

EC-TYPE EXAMINATION CERTIFICATE (MODULE B)

Application of: Directive 2014/90/EU of 23 July 2014 on marine equipment (MED), issued as "Forskrift om Skipsutstyr" by the Norwegian Maritime Authority. This Certificate is issued by DNV GL AS under the authority of the Government of the Kingdom of Norway.

This is to certify:

That the Sewage systems

with type designation(s)

G&O Bioreactor, Models; BR 014800, BR 018500, BR 023125, BR 027750, BR 037000, BR 046250, BR 055500, BR 064750, BR 074000

Issued to

Gertsen & Olufsen AS

Allerød, Denmark

is found to comply with the requirements in the following Regulations/Standards:

Regulation **(EU) 2015/559,**

Annex A.1, item No. A.1/2.6 and Annex B, Module B in the Directive. Marpol 73/78 as amended, Annex IV Regulation 9, IMO Res. MEPC.227(64) with the exception of Section 4.2.

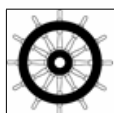
Further details of the equipment and conditions for certification are given overleaf.

This Certificate is valid until **2020-05-29**.

Issued at **Høvik** on **2016-11-25**

DNV GL local station:
Copenhagen

Approval Engineer:
Pål Evang Nundal



Notified Body
No.: **0575**

for **DNV GL AS**

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Vidar Dolonen
Head of Notified Body

Product description

The equipment is intended for installation onboard ships to provide sewage treatment for the protection of the marine environment.

The process of the sewage treatment plants are based upon a biological process of degrading.

Application/Limitation

Sewage Treatment Plants;

Model:	Designed Capacity (m ³ /day):	Designed Organic Load, (Kg BOD ₅ / day):
BR 014800	14.80	6.00
BR 018500	18.50	7.50
BR 023125	23,13	9.38
BR 027750	27.75	11.25
BR 037000	37.00	15.00
BR 037000-Split design	37.00	15.00
BR 046250	46.25	18.75
BR 055500	55.50	22.50
BR 064750	64.75	26.25
BR 074000	74.00	30.00

The inlet mixing tank is not part of the type-examination. Sizing of this tank should be according to recommendations from Gertsen & Olufsen AS.

The sewage treatment plants are not certified for nitrogen and phosphorus removal (MEPC.227(64) Sec. 4.2). If installed on passenger ships, treated sewage cannot be discharged in special areas. This prohibition applies when this sewage treatment plant is installed on new ships on or after 1 January 2016, and on existing ships on or after 1 January 2018.

The equipment is not permitted to be installed in spaces subject to explosion hazards.

Type Examination documentation

Mechanical/ System;

Drwg.No.;	Date/ Rev.;	Title:
----	Rev.0	GA – G&O Sewage Treatment Plant – Complete Test Setup
----	Rev.0	P&I Diagram
----	Rev.0	General Arrangement - Front View
----	Rev.0	General Arrangement - Top View
----	Rev.0	General Arrangement - Left Side View
----	Rev.0	General Arrangement - Back Side View
----	Rev.0	Component List -Test Plant (3 shts.)
----	Rev.0	Inside Front View – Test Plant
----	Rev.0	Inside Top View – Test Plant
----	Rev.0	Inside Left Side View – Test Plant
----	Rev.0	Inside Back Side View – Test Plant
BR 014800	Rev.0	Foot Print BR 014800
BR 018500	Rev.0	Foot Print BR 018500

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BR 023125	Rev.0	Foot Print BR 023125
BR 027750	Rev.0	Foot Print BR 027750
BR 037000	Rev.0	Foot Print BR 037000
BR 046250	Rev.0	Foot Print BR 046250
BR 055500	Rev.0	Foot Print BR 055500
BR 064750	Rev.0	Foot Print BR 064750
BR 074000	Rev.0	Foot Print BR 074000

Component configuration on G&O Sewage Treatment Plants, BR 014800 – BR 074000, dated 07-04-2010.

