



PARAFOULING®

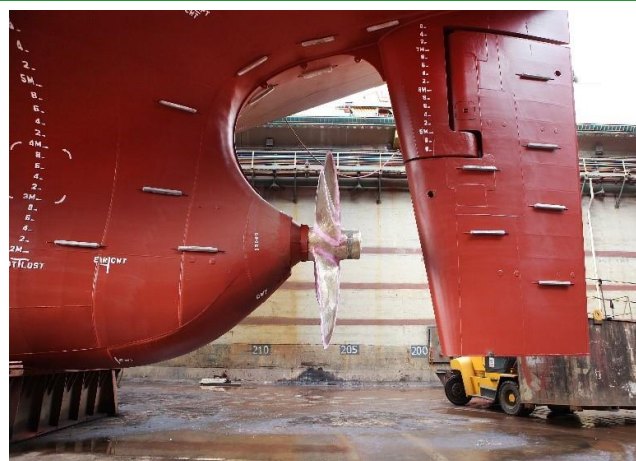
**BIOCIDE-FREE
ANTIFOULING VARNISH**

PRODUCT OVERVIEW



PARAFOULING®

BIOCIDE-FREE ANTIFOULING VARNISH



PRODUCT DESCRIPTION

Antifouling is a paint that is applied to the hull of a boat, the propellers, the keel and all submerged elements, in order to protect them and prevent aquatic organisms (bacteria, unicellular algae, green algae, barnacles, sponges, marine worms, etc.) attach themselves to it.

Without antifouling, aquatic organisms develop on the hull, causing:

- Reduced browsing speed.
- Significant increase in fuel consumption.
- In some cases, impossibility of sailing upwind.

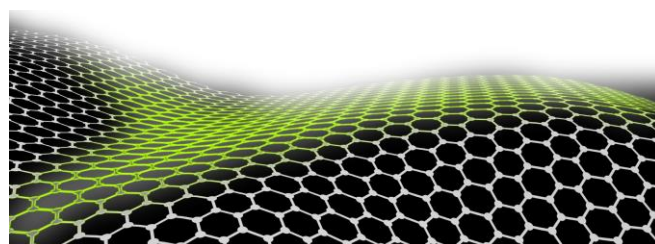
Conventional antifouling paints contain high concentrations of chemicals toxic to marine life which gradually diffuse into the aquatic environment.

Made up of a hard silicate-like matrix containing graphene for better resistance to friction and to improve the non-stick effect, **PARAFOULING®** is without biocide or any other toxic component.

Thanks to its innovative graphene technology, **PARAFOULING®** durably protects your hulls, reduces your fuel consumption while fully respecting the environment.

BENEFITS

- **Does not contain biocide.**
- Ecological, does not release toxic product.
- The substances used comply with European REACH legislation.
- Applicable on most materials.
- Applicable on all parts submerged or not.
- Quick application.
- Monolayer.
- Reduces downtime.
- Very high covering power.
- Minimum wear of 24 months (compared to only 12 months for classic antifouling's).
- Improves glide and, at equivalent engine speed, the speed of the vessel by 3 to 5%.
- Reduces fuel consumption by 3-5%.
- Can be applied outside fairing areas.



3D illustration of Graphene molecules.

FEATURES

Features	Average Values
Matrix type	Hard
Hull Type	Polyester, steel, aluminium, wood
Navigation area	Low to high soiling
Grounding	Yes
Browsing speed	0 à >25 Knots
Hardening mechanism	Solvent evaporation and crystallization
Number of layers	1
Drying time	3h to 4h
Time before launching	24h minimum
Packaging	0,75 L
Density	0,84 ± 0.05
Recommended thickness	1 à 5 µm dry
Thickness not to exceed	10 µm dry
Practical performance	25m ² for 750 ml
Operating temperature	+10°C to +35°C
Hygrometry	<85%
Dilution	0 %
cleaning solvent	Alcohol

Graphene, a "natural" material derived from graphite, is an innovative carbon material with amazing properties. Often described as a "miracle material", graphene is the lightest, thinnest, strongest, most durable, waterproof and best thermal conductor material known. Graphene also has the highest lubricity or the lowest coefficient of friction of any known material.

To learn more about graphene:

<https://www.calameo.com/books/00715983426067512cfe0>

INSTRUCTIONS FOR USE

Media status: Clean and adherent.

- Shake the packaging well before use to guarantee a good homogeneity of the product.
- **PARAFOULING®** applies pure in one layer, do not dilute.
- Apply using an HD hard foam roller or HVLP sprayer.



- The quantity deposited must not be greater than 50 gr/m², the minimum quantity to obtain good efficiency is 10 gr/m².

- A 750 ml canister is enough to treat the hull of a 12 to 14 m vessel.

The exceptional mechanical resistance of graphene guarantees to **PARAFOULING®** a longevity of at least 2 years.

PACKAGING

Metal bottle of 750 ml totally recyclable.



CONSUMPTION

- Yield: approximately 25 m² per 750 ml bottle. A 750 ml container is enough to treat the hull of a 12 to 14 m boat.

STORAGE

- Store away from frost and heat in a dry place: temperature between 5°C and 30°C.
- Maximum storage time: 1 year in original packaging.
- Remember to recycle empty packaging.

HANDLING & SAFETY

- This product is labelled as dangerous due to the presence of solvent in its composition.
- After drying, **PARAFOULING®** becomes completely inert and poses no danger to the environment.
- If spraying, use protective goggles.
- Gloves recommended..

