



Engineered antivibration and sealing systems R&D & Innovation – Blue Technologies



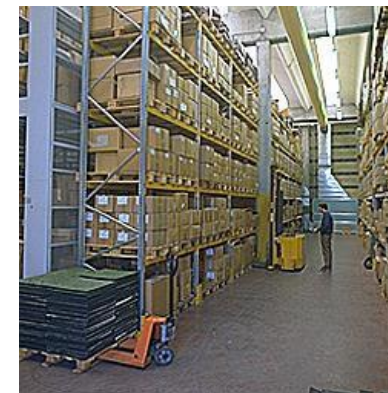
Industrial Invention Patent
No. 102020000021490 issued
by the Ministry of Economic
Development on 21.09.2022

Copyright by Pantecnica



Facts & Figures

Offices and Warehouse:	Rho (MI), Italia
Year of establishment:	1968
Ownership:	Fatigati Family
Employees:	32
Subsidiaries:	1
Turnover 2022:	≈ € 10,0 mio



Quality Management System



MANAGEMENT SYSTEM CERTIFICATE

Certificate no.: CERT-08910-2001-AG-ML-INCERT Initial certification date: 18 July 2001 Valid: 24 July 2021 – 23 July 2024

This is to certify that the management system of
PANTECNICA S.p.A.
Via Magenta, 77/14 A - 20017 Rho (MI) - Italy

has been found to conform to the Quality Management System standard:
ISO 9001:2015

This certificate is valid for the following scope:
Design and trade, also under own trademark, of anti-vibration Systems, fluid seal systems and technical industrial items (IAF 29, 14, 17)

Place and date:
Vimercate (MB), 04 February 2022



ACCREDIA
CONFERENZA ITALIANA
ACCREDITAMENTO
1992-99-001-A 1992-99-001-B
1992-99-001-C 1992-99-001-D
1992-99-001-E 1992-99-001-F

For the issuing office:
DNV - Business Assurance
Via Energy Park, 14 - 20871 Vimercate (MB) - Italy

Claudia Baricini

Claudia Baricini
Management Representative

Lack of fulfillment of conditions as set out in the Certification Agreement may render this Certificate invalid.
ACCREDITED UNIT: DNV Business Assurance Italy S.r.l., Via Energy Park, 14 - 20871 Vimercate (MB) - Italy - TEL: +39 03 99 9105 - www.dnv.it



MANAGEMENT SYSTEM CERTIFICATE

Certificate no.: 119652-2012-AG-ITA-ACCREDIA Initial certification date: 19 July 2012 Issue Date: 19 July 2021 Expiry Date: 18 July 2024

This is to certify that the management system of
PANTECNICA S.p.A.
Via Magenta, 77/14 A - 20017 Rho (MI) - Italy

has been found to conform to the Quality Management System standards:
EN 9120:2018 and ISO 9001:2015
(technically equivalent to AS9120B and SJAC9120:A)

and has been audited in accordance with the requirements of EN 9104-001:2013 and ACCREDIA Technical Regulation RT-18.

Type of certification structure: Single Site

This certificate is valid for the following scope:
Parts and materials marketing for aviation, space and defense industry. Commercializzazione di parti e materiali per l'industria aeronautica, dello spazio e della difesa.

IAF Sector(s) : 29, 14, 17

Place and (re-)issue date:
Vimercate (MB), 14 July 2021



ACCREDIA
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ACCREDITAMENTO
1992-99-001-A 1992-99-001-B
1992-99-001-C 1992-99-001-D
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Zino Bellrini

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Cluster & Associations



ADERENTE AL SISTEMA
CONFEDERALE



Corporate Social Responsibility



Focus on Customers' technical needs

Technical and application engineering consultancy for the design, development, production and supply of systems and components for the isolation and damping of vibrations and impacts in any type of industrial application, in addition to some specialized civil environments, and fluid sealing systems and components, also with a certification of materials and process systems



