

# Avantguard

Long-lasting corrosion  
protection with less  
environmental impact



It's time to **AVANTGUARD**

# Time to redefine durability, time to Avantguard

In a world where the need for steel is increasing, the need for making steel structures more durable is increasing too – not only for the sake of our climate but also for our economy. Each year, the global cost of corrosion tops \$2 trillion, while the environmental impact of replacing corroded steel drives up emissions significantly.

At Hempel, we believe it's time to rethink corrosion protection and challenge conventional thinking. Avantguard® is our innovative and patented technology; the first activated zinc primer to use three methods of anti-corrosive protection: Barrier effect, Inhibitor effect and Galvanic effect. It combines zinc, hollow glass spheres and a proprietary activator in our unique patented technology. The result is superior corrosion

protection with higher durability compared to standard zinc-rich primers.

Not only does this technology allow for a reduction in the number of coats or the overall dry film thickness needed in a coating system, it also aligns closely with the UN Sustainable Development Goals by lowering CO<sub>2</sub> emissions and enhancing the durability of structures.

Even in the harshest conditions, Avantguard is proven to deliver superior corrosion protection with extended durability, resulting in longer asset life time, with less frequent maintenance and repair.

In short, Avantguard consistently outperforms conventional zinc-rich systems.

Up to  
**50% longer asset durability**

Achieve exceptional durability with extended corrosion protection, even in the harshest environments.

Up to  
**35% lower carbon footprint**

Reduce environmental footprint with lean coating schemes and options which are exceptionally low in volatile organic compounds (VOCs).

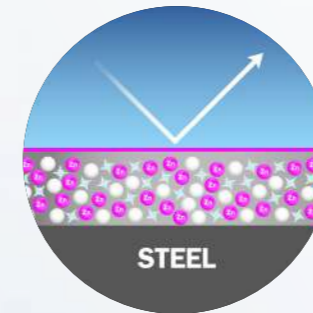
Up to  
**30% lower maintenance cost**

Benefit from longer intervals between maintenance, minimising rework and maximising operational uptime.

Calculations are contingent upon the specific coating system applied.

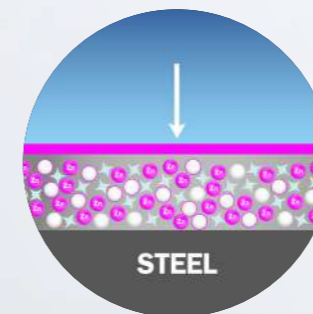
# Triple activation with patented Avantguard technology

Avantguard coatings are based on activated zinc, a patent-protected technology developed by Hempel. Activated zinc primers combine three anti-corrosion mechanisms – Barrier effect, Inhibitor effect and Galvanic effect – to effectively protect assets against atmospheric corrosion.



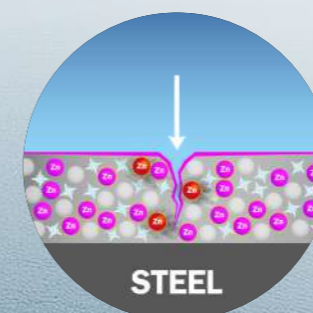
## Barrier effect Low water permeability

In the case of mechanical damage, the zinc salts produced by the unique zinc activation process fill any space within the film, sealing it and enhancing the coating's water barrier properties.



## Inhibitor effect Reduction in corrosive elements

The zinc salts contain high levels of ions. These are captured within the coating as they diffuse from the environment through the film, reducing the concentration of corrosive agents that can reach the surface of the steel.



## Galvanic effect Longer system lifetime

Zinc reacts before steel in the presence of oxygen, water and salt. The technology in Avantguard activates the zinc in the coating, which stops steel corrosion more effectively and reduces rust creep if the coating suffers mechanical damage during service.

# Avantguard has been extensively tested against equivalent zinc-rich coatings

Avantguard's Triple Activation technology ensures long-lasting protection in the harshest conditions, while enhanced mechanical strength provides superior resistance to cracking and damage.

