



COATINGS AND ANTI CORROSION ENGINEERING REVIEW

August - September 2024 | Volume 15 Issue 3 | ₹ 100



Expanding growth in several sectors propel demand for hydrophobic coatings



Interview
Ms My Lan Nguyen
*Business Unit Director, Decorative Business Unit
ASEAN*

Technical Feature
**Graphene as a chemical additive
for latex paint**

HOT AIRLESS PLURAL COMPONENT SPRAY SYSTEM

Specifications and Features :

- ▶ Powerful performance with high proportioning accuracy
- ▶ Simple and safe operation
- ▶ Different mixing ratios can be achieved by using multiple hydraulic sections
- ▶ Suitable for variety of coatings with very high viscosity & extremely short pot life material
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- ▶ Easily detachable suction port reduces Cleaning & maintenance time
- ▶ Cartridge type throat seal housing

Applications :

- ▶ High performance coatings for special applications
- ▶ Power plants & Refinery
- ▶ Internal & external coatings of Pipeline
- ▶ Marine coating & ship buildings
- ▶ Fire retardant coatings
- ▶ PEB structural coating
- ▶ Offshore & Onshore industries
- ▶ Dams and roofs coating
- ▶ Corrosion preventive coating

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- Zinc silicate primers
- Epoxy primers & finishes
- Vinyl ester coatings
- Heat resistant coatings
 - Bituminous coatings
 - Polysiloxane coatings
- Hi-gloss polyurethane finishes
- Chlorinated rubber

PIPELINE COATINGS

- Heavy duty coatings for chemicals & petroleum industries
- Coating systems for thermal power, wind & nuclear power plants
 - Food grade epoxy linings
 - Gas flow epoxy coatings
 - Jet Fuel coatings

OEM COATINGS

- Quick drying primer & top coats, low bake & stoving systems
 - Thermosetting acrylics
 - Hi gloss polyester top coats
 - Low bake polyurethane
- Casting sealers & unicoat epoxy chassis black

MARINE COATINGS

- Marine enamels & epoxy coatings
- Prefabrication primers
- Ballast tank coatings
- Under water coatings
- Antifouling coatings

Architectural Coatings

- External coatings
- Internal coatings
- Hygiene coatings
- Anti carbonation coatings

FLOOR COATINGS

- Penetrating Primer
 - Screed
- Solvent less Epoxy
- Solvent less PU



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Tubular Impact Tester

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Certification



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From the Editor-in-Chief...

Hydrophobic coatings are designed to repel water and prevent its adherence to surfaces. They create a protective layer that causes water, contaminants, and impurities to easily roll off, ensuring that surfaces stay clean and dry.

Hydrophobic coatings are used in a variety of industrial verticals for a variety of purposes.

Manufacturers have been concentrating on refining the product mix and supplying customized and personalized items in accordance with customer-specific requirements that each application demands. The healthcare, electronics, and automotive industries need goods that are specifically suited to their needs and meet higher quality standards.

As reported by Persistence Market Research, the worldwide demand for hydrophobic coatings registered 4.1% year-on-year growth in 2022 and is estimated at US\$ 1.8 billion in 2023. Looking ahead, global sales of hydrophobic coatings are predicted to exhibit 4.2% CAGR and reach US\$ 2.71 billion by the end of 2033.

The market is expected to continue growing steadily over the coming years, driven by increasing demand in the glass and metal sectors due to the resilient nature of hydrophobic coatings. These coatings can be applied to a variety of surfaces, including glass, metal, synthetic materials, and plastics increasing its capabilities of adoption in the respective market. The coatings repel water and stop the build-up of filth, grease, and grime in industrial environments as well as automotive applications.

Demand for hydrophobic coatings and hydrophilic coatings in automotive production and construction is increasing substantially. As industrial activities continue to expand globally, the need for efficient coatings has increased. In this issue, we try and discuss the merits and growth of hydrophobic coatings as investors and manufacturers come up with new innovative products to keep pace with the growing marketplace.

Plus, all our regular features and columns to bring you the latest within our industry.

Jolly Lonappan
Editor-in-Chief



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VERSATILE INDUSTRIAL APPLICATIONS



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PPG launches PPG PRIMERON Optimal powder primer with optimized zinc

PPG (ppg.com) has announced the introduction of PPG PRIMERON™ Optimal zinc epoxy powder primer. The patent-pending product is formulated with an optimized amount of zinc, providing better transfer efficiency than standard zinc-rich primers and corrosion protection that meets rigorous ISO C5 corrosivity specifications for use in high humidity and aggressive environments, notes a press release from the company.

significant challenges for the coating industry,” said Paul Bradley, PPG manager, product development, Industrial Coatings. “PPG Primeron Optimal primer offers improved adhesion and corrosion resistance, even in coastal environments, and has a better overall balance of properties than traditional zinc-rich primers.”

Additional benefits include exceptional edge, face and scribe corrosion resistance,



PHOTO: BUSINESS WIRE
PPG PRIMERON powder primers meet ISO 12944. This specification serves as the industry benchmark for safeguarding steel structures against corrosion through protective paint systems.

PPG Primeron Optimal primer has a much lower specific gravity than standard zinc-rich primers (2.0 vs. 3.6), making it less dense and easier to apply. With a transfer efficiency of 85%, about half as much product is needed compared to a standard zinc-rich primer, saving costs and enhancing sustainability. Additionally, PPG Primeron Optimal primer is made without solvents that release volatile organic compounds (VOCs).

“Corrosion protection is a decisive factor in the durability of a part and one of the most

and excellent adhesion on both smooth and blasted steel for a strong bond that resists peeling, chipping and degradation. In lab testing, the primer surpassed 10,000 hours of salt spray performance on blasted steel. It is engineered for use on steel, hot-dip galvanized steel, metallized steel and aluminum, and is suitable for a wide range of applications, including trailers, gas tanks, pipes, automotive parts and machinery.

The sustainability benefits include reduced waste and material usage. PPG Primeron

AkzoNobel driving innovation with new powder coatings technology for EV batteries

Innovative powder coatings technology which provides improved electrical protection for electric vehicle (EV) battery systems – in just one spray – has been developed by AkzoNobel's Resicoat brand, notes a press communique from the company.

The technology's ability to build a consistent film with one-time application also means the entire process is more efficient in terms of increasing speed and production capacity, reducing man hours and improving asset utilization.

As well as boosting the safety of EV battery systems, AkzoNobel's newly developed one-spray technology provides resistance against thermal shock, water immersion and chemicals.



PHOTO: AKZONOBEL
As well as boosting the safety of EV battery systems, AkzoNobel's newly developed one-spray technology provides resistance against thermal shock, water immersion and chemicals.

There's growing demand in the EV market for coatings with a higher dielectric strength to help increase the safety of battery systems. The company's Powder Coatings business has risen to this challenge by creating a solution which allows customers to reach the required film thickness with a single spray – helping to increase efficiency and productivity.

“We've developed innovative technology which addresses a clear need within the industry and helps to improve safety,” explains Jeff Jirak, Director of AkzoNobel's Powder Coatings business. “It's an important breakthrough which means customers no longer have to spray twice or more to achieve the right thickness for providing high dielectric strength.”

Adds Jirak: “Working with customers throughout the value chain has put us in a unique position to understand the needs of the market. Our strong global footprint means they can benefit from our ability to deliver consistency in product and service worldwide.”

AkzoNobel's Resicoat powder coatings range has been helping to solve the challenge of electrical insulation across various industries since the 1960s. In 2023, a dedicated range of Resicoat EV powder coatings was launched, which is specifically designed to help improve the safety and performance of EV components such as battery systems and electric motors.

Optimal primer can be gelled (partially cured), or used in a two-coat, one-bake process, yielding quicker, more

sustainable and energy-efficient finishing that reduces greenhouse gas emissions by up to 50%.



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Axalta launches industry first range of ISCC Plus certified biobased powder coatings

Axalta Coating Systems (axalta.com), a leading global coatings company, has launched its Alesta® BioCore™ range of powder coating solutions derived from non-food organic waste. The new offering enables up to a 25% reduction in CO₂ emissions compared to incumbent products containing fossil fuel-based polyester resins, while offering the same performance benefits and properties, notes a press communique from the company.

traceable non-food sources, which eliminates any additional burden on food supply. Such materials contain significantly lower levels of embodied carbon, with all of the same benefits as fossil fuel-based equivalents.

The new range of biobased powder coatings includes:

Alesta® SD BioCore™ Architectural SuperDurable is a range of super durable, biobased powder coatings



Alesta® BioCore™ provides a sustainable alternative to incumbent products containing fossil fuel-based polyester resins.

The new range marks another milestone for Axalta after becoming the first manufacturer within the powder coatings industry to receive the ISCC Plus accreditation for biobased feedstock sourcing practices earlier this year.

As construction, architecture and industrial customers work to reduce their carbon footprint, replacing traditional polyester resins with sustainable solutions like Alesta® BioCore™ provides a quick and cost-effective way to cut scope 3 emissions. This is made possible via the use of natural raw materials sourced from sustainable and fully

formulated with high performance exterior grade pigments of the highest quality. This Qualicoat Class II- and AAMA2604-certified product line delivers exceptional weather and UV resistance and is backed by a warranty of up to 25 years.

Alesta® AP BioCore™ Architectural is a range of standard durable, biobased powder coatings formulated with high quality exterior grade pigments. Designed for outdoor architectural substrates and outdoor structures such as cladding, it is compliant with standards such as Qualicoat Class I, AAMA 2603 and GSB Florida

LUXAN CFX B842 Immersion Red: intense red effect pigment with a unique sparkle



Compared to the already successfully launched LUXAN CFX C842 Spotlight Red, the new LUXAN CFX B842 Immersion Red has a more subtle effect, a smoother clear coat level and a reduced graininess.

With LUXAN CFX B842 Immersion Red, effect pigment manufacturer ECKART (eckart.net) is launching a new effect pigment based on borosilicate glass. It is characterized by a pure, powerful red tone - combined with a high sparkle, notes a press release from the company. The pigment stands out from conventional earth-tone effect pigments in that it does not transition into undesirable red-brownish color spaces.

Compared to the already successfully launched LUXAN CFX C842 Spotlight Red, the new LUXAN CFX B842 Immersion Red has a more subtle effect, a smoother clear coat level and a reduced graininess - and thus fulfils the noticeable market demand for smaller particle sizes.

The impressive sparkle

1 (Standard) and is backed by a warranty of up to 15 years.

Alesta® IP BioCore™ Industrial, Alesta® IP is a range of biobased powder

creates a three-dimensional appearance with an optical depth effect. This so-called “diving effect” enhances every base color. Even low pigmentation levels maximize the visual impact.

LUXAN CFX B842 Immersion Red is available in a weather-, shear- and chemical-resistant CFX version.

It lends an elegant appearance to high-quality automotive paints, electronics, sports and household appliances and is compatible with water-, solvent- and UV-based systems as well as all common application methods.

LUXAN CFX B842 Immersion Red offers high radar permeability and impresses with its color purity, deep sparkle and strong chroma, the press note concludes.

coatings for outdoor industrial applications, offering excellent weather resistance, outstanding mechanical properties for outdoor durability, and first-rate reactivity.



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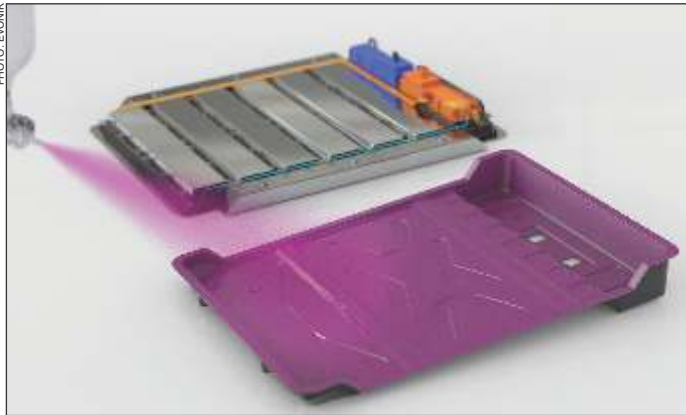
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Evonik drives safety for EVs with TEGO® Therm fire-resistant coatings for battery housings

Evonik (evonik.com) is expanding its TEGO® Therm product range to provide heat protection and fire-resistant coatings for electric vehicle (EV) battery housings and covers. In the rapidly growing EV market, safety standards for lithium-ion batteries are becoming increasingly stringent. Coatings based on Evonik's TEGO® Therm products are a robust solution to the industry's demand for effective thermal insulation barriers, which are essential for preventing thermal runaway in EV batteries.

thermal insulation and fire-resistant coatings. Among these, TEGO® Therm HPG 4000 granules boast a microporous silica core, which provides superior low thermal conductivity, high hydrophobicity, and reduced flammability. TEGO® Therm HPG 6806, a finer silica-based granule, not only excels in insulation but also strengthens mechanical performance and ensures smooth, even surfaces of insulation coatings. The waterborne polysiloxane hybrid binder, TEGO® Therm L



TEGO® Therm HPG 6806, a finer silica-based granule, not only excels in insulation but also strengthens mechanical performance and ensures smooth, even surfaces of insulation coatings.

Dr Benjamin Schaeffner, Global Head of Market Segment Industrial and Transportation Coatings at Evonik Coating Additives, said: "With the electric mobility sector accelerating, the safety of lithium-ion batteries in EVs has never been more crucial. TEGO® Therm is our response to the industry's call for reliable thermal barriers that not only meet but surpass the stringent safety standards of today."

The TEGO® Therm toolbox includes a variety of components, each meticulously engineered to enhance the performance of

300, further enhances the thermal stability and fire resistance of protective coatings.

Coatings based on this range of products meet the UL 94 V-0 fire safety standards, providing a new level of protection for EV batteries. The versatility of TEGO® Therm allows for spray application on complex three-dimensional substrates, ensuring complete and efficient fire resistance of the coverage of every contour of the battery housing.

"The synergy between TEGO® Therm binder and granules is

Tnemec announces the release of two new products: Series 108 & 109 ProBond

Tnemec Company, Inc., a leading manufacturer of high-performance protective coatings, has launched the Series 108 and Series 109 ProBond, the newest epoxy penetrating sealers in the Tnemec family of high-performance coatings.

Series 108 and 109 yield the next evolutionary step in Tnemec's world of low-stress penetrating epoxy sealers. These products continue Tnemec's legacy of premium high-performance coatings and will go forth as a go-to problem-solving primer in the epoxy sealer arena. Series 108 and 109 bring additional performance and convenience features to the marketplace, such as extended pot life and recoat windows, low-temperature cure, shipping and packaging advantages, and more. "The performance of these epoxy resins is astounding," said Dan O'Toole, the Director of Sales at Tnemec.



