

High Performance vs. Ultra-High Performance Exterior Coating Systems—What's Right for Your Tank?

By: Michael L. Doolittle, Contract Administrator
NACE Certified Coatings Inspector
SSPC Protective Coatings Specialist

Alkyds, the much-trusted coatings of the past were summarily replaced by the superior performance of the polyurethane coatings. These coatings promised a twenty-year life and resistance to fading. But now, those coatings are being challenged by the newcomer on the block, the Ultra-High Performance coatings.

Fluorourethane and Siloxane coatings are rapidly gaining popularity with tank owners. The advertised thirty-year life of these coatings is a big plus as stricter and stricter regulations are placed on coating removal and application procedures, and labor costs continue to rise. But the product cost makes most tank owners look twice, and re-evaluate the value of the increased life.

As a comparison, the following are some of the highlights of several types of coatings:

Polyurethane:

- Standard of the industry for over 20 years.
 - Approximately 15-year life expectancy.
 - Loses gloss over time.
 - Relatively easy to apply.
 - Relatively short material pot life.
 - Not as sensitive to recoating with itself.
- Polyurethane with UV Protector or a Clear Coat are newer additives to extend the life of the gloss of the polyurethane coating.

Fluorourethane:

- Ultra-high performance coating, relatively new to the market. Promoted as a 30-year life expectancy.
- Very good color and gloss retention.
- Material in service for approximately 5 to 8 years shows good results and gloss retention.
- Very high material cost per gallon, but not as significant when figured into the cost of the total rehabilitation or construction project.
- Relatively easy to apply with a pot life exceeding that of the polyurethane coatings.
- Narrow recommended application thickness range.
- Often used as the coating for a logo on tanks coated with polyurethane coatings.

Siloxane:

- Ultra-high performance coating, newer to the industry than the fluorourethane.
- Promoted as very good color and gloss retention, but less expensive than the fluorourethane coatings.
- Wider recommended application thickness range.

- Relatively easy to apply with pot life exceeding the fluorourethane coatings.

Which exterior coating is right for your tank? There is no one right answer to that question. That is why TIC takes into consideration multiple criteria when designing a coating system for each tank specification we write. Items to consider include:

- In what environment is this tank located?
- What are the constraints of the tank site?
- What is the design of this tank?
- What is the present condition of the coating?
- What are the types of coating failures observed on this tank?
- Why did these coating failures occur?
- What can be done to correct these failures?
- Where are the existing corrosion problems on this tank?
- What time of year and for how long can the tank be taken out of service for painting?
- How sensitive are the neighbors?
- What are the owner's short- and long-term plans for this tank?

What is the right coating system for your water storage tank? Now, more than ever, tank owners and operators need expert, unbiased third-party input to make this complex decision.



Mike Doolittle, TIC's Contract Administrator, is a NACE Certified Coatings Inspector and an SSPC Protective Coatings Specialist. He has more than 30 years practical and textbook training in the construction and maintenance of water storage tanks.

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President's Corner *Something for Nothing*

By: Steven P. Roetter, P.E., President, Tank Industry Consultants

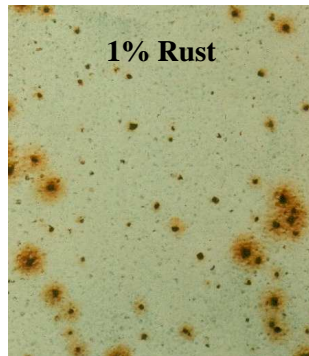
In this day and age you seem to run into more and more people who want something for nothing. Maybe it's the times we live in—times of dwindling resources and raised expectations for performance. My momma always told me: "If it seems too good to be true, it probably is."

Some tank owners are also looking for something for nothing by attempting to save money by eliminating the independent oversight of tank painting projects. If professional evaluation and observation by a qualified technician were just an added cost, this would be understandable. However, establishing a good scope of work and verifying that all parameters of the specification are met has significant value to the owner.

It's possible to rationalize eliminating independent oversight if the tank owner has specific knowledge of the work being done and the ability to access the work. But on tank rehabilitation projects, most owners have neither the structural nor coatings expertise; nor the ability to access the work for even rudimentary observation. This leaves one firm—the contractor—to establish the scope of work, perform the work, perform quality control, AND determine the effectiveness of the work. Unless the exterior coating visibly fails, the project will inaccurately appear to be a success to the owner. Having only one contractor bid the work also eliminates the advantages of competitive bidding.