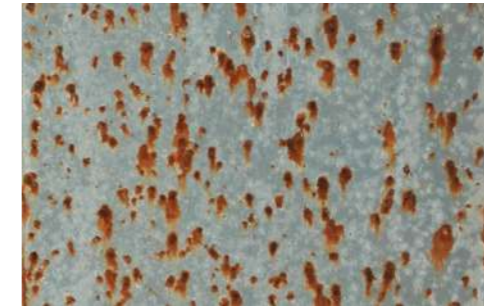
Performance has been proven through extensive testing, including salt spray tests and NACE cracking tests, where Avantguard consistently outperforms traditional zinc-rich epoxy coatings.



## Superior anti-corrosive performance

Avantguard significantly reduces rust creep and provides enhanced corrosion protection, outperforming conventional zinc-rich coatings in harsh conditions.

Salt spray test after 1440 hours



Conventional zinc epoxy



Avantguard system



Conventional zinc epoxy



Avantguard system

## Improved mechanical strength

Avantguard reduces internal stress caused by steel's expansion and contraction, delivering high cracking resistance. Proven through the NACE cracking tests, it performs reliably at both low and high DFT.

NACE cracking test



Conventional zinc epoxy



Avantguard system

# Introducing the new Avantguard 750 Pro

The new generation of activated zinc-rich primer delivering on sustainable durability.

Engineered for lasting protection in the absolute harshest environments, Avantguard 750 Pro is the ultimate solution for steel durability. Designed for new build, repairs and maintenance, Avantguard 750 Pro is a zinc-rich, high-solids primer offering the highest solids (76%) and lowest VOC content (244 g/l) on the market, making it the ideal choice for projects that demand superior performance and long-term sustainability – no matter how challenging the conditions.

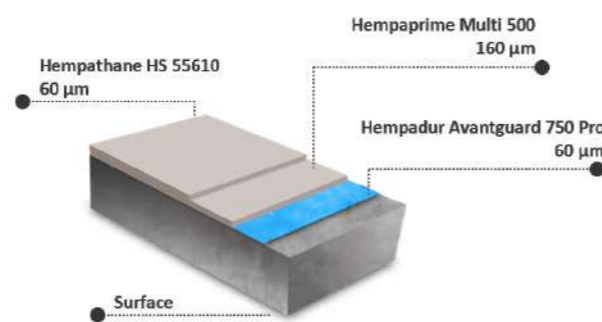


## Avantguard 750 Pro **NEW**

The proven choice for durability and sustainability

Avantguard 750 Pro is the new, innovative and patented high-performance, activated zinc coating from Hempel. Its high solids content makes it the perfect choice for projects where low VOC is key. Built on the trusted Avantguard technology with more than 10 years of proven performance.

- **ISO 12944** Up to CX
- **VOC CONTENT** 244 g/L



Recommended for extended durability in C5-VH and CX environments and projects where low VOC content is key

## Benefits with Avantguard 750 Pro

### Extended durability

Designed to exceed the current standards, Avantguard 750 Pro is recommended to achieve durability beyond 35 years and performance guaranteed with certified coatings systems.

### Sustainability gains

Avantguard 750 Pro has been tested and certified in lean coating schemes, allowing for a significant reduction in paint consumption, resulting in up to 35% less CO<sub>2</sub> and 52% less VOC emissions\* compared to traditional zinc-rich coating systems.

### Simple specifications

With one product for new build, repairs and maintenance, and its suitability for lean coating schemes, Avantguard 750 Pro keeps specifications simple. Plus, with its market leading VOC content, you can be sure your specifications meet the latest health and safety and environmental standards.

### Efficient application

In addition to being suitable for 2-coat systems, Avantguard 750 Pro is fast drying and has an overcoating interval of just 1 hour at 20°C, resulting in up to a 1.7x faster application time\*. This, coupled with its high surface tolerance and superior mechanical properties, leads to improved application productivity.

# Explore the Avantguard range

The Avantguard range is built with engineers, fabricators, and applicators in mind to meet the demands of durable, sustainable and cost-effective steel protection.



## Designed with sustainability and productivity in mind

### – for specifiers, fabricators and applicators

In coating application – whether in the paint shop, on-site, or offshore – productivity and sustainability matter. By combining low VOC emissions, reduced paint consumption, and long-term durability, Avantguard meets strict sustainability standards without compromising performance or productivity.

**For specifiers,** Avantguard delivers a solution that meets the strictest sustainability requirements without compromising performance, including low VOC emissions, reduced paint consumption, and long durability. Additionally, Hempel's expert advisors are always on hand to assist with tailored coating specifications, ensuring that every project achieves the best possible durability, efficiency, and compliance with industry standards.

