



MID-SOUTH
TANK CONSULTANTS

PRELIMINARY INSPECTION REPORT

AMITY TANK

HOT SPRINGS, ARKANSAS

September 12, 2024

1,000,000-Gallon Standpipe



Prepared for:

**City of Hot Springs
133 Convention Boulevard
Hot Springs, Arkansas 71901**

**Crist Engineers, Incorporated
205 Executive Court
Little Rock, Arkansas 72205**

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INSPECTION SUMMARY

INSPECTION SUMMARY

AMITY TANK 1,000,000-GALLON STANDPIPE

HOT SPRINGS, ARKANSAS

September 12, 2024

Capacity:	1,000,000-Gallons	Type Const:	Welded Steel
Builder:	Circle P Welding	Last Maintenance:	2007
Built:	2007 Contract #703	Elev. To HWL:	108'-0"
Tank:	Standpipe	Tank Diameter:	40'-8"

GENERAL:

On September 12, 2024, Mid-South Tank Consultants washed out and inspected the 1,000,000-gallon standpipe water tank identified as the Amity tank located in Hot Springs, Arkansas. The inspection was performed in accordance with the proposal approved by Mr. Todd Pillar, P.E. of the City of Hot Springs. Based on the areas that were accessed, the following report describes the structural, sanitary, safety and coating conditions. This report also includes recommendations for repair and maintenance.

STRUCTURAL:

Foundations: The top of the concrete foundation was well exposed on all sides. The concrete is in sound condition. Mildew covers all concrete surfaces. Minor active corrosion was noted along the concrete to steel tank interface.

Ringwall: Structurally sound.

Erosion and/or Settling: No erosion was noted around the tank.

Shell Flange: The flange was in sound condition. Minor rust was visible along the edges. The joint between the flange and concrete base should be sealed with Dow Corning CWS caulk to prevent moisture from getting to the bottom side of the tank floor.

Anchor Bolts: The tank has thirty-six 2" diameter anchor bolts. The anchor bolt chairs are 18" tall and 8" wide. The chairs vertical side plates are too close to the anchor bolts to allow the backsides of the bolts to be properly abrasive blast cleaned, coated and inspected. New flared chairs should be installed.

Fill Pipe: The 16” diameter stainless-steel fill pipe was in excellent condition. The pipe had a 90-degree “T” installed about halfway up the pipe. Heavy rust was noted along the steel coupling near the floor of the tank.

Tank Shell: Exterior ➔ The coating was in fair condition. The finish coat is heavily chalked and is covered with very heavy mildew on the lower surfaces and light mildew and lichen growths on the upper surfaces. The white finish coat is dull and brittle and is close to the end of its life cycle. The dry film thickness (DFT) ranged from 13.0-20.5 mils and averaged 15.00 mils. The coating exhibits poor cohesion to the primer with ratings of 2A and 0B. The tank is NOT a candidate for overcoating due to its brittleness and poor intercoat cohesion.

Interior ➔ The interior epoxy coating is in fair condition. There is no ladder and the roof access hatch lock could not be opened or cut with bolt cutters. Upper tank surfaces could not be closely evaluated. Active corrosion was visible in scatted spots on the lower three shell panels. Areas of delamination to the zinc primer as well as delamination to the steel substate were noted on the lower shell panel. The coating exhibits marginal cohesion in scattered locations but good cohesion when washed with the 4,000-psi pressure washer. The dry film thickness (DFT) of the lower shell panels ranged from 12.6-15.9 mils and averaged 14.94 mils.

Tank Floor: The floor was covered with a layer of silt which was removed following pressure washing. Eighty-seven pits were noted in the floor. Several of the pits are deep enough that they will soon become leaks if not repaired. The weeper pits will require repair by welding. The pits less than 1/8” in depth can be filled with solventless epoxy. The dry film thickness (DFT) of the floor panels ranged from 12.9-16.8 mils and averaged 15.11 mils.

Exterior Ladders: The 18” wide shell ladder is structurally sound. Access from the ladder to the roof is safe. Handrails 42” tall extend from the platform at the top of the shell ladder to the corral around the roof cap plate. A swing gate or stainless-steel safety chains need to be installed at the handrail and mid-rail levels across the opening in the handrails. An aluminum climb prevention shield is in place at the base of the ladder.

Interior Ladders: None.

Safety Climbing Devices: The exterior ladder has a fall prevention device. The exterior shell ladder has a galvanized fall prevention cable that remains in good condition.

Platforms: The platform at the top of the shell ladder is in excellent condition and has railings on both sides.

Vents:	The 36” diameter vent pipe cover is covered with mildew and lichen growths. The cover is mounted to a flanged 24” diameter pipe. The insect screen frame is in good condition. The stainless-steel screen is in good condition.
Roof:	Exterior ➡The coating is chalky and dull and shows signs of erosion on 90% of the surfaces. All surfaces are covered with mildew. The coating is brittle and is covered with significant active corrosion on the west outer panels. Small areas of delamination to the zinc primer were noted. The dry film thickness (DFT) ranged from 10.6-13.7 mils and averaged 11.45 mils. Interior ➡ The roof coating is in marginal condition as large areas of delamination to the green zinc primer were visible from the floor. The roof could not be closely evaluated since there was no interior ladder and the access hatch could not be opened. The roof to shell interface and all seams should be sealed with Sika-Flex 1A following finish coat application at the next maintenance event. No holes were noted.
Overflow Pipe:	The 10” diameter pipe extends through the upper knuckle and extends down the northwest shell to a discharge point just above grade onto a concrete splash pad. The discharge end of the pipe has a stainless-steel insect screen and a hinged flap valve.
Spider Rods:	N/A
Welds:	No structurally unsound welds were observed.
Bolts:	No structurally unsound bolts were observed.
Rivets:	N/A
Pins:	N/A
Manways:	The tank has two lower shell manways. New stainless-steel washers and brass nuts and a new rubber gasket should be installed on the 24” diameter east manway and on the 30” diameter west manway to secure the covers.
Level Indicator:	None.
Leaks:	None noted or reported by the tank owner.

SANITARY:

Fence:	An 8' tall chain link fence encompasses the tank site.
Gate:	A double wide vehicle gate provides access on the west side of the tank.
Locks:	The gate was secured with a lock.
Overflow Screen & Flap:	The discharge point of the overflow pipe is just above grade. A concrete splash pad is located just beyond the discharge point. The end of the pipe has a stainless-steel insect screen and a hinged flap valve.
Vent Screen:	The insect screen is in good condition and the steel frame that supports the insect screen is in sound condition.
Access Hatch:	The hatch is 30"x 30" and has a 6" tall curb. The hatch could not be opened since the owner did not have the correct key for the lock. The lock could not be cut with bolt cutters. The hinge was in sound condition and the cover has a lockable hasp.
Access Hatch Lock:	The roof hatch was secured with a lock.
Evidence of Foreign Matter:	None in the water bearing area.
Evidence of Vandalism:	None.
Sediment:	The tank had approximately 1" of sediment in the floor. The shell had a light film present.
Silt Stop:	The fill pipe extends 16" above the floor.
Outlet Pipe:	The 16" diameter pipe was in sound condition but active corrosion covered the inside and outside surfaces.

