meeting of the GESAMP-BWWG (MEPC 66/2/7) have been fully addressed prior to the issuance of a Type Approval Certificate.    | Type Approved by Japan<br>21 October 2014                  |
| 33. Evonik Ballast Water Treatment System with PERACLEAN® Ocean<br><br>MEPC 66/2/5 (Germany)     | Evonik Industries AG   | MEPC 66/2/10, annex 5                              | 4 April 2014 (MEPC 66)    | Flag State Administration was invited to verify that all the recommendations contained in annex 5 of the report of the twenty-seventh meeting of the GESAMP-BWWG (MEPC 66/2/10) have been fully addressed prior to the issuance of a Type Approval Certificate. |  |
| 34. MARINOMATE™ Ballast Water Management System<br><br>MEPC 67/2 (Republic of Korea)             | KT Marine Co. Ltd.   | MEPC 67/2/4, annex 4                               | 17 October 2014 (MEPC 67) | Flag State Administration was invited to verify that all the recommendations contained in annex 4 of the report of the twenty-eighth meeting of the GESAMP-BWWG (MEPC 67/2/4) have been fully addressed prior to the issuance of a Type Approval Certificate.   |  |
| 35. BlueZone™ Ballast Water Management System<br><br>MEPC 67/2/1 (Republic of Korea)             | Sunbo Industries Co. Ltd.                                    | MEPC 67/2/4, annex 5                               | 17 October 2014 (MEPC 67) | Flag State Administration was invited to verify that all the recommendations contained in annex 5 of the report of the twenty-eighth meeting of the GESAMP-BWWG (MEPC 67/2/4) have been fully addressed prior to the issuance of a Type Approval Certificate.   | Type Approved by the Republic of Korea<br>8 September 2015 |

| Name of the system and MEPC document related to the proposal for Final Approval                      | Name of manufacturer                                    | Relevant GESAMP-Ballast Water Working Group report | Date of Final Approval    | Specifications  | Remarks   |
|--|---|--|---------------------------|---|---|
| 36. KURITA™ Ballast Water Management System (subsequently changed to Senza BWMS) MEPC 67/2/2 (Japan) | Kurita Water Industries Ltd.                            | MEPC 67/2/4, annex 6                               | 17 October 2014 (MEPC 67) | Flag State Administration was invited to verify that all the recommendations contained in annex 6 of the report of the twenty-eighth meeting of the GESAMP-BWWG (MEPC 67/2/4) have been fully addressed prior to the issuance of a Type Approval Certificate. | Type Approved by Japan<br>13 January 2017<br><br>Type Approved by Norway<br>19 January 2021 and amended<br>10 August 2021 |
| 37. Ecomarine-EC<br><br>MEPC 68/2/5 (Japan)  | Ecomarine Technology Research Association               | MEPC 68/2/21, annex 5                              | 15 May 2015 (MEPC 68)     | Flag State Administration was invited to verify that all the recommendations contained in annex 5 of the report of the thirty-first meeting of the GESAMP-BWWG (MEPC 68/2/21) have been fully addressed prior to the issuance of a Type Approval Certificate. |   |
| 38. ECS-HYCHLOR™ System<br><br>MEPC 69/4 (Republic of Korea)   | TECHCROSS Inc.  | MEPC 69/4/5, annex 4                               | 22 April 2016 (MEPC 69)   | Flag State Administration was invited to verify that all the recommendations contained in annex 4 of the report of the thirty-second meeting of the GESAMP-BWWG (MEPC 69/4/5) have been fully addressed prior to the issuance of a Type Approval Certificate. | Type Approved by Norway<br>10 February 2020   |
| 39. NK-CI BlueBallast System<br><br>MEPC 69/4/1 (Republic of Korea)                                  | NK Company Ltd.   | MEPC 69/4/5, annex 5                               | 22 April 2016 (MEPC 69)   | Flag State Administration was invited to verify that all the recommendations contained in annex 5 of the report of the thirty-second meeting of the GESAMP-BWWG (MEPC 69/4/5) have been fully addressed prior to the issuance of a Type Approval Certificate. |   |