- **KEEP OUT OF REACH OF CHILDREN**

Product developed and manufactured in France



éco' PRISME®

Société à Mission pour l'Environnement

ZA Du Puy Bayard – 3, Rue des Chambettes
63570 AUZAT LA COMBELLE

Tél. : +33 4 22 52 18 20 – Fax : +33 4 22 52 18 21

E-mail : info@eco-prisme.com

Internet : www.eco-prisme.com

PARAFOULING®

BIOCIDE-FREE ANTIFOULING VARNISH



PRODUCT DESCRIPTION

PARAFOULING® is an antifouling varnish made up of a hard silicate-like matrix containing graphene, a revolutionary material with extraordinary properties.

PARAFOULING® ensures a smooth film, with low surface tension which prevents the attachment of marine organisms to the hull and the propellers and facilitates their detachment when the boat is in motion.

Conventional antifouling's contain high concentrations of toxic chemicals which gradually diffuse into the aquatic environment. Without biocide, **PARAFOULING®** is completely harmless to marine flora and fauna.

PARAFOULING® can be applied on all types of substrates, very simply in a single coat.

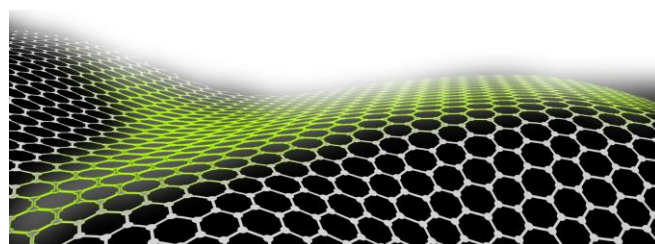
The exceptional resistance of graphene allows **PARAFOULING®** to remain effective for at least 2 years, thus limiting costly fairing operations.

PARAFOULING® will reduce draft friction forces. Drag is thus reduced, increasing speed and reducing fuel consumption by 3 to 5%.

Thus, thanks to its innovative graphene technology, **PARAFOULING®** durably protects your hulls, reduces your fuel consumption while respecting the environment.

BENEFITS

- Does not contain biocide.
- Ecological, does not release toxic product.
- Simple and fast one-coat application on most materials.
- Very high covering power.
- Lasts for at least 24 months (compared to only 12 months for classic antifouling's).
- Reduces downtime and maintenance.
- Applicable on all parts submerged or not. (Hull, propeller, rudders, keels, transmissions, foils, etc.).
- Improves speed by 3-5%.
- Reduces fuel consumption by 3 to 5%.
- Very fast payback.



3D illustration of Graphene molecules.

FEATURES

Features	Average Values
Matrix type	Hard
Hull Type	Polyester, steel, aluminium, wood
Navigation area	Low to high soiling
Grounding	Yes
Browsing speed	0 à >25 Knots
Hardening mechanism	Solvent evaporation and crystallization
Number of layers	1
Drying time	3h to 4h
Time before launching	24h minimum
Packaging	0,75 L
Density	0,84 ± 0.05
Recommended thickness	1 à 5 µm dry
Thickness not to exceed	10 µm dry
Practical performance	25m ² for 750 ml
Operating temperature	+10°C to +35°C
Hygrometry	<85%
Dilution	0 %
cleaning solvent	Alcohol

Graphene, a "natural" material derived from graphite, is an innovative carbon material with amazing properties. Often described as a "miracle material", graphene is the lightest, thinnest, strongest, most durable, waterproof and best thermal conductor material known. Graphene also has the highest lubricity or the lowest coefficient of friction of any known material.

To learn more about graphene:

<https://www.calameo.com/books/00715983426067512cfe0>

INSTRUCTIONS FOR USE

Media status: Clean and adherent.

- Mix **PARAFOULING**[®] before use, with a mixer, at low speed, for 2 minutes in order to guarantee a good homogeneity of the product.
- **PARAFOULING**[®] must be applied pure in one layer, do not dilute.
- Apply using an HD hard foam roller or HVLP sprayer.



- The quantity deposited must not be greater than 50 gr/m², the minimum quantity to obtain good efficiency is 10 gr/m².

The exceptional mechanical resistance of graphene guarantees to **PARAFOULING**[®] a longevity of at least 2 years.

PACKAGING

Recyclable metal container 27 liters.

CONSUMPTION

- Yield: approximately 35 m²/L.
A 27L container covers approximately 900 m².



STORAGE

- Store away from frost and heat in a dry place: temperature between 5°C and 30°C.
- Maximum storage time: 1 year in original packaging.
- Remember to recycle empty packaging.

HANDLING & SAFETY

- This product is labelled as dangerous due to the presence of solvent in its composition.
- After drying, **PARAFOULING**[®] becomes completely inert and poses no danger to the environment.
- If spraying, use protective goggles.
- Gloves recommended..
- **KEEP OUT OF REACH OF CHILDREN**

Product developed and manufactured in France



éco'PRISME[®]

Société à Mission pour l'Environnement

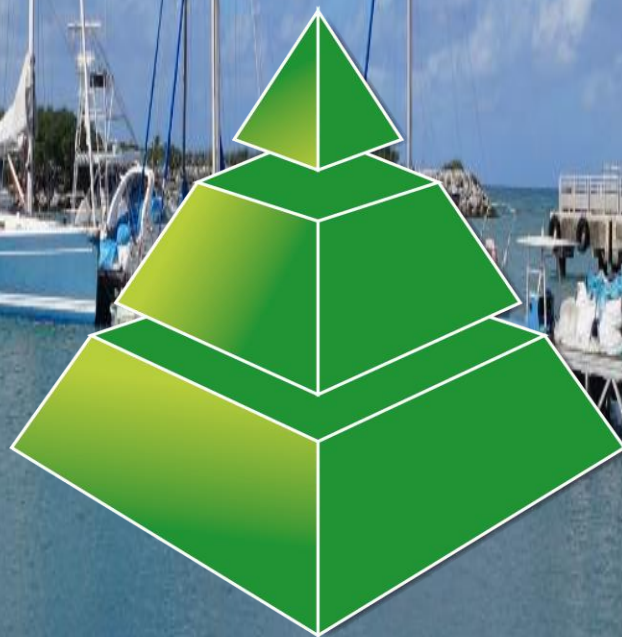
ZA Du Puy Bayard – 3, Rue des Chambettes
63570 AUZAT LA COMBELLE