COATING:

Exterior Surfaces:

Exterior Coating

Condition:

All tank surfaces are chalky, dull, and are covered with a light layer of mildew on upper shell surfaces and a heavy layer of mildew on the lower shell and roof panels. The roof coating shows signs of delamination with some areas of extensive general corrosion being visible. The average coating thickness was 11.45 mils on the roof and 15.00 mils on the shell. The existing coating exhibits marginal to poor cohesion between coats with ratings of 2A and 0B in the test area. However, areas of excellent adhesion were noted following pressure washing with 4,000-psi water and a rotating nozzle. The white urethane finish coat is brittle, and the scattered areas of delamination to the steel do not make the tank a candidate for overcoating. The existing coating does not contain lead. The existing coating should be completely removed by blasting to bare metal per SSPC-SP6 to completely remove the existing unsound coating system.

Interior Surfaces:

Interior Coating

Condition:

The zinc primer and two-coat epoxy coating system is in fair condition on most surfaces. The ceiling and the lower shell panels exhibit signs of cohesive failure to the zinc primer. The floor surfaces were covered with silt and after removal numerous pits were visible. The coating system is very close to the end of its life cycle. Blotchy corrosion covers scattered spots on the shell panels. The average coating thickness was 14.94 mils on the lower shell panels and 15.11 mils on the floor. The existing coating does not contain lead. All surfaces should be blasted to near white metal per SSPC-SP10. Pitted surfaces may require repair by welding or filling with solventless epoxy.

SAFETY NOTES:

1. Install stainless-steel safety chains across the opening at the top of the exterior shell ladder and the handrail and mid-rail heights.

REPAIRS:

1. Sharp edges can cause premature coating failure. All sharp edges, weld spatter and burrs should be ground flush.

2. Caulk the crevice along the top of the shell where the roof connects. The caulking material above the high-water level shall be Sika-Flex 1A. (Est. 155 LF)
3. Caulk pits deeper 1/8" with Tnemec series 215 Surfacing Epoxy. (Est. 45 SF)
4. All roof lapped seams shall be sealed with caulk. The caulk shall be NSF approve such as Sika-Flex 1A. (Estimated 260 LF)
5. Install a freeze-proof drain valve in the existing coupling in the lower shell. The valve should be constructed of corrosion resistant material.
6. Install a 36" x 16" x 12" deep sump pit near the SW shell manway.
7. Weld pits deeper than 1/8". (Est. 70 Square inches)
8. Secure both shell manway covers using stainless-steel bolts and washers and brass nuts. Install new rubber gaskets.
9. Remove the existing anchor bolt chairs and grind all burrs flush. Install new flared chairs that will allow the backside of the bolts to be properly abrasive blast cleaned, coated and inspected. (36 total)
10. Seal the concrete to steel interface along the lower shell panel chime with Dow Corning CWS caulk.
11. Install a new mixing system if required by the Arkansas Health Department.

RECOMMENDATIONS:

The existing interior system is close to the end of its life cycle. Metal loss is minimal but is active on the ceiling panels, along the lower shell panels and in the floor. We recommend the complete removal of the existing system by blasting to near-white metal followed by the application of a 10 to 15 mil high-performance zinc/epoxy/epoxy system which is NSF-approved for potable water contact. This system will provide good film wrap around seam edges and irregular surfaces and has excellent performance characteristics. Sharp edges should be rounded by grinding and lapped seams should be sealed with a flexible caulk following application of the finish coat. Properly applied, this system should provide at least 15 to 20 years of service with minimal maintenance.

The existing exterior system is chalky, dull and brittle and is covered with heavy mildew on lower shell and roof surfaces and light mildew on upper shell panels. No active corrosion was visible on the shell but significant active corrosion was noted on the roof. The coating system has reached the end of its useful life. The existing coating exhibits marginal intercoat cohesion due to its brittleness. The tank is not a candidate for overcoating. The entire coating system should be removed by blasting per SSPC-SP6. A zinc/urethane/fluoropolymer system should be applied to provide a durable coating and to restore a high gloss new look. The recommended system should be applied at 6.5 to 9.5 mils. The coating manufacturer

guarantees this coating system to maintain its gloss and color to within 80% of the original value for 15 years. Properly applied, this coating system should provide at least 15 to 20 years of corrosion resistant service.

We recommend this action be performed within the next 1-2 years.

LEAD RESULTS

The interior and exterior coating systems installed in 2007 do not contain lead per the coating manufacturer.

BUDGET ESTIMATE

BUDGET ESTIMATE FOR CLEANING & REPAINTING

AMITY TANK 1,000,000-GALLON STANDPIPE

HOT SPRINGS, ARKANSAS

CLEAN & PAINT TANK INTERIOR

- *Estimated Surface Area:* 14,690 SF
- *Surface Preparation:* SSPC-SP10 Near-White Blast Cleaning all surfaces.
- *Prime Coat:* Aromatic urethane, zinc rich primer at 2.5-3.5 mils DFT.
- *Stripe Coat:* Polyamidoamine epoxy at 2-3 mils DFT (roller applied) to weld seams and heavily pitted surfaces.
- *Intermediate Coat:* Phenalkamine epoxy at 6-8 mils DFT.
- *Finish Coat:* Phenalkamine epoxy at 6-8 mils DFT.

ESTIMATED COST FOR INTERIOR \$191,000

CLEAN & PAINT TANK EXTERIOR

- *Estimated Surface Area:* 14,300 SF
- *Surface Preparation:* SSPC-SP6 Commercial Blast Cleaning all surfaces.
- *Prime Coat:* Aromatic urethane, zinc rich primer at 2.5-3.5 mils DFT.
- *Intermediate Coat:* High-build acrylic polyurethane enamel at 2-4 mils DFT.
- *Finish Color Coat:* Fluoropolymer polyurethane at 2-3 mils DFT.

ESTIMATED COST FOR EXTERIOR \$186,000

ESTIMATED COST FOR REPAIRS \$52,000

ESTIMATED COST FOR HIDDEN REPAIRS \$2,000

**TOTAL ESTIMATED COST TO CLEAN,
REPAIR AND REPAINT THE TANK \$431,000**

REPAIRS

1. Sharp edges can cause premature coating failure. All sharp edges, weld spatter and burrs should be ground flush.
2. Caulk the crevice along the top of the shell where the roof connects. The caulking material above the high-water level shall be Sika-Flex 1A. (Est. 155 LF)
3. Caulk pits deeper 1/8" with Tnemec series 215 Surfacing Epoxy. (Est. 45 SF)
4. All roof lapped seams shall be sealed with caulk. The caulk shall be NSF approve such as Sika-Flex 1A. (Estimated 260 LF)
5. Install stainless-steel safety chains across the opening at the top of the exterior shell ladder and the handrail and mid-rail heights.
6. Install a freeze-proof drain valve in the existing coupling in the lower shell. The valve should be constructed of corrosion resistant material.
7. Install a 36" x 16" x 12" deep sump pit near the SW shell manway.
8. Weld pits deeper than 1/8". (Est. 70 Square inches)
9. Secure both shell manway covers using stainless-steel bolts and washers and brass nuts. Install new rubber gaskets.
10. Remove the existing anchor bolt chairs and grind all burrs flush. Install new flared chairs that will allow the backside of the bolts to be properly abrasive blast cleaned, coated and inspected. (36 total)
11. Seal the concrete to steel interface along the lower shell panel chime with Dow Corning CWS caulk.
12. Install a new mixing system if required by the Arkansas Health Department.

