



COATINGS AND ANTI CORROSION ENGINEERING REVIEW

December 2023 - January 2024 | Volume 14 Issue 5 | ₹100



Innovations and significant R&D spending expected to stimulate market growth of high temperature coatings



Interview

Dr B. P. Mallik

*Sr Vice President, R&D, Paints Division,
Grauer & Weil (India) Ltd.*

Technical Feature

**Desiccant dehumidification empowers round-the-year
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- › Dams and roofs coating
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 - Hi gloss polyester top coats
 - Low bake polyurethane
- Casting sealers & unicoat epoxy chassis black

MARINE COATINGS

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

Architectural Coatings

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

FLOOR COATINGS

- Penetrating Primer
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- Solvent less Epoxy
- Solvent less PU



Grauer & Weil (India) Limited

Regd. Office: Growel Corporate, Akurli Road, Kandivli (E), Mumbai 400 101, India
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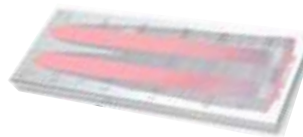
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Editor-in-Chief

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

Administration

Chhaya Kapadia

Accounts

Aatish Shedge

Office

Akash Mane

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

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From the Editor-in-Chief...

The global high temperature coatings market size is expected to reach US\$ 1.74 billion by 2030, registering a CAGR of 4.3% from 2023 to 2030, according to a new report by Grand View Research, Inc. Surging thermally efficient coatings requirement that can protect industrial and commercial equipment in moderate to extreme temperature conditions is expected to drive industry growth over the next eight years.

Technological innovations and significant R&D spending by key industry participants regarding commercializing single-component coatings for multiple applications is anticipated to stimulate market growth over the forecast period. Companies have been constantly involved in developing finished products which can be used for wide range of operating temperatures ranging from 150°C to 750°C in addition to providing corrosion resistance.

In this issue, we try and discuss the various types of high temperature coatings, its uses, and the new innovations introduced into the market. At the same time, this edition also carries an interesting Interview with a noted industry personality who discusses the aspects to R&D within the sector in our country.

While a lot still needs to be done in the R&D sector, he points out that the positive aspect of Indian paints R&D is its innovation and agility to re-engineer products quickly to respond to customer needs, introduction of new cost-effective product variants, and ability to customize products to suit Indian climatic conditions and work practices. In a nutshell Indian paints R&Ds are prompt at market focused innovations leading to cost efficiency and customized product development.

One of the leading indicators of top-notch R&D is the number of patents filed and granted. Till 2010 Indian paint players were not at all focused in filing patents. Of late we see a change in this trend. For intellectual property protection top players are now more active in patent filing, which is a heartening trend.

On a positive note, let me take this opportunity to wish you all a great, happy and blessed New Year ahead!!!

Jolly Lonappan
Editor-in-Chief



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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.
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New Evonik TEGO® Guard 9000 protects facades from the moment of application

While the formulation of exterior paints may differ around the world, the challenge of protecting buildings from environmental impact seems universal. With the new additive TEGO® Guard 9000 from Evonik Coating Additives (coating-additives.com), it is possible to protect building facades from the moment of application, notes a press release from the company.

technology enables high rain resistance just a few minutes after application. The technology promotes electrostatic interaction between a cationic organic polymer and the anionic paint ingredients in the coating formulation.

Additionally, the special formulation of TEGO® Guard 9000 allows for customized addition to formulations without affecting storage



The new 'Quick-Set property' of TEGO® Guard 9000 technology enables high rain resistance just a few minutes after application.

“The application of facade paints has been highly dependent on the weather, as newly applied facade coatings had traditionally long drying times, making them more vulnerable to water and dirt,” says Ellen Reuter, head of the Decorative market segment for the EMEA region. “Evonik’s new TEGO® Guard 9000 addresses this key customer pain-point by improving the stabilization of paint ingredients in facade coatings and providing almost immediate protection against weathering,” she says.

While conventional high pigment volume concentration (PVC) exterior facade coatings typically take three hours or more to dry, the new 'Quick-Set property' of TEGO® Guard 9000

stability. The additive can be used universally, regardless of the binder, PVC and color selected, and is suitable for environmentally friendly waterborne facade coatings.

“Coating formulators using TEGO® Guard 9000 can offer innovative and environmentally friendly facade coatings that can be applied more flexibly and regardless of weather conditions,” says Katina Kiep, head of the Global Decorative market segment at Evonik Coating Additives. “Due to the increasing unpredictability of extreme weather caused by climate change, and more stringent regulatory requirements, there is a growing demand for facade coatings that offer immediate weather resistance and long-

Wagner Spray Shelters

Wagner SprayTech (wagnerspraytech.com), a market leader in advanced paint applicators, has announced availability of Spray Shelters in three sizes, according to a press release from the company.

Wagner Spray Shelters are tent-like structures that provide a contained space for spraying paint and stain on objects of all sizes – from small crafts to large pieces of

furniture. They help to protect the surrounding area from potential overspray when using airless and HVLP paint sprayers or aerosol cans. While items are drying, the shelters also prevent dirt and debris from coming into contact with the wet paint or stain.

Portable and lightweight, the Spray Shelters have three sides and integrated floors to protect tabletops and floors. It takes just minutes to set them up and take them down. Each Spray Shelter comes with a fabric storage bag for convenient storage between projects.

The Small Spray Shelter is ideal for small projects like spraying crafts, lamps,

wooden boxes, home décor, etc., and measures 35”(W) by 30”(D) by 39”(H).

The Medium Spray Shelter is perfect for medium-sized projects like spraying nightstands, small dressers,



Wagner's Spray Shelters help protect the surrounding area from potential overspray when using airless and HVLP paint sprayers or aerosol cans.

chairs, etc. It measures 4' 7”(W) by 4' 7”(D) by 5'6”(H).

Measuring 9'(W) by 6'(D) by 5' 5”(H), the Large Spray Shelter is great for large projects like spraying doors, dressers, armoires, dining sets, etc.

“These popup shelters can be used for spraying projects inside the house, the garage or outdoors,” said Jon Beaton, vice president of Product Management at Wagner. “In addition to protecting the area around your projects from potential overspray, they help to prevent dirt and debris from coming into contact with the paint or stain while it dries.”

lasting protection against environmental impacts.”

Evonik's Coating Additives business line offers a wide range of specialty additives for the coatings and printing inks industry. The business line has

decades of experience in researching and developing innovative products for a wide range of coatings markets, including decorative coatings, industrial coatings, automotive coatings and printing inks.

Trenton offers three Wax-Tape® brand anticorrosion wrap systems.

High-quality, easy-to-apply wraps that protect irregularly shaped fittings and require minimal surface preparation.



Belowground applications

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Anticorrosion Wrap:

A very durable wrap that uses a thick, non-stitch bonded synthetic fabric and has no clay fillers, so it stays conformed to irregular profiles. The wrap requires no abrasion blasting, can be backfilled immediately and is compatible with cathodic protection.



Aboveground and belowground applications

Wax-Tape® #2

Self-Firming Anticorrosion Wrap:

A unique, microcrystalline-wax-saturated wrap that slowly firms up to provide excellent aboveground and belowground protection. Comes in a variety of colors and usually requires no outerwrap.



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Wax-Tape® HT-3000

High-Temperature Anticorrosion Wrap:

Designed for operating temperatures up to 230°F (110°C), Wax-Tape® HT-3000 wrap can be used on high-temperature oil and gas piping, on compressor station discharge piping, beneath thermal insulation and in high ambient temperature conditions.

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Discover Clariant's new Ceridust® 8170 M PTFE-free texturing agent for powder coatings

Rising concerns about the impact of PFAS on human health and the environment have led to a growing demand for PTFE alternatives. As part of this trend, Clariant (clariant.com) has launched Ceridust 8170 M, a PFAS/PTFE-free agent with texturing effects for architectural powder coatings, notes a press release from the company.

environment agency has approved a ban on the manufacture, import and use of 56 PFOA-related compounds under the country's Chemical Substance and Control Law while the U.S. EPA wants to designate PFOAs and PFOS as "hazardous substances" under the federal Superfund law.

"As a sustainability front-



PHOTO: CLARIANT

With Ceridust 8170 M, the challenge was to create a product for texturing effects in powder coatings that was PTFE-free and that offered equal performance to PTFE-containing predecessors.

For use on window frame and fence surfaces to furniture and bicycle rims, the new additive delivers excellent performance in dark and light colors with no extrudate swelling, and with the ability for gloss and texturing levels to be adjusted.

Ceridust 8170 M complies with the European Union's REACH legislation. It can also help to lower energy consumption during the extrusion process.

Regulations around the world are increasingly targeting PFAS-related compounds. Currently under public consultation, the European Union has developed legislation to further restrict or ban PFAS products from as early as 2026. Japan's

runner, Clariant is taking a proactive, pro-safety and pro-environment approach to help customers navigate this uncertain and fast-moving landscape. With Ceridust 8170 M, the challenge was to create a product for texturing effects in powder coatings that was PTFE-free and that offered equal performance to PTFE-containing predecessors," said Simon Bodendorfer, Technical Business Development Manager at Clariant.

"As PTFE-free additives will soon be a major business imperative, we're proud to have developed this leading alternative for Architectural Powder Coatings."

Ceridust 8170 M is the latest addition to the growing Ceridust portfolio of additives

Indicus Paints launches new 'Heatseal' heat reflective coating that makes buildings cooler and energy efficient

Indicus Paints, from the house of VNC Group, a leading player in industrial products in South India, has launched Indicus Heatseal Advanced, its latest heat reflective waterproof coating solution that reflects heat better and thus makes buildings more cool and energy-efficient.

Indicus is the first brand in India to come out with a product exclusively focused on heat reflection. While Indicus Heatseal

was launched a year ago, the new Indicus Heatseal Advanced is the next generation coating with advanced waterproofing properties. The coating instantly reflects solar radiation back into the atmosphere and makes the building cooler by up to 10°C. This significantly improves the comfort for occupants during hot weather and reduces the power consumption on account of running fans and air-conditioners.

Commenting about Indicus Heatseal Advanced, Mr B. Gokul, Partner, VNC Group, said, "Air conditioning can account for up to 70% of the

residential energy consumption in a largely tropical country like India. In this context, our heat reflective coating can be a game-changer for homeowners, as it can significantly bring down the

indoor temperature and thus, the energy cost. Heatseal is an emerging technology, and we worked hard to develop this environment-friendly product. It is the need-of-the-hour solution with

soaring summer temperatures, looming air conditioning costs and its environmental impact."

Heatseal has specially added microspheres that are tiny gas-filled thermoplastic bubbles. They form voids in the coatings that reduce thermal conductivity into the building and also make the coating elastic. It allows the coating to expand and contract along with the structure, which stops water leakage through the cracks. The product can provide superior protection against both hot sun and monsoon rains, making it a coating solution that delivers benefits in all seasons.



PHOTO: INDICUS PAINTS

The Indicus Heatseal Advanced heat reflective waterproof coating solution reflects heat better and thus makes buildings more cool and energy-efficient.

that offer solutions focused on today's challenges of minimizing environmental impact and maximizing product performance.

Clariant's PTFE-free solutions include polyethylene waxes and a bio-based wax blend, all with proven success in replacing PE/PTFE additives.



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Referenced in more than 100 international test standards and specifications, the easy to operate, Taber Abraser has been specified by numerous industries as the standard for wear and abrasion research, quality and process control, materials evaluation, and product development. Its field of application includes tests of painted, lacquered, powder coated, and electroplated surfaces; textile fabrics ranging from sheer silks to heavy upholstery and

the Grit Feeder or Scuffing Head Attachments can be used to expand the type of test being conducted.

'Taber Test' delivers reliable data in minutes. Used to evaluate a material's resistance to wear, a flat specimen is mounted to a turntable platform that rotates on a vertical axis. As the turntable rotates, contact of the specimen against the sliding rotation of two abrading wheels cause wear



The single platform Taber Rotary Platform Abrasion Tester Model 1700 and the dual platform Model 1750.

carpeting; solid materials such as metals, stone and ceramics; plus plastics, leather, rubber, linoleum, laminates, glass, paper, and many others, notes a press release from Khushboo Scientific Pvt Ltd., their agents in India.

Different grades of standardized abrasive wheels have been engineered to meet varying requirements of abrasive action enabling the instrument to be used to test a diverse range of materials. Available as Calibrase® or Calibrade®, these proprietary abrasants are designed so the binder material breaks down during use, exposing new abrasive particles. Optional accessories such as

while a vacuum system removes loose wear debris during the test. The resulting abrasion marks form a pattern of crossed arcs in a circular band that cover an area approximately 30 cm².

Features include LCD operator touch screen; quick release wheel mounting hub; easy to replace critical components; compact abramer arm assemblies; redesigned support frame and housing; direct flow vacuum nozzle with precision height adjustment; screw-in vacuum nozzle tips for 8mm and 11mm; selectable display options (including language); and store test profiles.

More details:
sales@khushbooscientific.com

AkzoNobel uses rapeseed and pine rosin to create first bio-based interior coating for KIA Motors

KIA Motors is using bio-based paint supplied by AkzoNobel for the inside of its new EV9 electric SUV. It's the first time the vehicle manufacturer has specified an interior bio-based coating.

color master approval, the bio-based paint being used on the EV9 also meets all of KIA Motors' requirements for both chemical and physical resistance (against sunscreen, air freshener, heat and scratches, for example).



