

# Corrosion protection

of cargo handling equipment



# A global service

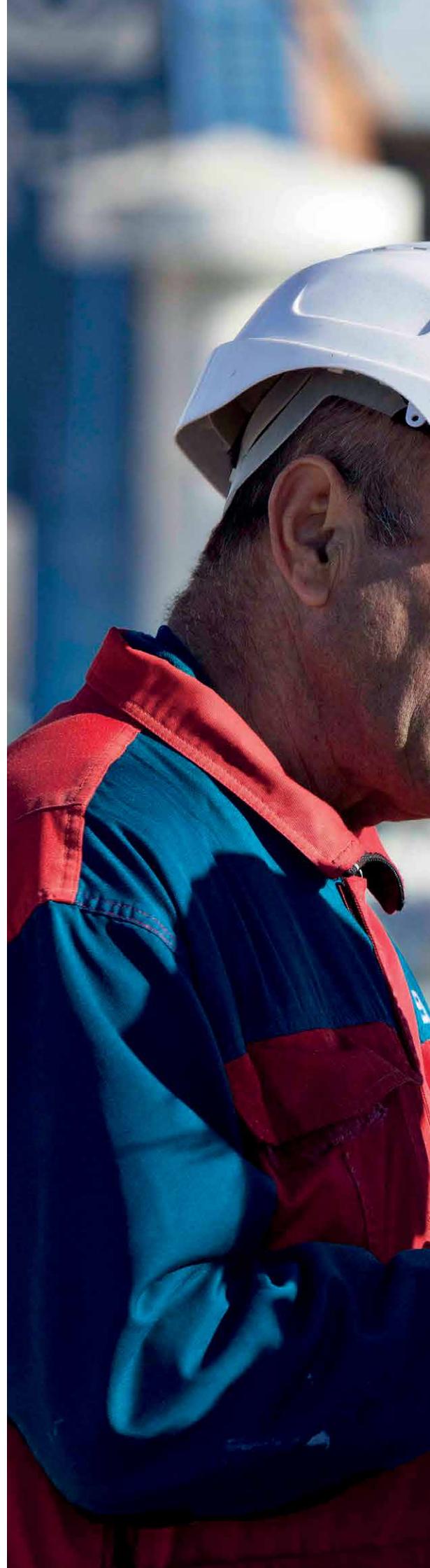
Hempel was founded in 1915 and is today one of the worlds leading manufacturers and suppliers of protective coatings. We offer advanced performance solutions to protect your assets in challenging environments around the globe.

Cargo handling equipment is an essential focal point to running a 24-hour, 7 days a week operation and, here at Hempel, we understand that protection against corrosion is a key part of keeping these assets in service.

As a leading protective coatings supplier for cargo handling equipment, we have vast expertise and knowledge, so you can be assured that by choosing Hempel, you are choosing a brand you can trust.

## **Trusted solutions**

We have been a reliable provider of anti-corrosive protective coatings for 100 years and continue to develop market-leading solutions to deliver advanced results for our customers around the world.







# Professional solutions

Our range of high performance protective coatings is designed to protect against the extremes of weather, with changing temperature and humidity and harsh coastal conditions. Developed to meet global requirements for container and bulk handling equipment, our products provide year round protection and can be used for new construction and as part of your ongoing maintenance programme.

Hempel's global research and development teams are committed to the creation of innovative and effective protective coatings solutions for our customers. With 10 research and development facilities around the world, we can work locally to develop solutions for your project.



# Global support

Our Technical Service teams are globally renowned, offering you expert advice and the best solutions to guarantee that your assets last as long as expected and that every application procedure is carried out as efficiently as possible.

At Hempel, we don't just want our customers to buy our coatings; we want you to get the most out of them. That means choosing exactly the right coating solution and securing the right application setup for your project and conditions.

We have more than 600 FROSIO/NACE certified coating advisors around the world ensuring our customers receive the exact application advice for their project and conditions. Hugely experienced and dedicated, our coating advisors are available to give you off and on-site advice at every stage of your project, from initial specifications to final application.

## Global supply

Hempel's 27 manufacturing plants and 150 stock points are located close to many fabrication sites for cargo handling equipment around the world. This ensures that Hempel offers a delivery service that is second to none, providing you with the right products on site when you need them.

# A structured approach

Our structured approach towards technical service ensures that clients are supported in the best way possible throughout the application process. Our state-of-the-art technical service process offers our clients support and advice prior to application.

