coatingsjournal.com

COATINGS AND ANTI CORROSION ENGINEERING REVIEW

February - March 2026 | Volume 16 Issue 6 | ₹100

AI no longer a futuristic concept but a practical tool reshaping the paint and coatings industry

Interview

Ms Veron Teoh

Head of APAC Commercial, Advanced Polymer Coatings

Technical Feature

ECOMET® CORUNDUM: A PFAS-free, zero-liquid-discharge zinc-aluminium lamellar coating system...

JAGUAR EQUIPMENTS PVT. LTD.

Manufacturer of airless equipment and spraying systems, utilizing advanced technology and expertise to handle various fluids and coating materials in industrial and commercial applications. Our equipment globally sprays, transfers, meters, dispenses, and controls liquids and semi-solids.


INFRASTRUCTURE


WIND ENRGY


OIL & GAS


PASSIVE FIRE PROTECTION


SHIP BUILDING

The **JaguaR Plural-Component Spraying Equipment** is designed to pump, mix and spray high viscosity, high solids injections with excellent results. The trend for the coatings industry is toward high solids coatings. Formulated with less solvent, these coatings reduce Volatile Organic Compounds emissions and speeds up production with faster cure times. When switching from a manual mixing system, you will find that Plural-Component Spraying Equipment provides an excellent return on investment by reducing waste material and using less cleaning solvent.

READY FOR THE TREND OF COATINGS

PUMP, MIX & SPRAY
HIGH VISCOSITY
HIGH SOLIDS

JAGUAR EQUIPMENTS Pvt. Ltd.
PLOT NO 21, SECTOR NO.10 PCNTDA,
MIDC BHOSARI, PUNE, MAHARASHTRA,
INDIA - 411026

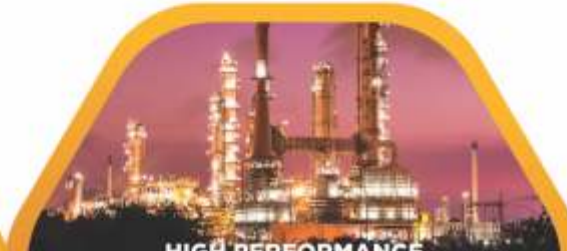
sales@jaguarequipments.com
+91-020-66306016 66340411
I www.jaguarequipments.com

A COAT OF PROTECTION FOR EVERY APPLICATION

GROWEL
SINCE 1957
Paints

AEROSPACE & DEFENCE (AS 9100 certified)

- GOST spec products
- BS spec products
- MIL spec products
- Coatings for missiles & aircraft



HIGH PERFORMANCE INDUSTRIAL COATINGS

- 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

MARINE COATINGS

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

Architectural Coatings

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

FLOOR COATINGS

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

GROWEL
SINCE 1957

Grauer & Weil (India) Limited
Regd. Office: Growel Corporate, Akurli Road, Kandivli (E), Mumbai 400 101, India
T 91 22 66993000 8082048048 E info.paints@growel.com
www.growel.com

Chemicals I Engineering I Paints I Lubricants I Real Estate

KHUSHBOO SCIENTIFIC

YOUR QUALITY OUR ASSURANCE

SINCE 1984...

Advanced Instruments for Corrosion Prevention & Durability Testing

Q-LAB USA

Authorised Distributors for India

Accelerated Weathering for Ultimate Corrosion Resistance

QUV
Weathering Tester

Q-Sun Xe-8
Xenon Test Chamber

Q-Fog SSP & CCT

Q-Fog CRH

BEVS

Exclusive Distributor for India

Paint & Coating Testing Instruments

- Rotothinner
- Intelligent Cone & Plate Viscometer
- Intelligent Stormer (Krebs) Viscometer

Wet Abrasion Scrub Tester with Camera & AI

Tubular Impact

Automatic
Film Applicator

Conical/ Cylindrical Mandrel

Cross Hatch Cutter

RHOPOINT INSTRUMENTS UK

Exclusive Distributors for India

Precise Gloss, Haze & Opacity Measurement

Novo-Gloss Trio
(20°/60°/85°) Glossmeter

Rhopoint IQ 20°/60°/85°
DOI Gloss Haze Meter

TABER INDUSTRIES USA

Authorised Distributors for India

Abrasion Testing for Long- Lasting Surface Protection

Rotary Platform Abrasion
Tester - Model 1700

Metrohm Swiss

Authorised Distributors for India

Electrochemistry Redefined for Precision and Performance

Multichannel Potentiostats/
Galvanostats
(Corrosion Studies)

Karl Fischer Titrando

ION
Chromotograph

OMNIS NIR Analyzer

Khushboo Scientific Pvt. Ltd.
NABL Accredited Calibration Lab
15th Floor, Jolly Maker Chambers II,
Nariman Point, Mumbai - 400 021,
Maharashtra, India
Mumbai | Delhi | Chennai | Pune | Ahmedabad

Contact Us
+91-22-4884 4859/93/85/99
sales@khushbooscientific.com
www.khushbooscientific.com
GeM Seller Id : BAB7190000927726

Certifications

NABL (CC-4436) ISO CRISIL

COATINGS AND ANTI CORROSION
ENGINEERING REVIEW

Cover Feature 30

AI no longer a futuristic concept but a practical tool reshaping the paint and coatings industry

Product Profile 14

PPG: Reaching new horizons in sustainability and performance

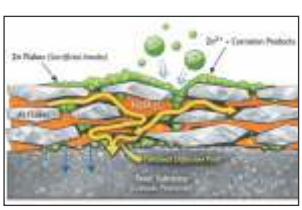
Interview 18

Ms Veron Teoh
Head of APAC Commercial, Advanced Polymer Coatings

Company Profile 24

Nippon Paint Marine: Effective maritime operations demand reliable, high-performing coatings

Technical Feature 34



ECOMET® CORUNDUM: A PFAS-free, zero-liquid-discharge zinc-aluminium lamellar coating system...

Editorial 4
New Products & Processes 6
Industry Report 41
Industry News 44
Training Programs 48
Research 49
Events & Exhibitions 52
Calender of Events 56
Classifieds 58

COVER PHOTO:ESS / PAINTEXPO
(Instead of around 600 kWh for painting a vehicle, ESS's new patented painting technology reduces the energy requirement per car body to 200 kWh.)

COATINGS AND ANTI CORROSION ENGINEERING REVIEW

From the Editor-in-Chief...

Volume 16; Issue 6
February - March 2026

Editor-in-Chief
Jolly Lonappan
editor-in-chief@coatingsjournal.com

Publisher
Franco Lonappan
publisher@coatingsjournal.com

Editor
Abraham Mathai
editor@coatingsjournal.com

Subscriptions
Vitthal Talekar
M: 8879050769
marketing@coatingsjournal.com

Design
Narendra Tipnis

Accounts
Aatish Shedge

Office
Jerome Quadras

Editorial, Advertising and Circulation Office:
102, Dattar Mansion, C. S. Marg, Vakola Bridge, Santacruz (East), Mumbai 400055
Tel: (022) 26680477, Tel/Fax: 26684376
E-mail: info@coatingsjournal.com
URL: www.coatingsjournal.com

Much has been written about Artificial Intelligence (AI) transforming healthcare, finance, manufacturing, and retail through predictive analytics, automation, and generative models. At the same time AI and automation are making many strides in surface technology – which includes coatings, surface treatments, material characterization, and manufacturing finishing – shifting it from manual, experience-based operations to intelligent, data-driven, and highly precise systems.

Whether process monitoring, quality assurance, material efficiency or plant control, digital technologies are fundamentally changing painting processes and raising them to a new level of performance. Intelligent, automated solutions are already in use today and will become even more important in the future. Close cooperation with manufacturers, system providers, research institutions and users shows that AI is no longer a promise for the future, but a decisive lever for more efficient, sustainable and stable coating processes.

This technology is not just automating old processes; it is creating entirely new possibilities. It helps manufacturers produce higher-quality paint with less waste, empowers consumers to find the perfect color with a tap on their screen, and pushes the boundaries of what a simple coat of paint can achieve.

These illustrations show that AI and automation in surface technology are no longer viewed in isolation, but increasingly as integral components of continuous process chains. The focus is shifting from individual optimizations to networked systems in which process data, quality information and plant parameters are collated and evaluated in real time. This development opens up new potential for reproducible quality, resource efficiency and process stability – but at the same time requires a high level of system integration and robust data models.

In this issue, we try and discuss some of the latest developments within our sector in the field of AI and automation. Besides, this issue also carries all our regular features and columns to keep our readers updated.

At the same time, we also hope the hostilities in the Middle East comes to an end as soon as possible and we are able to get on with our businesses and lives as usual and in peace!

Jolly Lonappan
Editor-in-Chief

Owned, Printed and Published by Franco Lonappan. Printed at Aarya Graphics, Unit No.20, J.K.Indl. Estate, Mahakali Caves Road, Near Paper Box Co, Andheri (East), Mumbai - 400093 and Published from 102, Dattar Mansion, C. S. Marg, Vakola Bridge, Santacruz (East), Mumbai 400055. Editor: Abraham Mathai.
Coatings And Anti Corrosion Engineering Review is Registered with the Registrar of Newspapers of India under No: MAHENG/2010/37489

Aluma-Coat®

GOOD BYE CORROSION & ABRASION W E A R

Now Increase Equipment life and Control Operating Cost

VISIT US
PAINTINDIA 2026
Bombay Exhibition Centre, Mumbai, India
19th - 21st FEB. 2026
STAND NO.: C-12
HALL NO.: 2

CORROSION, ABRASION & CHEMICAL ATTACKS destroy crores of rupees worth equipment every year. Worldwide research shows that nearly 70%-80% equipment failures are purely due to their surface erosion. The need for effective preventive maintenance therefore is imperative.

The time has arrived for ceramics to finally take centre stage. Jyoti Ceramic Industries has specially developed ceramic filled polymer based coating compounds, "**Aluma Coat®-BR**" brushable / sprayable and "**Aluma Coat®-TW**" trowelable.

VERSATILE INDUSTRIAL APPLICATIONS

Motor Shaft Coated with Aluma Coat - BR

Butterfly Valve Coated with Aluma Coat - BR

Aluma Coat® - BR

A brushable / sprayable easy to apply coating designed to protect surfaces from severe turbulence, corrosion, erosion and chemical attacks. It gives a satin smooth, high-gloss surface finish and can withstand maximum service temperature up to 150°C / 302°F

Aluma Coat® - TW

A trowelable, easy to apply protective coating, comprising of sintered sapphire-hard ceramic micro beads, doped in polymer resins designed to resist corrosion, abrasion and moderate surface impact. It gives a rough textured surface finish and can withstand maximum service temperature up to 150°C / 302°F.

VERSATILE INDUSTRIAL APPLICATIONS

Mineral Crusher Coated with Aluma Coat - TW

Inner Base of Dust Collector Coated with Aluma Coat - TW

Contact us :

JYOTI CERAMIC INDUSTRIES PVT. LTD.

Proudly made in INDIA for the WORLD

MAKE IN INDIA

India (Head Office)
C-21, N.I.C.E, Satpur, Nashik - 422 007,
Maharashtra, India.
Tel.: +91 (0) 253 6918111, 2350120 / 338 / 729
E-mail: info@jyoticeramic.com
Web: www.jyoticeramic.com

Europe
Jyoti Ceramic GmbH
Frankenstr. 12, 90762 Fürth, Germany.
Tel.: +49 (0) 911 78 71 20 83 / 84 / 85
Fax : +49 (0) 911 78 71 20 82
E-mail : sales@jyoticeramic.com

U.S.A.
Techno Ceramic Inc.,
P.O. Box 333, New Hampton, NY 10958, USA.
Tel.: +1 (0) 845 547 2219 / 845 547 2220
Fax: +1 (0) 845 547 2221
Email : jcw@tci-jyoti.com

JYOTI CERAMIC SINCE 1970

55 years service to the nation

Inviting state wise proposals for dealership / distributorship.

www.jyoticeramic.com

Borchers launches next-generation tin-free catalyst: Borchi® Kat 2115

Borchers (borchers.com), a Milliken brand and global leader in coating additives, has launched the Borchi® Kat 2115, a next-generation tin-free catalyst engineered for polyurethane coatings. This innovation empowers formulators to meet demanding performance standards while advancing compliance and sustainability in line with evolving global regulations, notes a communique from the company.

"True innovation means delivering solutions that not only perform but also advance sustainability and compliance in our industry," said Jeff Losch SVP and Managing Director for Milliken's polymer solutions business. "The launch of Borchi® Kat 2115 demonstrates our team's commitment to developing next-generation technologies that help our customers meet evolving regulatory requirements and achieve their performance goals with confidence."

PHOTO: BORCHERS

Borchi® Kat 2115's key benefits include optimal drying times, longer pot life, superior hardness, excellent corrosion resistance, and stable gloss/color retention.

With increasing global regulations driven by regulatory bodies like the European Chemical Agency mandating stricter labeling on dibutyltin dilaurate (DBTDL) and 2-ethylhexanoic acid (2EH) and its salts in coatings, Borchi® Kat 2115 enables manufacturers to confidently transition to better-labeled, high-performance systems without sacrificing efficiency or durability. Developed as a combination of neodecanoate metals, Borchi® Kat 2115 delivers optimal reactivity and reliability while minimizing regulatory drawbacks.

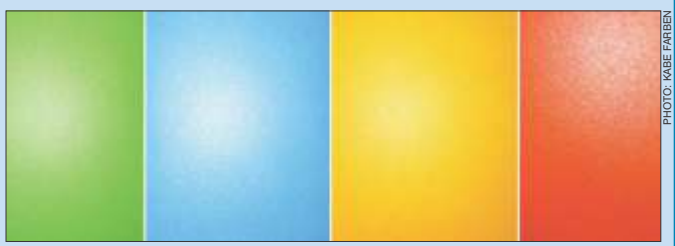
Borchi® Kat 2115 provides efficient reactivity and enhances durability properties compared to traditional tin and bismuth-based catalysts in 2K polyurethane systems. This next-generation catalyst has been tested across a range of applications, including general industrial, protective, marine, and automotive refinish coatings. Key benefits include optimal drying times, longer pot life, superior hardness, excellent corrosion resistance, and stable gloss/color retention.

PFAS-free fine-textured powder coatings from KABE Farben

A Swiss powder coating specialist now offers its complete range of fine-textured powder coatings in PFAS-free versions. The expansion includes products for interior applications, highly weather-resistant façade coatings, and the MDF range – without compromising on quality or processing, according to a press release from the company.

In light of this development, Karl Bubenhofer AG has invested considerable resources in research and development to create high-performance alternatives. The result: all of the company's finely structured powder coatings are now also available as PFAS-free variants. In doing so, KABE Farben is not only responding to stricter regulatory requirements but also taking on a pioneering role in the industry.

PHOTO: KABE FARBEN



The PFAS-free formulations are suitable for interior products, highly weather-resistant facade products (Qualicoat certified), and MDF.

KABE Farben (kabe-farben.ch/) has been active in the field of powder coatings for almost 50 years. The Swiss paint manufacturer's development work is characterized by its continuous pursuit of maximum performance and responsibility towards people and the environment.

Per- and polyfluoroalkyl substances, or PFAS for short, have been used in numerous industrial applications for decades due to their special properties. They have also long been considered indispensable in the manufacture of finely structured powder coatings. However, the widespread use of these substances has led to considerable environmental pollution. PFAS are now detectable in the blood of virtually all humans – a situation that is cause for concern from a health perspective and is increasingly coming under regulatory scrutiny.

The PFAS-free formulations are suitable for interior products, highly weather-resistant facade products (Qualicoat certified), and MDF. The decision is up to the customer. Both the tried-and-tested and the new PFAS-free variants are available. It should be emphasized that the PFAS-free products have no restrictions whatsoever. The baking window, shelf life, and complete color selection meet the usual standards. Users can therefore flexibly choose which variant is right for their requirements.

With this expansion of its range, Kabe Farben is underlining its commitment to sustainable solutions that meet the highest technical standards.

GRACO

E-MIX XT™

PATENT PENDING

ELECTRIC VARIABLE RATIO SPRAYER

THE EASIEST-TO-OPERATE VARIABLE-RATIO SPRAYER IN THE INDUSTRY

Introducing the industry's most economical, easy-to-operate & portable electric variable ratio spray system! Designed to handle spray ratios from 1:1 up to 6:1, it is also fully capable with coatings up to 100% solids content — making it an ideal solution for nearly every job!

ELECTRIC POWERED, NO AIR COMPRESSOR NEEDED
LESS HASSLE AND EXPENSE —SAVE $1000'S PER WEEK!

EASY TOUCHSCREEN OPERATION
SET RATIO, PRESSURE, HEATER TEMPERATURES AND SPRAY!

QUIET OPERATION ALLOWS EXTENDED SPRAY TIMES IN NOISE-SENSITIVE AREAS

OFFERS SUBSTANTIAL SOLVENT AND COATING SAVINGS COMPARED TO "HOT-POTTING"

Scan The QR Below

Graco India Pvt. Ltd.
295, Udyog Vihar, Phase 4, Gurgaon - 122015, Haryana, India.
Tel: +91-124-6610200
Website : www.graco.com

Compact resource-optimized anodizing plant launched by ALSAN

ANODIKIT® ZONE from the Spanish company ALSAN (alsan.es/en/) is a compact anodizing plant developed for aluminium finishing companies seeking high-quality anodizing with reduced space, resource and operational requirements. The installation is based on a spray-applied pretreatment concept, in which all pretreatment stages are carried out within a single multiprocess tank, according to a communique from the company. This configuration significantly reduces the number of tanks and bath volumes compared to conventional anodizing lines, while maintaining uniform and controlled surface preparation.

PHOTO: ALSAN

ANODIKIT® ZONE's simplified layout also translates into lower maintenance needs and straightforward daily operation.

Thanks to its compact design, ANODIKIT® ZONE requires approximately 250 m^2 of installation space and can be operated with 1 - 2 people per shift, making it suitable for facilities where space and manpower optimization are key factors. The simplified layout also translates into lower maintenance needs and straightforward daily operation. Despite its compact size and optimized resource requirements, the process delivers high-quality anodizing and enables additional finishing possibilities such as coloring, depending on configuration and application requirements.

The anodic layer quality obtained with ANODIKIT® ZONE meets the requirements of the Qualanod certification, and anodizing processes carried out on this type of installation are already being used by Qualanod certified companies in their production. ANODIKIT® ZONE offers lower water and chemical consumption compared to traditional anodizing pretreatments. When combined with zero-liquid-discharge solutions such as EcodePure, the installation supports advanced sustainability strategies aligned with current environmental and regulatory requirements. In facilities where powder coating is already present, the compact nature of ANODIKIT® ZONE allows anodizing to be incorporated as a complementary process, enabling preox pretreatment without the infrastructure demands of a conventional anodizing plant.

The Taber Rotary Platform Abrasion Tester Model 1700

In the world of surface finishing and anti-corrosion coatings, durability is the ultimate benchmark. A coating may offer exceptional chemical resistance, but if it cannot withstand mechanical wear, the underlying substrate remains vulnerable. For professionals seeking to quantify this endurance, Khushboo Scientific has on offer the Taber Rotary Platform Abrasion Tester – Model 1700.

PHOTO: TABER

The Taber Rotary Platform Abrasion Tester – Model 1700 is engineered for repeatable, reliable data.

The Model 1700 utilizes a unique "X" pattern of abrasion produced by the rotary action of two abrasive wheels. As the turntable rotates, the wheels are driven by the sample in opposite directions. This creates a circular wear path, exposing the material to rubbing-shear action at all angles. This process simulates years of real-world wear in just a few hours. This method is critical for determining the lifespan of paints, lacquers, and electroplated layers; testing the integrity of metals, plastics, and ceramics, and assessing wear resistance in high-friction applications.

The Model 1700 is engineered for repeatable, reliable data. It features a precision-built housing and an intuitive interface that allows operators to set cycles and suction speeds with ease. Standardized loads of 250g, 500g, and 1000g ensure consistent pressure load weights. The vacuum removal system with a built-in nozzle removes debris during testing to prevent irregular wear. Interchangeable wheels with a variety of abrasive grains (calibrade and calibrase) simulate specific environments. Modern touch-screen digital interface controls automate the testing process and stop at precise milestones.

By utilizing the Model 1700, labs can determine the exact wear rate of a material by measuring weight loss over a specific number of cycles. This quantitative approach allows manufacturers to refine their formulas, ensuring that anti-corrosion barriers remain intact even under heavy physical stress.

For the Indian paint and coating industry, where quality mandates are tightening and exports are growing, the Model 1700 is more than just a tester; it is an investment in process control and conformance, the press release notes.

More details:
www.khushbooscientific.com

World class testing Instruments for Paint, Coating & Corrosion testing

In the silence of the lab, our instruments speak volumes.

