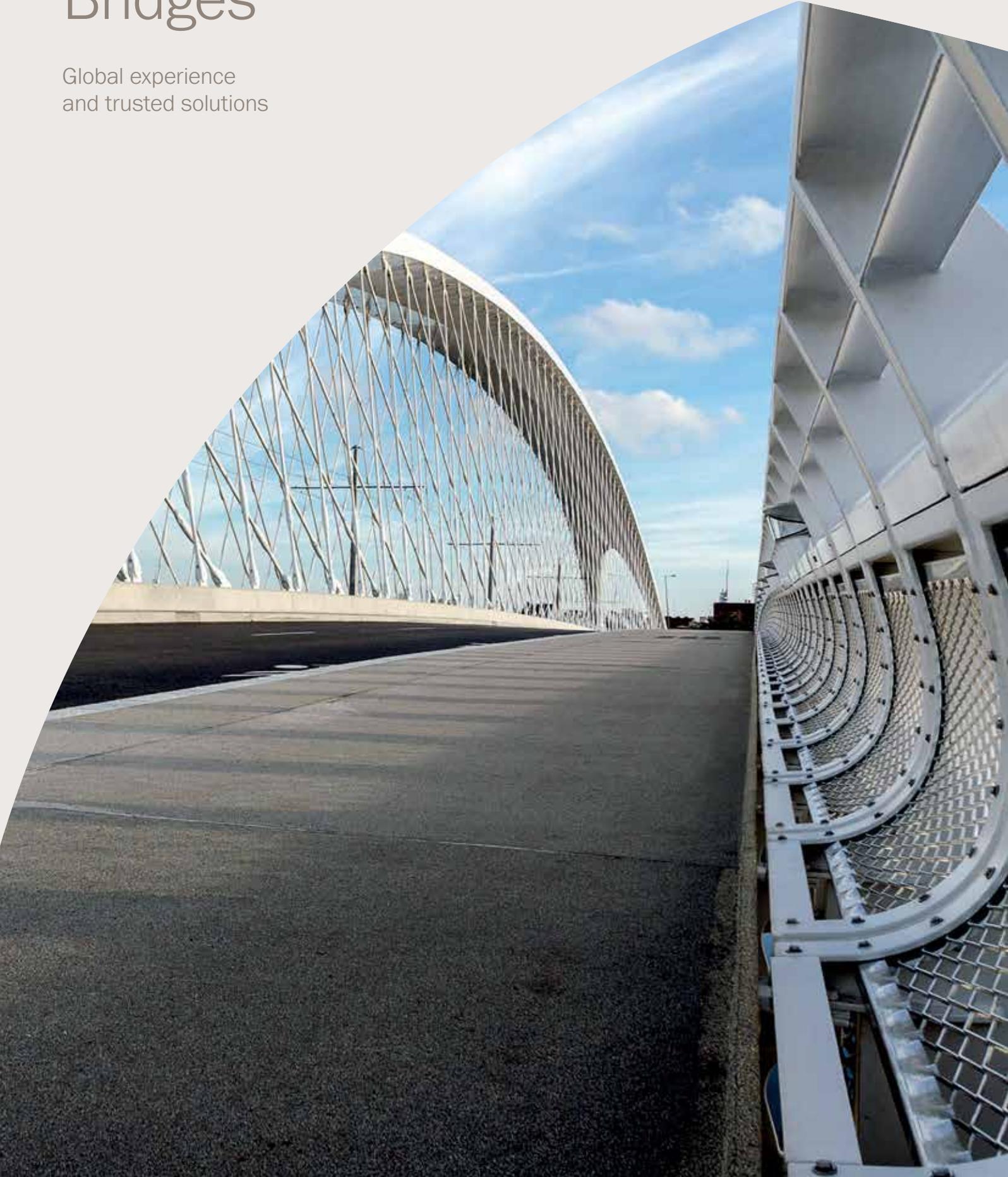


Bridges

Global experience
and trusted solutions



World-leading coatings supplier

Hempel was founded in 1915 and is today one of the world's leading manufacturers and suppliers of coating solutions. Our advanced protective and decorative coatings can be found on millions of surfaces around the globe.

