

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 Norway.

This is to certify:

That the Sewage systems

with type designation(s)

DELTA PRBN 105, 140, 175, 210, 280, 350, 420, 490, 560, 630, 735, 875, 1200, 1400, 1575, 1750, 1925, 2100, 2450 and 2800

Issued to

DESARROLLO TECNICAS INDUSTRIALES DE GALICIA, S.A
LA CORUÑA, Spain

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

Regulation **(EU) 2019/1397,**

item No. MED/2.6. Marpol 73/78 as amended, Annex IV Regulation 9, IMO Res. MEPC.227(64)
with the exception of Section 4.2.

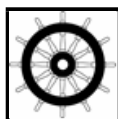
Further details of the equipment and conditions for certification are given overleaf.

This Certificate is valid until **2025-06-10.**

Issued at **Høvik** on **2020-06-11**

DNV GL local station:
NB/CMC Team West

Approval Engineer:
Thomas Grafton



Notified Body
No.: **0575**

for **DNV GL AS**

Roald Vårheim
Head of Notified Body



The mark of conformity may only be affixed to the above type approved equipment and a Manufacturer's Declaration of Conformity issued when the production-surveillance module (D, E or F) of Annex B of the MED is fully complied with and controlled by a written inspection agreement with a Notified Body. The product liability rests with the manufacturer or his representative in accordance with Directive 2014/90/EU.

This certificate is valid for equipment, which is conform to the approved type. The manufacturer shall inform DNV GL AS of any changes to the approved equipment. This certificate remains valid unless suspended, withdrawn, recalled or cancelled.

Should the specified regulations or standards be amended during the validity of this certificate, the product is to be re-approved before being placed on board a vessel to which the amended regulations or standards apply.



Product description

The PRBN Series of Sewage Treatment Plants are intended for installation onboard ships and offshore units for sewage treatment meeting the requirements specified in IMO Res. MEPC.227(64).

The PRBN Series uses a biological process to treat the sewage. After the biological treatment the process water is diluted with sea water (within the limits prescribed in IMO Res.MEPC.227(64)).

The sewage enters a Collecting and Aeration Tank which is supplied with air to stimulate bacteria growth and treat the sewage through an aerobic process. The process liquid is transferred through a screen to the Settling Tank where suspended solids and particles are separated. Sewage Sludge from the Settling Tank can be returned to the Collecting and Aeration Tank to feed the biological process. The process liquid is then transferred to a Disinfection Tank where sodium chlorine is used for disinfection. Before discharge, sodium bisulphite is added to remove residual chlorine from the effluent. The treated liquid is then discharged using the discharge pump.

Sewage Sludge is collected in each tank and is removed periodically using the discharge pump.

The PRBN Series may optionally be used with dilution water added to the disinfection tank. The dilution is controlled by a dilution water transfer module.

Application/Limitation

Application: -

<i>Model</i>	<i>Hydraulic Loading (litres/day) (*)</i>	<i>Organic Loading, BOD₅ without nitrification (kg/day)</i>
105	1050	0.75
140	1400	1.00
175	1750	1.25
210	2100	1.50
280	2800	2.00
350	3500	2.50
420	4200	3.00
490	4900	3.50
560	5600	4.00
630	6300	4.50
735	7350	5.25
875	8750	6.25
1200	11998	8.57
1400	14000	10.00
1575	15750	11.25
1750	17500	12.50
1925	19250	13.75
2100	21000	15.00
2450	24500	17.50
2800	28000	20.00

(*) Litres of sewage (excluding dilution water)

Dilution water (if used) may be grey water, salt water (sea water) or fresh water.

Installation Requirements: -

When the dilution option is specified, Inlet "C" is used for the supply of grey water, sea water or fresh water for dilution. The supply and control of the dilution water shall be arranged according to the Flow Diagram listed in the Type Examination documentation.

When the dilution option is not specified, Inlet "C" shall not be used.

Limitations: -

The PRBN Series is not certified for use on Passenger Ships in Special areas (ref. IMO Res.MEPC.227(64) Section 4.2).

When dilution water is added to the disinfection tank through Inlet "C", the dilution compensation factor (Q_d) shall not be less than 0.5.

