



ACO Maripur - Advanced Wastewater Treatment Units

ACO Maripur - the highest standard of wastewater treatment plants for all marine applications.

The ACO Maripur with low-pressure ultra-filtration units offers the following advantages:

■ Type Approved to IMO MEPC 159(55)  and MED Module B. 

■ Compact process due to high concentration of activated sludge in the reactor enabling limited space on ships and other marine structures to be used more efficiently.

■ The combination of a biological process with ultra-filtration – without the need for final clarification or additional disinfection (e.g. chlorination and/or UV filtration) – meets and exceeds the quality standards of IMO/MARPOL, HELCOM, USCG, US CFR40.133, Australian ADNOC and Australian Federal Environmental agency and the Alaska requirement.

■ ACO Maripur is manufactured using only high quality 316 stainless steel.

■ Simple automated operation requires minimal operator intervention and maintenance.

■ Modularization - wastewater transfer pumps and vacuum collecting systems can be shelf mounted onto ACO Maripur body.

■ Designed to treat all wastewaters (black and grey water) in one reactor reducing the need for more costly, heavier and larger alternative solutions.

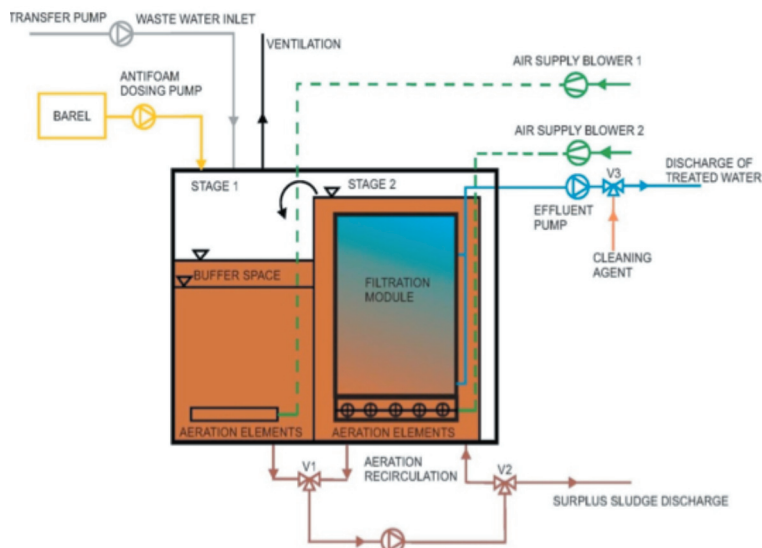
■ Retrofit options. ACO Maripur is available in modular sections to allow easier access to installation site.



Effluent values and its comparison with alternative standards

| | IMO MEPC.2 (VI) | USCG 33CFR 159 PT1-300 | USCG/Alaska 33CFR 159.309 | IMO MEPC 159(55) | ACO Maripur® IMO certified values |
|-------------------------------|-----------------|------------------------|---------------------------|------------------|-----------------------------------|
| Coliform bacteria [n/100ml] | 200 | 200 | 20 | 100 | 9 |
| Total suspended solids [mg/l] | 100 | 150 | 30 | 35 (70 at sea) | 2 |
| BOD5 [mg/l] | 50 | - | 30 | 25 | 3 |
| COD [mg/l] | - | - | - | 125 | 45 |

Technical Description



ACO Marine Data Sheet

Process Description

The wastewater passes into bioreactor where biological purification of the sewage water by activated sludge, a mixture of a number of micro-organisms, occurs.

The process is an aerobic one where the oxygen for respiration of the activated sludge must be delivered into the tank. The blowers continuously deliver air into the system which is then distributed into the bioreactor via the aeration elements. This air, whilst serving to keep the filtration modules clean, also ensures delivery of the required amount of oxygen to the micro-organisms within the process. Simultaneously the volume of the bioreactor is mixed to ensure the contact of sewage water with the activated sludge.

The first stage is continuously re-circulated to the membrane compartment by means of the recirculation pump. This membrane compartment maintains a constant level by overflowing back into the first stage compartment.

