

How a Chicagoland landmark combats corrosion

Emergent powders and resins better protect tanks and vessels inside and out, says here

By Katie Sprick and Bob Parker

Storage tanks and vessels are a significant investment, and they play a major role in process operations. Regardless of the industry or what a vessel holds, processors can preserve its value with regular maintenance. Therefore, linings and coatings could be considered the most important features of industrial vessels.

Corrosion is the number-one enemy of industrial tanks and vessels, and the damage is costly on many levels. Not only does it destroy tank components, it also can contaminate the stored product, release the contained materials into the environment, raise safety concerns and increase operating costs.

The goal, then, is to defend against cor-

rosion. The ROI from reduced maintenance, limited recoating and extended vessel life typically offsets any upfront cost to defend against corrosion.

So, the question becomes: which exterior coatings and interior linings are the best in terms of longevity, durability and cost effectiveness?

From the inside out

Exterior corrosion often jumps out as a first concern for the simple reason that it is easily seen on the outside of the vessel. However, interior corrosion is just as much a threat, and neglecting to protect against it can reduce

storage tank productivity. Moreover, the best exterior coating solution might not be the best lining for inside the tank.

Interior corrosion control must focus on selecting a suitable lining based on the material being stored, because different substances react in their own unique way with tank interiors. Vessel linings must resist chemicals attack, heat and abrasion, as well as have a proven, successful field-performance history.

The vessel's exterior, on the other hand, faces regular assaults of heat, cold, ultraviolet rays and wind-blown particles, leading to corrosion of unprotected surfaces. Therefore, it is necessary to apply a coating that provides



genuine BINDICATOR®

Roto-Bin-Dicator® PRO

Actively Protecting Inventory

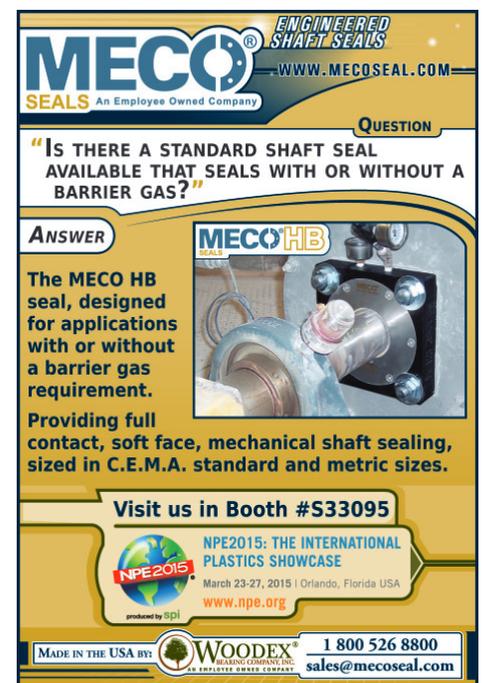
With its ability to perform self-diagnostics and **differentiate** between faults when its paddle is **buried in material**, the Roto-Bin-Dicator PRO is the most advanced, **genuinely fail-safe**, paddle-wheel indicator in the bulk solids industry.

See the PRO in action at the NPE show! Booth #S14019
Orlando, FL · March 23-27

produced by Spi

VISIT WWW.INFO.BINDICATOR.COM/PRO3 FOR MORE INFORMATION

Write In 114



MECO® ENGINEERED SHAFT SEALS
SEALS An Employee Owned Company
WWW.MECOSEAL.COM

QUESTION

"IS THERE A STANDARD SHAFT SEAL AVAILABLE THAT SEALS WITH OR WITHOUT A BARRIER GAS?"

ANSWER

MECO HB

The MECO HB seal, designed for applications with or without a barrier gas requirement.

Providing full contact, soft face, mechanical shaft sealing, sized in C.E.M.A. standard and metric sizes.