Tnemec's Series 108 and 109 bring additional performance and convenience features to the marketplace.

"With this next generation of ProBond products, you can expect an even more robust sealer providing best-in-class service."

With the applicator in mind, these products were designed to adhere to a multitude of substrates, including old finishes, and are frequently used as an overcoating primer. Series 108 and 109 are solvent-free coatings applied at a low film thickness to reduce stress and weight on old tightly adhered coatings, creating a reliable foundation to accept high-performance epoxy and polyurethane finishes.

at the core of our solution. It minimizes heat transfer and effectively inhibits the spread of fires, offering crucial additional time for emergency response", said Dr Niko Haberkorn, Global Head of Business Development for the Market Segment Industrial & Transportation Coatings at Evonik Coating Additives. "Moreover, our products ensure high mechanical resistance, maintaining structural integrity in high-temperature scenarios."

Evonik's commitment to safety and innovation is demonstrated by rigorous testing. When subjected to a propylene flame with more than 1000 °C, TEGO® Therm-based coatings protected the

substrate effectively, with the temperature on the back of substrate remaining moderate, even with a thin dry film thickness. These results underscore the effectiveness of TEGO® Therm in insulating against intense heat and highlight its suitability for applications where space is at a premium.

The expansion of TEGO® Therm products represents a significant advancement in EV battery safety. As the electric mobility market continues to expand, Evonik's commitment to providing cutting-edge, reliable, and efficient coating solutions will play a pivotal role in shaping a safer and more sustainable future for the automotive industry.



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The Biuged BGD 860 Xenon test chamber

The Biuged BGD 860 is a powerful, highly cost-effective, easy to use and convenient to maintain Xenon test chamber. It uses an air-cooled Xenon lamp and relevant daylight filter, to simulate more real and much better the full spectrum sunlight of outdoor,



The Biuged BGD 860 is a powerful, highly cost-effective, easy to use and convenient to maintain Xenon test chamber.

and ensure that the test results obtained from the laboratory have a perfect correlation with outdoor application. Furthermore, the samples holder is designed with a special rotating drum to ensure each sample can obtain the same and uniform irradiance during the whole test, notes a press release from Biuged's agent in India, Aadarsh Technologies.

BGD 860 Xenon Test Chamber can meet with standards requirements from different fields and can hold 22 pieces of samples. It not only has spray function, but also can control the relative humidity of the working room. Operator can set all required test parameters like irradiance, test time, BPT, BST, etc, through touch screen, and can check its running status at any time. All running parameters can be

exported to computer directly through the USB interface.

The Xenon lamp light can emulate the effect of sunshine, while water spray system can emulate the effects of rain and dew. During the test, radiation energy and temperature are controllable. A typical test cycle generally is carried out under strong irradiation of Xenon light and periodic precipitation. These tests are generally applied in the fields of paint and coatings, automotive, plastic, wood, glue, etc.

More details:
aadarshtech.com

Hempel introduces Hempaguard Ultima, the next generation of its market-leading high-performance silicone hull coating system

As the maritime industry faces increasing pressure to decarbonize, Hempel introduces its groundbreaking new two-layer coating system, Hempaguard Ultima. With the introduction of Hempaguard



With Hempaguard Ultima, a vessel's hull is able to achieve a more stable surface smoothness, even into the fourth or fifth year of the docking cycle.

Combating corrosion and weathering, industry's silent threat



Khushboo Scientific Pvt Ltd., offers a range of state-of-the-art testing technologies employing a suite of cutting-edge instruments to simulate and analyze the effects of corrosion and weathering.

Corrosion and weathering are relentless adversaries, silently eroding the integrity of materials across industries. These insidious processes cause catastrophic failures, costly repairs, and safety hazards that can ripple through your entire operation. But amidst this looming threat, there's a beacon of hope: the power of advanced materials testing. By simulating real-world conditions in a controlled laboratory environment, we can unlock the secrets of material durability, empowering you to safeguard your assets and make informed decisions about their future.

Khushboo Scientific Pvt Ltd., offers a range of state-of-the-art testing technologies employing a suite of cutting-edge instruments to simulate and analyze the

effects of corrosion and weathering:

Q-Lab QUV Accelerated Weathering Tester: Replicates the damaging effects of sunlight, rain, and dew.

Q-Sun XE-3 Xenon Test Chamber: Accurately simulates the full spectrum of sunlight, including UV radiation.

Q-Fog SSP Corrosion Tester: Creates a controlled salt fog environment to assess corrosion resistance.

The testing services are tailored to address the specific needs of various sectors such as automotive, paint and coating, steel, textile, geo fabrics, nonwoven FIBC bags, aerospace, construction, energy, electronics, marine, etc.

More details:
khushbooscientific.com

Ultima, customers are better able to navigate the increasingly strict regulatory environment and move the maritime industry closer to meeting its decarbonization goals, notes a press release from the company.

"Hempaguard Ultima is our most significant innovation in a decade and an important step forward in our ability to protect and improve our customers' most important assets. It has been designed

to safeguard vessels from fouling with a unique two-layer system, enabling our customers to reach their sustainability objectives while also achieving operational excellence. I am excited to introduce this groundbreaking innovation to our customers and look forward to following its success and impact in the market," says Alexander Enström, Executive Vice President and Head of Marine at Hempel A/S.



The ECKART effect – makes strong stronger.

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Sherwin-Williams introduces Sher-Bar™ TEC - The first damage-tolerant textured epoxy coating for rebar

The textured epoxy coating has the potential to significantly extend the lifespan of critical infrastructure assets – offering a cost-effective solution that adds unprecedented value

Sherwin-Williams Protective & Marine has launched the Sher-Bar TEC, a transformative new coating technology for the concrete industry. Designed for an array of construction applications and environments, the textured epoxy coating (TEC) redefines standards for rebar coatings, offering increased bond strength, damage tolerance and corrosion resistance for both horizontal and vertical concrete projects. These properties enable improved asset longevity and reduced environmental impacts associated with construction and maintenance, notes a press communiqué from the company.

“Sher-Bar TEC is a breakthrough in concrete and construction innovation,” says Jeffrey Rogozinski, Global Director of Functional Coatings for Sherwin-Williams Protective & Marine. “The textured epoxy coating has the potential to significantly extend the lifespan of critical infrastructure assets – offering a cost-effective solution that adds unprecedented value. With this novel TEC technology, Sherwin-Williams Protective & Marine is ushering in a new era of infrastructure protection and sustainability.”

As a secondary coating, Sher-Bar TEC provides added protection for the industry's leading corrosion protection solution: epoxy-coated rebar (ECR), which is commonly referred to as “green bar.” With a smoother surface than

uncoated rebar, ECR results in reduced bond strength with concrete, necessitating the use of more rebar in projects. This additional rebar adds costs and weight, as well as on-site rebar grid congestion when pouring concrete. These drawbacks have limited the use of ECR worldwide, leaving structures susceptible to corrosion and decay.

Sher-Bar TEC, with its textured elements, offers significant improvements over both ECR and uncoated rebar, known as “black bar.” Tests by independent labs and research universities have documented and demonstrated Sher-Bar TEC's superior performance in bond strength, durability and corrosion resistance. The research led to the development of the new ASTM A1124/A1124M-23 Standard Specification for Textured Epoxy-Coated Steel Reinforcing Bars, underlining the importance of TEC in the construction industry.

According to a Wisconsin Department of Transportation study, Sher-Bar TEC can reduce rebar overlap by 10% to 60%, compared to black bar and ECR. This reduction helps to lower project weights, raw material costs and logistical expenses while also potentially allowing for the use of higher grades of concrete.

Tests at the University of Illinois showed that cracks in concrete with Sher-Bar TEC-coated rebar were about half as wide as those with ECR



PHOTO: SHERWINWILLIAMS

Designed for an array of construction applications and environments, the textured epoxy coating (TEC) redefines standards for rebar coatings, offering increased bond strength, damage tolerance and corrosion resistance for both horizontal and vertical concrete projects.

bars – suggesting that less road salt and water will be able to infiltrate concrete and meet rebar where it could promote corrosion. Additional tests showed concrete with Sher-Bar TEC-coated rebar had lower levels of stress because the textured rebar was more engaged in the structure.

“Extensive testing has shown that Sher-Bar TEC is a unique and value-adding solution compared to existing rebar coatings and black bar,” says Anthony Del Percio, North American Sales Manager for Rebar, Valve and Traffic Markings for Sherwin-Williams Protective & Marine. “Its performance marks a significant leap forward in the realm of concrete reinforcement.”

Application of Sher-Bar TEC is also practical and efficient in highly controlled shop conditions. After coating the

rebar with powdered fusion-bonded epoxy to create ECR, the powdered Sher-Bar TEC is immediately applied. The two layers cure simultaneously and form a seamless, monolithic coating that enhances barrier and durability properties to deliver superior corrosion resistance and damage tolerance. Additionally, the resulting texture restores the desired bonding interaction between the steel and concrete that is lost with smooth ECR surfaces.

Sher-Bar TEC also provides favorable sustainability impacts. Made with up to 30% upcycled materials redirected from landfills, Sher-Bar TEC supports environmentally friendly practices and promotes the potential use of alternative cementitious technologies that could reduce the significant carbon emissions associated with concrete production.



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How high can you go with biobased rust prevention?

Cortec® shares two viable, USDA certified, rust preventatives that allow users to go as high as 72% or 99% biobased content for metals protection in humid environments

Today's emphasis on sustainability and the circular economy may leave some manufacturers wondering, "Can I really get the results I need while increasing my use of biobased content?" Cortec® shares two viable rust preventatives that allow users to go as high as 72% or 99% biobased content for metals protection in humid environments.

Canola oil based rust preventatives

EcoLine® 3690 and EcoLine® 3220 are two wet film rust preventatives from Cortec® Corporation. Each includes a special package of corrosion inhibitors in a canola oil base for protection in high humidity conditions. EcoLine® 3690 contains 72% USDA certified biobased content. EcoLine® 3220 goes even higher; it contains 99% USDA certified biobased content. Both can be applied by spray, brush, or dip like traditional wet film rust preventatives, leaving behind a tenacious oily film that clings to metal surfaces and provides excellent contact corrosion protection.

Where to use EcoLine® 3690 and 3220

These two temporary



EcoLine® 3690 and EcoLine® 3220 protects both ferrous and yellow metals and can be applied to wire, sheet metals, pipes, flanges, gears, and equipment.

PHOTOS: CORTEC

biobased coatings can be used in a variety of applications. Among the most common is rust prevention in various stages of the manufacturing process or during storage and shipment. EcoLine® 3690 and EcoLine® 3220 protects both ferrous and yellow metals and can be applied to wire, sheet metals, pipes, flanges, gears, and equipment. Furthermore, a low pour point of -0 °F (-18 °C) makes EcoLine® 3220 good for application in cold conditions where other rust preventatives might freeze.

Biobased rust prevention in action

With almost three-quarters of its content coming from a renewable cooking oil, EcoLine® 3690 has been used to replace products that were

less friendly to workers and the environment. In one case, a tube manufacturer investigated the use of EcoLine® 3690 as a rust preventative for the ends of pipes bundled and stored for 9-12 months outdoors. They were impressed with the results on the test bundle after eight months and expressed satisfaction with its level of worker safety as they decided to use it going forward.

In another case, EcoLine® 3690 was adopted for protection of automotive all-time-buys that needed be stored for up to 10 years after tooling retirement. The previous rust preventative had been used for decades but was hard to remove and raised worker and environmental concerns. EcoLine®

3690 underwent necessary testing and met the automaker's requirements for rust prevention, so it was written into the automaker's specifications for aftermarket engineering processes. The third-party packager started using it in 2019 for crankshafts, camshafts, and cylinder heads going into long-term storage.

Time to up your biobased content?

Being able to reduce the amount of petroleum-based solvents in a product and replace them with gentler biobased material such as canola oil is a great option whenever an effective, affordable product results. With EcoLine® 3690 and 3220, manufacturers have two viable options for upping their biobased content and protecting metals from corrosion.



Camshaft protected by EcoLine® 3690 after four days in salt spray conditions.

Courtesy: Ana Juraga, Cortec Corporation



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Driving growth, fostering innovation, expanding AkzoNobel's market leadership across the region

My journey has proved that overcoming challenges and breaking stereotypes is not just about personal success, but also about paving the way for future generations of women leaders in the industry, notes Ms My Lan Nguyen, General Director of Decorative Paints, AkzoNobel Vietnam and Business Unit Director, Decorative Business Unit ASEAN in a chat with C&ACER

What made you venture, or how did you get into this sector?

From a young age, I was fascinated by colors and the way layers of paint impact everyday life. After joining AkzoNobel, I was surprised and impressed by the company's remarkable achievements and its vibrant culture.

Over our 200-year history, AkzoNobel has consistently reinvented itself to provide optimal, sustainable solutions to our customers and partners. We have launched an impressive product portfolio in every market we enter.

At AkzoNobel, I feel a great connection and sense of fulfilment from the work that I do. We are constantly inspired and empowered to passionately explore the field of paints and coatings.

Additionally, AkzoNobel's

contributions to community growth and sustainable development worldwide make me extremely proud and excited to come to work every day. Our initiatives like "AkzoNobel Cares" and "Let's Colour" are certainly painting a more beautiful and liveable world.

Your experience navigating challenges as a woman leader in the industry.

Venturing into a leadership role in the coatings industry presented a unique set of challenges. In truth, it was not an easy decision to leave my comfort zone and enter a completely new field, especially in such a volatile industry. However, I have always been driven by a desire for new challenges and personal growth. For me, success is about overcoming my current self rather than setting overly ambitious goals.



PHOTOS: AKZONOBEL

Ms My Lan Nguyen, General Director of Decorative Paints, AkzoNobel Vietnam and Business Unit Director, Decorative Business Unit ASEAN.

One of the significant challenges I faced was overcoming stereotypes and biases associated with women leaders in a predominantly male-dominated industry. It required a blend of confidence and unwavering belief in my capabilities while demonstrating expertise. Luckily, AkzoNobel's approach to gender inclusivity made this much easier, as the company always aims to provide equal opportunities to all genders. I also worked towards improving my technical knowledge and leadership skills to gain the trust and respect of my peers and subordinates, something that is highly appreciated within our company's work culture. This was achieved by staying well-informed about industry trends, continuously upskilling, and confidently making informed decisions.