Jeff W. Oakley
NACE #319 Level III Certified Coating Inspector

Date: September 12, 2024

SPECIFICATION

TECHNICAL GUIDE SPECIFICATION

REPAIR, CLEANING AND PAINTING AMITY STANDPIPE TANK

HOT SPRINGS, ARKANSAS

PART I: GENERAL

1.01 SCOPE

- A. This specification covers, preparation of surfaces, performance and completion of sandblasting and painting of all interior and exterior surfaces for a 1,000,000-gallon steel standpipe water storage tank located in Hot Springs, Arkansas.
- B. The tank was built by Circle P Welding in 2007. The following are some general design criteria for the tank:

Overflow Height:	108'-0"
Shape:	Standpipe
Diameter:	40'-8"
Capacity:	1,000,000-gallons

- C. The intent of the exterior surface preparation is to remove all the existing coating by blasting to a commercial blast in accordance with SSPC-SP6.
- D. The intent of the interior surface preparation is to remove all the existing coating by blasting to a near-white metal finish in accordance with SSPC-SP10.
- F. The coating systems applied to the interior and exterior surfaces do not contain lead per the coating manufacturer. No special handling of the interior or exterior blast residue will be required.
- G. The CONTRACTOR shall be responsible for all costs associated with additional sampling, worker protection, environmental pollution control, handling of debris, laboratory analysis, and waste disposal.

1.02 WORK INCLUDED

- A. Preparation of failed surfaces, which are to receive finishes.
- B. Collection, handling and disposal of debris.
- C. Tank repairs.
- D. Coating application.
- E. Testing and cleaning.

1.03 RELATED WORK AND APPLICABLE REQUIREMENTS SPECIFIED ELSEWHERE

ALL BIDDING REQUIREMENTS, CONTRACT FORM, CONDITIONS OF THE CONTRACT, AND GENERAL REQUIREMENTS shall apply to all work included in this section.

1.04 REFERENCE DOCUMENTS AND STANDARDS

- A. Coating manufacturer's printed instructions.
- B. American Society of Testing Materials
 - 1. ASTM B117 **Salt Spray (FOG)**
 - 2. ASTM D149 **Dielectric Strength**
 - 3. ASTM D522 **Flexibility**
 - 4. ASTM D3353 **Hardness**
 - 5. ASTM D4060 **Abrasion**
 - 6. ASTM D4141C **Weathering**
 - 7. ASTM D4541 **Adhesion**
 - 8. ASTM D4585 **Condensing Humidity**
 - 9. ASTM G53 **QUV Exposure**
- C. American National Standards Institute/National Sanitation Foundation
 - 1. ANSI/NSF Standard 61 **Listed Drinking Water System Components - Health Effects**
- D. American Water Works Association
 - 1. AWWA Standard C652-92 **Disinfection**
 - 2. ANSI/AWWA D100-84 **Welded Steel Tanks**
 - 3. ANSI/AWWA D102-97 **Coating Steel Water Storage Tanks**
 - 4. AWWA M2 Manual of Water Supply Practices: **Steel Water Storage Tanks**
- E. Code of Federal Regulations
 - 1. 29 CFR 1910 **Occupational Safety and Health Standards** (General Industry Standards)
 - 2. 29 CFR 1910.134 **Respiratory Protection**
 - 3. 29 CFR 1910.1020 **Access to Employee Exposure and Medical Records**
 - 4. 29 CFR 1926 **Safety and Health Regulations for Construction** (Construction Industry Standards)
 - 5. 29 CFR 1910.1200 **Hazard Communication**
- F. Society for Protective Coatings
 - 1. SSPC **Systems and Specifications, Vol. 2, Sixth Ed.**
 - 2. SSPC-PA2 **Paint Thickness Measurement**
 - 3. SSPC-PA5 **Guide to Maintenance Painting Programs**

4. **SSPC-Guide 6 (CON), Guide for Containing Debris Generated During Paint Removal Operations**

1.05 SUBMITTALS

- A. Manufacturer's descriptive data describing each product to include solids by volume, performance data and manufacturer's recommendations for mixing, thinning and curing.
- B. Manufacturer's certified test reports confirming compliance with the specified performance requirements under Section 2.01.
- C. Color cards showing color availability for each finish coat.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to job site in factory-sealed, original-labeled containers.
- B. Store materials in a protected area at a temperature between 35° F and 110° F.

1.07 ENVIRONMENTAL CONDITIONS

- A. Provide adequate continuous ventilation and sufficient heating facilities to maintain temperatures above the minimum shown on the manufacturer's product data sheets.
- B. Provide minimum 25-foot candles (270 lx.) of lighting on surfaces to be finished.

1.08 CONTAINMENT, COLLECTION AND DISPOSAL OF DEBRIS

- A. The CONTRACTOR shall provide a containment system to prevent the migration of any hazardous blast media, dust and paint residue onto or from the property of the OWNER. The containment system shall meet the appropriate SSPC Class to provide the highest level of emission control required by governmental regulations and include the cover panels, screens, tarps, scaffolds, supports and shrouds used to enclose an entire work area. Refer to SSPC-Guide 6 (CON) **Guide for Containing Debris Generated During Paint Removal Operations**. Containment and collection shall be in accordance with applicable federal, state and local requirements.
- B. The CONTRACTOR shall place waterproof plastic sheeting on the ground surrounding the exterior of the tank, which is bermed to a sufficient depth to contain all debris generated in the cleaning process.
- C. All surface preparation debris must be disposed of in accordance with applicable federal, state and local regulations. The CONTRACTOR shall be responsible for all cost associated with containment and waste disposal that may result from the execution of this project.
- D. The CONTRACTOR shall be responsible for removing, handling and disposal of any soil that is contaminated with lead from his operations and replacement with uncontaminated soil.

- E. All expenses associated with the soil sampling and lead analysis shall be included in the base price to clean and paint the tank.

1.09 PROTECTION AND SAFETY PRECAUTIONS

- A. Take all precautions necessary to avoid adversely affecting the surrounding environment with blast media or paint particle drift or overspray. All of the CONTRACTOR'S activities shall comply with federal, state and local requirements for environmental pollution control.
- B. Plug and protect the tank inlet/outlet and overflow pipe at all times during the execution of the work to prevent damage and the entrance of blast media and debris.
- C. Adequately protect the level controls from paint and damage. Repair damage as a result of inadequate or unsuitable protection.
- D. All of the CONTRACTOR'S activities and equipment used on the job site must be in compliance with federal, state and local law. Defective or substandard equipment shall not be used. Hoists, ladders, electrical equipment, scaffolding and hand or powered tools must meet safety standards.
- E. Inspect all tank surfaces, ladders, and rigging connections before they are used. Any excessively deteriorated parts shall be repaired or replaced before use.

PART II: PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Specified products are those manufactured by TNEMEC Co., Inc. The representative for this project is:

Eagle Rock Coatings, Inc.
P.O. Box 24402
Little Rock, Arkansas 72221
(501) 448-2111
- B. Equivalent products by other manufacturers are acceptable, providing they meet or exceed all performance criteria of the specified materials. No products shall be considered that would decrease film thicknesses or offer a change in generic type of coating specified.
- C. Before submitting a bid based on a coating other than the specified system, submit to the Owner for approval at least 10 days prior to the bid date all pertinent data on the substitution coating including performance data as determined by an independent testing laboratory.
- D. Products for each specified function and system shall be of a single manufacturer.