AADARSH TECHNOLOGIES

Versatile Sand-Milling Dispersing-agitator

Super high speed dispersing Machine

Versatile Sand-Milling Dispersing-agitator - Electrical motorised lift

Lab basket mill

Triple roller mill

Intelligent line drying time recorder

Automatic Cupping tester

Automatic film Applicator

Wet abrasion scrub tester

MFFT

Haze meter

Intelligent Touch-screen glossmeter

Portable Spectrophotometer

Benchtop Spectrophotometer

DFT meter

Analytical Balance

Moisture analyzer

Benchtop pH meter

Micro-Analytical Balance

Karl fischer titrator

UV weathering Tester

Xenon Test Chamber

Humidity cabinet

Programmable salt spray tester

Cyclic corrosion tester

AADARSH TECHNOLOGIES

Aadarsh Technologies - Laboratory Testing Equipment & Instruments

Bldg No. B, Floor No. 3rd Shop No. 66, Gami Industrial Park, Plot Number: C - 39A, TTC Industrial Area, MIDC Industrial Area, Pawne, Navi Mumbai, Maharashtra 400705

Email : sales@aadarshtech.com / info@aadarshtech.com Call : +91 - 9619519171 / +91 - 8691007010

www.aadarshtech.com

Official distributor for India

Biuged

BIUGED LABORATORY INSTRUMENTS (GUANGZHOU) CO. LTD.

Hempel launches Hempaline Defend 430: a solvent-free tank lining boosting efficiency in the energy sector

Hempel A/S (Hempel.com) has launched the latest addition to the Hempaline Defend family; Hempaline Defend 430, a next-generation tank lining created to help energy operators boost efficiency, minimize downtime and extend maintenance intervals. The solvent-free epoxy phenolic lining streamlines application, lowers energy use during installation and supports more sustainable operations by reducing VOC emissions and workplace hazards, according to a press release from the company.

PHOTO: HEMPEL

Combining rapid curing, single-coat efficiency and long-term durability, Hempaline Defend 430 delivers measurable performance benefits for energy storage tanks.

By combining single-coat efficiency with rapid curing and long-term durability, Hempaline Defend 430 enables asset owners to keep tanks in service longer while lowering lifecycle costs.

"After a trial application with a major tank builder, we received clear feedback that the shorter inspection time, compared to their existing lining, will significantly improve output in their workshop," Matthew Fletcher, Segment Development Manager, Linings at Hempel A/S explains.

Matthew adds that: "With Hempaline Defend 430, asset owners benefit from a solvent-free lining that can be applied in a single coat, returned to service quickly and approved even for the most sensitive cargos. And with a temperature resistance up to 90°C and strong hydrocarbon resistance, Defend 430 truly offers a versatile one-product solution for storage tanks."

Key technical highlights include solvent-free epoxy phenolic lining for energy storage tanks; single-coat application at 400 μm (16 mils); rapid return to service: 3 days at 20°C; withstands crude oil up to 93°C (200°F); approved for potable water (WRAS) and jet fuel (EI1541); inspection interval extension up to 5 years (API 652 & 653 compliant with optional glass fibre mat reinforcement); and compatible with Hempaline Prepare 130 primer for immersion up to 90°C.

Hempaline Defend is a range of high-performance lining solutions engineered for the demanding conditions of the energy and process industries. Designed to withstand corrosion, high temperatures, abrasion and exposure to a wide spectrum of chemicals and solvents, these linings provide reliable long-term protection. By reducing maintenance needs and extending service life, Hempaline Defend helps operators maximise uptime and lower total lifecycle costs.

PPG introduces PPG STEELGUARD 652 coating for interior structural steel

PHOTO: PPG

PPG Steelguard 652 cellulosic passive fire protection (PFP) coating delivers up to two hours of fire protection.

PPG (ppg.com) has announced the launch of PPG STEELGUARD® 652 high-performance, water-based intumescent fire protection coating designed specifically for interior general-purpose structural steelwork, notes a press release from the company. The product combines long-lasting protection and aesthetic appeal.

PPG Steelguard 652 cellulosic passive fire protection (PFP) coating delivers up to two hours of fire protection. Its United Laboratories (UL) 263 certification gives architects, engineers and building owners confidence in the coating's performance and compliance with industry standards. The low volatile organic compounds (VOC) waterborne formulation supports more sustainable construction practices.

Key features of PPG Steelguard 652 coating include long-lasting protection, offering up to 20 years of performance and easy on-site application with standard PFP airless spray equipment, ensuring smooth, consistent coverage

"PPG Steelguard 652 coating expands our range of certified solutions and reflects our ongoing commitment to fire protection innovation," said Richard Mann, PPG global product development director, fire protection, Protective and Marine Coatings. "It stands out for its innovative fire performance and physical properties, including low certified thickness, high bond strength and high impact resistance, providing lasting durability for up to 20 years."

KOMAL Scientific International Pvt. Ltd.
(NABL Accredited Lab CC-3743)

AN ISO 9001-14001-45001 CERTIFIED COMPANY

UKAC
UK ACKREDITERING CERTIFICATION LIMITED

☞ THE ONE STOP SOURCE FOR YOUR TESTING REQUIREMENTS.
☞ A COMPANY WHERE QUALITY AND CUSTOMER SERVICE ARE AT PAR.

- IMPORTERS & EXPORTERS OF SCIENTIFIC LABORATORY TESTING INSTRUMENTS.
- PIONEER IN PAINT, INK, POWDER COATING, SURFACE COATING, PACKAGING, ADHESION, CORROSION, COATINGS, CONCRETE & METAL TESTING INSTRUMENTS.
- SPECIALIST IN VISCOSITY, RHEOLOGY, TEXTURE ANALYSIS & POWDER FLOW INSTRUMENTATION IN A WIDE RANGE OF INDUSTRIES SUCH AS PHARMACEUTICALS, FOOD & BEVERAGES, LUBRICANTS, CHEMICALS, MEDICAL DEVICES, COSMETICS AND PERSONAL CARE PRODUCTS.

CC-3743

SHOWROOM : 633, LAXMI PLAZA, LAXMI INDUSTRIAL ESTATE, NEW LINK ROAD, ANDHERI (W), MUMBAI - 400 053. (INDIA)

(+91-22) 48257108 • 49638303 info@komalscientific.com
prasan@komalscientific.com mayank@komalscientific.com
komalscientific.com

CRISIL Rating : SME 1 'Highest'

Please scan the **QR CODE**
To download our Catalouge

Indicus Paints launches Neotë: India's first luxury paint brand weaving a cultural narrative

Indicus Paints (indicus.in), a brand rooted in heritage and performance, has unveiled Indicus Neotë Luxury Interior Emulsion – India's first luxury paint inspired by the cultural soul of Tamil Nadu. The Neotë line brings together cutting-edge paint technology and the enduring beauty of South Indian art, architecture, and traditions. Neotë introduces a new dimension to the premium paints category, combining advanced technology with packaging that reflects South India's artistic traditions and architectural landmarks. It delivers premium performance with a radiant silky-sheen finish, scuff resistance, and superior washability powered by advanced stain-resistant polymers. Creating velvet-touch texture and an ultra-smooth surface, while Silver Ion Technology provides natural antimicrobial protection. The product is backed by an eight-year warranty covering film integrity, flaking, and peeling, notes a press release from the company.

PHOTO: INDICUS PAINTS

The Neotë line brings together cutting-edge paint technology and the enduring beauty of South Indian art, architecture, and traditions.

In addition to performance, Neotë reflects India's ecological intelligence through Low-VOC, odorless formulations and wellness-driven technology.

"With Neotë, we wanted to do more than create a luxury paint – we wanted to honor the richness of Tamil Nadu's cultural heritage," said B. Gokul, Brand Founder, Indicus & Partner, VNC Group. "Bringing timeless arts into our packaging is our way of showing that modernity doesn't replace tradition – it reimagines it with confidence."

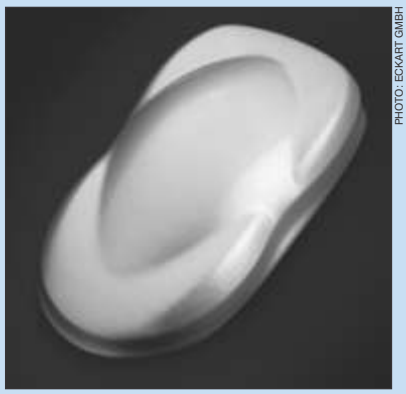
The launch comes at a pivotal moment for Tamil Nadu, India's fastest-growing major state with a real growth rate of 9.69% and a 75% surge in millionaire households since 2021. Rising prosperity has transformed the real estate and lifestyle landscape, with affluent consumers in Chennai, Coimbatore, Madurai, and Trichy increasingly gravitating toward ultra-luxury villas and gated communities. Non-Resident Indians (NRIs) and High Net-Worth Individuals (HNIs) are also investing in premium homes, driving demand for bold, design-conscious interiors, he added.

Gokul further commented, "the paint market is undergoing transformation. Repainting cycles have shortened from 8–10 years to 5–6 years, while preferences for anti-bacterial, Low-VOC, and odorless paints have moved into the mainstream. Design-conscious buyers are embracing texture finishes, feature walls, and maximalist materials such as wicker, terracotta, brass, and handloom. Neotë aligns seamlessly with these converging trends, offering advanced performance while adding a cultural dimension that resonates deeply with Tamil Nadu's heritage."

ECKART's STANDART® PCS HD sets new standards for effect pigments in powder coating

With the launch of STANDART® PCS HD, ECKART (eckart.com), the specialist in effect pigments, is expanding its portfolio with a product line developed specifically for demanding powder coating applications. The new non-leafing aluminum pigments are based on Silver Dollar pigments and impress with an exceptional combination of intense coverage and metallic brilliance, notes a press release from the company.

PHOTO: ECKART GMBH



ECKART's STANDART® PCS HD, a non-leafing aluminum pigment for powder coatings, can reduce pigment use by up to 30% while maintaining high hiding power and a bright metallic finish.

STANDART® PCS HD is suitable for furniture, household appliances, and other high-quality surfaces. Users benefit from up to 30% pigment savings while maintaining performance, as well as optimized processing and application properties.

The series is available in two grades: STANDART® PCS HD33 (coarse) and STANDART® PCS HD12 (fine). Both variants offer significantly improved coverage and an exceptionally bright, metallic appearance. Comparative tests show: Even with a low pigment content, the new pigments achieve outstanding visual effects.

"With STANDART® PCS HD, we offer our customers a solution that sets new standards in both cost efficiency and visual impact," explains Kerstin Ahne, Head of Technical & Research Services Powder Coating. "Our latest generation of effect pigments delivers the highest quality in powder coating thanks to its high coverage and extreme brilliance."

BERGER PROTECTON
PROTECTIVE COATINGS DIVISION

Your trusted partners in fight against Corrosion

Flagship Coating Solutions for...

Durability & Longlife
- BR ACRYLIC POLY SILOXANE
- BR FLUORO THANE

Maintenance & Repair
- DURE BILD MASTIC
- EPILUX HIGH BUILD DIRECT-TO METAL

Passive Fire Proofing
- 150 mins
- BER CHAR WB 70

Across all Industry Segments

Since 1760 Lewis Berger Paint your imagination
100 YEARS OF TRUST

Scan to know more

Berger Paints India Limited
Kolkata, India

Reaching new horizons in sustainability and performance

PPG's product diversification aims to meet growing demand for premium fouling control coatings that help minimize environmental impact and meet sustainability and regulatory targets

Victor Zhang, Senior Marketing Manager, PMC APAC, PPG Coatings

The global shipping industry is changing quickly as pressure mounts to meet greenhouse gas (GHG) emissions reduction targets and comply with stricter regulations. In this environment, fouling control is no longer a check-the-box item; it has become a vital strategy for lowering emissions, meeting environmental regulations and helping protect the lifespan of marine assets.

As sustainability and performance become top priorities, leading marine coatings companies are shaping the shipping industry's path to a more sustainable future.

PPG is one company leading this effort. With more than 140 years of experience and a presence in over 50 countries, PPG is known for innovation and reliability. At Asia Pacific Maritime 2026, PPG is highlighting the shipping industry's push to reach new horizons in sustainability and performance through premium hull coatings, advanced application techniques and digital innovation.

Sustainably advantaged coating solutions

The shipping industry faces intense pressure to achieve the International Maritime Organization's (IMO) net-zero GHG targets. Some mandatory measures are already in place, such as the Carbon Intensity Indicator (CII), which tracks a ship's carbon emissions. Other measures, including the GHG Fuel Intensity Standard, are in development and will use penalties or rewards based on each vessel's emissions. Meeting these requirements means shipowners must significantly reduce fuel consumption and GHG emissions.

PHOTOS: PPG

PPG SIGMAGLIDE® 2390 biocide-free fouling release coating can help vessels achieve instant power savings of up to 20%.

Choosing the right hull coating is a key part of reaching these goals

PPG is responding to these challenges by expanding its project portfolio. The company's product diversification aims to meet growing demand for premium fouling control coatings that help minimize environmental impact and meet sustainability and regulatory targets.

The PPG SIGMAGLIDE® 2390 biocide-free fouling release coating addresses demand for more sustainable marine coatings. The silicone-based solution incorporates PPG HYDRORESET TECHNOLOGY™ water-responsive surface technology. In water, the coating becomes a nonstick, ultra-smooth, virtually friction-free surface that organisms cannot attach to. Vessels coated with this advanced technology can achieve instant power savings of up to 20 percent, with a speed loss of less than 1 percent. It also helps lower vessel emissions by up to 30 percent, making it easier for shipowners to meet IMO GHG emissions targets.

PPG NEXEON™ 810 ultra-low friction, copper-free coat is the latest addition to PPG's range of antifouling solutions. Its formulation can enable up to 25 percent reduction in GHG emissions while

DRAGON

Passive fire protection High performance airless spray system

Powering ahead with **50+** units across Gulf & European markets

TECHNICAL SPECIFICATIONS

PARAMETERS	DRAGON 1:1	DRAGON 2.28:1	DRAGON 2.33:1	DRAGON 2.35:1	DRAGON 2.5:1	DRAGON 2:1
Pressure ratio	73:1	58:1	58:1	58:1	57:1	67:1
Discharge/cycle (th)	302 CC	371CC	377CC	377CC	395CC	339CC
Pump combination	Ø350 - (151/151)	Ø350 - (145-113/113)	Ø350 - (151-113/113)	Ø350 - (151-113/113)	Ø350 - (169-113/113)	Ø350 - (113-113/113)
Max inlet air pressure	6 BAR	6 BAR	6 BAR	6 BAR	6 BAR	6 BAR
Max output pressure	438 BAR	348 BAR	348 BAR	348 BAR	342 BAR	402 BAR
Mixing ratio	1:1	2.28:1	2.33:1	2.35:1	2.5:1	2:1
Supply	415V/3Ø/50HZ	415V/3Ø/50HZ	415V/3Ø/50HZ	415V/3Ø/50HZ	415V/3Ø/50HZ	415V/3Ø/50HZ
Reference intumescent material	Jot char 1709,Carboline3000SP, Carbolinethermo lag-E100,Chartek- 2218	PITT CHAR -NX	PITT CHAR -XP, Chartek 7E, Chartek-1960CSP	Jotun Steel Master 1200HPE	Hempafire XTR 100	Firetex M90/02

Registered Office:
J-138 MIDC, Bhosari,
Pune 411026 Maharashtra,INDIA

VR Coatings Pvt.Ltd.

+91 98 2291 29 14
sales@vrcoatings.com
www.vrcoatings.com

maintaining excellent color retention. Designed to exhibit functional photodegradability, the coating enables the gradual release of organic biocides near the surface, minimizing environmental impact without sacrificing performance.

Novel application technology

The way PPG applies low-friction fouling-release solutions is just as important as the coatings themselves. To further reduce environmental impact, the company has introduced electrostatic application to the shipping industry.

Electrostatic application is a more sustainable spraying method than traditional airless spraying. With electrostatic spray guns, the paint is charged while the ship is grounded, causing droplets to be attracted to the hull of a ship. This method increases coating transfer efficiency compared to airless spraying, reducing overspray, material use, waste and applicator exposure. The unique formulations of PPG Sigmaglide fouling release coating and PPG Nexeon antifouling make them ideal for this advanced application method.

The precision of electrostatic application reduces the need for masking the hull and onboard accommodation areas, resulting in cleaner operations in shipyards and more efficient application procedures.

Digital innovation

Digitalization is transforming maritime operations just as much as coatings and application technology. PPG offers a range of digital platforms designed specifically for the marine industry. These platforms help customers manage vessel performance, streamline processes and make informed choices about ordering and spending.

PMC City digital platform brings together a suite of 3D experiences into a single environment, helping to simplify the coatings selection process. The platform allows users to explore their industry and receive tailored product recommendations based on their unique factors such as location, industry and application area.

Electrostatic application of paint provides higher transfer efficiency than airless spraying, resulting in sustainability benefits.

PPG HULLNAV™ tool is a hull performance management toolkit that provides visibility into hull condition and operational factors affecting performance. By monitoring hull-related parameters, PPG HullNav helps operators track performance over time.

PPG InsightsNav digital tool organizes historical seastock spending data, helping users make more informed decisions about their coating use while allowing for increased spend transparency.

PPG has turned decades of expertise into interactive platforms that help customers make decisions. No guesswork. Just confidence.

What comes next

PPG's marine offering combines coating technologies, application processes and digital tools. Instead of treating each element separately, this approach supports vessel owners and operators across every stage of the vessel lifecycle, from coating selection and application to in-service monitoring and performance review.

This integrated approach will be on display at Asia Pacific Maritime 2026, Singapore, where PPG's Protective and Marine Coatings business will show how these solutions work together within marine operations.

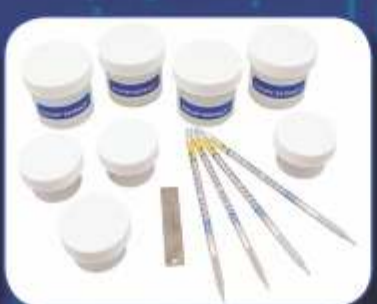
By advancing marine operations through coordinated solutions and long-term asset protection, the shipping industry can reach new horizons in sustainability and performance.

PPG HULLNAV™ tool is a hull performance management toolkit that provides visibility into hull condition and operational factors affecting performance.

LEADER IN PAINTS, COATING & CORROSION TESTING INSTRUMENT & EQUIPMENTS







ISO 9001 2015 CERTIFIED

For further details contact us at:

Caltech Instruments Pvt. Ltd.

Tel.: +91 22 49786763/46012763

D-104, Twin Arcade, Military Road, Marol, Andheri East, Mumbai 400059, India

E-mail: info@caltechindia.com | Web: www.caltechindia.com

Advanced Polymer Coatings: Focused on solving performance challenges

A defining characteristic of APC is the integration of advanced polymer science with comprehensive technical service support

Founded in 1997 in Avon, Ohio, Advanced Polymer Coatings is a global coatings manufacturer focused exclusively on developing advanced polymer coating systems for highly corrosive and chemically aggressive environments. From the outset, their approach has centered on solving performance challenges that conventional coatings could not reliably address.

APC's technologies are widely specified across marine, chemical transportation, rail, and industrial sectors where coating performance directly impacts operational reliability, cargo flexibility, maintenance intervals, and long-term asset value. In marine applications, particularly, their systems are designed to withstand aggressive chemical cargoes, repeated cleaning cycles, and demanding global trading conditions while preserving steel integrity over extended service periods.

A defining characteristic of APC is the integration of advanced polymer science with comprehensive technical service support. They have consistently emphasized that coating performance is not determined solely by chemistry, but by disciplined surface preparation, correct application, and ongoing inspection throughout the coating's lifecycle. As a result, our technical teams work closely with owners, operators, and shipyards, from specification development and crew training to on-site supervision and long-term performance evaluation.

Over the past several years, their focus has increasingly aligned with lifecycle thinking. Rather than viewing coatings as short-term consumables, APC views them as long-term asset-protection systems that influence drydock planning, cargo trade flexibility, cleaning requirements, and total cost of ownership. This perspective has shaped both their product development strategy and their field support model.

APC technical and inspection teams walking through a fully cured, completed cargo tank with MarineLINE®.

At Asia Pacific Marine, Singapore, APC will be highlighting coating technologies, MarineLINE®, an industry-leading cargo tank coating engineered to meet the evolving demands of modern marine operations, balancing chemical resistance, durability, operational efficiency, and regulatory compliance, as well as their new product, OneGUARD™, a high-solids, one-coat, direct-to-metal (DTM) hybrid tank lining designed for product and chemical tankers. Engineered to replace traditional multi-coat epoxy systems, OneGuard™ delivers comparable corrosion protection with enhanced mechanical performance in a single application. The formulation combines exceptional flexibility, impact resistance, and hydrophobic barrier properties with a low-VOC profile.

On the sidelines of APM, *C&ACER* had an interaction with Ms Veron Teoh, Head of APAC Commercial, Advanced Polymer Coatings, and Mr Anthony Aw, Regional Sales Manager APAC, Advanced Polymer Coatings.