A crucial strategy in counter-ing stereotypes was to

sincerely believe in what I do. My enthusiasm and passion for the work inspired others to align our goals and work collaboratively. By demonstrating a strong commitment to projects and leading by example, I was able to foster a culture of mutual respect and shared purpose.

My leadership style naturally fosters a friendly, warm, and open work environment, making team members look forward to work each day. By promoting collaboration and inclusivity, I ensure everyone feels valued and motivated, enhancing overall productivity and job satisfaction. I'm very glad that my leadership style and my values are seen as key pillars of AkzoNobel's HR practices.

The company has helped me tremendously in navigating these challenges, which has not only strengthened my leadership skills but also



AkzoNobel continues to set industry standards and shape the future of decorative paints in the ASEAN region and beyond.

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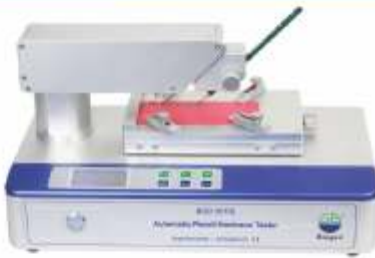
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reinforced my commitment to fostering an inclusive and supportive work environment at AkzoNobel. In addition, my mentors have been female leaders and colleagues themselves, showcasing not just the company's commitment but also supporting my personal growth through role models I could identify with.

My journey has proved that overcoming challenges and breaking stereotypes is not just about personal success, but also about paving the way for future generations of women leaders in the industry. In this regard, my personal and AkzoNobel's values are very much aligned.

Anecdotes where you have championed gender diversity and inclusion, serving as a role model and mentor for aspiring female leaders.

Personally, I believe that leadership is about leading by example. By demonstrating a strong commitment to diversity and inclusion in my daily interactions and decision-making, I aim to set a positive precedent for my colleagues. Enhancing a culture where everyone feels valued and respected not only increases our organizational effectiveness but also contributes to a more cohesive and innovative workplace.

As part of the women's network at AkzoNobel, I have been privileged to support and participate in various activities aimed at promoting gender balance, diversity and fostering a respectful work environment for all. One of the key initiatives I have been involved in is our comprehensive Diversity, Equity, and Inclusion (DE&I) strategy, launched in 2023. Our goal is to achieve at least 30% female representation in senior leadership roles by 2025, a target that reflects our dedication to creating a more

inclusive workplace. Given we strive to promote talent from within, we also set gender targets for all our business units and functions with the aim of enabling a robust talent pipeline feeding into the Senior Executive (SE) level.

Your experiences navigating cultural dynamics in the workplace, given your various experiences within the region, and how it has influenced your leadership style.

Each ASEAN country carries its unique cultural heritage, values, and communication styles. My experiences within the region have profoundly shaped my approach to navigating the workplace and have greatly influenced my leadership style. I have since learned to adapt to different cultural contexts while staying true to fundamental principles of respect.

Navigating cultural dynamics also involves recognizing and addressing potential challenges such as language barriers, differing work ethics, and varying levels of assertiveness. By embracing cultural diversity and encouraging cross-cultural understanding among team members, I strive to create an inclusive workplace where diversity is celebrated.

How do you envision integrating Decorative Paint into the lifestyle and design preferences across the ASEAN region?

At AkzoNobel, we understand the importance of aligning our products with local design preferences and cultural nuances to enhance customer experience and market reach. By offering color palettes and product approaches that resonate with regional tastes, we can effectively transform living spaces and empower customers to create environments that reflect their unique



Sweet Embrace, as a premium brand in the decorative paint category, Dulux aims to inspire consumers through color leadership.

lifestyles and identities.

For instance, in Vietnam, we introduced the innovative 'Vietnam Favourite Colour' concept from Maxilite by Dulux. This collection draws inspiration from the country's breathtaking natural landscapes and iconic tourist destinations. Colors such as Pink Lotus, Golden Rice, Green Tea Hills, and Blue Sea encapsulate the essence of Vietnamese beauty.

Elsewhere in Indonesia, we launched Dulux Colour of the Year 2024, Sweet Embrace. As a premium brand in the decorative paint category, Dulux aims to inspire consumers through color leadership. Sweet Embrace includes three palettes for homeowners: Warm (earth tones), Calm (greens and blues inspired by nature), and Uplifting (modern purples and yellows that evoke joy).

Furthermore, our products are continuously innovated and integrated with advanced technologies to meet the specific needs and weather conditions of each market. This commitment to adaptation and enhancement ensures that our decorative paints not only deliver aesthetic appeal but also provide durable and sustainable solutions tailored to regional requirements.

The yellow canteen program is one example where the use of color is aimed at meeting

specific needs – in this case helping to keep flies away, responsible for transmitting diseases – including potentially-fatal ones such as typhoid, cholera and diarrhoea. Children at a school in Indonesia can eat in peace after Dulux was used to paint the school canteen's benches, tables and walls yellow to help keep the flies at bay. In partnership with Innocean, AkzoNobel conducted a pilot experiment at three schools confirming the colors efficacy in repelling flies; and the yellow canteen program is now being rolled out across Indonesia.

In essence, integrating decorative paint into the lifestyle and design preferences across the ASEAN region is an exciting journey marked by innovation, cultural appreciation, and customer-centricity. By embracing local diversity and leveraging our expertise in color and design, AkzoNobel aims to enrich living spaces, inspire creativity, and foster enduring connections with our valued customers throughout the region.

Could you share some insights on the Decorative Paint business through the lens of lifestyle and color trends?

Decorative Paint at AkzoNobel is not just about adding color to walls — it is about enhancing lifestyles, reflecting



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cultural preferences, and staying ahead of global trends.

For the last two decades, AkzoNobel has conducted extensive global research into which trends are influencing our lives and how they are reflected in our homes and built environment. The research underpins AkzoNobel choice for Colour of the Year and plays a central role in helping to meet the color needs that will inspire our customers.

Decorative paints are more than just a means of decoration; they are tools for transformation. They enable individuals to personalize their environments and contribute to their overall well-being. Whether it's enhancing the warmth of a home or creating a vibrant workspace, our paints are designed to meet diverse needs while maintaining high standards of durability and sustainability.

Furthermore, our products are adapted to regional climates and environmental conditions, ensuring optimal performance and longevity no matter the place. This commitment to innovation underscores our role not just as a paint specialist, but as a partner in enhancing the built environment and enriching daily lives.

As we look ahead, our goal remains clear: to inspire and transform lives through color. By staying at the forefront of design trends, understanding local preferences, and leveraging our expertise in color science, AkzoNobel continues to set industry standards and shape the future of decorative paints in the ASEAN region and beyond.

How differently does a woman view the coating industry vis-a-vis male counterparts and what are the advantages?

In the dynamic world of the coating industry, the perspective of women brings unique insights and strengths that complement those of their male counterparts, contributing significantly to overall success.

Women in leadership roles within this sector often bring a distinct approach characterized by attention to detail, customer-centricity, and innovative thinking. This perspective ensures that products not only meet technical specifications but also address the practical needs and preferences of end-users.

At AkzoNobel, products like Dulux Weathershield, Dulux Powerflex, and Dulux Easyclean, renowned for their superior innovation and features, bear the imprint of female leadership.

What do you want to achieve in your position as BU Director (Decorative Paint) for ASEAN?

As Business Unit Director of Decorative Business Unit ASEAN, my vision is focused on driving growth, fostering innovation, and expanding AkzoNobel's market leadership across the region. Building on our strong foundation in Vietnam, where AkzoNobel has been a pivotal player for nearly three decades, I am committed to enhancing our presence and impact.

Our primary goals include revitalizing key markets in the region, such as Indonesia and Vietnam, with AkzoNobel's cutting-edge solutions known for their aesthetic appeal and protective qualities. We also aim to accelerate growth in Indonesia and Malaysia, leveraging our key strengths. Additionally, we are focused on enhancing AkzoNobel's position in markets like Singapore and Thailand while exploring untapped opportu-



Children at a school in Indonesia can eat in peace after Dulux was used to paint the school canteen's benches, tables and walls yellow to help keep the flies at bay.

nities in Laos, Cambodia, Philippines, etc.

We aim to align closely with AkzoNobel's new purpose, 'Paint the Future,' dedicated to creating sustainable value for communities through innovative paint and coating solutions.

Strategically, we are expanding our business footprint, utilizing our existing manufacturing facilities in Binh Duong, Dong Nai, and Bac Ninh to meet growing market demands while upholding operational excellence and sustainability. An essential aspect of our strategy is on fostering diversity and inclusion within our workplace and the broader industry. We've implemented strong Talent Acquisition guidelines and enhanced our facilities to ensure a healthy, inclusive environment, especially for women. This is further demonstrated through initiatives such as the Voices employee engagement platform that empower our workforce to shape HR strategies and foster inclusivity.

A brief about yourself...

I am recognised in the Vietnamese B2B market for my strategic insights in international business and deep understanding of the domestic landscape.

Appointed as General Director of Decorative Paints for

AkzoNobel Vietnam and South Asia in August 2021, I have spearheaded initiatives that significantly bolstered our market position and brand recognition. Transitioning to the role of Business Unit Director for the Decorative Business Unit ASEAN from January 2024, I now oversee operations across Vietnam, Indonesia, Thailand, Malaysia, Singapore, and other key export markets.

My professional journey underscores my commitment to leadership, innovation, and positive industry impact. I prioritise investing in leadership development as integral to our organisational growth and performance excellence within AkzoNobel. My dedication extends beyond business objectives to include a passion for initiatives driving societal progress and environmental sustainability.

In summary, my career reflects my steadfast dedication to steering business success while fostering a culture of innovation and inclusivity at AkzoNobel. I remain committed to leveraging my experience to guide our company towards continued growth and leadership in the industry.

Note: At AkzoNobel, they do not tolerate unfair treatment or discrimination due to a person's age, race, ethnicity, religion, gender identity, sexual orientation, ancestry, disability, pregnancy, marital status, nationality, chronic illness and/or any other status.



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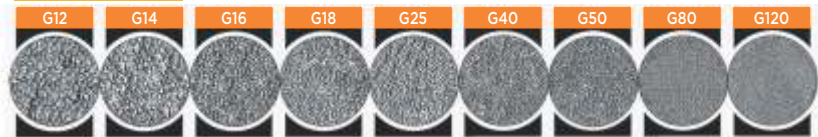


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Reviving corroded fan blades: A Belzona 1321 case study at a leading cement plant in India

The cement plant's fan blades had suffered extensive corrosion due to constant exposure to a chemical environment, which compromised their structural integrity

The cement industry in India is a vital contributor to the country's infrastructure development, but it faces numerous challenges in maintaining and optimizing its operational machinery. One such challenge encountered by a prominent cement plant in India was the corrosion of fan blades. The client sought a cold repair solution that would be both economical and allow for the shortest possible outage window to minimize production disruption.

The problem:

The cement plant's fan blades

had suffered extensive corrosion due to constant exposure to a chemical environment, which compromised their structural integrity. This corrosion posed a significant threat to the efficient operation of the plant's cooling system and necessitated immediate attention.

After a thorough assessment, our experienced service engineer identified the fan blades' corroded surface as the primary issue. In cases where metal surfaces are in constant contact with harsh chemicals, Belzona 1321

proved to be an effective and economical solution for preventing further deterioration and restoring the metal surface integrity.

Surface preparation and application of Belzona

Surface preparation: The corroded fan blades, which were made of carbon steel, were meticulously prepared to remove the damaged and corroded layers. This preparation was achieved using readily available hand tools until a smooth and clean surface was attained. Proper surface preparation is vital for the success of any Belzona application.

A carefully measured and mixed quantity of Belzona 1321, a two-component cold-curing epoxy, was applied to the prepared fan blades. The application was conducted with precision, ensuring complete coverage of the affected areas.

The coating was allowed to cure for a specified period. The quick curing time minimized the downtime,

ensuring a swift return to operational status.

The result and advantages:

Belzona 1321 proved to be highly effective in restoring the integrity of the fan blades. The cement plant experienced several benefits:

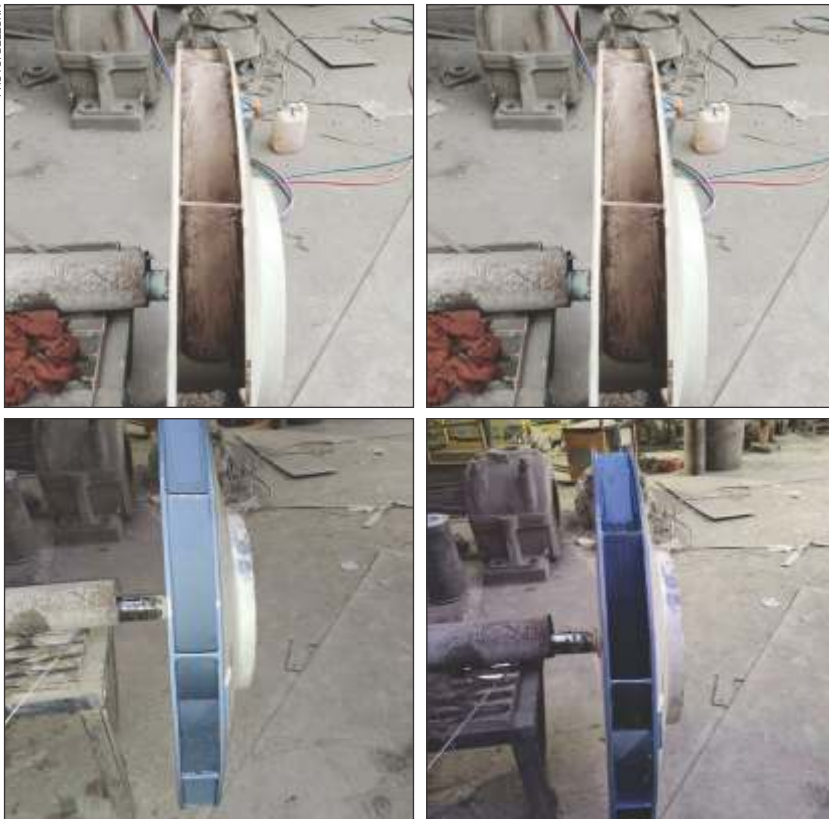
Corrosion prevention: Belzona 1321 created a durable and protective barrier against further corrosion, extending the fan blades' lifespan.

Economical solution: The cost of using Belzona 1321 for this cold repair was considerably lower than the expense of replacing the fan blades or using traditional repair methods.

Shortened outage window: The rapid curing time of Belzona 1321 allowed the cement plant to minimize production downtime, ensuring a quicker return to full operational capacity.

Enhanced reliability: With the fan blades restored to their original condition, the cooling system's efficiency and overall plant reliability were significantly improved.