During the application, Hempel can offer on-site supervision and consultation and documentation on progress and results. Finally, our after-sale support package offers follow-up visits to inspect coating systems and suggest repair and maintenance actions.



# Focus on Avantguard®

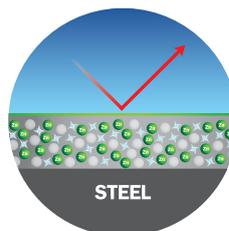
Here at Hempel, we strive to develop coatings that are ever stronger to protect our customers' assets around the world against the corrosive effects of industry and nature alike.

Avantguard, is our innovative, award winning anti-corrosion technology that redefines anti-corrosion. It is based on activated zinc and locked in to our range of high performance protective coatings.

Avantguard significantly reduces the effects of corrosion and offers superior protection. This increased durability has been proven in extensive tests against standard zinc primers.

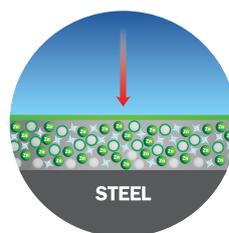
- Redefines protection showing reduced rust creep and superior corrosion protection\*
- Redefines durability with improved mechanical strength and significantly improved crack resistance through high flexibility and self-healing of micro cracks. Avantguard is best in class zinc epoxy to withstand cyclic temperatures\*\*
- Redefines productivity even in high temperatures and humidity using the same application techniques as standard zinc epoxies and ensuring less rework due to cracking under application as the coating is tolerant even with high DFTs

This new generation of activated zinc primers improves full systems by strengthening the system at it's core. Unlike standard zinc epoxies, Avantguard is effective using all three methods of protection, barrier, inhibition and galvanic.



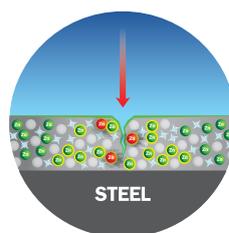
### Avantguard has improved barrier properties

Avantguard displays low water permeability that is further increased by the white salts produced as a result of the unique zinc activation process. These salts fill any space within the film, sealing it, and enhancing the barrier properties of the coating system.



### The inhibition effect increases its anti-corrosion process

The zinc salts formed contain high levels of chloride ions that are captured as they are diffused from the environment through the film. As a result, the coating uses the inhibition effect by reducing the concentration of corrosive agents that reach the steel structure, delaying the start of the unwanted corrosion process.



### Activated zinc gives excellent anti-corrosive properties

In the presence of oxygen, water and salt, zinc reacts faster than steel. The activated zinc in Avantguard performs to a higher standard with more particles becoming 'sacrificed'. This delays the corrosion process for much longer.

Product	Compliance
<b>Hempadur Avantguard 750</b> Anti-corrosive performance in compliance with Norsok M-501 which is faster curing, easy to apply and retains it's properties even at excessive application.	Complies with NORSOK M-501 Ed. 6 (ISO 20340) and Level 2, type II in SSPC Paint 20, 2002. Utilizes ASTM D520, type II zinc dust.
<b>Hempadur Avantguard 550</b> Anti-corrosive performance in compliance with ISO C5-I high, which is faster curing and easy to apply.	Complies with the requirements for Level 3, type II in SSPC Paint 20, 2002. Utilizes ASTM D520, type II zinc dust.

\* Salt spray test according to ISO 12944, Cyclic corrosion test (ISO 20340) Norsok M 501 revision 6.

\*\* Proven in Thermal Cycling Resistance test, NACE cracking test and Hempel welding test.

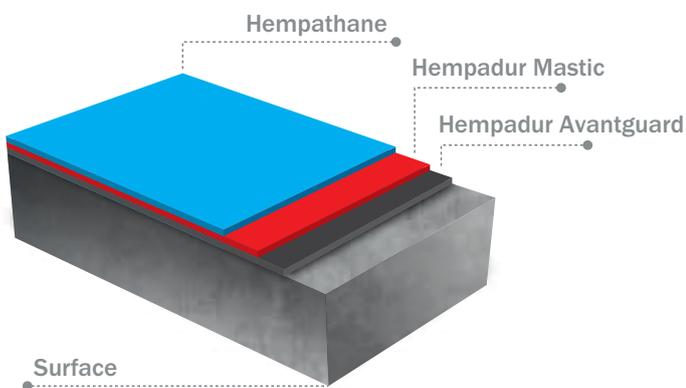
# A coating system with a global track record

We have been supplying heavy-duty coating solutions for cargo handling equipment in coastal areas for many years. Our recommended three-coat system has a proven track record globally.