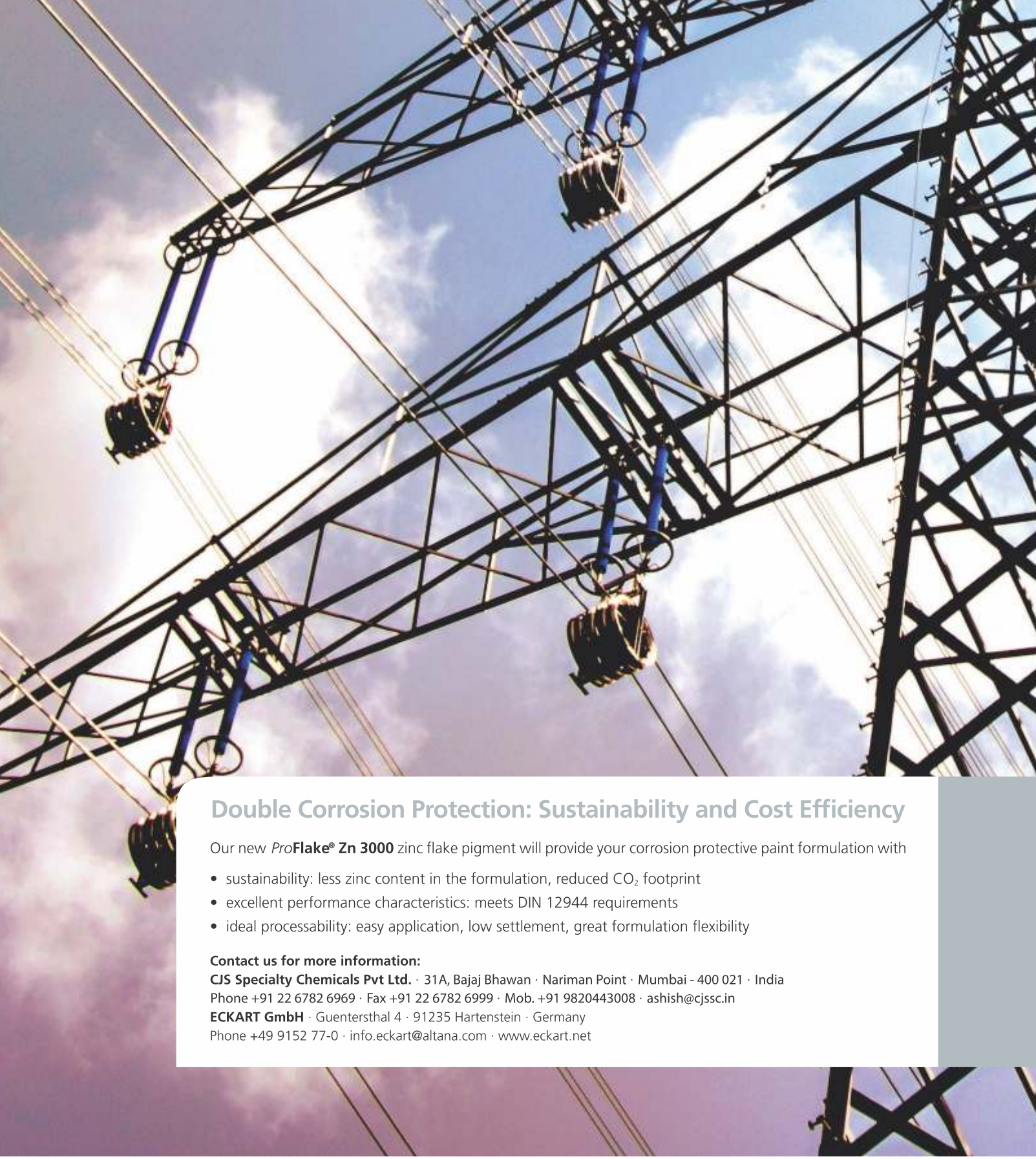
PHOTOS: ADVANCED POLYMER COATINGS

Ms Veron Teoh, Head of APAC Commercial, Advanced Polymer Coatings.

What are the key factors influencing the selection of marine coating systems?

The selection of a marine coating system today extends far beyond basic corrosion protection. Owners and operators are increasingly evaluating coatings through the lens of long-term performance, operational efficiency, chemical compatibility, and total lifecycle cost rather than just initial material price.

One of the most critical factors is chemical resistance. As global trade shifts toward more aggressive and diverse cargoes, including specialty chemicals, biofuels, and refined products, coating systems must withstand repeated exposure without softening, permeation, or degradation. A coating's resistance profile directly impacts cargo flexibility, cleaning requirements, and



Double Corrosion Protection: Sustainability and Cost Efficiency

Our new *Pro***Flake® Zn 3000** zinc flake pigment will provide your corrosion protective paint formulation with

- sustainability: less zinc content in the formulation, reduced CO_2 footprint
- excellent performance characteristics: meets DIN 12944 requirements
- ideal processability: easy application, low settlement, great formulation flexibility

Contact us for more information:
CJS Specialty Chemicals Pvt Ltd. · 31A, Bajaj Bhawan · Nariman Point · Mumbai - 400 021 · India
Phone +91 22 6782 6969 · Fax +91 22 6782 6999 · Mob. +91 9820443008 · ashish@cjssc.in
ECKART GmbH · Guentersthal 4 · 91235 Hartenstein · Germany
Phone +49 9152 77-0 · info.eckart@altana.com · www.eckart.net

A member of ALTANA

ECKART

long-term integrity of the substrate.

Long-term corrosion protection and permeability control are equally important. High-performance marine coatings must act as durable barriers against moisture and ionic ingress while maintaining adhesion under thermal cycling and mechanical stress. Poor barrier performance can lead to underfilm corrosion, blistering, and premature failure, all of which increase maintenance costs and off-hire time.

Another major consideration is operational efficiency. Modern fleets operate under tight drydock schedules and commercial pressures that demand faster turnaround. Coating systems that require fewer layers, cure more rapidly, and simplify inspection and repair processes provide significant operational advantages. Over the past several years, the industry has increasingly favored advanced polymer technologies that reduce application complexity while improving service life.

Technical support and application reliability have also become decisive factors. Even the most advanced coating chemistry depends on proper surface preparation, environmental control, and quality assurance during application. As a result, owners and shipyards now prioritize coating suppliers that provide hands-on technical service, from specification development and crew training to on-site supervision and long-term performance monitoring. This technical partnership approach has proven essential in achieving consistent real-world coating performance.

APC ensures the coating has been fully cured to achieve the maximum cross linking, which ensures maximum protection and benefits of the coating system for their customers.

Environmental and regulatory compliance further influences coating selection. Low-VOC formulations, improved durability to reduce recoating frequency, and alignment with evolving environmental standards are now baseline expectations rather than differentiators.

Finally, many operators assess coatings based on lifecycle value rather than upfront cost. Systems that extend coating life, reduce cleaning chemical usage, minimize repairs, and preserve steel condition deliver measurable financial benefits over a vessel's operating life.

As a global coatings manufacturer, our experience across demanding marine trades has consistently shown that the most successful coating strategies balance advanced polymer chemistry with practical application support, focusing on performance in service rather than just on paper. This shift toward lifecycle performance, operational efficiency, and technical partnership continues to shape how marine coating systems are selected worldwide.

What are the common causes of coating failure in marine environments?

Despite significant advances in marine coating technology, most coating failures continue to stem not solely from material limitations but from the interaction among surface preparation quality, application conditions, operational demands, and long-term maintenance practices.

Mr Anthony Aw, Regional Sales Manager APAC, Advanced Polymer Coatings.

One of the most consistent causes remains inadequate surface preparation. Residual salts, moisture, oil contamination, or insufficient blast profiles can severely compromise coating adhesion. In marine environments, where chloride contamination is common, even small amounts of soluble salts left on steel surfaces can lead to osmotic blistering and underfilm corrosion. Over time, this weakens the coating's protective barrier and accelerates steel degradation. Real-world performance data consistently show that even high-performance polymer systems cannot overcome poor substrate preparation.

Application-related variables also play a major role in coating breakdown. Improper film thickness, whether too thin to provide barrier protection or too thick to cure properly, can result in

BYK Additives

Sea the protection

Water, wind and waves – the rough, irrepressible power of the sea is a real challenge for any surface protection. Whether it's a ship or drilling rig, steel or concrete, BYK Additives for Protective and Marine Coatings prove how powerful they are under extreme conditions. They simplify the application of coatings, enable the coating layers to be reduced, provide long-lasting corrosion protection, and reduce maintenance intervals. Positive effects to be proud of both economically and ecologically!

www.byk.com

A member of ALTANA

BYK

cracking, solvent entrapment, or premature wear. Environmental conditions during application, such as high humidity, condensation, or temperature fluctuations, further increase risk. Many early failures can be traced back to coatings applied outside of recommended environmental windows.

Another significant contributor is chemical incompatibility or operational exceedance. As vessels trade a wider variety of aggressive cargoes, coatings may be exposed beyond their designed limits of resistance. Repeated exposure to highly alkaline or acidic cleaners, elevated cargo temperatures, and solvent-rich products can gradually soften, permeate, or embrittle coatings not specifically engineered for such service. This often leads to blistering, delamination, and loss of corrosion protection. Mechanical damage and thermal cycling are additional stressors in marine service.

Inspection in progress to look for any pinholes in the coating that do not meet standards and marked to be repaired before final sign off on the cargo tank.

A cargo tank coated with MarineLINE® and has been in service for years.

Abrasion from cargo movement, cleaning equipment, and routine operations gradually erodes coating thickness. Temperature swings, particularly in vessels operating across multiple climate zones, can induce expansion and contraction stresses that, over time, weaken adhesion if coatings lack sufficient flexibility.

Equally important, though sometimes overlooked, is the absence of ongoing inspection and technical oversight. Minor defects left unaddressed can quickly propagate into widespread corrosion issues in aggressive marine environments. Regular condition monitoring, prompt repairs, and adherence to recommended maintenance protocols are critical to sustaining long-term coating performance.

From extensive field experience, it is clear that coating failures are rarely caused by a single factor. They are typically the result of compounding issues, surface contamination combined with harsh application conditions, or chemical exceedance paired with insufficient inspection and repair.

As a global coatings manufacturer, our long-term performance data have consistently reinforced that successful marine coating systems rely on a holistic approach: advanced polymer chemistry supported by rigorous surface preparation standards, disciplined application practices and hands-on technical partnership throughout the coating lifecycle. Addressing failure risks at each stage, rather than relying solely on material performance, remains the most effective strategy for achieving durable corrosion protection in marine environments.

HTS COATINGS
GLOBAL TRAINING BODY

FROSIO

Building Excellence from the Surface Up: HTS Coatings Sets a New Standard with FROSIO Certification

In industries where longevity and safety are paramount, specialized education isn't just an advantage, it's a necessity, HTS Coatings bridges the global skill gap with its premier FROSIO Coating & Ihs, inspector course. The global infrastructure and energy sectors reston a crtical,offen unseen frontier: the integrity of protective coatings and insulation A single falure In this line of defense can lead to catastrophic corrosion, astronomical repair costs, severe safety hazards, and profound environmental damage. In this high-stakes environment, the demand for certified, highly skilled inspectors has never been greater.

Why FROSIO? Why Now?

Global Gold Standard: The FROSIO certification is mandated by major international oil companies, shipyards, and engineering conglomerates.

Enhanced Career Passport: It's a professional credential that unlocks top global career opportunities worldwide.

Assurance of Quality: Certification signifies competency in coating and insulation inspection, ensuring compliance and / mitgating risks.

The HTS Advantage: Beyond the Textbook

Real-World Expertise: Courses delivered by seasoned FROSIO certified instructors combining theory with practical case studies.

Industry Focused Insights: Learn from challenging field conditions acress sectors like Oil & Gas, Marine & Shipbuilding, Renewable Energy, Infrastructure.

Invest in Your Future, Secure Your Projects

Career Advancement: FROSIO certification is your gateway to higher-paying and more prestigious roles.

Organizational Excellence: Equips professionals to spot defects and prevent them, protecting assets over the long term.

Competitive Edge: Expertise that differentiates you in the market and ensures project safety.

CONTACT & INFORMATION: www.froslotraining.com

info@htscoatings.in | +91 - 91766 18930

Effective maritime operations demand reliable, high-performing coatings

For shipyards and owners, the technologies employed in Nippon Paint Marine's products support quality control to improve coating performance over the lifecycle of a vessel

Masuda Kazuaki, Technology Division Director, Nippon Paint Marine

Protective coatings serve as a critical defence against corrosion, structural degradation and costly maintenance and repair projects for maritime operators. It is essential that coatings are accurately applied to ensure their integrity and maintain performance over the long term in demanding environments. Long exposure to seawater, chemicals and mechanical impacts place significant demands on coatings for water ballast tank and cargo hold coatings. Their reliability is vital for safe and sustainable operations.

For 145 years, Nippon Paint Marine has been innovating coatings for the maritime industry, developing products that serve the needs of its customers in the shipping industry, both above and below the water line. Focused on solving the challenge of helping applicators to achieve the right dry film thickness central to product performance, Nippon Paint Marine developed its NOA range of self-indicating coatings, which makes it easy for applicators to see when they have applied the right thickness of coating. This product can be applied across all vessel surfaces and in particular, water ballast tanks, where the NOA 60HS product has been specifically designed for use in seawater environments.

Another significant innovation providing anti-corrosion protection for the maritime industry has been NEOGUARD, a hold coating for the dry bulk sector. High-impact loading of cargo in this sector of the maritime industry, whether the cargo is iron ore, grains or coal, requires a coating that is durable and can maintain integrity through repeated stresses.

PHOTOS: NIPPON PAINT MARINE

Interior water ballast spaces showing coated internal bulkheads and stiffeners.

In the highly competitive maritime industry, coating performance is essential to voyage and operational success. Across the sector, customers demand reliable coatings, designed and engineered to withstand the demanding marine environments where they operate.

Self indicating technology – seeing is believing

Applying tank coatings accurately can be difficult for applicators. Low-light conditions and complex profiles mean achieving the correct dry film thickness is labour intensive. The same conditions make it difficult to check and verify the coating thickness. Too thin a coating can lead to premature corrosion, particularly in water ballast tanks.

The self-indicating technology of the NOA range allows applicators, surveyors and inspectors to easily see exactly when the coating has reached its specified thickness. NOA coatings incorporate carefully calibrated pigmentation with varying opacity levels that shift from translucent to opaque as thickness increases. When the coating appears fully opaque, the film has reached its required protection level, providing a visual cue for applicators.

This simple, precise mechanism ensures that low thickness areas, particularly on edges and corners can be identified immediately and corrected before the coating cures. The result is a more consistent, more reliable application process, ensuring long-term effective performance and a quicker application process.

Water ballast tanks are subject to some of the harshest corrosion conditions on a vessel. Continuous cycles of filling and emptying, exposure to saltwater and internal abrasion can rapidly degrade coatings that lack sufficient mechanical and chemical resistance.

BLASTLINE®

All New 2 in 1
Air Preparation Solutions

NEW

Aftercooler + Air Receiver

- High Efficient Moisture Removal using built-in aftercooler
- Pneumatic Fan Motor
- Easy to Maintain
- Available in different flow rates (535, 850, 1200 & 1600 CFM)
- ASME & Non-ASME models available

Available in Custom Configurations

Air Cooled
Aftercooler

Pneumatic | **Electric** NEW

Blastline Air Cooled Aftercooler are designed to work on most of air compressors. To select the appropriate model, simply determine compressor horse power and select model form the chart.

Rating

Maximum working pressure : 250psi
Maximum working temperature : 121°C

80% Moisture removal from compressed air

Customizable with double outlet & inlets

Pneumatic Models	Electric Models	Internal Airflow Max CFM	Air Compressor Horsepower
BL-450	BL-450 E	539	50-70 HP
BL-600	BL-600 E	785	100-125 HP
BL-1000	BL-1000 E	1569	150-200 HP
BL-1600	BL-1600 E	2300	225-350 HP

Enquiry Now

BLASTLINE® INDIA PVT. LTD.

Cochin, Chennai, Tuticorin, Ahmedabad, Bengaluru
Phone: +91 484 2537375/76, 09562011088
Info@blastlineindia.com | www.blastlineindia.com

Coverage and protection in harsh environments

The NOA 60HS product is engineered specifically for water ballast tanks and is fully compliant with the IMO Performance Standard for Protective Coatings (PSPC) for ballast tanks, ensuring the highest levels of corrosion protection and durability in service. The product features the NOA line's self-indicating technology and provides real time visual confirmation of film thickness for applicators. This means they can assess its opacity instantly as they spray, helping to ensure accurate, even coverage on flat surfaces and intricate geometries.

The buff color of the coating was selected after chemists in Nippon Paint Marine's research and development team studied the opacity of different color pigments, comparing how well primer colors could be differentiated from the substrate beneath them. The buff color was shown to perform best, and the color and pigmentation of the coating was then optimized to ensure it correlated with the correct dry film thickness.

Hartmann-CSL joint venture's first newbuild self-unloading bulker Starnes.

The product is formulated to be resistant to cracking and to avoid pinholes developing that can be weak points leading to the development of corrosion.

NOA 60HS has been applied to more than 2,000 vessels since its launch more than 20 years ago. Long term inspection data shows minimal corrosion in ballast water tanks, crude oil tanks and voices even more than a decade application. NOA 60HS is a coating that delivers effective corrosion resistance, boosted by self-indicating technology that provides confidence of full coverage to ensure dry-dock operations run on time and shipowners enjoy reliable tank coating.

Heavy duty protection

Cargo holds need protection against high-impact loading and abrasion of aggregates, minerals and other dry cargoes. For bulk carriers, repeated loading cycles create stresses that damage coatings, exposing the steel underneath, and leading to corrosion and, in the worst case, structural damage and repair.

NEOGUARD is a heavy duty epoxy anti-corrosive coating with high solids content, designed to deliver resistant to the impact of falling cargo and abrasion caused by repeated loading and unloading.

NEOGUARD coating system from Nippon Paint Marine was considered the only viable option, because the bulker Starnes carries crushed stones and other aggregates; the holds requied a very tough coating to withstand mechanical impact, abrasion and prevent corrosion.

In 2022, Nippon Paint Marine applied NEOGUARD to the HJH Shipmanagement newbuild bulker Starnes. The self-unloading 40,000 DWT vessel received coatings of NEOGUARD 100 GF for its cargo holds and NEOGUARD TOUGHNESS for its unloading tunnels. More than two years after application, inspections of the coating surfaces showed they maintained their integrity in the face of continuous loading operations. This allowed the operators to lengthen maintenance inspections cycles and the interval to the renewal of the coating in the cargo hold and unloading tunnels.

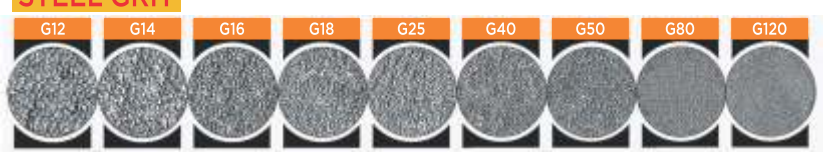
The experience of Starnes demonstrates the importance of specifying the right anti-corrosion solution for a newbuild vessel and the effect it can have on operations and sustainability. Coating failure can cause major disruption to operations for bulk carriers when hold integrity is compromised. By selecting the right coatings, vessel owners can be confident they

Saudi Abrasives
Steel Shot & Grit

SA GRIT

Saudi Abrasives:
Reducing Costs, Enhancing Efficiency

STEEL GRIT



STEEL SHOT

www.saudiabrasives.com

Manufactured by:
SAUDI ABRASIVES CO.
Street No.118, 2nd Industrial Area,
P.O. Box No.: 11982, Dammam - 31463
Kingdom of Saudi Arabia
Tel.:+966 13 8342998 I Fax:+966 13 8348617
E-mail: info@saudiabrasives.com

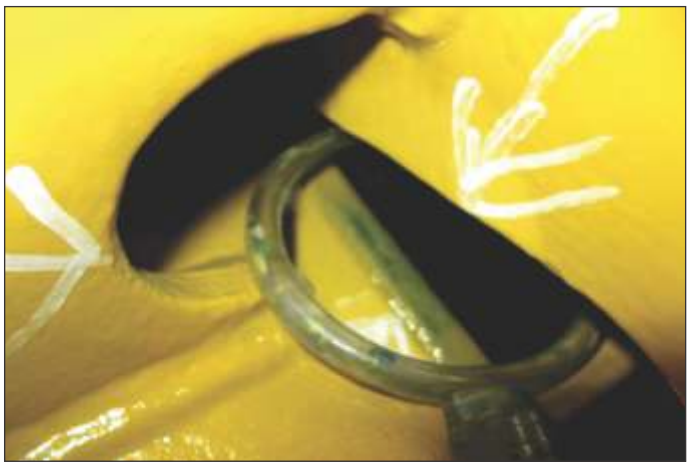
can avoid remedial work on their holds between dry dockings.

Driving performance

Nippon Paint Marine's commitment to data driven product development and support for its customers throughout the product lifecycle has led to the creation of coatings like NOA and NEOGUARD. The needs of our customers were the most important consideration for our R&D team as they worked through laboratory testing, simulations and collaborations with shipyards and marine institutes to develop these products and validate their performance.

A continuous stream of data and reporting from their customers' operations, drydock inspections, performance reviews and operator interviews feeds into ongoing product development and innovation to ensure customers have access to products tailored to their needs. ensuring effective formulations are developed that deliver long term value and support the sustainable performance of shipowners and their operations. This feedback and evidence-backed performance are essential for helping owners to select the coatings that meet their real-world needs in consultation with experts.

For shipyards and owners, the technologies employed in Nippon Paint Marine's products support quality control to improve coating performance over the lifecycle of a vessel. The tailored products optimize return on investment for shipowners and operators in drydock and at sea to support competitiveness and improve the long-term value of their assets.



This image shows the effectiveness of BOA's self-indication; areas of low thickness can be found visuallly even in areas where thickness gauges cannot be used.

Nippon Paint Marine will be attending the Asia Pacific Maritime exhibition and conference in Singapore, March 25-27, 2026, where it will be showcasing a range of its products including NEOGUARD and NOA. Visit the team during the event to learn more about how approaches to innovation, product development and in-service monitoring support a product portfolio to drive the performance of shipowners and operators.

