

# Marine newbuilding coatings

High performance at sea  
and in the shipyard





# Hempel coatings for newbuilding marine vessels

From the frozen expanses of the Arctic to stormy southern seas, Hempel coatings can be found on ocean-going vessels of all types, protecting steel from corrosion above the waterline and ensuring maximum fuel efficiency below it. We've supplied marine coatings for over 100 years. Today, we're one of the marine industry's most trusted coating suppliers.

## High performance and productivity on every vessel

Whatever coatings you need, we can supply a reliable, high-performance solution that will prove its worth at sea and increase productivity in the yard. From the most advanced ships to simple boats, we can put together a coating and service package that meets the exact needs of the project and vessel – while fully complying with local and international regulations.

All our marine newbuilding coatings are designed with productivity in mind. From fast and accurate application to multipurpose one-coat solutions, we provide a full range of coatings that enable applicators to achieve a high-quality finish in the shortest possible time.

## Global service for increased efficiency

Our local FROSIO/NACE-certified coating advisors can work with you to ensure your coatings are applied correctly, with minimum time, waste and costs. And, with a global network of factories and R&D centres strategically located near key shipyards, you know that we will always supply you with the coatings you need, when you need them.

At Hempel, we say that trust is earned. We earn this trust every day by helping our customers overcome their biggest coating challenges to improve their business performance.







# Trends to watch

The shipbuilding industry is fast-moving and affected by new trends and legislation.

Which new trends and technologies will shape shipping building, coating design and coating application in the years to come?

LNG can reduce CO<sub>2</sub> emissions by around 25%

Improved fuel efficiency and reduced emissions with SHAPE



## Zero emissions

There are no commercially viable solar or wind-powered ships today, but they shouldn't be ruled out in the future, especially with groups like the Getting to Zero Coalition gaining traction. The Getting to Zero Coalition is a multi-stakeholder alliance that aims to see the introduction of commercially viable zero emission vessels (ZEVs) by 2030. Its overall goal is to eliminate emissions from shipping altogether. Hempel has already joined the coalition, and more companies and organisations are following suit.



## LNG-fuelled engines

Compared to diesel, Liquefied Natural Gas (LNG) can reduce CO<sub>2</sub> emissions by around 25 per cent and NO<sub>x</sub> emissions by almost 90 per cent, while eliminating SO<sub>x</sub> emissions almost completely. Major ship engine designers, including Mitsubishi, Wartsila and MAN Diesel & Turbo, are driving the development of LNG-powered engines; increasingly stringent environmental legislation and the lower cost of LNG fuel will drive it even further.



## Data-driven decision making

Digital solutions are giving both shipyards and ship operators new types data, which they can use to improve efficiency and environmental performance. SHAPE, our propulsion monitoring service, is a good example. SHAPE gives vessel operators accurate in-service data on the propulsion efficiency of their vessel, enabling them to make adjustments to improve fuel efficiency and reduce emissions. Digital solutions for the marine industry are evolving fast and many are being adopted in the newbuilding stage to measure a vessel's performance from the very beginning of its service life, so expect smarter decision-making in the future.



## Robotics

Robotics are a driver of efficiency in many industries and an excellent way to ensure workers avoid dangerous tasks, such as welding. Robots can already carry out blasting, heavy lifting and other tasks in a shipyard. The question is simply how many tasks will become robotic. Spider robots can already be used to prepare a vessel's hull for painting. How long before drones are used to apply the coatings?



# High-performance coatings

When it comes to coating specification and application for newbuild vessels, there are some factors that remain the same regardless of the vessel.

At Hempel, we understand the challenges and work closely with ship owners and shipyards to find the ideal solution.

## Increasing productivity for lower costs

To minimise costs and maximise profits, you need to maintain high productivity across the shipbuilding process. When it comes to coating application, this means increasing application speed, without compromising on quality.

Our high-tolerance coatings give you easy application by airless spray, brush or roller, even in less-than-ideal conditions. Our fast-drying coatings enable applicators to coat more in one shift. And, to simplify your logistics, we provide a wide range of multipurpose coatings that can be applied on a variety of vessel areas, all year round.

