



Certificate No:
TAP00002BB

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Sewage Treatment Plants

with type designation(s)

ECOMar 20 S, ECOMar 32 S, ECOMar 45 S, ECOMar 70 S, ECOMar 145 S, ECOMar 230 S, ECOMar 340 S, ECOMar 545 S

Issued to

TECNICOMAR S.P.A.

Marsala TP, Italy

is found to comply with

IMO MEPC Circ. 227(64) "GUIDELINES ON IMPLEMENTATION OF EFFLUENT STANDARDS AND PERFORMANCE TESTS FOR SEWAGE TREATMENT PLANTS"

Application :

Product(s) approved by this certificate may be accepted for installation on all vessels to demonstrate compliance with MARPOL Annex IV Reg.9. Acceptance is subject to confirmation from the Flag Administration of the vessel the product is installed on.

Limitations imposed are described in this document.

Note: For vessels with EU Flag, EU Marine Equipment Directive (MED) certificates are required instead of this Type Approval certificate.

Issued at **Høvik** on **2021-07-01**

This Certificate is valid until **2026-06-30**.

DNV local station: **Italy FIS**

for **DNV**

Approval Engineer: **Thomas Grafton**

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Dag Sæle-Nilsen
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Form code: TA 251

Revision: 2021-03

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Product description

The ECOmar S series treats batches of sewage using the following process: i) transfer of a fixed amount of sewage from a holding tank to a treatment tank, ii) chemical treatment and addition of a flocculant, iii) adding a fixed amount of dilution water, iv) maceration and return to treatment tank, v) filtration and UV treatment prior to overboard discharge, vi) washing of the tank and discharge of the waste (sewage sludge).

The chemical treatment and flocculation processes uses hydrogen peroxide and ECOFLOC (*). After the chemical treatment the sewage batch is diluted with sea water (within the limits prescribed in IMO Res.MEPC.227(64)).

(*) ECOFLOC is a Tecnicomar S.p.A. brand product.

Application

Model	Hydraulic Loading (litres/day) (**)	Organic Loading, BOD ₅ without nitrification (kg/day)
ECOMar 20 S	2,000	0.70
ECOMar 32 S	3,200	1.12
ECOMar 45 S	4,500	1.58
ECOMar 70 S	7,000	2.46
ECOMar 145 S	14,500	5.09
ECOMar 230 S	23,000	13.89
ECOMar 340 S	34,000	20.54
ECOMar 545 S	54,500	32.92
(**) Litres of sewage (excluding dilution water).		

Limitations

Condition of heel up to (max angle of pitch and roll):	22.5 degrees
Range of environmental temperature	0 to 55 degrees Celsius
Maximum environmental humidity	95%

The ECOmar S series may be used on Passenger Ships in Special areas (ref. IMO Res.MEPC.227(64) Section 4.2).

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

The design of structural tanks and piping constructed by the shipyard (e.g. sewage collecting tanks, sludge tanks, piping marked as "yard supply", etc.) are not evaluated as part of the type examination.

Toilet cleaning products that affect the ECOFLOC and/or Hydrogen Peroxide treatment efficiency shall not be used. In case of doubt, the compatibility of toilet cleaning products should be checked and confirmed by Tecnicomar.

Installation requirements

Dilution water may be either salt water (sea water) or fresh water.

Sewage Sludge shall be directed to a sludge tank/holding tank, as shown in the Flow Diagrams listed in the Type Examination documentation.

Electrical and control components

The units are controlled through a main control box containing a Printed Circuit Board (PCB). The PCB is approved with the following control firmware:

Control Box Firmware:	Tecnicomar_TMM_ECOMar V3.5 – 30.11.18
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Changes in the firmware which can alter the performance of the system shall be approved by DNV. Note that testing of the system with the revised firmware may be required. Documentation confirming the approval (and any testing) shall be kept together with the certificate, or the certificate shall be updated.

Type Examination documentation

Performance Test Plans:

<i>Title:</i>	<i>Revision:</i>
Testing Plan for ECOmar 45 S unit S.T.P.	2019-R1
Testing Plan for ECOmar 230 S unit S.T.P.	2019-R3

Basis of acceptance

Test reports

Performance Test:

- Testing Plan for ECOmar 45 S unit S.T.P, Annex: Performance Test Results, Rev.4, dated 01.03.2019. (Test Reports from Eurolab S.r.l. dated 11.01.2019 to 14.01.2019).
- Testing Plan for ECOmar 230 S unit S.T.P, Annex: Performance Test Results, Rev.2, dated 17.05.2019. (Test Reports from Eurolab S.r.l. dated 26.03.2019 to 06.04.2019).

Environmental Test: -

- Environmental Test for Tecnicomar S.p.A, Report no. 18B292A, dated 30.11.2018, TesLab, Livorno, Italy.
- Validation of the Environmental Test for ECOmar S/SX STP units, dated 30.04.2021.

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

Copy of the certificate and operation and maintenance manual

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

The ship should have on board at all times a manual detailing the operational and maintenance procedures for the sewage treatment plant, including safety information about the chemicals and materials actually used in the operation of the sewage treatment plant.

Periodical assessment

For retention of the Type Approval, a DNV surveyor shall perform periodical assessments (refer to Type Approval program DNVGL-CP-0338). The main scope of the periodic assessment will normally include:

- Verification of the Type Approval applicant's production and quality system with relation to ensuring continued consistent production of the type approved products at the applicant's own premises and at other companies that are given the responsibility for manufacturing of the products.
- Review of the documentation and checking that this is still used as basis for the production.
- Review of possible changes to the design, material and performance of the product.
- Verification of the product marking.

This certificate is valid for five years and periodical assessments will be required after 2 years (+/- 90 days) and 3.5 years (+/- 90 days). The date defining the beginning of as the validity period is 2021-05-03.

Places of manufacture

- TECNICOMAR S.P.A., Contrada Barbaro 78, Marsala, Italy.

Revision history

<i>Revision</i>	<i>Issue Date</i>	<i>Reason for revision</i>
-	01.07.2021	Initial certificate.



Job Id: **262.1-035619-1**
Certificate No: **TAP00002BB**

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 responsible for the test:

Organization handling the samples and responsible
for analysis at the test site:

Organization responsible for laboratory analysis:

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 (Q_i):

Effluent flow (Q_e):

Dilution compensation factor (Q_i/Q_e):

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:



Job Id: **262.1-035619-1**
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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:

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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 (with additional confirmatory testing including Section 4.2 for Passenger Ships in Special Areas):

Sewage treatment plant type:

Manufactured by:

Organization responsible for the test:

Organization handling the samples and responsible
for analysis at the test site:

Organization responsible for laboratory analysis:

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 (Q_i):

Effluent flow (Q_e):

Dilution compensation factor (Q_i/Q_e):

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:



Job Id: **262.1-035619-1**
Certificate No: **TAP00002BB**

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:

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