

Avantguard[®]

Triple Activation with patented
Avantguard technology





Avantguard

Challenging the standard for corrosion protection

When it comes to protecting assets in harsh environments, you need a high-performance anti-corrosion system that will last, whatever nature or industry throws at it. You need Avantguard technology with Triple Activation.

Avantguard outperforms equivalent zinc-rich epoxies in almost every area of application. Its superior performance allows a reduction in typical system dry film thicknesses to achieve the required protection. Challenging the standard for corrosion protection in tough environments, our Avantguard activated zinc epoxy primers protect assets for longer and with less maintenance.

Avantguard coatings are better during application, too. You get unbeatable ease of application, even in high ambient temperatures and humidity, and the shortest overcoating intervals on the market. The result? Your production moves faster, your maintenance work is quicker and coating quality is more consistent.

Increase asset longevity
with longer corrosion protection in the toughest conditions

Reduce application and construction costs
with lower paint consumption and faster application

Reduce maintenance costs
with longer maintenance intervals and less rework

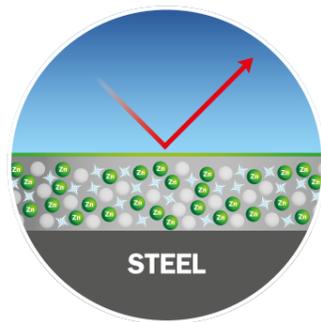
Improve sustainability
with less maintenance and fewer emissions

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 to effectively protect assets against atmospheric corrosion.



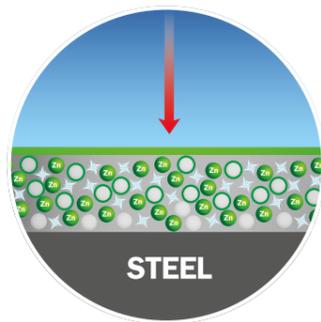
Three corrosion protection mechanisms



Galvanic

A longer system lifetime

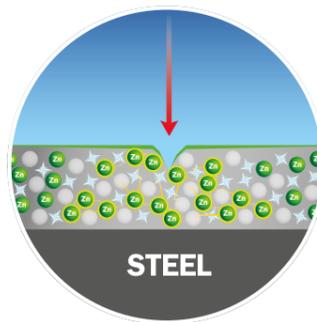
Zinc reacts before steel in the presence of oxygen, water and salt. The technology in Avantguard activates the zinc in the coating, which stops steel corrosion more effectively and reduces rust creep if the coating suffers mechanical damage during service.



Barrier

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

A 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.

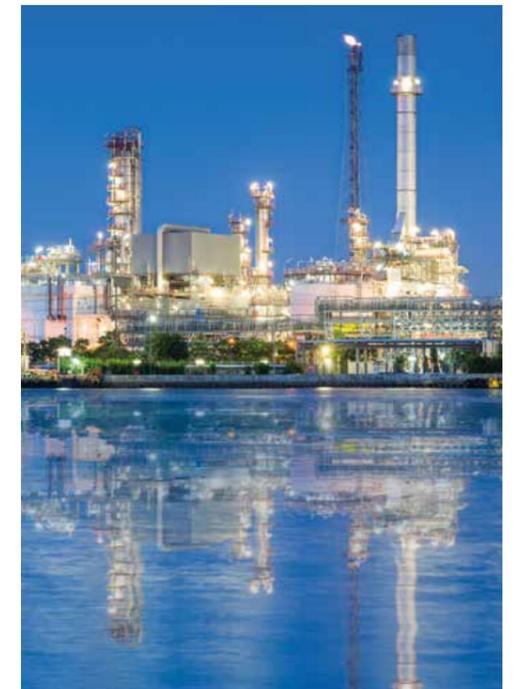
Triple Activation with patented Avantguard® technology



In order to achieve full zinc utilisation, we combine zinc, our proprietary activator and hollow glass spheres. Avantguard is also the only zinc-rich primer to use all three methods of corrosion protection:

Barrier effect | Inhibitor effect | Galvanic effect

Triple Activation with patented Avantguard technology provides superior protection, durability and sustainability compared to standard zinc-rich primers. So you save on application and maintenance costs, while your assets last longer.