## Sustainability for today and the future

Stakeholders across the industry are pushing for more sustainable solutions – both in terms of vessel operation and construction – while increasing legislation is placing ever-stricter requirements on shipbuilding processes and materials. Our coatings extend a vessel's lifetime, which lowers its carbon footprint across its entire lifecycle.

And, as a member of the Getting to Zero Coalition, we're committed to helping reduce the shipping industry's overall environmental footprint. We collaborate with specifiers to design coating systems with reduced long-term impact and work closely with applicators to reduce emissions and waste during application.

## Meeting every regulation

Every coating applied must meet strict regulations, from local legislation, such as VOC restrictions in China and Korea, to international requirements, like the IMO regulations for ballast tank coatings.

When you work with us, you can rest assured that every coating we supply will have the necessary approvals. All of our products comply with the latest VOC and chemical regulations (REACH) and are tested according to relevant regulators, industry bodies and classification societies, such as the IMO and ISO.

## Quality and reliability throughout the vessel

Most modern vessels are designed for a service life in excess of 20 years. This requires high quality, from beginning to end.

We can deliver a proven coating for every area a vessel, from the hull and cargo tanks to the accommodation blocks, and can tailor solutions to meet specific local needs and vessel requirements.



# Every area of the vessel – we've got you covered

You can find a proven Hempel coating for every vessel area and performance requirement.

## Fuel efficiency and emissions

Hull coatings that are proven to reduce fuel consumption can have a big impact on a vessel's long-term operating costs and emissions. With a complete range of primers, tie-coats and fouling control coatings, we can specify a solution for any vessel and trading pattern that's proven to perform at sea and fast to apply in dock.

## Fouling control during outfitting

On a newbuild vessel, fouling can build up on the hull during outfitting. This has to be removed, adding both time and expense to the construction process. Our high-performance hull coatings start working as soon as the hull hits the water to keep fouling at bay while the vessel is idle, making them ideal for any newbuild vessel that will spend an extended period beside the dock.

## Water ballast tanks

The ballast tanks are probably the largest area of structural steel on a vessel. That's why you need a flexible coating that can be applied fast in a variety of climatic conditions. We offer a range of ballast tank coatings to accommodate every need – all IMO/PSPC approved and VOC compliant.

## Cargo holds

From high temperatures and aggressive chemicals to abrasion and impact, cargo holds are subject to extremely harsh conditions. This demands a robust coating system that will last. The coating also needs to be easy to clean, for faster turnarounds between cargos. All of our cargo hold coatings have NOHH Grain and FDA (Carriage of Dry Foodstuffs) approval.

