Protecting Steel Filter Vessels from Ozone Additives

> **Q** *What coating specification, including surface preparation, is required to resist ozone used as an additive in big steel filter vessels?*

From Terrence Vargo, PhD, and Garner S. Holdsworth Integument Technologies, Inc. Tonawanda, New York, USA:

Historically, traditional epoxy- and vinyl ester-based coatings and linings have not fared well in applications requiring exposure to ozone, even in the parts per million (ppm) range. Although surface preparation influences the performance of the materials, the resins themselves do not commonly withstand the environment well. Recent developments in fluoropolymer technologies now provide a solution to this problem.

A new plasma surface modification process permits thin films and sheets of specific grades of fluoropolymer materials to be installed in tanks and vessels requiring protection from ozone attack. The process creates a chemical covalent bond between the fluoropolymer lining material and adhesive. The bond is permanent, enabling it to be used in applications where no conventional adhesive sheet or film product can be used. The covalent bond withstands a variety of stresses such as extreme temperature cycling, UV, and a wide range of aggressive chemicals without delaminating from the adhesive.

These fluoropolymers are typically in the range of 5 to 30 mils (125 to 750 microns) and incorporate a peel-and-stick silicone-based adhesive. All of the materials used in the ozone protection lining systems resist ozone, even under extreme concentrations. For ozone protection applications, the systems are developed using several fluoropolymer linings that are inherently inert to ozone. Additionally, the silicone-based adhesives and sealants are specially designed to resist ozone degradation that commonly occurs within electrical transformers.

Over the past year, several lining systems have been developed to protect fiberglass-reinforced plastic (FRP), metal, and other materials from ozone degradation. These systems are being tested for applications in wastewater remediation, as well as for FRP tank linings used for ozone purification of living bioaquatic systems in zoological parks.

These fluoropolymer lining systems should provide the ozone protection required for the steel filter vessels, with the only caveat being the operating temperature of these systems. Current fluoropolymer lining systems have the ability to perform at temperatures between -40 and 450 F (-40 and 232 C). Currently, however, their use in this particular application is limited to operating temperatures that do not exceed 200 F (93 C), due to the use of the silicone sealants for edges and seams. For temperatures up to 300 F (149 C), we recommend a 30-mil (0.8 millimeter) fluoropolymer system that facilitates the welding of joints and nozzles.

The surface preparation necessary

Continued

Polibrid Coatings

The World Leader In Solventless Elastomeric Polyurethane Coatings & Linings — Featuring

POLIBRID® 705

Known By Users Everywhere As

THE MOST RELIABLE
The most mature, field-proven product in its class — in severe service since 1982

THE HIGHEST QUALITY
Premium urethane components contain no solvents, extenders or adulterants

THE TOUGHEST
A thick, flexible membrane that is chemical resistant, wear resistant and impermeable

THE EASIEST TO APPLY
Applied at any thickness in only one coat with the simplest plural-component spray equipment available

THE MOST VERSATILE
Ideal for steel or concrete subjected to severe service in nearly every industry

- **Immersion Tank Linings**
- **Pipe Linings & Coatings**
- **Marine/Offshore Coatings**
- **Bonded Geomembranes**
- **Containment Linings**

WORLDWIDE PROJECT CAPABILITIES & EXPERTISE!

NSF 61 COMPLIANT!

For More Information Contact:
POLIBRID COATINGS, INC.
6700 FM 802, Brownsville, TX 78521, USA
Tel: +1 (956) 831-7818
Fax: +1 (956) 831-7810
E-Mail: mktg@polibrid.com
Internet: www.polibrid.com

EXPERT SALES & SERVICE IN
USA, Brazil, Germany, UK, Canada, Mexico, Argentina, Australia, New Zealand, Thailand, India, UAE, South Africa, Israel and more!

NOW MANUFACTURED BY POLIBRID LICENSEES IN GERMANY AND BRAZIL!

