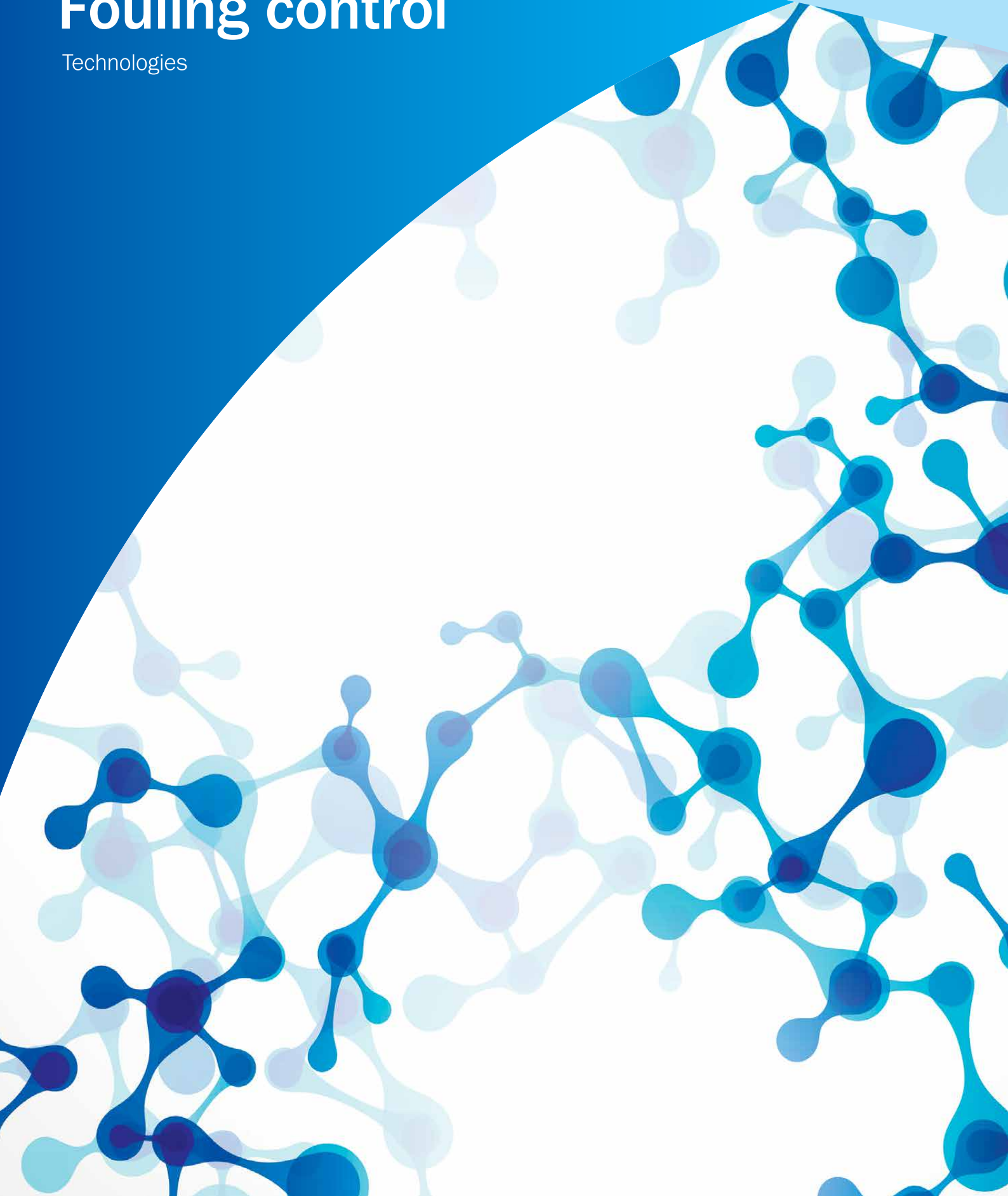



Fouling control

Technologies



Your hull was made to cut through the water. Let us help you cut through the confusion.

Use the product selector in this brochure to navigate to what's right for you.

 Use antifoulings safely. Always read the label and product information before use.

For superior fouling control, count to three

In an ideal world, there should be nothing on your hull but water. Unfortunately, the marine environment is full of harmful organisms that create drag and corrosion, costing you time and money. Hempel has developed a broad range of fouling control products offering exceptional clean hull performance for up to 90 months.

Our products have proven to reduce fuel consumption by up to 6 per cent and significantly reduce time in dry dock. No matter what you are up against, we have fouling control products that are right for your fleet and your business.