| 40. ATPS-BLUE <sub>sys</sub> ballast water management system<br><br>MEPC 69/4/2 (Japan)              | Panasonic Environmental Systems & Engineering Co., Ltd. | MEPC 69/4/5, annex 6                               | 22 April 2016 (MEPC 69)   | Flag State Administration was invited to verify that all the recommendations contained in annex 6 of the report of the thirty-second meeting of the GESAMP-BWWG (MEPC 69/4/5) have been fully addressed prior to the issuance of a Type Approval Certificate. | Type Approved by Japan<br>30 March 2017<br><br>Type Approved by Norway<br>10 November 2020                                |

| Name of the system and MEPC document related to the proposal for Final Approval  | Name of manufacturer   | Relevant GESAMP-Ballast Water Working Group report | Date of Final Approval       | Specifications  | Remarks                                     |
|--|--|--|------------------------------|---|---|
| 41. ECS-HYCHEM™ System<br><br>MEPC 70/4/1<br>(Republic of Korea)   | TEHCROSS Inc.  | MEPC 70/4/6, annex 5                               | 28 October 2016<br>(MEPC 70) | Flag State Administration was invited to verify that all the recommendations contained in annex 5 of the report of the thirty-third meeting of the GESAMP-BWWG (MEPC 70/4/6) have been fully addressed prior to the issuance of a Type Approval Certificate.  |   |
| 42. ECS-HYBRID™ System<br><br>MEPC 71/4/1<br>(Republic of Korea)   | TEHCROSS Inc.  | MEPC 71/4/3, annex 5                               | 7 July 2017<br>(MEPC 71)     | Flag State Administration was invited to verify that all the recommendations contained in annex 5 of the report of the thirty-fourth meeting of the GESAMP-BWWG (MEPC 71/4/3) have been fully addressed prior to the issuance of a Type Approval Certificate. |   |
| 43. Envirocleanse inTank™ BWTS (Electrochlorination Variation) (subsequently changed to inTank BWTS Electrochlorination (EC) variation)<br><br>MEPC 73/4/1<br>(Norway) | Envirocleanse, LLC. (ownership subsequently transferred to Scienco/FAST) | MEPC 73/4/2, annex 5                               | 26 October 2018<br>(MEPC 73) | Flag State Administration was invited to verify that all the recommendations contained in annex 5 of the report of the thirty-sixth meeting of the GESAMP-BWWG (MEPC 73/4/2) have been fully addressed prior to the issuance of a Type Approval Certificate.  | Type Approved by Norway<br>20 December 2018 |



| Name of the system and MEPC document related to the proposal for Final Approval   | Name of manufacturer  | Relevant GESAMP-Ballast Water Working Group report | Date of Final Approval     | Specifications   | Remarks  |
|---|---|--|----------------------------|--|--|
| 44. Envirocleanse inTank™ BWTS (Bulk Chemical Variation) (subsequently changed to inTank BWTS Bulk Chemical (BC) variation)<br><br>MEPC 74/4 (Norway) | Envirocleanse, LLC (ownership subsequently transferred to Scienco/FAST) | MEPC 74/4/6, annex 4                               | 17 May 2019 (MEPC 74)      | Flag State Administration was invited to verify that all the recommendations contained in annex 4 of the report of the thirty-seventh meeting of the GESAMP-BWWG (MEPC 74/4/6) have been fully addressed prior to the issuance of a Type Approval Certificate. | Type Approved by Norway<br>4 July 2019                     |
| 45. MICROFADE II Ballast Water Management System<br><br>MEPC 74/4/2 (Netherlands)   | by Kuraray CO., LTD.  | MEPC 74/4/6, annex 6                               | 17 May 2019 (MEPC 74)      | Flag State Administration was invited to verify that all the recommendations contained in annex 6 of the report of the thirty-seventh meeting of the GESAMP-BWWG (MEPC 74/4/6) have been fully addressed prior to the issuance of a Type Approval Certificate. | Type Approved by the Netherlands<br>6 April 2020           |