Increase asset lifetime and reduce maintenance

due to superior anti-corrosive performance

Avantguard activated zinc primers deliver better anti-corrosive performance than conventional zinc rich epoxy coatings. This durability translates into significantly less maintenance over the entire lifetime of an asset. The potential savings are huge, especially on assets where maintenance costs and downtime can soon add up.

Reduced lift-off for a longer lifetime

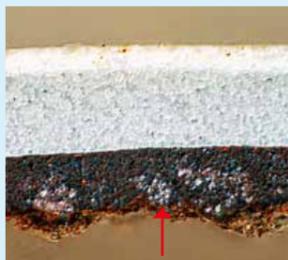
When damaged, conventional zinc epoxy systems can deteriorate rapidly and begin to lift from the structure.

With Avantguard systems, the activated zinc slows down the corrosion process, which protects the asset for longer.

After 1440 hours of salt spray exposure, conventional zinc rich primers show formation of red rust at the primer-steel interface in areas close to coating damages. Avantguard technology prevents the formation of such rust and therefore the development of corrosion.



Avantguard system



Conventional zinc epoxy system

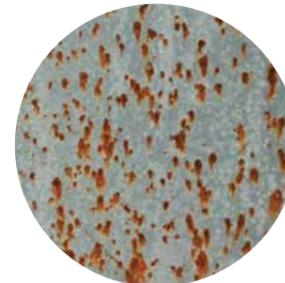


Extensively tested

against equivalent zinc-rich coatings

Compared to conventional zinc epoxies, Avantguard coatings show superior anti-corrosive performance in salt spray tests, as well as reduced rust creep and better corrosion protection in cyclic corrosion testing.

Salt spray test after 1440 hours



Conventional zinc epoxy



Avantguard technology



Conventional zinc epoxy



Avantguard technology

Avantguard's patent-protected technology has been successfully protecting our customers assets across the globe for many years. Read more about it's proven performance in the case story reference section below.

Improved mechanical strength

Avantguard has been engineered to release the internal stress generated by the continual expansion and contraction of the steel. High cracking resistance has been demonstrated by the NACE cracking test and Hempel's own welding test with both low and high dry film thicknesses.

NACE cracking test

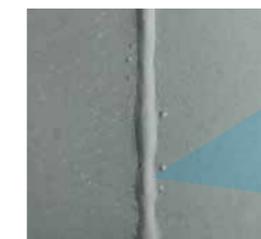


Conventional zinc epoxy

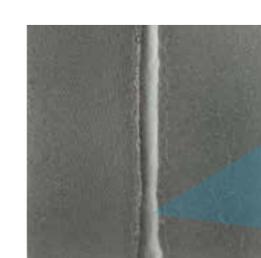
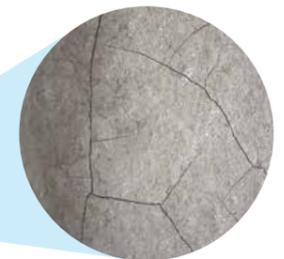


Avantguard technology

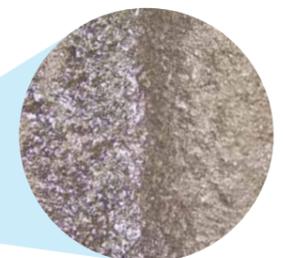
Welding test



Conventional zinc epoxy



Avantguard technology



Step up your productivity

due to best-in-class overcoating intervals and fewer coats

When it comes to coating application – in the yard, on-site or offshore – time is money. That's why we designed our Avantguard coatings to be extremely fast drying. All Avantguard coatings have an overcoating interval of just 45 minutes at 20°C. This means that, whichever Avantguard coating you choose, it will dry faster than its nearest competitor product.