Technical and application know-how

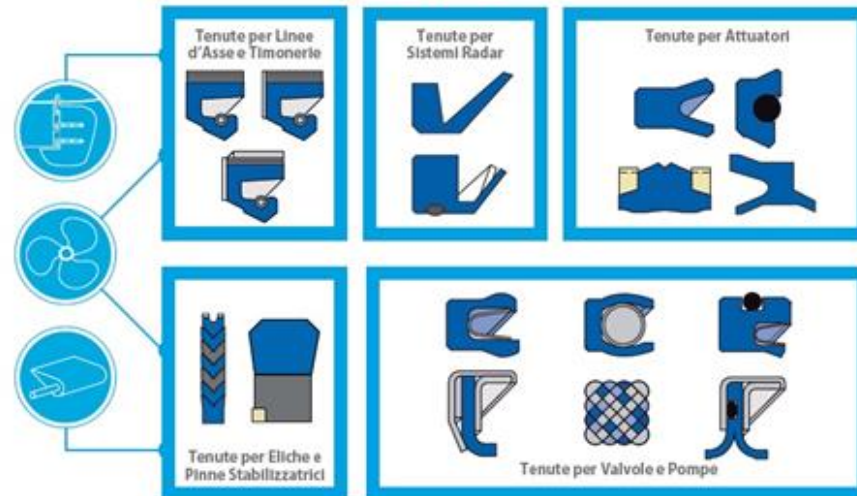
Antivibration systems and Blue Technologies for shipbuilding industry



Technical and application know-how Sealing systems and solutions for shipbuilding industry



Engineered
Sealing
Systems



www.pantecnica.it

Preserving marine environment



Given that our commitment to mitigate the vibro-acoustic disturbance originating from on-board auxiliary machinery has the positive implication of reducing the introduction of energy into the marine environment (noise and vibrations), the attention to preserve the marine environment has always been one of our priorities, in accordance with Sustainable Development Goal 14 of the ONU 2030 Agenda.

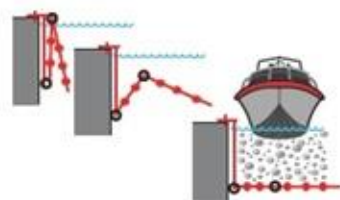
In fact, not only are we Supporters since the beginning of the One Ocean Foundation, but we have developed innovative systems to avoid antifouling treatments, notoriously polluting, and acoustic shieldings in 100% recyclable material.



R&D & Innovation Blue Technologies Circular Economy

SONICBOAT®

BUBBLEBOAT®



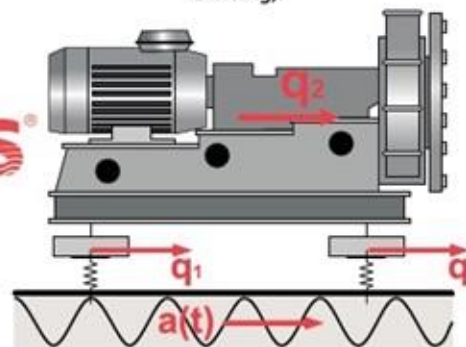
Sonicboat® e Bubbleboat® - Tecnologie antifouling, in linea con l'obiettivo Sustainable Development Goal 14 dell'Agenda ONU 2030.



Siamo partner di Manta Aircraft nello sviluppo di HEV/STOL (Hybrid Electric Vertical Short TakeOff and Landing).

DAFiReS®

Dispositivo Antivibrante con Fissaggio a Resistenza Sismica.



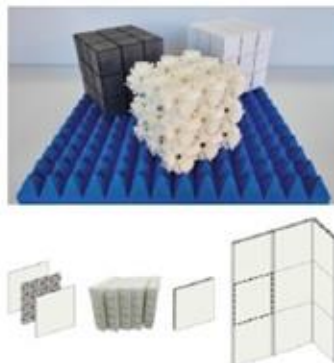
R&D & Innovation Blue Technologies Circular Economy

ACOUSTIC SHIELDING



Schermature Acustiche per il Settore Navico
Metalow Frequency & MetaPanel Absorbing

NoViDamp®



NoViDamp® metatecnologie innovative brevettate per isolare le vibrazioni in ambito civile, industriale e infrastrutturale.



In partnership con:



Technical and application know-how Blue Technologies for shipbuilding industry



BUBBLEBOAT[®]



Background

“**Fouling**” is a natural phenomenon that emerges with the formation of an invisible biofilm, which is rapidly colonized – according to light, temperature and nutrient richness of the water - by parasitic organisms. Unfortunately, the fairing of a boat shell is critical because a smooth hull offers less resistance to movement, increasing boat speed and reducing its fuel consumption (1 to 2 mm of algae or organisms fixed on a shell causes a 15% loss of speed).



Negative consequences for the marine environment (and beyond...)

The boat's fairing maintenance is something that cannot be avoided in order to protect it from corrosion (for metals), musty and rot (for woods), osmosis (for plastics) and especially from aquatic organisms' settlement, which, if passively transported to different microclimatic environments, could also easily colonise them invasively.



Negative consequences for the marine environment (and beyond...)