Let me tell you a couple of stories. Several years back, we did an inspection of an elevated tank that had been under a continuous maintenance contract with a

single company for over 15 years. The contract promised that the exterior would not have more than 1% coating failure (which is an enormous amount) and that all required repairs would be performed. Our evaluation uncovered severe and widespread pitting in the riser pipe that necessitated the complete replacement of the riser. Since the riser theoretically did not "require" replacement during the contract period and the exterior looked good, the maintenance firm had complied with their agreement. This tank was not, however, maintained for a long service life and the cost of the riser replacement more than eliminated any supposed cost savings of the maintenance contract.



Another tank with which we were involved was also under maintenance contract. During maintenance operations, the contractor repaired corrosion on the balcony. When executing this repair, the contractor did not complete all of the required welds. This precipitated a failure at the posthead connection, and the entire tank had to be demolished. Was this maintenance contract cost effective? Not at all.

These tank owners do not feel as though they got something for nothing. These failures were directly attributed to not establishing a proper scope of work, lack of structural engineering expertise, and failure to monitor the work quality.

Steve

New Members of TIC's Project Management Team



Christine Gunsallus

To assist with project management on projects in the Pennsylvania and New England, **Christine Gunsallus** has joined TIC to establish an office in the Philadelphia area. Prior to joining TIC, Christine had nearly eleven years with Fisher Tank Company, a well-respected manufacturer of welded steel storage tanks for the water, chemical, and petroleum industries. While at Fisher Tank, Christine's responsibilities included Sales and Marketing, Estimating and Design, and Project Management.

Christine's experience in the steel tank industry is invaluable in her position as Project Manager for TIC's East Coast projects. In this capacity, Christine serves as client liaison in development and execution of tank rehabilitation and new tank construction projects—both water and industrial. Her in-depth knowledge of tank construction and repair procedures, standards, and recognized industry practices helps assure clients of smooth-running, quality projects that are on schedule and within budget.

Contact Christine at: Gunsallus@TankIndustry.com or by phone at 610 / 696-0403.

Bill Pybus



Also joining TIC's project management team is **Bill Pybus**. Bill is a familiar face to many East Coast clients and has more than thirty years experience in the storage tank industry.

He has served as a Senior Coating Inspector and Protective Coating Specialist for engineering companies and municipal and industrial clients at nuclear and terminal facilities throughout the US.

Bill joined Tank Industry Consultants to assist with project management and construction phase observation for TIC's East Coast projects. His quality control expertise, along with his managerial experience, makes him invaluable during new tank and tank rehabilitation projects.

Contact Bill at Pybus@TankIndustry.com or 804 / 897-7176.

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Hexavalent Chromium—The Next Lead?

By: *Jennifer D. Coon, CHMM, CET*

OSHA recently published three new hexavalent chromium (CrVI) standards including a Construction Industry version (29 CFR 1926.1162) for those workers involved in any construction, alteration, and/or repair activities, including painting and decorating; and a General Industry version (29 CFR 1910.1026) for those workers involved in all industries except agriculture, construction, or maritime (maritime also has its own standard). CrVI exposure has been linked to a number of health effects including eye damage, kidney damage, respiratory tract irritation, ulcerated mucous membranes of the nasal passages, nasal septum perforation, dermatitis, and skin ulcers. CrVI is considered to be a possible lung carcinogen.

Chromium is present in stainless steel and is often present in pigments found in spray paints and coatings. Workers who perform any welding or cutting on stainless steel or any grinding, chipping, welding, cutting, or other disruption of a surface coated with a chromium-pigmented coating may be exposed to CrVI. OSHA set relatively low exposure limits for CrVI. The Action Level (AL) is 2.5 µg/m³ calculated over an 8-hour time-weighted average (TWA), and the Permissible Exposure Limit (PEL) is 5.0 µg/m³ calculated over an 8-hour TWA. Painting contractors removing chromium-pigmented coatings will almost definitely be exposed to elevated CrVI levels. The exposure levels for project observers and water system employees will need to be assessed.

Comparisons to Lead in Construction Standard

Because OSHA's approach to the regulation of CrVI is similar to that of lead and because the two are common constituents of tank coatings, comparing the two regulations may provide an indication of the additional requirements that the new CrVI standard will impose.

OSHA promulgated its Lead in Construction Standard (29 CFR 1926.62) in 1993. This created strict requirements for the painting contractors whose employees' work operations involved welding, cutting, chipping, grinding, abrading, removal, or other disruption of lead-based coatings. Some of these

requirements included personal exposure monitoring, medical surveillance, biological monitoring, respiratory protection equipment, skin protection (typically Tyvek®-type suits), training programs, warning signs, and hygiene facilities.

Unlike lead, there are no conclusive blood tests or warning signs of the potential health effects of CrVI until they have actually started to occur. For CrVI exposures, an occupational physician must evaluate employees on an annual basis to look for the start of any of these effects. Therefore, employees can undergo a blood lead level (BLL) test and get an indication if their body has been over exposed to lead or if there body is metabolizing the lead in detrimental ways. However, there are no such tests for CrVI at the present.

