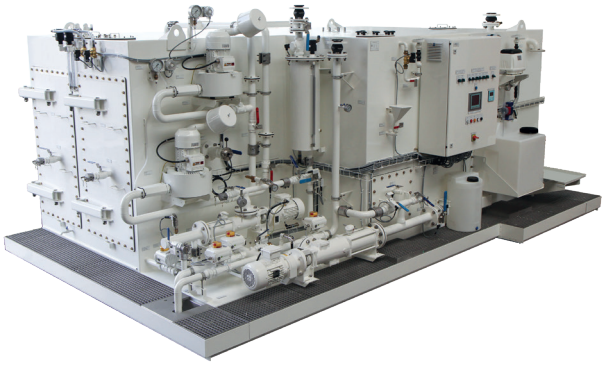
ACO Maripur NF Advanced Wastewater Treatment Units

IMO has adopted RESOLUTION MEPC 227(64) with revised guidelines for effluent standards and performance test procedures for sewage plants.

These guidelines, adopted in October 2012, which supersede resolution MEPC 159 (55), include the standards of section §4.2 that specifically apply to passenger ships operating in MARPOL Annex IV special areas and which intend to discharge treated sewage effluent into the sea.

The ACO Maripur NF range of sewage treatment plants are fully certified to IMO MEPC 227 (64) including section §4.2 for passenger vessels operating in IMO designed special areas as defined in IMO MEPC 200 (62). Manufacturing, Test and Quality Management are certified to ISO9001:2009/ISO9001:2008 and EC MED Module D.



ACO Maripur NF - the highest standard of wastewater treatment plans of marine applications

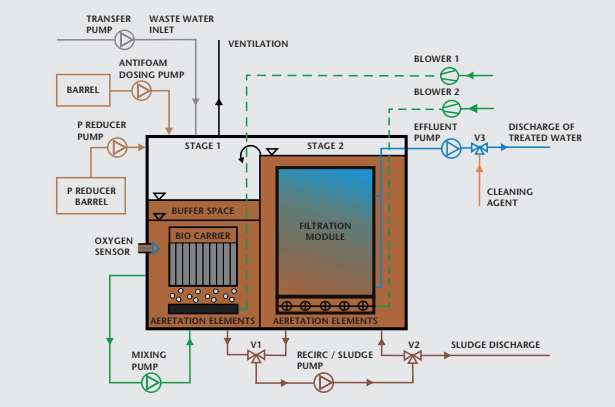
- **Type Approved to IMO MEPC 227(64) including section §4.2 for passenger vessels operating in IMO designated special areas.**
- Compatible with both gravity and vacuum systems
- Modularisation - wastewater transfer pumps and vacuum collecting systems can be shelf mounted onto ACO Maripur NF body
- Designed to treat both black and grey water in one single system
- 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
- Manufactured entirely in the EU from high performance materials which, unlike coated black steel, are completely corrosion resistant and light weight
- Unaffected by ship movement or vibration
- Bespoke newbuild and retrofit solutions with complete ship system integration

Process Description

The main biochemical purification process occurs in the 1st stage activation chamber. The biological cleaning is based on the action of aerobic bacteria which need a good distribution of oxygen. During the aerobic mode organic pollution and ammonia is removed. Simultaneous to the aerobic phase is the anoxic cycle where nitrate is removed. Critical to the process is the balance of timing for the oxygenation and de-oxygenating cycles.

Throughout the process the dissolved oxygen content is monitored and regulated during the aerobic/anoxic cycle.

Simultaneous aerobic nitrification and anoxic denitrification is the conversion of the ammonium ion to nitrogen gas inside the bioreactor. Denitrifying microbes require a very low oxygen concentration. Cyclic aeration is therefore carefully balanced to ensure optimum nitrification and denitrification.



Biochemical phosphorus removal is achieved by dosing with aluminum or iron-based coagulants which ensure the effective precipitation of the phosphorous during the final filtration stage.

Maripur NF	USCG	IMO MEPC.2 (VI)	IMO MEPC 227(64)	ACO Maripur NF test values
Coliform bacteria [n/100ml]	200	200	100	17,5
Total suspended solids [mg/l]	150	100	35	2,4
BOD_5 [mg/l]	-	50	25	7,3
COD [mg/l]	-	-	125	60
pH	Not req'd	Not req'd	6 - 8.5	7,3
Chlorine (mg/l)	Not req'd	As low as practicable	<0.5	NIL
Total Nitrogen (mg/l)	Not req'd	Not req'd	20	7,2
Phosphorous (mg/l)	Not req'd	As low as practicable	1	0,3

The first stage is continuously re-circulated to the 2nd stage by means of the recirculation pump. This 2nd stage compartment maintains a constant level by overflowing back into the first stage compartment. This feature allows for much greater flexibilitay 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.

Purified water is removed under a small vacuum created on the clean side of the membrane material by the progressive cavity permeate discharge pump with frequency converter.

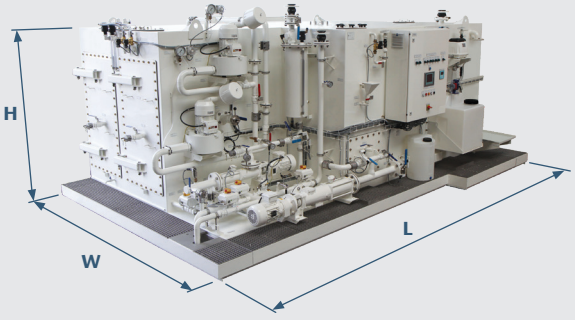
The filtration modules are continuously cleaned to prevent fouling by the activated sludge. This is achieved by locating the aeration elements uniformly under the filtration modules. An integrated cleaning chamber is included in the main stainless steel tank for periodic membrane cleaning.

Maripur NF Sizing and Design

Maripur NF	Hydraulic Load [Lits/Day]	BOD_5 Load [kg/day]	Number PE* [Black & Grey Water]		Overall Dimensions [mm]		
			HYD	BOD	L	W	H
Maripur NF-25	5 750	2.25	33	32	2 126	1 730	2 081
Maripur NF-50	11 500	4.50	67	64	2 647	1 974	2 164
Maripur NF-75	17 250	6.75	98	96	2 585	2 346	2 436
Maripur NF-100	23 000	9.00	134	129	3 606	2 593	2 284
Maripur NF-150	34 500	13.50	197	192	4 595	2 431	2 139
Maripur NF-200	46 000	18.00	263	257	4 837	2 269	2 727
Maripur NF-250	57 500	22.50	329	321	5 722	3 216	2 226
Maripur NF-500	115 000	45.00	658	643	6 452	6 102	2 271

* Indicative only - to be confirmed during specification review; based on 25 lit black and 150 lit grey water per person and 70g BOD5/per/day

Size range



Certificates