2.02 MATERIALS

- A. Rust-inhibitive, zinc-rich urethane interior and exterior primer: TNEMEC Series 94-H₂O HYDRO-ZINC.
- B. Phenalkamine epoxy potable water intermediate coat: TNEMEC Series 21-39BL EPOXOLINE.
- C. Phenalkamine epoxy potable water finish coat: TNEMEC Series 21-WH16 EPOXOLINE.
- D. Aliphatic acrylic polyurethane exterior intermediate coat: TNEMEC Series 1075 ENDURA-SHIELD II
- E. Advanced thermoset solution fluorourethane exterior finish coat: TNEMEC Series 700 HYDROFLON.

2.03 MATERIAL PREPARATION

- A. Mix and thin materials according to manufacturer's latest printed instructions.
- B. Do not use materials beyond manufacturer's recommended shelf life.
- C. Do not use mixed materials beyond manufacturer's recommended pot life.

PART III: EXECUTION

3.01 FIELD INSPECTION BEFORE COATING APPLICATION

- A. Examine surfaces to be coated and report conditions that would adversely affect appearance or performance of coating systems and which cannot be put into an acceptable condition by preparatory work specified in Section 3.02, 3.03 and 3.04.
- B. Do not proceed with field surface preparation and coating application until surface is acceptable or authorization to proceed is given by the OWNER.

3.02 SURFACE PREPARATION

- A. All interior surfaces shall be abrasive blast cleaned in accordance with the Society for Protective Coatings' Specification SSPC-SP10 Near-White Blast Cleaning per Section 3.03. All exterior surfaces shall be blast cleaned in accordance with the Society for Protective Coatings' Specification SSPC-SP6 Commercial Blast Cleaning per Section 3.04 of this specification.
- B. Abrasive materials shall be selected to produce the required anchor pattern and no evidence of a polished or peened surface will be accepted.
- C. All dust, blasting debris and contaminants shall be removed from the surface prior to painting.
- D. The compressed air used for blasting shall be free of water and oil.

- E. Blasting shall not be performed when the surface temperature is less than 5°F above the dew point to prevent the formation of rust bloom.

3.03 INTERIOR COATING SYSTEM

- A. **Surface Preparation:** Remove all visible oil, grease, soil, dirt and other soluble contaminants in accordance with SSPC-SP1. All surfaces shall be abrasive blast cleaned by Near-White Blast Cleaning in accordance with the recommended methods outlined in the Society for Protective Coatings' Specification SSPC-SP10 (NACE No. 2). A surface profile of 1.5 to 2.0 mils is required.
- B. **Prime Coat:** Apply one coat of TNEMEC Series 94-H₂O HYDRO-ZINC at a dry film thickness of 2.5 to 3.5 mils to all blasted steel surfaces.
- C. **Stripe Coat:** Apply one coat of TNEMEC Series N140-1255 POTA-POX PLUS along all weld seams and to plate edges at 3.0-5.0 mils.
- D. **Intermediate Coat:** Apply one coat of TNEMEC Series 21-39BL "Delft Blue" EPOXOLINE to all prime coated surfaces at a dry film thickness of 6.0 to 8.0 mils.
- E. **Finish Coat:** Apply one coat of TNEMEC Series 21-WH16 "Off White" EPOXOLINE to all intermediate coated surfaces at a dry film thickness of 6.0 to 8.0 mils.

3.04 EXTERIOR COATING SYSTEM

- A. **Exterior Surface Preparation:** Remove all visible oil, grease, soil, dirt and other soluble contaminants in accordance with SSPC-SP1. All surfaces shall be abrasive blast cleaned by Commercial Blast Cleaning in accordance with the recommended methods outlined in the Society for Protective Coatings' Specification SSPC-SP6 (NACE No. 3).
- B. **Prime Coat:** Apply one coat of TNEMEC Series 94-H₂O HYDRO-ZINC at a dry film thickness of 2.5 to 3.5 mils to all blasted steel surfaces.
- C. **Intermediate Coat:** Apply one full coat of TNEMEC Series 1075 ENDURA-SHIELD II to all surfaces at a dry film thickness of 2.0 to 4.0 mils.
- D. **Finish Coat:** Apply one coat of TNEMEC Series 700 HYDROFLON at a dry film thickness of 2.0 to 4.0 mils.

**NOTE: TNEMEC Series 44-710 URETHANE ACCELERATOR may be used when the air, material or surface temperature is anticipated to be between 35°F and 60°F during application and/or curing.*

3.05 APPLICATION

- A. Prepare surface and touch-up welds, burned and abraded areas with specified primer before applying coatings.
- B. Mix, thin and apply each coating at the rate and manner specified by the manufacturer's current product data sheet.

- C. Finish coats shall be uniform in color and sheen without streaks, laps, runs, sags or missed areas.
- D. Allow the interior coating to cure a minimum of 7 days before being subjected to immersion.

3.06 INSPECTION

- A. Degree of surface cleanliness and blast profile of steel surfaces shall conform to the specifications detailed in Sections 3.02 and 3.03. Reference SSPC or NACE visual standards and consult Testex tape to verify anchor pattern.
- B. Wet film thickness readings for successive coats shall be taken as soon as possible at a frequency of at least one per 100 square feet.
- C. Dry film thickness readings of steel surfaces shall be taken prior to the application of successive coats with a nondestructive magnetic type gauge in accordance with SSPC-PA-2.
- D. All interior coated steel surfaces shall receive holiday testing with a Tinker and Razor Model M-1, or equivalent, low voltage holiday detector. Any areas failing this test shall be marked and receive an additional repair coat in accordance with Section 3.03 - INTERIOR COATING SYSTEM until satisfactory test results are achieved.
- E. The final film is to be visually inspected and shall be free of sags, runs, wrinkles and other excessive film-build characteristics and surface defects.

The CONTRACTOR shall maintain a contemporaneous daily inspection log to be used as a permanent record for the project and to compliment the periodic inspections by the OWNER'S representative. The contractor's inspection log shall include:

- 1. Daily record of materials stored and used on-site.
 - 2. Ambient conditions: min. of three measurements daily of air and surface temperature, dew point, wind speed and direction, precipitation, etc.
 - 3. Production record: personnel on-site, hours worked, location of surface preparation and painted areas and materials used at each work area.
 - 4. In-process quality control observations as described in this section to include surface cleanliness, surface profile, wet film thickness, dry film thickness, visual defects, time between cleaning and priming and time between coats.
- F. The CONTRACTOR'S daily inspection log shall be made available at any time to the ENGINEER / OWNER or their representative and an updated copy shall be included with each pay request.

3.07 ACCEPTANCE OF WORK

All surface preparation and repairs shall be approved by the OWNER before primer is applied. The CONTRACTOR shall request acceptance of each coat before applying next coat and shall correct work that is not acceptable and request re-inspection. All rigging to remain in place, and CONTRACTOR shall aid in use of rigging for all inspections by OWNER'S Representative.