You can choose between three categories of fouling control products:

Fouling defence

Our unique Actiguard technology gives you the best of two worlds: silicone-hydrogel and diffusion control of biocides, all in a single fouling defence coat. You can expect from 7 up to 10 per cent fuel savings compared to best-in-class antifoulings over the entire service interval, regardless of trading patterns and sailing speed, and a clean hull over an idle period of up to 120 days. The result is exceptional fouling control performance and lower CO₂ emissions over docking intervals of up to 90 months.

Antifouling

Our antifouling products use controlled release of biocides to keep your vessels fouling-free from 36 to 90 months. You can choose between chemically hydrolysing nano acrylate and silyl acrylate technology for optimal performance and low friction for longer periods, or zinc carboxylate and rosin technology for shorter periods. All antifoulings are reinforced with microfibre technology for superior mechanical strength. Whatever your business and wherever your vessel operates, you can find an antifouling solution that meets your needs.

Fouling release

Our fouling release technology is based on biocide-free silicone and hydrogel, giving you a smooth hull surface that makes it difficult for fouling organisms to attach. The result is less drag compared to best-in-class antifoulings, fuel savings averaging 5 per cent and lower CO₂ emissions, increasing the efficiency of your fleet and offering superb return on investment. You can use our fouling release technology on any type of marine vessel, even those currently using another type of fouling control coating.

	Fouling defence	Antifouling				Fouling release
	Actiguard technology	Next Generation of silyl acrylate	Nano acrylate technology	Silyl acrylate polymers	Rosin based	Silicone based
Low activity level	•	•	•	(•)	(•)	-
Flexible trading pattern	•	•	•	-	-	•
Instant effect on contact with water	•	•	•	-	(•)	•
High activity level	•	•	•	•	•	•
Recommended for slow steaming	•	•	•	(•)	(•)	-
Recommended for tropical waters	•	•	•	•	-	•
Microfiber-based for superior mechanical strength	-	•	•	•	•	-
Easy overcoating	•	•	•	•	•	•
Application in warm environment	•	•	•	•	•	•
Can be applied down to 0°C	•	•	•	•	•	•
Can be applied below 0°C	-	•	•	•	•	-
Low friction technologies	•	•	•	•	-	•
Full return on investment	*****	*****	****	****	**	*****
Guarantee (conditions apply)	Satisfaction /Fuel savings	High performance	Performance	Performance	Performance	Fuel savings
Docking interval up to 90 months	Hempaguard	Sonic	Globic	Sonic E	-	
Docking interval up to 60 months	Hempaguard	Sonic	Globic	Sonic E	Oceanic+	Hempablue
Docking interval up to 36 months	Hempaguard	Sonic	Globic	Sonic E	Olympic+	Hempablue

Hempaguard®

The industry-leading hull coating for energy efficiency

Hydrogel silicone solutions and biocidal antifouling each have their pros and cons. That is why we combined the best of both worlds in a single product. Hempaguard uses groundbreaking Actiguard technology in a unique fouling defence coating. It has been applied to more than 3000 vessels and delivers unmatched performance in any trading pattern.

What it does – and what it does for your fleet

Hempaguard coatings integrate silicone hydrogel and full biocide diffusion control in a truly unique single-coat fouling defence system that delivers best-in-class fuel savings and performance during idle periods. It delivers an average of 6 per cent fuel savings from smoothness of the technology and maximum 1.4 per cent speed loss over five years, with correspondingly lower CO₂ emissions.

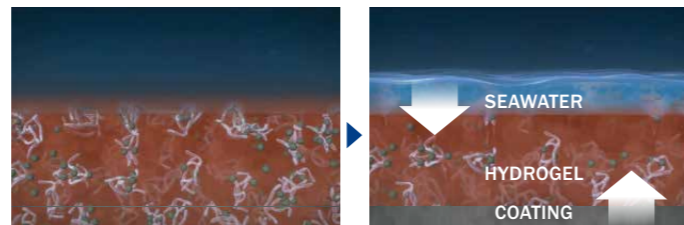
You can also expect the same exceptional performance in both warm and cold waters or when switching from slow to fast steaming, giving you unlimited trading flexibility anywhere in the world. With its unique combination of silicone hydrogel and biocide diffusion, Actiguard technology gives you all these benefits in a single coating and can be applied on vessels currently using another hull coating.