Avantguard coatings are the ideal zinc primer for high productivity systems. When used with other fast-curing Hempel products, they enable you to coat more sections in one shift, for higher productivity in the yard and shorter maintenance times on-site. And, because many of our systems allow the use of fewer coats than traditional solutions, there's less painting required, too.

Coat more steel in one shift

Reduce maintenance time

Lower paint consumption

Reduce your costs and risks

due to better application and mechanical properties

Avantguard outperforms equivalent zinc-rich epoxies in almost every area of application. This lowers the risk of incorrect application, reducing the chance of quality issues further down the line and giving you greater piece of mind.

Thanks to its high tolerance to environmental conditions, Avantguard is easy to apply using airless spray, brush or roller, even in high temperatures and humidity. It ensures excellent coating stability, edge retention and film formation. And, it has a higher tolerance to overthickness than conventional zinc rich epoxies. It also has better mechanical properties than standard zinc-rich coatings, reducing repair work during construction and limiting the chance of early failure during service.

The result is unmatched application efficiency and consistency of quality – even in tough on-site conditions – which reduces your quality control requirements and keeps rework to a minimum.

With Avantguard you can:

- work in a wide range of ambient conditions
- increase application speed
- reduce repair work and touch-up
- lower the risk of premature coating failure

Meet the Avantguard range

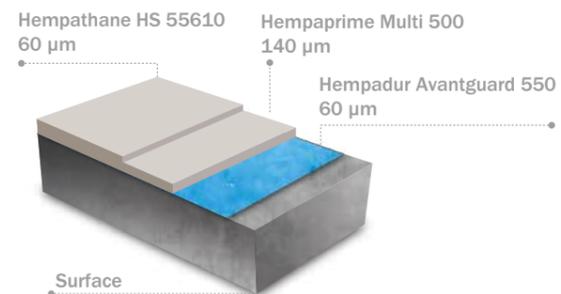
Coating systems using Avantguard outperform conventional zinc epoxy systems in every way

Avantguard 550

An activated zinc epoxy primer with a zinc content that complies with Level 3 in SSPC Paint 20. Provides excellent galvanic corrosion protection in very high corrosivity environments (up to C5).

- Anti-corrosive performance on par with or better than many traditional 80 per cent zinc-rich primers
- Meets the test requirements of ISO 12944 up to C5VH, making it a suitable alternative to nominal zinc-rich primers

Recommended for extended durability in C5 (alternative to 80 per cent zinc rich primers)

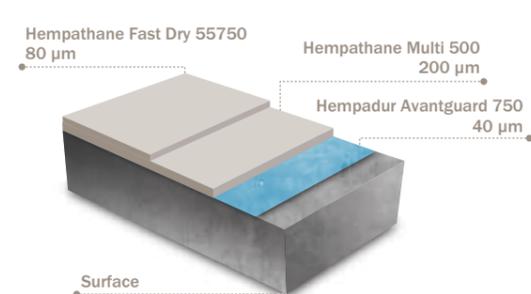


Avantguard 750

An activated zinc-rich epoxy primer according to ISO 12944 Part 5 that complies with Level 2 in SSPC Paint 20. Ideal for a range of corrosivity environments, including offshore (up to CX).

- Provides longer durability up to CX environments in compliance with ISO 12944 Part 9 and NORSOK M501
- Its superior performance allows to reduce typical system dry film thicknesses to achieve the required protection
- As part of a 2-coat system it provides the same level of corrosion protection as conventional zinc epoxy 3-coat systems up to C5H

Recommended for fast application and extended durability in C5

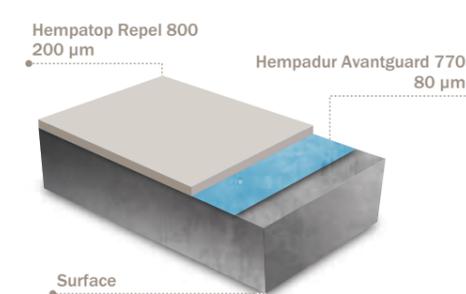


Avantguard 770

An activated zinc-rich epoxy primer according to ISO 12944 Part 5 that complies with Level 2 in SSPC Paint 20. Superior adhesive and anti-corrosive properties ensure extended durability in a range of environments up to CX.

