Welcome to the latest edition of Hempel News, dated spring 2018, the year in which Hempel will act as title sponsor for the Hempel World Sailing Championships (HSWC) in our home country of Denmark. What such an international event means for our company is explained in detail in the interview with Henrik Andersen, Hempel Group President & CEO on page 3.

But 2018 is also set to be a significant milestone, not just here in the UK but across the entire Paint and Coatings industry, thanks to the publication of the revised ISO 12944 standard, the guiding star of much of the technical data by which we calibrate the quality and attributes of our protective coatings. The revised version of the standard has been extended in its Chapter 9 to specifically deal with anti-corrosion coatings for offshore constructions, a sector where Hempel is building itself an unbeatable reputation based on the numerous offshore projects unwrapped over the last five years, such as the impressive Johan Sverdrup oil rigs in Norway (p. 11).

As always, Hempel News is here to bring you updates on our latest products and illustrate how our coatings are being effectively applied in some of Europe’s foremost engineering projects. On pages 4 and 5, we take a close look at AvantGuard® 860, the latest addition to our patented range of activated-zinc primers, designed to afford even greater protection against corrosion with ever-simpler and more cost-effective application requirements.

Looking at some of the projects taking place across the globe, 2018 is also the year of the FIFA World Cup in Russia and on page 7, we zoom in on a couple of the stadiums being prepared for this world-class event with Hempel coatings.

Offering the best anti-corrosion properties from our coatings is only part of the Hempel story. The articles featured in the coming pages attempt to exemplify how our global capacity provides uninterrupted protection for constructions built on different continents, such as the voestalpine hot briquetted iron reduction plant in Texas (p. 6), or how our logistics are able to assist applicators in reaching ever-tighter deadlines (Yara Sluiskil, p. 9) and comply with stringent food safety requirements (Ukrpischesbytsyrie, p. 8).

It is impossible to feature all the exciting projects in which Hempel coatings are being applied this year, but we sincerely hope the few we are able to mention will be of interest to all our stakeholders.

See you in the Autumn!
2018 is the year of sailing for Hempel

Why is Hempel and the Sailing World Championships a perfect fit? Interview with Henrik Andersen, Group President & CEO of Hempel A/S, on Hempel Sailing World Championships (HSWC) in July and August this year.

In July and August, the biggest international sailing event ever will be held in Denmark. Nearly 1,500 sailors from 100 countries will compete at the HSWC in the Danish seaside town of Aarhus. It is going to be an amazing event and Hempel is the title sponsor.

We asked Henrik Andersen, Group President & CEO, why Hempel chose to engage in its first major sponsorship, how the event matches our values and how the increased exposure can add value to our business.

Why sailing?
“Our roots are in the maritime industry and by sponsoring the HSWC, we’re giving back to the sea and the sailors. We’re also supporting the willpower and winning mentality needed to be a top sailor. We are driven by the same values, which makes it natural for us to support an event that brings together the world’s most dedicated and talented sailors.”

Why did Hempel choose to sponsor this event?
“We expect up to 400,000 spectators at the HSWC over the 14 days and 160 million TV viewers around the globe – making it a great way to spread the word about Hempel and our values to a wider audience. In 2015, we launched a new brand identity and a new logo and it’s a fantastic opportunity to show our new visual identity internationally, strengthen our global market position and demonstrate our pioneering spirit. The Hempel name and logo will be everywhere. This is why we sponsor an international event with competitors from 100 countries.

As I mentioned, our roots are in the maritime industry, but as our business has grown and developed, we have expanded into new areas of expertise. Today, we provide category-leading solutions and services across a range of specialist areas and our mindset is global.”

How are you giving back to the sailing world?
“The entire world will have its eyes set on Aarhus during the HSWC, but also the sailing world in general – the organisations, the clubs and the people making it happen. The HSWC will increase interest in sailing, and I hope this will have a positive effect on local sailing clubs and marinas, not only in Denmark, but worldwide.”

