



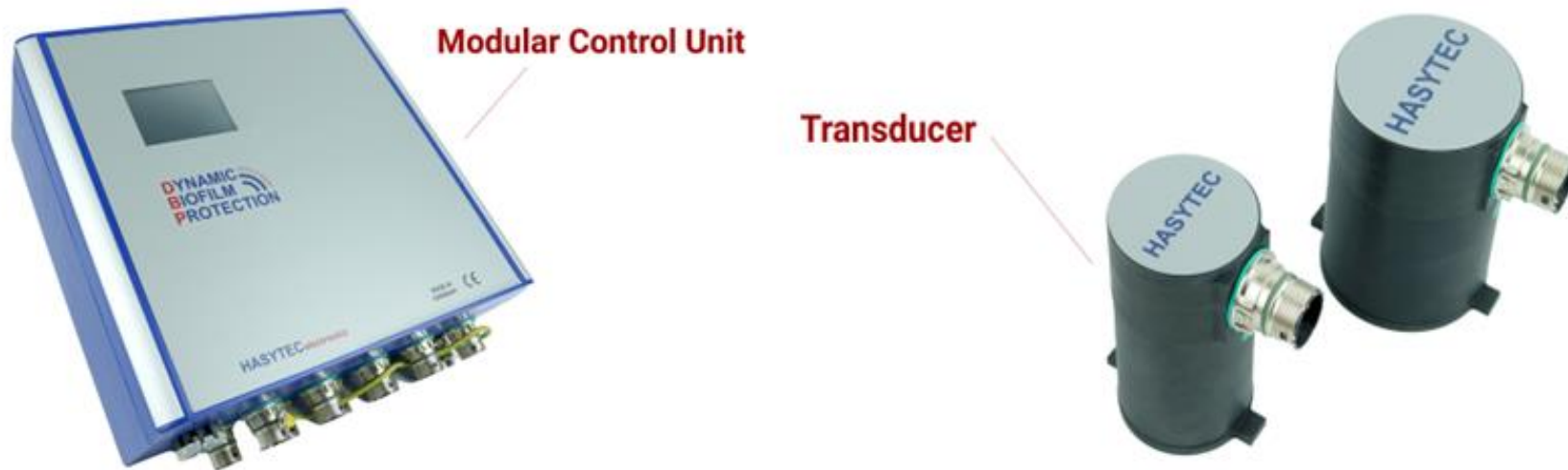
**From saving the oceans.
To safeguarding the planet.**

Dynamic Biofilm Protection Intelligent®
Ultrasonic Antifouling



Dynamic Biofilm Protection Intelligent[®]

Ultrasonic Antifouling



From saving the oceans. To safeguarding the planet.

Dynamic Biofilm Protection Intelligent® Ultrasonic Antifouling

AI-controlled Ultrasonic Antifouling technology Dynamic Biofilm Protection Intelligent® prevents marine growth and biofouling on all liquid carrying surfaces.

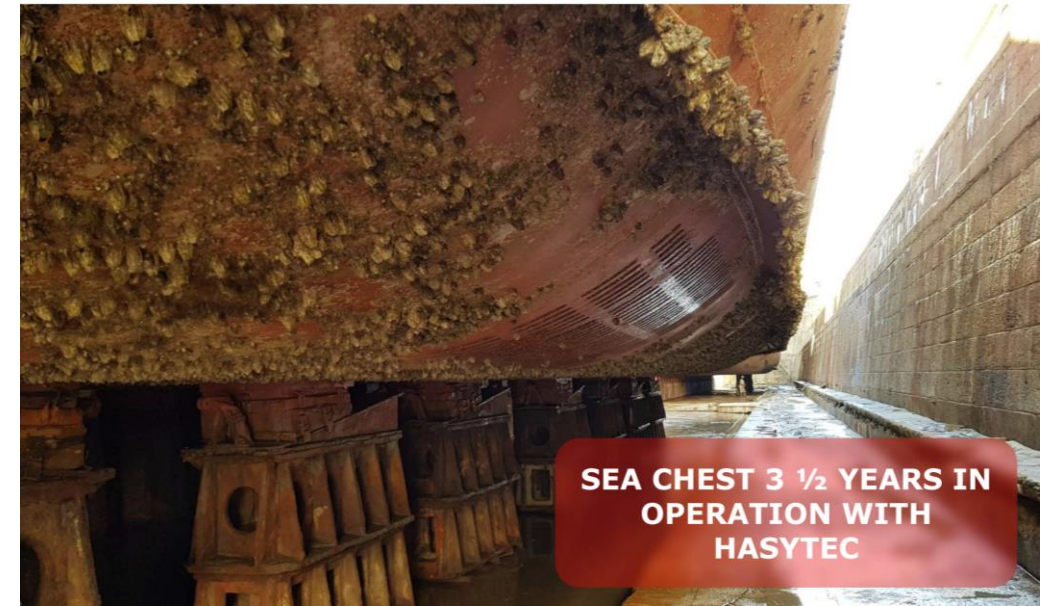
- Save cost from propeller cleaning
- Reduce fuel consumption and cuts CO₂ emissions
- Reduces OPEX
- Helps to improve the CII index
- Increases operational efficiency
- Stops the spread of invasive species
- Stops the release of heavy metals into our oceans by replacing copper anodes
- Type approval by LLOYD'S REGISTER and ATEX Approval
- Sustainable & green
- Environmentally safe & friendly

APPLICATIONS

Propeller / Pod Drives, Seawater Cooling Systems,
Freshwater Generators, Bow Thruster / Stern Thruster.

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DECARBONISATION



HONOURS

- Nominated for **German Environmental Award 2022 and 2024**
- Winner of **German Innovation Award 2020**
- **10+ international awards**