As well as obtaining 100% color master approval, the bio-based paint being used on the EV9 also meets all of KIA Motors' requirements for both chemical and physical resistance.

Two kinds of bio-rosin (rosin is a solid form of resin) have been used to create the product, one extracted from rapeseed, the other from pine rosin. The paint can be found on the EV9's interior door switch panels, with AkzoNobel also supplying coatings for the rest of the interior, notes a press

communicate from the company. "Both companies have a long history of developing more sustainable products and we're proud to have played a role in helping KIA Motors achieve a notable production landmark," says Patrick Bourguignon, Director of AkzoNobel's Automotive and Specialty Coatings business.

As well as obtaining 100%

"KIA Motors had a very specific coating requirement for the EV9 and the performance of our bio-based product met all their needs," continues Bourguignon. "It's the latest example of how we as a business continue to develop advanced coatings technology that minimizes environmental impact, without compromising on quality."

AkzoNobel has been a proud partner of KIA Motors for ten years, and while this new agreement is currently limited to EV9 models produced in South Korea, it's expected to be extended to several of the vehicle manufacturer's upcoming EV models.



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CRISIL Rating : SME 1 'Highest'



Nippon Paint India launches INFINITY Automatic Tinting System

The Wood Art business of Nippon Paint India has announced launch of best in class “INFINITY Automatic Tinting System,” offering unlimited colours and product solutions for the rapidly growing interior furniture coating market in India.

Nippon Paint's INFINITY's



One of the key features of INFINITY coatings is the ability to create a seamless, smooth, and luxurious finish on any surface.

Automatic Tinting System represents a significant leap forward in the realm of interior furniture coatings. By combining Japanese cutting-edge technology with world class materials, this system empowers users to effortlessly create stunning finishes on furniture surfaces while saving time, reducing waste, and ensuring longevity.

One of the key features of INFINITY coatings is the ability to create a seamless, smooth, and luxurious finish on any surface. These coatings can be applied over wood, metal, aluminum, glass, plastics and acrylic while protecting them from scratches, stains, wear and tear. The coatings are available in a wide range of colors, and finishes, allowing for personalization to suit different design preferences.

According to Sharad Malhotra, Director, Nippon Paint India, “We are thrilled to introduce the INFINITY range to the Indian consumers. This product range and color system has been specifically developed for Indian conditions, keeping in view the preferences of the Indian consumers. What's more, as the name suggests, the INFINITY portfolio will grow significantly, creating more value for consumers, while giving architects and interior designers a great choice

of products and colors to play with.”

Hitesh Shah, Sr. Vice President - Wood Coatings, Nippon Paint India said, “INFINITY is our most important innovation of the decade, and it offers color coatings to last more than a decade. Our state-of-the-art technology empowers furniture manufacturers, designers, and homeowners to elevate their interiors with stunning, customized finishes on a multitude of substrates. Our focus on efficiency, sustainability, and superior quality sets us apart in the industry.”

The INFINITY range of products is now available across all major markets in India. These coatings have

Gema's multi-gun axis UA05-x coats tricky areas automatically

Gema Switzerland GmbH's (gemapowdercoating.com) multi-gun axis UA05-x is used for applications where top or underside coating with multiple guns are required.

The solution is expandable with angled nozzles and extensions to further increase the application range.

The multi-gun axis opens up



In combination with the vertical Z-axis, the UA05-x unfolds its full strength to solve complex application challenges.

The solution uses a single positioning axis for the horizontal alignment of up to three automatic guns during the coating of complex components and XXL parts, notes the company's press release.

In combination with the vertical Z-axis, the UA05-x unfolds its full strength to solve complex application

new application solutions such as fixed gun positioning or horizontal oscillation across the work piece or applications where vertical gun positioning or top and/or bottom product tracking are required. This allows the automatic coating of tricky areas and offers a flexible approach for top-, underside- and deep contour coating.

been developed and designed by Nippon Paint's labs in India, based on the requirements of the local market, while encompassing the essence of Japanese coating technology. The manufacturing of these products too is being done in India, truly emphasizing the company's 'Make in India' thrust.

The company further plans to

extend its portfolio by adding several new products and innovations and other paint systems like PE, NC, alkyd, and epoxy. With the technological advantage and prowess to coat multi-substrates like wood, metal, aluminum, glass, plastics and acrylic, the company is among the first movers in the market having this versatility and product depth.



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India's paint R&Ds prompt at market focused innovations

The positive aspects of Indian paints R&D is its innovativeness and agility to re-engineer products quickly to respond to customer needs, introduction of new cost-effective product variants, and ability to customize products to suit Indian climatic conditions and work practices, says Dr B. P. Mallik, Sr Vice President, R&D, Paints Division, Grauer & Weil (India) Ltd.

How strong is R&D amongst paint companies in India?

Focus and priorities towards research and development (R&D) capability building and ability to undertake cutting edge research varies from company to company. In India most organized players have structured the R&D department in place for product development and market support. However, the risk appetite of Indian companies to invest in building best in class R&D organizations and enabling R&D culture is not at par with globally recognized paint players barring few leading companies. In general, organized players in the Indian paint industry invest in the range of 0.1 - 0.5% of turnover in R&D against 1 - 4% for global paint companies. As a result, R&D activities are primarily short term centric having focus more on cost reduction, product customization, market support and developing copycats against dominant leading branded products. Focus on long term

R&D and breakthrough innovation for creating unique products which are new to the world or even new to our market is relatively lesser barring top one or two dominant players.

However, the positive aspect of Indian paints R&D is its innovation and agility to re-engineer products quickly to respond to customer needs, introduction of new cost-effective product variants, and ability to customize products to suit Indian climatic conditions and work practices. In a nutshell Indian paints R&Ds are prompt at market focused innovations leading to cost efficiency and customized product development.

One of the leading indicators of top-notch R&D is the number of patents filed and granted. Till 2010 Indian paint players were not at all focused in filing patents. Of late we see a change in this trend. For intellectual property protection top players are now more active in patent

filing, which is a heartening trend.

I think Indian entrepreneurs, promoters need to recalibrate outlook towards R&D as a key value creating function for long term business sustainability and drive scientific capability building by investing in R&D infrastructure, instrumentation, talent development, external collaboration and overall culture building. This will help to raise the bar of R&D's from existing level to next level.

What are the new developments in paints / coatings around the world?

Major thrust in current coating research across companies is to make the existing coating materials greener, safer and sustainable, regulatory compliant, induce multi-functionality, energy saving and energy harvesting attributes, enhance performance and durability, improve overall cost efficiency and develop smart interactive materials with sensing and healing properties. Clear trends are visible to reduce volatile organic compounds (VOCs), hazardous air pollutants (HAPs), eliminate carcinogenic, mutagenic and reprotoxic (CMR) to make coatings safer and environment friendly, use renewable chemistries and develop high performance water-based coatings to reduce overall carbon footprint. Novel cross linking chemistries are being developed to produce fast



Dr B. P. Mallik, Sr Vice President, R&D, Paints Division, Grauer & Weil (India) Ltd.

cure products to save energy without compromising performance. Nano materials and sol-gel chemistries are being used extensively to impart unique coating features and enhance properties such as self-cleaning, anti-graffiti, antimicrobial, ultraviolet (UV) resistance and coatings with superior anticorrosion properties, mechanical strength at lower dry film thickness (DFT). In terms of technology road map the general trend is to increase the % of green and sustainable products as a part of the overall product portfolio.

Just to cite few examples of areas where the industry will see more innovations in terms of new products are:

- Solar harvesting and solar heat management coatings.
- Coatings based on renewable materials with lower carbon footprint.



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In addition to above top coating players are working on R&D process intensification using high throughput robots for experimentation to accelerate product development, use of artificial

intelligent (AI) based software for coating application, colour matching, intelligent predictions and use of drone technology for monitoring painting operation, identifying painting flaws, defects, etc.

How easy is it for industry, large public sector units (PSUs), etc., to accept newer types of paints / coatings with enhanced performance / properties?

As such there is no barrier in adopting new technology products. However, there are few practical challenges. Adoption of new paint and coating systems not only calls for products based on superior technology but also require new application equipment, new work practices and trained manpower. Chances of acceptance of new technology products and systems are far higher if it does not call for infusion of new capex for line modification, purchase of new application equipment or change in existing work practices. Success probability of acceptance is much lesser if it is other way. Probably this is the reason why UV cured liquid or powder products could not penetrate much in the market. Similarly, very short pot life products like polyurea, polyaspartic, solvent-free polyurethane had limited acceptance initially in our market, since all these technologies' require special application equipment and line discipline. On the contrary new technology

products which are applicable by conventional airless spray gun, roller or brush are accepted by clients far more easily as long as value proposition and performance benefits are demonstrated.

The heavy-duty coating segment, represented by large industrial houses and PSU's, buy paints as specified in their internal specification from least cost bidders. Upgrading these specifications with high quality products and the system is difficult as well as time consuming. Focus on least cost acts as a deterrent to introduce environmentally friendly products. However, the heartening sign is that the oil and gas industry and infra segments are progressively adopting products and systems meeting latest international standards at least at the time of erection and commissioning of projects. On the other hand, when these projects come for maintenance painting, the rigor on overall painting quality is somewhat compromised.

What kind of futuristic paints / coatings do you see coming in the near / distant future?

Future product innovations will come primarily in the space of product differentiation using value added features involving nanotechnology, deployment of smart and intelligent functionalities, energy saving and energy harvesting products, green and sustainable products with superior health and hygiene attributes, durability and service life enhancing chemistries and digitally interactive products. All the segments of coatings will see lot more feature enriched multifunctional new generation products. For example marine segment will see new generation biocide free antifouling coating on

ship hulls that work on the principle of repelling barnacles, larvae rather than killing those organisms with leached biocides, low friction underwater coating with lesser hydrodynamic drag, etc. High performance coatings (HPC) segment will see fast cure single coat direct to metal (DTM) type heavy duty system in place of existing multicoat system to achieve faster job turnaround time, water-based epoxy and PU with equal or better performance than existing solvent-free / high solid (SF / HS) systems, coatings embedded with sensor materials to detect under film corrosion, autonomous self-healing anticorrosive coatings and environmentally safer products free from VOC, HAP, CMR and heavy metals. The global drive towards green hydrogen as future fuel will call for new generation anticorrosive coating systems which can maintain its integrity and adhesion at temperatures as low as -200°C to sustain temperature drop during decompression of liquefied hydrogen for transportation through pipelines.

Automotive segment will see more efficient low temp cure coatings which can perform better in lower thickness, top coats that can interact efficiently with light detection and ranging (LIDAR) and radio detection and ranging (RADAR) driven autonomous vehicles, soft feel interiors for extra comfort and products for lithium ion battery segments.

In the deco segment we are already seeing huge thrust on new functionality introduction for premiumization such as self-cleaning, antimicrobial, air purifying, antiviral, anti-stain, anti-graffiti, anti-dust, cool roof coatings. All these

- Environment friendly coatings free from toxic metals, CMR, HAP, VOC
- Water based heavy duty coatings having equal or better performance than existing solvent-based system.
- Improved anticorrosive coatings that can arrest corrosion under insulation, protect spot weld, sharp edges, and joints more efficiently.
- Low friction abrasion resistant ship hull coatings with much lesser hydrodynamic drag to reduce GHG emission.
- Novel antifouling coatings which will interact selectively with the specific protein of fouling organisms to repel them from attaching on ship hulls instead of killing them with leached biocide.
- Thermo-responsive temperature indicating coating.
- Thermochromic colour changing coating.
- Intelligent coatings with sensing and healing properties, sensor based interactive coatings.
- Superhydrophobic self-cleaning, anti-icing coating, anti-graffiti, easy clean coating.
- New generation coatings for autonomous electric vehicles, battery casing, electrodes of lithium-ion battery, etc.



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developments are happening without any compromise on the green and sustainability parameters.

Do you find the right kind of paints / coatings being used for a particular purpose, if not, what are the reasons and what can be done to rectify it?

There is no doubt that product technology and system specification have improved a lot compared to what it was in the past. But there is still room for improvement in the area of surface preparation and application which require more mechanization, skilled painters, use of advanced equipment, safe work practices and disciplined deployment of coating system and site monitoring mechanism. Better quality management is seen in areas where application is done in original equipment manufacturing (OEM) set up and project painting site. However, the practices are diluted when it comes to maintenance painting using supply apply contracts. Since the contract is awarded solely based on least cost bidder and not on credential and capability assessment, compromises are often made both in terms of product technology and application to manage cost and win over competition. I

think all the stakeholders in the value chain, be it asset owners, paint manufacturers, applicators, quality certifiers, inspectors, etc., have to be cognisant about the long-term consequence of taking shortcuts during project execution and work collaboratively keeping in mind the single-minded objective of 'Quality First.' Also, there is a need to revisit the award criteria on multiple metrics and not solely on cost metric.

What are the challenges facing the paints / coatings industry today and your suggestions for a way forward...