What can we learn from sailing?
“A world championship is an immense challenge, and you can only win if your team members collaborate with each other, trust each other and share knowledge. These are all at the heart of our values: Our business is built on trust and we need to collaborate very closely, not only internally but also with our customers around the world. Also, our founder J.C. Hempel used to say ‘It is the will to want that creates the skill to do’. It’s the same for the sailors: They always strive for better co-operation and higher performance. This is exactly the way we work in Hempel. We’re on a global journey towards excellence, just like the world’s best sailors and their teams.”

What do you expect from the HSWC?
“First, we are proud and honoured to have been given the opportunity to sponsor this event. Secondly, I look forward to a maritime celebration together with our employees and customers in Aarhus with nerve-racking races and good sportsmanship. I look forward to meeting you in Aarhus this summer.”

Henrik Andersen
Group President & Chief Executive Officer (CEO)
New Hempadur Avantguard 860 – pushing performance of our activated-zinc primers

The protective capabilities of a zinc silicate coating with the ease of application of a zinc-rich epoxy

The Hempadur Avantguard® range was first released in September 2014 and since then, this patented technology that uses a combination of zinc dust, hollow glass spheres and a proprietary zinc activator has gone on to win recognition and numerous awards across the globe, recognizing the superior anticorrosion protection of Avantguard. Now Hempel is pleased to announce the launch of a new addition to the range – Hempadur Avantguard 860 – our two-component, activated zinc-rich epoxy primer engineered to provide the high level of protection of an inorganic zinc silicate (IOZ), combined with easy application, thanks to its Avantguard technology.

<table>
<thead>
<tr>
<th></th>
<th>IOZ</th>
<th>Hempadur Avantguard 860</th>
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<tbody>
<tr>
<td>Competitor product</td>
<td>Min OI/touch dry</td>
<td>Min OI/touch dry</td>
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<tr>
<td>Fast curing IOZ</td>
<td>4-5hrs</td>
<td>Hempadur Avantguard 860</td>
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<tr>
<td>Generic mid-coat</td>
<td>5hrs</td>
<td>Hempaprime Multi 500</td>
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<tr>
<td>Generic topcoat</td>
<td>2hrs</td>
<td>Hempathane HS 55610</td>
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<tr>
<td>Total</td>
<td>11 – 12hrs (2 shifts)</td>
<td>Total</td>
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> 48% productivity increase (shorter drying time)
- 14% productivity increase (no mist coat)
Product description
Hempe’s new two-component, activated zinc epoxy primer offers fast-curing times in all seasons at temperatures down to -10°C and with no restrictions on minimum relative humidity. Avantguard 860 is recommended as a primer coat and provides a real alternative to IOZ coatings by offering the same level of anticorrosion performance and recoating intervals that are at least 4 times shorter than typical zinc silicates. It is recommended for the long-term protection of exposed steel in moderate to severe corrosive environments (ISO 12944-2). In addition, its improved mechanical properties offer greater crack and impact resistance and thus less rework of coated surfaces.

Application
Given that Hempadur Avantguard 860 can be applied in a wide range of temperatures and humidity conditions, and with an overcoating interval as short as 1 hour, it enables a three-coat system to be applied in a single shift with less reworking needs, thus increasing asset productivity in sensitive sectors such as Oil & Gas, Power Generation or Civil Infrastructures.

Compliance
Avantguard coatings consistently deliver superior protection and lower rust creep in neutral salt spray tests than conventional epoxies found in the market today, as Hempel laboratory tests under the ISO 12944-6 standard have proven. The new Avantguard 860 provides the range with an SSPC Paint 20 2002, Type II, Level 1 product, which is pre-qualified for NORSOK’s M-501 Ed.6, System 1 according to ISO 20340. Additionally, it meets the requirements of ISO 12944 C5-M High and is in compliance with ASTM D520 type II high-purity zinc dust for pigments.

In brief
Fast-drying with best-in-class over-coating intervals, Hempadur Avantguard 860 has been developed as a true challenger to inorganic zinc silicates, providing high efficiency in corrosion protection and a 48% improvement in productivity compared to IOZ based systems.