How it works

Actiguard, Hempel's patented low-friction fusion technology, makes it possible to combine hydrogel fouling release with biocides. An active microlayer forms a barrier between the solid silicone binder and fouling organisms. This establishes a highly effective fouling defence barrier with a significantly longer effect than either conventional antifouling or fouling release solutions.

Performance satisfaction guarantee on Hempaguard X7

Hempel is the first hull coating manufacturer to offer a satisfaction guarantee. We believe that nothing compares with the Hempaguard fouling defence system. If you are not satisfied with the performance of our top-of-the-range Hempaguard X7 coating, we will pay for the conversion back to a conventional antifouling.



Upon immersion of the low-friction silicone coating, a hydrogel microlayer forms at the silicone-water interface, where it acts as a physical fouling defence. Actiguard technology enables controlled release of biocide via the active hydrogel micro layer. The biocide-activated hydrogel reinforces the fouling defence, significantly extending the fouling-free period and effectively improving fuel efficiency.

Product highlights:

- Low and high activity level
- Flexible trading pattern
- Instant effect on contact with water
- Recommended for slow steaming
- Recommended for tropical waters
- Easy overcoating
- Application in warm environment
- Can be applied down to 0°C
- Low-friction technologies
- Full return on investment
- Performance/Fuel savings guarantee
- Docking interval up to 90 months

Products:

Hempaguard X7

For flexible trading patterns. Offers 90 months sustained fouling defence with an average of 6 per cent out-of-dock fuel savings and speed loss of 1.4 per cent over the service interval. Guarantee: up to 120 idle days.

Hempaguard X5

For flexible trading patterns. Offers 36 months sustained fouling defence with an average 6 per cent out-of-dock fuel savings and 1.5 per cent speed loss over the service interval. Guarantee: up to 60 idle days.



90
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DOCKING
INTERVAL

Hempablue

Biocide free silicone enhanced hydrogel

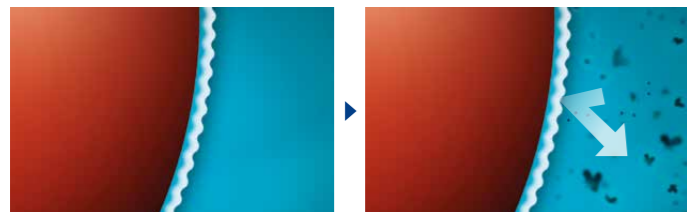
Hempablue is the leading fouling release solution when it comes to reducing fuel consumption. The best-in-class fouling release coating provides 2 per cent speed loss and up to 40 idle days, due to its an enhanced micro-layer of hydrogel that prevents fouling organisms from adhering firmly, while also providing self-cleaning properties. This results in a smooth, uniform, and repellent surface with unique anti-fouling characteristics.

What it does – and what it does for your fleet

Hempablue, our fouling release flagship, is completely biocide-free. Not only does Hempablue reduce fuel consumption and CO₂ emissions over the entire service interval, but also heavily reduces biocide emissions to sea. It can be used on any type of marine vessel, even vessels currently using another hull coating. Hempablue can be applied on existing antifouling and fouling release coatings.

How it works

Together with the pure silicone composition, the unique hydrogel technology sets Hempablue apart from conventional fouling release coatings. The hydrogel tricks fouling organisms into thinking the hull is a liquid instead of a solid surface, thus greatly reducing their ability to settle. The inherent self-cleaning properties of the silicone beneath the hydrogel layer keep the hull surface smooth over the entire service interval.



Unique, non-reactive polymers form a hydrogel layer between the steel and seawater.

Fouling organisms perceive the hull as a liquid and are consequently unable to attach to the hull.

Product highlights:

- Biocide free
- Flexible trading pattern
- Instant effect on contact with water
- High activity level
- Recommended for tropical waters
- Easy overcoating
- Application in warm environment
- Can be applied down to 0°C
- Low friction technologies
- Full return on investment
- Fuel savings guarantee