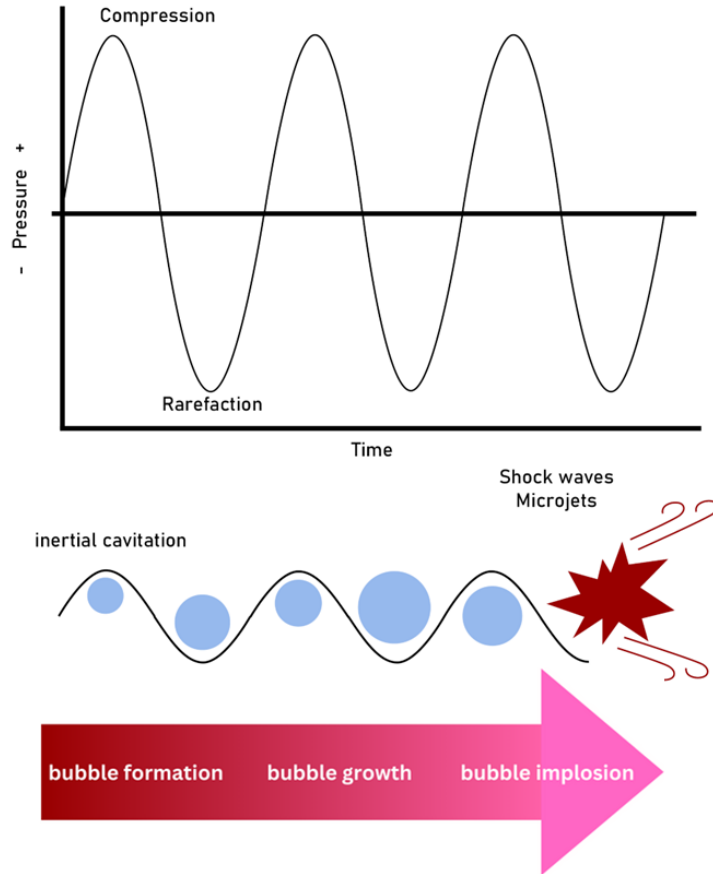


REFERENCES

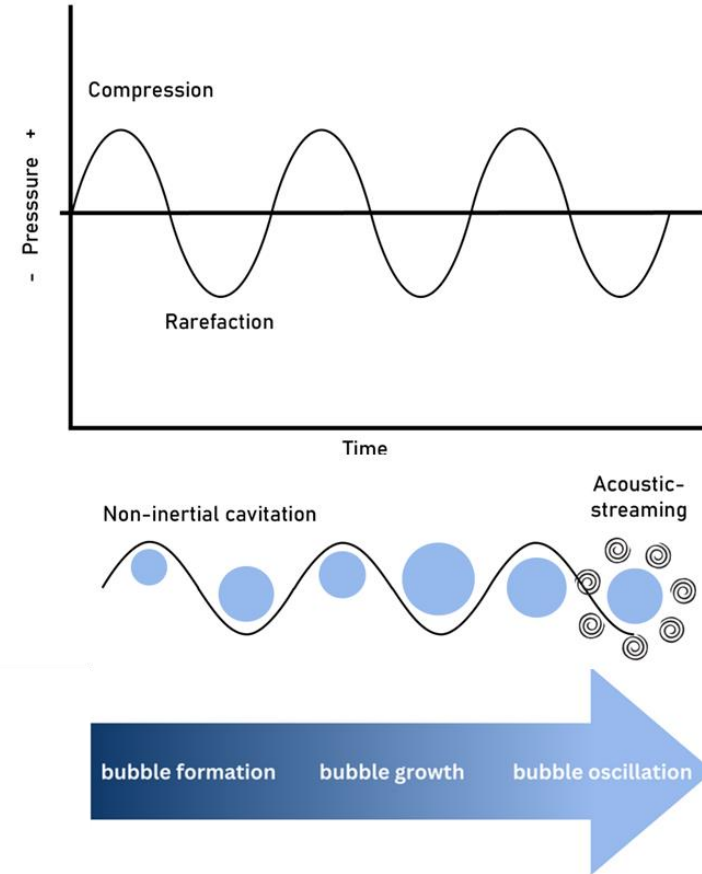
Among others:



