



Confirmation of Product Type Approval

Please refer to the "Service Restrictions" shown below to determine if Unit Certification is required for this product. This certificate reflects the information on the product in the ABS Records as of the date and time the certificate is printed.

Pursuant to the Rules of the American Bureau of Shipping (ABS), the manufacturer of the below listed product held a valid Manufacturing Assessment (MA) with expiration date of 12/MAY/2018. The continued validity of the Manufacturing Assessment is dependent on completion of satisfactory audits as required by the ABS Rules.

And; a Product Design Assessment (PDA) valid until 23/JAN/2018 subject to continued compliance with the Rules or standards used in the evaluation of the product.

The above entitle the product to be called Product Type Approved.

The Product Design Assessment is valid for products intended for use on ABS classed vessels, MODUs or facilities which are in existence or under contract for construction on the date of the ABS Rules used to evaluate the Product.

ABS makes no representations regarding Type Approval of the Product for use on vessels, MODUs or facilities built after the date of the ABS Rules used for this evaluation.

Due to wide variety of specifications used in the products ABS has evaluated for Type Approval, it is part of our contract that; whether the standard is an ABS Rule or a non-ABS Rule, the Client has full responsibility for continued compliance with the standard.

Product Name: Ballast Water Treatment
Model Name(s): OxyClean

Presented to:
DESMI OCEAN GUARD A/S
LUFTHAVNSVEJ 12
NORRESUNDBY
Denmark

Intended Service: Ballast Water Treatment System for Ships

Description: The OxyClean System is a fully automated ballast water treatment system composed of pre- and after - treatment to disinfect aquatic species in the ballast water. The treatment system comprises of mechanical filtration in combination with Ultra Violet radiation and Ozone mixing treatment. The system consists of the following main components: 1.Auto back flush filter with a mesh size of 30 microns and optional back flush pump. 2.Salinity sensor. 3.OxyClean UV unit, which consist of a number of UV-Ozone units each containing nine 800W low Pressure UV lamps. The UV lamps has dual function of treating the ballast water with UV rays as well as generating ozone, which is injected downstream into the ballast water prior to the static mixer pipe. 4.Ozone ejector pump and Ozone injecting ejector. 5.Static mixer pipe for mixing Ozone into ballast water stream. 6.Ozone destructor to convert excess ozone back to oxygen. 7.Ambient Ozone detection system to monitor any leakage and the efficiency of the Ozone conversion. 8.Cleaning in place (CIP) pump for the UV units. 9.Associated automation, control panels and visual display units.

Ratings: Treatment Rated Capacity: From 75 m³/h to 3000m³/h depending on number of UV cassettes installed. Filtration grade: 30 microns, Boll & Kirch auto back flush filter with internal housing diameters from #419 to #1460. Maximum working pressure: 10 bar g. Operating water temperature: 0 to 40 deg C. Enclosure: UV unit - IP68 Control Cabinet - IP54 Transformers - IP23

Service Restrictions: 1. Unit Certification is required for this product. 2. Detailed ship installation and arrangement plans to be submitted for approval. The plans are to clearly indicate and /or include information as following (but not limited to): a. Piping drawing with piping specifications, showing installation location and integration with ship's ballast system b. Sampling facilities for ballast system. c. Types and operation controls for system isolation valves. d. All electrical and instrumentation drawings. e. Control, monitoring and safety system documentation. f. Power calculation document including electrical load analysis. g. Location of local fire extinguishing systems, if any. 3. All filters used in OxyClean Ballast Water system are to be ABS certified. 4. Ex certification is not covered by this certificate. Ex installations to be approved in each case.

Comments: The manufacturer has confirmed that the ballast water treated by OxyClean Ballast Water Treatment System is not expected to change the corrosiveness to materials or equipment of the normal ship construction. This applies both to corrosion of metals as well as impact on protective coating.

Notes / Documentation: 1. Performance evaluation in Land-based and ship-board test of DESMI Ocean Guard Ballast Water management System DOG P40-300; DHI Test report dated 26 Oct 2012. 2. Danish Technological Institute Test report on corrosion effects of metals in Ozone treated water: 4C 1303031-433373 dated 31 Jan 2012. 3. Test for Marine Type Approval of electrical components of Ballast water system in compliance with IACS E10 Rev.5; Delta Test report -- Danak-19/12164 dated 18 June 2012. 4. Report of eleventh meeting of GESAMP - Ballast Water Working Group: MEPC 60/2/12 dated 01 December 2009 regarding Basic Approval of OxyClean System. 5. Report of twenty first meeting of GESAMP - Ballast Water Working Group: MEPC 64/2/6 dated 11 June 2012 regarding Final Approval of OxyClean System. 6. OxyClean - Operation and Technical Manual Rev.2 Dated 11 October 2012. 7. This Product Design Assessment (PDA) is valid only for products intended to use on ABS classed vessels, MODUs or facilities which are in existence or under contract for construction on the date of the ABS Rules used to evaluate the Product.

Term of Validity: This Product Design Assessment (PDA) Certificate 13-LD977708-PDA, dated 24/Jan/2013 remains valid until 23/Jan/2018 or until the Rules or specifications used in the assessment are revised (whichever occurs first). This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the Product. Use of the Product on an ABS classed vessel, MODU or facility which is contracted after the validity date of the ABS Rules and specifications used to evaluate the Product, will require re-evaluation of the PDA. Use of the Product for non ABS classed vessels, MODUs or facilities is to be to an agreement between the manufacturer and intended client.

ABS Rules: The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product. The Rules applicable are: ABS Rules for Building and Classing Steel Vessels 2013 1-1-4/7.7, 4-4-1/1.1, 4-6-2/3.0, 4-8-3/5.3.1, 4-8-3/Table 2, 4-8-3/15, 4-9-6/Table 2, ABS Guide for Ballast Water Treatment Nov 2011.

National Standards:

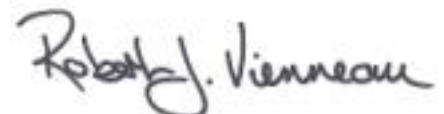
International Standards: IMO Resolution MEPC.169(57), IMO Resolution MEPC.174(58)

Government Authority:

EUMED:

Others:

Model Certificate	Model Certificate No	Issue Date	Expiry Date
PDA	13-LD977708-PDA	24/JAN/2013	23/JAN/2018



ABS Programs

ABS has used due diligence in the preparation of this certificate and it represents the information on the product in the ABS Records as of the date and time the certificate was printed. Type Approval requires Drawing Assessment, Prototype Testing and assessment of the

manufacturer's quality assurance and quality control arrangements. Limited circumstances may allow only Prototype Testing to satisfy Type Approval. The approvals of Drawings and Products remain valid as long as the ABS Rule, to which they were assessed, remains valid. ABS cautions manufacturers to review and maintain compliance with all other specifications to which the product may have been assessed. Further, unless it is specifically indicated in the description of the product; Type Approval does not necessarily waive witnessed inspection or survey procedures (where otherwise required) for products to be used in a vessel, MODU or facility intended to be ABS classed or that is presently in class with ABS. Questions regarding the validity of ABS Rules or the need for supplemental testing or inspection of such products should, in all cases, be addressed to ABS.