**For fabricators and applicators,** Avantguard ensures ease of application even in challenging conditions like high temperatures and humidity. With an overcoating interval of just 60 minutes or less at 20°C, Avantguard enables faster production, allowing you to coat more steel in a single shift.

Avantguard's advanced formula ensures consistent coating stability, excellent edge retention, and smooth film formation, while its high tolerance for overthickness minimises rework. Its superior mechanical properties further prevent early failures, ensuring long-term performance.

In addition to the productivity benefits, Avantguard's low VOC emissions also help create a safer, healthier working environment for applicators.

The result? A coating that simplifies your job, ensures quality every time, and minimises paint usage and environmental impact but also prioritises worker health and safety—all while performing in the toughest on-site conditions.

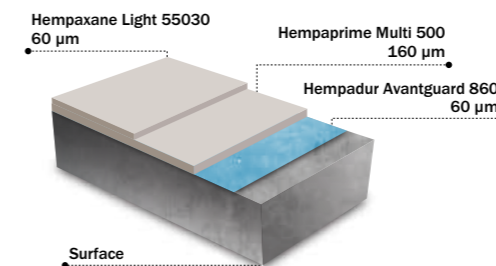
## Avantguard 860

### The top choice for superior corrosion protection as an alternative to zinc silicates

Avantguard 860 is the perfect substitute to inorganic zinc silicates, providing the same level of corrosion protection with significantly faster application times.

- ISO 12944 Up to CX
- VOC CONTENT 302 g/L

#### Recommended for extended durability in C5 and CX or as an alternative to systems using zinc silicate primer



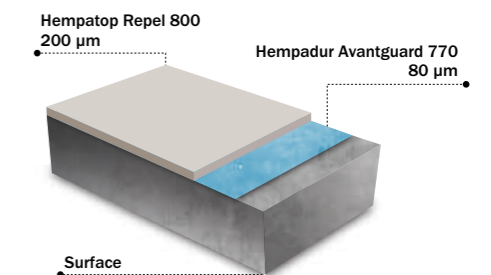
## Avantguard 770

### The best corrosion protection for maintenance projects

Avantguard 770 has improved surface tolerance properties. It offers superior corrosion protection for extended durability and suitable systems for splash zone areas (NORSOK 7A). The ideal solution for maintenance projects even in 2-coat system.

- ISO 12944 Up to CX
- VOC CONTENT 328 g/L

#### Recommended 2-coat system for maintenance and extended durability in CX



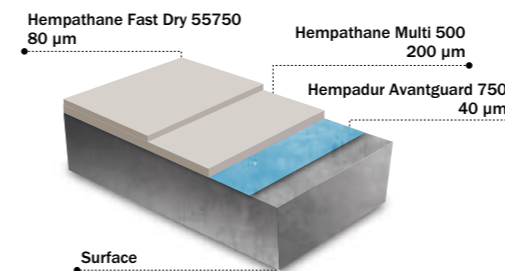
## Avantguard 750

### The versatile activated zinc-rich primer

Avantguard 750 outperforms conventional zinc-rich primers allowing special systems with 40 microns, reduced overall system thickness and 2-coats up to C5-H.

- ISO 12944 Up to CX
- VOC CONTENT 330 g/L

#### Recommended zinc-rich primer up to CX



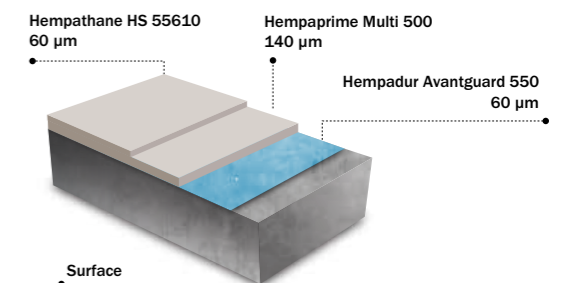
## Avantguard 550

### The most economical activated zinc primer

Avantguard 550 meets test requirements up to C5-VH making it a suitable alternative to nominal zinc-rich primers, with an anticorrosive performance on par or better than many traditional 80% zinc-rich epoxies.

