



Marine & Offshore

Certificate number: 60207/A0 BV

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Product code: 9086I

*This certificate is not valid when presented without the full attached schedule composed of 7 sections*

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## TYPE APPROVAL CERTIFICATE

*This certificate is issued to*

**Desmi Ocean Guard A/S**

Noerresundby - DENMARK

*for the type of product*

**BALLAST WATER MANAGEMENT SYSTEM**

CompactClean & CompactClean EX

### Requirements:

- BUREAU VERITAS Rules for the Classification of Steel Ships
- IMO Res. MEPC.300(72) - Code for Approval of Ballast Water Management Systems

*This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.*

**This certificate will expire on: 26 Feb 2025**

**For Bureau Veritas Marine & Offshore,**

At BV FREDERICIA, on 26 Feb 2020,

Jesper JENSEN



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with Bureau Veritas Marine & Offshore. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

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BV Mod. Ad.E 530 June 2017

This certificate consists of 5 page(s)

## THE SCHEDULE OF APPROVAL

### 1. PRODUCT DESCRIPTION

#### CompactClean Ballast Water Management System (BWMS)

##### 1.1 Ballast Water Technology

- The CompactClean BWMS consists of two treatment steps in order to comply with the IMO D2 standard:

- a) Mechanical Filtration by 20 micron automatic filter, and
- b) Ultraviolet disinfection by a UV system.

- The CompactClean BWMS base unit (1 Filter + 1 UV reactor) has a TRC (Treatment Rated Capacity) automatically regulated from 20% to 100% depending on the measured UV intensity.

- The CompactClean BWMS is operated from a main panel, which starts the automated ballasting, deballasting or stripping processes. Operation (automatic or manual) is controlled through PLC and monitoring equipment (UV sensors, temperature sensor, pressure sensors, flow meter, ...).

##### 1.2 Table for CompactClean BWMS Range Description

BWMS Model	Inlet TRC Range (m3/h)	Outlet TRC Range (m3/h)	Filtrex filter model (20 µm)	Nb of filter(s)	UV Reactor	Nb of UV Reactor(s)
CC-35	8 - 35	5 - 135	ACB-903-65	1	UV-UNIT 135	1
CC-55	10 - 55	5 - 135	ACB-904-80	1	UV-UNIT 135	1
CC-87	15 - 87	5 - 135	ACB-906-100	1	UV-UNIT 135	1
CC-135	25 - 135	5 - 135	ACB-910-150	1	UV-UNIT 135	1
CC-190	35 - 190	9 - 340	ACB-915-150	1	UV-UNIT 340	1
CC-255	35 - 255	9 - 340	ACB-935-200	1	UV-UNIT 340	1
CC-340	45 - 340	9 - 340	ACB-945-200	1	UV-UNIT 340	1
CC-500	50 - 500	13 - 500	ACB-955-250	1	UV-UNIT 500	1
CC-750	65 - 750	19 - 750	ACB-985-300	1	UV-UNIT 750	1
CC-1000	95 - 1000	26 - 1000	ACB-999-350	1	UV-UNIT 1000	1
CC-1500	126 - 1500	38 - 1500	ACB-9100-400	1	UV-UNIT 1500	1
CC-2000	126 - 2000	52 - 2000	ACB-9120-500	1	UV-UNIT 1000	2
CC-2500	126 - 2500	64 - 2500	ACB-9200-600	1	UV-UNIT 1000 UV-UNIT 1500	1 1
CC-3000	126 - 3000	76 - 3000	ACB-9200-600	1	UV-UNIT 1500	2

##### 1.3 Technical characteristics of filters

Maker	Filtrex (Italy)		Filter Model	Flow Rate (m3/h)	Filter Model	Flow Rate (m3/h)
Filtration size	20mm screen		ACB-903-65	8 - 35	ACB-955-250	50 - 515
Backwash type	automatic		ACB-904-80	10 - 55	ACB-985-300	65 - 770
Design pressure	10 bar		ACB-906-100	15 - 87	ACB-999-350	95 - 1040
Max. differential pressure	0.3 to 0.5 bar		ACB-910-150	25- 135	ACB-9100-400	126 - 1500
Mounting	vertical		ACB-915-150	35 - 190	ACB-9120-500	126 - 2100
Material of Filter housing	ASTM B148 C95800		ACB-935-200	35 - 255	ACB-9200-600	126 - 3000
Max operating temperature	55 °C		ACB-945-200	45 - 340		