PHOTO: BELZONA



Belzona 1321 created a durable and protective barrier against further corrosion, extending the fan blades' lifespan.



The author, **Mr Somen Sarkar** is the Senior Digital Marketing Manager at Nicco Engineering Services in Kolkata. Somen, regularly writes case

studies and thought leadership content featuring a variety of different industries, with a special focus on the renewal sector including hydropower, windpower, oil & gas and thermal power, cement, etc.

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Expanding growth in several sectors propel demand for hydrophobic coatings

Factors include increasing automotive production and sales, robust growth of the construction sector, and the growing need for high-performance coatings

A species of spider lives its entire life underwater, despite having lungs that can only breathe atmospheric oxygen. How does it do it? This spider, known as the *Argyroneta aquatica*, has millions of rough, water-repellent hairs that trap air around its body, creating an oxygen reservoir and acting as a barrier between the spider's lungs and the water.

This thin layer of air is called a plastron and for decades, material scientists have been trying to harness its protective effects. Doing so could lead to underwater superhydrophobic surfaces able to prevent corrosion, bacterial growth, the adhesion of marine organisms, chemical fouling, and other deleterious effects of liquid on surfaces. But plastrons have proved highly unstable under water, keeping surfaces dry for only a matter of hours in the lab.

Now, a team of researchers led by the Harvard John A. Paulson School of Engineering and Applied Sciences (SEAS), the Wyss Institute for Biologically Inspired Engineering at Harvard, the Friedrich-Alexander-Universität Erlangen-Nürnberg in Germany, and Aalto University in Finland have developed a superhydrophobic surface with a stable plastron that can

last for months under water. The team's general strategy to create long-lasting underwater superhydrophobic surfaces, which repel blood and drastically reduce or prevent the adhesion of bacterial and marine organisms such as barnacles and mussels, opens a range of applications in biomedicine and industry.

"Research in bioinspired materials is an extremely exciting area that continues to bring into the realm of man-made materials elegant solutions evolved in nature, which allow us to introduce new materials with properties never seen before," said Joanna Aizenberg, Amy Smith Berylson Professor of Materials Science and Professor of Chemistry & Chemical Biology at SEAS and co-author of the paper. "This research exemplifies how uncovering these principles can lead to developing surfaces that maintain superhydrophobicity under water."

"The stability, simplicity, and scalability of this system make it valuable for real-world applications," said Stefan Kolle, a graduate student at SEAS and co-author of the paper. "With the characterization approach shown here, we demonstrate a simple toolkit that allows you to optimize your superhydrophobic



PHOTOS: 123RF

surface to reach stability, which dramatically changes your application space."

That application space includes biomedical applications, where it could be used to reduce infection after surgery or as biodegradable implants such as stents, according to Goldmann, senior author of the paper, and former Harvard fellow. It also includes underwater applications, where it could prevent corrosion in pipelines and sensors. In the future, it could even be used in combination with the super-slick coating known as SLIPS, the Slippery Liquid-Infused Porous Surfaces, developed by Aizenberg and her team more than a decade ago, to protect surfaces even further from contamination.

Understanding hydrophobic coatings

Hydrophobic coatings are

designed to repel water, thanks to their unique chemical properties. The term "hydrophobic" comes from the Greek words "hydro," meaning water, and "phobos," meaning fear. These coatings create a barrier that prevents water from coming into contact with surfaces, thereby reducing the likelihood of water damage and mold growth.

The science behind hydrophobic coatings involves the use of substances like silanes, siloxanes, and fluoropolymers. These materials alter the surface tension of the coated material, making it nearly impossible for water to adhere. Instead, water beads up and rolls off, carrying away dirt and other contaminants in the process.

Global market

As reported by Persistence Market Research, the

worldwide demand for hydrophobic coatings registered 4.1% year-on-year growth in 2022 and is estimated at US\$ 1.8 billion in 2023. Looking ahead, global sales of hydrophobic coatings are predicted to exhibit 4.2% CAGR and reach US\$ 2.71 billion by the end of 2033.

Increasing adoption of hydrophobic coatings is being driven by the following factors:

- Expanding growth in several sectors, including medical and healthcare, textiles, and electronics
- Surface fabrication benefits offered by hydrophobic coatings in the plastic polymer segment, meeting specific surface requirements
- Increasing automotive production and sales
- Robust growth of construction sector
- Growing need for high-performance coatings

Hydrophobic coatings are designed to repel water and prevent its adherence to surfaces. They create a protective layer that causes water, contaminants, and

impurities to easily roll off, ensuring that surfaces stay clean and dry.

Hydrophobic coatings are used in a variety of industrial verticals for a variety of purposes.

Manufacturers have been concentrating on refining the product mix and supplying customized and personalized items in accordance with customer-specific requirements that each application demands. The healthcare, electronics, and automotive industries need goods that are specifically suited to their needs and meet higher quality standards.

The market is expected to continue growing steadily over the coming years, driven by increasing demand in the glass and metal sectors due to the resilient nature of hydrophobic coatings. These coatings can be applied to a variety of surfaces, including glass, metal, synthetic materials, and plastics increasing its capabilities of adoption in the respective market. The coatings repel water and stop the build-up of filth, grease, and grime in industrial environments as

well as automotive applications.

Demand for hydrophobic coatings and hydrophilic coatings in automotive production and construction is increasing substantially. As industrial activities continue to expand globally, the need for efficient coatings has increased. These coatings are used in ceramics, plastic polymers, fabrics, and concretes where they help enhance product quality and reduce operational costs. Investors and manufacturers are coming up with new innovative products to keep pace with the growing marketplace.

New investments and innovations

Kipp Umwelttechnik and its sister company, Jens W. Kipp Tiefbau GmbH, Germany, have invested in a special system for corrosion protection coatings for all conceivable surfaces such as concrete, metal and steel.

In the field of industrial pipes, for instance, Kipp Umwelttechnik already offers hydrophobic coatings that can withstand operating temperatures of up to 1,000° C. These coatings are applied to the pipes' interiors, after they have been cleaned in a special process.

The coating agents have been tried and tested in the field over several years. For the most part, silicate-polymer systems are used in the area of mineral surfaces such as concrete. Water-repellent, thin-layer ceramic coatings are used for metallic surfaces such as aluminum or steel, since they offer great

advantages in many areas. Another important aspect is that they offer considerably reduced cleaning times.

Kipp Umwelttechnik is also working on a coating process for sewage pipes. Initial test evaluations have already shown very promising results.

Hempel Repel 800 repels water from coated surfaces

Worldwide coatings manufacturer Hempel has rolled out a highly flexible two-coat water repellent coating – Hemptop Repel 800. This topcoat offers enhanced corrosion protection by actively repelling water from the coated surface. By enabling the use of fewer coating layers, this solution for offshore assets and installations can be applied faster and lasts longer than conventional coatings solutions.

This unique two-coat system requires one coat less than standard protective coatings solutions for offshore installations and lasts significantly longer. This simplifies the construction and maintenance processes of offshore assets, and reduces costs for owners.

Oriol Osso, Head of Energy, Group Product Management, Hempel, comments: "We have found that traditional three-coat systems used for offshore structures regularly show signs of early coating failure. This is primarily due to water ingress through the coating system, stress induced micro-cracking and/or mechanical damage. This leaves asset owners with unsustainable maintenance costs. Our new Hemptop Repel 800, used in combina





tion with our innovative activated zinc primer Avantguard 770, simplifies the process and addresses all these challenges. Assets can now be protected for longer, reducing the frequency and cost of ongoing maintenance."

The Hempatop Repel 800 system can be applied in just one day reducing the man-hours required for applicators offshore, saving time and money for asset owners. Designed to be easily applied with conventional or airless application equipment, this solution delivers further efficiencies to the applicator and owner.

Applications in automotive industry

Widely used to enhance cars' safety performance, camera units, amid a growing demand for safety, are evolving to be able to take in the surrounding area's images from the surround view monitor for autonomous driving. The surrounding view camera units on a car's front and rear sections and on its both sides catch the wind while the car is running. Among other devices, the camera units installed on a car's front, back, and sides

employ a large amount of coat that repels water strongly when the cameras are hit by the wind, enabling to provide clear images. On the other hand, the camera installed on the back of a vehicle, is less likely to face the wind, causing raindrop to stay long on the camera's surface, and generating concerns for fuzzy images and other types of erroneous detection.

With Nidec Instruments' latest hydrophilic coat, raindrop on a lens is less likely to become stillform, and spreads over the lens' surface instead. This is why the coat can mitigate raindrop's effects on projected images from the rear camera, which is insulated from the effects of wind. In addition, this hydrophilic coat boasts a very high durability, as the product's performance recovers with the help of ultraviolet light even when the hydrophilia decreases due to smear, etc. While enriching Nidec Instruments' product lineup, this newly developed hydrophilic coat will enable customers to choose water-repellent or hydrophilic coat freely based on their diverse usage.

Furthermore, this technology, which is expected to go

beyond automotive lens to contribute to many other applications such as drone and wearable camera, will help develop applied technology.

GKN Aerospace's transparencies centre of excellence in Garden Grove, California, introduced a new hydrophobic coating for cockpit glass. A permanent surface treatment that greatly enhances resistance to surface abrasion also provides the rain-shedding in-flight/ground activity that is provided by the surface.

NEI Corporation launched the UV-Protect (UVP) technology with the goal of developing upgraded versions of its successful NANOMYTE® coating products. These upgraded versions are intended to deliver distinctive characteristics in coatings that have unrivalled durability. The NANOMYTE® line of surface treatments and protective industrial coatings include characteristics such as hydrophobicity, oleophobicity, self-healing, fog resistance, scratch resistance, anti-icing, self-cleaning, and anti-corrosion. These characteristics can be found in the protective

coatings.

Hydrophobic coatings has also been gaining traction in the construction sector, where in the quest for a more energy-efficient home, homeowners and builders alike are constantly seeking innovative solutions. According to a special report from Mr Ajaykumar Patil, Persistence Market Research Pvt Ltd., UK., these advanced materials, known for their water-repellent properties, offer more than just protection against moisture. When applied correctly, they can significantly enhance your home's energy efficiency.

Energy efficiency benefits of hydrophobic coatings

Improved insulation performance

One of the primary ways hydrophobic coatings enhance energy efficiency is by improving insulation performance. When water penetrates building materials like concrete, wood, or brick, it can compromise their insulating properties. Wet materials are less effective at insulating because water conducts heat more efficiently than air. By repelling water, hydrophobic coatings help maintain the insulating

properties of these materials, ensuring that your home stays warmer in the winter and cooler in the summer.

Reduced heat loss

Hydrophobic coatings can also contribute to reduced heat loss. When applied to windows and other surfaces, these coatings create a barrier that helps to keep heat from escaping. This is especially beneficial in areas prone to condensation and frost, where heat loss can be significant. By minimizing the impact of condensation and frost, hydrophobic coatings help to maintain a consistent indoor temperature, reducing the need for heating and cooling systems to work as hard.

Enhanced durability of building materials

Moisture can cause significant damage to building materials over time, leading to increased maintenance and repair costs. Hydrophobic coatings protect surfaces from water damage, thereby extending the lifespan of materials such as roofs, walls,

and foundations. By reducing the need for repairs and replacements, these coatings contribute to overall energy savings by keeping your home's infrastructure in better condition.

Lower energy bills

The combined effects of improved insulation performance, reduced heat loss, and enhanced durability can lead to noticeable reductions in energy bills. When your home is better insulated and less prone to heat loss, your heating and cooling systems can operate more efficiently. This means that your HVAC systems don't have to work as hard to maintain a comfortable temperature, leading to lower energy consumption and, consequently, lower utility bills.

Reduction in HVAC system strain

By maintaining consistent indoor temperatures and improving insulation, hydrophobic coatings help to reduce the strain on your heating, ventilation, and air conditioning (HVAC) system.

When HVAC systems operate under less strain, they tend to have a longer lifespan and require less frequent maintenance. This can lead to further energy savings and reduced costs associated with HVAC system repairs and replacements.

Mitigation of condensation issues

Condensation can be a major issue in homes, leading to problems such as mold growth, wood rot, and structural damage. Hydrophobic coatings help to mitigate condensation by preventing water from accumulating on surfaces. This not only protects your home from potential damage but also contributes to better indoor air quality, which can positively impact energy efficiency by reducing the need for additional ventilation.

Sustainability and environmental impact

Hydrophobic coatings can also contribute to a more sustainable and environmentally friendly home. By improving the energy efficiency of your home and reducing the need for frequent repairs and replacements, these coatings help to decrease your overall environmental footprint. Additionally, many hydrophobic coatings are designed to be eco-friendly, with low VOC (volatile organic compounds) emissions and minimal environmental impact.

Applications of hydrophobic coatings

Hydrophobic coatings can be applied to a variety of surfaces in and around your

home to improve energy efficiency:

Roofs: Applying hydrophobic coatings to your roof can prevent water damage and improve the roof's insulation properties, leading to better energy efficiency.

Walls: Coating exterior walls with hydrophobic materials helps to protect them from water damage and maintain their insulating properties.

Windows: Hydrophobic coatings on windows can reduce condensation and heat loss, contributing to a more energy-efficient home.

Foundations: Protecting your foundation with hydrophobic coatings can prevent water infiltration and maintain the structural integrity of your home.

Conclusion

Hydrophobic coatings represent a cutting-edge solution for enhancing your home's energy efficiency. By improving insulation performance, reducing heat loss, and extending the durability of building materials, these coatings offer a range of benefits that can lead to lower energy bills and a more comfortable living environment. As the demand for energy-efficient and sustainable building practices continues to grow, hydrophobic coatings provide a practical and effective way to achieve these goals. Whether you're building a new home or looking to improve your existing one, considering the application of hydrophobic coatings could be a smart investment in your home's long-term energy efficiency and overall performance.



Graphene as a chemical additive for latex paint

Xavier Raby of Gerdau Graphene, aims to illustrate the potential of graphene as a performance enhancer for latex paint, particularly in terms of durability

Introduction: Objectives and context

Graphene exhibits unique electrical, mechanical, and thermal properties that can significantly improve various technical applications, including the paint and coating industry. Although graphene's use as a corrosion inhibitor in industrial coatings is well-documented, its application in architectural and decorative coatings, especially waterborne latex resin coatings, is still limited.

Recent lab research conducted by Gerdau Graphene has shown promising results in terms of viscoelastic properties and moisture resistance. Graphene-latex films exhibited lower water vapor transmission rates, higher surface hydrophobicity, reduced porosity and modified mechanical properties to resist better against abrasion stresses. These characteristics are crucial for improving the

longevity and performance of latex paints. For those reasons, two field tests were planned to confirm these first lab observations.