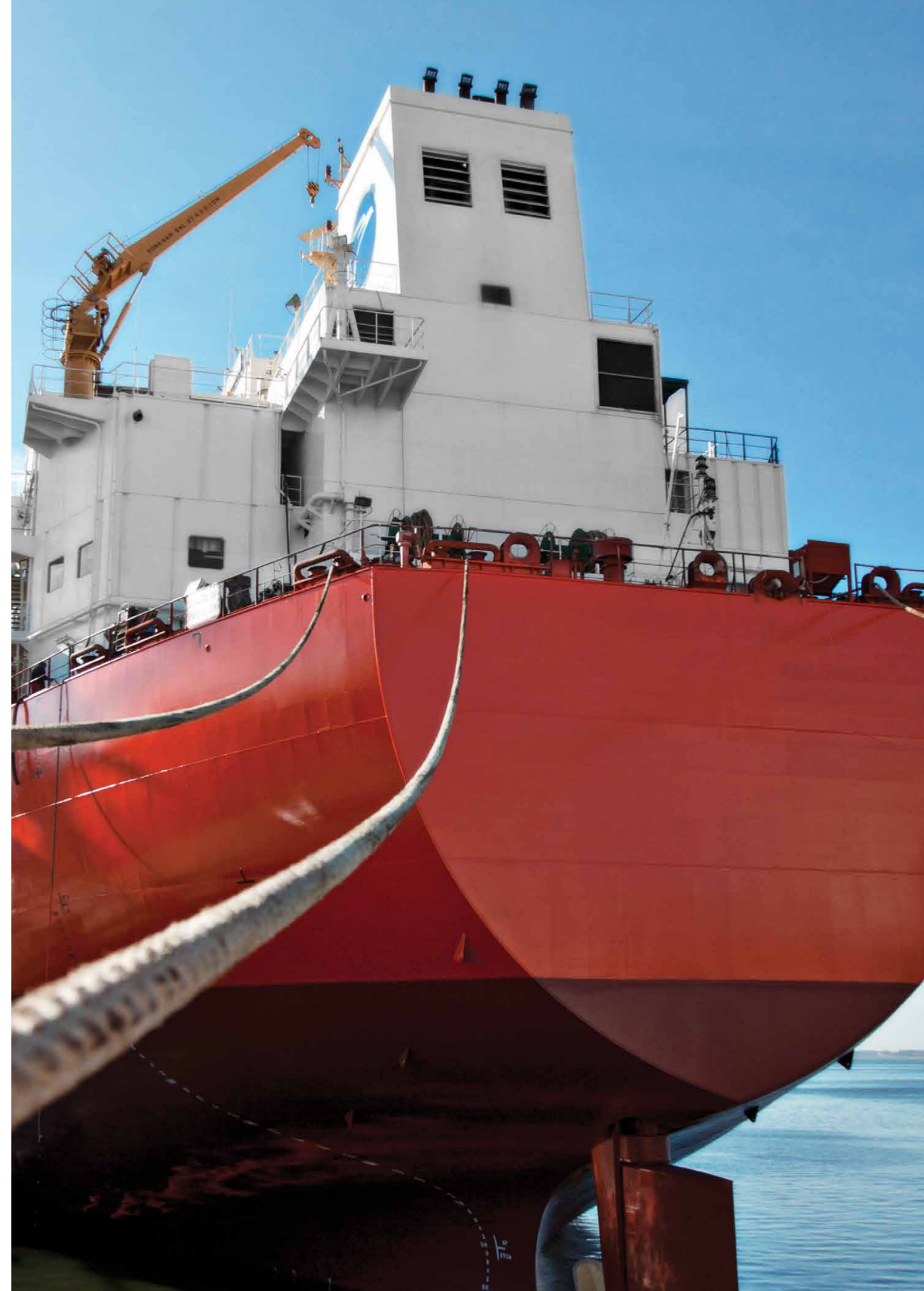
Products:

Hempablue

Hempablue is a fourth generation fouling release coating with high solids content and can be used on vessels with sailing speeds down to 8 knots with docking intervals over 60 months.



Hempablue can be used on any type of marine vessel and it is the only fouling release system that can be applied down to 0°C.



Hempel's antifouling Sonic

Next Generation of silyl acrylate for high performance

Sonic comes to the Hempel assortment to revolutionize the premium tier of conventional antifoulings. Sonic is the result of more than 10 years of intense research to optimize the coating mechanism.

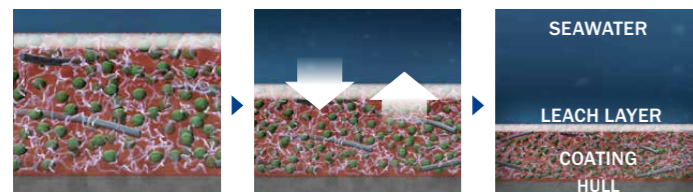
What it does – and what it does for your fleet

Sonic's mechanism combines a predictable, stable and linear polishing during 90 months of service, a minimum leaching layer to achieve a continuous diffusion of biocides to the surface and the incorporation of smart fibre technology (more than 20 years of experience in this technology) for exceptional mechanical properties.