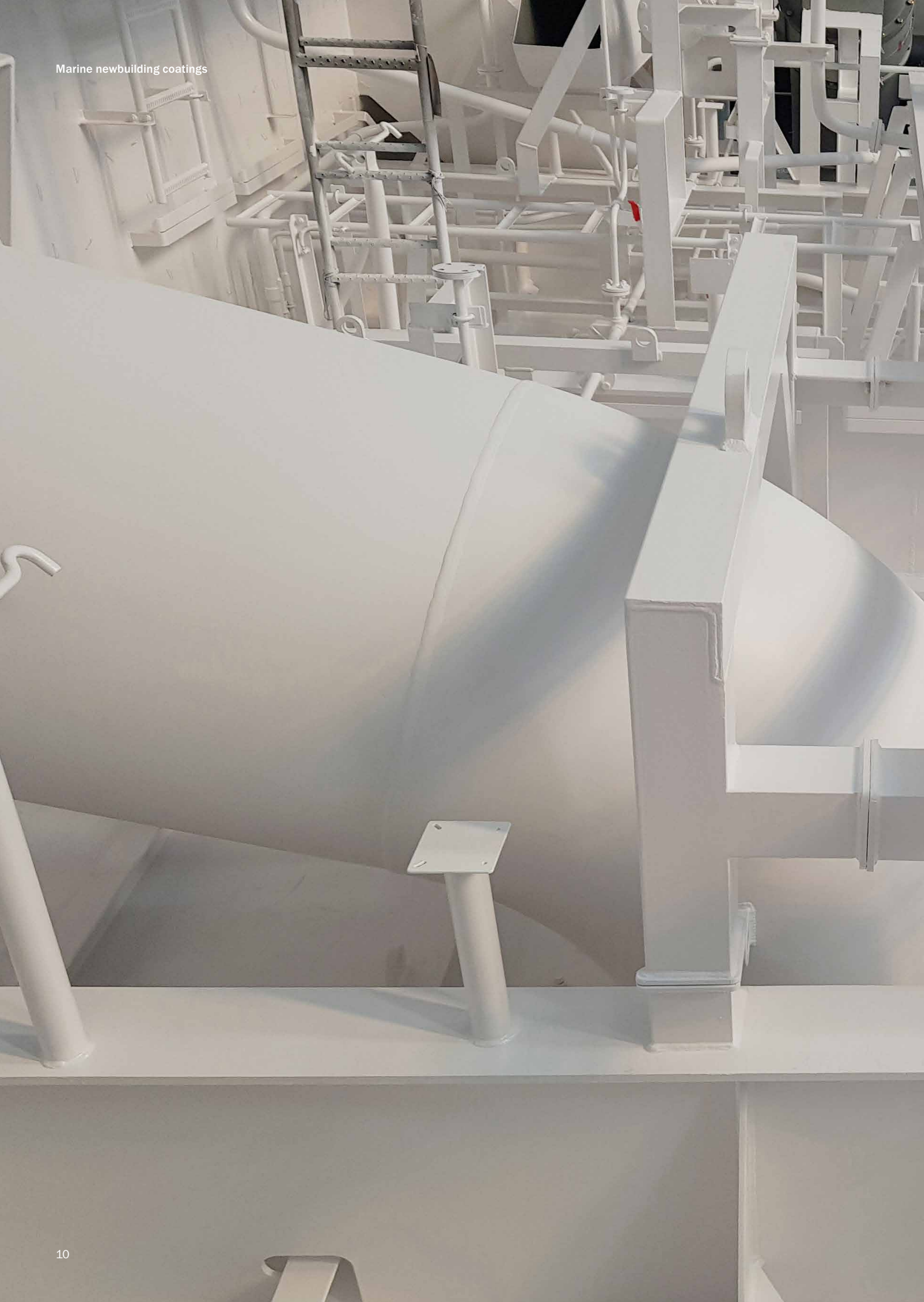
- **Fouling control – Hempaguard X7 and Hempaguard X8:** Advanced hull coatings that offer exceptional antifouling performance and full operational flexibility
- **Antifouling – Globic and Dynamic:** A full range of antifouling coatings for any vessel or trading pattern
- **Fouling release – Hempasil X3+:** A completely biocide-free solution that reduces fuel consumption without releasing biocides into the environment

- **Globic 9000/Globic 9500M and 9500N:** Water-activated nano acrylate antifoulings that provide highly efficient performance during long idle periods and slow steaming

- **Hempadur Quattro XO:** A pure epoxy primer with a flexible overcoating interval that can be applied all year round, curing at temperatures as low as -10°C. Available with different levels of aluminium and fibre pigmentation to ensure excellent long-term performance in diverse service conditions
- **Hempadur Quattro:** A family of universal epoxy primers with the longest track record and able to provide one solution-all year round and high productivity where fast dry and maximum flexibility are required. These coating solutions provide excellent direct adhesion to a wide range of substrates and ensure long term water ballast tanks'corrosion protection and low maintenance costs for the whole ship's lifecycle.

- **Hempadur Quattro XO** A pure epoxy primer with a flexible overcoating interval that can be applied all year round, curing at temperatures as low as -10°C
- **Hempadur Ultra-Strength Fibre** A fibre-reinforced, high-build pure epoxy that can be applied at surface temperatures as low as -5°C and cures fast for higher productivity
- **Hempadur Impact 47800** A high-build pure epoxy that cures to a tough coating resistant to abrasion, impact and corrosion





## Cargo tanks and potable water tanks

A cargo tank coating should protect the tank against harmful cargos and corrosion. It should also be fast to clean – to ensure a quick switch between cargos.

Our cargo tank coatings conform to IMO/PSPC rules and are FDA compliant for liquid foodstuffs. All of our potable water tank coatings are fully certified.