KHANNA PAINT TESTING LABORATORY (OPC) PVT. LTD.

A-107, Kailash Industrial Complex, Hiranandani Link Road,
Vikhroli West, Mumbai- 400079
Tel: 022 35113458, E: info@kptllab.com W:- www.kptllab.com

TC-9607

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).**

Surface Engineering & Coating Consultant

A-107, Kailash Industrial Complex, Hiranandani Link Road, Vikhroli West, Mumbai- 400079
Tel: 022 35113458, E: anandkh52@gmail.com, W:- www.secclab.com,

Prof. A. S. Khanna
Proprietor

A Reliable Paint Coating and Surface Modification Consultancy Company

Surface Engineering

1. Surface Treatment methods
2. Chemical Vapour Deposition (CVD)
3. Physical Vapour Deposition (PVD)
4. Chemical Conversion Coatings
5. Laser deposition Method

Paint Coatings

- Conventional Coatings
- High Performance Coatings
- Waterborne Coatings
- Functional Coatings
- Nano Coatings
- Smart Coatings
- Green Coatings

Metallic Coatings

1. Hot Dip Coatings :
   - Galvanized,
   - Galvalume and
   - Zn-Mg-Al alloy coatings
2. Thermal Spray Coatings

- ❑ **Paint Failure Analysis and remedial measures**
- ❑ **Paint Scheme recommendation**
- ❑ **Site Selection and Specifications for Corrosion Protection for Solar Plants**

Consultancy Company

Please visit our website: www.secclab.com for more information

AI no longer a futuristic concept but a practical tool reshaping the paint and coatings industry

Companies that embrace this technology are not only improving their bottom line but are also paving the way for a more innovative, sustainable, and colorful future

The India AI Impact Summit 2026, held in New Delhi, February 16–21, 2026, concluded as one of the largest AI events to date, with a focus on positioning India as a global Artificial Intelligence (AI) leader. AI is revolutionizing industries, enhancing creativity, and augmenting human potential. Much has been written about AI transforming healthcare, finance, manufacturing, and retail through predictive analytics, automation, and generative models. At the same time AI and automation are making many strides in surface technology – which includes coatings, surface treatments, material characterization, and manufacturing finishing – shifting it from manual, experience-based operations to intelligent, data-driven, and highly precise systems

The integration of machine learning (ML) and computer vision allows manufacturers to move beyond traditional, manual methods to automated, predictive systems that optimize quality and efficiency, particularly in 3D printing and industrial coating industries.

AI enhances the durability, corrosion resistance, and quality of surfaces through real-time monitoring and control. For example, AI can monitor equipment (pumps, sprayers) in coating plants, analyzing vibration and temperature data to predict failures before they cause downtime. High-resolution cameras combined with AI algorithms can detect microscopic defects like pitting, discoloration, or uneven coatings more consistently than human inspections. AI systems can also track chemical concentrations, pH and temperature in real-time, automatically adjusting to maintain optimal conditions, reducing waste and increasing bath life.

PHOTO: 123RF

With AI and automation, industries such as automotive, aerospace, and electronics are achieving higher throughput, consistent finishes, and more sustainable production processes.

PHOTO: 123RF

AI and automation are making many strides in surface technology, shifting it from manual, experience-based operations to intelligent, data-driven, and highly precise systems.

In additive manufacturing (3D printing) and machining AI is used to predict and control surface roughness, a key indicator of quality. Models (such as Support Vector Machines and Random Forests) analyze process parameters like laser power, scan speed, and temperature to predict surface roughness. AI analyses vibration data from manufacturing machines to predict surface quality during the production process. AI-driven robotic systems can adapt to varying surface conditions in real-time for tasks like sanding, grinding and blasting.

AI accelerate the discovery and development of new functional surfaces. Machine learning models are used to identify potential material combinations for self-healing coatings or anti-corrosion materials. AI such as ZEISS ZEN Intellesis or the MIPAR software, automates the analysis of 3D-scanned surface images to analyze grain size and layer thickness, bypassing manual, time-intensive evaluation.

Key technologies driving the transition include Machine Learning, Computer Vision and Digital Twins. ML is used for predictive modelling and optimizing process parameters. Computer vision is used for detecting surface defects and analyzing microstructures. Digital Twins combine physical models with AI to simulate and optimize coating processes before actual production.

Future trends

Future surface treatment plants will be able to self-correct in real-time, adjusting chemical concentrations and cycle times without human intervention. AI will assist in designing surface textures that are specifically engineered for functionality rather

than just aesthetics.

By using AI, industries such as automotive, aerospace, and electronics are achieving higher throughoutput, consistent finishes, and more sustainable production processes. Artificial intelligence is rapidly moving beyond the digital world, embedding itself in the core of traditional sectors such as manufacturing and chemicals. The paint and coatings industry, an arena built on precise chemistry and hands-on application, is experiencing a remarkable transformation driven by AI. From the factory floor to the final coat on a wall, AI is introducing unprecedented levels of efficiency, innovation, and sustainability.

This technology is not just automating old processes; it is creating entirely new possibilities. It helps manufacturers produce higher-quality paint with less waste, empowers consumers to find the perfect color with a tap on their screen, and pushes the boundaries of what a simple coat of paint can achieve. It helps manufacturers produce higher quality paint with less waste, empowers consumers to find the perfect color with a tap on their screen, and pushes the boundaries of what a simple coat of paint can do.

PHOTOS: PAINTEXPO

(Left) Data generated by AOM enables users to use AI to correct errors in the spraying process in a targeted and immediate manner. (Right) Convergent Information Technologies GmbH utilises various forms of AI and machine learning that enable the automation of complex applications, which seemed unthinkable just a few years ago.

Exploring the significant impact of AI in the paint industry

Artificial intelligence and automation have long been an integral part of industrial surface technology. Whether process monitoring, quality assurance, material efficiency or plant control – digital technologies are fundamentally changing painting processes and raising them to a new level of performance. Intelligent, automated solutions that are already in use today and will become even more important in the future. Close cooperation with manufacturers, system providers, research institutions and users shows that AI is no longer a promise for the future, but a decisive lever for more efficient, sustainable and stable coating processes.

Ten years ago, German paint shop manufacturer SEHON was approached by a customer for the first time and asked to offer robotic painting for the trade, especially for body shops and paint shops.

Although painting robots were already commonplace in series automobile production at that time, it seemed impossible to develop robotics for repair painting, small series or the painting of individual parts.

This is because, compared to industry with its standardized products and processes, the challenges in the trade are fundamentally different. There are no standard products and processes, but rather an infinite variety of vehicles and components that need to be painted individually.

“Thanks to AI, improved robot technology and paint booths specially developed for these applications, our customers now have the opportunity to use this technology,” explains the managing partner.

Craft businesses suffer from a shortage of skilled workers, high levels of sick leave, a lack of young talent and rising costs. The new AI-supported SEHON AI-REVOLUTION generation of paint booths is one possible answer to help businesses solve these problems.

In the new SEHON paint booth, components or a vehicle are scanned completely and with high precision. The data obtained is transferred to a computer. This computer uses the data to develop commands for the painting robot and generates graphic images for the control terminal. At the control terminal, the painter decides, for example, which parts and surfaces are to be painted and triggers the fully automatic painting process.

Paint booths need to be redesigned for the use of robot technologies. “In the area of safety alone, for example in explosion protection, there are completely new requirements when humans work with robotics,” says a spokesperson for SEHON.

AOM-Systems is a major player when it comes to sustainable processes and error minimization in the wet paint process. Data generated by AOM forms the basis for the AI that automates and optimizes customer processes. This enables users to use AI to correct errors in the spraying process in a targeted and immediate manner. In return, the AI sends the operator a message indicating the exact cause of the error in the process. This reduces production errors and minimizes paint, energy and electricity consumption. Thus, AI now contributes directly to resource conservation and better use of production resources. “A major OEM had to achieve a minimum coating thickness and therefore specified a high safety factor to ensure that the minimum coating thickness was achieved even with minor process fluctuations. With spray from AOM, they can now control 100% of the coating application in real time. This saves a huge amount of coating thickness, material and alternative downstream checks, and therefore money,” explains Managing Director Dr Meiko Hecker.

Convergent Information Technologies GmbH, a leading global software supplier for paint repair using robots, also utilizes various forms of AI and machine learning. “This enables the automation of complex applications that seemed unthinkable just a few years

ago. They allow for shorter start-up times, greater production flexibility and faster integration of new products," explains Managing Director Dr Christof Eberst.

At Dürr Systems AG, the focus is on automation for wet paint systems. Dürr has launched their overspray-free painting system, the EcoPaintJet and the EcoSupplyP Core material supply system. This is a modular paint supply system with pigging that can be used wherever different paint colours are applied in small quantities, such as in the construction and wood industries or by automotive suppliers. Unused paint can be recovered almost completely, minimizing the consumption of detergent and speeding up the colour change. With the EcoPaintJet, an overspray-free paint application made its way into industrial vehicle painting, which paints with sharp edges and without any overspray. Now other industries are also benefiting from this solution.

PHOTOS: PAINTEXPO

(Left) Dürr Systems AG's, EcoPaintJet is a modular paint supply system with pigging that can be used wherever different paint colours are applied in small quantities, such as in the construction and wood industries or by automotive suppliers. (Right) ESS solutions enable reduced prototype costs, faster optimisation and less dependence on experts.

ESS Engineering Software Steyr GmbH specializes in automating the pre-processing step in meshing. This commitment to process automation extends across the entire simulation workflow. Thanks to automation, the solutions achieve considerable time and efficiency gains. For example, vehicle development time can be reduced by up to one month and operating costs can be cut by around 30 percent. ESS solutions also enable reduced prototype costs, faster optimization and less dependence on experts. Instead of around 600 kWh for painting a vehicle, ESS's new patented painting technology reduces the energy requirement per car body to 200 kWh. In conjunction with CO_2 reduction, increased material efficiency and waste prevention thanks to digital prototypes, ESS customers save significant resources.

As a leading developer of end-of-arm tools for sensitive surface processing – such as grinding, polishing or deburring – FerRobotics Compliant Robot Technology GmbH occupies a key position at the interface between high-precision mechatronics and advanced automation. With the help of its patented Active Compliant Technology (ACT), the company is transferring sensitive manual processes to robot-assisted series production. ACT-based tools guarantee precision through active force control, automatic tolerance compensation and AI-optimized calibration, resulting in 100% reproducible results and enabling perfect finishes even on sensitive surfaces. At the same time, efficiency increases while process reliability is enhanced and the reject rate is minimized. FerRobotics' latest is the Active Taping Kit (ATK), a solution for automated masking and a unique method for repairing paint defects on plastic (AOK 403), as well as new processing strategies for fast and intuitive programming.

Automation and AI are also relevant in powder coating. As an application manufacturer, Gema Switzerland GmbH has been relying on intelligent, networked control systems and control software for some time now, such as the MagicControl 4.0 system, which offers a powerful automation interface. In addition, selected concepts from Industry 4.0 can be profitably applied in the powder coating process. Production data is continuously recorded, processed and visualized in a clear and informative manner using tools such as the GemaConnect® Dashboard. The resulting added value for powder coating customers is material savings and increased efficiency. Precise control optimizes the amount of powder used, which means less overspray and therefore less material consumption. However, AI and automation can also serve to achieve higher quality and consistency, relieve the burden on workers, improve process control and traceability with networked systems and real-time data, and increase safety for operating personnel.

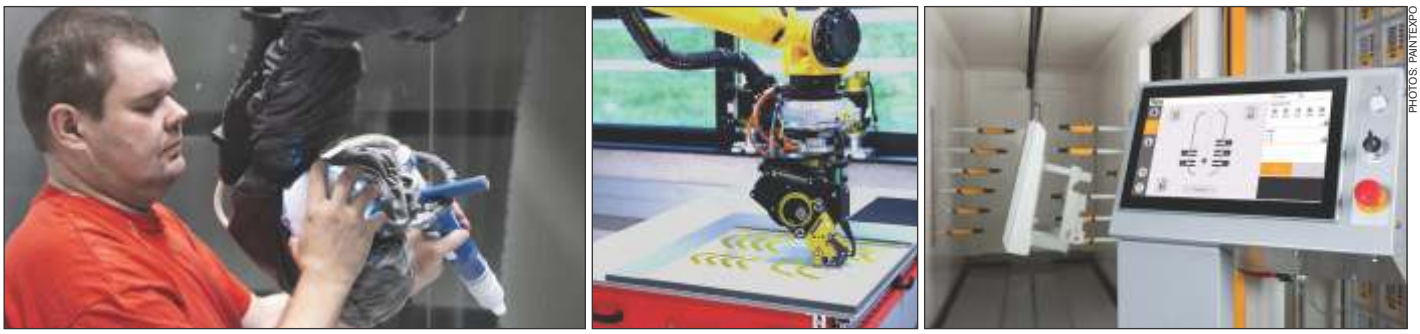
Automation also plays a central role at M&N Fördersysteme GmbH. The conveyor technology ensures

PaintExpo brings innovations and hottest trends to the international stage

April 14 – 17, 2026, the international paint industry will meet in Karlsruhe to experience the latest solutions and world premieres. Innovations range from sustainable coating systems and energy-efficient solutions to AI and automation-driven process optimizations. “PaintExpo is at the heart of industrial painting technology – in Germany, Europe and worldwide. It brings together leading companies, innovative technologies and global decision-makers on one platform and sets standards for the industry's future,” explains project director Carmen Bender.

All the organizations mentioned in this cover feature will be displaying their innovations, products and processes at the PaintExpo.

Exhibitors from India include Sidharth Automat India Pvt Ltd; Krishna Shot Blasting India Pvt Ltd; Prism Surface Coatings Pvt Ltd; Rapid Engineering Company Pvt Ltd; Greenovoc Specialty Coatings; R R Fluid Engineering Pvt Ltd; and Techexpert Engineering Pvt Ltd.



PHOTOS: PAINTEXPO

(Left) The ESCO Paint App lets operators create robot coating trajectories quickly – no programming required; an operator simply guides the robot by hand, the motion is recorded, and the software generates a repeatable program. (Center) FerRobotics' Active Taping Kit (ATK) is a solution for automated masking and a unique method for repairing paint defects on plastic, as well as for new processing strategies that enable fast, intuitive programming. (Right) Production data is continuously recorded, processed and visualized in a clear and informative manner using tools such as the GemaConnect® Dashboard.

a continuous, stable flow of materials and guarantees that all process steps in surface technology are precisely coordinated. This enables M&N's customers to achieve high process reliability, efficiency and reproducible quality. Automated conveyor technology also makes an important contribution to conserving resources, as continuous and precisely controlled transport of workpieces reduces downtime and idle time, minimizes reworking and ensures optimum utilization of the coating systems. This leads to lower energy consumption, less waste and more efficient processes overall. M&N is focusing on new, advanced rotary transfer systems and optimized control and guidance systems that offer greater flexibility in cycle times and workpiece variants, improve the energy efficiency of the drives and enable an even more continuous, automated material flow.

In paint and coating development, ML-supported analysis methods enable formulations, recipes and application processes to be understood much more quickly and thoroughly. The German company, Pi Probaligence develops ML algorithms that are used across industries in product development, process control and simulation. These models are increasingly being incorporated into control software, where they enable intelligent predictions and assistance functions. The more data-rich and automated a process is, the more effectively Pi Probaligence solutions can be used. In product development, ML enables data-efficient, exploratory experimental design that searches parameter spaces in a targeted manner. This either finds an optimum or creates a digital twin that virtually maps complex real chemical and physical systems.

The ESCO Paint App lets operators create robot coating trajectories quickly – no programming required. An operator simply guides the robot by hand, the motion is recorded, and the software generates a repeatable program. Two teaching modes are available: Point-to-Point for defined positions with smooth transitions, and Continuous mode to replicate manual motion precisely. Programs and trajectories are managed directly from the robot's touchscreen, enabling fast job changeovers. The robot's long reach allows multiple parts to be coated in one cycle. An automatic camera recognition system detects the exact position and orientation of each part before coating. The system automatically adjusts the robot path to match the real part location, increasing accuracy, reducing setup time, and preventing coating errors caused by misaligned hangers. Safe, flexible, and compact operation integrated safety scanners monitor the work zone and instantly stop the process if someone enters. Thanks to sensor-based safety, no fencing is required, reducing floor space and increasing layout flexibility while maintaining full compliance with high safety standards. A protective sleeve shields the robot in dusty environments, extending service life and ensuring stable long-term performance. Industry 4.0 digitalization The ESCO control system centralises programs, trajectories, and coating parameters on the main panel. Operators can easily adjust speed, powder flow, voltage, recipes, and safety settings, while ensuring consistent results across shifts.

SurfaceCONTROL Automotive from Micro-Epsilon Messtechnik GmbH & Co. KG is a robot-based inspection solution for fully automated surface inspection of raw car bodies. The system uses the principle of structured light projection and, with the help of a learning process, detects local shape defects such as dents, bumps, or scratches with the highest precision. In addition to its high reproducibility, the solution offers outstanding area coverage of ≥ 97%, integrated 6D position correction for automatic compensation of position deviations, and individual, AI-based defect classification. Defect detection is reliable even in edge areas, on design edges, and in strongly curved zones such as door handle recesses – as well as on stripped areas of the raw car bodies. Thanks to this extremely high coverage, flawlessly inspected raw car bodies can be transferred directly to the paint shop without manual visual inspection.

AI and automation as integral components of networked coating processes

These illustrations show that AI and automation in surface technology are no longer viewed in isolation, but increasingly as integral components of continuous process chains. The focus is shifting from individual optimizations to networked systems in which process data, quality information and plant parameters are collated and evaluated in real time. This development opens up new potential for reproducible quality, resource efficiency and process stability – but at the same time requires a high level of system integration and robust data models.

ECOMET® CORUNDUM

A PFAS-free, zero-liquid-discharge zinc-aluminium lamellar coating system for long-term corrosion protection in ISO 12944 C5 - CX atmospheric environments

- Kalyan Dhakane, Director, EFFCO Finishes & Technologies Pvt. Ltd

Abstract

Severe atmospheric corrosion in ISO 12944 and ISO 9223 C5-High, C5-Very High, and CX environments presents persistent challenges for steel fasteners and engineered components subjected to chloride deposition, cyclic wet–dry exposure, and industrial pollution. Conventional zinc electroplating and hot-dip galvanizing (HDG), while industrially established, rely on electrolytic or high-temperature metallurgical processes that impose intrinsic limitations related to hydrogen embrittlement susceptibility, dimensional non-uniformity, excessive zinc consumption, high energy demand, and incompatibility with zero-liquid-discharge (ZLD) manufacturing and emerging carbon-regulatory frameworks.

This paper presents a comprehensive corrosion-science-based evaluation of ECOMET® CORUNDUM, an advanced zinc-aluminium lamellar (zinc-flake) coating system engineered for long-term corrosion protection in severe atmospheric environments. The coating is applied via non-electrolytic dip-spin or spray processes and cured at low metal temperatures (~200–220°C), enabling micro-thin dry film thicknesses of 8–12 μm while maintaining hydrogen-embrittlement safety, dimensional precision, and controlled torque-tension behavior.

Corrosion performance is assessed using neutral salt spray testing (ISO 9227 / ASTM B117), cyclic corrosion testing (IEC 60068-2-52), and functional torque-tension testing (ISO 16047). Sustained resistance to red rust exceeding 6,500–8,000 h in neutral salt spray and stable behavior under cyclic marine-industrial exposure are interpreted through a mechanistic framework integrating lamellar barrier tortuosity, sacrificial zinc electrochemistry, galvanic current distribution, and self-sealing corrosion-product evolution. Conceptual electrochemical models based on open-circuit potential (OCP), impedance response, and polarization behavior are used to rationalize durability trends and laboratory-to-field correlation.

From a sustainability perspective, the coating system enables ZLD-compatible manufacturing by eliminating electrolytic baths, acid pickling, and molten zinc immersion. Lifecycle-oriented analysis indicates a reduction of approximately 0.10–0.15 t CO_2 per tonne of steel coated relative to HDG, driven by reduced zinc intensity, lower thermal energy input, and minimal water demand. These attributes position zinc–aluminium lamellar coatings of the ECOMET® CORUNDUM class as a technically mature, environmentally aligned, and regulation-ready corrosion-control strategy for long-life infrastructure in carbon-constrained industrial ecosystems.

Keywords: Atmospheric corrosion; zinc-aluminium lamellar coating; zinc-flake technology; C5 corrosion; CX environments; barrier-sacrificial synergy; hydrogen embrittlement; zero-liquid-discharge manufacturing; carbon-efficient coatings

1. Introduction

Atmospheric corrosion remains one of the most significant degradation mechanisms affecting steel infrastructure, transportation systems, renewable-energy installations, and industrial equipment worldwide. While primary structural members often receive robust corrosion protection, fasteners and mechanical connectors – despite their small mass fraction – frequently govern system reliability by acting as corrosion-initiation sites. Failures originating at bolted joints can propagate load redistribution, joint relaxation, vibration-induced loosening, and premature structural degradation.

ISO 9223 and ISO 12944 classify atmospheric environments from C1 (very low) to CX (extreme). C5 and CX environments are characterized by high chloride deposition, elevated time-of-wetness, industrial pollutants (SO_2, NO_x), and cyclic wet-dry exposure. Under such conditions, unprotected carbon steel can corrode at rates exceeding several hundred micrometres per year. Corrosion-protection systems for these environments must therefore provide sustained electrochemical protection, high barrier efficiency, and tolerance to coating defects and cut edges.