Challenges are different from country to country depending on state of economy, per capita income, growth rate etc. Few challenges are global, and some others are country specific. As of now the common challenge for paint industry across the globe is the volatility of raw material prices as well as availability due to crude oil price fluctuation in view of prevailing geo-political scenarios namely Ukraine and the Israel war, and China's slowdown.

India being fastest growing economy now is expected to maintain steady growth rate at least for next one to one and half decade. However, there

are few challenges specific to our country which we need to tackle. These are shortages of adequate number of technical talents with right skillsets, non-availability of sufficient number of skilled painters, slow pace of mechanization for surface preparation and application especially in decorative segment, poor quality of construction surfaces. Also, contract awarding guideline based on lowest cost bidder leads to unhygienic market competition leading to quality compromise. Over reliance on lowest price over quality by the end users often delay the entry of eco-friendly green and sustainable products.

To address pricing pressure or availability concerns there must be a greater thrust on in house innovation and collaborations with vendors and customers. Skill shortage has to be addressed through in house training and development of freshers and opportunity creation for their growth instead of poaching from competitors. Structural correction on contract awarding guidelines with weightage on both quality, price and credentials should be given due consideration by the decision making bodies.

How important is R&D for Grauer & Weil (India) Ltd., and what kind of work is being done there?

Grauer & Weil is primarily a surface solution provider company dedicated to providing anticorrosive and aesthetic solutions for different types of surfaces such as metals, alloys, concrete, wood, plastics, composites etc. through our vast array of innovative products ranging from metal finishing electroplating, lubricants and paints products. Being primarily a B2B solution providing company our goal is to deliver robust and differentiated

value-added product solutions to delight our customers. Innovation, agility, customer orientation and scientific phenomena understanding are the guiding pillars of our R&D. We invest heavily in technical manpower, sophisticated instruments, pilot plant and other facilities to support scientific capability building.

Our corporate instrumentation lab is equipped with best-in-class research instruments for thermal, spectroscopic, chromatographic, imaging, electrochemical and surface analysis to support in house research. We are also in the process of building a dedicated corporate research and technology centre near Mumbai which will house R&Ds of all business verticals to leverage our expertise and capabilities as a group. We have also started digitalizing our R&D operations with new formulation and Materials Safety Data Sheet (MSDS) software. We firmly believe that stronger R&D foundation is instrumental for sustaining our future growth and hence we will continue to invest to enhance our current capabilities to the next level.

In terms of activities, we develop tailor-made products as per customer requirement, provide solutions to customer's pain points, bring in cost efficiency, add innovative features for better value proposition as a part of core activities. We also undertake joint projects with customers to solve specific issues, import substitution, new product development.

As a part of long-term agenda in paints we are working on developing high performance water borne products, environment friendly green products, nanotechnology based products, high temperature products for mitigating corrosion under insulation (CUI), thermal



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barrier coatings and high durable coating system with longer service life. We are also developing few challenging products for helicopter and missiles in our aerospace division to support the indigenization drive of the defence sector in our country.

New paints developed by Grauer & Weil (India) in the recent past...

Grauer & Weil's main focus is to expand and enrich the current product portfolio with high quality high durable paints with value added innovative features. During the last 2 - 3 years we have successfully developed and commercialised a full range of SF epoxy and PU paints for pipeline segment for automatic and single leg twin feed hot airless spray application, National Science Foundation (NSF) and Water Regulation Advisory Scheme (WRAS) approved potable water epoxy and PU coatings for ambient as well as high temperature, glass flake coatings in polyester, vinyl ester and Novolac vinyl ester chemistry, CUI coating up to 650°C, ultra-high durable polysiloxane and fluoro urethane based top coats, water based epoxy and PU system for railways, water based anti-carbonation coatings for concrete pillar and bridge structures, DTM coating in alkyds, epoxy and PU chemistry. Many of these coatings are certified against international standards from international test labs. For the aerospace segment we have developed low friction, non-stick, heat resistant coatings for helicopter nose cone, super hydrophobic easy clean, anti-smudge coatings for antenna Radome. We are also working on thermal barrier coating with high heat gradient for wings and fins of missile carriers as well as external surface of missiles. In

the OEM segment we have developed high durable transparent anti tarnishing lacquers for various metals, alloys and electroplated articles.

In addition, we have introduced a full range of interior and exterior decorative coatings for masonry walls and concrete surfaces including waterproofing coatings for roof terrace, interior and exterior walls, and basement for the project segment.

Is the Indian paints / coatings industry as advanced as say in other developed countries, or is there some catching up to do? Or, how different is the Indian paints / coatings market from those in other developed countries?

Indian paint market is largely a decorative paint market, and it constitutes almost 75% of total paint market. Globally deco market is highly country specific, and it requires products specific to quality of construction surfaces, climatic variations, and prevailing application methods. Hence the products used in decorative segments are somewhat different from that of developed nations especially to suit shelf life in tropical climate and application related work practices. Indian companies are fairly self-sufficient to address deco product needs as per Indian market. These products are not significantly different either technologically or functionally from that of products coming from developed market. In fact, some of high durable exterior and interior decorative products are equal or even better than the products of developed countries in terms of durability and service life. Hence, I do not perceive any major technology gap in decorative segment with respect to developed nations.

In automotive market the foreign players are dominant either as standalone entity or through collaboration and licensing. Hence there is constant flow of latest technology and painting system knowhow from developed nation to India. Here the question is how good or how fast we are in adoption of these global systems and best painting practices in Indian auto plants. I feel the gap in terms of technology adoption has reduced considerably due to harmonization of painting system between developed and our market. Need for this transition has been further accelerated to use Indian auto plants as outsourcing hub for export. The overall quality of painting system of India made cars are not much different from that produced by developed countries. However there are gaps in few areas where further advancements in technology and preparedness is required such as high quality painting system for railways, painting materials for upcoming autonomous and electric vehicles, water based automotive coatings etc.

In heavy duty coating field, advanced SF technologies across chemistries are well entrenched in Indian market. Possibly the lag is high with respect to development and adoption of water based high performance coating technology and environment friendly coatings. Further advancement is required in areas such as development of high temperature corrosion under insulation coatings, coatings for spot weld and sharp edges, new generation biocide free antifouling coating, high abrasion resistant coatings for ship hulls with reduced aerodynamic drag, thin film intumescent coating for cellulosic and hydrocarbon fire and coating system

having service life beyond 15 years.

To sum up the spaces that requires catching up or further advancements over existing technology are coatings for electric vehicle technology, water based high performance industrial coatings, heavy duty coatings for green hydrogen storage and transmission, high temperature coatings, self-cleaning and self-healing coatings, superhydrophobic coatings, multifunctional coatings and finally elimination of toxic metals and CMR from existing coatings. Also, the time has come for Indian industry to consider use of advanced tools such as automation, robotics, AI, data analytics for coating research.

A bit of Dr B. P. Mallik's career path...

Dr B. P. Mallik is a passionate, accomplished coating professional having 44 years of experience in coatings research, product development and commercialization, driving innovation, strategic R&D management and organization building and providing technology leadership to large R&D organizations. Started career as research scientist in the R&D of Berger Paints India Ltd, way back 1980 and subsequently moved to Asian Paints in 1999 as General Manager, R&D of Growth Business Division. Dr Mallik took over as Vice President, R&D, of Asian Paints in 2013 and finally superannuated in 2018. Post retirement he was technical advisor of Asian Paints India Ltd, till 2020. Dr Mallik is currently engaged with Grauer and Weil (India) Ltd as Sr Vice President, R&D of their Paints Division.

Academically Dr Mallik did his M Sc in Chemistry from Kolkata University, M Phil and Ph D from Jadavpur University and post graduate in General Management from Indian Institute of Management, Kolkata.

Dr Mallik is attached to several professional bodies such as member of Indian Paints Association, BIS, SSPC, NACE, ACS and well networked with academia, CSIR institutes, vendors, and customers. He has several publications and few patents to his credit and delivered talks at various national and international symposiums, chaired many technical sessions, conducted training programs on behalf of NACE and SSPC, acted as research guide for several B Tech and M Tech students and mentored many coating professionals.

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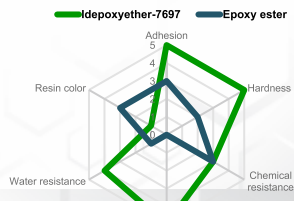
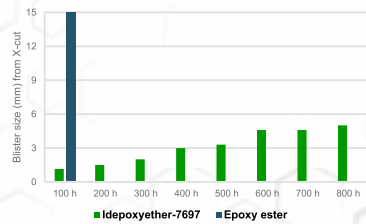
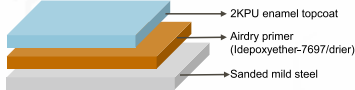
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IDEPOXYETHER-7697 BIO-BASED EPOXY ETHER

Specification	Idepoxyether-7697
NV (%)	63.0-67.0
Viscosity (Ford cup B-4, 30°C, 40% solution in xylene)	40-60 seconds
OHV (mgKOH/g, solids)	73-78
Color (Gardner)	14 max.
Solvent	Xylene

Evaluation Results for protective primer

On mild steel



EPICLON H-303-45M MODIFIED EPOXY RESIN

SPECIFICATION	:
Appearance	: Clear viscous liquid
Non-volatile (%)	: 43.0 - 47.0
Viscosity (Gardner, 25°C)	: Z ₁ - Z ₄
Color (Gardner)	: 3 max.
OHV (sol ² , mgKOH/g)	: 95 - 135

FILM PROPERTIES :

Checking item	EPICLON H-303-45M	
Air-drying		
Drying time (0.076 mm., hr. : min)	2 min	
Set to touch	5 min	
Surface dry	1hr 50min	
Hard dry		
Drying condition	120°C x 20 m.	RT x 5 days
Substrate	Bonderite	Steel/Alloy*
Physical properties		
Gloss (60°)	102	60
Hardness (pencil, 2 kg., marked-broken)	E - 4H	B - H
Adhesion (cross-cut, 1 x 1 mm.)	100/100	100/100
(scratch, 1 kg.)	Excellent	Excellent
Impact (½", 500 g., cm.)	> 50	> 50
(1 kg., cm.)	-	-
Erichsen (mm.)	> 7.0	> 7.0
Bending (∅ mm.)	∅ 2	∅ 2
Chemical resistance (spot test)		
- 5% NaOH (RT x 24 hr.)	Excellent	Excellent
- 5% H ₂ SO ₄ (RT x 24 hr.)	Excellent	Excellent
- Xylene (RT x 1 hr.)	Excellent	Excellent
Hot water (dip 40°C x 168 hr.)	Excellent	-
Humidity test (50°C x 98% RH x 250 hr)	Excellent	-

Gray primer air-drying enamel

Checking item	EPICLON H-303-45M	
Adhesion (cross-cut, 1 x 1 mm.)	100/100	
Salt-spray test		
500 hr.	Good	0
1000 hr.	Good	0

Salt Spray Test :

1K Epoxy Primer H-303-45M (2)



Blister 0-2 mm Primer 0-1 mm Primer/Top coat

1K Epoxy Primer H-305-45T (3)



Blister 0-12 mm Primer 0 mm Primer/Top coat

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Anti-Sagging Additive for S/B Coatings

DISPARLON 6650

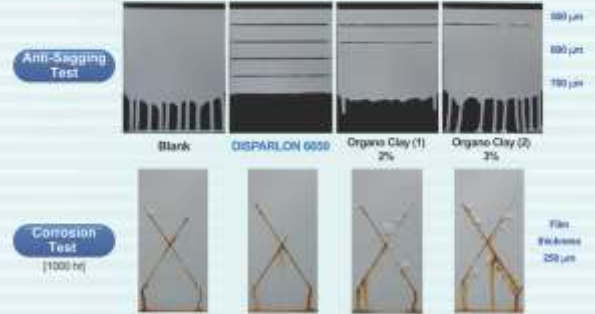
ADVANTAGES

- Strong anti-sagging & anti-settling effect
- 100% active (powder)
- Lower dosage required (cost effective)
- Excellent water resistance
- No recoatability problem



High Solid Epoxy System

Raw Material	Function	Supplier	Parts
806	Diphenyl-A epoxy resin	Mitsubishi Chemical	40.0
NeciresEPX-L2	Low viscosity liquid hydrocarbon resin	PTT JAPAN LTD.	5.0
Tal #1	Talc	DAKSHINA Chemical	35.0
TH-820	Titanium oxidant	ISHIKAWA SANGYO	10.0
3LI (N-CLON 111)	Diluent		10.0
DISPARLON 6650	Thixotrope	Kusumoto	1.0
Total			101.0
B Versamid 1400 (Versamid 140)	Hardener	BAF	25.0
C NLMAN-BuChp-V511	Diluent		0



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NAMLON

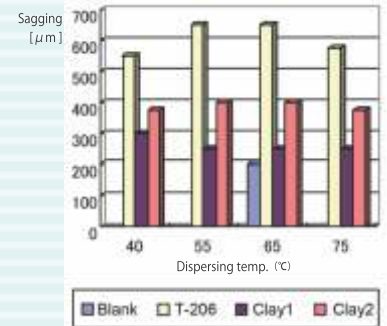
Anti-sagging/Anti-settling agents for coatings and sealants

NAMLON T-206

Anti-Sagging in High Solid Epoxy Primer

FORMULATION

Part A	Supplier	Parts
EPOTEC YD-128	Aditya Birla	40.0
Necires EPX-L2	NEVCIN	5.0
Xylene		5.0
n-Butanol		5.0
Talc		35.0
Titanium dioxide		10.0
Thixotrope		1.0
Part B		Parts
Versamid 140	GABRIEL	16.0
Xylene		2.0
n-Butanol		2.0



Anti-Sagging Test (65°C)



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Jaguar Surface Coating Equipments on a growth path

JSCE specializes in special paint application systems

Pune-based Jaguar Surface Coating Equipments (JSCE) is an ISO 9001-2018 certified and CE certified company, professionally engaged in designing and manufacturing of airless spray painting equipment, automatic spray painting systems, plural component spray paint circulation systems, paint transfer pumps and systems, dispensing equipment and systems and various fluid handling systems. They also offer electric airless sprayers, diaphragm pumps, paint booths, high pressure paint hoses, pneumatic paint agitator, pressure feed containers, air assisted guns and other accessories.