## Special coatings for ice-going vessels

Ice-going vessels need highly abrasion-resistant coatings to protect exposed steel, such as the underwater area and ice belt zones, from mechanical damage. All our solutions for ice- trading vessels provide class-certified protection against impact and abrasion, as well as low ice adhesion and low frictional resistance.

## Vessel exteriors and exposed areas

To ensure a vessel remains in top condition, you need tough coatings that can handle corrosion and extreme treatment. The superstructure and topside areas require highly durable coatings to protect them from saline corrosion, abrasion and UV light, while the exposed areas such as decks and ramps need specialist heavy-duty coatings that can handle high impact, wear and tear.

## Interiors: Accommodation and engine room

When coating the interior of a newbuilding vessel, you need a multipurpose coating that goes on fast, with short drying times and flexible overcoating intervals, supported by specialist coatings for particular needs.

## Finishes

Nearly every area of the vessel requires a durable finishing coat that will protect it from UV light, corrosion and impact – to reduce onboard maintenance and keep the vessel looking good for longer.

- **Hempadur 15460** An epoxy coating with excellent resistance to a wide range of chemicals –ideal for oil tankers and crude oil tankers
- **Hempadur 15600** A pure epoxy coating with excellent resistance to crude oil and most refined oil products – ideal for oil tankers and crude oil tankers
- **Hempadur 15500** A phenolic epoxy (novolac) coating with excellent resistance to a wide range of chemicals – ideal for chemical tankers, oil tankers and crude oil tankers
- **Hempel's Galvosil 15700** An inorganic zinc-rich silicate with outstanding resistance to abrasion – ideal for chemical tankers and oil tankers
- **Hempadur 35560** A NORSOK M-501 approved waterborne coating for potable water tanks

- **Hempadur Multi-Strength GF 35870 and 3587B:** A highly impact and abrasion resistant hull coating that delivers best-in-class smoothness to increase vessel fuel savings
- **Hempadur Multi-Strength 45751 and 45753:** A tough epoxy-polyamide/amine coating that can be applied in temperatures as low as -10°C and cures to an abrasion and corrosion resistant coating

- **Hempadur Quattro XO** A pure epoxy primer with different levels of aluminium and fibre pigmentation to ensure excellent long-term performance in diverse service conditions
- **Avantguard 550** A fast-drying activated zinc epoxy that goes on easily for high productivity in the yard, and ensures excellent protection against corrosion, impact, wear and tear for reduced onboard maintenance
- **Spray Guard 35490** A heavy-duty coating for areas subjected to heavy wear and tear, such as ramps and decks

- **Multi K150D** A fast-drying one-coat solution with excellent sprayability and application tolerance that can be applied in a wide range of temperatures and conditions – the one ‘must-have’ interior product in any shipyard assortment (only available in North Asia)
- **Hempatop Tough 500** A fast-drying one-coat epoxy with a wide overcoating interval that can be applied in temperatures down to -10°C – resistant to abrasion, seawater and mineral oils, with good gloss and colour retention

- **Hempaxane 55000** A high-solids polysiloxane enamel with excellent corrosion resistance and a long-lasting high-gloss finish
- **Hempathane 55210/Hempathane HS 55610** Two-component polyurethane acrylic topcoats that deliver excellent gloss and colour retention in corrosive and severely corrosive environments
- **Hempatop Tough 500** A fast-drying epoxy finishing coat with a wide overcoating interval that can be applied in temperatures down to -10°C
- **Multi K150D/Hempel's K150S** A fast-drying finishing coat with excellent sprayability and application tolerance that can be applied in a wide range of temperatures and conditions
- **Hempalin Enamel 52140/Hempalin Enamel Hi-Build 52220** Glossy, general purpose alkyd topcoats that are resistant to weather, saltwater, spilled mineral oil and other aliphatic hydrocarbons



# A full package for six state-of-the-art LNG carriers

**BP Shipping commissioned six newbuild LNG carriers to be constructed at the DSME Shipyard in South Korea, with completion in 2018 and 2019. For the vessels, BP Shipping had two very specific requirements: For the ballast tanks, it wanted a coating with an extended lifetime; for the underwater hulls, it wanted a 60-month tin-free antifouling with a hull roughness below 125 microns.**

After closely examining the operational profile of the LNGs, our team created a full coatings and service package for each vessel. For the ballast tanks and other steel areas, we specified Hempadur Quattro 47604, a universal primer with aluminium and fibre-reinforcement to increase strength and corrosion resistance. For the underwater hull, we specified Dynamic 9000 with a thin a layer of Globic 9500S – a combination that would eliminate the need for expensive hull cleaning after outfitting and ensure excellent fuel savings when trading.