Tél. : +33 4 22 52 18 20 – Fax : +33 4 22 52 18 21

E-mail : info@eco-prisme.com

Internet : www.eco-prisme.com

Test of biocide-free antifouling varnish **PARAFOULING®**



éco' PRISME®

Biocide-free antifouling varnish PARAFOULING®

- This historic boat has been renovated
- The hull was repainted then received a coat of PARAFOULING®
- PARAFOULING® was applied using a foam roller.
- The boat is moored in a port (Bas-Rhin region)
- Rarely used
- Used for short distances
- Travel only at low speed



Biocide-free antifouling varnish PARAFOULING®

Before cleaning

- Major inlays on the bottom
- Mucilage on the side areas
- Almost no encrustations on the visible parts

After cleaning

- Manual cleaning by hand with water under low pressure (no brushing, sanding, etc.)
- All biomass has been completely removed



Biocide-free antifouling varnish PARAFOULING®



Before cleaning



After cleaning

**Biomass has been
easily removed**

Biocide-free antifouling varnish PARAFOULING®

Fiberglass boat used in the Mediterranean.

Bi-weekly use of approximately 3 hours,

Dimensions :

- **Length: 9.3m (30ft 6in)**
- **Width: 3.2 m (10 ft 6 in)**
- **Height: 1.0 m (3 ft 3 in)**

Coating system :

- **Primer: 5-coat solvent-based epoxy coating at 100 µm dry film thickness**
- **Base coat: solvent-based epoxy coating (2 K) 1 coat, 100 µm dry film thickness**
- **Hull finish: PARAFOULING® 1 coat, 5 µm to 8 µm dry film thickness (quantity used approx. 0.5 l) Applied with a foam roller**



Biocide-free antifouling varnish PARAFOULING®



**2 years after application, the
coating is in perfect condition,**



PARAFOULING®

THE FIRST GRAPHENE ANTIFOULING VARNISH



éco' PRISME®

PARAFOULING® is the solution to sustainably maintain your hull while preserving the environment.

PARAFOULING® is an antifouling varnish formulated with graphene, a revolutionary material with extraordinary properties. Biocide-free, it releases no toxic substances into the marine environment.

PARAFOULING® is very easy to apply on all types of boats and on all supports. PARAFOULING® applies in a single coat, without special equipment, on all the elements, whether submerged or not.

Thanks to its very high covering power, PARAFOULING® can be used in very small quantities: A 750ml container is enough to treat the hull of a 12 to 14 m boat.

Graphene gives the PARAFOULING® an exceptional solidity, which allows it to remain effective for 2 years (compared to 1 year for classic antifouling). PARAFOULING® reduces your fuel consumption and improves the glide of sailboats, surfboards, windsurfers...



WWW.ECO-PRISME.COM



Biological fouling of hulls is responsible per year for:

110 MILLION TONS OF EMISSION OF CARBON SURPLUS

Source : I-TECH AB WHITEPAPER SEPTEMBER 2021

WHAT IS ANTIFOULING USED FOR?

Antifouling is a type of boat coating that inhibits the growth of underwater organisms that attach themselves to the hull.

It prevents marine organisms from attaching themselves to the materials. It thus protects the hulls of boats or other submerged supports. The invasion of surfaces by micro-organisms remains a natural phenomenon encountered very frequently.

If you want to prevent this growth, you will need to treat your boat with an antifouling. This applies to all boats that remain in the water for long periods of time. The treatment of the hull prevents underwater organisms from attaching to it, such as barnacles and shells, and other plant organisms, such as algae.

Most antifouling's contain biocides, molecules intended to destroy micro-organisms clinging to the hull, thus slowing down their proliferation and colonization of the hull.

IS ANTIFOULING REQUIRED?

The development of marine organisms on the hull, or fouling, has negative effects on navigation:

➤ FUEL OVERCONSUMPTION

By increasing the boat's weight and water resistance, fouling can cause fuel overconsumption of up to 40%.

