



PROFESSIONAL MARINE & INDUSTRY



DYNAMIC
BIOFILM
PROTECTION

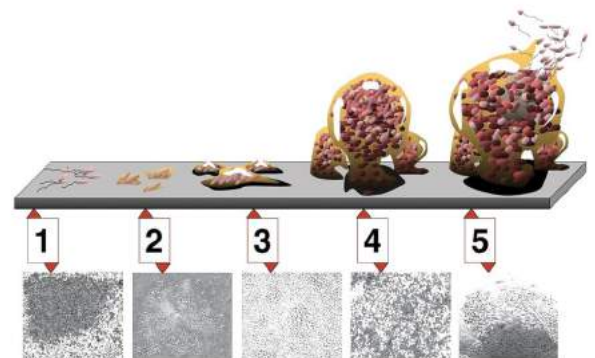
HASYTEC *electronics*



BIOLOGICAL FOULING

BIOFILM

Biofilm consists of micro-organisms in which cells are sticking to each other. These micro-organisms are able to multiply under favorable conditions and as a result will form biofilm. This biofilm is the attachment and food base for every further fouling and growth as algae, barnacles or shells.



CONSEQUENCES

Fouling as the result of biofilm causes a lot of issues like corrosion, formation of micro-organisms and deterioration of heat transfer as well as cross-section reduction and blockages. All these issues lead to the fact that chemicals or other environmental unfriendly procedures are required. In addition to the environmental effect all these issues are causing higher costs of maintenance and will lead to higher operational costs as well as to increased total costs of ownership in the shipping industry.

TARGETS

The removal of biofilm is really difficult since it has the ability to protect itself. In addition, if remaining parts of biofilm are not completely removed, subsequently this will lead to an accelerated regrowth of micro-organisms. Therefore biological fouling prevention is a major target in the pre-treatment process. It will directly save costs and will contribute to an environmental friendly and sustainable solution.

Major topics:

- Attachment prevention of micro-organisms
- Biofilm removal and prevention
- Avoiding attachment of particles as lime or rust
- Preventing the development of biofilm based bacteria
- Destruction of all unicellular organisms as, e.g. algae, by breaking their membrane-bound organelles
- Avoiding biocorrosion
- Avoiding biofouling





WORKING PRINCIPLE

PRINCIPLE OF DYNAMIC BIOFILM PROTECTION

The uniqueness of HASYTEC Dynamic Biofilm Protection is the combination between the “low power” consuming transducers and the intelligent software, which results in the transducers to be directed highly focussed and controlled. HASYTEC DBP runs a very precisely tuned program of several frequencies and power consumptions.

The transducers need to be glued with special industrial glue onto the requested applications. The metal transports the ultrasonic signals into the liquid (mostly water) and as a consequence it will diffuse completely through the medium (see pictures). These diffused ultrasonic waves will prevent the biofilm and will even remove it in early stages. Consequently HASYTEC DBP prevents fouling, marine growth, bacteria, clogging and blockage.