For all six vessels, we assigned a team of FROSIO/NACE-certified coating advisors to oversee application. The teams worked with the applicators to make sure the coatings were applied to specification and coordinated with the project team to keep application time, waste and costs to a minimum.

| At a glance    |                                                                                                                                   |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Vessels:       | 6 LNG vessels, each with a capacity of 173,400m <sup>3</sup>                                                                      |
| Vessel names:  | British sponsor, British mentor, British listener, British contributor, British achiever, British partner                         |
| Delivery date: | 2018 and 2019                                                                                                                     |
| Location:      | Daewoo Shipbuilding & Marine Engineering Co., Ltd (DSME), South Korea                                                             |
| Coatings:      | Antifoulings Dynamic 9000 and Globic 9500S (underwater hull); universal primer Hempadur Quattro 47604 (internal & external areas) |







# High productivity on neopanamax newbuilds

**When the biggest container shipping company in China commissioned two neopanamax container vessels, each with a capacity of 13,500 TEU, it wanted a coatings supplier that could offer the best complete coating solution.**

We've worked with the shipping company for over 30 years and have tracked the performance of our hull coatings on a number its vessels. As a result, we knew that a combination of Globic 8000 and Globic 9000 would be ideal for the newbuildings. As well as offering optimum fuel savings over the entire first docking interval, the hybrid Globic system can be applied with less dry film thickness than similar products, reducing coating consumption and application costs in the yard.

For the internal and external steel – including the ballast tanks, decks, cargo holds, hatch covers and superstructure – we specified Hempadur Quattro XO. A high-performance coating designed for both durability and productivity, Hempadur Quattro XO offers short recoat intervals for a fast turnaround between coats and a high volume solids ratio, which means less VOCs are released into the atmosphere during application.

| At a glance          |                                                                                              |
|----------------------|----------------------------------------------------------------------------------------------|
| Vessels:             | 2 neopanamax container vessels each with a capacity of 13,500 TEU and 143,179 gross tonnage  |
| Date of application: | Spring 2017 to summer 2018                                                                   |
| Location:            | Shanghai/ Shanghai Jiangnan Changxing Shipbuilding Co. Ltd.                                  |
| Coating:             | Globic 8000, Globic 9000 (underwater hull) Hempadur Quattro XO (internal and external areas) |