Electrical for test tank (Schmidt's Marine EI)

<i>Drwg.No.;</i>	<i>Date/ Rev.;</i>	<i>Title;</i>
Sh. 1 of 9	08-12-23	Control Cabinet – Layout
Sh. 2 of 9	08-12-23	Control Cabinet – Layout inside
Sh. 3 of 9	08-12-23	Line Diagram – Main Voltage
Sh. 4 of 9	08-12-23	Line Diagram – Control Voltage
Sh. 6 of 9	08-12-23	Line Diagram – Control Voltage
Sh. 7 of 9	08-12-23	Terminal Row
Sh. 8 of 9	08-12-23	Line Diagram – Main Voltage Pump
Sh. 9 of 9	08-12-23	Item List – Electrical Components
Sh. 10 of 9	08-12-23	Item List – Electrical Components

Electrical – common – all gravity units with compressor

<i>Drwg.No.;</i>	<i>Date/ Rev.;</i>	<i>Title;</i>
Sh. 1 of 8	Rev.1	Wiring Diagram & Cable List
Sh. 2 of 8	Rev.1	Wiring Diagram & Cable List
Sh. 3 of 8	Rev.1	Wiring Diagram & Cable List
Sh. 4 of 8	Rev.1	Wiring Diagram & Cable List
Sh. 5 of 8	Rev.1	Wiring Diagram & Cable List
Sh. 6 of 8	Rev.1	Wiring Diagram & Cable List
Sh. 7 of 8	Rev.1	Wiring Diagram & Cable List
Sh. 8 of 8	Rev.1	Wiring Diagram & Cable List
Sh. 8 of 8	Rev.1	Wiring Diagram & Cable List

Electrical – common – all vacuum units with compressor

<i>Drwg.No.;</i>	<i>Date/ Rev.;</i>	<i>Title;</i>
Sh. 1 of 9	Rev.1	Wiring Diagram & Cable List
Sh. 2 of 9	Rev.1	Wiring Diagram & Cable List
Sh. 3 of 9	Rev.1	Wiring Diagram & Cable List
Sh. 4 of 9	Rev.1	Wiring Diagram & Cable List
Sh. 5 of 9	Rev.1	Wiring Diagram & Cable List
Sh. 6 of 9	Rev.1	Wiring Diagram & Cable List
Sh. 7 of 9	Rev.1	Wiring Diagram & Cable List
Sh. 8 of 9	Rev.1	Wiring Diagram & Cable List
Sh. 9 of 9	Rev.1	Wiring Diagram & Cable List

Specifications;

Specifications & datasheets for main components
Specifications & datasheets for main electrical and instrument components
Typical piping specifications incl. materials, wallthicknesses, pressure ratings of valves, flanges and fittings

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General Documents;

- G&O Bioreactor sewage treatment plant, Technical description & test set-up.
- G&O MBR Bioreactor, Material Description, Rev.0, incl. specifications from vendors.
- Users Manual - G&O Bioreactor Sewage Treatment Plant.
- Asbestos free declaration, dated 2015-05-21.

Operations Control;

The equipment will be controlled through relay based system.

Drawings for BR37000BG-G split design:

<i>Drwg.No.;</i>	<i>Date/ Rev.;</i>	<i>Title;</i>
641-135-12	28.01.2010	Split plant - P&ID gravity
641-001-16	02.09.2015	Split plant - General arrangement

Tests carried out

- Danish Technological Institute; Test procedure and test results from testing of sewage treatment plant model STP 1850, during February 12th to 23rd, 2009, Rev.3, 2009-04-22/MHA.
- Results of analyses of samples from testing by AnalyTech Environmental Laboratory, Denmark.
- Report No. DANAK-196719, DELTA, Danish Electronics, Light & Acoustics, Vibration and temperature tests of Sewage Treatment Control Cabinet, performed for Gertsen & Olufsen AS, dated 2003-02-06.
- Report No. DANAK-198167, DELTA, Danish Electronics, Light & Acoustics, Shock tests of Sewage Treatment Control, performed for Gertsen & Olufsen AS, dated 2005-11-25.
- ENVICLEAN ApS; Type Test for BR 74000 BG Sewage Treatment Plant, dated 8th August 2011, including results of analyses of samples from testing by AnalyTech Environmental Laboratory, Denmark.
- ALS Denmark; *Modec Alfarapporteret analyser*, report no. 116272/16, tested model: BR37000BG-G Split design, test date 15.11.16

Marking of product

For traceability to this type approval, each unit is to be marked with;

- Manufacturer's name or trade mark
- Type designation
- Serial No.
- Mark of Conformity

This certificate replaces previous EC Type-Examination Certificate No. MED-B-9956.