From the world's longest bridges and tallest skyscrapers to airports, sports stadia and civil structures our coatings protect your assets against corrosion in many different and challenging environments.

Our history is rooted in protective coatings for the extreme conditions experienced in the Marine, Decorative and Protective industries, so you can be assured that we offer trusted technology, expert technical service and reliability.

With our vast expertise and knowledge, you know that by choosing Hempel, you are choosing a brand you can trust.

Tailored for bridges

Bridges are essential in bringing people together. They span land, rivers and even the seas. Made from concrete and steel, bridges require tailored protective coatings to ensure they are resistant to weather, climate and the pollution caused by continual traffic.

Whether huge and breathtaking or functional and unassuming, bridges are essential to keep us connected. This is why we have designed our range of high performance, anti-corrosion systems to provide an advanced, durable, hard working and good looking finish to reduce maintenance and keep people on the move.

Whatever the challenge of your project, we have the right corrosion protection to meet your specific needs and offer on and off site technical support that makes a real difference to you.



Global service

We want to give you the right products on site, on time, every time. With the support of our 28 manufacturing plants and over 150 stock points worldwide, we offer a flexible service to all our customers. A service that we believe is second to none.

Proven performance

Our range of high performance protective coatings offer advanced protection and optimised application for a durable finish that looks good for longer, in even the most challenging climates. With a proven track record, we are a trusted protective coatings partner for our customers in the construction industry around the world.

Professional support

Our customers know that specifying the right products is crucial when designing bridges, to ensure corrosion protection, good appearance and minimum maintenance. Our multinational, globally based teams are uniquely positioned to ensure the smooth running of your project. From planning to completion, specification to application, we have key people to support you both off and on site.

Innovative solutions

With 15 global research and development facilities, we work locally with you to provide the right solution for your project. Our research and development teams are committed to continuous development of innovative and effective speciality coatings to give you durable protection whilst ensuring environmental responsibilities are met.

Contex EM

Elastomeric coating for outstanding protection

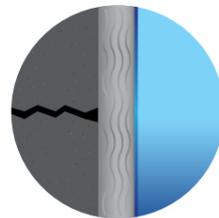
Tough climates require tough protection. Our Contex range uses advanced technology to deflect solar rays, protect against carbonation and enhance crack bridging.

Benefits

- Outstanding crack bridging properties
- Excellent anti-carbonation properties
- Excellent UV resistance
- Exceptional weathering resistance

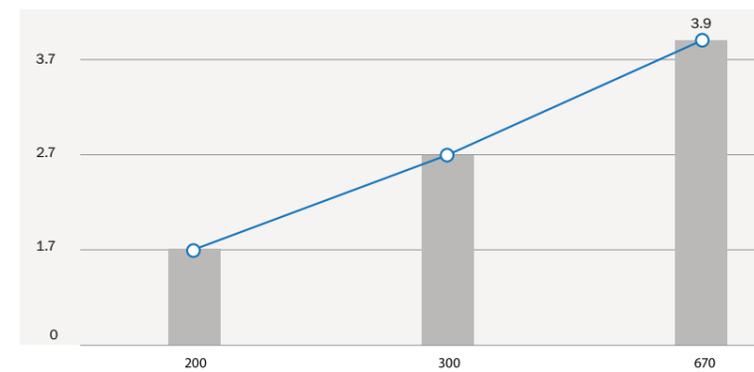
Contex EM is ideally suited for bridges, roads, by-passes and tunnels, it is available in a variety of finishes and textures that prolong the life of concrete surfaces.

Contex EM is a waterborne elastomeric topcoat with outstanding dynamic and static crack bridging properties to accommodate structure movements. Based on 100 percent pure acrylic binders it provides effective protection against harsh climatic conditions. The breathable smooth textured surface offers brilliant anti-carbonation properties.



