

Harsonic® Product Range : different devices



Recreational Marine :

1. Harsonic® for BoatHull
2. Harsonic® for Propellers
3. Harsonic® for Gasoil tanks
4. Harsonic® for Watertanks



Professional Marine & Offshore :

1. Harsonic® for Hull
2. Harsonic® for Propellers
3. Harsonic® for Tanks
4. Harsonic® for Boxcoolers
5. Harsonic® for Pipelines



Industry :

1. Harsonic® for Cooling towers & Heat exchangers
2. Harsonic® for Industrial Tanks & Filters
3. Harsonic® for Industrial Pipelines



Agriculture & Aquaculture :

1. Harsonic® for Tubes
2. Harsonic® for Tanks



Open Waterstorage :

1. Harsonic® for Open Waterstorage (ponds, open tanks,..)
2. Harsonic for jacuzzi

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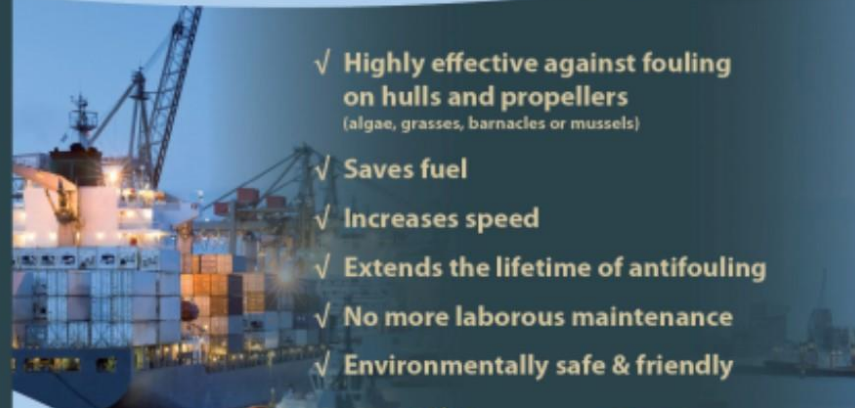
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HARSONIC

HARSONIC® for INDUSTRIAL MARINE



- ✓ Highly effective against fouling on hulls and propellers (algae, grasses, barnacles or mussels)
- ✓ Saves fuel
- ✓ Increases speed
- ✓ Extends the lifetime of antifouling
- ✓ No more laborous maintenance
- ✓ Environmentally safe & friendly



HARSONIC FOR BOXCOOLERS OFFERS YOU A SOLUTION FOR A MAINTENANCE-FREE BOXCOOLER

On a seagoing vessel there is in general a lot of cooling required. This is done traditionally, by using seawater, bringing into the vessel through the sea chest, and then use this seawater for cooling. In principle, a boxcooler is a pipe bundle, as known from tubular heat exchangers, which is put direct in the seawater, whereas the seawater can be used direct for the cooling of the different processes on a vessel. These pipe bundles are installed in special compartments, where the ship is open to the sea, so all time seawater is around the tubes of the box cooler. Bringing in huge amounts of seawater inside a vessel, boxcoolers are always potential fouling victims. **Barnacles, mussels, algae, and other types of shellfish grow on the tubes of the boxcooler and thus affect its heat transfer function.**



Classical methods, as using chemicals, to avoid scale or even sea growth are not possible to use in this case, as the chemicals would be needed to put direct in the seawater, what will never work due to the amount of seawater and as well due to the regulations and other authorities.

After a chemical or heated treatment, the bio-film will grow immediately back. So the procedure today is as soon the cooling is not sufficient anymore, the box cooler has to be removed, cleaned and brought back in operation. **Of course during the cleaning the vessel can't be in operation, so this cleaning is very expensive for the ship owners and fouling can start again.**

The well known **cathodic protections, are expensive and don't always offer the required no growth warranty. Then the vessel still needs to go in dry dock for cleaning or repairs due to fouling.**

HARSONIC FOR BOXCOOLERS PROTECTS 24/7 THE BOXCOOLER ON LOW VOLTAGE, THE SEA-CHEST AND THE COOLING TUBES REMAIN FREE OF GROWTH AND BIOFILM

1. Harsonic® for Boxcoolers gives increased cooling efficiency and improved reliability
2. Harsonic® for Boxcoolers means substantial savings on maintenance costs and there is no need for dry docking
3. Harsonic® for Boxcoolers avoids the use of chemicals and protects the environment

HARSONIC FOR THE HULL OF VESSELS OFFERS YOU A SOLUTION AGAINST FOULING

HARSONIC IS THE BEST FUEL SAVING OPTION POSSIBLE !!

A clean hull is extremely important! Fouling is an annoying problem which reduces speed, increases fuel consumption and causes biocorrosion damage caused by SBR (Sulphate Reducing Bacteria).

Fouling begins with a layer of slime of biofilm. This slime paves the way for plants and animals to attach. The amount increases over time. Organisms like barnacles, mussels, sponges, algae and sea squirts attach themselves to the hull and propeller of ships.

Fouling can negatively affect the fuel efficiency, speed and cause increased maintenance costs to remove the fouling. Fouling attached to the hull for too long can damage the paint and cause deterioration.



The current solutions are often not effective and harm the environment. **Especially vessels that have to lay still for a while are fouling-victims.**

Harsonic® avoids the initial step of the fouling, called biofilm. Once a film of bacteria forms, it is easier for other marine organisms such as barnacles to attach. Such fouling can reduce maximum vessel speed by **up to 20%**, prolonging voyages and consuming fuel. Time in dry dock for refitting and repainting reduces the productivity of shipping assets, and the useful life of ships is also reduced due to corrosion and mechanical removal (scraping) of marine organisms from ships' hulls.

Biofilms in marine engineering systems, such as pipelines of the offshore oil and gas industry, can lead to substantial corrosion problems. Corrosion is mainly due to abiotic factors; however, at least 20% of corrosion is caused by microorganisms that are attached to the metal subsurface (i.e., microbially influenced corrosion).