The company serves customers globally in the manufacturing, processing, construction and maintenance industries. The company's products help

customers to increase productivity, improve quality, conserve energy, save expensive material, control environmental emissions and reduce labor costs.

For protective and high build coatings the JSCE single and plural component spray machines are designed to handle protective and high build coatings, which can efficiently spray up to 100 percent volume solids paint and coatings with superior quality finishing.

Applications include use in marine coating and ship building, passive fire protection (PFP); PEB structural coating; offshore / onshore industries; dams and roofs coating; refinery; pipe internal and external coating; alternative energy; infrastructure; construction; manufacturing industries; corrosion preventive coating and floor coatings.

The company's fluid transfer, dispensing and metering equipment are widely used in the automotive; pharmaceutical; manufacturing; solar energy; chemical and electronic industries. The typical fluid handled include high volume solid paints, high viscosity coatings, solvent-less coatings, epoxy paints and mastics, polyurethane coatings, zinc base coatings, coal tar epoxy and glass flex epoxy; waterproof materials, sealants and adhesives applications.

Their range of finishing and

process equipment find use in automotive, alternative energy, aerospace, home appliances and furniture industries.



PHOTO: JAGWAR





Saudi Abrasives
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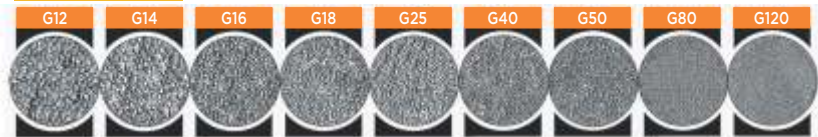


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Tel.:+966 13 8342998 | Fax:+966 13 8348617
E-mail: info@saudiabrasives.com



In the finishing and process equipment range, the JSCE low pressure pumps, diaphragm pumps and pressure feed containers are the ideal choice for medium surface projects where a good balance between application speed, finish quality and quick touchup is required. Applications include use in automotive, aerospace, manufacturing, and furniture industries. Typical fluids handled are solvent and water-based paints, transfer of abrasive fluids, glues, bonding compounds and die lubricants; low viscous paints and coatings.

JSCE sealer dispenser and transfer pumps are widely used in transferring, measuring, controlling, dispensing and applying a wide range of fluids and viscous materials used in vehicle lubrication, commercial and industrial applications. Applications

include high flow rate for dispensing of highly viscous sealants and adhesives; dispensing of 2K sealants and adhesive for electronic industries; dosing and metering systems for food and pharmaceutical industries.

Typical fluids handled are rubber based sealers, waterborne adhesives; silicone and solvent-borne materials; grease and lubricants, jams and jelly, and printing inks.

JSCE started manufacturing activities in 2003. At first, they had a moderate setup where they manufactured small airless spray painting equipment, pressure pots, tanks, etc. After that in 2007, they entered into bigger equipment like industrial airless spray painting equipment and systems and projects. At the same time,

they also started supplying their equipment to government organizations like PSUs, Indian Railways, Indian Navy, while expanding their manufacturing set up in Bhosari, Pune. In 2008, JSCE started exporting their products as well as their systems and started manufacturing turnkey projects for painting systems. In 2011, they started their second manufacturing unit also in Bhosari with a dedicated machining center which had different types of CNC machines, special purpose machines through which they enhanced their production capacity as well as quality.

In 2013, they inaugurated their third unit in Shrirampur, Maharashtra, which was dedicated for special processes like hard chroming, heat treatment, and to carry out different painting processes, etc.

2017, saw them entering into electrically operated airless painting systems. According to Mr Paritosh Pradhan, Managing Director, JSCE, it was a good time for these electrical systems as there were many industrial and residential projects coming up in a big way with big requirements for painting systems. At that time, they started their fourth unit, also in Shrirampur with assembly lines, testing, storage, and packaging areas in an area totaling 85,000 sq ft. This unit helped JSCE to upscale and increase productivity as well as maintain consistent quality. This, according to Mr Pradhan, was a milestone at that particular time. With this, they were now able to compete with Chinese manufacturers and at the same time match the quality of European products, he said.

Going forward, their aim is to introduce a do-it-yourself (DIY) range that will make a 'painter in each and every home.' Everyone can own a small painting equipment at home and can try their hand at conveniently painting any small object, say a small piece of furniture or decorative item.

Globally, JSCE's aim is to be in the top five and within India, they aim to be the leading company in this line. "We are a company having good professionals as well as ethical approach with our customers and our suppliers who are our channel partners who we consider as a part of our family or team," signs off Mr Pradhan.



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Innovations and significant R&D spending expected to stimulate market growth of high temperature coatings

Surging thermally efficient coatings requirements that can protect industrial and commercial equipment in moderate to extreme temperature conditions is expected to drive industry growth over the next eight years

High temperature coatings as the name suggests, are those that can help prevent the rapid corrosion and degradation of materials and equipment that can occur at high operating temperatures. These coatings are designed to withstand high temperatures for long periods of time.

Industrial high temp coatings are widely used in process-based facilities such as refineries, petrochemical plants, pulp and paper mills and power plants. These facilities usually contain extensive networks of pipe that need to be diligently protected from corrosion under insulation and away from the naked eye. Therefore, it is essential that users have confidence in the effectiveness of their high temperature coatings. Aerospace propulsion systems such as incinerators, gas turbines, industrial furnaces, and industrial silencers and industrial processes which include high temperature equipment, stacks, mufflers, boilers, jet engines, heat exchangers, chemical processing equipment, and outdoor electrical equipment are the other areas high temperature coatings are necessary.

High temp coatings are also often used on smokestacks, kiln exteriors, portable fireplace units and so on. Uses determine the different properties required of a high temperature coating. Customers will ask if a high temp coating will provide the

corrosion protection they're looking for. Or, simply, if it is safe to use on a barbecue pit.

When selecting a high temperature coating, ease of application should be a major consideration. It can often be the deciding factor when choosing between two products. The main reason being, high temp coatings are often not applied as a part of some major recoating initiative, but rather as and when required, with touch ups being done at select portions at a facility.

High temperature coatings that can be applied even to a hot surface would help avoid the need to shut down an entire facility, especially if only a small portion has to be coated. This will make the exercise much more manageable and cause less of a disturbance to day-to-day operations. Products that are easy to apply, say a single-component, direct-to-metal coating will help the facility to return to service as quickly as possible. In case of coatings under insulation (CUI), single-component systems are easier to apply in sections where insulation has been removed. Ideally, as part of the regular coating maintenance plan, single-component systems are also easier to store for spot touch-ups when required.

One of the first questions a customer will ask while sourcing a high temperature coating is, what is the effective temperature range of this product? It's really



PHOTO: BELZONA

Using the right technique, equipment and workmen who are trained in its application also plays a very major role in the success or failure of the coating.

important to know this. Many a times failure occurs when these coatings are knowingly or unknowingly expected to perform outside of the temperature range they were manufactured for. Using the right technique, equipment and workmen who are trained in its application also plays a very major role in the success or failure of the coating.

High temperature coatings have different ratings. Some coatings are rated between 148-205°C (350-400°F), others up to 650°C (1200°F) and beyond. Their effectiveness at high temperatures depends on different resins and chemical compositions of individual products. Whatever their rating, the main goal is always protecting substrates from corrosion.

Then, there are areas where piping is color-coded. Or, certain colors may be used for purely aesthetic reasons. Here, one must make sure that the paint will not discolor if exposed to high temperatures. Otherwise, the asset will

have to be recoated more frequently than would be the case otherwise.

In certain circumstances, it's important to verify that high temp coatings are food-grade safe. Take the case of the black coating on the inside of a traditional barbecue pit. These coatings must certainly stand up to high heats. At the same time, they should not emit harmful chemicals that can contaminate the food being prepared.

The global high temperature coatings market size is expected to reach US\$ 1.74 billion by 2030, registering a CAGR of 4.3% from 2023 to 2030, according to a new report by Grand View Research, Inc. Surging thermally efficient coatings requirement that can protect industrial and commercial equipment in moderate to extreme temperature conditions is expected to drive industry growth over the next eight years.

Technological innovations and

significant R&D spending by key industry participants regarding commercializing single-component coatings for multiple applications is anticipated to stimulate market growth over the forecast period. Companies have been constantly involved in developing finished products which can be used for wide range of operating temperatures ranging from 150°C to 750°C in addition to providing corrosion resistance.

High temperature coating demand in cookware is anticipated to emerge as fastest growing end-use segment over the forecast period. In terms of demand, the sector is expected to grow at a CAGR of 5.5% over the forecast period.

Major appliances such as bakeware, induction appliances, and food processors have gained significance in commercial and residential sectors. This segment has witnessed significant growth in France, Japan, and South Korea owing to growing awareness towards innovative cooking technologies that sustain the nutrient levels of the food.

There are different types of high temperature coatings.

Thermal barrier coatings (TBCs) have low thermal conductivity, high-temperature chemical stability, scouring resistance, and thermal insulation. They are considered one of the most advanced high-temperature protective coatings available.

High-temperature ceramic coatings are also known as header, exhaust, and high-heat coatings. They can typically withstand temperatures as high as 650°C (1200°F), and some variations can even withstand temperatures higher than 872°C (1600°F).

Epoxy coatings are known for their excellent heat resistance properties. They withstand temperatures ranging from moderate to high levels, providing thermal insulation and protection to surfaces and substrates.

Aluminide coating also known as aluminizing, is a high temperature chemical process where aluminum diffuses into the surface of the base metal to form an aluminized layer or coating.

Ceramic coatings are mainly used in high-temperature applications such as chimney or stack outlets where flue gases are needed to be burnt before entering into the atmosphere.

Ultra-high temperature ceramic matrix composites are currently among the most promising high-temperature-resistant materials. They are widely used in national defense and aerospace fields.

Other types of high temperature coatings include:

diffusional coating, overlay coating, heat resistant silicon paint, cable coatings, etc.

Manufacturers are constantly innovating with new products and processes and here, we mention a few.

Sherwin-Williams launches thermal insulative coating system, Heat-Flex® 7000

The new Heat-Flex 7000 thermal insulative coating system from Sherwin-Williams Protective & Marine offers personnel protection, insulating capabilities and solar heat reflectivity for an array of industrial applications. The single-component, spray-applied coating system meets Occupational Safety and Health Administration standards for protecting personnel from skin-contact burns on assets operating at temperatures up to 350°F (177°C) in one coat.

A single coat of Heat-Flex 7000 can eliminate the costs of installing, inspecting and repairing conventional insulation and cladding systems for personnel skin-contact protection, thereby also eliminating the common threat of corrosion under insulation (CUI). In addition, the coating reduces thermal losses on assets that need to stay warmer or diminishes solar heat gain on assets that need to stay cooler.

Able to be directly applied to hot substrates, Heat-Flex 7000 is spray-applied in a single coat — typically 50-75 mils dry film thickness (DFT) — over a required corrosion-

resistant primer. The coating system features new technology that yields a thick, fully cured coating film with a high volume that effectively resists the transfer of heat from the underlying substrate to the surface, as well as from the surface to the substrate.

“Heat-Flex 7000 represents a step-change in our insulative coatings technology,” said Neil Wilds, Global Product Director, CUI/Testing for Sherwin-Williams Protective & Marine. “Because of its new chemistry and formulation, a single topcoat of Heat-Flex 7000 can protect personnel from skin-contact burns on process assets operating at up to 350°F. A single topcoat of this new product also provides a significant level of insulating value that can help to prevent process heat losses or, conversely, to protect against solar radiant heat gain, which can otherwise cause vaporization losses in storage tanks. Other coating products often require multiple coats to provide similar personnel protection and insulating value.”

Compared to conventional insulation and cladding systems, which require time-consuming fabrication and installation, the spray-applied Heat-Flex 7000 insulative coating is far easier and less costly to apply and maintain. Although Heat-Flex 7000 does not provide as much R-value as conventional insulation in dry conditions, it forms a closed-cell film that resists moisture penetration — from rain, water sprays or humidity — far more effectively than conventional insulation. Therefore, its thermal efficiency remains consistent in even the wettest conditions. By contrast, any cracks or seams in insulation/cladding systems can admit and hold water, which displaces



PHOTO: BELZONA

High temperature coatings that can be applied even to a hot surface would help avoid the need to shut down an entire facility, especially if only a small portion has to be coated.

insulating air and greatly reduces the insulation system's R-value. This moisture may become trapped at the insulation/substrate interface, significantly raising the risk of the formation and proliferation of CUI.

