

3 Introduction to the waste water treatment system

3.1 Generality

A waste water depurator “BLUE SEA” is a system that serves to eliminate the bacteriological pollution and to lower the TSS drastically, the BOD5, the COD, the turbidity of black waters of drainage produced in one boat.

The system, fully automatic, is equipped of a special chemical laboratory/physicist where the drainage waters come depurate, crushed, sterilized and consistent yields to the international norms, that they regulate the drainage in sea of black waters.

Thanks to “BLUE SEA” it is therefore today possible to directly unload black waters in sea, in the full respect of the atmosphere and of the enforced norms, avoiding at the same time, of having heavy and big tanks of collection of black waters and the annoying procedures of drainage in the authorized ports.

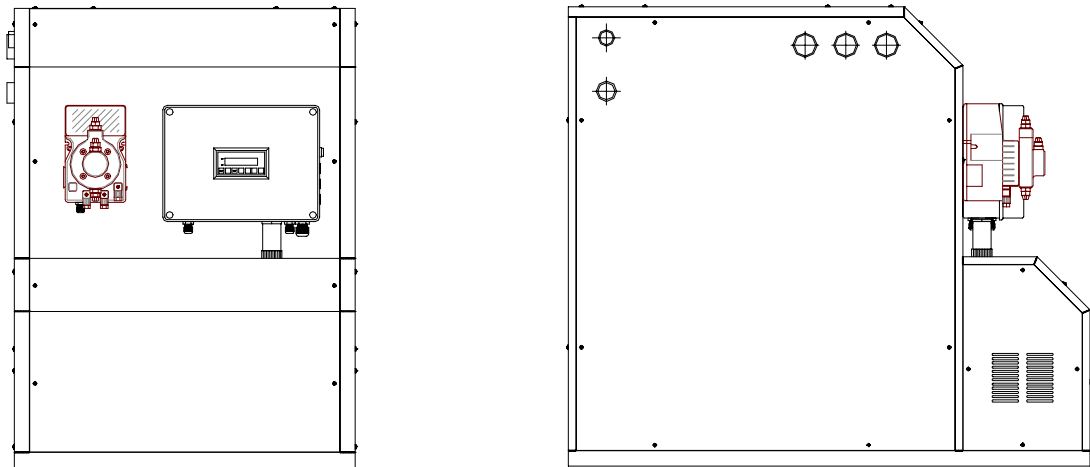


Figure 3.1 Waste water treatment system model BLUE SEA 3500

3.2 Previewed use

The waste water depurator "BLUE SEA 3500" is produced mainly for uses it in sail boats, motor boats, ships, large yacht.

3.3 Operation principle

The operation of the waste water depurator "BLUE SEA 3500" is based on the principle of the chemical oxidation.

3.3.1 Process of chemical oxidation

The oxidation and the reduction are complementary chemical processes that involve one loss of electrons (oxidation) from part of a reagent and a correspondent electron purchase (reduction) from part of an other: the two processes must therefore have place and in corresponding amounts at the same time.

The more common processes of oxidation use oxygen of the atmosphere; between these they re-enter the formation of rust (v. corrosion), the combustion and the respiration. In all the cases it is the oxygen that is reduced. Between the reduction processes they can be remembered the recovery of the metals from their minerals, the photo-synthetic production of carbohydrates and the hydrogenation of the fat people.

Oxidizing agents

The substance that acquires electrons during an oxide reaction reduction is said oxidizing agent. In the course of the reaction the oxidizing agent reduces itself; a fort oxidizing agent, reacting, becomes a reducing agent weak person. The most electron-negative between the chemical elements they are those that have the greater tendency to participate to the reactions like oxidizing agents, in how much form Ionian denied to you (that is acquire electrons) a lot easy.

The fluorine, that it is the electron-negative element, is the agent more active oxidant between the chemical elements. It reacts forming ion the fluorine, that she is more the reducing agent weak person. Oxygen is highly reactive, in particular in its allotropic shape, ozone.

All the halogens can be behaved from strong oxidizing agents. Some compounds that contain oxygen yield easy it to other reagents, reducing themselves in this process.

Important examples of this type are the hydrogen peroxide, the nitric acid, the concentrated sulphuric acid, permanganate, the dichromate one, chlorate and hypochlorite, the nitrate of potassium and Ionian. The permanganate one of potassium is a

profit agent oxidant of laboratory, much energetic in solution acid and little assets in alkaline solution.

Reducing agents

Those elements are active reducing agents whom they form positive Ionians, as it is expectable in basis to the low electron-negative, most active are the alkaline metals, follow from that alkaline-terrosi. Between all the elements the cesium is more the reducing agent fort.

In organic chemistry the hydrogen, idruro of lithium and aluminium and the boroidruro are useful reducing agents of sodium.

In general terms, the force of a reagent in a oxygen-reduction process depends on the reaction conditions. The hydrogen reduces the triple ties carbon to simple ties when a catalyst to platinum is used, but the reaction is arrested to the stage of the double tie if the catalyst is the nichel-Raney. In order to oxidize or to reduce sure groups it works them on a complex molecule and to leave of unchanged others, must accurately be selected the appropriated agent, the catalyst, the concentrations, the temperature and the pressure.

Self-oxidation

Some compounds can act are from oxidizing agents who give reducing agents. In hydrogen peroxide oxygen is found in one be of intermediate oxidation between that one of free oxygen and that one of oxides. In the decomposition of this compound they are formed is water that molecular oxygen. This process is defined of self-oxidation and is catalyzed from present impurities in the sample.