The product also shows extraordinary resistance to discoloration and whitening, a key property for NB projects.

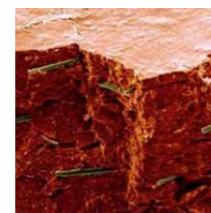
How it works

Silyl acrylate film is relatively impermeable. Seawater penetrates only the first few microns of the coating, allowing hydrolysis/polishing at a time. The result is a highly stable and predictable polishing rate for the docking period.

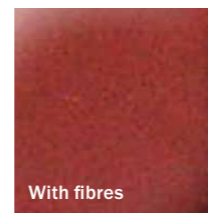


Seawater penetrates the outer layer, starting hydrolysis. As the level of hydrolysis rises, the polymer (light grey) starts to become soluble, forming a leach layer and releasing the biocide (green). The leach layer is progressively eroded from the surface, exposing a fresh coating layer underneath.

Hempel's microfibre technology



The microfibres run close to the surface to ensure best-in-class mechanical strength.



With fibres



Without fibres

Coating condition after exposure to a cyclic blister box test: No failures were observed on the panel reinforced with microfibres. The coating without microfibres showed severe cracking.

Product highlights:

- Premium biocide with very broad spectrum against hard and soft fouling
- Suitable for trading at different speeds and outperforms other SPC products in all conditions
- Excellent low friction and self-smoothing properties
- High volume solids for fast paint application and less time in dock
- High resistance to whitening and high color retention
- Unique mechanical properties due to the use of smart fibre technology
- Easy overcoating
- Flexible application conditions in cold and warm environments
- Performance guarantee

Products:

Sonic 79970

Engineered for superior long-term fouling protection, Hempel's Antifouling Sonic ensures minimal speed loss up to 1.5 per cent over time. Guarantee up to 40 days.

Sonic E 79960

Delivering reliable fouling protection with controlled polishing. Enhanced with microfiber reinforcement and a smart biocide package, it ensures a maximum speed loss of 2.5%. Guarantee up to 33 days.



Hempel's antifouling Globic

Instant antifouling protection

A cocktail of technologies, Globic uses Nano acrylate technology for highly controlled self-polishing. Globic is a hydrolysing, low friction antifouling product line with extraordinary mechanical strength thanks to Hempel's microfibre technology and best-in-class biocides. The Globic line offers high fuel savings through outstanding performance for both high speed and slow steaming.

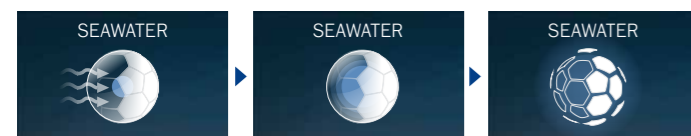
What it does – and what it does for your fleet

Designed for docking intervals of up to 90 months, Globic offers excellent return on investment and correspondingly lowers CO₂ emissions in both warm and cold waters.

Directly water-activated hydrolysing Nano acrylate technology means that Globic starts working as soon as the hull meets the water, ensuring full antifouling protection from day one. Globic is entirely independent of water friction, making it highly efficient even for slow steaming and long idle periods. Furthermore, Nano acrylate technology ensures very low hull roughness and constant self-smoothing to deliver the highest possible return on investment.

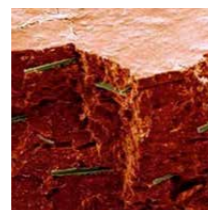
How it works

The Globic range features Hempel's specially designed water-activated Nano acrylate technology using Nano-capsules to control polishing. When seawater comes into contact with the Nano-capsules, it penetrates the hydrophobic outer shell. The hydrophilic inner core swells and breaks through the outer shell, enabling controlled polishing. Consistent self-polishing and a constantly thin leach layer ensure uniform biocide release over the entire docking interval. Unlike other premium antifouling technologies, Nano acrylate technology provides immediate antifouling protection without the need for water friction. Hempel's microfibre technology adds unmatched mechanical properties to withstand mechanical stress and avoid cracking.

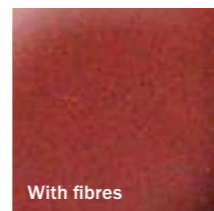


Nano acrylate technology allows seawater ions to penetrate the hydrophobic shell and hydrolyse the hydrophilic core. The core swells until the shell fractures, exposing the hydrolysed core polymer, which is then solubilised to enable polishing through slow, controlled and predictable diffusion.