Visit us in Booth #S33095

NPE2015: THE INTERNATIONAL PLASTICS SHOWCASE
March 23-27, 2015 | Orlando, Florida USA
www.npe.org

produced by spi

MADE IN THE USA BY: **WOODDEX®** AN EMPLOYEE OWNED COMPANY
1 800 526 8800
sales@mecoseal.com

Write In 115

16 Tanks & Vessels

Right: Effects of corrosion on industrial tanks and vessels.

superior corrosion resistance and adhesion to ensure the tank's long-term performance.

Advantages inherent

When used in corrosive chemical environments, ETFE linings allow for less expensive vessel substrates, such as carbon steel, saving upfront fabrication costs. These linings may also be replaced or repaired while reusing the original piece of equipment.

ETFE is a melt-processable copolymer of tetrafluoroethylene and ethylene. It possesses outstanding physical toughness and high resistance to heat, chemical attack and aging. The powder is ideal for seamless rotational linings (rotolinings) and electrostatic coatings for industrial tanks. These tanks are used in chemical-processing applications in the food, petroleum and potable water and wastewater industries.

ETFE can be applied as an electrostatic coating up to thicknesses of 0.060". Electrostatic coatings are installed by applying a charge to the powder and using a spray gun to apply coverage to all vessel interior surfaces. The vessel is

Costs of Corrosion

- 1 Costs half a trillion dollars per year in U.S.
- 2 Destroys components of the tank
- 3 Contaminates the stored product
- 4 Releases the contained materials into the environment
- 5 Raises safety concerns
- 6 Increases operating costs

then baked in an oven to cure the coating, and this is repeated four or five times to build a seamless coating. This is a cost-effective way to add a thick, corrosion-resistant barrier to any shaped object. For additional protection, one lining coat can be electrostatically applied at the same time to the exterior of the vessel for protection against chemical drips and environmental concerns.

For exceptionally harsh processes, an even thicker lining can be installed using rotolining. The process involves adding the powder into the tank and spinning it while heating.

Conforming, free-flowing powder

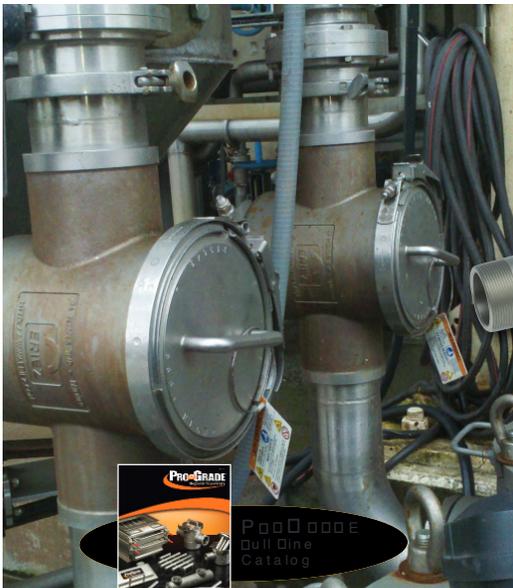
Rotolining vessels is superior to traditional sheet-lining methods because the free-flowing powder naturally conforms to interiors and does not typically require welding and sealing. This process may result in a lining of up to 0.250" thick. The lack of seams eliminates stress-risers that can prematurely cause a sheet-lining failure, as well as minimizes areas that can accumulate dirt, keeping the process cleaner and allowing easier clean-up of the vessel interior. Traditional bonded and loose-sheet linings are restricted to use in very simple shapes and geometries and require numerous seams, regardless of the vessel design. In addition, loose-sheet linings can collapse under vacuum.

Fisher Co. of North Salt Lake, Utah, uses ETFE exclusively in complicated vessel-lining projects. One of Fisher's more challenging projects was lining thirteen deionized water mixed



The #1 Selling Industrial Magnet

SO IPS O EOT O O O O



PROGRADE Liquid Line Traps
Your best defense against metal contamination!