Ten's thousands tons of extremely toxic "anti-vegetative" coating (or anti-fouling paint) are used every year to protect the boat hull from sea organisms (algae, shellfish...). Remember that each kg of antifouling paint normally contains 70 g of biocides, of which 1 g is enough to pollute several m³ of seawater, and also that the necessary PPE must be worn as it is toxic.

Please Note: the EU has banned the use of Biocides since December 2017 and, finally, Glyphosate since 2019. However, any new 'anti-fouling' paint will hardly be effective, if not toxic.



Costs for shipowners

Steps to follow for a new fairing:

- Boat towage with a crane or other suitable means;
- Hull cleaning from all shellfish and algae with a high-pressure cleaner;
- Fairing sanding with a suitable method;
- Application of a base layer;
- First layer of antifouling paint (to protect against shellfish colonies);
- Second layer of antifouling paint..

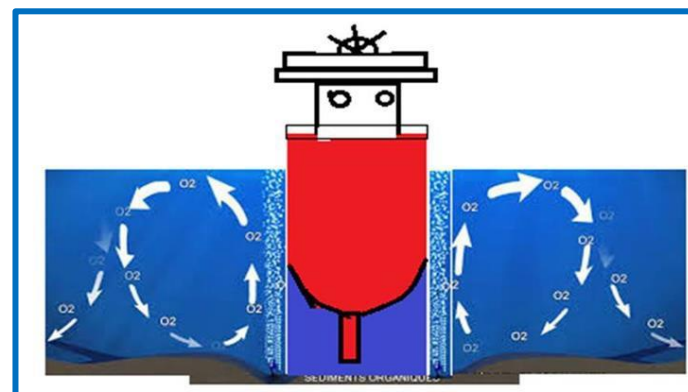
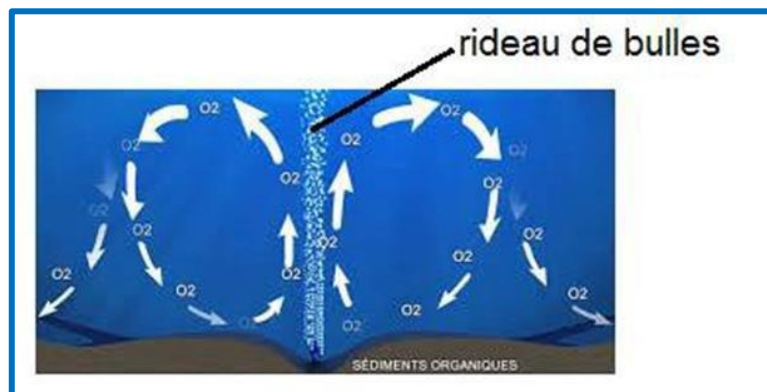


For a 45-foot boat cost is estimated to be around € 2,000 ~ € 3,000, while for a 90-foot superyacht cost rises to about € 8,000 ~ € 10,000, and for professional ships it is approximately several ten's thousands euros.

And this is done at varying intervals (one, two or three years) depending on the effective period spent in port.

BubbleBoat[®] solution: operating principle

BubbleBoat[®] system, in all its variants, injects micro-bubbles of air directly into the water. As they rise up along the hull to the surface, they create an impenetrable wall for marine micro-organisms, producing an effective and natural protective shield around the hull of the boat. Furthermore, the consequent forced introduction of oxygen helps to restore the pH value of the water to normal, which benefits the marine environment. The sketches below show that the wall of micro-bubbles is not penetrated by large or small micro-organisms.



BUBBLEBOAT[®]