Flexible formulation for outstanding crack bridging

Crack bridging in mm



Dry film thickness in microns

The graph shows that the increase of Contex EM thickness can bridge wider cracks.

| Certification |
|---|
| BSEN 7-1062 Crack bridging |
| BSEN 6-1062 Carbon dioxide diffusion resistance |

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 is locked in to our range of high performance protective coatings.

Avantguard technology uses a new combination of zinc, hollow glass spheres and a proprietary activator, which activates the zinc and enhances its protective capabilities.

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

Improves full systems

Strengthening the system at it's core, Avantguard gives the system enhanced anti-corrosion performance.

Redefines protection

Avantguard shows reduced rust creep and significantly better corrosion protection in Cyclic corrosion testing (ISO 20340) NORSOK M501 revision 6 and Salt Spray testing (ISO 12944).

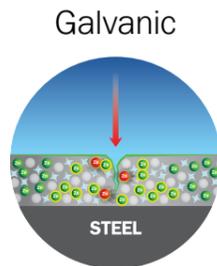
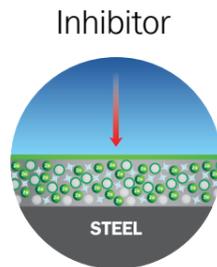
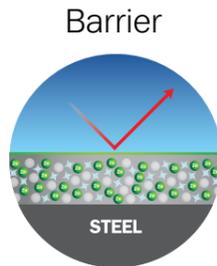
Redefines productivity

Avantguard has a high tolerance to different climatic conditions, displayed during application under extreme thickness, temperature and humidity.

Redefines durability

Avantguard displays improved mechanical strength in the protective coating, with improved crack resistance, (shown in the Thermal Cycling Resistance test). The NACE cracking test and Hempel welding test have proven that Avantguard significantly reduces cracking at low and high DFT.

This new generation of activated zinc primers reduces the effects of corrosion, offers advanced protection and increased durability for all-round performance and unlike standard zinc epoxies, is effective using all three methods of protection.



Avantguard has improved barrier properties

Avantguard displays low water permeability. The salts produced by the activation process fill any space within the film, sealing it, and enhancing the barrier properties.

The inhibition effect helps improve the anti-corrosive protection

The zinc salts formed contain high levels of chloride ions that are captured as they are diffused from the environment through the film. This reduces the concentration of corrosive agents that reach the steel structure.

Activated zinc gives excellent anti-corrosive properties

In the presence of oxygen, water and salt, zinc reacts faster than steel. This delays the corrosion process for much longer.

“Avantguard has a self-healing effect on micro cracks, which is something that we've never seen before. The insoluble salts which are created in the unique zinc activation process actually occupy the space left by the microcrack, further preventing the development of a more serious crack.”

Josep Palasi
Hempel Strategic Technology Director

Hempadur Avantguard 550

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.

Utilises ASTM D520, type II zinc dust.

| Parameters | |
|--|---------------------------------|
| DFT range (min and max) | 50 - 100 micron |
| Curing time - dry to handle (20-25°C) | 1 hour 30 mins |
| VS% | 65 |
| VOC (g/L) | 319 |
| Pot life (20°C) | 3 hours |
| Min. overcoating intervals with epoxy (20°C) | 1 hour |
| Application equipment | Airless spray, air spray, brush |

Hempadur Avantguard 750

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.

Utilises ASTM D520, type II zinc dust.

| Parameters | |
|--|---------------------------------|
| DFT range (min and max) | 50 - 100 micron |
| Curing time - dry to handle (20-25°C) | 1 hour 30 mins |
| VS% | 65 |
| VOC (g/L) | 316 |
| Pot life (20°C) | 4 hours |
| Min. overcoating intervals with epoxy (20°C) | 1 hour |
| Application equipment | Airless spray, air spray, brush |

First Ring Road

Kuwait

By using a network of new at-grade roads, depressed roads in troughs and tunnels, elevated roads and bridges, the first phase of the First Kuwait Ring Road project will significantly improve access to downtown Kuwait City while reducing traffic congestion.

To ensure the Ring Road is protected with leading technology coatings, the bridge has been coated with over 80,000 litres of Contex EM, providing exceptional flexibility, excellent crack bridging and anti-carbonation properties.