CAVITATION THEORY

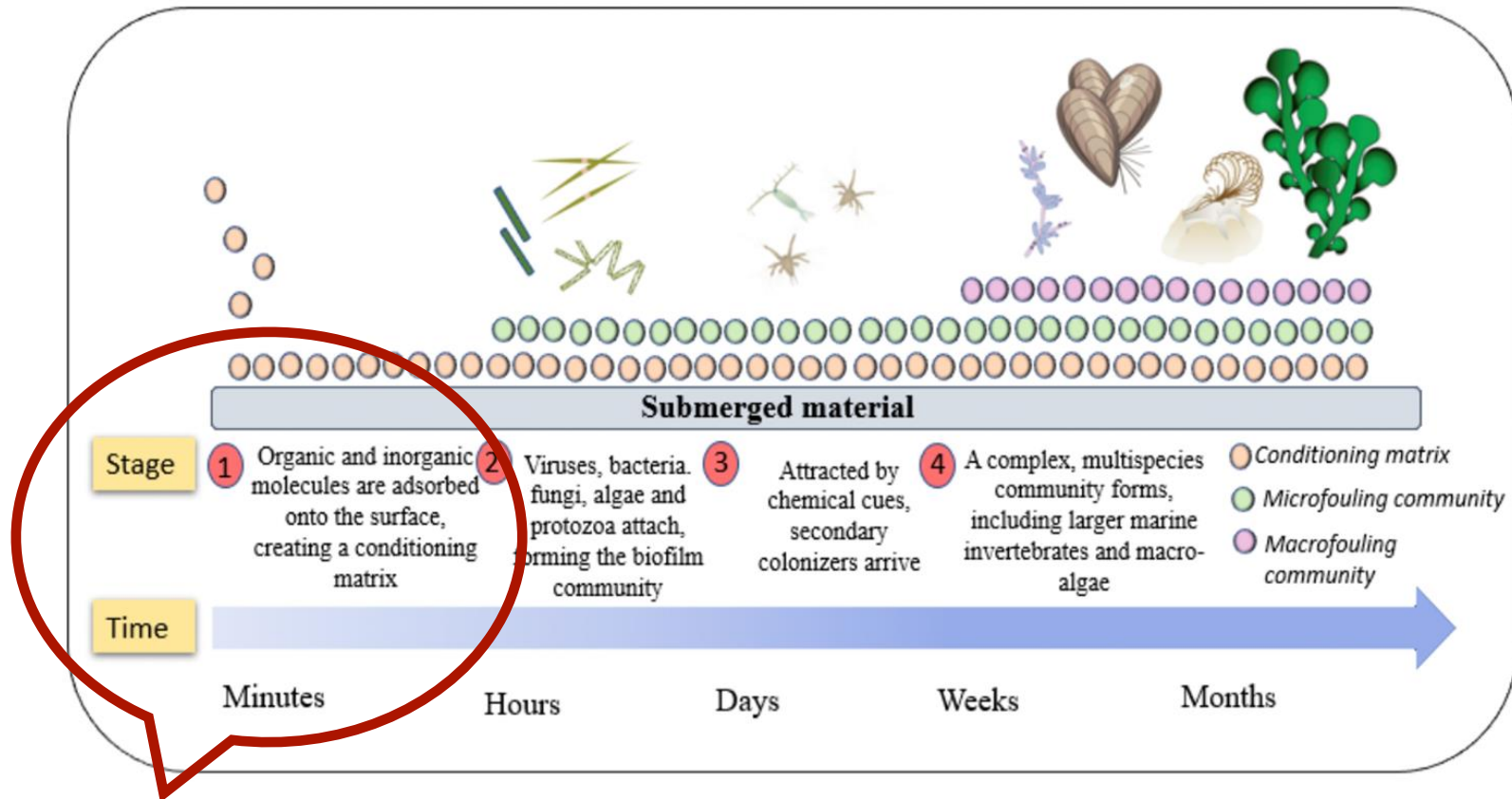


**INERTIAL CAVITATION
CAN HARM MATERIALS**

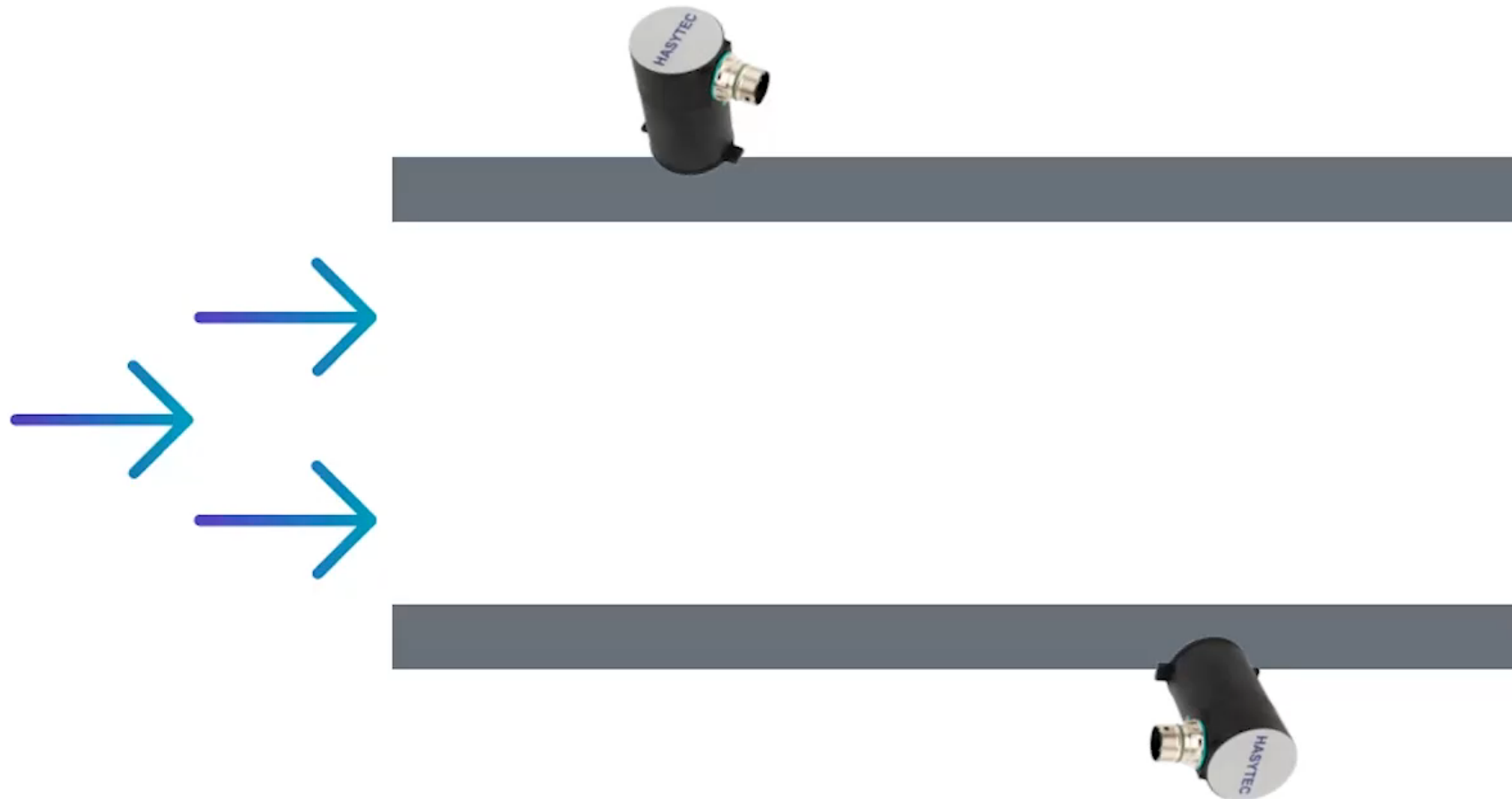


**NON-INERTIAL CAVITATION produced by
DBPI IS NOT HARMING ANY MATERIALS**

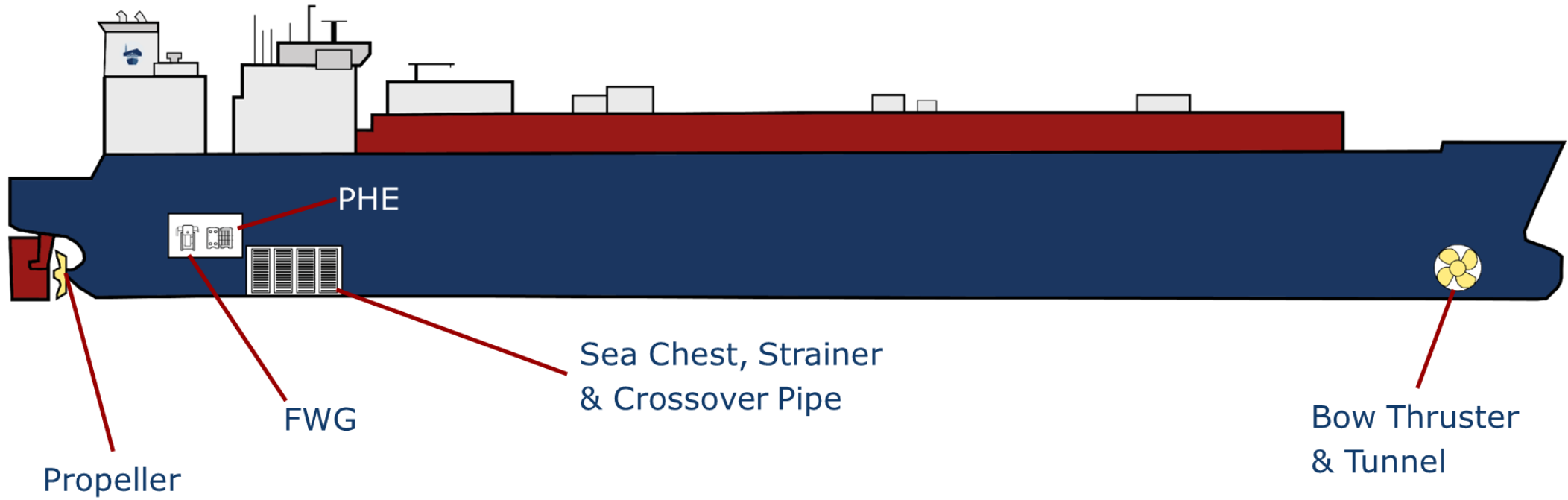
INITIAL STEPS OF BIOFOULING



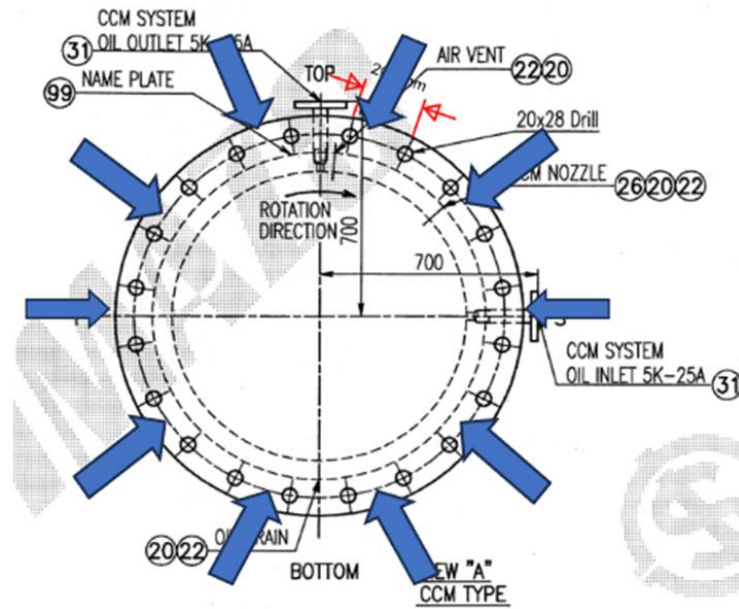
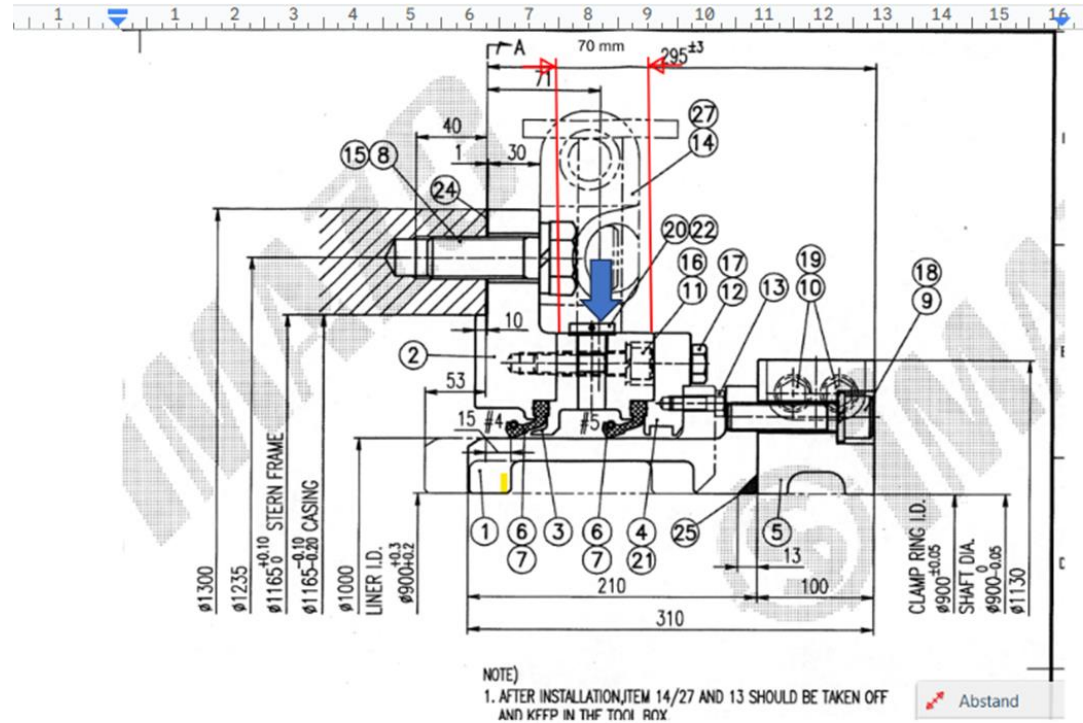
WORKING PRINCIPLE TO PREVENT ORGANIC DEPOSITS