Because there's no way for water to penetrate down to the asset substrate and remain trapped there — and because no physical cladding system is applied on top of the coating — Heat-Flex 7000 eliminates the risk of CUI altogether. Coated assets are also easier to inspect and repair, as insulation/cladding systems require periodic removal for inspections or specialized ultrasonic/radiography testing for CUI. The Heat-Flex 7000 coating system requires only a brief visual inspection for damage to the coating surface. Repairs are far simpler too, involving application of the coating over any damaged areas.

Heat-Flex 7000 can protect heat-sensitive assets (tanks, fuel pipelines, water cooling lines and other assets) from solar heat gain. In these situations, a reflective white formulation is recommended to insulate the asset, enabling it to maintain a lower internal operating temperature. Lower operating temperatures can help reduce the loss of fuels or cooling water in tanks and pipes due to vaporization, as well as reduce the need for expensive vapor-recovery or cooling equipment.

The Heat-Flex 7000 coating system can be specified for use in indoor or outdoor environments to protect personnel and insulate assets and processes involved in oil and gas production and refining, mining, power generation, chemical

processing, offshore and marine operations.

Hempel launches new fast-drying CUI coating

A leading supplier to the process industries for over 50 years, Hempel offers a broad range of proven coatings for high heat and insulated environments. Hempaprime CUI 275 is the latest addition to its portfolio — and offers a number of benefits to asset owners and applicators.

During tests, Hempaprime CUI 275 has shown significantly higher crack resistance at high temperatures than traditional epoxy phenolic coatings, which reduces the risk of cracking and premature failure during service. It is also extremely fast-drying, which increases applicator productivity.

Zechariah Lim, Product Manager (CUI, high heat and insulation) at Hempel, comments: "Insulated pipework and equipment can be exposed to temperature fluctuations and harsh wet/dry cycling, which makes specifying for CUI service challenging. Hempaprime CUI 275 is suitable for use in a wide range of temperatures from cryogenic up to 275°C and has excellent crack resistance under cycling. This makes specification simpler and ensures a more reliable performance in service."

He continues: "Importantly, Hempaprime CUI 275 also has a very short overcoating interval — just 90 minutes at 20°C. As a result, applicators can coat more sections in one shift, increasing productivity in fabrication situations and reducing the time needed to re-insulate equipment during maintenance work. This can lead to significant cost savings for customers."

Hempaprime CUI 275 meets

the ISO 19277: 2018 standard for categories CUI-1, CUI-2, CUI-3 and all cryogenic equivalents. Hempaprime CUI 275 was launched in June. It is available globally as a standard part of Hempel's coating portfolio for the process industries, including oil & gas and power generation.

A fast-drying, alkylamine-cured epoxy paint, Hempaprime CUI 275 provides long-lasting barrier protection in severe corrosive environments, high temperatures and wet conditions beneath thermal insulation. Its wide application temperature range, down to -10°C (14°F), reduces heating costs during in-shop application and extends the maintenance season in cold climates.

With excellent crack resistance compared to traditional epoxy phenolic coatings, Hempaprime CUI 275 can be applied on hot surfaces up to 204°C (399°F) to minimize disruption and shutdown during maintenance.

Endura-Heat coatings provide protection from high-temperature corrosion

Tnemec Company Inc., a leading manufacturer of high-performance coatings and linings, has introduced a line of products built to provide durable protection for surface temperatures up to 1200°F (649°C). The innovative Endura-Heat line of coatings offers performance against high heat, thermal shock and corrosion under insulation (CUI).



High temperature coatings are also often used on smokestacks, kiln exteriors, portable fireplace units and so on.

Endura-Heat coatings consist of primers, direct-to-metal (DTM) coatings and topcoats that can be combined in a variety of systems to protect valuable steel and stainless steel surfaces from the threats of corrosion, according to Chris Ard, Industrial Market Manager for Tnemec.

"This new line of Tnemec products provides additional corrosion-resistance and aesthetic longevity to our long-time customers in power facilities, steel mills, water and wastewater facilities, refineries, pulp and paper and chemical processing plants," stated Ard. "The Endura-Heat line includes products designated for service in corrosive environments as well as coatings that protect substrates up to 1200°F (649°C)."

At the time of introduction, Endura-Heat coatings consist of seven products, ranging from a zinc-rich silicone primer to an advanced multipolymeric DTM coating. The new Tnemec products offer several notable characteristics including high-film

build and both ambient and heat cure options.

“These coatings are easily applied, versatile and offered in a variety of standard colors with custom color matching available,” commented Ard. “Using quality pigments and resins, the Endura-Heat line is formulated to provide enhanced color-stability in exterior high-heat environments.”

The coating line continues Tnemec’s commitment to providing high-performance options for owners, engineers and applicators working in the industrial facilities. Over the past decade, the coatings manufacturer has introduced numerous products for customers in this sector, such as chemical storage tank linings, secondary containment systems and thermal insulating coatings made to protect valuable structures and personnel in various industries.

“Tnemec is dedicated to offering products designed to solve serious corrosion issues in industrial facilities,” mentioned Ard. “The Endura-Heat line of high-temperature coatings helps further our commitment to this goal.”

Unprotected tank’s upper surface, operating at high temperatures

A leading oil and gas company needed thermal insulation for a tank at one of its lubricant plants. The upper surface of the tank, which reaches a temperature of 110 °C (230 °F), serves as a walkway for operators. This creates a high risk of employees receiving contact burns from the hot substrate. Additionally, some pitting corrosion had occurred. Finding a solution that would lower the surface temperature to prevent burns and halt further corrosion was crucial.

In this case, the high temperature of the tank caused a hazard for the employees walking upon it. According to the guidance set forth by the Occupational Safety and Health Administration (OSHA), the maximum temperature for exposed surfaces that an employee could come into contact with is 60°C (140°F), in line with ASTM C1055. Workers must be protected from exposed heated surfaces, so it was crucial to lower the surface temperature of this tank to



PHOTO: BELZONA

Protected from high temperatures with Belzona 5871.

eliminate this hazard.

In addition to its high temperature, the metal tank surface had been experiencing pitting corrosion, necessitating pit filling and a protective coating that would prevent it from corroding further.

Having previously used various Belzona products, this particular customer had confidence in their distributors’ recommendation that Belzona 5871 was the optimal solution.

As well as offering thermal insulation to protect employees from contact-burn injuries, this product only needs two coats, enabling quick turnaround times. It also has excellent corrosion resistance which was essential as the tank top had been experiencing pitting corrosion.

The surface was prepared by vapor blasting the substrate to meet SSPC-SP10 (Near-White Metal) standards and was then degreased. Additionally, some corrosion on the top of the tank required pit filling with Belzona 1121 (Super XL-Metal) ahead of the coating being applied.

With the surface prepared, the first coat of Belzona 5871 was then applied using a short-bristled brush. This product expands, reducing the number of layers which are needed, the first coat was applied at the target thickness of 1000 μm (39 mil) wet film thickness, which results in 3000 μm (118 mil) dry film thickness. The second coat was then applied using the same method six hours later. The tank was back to full service just 12 hours after the final coat was applied. This application successfully offered thermal insulation protection for a Fortune 500 oil and gas company. Following the application of two coats of Belzona 5871, the previously dangerous temperature of 110°C (230°F) has been successfully lowered to a safe level—below 60°C (140°F).

This case showed how Belzona 5871 offers thermal insulation and creates long-lasting safety and durability. The solution not only mitigated the risk of contact burns but also introduced a valuable layer of protection against corrosion.



PHOTO: BELZONA

The high temperature of a tank can cause a hazard for the employees walking upon it.

Desiccant dehumidification empowers round-the-year blasting, painting, and coating processes

Atul Bansal, Chief Operating Officer, Technical Drying Services

Looking at the damaging effects of humidity across industries, it remains to be a huge matter of concern in critical sectors of power plants and refineries. Severely meddling with the various operations, it can incur a huge loss to the company. Where the industry is already involved in complex and crucial processes, the presence of humidity can sabotage the entire performance of the plant by rendering the already tough tasks difficult to accomplish. Considering that blasting, painting, and coating form an intricate part of the power plant and oil refinery operations, it becomes imperative to exercise climate control throughout the processes. Moreover, being carried out in confined spaces

inherently escalates the risks of the processes. As a result, even the slightest trace of moisture can invariably plague the efficiency of the various operations. Understanding that blasting is the very step for enabling painting and coating, the presence of humidity can severely intervene with the surface preparation and jeopardize the following coating and other processes.

The perils of humidity can be understood from the instance of condensation formation on the surface when the blasted surface is exposed to moisture prior to painting. It can render the coating incapable of adhering to the surface properly. Therefore, surface preparation determines effective and quality coating and painting on the

surface. Proper surface preparation plays a crucial role in securing thorough adhesion of the coating to the substrate. Conducting painting on a condensed surface can lead to blistering and delamination on the surface.

Therefore, looking at the repercussions of the humidity, it is advisable to carry out intricate processes in tanks, bullets, columns, reactors, coke drums, vessels, pipelines, etc. under a strictly controlled environment. It can immensely contribute to curtailing the adverse effects of moisture. Being a source of concern, moisture can account for 60 to 80% of premature coating failure, specifically due to inadequate or improper surface preparation. Consequently, it can give

rise to a phenomenon called flash rust which is basically a result of surface being exposed to environmental conditions before the application of coating. As flash rust is majorly responsible for inhibiting the adhesion of the coating to the surface post blasting, it gives rise to the inconvenience of repeating the entire coating process all over again. In addition to this, condensation also accounts for blistering, blooming, and peeling problems throughout the painting jobs. Overall, the insufficient adhesion between the substrate and coating invariably shortens the life of the coating system.

In addition to this, understanding that highly vulnerable and critical materials such as petrochemicals, chemical gases, etc. are stored in tanks, the improper coating can damage the surface which gives rise to contamination and dilutions of products. Looking at the menace moisture creates it is imperative to control humidity level in the power plants to effectively eliminate the problems arising from it. Here, deploying desiccant dehumidifiers comes with the ability to hold the blast intact till the coating is done. Conducting coating in the absence of a desiccant dehumidification solution can immensely impair the coating life with no guarantee to it. There is a tendency of the coating to peel off when done on a cold metal surface. As a result, it requires the surface to be thoroughly cleaned and



PHOTO: TECHNICAL DRYING SERVICES

Understanding that highly vulnerable and critical materials such as petrochemicals, chemical gases, etc., are stored in tanks, improper coating can damage the surface which gives rise to contamination and dilutions of products.

dried before the coating is applied. Owing to this, the blasting and coating operations of the metal surfaces mandate a combination of low relative humidity or high surface temperature to avoid any coating failure.

Perceiving the complex setting of the confined space, employing a desiccant dehumidification solution makes for a simple and cost-effective technology for ensuring proper surface preparation for quality coating application. Adept at eliminating the moisture from the coating system, the technology is highly advanced at desiccant dehumidifying the air inside the tank efficiently which is aimed at achieving effective accomplishment of blasting and coating processes. It effectively curtails condensation and rust bloom issues by maintaining the humidity within safe limits. In the pursuit, the desiccant dehumidification systems assist in conforming to the

climate conditions within the confined spaces as outlined by contractors for achieving optimum coating performance that aids in the timely completion of jobs.

The desiccant dehumidification solutions come handy in maintaining the RH at less than 55% within the tank while keeping the temperature between the narrow range of 30°C to 35°C throughout the blasting, painting, and coating processes. Along with this, the technology also controls the environment during the night to avoid any prospect of condensation. It comes with the ability to maintain a constant -5°C dew point differential between the air and the surface to be coated. At the same time, it also maintains a dew point difference of -12°C between the air inside the tank and outside.

Looking at the multi-faceted advantages of desiccant dehumidifiers, they reduce

inter-coating delamination and consequently improve the curing properties simply by preventing condensation on the surface. It plays a crucial role in ensuring quality coating with the help of strong inter-coat adhesion that invariably abides by the technical specifications outlined by the paint manufacturers. In the process, the coating life is enhanced by 1.5 to 2 times.

Understanding that moisture can disrupt the coating process, it can lead to a delay or break in the continuity of the process during the monsoons due to the high proximity to humidity. At the same time, considering that the chances of condensation on metal surfaces are very high during the night because of cold weather, it can invariably delay the completion of the project and even compromise the productivity of the plant. Therefore, resorting to a desiccant

dehumidification solution empowers round-the-year blasting, painting, and coating processes, irrespective of the weather conditions outside. As a result, it successfully contributes to curbing the downtime of the plants due to bad weather and plays a pivotal role in reducing the project time and cost by 35%.

Therefore, looking at the inherently critical operations being carried out inside the confined areas, even the slightest presence of moisture can be destructive for the entire plant. Installing desiccant dehumidification technology provides the necessary solution to achieve the required environmental conditions essential for curbing the various perils of moisture.