Products

Contex EM

Tower Bridge, London UK

After a four-year face-lift, historic Tower Bridge looks resplendent again in its familiar blue and white colours. Coated with 22,000 litres of our advanced protective coatings, this iconic bridge will resist London's harsh city environment and continue to display its true colours for at least the next 25 years.

Products

Hempaxane Classic

Hempathane HS

Hempadur Mastic



Nanjing Bridge, China

Being the 6th largest suspension bridge in the world the Nanjing Bridge required over 400,000 litres of Hempel protective coatings. With a length of over 28km and a span of 5.448km crossing the Yangtze River, the bridge carries the G42 Shanghai-Chengdu Expressway.

Products

Hempel's Galvosil

Hempadur Sealer

Hempadur MIO

Hempathane Topcoat



Trinec – Baliny Road Bridge, Czech

Built as part of the Trinec City Bypass, the Trinec - Baliny road bridge is one of three bridges protected with our high performance, anti-corrosion coatings.

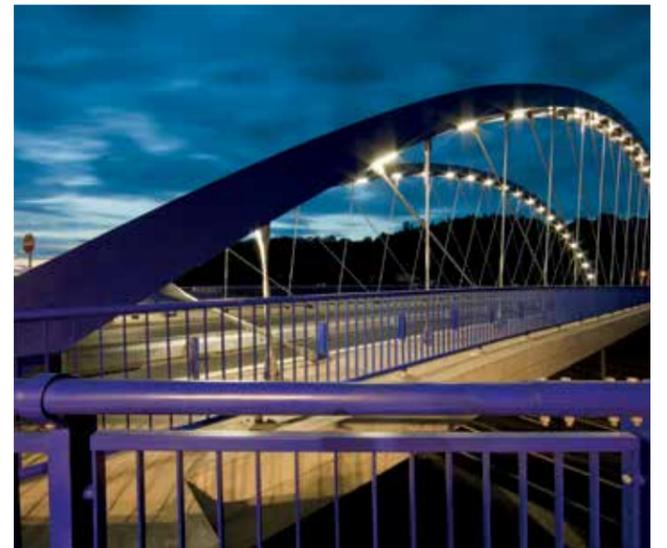
Our proven products meet international, and more importantly, local approvals, so our customer is assured of long term durability. And, with our local service, ensuring optimised application, the customer benefits from real cost effective solutions.

Products

Hempadur Zinc

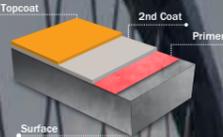
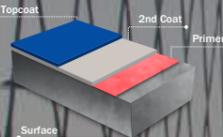
Hempadur Fast Dry

Hempathane HS

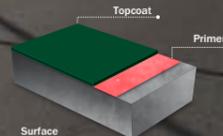


Protective systems for bridges

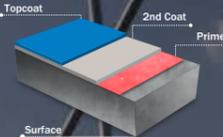
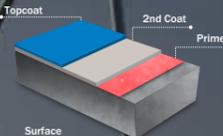
1.1. New metal structures (high durability systems)

| | System | DFT (µm) | Recommended use | Finish | Volume solids % | VOC (g/L) | Dry to touch (20°C) |
|---|---|----------|--|------------|-----------------|-----------|---------------------|
| Premium C5I-H system exterior coatings >15 years  | Hempel's Galvosil 15700 | 60 | As a versatile primer for long-term protection of steel in severely corrosive environments. | Flat | 65 ± 1 | 315 | 30 mins |
| | Hempadur Mastic 45880/1, Hempadur 47300 | 200 | Self primed, surface tolerant paint system or as an intermediate or finishing coat in heavy duty paint systems where low VOC and high film build are required. | Semi gloss | 80 ± 1 | 216 | 3 hours |
| | Hempaxane Light 55030 | 60 | As a VOC-compliant, high-build finishing coat for protection of structural steel in severely corrosive environment. | Glossy | 67 ± 1 | 336 | 5 hours |
| High quality C5I-H system exterior coatings >15 years  | Hempadur Avantguard 750 | 60 | As a versatile primer for long-term protection of steel in severely corrosive environments. | Flat | 65 ± 1 | 318 | 10 mins |
| | Hempadur Mastic 45880/1, Hempadur 47300 | 200 | Self primed, surface tolerant paint system or as an intermediate or finishing coat in heavy duty paint systems where low VOC and high film build are required. | Semi gloss | 80 ± 1 | 216 | 3 hours |
| | Hempathane HS 55610 | 60 | As a VOC-compliant, high-build finishing coat for protection of structural steel in severely corrosive environment. | Glossy | 67 ± 1 | 336 | 3 hours |