➤ DECREASE IN MANEUVERABILITY

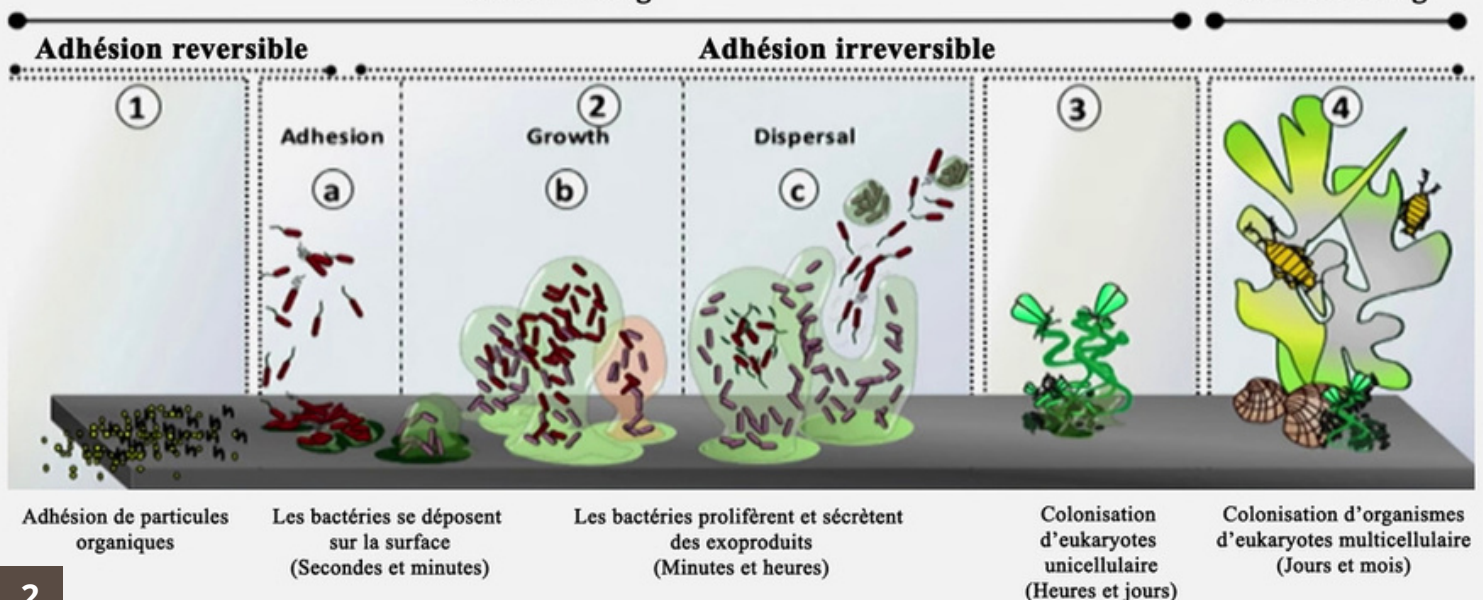
Dirt weighs down the boat and increases the resistance due to friction. This has a direct influence on the manoeuvrability and speed of your boat. Dirt on the propeller, the bow thruster and the rudder... can have the same consequences.

➤ HULL DETERIORATION

Bio-corrosion alters the hull causing increased maintenance costs for cleaning and repairing the hull.

Microfouling

Macrofouling



THE PROBLEM OF BIOCIDES ON MARINE ORGANISMS

The principle of antifouling is to prevent living organisms (algae, small crustaceans, etc.) from attaching themselves to the hull of boats and disturbing its navigation.

The substances of the majority of commercial products are qualified as "biocide" (in literal meaning: bio = life, cide = killer). They are designed to destroy or repel marine organisms that grow on the hull of boats.

But these substances are volatile and disperse in the marine environment, especially during the first few weeks after launching your boat. By dispersing in the marine environment, they will therefore exert their action beyond the hull, in particular on marine organisms.

These substances persist for a long time in water and sediment. Some of them are "bio-accumulable": they are absorbed and concentrated by marine organisms throughout the food chain.

Worldwide, the antifouling market is estimated at more than 100,000 tonnes, including 20,000 tonnes for Europe. It is estimated that pleasure craft represent on a European scale 3000 tonnes of paintings.

Source : Rapport AntiFouling et Environnement - Finistère 360° - Tourisme Nautisme & Territoires- Avril 2019



THE CONSEQUENCES ON THE MARINE ENVIRONMENT

Recent analyses of sediments taken from port areas reveal the presence of TBT. This biocidal agent, declared toxic for humans, has been banned since 2003.

These studies also reveal the presence of other biocides and heavy metals present in the water and in particular :

- zineb, an endocrine disruptor.
- diuron, a herbicide prohibited for use on boats.
- copper and its derivatives such as copper oxide.

These products have harmful effects on the marine environment: degradation of water quality, anomalies in certain species of shellfish and fish, invasion of undesirable species, etc.

1 m² of a boat hull contains 15 g of biocide
1 g of biocide pollutes 10,000 m³ of water

SOURCE : ÉCONAV

Even at low concentrations, biocides have a rapid effect on phytoplankton, the plant element at the base of the food chain. This effect affects filter-feeding organisms (oysters, mussels, etc.) and top predators (fish, marine mammals, etc.).

On humans, the direct effects are irritations, gastric disorders. In high doses, biocides can be sources of cancer.

THE PARAFOULING® SOLUTION

To address this problem, the ECO'PRISME® research laboratory has developed an innovative and ecological solution based on GRAPHENE technology.

PARAFOULING® is a varnish consisting of a hard matrix, which after drying is similar to glass. It contains GRAPHENE for better resistance to friction and to improve the non-stick effect.

PARAFOULING® does not contain any biocides.

PARAFOULING® IS THE SOLUTION FOR SUSTAINABLY MAINTAINING YOUR HULL WHILE PRESERVING THE ENVIRONMENT.

THE ADVANTAGES OF PARAFOULING®

INNOVATIVE : **PARAFOULING®** is the 1st antifouling based on Graphene, this revolutionary material with extraordinary properties.

ECOLOGICAL : **PARAFOULING®** does not release any toxic substances into the marine environment.

EASY TO USE: After cleaning the supports, **PARAFOULING®** applies in a single coat, without special equipment, on all the elements, whether submerged or not.

ECONOMIC : thanks to its very high covering power, a 750 ml bottle of **PARAFOULING®** replaces up to 15 L of conventional antifouling paint.

VERSATILE : **PARAFOULING®** can be used on all types of supports and boats.

SUSTAINABLE : graphene gives exceptional strength to the **PARAFOULING®** which remains effective for 2 years (compared to 1 year for classic antifoulings).

EFFICIENT : Thanks to the exceptional lubricating properties of graphene, **PARAFOULING®** improves glide by reducing resistance. The consumption of motor boats is reduced. Sailboats, surfboards and windsurfers are gaining speed.



TECHNICAL DATA

Matrix type : Hard
Hull type : Polyester, steel, aluminium, wood
Navigation area : Low to high soiling
Grounding : Yes
Browsing speed : 0 à >25 knots
Hardening mechanism : Solvent evaporation and crystallization
Number of layers : 1
Drying time : 3h à 4h
Time before launching : 24h minimum
Packaging : 0,75 L
Density : 0,84 ± 0.05
Recommended thickness : 1 à 5 µm dry
Thickness not to exceed : 10 µm dry
Practical performance : 30 - 40m²/L
Operating temperature : +10°C à +35°C
Hygrometry : <85%
Dilution : 0%
cleaning solvent : Alcool



WHAT IS GRAPHENE?