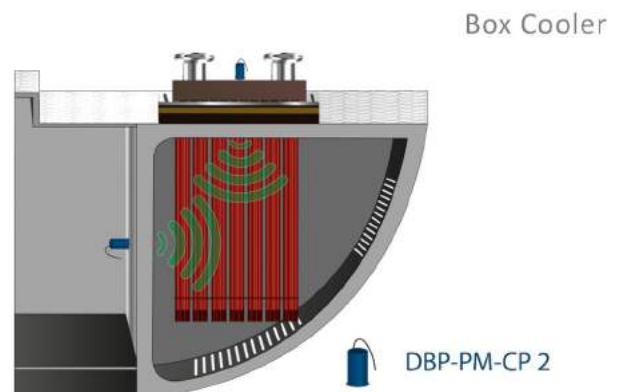
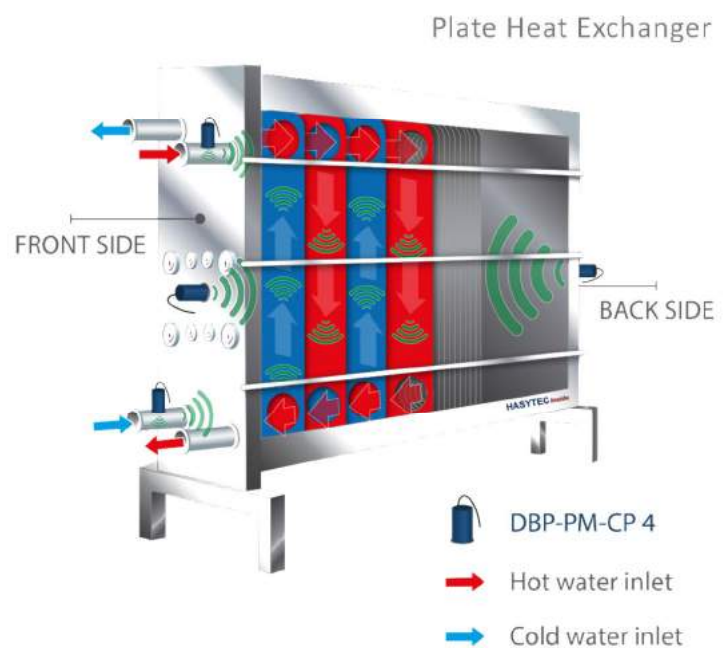
Due to the fact that the emitted ultrasound is running on several different frequencies which only avoid biofilm and destroy unicellular organisms, it doesn't harm the environment as fishes, dolphins, whales or human beings.

The system needs a constant power supply which has to be provided 24/7. It consumes max 20 Watt per transducer.

HASYTEC DBP doesn't require any maintenance.

Due to the fact that HASYTEC DBP is a preventive system it's necessary to start with a clean surface.

Installation of HASYTEC DBP is very easy. There is no need for the vessel to go to dry dock. The installation can be realised at any given time. Only hull protection installations require dry dock conditions to reach the ballast water tanks, if applicable.





PRODUCT DESCRIPTION

PRODUCT HIGHLIGHTS

HASYTEC DBP is the result of 22 years electro technical marine experience and prevents biofilm which is the initial basis of all fouling and marine growth. It is developed to combat fouling and growth on every liquid carrying surface.

HASYTEC DBP is currently the only system on the market which enables 8 transducers emitting ultrasound at the same time which increases the effect and the covered areas enormously.

Highly effective and efficient against biofilm, fouling, marine growth on:

- hulls
- box coolers
- LT-coolers
- strainers
- fresh water generators
- propellers
- bowthrusters

Highly effective and efficient against biofilm and clogging on liquid carrying surfaces like:

- pipes
- plate heat exchangers
- tanks
- process water lines

TECHNICAL HIGHLIGHTS

- modular control unit controls up to 8 transducers which are emitting ultrasound at the same time
- casted alloy casing, protected in IP 66 standard, powder coated (DNV GL approved)
- protected cables (DNV GL approved)
- cable routing (DNV GL approved)
- cable length up to 25 m
- cables to be connected inside control unit
=> no plugs needed

**DYNAMIC
BIOFILM
PROTECTION**



HASYTEC DBP is developed and produced in Germany

ADVANTAGES

- ✓ Reduces the costs of fouling and bacteria prevention
- ✓ Reduces operational costs
- ✓ Reduces the Total Cost Of Ownership
- ✓ Environmental friendly and sustainable
- ✓ Maintenance free
- ✓ 5 years warranty

**5 YEARS
WARRANTY**



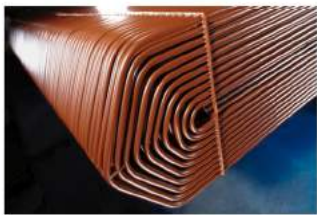
**MADE IN
GERMANY**



APPLICATIONS

PROFESSIONAL MARINE

BOX COOLERS / SEA CHESTS



LT-COOLERS / STRAINERS



PIPES



PROPELLERS



FRESH WATER GENERATORS



HULLS



INDUSTRY

COOLING TOWERS



METAL PROCESSING



PAPER PROCESSING



PROCESS WATER



OFFSHORE



OIL AND GAS





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