Background: Graphene waterborne dispersion

Gerdau Graphene produces waterborne graphene dispersions for compatibility with latex paints. Graphene dispersions produced by Gerdau Graphene were found to be highly stable and effective when integrated into waterborne latex paints. These dispersions typically have a high solids content (10 wt.%) and demonstrate excellent long-term stability. Characterization involved Scanning Electron Microscopy (SEM) and Raman spectroscopy to analyze crystalline defects and interlayer numbers. The SEM images showed deagglomerated graphene sheets with a lateral size around 4 μm , indicating a well-dispersed state (figure 1).

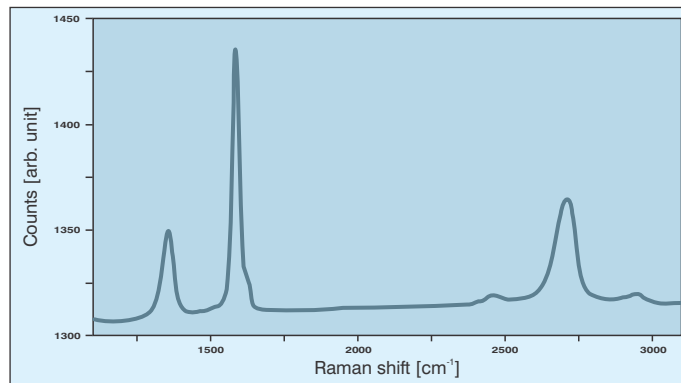


Figure 2: Raman median spectrum of waterborne graphene dispersion.

Raman spectroscopy further confirmed the quality of the graphene, highlighting its low defect levels and high crystallinity (figure 2). The number of intercoupled graphene layer number is below 10 (figure 3), this material can be considered as genuine few-layer graphene.

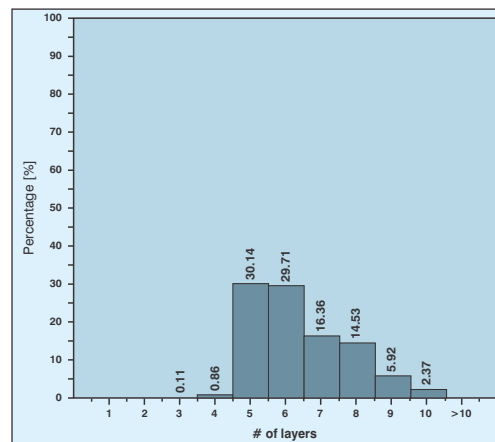


Figure 3: Intercoupled layer number distribution.

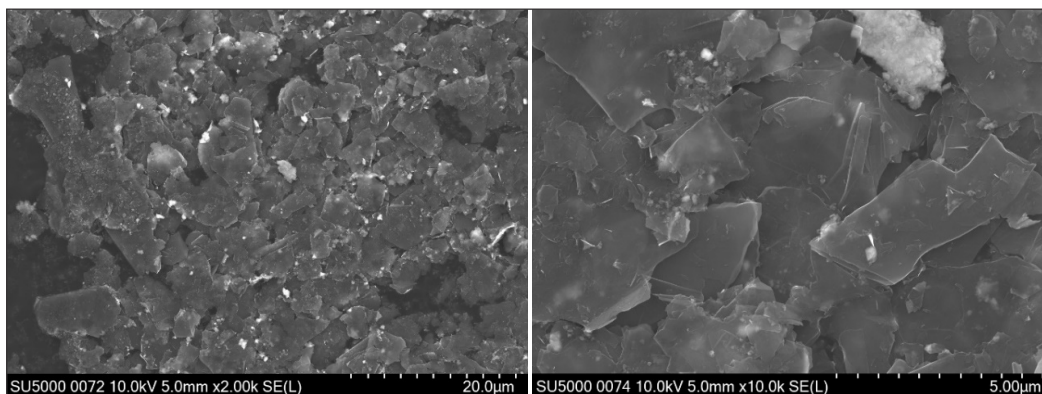


Figure 1: SEM images of waterborne graphene dispersion.

Experiments

Experiment 1: Floor Latex Paint in Pindamon-hangaba, Brazil (2022)

Paint preparation: A generic commercial formulation of floor latex matt paint was used, meeting Brazilian standards. The paint was produced on a pilot scale (1,000 liters), with and without 0.05 wt. % graphene. After preparation, the paints were stored at room temperature for characterization and performance tests, including pH, viscosity, stability at 60°C,



Figure 4: Paint application location in Gerdau Pindamonhangaba plant.

field tests, and abrasion resistance.

Field Test: Two bike lanes were painted at Gerdau Pindamonhangaba as depicted in figure 4. In both locations, asphalt surfaces were thoroughly cleaned with a high-pressure water gun before application. It is essential to emphasize that both locations were free from any previous coating. After drying, 2 or 3 coats of latex paint were applied using a paint roller. The latex paint was initially diluted with an additional 30% of water for the application of the first coat and with only 10% for the subsequent coats. Only one coat per day was applied, allowing the paint to cure overnight. The applications conditions for each location are detailed in table 1. A monthly visual inspection was conducted to assess the wear rate of each paint application.

Results: The floor latex paint produced with graphene was tested both in the lab and in the field. Lab tests showed no significant differences in abrasion resistance when compared to paint without graphene as shown in figure 5. However, field tests at the Gerdau Pindamonhangaba plant revealed that the graphene-enhanced paint exhibited better durability under real-world conditions, particularly during the rainy season. The paint with graphene maintained a more uniform coloration and exhibited less wear compared to the non-graphene paint, suggesting that graphene may help reduce paint consumption and improve durability as illustrated in figure 6

Experiment 2: Floor latex paint in Mogi das Cruzes, Brazil (2023)

Area name	Application start date	Final date	Substrate	Coat number	Graphene
A1	18/03/2022	27/09/2022	Asphalt	2	0.05%
A2	14/04/2022	27/09/2022	Asphalt	3	No

Table 1: Paint application location characteristics.

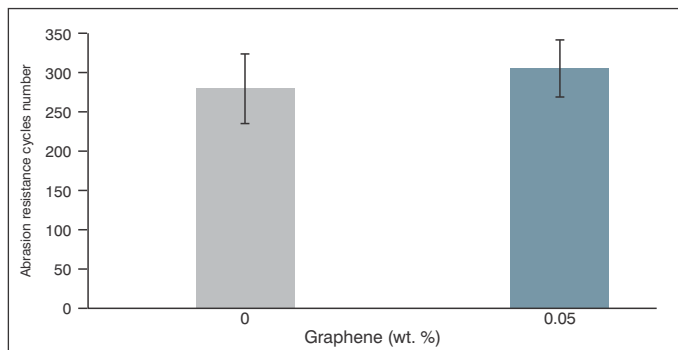


Figure 5: Comparison between reference and graphene paint as measured by the ABNT NBR 14940 standard.



Figure 6: 7 months ageing (A1 – 0,05% Graphene) versus 6 months ageing (A2 – Reference).

Paint preparation: An industrial-scale production of 5,000 liters of floor latex paint, formulated with and without 0.05 wt. % graphene. The same raw materials were used, except for necessary pigment adjustments to avoid color discrepancies.

Field test: In the Mogi das Cruzes field tests, the paint was applied to create bike lanes. Concrete surfaces were thoroughly cleaned with a high-pressure water gun before application. It is essential to emphasize that the location was free from any previous coating.

After drying, three coats of latex paint were applied using a paint roller. The latex paint was initially diluted with an



Figure 7: Paint application location in Gerdau Mogi das Cruzes plant.

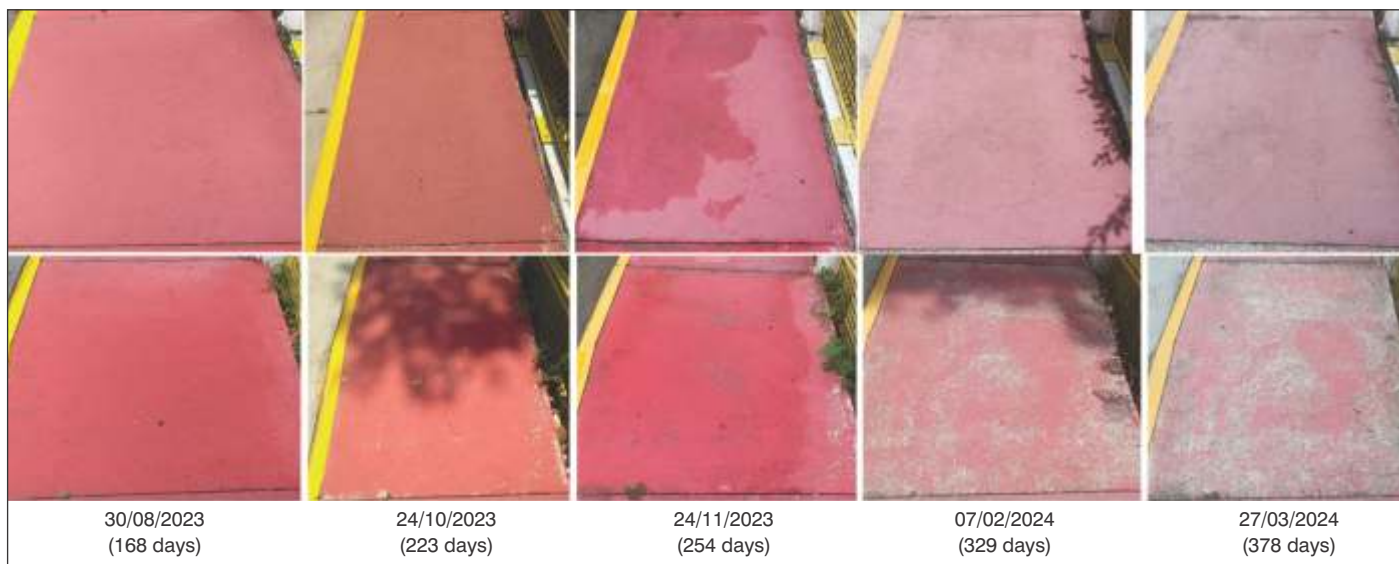


Figure 8: Chronological evolution of typical in both areas with 0.05% graphene (top) & no graphene (bottom).

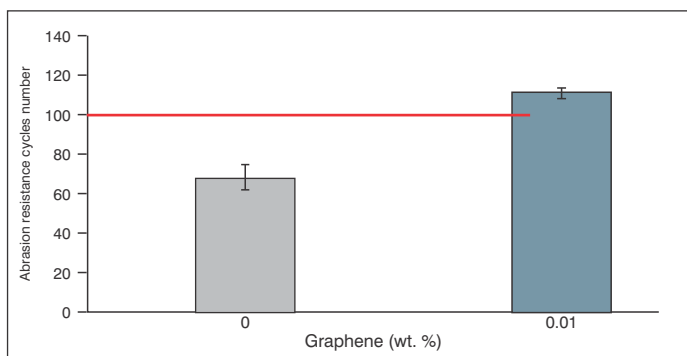


Figure 9: Comparison between reference and graphene paint as measured by the ABNT NBR 15078 standard.

additional 30% of water for the application of the first coat and with only 10% for the subsequent coats. Only one coat per day was applied, allowing the paint to cure overnight. Paint with graphene and reference paint without graphene were applied alternatively every 1- to 2-meter-long interval as shown in figure 7 in order to make sure external aggressive conditions will affect in the same way the evolution of both types of paint. A monthly visual inspection was conducted to assess the wear rate of each paint application.

Results: Different areas showed varying levels of wear, influenced by environ-

mental conditions such as humidity and mechanical stress. In high humidity areas, both graphene and non-graphene paints showed similar wear levels, likely due to adhesion issues. In protected areas, wear was minimal for both types. However, in areas exposed to moderate stress, graphene-enhanced paint demonstrated significantly better performance, retaining its color and showing less wear over time. Differences in wear between both conditions (with/without graphene) started to be significantly noticeable after approximately 200 days exposure and it accelerated during the rainy season

(September-March) as illustrated in figure 8. The positive impact of graphene in terms of durability is easily noticeable.

Experiment 3: High PVC wall paint with graphene incorporation

Preparation of the paint: A standard commercial formulation of high PVC latex matte paint was provided. The paint was produced on a small scale (1 liter) with and without 0.01% graphene. Performance testing focussed on abrasion resistance according to ABNT NBR 15078 (without abrasive paste).

Results: Graphene at 0.01% improved abrasion resistance

significantly), suggesting it could replace wash promoters like sodium silicate without affecting pH as shown in figure 9.

Conclusions

Graphene has shown promise as a performance-enhancing additive for latex paints, particularly in improving durability and resistance to wear (without abrasive paste). Future projects (NanoDUR generation 2) will focus on developing graphene-based additives that enhance both durability and abrasion resistance with abrasive paste involving new technologies such as covalent graphene functionalization.

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Water damage restoration solutions for equipment and assets

Water accumulation culminates in corrosion, decay, and a host of other moisture-related deterioration

The increasing instances of flooding every year are a matter of concern across the globe. With the impact of climate change being felt in the form of extreme weather conditions, the situation is only expected to exacerbate with every passing year. Water damage can happen due to various reasons such as flooding, water logging, post fire-fighting, overhead pipe burst, overhead tank overflow, structural leakages. As a result, basements, low lying areas, assets near water sources like rivers, canals, water channels and streams are more at risk.

Additionally, the rapid urbanization giving rise to inefficient drainage issues further amplifies the problem of water logging. Understand-

ing the gravity of the situation, where heavy rains can wreak havoc on lives and property, it is mandatory to have a swift response plan in place to proactively address the damaging effect of water deluge.

Even India is experiencing a similar situation with the onset of monsoon this season. The country is reeling under the impact of heavy rainfall, bringing the people to a screeching halt. Looking at the volume of torrential downpour, various parts of the country run the risk of getting submerged in water due to the flooding effect. It comes with danger of huge losses to the property by causing destruction to the valuable assets. Here, the severity is invariably amplified in

commercial and industrial spaces. Excessive water can potentially disrupt the business operations by bringing several activities to a halt. Failing to address the situation in time can further exacerbate the condition and can even account for a business shutdown.

Destroying the properties on a large scale can cost a fortune to the companies to replace the equipment ruined by flooding. The wide range of machinery, and miscellaneous items in a commercial and industrial setup are exorbitantly expensive, and replacing them with new ones can levy a huge financial cost on the company. As a result, resorting to reconstruction of the entire infrastructure can be quite impractical and take

a toll on the business to restore the facility to its original state. In addition to this, many companies face the challenge of unbudgeted compensation due to high insurance claims, which further exacerbates the complexity of the situation. The biggest problem is longer delivery period for new equipment along with lot of effort and time with decommissioning and commissioning of equipment. Water Damage Restoration (WDR) services can be provided in situ.