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

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**COATINGS AND
ANTI CORROSION**
ENGINEERING REVIEW

Spinner hanger blast machine produces eight times faster processing times

Improved quality and lower costs through automated shot blasting operation

The lack of flexibility and unsatisfactory powder coating qualities at external job shops induced a Dutch manufacturer of industrial furniture to bring its coating operation in-house. Unlike its competitors, the company decided to also do the paint preparation by shot blasting in-house with an automatic shot blasting machine from Rösler (rosler.com). Compared to manual processes, the shot blasting cycle times are not only eight times faster, but the automatic solution also produces better qualities at lower costs. This resulted in a significant competitive advantage.

ML Constructie produces small tools and industrial furniture. In addition, the company serves other manufacturers with a laser cutting service for sheet metal, tubes and semi-finished products. In the past industrial furniture was generally sold without any protective coating. However, in recent years customers increasingly demanded the furniture to be painted. Due to the rapidly growing demand for color coated products, the company initially had the shot blasting and powder coating of the furniture done by external job shops. Ben

Luizink, co-owner of ML Constructie, reports: “We were not satisfied with the handling of our work by the external job shops. Due to long lead times we could not deliver our products as quickly as we wanted. Moreover, most of the time the coating quality did not meet our specifications. For example, we found residual sand from the sand blasting operation on our products. And the coating thickness was generally insufficient. To better control the blasting and coating operations we created our own in-house coating department.” That’s how a few

years ago ML Coating was started. Since then it has grown into a coating company that shot blasts and powder coats its own products and provides blasting and coating services to other companies.

Quick investment in a spinner hanger blast machine

One of the first purchases by the newly created company was a spinner hanger blast machine from Rösler. Mike Luizink remembers: “Pre-condition for achieving a homogeneous, high-quality coating is that the components are thoroughly and precisely shot blasted. Most companies in our area still do this manually. However, right from the beginning we decided to automate the entire shot blasting operation.”

More comfortable working conditions and higher shot blasting qualities

Since manual blast operations are hard and exhausting, it is very difficult to find and keep the people for this kind of work. With the Rösler blast machine the employees must only place the work pieces onto the respective fixtures and remove them after the blast process. Another significant contribution towards a better working environment was the low noise emission, which is considerably lower than the



With the Rösler blast machine ML Coating achieves considerably better shot blast qualities, a better working environment and substantial cost savings. All this provides a significant competitive advantage for the company.

noise from manual blast rooms. Moreover, the automated shot blast process is eight to ten times faster. While in manual blast rooms media quantities about six kg are dispensed per minute, each of the four blast turbines in the spinner hanger machine throws 150 kg of media at the work pieces every minute. Another benefit is that the spinner hanger blast machine is equipped with two rails in "Y" design. This allows the operator to place work pieces onto the fixture at one rail branch, while the work pieces from the other rail branch are being blasted. Therefore, unproductive idle equipment times are more or less completely eliminated. Last but not least, the overall blast cleaning quality is considerably better. "In the automated shot blast process the blast media is getting into even the tiniest work piece corners. This is nearly impossible with manual shot blasting operations," comments Ben Luizink and continues: "The Rösler shot blast machine is very tight and emits practically no dust. Since we are coating the work pieces in the same hall, this is a huge benefit."

Lower media and energy consumption results in significant cost savings

That shorter processing times result in lower costs is quite obvious. However, ML Coating achieved significant cost savings in other areas. "After ten blast cycles the sand used in manual shot blast operations becomes dust and is, therefore, no longer usable. This produces a lot of waste material," explains Ben Luizink. "Another drawback of manual blast

operations is that the sand remains in tight corners of the work pieces and is, therefore, lost. In automated shot blasting machines the entire quantity of thrown blast media is collected in the bottom and transported to the media cleaning system with special augers. This ensures a much longer usable life of the blast media. An additional advantage is that significantly harder blast media can be used."

In manual blast rooms the compressed air needed for the blast operation is generated by compressors requiring a high energy input. In the new Rösler shot blast machine the blast media is accelerated by direct-drive electric turbines. Ben Luizink explains: "The turbines require a lot less energy than media acceleration by compressed air." Another important energy-saving feature in the Rösler machine are the Rösler Gamma G turbines with their curved throwing blades. Because of the curved blade design the blast media leaves the throwing blades at a higher speed without additional energy requirements. This results in a higher impact velocity of the media on the work pieces. The energy consumption can be further reduced by intelligent adjustment of the turbine RPM. For example, delicate components can be blasted at 1,500 RPM, whereas stripping of old paint can take place with 3,000 RPM.

Smooth order processing and trouble-free commissioning

Ben Luizink remarks: "During the entire project we had optimal support from Rösler.

Initially, the Rösler engineers helped us to decide which shot blast machine is best for us." Once the decision had been made, the implementation started. For example, for an optimal placement of the machine in the hall the standard equipment layout had to be modified, and the dust collector had to be relocated. Various preparatory work like the installation of electrical conduits and the pouring of various concrete foundations was done by the customer. After a brief review of this work by Rösler the blast machine was installed and commissioned. "Installation and commissioning were completed within one week. After a short operator and maintenance training we were able to fully utilize the machine," explains Ben Luizink.

Automated shot blasting provides a competitive advantage

At the moment ML Coating is the only company of its kind in the region that does its shot blasting operation fully automatically. Around 80% of all work pieces can be processed in the spinner hanger blast machine. The remaining work pieces, for example very large and heavy components are blasted manually. If needed, very delicate components can be pre-treated chemically.

About 50% of the work pieces processed in the automatic Rösler blast machine are components for ML Constructie, whereas the other 50% are prepared for coating jobs for external customers. Overall ML Coating achieves excellent shot blasting results, and the

company is highly satisfied with the easy operation of the Rösler machine. "We can easily adjust the shot blast parameters such as throwing speed and blast time. This allows us to create work piece specific programs for the various product groups. At the moment we work with twelve programs, which are more than sufficient for our current shot blasting needs," concludes Ben Luizink.

For over 80 years the privately owned Rösler Oberflächen-technik GmbH has been actively engaged in the field of surface preparation and surface finishing. As a global market leader, they offer a comprehensive portfolio of equipment, consumables and services around the mass finishing and shot blasting technologies for a wide spectrum of different industries. Their range of about 15,000 consumables, developed in their Customer Experience Centers and laboratories located all over the world, helps customers fulfill their individual finishing requirements. Under the brand name AM Solutions, they offer numerous equipment solutions and services in the area of additive manufacturing/3D printing. Last but not least, their central training center the Rösler Academy offers practical, hands-on seminars on the topics mass finishing and shot blasting and lean management. The Rösler group has a global network of 15 locations and 150 sales agents.

Author: Doris Schulz, SCHULZ.PRESSE.TEXT., Journalist.

What role does polymeric technology play in burgeoning wind industry?

Designed to safeguard the integrity of wind turbine blade leading edges for the long term, this polymeric technology plays a critical role in supporting this growing sector

There has been considerable growth in the wind power industry over the past few years. However, further exponential growth of the industry is required in order to ensure that the net-zero by 2050 pathway (outlined in the Paris Agreement) is successfully reached.

In order to support this seismic growth, polymeric repair and protection technology has an important part to play. Designed to safeguard the integrity of wind turbine blade leading edges for the long term, this technology plays a critical role in supporting this burgeoning industry.

Wind electricity generation needs to grow fourfold by 2030

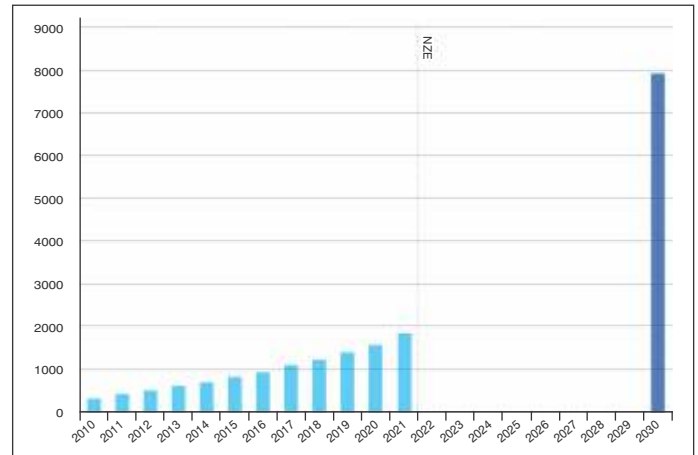
According to the International Energy Association's (IEA) Wind Electricity Tracking Report (September 2022): "In

2021 wind electricity generation increased by a record 273 Twh (up 17%). This was 55% higher growth than that achieved in 2020 and was the highest among all renewable power technologies."

While the industry has undoubtedly experienced impressive levels of growth in these years, according to the IEA, wind electricity generation needs to reach four times the record levels set in 2020 by 2030. The Report said: "Our pathway calls for scaling up solar and wind rapidly this decade, reaching annual additions of [...] 390 GW of wind by 2030."

How is the scale-up of the wind industry being financed?

According to the IEA's Report: "Policy support remains the principal driver of wind deployment in the majority of the world." Indeed, over the



Wind electricity generation needs to grow fourfold by 2030 (IEA. License: CC BY 4.0).

past few years, several policies have been launched that are designed to drive forward the roll-out of renewables.

For example, in August 2022, the US brought in the Inflation Reduction Act (IRA) which includes US\$369 billion of investment, in the European Commission's Green Deal Industrial Plan, US\$270 billion was pledged, and since the

UK government's Ten Point Plan was launched in November 2020, over £26 billion of government capital investment has been mobilized.

Safeguarding expanding fleets of wind turbines with polymeric technology

Given the critical role wind power plays in the transition to a net-zero future, as well as the significant amount of capital being invested into the renewables industry, the wind power sector is poised to experience considerable exponential growth in the upcoming decades. In order to support this growth, polymeric technology plays a significant role when it comes to maintaining the operational efficiency of the rapidly expanding fleets of wind turbines.

Polymeric systems such as the rebuild, blade filler material, Belzona 5711 and



Maintaining the integrity of wind turbines with polymeric technology.



Leading edge damaged by erosion.



Surface preparation using an orbital sander.

the cartridge-applied leading edge protection coating, Belzona 5721, are specially designed to repair damaged leading edges and protect them against rain erosion and impact damage for the long term.

In addition to the performance capabilities of these systems, maintenance engineers are investing in this technology due to the simple, in-situ application method and fast cure times the cold-curing systems facilitate. In turn, this helps to keep downtime to a minimum, and allows the turbine to be returned to service in the same day.

Belzona 5711 can be directly overcoated with Belzona 5721 in as little as 30 minutes at 20°C/68°F without the need for any additional surface preparation. At the same

temperature, Belzona 5721 will be fully cured within five hours.

Below is a case study featuring the repair and protection of a wind turbine leading edge with Belzona 5711 and Belzona 5721.

Wind turbine blade repaired and protected

Belzona, a global designer and manufacturer of industrial protective coatings and repair composites, successfully addressed the wind turbine blade damage issue at Electricity Generating Authority of Thailand's (EGAT) Khao Yai Thiang Windfarm in Thailand.

Leading edge erosion damage

The windfarm features wind turbines with 40-metre-long



Self-mixing Belzona 5711 cartridge.



Application of repair paste, Belzona 5711.



Completed repair and protection of leading edge.



Application of high-performance coating, Belzona 5721.



Successful application of Belzona polymeric systems.

(131.2 ft) blades. During routine inspections, evidence of damage measuring 300 cm x 14 cm x 2 mm (118 in x 5 in x 0.08 in) on the leading edge of one of the blades was discovered.

System selection

Representatives from the 35-year-old Belzona Authorised Distributorship, Pan Mechanic Engineering, recommended the solvent-free, two-part repair paste, Belzona 5711, to reconstruct the damaged area on the blades, followed by the high-performance coating, Belzona 5721, to overcoat the area.

Application procedure

The application procedure involved surface preparation

using an orbital sander, followed by the direct application of approximately 1.4 kg (3.1 lbs) of Belzona 5711 from a self-mixing cartridge onto the blade. The repair area was contoured using a piece of Belzona mixing board.

After a two-hour curing period, a visual inspection was conducted to ensure the application's readiness for overcoating with approximately 3.5 kg (7.7 lbs) of Belzona 5721. Using a short-bristled brush, this system was then applied to the leading edge and left to cure. The blade was back in service 24 hours later.

EGAT's technicians were trained at the Belzona Asia Pacific facility to perform the

application, with two representatives from Belzona's Technical Service Department present on site to observe and provide guidance.

Commenting on the application, an EGAT representative said: "We are extremely satisfied with the results achieved by Belzona's leading edge repair and protection system. The application procedure was very simple, and could be carried out quickly, which ensured that downtime was kept to a minimum. We plan to place an order for more Belzona 5711 and Belzona 5721."

Supporting a net-zero future

In order to support the

seismic growth of the wind power sector, polymeric technology, such as Belzona 5711 and Belzona 5721, plays a critical role. By safeguarding the integrity of wind turbine blades, this helps to keep windfarms functioning at their optimum efficiency, which in turn, supports a net-zero by 2050 pathway for the planet.

More information about Belzona's solutions for the wind industry can be found at: http://www.belzona.com/en/industries/wind_power.aspx



Author: **Chloe Hirst**, Senior Copywriter, Belzona, E: chirst@belzona.com

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Adoption of robotics across various industry verticals is impacting coatings market

| Future Market Insights Inc.