Boats BubbleBoat[®] solution: overview



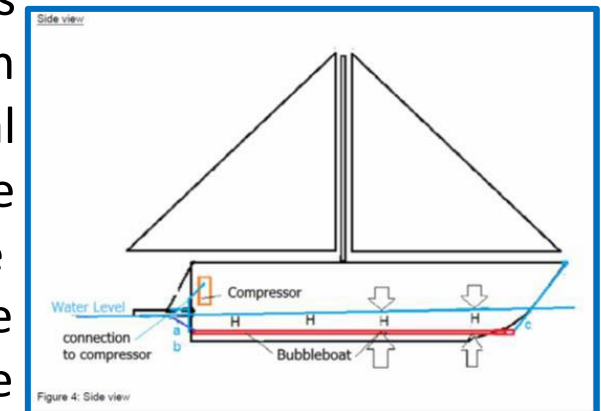
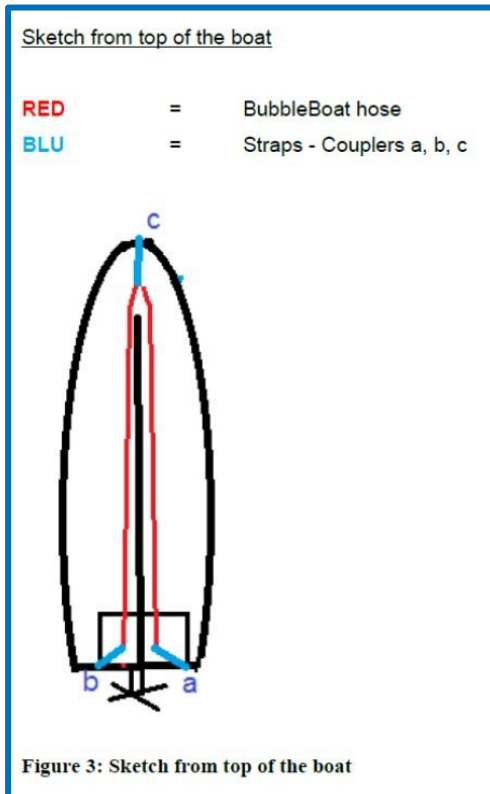
The version placed on board consists of a transportable kit, made up of 1 air pump with a flow of about 3000l/hour (with a power source not exceeding 12/24 VOLT and, so can also be powered by mini wind turbines and/or solar panels), directed to a porous pipe (with micro holes) to obtain total coverage of the immersed part of the hull. It is particularly suitable for pleasure boats with an overall length of $< 10 \approx 14$ metres, because the owner and/or captain can deploy it under the hull when he decides to stop for a long time in port or at anchor, and then raise it on board and roll it up before leaving



 **BUBBLEBOAT**[®]

Boats BubbleBoat[®] solution: installation

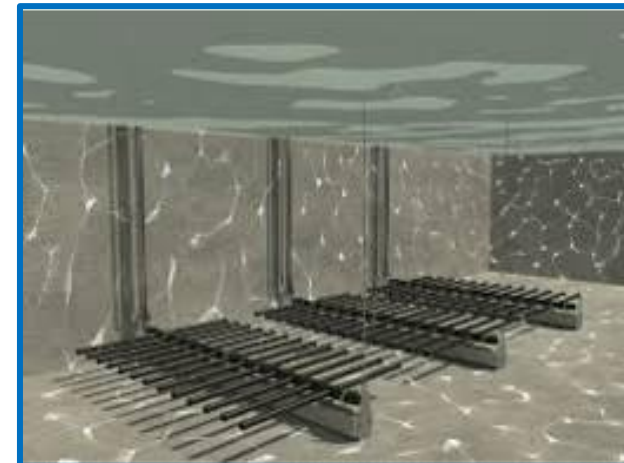
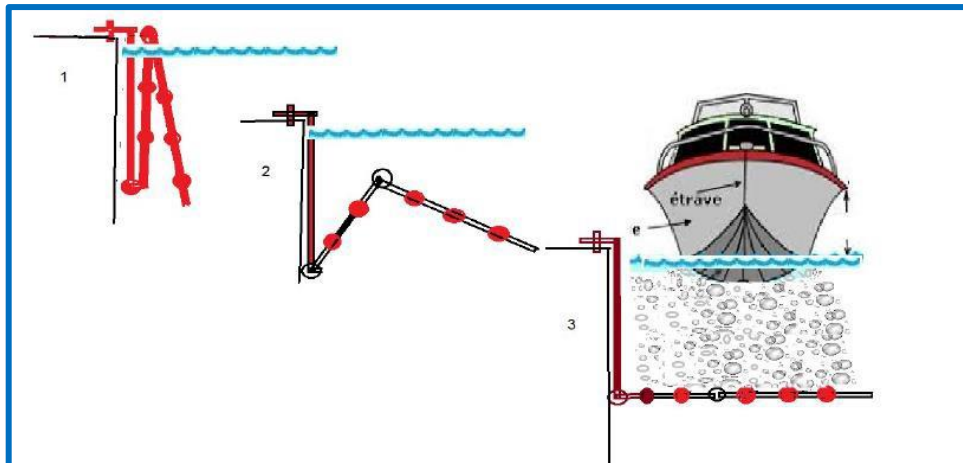
In the placed on board version, the device should be deployed in the water around the hull, and then positioned below and parallel to the waterline, and as close as possible to the keel, and should be held in this position thanks to three special rubber straps (the first one tied to the bow, the others to the two ends of the stern). It should be noted that the installation of the straps and the adjustment of BubbleBoat[®] tube must be carried out with the compressor running, to avoid bending the tube.