Hempel's microfibre technology



The microfibrils run close to the surface to ensure best-in-class mechanical strength.



With fibres



Without fibres

Coating condition after exposure to a cyclic blister box test: No failures were observed on the panel reinforced with microfibrils. The coating without microfibrils showed severe cracking.

Product highlights:

- Low activity level
- Flexible trading pattern
- Instant effect on contact with water
- High activity level
- Recommended for slow steaming
- Recommended for tropical waters
- Microfibre-based for superior mechanical strength
- Easy overcoating
- Application in warm environment
- Can be applied below 0°C
- Low friction technologies
- Full return on investment
- Performance guarantee
- Docking interval up to 90 months

Products:

Globic 9500M Supreme antifouling performance for all operating conditions, with maximum speed loss of 2 per cent.

Globic 9500S Supreme antifouling performance for new outfitting and beyond. Enhanced protection against hard fouling.

Globic 9000 Is a premium hydrolysing nano acrylate antifouling for up to 90-month service intervals with a maximum speed loss of 3 per cent.

Globic 8000 Is a top-tier hydrolysing nano acrylate antifouling for up to 90-month service intervals. Designed to meet the highest expectations of very high performance, great operational flexibility and return on investment with a maximum speed loss of 3.5 per cent.

Globic 7000 Is a high-tier hydrolysing nano acrylate antifouling for up to 60-month service intervals. Designed to meet the highest expectations of higher performance, high operational flexibility and return on investment with a maximum speed loss of 4.5 per cent.

Globic 6000 Is a mid-tier hydrolysing nano acrylate antifouling for up to 60-month service intervals. Designed to meet high expectations for high performance and return on investment with a maximum speed loss of 5.0 per cent.

**90
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DOCKING
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Hempel's antifouling Oceanic+

A cost effective antifouling with unmatched mechanical strength

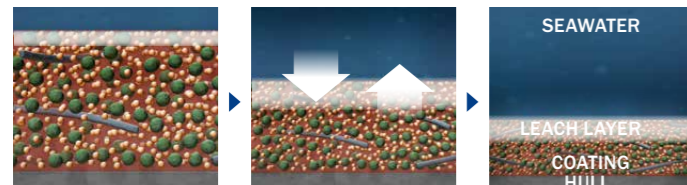
Built on proven zinc carboxylate technology, Oceanic+ is a budget-friendly antifouling solution for docking intervals of up to 60 months. Designed for operators looking for a reasonably priced product without compromising on quality, Oceanic+ offers excellent application properties, microfibre-reinforced mechanical properties and effective self-polishing.

What it does – and what it does for your fleet

A high-performance biocide package means that Oceanic+ offers high reliability and flexibility for vessels operating in different trading areas. The main binder component is zinc carboxylate, which on immersion in seawater undergoes a predictable ion-exchange process to form the more soluble sodium carboxylate. This results in excellent polishing control compared to gum rosin type paints. These advantages together with Hempel's microfibre technology make Oceanic+ an attractive cost-efficient solution that delivers excellent fouling control performance and top-of-the-line mechanical strength.

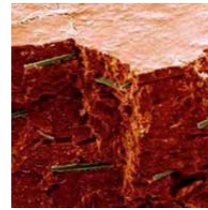
How it works

Natural gum rosin is the most common raw material in antifouling coatings and has been used for more than 100 years. Oceanic+ uses synthetic rosin treated to make it more resistant to cracking. Unlike gum rosin, synthetic rosin enables more precise control of polishing because it does not vary in quality from year to year or batch to batch. Combined with an insoluble co-binder, the rosin progressively dissolves into the sea. The remaining insoluble co-binder frame is then eroded by surface shear stress.



Seawater penetrates the coating and hydrates the rosin (yellow) and biocide (green). The rosin dissolves and the biocide leaches out of the coating. An insoluble 'hard' polymer structure remains, weakened in the absence of synthetic rosin, and is physically eroded by the abrasive effect of surface water currents. Over time, the zinc carboxylate makes sure the leach layer remains low while releasing a controlled level of biocide.

Hempel's microfibre technology



The microfibrils run close to the surface to ensure best-in-class mechanical strength.



Coating condition after exposure to a cyclic blister box test: No failures were observed on the panel reinforced with microfibrils. The coating without microfibrils showed severe cracking.