Zinc electroplating and hot-dip galvanizing (HDG) have historically dominated corrosion protection for fasteners. However, these technologies were developed when hydrogen embrittlement risk, dimensional precision, water intensity, and embedded carbon were secondary considerations. The widespread adoption of high-strength steels (≥10.9), precision-engineered fasteners, and sustainability-driven procurement has exposed fundamental incompatibilities in these conventional approaches.

Zinc-aluminium lamellar coatings represent a fundamentally different corrosion-control strategy, decoupling durability from coating thickness and zinc mass while enabling non-electrolytic, low-temperature processing. This

paper evaluates ECOMET® CORUNDUM as an advanced realization of this technology.

2. Corrosion drivers in C5-CX atmospheric environments

C5-CX environments are governed by synergistic corrosion drivers. Chloride deposition from marine aerosols or de-icing salts promotes electrolyte formation on metal surfaces, while high relative humidity increases time-of-wetness. Industrial pollutants contribute to acidification of surface electrolytes, accelerating anodic dissolution. Repeated wet-dry cycles concentrate salts, enhance oxygen availability, and promote localized corrosion mechanisms such as crevice attack and under-deposit corrosion.

Fasteners operating under such conditions must satisfy competing requirements: long corrosion life at minimal coating thickness, dimensional stability for gauge-fit compliance, predictable torque-tension behavior, resistance to hydrogen-assisted cracking, and compliance with increasingly stringent environmental and carbon-accounting regulations.

3. Limitations of conventional zinc-based coatings

3.1 Zinc electroplating

Electroplated zinc coatings rely primarily on sacrificial protection and provide limited intrinsic barrier efficiency. Porosity development under chloride exposure accelerates zinc depletion. Hydrogen evolution during acid pickling and electrolytic deposition introduces hydrogen into high-strength steels, increasing susceptibility to delayed hydrogen embrittlement. Electroplating is water-intensive, generates complex effluents, and presents challenges for ZLD implementation.

3.2 Hot-dip galvanizing (HDG)

HDG provides extended service life through high zinc mass; however, its protection mechanism is consumption-driven rather than efficiency-driven. In severe environments, zinc dissolution rates increase, necessitating excessive coating thickness. High process temperatures (~450°C) lead to alloy-layer growth, dimensional distortion, and incompatibility with precision fasteners, while molten-zinc processing imposes high energy and carbon penalties.

Parameter	Zinc electroplating	Hot-dip galvanizing	Zinc–al lamellar
Typical thickness	5–25 μm	45–100 μm	8–12 μm
Process	Electrolytic	Molten zinc	Non-electrolytic
Hydrogen embrittlement	High	Low–moderate	None
Dimensional control	Moderate	Poor	Excellent
Zinc efficiency	Medium	Low	High
Water intensity	Very high	Medium	Very low / ZLD

Table 1: *Comparison of zinc-based corrosion-protection technologies.*

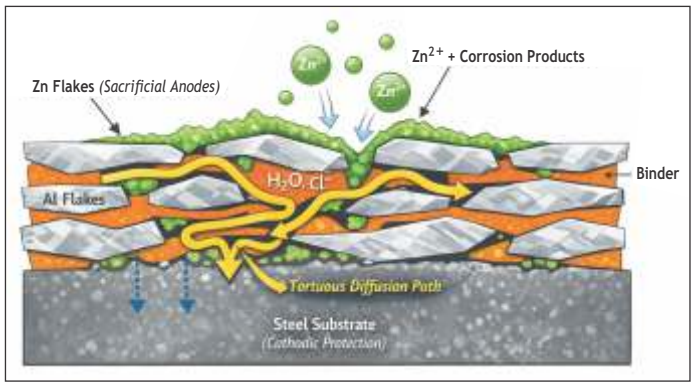


Figure 1: Zinc–aluminium lamellar microstructure and protection mechanism: *Schematic representation of a zinc–aluminium lamellar coating system illustrating preferential lamellae alignment parallel to the steel substrate, resulting in highly tortuous diffusion paths for moisture and chloride ions. Zinc lamellae function as distributed sacrificial anodes providing cathodic protection to the steel, while aluminium lamellae enhance barrier stability. Progressive formation of zinc corrosion products contributes to pore blocking and self-sealing behavior, leading to stabilized electrochemical response and extended corrosion resistance at micro-thin coating thicknesses.*

4. Scientific basis of zinc–aluminium lamellar coatings

Zinc–aluminium lamellar coatings consist of overlapping metallic flakes aligned parallel to the substrate surface, forming highly tortuous diffusion paths for moisture and aggressive ions. Zinc remains anodic relative to steel, ensuring sacrificial protection, while aluminium flakes enhance barrier stability and thermal resistance. Progressive formation of zinc corrosion products seals micro-porosity, improving barrier performance over time.

5. ECOMET® CORUNDUM system architecture

5.1 Coating composition

ECOMET® CORUNDUM employs a zinc-aluminium flake system dispersed in a hybrid inorganic-organic binder engineered for adhesion, flexibility, and controlled porosity. The formulation is PFAS-free, chromium-free (Cr^{6+}/Cr^{3+}-free), and low-VOC, aligned with global regulatory requirements.

5.2 Application and curing

The coating is applied via dip-spin, rack dip-spin, or spray processes and cured at 200–220°C. This eliminates hydrogen-charging pathways, minimizes thermal distortion, and reduces energy demand relative to HDG.

5.3 Thickness efficiency

At 8–12 μm dry film thickness, the system provides severe-environment protection while maintaining gauge-fit compliance and stable torque-tension behavior without re-tapping.

6. Electrochemical interpretation and durability modelling

Zinc exhibits a more negative open-circuit potential than steel, ensuring sustained sacrificial protection. Distributed lamellar architecture increases effective anodic area, reducing local current density at defects.

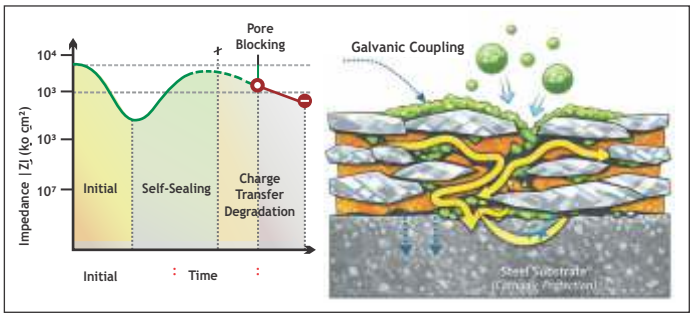


Figure 2: Electrochemical protection model and galvanic coupling: *Conceptual impedance behavior shows high initial coating resistance, progressive pore resistance increase due to self-sealing, and delayed charge-transfer degradation.*

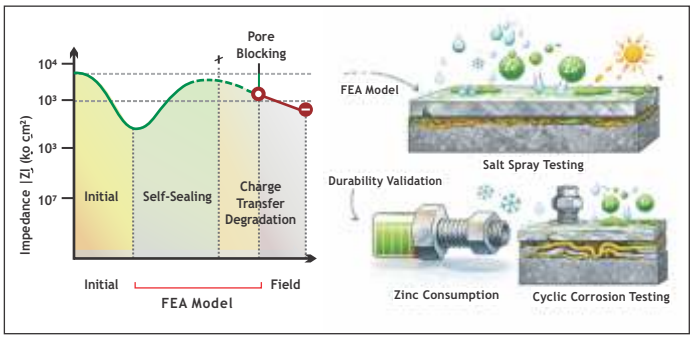


Figure 3: Conceptual electrochemical impedance evolution
Laboratory-to-field correlation integrates salt spray and cyclic corrosion data with zinc consumption models, supporting conservative service-life estimates exceeding 20-25 years in C5-CX environments.

7. Experimental evaluation and performance

The experimental evaluation of ECOMET® CORUNDUM was designed to validate corrosion durability, functional reliability, and hydrogen-embrittlement safety for zinc–aluminium lamellar coatings intended for ISO 12944 / ISO 9223 C5-CX atmospheric environments. The assessment integrates standardized accelerated corrosion testing, functional fastener validation, and mechanistic electrochemical interpretation in alignment with ISO 10683.

7.1 Accelerated corrosion resistance

Neutral Salt Spray (NSS)

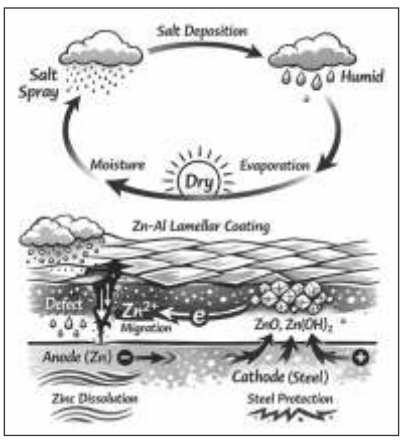
Neutral salt spray testing was conducted in accordance with ISO 9227 / ASTM B117 to provide a comparative measure of corrosion resistance. At a controlled dry film thickness of 8–12 µm, ECOMET® CORUNDUM demonstrated resistance to red rust exceeding 6,500–8,000 hours.

This performance is attributable to the lamellar microstructure and distributed sacrificial zinc activity, rather than zinc mass alone. The underlying protection mechanism – combining barrier tortuosity, cathodic protection, and self-sealing corrosion-product formation – is illustrated schematically in Figure 1, which shows preferential alignment of zinc-aluminium flakes parallel to the steel substrate and the resulting tortuous diffusion paths for chlorides and moisture.

Cyclic Corrosion Testing (CCT)

To better replicate real atmospheric exposure, cyclic corrosion testing was performed in accordance with IEC 60068-2-52 (Method 6). The test incorporates alternating salt deposition, humidity, and drying phases representative of marine-industrial environments.

Figure 4: Zinc–aluminium lamellar microstructure and protection mechanism *(Referenced here to explain NSS durability through barrier + sacrificial mechanisms).*



Cyclic Corrosion Testing (CCT).

ECOMET® CORUNDUM completed 8 cycles (56 days) without substrate corrosion. The result confirms that the lamellar architecture retains protective functionality under wet–dry chloride cycling, where traditional salt spray testing alone may overestimate or underestimate field performance.

The electrochemical stability underlying this behavior – particularly controlled zinc dissolution at defects and edges – is further explained by the galvanic protection model presented in Figure 2.

7.2 Coating integrity, adhesion, and dimensional stability

Coating adhesion was evaluated according to ISO 2409, achieving Class 0–1, confirming robust bonding between the lamellar coating and steel substrate. Uniform thickness distribution was observed across threads, recesses, and edges.

Because the coating achieves high performance at micro-thin thickness (8–12 µm), dimensional integrity is preserved. This enables:

- ☐ thread gauge-fit compliance,
- ☐ elimination of re-tapping,
- ☐ predictable torque–tension behavior.

The efficiency of corrosion protection at such low thickness, compared with conventional hot-dip galvanizing, is illustrated conceptually in Figure 5, which correlates service life with coating thickness.

7.3 Functional performance and hydrogen-embrittlement safety

Torque-tension behaviour

Torque-tension testing was conducted per ISO 16047. The coating exhibited stable and repeatable friction behavior, supporting consistent clamp-load generation in structural and safety-critical fasteners. Controlled friction is achieved through the lamellar

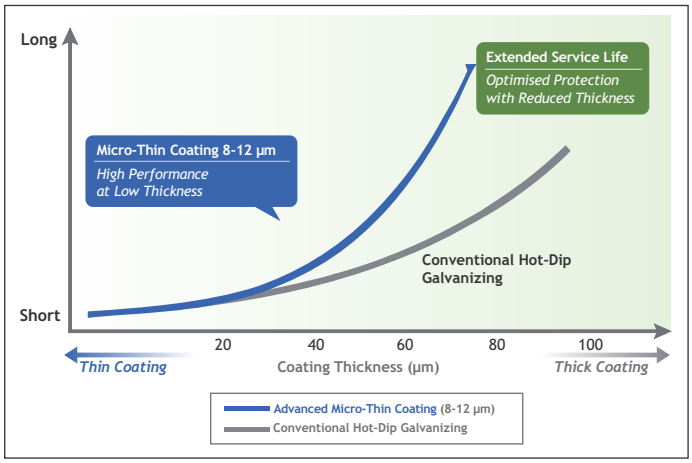


Figure 5: Service life vs coating thickness
(Referenced here to explain dimensional stability and efficiency-driven protection).

system and optional functional topcoats, without compromising corrosion performance.

Hydrogen embrittlement considerations

ECOMET® CORUNDUM is applied via a non-electrolytic process, without acid pickling or electrolytic deposition. Consequently, hydrogen-charging pathways associated with zinc electroplating are eliminated. The system is therefore inherently hydrogen-embrittlement safe, supporting application on high-strength fasteners (≥10.9 and 12.9) when appropriate base-material controls are applied.

7.4 ISO 10683 functional protection mechanisms

The functional attributes required under ISO 10683 are fulfilled through complementary mechanisms:

☐ Barrier protection: lamellar overlap creating tortuous diffusion paths.

☐ Cathodic protection: zinc acting as a distributed sacrificial anode.

☐ Bimetallic stabilization: aluminium flakes enhancing barrier stability.

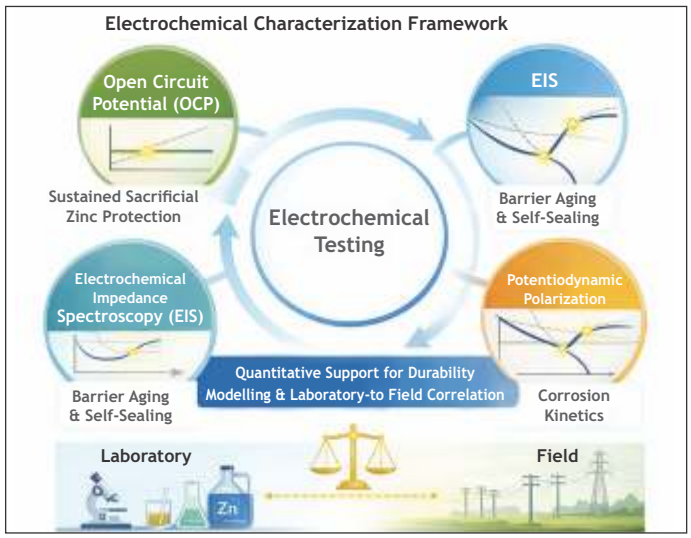
☐ Cut-edge tolerance: self-sealing via zinc corrosion products.

Together, these mechanisms explain why high corrosion resistance is achieved without thick zinc layers.

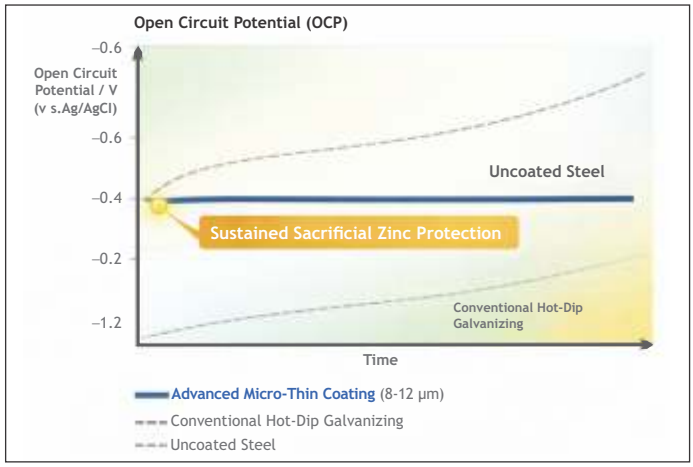
7.5 Summary of corrosion and functional performance

Property	Standard	Result
Neutral salt spray	ISO 9227 / ASTM B117	6,500-8,000 h
Cyclic corrosion	IEC 60068-2-52	8 cycles / 56 days
Adhesion	ISO 2409	Class 0–1
Coating thickness	ISO 2178 / ISO 2360	8–12 µm
Torque–tension	ISO 16047	Stable
Hydrogen embrittlement	ISO 10683 principle	Inherently safe
Cathodic protection	ISO 10683	Confirmed
Barrier efficiency	Mechanistic	High

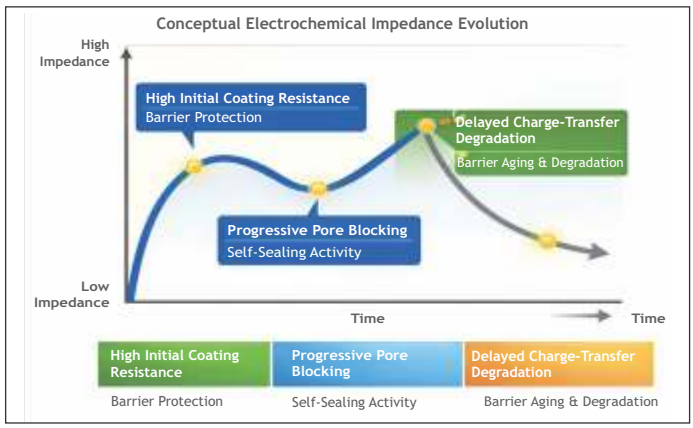
Table 2: *Corrosion and functional performance of ECOMET® CORUNDUM*



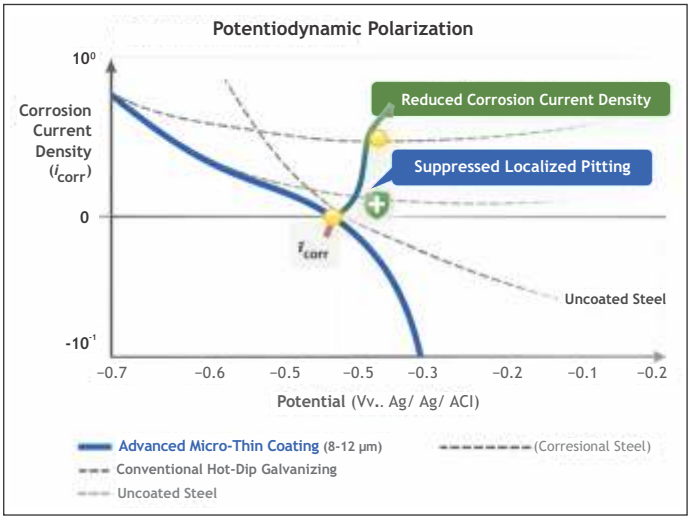
7.6 Electrochemical characterization framework
Electrochemical testing is proposed to quantitatively support durability modelling and laboratory-to-field correlation.



7.6.1 Open circuit potential (OCP)
OCP monitoring will confirm sustained sacrificial zinc activity relative to steel during exposure.



7.6.2 Electrochemical impedance spectroscopy (EIS)
EIS will be used to quantify coating resistance, pore resistance, and charge-transfer behavior over time. Conceptual impedance evolution – showing high initial coating resistance, progressive pore blocking, and delayed charge-transfer degradation – is illustrated above.



7.6.3 Potentiodynamic polarization

Polarization testing will assess corrosion kinetics, with expected suppression of localized pitting and reduced corrosion current density at the steel interface.

8. Sustainability, ZLD manufacturing, and carbon intensity

The elimination of electrolytic baths, acid pickling, and molten zinc immersion enables ZLD-compatible processing.

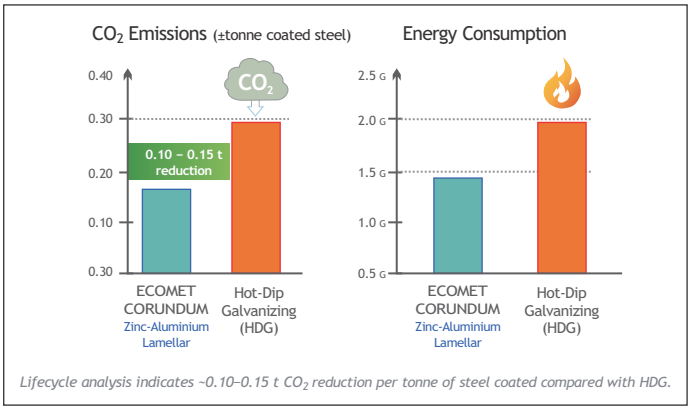


Figure 5: Carbon and energy footprint comparison
Lifecycle analysis indicates ~0.10–0.15 t CO_2 reduction per tonne of steel coated compared with HDG.

9. Service-life efficiency

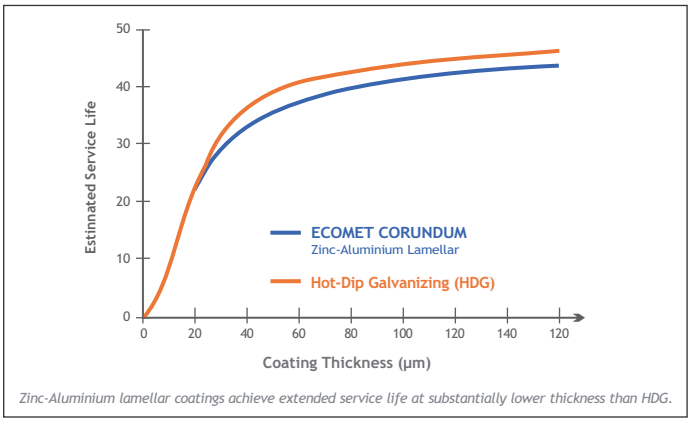


Figure 6: Service life vs coating thickness
Zinc–aluminium lamellar coatings achieve extended service life at substantially lower thickness than HDG.