3.08 REPAIRS

- A. Immediately after blast cleaning the tank interior surfaces and water blasting the exterior surfaces, an inspection shall be made by the ENGINEER/OWNER or Representative in the presence of the CONTRACTOR to determine if any additional repair items will be authorized by the OWNER as additional work to be paid for at the Unit Bid prices for tank repair.
- B. All repairs shall be made in a manner to effect a permanent repair. Any welding shall be done by qualified personnel. Care shall be taken to avoid damage to seams, plates and pipe connections which could result in leakage. The CONTRACTOR shall guarantee the water tank to be free from leakage upon completion of his work.
- C. Any welding on the tank shall be in conformance with requirements of AWWA Standard for welded steel tanks for water storage (AWWA D100-84). Pits deeper than 3/16" shall be repaired by filling with weld metal. Upon completion of welding the repaired area shall be ground flush with the surrounding area.
- D. Sharp edges can cause premature coating failure. All sharp edges, weld spatter and burrs should be ground flush.
- E. Caulk the crevice along the top of the shell where the roof connects. The caulking material above the high-water level shall be Sika-Flex 1A. (Est. 155 LF)
- F. Caulk pits deeper 1/8" with Tnemec series 215 Surfacing Epoxy. (Est. 45 SF)
- G. All roof lapped seams shall be sealed with caulk. The caulk shall be NSF approve such as Sika-Flex 1A. (Estimated 260 LF)
- H. Install stainless-steel safety chains across the opening at the top of the exterior shell ladder and the handrail and mid-rail heights.
- I. Install a freeze-proof drain valve in the existing coupling in the lower shell. The valve should be constructed of corrosion resistant material.
- J. Install a 36" x 16" x 12" deep sump pit near the SW shell manway.
- K. Weld pits deeper than 1/8". (Est. 70 Square inches)
- L. Remove the existing anchor bolt chairs and grind all burrs flush. Install new flared chairs that will allow the backside of the bolts to be properly abrasive blast cleaned, coated and inspected. (36 total)
- M. Secure both shell manway covers using stainless-steel bolts and washers and brass nuts. Install new rubber gaskets.
- N. Seal the concrete to steel interface along the lower shell panel chime with Dow Corning CWS caulk.
- O. Install a new mixing system if required by the Arkansas Health Department.

3.09 CLEANING AND DISINFECTION

- A. **Cleaning:** After painting, remove all scaffolding, planks, tools, rags, blast media and all other materials not part of the structural or operating facilities of the tank. Thoroughly clean and wash the walls, floor, roof and operating facilities of the tank by use of a high-pressure water jet, sweeping, scrubbing or other effective means. Flush out and otherwise remove from the tank all water, debris, and foreign materials accumulated during this cleaning operation. Thoroughly clean and flush out the bottom of the tank and the inlet/outlet pipe.
- B. **Disinfecting:** After cleaning, but before placing it in service, disinfect the inside of the tank in accordance with AWWA Standard C 652-92, **Section 4.3 by Chlorination Method 2.**
- C. **Sampling and Testing:** After the chlorination is complete and before the tank is placed in service, water from the full facility shall be sampled and tested in accordance with AWWA Standard C652-92, **Section 4.4 Bacteriological.**
- D. **Chemicals and Equipment:** Provide all necessary chlorine bearing compounds, solution tank, pumps, hoses, mops and other items required for cleaning, disinfecting and flushing operations.

3.10 CLEAN UP

Remove all debris and leave site in pre-project condition.

3.11 GUARANTEE

- A. The CONTRACTOR shall guarantee his work for a period of two years to the extent that he shall repair any defects due to faulty workmanship or materials which may appear on the structure during this period.
- B. A first anniversary inspection shall be conducted by the OWNER or Representative with the CONTRACTOR present in accordance with AWWA Standard D102-97, Section 5.2.

End of Section

EXTERIOR PHOTOS



Photo shows an overall view of the tank from the west. The tank has 10 ring sheets.



Photo shows the lower shell on the west side of the tank. The ladder, aluminum climb prevention shield and the overflow pipe are located on this side of the tank.



Photo shows the center portion of the roof. All surfaces are covered with heavy mildew.



Photo shows the roof vent. Heavy lichen growth is present.



Photo shows the insect screen in place on the roof vent.



Photo shows a solar panel mounted on the roof corral.



Photo shows the roof access hatch.



Photo shows the hatch secured with a lock. The locked could not be removed to allow the hatch to be opened.



Photo shows large areas of active corrosion on the roof. The coating has reached the end of its life cycle.



Photo shows the east side of the roof. The white finish coat has lost its gloss and is covered with mildew.



Photo shows active corrosion cells on the roof where the brittle coating has delaminated to the steel substrate.



Photo shows the west side of the roof.



Photo shows the north side of the roof. The coatings are stained. Mildew and lichen growth are active.



Photo shows the roof on the east side of the tank. Extensive active corrosion is visible along the outer roof panel surfaces.



Photo shows a spot with delamination to the zinc prime coat on the roof.



Photo shows a closer view of the roof. The coatings are covered with mildew and lichen growth.



Photo shows a section of the northwest shell pressure washed with 4,000-psi water and a rotating nozzle to remove the mildew stains.



Photo shows the ladder platform at the roof edge.



Photo shows another view of the ladder connection to the roof platform. Safety chains should be installed across the opening.



Photo shows the handrails leading to the center of the roof.



Photo shows lichen growth on the middle west side shell.



Photo shows heavy lichen growth on the roof's upper knuckle.



Photo shows the top of the shell ladder. Removable stainless-steel chains should be installed across the opening at the handrail and mid-rail.



Photo shows the south upper shell. The white finish coat has lost its gloss.



Photo shows the south lower shell. No active corrosion was noted.



Photo shows the south side of the tank base. The concrete foundation remains in excellent condition. No cracks were visible. The concrete to steel interface should be sealed with Dow Corning CWS caulk to prevent moisture from getting to the bottom side of the tank floor.



Photo shows the 30" diameter shell manway on the west side of the tank. The tank had approximately 16" of water prior to the start of the inspection.



Photo shows the 18" wide shell ladder. The ladder has a cable type fall prevention device.

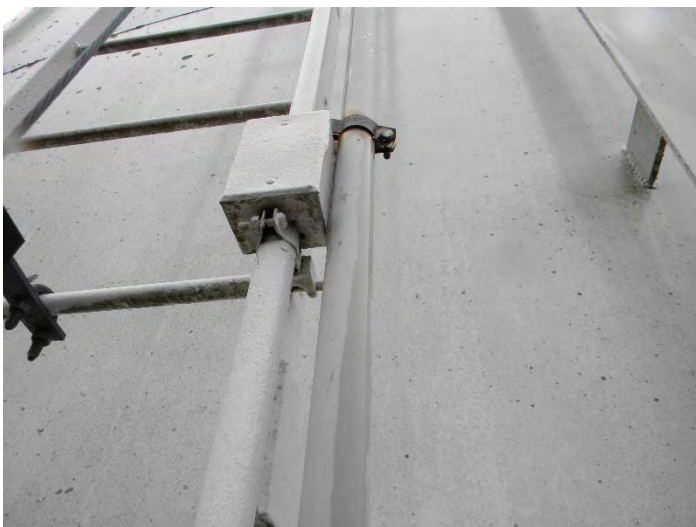


Photo shows a conduit attached to the ladder side rail.



Photo shows a closer view of an anchor bolt connection to the chair. The chair is too close to the bolt to allow the backside of the anchor bolt to be properly cleaned, coated and inspected. The existing chairs should be removed and new flared chairs installed.



Photo shows the 24" diameter shell manway on the east side of the tank. At the next maintenance new stainless-steel bolts and washers and brass nuts should be installed to secure the cover.



Photo shows the southeast side of the tank base. Mildew covers all surfaces.



Photo shows the drain plug in the base of the shell. Heavy mildew growth is present on the lower shell. The plug should be removed, and a freeze-proof drain valve should be installed. The freeze-proof valve should be modified to allow sampling.