The coatings and application technologies for robotics market is set for significant expansion, with an anticipated valuation of US\$ 18,141.9 million by 2023. The coatings and application technologies for robotics market is poised to achieve an impressive valuation of US\$ 38,925 million by 2033 featuring a promising CAGR of 7.9% from 2023 to 2033, reveals a press note from Future Market Insights Inc.

Key market trends and highlights

The increasing trend of electric automobiles is set to impact the industrial robotics industry significantly. Car manufacturers are increasingly using automated robotic systems for high-volume vehicle production, contributing to the growth of industrial robotics.

The incorporation of machine

learning and artificial intelligence (AI) technologies into industrial robots is positively influencing the sector. These advancements enhance the capabilities and efficiency of robotics, making them versatile and adaptable to various tasks.

Rising labor and factory insurance costs are compelling manufacturers to introduce industrial robotics for cost-effective and efficient resource allocation with minimal downtimes. Robotic systems also significantly reduce error rates while increasing production output, making them an attractive option for enhancing operational efficiency and profitability.

The coatings and application technologies for robotics market faces environmental challenges due to the pollution and VOC emissions

associated with these coatings. Environmental concerns may impede the market's growth

2018 to 2022 historical analysis vs 2023 to 2033 market forecast projections

The scope for global coatings and application technologies for robotics market insights rose at a 4.68% CAGR between 2018 and 2022. The market is anticipated to develop at a moderate CAGR of 7.9% over the forecast period from 2023 to 2033.

The COVID-19 pandemic has triggered a significant shift in how industries approach their business models and manufacturing processes. The highly contagious nature of the disease forced many key sectors to halt production temporarily, disrupting traditional demand-supply dynamics.

coatings and application technology software.

The trend of automation, driven by the need for workforce safety and operational resilience during the pandemic, is poised to persist even in the post-pandemic world. Industries are more focused than ever on enhancing workflow efficiency and streamlining their operations.

Investments in robotics and robotic process automation are on the rise. This continued investment is expected to create a substantial and expanding revenue pool for the coatings and application technologies for the robotics sector in the foreseeable future.

Coatings and application technologies for robotics market advancing factors

The primary driver for the coatings and application technologies for the robotics market is the growing adoption of robotics across various industry verticals. Industries increasingly rely on robotics to automate critical processes. It further leads to a high demand for coatings and application technologies that enhance the functionality and durability of robotic systems.

The COVID-19 pandemic accelerated the trend of automation as industries sought ways to ensure operational continuity while minimizing human interaction. This emphasis on automation is expected to persist even in the post-pandemic era, driving the demand for

Stakeholders across various industries have turned to automation, deploying robots and other automated equipment in their plants and manufacturing sites to ensure operational continuity and minimize risks. The strategic move has resulted in a notable surge in the sales of robotic



PHOTO: WAGNER

coatings and application technologies for robotics.

Industries are making substantial investments in robotics and robotic process automation to streamline workflow processes. The investment aims to improve operational efficiency and reduce downtimes, fueling the market's growth.

Both at the global and local levels, there is a notable trend of expanding production capacities. As industries expand their operations, the need for advanced robotic systems with efficient coatings and application technologies increases, driving market growth.

Coatings and application technologies for robotics market restraining factors

One of the significant challenges facing the industry is the environmental impact of coatings and application technologies used in robotics. Many of these coatings emit Volatile Organic Compounds (VOCs) that can harm the environment and contribute to pollution. Addressing these environmental concerns and developing eco-friendly alternatives is crucial.

The coatings and application technologies for robotics market must navigate complex regulatory frameworks related to environmental standards and safety. Meeting these regulatory requirements can be a challenging and costly endeavor for manufacturers and may impact market growth.

The cost of advanced coatings and application technologies can be a limiting factor for some industries, particularly small enterprises. Balancing the need for efficient robotics with budget constraints can pose

challenges for market adoption.

The market is dynamic, with continuous technological advancements in robotics. Staying competitive requires constant innovation, and companies may face challenges in keeping up with the latest technological trends and integrating them into their products.

Water-borne coating technology's market dominance

Water-borne coating technology is poised to reign supreme in the global market, characterized by a substantial market valuation and a notable CAGR. The technology's ascendancy is underpinned by its eco-friendly attributes and the growing emphasis on sustainability in the coatings industry.

Water-borne coatings offer a compelling combination of performance, durability, and reduced environmental impact, making them a preferred choice for diverse applications. Their versatility and compliance with stringent environmental regulations position them as a dominant force in the coatings landscape.

It is anticipated to exhibit a significant expansion within this category throughout the projection period. Powder coatings have been gaining traction due to their efficiency, durability, and versatility, particularly in applications requiring a resilient finish.

Powder coatings emerge as a compelling solution as industries seek coatings that can withstand demanding conditions while minimizing environmental impact. Their rising demand signifies a shift toward sustainable and high-performance coating solutions, making them a



PHOTO: 123RF

dynamic force in the coatings market's evolution.

Acrylics are the cornerstone of the coating industry growth

The utilization of acrylics within the coatings industry has witnessed extensive growth, and this trend is poised to continue its upward trajectory. The acrylic segment is on track to achieve a substantial market valuation by the end of the forecast period, reflecting its remarkable growth rate.

The segment expansion can be attributed to several factors, including the exceptional performance characteristics of acrylic-based coatings. Acrylic coatings are renowned for their durability, versatility, and ability to provide an attractive finish across various applications. Their resilience against harsh environmental conditions and the capability to maintain color and gloss over time make them a preferred choice.

Competitive landscape

The global coatings and application technologies for

robotics market is quite fragmented. Companies are even increasing their local manufacturing to reinforce their position in the local market. The majority of businesses enter the market with the assistance of local suppliers. These firms also expand their presence in other locations by acquiring local partners.

In July 2023, AkzoNobel N.V., a leading global paints and coatings company, took steps to improve its industrial operations in North America and deliver innovative solutions to customers in the region.

In July 2022, Nippon Paint Holdings Group aimed to conduct business activities to support and enable sustainable development everywhere they operate. It also aimed to include the three elements – economic, social, and environmental – in a balanced and integrated manner.

These insights are based on a report on Coatings and Application Technologies for Robotics Market by Future Market Insights.

Paint that can change colors?

The skin of an octopus holds the key, say researchers

When you think of an octopus, you might be envious of its eight limbs. After all, there's a lot to be done with eight arms. But scientists are a bit more interested in something else: its skin.

Cephalopods — like octopi and squid — change colors rapidly in response to threats or even just changes in light thanks to xanthommatin, a naturally occurring dye present in their bodies. Researchers at Northeastern University's Kostas Research Institute work with a synthesized version of this dye, experimenting to create colorants that change in response to different stimuli. Their latest discovery: using this to create paint that can change colors when exposed to light, notes Erin Kayata in a press communicate from the University.

KRI focuses its work on interesting components from natural materials, Cassandra Martin, a research scientist at the institute, said, looking into ways those components can be replicated and used in the

real world. Cephalopods have been a starting point due to the unique nature of their skin.

"Their color change is so rapid and it's so vibrant and it's so intense," Martin said. "There's not a lot of natural systems out there that change that fast and there's not a lot of color-changing materials that are that fast without requiring a lot of external (changes)."

The staff at KRI has long worked to replicate this. Previously, the lab used this to create wearable patches that change color when the wearer gets too much sun. Dan Wilson, senior research scientist at the Kostas Research Institute, said the team wanted to try to find a way to make a material where this change could be reversed to return the material back to its original color.

Last summer, Kaitlyn Flynn, then an intern/visiting student, was working on a project using this colorant and decided to further research how to do this. She and the team found that titanium

dioxide served as a conductor for the color change. Mixing different amounts with the xanthommatin could speed up the change or add to the intensity of the color shift.

Northeastern, Army Research Lab partner to develop technologies to keep warfighters safe, effective. The changes can happen in as quickly as five minutes and can last as long as 24 hours, depending on how long the paint is exposed to light. The colorant can easily be made in as little as two hours and added to water or oil-based paints.

The research ended up being published recently in *Advanced Science*.

"We've imagined a scenario where if you want to have art that changes from day to day on an interior wall, like maybe in a coffee shop or something you could use a regular projector to project a pattern onto the wall, temporarily paint in this color and this pattern or this art, and then over time that fades away and you can redo it again, ideally as many times as you want,"

Wilson said. "We can create temporary artwork or art or paint that could potentially track the weather or track the environment that it's in."

Besides the ability to create temporary art, this discovery has environmental implications. It can serve as an eco-friendly alternative to paints currently on the market.

"Paints that are like commercially used nowadays can have harmful chemicals in them, so they can have things that can be harmful to the people that are painting them," said Flynn who is now getting her PhD. in chemistry at Northeastern. "The fumes can be super harmful. They can be harmful long term if you're exposed to them for a long time. They can also leach out into the environment. Searching for a more natural way to make these paints creates a safer environment for the people using it and for the people that are going to be exposed to it."

What squid neurons and an octopus on ecstasy can teach us about ourselves

Moving forward, Flynn and Martin said they hope they can apply this system to other materials and expand beyond the yellow-red color palette they used in the initial experiment. They also hope to get to the point where the user can decide how quickly they want the colors to change on the paint.



Researchers at the Kostas Research Institute found a component in squids and octopi can be used to create paints that change colors in different lights.

PHOTO: ALEXSA STONE/NORTHEASTERN UNIVERSITY

Source: *Erin Kayata* is a Northeastern Global News reporter. Email her at e.kayata@northeastern.edu. Follow her on X/Twitter @erin_kayata.

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Hexigone expands reach in South America through Chilean distributor, Adizol

Sustainable corrosion inhibitor manufacturer, Hexigone Inhibitors, has unveiled their new distribution partnership with Adizol, a specialty chemical distributor based in Santiago, Chile. This strategic collaboration brings Hexigone's groundbreaking ion-exchange corrosion inhibitors to the heart of the Chilean coatings industry.

Adizol boasts over 20 years of experience in delivering technical products to the market, positioning itself as a trusted name within the region. Their passion for environmental sustainability aligns perfectly with Hexigone's vision to create a safer and more sustainable world through innovative solutions.

Ella Newington, Marketing Manager at Hexigone, expressed her enthusiasm for this new venture, saying, "We are thrilled to partner with Adizol to bring our Intelli-ion technology to the Chilean market. This collaboration is an exciting opportunity, especially given the substantial mining and construction industries in Chile that require anti-corrosion coatings to safeguard equipment and infrastructure. A sustainable alternative that excels in performance will be welcomed in this region!"

Bernardo Bollmann, Development and Technical Manager at Adizol, shared his perspective: "Our partnership with Hexigone signifies our joint



PHOTO: HEXIGONE

commitment to sustainability and cutting-edge solutions in the coatings industry. Hexigone's corrosion inhibitors are unique and we know our customers are going to be excited to start testing and utilizing something new within our market."

Alongside Adizol and MCassab – Hexigone's new

Brazilian distributor – Hexigone will have strong presence at the upcoming ABRAFATI event, where they are eager to meet with South American Coatings manufacturers. This event provides a unique opportunity to meet the Hexigone team, learn more about their smart Intelli-ion technology and how it can elevate primer coatings.



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Excellent level of registrations for PaintExpo 2024

Preparations are in full swing for the next edition of the world's leading trade fair for industrial coating technology from April 9 - 12, 2024 in Karlsruhe: Around six months before the start of PaintExpo, a large number of exhibitors have registered and 90 percent of the exhibition space of the last event has already been rented. There will also be a new feature: In advance of the trade fair, exhibitors can benefit from "digital themed routes" by using the exhibitor and product directory on the PaintExpo website to draw additional attention to topics revolving around sustainability, career and exhibitor events.

Currently, 340 exhibitors have registered for PaintExpo 2024. "We are right on track and looking forward very much to the next edition of the world's leading trade fair for industrial coating technology. We are very pleased with the current level of registrations. Anyone who wants to exhibit at PaintExpo 2024 should register as soon as possible to secure a stand space," says Project Director Mariella Riedel, who took on responsibility for PaintExpo in April of

this year and manages several international trade fairs for Leipziger Messe.

Global showcase for the latest trends in industrial coating

Alongside companies from Germany, the majority of exhibitors are currently from Italy, Turkey and Switzerland. However, the event attracts exhibitors from far beyond Europe. Companies from countries such as the USA and China will also be there. As things stand today, the proportion of international exhibitors is over 40 percent. "The high level of international registrations is proof that PaintExpo will once again be a global showcase for the latest trends in industrial coating. The who's who of the industry with their market and technological leaders will be there again," explains Project Director Mariella Riedel. Numerous first-time exhibitors will be celebrating their premiere at PaintExpo in April of next year, including B6 Innovations from Germany, Botko from Belgium, Mirodur from Italy and Rhopoint Instruments from Germany.