Yachting BubbleBoat[®] solution: overview

In yachting version the system is composed of at least 1 air pump to be sized according to the number and length of the moorings, and alternately:

a) by special telescopic arms to be fixed to the quay at each berth (which can be motorised if necessary), in order to be deployed underneath the hull when the owner and/or the captain decide to stop for a long time in port (see figure and photo below);



BUBBLEBOAT[®]



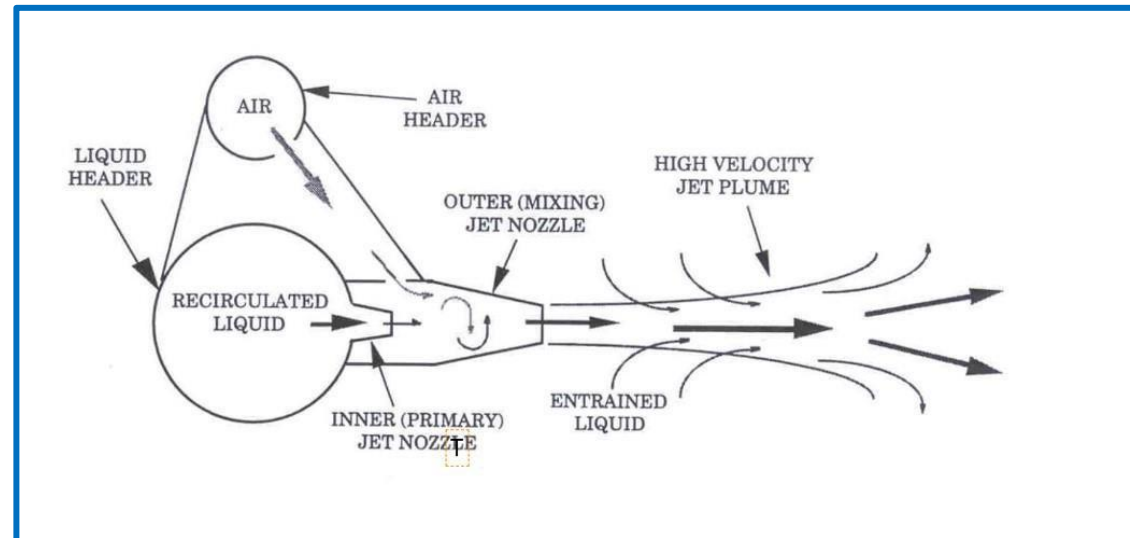
Yachting BubbleBoat[®] solution: overview

b) by special diffusers to be fixed to the ground at each berth, so as to release the micro-bubbles of air below the hull when the owner and/or captain decide to stay in port for a long time (see figure and photo below).