- Higher tolerance to less than ideal surface preparation in both offshore and onshore applications, making it the perfect choice for maintenance as well as new construction
- As part of a 2-coat system it provides the same level of performance in offshore environments (CX) as conventional zinc epoxy 3-coat systems

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

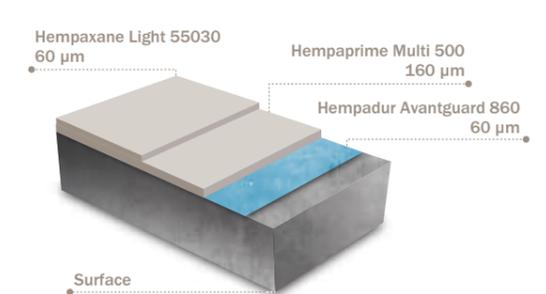


Avantguard 860

An activated zinc-rich epoxy primer that complies with ISO 12944 Part 5 and Level 1 Type 2 in SSPC Paint 20. Ideal for when the best corrosion protection is needed in highly corrosive environments.

- Perfect substitute to inorganic zinc silicates in anti-corrosive paint systems, providing same level of anti-corrosion performance
- Significantly faster application times and higher robustness towards over-thickness and difficult application conditions
- Exceptionally long durability in CX environments

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



New storage tanks at Decal

Port of Huelva, Spain



The Decal Group once again trusts Hempel products for the long-term protection of its new storage tanks in the Port of Huelva, Spain. Located on the Atlantic coast, its an intermodal logistics hub for maritime, rail and highway cargo.

When Decal needed to increase capacity at the terminal, it decided to add four new storage tanks. This would bring the terminal's storage capacity up to 600,000 m³, making it the largest of the Decal Group's global facilities. Apifema, a corrosion protection specialist based in Jaén, was tasked with applying the protective coatings to the new tanks.

Our solution was based on Avantguard 750, a high-performance zinc-based primer, ideal for fast application and long-term corrosion protection.

Our products have successfully protected the other 48 tanks at the terminal since it was constructed in the 1990s and we were asked to supply coatings for the 20,000 m² of new steel.

| Products |
|---|
| Primer: Avantguard 750 (60 microns) |
| Intermediate: Hempadur 47300 (150 microns) |
| Topcoat: Hempel's Polyenamel 55102 (50 microns) |

Wikinger wind farm

North German Coast, Baltic Sea



The 350 MW Iberdrola windfarm provides 20% of local power using 70 offshore wind turbines, each an impressive 246 feet tall.

The chosen scheme for these enormous towers was designed to provide optimal protection in CX Marine conditions and comprises a 3-layer coating of Hempadur Avantguard 770, Hempadur 47300 and Hempathane HS 55610, on both inner and outer surfaces.

A key infrastructure in the project is the 'Andalucía' sub-station. Located in Germany it is also protected against the elements with Avantguard.

The Wikinger windfarm is another example of Hempel's significant position in developing and supplying protective coatings for the offshore market.

| Products |
|-------------------------|
| Hempadur Avantguard 770 |
| Hempadur 47300 |
| Hempathane HS 55610 |

Brabant Groep

The Netherlands



A recent downstream project Hempel completed with the Brabant Groep was for Vopak Amsterdam, where Hempel has supplied 8,500 litres of paint. The aim of the project was to expand the current capacity at Vopak Amsterdam by extending the existing jetty and building a new quay. A fast drying and easy-to-apply system for in-shop application was required, so the system chosen was Hempadur Avantguard 550, Hempaprime Multi 500 and Hempathane Speed-Dry Topcoat 250.