1.2. Maintenance of metal structures

| | System | DFT (µm) | Recommended use | Finish | Volume solids % | VOC (g/L) | Dry to touch (20°C) |
|--|---|----------|---|------------|-----------------|-----------|---------------------|
| Exterior coatings  | Hempathane Topcoat 55210 | 50 | Finishing polyurethane coat for protection of structural steel in severely corrosive atmospheric environments. | Glossy | 51 ± 1 | 442 | 1 hour |
| | Hempadur Mastic 45880/1, Hempadur 47300 | 150 | Self primed, surface tolerant epoxy paint system or as an intermediate or finishing coat in heavy duty paint systems. | Semi gloss | 80 ± 1 | 217 | 3 hours |

2. Concrete structures

| | System | DFT (µm) | Recommended use | Finish | Volume solids % | VOC (g/L) | Dry to touch (20°C) |
|---|-------------------------------|----------|---|--------|-----------------|-----------|---------------------|
| Exterior coatings  | Hempel's Contex Protect 58430 | 3 x 70 | Waterborne acrylic based coating, designed to protect concrete from ingress of aggressive agents, preventing from carbonation and chloride attack | Matt | 40 ± 1 | 35 | 1 hour |
| | Contex SB Primer 26600 | | An alkali resistant, acrylic solvent-borne primer/sealer especially developed for use in Hempel's Contex anti-carbonation systems. | Matt | 32 ± 2 | 558 | 2 hours |
| Exterior coatings  | Contex Smooth 46600 | 2 x 50 | An alkali resistant, acrylic, solvent-borne topcoat in Contex anti-carbonation system. | Matt | 35 ± 2 | 565 | 2 hours |

The physical constants stated are nominal data according to the Hempel Group's approved formulas. Coating shades are according to Hempel assortment list.

With regards to corrosion category for maintenance (1.2) and concrete (2) coating systems, follow the recommendations below:

When a repair is done it can be done in two ways:

a. The old paint is completely removed back to the steel and a new system is applied. In this case the system will correspond to a new full system (new building).

b. The old paint system is partially intact - e.g. if a customer wants to apply a new topcoat and the underlying old epoxy coat is still present. In this case a full system (old + new paint) should be considered, in order to access what corrosion category the system is fit for.

Note: shown examples are based on the recommendation of ISO 12944 but other specifications can be provided if required.

Western High-Speed Diameter (WHSD)

The WHSD highway is a key link improving road transport between Scandinavia, Central Russia and the Baltic States. The central section includes 21km of bridges and a tunnel designed to take 140,000 vehicles a day across St Petersburg, the River Neva delta and the Gulf of Finland. This is an extremely challenging C4 corrosive environment requiring a robust anti-corrosive coating system to protect vital structures.



| Products |
|-------------------|
| Hempadur Zinc |
| Hempadur Mastic |
| Hempaxane Classic |

Jiangyin Yangtze River Bridge

Jiangyin Yangtze bridge is a cable-stayed bridge totalling 1,806m in length and with a main span of 818m making it number seven in the top ten of the world's largest cable-stayed bridges. Coverage required over 300,000 litres of Hempel protective coatings.



| Products |
|----------------------|
| Hempadur Zinc |
| Hempadur Epoxy |
| Hempel's Fluorcarbon |

Mekkah Metro, Kingdom of Saudi Arabia

The Mekkah Metro C-Line will be part of a 4-line transport system capable of carrying 72,000 passengers per hour and stations will capture the unique fusion between the ultra-modern technology of the metro system and the historical richness of Mekkah itself.



| Products |
|-----------|
| Contex EM |

Stonecutters Bridge

Hong Kong

The elegant span of the Stonecutters Bridge in Hong Kong stretches some 1,018 metres, and, with a tower height of 290 meters, is an impressive landmark.