Write 116 on Reader Inquiry Card.

for these systems is relatively minimal compared to that for traditional spray-applied materials. The surface (plastic, metal, or ceramic) must be dry and free of loose coatings, grease or surfactants, and other surface contaminants or debris. The pressure-sensitive adhesive (PSA) technology used in this application reduces the need for physical bonding to a profiled surface, which is commonly required for traditional liquid-applied coatings and linings. For this application, the surface profile can be up to 2 mils (50 microns) without interfering with the performance of the PSA. This contrasts with most traditional liquid-applied coatings and linings that are used in immersion and aggressive environments, where surface preparation is absolutely critical to the ultimate success of the system. The surface preparation required for an aggressive service like ozone would conventionally demand a white metal blast with a profile as recommended by the manufacturer. The profile required is usually related to the final coating film thickness. It is common to see anchor profiles in the range of 2.5 to 4.5 mils (63 to 113 microns). However, it is important to follow the specific coating manufacturer's specification for surface preparation. The fluoropolymer film systems discussed above can tolerate pre-existing anchor profiles up to 2.5 mils (63 microns) without compromising their long-term performance.

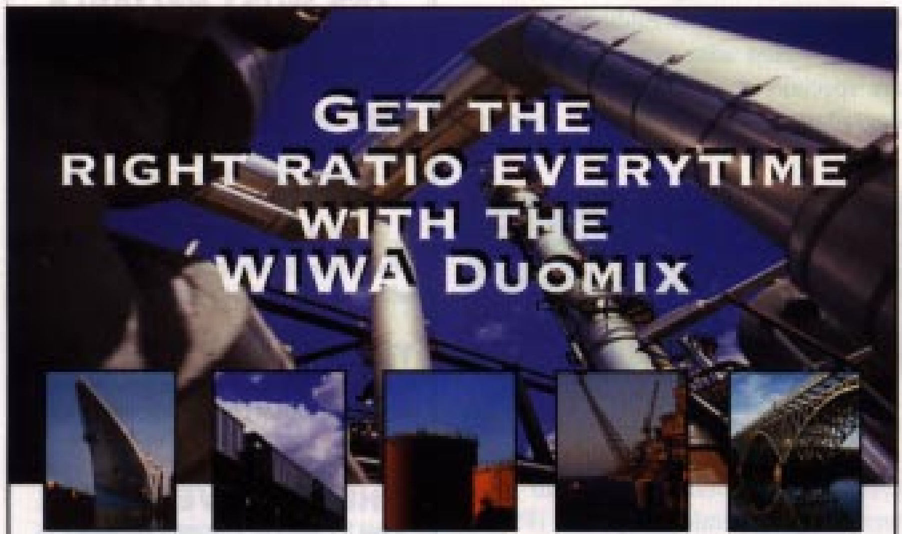
With the same surface preparation requirements, liquid fluoropolymer systems would also withstand ozone, particularly in vessels that operate at ambient temperatures. However, if the coating is to be baked for final cure, the substrate surface would have to be decontaminated prior to coating to prevent premature failure from outgassing or damage to the lining when the coating is baked or placed into service at an elevated temperature. The baking may be a problem if the substrate is FRP, not steel. The sheet film referred to earlier will not require baking for cure.

B.P.F. Goldie
Protective Coatings Europe
Surrey, UK:

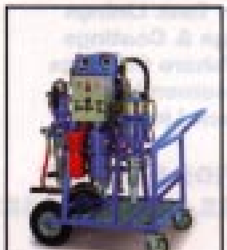
In the production of drinking water, or for water in swimming pools, one of the steps is the sterilisation of the water to neutralise all bio-organisms present in the water. Sterilisation can be achieved by ozonalysis. In this process, ozonised air, which is highly oxidative, is injected into the water. The ozone is very unstable and will decompose rapidly to form oxygen.

In municipal swimming pools, the

Continued



The Reliable Plural Component Spray Pump.



The Duomix system achieves extremely precise mixing ratios while ensuring that coatings are applied according to paint manufacturers' specifications, and is capable of handling materials with potlifes of less than a minute. You won't waste any time or material making adjustments, and cleaning is made easy with automation unique to WIWA.