Photo shows the north side of the shell. Mildew stains are present. No active corrosion was visible.



Photo shows the anchor bolt connections on the base of the tank. The tank has thirty-six 2" diameter anchor bolts.



Photo shows the aluminum climb prevention shield in place on the lower section of the tower ladder.



Photo shows the discharge point of the 10" diameter overflow pipe. The end of the pipe has a hinged protective flap.



Photo shows the insect screen installed behind the overflow flapper. The pipe is partially filled with ladybugs.

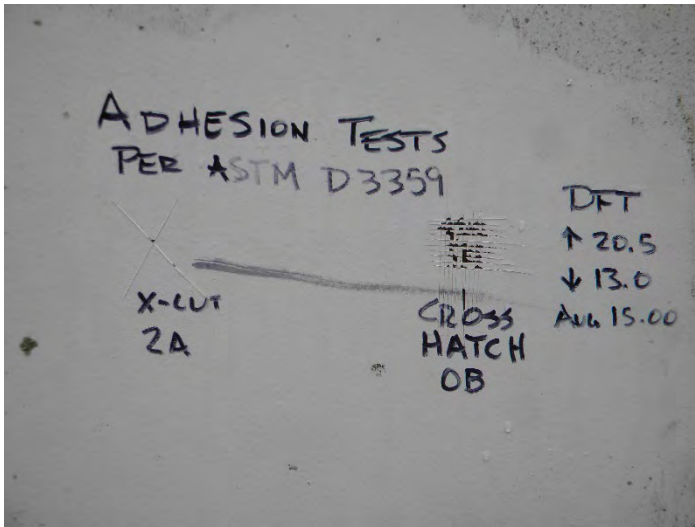


Photo shows adhesion tests performed per ASTM D3359 on the lower shell. The ratings are a 2A and a 0B. The tank is NOT a good candidate for overcoating. The Dry Film Thickness (DFT) in the test area ranged from 13.0-20.5 mils and averaged 15.00 mils.



Photo shows a closer view of the cross-hatch method B adhesion tests.

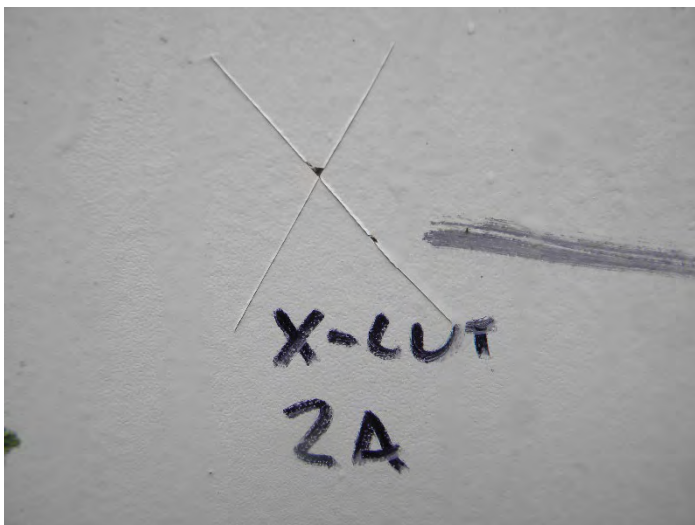


Photo shows a closer view of the X-cut method A adhesion tests.

INTERIOR PHOTOS



Photo shows the east shell of the standpipe and its 24” diameter manway entrance. Surfaces are lightly stained.



Photo shows the south shell before the 4,000-psi pressure washing effort.



Photo shows the 30” diameter manway entrance along the west side of the standpipe.



Photo shows the north side of the tank where the fill and distribution pipes are located.



Photo shows the west shell and floor after the washout was completed.



Photo shows the south lower shell after all the water was pumped out and the surfaces cleaned.



Photo shows the area surrounding the west manway entrance. The stains were removed from the lower 10' of the shell by the pressure washer.



Photo shows the north shell and floor panels after the 4,000-psi pressure washing effort. All debris has been removed from the floor.



Photo shows the east manway entrance where the paint has failed in multiple areas. The steel substrate is exposed.



Photo shows the bolted connection at the base of the fill pipe which has experienced heavy corrosion.

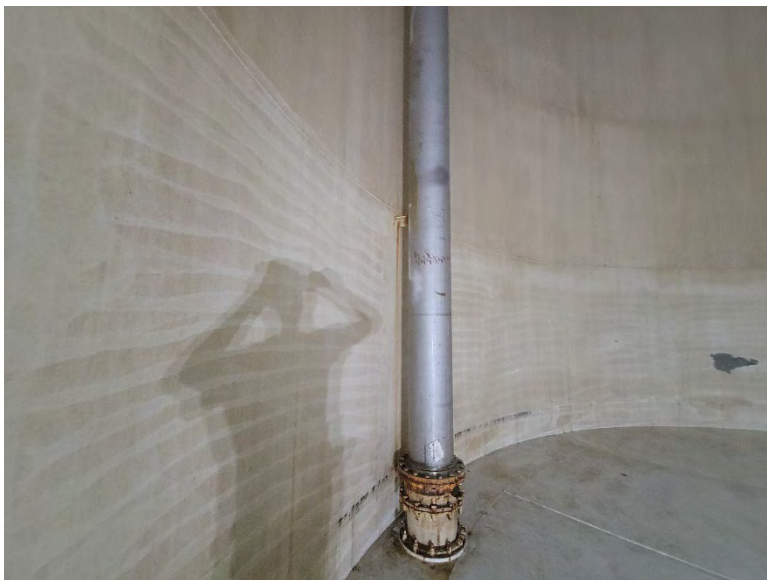


Photo shows the bottom section of the 16" diameter stainless-steel fill pipe.

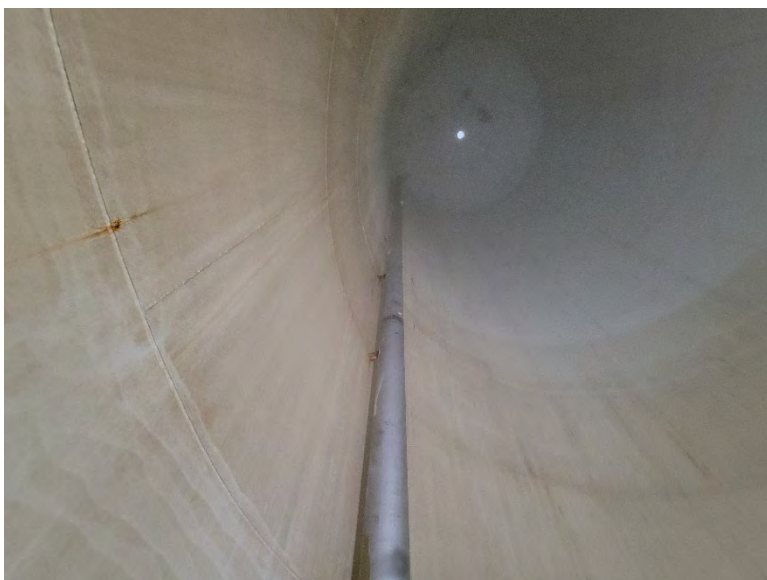


Photo shows the stainless-steel fill pipe running up the north shell of the standpipe.



Photo shows the northeast section of the floor where the float guide cable are located. The float is stuck about halfway up the tank.



Photo shows the 16" diameter distribution pipe located in the north section of the floor. The white epoxy coating no longer adequately protects the steel substrate.