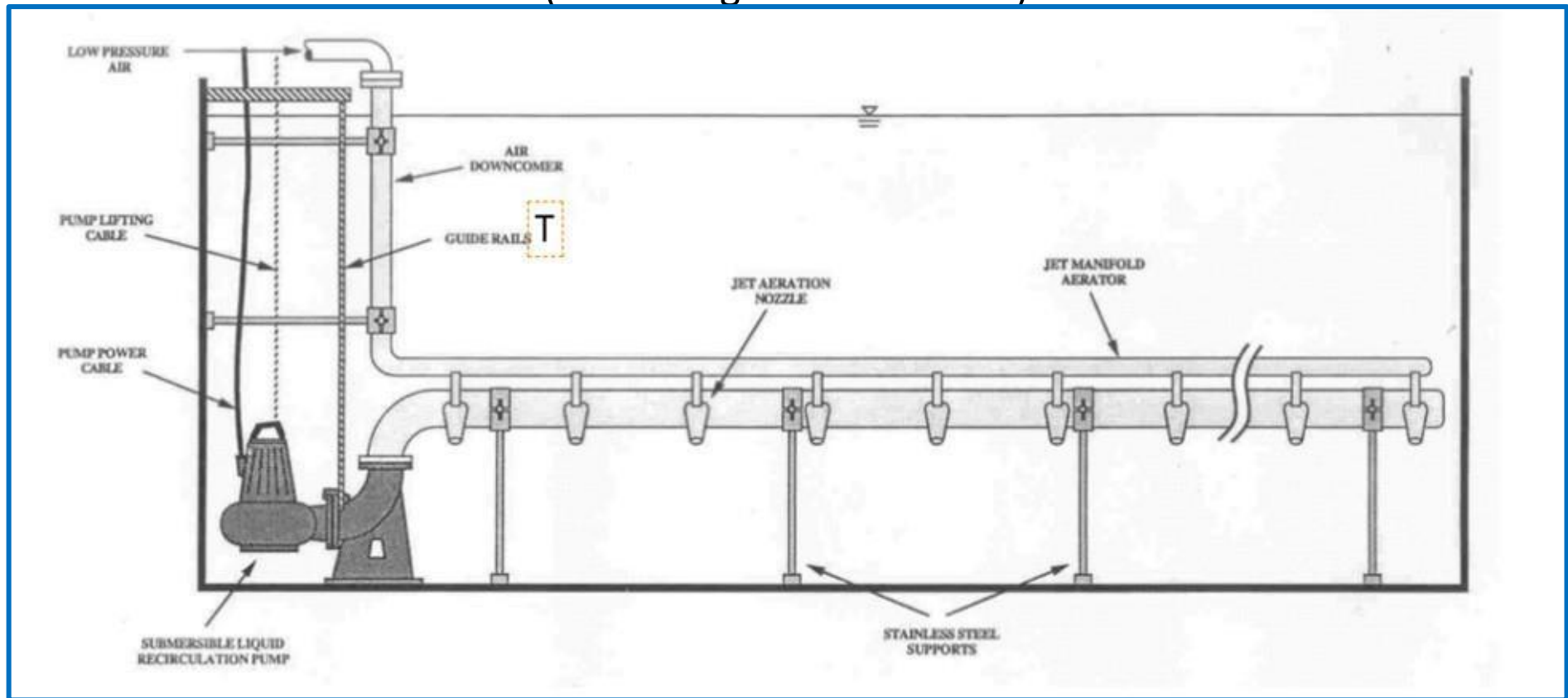
Ports BubbleBoat[®] solution: overview

In commercial ports version, the system consists of an obviously more articulated and complex set-up, with at least 1 air pump to be sized according to the number and length of the moorings, and special collectors and aeration nozzles permanently fixed to the ground (see diagram below for the operating principle).