APPLICATIONS



DRAWINGS - PROPELLER



Shaft
10 x TD56
2 x DBPi.5
Devcon 5x

TRANSDUCERS BONDING PROCESS



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INSTALLATION - PROPELLER



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PROPELLER PROTECTION PRINCIPLE



RESULTS - PROPELLER



1 year with
HASYTEC

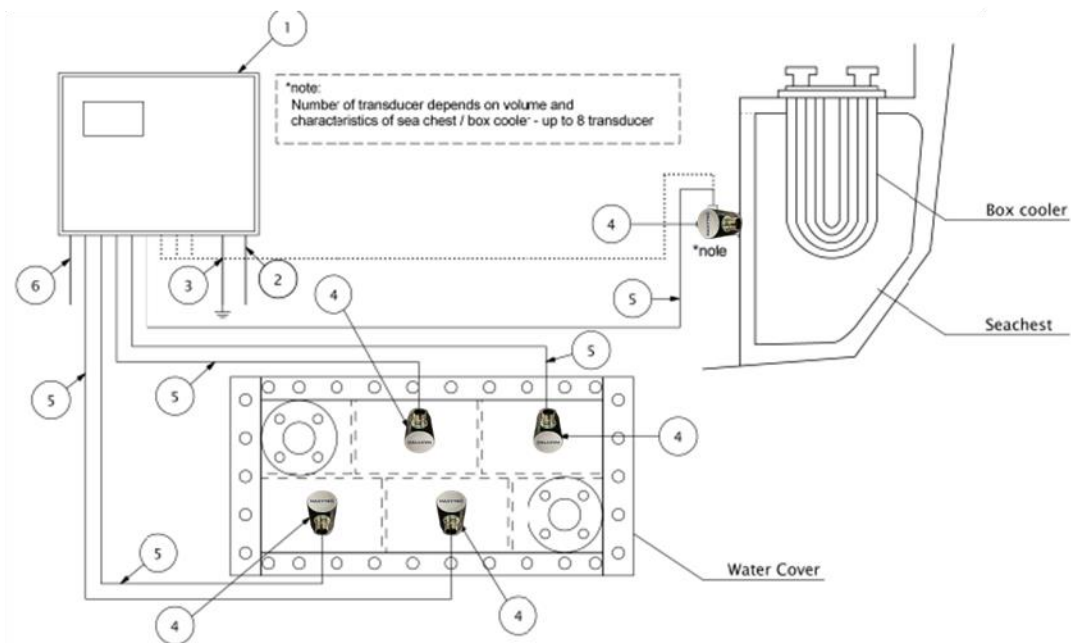
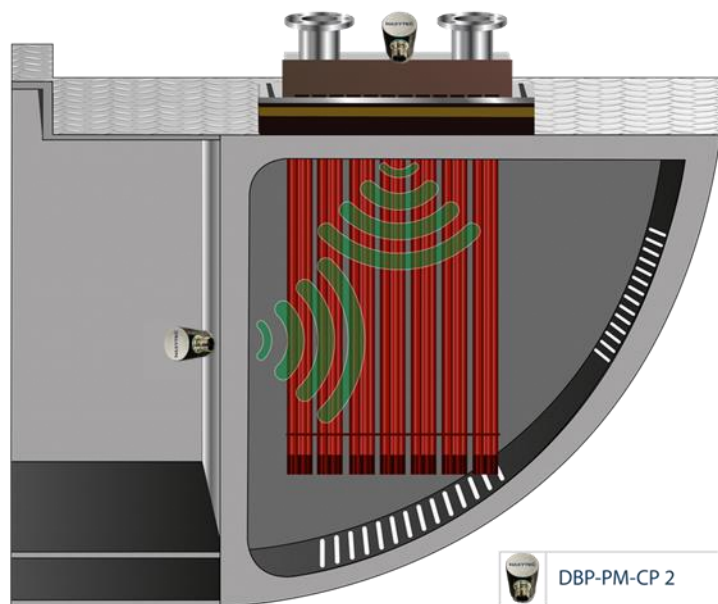