##### 1.4 Technical characteristics of UV assembly

Maker	Desmi Ocean Guard
Design pressure	10 bar
Working temperature range	-2 / 50 °C
Mounting	Vertical
Material of Filter housing	CC333G
UV Lamp power	4 & 6kW

UV Reactor	Flow Rate (m3/h)	Nb of UV lamps	UV lamp power (kW)	Power Cabinet	Nominal Power (kW)
CC-135	5 - 135	6	4	441399	35
CC-340	9 - 340	8	6	441400	67
CC-500	13 - 500	12	6	441401	92
CC-750	19 - 750	18	6	441402	130
CC-1000	26 - 1000	24	6	441403	167
CC-1500	38 - 1500	36	6	441404	243

### 1.5 Control and Monitoring

- Software version V.052

## **2. DOCUMENTS AND DRAWINGS / DOCUMENTS ET PLANS**

- P&ID Piping and Instrumentation diagram CompactClean™ BWMS CC-35 to CC-1500 N° 470250 Rev.J dated 21/09/2018
- P&ID Piping and Instrumentation diagram CompactClean™ BWMS CC-2000 to CC-3000 N° 470251 Rev.B dated 26/06/2018
- General arrangement drawings as provided on 05/12/2019
- Drawings of filters, UV reactors, power and control cabinets as provided on 05/12/2019
- Electrical and Electronic Wiring Diagrams as provided on 05/12/2019
- OMSM for CompactClean BWMS N° 161335 Rev.C Version 23 dated 30/04/2019
- Installation and Maintenance Manual for CIP unit N° A27.11
- Technical manuals for major components supplied by manufacturers (filters and flow meter)
- Technical specifications of components (data sheets of pumps, valves, sensors)
- Instruction for change of Control of circuit diagrams, control programs and set parameters for BWMS controls N° AQA001009 Rev.0 dated 31/05/2017
- Risk assessment report N° 157936 Ver.5 dated 31/05/2017
- SDL Report dated 21/09/2018

*No departure from the above documents shall be made without the prior consent of the Society named on this certificate. The manufacturer must inform the Society of any modification or changes to these documents and drawings.*

## **3. TEST REPORTS**

### 3.1 IMO Type Approval Certificate:

- No. 19/00006 dated 16/05/2019 issued by LR on behalf of the Danish Environmental Protection Agency and Danish Maritime Authority
- No. 60407/A0 MMF dated 03/02/2020 issued by BUREAU VERITAS on behalf of the French Administration.

### 3.2 Biological Performance Evaluation Land-Based

- Tested model : CompactClean BWMS CC-340 (340m3/h)
- Report N° 11821290 Rev.2 dated 20/09/2018 issued by DHI Denmark
- Additional report for supplementary test cycles with short holding time N° 11821290 dated 22/03/2019 issued by DHI Denmark

### 3.3 Biological Performance Evaluation Shipboard

- Tested model : CompactClean BWMS CC-1000 (1000m3/h) installed on board PROVIDANA
- Report No. 1182190 Rev.2 dated 21/09/2018 (DHI Denmark)

### 3.4 Environmental tests

- Environmental tests report N° 117-36341-1 Revision 1 dated 28/02/2019 issued by FORCE Technology including: Visual inspection and performance test, External power supply failure, Power supply variations (permanent/transient), Low temperature, Dry heat, Damp heat (cyclic), insulation resistance (UN > 65V), High voltage, Vibration, Electrostatic discharge, Radiated radio frequency interference, Conducted low frequency, fast/slow transient, radiated/conducted emission & Inclination test.

