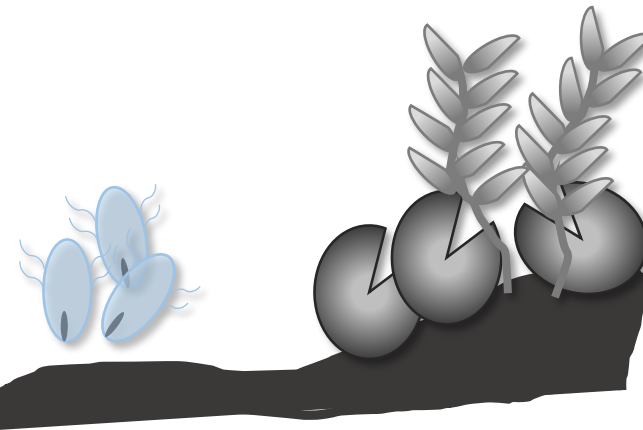
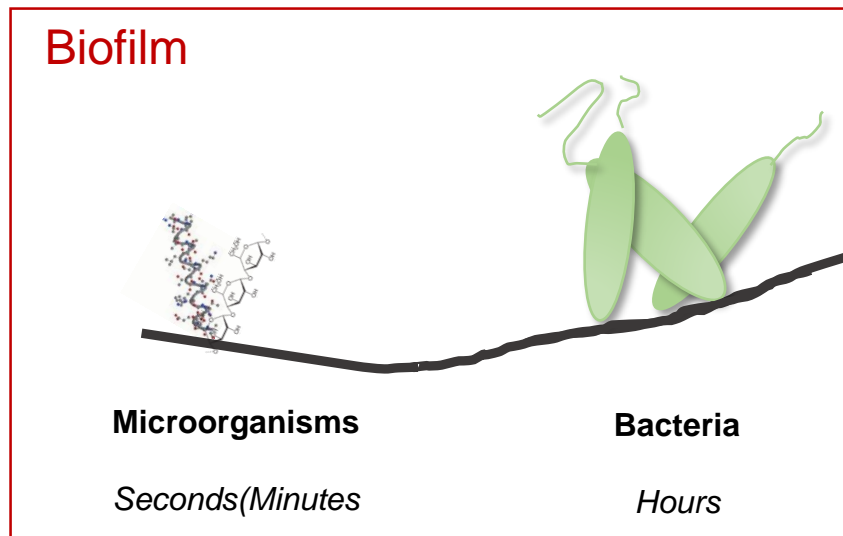
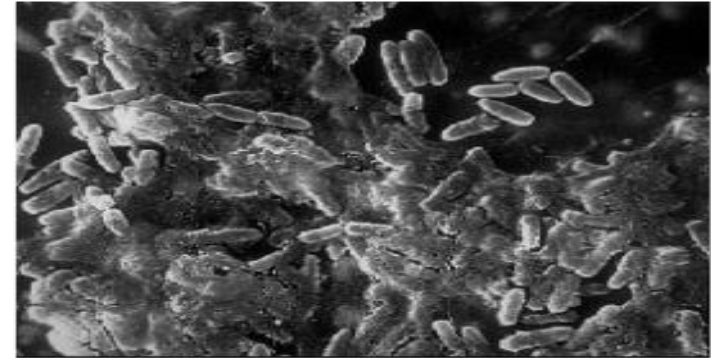


# HASYTEC *electronics*

DBP

Workingprinciple & Results

# Biofilm



**Larvae**  
*Days*


**Barnacles, Shells, Algae**  
*Weeks*

# Different Ultrasound Working Principles

## Ultrasound causing Cavitation

Target: Cleaning of marine growth and fouling which has already attached to the surface


### Disadvantages:

- Very small covered area
- Cavitation cannot make a difference between hard growth and hard vessel's steel
- **Result**  **NO market acceptance**