Here because the chemical processes advance you of oxidation they take advantage of the oxidants (chemical) in order to reduce the levels of COD/BOD and in order to remove she is the organic members who oxidizer inorganic. The processes can completely oxidize the organic materials in carbon dioxide and water, even if often it is not necessary to make to be left over them until this level of treatment.

A width variety of advances processes to you of oxidation e' therefore available:

- Processes of chemical oxidation that take advantage of peroxide of hydrogen, ozone, peroxide and ozone arrange to you, reagents of Fenton etc.
- oxidation improved with ultra violet, like UV/Ozone, UV-peroxide of hydrogen, UV/aria
- oxidation to humid air: catalytic oxidation with humid air (in which the used air e' like oxidant) In the event specific, for the oxidation process, it comes employed hydrogen peroxide, such chemical process it represents the finest technique than oxidation and offers several advantages regarding the biological processes.

4 Operation of the waste water depurator

4.1 Diagram of operation

The operation of the depurator black waters “BLUE SEA 3500” is represented from the diagram of flow of continuation here exposed.

In it they come characterizes the following blocks to you works them:

- 1 - UNIT OF FEEDING (MACERATOR BOOSTER PUMP) (*)
- 2 - UNIT OF OXIDITION/REDUCTION
- 3 - UNIT OF TRITURAZIONE AND EXPLANATION
- 4 - ULTRAVIOLET STERILIZATION (U.V.) (*)
- 5 - UNIT OF COMMANDS AND CONTROLS
- 6 - REMOTE CONTROL(*)
- 7 - UNIT OF FLUSHING(**)

(*) Optional; (**) Function to only employ for the conservation of the system and/or the extraordinary maintenance;

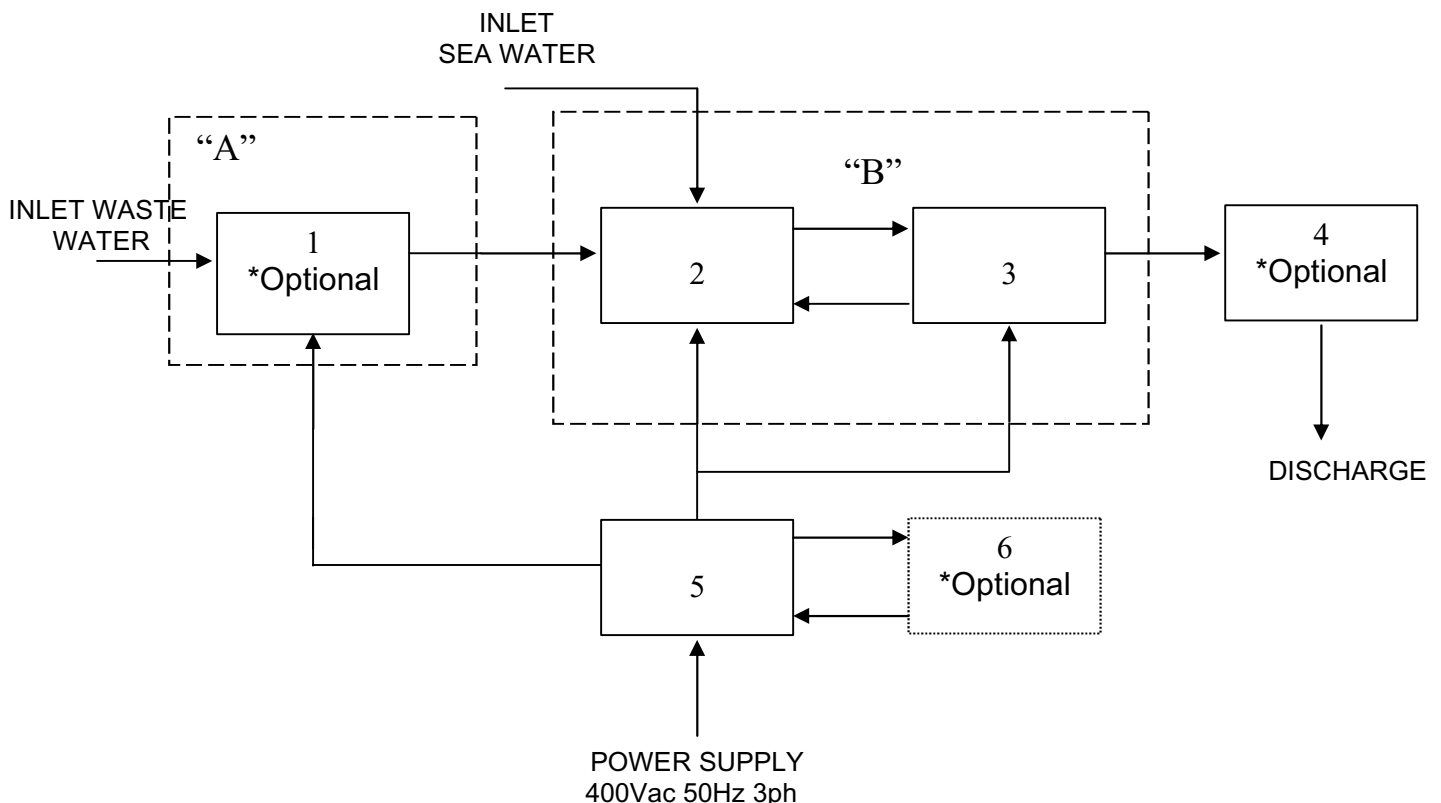


Figure 4.1: Flow chart of the operation of BLUE SEA