3 years with
HASYTEC



3 years with
HASYTEC

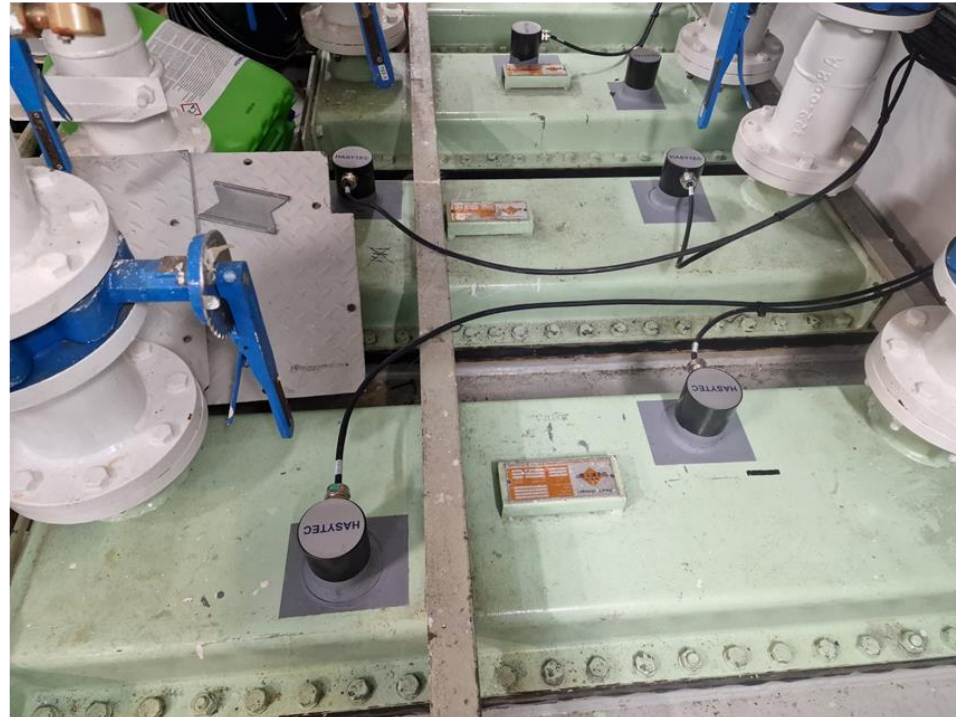
DRAWINGS - BOXCOOLER



INSTALLATION - SEA CHEST AND BOX COOLER



Sea Chest



Boxcooler

RESULTS - SEA CHEST



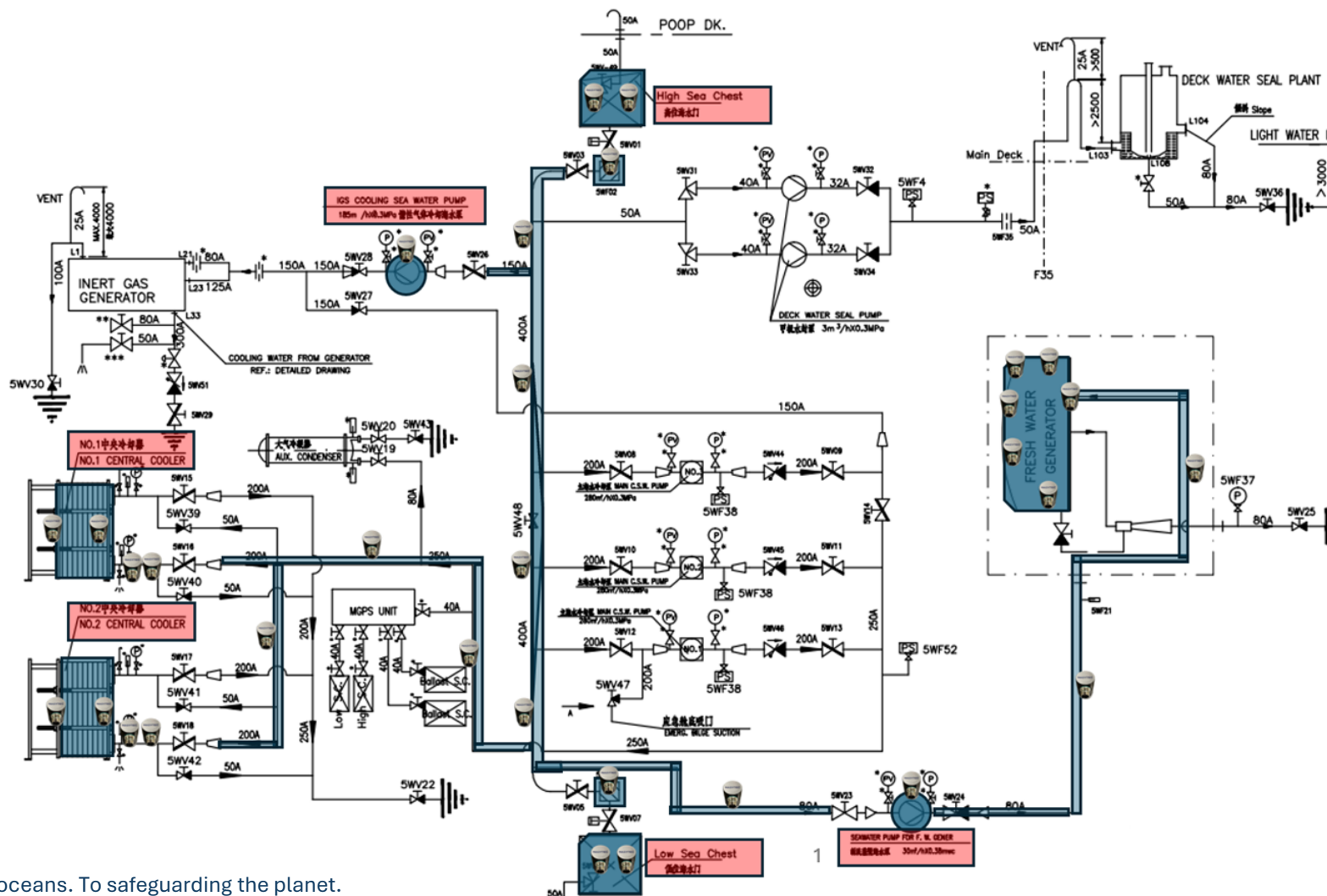
6 months without
HASYTEC



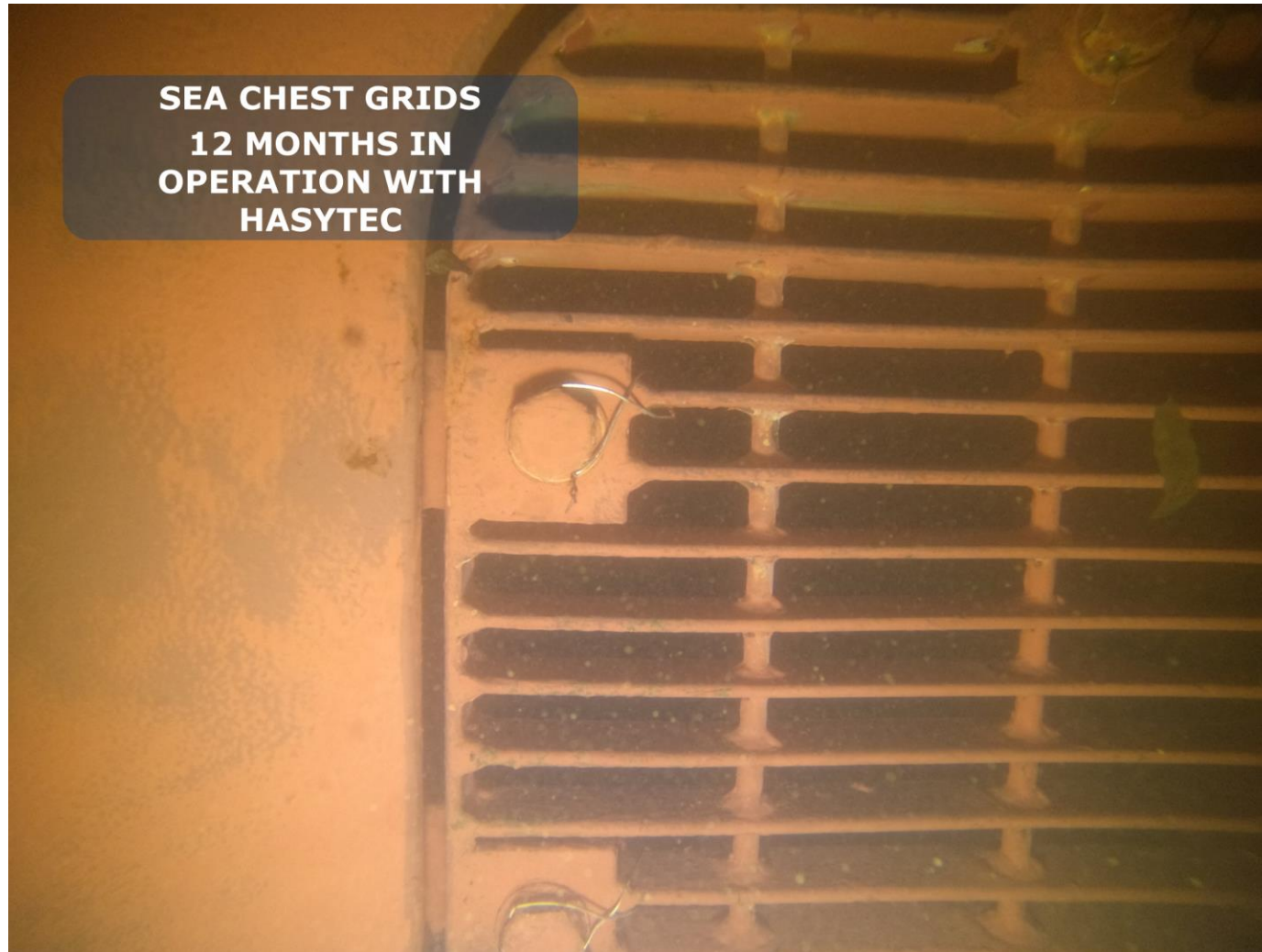
18 months with
HASYTEC

DRAWINGS - SW COOLING AND FW GEN

SEA WATER COOLING PIPING DIAGRAM



RESULTS - SEA CHEST GRIDS



SEA CHEST GRIDS
12 MONTHS IN
OPERATION WITH
HASYTEC

RESULTS - SEA CHEST GRID



RESULTS - STRAINER HOUSING



12 months without
HASYTEC



12 months with
HASYTEC

RESULTS - STRAINER



6 months with
HASYTEC



6 months with