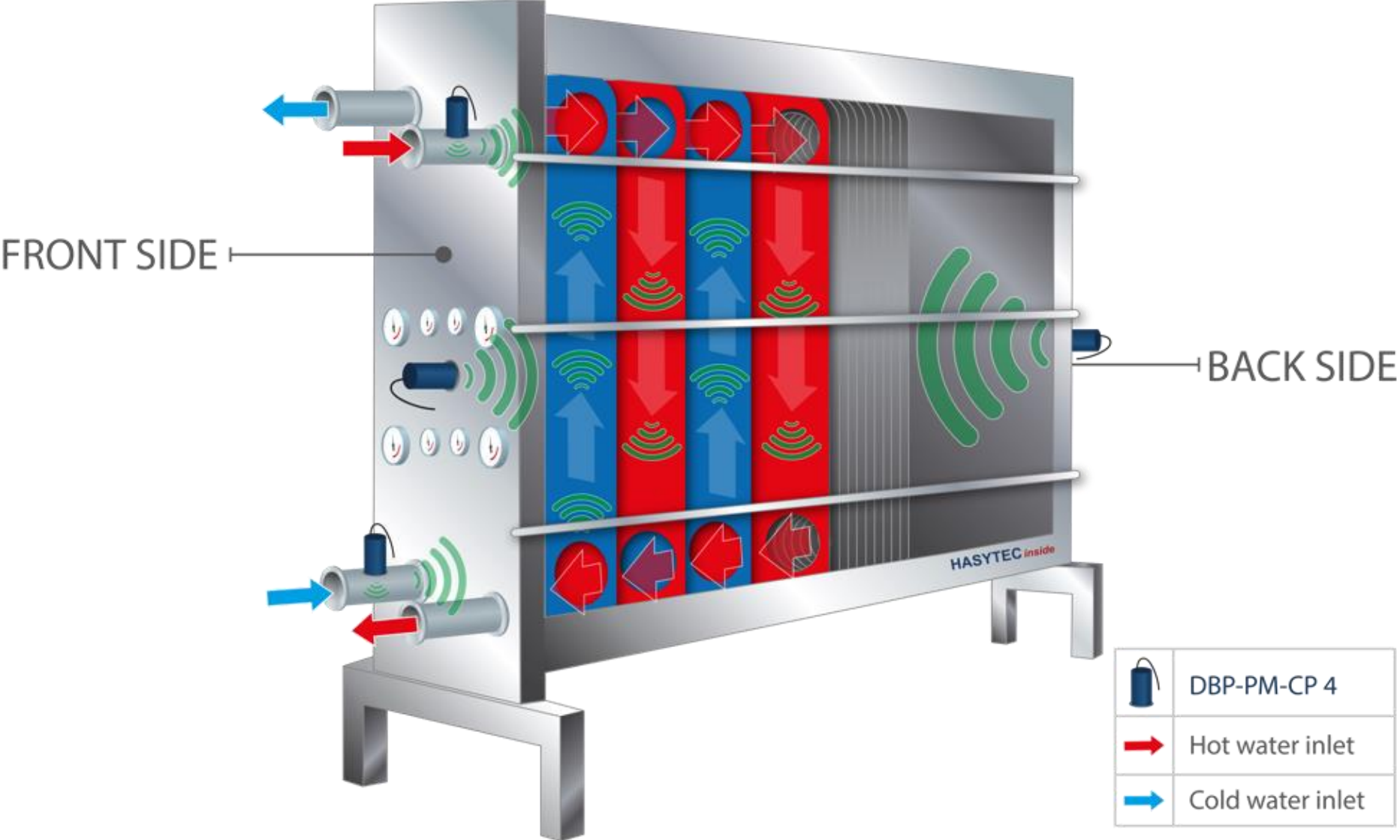
## Ultrasound NOT causing Cavitation (HASYTEC DBP)

Target: Avoiding and Removal of Biofilm, the initial step of all marine growth and fouling