In 2004, two researchers from the University of Manchester succeeded in producing, from graphite, a 2D crystal of graphene one atom thick.

In 2010, the two scientists were awarded the Nobel Prize for their discovery and their experiments, deemed revolutionary by the Nobel Committee.

Since its discovery, the list of patents concerning graphene has been growing at a spectacular rate from year to year.

The whole world invests in what has been renamed the "super material" with extraordinary characteristics and which allows many innovations in electronics, medical research, automotive, aeronautics...

GRAPHENE IN PARAFOULING®

PARAFOULING® is a varnish consisting of a hard matrix, which after drying is similar to glass. It contains graphene for better resistance to friction and to improve the non-stick effect.

The benefits of using graphene in an antifouling are numerous. In addition to the harmlessness of the product on the marine environment, graphene makes the surface treated with **PARAFOULING®** extraordinarily waterproof, both improving glide and preventing adhesion of aquatic organisms.

The use of graphene in the **PARAFOULING®** thus makes it possible to obtain a product free of biocides, effective against the development of marine organisms on the hull. This product fully complies with the new European regulations on hull paints.

PARAFOULING® also takes advantage of the extraordinary solidity of graphene, (Graphene is more than 100 times stronger than steel), to offer a coating with a hold of more than 24 months (compared to only one year for conventional antifouling paints).

The graphenes used in their formulation of our **PARAFOULING®** are generally made up of 2 to 5 layers, i.e. a yield of 480 to 1200 m² for 1 gram, which explains the small quantity necessary to effectively cover a boat hull (1 bottle of 750 ml is sufficient to cover the hull of a 14 meter boat).

OUTSTANDING PROPERTIES

Atomic thickness: a single layer of graphene is only one atom thick (we speak of a "2D" or "two-dimensional" material), or about 0.335 nanometers.

Mobility of electrons: electron mobility is the highest of all electronic materials, with a theoretical limit of 200,000 cm²/(Vs) (100x higher than silicon).

Resistance: Flawless single-layer Graphene is the strongest material ever tested with a strength of 42 N/m, which equates to an intrinsic strength of 130 GPa (Over 100 times stronger than steel).

Tenacity and Extensibility: although graphene is relatively brittle, it can be stretched by up to 25% - very relevant for flexible electronics.

Rigidity: experiments on a flawless graphene monolayer yielded a Young's modulus of around 1.0 TPa - one of the highest values of any material, about the same as diamond.

Expansiveness: 2630 m²/g - with less than 3 grams you could cover an entire football pitch.

Waterproofed: even the smallest atom (helium atom) cannot pass through a graphene sheet.

Electrical resistivity: 1·10⁻⁸ Ω·m among the weakest of all known materials at room temperature (35% less than copper).

Thermal conductivity: 1500-2500 W/mK at room temperature, higher than diamonds.

Transparency: it absorbs only 2.3% of reflected light.

Source : Nanowerk.com



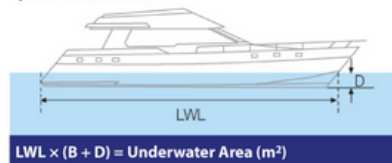
IMPLEMENTATION

After cleaning with a high-pressure jet to remove dirt and salt and allowing the supports to dry, **PARAFOULING®** apply pure in one coat, without dilution. **PARAFOULING®** apply using HVLP sprayer or a hard foam roller. The quantity deposited must not be greater than 50 gr/m², the minimum quantity to obtain good efficiency is 10 gr/m². The optimum thickness of the film should be between 5 and 10 µm..

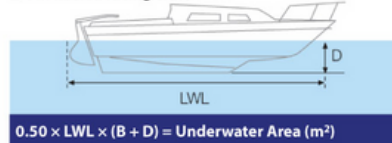
How much antifouling paint do I need?

- 1 Work out the area to be painted using the appropriate formulation (below).
- 2 Divide the area by the coverage of the paint you've chosen to determine how many litres per coat you will need.
- 3 Multiply the litres per coat by the number of coats to give your total paint requirement.

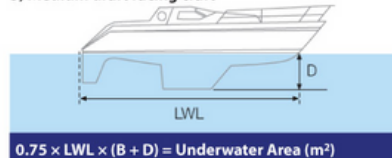
1) Full bodied craft



2) Fin keeled racing craft



3) Medium draft racing craft



LWL = Length Waterline
B = Beam
D = Draft

Conversion Table
1 foot = 0.3 metres
1 metre = 3.281 feet
1 sq foot = 0.093 sq metres
1 sq metre = 10.764 sq feet
1 gallon = 4.546 litres
1 litre = 0.219 gallon

YIELD

The covering power of **PARAFOULING®** is very high. The practical yield is 30 to 40 m²/L. A single 750ml bottle of **PARAFOULING®** can treat a boat of 14 meters.



APPLICABLE ON ALL TYPES OF BOATS



PARAFOULING®: THE BEST ALTERNATIVE TO BIOCIDAL ANTIFOULING



In recent years, alternatives to conventional antifouling paints containing biocides have appeared on the market. However, none of the proposed solutions is as efficient as **PARAFOULING®**.