HASYTEC

RESULTS - CROSS OVER PIPE



12 months with
HASYTEC



9 months with
HASYTEC

RESULTS - CENTRAL COOLER



initial condition after
cleaning

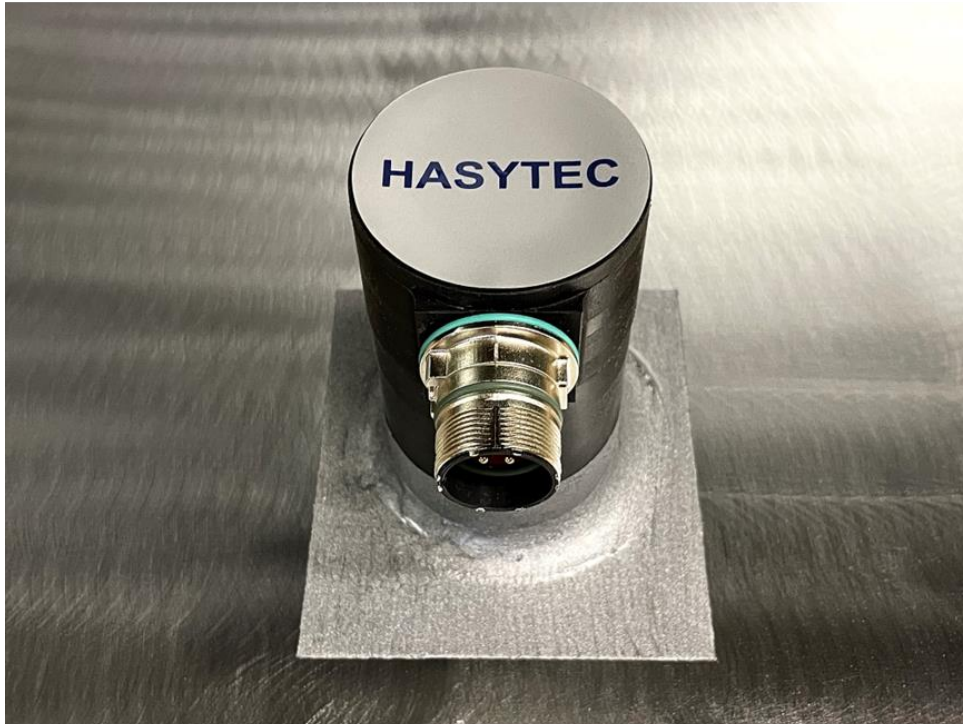


11 months with
HASYTEC

SYSTEM COMPONENTS

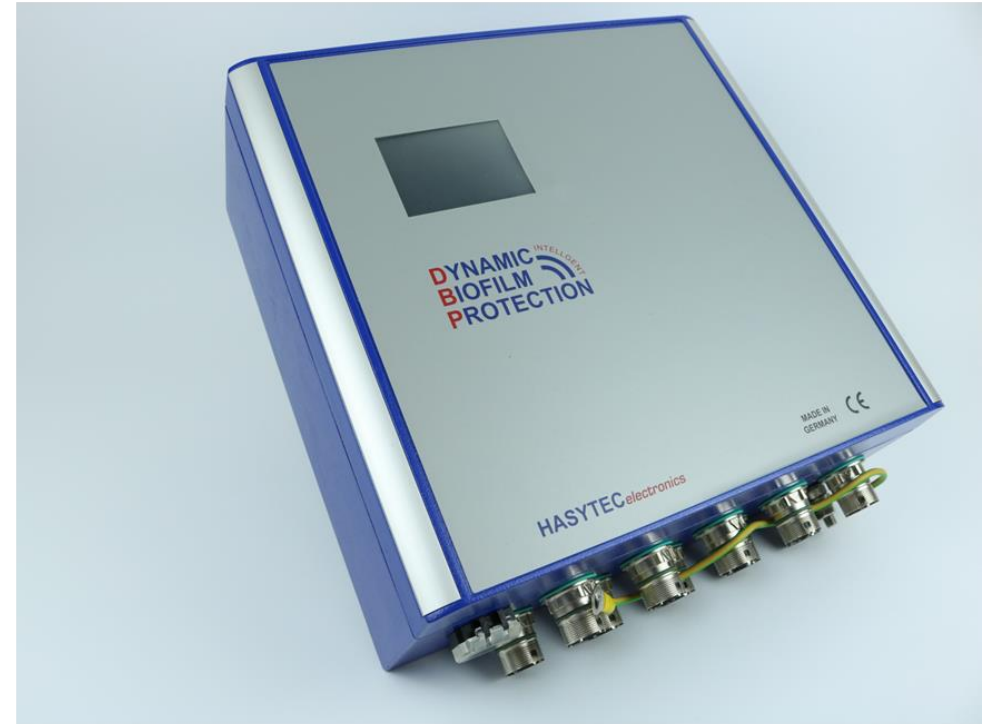
Transducer

installation by glueing
with 2-component adhesive



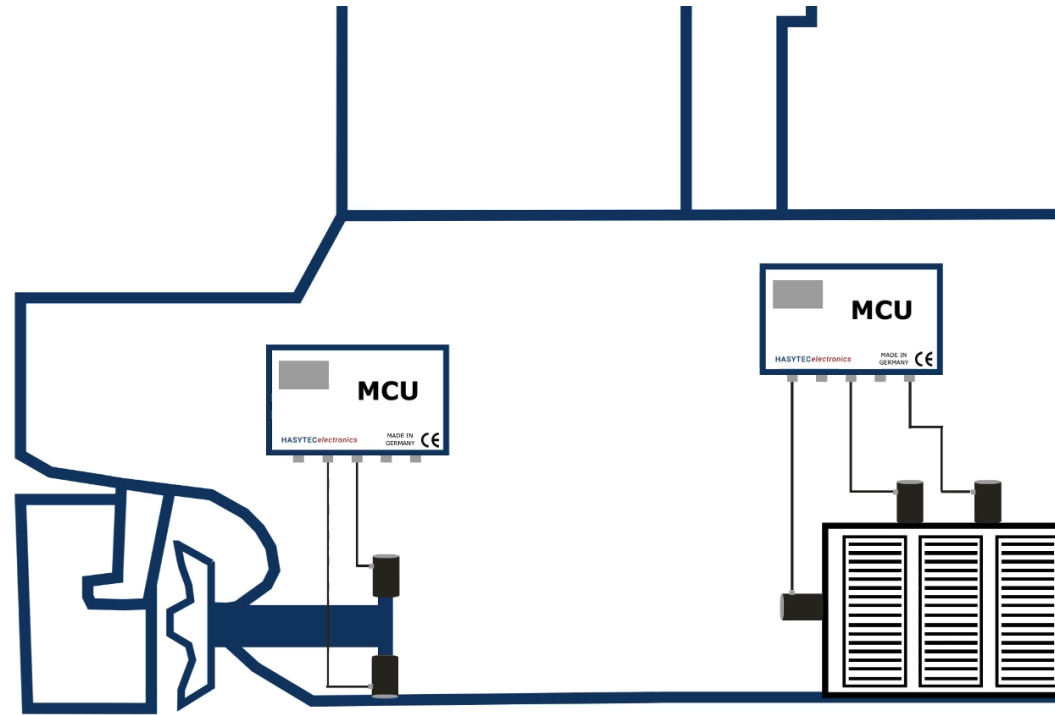
Modular Control Unit

Plug & Play connection



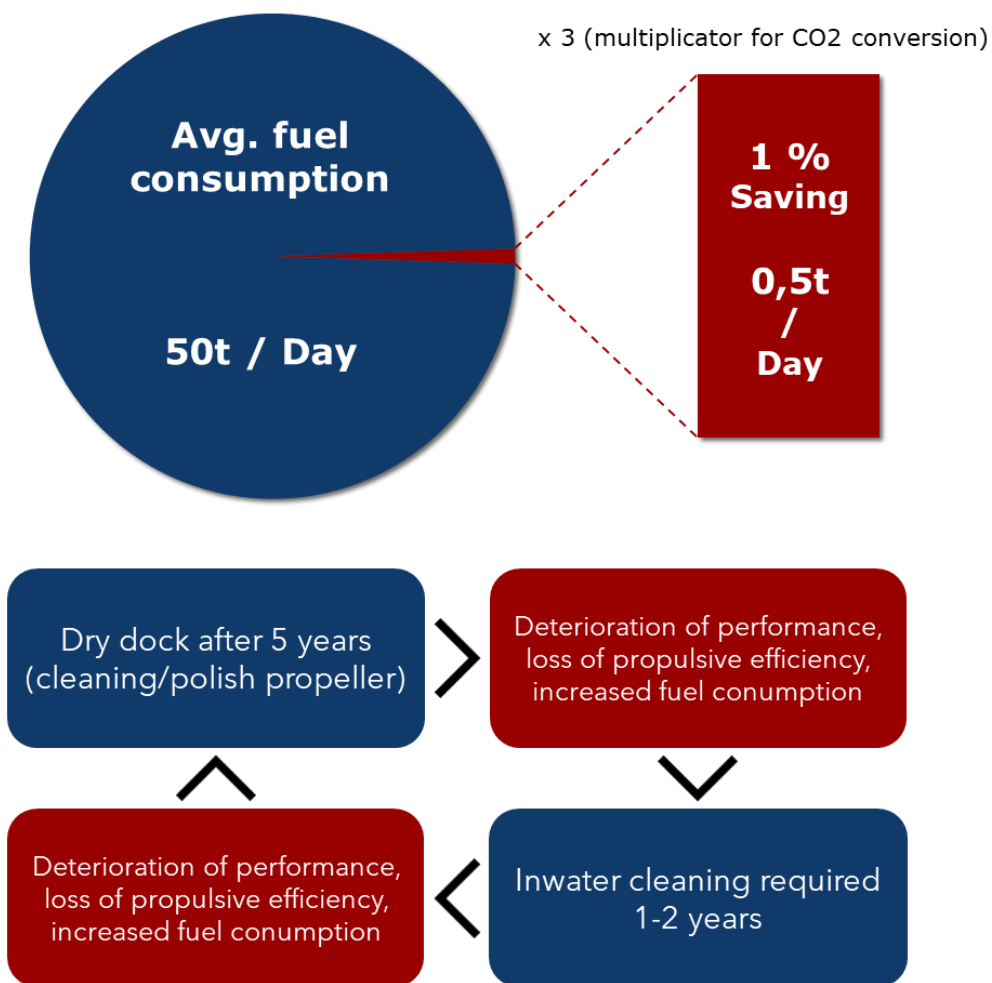
Power supply: 85 - 264 V AC 50 | 60Hz
Max. electrical consumption: 0,5 kW/h

AI APPLICATION



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DBPI ROI PROPELLER APPLICATION