For the first time since 2012, Harter is back as an exhibitor



at PaintExpo. Jonas List from Harter's technical sales department explains why the company is returning to the world's leading trade fair for industrial coating technology: "We have recently received a lot of enquiries from plant manufacturers who want to offer their customers energy-saving and at the same time efficient dryer systems. This has prompted us to show our presence in the field of paint drying again. Exhibiting at PaintExpo is a wonderful opportunity to enter into personal discussions with interested parties – about the numerous possibilities and advantages of our state-subsidised drying technology." Harter has been manufacturing heat pump-based drying systems for more than 30 years – and when it comes to energy saving, the company has been at the forefront with its condensation dryers from the very beginning.

J. Wagner has exhibited at every PaintExpo since the first edition in 2006 – the company has also secured its stand for the upcoming world's leading trade fair for industrial coating technology. "PaintExpo is an irreplaceable industry meeting

place for us, where we present our products, solutions and services. Personal contact with existing and potential customers and business partners is enormously important for us, as we can continuously improve through mutual exchange. PaintExpo is one of the highlights of our trade fair year, as all the relevant players in the surface industry gather here. The internationality of the visitors is an important aspect for us as a global company," reports Markus Sonnenstatter, CSO Industrial Solutions at J. Wagner. The manufacturer will be showing innovations in the area of wet coatings and powder, with a focus on sustainability and energy efficiency. At the J. Wagner stand, visitors can experience a wide range – from manual equipment to fully automated systems.

Digital themed routes: a new feature at PaintExpo 2024

Alongside the numerous innovations being showcased by exhibitors from the industrial coating industry, attendees of the trade fair can look forward to an additional new feature: Digital themed





routes will be introduced for the first time at PaintExpo. This new service focuses on sustainability, career and exhibitor events and enables exhibitors to present their content relevant to these themes in the exhibitor and product directory on the PaintExpo website in advance of the trade fair. Visitors can then use this additional digital feature while they are at

PaintExpo to target specific products or services along the themed routes.

About PaintExpo

At PaintExpo 2022, around 430 exhibitors from 27 countries presented their products and services and more than 9,000 trade visitors from 57 countries attended. The next edition of PaintExpo will take place from April 9 -

12, 2024 in Karlsruhe. The world's leading trade fair for industrial coating technology serves as a showcase for innovations, applications, future technologies and trends in all areas of the coating industry. PaintExpo will cover the entire range of international products and services in the industrial coating technology supply chain. This global get-together of companies from the industry is unparalleled worldwide, making it highly attractive for coating service providers and in-house coating companies from around the world.

About Leipziger Messe

The Leipziger Messe is one of the ten leading German trade fair companies and one of the top 50 worldwide. It organises events in Leipzig and at various locations all over Germany and abroad. With its

five subsidiaries and the Congress Center Leipzig (CCL), Leipziger Messe is a comprehensive service provider covering the entire chain of the events business. It is due to this level of professionalism, that customers and visitors in 2023 voted the Leipziger Messe the service champion of the trade fair industry in Germany's largest service ranking for the tenth time in a row. The Leipzig fairgrounds comprise an exhibition area of 111,900 m² and an open-air exhibition area of 70,000 m². Every year, over 270 events take place – from trade fairs, exhibitions and congresses to events. Leipzig was the first German trade fair company to be certified according to the Green Globe standards. Sustainability is a recurring theme in the Leipziger Messe's corporate activities.

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CORCON, a landmark event that facilitates the exchange of technical information and interaction amongst professionals

“CORCON, an annual conference and expo on corrosion science and engineering in India, stands as one of the largest gatherings in Asia dedicated to this field,” said Mr Sumeet Kataria, Chairman CORCON 2023, speaking at the inaugural function on October 25, 2023 at Hotel Sahara Star, conveniently located outside the Terminal 1, Chhatrapati Shivaji Maharaj International Airport, Mumbai. “This event serves as a robust platform for sharing knowledge, acquiring information, identifying business prospects, and fostering valuable networks within the corrosion community. It is a win-win situation for all those who converge here. CORCON stands as a beacon of knowledge and innovation in the field of corrosion. This year, CORCON aims to push the boundaries of our understanding, explore cutting-edge research and fostering partnerships that transcend the boundaries.”

The four-day event held October 25 – 28, 2023 had

three plenary talks, 23 keynote sessions, seven technical interactive forums, 18 symposia with more than 150 papers presented over four parallel sessions and poster presentations.

Prof Amir Eliezer, AMPP Board of Directors, Chair 2023, who was the chief guest at the event emphasized that the merger of NACE and SSPC has brought in many more opportunities. Showing his commitment to the growth of AMPP in India, he made it a point to attend the event in spite of the crisis in his homeland. He exhorted more persons from India to take part and get involved in the activities of AMPP by making it a more global organization from the American centric it is now. He said: “There are no such chapters in the world that have so much activity. For example, a few months ago, we had only one student chapter, and now we have three. After the merger, when we started this year, we had 32,000 members and now it's grown to 35,000. With a



PHOTO: D

strong and growing economy, a 1.4 billion strong people, there is so much potential to grow.”

Dr A. K. Tewari, Chairman, AMPP India Chapter 2023-24, emphasized, “India has embarked upon a journey of becoming a US\$ 45 trillion economy within a couple of years and aspire to be one amongst the developed countries by 2047. With this comes huge infrastructure creation including roads, railways, RCC structures, marine and offshore, oil and gas, petrochemicals, power plants and transmission systems, utilities, fertilizers and chemicals, etc., etc. So when infrastructure is created the asset has to be protected, and definitely corrosion professionals have a very vital role to play. New trends in corrosion monitoring will be debated and the involvement of young scientists and students will be a game changer for the industry, and a lot of learning is likely to take place. The future of the corrosion control industry is very bright. The industry is

witnessing all-round change.

We are today in an era of sector-specific knowledge expertise. All of us need to remain familiar and well-versed with the latest scientific and technological developments in this field.”

This year, there were 18 symposia including the young scientist forum. The symposia on Corrosion in Petrochemical and Refineries; Corrosion Monitoring and Testing; Paints and Coatings; Cathodic and Anodic Protection; Corrosion Control in Water Treatment Utilities; Microbial Corrosion and Inhibitors; New Trends and Innovations in Corrosion Control; Materials and Composites; Corrosion in Marine and Offshore; Corrosion in Power Plants and Utilities; Corrosion in Tanks, Mounds, Bullets and Spheres; Corrosion in City Gas; Corrosion in Nuclear Industry; and Corrosion in Defense Equipment and Facilities continued to attract a large number of technical papers. With a delegate strength of over 900 industry stalwarts,





special emphasis was given to research work through the platform of young students and scientists forum. A round table conference on the Protective Coating and Lining Industry along with 'Jung-se-Jung, – Challenges with Integrity Assessment of Non-piggable Pipelines' and the workshop on 'High-Temperature Coatings,' were the other highlights this year.

Seven technical interactive forums on contemporary corrosion issues like corrosion monitoring, cathodic protection systems, water treatment, optimum coating specifications, concrete corrosion, regulations and standards in corrosion, was another segment that was attended in large numbers.

As is the practice at every CORCON, this year too Corrosion Awareness Awards

were presented to honor and respect individuals / institutions for their contribution to corrosion awareness and development in the field of corrosion science and technology in India.

Ever since the recognition was instituted in 1995, 127 scientists / teachers / engineers / professionals, 46 students and 26 public / private sector laboratories have been conferred various awards.

This year, the Excellence in Corrosion Science and Technology in Research and Education went to Mr Sunilkumar Dayarambhai Kahar; Excellence in Corrosion Science and Technology in Industrial Organization, Mr Jaiprakash Narain; Distinction in Corrosion Science and Technology in Research and Education, Dr Raffi Moham-

med, National Institute of Technology, Andhra Pradesh; Distinction in Corrosion Science and Technology in Industrial Organisation, Dr Dyana Joseline, Larsen & Toubro Construction, Chennai; Student Award for PhD Degree, Dr Sai Karthik Nouduru, Bhabha Atomic Research Centre, Mumbai; Meritorious Contribution in Research and Education, Dr R. Balaji Naik, Naval Material Research Laboratory, Ambarnath; and the Meritorious Contribution in Industrial Organization, Dr Bhupendra Gaur.

The Expo area hosted over 75 stalls, not only leading names in the industry from across the country, but all over the globe exhibiting the latest innovations, products and processes. Awards were also given to the best designed stalls. Blastech, was awarded the best stall in the 9 sqm category, whereas BSS Tech CP (I) Pvt Ltd., was the winner in the 12 sqm category. The runners up were PRSTR International Pvt Ltd., and Asian Paints PPG Pvt Ltd., respectively. Besides these, awards were also given to 18 paper and poster presentations at the valedictory function.

The four-day event was not just scientific and serious

discussions but also had its share of lighter moments. The cultural program on the third day had delegates taken back in time with a musical program by Niche Entertainment titled Black and White that highlighted the glory of songs in Bollywood from 1945 to 1968 - the golden era of Hindi cinema.

A collage of performance on screen and stage aided by mega audio-visuals, the performers on stage blending with the celluloid took the delegates through a journey with veterans like K. L. Saigal, Bimal Roy, V. Shantaram and Guru Dutt along with the stylish Dev Anand, tragedy king Dilip Kumar, showman Raj Kapoor, the beautiful Madhu Bala, the classy Meena Kumari and the 'yahoo' Shammi Kapoor, to name a few. The presentation format was reminiscent of a stage musical where the singers "act" the characters. The performance touched the finer aspects of the era through the medium of music, pictures, movie clips, anecdotes and trivia. 'Black and White' was an attempt to give a third dimension to the celluloid screen, restore links with our past, get nostalgic and go back to our roots, to those moments which we all want to relive.

Date	Event	Venue	Organizer	Contact Details
FEB 06 – 08, 2024	MIDDLE EAST METALLURGY CORROSION & COATINGS EXPO 2024	Abu Dhabi, UAE	Aldrich Energy	T: +971 56 903 2809 E: mathew@aldrichme.com W: mecocmiddleeast.com
FEB 22 – 24, 2024	PAINTINDIA 2024	Bombay Exhibition Centre Mumbai, India	NovaExpo Exhibitions and Conferences (India) Pvt Ltd.	E: paintindia.expo@colorpub.in W: paintindia.in
FEB 27 – MAR 01, 2024	INTERLAKOKRASKA 2024	Expocentre Fairgrounds Moscow, Russia	Expocentre Moscow	T: 8 (800) 7073799 E: centr@expocentr.ru W: interlak-expo.ru
MAR 03 – 07, 2024	AMPP ANNUAL CONFERENCE + EXPO	New Orleans Louisiana, USA	AMPP	W: ace.ampp.org
MAR 19 – 24, 2024	EXPO-SURFACE KIELCE	Exhibition & Congress Centre, Kielce, Poland	Targi Kielce S.A.	T: +48 41 365 12 22 E: biuro@targikielce.pl W: targikielce.pl
MAR 26 – 28, 2024	EUROCOAT 2024	Paris Expo, Porte de Versailles, France	Infopro-Digital	W: eurocoat-expo.com
APR 09 – 12, 2024	PAINTEXPO 2024	Karlsruhe, Germany	Leipziger Messe GmbH	T: +49 341 678 0 E: info@leipziger-messe.de W: leipziger-messe.de
APR 15 – 17, 2024	MIDDLE EAST COATINGS SHOW	Dubai World Trade Centre Dubai, UAE	dmg.events	T: +971 4 4453773 E: paddyoneill@dmgevents.com W: middleeastcoatingsshow.com
APR 30 – MAY 02, 2024	AMERICAN COATINGS SHOW 2024	Indiana Convention Center Indianapolis, Indiana, USA	American Coatings Association	E: chames@paint.org W: american-coatings-show.com
MAY 15 – 17, 2024	INTERNATIONAL COATING INDUSTRY EXPO	Poly World Trade Centre Guangzhou, China	China Coating Alliance International	T: +80-20-29193563 E: sfexpo@hotmail.com W: coatexpo.cn
JUN 12 – 16, 2024	COATINGS EXPO VIETNAM 2024	SECC, Ho Chi Minh City, Vietnam	VEAS	T: +84 28 38488561 E: info@veas.com.vn W: coatings-vietnam.com
JUN 19 – 22, 2024	SURFACE & COATING 2024	BITEC, Bangkok, Thailand	RX Tradex	T: +66 2686 7222 E: surfaceandcoatings@rxtradex.com W: surfaceandcoatings.com
JUNE 27 – 29, 2024	EXPO PAINT AND COATINGS 2024	Pragati Maidan New Delhi, India	Toredo Fairs India Pvt Ltd	T: (91) 98453 63225 E: info@expopaintcoating.in W: expopaintcoating.in
SEP 11 – 15, 2024	ASIA PACIFIC COATINGS SHOW	Convention Centre Jakarta, Indonesia	dmgevents	T: +971 44453773 E: paddyoneill@dmgevents.com W: asiapacificcoatingsshow.com
SEP 19 – 21, 2024	EXPO PAINT AND COATINGS 2024	ICCB, Dhaka, Bangladesh	Toredo Fairs India Pvt Ltd	T: (91) 98453 63225 E: info@expopaintcoating.in W: expopaintcoating.in

Please note, schedules are subject to last minute changes.



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EXHIBITION INQUIRIES

Romin Mathew
Mobile: +971 56 903 2809
Email: mathew@aldrichme.com

ALL OTHER INQUIRIES

Email: info@aldrichme.com
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