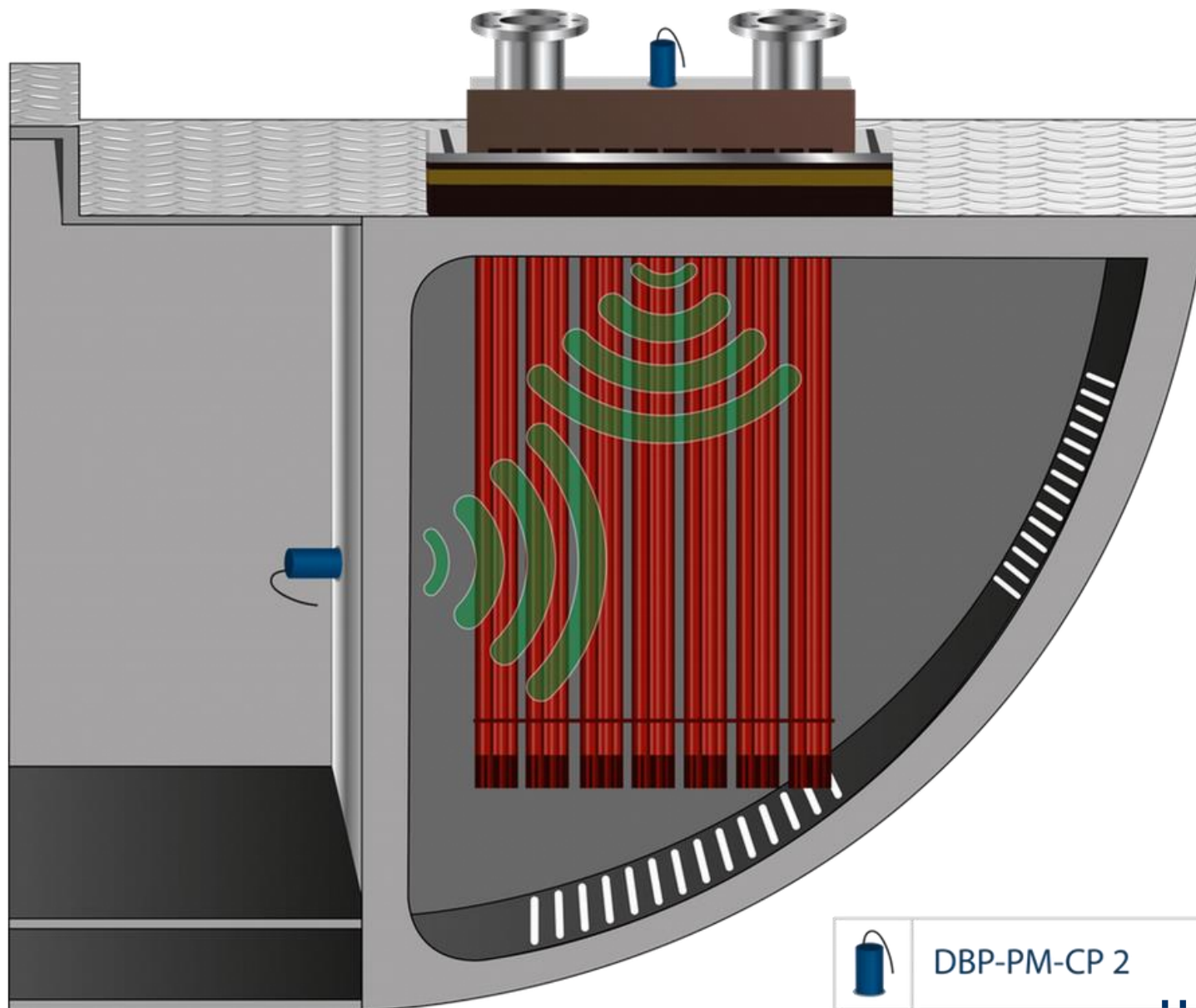
### Advantages:

- Much more covered area
- Marine growth and fouling even NOT occurs
- NO bad impact on any vessel's installation or its steel
- Environmental friendly & Sustainable
- **Result**  **Alternative Solution, market acceptance is increasing**