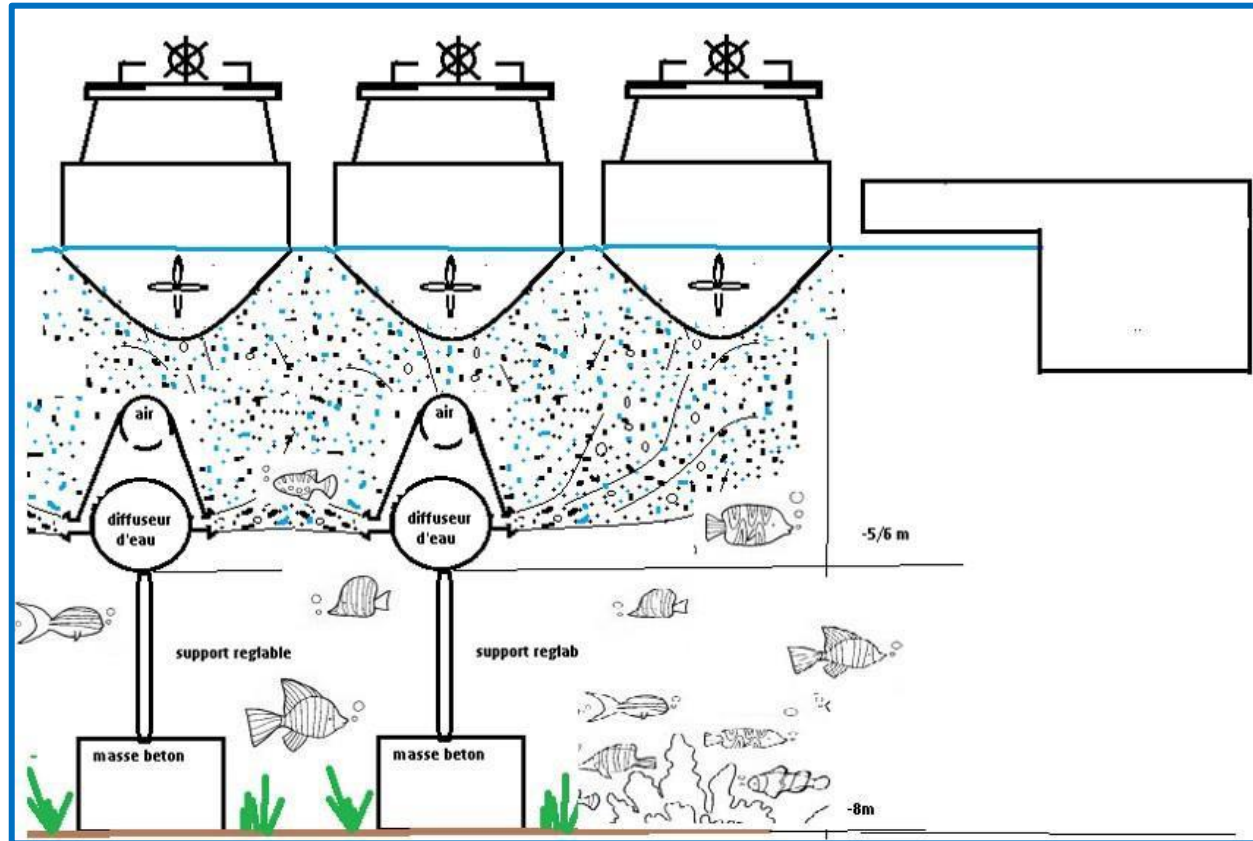
Ports BubbleBoat[®] solution: overview

(ex. of longitudinal section)



Ports BubbleBoat[®] solution: overview

(ex. trasversal section)

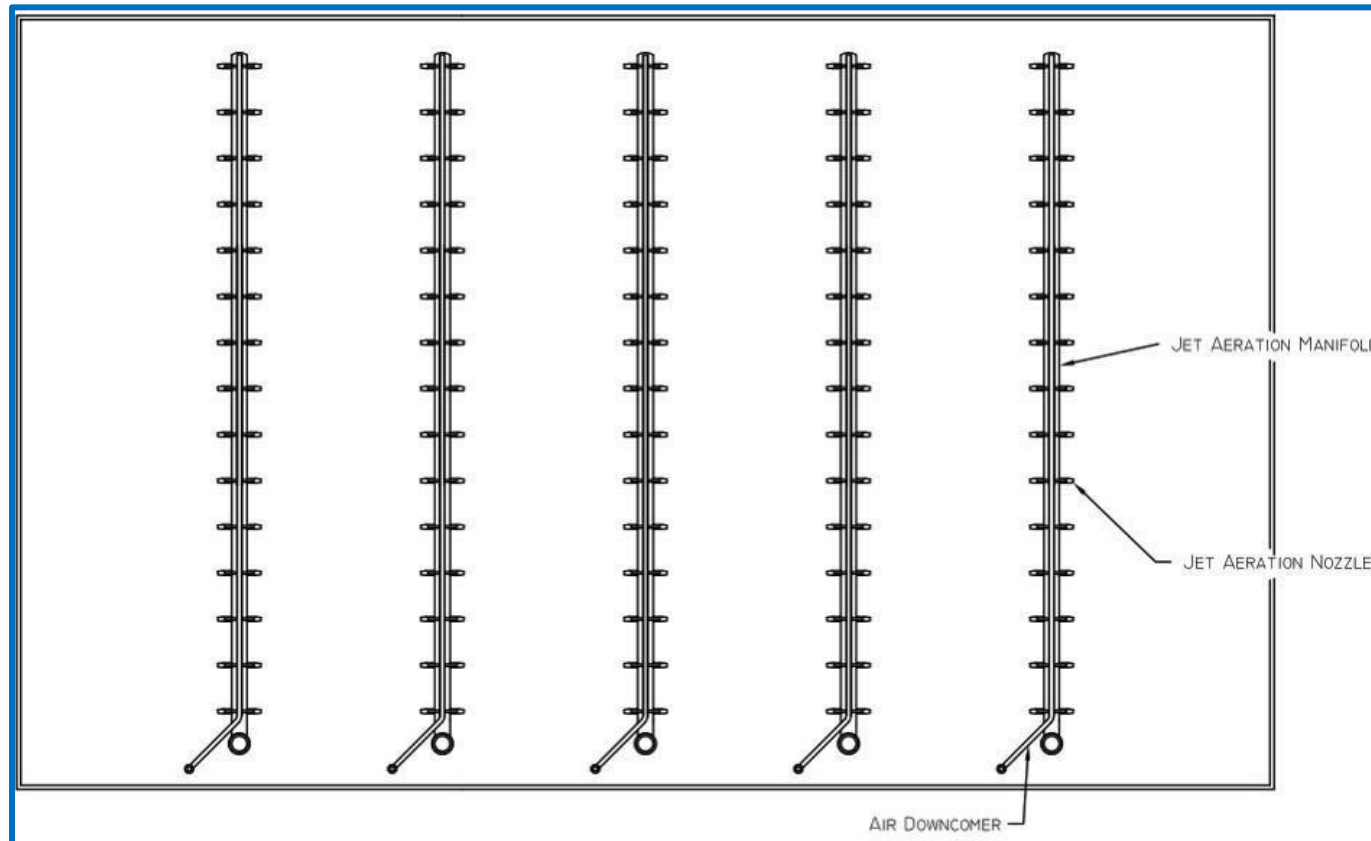


BUBBLEBOAT[®]