The third longest cable-stayed bridge in the world, it is constructed to British standards and uses a high anti-corrosive coating system to ensure durability in the Hong Kong Bay's marine climate.

As a trusted world-leading coatings supplier, we were the customer's choice. Our globally certified coatings provide proven protection against corrosion and met the project needs exactly.

And, with our technical team on hand, both on and off site, our customer was assured of efficient and effective application to ensure long-term corrosion protection.

| Products |
|--------------------|
| Hempadur Zinc |
| Hempadur ZP |
| Hempathane Topcoat |



Troja

Prague

The award-winning Troja Bridge carries pedestrians, cyclists, four lanes of traffic and a double-track tramway over the River Vltava into Prague city centre.

The unique design, which includes a huge number of assembly joints and large overhangs, called for a unique coatings solution, particularly given the C4 corrosive environment and 30-year coating life-cycle specification.

Our highly protective solution was selected after extensive laboratory performance testing and the landmark bridge is now topcoated with Hemplathane HS 55610 to provide long-lasting colour fastness.

Products

- Hempadur Zinc
- Hempadur Fast Dry
- Hemplathane HS



8 KARGO Bridges on the Amsterdam-Rhine canal
 KARGO – is a public sector project sponsored and funded by the Rijkswaterstaat, for the extensive refurbishment of 4 steel arch bridges, and the construction of 4 new bridges: Amsterdamse, Schellingwouderbrug, Schalkwijk, Juthphase, Weesp, Loenesloot, OverEindse, Breukeler bridges. The aim of the project is to bring these infrastructures up to 21st century standards, both in terms of safety and transport capacities. Hempel is supplying the protective coatings for all 8 bridges, specified to comply with the client’s demands for the paintwork to be certified under ISO 12944 for a C5M environment.

Products

- Hempadur Mastic
- Hempadur HS



Author: DelftscheSlaolie

Langenfeld Bridge

A major investment in the German Autobahn network is the Langenfeld Bridge. On the outskirts of Hamburg, between Volkspark and West Stellingen, this is an important commuter route on the A7, one of the longest and busiest motorways in Germany.

Products

- Hempadur TL/ZN
- Hempadur TL87/ZP
- Hempadur TL87/EG
- Hemplathane TL87/RAL



De Hef Bridge, Rotterdam

We are helping to restore De Hef Bridge in Rotterdam, the oldest rail bridge in the city and a significant monument. De Hef Bridge served the city centre of Rotterdam from 1927 until 1993. The bridge has been blasted and recoated with a modern 3-layer coating system giving class C5-I high protection.

