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% 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 an average of 6% fuel savings, 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, reducing fuel consumption by an average of 4%. You can choose between chemically hydrolysing nano acrylate and silylated 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 patented 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, fuel savings averaging 5% 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.

For more information visit www.hempel.com

For superior fouling control, count to three.

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.
## Hempel product selector

### Fouling Control Coating Matrix

<table>
<thead>
<tr>
<th>FOULING DEFENCE</th>
<th>ANTI-FOULING</th>
<th>FOULING RELEASE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Actiguard Technology</strong></td>
<td>Nano Acrylate Technology</td>
<td>Silylate Acrylate Polymers</td>
</tr>
<tr>
<td>Low activity level</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Flexible trading pattern</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Instant effect on contact with water</td>
<td>✓</td>
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</tr>
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<td>High activity level</td>
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<td>–</td>
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</tr>
<tr>
<td>Easy overcoating</td>
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<tr>
<td>Application in warm environment</td>
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<td>✓</td>
</tr>
<tr>
<td>Can be applied down to 0°C</td>
<td>✓</td>
<td>✓</td>
</tr>
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<td>Can be applied below 0°C</td>
<td>–</td>
<td>✓</td>
</tr>
<tr>
<td>Low friction technologies</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Full return on investment</td>
<td>******</td>
<td>****</td>
</tr>
<tr>
<td>Guarantee (conditions apply)</td>
<td>Satisfaction/Fuel Savings</td>
<td>Performance</td>
</tr>
</tbody>
</table>

- Docking interval up to 90 months: **HEMPAGUARD**
- Docking interval up to 60 months: **HEMPAGUARD**
- Docking interval up to 36 months: **HEMPAGUARD**
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.

For more information visit www.hempel.com
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.

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 with fuel savings averaging 4.1% and correspondingly lower 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-smoothening to deliver the highest possible return on investment.

A cocktail of patented 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.

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.

For more information visit www.hempel.com
**DYNAMIC**

Best-in-class silylated acrylate for higher speed and activity level

**How it works**

Silylated acrylate film is relatively impermeable. Seawater penetrates only the first few microns of the coating, allowing only a few microns to undergo 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.

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.

**What it does – and what it does for your fleet**

Constant refinement over the past 10 years is your assurance of a high-performing solution for all vessel types and trading patterns. Exceptionally good film formation, optimised with the self-smoothening effect of the silylated acrylate binder, means lower water friction for significant fuel savings and correspondingly lower CO₂ emissions. This, along with its microfibre-reinforced mechanical properties, long track record and proven protection, makes DYNAMIC a great choice for predictable performance, high fuel savings and higher return on investment.

Using the most advanced silylated acrylate technology, the DYNAMIC line is Hempel’s chemically hydrolysing low friction antifoulings for up to 90-month service intervals. Controlled polishing with exceptionally low leach layers and best-in-class biocides combine with low surface roughness and high volume solids to make Hempel’s DYNAMIC line the top antifouling choice in the silylated acrylate category.

**Product highlights:**

- Low activity level
- High activity level
- Recommended for slow steaming
- Recommended for tropical waters
- Microfibre-based 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:**

- **DYNAMIC**
  - A best-in-class premium hydrolysing silylated acrylate antifouling for up to 90-month service intervals. Designed to meet the highest expectations for higher performance and return on investment with fuel savings averaging 4.1%.
  - Hempel’s microfibre technology
  - THE ONLY SILYL ACRYLATE PRODUCTS WITH MICROFIBRE TECHNOLOGY TO PREVENT CRACKING

<table>
<thead>
<tr>
<th>Feature</th>
<th>With Fibres</th>
<th>Without Fibres</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td><img src="image" alt="Coating Condition" /></td>
<td><img src="image" alt="Coating Condition" /></td>
</tr>
</tbody>
</table>

**DYNAMIC 8000**

DYNAMIC 8000 is a top-tier hydrolysing, silylated acrylate based antifouling for up to 90-month service intervals. Designed to meet high expectations for performance and cost with fuel savings averaging 3.6%.

**For more information visit www.hempel.com**
OCEANIC+

With zinc carboxylate for competitive performance

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 ablative effect of surface water currents. Over time, the zinc carboxylate makes sure the leach layer remains low while releasing a controlled level of biocide.

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.

A COST EFFECTIVE ANTIFOULING WITH UNMATCHED MECHANICAL STRENGTH

Hempel’s microfibre technology

The microfibres 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 microfibres. The coating without microfibres showed severe cracking.

For more information visit www.hempel.com
**OLYMPIC+**
Reliable performance with impressive value for money

**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.

**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
- Docking interval up to 36 months

**Hempel’s microfibre technology**
The microfibres 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 microfibres. The coating without microfibres showed severe cracking.

For more information visit www.hempel.com
**BASIC**
The economic choice for reliable performance

**How it works**
BASIC uses gum rosin for stable polishing and effective leaching of biocides. Combined with an insoluble co-binder polymer, 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), which dissolves and 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 current. Over time with steady rosin and biocide release, the leach layer becomes thicker. At the end of the docking interval there will be no coating left.

**What it does – and what it does for your fleet**
BASIC is the preferred choice for short service intervals when you are looking for an effective and budget-friendly solution. BASIC consists of rosin and effective biocides that ensure controlled polishing and leaching. It performs well in different water types and at different sailing speeds.

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

**Hempel’s microfibre technology**
The microfibres 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 microfibres. The coating without microfibres showed severe cracking.

**Product highlights:**
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**Products:**
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  - The economic choice for reliable performance
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  - 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

For more information visit www.hempel.com
HEMPASIL X3
Biocide free silicone hydrogel

HEMPASIL X3 is the leading fouling release solution when it comes to reducing fuel consumption. Based on a smooth silicone binder it utilizes an invisible silicone-based hydrogel microlayer that makes it very difficult for organisms to attach to the hull.

What it does – and what it does for your fleet
HEMPASIL X3, our fouling release flagship, is completely biocide-free. Not only does HEMPASIL X3 reduce fuel consumption by an average of 5% over the entire service interval, but also cuts CO₂ emissions. It can be used on any type of marine vessel, even vessels currently using another hull coating. HEMPASIL X3 can be applied on existing antifouling and fouling release coatings.

How it works
Together with the pure silicone composition, the unique hydrogel technology sets HEMPASIL X3 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 service intervals of up to 90 months.

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:
- 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 ✓
- Docking interval up to 90 months ✓

Products:
HEMPASIL X3
HEMPASIL X3 is a third generation fouling release coating with high solids content and can be used on vessels with sailing speeds down to 8 knots with docking intervals of up to 90 months.

THE ONLY FOULING RELEASE SYSTEM THAT CAN BE APPLIED DOWN TO 0° C

HEMPASIL X3 can be used on any type of marine vessel.

For more information visit www.hempel.com
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!”

For more information visit www.hempel.com
HEMPEL was founded in 1915 and is today one of the world’s leading suppliers of marine and industrial coatings. Our 5,000 employees work from 3 main and 7 regional Research and Development centres, and 24 production plants situated in strategic locations across six continents. Our global sales and service organisation operates from more than 150 stock points in over 80 countries, providing our customers with expert assistance at all stages of the contract.

Visit www.hempel.com to discover more about our fouling control range and find out which solution best suits your needs.