# Working Principle HASYTEC DBP



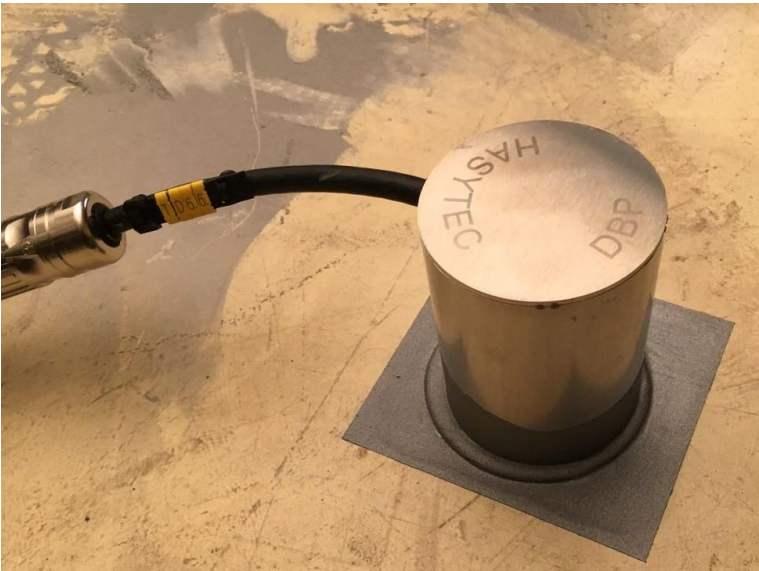
# Working Principle HASYTEC DBP



 DBP-PM-CP 2



# Examples of installed Transducers



## Examples of installed Transducers



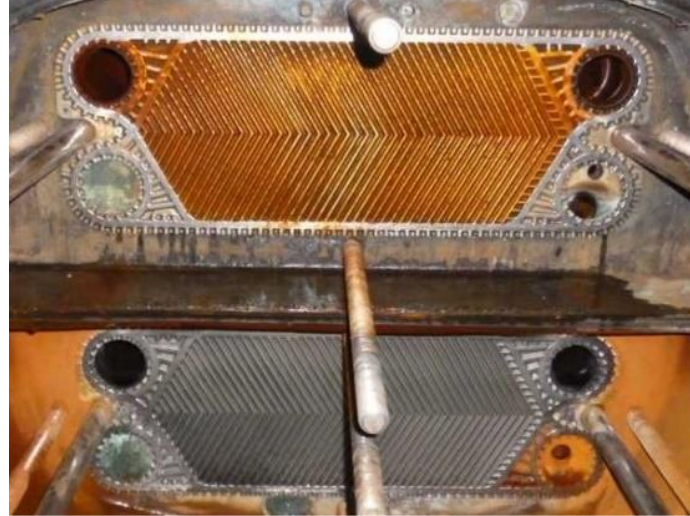


## Examples of applications and results in general

*Fresh Water Generator usually after 6-8 weeks*



*Fresh Water Generator usually after 6-8 weeks*



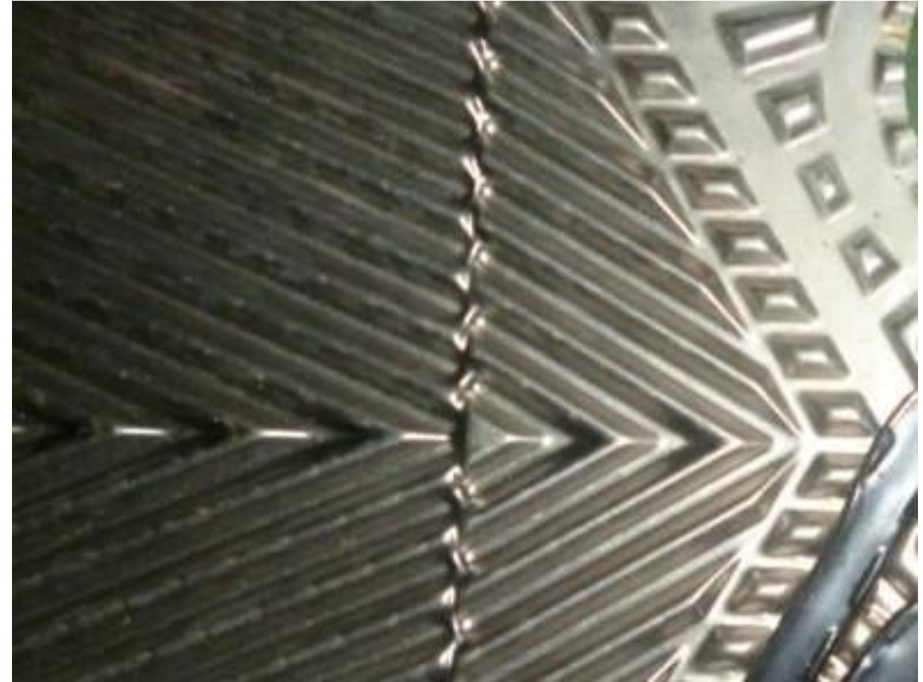
*Fresh Water Generator usually after 6-8 weeks*