PRODUCT FAMILY	Mechanical solutions			Classic paints with biocide		"New generation" paint with biocide	
PRODUCT NAME	Pressure washer	Protective cover	Brush "Lulu"	Altura 619	UltraEU	R&D Nautix	M300
EFFICIENCY	👍👍👍👍	👍👍	👍👍👍	👍👍👍	👍👍👍	👍👍	👍👍
MICROALGAE TOXICITY	none	none	none	⚠️⚠️⚠️	⚠️⚠️⚠️⚠️⚠️	⚠️⚠️	⚠️⚠️
CRUSTACEANS TOXICITY	none	none	none	⚠️	⚠️⚠️⚠️⚠️	⚠️	⚠️⚠️⚠️
FISH LARVAE TOXICITY	none	none	none	⚠️⚠️⚠️⚠️	⚠️⚠️⚠️⚠️⚠️	⚠️⚠️⚠️⚠️⚠️	⚠️⚠️⚠️⚠️⚠️
COST OF PURCHASE (for 14.35 m²)	< 500 €	500 à 1000 €	< 500 €	< 500 €	< 500 €	N.C	500 à 1000 €
COST OF PURCHASE (for 14.35 m²)	10 years	5 years	5 years	3 à 4 years	1 years	N.C	5 years

PRODUCT FAMILY	Peinture avec silicone	Adhésif PVC	Adhésifs avec silicone		Ultrasons	PARAFOULING®	
PRODUCT NAME	Silicone	Anti-Graf	Mac Glide	Flox Fouling	Ultrasystem		
EFFICIENCY	👍👍👍	👍👍	👍👍👍	👍👍👍	👍👍		👍👍👍👍
MICROALGAE TOXICITY	⚠️⚠️⚠️⚠️	⚠️⚠️⚠️⚠️	⚠️⚠️⚠️	⚠️⚠️⚠️	none		none
CRUSTACEANS TOXICITY	⚠️	⚠️	⚠️	⚠️	none		none
FISH LARVAE TOXICITY	⚠️⚠️⚠️⚠️	⚠️⚠️⚠️⚠️	⚠️⚠️⚠️	⚠️⚠️⚠️	none		none
COST OF PURCHASE (for 14.35 m²)	500 à 1000 €	1500 à 2000 €	1500 à 2000 €	1500 à 2000 €	1500 à 2000 €		< 200 €
COST OF PURCHASE (for 14.35 m²)	5 years	4 years	5 years	5 years	5 years		At least 2 years

Source : GT Environnement UNAN 56-Notions fondamentales sur les peintures sous-marines antisalissures

PARAFOULING®

THE FIRST GRAPHENE ANTIFOULING VARNISH



A TECHNOLOGICAL AND ECOLOGICAL INNOVATION

PARAFOULING® is an antifouling varnish formulated with graphene, a revolutionary material with extraordinary properties. Biocide-free, it releases no toxic substances into the marine environment.

PARAFOULING® is very easy to apply on all types of boats and on all supports. **PARAFOULING®** applies in a single coat, without special equipment, on all the elements, whether submerged or not.

Thanks to its very high covering power, **PARAFOULING®** can be used in very small quantities: A 750 ml container is enough to treat the hull of a 12 to 14 m boat (i.e. approximately 30 g/m²).

Graphene gives the **PARAFOULING®** exceptional mechanical resistance, which allows it to remain effective for at least 2 years (compared to 1 year for conventional antifouling).

PARAFOULING® improves glide and, at equivalent engine speed, increases the speed of your vessel while reducing your fuel consumption.

**PARAFOULING®
ALLOWS
DECREASE THE
CONSUMPTION
FUEL
FROM 3 TO 5%**



PARAFOULING® : ONE SOLUTION AT A TIME ECOLOGICAL AND ECONOMIC FOR HULL MAINTENANCE

- **PARAFOULING® CONTAINS NO BIOCIDES**

Unlike conventional antifouling, **PARAFOULING®** does not contain any biocides or chemical products that can alter the marine fauna or flora.

- **PARAFOULING® HAS A VERY STRONG COVERING POWER**

A 750ml bottle of **PARAFOULING®** replaces up to 15 L of conventional antifouling paint.

Its application is therefore much faster and the immobilization of ships is reduced.

- **A SIMPLE AND QUICK APPLICATION ON ALL TYPES OF SUBSTRATES**

PARAFOULING® can be used on all types of supports and boats.

PARAFOULING® can be applied in a single coat on wood, metal, composite materials, aluminium, etc.

- **PARAFOULING® HAS A SUPERIOR LONGEVITY THAN CLASSIC ANTIFOULING**

Graphene gives exceptional strength to the **PARAFOULING®** which remains effective for at least 2 years (compared to 1 year for classic antifouling).

PARAFOULING® makes it possible to avoid operations of expensive annual fairing.

- **PARAFOULING® IS APPLICABLE ON ALL SUBMERSIBLE OR NOT SUBMERSIBLE PARTS**

PARAFOULING® applies in a single coat on any type of hull. It allows treatment of all submerged or non-submerged elements (hull, propeller, rudders, keels, transmissions, foils, etc.).

Thanks to its very low thickness, **PARAFOULING®** can be applied to propeller and shaft drive without generating noise or vibration.

- **PARAFOULING® INCREASES SPEED AND DECREASES FUEL CONSUMPTION**

PARAFOULING® reduces by 3 to 5% the fuel consumption.

Thanks to its extraordinary power non-stick, **PARAFOULING®** improves your ship's glide and increases speed by 3-5%.