Typical specifications

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits</th>
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<tbody>
<tr>
<td>Faster drying (4x faster than IOZ)</td>
<td>Apply a 3-coat system in a single shift</td>
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<tr>
<td>2x better mud cracking resistance than IOZ</td>
<td>Reduces rework</td>
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<tr>
<td>Wide application temperature range</td>
<td>Global application flexibility</td>
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<tr>
<td>(down to -10°C/14°F)</td>
<td>all year round</td>
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<tr>
<td>No restrictions on minimum relative humidity</td>
<td>Reduced idle time in regions</td>
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<td></td>
<td>with low RH</td>
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<tr>
<td>No need for a mist coat to avoid popping</td>
<td>Further improved productivity</td>
</tr>
</tbody>
</table>

Typical products
- Hempathane HS 55610 - 60µm
- Hempaprime Multi 500 - 160µm
- Avantguard 860 - 60µm
Great partners make great partnerships

In October 2016, the voestalpine Group opened the largest-ever investment project by an Austrian company in the US, namely a Direct HBI Reduction Plant, in Corpus Christi, Texas. It is designed to produce two million metric tons of hot briquetted iron (HBI) per year, making it the largest single module of this type in the world. The project also included comprehensive infrastructure improvements for the project location, particularly the necessary port facilities. The plant is already regarded as an environmental benchmark, for which Hempel supplied its Hempadur Fast Dry 17410, Hempadur Quattro 17634, Hempadur Mastic 45881 and Hempathane HS 55610 coatings to create a heavy-duty protection system for the reduction tower.

In its business segments, voestalpine is a globally leading technology and capital goods group with a unique combination of material and processing expertise. voestalpine has around 500 Group companies and locations in more than 50 countries on all five continents. With its top-quality products and system solutions using steel and other metals, voestalpine is a leading partner to the automotive and consumer goods industries in Europe and to the aerospace, oil and gas industries worldwide. The voestalpine Group is also the world market leader in turnout technology, special rails, tool steel, and special sections.

Hempel paints are applied to protect and decorate some of the most remarkable construction achievements both on land and at sea.
Hempel is contributing to preparations for the 2018 FIFA World Cup

From 14th June to 15th July, Russia is hosting the year’s top sporting event, namely the final rounds of the 21st FIFA World Cup. Matches will be played in 12 stadiums across the country, some of which have been specifically built for the event. Hempel Russia initially supplied coatings to paint the metal structures of the Moscow and St Petersburg stadiums but subsequently, the positive experience there led to Hempel securing a contract to supply anti-corrosion coatings for the stadiums in Samara and Saransk. Decisive factors in the customer’s selection included Hempel’s reputation, the competitive price of the proposal, and the customer service.

Contractors for these stadiums in C3-classed corrosive environments specified fast-drying paints that could be applied in below-zero temperatures to achieve a coating durability of 15 years.

A number of different airless-sprayed systems were proposed for each site. The “Samara Arena” stadium in Samara called for a more complex scheme, starting with Hempadur Fast Dry 15560, a two-component epoxy primer with a very short drying time, followed by a midcoat of Hempadur 47200, another two-component epoxy with a short recoating interval. Hempathane 55210 was used as the topcoat.

To protect the metal structures of the “Mordovia Arena” in Saransk, a 2-layer system was chosen, comprising a coat of the two-component, highly structured epoxy Hempadur Fast Dry 17410, under a layer of Hempathane Topcoat 55210.

The interaction process involved in these projects has enabled Hempel to extend its customer base in Russia and we are delighted to be working more closely now with “PSO Kazan”, the general building contractor for the Samara and Saransk stadiums.

We have also increased our portfolio of protective coatings for sports infrastructures and facilities: since 2010, 14 new stadiums have been built in Russia and of these, 8 were protected exclusively with our coating materials. We are proud of the results achieved by our Russian colleagues and join them in wishing all the teams and fans in this summer’s FIFA World Cup the very best of luck.
Merging food safety with corrosion protection

Hempel coatings create optimal tank conditions for storing edible vegetable oils.

The Ukrpishesbytsyrie (UPSS) Terminal in southern Ukraine’s Nikolayev region is a large port storage complex offering transhipment services for a wide range of bulk liquid foodstuff cargoes, as well as serving as a base for exporting molasses, vegetable oils and other products to 105 countries around the world.