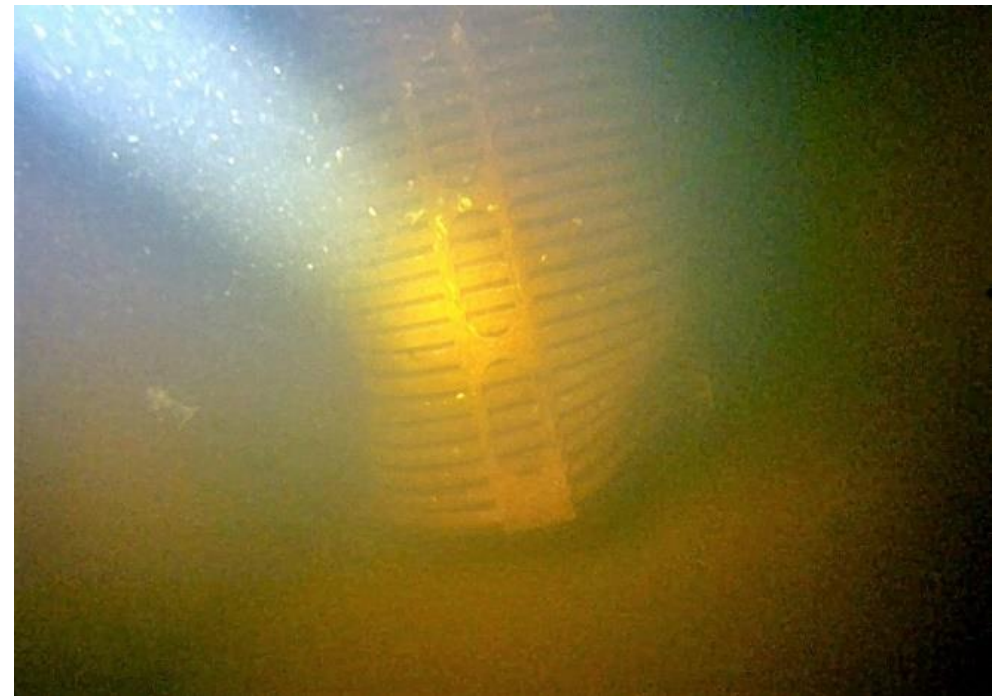
## Examples of applications and results in general