Until personal exposure monitoring has been conducted, and the results analyzed, the implications of the CrVI standard will not be completely known.

Over the next several months, TIC will be conducting personal employee monitoring at a representative sample of job sites in order to determine exposure levels for TIC Project Observers and for those TIC employees conducting tank inspections. TIC will then develop compliance strategies based on these results and execute those strategies by the November 27, 2006, deadline.

Jennifer Coon, TIC Safety Director, is responsible for developing, communicating, and monitoring TIC's extensive Health and Safety program.



Jennifer is a Certified Environmental Trainer (CET) as designed by the National Environmental, Safety & Health Training Association and is designated by OSHA as an outreach trainer for their 10-Hour General Industry course. She has an MS in Environmental Science (Hazardous Materials) from Indiana University.

For the detailed CrVI paper prepared by Jennifer, please contact her at Coon@TankIndustry.com.

News of Note

TIC's professional staff has long been noted for their leadership in various industry and standards-making organizations. Following are a few of the recent appointments:

John Lieb API Resolution of Appreciation

This spring, John Lieb, TIC Chief Engineer-Industrial, was honored by the American Petroleum Institute with a plaque honoring his work on the API Subcommittee on Pressure Vessels and Tanks.

Chip Stein CoatingsPro Editorial Advisor

Chip Stein, Vice President of TIC, has been named to the Editorial Advisory Group for the NACE International magazine, *CoatingsPro*. The appointment was made by the NACE Executive Director in recognition of Chip's expertise as an author and coatings professional.

Mike Doolittle NACE Trainer

Mike Doolittle, a long-time supervisor in TIC's field services department and our current Contract Administrator, has been certified to teach the NACE Certified Coatings Inspector program (CIP). CIP is the most widely recognized coating inspector certification program in the world.

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Topics of Interest at Industry Conferences

Watch for presentations by members of TIC's professional staff at state and local AWWA conferences and other industry meetings.

If you have a need for a tank-related featured speaker, please contact us.

Industry Update

AWWA D100-06: The ANSI/AWWA D100-06 Standard for Welded Steel Tanks for Water Storage have been approved for publication. This is the last planned revision of the Standard. Two new standards are being developed to replace D100—*Welded Steel Elevated Tanks* and *Steel Flat Bottom Tanks*.

AWWA General Tank Standard: The first draft of the new General Tank Standard has been completed. When published, this standard will contain basic information applicable to all AWWA tank standards and will be used to supplement the subject-specific standards.

AWWA D102: It is anticipated that the next revision of D102 will be published in 2006. Changes incorporated in this revision include: NFS compliance will be required for all interior coatings; pre-construction primers will be allowed; and all references to federal and military standards will be changed to reference SSPC coating standards

AWWA D103-97—Factory-Coated Bolted Steel Tanks for Water Storage: The first ballot of this revision is closed. Changes to wind and seismic criteria are updated similar to those in D100-06, and a commentary has been added.

AWWA D104-04—Automatically Controlled, Impressed-Current Cathodic Protection for Water Storage Tanks: The Sacrificial Anode Standard has been balloted. The Task Force anticipates sending the revision to the Steel Tank Committee this summer.

AWWA D170—Composite Elevated Tanks for Water Storage (working title): Development efforts continue on this new standard.

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Tank Tip: Prepare Now for Spring Tank Projects

As summer ends and thoughts turn to the cooler months, now is the time to start preparing for next year's tank rehabilitation/repainting projects. If you are lucky enough to live in warmer climates, the painting of tanks may not be as season-sensitive. Although coatings technology is expanding the painting season, in a lot of areas of the country the optimum season for tank painting is still limited. To obtain the lowest possible prices for the repainting project, specifications should be prepared during the winter months and the projects bid so that work can start early next spring, if possible.

The first step in a tank rehabilitation project should be an engineering evaluation to determine the existing condition of the tank. The evaluation should encompass all of the safety, sanitary, and operational aspects of the tank, an analysis of any structural deficiencies, and determination of the condition of the existing coatings. Based on the engineering recommendations and construction estimates included in the report, the proper

scope of work can be established to meet the tank owner's maintenance and economic goals.

Project specifications should not only be designed to reduce construction costs during tank rehabilitation, but also for future tank rehabilitation. By specifying the best coating system for the tank and "designing out" problem maintenance areas, the newly applied coating system will not only last longer, but when future maintenance is required, the repainting will be easier and therefore less expensive.

For more information about the tank evaluation and project engineering services provided by Tank Industry Consultants, please contact:

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