Elaborating on the potential risks of flooding, the affected area is continuously under the threat of highly hazardous or regulated materials. There are high chances of the presence of toxic elements such as arsenic, mercury, lead, asbestos, polychlorinated biphenyls (PCBs), pesticides, fuels, solvents, caustic chemicals, and radiological residues in the space. Looking at the perils of water deluge, companies should be proactive and devise a solid emergency plan beforehand for timely and effective execution of crisis management plans.

The crucial aspect of taking action on time cannot be negated during the flooding situation. Immediate measures should be undertaken within the first 24 to 48 hours



PHOTO: 123RF

to avoid further worsening of the condition. This calls for conducting timely restoration of water-damaged assets under the supervision of highly trained professionals. The professionals come with demonstrated skills and the required knowledge to give relief from the damaging effect of the water. They tackle the problem efficiently by deploying highly sophisticated technology, and equipment for instating the damaged space to its original state.



PHOTO: 123RF

The professionals come with the expertise to employ WDR, which is an emergency service invariably sought for drying and restoring water damaged assets. It goes a long way in resisting further damages to the assets by preserving, protecting, and safeguarding them. In the processes, the service also ensures the safety of occupants present in the affected areas from any health hazards.

When conducting WDR drying makes for an important part of the process. The WDR eliminates water in a phased manner, involving the removal of trapped moisture followed by evaporation, which is

facilitated by air movement and dehumidification. Moving forward, dehumidification forms the next step, which comes in handy for externally exhausting and removing moisture from the air.

Therefore, prioritizing a quick action in the form of a restoration plan can come to the rescue for safeguarding, recovering, and restoring the water-damaged assets. To drive optimal results, it is important to exercise proper humidity regulation throughout the restoration to accelerate the drying process. Inability to maintain the relative humidity within a narrow range can give rise to unforeseen conditions. This

can be understood from the fact that the presence of wet and moist conditions can have a disastrous effect on the WDR process. In addition to prolonging the restoration process, it sets the stage for breeding of mold, bacteria, and other harmful microorganisms. Significantly amplifying damages in the facility, it can invariably shoot the cost of the restoration.

On the contrary, maintaining a combination of high temperature and low relative humidity gives the desired impetus to the water evaporation process. This is primarily because warm air is well suited to hold more capacity of moisture as compared to cold air. Reversal of the condition by any chance not just impedes the evaporation but can take an unfortunate turn of events during cases where relative humidity touches a saturation point of 100% capacity. Giving rise to condensation on surfaces, it eventually culminates in corrosion, decay, and a host of other moisture-related deterioration.

To achieve optimal results, it's

essential to create an environment where the temperature is consistently maintained at 22.2°C, with relative humidity (RH) between 50-55%. The evaporation process can be further enhanced by reducing the RH to below 40%. It's crucial to ensure that the space temperature remains stable and does not increase during this process.

Gauging the destructive nature of flooding, timely action can prevent the huge loss of revenue that occurs due to a long period of business shutdown and replacement of damaged assets. Rather, employing top-of-the-line dehumidification systems as part of the water damage restoration solution significantly contributes to shrinking the downtime and instating the facility to the original state for resuming the business activities in no time.



Author:
Mr Atul Bansal,
Chief Operating Officer,
Technical Drying
Services.

Khanna Paint Testing Laboratory (OPC) Pvt. Ltd.

KPTL is accredited by NABL with a scope of 54 standards, which includes IS, ASTM, ISO, DIN and other international standards

Testing and evaluation are the most important part of material utilization in various industrial applications. Material specifications, material characterization and its performance evaluation is the first step for its utility in any application. Another important requirement of any industrial construction is to qualify materials being supplied by various vendors so that it meets the specifications laid down for the job. In order to achieve this, material analysis and its characterization is required to certify that material being used is the right material. There are many items used in industrial construction: concrete, steels, plastics, wood, glass and many more. The last step in

the construction is painting which is responsible to provide aesthetic as well as durability to the structure. Since there are large number of paint manufacturers and also large number of paint formulations, it is important to use a paint with a certain specification as laid down in the initial specifications. Paint testing and certification is required right from tendering stage to the final approval of the job and also in case where there is a big job, each batch needs certification to ascertain the uniformity of the raw material.

The paint testing for a long time was done by several CSIR labs, national test houses, reputed educational institutes such as IIT's and

NIIT's with all giving reports in different formats. Today the Government has standardized the process and makes it mandatory to use NABL accredited labs which assure a universal procedure and tests as per national and international standards and reports in a uniform format. Khanna Paint Testing Laboratory (KPTL) is one such lab – a reliable paint testing laboratory, accredited by NABL with a scope of 54 standards, which include IS, ASTM, ISO, DIN and other international standards. The main advantages of NABL is the assurance of suitable equipment, fully calibrated and well maintained. KPTL has more than 60 different equipment, catering to 40 different paint tests and is well known in the construction industry.

Another important aspect of the KPTL, earlier known as SECC, is that it has a qualified and trained manpower. The lab, located at Vikhroli, an Eastern suburb of Mumbai, is run by Prof A. S. Khanna, the Director, who has more than

28 years' experience in teaching, research and consultancy in paint coating thru IIT Bombay. He is author of more than 200 papers on various topics of paint coatings, having 15 Ph.D (out of total 27 to his credit) in paint related topics, and has also written a book on paint coatings which highlights testing and certification and training on paint coatings. The other staff is also a well-educated and trained in paint testing. Rajkumar with 20 years' experience in testing, Jinal Gohil and Mukund Pawar, M.Sc in Surface Engineering and Paint from I-Star Institute Anand and Sheetal, a Diploma Holder in Paint Technology from Garware Institute. A list of the test parameters offered is given below.

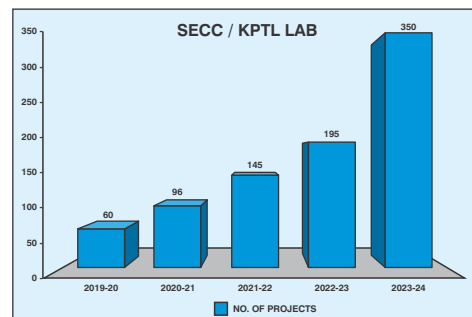


Fig 1 shows number of projects undertaken since 2019-20 to 2023-2024.



KPTL test parameters			
Test Parameters	Sr. No.	Standard Methods	Details
1	1	ASTM D1475: 2020	For Density of Liquid Coatings, Inks, and Related Products
	2	ISO 2811-1: 2016	Paints and Varnishes Determination of Density Part 1: Pycnometer Method
	3	IS 101 Part 1 / Sec 7:2020	Methods of Sampling and Test for Paints, Varnishes and Related Products Part 1 Test on Liquid Paints (General And Physical) Section 7 Mass Per Ten Litres



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NABL ACCREDITED LAB



Prof. A. S. Khanna
Director

As per the new requirements all labs under NABL, must have a Registered Entity. As a result SECC a proprietorship company needed to be changed to a Pvt. Ltd. company. With effect from New Financial Year starting from April 1, 2024, SECC is renamed as Khanna Paint Testing Laboratory (OPC) Pvt. Ltd. We have now 54 different paint standards approved by NABL. These 54 standards include IS, ASTM, DIN, ISO, NACE, and AWWA standards. Details can be see on our website which is now www.kptllab.com The lab has the most modern, fully calibrated equipment with well-educated and trained staff.



**CATHODIC
DISBONDMENT TESTER**
ASTM G 8, G 42, 95 & ISO
15711



SALT SPRAY CHAMBER
ASTM B 117, ASTM G 85,
ISO 9227



**ACCELERATED
WEATHEROMETER
(QUV)**
ASTM G 154, ISO 16474



**AUTOMATIC PULL
OFF ADHESION**
ASTM D 4541, ISO 4624

1. Paint Characterizations, Specific gravity, % NVM, % Vol Solids, VOC, Viscosity & Drying time.
2. Flexibility Test, Pencil Hardness Test, Cross Hatch Adhesion Test, Shore Hardness A & D.

3. Chemical Immersion Test.
4. Water Vapor Permeability and % Water Absorption
5. Anti Carbonation Test .
6. Aluminium Composite Panels (ACP).



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KPTL test parameters			
Test Parameters	Sr. No.	Standard Methods	Details
2	4	ASTM D1200: 201	For Viscosity By Ford Viscosity Cup
	5	ASTM D562: 2018	For Consistency of Paints Measuring Krebs Unit (KU) Viscosity Using a Stormer -Type Viscometer
	6	IS 101 Part 1 / Sec 5:2020	Part 1. Test on Liquid Paints (General And Physical) Sec.5 Consistency
3	7	ASTM D2697:2021	For Volume Non-Volatile Matter In Clear Or Pigmented Coatings
	8	IS 101 Part 8 / Sec 6:1993	Methods of Sampling and Test For Paints, Varnishes And Related products Part 8 Tests For Pigments And other Solids Section 6 Volume Solids
4	9	EPA Method 24: 2020	Determination of Volatile Organic Compound (VOC) Content In Paints, Inks and Related Coating Products
	10	ASTM D2369: 2020	For Volatile Content of Coatings
5	11	ASTM 7091: 2021	For Non-destructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals
	12	IS 101 Part 3 / Sec 2:1989	Methods of sampling and test for Paints, Varnishes and Related products Part 3 Tests on Paint Film Formation section 2 Film Thickness
6	13	IS 101 Part 5/ Sec 2:2013	Methods of Sampling and Test For Paints, Varnishes and Related Products Part 5 Mechanical Test On Paint Films Sec 2 Flexibility And Adhesion
	14	ASTM D3359:2017	For Rating Adhesion By Tape Test
	15	ISO 15711	Cross Cut Test
7	16	ASTM D 6943: 2019	For Immersion Testing Of Industrial Protective Coatings And Linings
	17	ISO 2812-2	Water Immersion Test
8	18	ASTM D1640M- 14:2018	For Drying , Curing, or Film Formation of Organic Coatings
9	19	ASTM D1653: 2021	For Water Vapour Transmission of Organic Coating Films
10	20	ASTM D2240:2015	For Rubber Property Durometer Hardness
11	21	ASTM D523: 2018	For Specular Gloss
12	22	ASTM D3363: 2020	For Film Hardness By Pencil Test
13	23	ASTM D2485:2018	For Evaluating Coatings For High-Temperature Service
14	24	ASTM G59: 2020	For Conducting Potentiodynamic Polarization Resistance Measurements
15	25	ISO 16773-2:2016	Electrochemical Impedance On Coated And Uncoated Specimens
16	26	EN-1062-6:2002	Coating Materials and Coating Systems For Exterior Masonry And Concrete – Part 6: Determination of Carbon Dioxide Permeability
17	27	ASTM D1002: 2019	For Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens By Tension Loading (Metal-To-Metal)
18	28	ASTM D903:2019	For Peel or Stripping Strength of Adhesive Bonds
19	29	ASTM D624: 2020	For Tear Strength of Conventional Vulcanized Rubber And Thermoplastic Elastomers
20	30	ASTM D882:2018	For Tensile Properties of Thin Plastic Sheetting
	31	ASTM D638: 2014	For Tensile Properties of Plastics
	32	ASTM D2370:2016	For Tensile Property of Organic Coating
21	33	ASTM B117:2019	For Operating Salt Spray (Fog) Apparatus
	34	ISO 9227: 2017	Corrosion Tests in Artificial Atmospheres Salt Spray Tests
22	35	ASTM D2247:2020	For Testing Water Resistance of Coatings in 100% Relative Humidity
	36	IS 101 Part 6/Sec:2003	Resistance to Humidity Under Conditions of Condensation
	37	ISO 6270-3: 2018	Paints And Varnishes Determination of Resistance to Humidity Part 3: Condensation (In Cabinet Exposure With Heated, Bubbling Water Reservoir)
23	38	ASTM D2794:2019	For Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
	39	ASTM G14: 2018	For Impact Resistance of Pipeline Coatings (Falling Weight Test)
24	40	ASTM G8:2019	For Cathodic Disbonding of Pipeline Coatings
	41	ASTM G42: 2019	For Cathodic Disbonding of Pipeline Coatings Subjected to Elevated Temperatures
	42	ASTM G95:2013	For Cathodic Disbondment Test of Pipeline Coatings (Attached Cell Method)
	43	ISO 15711	Resistance to Cathodic Disbonding
25	44	ASTM D4541:2017	For Pull-Off Strength of Coatings Using Portable Adhesion testers
	45	ISO 4624	Pull off Adhesion Test
26	46	ASTM A522/A522M	For Mandrel Bend Test of Attached Organic Coatings
27	47	ASTM D4060:2019	For Abrasion Resistance of Organic Coatings by the Taber Abraser
28	48	ASTM D790 :2017	For Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
29	49	ASTM D5162	For Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates
30	50	ASTM G154	For Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials
	51	ISO 16474-3	Exposing coating to fluorescent UV Lamp
31	52	BS EN ISO 1518:2001/ BS 3900- E2	Method of test for paint scratch test
	53	ASTM D2471	Pot Life Test
32	54	ASTM D521-02	Zinc Content Test

OLI Systems unveils pioneering process simulation innovations for corrosion, mineral scaling, and critical materials recovery in Platform V12

OLI Systems (olisystems.com) has announced significant technological advancements with the release of OLI Platform V12. This latest version introduces groundbreaking innovations in corrosion prediction, mineral scale inhibition, and predictive recovery of critical materials from battery recycling. These enhancements tackle real-world, mission-critical challenges in industries such as upstream oil and gas, chemicals, carbon capture, utilization and storage (CCUS), mining, water treatment, and geothermal energy.

MSE Corrosion Technology is a standout innovation in the V12 platform, delivering unmatched precision in corrosion prediction and prevention. This advancement has the potential to save billions of dollars by preventing catastrophic equipment failures and enhancing safety. MSE Corrosion accurately

predicts corrosion behavior with a specialized model for both aqueous and non-aqueous environments. It features a novel thermodynamic and advanced electrochemical kinetics framework, providing rigorous corrosion calculations in diverse conditions. This initial release supports corrosion predictions for two widely used corrosion-resistant alloys (CRAs) — alloy 2205 and 2507 — enhancing design and maintenance strategies across the asset life cycle in upstream oil & gas, chemicals, CCUS, and geothermal industries.