Hempel has also been awarded a downstream project for Koole Terminals in Rotterdam. Around 7,500 litres of paint will be used to coat 6,200m² of piping and spools. The system will be comprised of Hempadur Avantguard 750, Hempaprime Multi 500 and Hempathane Speed-Dry Topcoat 250.

Hempel has built a longlasting relationship with one of the most important stationary blasting and coating companies in the Benelux. The key factors in our continued trusted relationship are our competitive pricing, newly developed zinc epoxies and paints with fast drying properties, which have also been proven to provide impressive hardness.

| Products |
|----------------------------------|
| Hempadur Avantguard 750 |
| Hempaprime Multi 500 |
| Hempathane Speed-Dry Topcoat 250 |

Ptolemais V expansion

Greece



Originally specified with inorganic zinc silicate primer, we proposed a change to our advanced Hempadur Avantguard 860 primer, since it provides many benefits including best-in-class productivity² with reduced over-coating times.

The additional benefits afforded by using Hempadur Avantguard 860 were supported by tests proving our product provides the same level of corrosion protection as the originally specified inorganic zinc silicate, whilst also considerably minimising the application risks and improving the over coating interval time. As a result, the project will benefit from an improved application process and a robust coating solution.

Set to produce 660MW of power, it will produce affordable electricity for the people of Greece with significant benefits to the Greek economy and environmental footprint.

| Products |
|--------------------------|
| Hempadur Avantguard 860 |
| Hempadur Mastic 4588W |
| Hempathane Topcoat 55210 |

² Hempadur Avantguard 860 is 4x faster drying than standard IOZs, based on a typical system, when comparing product data sheets.

Protective Services

Your business, our expertise – a performance partnership



Efficiency, powered by Hempel Services

In an increasingly competitive world, it's more important than ever to maximise the effectiveness and durability of every protective coating – while also reducing the costs associated with coating processes. That's what you get with Hempel Services.

From initial planning and specification through to application and final curing, our expert coating advisors work with your team to ensure all coatings are applied according to specification – with minimum time, costs, waste and downtime – so you enjoy extended asset uptime and optimised maintenance intervals. And, if you operate line production, we work with you to optimise your process flows and increase your production speed.

Why use Hempel Services?

Increase return on investment

- Reduce asset downtime
- Reduce maintenance costs and frequency
- Extend asset lifetime

Ensure excellent coating application

- Reduce application time and costs
- Avoid delays and penalty payments
- Increase coating lifetime

Save time and resources

- Ensure projects stay on time and within budget
- Increase application speed and efficiency
- Free up resources to focus on your core business

For more information, visit services.hempel.com

Shaping a brighter future

due to lower emissions and reduced long-term impact

In every industry and every region, companies, governments and the public are increasingly concerned about sustainability. At Hempel, we work to ensure that our coatings are carefully formulated with your sustainability goals in mind.