Product highlights:

- Low activity level
- Instant effect on contact with water
- High activity level
- Recommended for slow steaming
- Microfibre-based for superior mechanical strength
- Easy overcoating
- Application in warm environment
- Can be applied below 0°C
- Full return on investment
- Performance guarantee
- Docking interval up to 60 months

Products:

Oceanic+

Designed for effective antifouling for up to 60-month docking intervals, Oceanic+ is a hydrolysing antifouling based on zinc carboxylate binder. With a strong biocide package and stable polishing Oceanic+ offers a maximum speed loss of 5.5 per cent.



Hempel's antifouling Olympic+

Reliable performance with impressive value for money

Olympic+ is an affordable and powerful solution for short-term service intervals. Despite being one of Hempel's most cost-effective antifouling solutions, Olympic+ contains microfibres and natural binder properties that deliver excellent mechanical strength and make sure the coating's antifouling properties keep performing throughout a 36-month service interval.

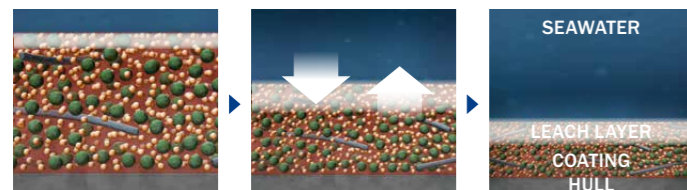
What it does – and what it does for your fleet

Olympic+ has been tried and tested for more than 10 years, combining reliable performance with impressive value for money. The effective biocide package means that Olympic+ is a very versatile solution for different water types, vessel types and vessel speed, delivering excellent protection in worldwide trading.

Olympic+ contains rosin, a tried and proven ingredient that not only helps improve antifouling performance, but also offers effective self-polishing and overcoating options.

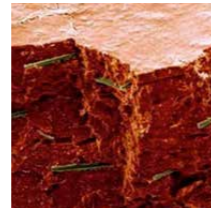
How it works

Olympic+ uses gum rosin for stable polishing and effective leaching of biocides. Combined with an insoluble co-binder polymer, the rosin is progressively dissolved into the sea. The remaining insoluble co-binder frame is then eroded by surface shear stress.



Seawater penetrates the coating and hydrates the rosin (yellow) and biocide (green). The rosin dissolves and the biocide leaches out of the coating. An insoluble 'hard' polymer structure remains, weakened in the absence of rosin, and is physically eroded by the ablative effect of surface water currents. Over time with steady rosin and biocide release, the leach layer becomes thicker. No coating remains at the end of the docking interval.

Hempel's microfibre technology



The microfibres run close to the surface to ensure best-in-class mechanical strength.



With fibres



Without fibres

Coating condition after exposure to a cyclic blister box test: No failures were observed on the panel reinforced with microfibres. The coating without microfibres showed severe cracking.