*Fresh Water Generator protected with HASYTEC DBP after 6 months*



## Examples of applications and results in general

*Box coolers & Sea Chest Grids after 12 months protected **with** HASYTEC DBP*

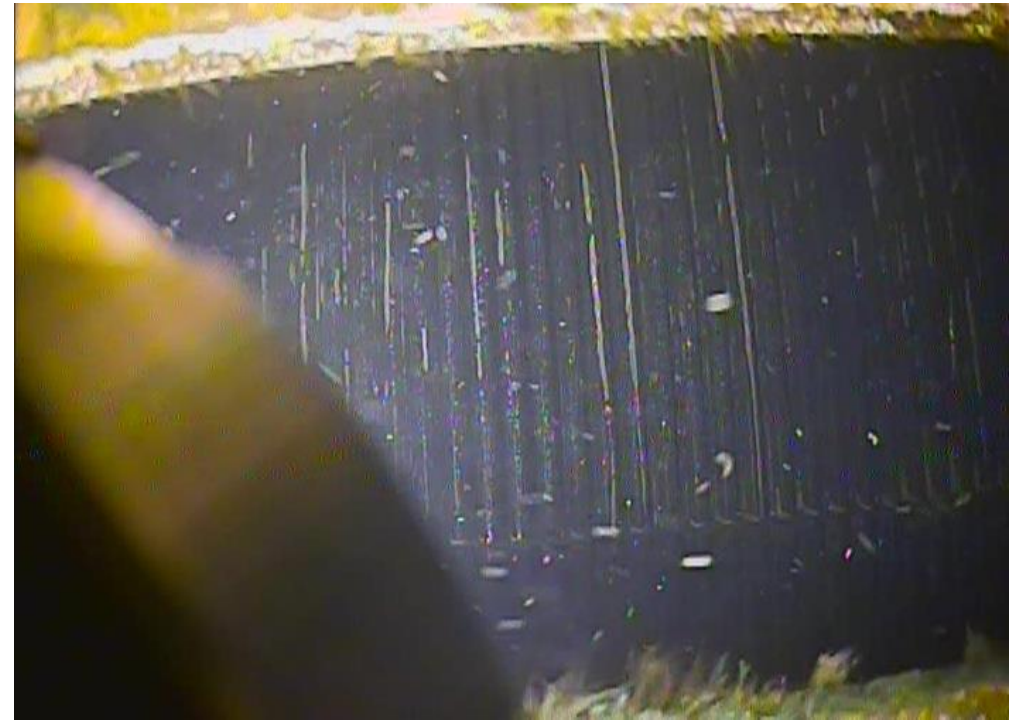


*Box cooler after 18 months protected **with** HASYTEC DBP*



## Examples of applications and results in general

*Box cooler after 8 months **without** HASYTEC DBP*



*Box cooler after 8 months protected **with** HASYTEC DBP*



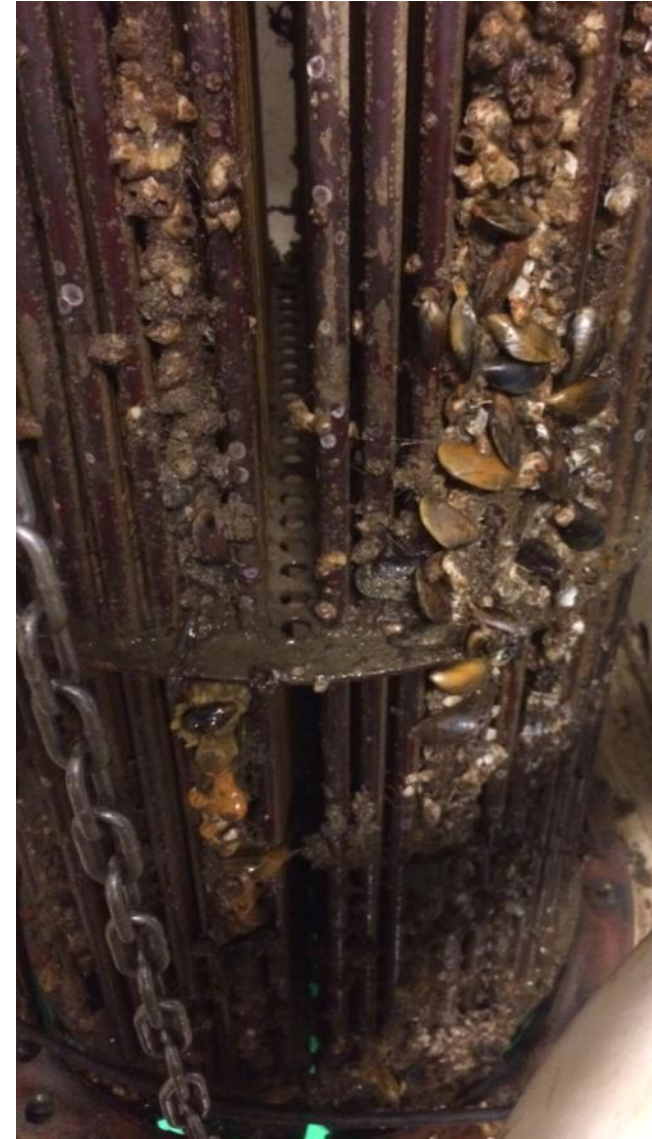
## Examples of applications and results in general