- ISO 12944 Up to C5
- VOC CONTENT 325 g/L

#### Recommended for extended durability in C5-VH and CX environments and projects where low VOC content is key



# Shenzhen-Zhongshan Bridge

## Beyond standards — a bridge built to last

The Shenzhen-Zhongshan Bridge is a massive cross-sea cluster project that integrates bridges, islands, tunnels, and underwater interchanges. As a key part of China's national highway network across the Pearl River Estuary, it plays a critical role in regional connectivity. However, the project faced significant environmental challenges such as extreme humidity, fluctuating temperatures, and constant exposure to salt-laden air-conditions that accelerate corrosion and threaten the structure's long-term integrity.

### The solution

To ensure lasting performance and meet China's increasing sustainability goals, Hempel's Avantguard technology was applied to extend the bridge's lifespan while reducing environmental impact. This approach not only strengthens the structure against the elements but also minimises maintenance, resource use, and emissions for decades to come.

Leveraging solid site research and vast experience in the Chinese bridge market, Hempel delivered a tailored coating solution for the Shenzhen-Zhongshan Bridge. The Hempadur Avantguard activated zinc primer ensures superior corrosion protection, while the Hempatop Finish 830 HS fluorocarbon topcoat provides light and colour retention, maintaining aesthetics even in polluted environments.

With minimal VOC emissions, the coating system meets strict sustainability targets while delivering durable performance and a vibrant finish for this iconic project.

At a glance	
Customer	China Railway Baoji Bridge Group Co., Ltd.  Wuchang Shipbuilding Industry Group Co., Ltd.
Coating system	Exterior surface: Hempadur Avantguard, Hempel's Epoxy MIO, Hempatop Finish 830 HS  Interior surface: Hempadur Avantguard, Hempadur Mastic 47550



- Total length: Approximately 24 kilometres
- Bridge section: 17 kilometres
- Submarine tunnel: 6.84 kilometres
- Main span suspension bridge: 1,666 metres
- Main tower height: 270 metres (equivalent to a 90-storey building)
- Navigational clearance: 76.5 metres.



## WIKING WIND FARM POWERING THE BALTICS

Off the North German coast in the Baltic Sea, the Wiking Wind Farm stands as a monumental project by Iberdrola, generating 350 MW of renewable energy — enough to supply 20% of the local power demand. Its 70 offshore turbines, each reaching an impressive 246 feet, are a testament to modern engineering.

At the heart of this project lies the 'Andalucía' substation, a critical piece of infrastructure located in Germany. It, too, benefits from the advanced protection of Avantguard coatings, safeguarding it from the harsh elements of the marine environment.

### The solution

To withstand the relentless CX offshore conditions, the coating system for these immense structures was meticulously designed. A 3-layer solution was applied, featuring Hempadur Avantguard 770, Hempadur 47300, and Hempthane HS 55610 for both the inner and outer surfaces.



### Products

- Hempadur Avantguard 750
- Hempaprime Multi 500
- Hempthane Speed-Dry Topcoat 250

## PTOLEMAIS V EXPANSION OF THE POWER STATION

The ambitious Ptolemais V expansion project in Greece was originally specified for an inorganic zinc silicate primer. Identifying an opportunity to optimise performance, Hempel recommended upgrading to the advanced Hempadur Avantguard 860 primer.

### The solution

Tests demonstrated that Hempadur Avantguard 860 provides the same level of corrosion protection as the originally specified primer while significantly reducing application risks and improving overcoating intervals. This upgrade delivered long-term protection for critical assets along with faster and more efficient application.



### Products

- Hempadur Avantguard 860
- Hempadur Mastic 4588W
- Hempthane Topcoat 55210

# A partnership that builds confidence in every project

Hempel Services supports you every step of the way — from specification and planning to application and final curing

Every day, our global team of coating advisors can be found on construction sites and production lines, helping customers optimise their processes, reduce maintenance costs, cut down on waste, and improve the environmental performance of their assets.

Wherever your project is located, we bring the coating expertise to ensure your structures are built to last.

Visit our contact page:  
[services.hempel.com](https://services.hempel.com)



We choose Hempel coatings because we know the paint and we know the service we can expect. The coatings have a good and reliable performance in corrosion protection, and the technical services are professional, precise and globally available, providing great support. We have worked with Hempel for many years, with great success.”

— Kai Zhao, Project Manager ZPMC

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