PARAFOULING®: A VERY QUICK RETURN ON INVESTMENT

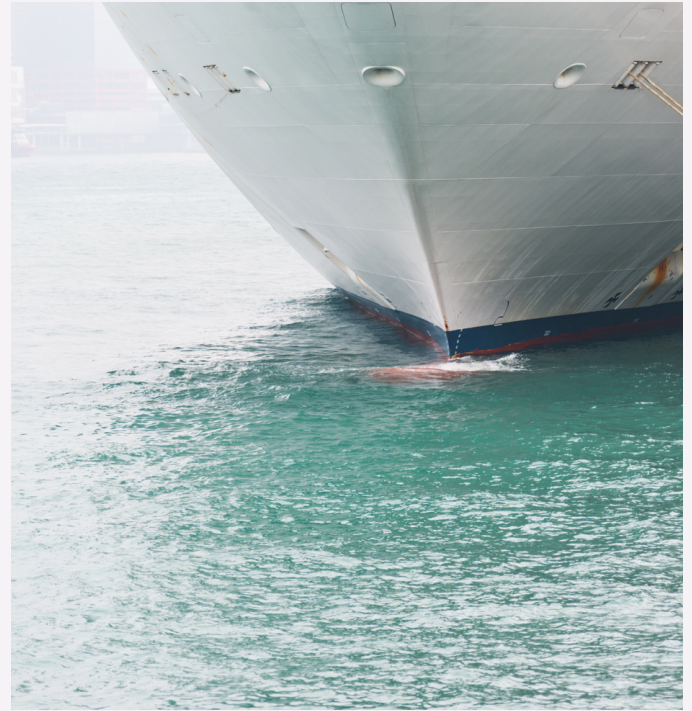
Compared to other antifouling products on the market, **PARAFOULING®** is very economical and allows a very fast return on investment.

PARAFOULING® saves money on the application time and maintenance.

Thanks to **PARAFOULING®**, the immobilization times of ships are reduced.

A very large container ship burns between 140 and 300 tonnes of fuel per day, a smaller commercial ship between 25 and 65 tonnes. By enabling fuel savings of 3 to 5%, the application of **PARAFOULING®** pays for itself very quickly.

For example, a ship consuming 1 million Euros of fuel per month will achieve savings of at least €30,000 per month, or €720,000 over 2 years.



THE BEST ALTERNATIVE TO BIOCIDAL ANTIFOULING

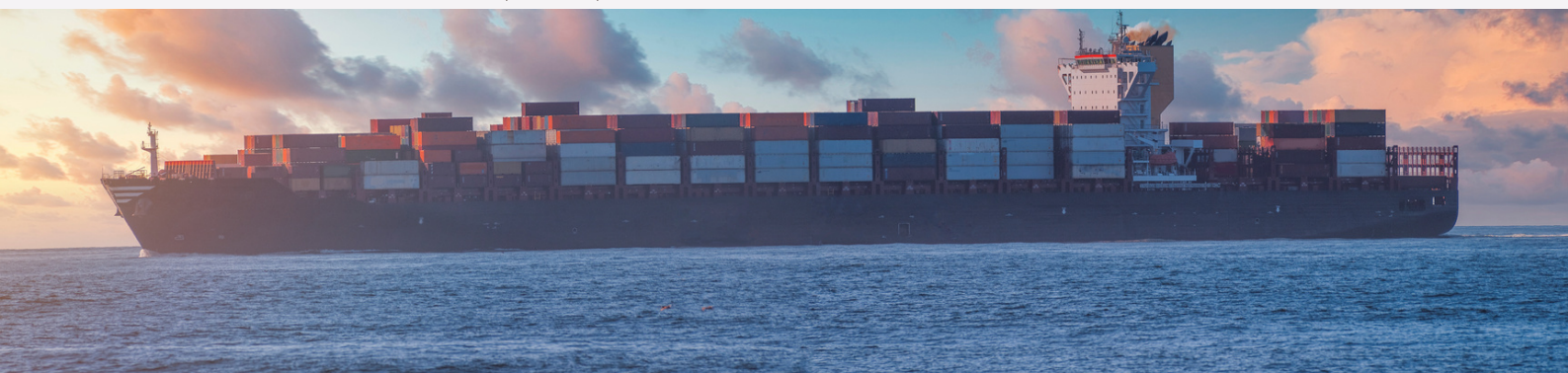
In recent years, alternative solutions to conventional antifouling paints containing biocides have appeared on the market, however none of the proposed solutions is as effective as **PARAFOULING®**.

PARAFOULING® is the only solution on the market that is effective, ecological and economical.

PRODUCT FAMILY	Mechanical solutions			Classic paints with biocide		"New generation" paint with biocide	
PRODUCT NAME	Pressure washer	Protective cover	Brush "Lulu"	Altura 619	UltraEU	R&D Nautix	M300
EFFICIENCY	👍👍👍👍	👍👍	👍👍👍	👍👍👍	👍👍👍	👍👍	👍👍
MICROALGAE TOXICITY	none	none	none	⚠️⚠️⚠️	⚠️⚠️⚠️⚠️⚠️	⚠️⚠️	⚠️⚠️
CRUSTACEANS TOXICITY	none	none	none	⚠️	⚠️⚠️⚠️	⚠️	⚠️⚠️
FISH LARVAE TOXICITY	none	none	none	⚠️⚠️⚠️⚠️	⚠️⚠️⚠️⚠️⚠️	⚠️⚠️⚠️⚠️	⚠️⚠️⚠️⚠️
COST OF PURCHASE (for 14.35 m²)	< 500 €	500 à 1000 €	< 500 €	< 500 €	< 500 €	N.C	500 à 1000 €
COST OF PURCHASE (for 14.35 m²)	10 years	5 years	5 years	3 à 4 years	1 years	N.C	5 years