#### **4. APPLICATION / LIMITATION**

4.1 Intended for Ballast Water Treatment:

- Ballast Water Uptake: Filtration / UV-disinfection
- Ballast Water Discharge: UV-disinfection
- The system can be used in the following common ambient and water conditions

Water temperature range	No limitation
Ambient temperature range	0 to +55 °C
Water salinity range	No limitation

4.2 Operating Conditions for CompactClean BWMS

Treatment Rated Capacity	35~3000 m <sup>3</sup> /h
Minimum Operating Pressure	2 bar
Maximum Operating Pressure	10 bar
Minimum UV intensity	227 W/m <sup>2</sup> @ reduce flow 880 W/m <sup>2</sup> @ full flow
Minimum Holding time	No limitation

4.3 The treatment rated capacity of the BWMS is not be less than the operated flow rate of ballast pump(s). During ballast water discharge the size and number of the UV units limits the systems TRC. During ballast water intake the lower of the flowrates for respectively Filter and UV unit limits the systems TRC.

4.4 Ex-certification is not covered by this certificate. Application for use in hazardous areas to be approved in each case.

4.5 The following documentation is to submitted for approval on a ship case-by-case basis :

- On-board location of the BWTS skid-unit;
- All connection details of interface towards ship's ballast piping systems;
- Management of stripping operations;
- Layout of the system;
- All associated control, alarm and monitoring equipment;
- Wiring diagrams and the cable specifications;
- Materials list;
- Arrangement and location of Ballast Water sampling ports.

#### **5. PRODUCTION SURVEY REQUIREMENTS**

5.1 The Ballast Water Management systems are to be supplied by **Desmi Ocean Guard A/S** in compliance with the type and the requirements described in this certificate. This type of product is within the category IBV of Bureau Veritas Rule Note NR320.

5.2 Production surveys requested for components:

a) Filters and pressure vessels are classified as Class 3 pressure vessels according to the Society's Rules Pt C, Ch 1, Sec 3 [table 2].

- Housings are to be hydraulically pressure tested to 1.5 times the design pressure under witnessing of a Society's surveyor;
- Work's certificate is to be provided for raw materials of shell assembly according to the Society's Rules [Class 3 vessels];
- Bureau Veritas certificate is required for final assembly of the filters according to the Society's Rules Pt C, Ch 1, Sec 3 [Class 3 vessels].

b) Electric and functional tests of Power and Control cabinets are to be performed to the surveyor satisfaction.

c) Production surveys for other components (Class III piping and manifold, sensors, pumps, electrical cables...) are to be in compliance with the **Desmi Ocean Guard A/S's** regime and Society's Rules.

d) When components (non-skid) are manufactured at supplier or subcontractor workshops, production surveys are to be carried out by the BV local surveyor in charge of the survey.

5.3 Fabrication and welding requirements to comply with the Society's Rules Pt C, Ch 1, Sec 3 [4.11 Class 3 vessels]. Welding procedures and welding consumables are to be approved by the Society.

5.4 A Bureau Veritas product certificate is required for the complete system. Factory acceptance tests records, including functional tests and electrical test are to be provided to the surveyor satisfaction.

5.5 Functional tests of the system to be carried out after onboard installation as required by the IMO resolution MEPC.300(72).

5.6 For information, **Desmi Ocean Guard A/S** has declared to Bureau Veritas the following production sites:

- **Desmi Ocean Guard A/S: P. O. Box 226, Tagholm 1, 9400 Nørresundby, DENMARK**
- **Desmi Pumping Technology (Suzhou) Co., Ltd.: No.740 Fengying Avenue, Weiting Sub District, 215122 SIP, Suzhou, CHINA**
- **Desmi Ocean Guard A/S: Lufthavnsvej 12, 9400 Noerresundby, DENMARK**

## **6. MARKING OF PRODUCT**

Each Ballast Water Treatment System is to be marked with:

- Manufacturer's name or trade mark
- Type designation
- Serial number
- Capacity
- Society's brand as relevant

## **7. OTHERS**

It is **Desmi Ocean Guard A/S's** responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

**\*\*\* END OF CERTIFICATE \*\*\***