\$29
PROGRADE Tube Magnets
4-Inch



\$109
PROGRADE Plate Magnets
6x6-Inch



\$110
PROGRADE Round Grate Magnets
6-Inch



\$265
PROGRADE Plate Magnets
6-Inch



\$1,064
PROGRADE Grate In Housing
6x8-Inch Two Drawer



ProGrade
Full Line
Catalog



Call 888.300.3743 or visit ProGrade.Eriez.com

18 Tanks & Vessels

and polishing beds for a leading semiconductor foundry. Three of the vessels were the largest in the world to have interior coatings. Challenges included the tanks' 10-foot diameter and more than 100 holes in a perforated interior plate. Fisher Co. clearly saw that traditional sheet lining or other fluoropolymer coatings could not successfully handle the project intricacies.

UV rays, wind, rain etc.

When considering corrosion resistance for tank exteriors, we believe fluoroethylene vinyl ether (FEVE) resins, which are formulated into paints, protective coatings and sealants, deliver performance superior to conventional resin chemistries.

Although traditional fluoropolymer PVDF-based coatings deliver excellent characteristics that improve weathering and corrosion resistance, they are limited in formulation and application. Pure PVDF has poor solubility in solvents

and must be blended with other polymers in order to be formulated into a liquid coating. Also, most PVDF-based coatings require heat to cure, which limits application to the factory settings.

We believe FEVE resins deliver superior durability, color retention, gloss retention and reduced maintenance costs, as well as excellent resistance to corrosion, dirt, UV rays, wind, rain, chemicals and petroleum products. Comprised of alternating segments of fluoroethylene and vinyl ether, the resins are synthesized with reactive hydroxyl groups and can be cross-linked with standard aliphatic isocyanates to make fluorourethane coatings that offer extreme strength.

Another advantage of FEVE resins is ease of application. Exterior coatings can be applied at room temperature, which preserves the integrity of the interior lining. Unlike traditional fluoropolymer-based products that must be applied

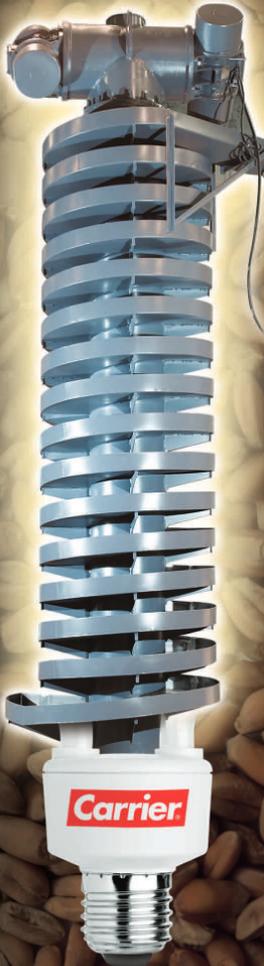
in the factory because they need to be heated to 200 C to form a film, the resins don't require heating. They can be applied in the field as well as factory.

The resins are transparent, provide outstanding adhesion to primers, fiberglass, plastics, composites and metals, including aluminum and steel, and can be used in both clear and pigmented coatings.

What to look for

When considering these resins for industrial tank-coating applications, look for solvent-based and water-based polymers, including solid-flake resins, which allow the formulation of coatings with no or low volatile organic compounds (VOC) and no hazardous air pollutants (HAP).

Although standard polyurethane-based coatings are less expensive on initial purchase, we believe that over the life of the tank these



Energy Efficiency in Bulk Material Handling

Our vibrating spiral elevator can heat, cool, dewater, quench, dry and elevate material, all without product degradation. With minimal floor space requirements, maximized circulation and an easy-to-clean design, our elevators are effective, one-step processing solutions.

Carrier Vibrating Equipment manufactures vibrating feeders, conveyors, fluid beds, dryers, coolers, washing systems and more. Our customized solutions make your work flow.

Carrier

Vibrating Equipment, Inc.