This three-coat system consists of a zinc rich epoxy primer, a high build epoxy intermediate, and a strong polyurethane topcoat. It has proven to be ideal for ship-to-shore, quay and yard cranes as well as ship loaders/unloaders, and spreaders. This system offers our customers optimal corrosion protection in a strong system that withstands highly corrosive coastal environments.

With our latest advancements in zinc epoxy primers throughout the Hempadur Avantguard range, our recommended coating system gives an even stronger all-round performance.

Recommended system	
Primer	Hempadur Avantguard
Intermediate	Hempadur Mastic
Topcoat	Hempathane



# ZPMC makes the shift to Avantguard

**ZPMC is the world's largest manufacturer of cargo handling equipment, from cranes and bulk handling machinery to steel bridges and offshore products.**

## The challenge

Port terminal cranes are used for loading and unloading containers onto carrier vessels at the side of the dock. They need a heavy-duty anti-corrosive coating system to protect them from the harsh saltwater atmosphere and heavy impacts that come with the job. When ZPMC was asked to produce four super-post-Panamax container cranes for delivery in Europe, they decided to chose Hempadur Avantguard 750 for advanced protection against corrosion.

## The solution

Our technical service team in China worked closely with ZPMC when the super-post-Panamax container cranes were coated at the start of 2015.

ZPMC's applicators were particularly pleased with the ability of the Avantguard coating to tolerate high dry film thicknesses without cracking or blistering, which ensures they remain easy to apply even if application conditions are not ideal. ZPMC customers will also benefit from a longer lasting coating.

In traditional zinc epoxies, only one-third of the zinc has an anti-corrosive effect. Avantguard technology activates all of the zinc in the coating, which significantly improves the coating's anti-corrosive performance and mechanical strength. By shifting to Hempadur Avantguard activated zinc primers, the world's largest producer of cargo handling equipment expects to benefit from this long-lasting anti-corrosive protection and improved application properties.



# Selected references

	Project type	Operator/Owner	Port name	Country	Year
1	STS/RTG	ICTSI	Port of Buenaventura	Colombia	2014
2	STS/RTG	APMT	Port of Izmir	Turkey	2014
3	STS	APMT	Port of Pecem	Brazil	2014
4	STS	ECT	Port of Rotterdam	Netherlands	2014
5	STS	APMT	Port Said	Egypt	2014
6	STS	Morocco Port Authority	Port of Casablanca	Morocco	2014
7	STS/RMG	APMT	Lazaro Cardenas	Mexico	2013
8	STS/RTG	APMT	Port of Callao	Peru	2013
9	STS	APMT	Port of Algeciras	Spain	2013
10	STS	TiL	Port of Lomé	Togo	2013
11	STS	APMT	Port of Tanjung Pelepas	Malaysia	2013
12	STS	Venezuela Port Authority	Port of La Guaira	Venezuela	2013
13	STS	Eurogate	Port of Wilhelmshaven	Germany	2011

# Our coatings travel the world

Specialist coatings for the container industry

**As one of the world's leading suppliers of protective coatings for containers, our coatings can be found around the globe on containers of all types, protecting them from harsh environments and rough treatment.**

As well as coatings for new containers, we also have a range of coatings for repair and maintenance work, and can work closely with you to help streamline your application lines or maintenance intervals.



# Designed for the toughest environments

Tailored solutions for mining and metal processing

**We have a protective coating range specifically tailored to withstand the harsh conditions found in the mining and mineral processing industry.**

We protect infrastructure, buildings and equipment against corrosion for many processing plants around the world, prolonging lifetimes and reducing maintenance requirements with our durable protective coatings.



Since 1915 Hempel has been producing protective coatings that help customers to safeguard their assets whilst keeping them looking their best. Today we are a world-leading supplier of trusted solutions in the Protective, Decorative, Marine, Container and Yacht markets. Employing over 5,000 people, across 80 countries worldwide, with 27 factories and more than 150 stock points globally. This includes many recognised brands like Crown Paints, Blome International Inc, Schaeppman and Jones-Blair.

**The Hempel Group Head Office**

Hempel A/S  
Lundtoftegaardsvej 91  
2800 Kgs Lyngby  
Denmark

Tel: +45 4593 3800  
Email: [hempel@hempel.com](mailto:hempel@hempel.com)  
[infrastructure.hempel.com](http://infrastructure.hempel.com)