Attribute	Electroplating	HDG	Zinc–al lamellar
Service life	3–5 yrs	10–15 yrs	20–25+ yrs
Maintenance	High	Medium	Low

Table 3: *Indicative lifecycle comparison (C5-CX).*

10. Industrial applications

ECOMET® CORUNDUM is engineered for fasteners and metal components operating in ISO 12944 C5–CX atmospheric environments, where corrosion protection must be achieved without compromising dimensional precision, mechanical integrity, or sustainability requirements. The zinc–aluminium lamellar architecture enables long-term durability at micro-thin coating thicknesses (8–12 µm), making the system particularly suitable for applications involving high-strength steels, tight tolerances, and cyclic exposure conditions.

10.1 Automotive and electric vehicle (EV) applications

In automotive and EV platforms, ECOMET® CORUNDUM is applied to chassis, suspension, underbody, steering, and brake-system fasteners exposed to de-icing salts, road spray, mud retention, and repeated wet-dry cycles. The non-electrolytic nature of the coating eliminates hydrogen-charging pathways, enabling safe application on high-strength fasteners (≥10.9 grade) where electroplated zinc systems present embrittlement risks. The controlled coefficient of friction and repeatable torque–tension response (ISO 16047) support consistent clamp-load delivery in safety-critical joints. In EV-specific assemblies, including battery enclosures, thermal-management brackets, and structural mounting hardware, the low coating thickness ensures gauge-fit compliance and dimensional stability without secondary machining.

10.2 Renewable energy structures (wind and solar)

Renewable-energy installations operate in some of the most aggressive atmospheric conditions, particularly for coastal and offshore wind farms and open-field solar arrays. ECOMET® CORUNDUM is suitable for tower and nacelle fasteners, external brackets, clamps, cable-management hardware, and solar-mounting components exposed to high humidity, UV radiation, and chloride-laden aerosols. The lamellar coating system provides high barrier efficiency combined with sacrificial protection, enabling extended service-life targets (≥20–25 years) while minimizing zinc consumption. Reduced process energy and ZLD-compatible manufacturing support sustainability and ESG requirements increasingly embedded in renewable-energy procurement and project financing.

10.3 Railways and power transmission hardware

Railway and power-transmission infrastructure is frequently exposed to mixed industrial, urban, and coastal atmospheres characterized by pollution, condensation, and debris accumulation. ECOMET® CORUNDUM is applicable to rail fasteners,

signaling and electrification hardware, cable-tray systems, and transmission-tower components where dimensional accuracy and maintenance torque repeatability are critical. Compared with HDG, the zinc–aluminium lamellar system provides superior dimensional control for assemblies requiring tight tolerances and reduces the risk of fitment issues during installation and inspection cycles. The coating's resistance to cyclic corrosion makes it suitable for long-term deployment in corridors with variable environmental severity.

10.4 Marine and offshore atmospheric components

Marine and offshore atmospheric zones represent extreme corrosion environments due to high chloride deposition, persistent humidity, and salt crystallization during drying cycles. ECOMET® CORUNDUM is suitable for deck and topside fasteners, brackets, clamps, handrails, ladders, and secondary steel components operating in non-immersion atmospheric conditions. The lamellar system's tolerance to coating defects and cut edges, combined with self-sealing corrosion-product formation, supports durable performance without reliance on excessive coating thickness that would compromise thread geometry. For splash-zone or immersion-adjacent applications, system selection should be supported by cyclic corrosion testing and project-specific qualification.

10.5 Infrastructure and heavy engineering

In infrastructure, construction, and heavy-engineering projects – including bridges, industrial plants, platforms, gantries, and external fixtures – ECOMET® CORUNDUM offers predictable long-term corrosion protection with reduced maintenance demand. The micro-thin coating thickness supports high-volume assembly, dimensional consistency, and compatibility with digital traceability and carbon-accounting frameworks increasingly required in public and EPC-driven projects. The combination of durability, hydrogen-embrittlement safety, and sustainability alignment makes the system well suited for infrastructure assets designed for multi-decade service life in aggressive atmospheric conditions.

11. Conclusions and future work

This study demonstrates that zinc–aluminium lamellar coating systems represent a fundamental transition in atmospheric corrosion control from zinc-mass-dominated protection toward efficiency-driven, microstructurally optimized corrosion engineering, particularly under ISO 12944 C5–CX exposure conditions. Unlike conventional zinc electroplating and hot-dip galvanizing, which rely primarily on electrolytic deposition or thick metallurgical zinc layers, lamellar coating architectures achieve durability through a synergistic interaction between barrier tortuosity, controlled galvanic coupling, and time-dependent self-sealing phenomena.

The corrosion performance of the ECOMET® CORUNDUM system can be mechanistically attributed to three interdependent factors:

(i) preferential alignment of zinc-aluminium lamellae parallel to the steel substrate, producing highly tortuous diffusion pathways that suppress transport of chlorides, oxygen, and moisture;

(ii) sustained anodic behavior of zinc relative to steel, enabling distributed sacrificial protection with reduced local current density at coating defects and cut edges; and

(iii) progressive accumulation of zinc corrosion products within micro-porosity, resulting in impedance stabilization and delayed charge-transfer processes under cyclic exposure.

Together, these mechanisms rationalize the observed resistance to red-rust formation in neutral salt spray testing and the stable performance under cyclic corrosion conditions more representative of real service environments.

From a materials-engineering perspective, the ability to deliver C5-CX corrosion resistance at micro-thin dry film thicknesses (8–12 μm) represents a significant advance in thickness efficiency, dimensional integrity, and functional reliability for threaded and precision components. Elimination of electrolytic hydrogen-charging pathways inherently mitigates hydrogen-assisted cracking risk in high-strength fasteners, while controlled frictional behavior supports repeatable torque-tension performance in safety-critical joints.

Equally important are the process-level implications. The non-electrolytic, low-temperature curing route enables integration with zero-liquid-discharge (ZLD) manufacturing, substantially reduces zinc intensity, and lowers thermal energy demand relative to hot-dip galvanizing. Lifecycle-oriented analysis indicates that these attributes translate into measurable reductions in embedded carbon, aligning lamellar coating technologies with emerging carbon-accountability frameworks and regulatory instruments such as the EU Carbon Border Adjustment Mechanism (CBAM).

While the present work establishes the mechanistic foundation and industrial relevance of zinc–aluminium lamellar coatings for severe atmospheric exposure, further research is required to enhance predictive capability and long-term validation. Future work should include systematic electrochemical impedance spectroscopy (EIS) studies under controlled and cyclic exposure conditions to generate time-resolved datasets describing coating resistance evolution, pore-sealing kinetics, and charge-transfer behavior. Such datasets would enable robust equivalent-circuit modelling and strengthen laboratory-to-field correlation.

Extended field exposure programs in representative C5 and CX environments – such as coastal marine, industrial-marine, and urban-polluted sites – are also recommended. Correlating mass-loss data, microstructural evolution, and electrochemi

cal response of retrieved specimens with accelerated test results would further refine service-life prediction models.

In parallel, integration of digital corrosion passports represents a forward-looking direction for coating-system governance. Linking formulation data, process parameters, inspection records, corrosion-performance metrics, and carbon-intensity information into digital traceability platforms would support lifecycle transparency, CBAM-aligned reporting, and data-driven asset management. The convergence of advanced zinc-aluminium lamellar coating technologies with electrochemical monitoring, digital twins, and predictive analytics offers a compelling pathway toward intelligent, low-carbon corrosion management of critical infrastructure.

Collectively, these findings and future directions position zinc-aluminium lamellar coatings not merely as an alternative surface treatment, but as a scientifically mature and forward-compatible corrosion-engineering paradigm for long-life infrastructure operating in aggressive atmospheric environments under increasingly carbon-constrained manufacturing conditions.

References / Bibliography

[1] ISO 10683, Fasteners – Non-electrolytically applied zinc flake coatings, International Organization for Standardization, Geneva, Switzerland.

[2] ISO 9227, Corrosion tests in artificial atmospheres – Salt spray tests, International Organization for Standardization, Geneva, Switzerland.

[3] ISO 12944-1 to ISO 12944-9, Paints and varnishes – Corrosion protection of steel structures by protective paint systems, International Organization for Standardization, Geneva, Switzerland.

[4] ISO 9223, Corrosion of metals and alloys – Corrosivity of atmospheres – Classification, International Organization for Standardization, Geneva, Switzerland.

[5] ISO 16047, Fasteners – Torque/clamp force testing, International Organization for Standardization, Geneva, Switzerland.

[6] ASTM B117, Standard Practice for Operating Salt Spray (Fog) Apparatus, ASTM International, West Conshohocken, PA, USA.

[7] ASTM F3393, Standard Specification for Zinc Flake Coatings, ASTM International, West Conshohocken, PA, USA.

[8] IEC 60068-2-52, Environmental testing – Part 2-52: Tests – Cyclic salt mist, International Electrotechnical Commission, Geneva, Switzerland.

[9] ISO 14064-1, Greenhouse gases – Quantification and reporting of greenhouse gas emissions, International Organization for Standardization, Geneva, Switzerland.

[10] ISO 14067, Carbon footprint of products – Requirements and guidelines for quantification, International Organization for Standardization, Geneva, Switzerland.

[11] Regulation (EU) 2023/956, Establishing a Carbon Border Adjustment Mechanism (CBAM), Official Journal of the European Union, Brussels, Belgium.

[12] AIAG CQI-12, Special Process: Coating System Assessment, Automotive Industry Action Group, Southfield, MI, USA.

[13] ISO/TR 18879, Guidelines for corrosion protection of fasteners in severe environments, International Organization for Standardization, Geneva, Switzerland.

[14] ISO 2178, Non-magnetic coatings on magnetic substrates – Measurement of coating thickness, International Organization for Standardization, Geneva, Switzerland.

[15] ISO 2360, Non-conductive coatings on non-magnetic substrates – Measurement of coating thickness, International Organization for Standardization, Geneva, Switzerland.

[16] ISO 2081, Metallic and other inorganic coatings – Electroplated coatings of zinc, International Organization for Standardization, Geneva, Switzerland.

[17] ISO 9587, Metallic and other inorganic coatings – Pretreatment of iron or steel to reduce the risk of hydrogen embrittlement, International Organization for Standardization, Geneva, Switzerland.

[18] ISO 4042, Fasteners – Electroplated coatings, International Organization for Standardization, Geneva, Switzerland.

[19] ISO 8044, Corrosion of metals and alloys – Basic terms and definitions, International Organization for Standardization, Geneva, Switzerland.

[20] ISO 15184, Paints and varnishes – Determination of film hardness by pencil test, International Organization for Standardization, Geneva, Switzerland.

[21] W. Funke, "Mechanisms of Barrier and Sacrificial Protection in Zinc-Based Coatings," Progress in Organic Coatings, Elsevier.

[22] L. L. Shreir, R. A. Jarman, G. T. Burstein, Corrosion, Butterworth-Heinemann, Oxford, UK.

[23] M. Stratmann, H. Streckel, "On the atmospheric corrosion of metals which are covered with thin electrolyte layers," Corrosion Science, Elsevier.

[24] U. R. Evans, The Corrosion and Oxidation of Metals, Edward Arnold, London, UK.

[25] G. S. Frankel, "Electrochemical techniques in corrosion science," Journal of The Electrochemical Society.

[26] D. A. Jones, Principles and Prevention of Corrosion, Prentice Hall, USA.

[27] P. Marcus (Ed.), Corrosion Mechanisms in Theory and Practice, CRC Press, Boca Raton, USA.

[28] ISO 16701, Corrosion of metals and alloys – Corrosion in artificial atmosphere – Accelerated corrosion test involving cyclic exposure to salt mist, International Organization for Standardization, Geneva, Switzerland.

[29] DIN EN 13858, Coatings for fasteners – Zinc flake coatings, Deutsches Institut für Normung, Berlin, Germany.

[30] VDA 233-102, Zinc Flake Coating Systems for Fasteners, Verband der Automobilindustrie (VDA), Germany.

Lead in paint: A hidden threat in Bangladesh

The industry in Bangladesh is committed to raising awareness, setting clear timelines to make all paints lead-free, and working closely with regulators to ensure strict compliance

Lead contamination in paint remains a serious public health issue in Bangladesh, with recent studies showing dangerously high levels in many decorative paints, though the government is now finalizing a national strategy to eliminate lead pollution. The Bangladesh Standards and Testing Institution (BSTI), UNICEF, Bangladesh Paint Manufacturer Association (BPMA), and NGOs like ESDO are actively pushing for updated standards and enforcement.

What is lead

Lead is a naturally occurring heavy metal because its density is very high. Generally, metals that have a very high density are called 'heavy metals'. These metals have a large metal density of 5 gcm^3. The density of lead is about 11.34 grams per cubic centimeter and the atomic number is 82, which indicates a heavy element. And lead is not only heavy, it is also a toxic metal that can harm the body and the environment. Lead is easily oxidized and forms various compounds, which are permanent in the environment. Therefore, due to its toxicity and weight, it is considered a dangerous heavy metal.

Health impact

Lead-based paint film peels or cracks, releasing fine lead dust, which can easily enter the body through the breath. Breathing in this dust allows lead particles to enter the lungs and then the bloodstream. Lead is a systemic toxicant that impacts every organ in the human body, with its effects posing particularly severe risks to children and pregnant women. According to UNICEF and the Bangladesh Bureau of Statistics, the country indeed ranks 4th globally in terms of children affected by lead poisoning, with over 35 million children showing dangerously high lead levels in their blood.

IMAGES: AUTHOR

Environmental impact

Lead pollution from paint harms the environment by contaminating soil, water, and air. When lead-based paint deteriorates or is improperly removed, toxic particles settle into soil, wash into water bodies, and disperse through the air. This persistent contamination disrupts ecosystems, poisons wildlife, and enters the food chain – posing long-term risks to agriculture, biodiversity, and human health. Improper disposal of unused paint often leads to serious environmental damage, as it is commonly

Lead sources in paint & coatings

Source	Component	Purpose of use	Types of paint	Risk
Pigment	Lead chromates, Lead carbonate, Lead molybdate	Vivid color Opacity & curability	Anticorrosive primers, automotive paints, protective & industrial coating, road-marking & traffic paints	High
Dryers & stabilizers	Lead oxides, Lead naphthenates, Lead octoate	Drying, improve film hardness, moisture & corrosion resistant	Solvent-borne paint, industrial & wood coating	High
Extender	Calcium carbonate, clay, barytes powder	Cost reduction, opacity, film strength, stability, coverage, durability	Water-based architectural coating & decorative paint	Moderate
Solvent borne stainer	Lead-based pigment, dryers & stabilizers	Color development	Solvent-borne system, wood stain & industrial coating	High
Water borne stainer & universal colorant	Lead-based pigment, dryers & stabilizers	Color development	Water borne & solvent borne system	High
Water	Hydrogen & oxygen	Carrier/solvent	Water borne system	Moderate

thrown on the ground or into water bodies. This practice should never be followed; instead, paint must always be disposed of in a safe and proper manner. Furthermore, old buildings or those repainted after long periods require careful maintenance. Cracked and deteriorating paint should be repainted promptly to prevent harmful lead dust from entering the air and posing risks to human health and the environment.

WHO and BSTI guideline

There is no safe level of lead exposure. Among various environmental pathways, lead-based paints are identified as a major contributor of lead contamination in homes and communities. The WHO, together with UNEP and the Global Alliance to Eliminate Lead Paint (GAELP), sets the recommended maximum lead content in paints at 90 ppm. Through S.R.O 221-Law/2018, the Bangladesh Standards and Testing Institution (BSTI) introduced a 90 ppm total lead limit setting standards for architectural coatings such as emulsion, latex, distemper, and enamel, in alignment with the WHO/UNEP Model Law. So far, industrial, marine, automotive, wood, and specialized paints remain unregulated, and enforcement of the existing rule is limited. On this issue, Bangladesh Standards and Testing Institution (BSTI) developed three mandatory standards in 2018 (BDS 1423:2018, BDS 1827:2018, and BDS 1833:2018)

Critical analysis of the ESDO findings

In 2025, the Environmental and Social Development Organization (ESDO) conducted a Lead Exposure Elimination Project to assess the presence of lead in household paints. A total of 161 paint samples were collected from Dhaka and Chattogram, covering both major paint brands as well as products from local manufacturers and imported sources. The study provides critical insights into the extent of lead contamination in paints available in Bangladesh, highlighting risks to public health and the urgent need for stronger regulation and consumer awareness.

The pie charts (Figure 1) shows 42.2% of samples (68/161) exceeded the BSTI standard 90 ppm limit, Most of these were imported and

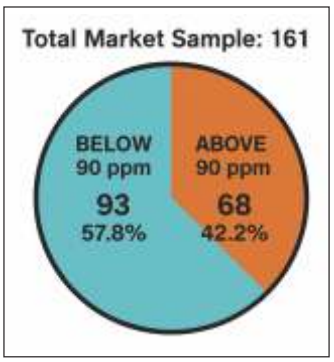


Figure 1.

produced by small-scale, unregistered manufacturers who failed to maintain safety labeling, manufacturing address, certification marks, TDS, and MSDS. All leading brands comply with the 90 ppm limit, ensuring safety.

Lead-free progress in Bangladesh's paint sector

In Bangladesh's rapidly growing paint industry, Berger Paints Bangladesh Ltd stands as the market leader, commanding more than half of the national market share. But beyond commercial dominance, Berger has positioned itself as a pioneer in sustainability and public health by eliminating lead from its paints and eco-friendly innovation. Berger Paints Bangladesh became the first company in the country to eliminate lead from all paints in 2011. Today, all of its water-based products and textile chemicals are formulated to be free from heavy metals, low in volatile organic compounds (VOC), and devoid of carcinogenic, mutagenic, and reproductive (CMR) substances. Looking ahead, Berger has set a clear sustainability target to make all water-based products APEO-free by 2025.

The tests were conducted using Inductively Coupled Plasma–Optical Emission Spectroscopy (ICP-OES), with a reporting limit of 49 ppm compared to the BSTI standard of 90 ppm. In contrast, third-party reports on Berger Paints showed that lead was not detected, with a reporting threshold as low as 10 ppm.

Test reports on Berger's popular Easy Clean brand confirm that the product is completely lead-free, with no lead detected against a reporting limit of 10 ppm compared to the BSTI standard of 90 ppm. Moreover, Easy Clean is also free from all types of heavy metals, reinforcing Berger's commitment to consumer safety and environmental responsibility. The company uses lead-free labeling across all of its products to promote consumer awareness and highlight its commitment to safety.

The ESDO report revealed that only 21.6% of paints tested (35 out of 162 samples) carried “Lead-Free” or “Eco-Friendly” labeling. Alarmingly, four of these paints were found to contain lead despite displaying a lead-free logo, highlighting serious gaps in compliance and misleading consumer practices.

When asked about this, Dr ASM Obaidullah Mahmud, Chief R&D Officer at Berger Paints Bangladesh Limited, said lead pollution from paints is a critical public health issue, particularly for children. At Berger Paints Bangladesh, we recognized this risk early and eliminated lead from all our formulations in 2011. Through advanced research

Research & Development Center, Berger Paints Bangladesh Ltd.

and innovation, we replaced lead-based pigments and additives with safe alternatives that deliver the same durability and color performance without toxicity. Our R&D strategy is clear – innovate safer alternatives, uphold strict quality standards, and collaborate with regulators and stakeholders to build a healthier, lead-free environment for future generations. Our team is committed to embedding climate resilience and green innovation into every product line, ensuring that paint is not just a coating but a contributor to healthier living spaces.

The role of BSTI, BPMA, NGOs, and national/ international organizations

On July 3, 2018, the Bangladesh Standards and Testing Institution (BSTI) introduced a lead limit of 90 ppm for decorative paints, aligning the country with international standards. This was a landmark step toward protecting public health, particularly children, from the dangers of lead exposure. However, no regulatory limit has yet been set for industrial paints, leaving a significant gap in protection. Industrial paints, widely used in factories, construction, and infrastructure, continue to pose risks to workers and surrounding communities. To address this gap, the active participation of all stakeholders is essential. An executive committee already formed to establish a national policy for industrial paints, ensuring that regulations are comprehensive, inclusive, and effective in combating lead pollution.

Recognizing this urgent need, on November 25, 2025, a policy dialogue titled *"Preventing Lead Poisoning and Updating Standards for Industrial Paints, Cookware, and Toys"* was jointly organized by BSTI, UNICEF, and the Environment and Social Development Organization (ESDO). The event brought together government agencies, industry representatives, NGOs, and international partners to discuss strengthening standards, closing regulatory gaps, and advancing public health protections. BSTI should recommend that the government enact legislation with strict guidelines for all paint companies. These guidelines must include mandatory product testing, continuous market monitoring, compulsory labeling, and clearly defined maximum permissible limits for lead content. Such measures would ensure accountability across the industry. For a lead-free and safe future, the Environment and Social Development Organization (ESDO) has consistently advanced international collaborations with UNICEF, UNEP, the European Union, the World Health Organization, IPEN, ILA, and GAELP. These partnerships highlight the power of collective action in tackling global health threats. The Bangladesh Paint Manufacturers Association (BPMA) should actively raise awareness among its members about the dangers of lead exposure and commit to a specific time frame for making all paints lead-free. In addition, unregistered paint companies must be identified, and strict action should be taken against them to ensure accountability and protect public health.