Photo shows an area of delamination above the east manway entrance. The green zinc primer is exposed.



Photo shows a large area of delamination to the zinc primer on the northeast standpipe shell. Intercoat cohesion in this area is poor.



Photo shows a failure in the coating on the south shell. Metal loss is active.



Photo shows an area of active corrosion on the west second shell panel.



Photo shows multiple failures in the coating behind the overflow pipe.



Photo shows two pits near the base of the standpipe's shell.



Photo shows a large pit found in the floor of the tank. If not repaired soon a leak may develop.



Photo shows two more pits found on one of the floor panels.



Photo shows several areas of active corrosion along the seam between the shell and the floor.



Photo shows three pits found on the floor. Eighty-seven pits were found in total.



Photo shows a deep pit on a floor panel.

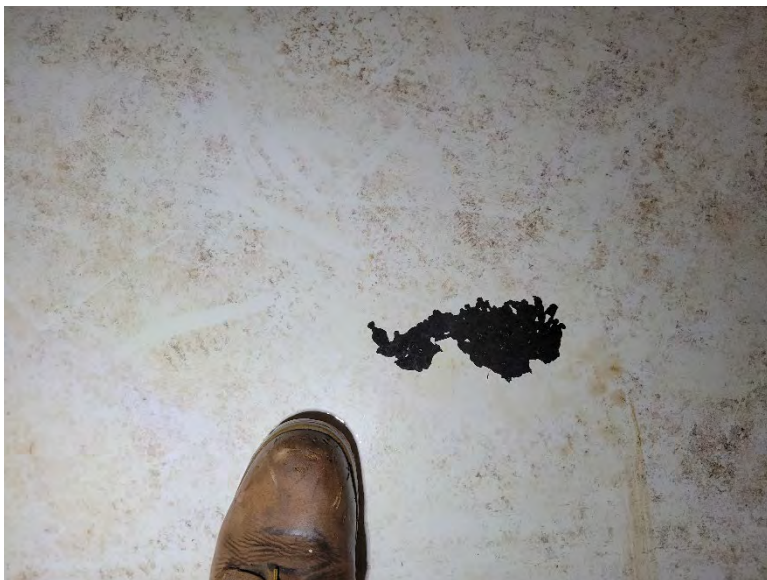


Photo shows more delamination found on the east section of the floor.



Photo shows the roof of the standpipe. The float was stuck in the air and large sections of delamination were present on the finger panels. The tank did not have an interior ladder, and the roof access hatch could not be opened so closer photos of the upper tank surfaces could not be taken.

PRODUCT DATA

WATER TANK

PROTECTIVE COATINGS

PERFORMANCE THAT TOWERS ABOVE THE REST





WATERTIGHT TESTIMONY

"Tnemec products consistently adhere well and provide lasting protection, which means I don't have to worry about coatings for years to come."

—GERALD W. BEVER
Water & Wastewater Operations
Baxter & Woodman Consulting Engineers

EARNING THE INDUSTRY'S MOST TRUSTED REPUTATION

A record of superior product performance and development has made Tnemec one of the largest, privately-held coatings companies in North America and the single most reliable resource for protection of concrete and steel potable water storage tanks.

As a result of continuous research, rigorous testing and meticulous refinement, Tnemec offers an

extensive line of durable, high-performance products for both interior and exterior tank applications.

Regardless of the conditions – harsh weather, temperature extremes or constant immersion – Tnemec coatings are sure to stand the test of time, lowering maintenance costs and extending the lifecycle of water tanks, which are often the source and symbol of community spirit and pride.

above: 2009 Tnemec Tank of the Year
Dublin, OH

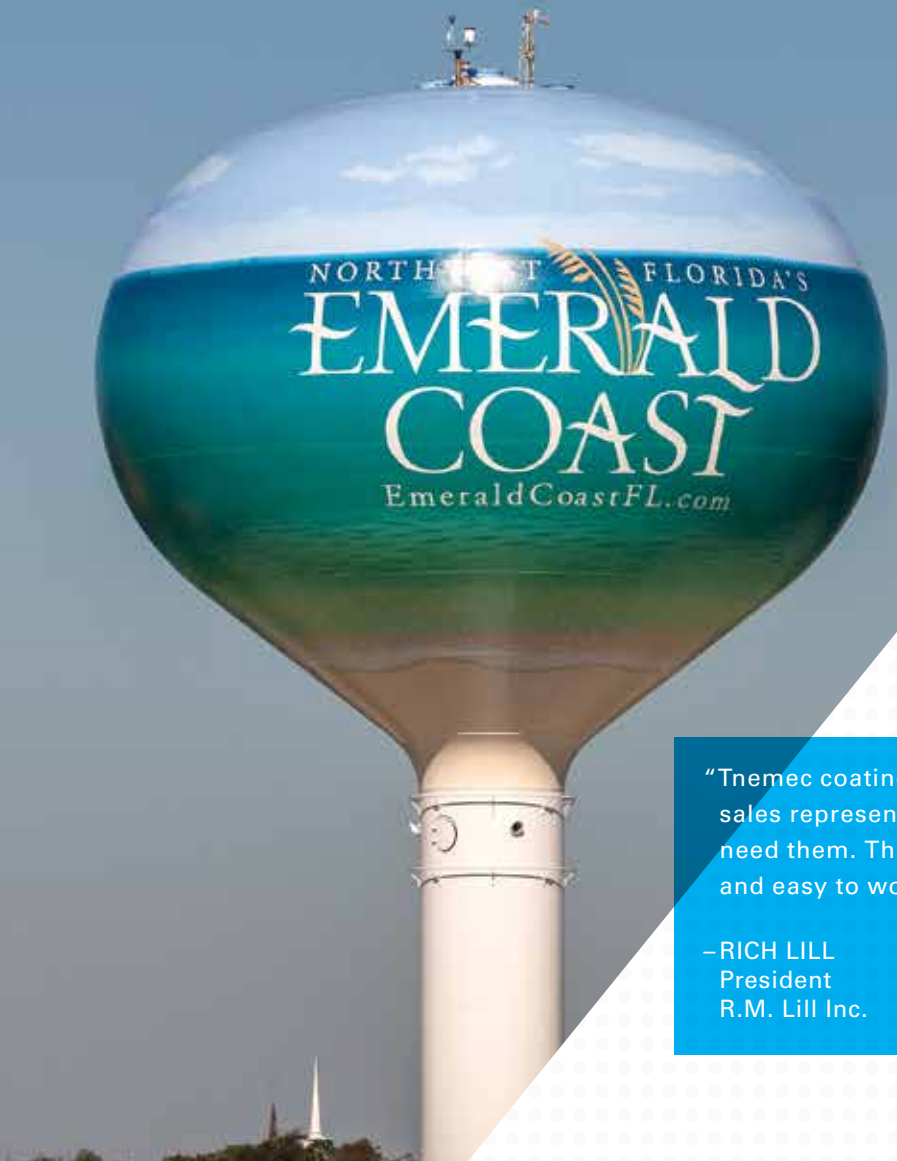
Of the more than one million tanks in use across America, a large majority utilize Tnemec protective coatings.



left: 2010 Tnemec Tank of the Year
Newton, KS



right: Greensburg, KS



left: 2012 Tnemec Tank of the Year
Okaloosa Island, FL

RIGHT. READY ANSWERS

"Tnemec coatings are extremely user-friendly. The sales representatives are always there when you need them. They're very prompt, knowledgeable and easy to work with."