The Scale Kinetics and Inhibitor Optimization Tool (SKIT) capability in V12 delivers tailored scale inhibition insights with proprietary inhibitor formulations, safeguarding intellectual property. It bridges the gap between laboratory measurements and field observations, optimizing scale treatment programs with



PHOTO: i2sRF

actionable insights to improve operational performance.

“Beyond corrosion and scaling, V12 introduces revolutionary capabilities in critical material recovery,” stated Vineeth Ram, Chief Sustainability Officer. “Our new solvent extraction models, combined with extensive chemistry coverage for nickel and cobalt, offer unparalleled accuracy in predicting and optimizing the recovery and purity of these

critical materials. This is a transformative advancement for the lithium-ion and sodium-ion battery recycling industries.”

The new calculator block in V12 enhances user productivity and experience in Flowsheet: ESP, providing greater flexibility and ease of use. Substantial updates to the Rare Earth Element (REE) Chemistry in V12 represent a significant improvement in simulating REE recovery from ores and industrial waste.

Engineering Director, Inc. unveils the SpecDoctor™

Engineering Director, Inc., (engineeringdirector.com/in) Partnership with AtmosphericIQ LLC, has announced the launch of the SpecDoctor™, a cutting-edge, experimental Artificial Intelligence (AI) tool designed to assist with the management of corrosion-related challenges. SpecDoctor™ embodies the latest advancements in machine learning algorithms.

SpecDoctor™ provides information about ISO 12944 and ISO 9223 for protective coating systems. It also covers a range of general corrosion subjects, including key topics such as underground pipeline corrosion, cathodic protection systems, and stress corrosion cracking (SCC). This AI guide is also multilingual, making it easily accessible to the global market.



“SpecDoctor™ is a tool born out of necessity. As we encounter increasingly complex engineering

challenges, having a comprehensive understanding of corrosion issues is vital,” said Joseph Mazzella, CEO of Engineering Director, Inc.

By bringing SpecDoctor™ into the market, Engineering Director, Inc. reaffirms its commitment to empowering industries with advancing technology that will streamline complex processes and improve overall productivity.

BASF expands e-coat manufacturing facility in Mangalore, India

BASF's Coatings division announced the expansion of e-coat manufacturing facility at its Mangalore site. This strategic expansion is driven by the growing demand for e-coat solutions by local automotive OEM customers in India, as well as customers in the South Asian and ASEAN markets.

E-coat, also referred to as electrophoretic or cathodic dip coating, serves the purpose of safeguarding the car body's surfaces, edges, and cavities from corrosion. Additionally, it effectively smooths out the roughness of pre-treated metal surfaces, creating an ideal foundation for the subsequent layers of paint to be applied.

With the expanded e-coat manufacturing facility in Mangalore, BASF will have the capability to manufacture the latest generation of e-coat products, such as CathoGuard 800 RE that offers lower consumption, increased efficiency, and higher reactivity for electric vehicles.

"India's automotive market is booming with opportunities. With a mix of international and local car brands, and evolving consumer behaviors, India holds immense potential for BASF," said Patrick Zhao, Senior Vice President, Global Automotive OEM Coatings, BASF.

"I'm incredibly proud of our



Expansion of BASF's e-coat manufacturing facility in Mangalore.

strong growth in India and the region, thanks to our successful collaborations with customers and partners. But beyond the numbers, what makes me even more proud is our ability to leverage our innovations, passion for

colors, and sustainability experience to serve the local market."

The BASF site in Mangalore has been in operation since 1996, and it is now BASF's largest production facility in South Asia.



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AkzoNobel's Color of the Year 2025 radiates 'True Joy'

'True Joy,' the sunny yellow shade on a mission to fill homes with optimism, pride and a splash of vibrant color has been declared as the AkzoNobel's Color of the Year for 2025.

Supported by three complementary color palettes, True Joy is the result of extensive research into color, design, cultural, economic and social trends, which identified a desire to make a joyful leap into the unknown, celebrate craftsmanship and embrace who we are.

"In this rapidly changing world, it's easy to feel uncertain about our next steps," explains Heleen van Gent, Creative Director of AkzoNobel's Global Aesthetic Center. "But change creates an opportunity for imagination; a chance to create something even better. With our new Color of the Year and ColourFutures 2025 palettes, we want to inspire consumers to celebrate their roots and creativity and embrace the optimism of moving forward in their homes and spaces." AkzoNobel's Global Aesthetic Center has been translating trends into desirable colors for our homes for more than 30 years. Its annual ColourFutures trend forecast meeting brings together in-house experts, international architects, designers and journalists to share insights into how our reactions to the world around us impact our color choices. Junior designers and interns were also included for the first time

this year, to ensure that consumers from the widest possible age range were represented in the influential Color of the Year decision-making process. Their discussions led to three decorative paint color stories being designed around True Joy to help consumers find the right complementary colors to match their mood and design preferences. The Bold color story urges you to leave your comfort zone and inject adventure into your home with bright and uplifting colors, while the Human color story encourages you to bring creativity into your home by filling it with unique handmade pieces.

The Proud color palette invites you to embrace your identity and have the confidence to create a home that's just as unique as you are.

Apart from Deco brands, the on-trend colors, textures and special effects have been designed for other key markets and segments, including aerospace, automotive, consumer electronics, metal furniture, lighting, cabinetry, flooring, and building and architectural



PHOTO: AKZONOBEL



"True Joy will have an impact on choices made by architects, interior designers, product developers and our consumers who want and need to be ahead of market trends."

products.

"Our Color of the Year shapes the direction of design globally," says Jan-Piet van Kesteren, Business Unit Director for Decorative Paints in Europe, Middle East and Africa. "We are leaders in color trend forecasting and True Joy will have an impact on choices made by architects, interior designers, product developers and our consumers who want and need to be ahead of market

trends. Another first for the latest launch is the involvement of three online design influencers – Mauricio Arruda (Brazil), Ana Milena Hernandez Palacios (Spain) and Theo-Bert Pot (the Netherlands) – who are helping us to lift the lid on Team Joy, a call to embrace the power of yellow. Over the next few months, we'll be sharing stills and videos to help consumers visualize how yellow can transform their homes."

Advances in construction chemical technology: What's new in 2024?

The advent of smart coatings is revolutionizing how we approach maintenance and protection in construction

The construction industry is experiencing a transformative phase, driven by advances in construction chemical technology. As we navigate through 2024, it's clear that innovations in this sector are setting new standards for performance, sustainability, and efficiency, notes a press communique from Persistence Market Research Pvt. Ltd., UK. This write-up delves into the most significant advancements in construction chemical technology this year, exploring how these developments are reshaping the industry.

Sustainable and eco-friendly chemicals

Sustainability remains a central theme in construction, and chemical technology is no exception. In 2024, the emphasis on eco-friendly solutions has intensified, leading to the development of several innovative products:

Bio-based admixtures: A new generation of bio-based admixtures, derived from renewable sources like plant extracts and agricultural by-products, is gaining traction. These admixtures not only reduce the carbon footprint but also enhance the properties of concrete, such as strength and durability.

Low-VOC and zero-VOC products: The push for healthier indoor environments has led to the creation of low-

VOC (Volatile Organic Compounds) and zero-VOC coatings, sealers, and adhesives. These products minimize harmful emissions and contribute to improved air quality, making them ideal for use in residential and commercial buildings.

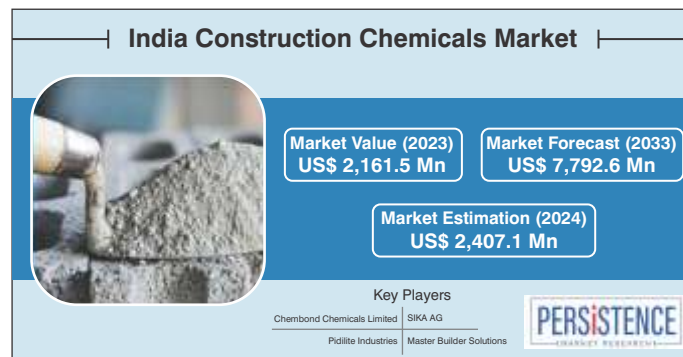
Recyclable and biodegradable materials: Advances in polymer chemistry have resulted in the development of recyclable and biodegradable construction chemicals. These materials reduce environmental impact and address the growing concern of waste management in the construction industry.

Enhanced concrete performance

Concrete remains a cornerstone of construction, and innovations in chemical technology are continually enhancing its performance. In 2024, several key advancements stand out:

High-performance superplasticizers: New formulations of superplasticizers are improving the workability and strength of concrete. These advanced admixtures allow for lower water content while maintaining or even enhancing the flowability and strength of the mix.

Self-healing concrete: The concept of self-healing concrete has moved beyond



the research phase and is now being implemented in real-world applications. New self-healing technologies incorporate bacteria or capsules containing healing agents that activate when cracks form, automatically repairing minor damages and extending the lifespan of concrete structures.

Nanotechnology in concrete: Nanotechnology is making waves in concrete chemistry. Nano-silica and nano-titanium dioxide are being used to enhance the mechanical properties, durability, and resistance to environmental factors like UV radiation and chemical attacks.

Smart and intelligent coatings

The advent of smart coatings is revolutionizing how we approach maintenance and protection in construction:

Self-cleaning coatings: Using photocatalytic materials like titanium dioxide, self-cleaning coatings are now available that use sunlight to break

down dirt and pollutants on building surfaces. This technology reduces the need for frequent cleaning and maintenance, ultimately extending the lifespan of exterior surfaces.

Thermochromic and photochromic coatings: These innovative coatings change color in response to temperature (thermochromic) or light (photochromic) changes. They offer potential benefits for thermal regulation and aesthetic customization in buildings.

Sensor-embedded coatings: The integration of sensors into coatings allows for real-time monitoring of structural health. These sensors can detect stress, moisture levels, and temperature changes, providing valuable data for predictive maintenance and ensuring the longevity of structures.

Advanced sealants and adhesives

Sealants and adhesives play a crucial role in ensuring structural integrity and

efficiency. In 2024, several advancements are improving their performance:

Hybrid sealants: Hybrid sealants, combining properties of silicones and polyurethanes, are offering enhanced adhesion, flexibility, and resistance to weathering. These sealants are suitable for a wide range of applications, including joints, seams, and glazing.

Fast-curing adhesives: New formulations of fast-curing adhesives are reducing construction time by significantly decreasing setting and curing times. These adhesives are particularly useful in high-traffic areas or projects with tight deadlines.

Fire-resistant sealants: The development of fire-resistant sealants that can withstand extreme temperatures without

degrading is enhancing safety in buildings. These sealants are critical for maintaining fire barriers and preventing the spread of flames and smoke.

Green chemistry and circular economy

The principles of green chemistry and circular economy are increasingly influencing the development of construction chemicals:

Cradle-to-cradle design: Chemicals and materials designed with cradle-to-cradle principles ensure that they can be fully recycled or safely returned to the environment. This approach minimizes waste and promotes the use of materials that do not deplete natural resources.

Closed-loop systems: Advances in chemical technology are enabling the



PHOTOS: 128RF

creation of closed-loop systems where waste products are reprocessed and reused in the production of new materials. This not only reduces waste but also lowers production costs and resource consumption.

Carbon capture and utilization: Emerging technologies are focusing on capturing carbon dioxide from industrial processes and using it in the production of construction chemicals. This approach not only mitigates greenhouse gas emissions but also creates valuable materials for construction.

Digital integration and automation

The integration of digital technology and automation is streamlining the use of construction chemicals:

Automated mixing and dispensing systems: Automation in mixing and dispensing construction chemicals ensures consistent quality and precision. These systems reduce human error and improve efficiency in large-scale projects.

Data-driven optimization: Advanced software and data analytics are being used to optimize the formulation and application of construction chemicals. Real-time data

helps in adjusting mixtures and application processes for better performance and cost-effectiveness.

IoT-enabled solutions: The Internet of Things (IoT) is facilitating smart construction practices by connecting chemical application systems to centralized control units. This connectivity allows for real-time monitoring and adjustments based on environmental conditions and project requirements.

Conclusion

The construction chemical technology landscape in 2024 is marked by significant advancements that enhance sustainability, performance, and efficiency. From eco-friendly materials and self-healing concrete to smart coatings and digital integration, these innovations are reshaping the industry and setting new benchmarks for future developments. As the construction sector continues to evolve, these cutting-edge technologies will play a pivotal role in addressing global challenges and driving progress in the built environment.

Source: Mr Ajaykumar Patil, Marketing Executive, Persistence Market Research Pvt. Ltd., UK;
E: ajaykumar@persistencemarketresearch.com



Breakthrough in catalysis research leads to a new self-cleaning wall paint

Typically, beautiful white wall paint does not stay beautiful and white forever. Often, various substances from the air accumulate on its surface. This can be a desired effect because it makes the air cleaner for a while – but over time, the color changes and needs to be renewed.

A research team from TU Wien and the Università Politecnica delle Marche (Italy) has now succeeded in developing special titanium oxide nanoparticles that can be added to ordinary, commercially available wall paint to establish self-cleaning power: The nanoparticles are photocatalytically active, they can use sunlight not only to bind substances from the air, but also to decompose them afterwards. The wall makes the air cleaner – and cleans itself at the same time. Waste was used as the raw material for the new wall paint: metal scrap, which would otherwise have to be discarded, and dried fallen leaves.

Modified titanium oxide in the wall paint

A wide variety of pollutants occur in indoor air – from residues of cleaning agents and hygiene products to molecules that are produced during cooking or that are emitted by materials such as leather. In some cases, this can lead to health issues, which is then referred to as “sick building syndrome.”

“For years, people have been trying to use customized wall paints to clean the air,” says Prof Günther Rupprechter from the Institute of Materials Chemistry at TU Wien. “Titanium oxide nanoparticles are particularly interesting in this context. They can bind

and break down a wide range of pollutants.”

However, simply adding ordinary titanium oxide nanoparticles to the paint will affect the durability of the paint: just as pollutants are degraded by the nanoparticles, they can also make the paint itself unstable and create cracks. In the worst case, volatile organic compounds can even be released, which in turn can be harmful to health. After a certain time, the paint layer becomes gray and tinted, finally it has to be renewed.

Self-cleaning by light

However, the nanoparticles can clean themselves if they are irradiated with UV light. Titanium oxide is a so-called photocatalyst – a material that enables chemical reactions when exposed to suitable light. The UV radiation creates free charge carriers in the particles, which induce decomposition of the trapped pollutants from air into small parts and their release. In this way, the pollutants are rendered harmless, but do not remain permanently attached to the wall paint. The wall color remains stable in the long term.