Sewage Sludge shall be discharged according to the procedures described in the Operation and Maintenance Manual.

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

The ship should have on board at all times a copy of the Operation and Maintenance Manual listed in 'Type Examination documentation'.

A copy of this certificate should be carried on board any ship equipped with the sewage treatment plants described above.

Type Examination documentation

"DELTA-BIO" PRBN "A": Flow Diagram	PRBN-000A-F01	0 (06.2019)
"DELTA-BIO" PRBN "A" + DIL: Flow Diagram (Dilution Option)	PRBN-000A/DIL-F01	0 (03.2020)

"DELTA BIO" PRBN-105 "A": General Arrangement & Interfaces	PRBN-105A-G01	0 (06.2019)
"DELTA BIO" PRBN-140 "A": General Arrangement & Interfaces	PRBN-140A-G01	0 (06.2019)
"DELTA BIO" PRBN-175 "A": General Arrangement & Interfaces	PRBN-175A-G01	0 (06.2019)
"DELTA BIO" PRBN-210: General Arrangement & Interfaces	PRBN-210-G01	0 (01.2016)
"DELTA BIO" PRBN-280 "A": General Arrangement & Interfaces	PRBN-280A-G01	0 (06.2019)
"DELTA BIO" PRBN-350: General Arrangement & Interfaces	PRBN-350-G01	0 (10.2018)
"DELTA BIO" PRBN-420: General Arrangement & Interfaces	PRBN-420-G01	0 (10.2018)
"DELTA BIO" PRBN-490 "A": General Arrangement & Interfaces	PRBN-490A-G01	0 (06.2019)
"DELTA BIO" PRBN-560 "A": General Arrangement & Interfaces	PRBN-560A-G01	0 (06.2019)
"DELTA BIO" PRBN-630: General Arrangement & Interfaces	PRBN-630-G01	0 (08.2018)
"DELTA BIO" PRBN-735 "A": General Arrangement & Interfaces	PRBN-735A-G01	0 (06.2019)
"DELTA BIO" PRBN-875: General Arrangement & Interfaces	PRBN-875-G01	0 (09.2018)
"DELTA BIO" PRBN-1200: General Arrangement & Interfaces	PRBN-1200-G01	0 (10.2018)
"DELTA BIO" PRBN-1400: General Arrangement & Interfaces	PRBN-1400-G01	5 (12.2018)
"DELTA BIO" PRBN-1575: General Arrangement & Interfaces	PRBN-1575-G01	0 (10.2018)
"DELTA BIO" PRBN-1750: General Arrangement & Interfaces	PRBN-1750-G01	0 (10.2018)
"DELTA BIO" PRBN-1925: General Arrangement & Interfaces	PRBN-1925-G01	0 (10.2018)
"DELTA BIO" PRBN-2100: General Arrangement & Interfaces	PRBN-2100-G01	0 (10.2018)
"DELTA BIO" PRBN-2450: General Arrangement & Interfaces	PRBN-2450-G01	0 (10.2018)

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"DELTA BIO" PRBN-2800: General Arrangement & Interfaces	PRBN-2800-G01	0 (10.2018)
"DELTA-BIO" PRBN "A": Power Diagram	PRBN-000A-E01	0 (06.2019)
"DELTA-BIO" PRBN-105/175 "A": Control Diagram	PRBN-105/175A-E02	0 (06.2019)
"DELTA-BIO" PRBN-210/2800 "A": Control Diagram	PRBN-210/2800A-E02	0 (06.2019)
"DELTA-BIO" PRBN "A": Wiring Diagram	PRBN-000A-E03	0 (06.2019)
"DELTA-BIO" PRBN/STPN "A": Control Panel and Components List	PRBN/STPN-000A-E04	0 (04.2019)
Sewage Treatment Plant - DELTA PRBN: Instruction Manual	PRBN-000-02	
Delta PRBN Series Dilution Option – Description	-	

Tests carried out

Performance Tests: -

- Type Approval of Pollution Prevention Equipment according to IMO MEPC.227(64), Testing of the Operational Performance, Equipment Tested: DELTA PRBN-175 with dilution option. Dated 01.06.2015 (witnessed by ABS).
- Type Approval of Pollution Prevention Equipment according to IMO MEPC.159(55), Testing of the Operational Performance, Equipment Tested: DELTA PRBN-175 without dilution option. Dated 10.02.2014 (witnessed by ABS).
- Type Approval of Pollution Prevention Equipment according to IMO MEPC.227(64), Testing of the Operational Performance, Equipment Tested: DELTA PRBN-1400 with dilution option. Dated 11.05.2015 (witnessed by ABS).