The terminal is actually made up of a series of 5 tank facilities, including a brand new tank yard that was commissioned in October 2016 to house 14 tanks of various sizes with a total storage volume of 14 million m$^3$. This new tank yard cost approximately 7 million dollars to construct and is primarily designed to handle palm oil products, exotic oils, fats and other cargoes with high melting points. Highly specific conditions need to be met to ensure safe storage of edible products, which includes providing heating for tanks - on occasions up to 70ºC - when the weather is cold and a nitrogen-based tank blanketing system to prevent any contact between stored oils and air in the tanks. In view of such stringent requirements, very close attention was given to the choice of anti-corrosion protective coatings to be used for these tanks, in a setting that is generally classed as a C4 corrosive environment.

Titankhim, the local contractors specialising in chemical protection entrusted with the anti-corrosion work, turned to Hempel as the leading company on the Ukrainian market supplying certified protective coatings for the internal surfaces of storage tanks. Hempel’s experts recommended a two-layer system to cover the 20,000 m$^2$ of internal tank surfaces consisting of 2 x 125 micron layers of Hempadur 85671, our two-component Novolac epoxy that combines very good adhesion with high temperature, water and chemical resistance. Hempadur 85671 is especially recommended for use as an interior lining in receptacles and piping carrying hot water, saline solutions, crude oil, molten sulphur, a number of other chemicals, and, most importantly in UPSS’ case, vegetable oils. It can also be safely used to line potable water tanks and as a primer in external paint systems.

Outer tank surfaces were given a 180-micron layer of Hempadur Mastic 45880, our two-component highly-structured epoxy that cures to form a tough and resilient coating and which can be used as an intermediate or finishing coat in heavy duty paint systems where low VOC and high film build are required. Finally, the tanks were painted with a 60-micron topcoat of our glossy Hempathane Topcoat 55210 acrylic polyurethane, tinted white for the main tank body but also with a colour coding system to distinguish each tank park.

Although it serves large, ocean-going vessels, the UPSS Terminal is actually located 35 km up the Dneprovskiy Liman estuary, which carries fresh water and connects to the sea via the Bug-Dnepr canal. Nevertheless, both the contractors and Hempel opted for a highly robust paint scheme that is equally suited to provide optimal corrosion protection on steelworks and tanks storing edible products in even more saline environments.
Outperforming customer demands

With Hempel fast-dry coatings, Buijsse International was able to deliver ahead of schedule, even in the cold months of winter.

In 2015, Norwegian group Yara International – the world’s leading producer of nitrates, calcium nitrate, NPKs and global number two in ammonia – began construction of a new Urea section at their plant in Sluiskil, an investment worth 250 million euros. With its ammonia, nitric acid, urea and nitrate granulation plants, Sluiskil houses Europe’s largest installed ammonia and nitrate fertiliser capacities.

The new urea plant was designed to replace the original prilling tower, dating back to the 1970s and produce urea granules with added sulphur. It is the first time ever that this new granulation technology has been implemented on such a scale. The protection coating contract for the building was awarded to Hempel’s long standing Belgian collaborator, Buijsse International.

Buijsse International aims to be the benchmark in terms of industrial surface coating and protection. Based in Lokeren, it boasts 20,000 m² of conditioned production halls and highly-qualified coating teams. In accordance with Yara’s project requirements, the steelwork construction was transported to site immediately after coating in winter at temperatures sometimes below 0°C, a challenge which Buijsse, with its vast experience in the chemical, construction, infrastructure and offshore sectors, was able to accomplish to perfection.

Building on over 3 decades of close collaboration, Buijsse chose Hempel for this job. Making wide use of our fast-dry protective coatings, they were able to complete the job ahead of schedule, a significant success for both Buijsse and Hempel in view of Yara’s stringent requirements for all its plants, which usually operate in industrial areas of high humidity and C-5I class environments.

We supplied 14,000 litres of Hempadur Mastic 4588W and 4,000 litres of Hempathane HS 55610. Hempadur Mastic 4588W was chosen as the primer and intermediate coat in this system because it is a fast-drying epoxy, especially suited to low-temperature application with short recoating intervals. Hempathane HS 55610 topcoat contains zinc phosphate to provide a VOC-compliant finish for structural steel in corrosive environments. This combination was a vital factor in Buijsse’s successful winter performance in Sluiskil.