This feature allows for much greater flexibility during maintenance where it is no longer necessary to discharge the entire contents of the tank for internal access. The purified water is separated from the activation sludge by means of filtration modules. The filtration modules create safe, physical, barriers for the activation sludge, bacteria and some viruses. As a result, the filtered water does not need to be further disinfected.

The purified water is removed under a small vacuum created on the clean side of the filtration elements by the progressive cavity filtrate/permeate discharge pump with frequency converter.

The filtration modules are continuously cleaned to prevent fouling by the activated sludge. This is achieved by locating the aeration elements uniformly under the filtration modules. An integrated cleaning chamber is included in the main stainless steel tank for periodic membrane cleaning (using the reversible

permeate discharge pump). This applies to ACO Maripur 100+. Smaller sizes are cleaned by externally prepared cleaning agent.

The amount of sludge in the bioreactor increases during operation. The sludge concentration design value is 12,000 mg/l. The sludge concentration is controlled by means of a timer function on the effluent pump after a pre-programmed number of running hours. If the biological loading per litre is equal for all compliment conditions this feature will control concentration very simply and effectively. The surplus sludge is discharged periodically from the second chamber by the recirculation pump.

During operation some foaming may occur on the surface level of the bioreactor. This is suppressed by the integrated antifoam dosing system.

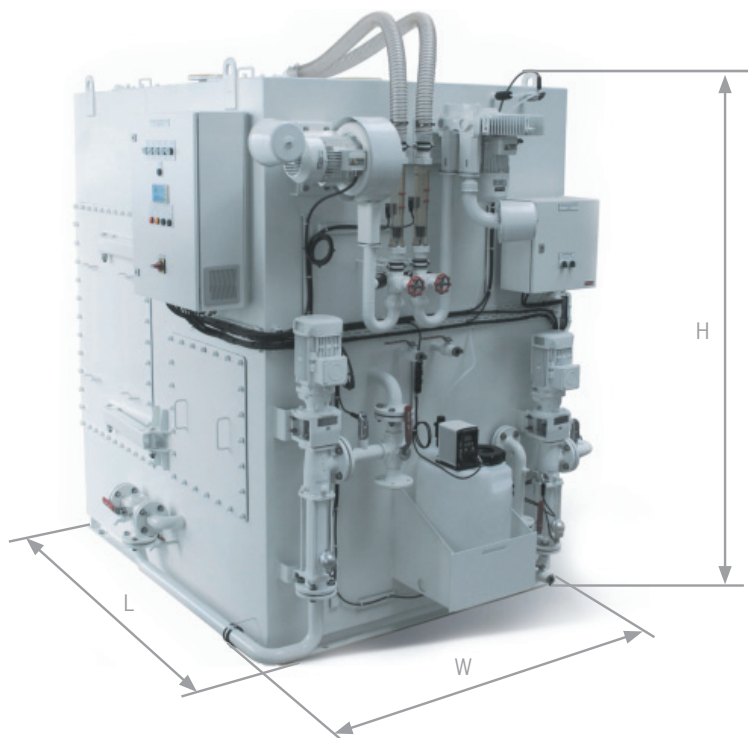
Sizing and design

The ACO Maripur was developed as a modular system of seven nominal sizes from 25 - 250.

ACO Marine also offer bespoke solutions to even the most specialist of requirements for

such markets as Cruise, Military, Megayacht and Offshore.

| ACO Maripur | | 25 | 50 | 75 | 100 | 150 | 200 | 250 |
|--------------------------------|-------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Designed hydraulic load | m ³ /d | 5,75 | 11,5 | 17,25 | 23 | 34,5 | 46 | 57,5 |
| Major Dimensions | LxWxH mm | 1800 x 1400 x 2100 | 2270 x 1520 x 2300 | 2380 x 1890 x 2400 | 2500 x 2290 x 2400 | 3090 x 2450 x 2500 | 3750 x 2750 x 2500 | 4600 x 2800 x 2500 |



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