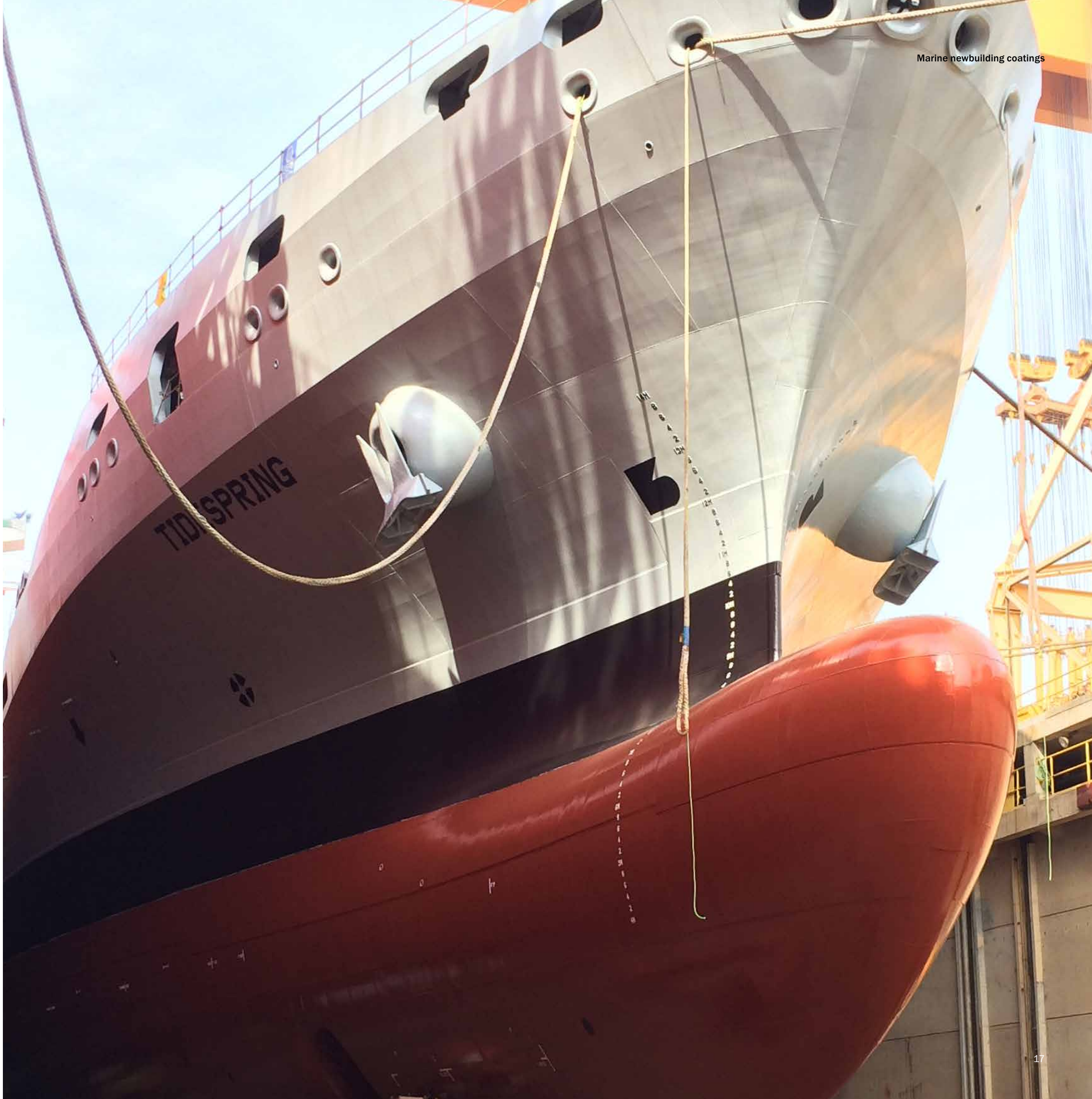
# Comprehensive coating and service package for navy support vessels

The UK Royal Navy was looking for a coatings supplier for four newbuild tankers, which are part of the RFA. As navy support vessels, the RFA tankers must be able to operate in different waters and steaming conditions. As a result, the hull coating must enable operational flexibility and high idle days. In addition, the vessels needed a cargo tank lining able to handle a range of cargos and fuel types.

For the underwater hulls, we specified Hempaguard X7, an advanced silicone-hydrogel hull coating with an extremely low average speed loss of just 1.4 per cent, whatever the vessel's trading pattern. We had previously supplied 16 UK Royal Navy vessels with the same system, and it had proven to perform in a variety of operational situations, including extended idle days in the most fouling aggressive waters. For the cargo tanks, we specified Hempadur 85671, an interior tank lining able to withstand hot water, brine, crude oil, vegetable oils and other chemicals.

The vessels were built and coated at the Daewoo Shipbuilding and Marine Engineering (DSME) shipyard in Korea. To ensure excellent coating application, we assigned a team of coating advisors to each vessel. Our team worked closely with the shipyard and applicators to make sure all coatings were applied to specification and would perform as promised throughout their entire service lives.

| Main areas of application                        | Main coatings                                  |
|--------------------------------------------------|------------------------------------------------|
| Flat & vertical bottom                           | Hempadur Quattro 17634<br>Hempaguard X7        |
| Boottop                                          | Hempadur Quattro 17634<br>Globic 9000          |
| Water ballast tanks<br>Cargo tanks               | Hempadur Quattro 47604 fibre<br>Hempadur 85671 |
| Topsides, superstructure and other exposed areas | Hempadur Quattro 17634<br>Non-Skid Paint 45340 |
| Other external areas                             | Hempadur Quattro 17634<br>Hempathane HS        |





# Your efficiency, powered by Hempel Services

Whatever type of vessel you're coating, it's vital that you control application expenses to reduce total costs and ensure profits. At the same time, you need to deliver high-quality to eliminate potential issues further down the line.