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Environmental Tests: -

- Test Report Sewage Treatment Plant DELTA PRM-21, Electric Panel (E04I), Reference Standard MEPC 49/22/Add.2 Annex 13, Part 3 Specification for Environmental Testing for Type Approval of Pollution Prevention Equipment. AT4 Wireless S.A., Report 37023REA.001, dated 09.10.2012.
- Environmental Test of PRBN Sewage Treatment Plants control panel. Justification of compliance with IMO MEPC 227(64), Rev.1, dated 28.01.2020.

Marking of product

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

- Manufacturer's name or trade mark
- Type and Model
- Serial No. and date of manufacture
- Hydraulic Loading
- Any operational or installation limits considered necessary by the manufacturer or the Administration

APPENDIX TO CERTIFICATE OF TYPE APPROVAL FOR SEWAGE TREATMENT PLANTS

Test results and details of tests conducted on samples from the sewage treatment plant in accordance with resolution MEPC.227(64) including Section 4.2 for Passenger Ships in Special Areas:

Sewage treatment plant type:	.....
Manufactured by:	.....
Organization conducting the test:	.....
Organization handling the samples:	.....
Test Location:	.....
Designed hydraulic loading:	.....
Designed organic loading:	.....
No. of effluent samples tested:	.....
No. of influent samples tested:	.....
Total suspended solids influent quality:	.....
Total nitrogen influent quality:	.....
- Geometric mean:	.....
- Maximum	.....
- Minimum	.....
Total phosphorus influent quality:	.....
- - Geometric Mean:	.....
- - Maximum:	.....
- - Minimum:	.....
BOD5 without nitrification influent quality:	.....
Maximum hydraulic loading:	.....
Minimum hydraulic loading:	.....
Average hydraulic loading (Qi):	.....
Effluent flow (Qe):	.....
Dilution compensation factor (Qi/Qe):	.....
Geometric mean of total suspended solids:	.....
Geometric mean of the thermotolerant coliform count:	
Geometric mean of BOD5 without nitrification:	
Geometric mean of COD:	

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Geometric mean of total nitrogen:

Percentage reduction of total nitrogen:

Geometric mean of total phosphorus:

Percentage reduction of total phosphorus:

Maximum pH:

Minimum pH:

Type of disinfectant used:

If Chlorine - residual Chlorine:

Maximum:

Minimum:

Geometric mean:

Was the sewage treatment plant tested with:

Fresh water flushing?

☒ ☐

Salt water flushing?

☐ ☒

Fresh and salt water flushing?

☐ ☒

Grey water added?

Was the sewage treatment plant tested against the environmental conditions specified in section 5.9 of resolution MEPC.227(64):

Temperature:

☒ ☐

Humidity:

☒ ☐

Inclination:

☒ ☐

Vibration:

☒ ☐

Reliability of Electrical and Electronic
Equipment:

☒ ☐

Limitations and the conditions of operation are imposed:

Salinity:

Temperature:

Humidity:

Inclination:

Vibration:

Results of other parameters tested:

APPENDIX TO CERTIFICATE OF TYPE APPROVAL FOR SEWAGE TREATMENT PLANTS

Test results and details of tests conducted on samples from the sewage treatment plant in accordance with resolution MEPC.227(64) excluding Section 4.2 for Passenger Ships in Special Areas:

Sewage treatment plant type:	.....
Manufactured by:	.....
Organization conducting the test:	.....
Organization handling the samples:	.....
Test Location:	.....
Designed hydraulic loading:	.....
Designed organic loading:	.....
No. of effluent samples tested:	.....
No. of influent samples tested:	.....
Total suspended solids influent quality:	.....
Total nitrogen influent quality:	.....
- Geometric mean:	.....
- Maximum	.....
- Minimum	.....
Total phosphorus influent quality:	.....
- - Geometric Mean:	.....
- - Maximum:	.....
- - Minimum:	.....
BOD5 without nitrification influent quality:	.....
Maximum hydraulic loading:	.....
Minimum hydraulic loading:	.....
Average hydraulic loading (Qi):	.....
Effluent flow (Qe):	.....
Dilution compensation factor (Qi/Qe):	.....
Geometric mean of total suspended solids:	.....
Geometric mean of the thermotolerant coliform count:	.....
Geometric mean of BOD5 without nitrification:	.....
Geometric mean of COD:	.....

Geometric mean of total nitrogen: _____
Percentage reduction of total nitrogen: _____
Geometric mean of total phosphorus: _____
Percentage reduction of total phosphorus: _____
Maximum pH: _____
Minimum pH: _____
Type of disinfectant used: _____
If Chlorine - residual Chlorine: _____
Maximum: _____
Minimum: _____
Geometric mean: _____
Was the sewage treatment plant tested with:
Fresh water flushing? ☒ ☐
Salt water flushing? ☐ ☒
Fresh and salt water flushing? ☐ ☒
Grey water added? _____
Was the sewage treatment plant tested against the environmental conditions specified in section 5.9 of resolution MEPC.227(64):
Temperature: ☒ ☐
Humidity: ☒ ☐
Inclination: ☒ ☐
Vibration: ☒ ☐
Reliability of Electrical and Electronic Equipment: ☒ ☐
Limitations and the conditions of operation are imposed:
Salinity: _____
Temperature: _____
Humidity: _____
Inclination: _____
Vibration: _____
Results of other parameters tested: _____

APPENDIX TO CERTIFICATE OF TYPE APPROVAL FOR SEWAGE TREATMENT PLANTS

Test results and details of tests conducted on samples from the sewage treatment plant in accordance with resolution MEPC.227(64) excluding Section 4.2 for Passenger Ships in Special Areas:

Sewage treatment plant type:	.....
Manufactured by:	.....
Organization conducting the test:	.....
Organization handling the samples:	.....
Test Location:	.....
Designed hydraulic loading:	.....
Designed organic loading:	.....
No. of effluent samples tested:	.....
No. of influent samples tested:	.....
Total suspended solids influent quality:	.....
Total nitrogen influent quality:	.....
- Geometric mean:	.....
- Maximum	.....
- Minimum	.....
Total phosphorus influent quality:	.....
- - Geometric Mean:	.....
- - Maximum:	.....
- - Minimum:	.....
BOD5 without nitrification influent quality:	.....
Maximum hydraulic loading:	.....
Minimum hydraulic loading:	.....
Average hydraulic loading (Qi):	.....
Effluent flow (Qe):	.....
Dilution compensation factor (Qi/Qe):	.....
Geometric mean of total suspended solids:	.....
Geometric mean of the thermotolerant coliform count:	.....
Geometric mean of BOD5 without nitrification:	.....
Geometric mean of COD:	.....

Geometric mean of total nitrogen: _____
Percentage reduction of total nitrogen: _____
Geometric mean of total phosphorus: _____
Percentage reduction of total phosphorus: _____
Maximum pH: _____
Minimum pH: _____
Type of disinfectant used: _____
If Chlorine - residual Chlorine: _____
Maximum: _____
Minimum: _____
Geometric mean: _____
Was the sewage treatment plant tested with:
Fresh water flushing? ☒ ☐
Salt water flushing? ☐ ☒
Fresh and salt water flushing? ☐ ☒
Grey water added? _____
Was the sewage treatment plant tested against the environmental conditions specified in section 5.9 of resolution MEPC.227(64):
Temperature: ☒ ☐
Humidity: ☒ ☐
Inclination: ☒ ☐
Vibration: ☒ ☐
Reliability of Electrical and Electronic Equipment: ☒ ☐
Limitations and the conditions of operation are imposed:
Salinity: _____
Temperature: _____
Humidity: _____
Inclination: _____
Vibration: _____
Results of other parameters tested: _____