The success of this project remains a source of great pride to Hempel, as both Buijsse and Yara are highly significant players in their fields and we look forward to collaborating with them in any region of the world in the future.
Guiding you through the ISO 12944 revisions

The International Organization for Standardization (ISO) has published the revised ISO 12944.

Originally developed in the 1990s, with the first edition published in 1998, the standard provides guidance for the selection of coating systems to suit varying environments and different surface preparation grades, as well as the durability grade to be expected.

At Hempel we consider ISO 12944 as one of the main international standards for corrosion protection of steel by paint. The revision impacts all existing parts of the standard and includes a new addition – Part 9 – dedicated solely to offshore structures.

Some of the changes have no bearing on the anticorrosive coatings industry, for example language changes (shortening of text) to certain sections of the standard. Other amendments however have an impact and our team is on hand to help customers understand these changes and their implications.

Some of the more significant changes include:

- new durability category - Very High Durability (> 25 years)
- new classification of environments (corrosivity) categories, including CX (Extreme) which will cover offshore (Part 9)
- update of dry film thickness (DFT) values which will become normative.
- new ISO 12944 Part 9 for offshore constructions.
- use of new and innovative paint systems.

Interestingly, the former ISO 20340 –performance requirements for protective paint systems for offshore and related structures – is part of the revised ISO 12944 as a new Part 9. This includes new corrosivity categories for atmospheric and immersed conditions.

There are specific areas of anticorrosive coatings that ISO 12944 does not apply to and these are clearly defined in the standard. For example,

ISO 12944 does not apply to tank linings, intumescent coatings (just the anticorrosive part of the intumescent coating system is part of ISO 12944), corrosion under insulation (CUI) or any other area outside the normal ambient temperature range.

The revised edition of ISO 12944 standard is already being applied to our business, from research and development through to technical service and marketing communication, ensuring that we are prepared to fully support our customers.

For any queries or further information please consult ISO12944.hempel.com or contact your Hempel sales representative.
A North Sea success for Hempel

Hempel and its distributor Joma Trading Norway AS have been selected to supply essential protective coatings for one of the most ambitious industrial projects ever to be developed in Norway. Johan Sverdrup features among the largest oil discoveries ever made in the North Sea region and when the estimated 1.9 to 3.0 billion barrels of oil equivalents come into production (Phase 1 is planned for late 2019), it will provide 25 percent of Norway’s petroleum needs. The development of the first phase will require 51,000 man-years of work, followed by 2,700 man-years of work in the production phase. It is little surprise, then, that it is to be one of the most important industrial projects in Norway over the next 50 years.

One crucial factor that led the main contractors to adopt Hempel solutions was their long-term relationship with Hempel and Joma, as well as the latter’s outstanding service reputation, built in part through the FROSIO technical inspections it provides. Through Joma, the client has already worked with Hempel products for many years without difficulty or claims. The standards for a project of this scale have to be the absolute highest (including Norsok M-501), and thus another reason why the client named Hempel and Joma as paint suppliers was that together we can supply a full range of certified protective coatings and systems for all environments, including the numerous challenges posed by the cold North Sea. Hempel’s recommendation for protecting underwater carbon and stainless steel was paint with low-temperature curing, and so the chosen scheme mainly features Hempadur Mastic 4588W, applied in 2 x 175µm coats.

Hempadur Mastic 4588W is a two-component, high-solids, high-build epoxy paint which forms a hard, tough coating and has good wetting properties. The first coat (19000) is bright aluminium in colour, while the second coat is tinted to Hempel 27040/RAL 1004 golden yellow, both sprayed on airlessly and mixed at the nozzle.

Phase One is due to start oil production in late 2019, when the superior technical features of Hempel’s offshore protective coatings will ensure the field’s plant is able to continue pumping significant quantities of oil along the underwater pipeline to the Mongstad terminal onshore to generate estimated revenues of NOK 1,350 billion over 50 years.