Md. Mohsin Habib Chowdhury, President of the Bangladesh Paint Manufacturers Association (BPMA), stated that the association is committed to raising awareness among its members, setting clear timelines to make all paints lead-free, and working closely with regulators to ensure strict compliance. He emphasized that, through responsible industry practices and strong enforcement, it is possible to protect children, safeguard communities, and build a healthier, lead-free future.

Author:

Sk Emadul Bari *is a dedicated researcher at Berger Paints Bangladesh Ltd, where he passionately contributes to the field of the paint and coating industry. He holds a master's degree in applied chemistry and chemical engineering from the University of Rajshahi. An accomplished paint & coating research & development professional with over 18 years of proven experience in water-based coating innovations, paint formulation, and raw material selection with a strong focus on eco-friendly solutions and VOC reduction strategies.*

His expertise extends to developing sustainable practices that enhance product performance and minimize environmental impact. With a track record of successful projects, he is committed to advancing the industry towards greener alternatives and setting new standards for quality and sustainability.

Teknovace in strategic investment to build a global wood coatings manufacturing hub in India

Teknovace, one of India's fastest-growing premium wood coatings companies, has entered into a strategic global partnership with Remmers Gruppe SE, an independent, family-owned German leader in speciality construction chemicals and high-performance wood coatings. As part of this partnership, Remmers plan to make a ₹300 crore strategic equity investment in Teknovace to acquire a 50.01% stake in two tranches, marking one of the most significant foreign strategic investments in India's wood coatings sector to date, notes a press release from the company.

The strategic investment comes at a time when India's wood coatings market – valued at approximately USD 1.3 billion (₹10,000 crore) – is projected to grow at 11% annually, driven by rising demand for premium furniture, interior finishes, and sustainable materials. Despite India's strong raw material base, the segment remains largely import-dependent and dominated by European suppliers, creating a significant opportunity for domestic manufacturing on a global scale.

Founded in 2019, Teknovace has rapidly emerged as a strong domestic challenger in the premium wood coatings segment, delivering a 43% annual average growth rate since inception, far outpacing the broader paints and coatings industry. The company recorded revenues of ₹57.1 crore in FY25, operates two manufacturing facilities with a current capacity of 6,000 tonnes per annum, and serves customers through a nationwide network of branches and dealers. Remmers, founded in 1949, operates across more than 30 countries and brings over 75 years of global expertise in advanced coatings, construction chemicals, and material science.

The capital infusion will be deployed to significantly expand Teknovace's manufacturing and technology capabilities. This includes scaling wood coatings production capacity from 6,000 tonnes to 60,000 tonnes per annum, setting up an integrated UV coatings manufacturing facility, establishing an in-house resin manufacturing unit, and building a greenfield construction chemicals factory in India. The partnership also envisages the creation of a global R&D centre in India, combining Remmers' advanced technology platforms with Teknovace's R&D-led manufacturing expertise.

Beyond domestic growth, the alliance is designed to position India as a global manufacturing and export hub for advanced coatings. Teknovace will directly supply markets across Asia-Pacific, the Middle East, and Africa, while also acting as a manufacturing and sourcing partner for select global markets through Remmers' international network.

Commenting on the partnership, Pankaj Singh, Managing Director, Teknovace, said, “This partnership with Remmers is not just about capital; it is about building a deeply integrated, technology-led manufacturing ecosystem in India. Despite India's rich raw material base, the country has historically been a net importer of high-performance wood coatings. Together with Remmers, we aim to change that equation by building global-scale manufacturing, backward-integrated capabilities, and export-ready platforms that position India as a serious player in the global coatings value chain.”

PHOTO: TEKNOVACE

(Left to right) Pankaj Singh, Managing Director, Teknovace, Dirk Sieverding, Chairman of the board, CEO and co-owner, Remmers Group and Nikhil Mahapatra, Executive Director, Teknovace.

Nikhil Mahapatra, Executive Director, Teknovace, added, “Teknovace has always been built on capital efficiency, strong R&D, and a deep understanding of the Indian market. With Remmers' technology leadership and global market access, we now have the opportunity to accelerate our growth journey, expand into construction chemicals and UV coatings, and create a future-ready coatings platform that is competitive not just in India, but globally.”

Dirk Sieverding, Chairman of the Board, CEO & Co-owner, Remmers Group, said, “India is a strategic market for Remmers' long-term global growth. Teknovace combines strong technical capability, entrepreneurial agility, and scalable manufacturing – making it an ideal partner for us. This partnership reflects our confidence in India as a global manufacturing hub and our shared ambition to build sustainable, high-performance coatings solutions for international markets.”

Under the partnership, Remmers will play an active role in strategy, technology transfer, and global market integration, working closely with Teknovace over the next decade. Bathiya Advisors acted as the exclusive strategic, financial and deal advisor to Teknovace and the selling shareholders. PwC and JSA acted as the financial and legal advisors to Remmers, respectively.

Axalta announces Orange 'Solar Boost' as its 2026 Global Automotive Color of the Year

Axalta Coating Systems, a leading global coatings company, has announced its 2026 Global Automotive Color of the Year – Solar Boost – a warm and inviting orange tone that shimmers with an energy all its own. Designed for modern vehicles, this boldly dynamic hue is infused with champagne-colored flakes to deliver a confident, exceptional expression that radiates from sunrise to sunset, notes a press release from the company.

PHOTO: AXALTA

Solar Boost reflects a shift toward individualistic design choices as consumers increasingly seek vehicles that express personal identity.

"A vehicle's color heavily shapes its initial perception, affecting how buyers feel about its safety, sportiness, elegance and even resale value, making color a significant influence in the buying decision," said Hadi Awada, President, Global Mobility Coatings at Axalta. "In fact, Axalta's own research has shown more than 80 percent of buyers consider it a key factor, which is why it's so critical for OEMs to understand dynamic global consumer sentiments and align their vehicle color portfolio accordingly."

Solar Boost reflects a shift toward individualistic design choices as consumers increasingly seek vehicles that express personal identity. Its bold hue aligns with growing interest in expressive colors beyond traditional neutrals, particularly among younger and trend-conscious buyers.

Grounded in Axalta's global color research, orange is emerging as a shade that connects emotional expression around the world. In North America, it evokes warmth, optimism, and creative energy, often linked to friendliness and bold lifestyle branding or streetwear. In Latin America, it reflects vibrancy and celebration, symbolizing life and joyful expression. Across Asia Pacific, bold and saturated hues continue to gain traction, including orange shades and accents, which are increasingly used to help vehicles project identity and stand out in fast-growing segments such as EVs. Solar Boost captures that shared sense of positivity and momentum, making it a powerful statement color for drivers who want their vehicles to reflect individuality and confidence.

"Solar Boost is the result of our team's deep experience in both the art and science of color," said Robert Roop, Ph.D., Senior Vice President and Chief Technology Officer at Axalta. "Elements of human psychology and popular culture inform our choice of color; then we apply our expertise in color science, optics, and coating formulations to transform color into a manufacturable coating that is beautiful, durable and sustainable."

This marks the 12th year Axalta has celebrated an Automotive Color of the Year, highlighting 160 years of experience in color design leadership, innovation, and forecasting future mobility coating trends. Axalta's color experts meet regularly to analyze automotive trends and anticipate how consumer color preferences are evolving. Their guidance helps vehicle manufacturers choose colors that will resonate with buyers.

Er Samir Surlaker Conferred ICI Lifetime Achievement Award at ACECON 2025, Hyderabad

The Indian Concrete Institute (ICI), India's apex professional body for concrete technologists and construction professionals, conferred the prestigious ICI Lifetime Achievement Award 2025 upon Er Samir Surlaker, Director of Assess Build Chem Private Limited and Institute for International Talent Development Private Limited, at its flagship international event ACECON 2025, held recently in Hyderabad.

Er Samir Surlaker received the award at the hands of eminent concrete technologists Dr Manamohan Kalgal and Dr Ramachandra V, President, Indian Concrete Institute, in the presence of Mr Ritesh Singh, Business Head – SIKA and senior members of the Institute.

The citation accompanying Er Samir Surlaker's award commended him "for his high level of professional integrity, ethics, honesty, and unassuming nature," and acknowledged his exceptional and sustained contributions spanning over 45 years to concrete technology, construction chemicals, and sustainable infrastructure development in India and internationally.

A distinguished alumnus of VJTI, Mumbai, Er Surlaker secured First Rank in M.E. (Civil – Structures) in 1977. He has also made substantial contributions as a member of several Bureau of Indian Standards (BIS) committees, including CED 2, CED 5, and CED 41, and the IRC B-8 Committee. Within ICI, he has served on multiple technical committees and co-authored the *Handbook of Advanced Concrete Technology*, with widely cited chapters on Acid-Resistant Concrete, Foam Concrete, and Concrete Repairs and Maintenance.

PHOTO: ACECON 2025

Er Samir Surlaker (seated) with the ICI Lifetime Achievement Award at ACECON 2025, Hyderabad.

A prolific author, speaker, and trainer, Er Surlaker has published over 100 technical papers, delivered more than 800 lectures, and conducted over 200 training programs, mentoring engineers and professionals across India and overseas.

He is also Founder and Director of Institute for International Talent Development (IITD), a skill development and training firm under certification from Construction Industry Development Council (CIDC).

COATINGS AND ANTI CORROSION
ENGINEERING REVIEW

India's premier B2B magazine on Corrosion Management

Special Offer!

Rs. 1,200 Only
for a 3-Year Subscription

Big Savings & a Free Gift!

☐ **Wet Film Thickness Gauge**

OR

☐ **11-in-1 Card Tool Kit**

Please ☑ your preferred gift

Period	Issues	Rate (INR)
1 year	6	700
2 years	12	1,400
3 years	**18**	**1,200***

* Big Savings & a Free Gift!

SUBSCRIPTION FORM

Name: Mr / Ms / Dr / Prof. _____ Designation: _____

Company: _____

Address: _____

_____

City: _____ Pin code: _____ State: _____ Country: _____

Tel: _____ Mobile: _____ E-mail ID: _____

Which of the following best describes your industry/business representation?

Aerospace ☐ Automotive ☐ Construction ☐ Consultancy ☐ Chemicals ☐ Defence ☐ Steel ☐ Services ☐
Energy ☐ Engineering ☐ Equipment & Supplies ☐ Fire & Safety ☐ Oil & Gas ☐ Off-shore & On-shore ☐
Infrastructure ☐ Instrumentation & Testing ☐ Inspection & Quality Assurance ☐ Shipping & Ports ☐ Pipelines ☐
Ship Building & Repairs ☐ Mining ☐ Minerals & Metals ☐ Paints ☐ High Performance Coatings ☐ Maintenance ☐
Turnkey Project Implementation ☐ Fabrication ☐ Other _____ (please specify)

Payment options

For the Subscription: 1-year Rs. 700 ☐ 2-years Rs. 1,400 ☐ 3-years Rs.1,200 ☐

☐ Cheque/DD No: _____ Dated: _____ Drawn on: _____

☐ Bank transfer

A/C: Coatings & Anti Corrosion Engineering Review | A/C No. 13332320000191
RTGS/NEFT IFSC Code: HDFC0001333, MICR Code 400240103

After fund transfer, please scan and e-mail this completed form to marketing@coatingsjournal.com

Cheque/DD in favour of Coatings & Anti Corrosion Engineering Review to be sent to:

Coatings & Anti Corrosion Engineering Review
102 Dattar Mansion, C.S Marg, Vakola Bridge, Santacruz (E), Mumbai 400055
Email: info@coatingsjournal.com I www.coatingsjournal.com

Or simply scan this QR code for UPI payments

Date	Course	Place	Conducted by	Contact Details
MAR 30 – APR 18, 2026	BGAS Grade 2 Painting Inspector	Kochi	Blastline Institute	T: (484) 2408477 E: info@blastlineinstitute.com W: blastlineinstitute.com
MAR 30 – APR 24, 2026	BGAS Painting Inspector Course	Hyderabad	Imech Institute	T: ((91) 9700008685 E: training@imech.in W: imechinstitute.com
APR 01 – 26, 2026	FROSIO Coating Inspector Course	Xanthi, Greece	HTS Coatings	T: (91) 9176618930 E: info@htscoatings.in W: frosiotraining.com
APR 01 – 26, 2026	FROSIO Coating Inspector Course	Sohar, Oman	HTS Coatings	T: (91) 9176618930 E: info@htscoatings.in W: frosiotraining.com
APR 01 – 28, 2026	FROSIO Coating Inspector Course	Doha, Qatar	HTS Coatings	T: (91) 9176618930 E: info@htscoatings.in W: frosiotraining.com
APR 01 – 29, 2026	FROSIO Insulation	Dubai, UAE	HTS Coatings	T: (91) 9176618930 E: info@htscoatings.in W: frosiotraining.com
APR 01 – 30, 2026	FROSIO Coating Inspector Course	Dubai, UAE	HTS Coatings	T: (91) 9176618930 E: info@htscoatings.in W: frosiotraining.com
APR 01 – MAY 02, 2026	FROSIO Coating Inspector Course	Batam, Indonesia	HTS Coatings	T: (91) 9176618930 E: info@htscoatings.in W: frosiotraining.com
APR 01 – MAY 04, 2026	FROSIO Coating Inspector Course	Cairo, Egypt	HTS Coatings	T: (91) 9176618930 E: info@htscoatings.in W: frosiotraining.com
APR 01 – MAY 06, 2026	FROSIO Coating Inspector Course	Cape Town, South Africa	HTS Coatings	T: (91) 9176618930 E: info@htscoatings.in W: frosiotraining.com
APR 01 – MAY 08, 2026	FROSIO Coating Inspector Course	Luanda, Angola	HTS Coatings	T: (91) 9176618930 E: info@htscoatings.in W: frosiotraining.com
APR 01 – MAY 10, 2026	FROSIO Coating Inspector Course	Dar es salaam, South Africa	HTS Coatings	T: (91) 9176618930 E: info@htscoatings.in W: frosiotraining.com
APR 06 – 24, 2026	CSWIP 3.1 Welding Inspector Level II	Kochi	Blastline Institute	T: (484) 2408477 E: info@blastlineinstitute.com W: blastlineinstitute.com
APR 13 – MAY 02, 2026	BGAS Grade 2 Painting Inspector	Kochi	Blastline Institute	T: (484) 2408477 E: info@blastlineinstitute.com W: blastlineinstitute.com
APR 13 – MAY 02, 2026	CSWIP 3.2 Welding Inspector Level III	Kochi	Blastline Institute	T: (484) 2408477 E: info@blastlineinstitute.com W: blastlineinstitute.com
APR 27 – MAY 15, 2026	CSWIP 3.1 Welding Inspector Level II	Kochi	Blastline Institute	T: (484) 2408477 E: info@blastlineinstitute.com W: blastlineinstitute.com

Engineers developing new protective coating for spacecraft

University of Texas at Dallas researchers are developing a material to protect spacecraft in low Earth orbit (LEO) from harsh environments that can damage vehicles in space, such as satellites, shortening their lifespans.

The research is part of DARPA's Materials Investigation for Novel Operations in Space (MINOS) program, which supports the development of material systems with low-drag characteristics and significantly greater resistance to erosion and corrosion for use in LEO, which extends up to about 1,200 miles above Earth, notes a press release from the University. The new materials are designed to protect satellites and other spacecraft components from two main threats: atmospheric drag and erosion.

When satellites collide with molecules and atoms in the LEO atmosphere, this causes drag, and the craft will lose its orbit and fall back to Earth. Atomic oxygen, formed in the lower atmosphere when ultraviolet radiation from the sun splits oxygen molecules into single atoms, is the most common particle in LEO. In addition to causing drag, these highly reactive oxygen atoms can bind to spacecraft surfaces and cause oxidation, or rust, and erosion.

The researchers are applying techniques currently used in other industries to design the material. One of the approaches, atomic layer deposition, originated in microelectronics manufacturing. The process allows manufacturers to build coatings one atomic layer at a time for greater control and precision.

Another approach is the sol-gel technique, which involves making solid materials from a liquid solution to create surfaces smooth enough to resist atmospheric drag. Sol-gel, used to create optical materials such as antireflective coatings, allows precise control over the composition and structure of the final material.

"This project marks a significant advancement in creating materials that enhance space resilience, providing long-term protection for essential components in upcoming space missions," said Dr Rafik Addou, assistant professor of materials science and engineering in the Erik Jonsson School of Engineering and Computer Science and principal investigator on the project.

Results from independent testing have demonstrated that the UT Dallas coating can withstand atomic oxygen conditions better than those in space, Addou said.

Addou is collaborating with co-principal investigators and materials science and engineering professors Dr Julia Hsu, a Texas Instruments Distinguished Chair in Nanoelectronics; Dr William Vandenberghe; and Dr Robert Wallace, the Jonsson School Distinguished Chair.

As the UT Dallas team continues its work to enhance the coating, Addou said he hopes the research can help extend the lifetime of satellites, which currently last about five years before falling back to Earth. Addou also dreams of enabling satellites to operate closer to Earth, in the lower end of LEO, where the environment is even harsher because of the much higher amount of atomic oxygen and increasing nitrogen concentration. Known as very low Earth orbit, this area is 60 to 280 miles above Earth.

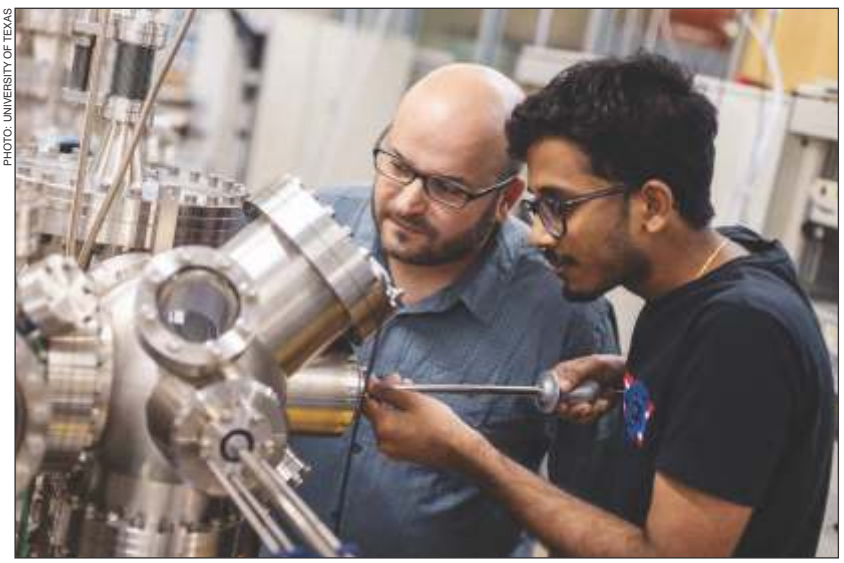
The space-related research is a new area for the four investigators, who typically work on materials and interfaces for semiconductor science and technology. Hsu also conducts research related to solar-cell manufacturing.

Vandenberghe, who focuses on computer simulations and modeling, said he was eager to work on the project to help improve communication and navigation in space and to help monitor the space environment.

"Helping to make multiplanetary life possible is a childhood dream come true," Vandenberghe said.

Joslin Prasanna, a materials science and engineering doctoral student, presented research – "Atomic Oxygen-Resistant Metal Oxide Coatings for Space Operations in Low-Earth Orbit" – from the team in September at the American Vacuum Society (AVS) International Symposium and Exhibition in Charlotte, North Carolina. Prasanna was recognized as an AVS Advanced Surface Engineering Division Rising Star for his presentation.

PHOTO: UNIVERSITY OF TEXAS



Dr Rafik Addou (left), assistant professor of materials science and engineering, and Joslin Prasanna, a materials science and engineering graduate student, use an ultrahigh vacuum surface science system, which includes sealed chambers, to process and study materials as part of a project to develop a coating to protect spacecraft in low Earth orbit.

IIT Guwahati researchers develop advanced epoxy coating to protect steel in harsh marine conditions

Researchers from the Indian Institute of Technology Guwahati have developed a corrosion-resistant epoxy coating for protecting steel structures, exposed to seawater and high-salinity environments.

The findings of this research have been published in the prestigious *Advanced Engineering Materials* journal, in a paper co-authored by Prof Chandan Das, Dept, of Chemical Engineering, IIT Guwahati, along with research scholar Dr Anil Kumar, notes a press communique from the Institution.

Corrosion is a natural and gradual process that weakens metal surfaces and shortens the lifespan of essential structures, particularly those exposed to saltwater environments, such as offshore platforms, coastal bridges, port infrastructure, and marine pipelines. It has also played a role in major industrial incidents such as the 1984 Bhopal gas tragedy and the 1992 Guadalajara explosion.

Corrosion also causes environmental degradation, and impacts human and aquatic life.

Although barrier coatings are widely used for corrosion protection, they do not completely protect the surface and develop microscopic defects over time, allowing moisture and salts to penetrate and damage the underlying metal.

To address this challenge, researchers worldwide have experimented with strengthening epoxy coatings by adding different types of nanomaterials. Nanomaterials are ultra-small particles, thousands of times smaller than the width of a human hair, that can enhance the strength, durability, and protective performance of coatings. While many studies have explored individual materials or simple combinations, no previous work has brought together reduced graphene oxide (RGO), zinc oxide (ZnO), and polyaniline (PANI) within a single epoxy coating for marine corrosion protection.

Researchers at IIT Guwahati have combined these three materials into one coating system. The novel nanocomposite has been developed by attaching zinc oxide nanorods to reduced graphene oxide and then wrapping this structure with polyaniline. The composite was then blended into an epoxy coating and evaluated using several characterization methods.