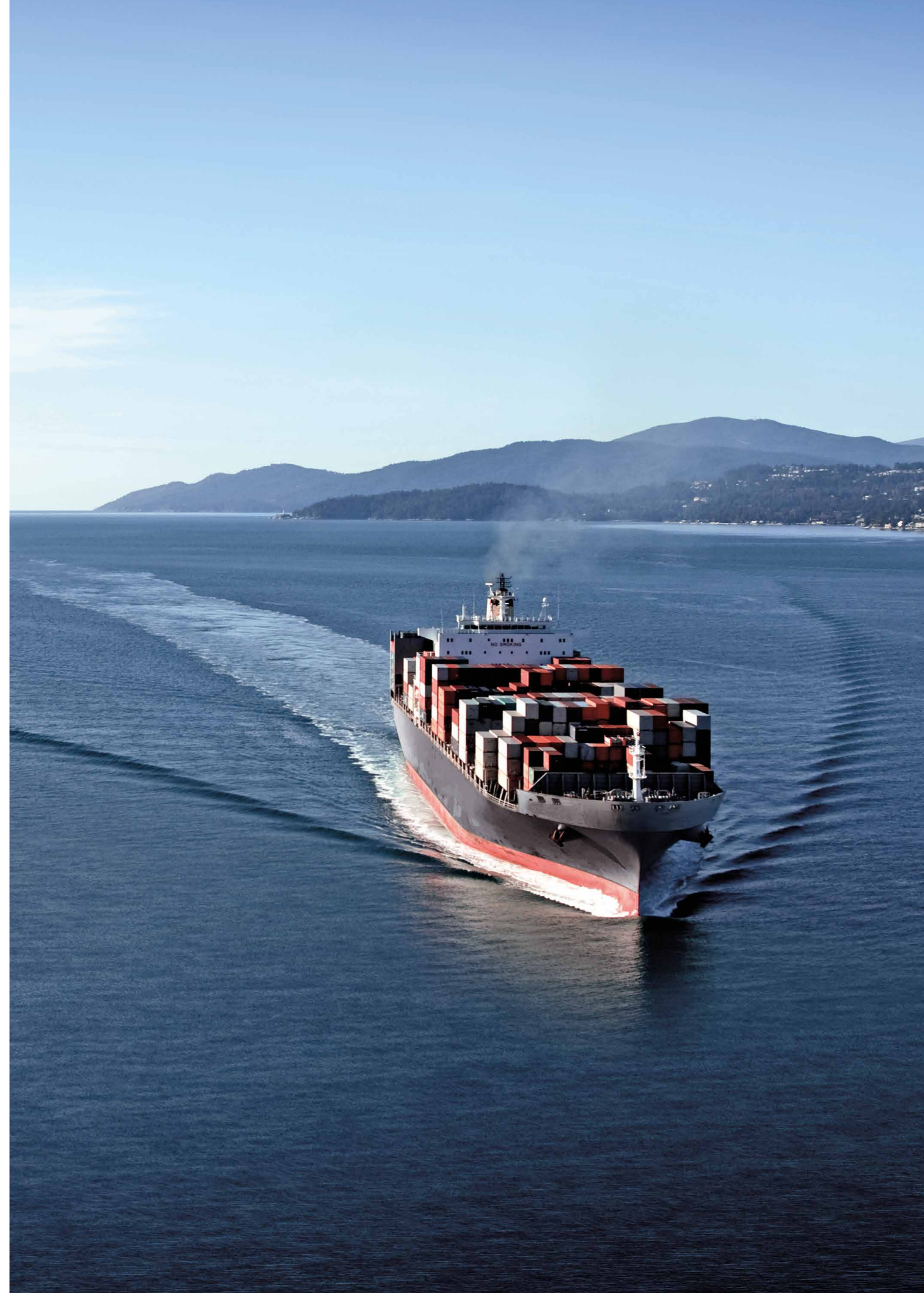
Product highlights:

- Low activity level
- Instant effect on contact with water
- High activity level
- Recommended for slow steaming
- Microfibre-based for superior mechanical strength
- Easy overcoating
- Application in warm environment
- Can be applied below 0°C
- Full return on investment
- Performance guarantee
- Docking interval up to 36 months

Products:

Olympic+

Olympic+ is a rosin-based antifouling with an effective biocide package, excellent mechanical strength and multiple polishing rates for good performance up to 36 months.



Your trusted partner

Helping you get it right first time

Finding the right hull coating is about maximising fuel savings. Getting there is about understanding the balance between many different factors. The right choice means short payback time and years of energy-efficient sailing, while the wrong one may haunt you for a whole service interval. As a technology leader with a complete range and more than a century of experience, Hempel is a trusted partner for owners and operators all over the world seeking the perfect coating for a specific need.

Assessment

Choosing the right coating requires an understanding of many interdependent factors including the expected trading pattern, sailing speed, and level of activity.

- How much can you realistically expect to save on fuel over the service interval?
- Will you operate the vessel or do you have plans to charter it out?
- How can you save money on overcoating at the next docking?



Application

Correct application requires insight, thoroughness and commitment to quality. Incorrect application can undermine performance from the start.

- You can be sure the coating is suitable for the application climate and process.
- You can depend on the promised coverage.
- You can ask for a Hempel coating advisor to be present during application.



Performance

Documented performance is nice to have, but will it also apply to your particular vessel?

- All Hempel coatings are supported by a performance guarantee.
- We can assist you in documenting fuel efficiency over the service interval.
- Your local Hempel contact will keep in close touch to answer any questions.

“Because the only thing on your hull should be water!”



As a world-leading supplier of trusted coating solutions, Hempel is a global company with strong values, working with customers in the decorative, marine, infrastructure and energy industries. Hempel factories, R&D centres and stock points are established in every region.

Across the globe, Hempel's paints and coatings protect and beautify buildings, infrastructure and other assets, and play an essential role in our customers' businesses. They help minimise maintenance costs, improve aesthetics and increase energy efficiency.

We are guided by our purpose - Make our world last longer, beautifully - which is our shared call to action: to protect what matters, enhanced by colour and craftsmanship.

Hempel was founded in Copenhagen, Denmark in 1915. It is majority owned by the Hempel Foundation, which ensures a solid economic base for the Hempel Group and supports cultural, social, humanitarian and scientific purposes around the world.

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