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CASE STUDY ROI OPERATING EXPENSES (OPEX)

- Propeller cleaning ~ **4k €**
- Loss of efficiency results in an increase in fuel consumption of min. +1 % (110t) to avg. 11,000t fuel per year.

110t x 550.00 € = **60.5k € / year**

Investments for preventive protection / coatings (i.e. silicone) ~ **15k €**

Investment DBPi.6 = **15.4k €** (for Propeller up to Ø6000mm)

ROI after ~ 70 days

DBPI ROI FOR SEA CHEST, BOX COOLER, STRAINER, CROSSOVER

1t copper = ~ 8.5k € → 0,8t copper = ~ 6,8k €

Investment DBPi.8 = **18.8 k €** (for Sea Chest, Box Cooler, Strainer, Crossover) → **ROI after ~ 33 months**

Not considered:

- OPEX (i.e. maintenance)
- GWP (Copper conversion CO2)
 - EWR (EU-ETS, 40-60-100%)
 - Investment for coatings
- Repair costs (i.e. biocorrosion on box cooler)
 -

SUMMARY

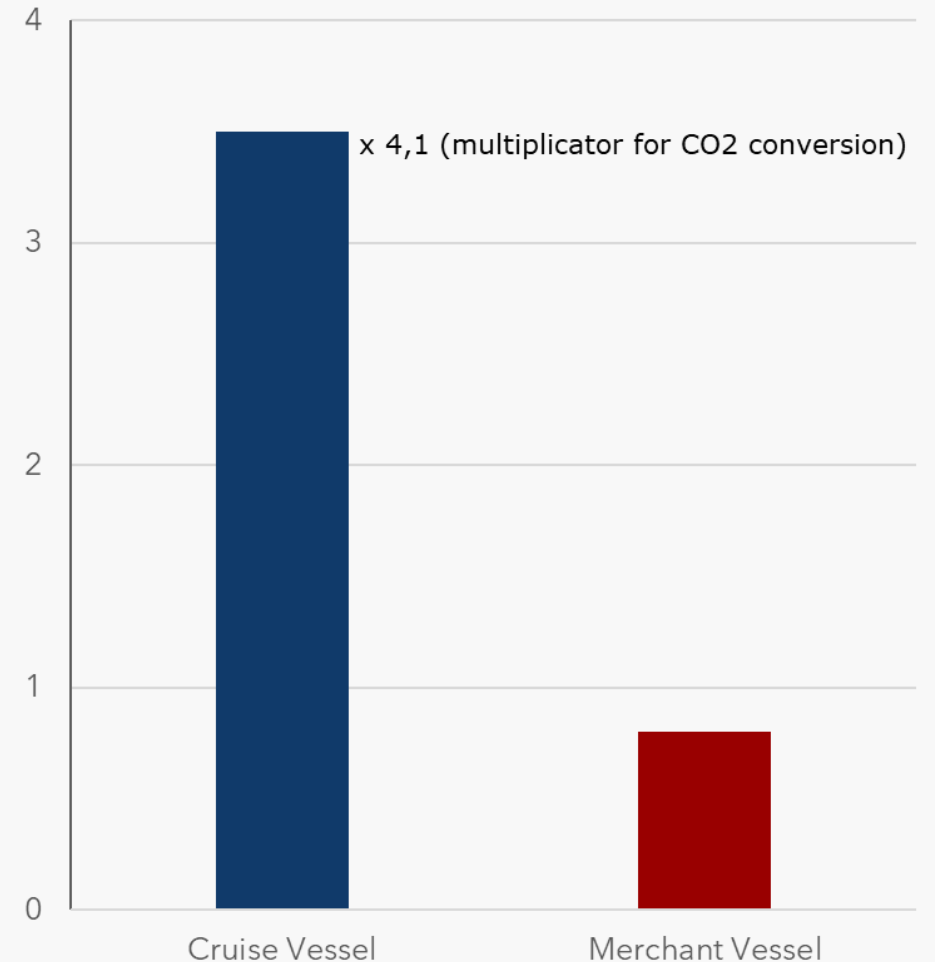
✓ Annual CO2 savings “Propeller Application”

min. 1% Fuel → 110t Fuel → 330t CO2

✓ Annual CO2 savings “SW cooling application”

- Cruise Vessel → **14.4 t Copper**
- Merchant Vessel → **3.3 t Copper**

ESG SAVINGS Sea Water Cooling





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GROUP

THINK DECARBONISATION ...
THINK ENVIRONMENTAL PROTECTION ...
THINK ERMA TECH GROUP!



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