*Box cooler after 12  
months in service*

*without*

*HASYTEC DBP*





## Examples of applications and results in general



*Box cooler after 14  
months in service*

***with***

*HASYTEC DBP*

**HASYTEC** *electronics*

## Examples of applications and results in general

*Sea Chest Grids after 15 months protected with HASYTEC DBP*



*Propeller after 8 months protected with HASYTEC DBP*





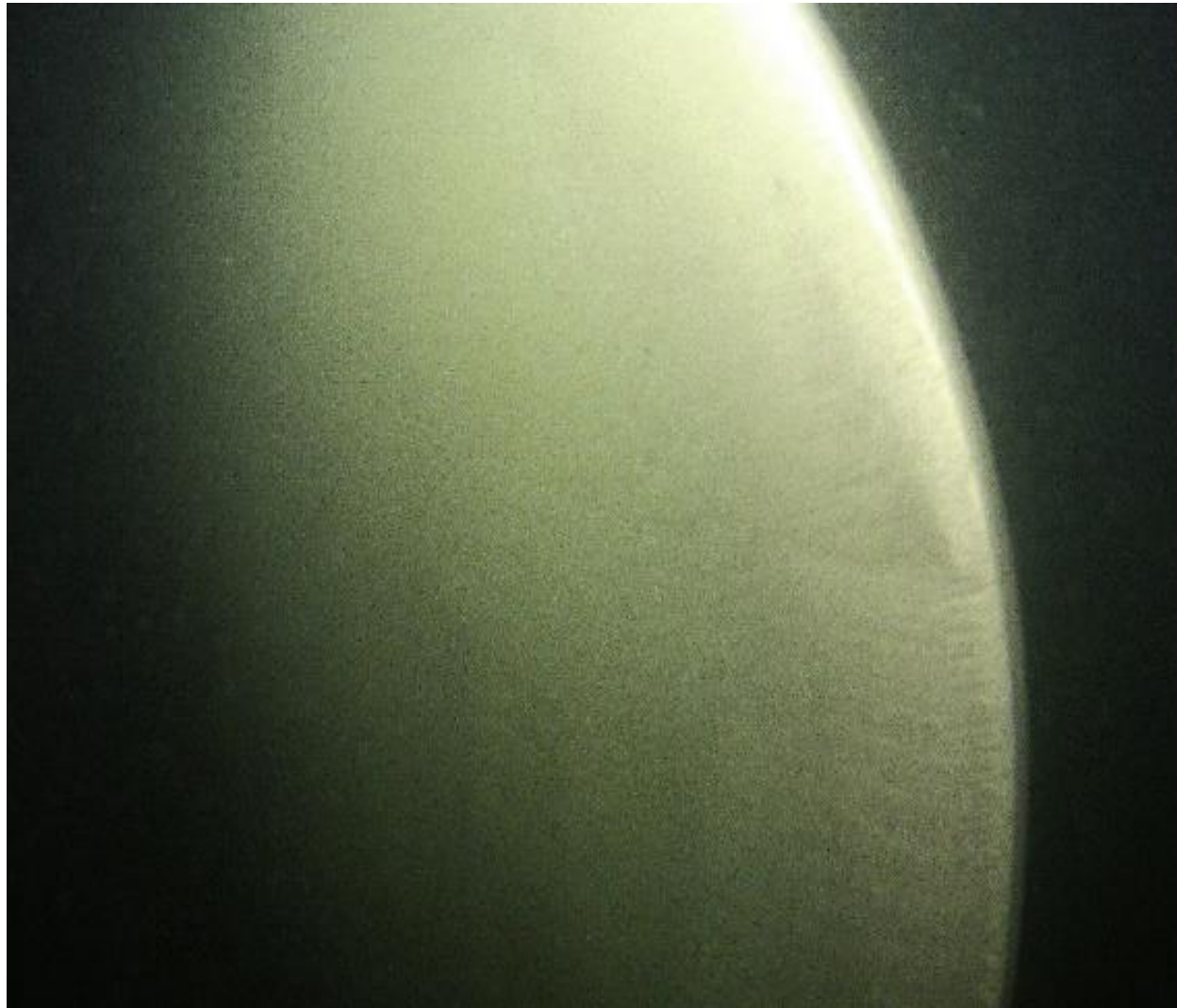
## Examples of applications and results in general

*Propeller usually after 6 months **without** HASYTEC DBP*



## Examples of applications and results in general

*Propeller after 14 months protected **with** HASYTEC DBP*



# Examples of results on Plate Heat Exchanger and Propeller

**WITHOUT** HASYTEC DBP



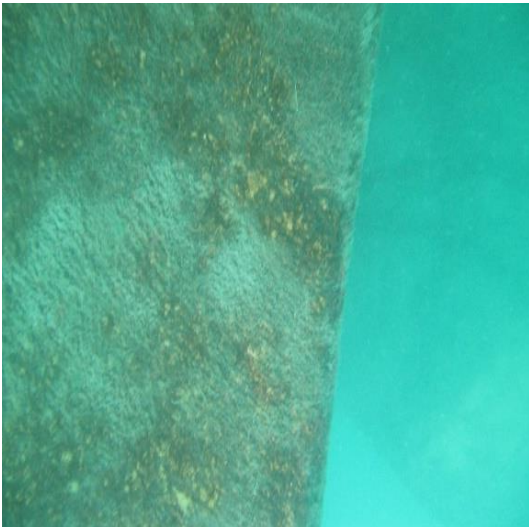
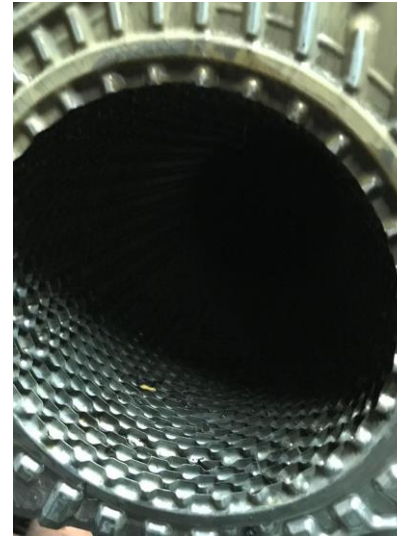
**Ultrasound based  
Marine Growth Prevention System**