Our expert coating advisors work with the applicators to ensure the coatings are applied to specification and will perform as promised for their entire service life.

**Hempel's Marine Services for newbuilding:**

- Coating Advisory Services**  
Our service portfolio entails different levels of support and involvement depending on your project needs. From basic support and assistance with our Standard package to our more advanced Premium Coating Advisory services where our experts are present during all critical stages of your project. For our most demanding customers, we recommend our project management services where we assign dedicated coating advisors to ensure desired outcomes and higher productivity for all surface preparation and coating application tasks.
- Technical Training**  
Training courses covering all the latest technology and techniques in coating specification, application and quality control.
- Underwater hull inspections**  
Fast, safe and effective underwater services to support decision making during outfitting.

## Your vessel, our expertise – a performance partnership

For the ultimate in coating performance and project efficiency, choose Hempel Services.

### Coating advisory services

- Standard Coating Advisory**  
We support with coating processes when onsite (subject to availability).
- Premium Coating Advisory**  
We are present during all the critical phases of your project to help achieve quality results according to specification.
- Project Management**  
We assign dedicated coating advisors and assume full project control to ensure desired outcomes.

### Service value chart

|                                                                                                                        |                           |                          |                    |
|------------------------------------------------------------------------------------------------------------------------|---------------------------|--------------------------|--------------------|
|  Lower newbuild costs               |                           |                          |                    |
|  Optimise repair costs              |                           |                          |                    |
|  Reduce long term maintenance costs |                           |                          |                    |
|                                                                                                                        | Standard Coating Advisory | Premium Coating Advisory | Project Management |

### Specialised services

- Underwater Hull Inspection**  
We provide fast, safe and effective underwater inspections with Remotely Operated Vehicles to support your hull maintenance decisions with our expert reporting.
- Condition Survey**  
We evaluate your asset's structure and coating system and help plan future maintenance work to extend asset lifetime and reduce maintenance requirements.
- Technical Training Services**  
We provide training courses for applicators, supervisors, technical staff and quality assurance personnel to ensure improved efficiency and quality.

### Service value chart

|                                                                                                                          |                            |                  |                             |
|--------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------|-----------------------------|
|  Increase fuel savings              |                            |                  |                             |
|  Cut down on lost revenue           |                            |                  |                             |
|  Optimise repair costs              |                            |                  |                             |
|  Reduce long term maintenance costs |                            |                  |                             |
|                                                                                                                          | Underwater Hull Inspection | Condition Survey | Technical training services |

### Why use Hempel Services?

|                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                          |                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Increase return on investment</b> <ul style="list-style-type: none"><li>Maximize utilization of new build application processes for long term protection and performance</li><li>Lower docking and application costs</li><li>Optimised docking time</li></ul> | <b>Ensure coating performance meets specifications</b> <ul style="list-style-type: none"><li>Decrease long-term maintenance requirements</li><li>Increase fuel efficiency and reduce emissions</li></ul> | <b>Save time and resources</b> <ul style="list-style-type: none"><li>Ensure projects stay on time and on budget</li><li>Free up resources so you can focus on your core business</li></ul> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

For more information, visit [services.hempel.com](https://services.hempel.com)



As a world-leading supplier of trusted coating solutions, Hempel is a global company with strong values, working with customers in the protective, marine, decorative, container and yacht industries. Hempel employs 6,700 people in 80 countries and has 28 factories, 15 R&D centres and more than 150 stock points worldwide.

Across the globe, Hempel's coatings protect surfaces, structures and equipment. They extend asset lifetimes, reduce maintenance costs and make homes and workplaces safer and more colourful.

Hempel was founded in Copenhagen, Denmark in 1915. It is proudly 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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