PRODUCT FAMILY	Peinture avec silicone	Adhésif PVC	Adhésifs avec silicone		Ultrasons	Vernis au Graphène
PRODUCT NAME	Silicone	Anti-Graf	Mac Glide	Flox Fouling	Ultrasystem	PARAFOULING®
EFFICIENCY	👍👍👍	👍👍	👍👍👍	👍👍👍	👍👍	👍👍👍👍
MICROALGAE TOXICITY	⚠️⚠️⚠️⚠️	⚠️⚠️⚠️⚠️	⚠️⚠️⚠️	⚠️⚠️⚠️	none	none
CRUSTACEANS TOXICITY	⚠️	⚠️	⚠️	⚠️	none	none
FISH LARVAE TOXICITY	⚠️⚠️⚠️⚠️	⚠️⚠️⚠️⚠️	⚠️⚠️⚠️	⚠️⚠️⚠️	none	none
COST OF PURCHASE (for 14.35 m²)	500 à 1000 €	1500 à 2000 €	1500 à 2000 €	1500 à 2000 €	1500 à 2000 €	< 200 €
COST OF PURCHASE (for 14.35 m²)	5 years	4 years	5 years	5 years	5 years	At least 2 years

Source : ÉTUDE : NOUVEAUX ANTIFOULING - FINISTÈRE 360°, TOURISME, NAUTISME & TERRITOIRES 2019





GRAPHENE

THE MATERIAL OF THE FUTURE

Miracle material, revolutionary molecule, superlatives rain down on graphene. Better conductor than copper, two hundred times more resistant than steel while being six times lighter, more flexible and waterproof. On paper, graphene is first in all categories. It is difficult to envisage one day doing without metal or plastic, and yet this new material could soon impose itself in all areas.

The history of graphene

Graphene is a two-dimensional crystal of carbon atoms evenly distributed in a hexagonal lattice in the shape of a honeycomb. In nature, the stacking of layers of graphene forms graphite, which is commonly found in our pencil leads. Rolled up on itself, it forms carbon nanotubes.

Graphene was discovered in 2004 by André Geim and Konstantin Novoselov, professors at the University of Manchester, and awarded the Nobel Prize in 2010. Without really believing it, the researchers used the adhesive tape from a roll of tape to glue scraps of graphite to it. Then they folded this strip whose adhesive side was covered with graphite. By unfolding it, they reduced its thickness. And so on... In the end, there was only a layer of graphite left. André Geim had made the discovery that would earn him the Nobel Prize: the finest carbon crystal, only one atom thick.

<https://fr.wikipedia.org/wiki/Graph%C3%A8ne>

Since 2004, it has aroused extraordinary enthusiasm. It gives rise to varied research, from the most fundamental to the most applied.

Today, research on graphene has very significant resources, especially in Europe. Indeed, the European Union has invested 1 billion euros spread over 10 years. The objective is to develop manufacturing techniques on an industrial scale. But also to exploit the exceptional properties of this material in all possible fields.

<https://cordis.europa.eu/article/id/124617-europes-investment-in-graphene/fr> <https://graphene-flagship.eu/>

Flexible, lightweight, ultra-resistant, transparent, excellent thermal and electrical conductor, impermeable to many gases... Graphene has physico-chemical qualities that open up many avenues for it. Particularly in the fields of electronics, energy, health and materials science.

<https://www.graphene.manchester.ac.uk/learn/applications/>

These unique properties allow graphene to be used in many applications, but which ones exactly?

Graphene is revolutionizing coating.

Graphene has shown great application potential in most industries, including the paint and coating industry.

<https://blog.iglcoatings.com/the-science-of-graphene-based-protective-coating/>

<https://www.paint.org/coatingstech-magazine/articles/graphene-coatings-exciting-properties-and-wideranging-potential/>

Graphene and the oil industry.

The exceptional properties of graphene make it possible to obtain super-lubricating products that eliminate mechanical wear.

<https://www.ami-universite-telaviv.com/index.php/2013-05-26-08-41-51/recherche/sciences/physique/920-un-super-lubrifiant-supprimant-l-usure-m%C3%A9canique-d%C3%A9velopp%C3%A9-%C3%A0-universit%C3%A9-of-tel-aviv>

<https://www.sciencedirect.com/science/article/pii/S0920410518303218>

Graphene and electronics.

The combination of its exceptional electronic properties, its flexibility and its transparency now opens the way to the era of flexible electronics for the screens of mobile phones and tablets as well as for the textile sector.

<https://lejournel.cnrs.fr/articles/le-graphene-superstar-episode-1>

Graphene at the service of energy.

Studies have shown that graphene absorbs only 2.3% of the light received. This makes it a very transparent material. By combining this property with its flexibility and its excellent conductivity, applications have been imagined in the field of photovoltaic panels. Graphene porous structures are used in batteries, chargers, fuel cells.

<https://lejournel.cnrs.fr/articles/le-graphene-superstar-episode-2>

<https://www.techniques-ingenieur.fr/actualite/articles/le-graphene-matériau-du-xxieme-siecle-31936/>

<https://www.boursorama.com/patrimoine/actualites/technologie-les-panneaux-solaires-fonctionnent-aussien-cas-de-pluie-0976856ffd5803eb0cc4c6fb1e0f382b>

Graphene to the rescue of health.

In the field of health, it is the surface and conductivity properties of graphene that are used. By combining its large contact surface and its electrical conductivity, ultra-sensitive gas detectors at room temperature will be developed. Currently, the sensitive detection of pollution is a major challenge for the health of cities and countryside.

<https://lejournel.cnrs.fr/articles/le-graphene-superstar-episode-3>

<https://today.uic.edu/first-use-of-graphene-to-detect-cancer-cells/>

Graphene and the materials of the future.

The exceptional rigidity of graphene associated in composite materials, lets imagine many applications in the field of materials. For example, as a replacement for metallic materials for the construction of lighter aircraft, therefore less expensive and less energy-intensive.

<https://lejournel.cnrs.fr/articles/le-graphene-superstar-episode-4>



éco' **PRISME**®

ÉCO'PRISME®
ZA du Puy Bayard
3, Rue des Chambettes
63570 AUZAT LA COMBELLE
Tél : +33 4 22 52 18 20
Fax : +33 4 22 52 18 21
info@eco-prisme.com
www.eco-prisme.com