| 46. CleanBallast® - Ocean Barrier System<br><br>MEPC 75/4/3 (Norway)  | Veolia Water Technologies Deutschland GmbH                              | MEPC 75/4/6, annex 4                               | 20 November 2020 (MEPC 75) | Flag State Administration was invited to verify that all the recommendations contained in annex 4 of the report of the thirty-ninth meeting of the GESAMP-BWWG (MEPC 75/4/12) have been fully addressed prior to the issuance of a Type Approval Certificate.  | Type Approved by Norway<br>7 January 2022                  |
| 47. HiBallast NF™ Ballast Water Management System<br><br>MEPC 77/4/2 (Republic of Korea)  | Hyundai Heavy Industries Co., Ltd. (HHI)                                | MEPC 77/4/4, annex 7                               | 26 November 2021 (MEPC 77) | Flag State Administration was invited to verify that all the recommendations contained in annex 7 of the report of the forty-first meeting of the GESAMP-BWWG (MEPC 77/4/4) have been fully addressed prior to the issuance of a Type Approval Certificate.    | Type Approved by the Republic of Korea<br>30 December 2021 |

| Name of the system and MEPC document related to the proposal for Final Approval     | Name of manufacturer                                   | Relevant GESAMP-Ballast Water Working Group report | Date of Final Approval     | Specifications   | Remarks   |
|---|--|--|----------------------------|--|---|
| 48. RADClean® BWMS<br><br>MEPC 79/4<br>(Islamic Republic of Iran)                   | Rahavaran Ayandeh Darya Company, RAD Co.               | MEPC 79/4/3, annex 4                               | 16 December 2022 (MEPC 79) | Flag State Administration was invited to verify that all the recommendations contained in annex 4 of the report of the forty-second meeting of the GESAMP-BWWG (MEPC 79/4/3) have been fully addressed prior to the issuance of a Type Approval Certificate. | Type Approved by the Islamic Republic of Iran<br>9 April 2023 |
| 49. ECS-HYCHLOR™ 2.0 System<br><br>MEPC 79/4/1<br>(United Kingdom)                  | TEHCROSS Inc.  | MEPC 79/4/3, annex 5                               | 16 December 2022 (MEPC 79) | Flag State Administration was invited to verify that all the recommendations contained in annex 5 of the report of the forty-second meeting of the GESAMP-BWWG (MEPC 79/4/3) have been fully addressed prior to the issuance of a Type Approval Certificate. | Type Approved by the United Kingdom<br>22 February 2023       |
| 50. BalClor® Smart BWMS<br><br>MEPC 80/4/1<br>(Denmark)                             | Sunrui Marine Environment Engineering Co., Ltd.        | MEPC 80/4/9, annex 4                               | 7 July 2023 (MEPC 80)      | Flag State Administration was invited to verify that all the recommendations contained in annex 4 of the report of the forty-third meeting of the GESAMP-BWWG (MEPC 80/4/9) have been fully addressed prior to the issuance of a Type Approval Certificate.  | Type Approved by Denmark<br>1 December 2023                   |
| 51. EcoGuardian NF™ Ballast Water Management System<br><br>MEPC 80/4/2<br>(Liberia) | HANLA IMS Co., Ltd.                                    | MEPC 80/4/9, annex 5                               | 7 July 2023 (MEPC 80)      | Flag State Administration was invited to verify that all the recommendations contained in annex 5 of the report of the forty-third meeting of the GESAMP-BWWG (MEPC 80/4/9) have been fully addressed prior to the issuance of a Type Approval Certificate.  | Type Approved by Liberia<br>21 August 2023                    |
| 52. HiBallast 2.0™ BWMS<br><br>MEPC 82/4<br>(Republic of Korea)                     | HD Korea Shipbuilding & Offshore Engineering (HD KSOE) | MEPC 82/4/2, annex 4                               | 4 October 2024 (MEPC 82)   | Flag State Administration was invited to verify that all the recommendations contained in annex 4 of the report of the forty-fifth meeting of the GESAMP-BWWG (MEPC 82/4/2) have been fully addressed prior to the issuance of a Type Approval Certificate.  |   |