When you need to spray plural component coatings, you need a pump that won't break down when you need it most. You can rely on WIWA's Duomix.

The robust pump design minimizes wear and tear of the moving parts, and allows huge areas to be coated without scheduled maintenance.

More than one hundred and fifty units of the powerful Duomix are being used world-wide under extreme conditions, in shipyards, by coating contractors, pipe coaters, and railcar shops.

The WIWA Duomix and a full line of quality spray pumps, spray guns, related equipment and customer service are available world-wide from WIWA.

For more information and the name of the distributor nearest you, contact:

WIWA®

NEW WIWA USA • SALES • SERVICE • WAREHOUSING

Spray Technology • Fluid Handling • Airless • Air Combi • Twin Feed Systems • Transfer Pumps

Wilhelm Wagner LP
5126 South Royal Atlanta Drive, Tucker, GA 30084
Tel: 1-866-661-2139 • FAX: 1-770-934-3384
Internet: www.wiwa-worldwide.com • E-mail: wiwa_LP@compuserve.com

Wilhelm Wagner GmbH & Co. KG
Gewerbestr. 1-3, 35633 Lahnau 1(Waldgirmes)/Germany
Tel: +49 (6441) 6090 • FAX: +49 (6441) 60950/52/58
Internet: www.wiwa.de • E-mail: info@wiwa.de

FAST, TOUGH, RESILIENT

Zipcoat from Corrocoat

ZIPCOAT

Developed initially by Corrocoat for coating structural steelwork, Zipcoat is a glassflake-filled coating system that has proved its worth in a range of coating applications right across industry.

Although often used as a two coat system, Zipcoat can also be used as a single coat application for speed and convenience.

Zipcoat's key advantages include:-

- Quick and easy to apply
- Short overcoating times
- Reduced time to full cure
- Excellent edge coverage – unique thixotropic properties often alleviate the requirement for stripe coating
- Product longevity means low whole life cycle costs

Application is available from Corrocoat service centres and contractors around the globe.

ZIPCOAT

The high speed, high performance coating system from Corrocoat

CORROCOAT LIMITED

Forster Street, Leeds, West Yorkshire, LS10 1PW, UK

Tel: +44 (0)113 2760 760

Fax: +44 (0)113 2760 700

Email: enquiries@corrocoat.com

Web Site: www.corrocoat.com

A member of the CDE group of companies

water is constantly circulated. As it is pumped out of the pool, the ozone is added before the water goes through a steel filter tank with a carbon filtration system and is then returned to the pool.

Ozone is only partially soluble in water, with some 20–30% escaping and gathering in the filter tank (where it is vented to the atmosphere). For a typical municipal swimming pool, these filter tanks are about 4 m (12 ft) high with a diameter of about 2 m (6 ft). The internals of these tanks must be protected against corrosion, both for structural reasons and for preventing contamination of the pool water. Because of the operation of the filtration system, with ozonised water added at the top and treated water removed from the bottom, not all of the tank interior is exposed to ozone. The filter bed is about 2 m (6 ft) high and about 1 m (3 ft) from the bottom of the tank.

The filter media is activated charcoal or anthracite, for ozone will not pass through either substance. Thus, within the tank, the lining in the filter bed area (and below) is exposed only to essentially clean water at about 28–30 C (82–86 F). However, above the filter bed, the tank lining is exposed to water containing ozone, oxygen, and free ozone, which is known to be very aggressive to organic coatings.

Conventional epoxy tank linings will withstand ozonised water at the operating temperatures of these filters but will chalk severely in the presence of free ozone. Protection of the upper levels of the filter tanks can be achieved with polyester or, more particularly, vinyl ester glass flake coating at a dry film thickness of approximately 500 microns (20 mils). These systems should give at least five years of protection and can be used for new building or maintenance purposes. Alternatively, thermal-sprayed metal coatings should also withstand the conditions in the filter tanks; however, these coatings are feasible only for new building work and are expensive.

Write 82 on Reader Inquiry Card