In practice, however, this is of little use – after all, it would be tedious to repeatedly irradiate the wall with intense UV light in order to drive the self-cleaning process. “Our goal was therefore to modify these particles in such a way that the photocatalytic effect can also be induced by ordinary sunlight,” explains Günther Rupprechter.

This is achieved by adding certain additional atoms to the



Qaisar Maqbool and Prof Günther Rupprechter, Institute of Materials Chemistry, TU Wien.

titanium oxide nanoparticles, such as phosphorus, nitrogen, and carbon. As a result, the light frequencies that can be harvested by the particles change, and instead of just UV light, photocatalysis is then also triggered by ordinary visible light.

96% pollutant removal

“We have now investigated this phenomenon in great detail using a variety of different surface and nanoparticle analysis methods,” says Qaisar Maqbool, the first author of the study. “In this way, we were able to show exactly how these particles behave, before and after they were added to the wall paint.”

The research team mixed the modified titanium oxide nanoparticles with ordinary, commercially available wall paint and rinsed a painted surface with a solution containing pollutants. Subsequently, 96% of the pollutants could be degraded by natural sunlight. The color itself does not change – because the pollutants are not only bound, but also broken down with the help of sunlight.

Waste as a raw material

For the commercial success of such paints, it is also important to avoid expensive raw materials. “In catalysis, for example, precious metals such as platinum or gold are used. In our case, however, elements that are readily available from everywhere are sufficient: To obtain phosphorus, nitrogen and carbon, we have used dried fallen leaves from olive trees, and the titanium for the titanium oxide nanoparticles was obtained from metal waste, which is normally simply thrown away,” says Günther Rupprechter.

This new type of wall paint combines several advantages at the same time: it removes pollutants from the air, it lasts longer than other paints – and it is even more resource-saving in production as it can be obtained from recycled materials. Further experiments are being carried out, and commercialization of the wall paint is intended.

Courtesy: Qaisar Maqbool and Prof Günther Rupprechter, Institute of Materials Chemistry, TU Wien; E: guenther.rupprechter@tuwien.ac.at

Engineers create complex concentrated alloy for use as a high-temperature coating for hydrogen combustion engines

An engineering research team at the University of Alberta has identified a new material for coatings that offers promise for high-temperature applications like hydrogen combustion engines.

The coating is made from a new super alloy composed of metals such as aluminum and nickel. Known as a complex concentrated alloy, the new material is ideal for coating surfaces that must withstand high temperatures, such as in gas turbines, power stations, vehicle and airplane engines. The newly developed alloy — AlCrTiVNi5 — has superior thermomechanical properties that include high stability, low expansion, fracture tolerance, and a valuable combination of strength and ductility — which make it able to stand up in high-heat and high-pressure environments, notes a press communique from the University.

When compared with existing commercially available alloys used as coatings in high-temperature applications, the new coating material stands up better than anything else, according to project supervisor Jing Liu, assistant professor in the Department of Chemical and Materials Engineering. It could prove important for use in hydrogen engines.

Hydrogen is considered one of the cleanest sources of energy, as it produces only water when it is burned or used in a fuel cell. It plays an important role in Canada and

Alberta's emissions reduction goals, for a range of uses including transportation, home heating and heavy industry.

But one of the challenges of hydrogen adoption is the high temperature at which it burns, ranging from 600 to 1500°C. These extreme temperatures mean that any mechanical components involved in hydrogen combustion must be able to withstand high heat as well as resist corrosion from steam.

"If you would like to use a 100 percent hydrogen fuel combustion engine, the flame temperature is extremely high," Liu says. "Until now, none of the existing metallic coatings have been able to work in a 100 percent hydrogen combustion engine."

Currently, most hydrogen combustion engines in commercial applications run on a mix of fuels — natural gas and hydrogen, or diesel and hydrogen, for instance — but as more industries work to adopt hydrogen as a primary fuel source, Liu sees a need to prepare for the ultra-high temperature conditions of a fully hydrogen-fuelled engine.

"As we move toward a 100 percent hydrogen combustion engine, we want to know which alloys can withstand the conditions. None of the existing ones did, but we learn valuable insights from these failures," she says.



PHOTO: UNIVERSITY OF ALBERTA

Engineering researcher Meifeng Li is part of a University of Alberta team that identified a new super alloy composed of aluminum, nickel and other metals that shows potential for high-temperature coatings.

The research team identified the strengths and weaknesses of each existing commercially available alloy, then used theoretical simulations to identify potential new combinations that might have the strength and durability they were looking for. Working with colleagues like Hao Zhang in the Faculty of Engineering, the team used computer modeling to understand the properties of each potential new alloy.

"We understand how things react when they heat up," explains Zhang. "So we use these simulations and calculations to understand how the interface between the matter and the environment changes if we change the composition."

After identifying AlCrTiVNi5, the team put the new alloy through the same high-temperature tests used on existing commercially available alloys. All of the existing alloys failed after 24 hours or less in the hot,

corrosive environment, but the new complex concentrated alloy stood up to the challenge.

"We did our experiment on these corrosive environments for up to 100 hours at 900°C and it survived, so that's a big improvement," says Zhang.

Although the new alloy offers promise to withstand the heat of a high-percentage hydrogen combustion engine, Liu notes that further studies are necessary before it can be widely adopted. Nonetheless, she remains optimistic about its potential.

"This alloy outperforms anything else on the market right now," said Liu. "It opens the door for new possibilities and will hopefully advance the Canadian hydrogen economy."

The study, "A novel entropy-stabilized oxide coating thermally grown from a valve metal-based complex concentrated alloy," was published in *Materials Today*.

Date	Course	Place	Organizer	Contact Details
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OCT 21 – 25, 2024	CSWIP 3.1 Senior Welding Inspector Level II	Kochi	Blastline Institute	T: (484) 2408477 E: info@blastlineinstitute.com W: blastlineinstitute.com
OCT 27 – 30, 2024	CSWIP 3.1 Senior Welding Inspector Level II	Kochi	Blastline Institute	T: (484) 2408477 E: info@blastlineinstitute.com W: blastlineinstitute.com
NOV 04 – 08, 2024	CSWIP 3.2 Senior Welding Inspector Level III	Kochi	Blastline Institute	T: (484) 2408477 E: info@blastlineinstitute.com W: blastlineinstitute.com
NOV 04 – 09, 2024	Basic Coatings Inspector / CIP Level 1 Course	Kochi	Corcon Institute of Corrosion	T: (022) 24106494 E: info@corrosionindia.org W: corrosionindia.org
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EuroBLECH 2024 sets out new ways to engage with productivity

Thousands of exhibits and four days of intense product sourcing, networking and learning: The sheet metal working industry is gearing up for their benchmark event, EuroBLECH 2024, presenting the world's largest selection of sheet metal working technology in one place. Reflected in this year's show motto, 'The Power of Productivity,' visitors can look forward to a trailblazing event at the core of the industry, with premier access to top-tier suppliers, live demonstrations and world premieres. Visitor registration is now live, with additional ticket options for Guided Visitor Tours and a special Careers Day for emerging talent.

Visitor registration has just kicked off for the 27th International Sheet Metal Working Technology Exhibition, EuroBLECH, taking place from October 22 – 25, 2024 at the Hanover Exhibition Grounds in Germany. It is the world's largest exhibition for sheet metal processing, covering the entire supply chain in 15 different technology sectors across nine exhibition halls. This year's focus is on productivity-enhancing technology, presenting the latest the market has to offer in terms of increasing output and efficiency while aligning individual production processes to the complex demands of smart manufacturing.

The coming event will feature some 90,000 sqm of net exhibition space, offering direct access and networking opportunities with blue chip and SME suppliers from all over the globe, with more than 60% of exhibitors joining from abroad. Besides

Germany, major exhibitor countries for 2024 are Italy, Turkey, China, Spain, the Netherlands, Switzerland, Taiwan, Poland, Belgium, Austria, India, France and the USA. The show floor will be a mix of well-known brands, such as Adige, AIDA, Amada, Bystronic, Dimeco, Durma, Haco, LVD, Messer Cutting Systems, Pivatic, Prima Power, Salvagnini, Schuler, Thyssen, TRUMPF, Yamazaki Mazak and many others, complemented by highly specialized SMEs and first-time exhibitors showing their innovative strength on the market.

Exhibits cover anything to do with the processing of semi-finished and finished products, including metal sheet, tubes, profiles, and plastic hybrids. Visitors will have plenty of opportunities to discover and source the latest in stamping, punching, pressing, forming, cutting, joining, welding, fastening, handling, finishing, quality control, CAD/CAM/CIM, tools, machine components, warehouse and factory equipment, material recycling, R&D, and so much more.

Noteworthy is the proactive stance taken by tech suppliers over recent years to future-proof the industry through innovation, efficiency, and adaptability. "If change comes at you fast, you have to come up with solutions even faster," says Evelyn Warwick, Event Director of EuroBLECH, on behalf of RX. "The integration of AI and machine learning are revolutionizing the industry, enabling unprecedented levels of precision and efficiency. Automation and robotics continue to advance, streamlining production



processes and reducing manual labor, while the Internet of Things connects machinery and systems for real-time monitoring and optimization. These innovations, showcased at this year's EuroBLECH, underscore the industry's commitment to meet the growing demands for customization, sustainability, and smart manufacturing."

Alongside thousands of exhibits and supplier representatives in the exhibition halls, the 2024 visitor experience offers a wealth of opportunities to personally engage with innovation, including the new Guided Visitor Tours on 'Automation and Robotics' and the 'Industrial Internet of Things (IIoT)' to optimize production efficiency. In addition, the popular Speaker Forum delivers actionable insight and knowledge on current key topics, such as 'Automation, Robotics and Cobots' in Forum I, and 'Digitalization, Industrial Metaverse (AI, VR, AR, IIoT) and Cybersecurity' in Forum II. The prestigious EuroBLECH Awards will honor five winners for their outstanding achievements in driving technical excellence and innovation. And Friday is Careers Day again, promoting young talent

in the industry.

The official event website (euroblech.com) provides extensive information on the exhibition profile and show visit, including Travel and Accommodation, the full Exhibitor List with company and product descriptions, and a comprehensive Online Show Preview with search and filter functions to help attendees find the companies and products most relevant to them. By clicking on a little icon, users can create a list of favorite suppliers which can be exported and easily accessed on multiple devices.

EuroBLECH 2024 at the Hanover Exhibition Grounds in Germany, occupies halls 11, 12, 13, 14, 15, 16, 17, 26 and 27. Daily opening times are 9:00 to 18:00. Registration and Ticket Shop are now open. Tickets are €39.00 for a Day Ticket, and €70.00 for a season ticket (valid on all four show days). Additional ticket options include Guided Visitor Tours (€25.00), the Official Show Catalogue (€44.00) and free admission for students and apprentices on Careers Day on Friday, October 25 (available onsite upon presentation of valid student ID).

Date	Event	Venue	Organizer	Contact Details
SEP 23 – 25, 2024	EUROPEAN TECHNICAL COATINGS CONFERENCE	Palace of the Popes of Avignon, Avignon, France	AFTPVA	W: etcc2024.org
NOV 11 – 14, 2024	ADIPEC	Abu Dhabi, UAE	dmg events	E: enquiry@adipec.com W: adipec.com
NOV 20 – 23, 2024	CORCON 2024	Chennai Trade Centre, Chennai, India	AMPP India Chapter	W: corcon.org
NOV 27 – 29, 2024	COAT INDIA 2024	Yashobhoomi, Dwarka New Delhi, India	ACEXM7 Events Pvt Ltd	E: support@acem7.com W: coatindia.in
DEC 03 – 05, 2024	CHINACOAT 2024	China Import & Export Fair Complex, Guangzhou, China	Chinacoat Exhibition Ltd	W: chinacoat.net
JAN 15 – 17, 2025	THE COATINGS SUMMIT	Andaz Hotel, Singapore	Vincentz Network	E: lena.witte@vincentz.net W: european-coatings.com
JAN 30 – 31, 2025	PAINTINDIA 2025	IICC (Yashobhoomi), Dwarka, New Delhi, India	ExpoNova	Email: paintindia.expo@colorpub.in W: paintindia.in
FEB 17 – 19, 2025	SAUDI ARABIA COATINGS SHOW 2025	Dhahran Expo, Damman, Saudi Arabia	dmg events	W: saudiarabiacoatingsshow.com E: andrewgathercole@dmgevents.com
FEB 23 – 25, 2025	EGYPT COATINGS SHOW	Egypt International Exhibition Center, Cairo, Egypt	dmg events	T: +971 44453773 E: paddyoneill@dmgevents.com W: egyptcoatingsshow.com
FEB 25 – 28, 2025	INTERLAKOKRASKA 2025	Expocentre Fairgrounds, Moscow, Russia	Expocentre	E: interlak@expocentr.ru W: interlak-expo.ru/en/
APR 06 – 10, 2025	AMPP ANNUAL CONFERENCE + EXPO 2025	Music City Center, Nashville, Tennessee, USA	AMPP	W: amp.org
MAY 13 – 15, 2025	SAUDI ARABIA COATINGS SHOW 2025	Dhahran Expo, Damman, Saudi Arabia	dmg events	T: +971 44453773 E: paddyoneill@dmgevents.com W: saudiarabiacoatingsshow.com
MAY 13 – 15, 2025	EASTERN COATINGS SHOW	Harrah's Atlantic City, NJ, USA	The Philadelphia Society for Coatings Technology	E: info@easterncoatingsshow.com W: easterncoatingsshow.com
JUN 25 – 27, 2025	COATINGS EXPO VIETNAM 2025	SECC, Ho Chi Minh City, Vietnam	VEAS	E: info@veas.com.vn E: coatings-vietnam.com
JULY 02 – 04, 2025	WEST AFRICA COATINGS SHOW	Landmark Centre, Lagos, Nigeria	dmg events	T: +971 44453773 E: paddyoneill@dmgevents.com W: westafricacoatingsshow.com
SEP 03 – 05, 2025	ASIA PACIFIC COATINGS SHOW	Bangkok International Trade & Exhibition Centre Bangkok, Thailand	dmg events	T: +971 44453773 E: paddyoneill@dmgevents.com W: asiapacificcoatingsshow.com
OCT 01 – 03, 2025	PAINTEXPO EURASIA	Istanbul Expo Centre, Istanbul, Turkey	Artkim	E: sales@artkim.com.tr W: artkim.com.tr

Please note, schedules are subject to last minute changes.



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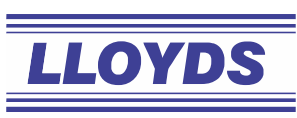
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