Products

- Hempadur Mastic
- Hemplathane TL87/EG



Selected references

| Project | Location | Products | Year |
|---|--------------------|--|------|
| Highway Bridge SO 202 Mengusovce - Jánovce | Slovakia | Hempadur Zinc, Hempadur, Hemplathane Topcoat | 2015 |
| Langenfeld Bridge, Hamburg | Germany | Hempadur TL/ZN, Hempadur TL87/ZP, Hempadur TL87/EG, Hemplathane TL87/RAL | 2014 |
| ZheJiang Bin Hai Bridge | China | Hempadur Epoxy Sealer, Hempadur Mastic, Hemplathane PU Topcoat | 2014 |
| Afcons Bridge Project in Jammu | India | Hempadur Zinc, Hempadur Ultra-strength, Hemplathane PU Topcoat | 2013 |
| Zhang Hua Highway Li Shui Bridge | Hunan | Epoxy Sealer, Hempadur Mastic, Hemplathane Topcoat | 2013 |
| Viaduct Deck Internal | Turkey | Hempadur Pro, Hempadur Mastic | 2013 |
| Forth Bridge Piers | Scotland | Hempadur Zinc, Hempadur MIO, Hemplathane HS | 2013 |
| Bridge Mokre Lazce | Czech Republic | Hempadur Zinc, Hempadur Fast Dry, Hemplathane HS | 2013 |
| Amsterdam Bridge, new stairs and construction | Netherlands | Hempadur Mastic, Hemplathane HS | 2013 |
| Tsakona Arch Bridge | Greece | Hempadur Fast Dry, Hemplathane Topcoat | 2013 |
| Western High-Speed Diameter in St. Petersburg | Russian Federation | Hempadur Zinc, Hempadur Mastic, Hemplathane HS | 2012 |
| Si Chuan Nan Xi Bridge | Sichuan | Epoxy Sealer, Hempadur Mastic, Hemplathane Topcoat | 2012 |
| Railway Bridge - Komarno, Km 3,021 | Slovakia | Hempadur, Hempadur, Hemplathane HS | 2012 |
| An Hui Tong Ling Yangtze River Bridge | China | Hempadur Epoxy Sealer, Epoxy PU topcoat | 2011 |
| Bizkaia Bridge | Spain | Hempatex Hi-Build, Hempadur | 2011 |
| Chongqing Qingcaobei Changjiang Bridge | China | Hempadur Zinc, Hempadur Mastic, Hemplathane Topcoat, Hempel's Fluorocarbon Topcoat | 2011 |

| Project | Location | Products | Year |
|--|----------------|---|------|
| Jiangyin Yangtze River Bridge | China | Hempadur Zinc, Hempadur, Hempel's Fluorocarbon Topcoat | 2011 |
| Lanheses Bridge | Portugal | Hemplathane Enamel | 2011 |
| Jing-Yue Yangtze River Highway Bridge | China | Hempadur Epoxy, Fluorocarbon Topcoat, Hempadur Epoxy Sealer, Epoxy, PU Topcoat | 2011 |
| Jiangxi Jiujiang Bridge | China | Hempadur Zinc, Hempadur, Hempel's Fluorocarbon | 2011 |
| Selune Bridge | France | Hempadur, Hemplathane Topcoat | 2011 |
| La Riviere St Etienne Bridge | France | Hempadur Pro Zinc, Hempadur Mastic, Hemplathane HS | 2011 |
| Agivey Bridge | United Kingdom | Hempadur Mastic, Hemplathane Enamel | 2010 |
| Asnieres Bridge | France | Hempadur, Hemplathane Topcoat | 2010 |
| Travessia Do Sado Refer Railway Bridge | Portugal | Hempadur Zinc, Hemplathane HS | 2010 |
| Nanjing Yangzi River 4th Bridge | China | Galvosil, Hempadur Hi-Build, Hempadur, Hemplathane PU Topcoat, Hempadur Zinc, Hempadur Hi-Build | 2010 |
| Hubei Edong Changjiang Expressway Bridge | China | Galvosil, Hempadur, Hemplathane Topcoat, Hempadur Zinc | 2010 |
| Sinntal Bridge | Germany | Hempadur TL/ZN, Hempadur TL87/ZP, Hempadur TL87/EG, Hemplathane TL87/RAL | 2010 |
| Dames-Tepelene Bridge | Albania | Hempadur Mastic, Hemplathane PU Topcoat | 2010 |
| Bridge D3 Tabor | Czech Republic | Hempadur Fast Dry, Hemplathane PU Topcoat | 2008 |
| Zhe Jiang Zhou Shan Xin Cheng Bridge | Zhejiang | Hempadur Multi-Strength, Hemplathane PU Topcoat | 2005 |

Since 1915 Hempel has been a world-leading coatings specialist, providing protection and inspiration to the world around us. Today we have over 5,500 people in 80 countries delivering trusted solutions in the protective, decorative, marine, container, industrial and yacht markets. This includes many recognised brands like Crown Paints, Schaeppman and Jones-Blair.

Hempel is proudly owned by the Hempel Foundation, which supports cultural, humanitarian and scientific causes across the world.

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