Reducing emissions

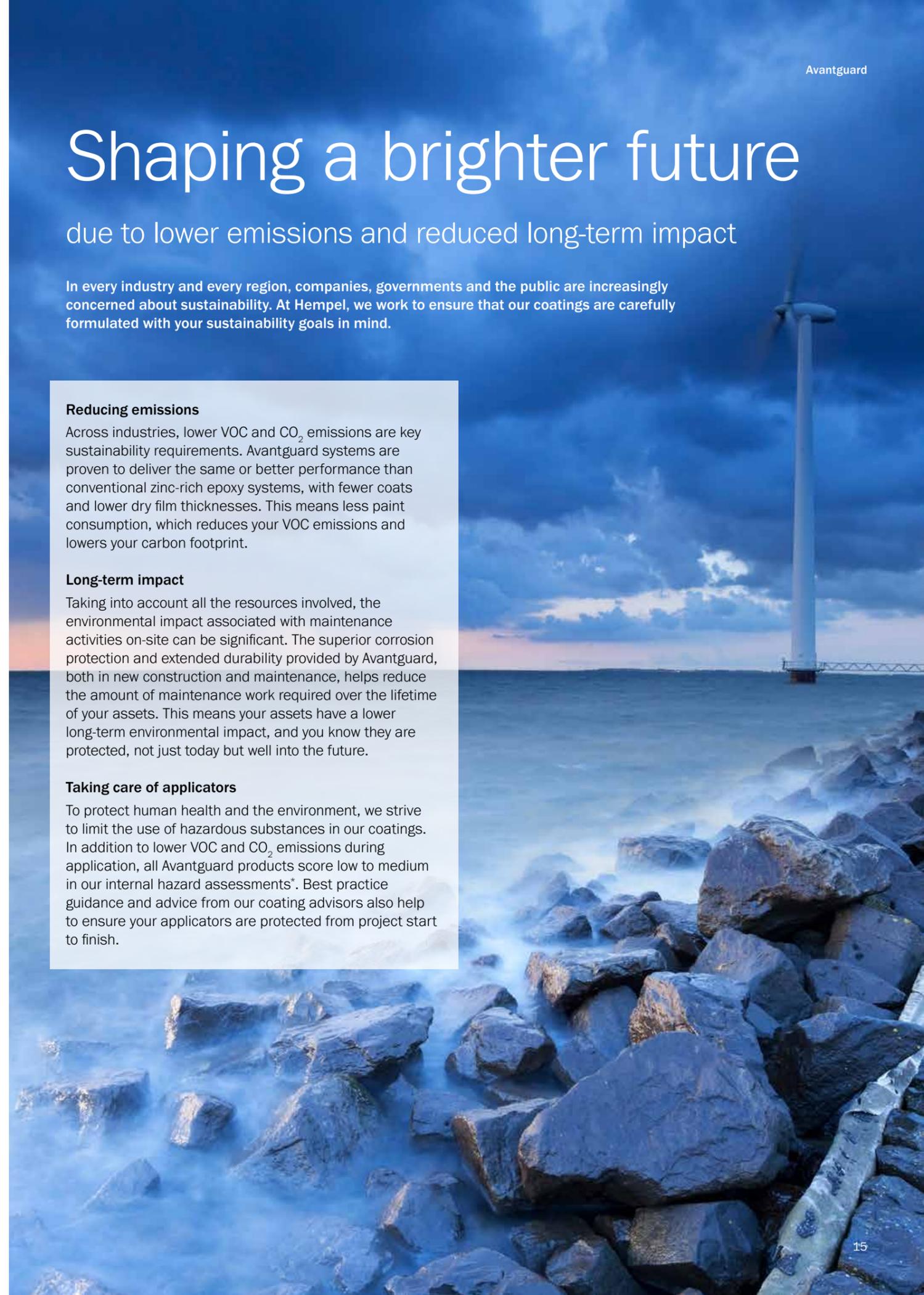
Across industries, lower VOC and CO₂ emissions are key sustainability requirements. Avantguard systems are proven to deliver the same or better performance than conventional zinc-rich epoxy systems, with fewer coats and lower dry film thicknesses. This means less paint consumption, which reduces your VOC emissions and lowers your carbon footprint.

Long-term impact

Taking into account all the resources involved, the environmental impact associated with maintenance activities on-site can be significant. The superior corrosion protection and extended durability provided by Avantguard, both in new construction and maintenance, helps reduce the amount of maintenance work required over the lifetime of your assets. This means your assets have a lower long-term environmental impact, and you know they are protected, not just today but well into the future.

Taking care of applicators

To protect human health and the environment, we strive to limit the use of hazardous substances in our coatings. In addition to lower VOC and CO₂ emissions during application, all Avantguard products score low to medium in our internal hazard assessments*. Best practice guidance and advice from our coating advisors also help to ensure your applicators are protected from project start to finish.



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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 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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