Ports BubbleBoat[®] solution: overview

(ex. Plan section)



Ports BubbleBoat[®] solution: overview

(See photo 1)



BUBBLEBOAT[®]



Ports BubbleBoat[®] solution: overview

(See photo 2)



BUBBLEBOAT[®]



BubbleBoat[®]: the green solution

Not only does it solve the problem of fouling without polluting, but especially in the yachting and commercial port version, where fauna is deprived of oxygenation due to stagnant water in the harbour under the sun, aggravated by discharges from ships and superyachts, even if they are stationary for long periods, which cause intense pollution, the BubbleBoat[®] system, active for a few hours a day or continuously, helps oxygenate the water against pollution and contributes to molecular renewal.



BUBBLEBOAT[®]



BubbleBoat[®] solution: benefits

- ✓ Fuel-saving, as the boat is no longer held back by a hull full of parasites.
- ✓ Eco-friendly: it does not damage sea life, fish or people, and since even and especially in the version for marinas and commercial ports the pumps can be powered by renewable energy sources (e.g. photovoltaic panels), the combined effect of the port water oxygenation and the use of renewable energies would be a concrete proof of the operator's environmental commitment, in line with **SDG 14** - Life Below Water of the ONU 2030 Sustainable Development Goals and with the investments planned for the ecological transition and financed by the famous Next Generation EU, and an undeniable competitive advantage (**ESG** - Environmental, Social, Governance -).

It makes no noise during use, not even at night, and if necessary the installations could be insulated with our innovative NoViDamp[®] sound shields, made of 100% regenerated PVC.



Warranty

1. WARRANTY

1. The content of this document refers expressly to « **Pantecnica S.p.A. - Technical Documents Disclaimer - EN - Rev.01** » published online, and it is provided for general information purposes only and should not be considered as a binding recommendation.
2. Pantecnica[®] does not assume any kind of responsibility, neither express nor implied, related to both the completeness and care of any type of Information contained and/or mentioned in this document, and the use that the Customer / User will do of the Information provided herein. Pantecnica[®] recommends to the Customer / User to obtain accurate guidance from experts in any specific scope of application to which the purchased Products are destined, possibly by carrying out appropriate verification tests on the specific suitability of the aforementioned Products.
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4. Given the wide range of possible applications and operating conditions, together with the imponderable factors involved, even of a human nature, Pantecnica[®] does not give any express or implicit guarantee regarding the durability of the Products nor the success of the application. Any assistance or advice from Pantecnica[®] commercial and technical support in choosing the Products does not in any way derogate from the foregoing, unless this was expressly and specifically provided for.

2. OPERATING CONDITIONS' LIMIT VALUES

1. The limit values referred to the operating conditions are correlated with each other and must never be reached simultaneously. They are in close relationship both with the correct choice of the Products with respect to the specific application, and with its correct assembly.

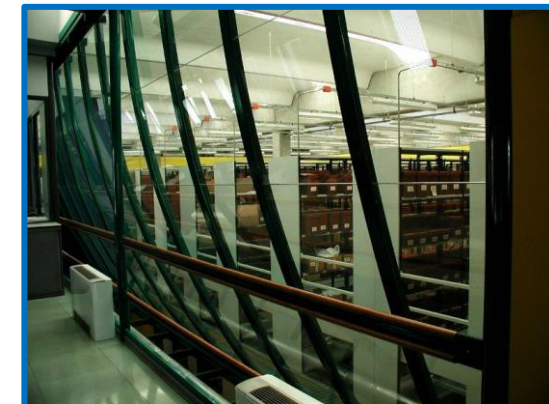
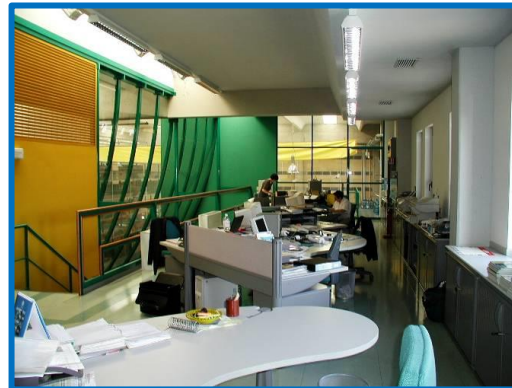
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**Technical application know-how
Blue Technologies for shipbuilding industry**



**Thank you for your
attention!
www.pantecnica.it**



“Let our love for the sea be a metaphor for the love of future generations.”

Dott. Davide Fatigati - Executive Chairman - Pantecnica S.p.A.