**Keeps the liquid carrying surfaces of**

- Coolers
- Pipes
- Strainers
- Fresh Water Generators
- Propellers
- Thrusters

**FREE of Marine Growth and Fouling**

**WITH** HASYTEC DBP



**Advantages**

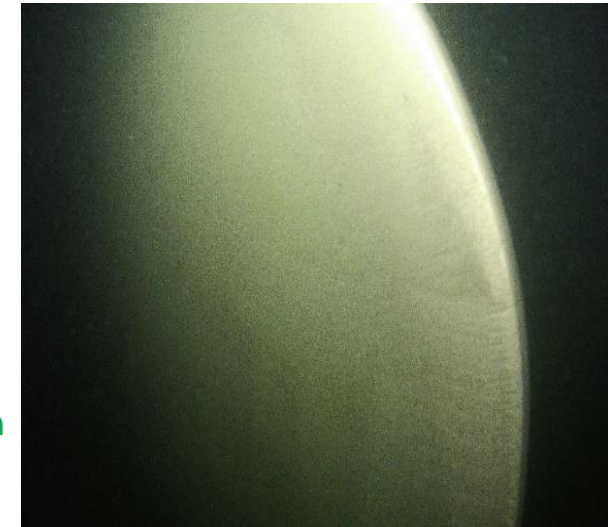
- ✓ Environmental Friendly
- ✓ Sustainable
- ✓ Maintenance Free
- ✓ 5-years Warranty
- ✓ Reduces Operational Costs
- ✓ Increases the lifetime of onboard equipment

**Coolers are not required to open for cleaning anymore**

- **Avoids broken seals & plates**
- **Avoids heavy metal emissions (copper) into the ocean**

**Propellers are not required for cleaning anymore**

- **Increases Fuel Efficiency**



**HASYTEC** *electronics*



# Latest development, progress and results of ultrasound based anti-fouling hull protection

Vessel in dry dock May 2017 after 12 months trading



# Latest development, progress and results of ultrasound based anti-fouling hull protection

Vessel in dry dock May 2017 after 12 months trading





## Latest development, progress and results of ultrasound based anti-fouling hull protection

After 10 months trading North & Baltic Sea, intermediate pictures in 2018

Portside





# Latest development, progress and results of ultrasound based anti-fouling hull protection

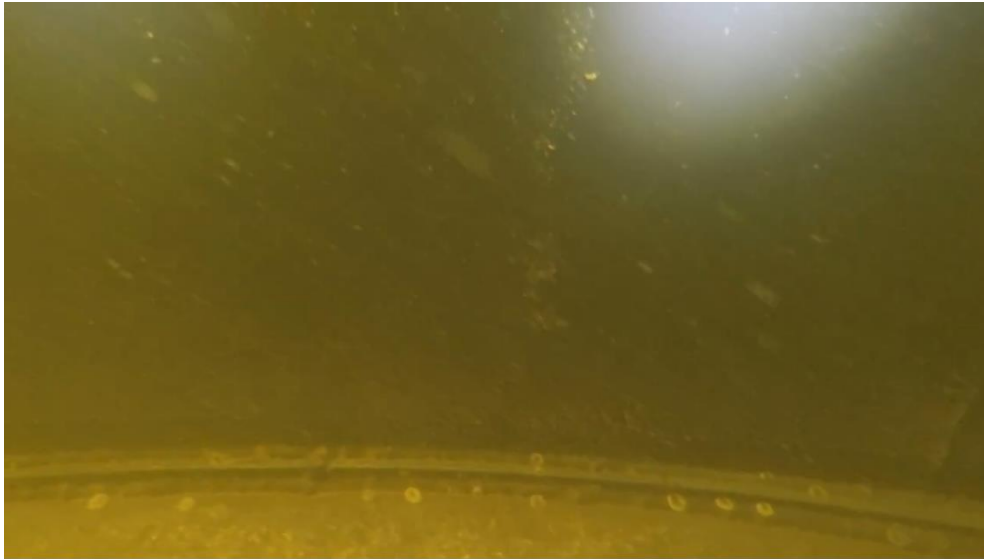
After 10 months trading North & Baltic Sea, intermediate pictures in 2018

Starboard



# Latest development, progress and results of ultrasound based anti-fouling hull protection

After 16 months trading North & Baltic Sea, intermediate pictures in 2018



Portside, WITH DBP

Starboard, WITHOUT DBP



## Examples of applications and results in general

*Papermill **WITHOUT** HASYTEC DBP after 3 months / after 3 months **WITH** HASYTEC DBP*





## Examples of applications and results in general

*Papermill **WITHOUT** HASYTEC DBP after 3 months/ after 3 months **WITH** HASYTEC DBP*



# Award Winning Technology

TOP 10 shortlisted



HASYTEC Electronics GmbH  
Söhren 44  
24232 Schönkirchen • Germany

Tel. +49 (0) 4348 91922 22  
Fax +49 (0) 4348 91922 25

sales@hasytec.com  
www.hasytec.com