The developed epoxy coating has shown improved performance compared to standard epoxy. It formed a denser and more uniform barrier, showed stronger adhesion to the steel surface, and slowed the movement of corrosive elements more effectively. These characteristics make it suitable for applications in marine infrastructure, offshore platforms, shipbuilding,

PHOTO: IIT GUWAHATI

Prof Chandan Das, Dept of Chemical Engineering, IIT Guwahati, along with research scholar Dr Anil Kumar, researchers from the Indian Institute of Technology Guwahati have developed a corrosion-resistant epoxy coating for protecting steel structures, exposed to seawater and high-salinity environments.

coastal pipelines, and other steel structures that must withstand continuous exposure to saltwater.

Speaking about the research, Prof Chandan Das, said, “The incorporation of RGO-ZnO-PANI nanocomposite into epoxy coating offers a promising strategy for achieving long-term corrosion resistance in harsh marine environments. As the next step, we are working towards assessing the long-term durability, real-world performance, and life-cycle impact of this coating.”

The work from IIT Guwahati adds to ongoing research on corrosion-resistant materials and provides a pathway toward improving the reliability and longevity of structures operating in marine and high-salinity conditions.

Disclaimer: The research described in this release is at a laboratory stage. The findings are subject to further validation and should not be interpreted as final or ready for commercial application.

Coatings Expo Vietnam 2026

in conjunction with Color and Spechem

The 11th International Exhibition on **COATINGS, COLOR, SPECHEM** and **PRINTING INK** industry in Vietnam

10-12/6/2026

SECC, HCMC, VIETNAM

www.coatings-vietnam.com

400+ Exhibitors

18+ Countries

8.000+ Visitors

VEAS

Organizer

Book a Stand

Asia Pacific Maritime returns to Singapore

Asia Pacific Maritime (APM), Asia's premier exhibition and conference for Shipbuilding & Marine, Workboat, Offshore, and Electric & Hybrid Marine, will return for its 19th instalment, March 25 – 27, 2026, at Marina Bay Sands, Singapore, with its largest edition to date. Anchored by the theme "Future of Vessels, Solutions for Tomorrow," APM 2026 is set to convene the global leaders to examine how the next energy technologies and innovations are driving the future of maritime.

As decarbonization targets intensify and digital innovation accelerates, the maritime sector is entering a decisive phase of energy transition. Energy is now the force behind the progress of maritime decarbonization, including newbuild specifications, fuel strategies, operational optimization, and the capital and contracts that back them.

Driven by this momentum, APM 2026, opening with a welcome address from Guest-of-Honour Ang Wee Keong, Chief Executive, Maritime and Port Authority of Singapore (MPA), will present a sold-out exhibition featuring over 700 exhibitors, in 18 pavilions across six exhibition halls. The exhibition spotlights solutions tied to the use of alternative fuels, electric and hybrid technologies, wind-assisted propulsion and solutions influencing decarbonization.

On the conference side, APM will welcome close to 100 global speakers, covering key topics including Future Fuels & Zero Emission Ships, Next-Gen Shipbuilding: Design, Build, Retrofit & Repair; Electric & Hybrid Power; Finance, Risk & Insurance for the Future Fleet; Maritime Cybersecurity; and Smart & Autonomous Ships.

Weichai, one of the world's largest industrial equipment manufacturers, commented, "APM is the largest meeting place in Asia and has played a pivotal role in accelerating our growth across the region, since establishing our presence in Singapore."

"Earlier this month, we celebrated the successful completion of a 1,000-hour sea trial of Pinnacle Marine's (Singapore) President 100. The vessel, operated by Prestige Ocean Pte Ltd, is the first of its kind vessel powered entirely by 100% biodiesel made from renewable feedstock and by B100 engines manufactured by Weichai. This milestone will be commemorated during a testing certification ceremony alongside partners NTU's Maritime Energy & Sustainable Development Centre of Excellence (MESD) and the China Classification Society Singapore at APM, and we are excited to feature our B100 product series at our booth."

PHOTO: APM

APM 2026 is set to convene the global leaders to examine how the next energy technologies and innovations are driving the future of maritime.

To support shipowners and operators more closely, APM 2026 introduces a new feature – the Electric & Hybrid Consultation Lounge. The lounge brings together experts from key industry stakeholders to provide practical guidance in achieving more efficient operations. Discussions will focus on four critical areas shaping adoption: high-power charging in e-mobility, maritime battery systems, next-generation electric marine technologies and zero-emission shipping.

In the renewables aspect, wind propulsion is re-emerging as a viable decarbonization pathway for deep-sea shipping, and APM will present cutting-edge equipment in wind propulsion. It was reported by Clarksons that there were 89 vessels adorned with a wind-propulsion system in December 2025, and the International Windship Association (IWSA) commented in the same month that there are indications of up to 130 of these vessels under construction, scheduled for delivery by 2028.

Visitors can also expect prominent exhibitors who are advancing alternative fuels, sustainable engine solutions, and technology that drives operational efficiency, including Advanced Polymer Coatings, DAIHATSU INFINEARTH, International Paint, Mitsubishi Heavy Industries Engine System Asia, Nippon Paint Marine, PPG Coatings, Rolls-Royce Solutions Asia Pte Ltd (MTU), Siemens Energy, VINSSEN, Volvo Group, Yanmar Power Solutions and ZF Friedrichshafen AG.

As innovative vessel concepts move from pilots to live deployment, the three-day conference focuses on how the maritime industry can translate ambition into action. Keynote panel "The Maritime State of Play & What's Next for Asia" will bring together leadership perspectives on decarbonization, digitalization, and shifting trade flows to answer key questions that can shape the industry's next decade: What strategic bets on technology and fuel innovation will deliver real competitive advantage? What role will Asia play in setting global standards and driving the next wave of maritime innovation?

The APM conference comprises panel discussions and fireside chats on breakthrough technologies and trends set to define the next decade of maritime.

CII CMD
Corrosion Management Division
Supported by : JSL

CII Centre of Excellence for Competitiveness for SMEs

CII Confederation of Indian Industry

CII International Conference on Corrosion Technology & Management

CORTEM 2026

SHAPING A CORROSION FREE NATION

Corrosion poses serious risks to public safety, manufacturing, product quality, and infrastructure. Recognizing its impact, CII launched **the National Mission** on **"War Against Corrosion"** in February 2023 to provide leadership, share knowledge, foster global collaboration, and accelerate a national policy framework for effective corrosion management.

CII Corrosion Management Division **successfully organized two editions of CORTEM – the International Summit on Corrosion Technology and Management**, held in February 2024 (Mumbai) and July 2026 (Chennai), with 650+ delegates and **85+ thought leaders, including 13 international experts.**

The **3rd Edition of CII CORTEM 2026, an International Summit** on Corrosion Technology and Management, will be held on **7–8 May 2026** in Delhi. The two-day summit will continue its focus on the theme **"Shaping a Corrosion-Free India and the World,"** strengthening CII's National Mission on War Against Corrosion.

FOCUSSED SESSIONS ON

- From Policy to Performance – National Governance, Enterprise Corrosion Management System & ROI from Corrosion Management
- Smart Corrosion Management AI, Digital Twins, Modelling & Simulation, Predictive Analytics & Decision Support Systems
- Future-Ready Materials & Coating Technologies for Renewable, Hydrogen & Net-Zero Infrastructure
- Corrosion in Transport & Built Infrastructure – Steel, Concrete & Asset Life Extension
- Global Best Practices in Corrosion Technology- Lessons from Mature Economies
- High-Profile Industries – Oil & Gas, Fertilizers, Chemicals & Petrochemicals, Power
- Corrosion Testing, Monitoring and Inspection Technologies – Roadmap for Life Assessment and Life Cycle Cost Analysis
- Roadmap for a Corrosion-Free India & the World – Vision for 2030 and Amrit Kaal

FOCUSSED SECTORS

- MINING & METALLURGY
- DEFENCE & AEROSPACE
- FOOD PROCESSING
- ARCHITECTURE, BUILDING & CONSTRUCTION
- TRANSPORT SECTOR
- OIL & GAS & PIPELINES
- CHEMICAL PROCESS
- AUTOMOTIVE
- INFRASTRUCTURE

DELEGATE FEES

(Exclusive of applicable GST)

CII MEMBER COMPANY LARGE	CII Member Company SME	NON MEMBERS	ACADEMIA
INR 7000	INR 6000	INR 8000	INR 4000

For more information and sponsorship opportunities, please contact:

Vineet Bhardwaj
Vineet.bhardwaj@cii.in | 9910475172

Dr Shubhra Pareek
Shubhra.pareek@cii.in | 97721 00119

PaintExpo 2026: Where the future of industrial coating takes shape

Industrial coating technology is undergoing one of the most dynamic phases in its history. Sustainability targets are tightening, production environments are becoming increasingly automated and digital, and supply chains are more global and interconnected than ever before. “Against this backdrop, PaintExpo has always had a clear mission: to be the place where the entire industrial coating value chain meets, exchanges ideas and sets direction.

“As the Project Director of PaintExpo, I see the 2026 edition as a particularly important milestone for the industry,” said Ms Carmen Bender, Project Director, PaintExpo.

A global platform with a clear focus

PaintExpo, taking place April 14 – 17, 2026 in Karlsruhe, Germany, is the world's leading trade fair dedicated exclusively to industrial coating technology. Every two years, it brings together suppliers, system integrators, coating manufacturers and users from across the globe. What makes PaintExpo unique is its uncompromising focus: it covers the complete process chain, from surface pre-treatment and coating materials to application systems, automation, curing, testing, quality assurance and environmental technologies.

This depth and completeness are precisely why PaintExpo has established itself as a true benchmark for the industry. It is not a general manufacturing show with a coating corner; it is a specialist platform where every exhibitor and visitor shares a common technical language.

Strong momentum going into 2026

The momentum for PaintExpo 2026 is already very strong. Three months ahead of the event, more than 400 companies have secured around 30,000 square metres of exhibition space, representing 90% of the previous edition's total floor space. This early commitment is a clear signal of confidence from the global coating community.

Internationalization continues to be a defining feature. Around 53% of exhibitors currently registered come from outside Germany, including companies from Italy, Turkey, India, China and emerging markets such as Hungary, Latvia and Portugal. This diversity reflects the reality of today's coating industry: innovation is global, and so are the challenges it addresses.

A new look – and a new generation

For 2026, PaintExpo will also present a refreshed brand appearance, with brighter, more vibrant colours that visually emphasize the “Paint” in PaintExpo. This is more than a design update; it reflects an industry that is evolving, becoming more visible, more innovative and more connected to sustainability and efficiency goals.

Another important addition is the New Talent Day, which will take place for the first time on the final day of the fair. Students and graduates from universities around Karlsruhe will be invited to explore the coating industry through guided tours, keynote sessions and direct interaction with exhibitors. Connecting young talent with established and emerging companies is essential if we want to secure the future skills base of our sector.

PHOTO: PAINTEXPO

PaintExpo has long been regarded as a launching platform for innovations, and 2026 will be no exception.

PaintExpo as an international trend barometer

PaintExpo has long been regarded as a launching platform for innovations, and 2026 will be no exception. Visitors can expect concentrated showcases of new developments in wet and powder coatings, application and automation systems, pre-treatment technologies, quality assurance and digital monitoring, as well as environmental and recycling solutions. Concrete product launches will be announced closer to the event, but the fair will once again serve as a reliable indicator of where industrial coating technology is heading.

For companies from growth markets such as India, PaintExpo provides exposure not only to European technology but to a truly international network of suppliers and users. It offers insights into export-oriented coating specifications, regulatory expectations and sustainability standards that are becoming increasingly relevant worldwide.

Looking ahead

“My hope for PaintExpo 2026 is that visitors leave Karlsruhe with more than product brochures and business cards. They should leave with clarity: clarity about which technologies will help them improve quality, reduce costs and meet sustainability goals; clarity about how automation and digitalization can future-proof their operations; and clarity about where their organization stands in an increasingly competitive global landscape.

“PaintExpo has always been a place where the industry takes stock of itself. In 2026, that role will be more important than ever,” said Ms Bender.

PaintExpo

World's Leading Trade Fair for Industrial Coating Technology

14 – 17 April 2026
Karlsruhe, Germany

Get your ticket now

AN EVENT BY LEIPZIGER MESSE

In cooperation with JOT

Date	Event	Venue	Organizer	Contact Details
APR 13 – 15, 2026	OFFSHORE ARABIA 2026	Dhahran, Kingdom of Saudi Arabia	Offshore Arabia	W: offshorearabia.com
APR 13 – 15, 2026	INDIA PAINT & COATING EXPO	Bangalore International Exhibition Centre Bengaluru, India	Media Day Marketing	E: expo@mediaday.co.in W: paintandcoatingexpo.com
APR 13 – 15, 2026	MARINECOAT 2026	Al Khobar, Kingdom of Saudi Arabia	Aldrich	W: marinecoat.com
APR 14 – 16, 2026	MIDDLE EAST COATINGS SHOW	Dubai Exhibition Centre, Expo City Dubai, UAE	dmg events	T: +971 4 4453773 E: paddyoneill@dmgevents.com W: asiapacificcoatingsshow.com
APR 14 – 17, 2026	PAINTEXPO	Karlsruhe, Germany	Leipziger Messe	M: (+91) 9166565118 E: hello@bmvalliance.co.uk
MAY 05 – 07, 2026	AMERICAN COATINGS SHOW AND CONFERENCE	Indiana Convention Center, Indianapolis, Indiana, USA	American Coatings Association	E: cmatthews@paint.org W: american-coatings-show.com
MAY 05 – 07, 2026	SURFACE TECHNOLOGY GERMANY 2026	Stuttgart Exhibition Centre, Stuttgart, Germany	Deutsche Messe	E: info@messe.de W: messe.de
MAY 07 – 08, 2026	CORTEM 2026	New Delhi, India	Confederation of Indian Industry	T: (91) 9910475172 E: Vineet.bharadvaj@cii.in W: cii.in
MAY 27 – 28, 2026	AUSTRALIA COATING SHOW	Melbourne, Australia	Surface Coatings Association Australia	E: admin@scaa.asn.au W: australia-coatings-show.com.au
JUN 10 – 12, 2026	COATINGS EXPO VIETNAM 2026	Saigon Exhibition & Convention Centre, Ho Chi Minh City, Vietnam	VEAS	T: (+84) 28 38488561 E: info@veas.com.vn W: coatings-vietnam.com
JUN 11 – 13, 2026	EXPO PAINT AND COATINGS 2026	Chennai Trade Centre, Chennai, India	Toredo Fairs India Pvt Ltd	T: (+91) 9341928011 E: info@expopaintcoating.in W: expopaintcoating.in
JUN 17 – 19, 2026	PAINTISTANBUL 2026	Istanbul Expo Center, Türkiye	CNG Expo	M: +90 (0) 549 749 55 05 E: info@cngexpo.com W: paintistanbul.net
JUN 17 – 20, 2026	SURFACE & COATINGS 2026	BITEC, Bangkok,Thailand	RX BITEC	T: +66 268672222 E: contactcenter@rxbitec.com W: surfaceandcoatings.com
AUG 26 – 28, 2026	ASIA PACIFIC COATINGS SHOW	Jakarta International Expo, Indonesia	dmg events	T: +971 4 4453773 E: paddyoneill@dmgevents.com W: asiapacificcoatingsshow.com
SEP 06 – 10, 2026	EUROCORR 2026	Convention Centre, Dublin, Ireland	European Federation of Corrosion	T: +44 (0) 2074517303 E: eurocorr2026@iom3.org W: eurocorr2026.org
NOV 11 – 13, 2026	CHINACOAT2026	China Import and Export Fair Complex,Guangzhou, Guangdong, China	Sinostar	E: info@sinostar-intl.com.hk W: chinacoat.net

Please note, schedules are subject to last minute changes.

A PROVEN MARKET PLACE FOR PAINT & COATING INDUSTRY

7th Expo Paint And Coatings - 2026®

11 12 13 JUNE 2026

CHENNAI TRADE CENTRE

CONCURRENT EVENT:

3rd SURFENTECH

EXPO ON SURFACE & COATING SOLUTIONS

BOOK YOUR SPACE NOW

5000 m²
EXHIBITION SPACE

250+
EXHIBITORS

12000+
VISITORS

- EXCLUSIVE PAVILION | CHINA | TAIWAN
- BUYER - SELLER MEET & NETWORKING FORUM
- EXCLUSIVE PRODUCT DISPLAY AND LAUNCH

Scan QR

For More Details

PAINT PRODUCTION

- Raw Materials And Chemicals
- Pigment, Adhesives, Additives
- Construction Chemicals
- Capital Equipment/Machines
- Testing & Analytical Instruments
- Paint Conveying & Handling Sys.
- Packaging & Containers

APPLICATION SYSTEMS

- Systems for Paint &Coatings Application
- Powder/Liquid/Coil Coating Systems
- Spray Guns /Paint Booths/Etc.
- Paint Brushes & Rollers
- Drying/Curing/Stripping Equipment
- Automation & Compressors
- Allied Technology & Services

INDUSTRIAL COATINGS

- All Kind of Industrial Coatings- Protective,
- Anti Corrosion-Water proofing-Fire retardant
- Metal-Wood-Plastic-Glass-Ceramics
- Marine Coatings , Auto Refinishes
- Special purpose Coatings
- Pre treatment & Protective Chemicals
- Surface Preparation & Finishing

SUPPORTED BY

Indian Small Scale Paint Association | Tamilnadu Dyes And Chemicals Merchants Association | SSPC INDIA

MEDIA PARTNERS

PAINTVISION | CHEMICAL MARKET | COATINGS AND ANTI CORROSION | ECHEMI | Blooming | Asia Trade Hub

Organiser: TOREDO FAIRS INDIA PVT LTD

Mob: +91 98453 63225 | 93419 28011 | 99864 36557
info@expopaintcoating.in | www.expopaintcoating.in

FORM IV

Statement about ownership and other particulars about COATINGS AND ANTI CORROSION ENGINEERING REVIEW to be published in the first issue every year after the last day of February.

1. Place of publication: Mumbai
2. Periodicity of its publication: Bi-monthly
3. Printer's name: Franco Lonappan
   Nationality: Indian
   Address: 102, Dattar Mansion, C. S. Marg, Vakola Bridge, Santacruz (East), Mumbai 400055. Maharashtra
4. Publisher's name: Franco Lonappan
   Nationality: Indian
   Address: 102, Dattar Mansion, C. S. Marg, Vakola Bridge, Santacruz (East), Mumbai 400055. Maharashtra
5. Editor's name: Abraham Mathai
   Nationality: Indian
   Address: 3, Questend Apt., I.C. Colony, Cross Rd No. 1, Borivali (West), Mumbai 400103, Maharashtra
6. Names and addresses of individuals who own the newspaper and partners or shareholders holding more than one percent of the total capital:
   Franco Lonappan, 102, Dattar Mansion, C S Marg, Vakola Bridge, Santacruz (East), Mumbai 400055, Maharashtra.

I, Franco Lonappan, hereby declare that the particulars given above are true to the best of my knowledge and belief.

-sd/
Franco Lonappan
Date: March 1, 2026

Superior Quality Through Every Step Of The Process For You to Build Great

ABRASIVE

Aluminium Oxide
Coal Slag
Garnet
Steel Shot
Steel Grit
Glass Bead
Copper Slag

PAINTING

Spray Painting Machines
IPC Equipments
Airless Paint Hoses
Airless Spray Guns
Paint Accessories
Paint Mixers

SAFETY

Blasting Helmets
Painting Hoods
Airline Filters
Blast Suits
Whip Checks
CO Monitor
Dead Man Handle

INSPECTION

Defelsko Instruments
Thermometer & Guages
Pocket Weather Meters

BLASTING

Blasting Machine
Blast System Package
Air Cooled After Cooler
Air Receiver Tanks
Blast Nozzles
Bristle Blaster
Hoses
Graco EcoQuip

www.blastech.co.in

BLASTECH
Your Key to Surface Excellence

Tel.: +91 22 26684375 / 76
Mob: +91 7718817131 / 32
Email: sales@blastech.co.in

102, Datar Mansion,
C S Marg, Vakola Bridge,
Santacruz East, Mumbai 400055

PAHWA GROUP
Innovation is life

25 YEARS OF SERVICE EXCELLENCE
TDS®
Air Solutions on Rent

DEHUMIDIFICATION SYSTEMS ON RENT

for blasting, painting and coating anytime during the year irrespective of weather conditions

BENEFITS :

- Hold the blast
- Prevent rust bloom
- Increase coating and paint life
- Prevent curing failures
- Strong adhesion of substrate with surface

Dehumidification, Temperature Control and Ventilation Systems on Rent

TECHNICAL DRYING SERVICES (Asia) Pvt. Ltd.
Plot No. 2274 / 3, Rajiv Nagar, Gurgaon – 122001, Haryana
tdsmarketing@pahwa.com | www.tdsasia.net

Contact
+91 9313481670

Social Connect

RNI Reg. No.: MAHENG/2010/37489

Your reliable partner in surface testing.

Delivering trusted solutions for coating thickness measurement, material analysis, nanoindentation, and material testing since 1953.

Fischer Measurement Technologies India Pvt. Ltd.
Phone : +91 20 67909500
Mobile : +91 9970 397 225
Email : sales@fischerindia.com
Website : www.helmut-fischer.com

Scan to learn more
about Fischer instruments

fischer®