Bright Ideas to Make Your Work Flow

www.carriervibrating.com ☎ 502-969-3171

□ Vibrating Fluid Beds & Coolers	□ Milk Slurry Dryer	□ Vibrating Conveyors	□ Vibrating Spiral Feeders
□ Conventional Fluid Beds (Dry/ Cool)	□ Trench Dryers	□ Operating Conveyors	□ Bag Fillers
□ Coal Dryers	□ Heat Dryers	□ Screens	□ Vibrating Dischargers
□ Sinter Aggregate Dryers/Coolers	□ Recycling Equipment	□ Vibrating Feeders	□ Fluidity Aids



MADE IN THE USA

Write In 119

Chemical Metering Pumps and Flowmeters for Successful Water & Wastewater Treatment.



FLEX-PRO® | ADV Series | Peristaltic Metering Pump

ProSeries

NSF Standard 61

TFD system Tube Failure Detection

NEMA 4X WASH-DOWN

EQUIPPED WITH BLUE-WHITE'S EXCLUSIVE **Flex-A-Prene™** Heavy-Duty Peristaltic Pump Tubing

FLEX-PRO® Peristaltic Metering Injector Pump

- Three Models Available with Feed Rates Ranging from 0.1 GPH/0.3 LPH to 158 GPH/600 LPH.
- Brushless Variable Speed Motor.
- Terminal Blocks in Junction Box for Remote Connections.
- Patented Tube Failure Detection, Patented Safety Switch, Patented Method for Extended Tube Life.

Blue-White

5300 Business Drive, Huntington Beach, CA 92649 USA
714-893-8529 ☎ 714-894-9492 ✉ sales@blue-white.com
www.blue-white.com

Write In 120

20 Tanks & Vessels



Water Tower, Village of Rosemont, Illinois

formulations don't deliver long-term protection like coatings using fluoropolymers or FEVE resins. When lifecycle costs are taken into account, we believe the FEVE coating system offers a 45-percent cost advantage after 10 years and a 26-percent cost advantage after 18 years over standard polyurethane coatings.

Fabricator Tnemec Co., Inc., of Kansas City, Missouri, used FEVE resin technology to recoat the exterior of a 500,000-gallon steel-substrate water tank in the Village of Rosemont, Illinois, near Chicago and O'Hare Airport, which is said to resemble a gigantic bouquet of long-stemmed roses. The rose pattern required six different colors, which had to be applied in two different layers.

The finish coat was chosen for its versatile application properties, superior long-term gloss, color retention, life expectancy, superior coverage rates and exceptional UV protection, giving it the ability to withstand the degrading effects of sunlight, according to Tnemec coating consulting Erik Otten.

Beyond Tanks and Vessels

In coating industrial tanks and vessels, the weatherability and corrosion resistance of FEVE resins make them attractive for inclusion in top-coats for steel and concrete surfaces. Further ETFE applications include rotational lined chemical process components for fluid handling such as valves, pumps, pipes, fittings and other complex parts.

Storage tanks and vessels are valuable assets in the processing industry, protecting products and materials at various stages of the operation. Maintaining these investments — inside and out — can produce long-term, cost-effective results.

Katie Sprick is a product and development engineer and Bob Parker is a chemist with AGC Chemicals Americas, Inc., which manufactures, markets and sells high-quality fluoroproducts and specialty chemicals. Headquartered in Exton, Pennsylvania, AGC Chemicals Americas maintains manufacturing operations in nearby Thorndale, and warehouses throughout North America. For more information call 800-424-7833.

AGC Chemicals
www.agcchem.com
Write In 507

GOOD NEWS!

Never recondition your lobe pump again
New 20 year warranty on Sine pump housing

- Low shear pumping protects product integrity
- No pulsation or meshing rotors
- One shaft, one seal and one rotor for less maintenance than a rotary lobe pump
- High flow, high suction capabilities on viscous products reduce cavitation and extend pump life



masosine.com
800-282-8823

**WATSON
MARLOW**

Watson-Marlow Pumps Group

A Spirax-Sarco Engineering Company

Write In 122