— RICH LILL
President
R.M. Lill Inc.

**TAKING POINT ON INNOVATION FOR
PERFORMANCE THAT HOLDS WATER**

Tnemec has always been at the forefront of coatings technology. It started with the introduction of epoxy and polyurethane coatings for use on water tanks, which represented an industry milestone. Tnemec then continued to lead with an organic zinc-rich primer, which was the first to be certified for use in potable water immersion service.

The next significant development was the extremely stable chemistry of Tnemec's superior fluoropolymer topcoats. Their innovative formulation prevents colors from fading, retaining their high gloss and vibrancy over extended periods of time.

Persistent research and development is proof of Tnemec's resolve to provide the best possible solutions for chemical, corrosion and abrasion resistance, long-term durability, low volatile organic compounds (VOCs), rapid low-temperature cure and ease of application.

With a proven record of unmatched performance, Tnemec water tank coating systems are truly second to none.



left: Hillsborough County, FL

**DEPENDABLE TECHNICAL SUPPORT AND
CONFIDENCE-INSPIRING EXPERTISE**

New technology is only part of the story. Tnemec's reliable, performance-driven coatings are backed by unequalled technical support. With an average of 17 years of experience in the industry, Tnemec coatings consultants have the in-depth knowledge necessary to assist customers with coating product and system recommendations to meet their unique environmental and situational needs, and ultimately, provide long-lasting results.

Tnemec coatings consultants are backed by a technical support staff that travels across the country sharing their expertise in product application, analysis and coating evaluation. When they're not in the field, technical staff members are actively involved in industry organizations or working closely with Tnemec's research and development team on new product introductions.



TEST OF TIME · The 750,000-gallon standpipe in the city of Winthrop, Massachusetts, presented a challenge when it needed recoating in 1996. Durability and maximum service life were primary requirements for the new coating system. Color and gloss retention were also critical considerations given the standpipe's red, white and blue colors, which are especially susceptible to degradation from ultraviolet (UV) light. After more than 20 years, Tnemec's coating system has endured the harsh exposure in this demanding windswept, salt-air coastal environment.



left: Sumter, SC

BUILDING IN THE BEST PROTECTION RIGHT FROM THE START

Tnemec is often the coating system of choice for new water tank construction – no matter the structural style, local conditions or other challenges.

To provide the best possible corrosion protection, the first step in the process is applying fast-curing, reliable primers, either in the shop

or during on-site construction. Next, a carefully chosen intermediate coat is added to ensure greater long-term durability. Finally, a high-performance finish coat provides seamless coverage, vibrant color and UV-resistant gloss retention for beautiful, visually arresting aesthetics.

ARTFUL SOLUTIONS FOR EVERY TYPE AND CONFIGURATION OF TANK

In countless communities, where water tanks emblazoned with graphic designs or school logos have become symbols of pride, Tnemec's rich color palette offers creative possibilities to renew the beauty and integrity of an existing tank and leave a lasting impression for many years.

Tnemec coatings consultants can also perform an overcoat analysis that will indicate if the existing paint needs to be removed or if it can support an

overcoat. When overcoating is an option, Tnemec offers a variety of effective topcoats, including those with dry-fall characteristics that can be spray-applied at the job site. Whether an overcoat or a complete recoat is needed, your representative will tailor a coating system that will maintain long-lasting performance and aesthetic appeal.



right: Fort Mill, SC



TEST OF TIME · At 4.1 million gallons, the hydropillar in Chalfont, Pennsylvania, was the largest elevated tank in the world for potable water when constructed in 2000. So it's understandable that project engineers had great expectations for the exterior coating system from Tnemec with its dry-fall characteristics and long-term color and gloss retention. Today, this landmark continues to make a big impression after more than 15 years.

ENDURING SIGN OF QUALITY

"In my experience, the longevity and performance of Tnemec coatings are superior, which is important, given the high visibility of water tanks."

– BEN WOFFORD
Principal Engineer
Design South Professionals, Inc.

right: Santa Fe, NM



PRODUCTS THAT STAND THE TEST OF TIME — EVERY TIME

Tnemec interior coating systems represent the most comprehensive NSF/ANSI Std. 61 selection in the industry and include liners that can be applied and cured at low temperatures. Whenever specifications require incredible longevity and protection for the tank's exterior, Tnemec zinc-rich primer, polyurethane and fluoropolymer technologies are considered the standard for the industry. Many of these

coating systems conform to the American Water Works Association (AWWA) D102 Standard for Painting Steel Water Storage Tanks. Tnemec also offers VOC-compliant coating systems that meet every air quality regulation in North America.

GREAT RESULTS. MANY TANKS

"HydroFlon is a top-of-the-line coating for water storage tanks. We've applied the product on numerous jobs and couldn't be more pleased with the results."

—STEVE BREND, JR.
President
Jetco, Ltd.

above: Tank Interior
Rosemont, IL

TEST OF TIME • Back in 2001, the 500,000-gallon composite elevated tank in Granbury, Texas, became the first water tank in the United States to receive an exterior finish coat of Tnemec's high-performance fluoropolymer coating, Series 700 HydroFlon. After more than fifteen years in the hot Texas sun, the finish coat still holds its luster with the town motto, "Where Texas History Lives," drawing people into the city's historic square to visit the many other historic landmarks.



left: Puyallup, WA

INDUSTRY-LEADING PRODUCTS ONLY FROM TNEMEC

HYDRO-ZINC®

Over 10,000 tanks have been coated with Hydro-Zinc since its introduction in 1997. The first organic zinc-rich primer to be NSF/ANSI Std. 61 certified for use in potable water immersion, Hydro-Zinc has demonstrated unparalleled long-term corrosion protection for both the interior and exterior of steel water tanks. It is compliant throughout North America with versions featuring low HAPs levels and less than 100 grams per liter VOCs.

HYDROFLON®

This exterior finish coat, introduced for use on water tanks in 2001, is known for its outstanding resistance to UV light degradation, unprecedented long-term color and gloss retention, and excellent resistance to abrasion and chalking. HydroFlon's advanced generation fluoropolymer technology vastly exceeds the life expectancy of traditional polyurethane topcoats. This extends time between maintenance cycles, thereby reducing future repainting costs. HydroFlon is also available in a low-VOC formulation that is compliant with even the most stringent air pollution regulations.

UNI-BOND MASTIC

Formulated specifically to overcoat sound rusted steel and aged coating systems, Uni-Bond Mastic provides high-build, elastomeric protection for water tank exteriors. Ideal for projects where minimal surface preparation is possible, this mastic acrylic coating forms a tough, flexible and impact-resistant film that is compatible with a variety of high-performance topcoats, including fluoropolymer finishes. Additionally, this product is low VOC, low odor and "dry-fall" capable, making it more convenient to apply in occupied areas.

EPOXOLINE®

Protecting tanks all over the country, this next-generation 100% solids epoxy liner is built to fight corrosion in steel and concrete tanks containing potable water. With a robust formulation that can stand up to harsh chemicals and water immersion alike, Epoxoline offers a high-build film and is available with fast-cure capabilities for quick return to service. The product is NSF/ANSI Std. 61 certified and meets the strictest requirements for coating exactable levels in drinking water.

right: Plant City, FL





left: 2015 Tnemec Tank of the Year
Cocoa, FL



THE HEIGHT OF ACHIEVEMENT — TANK OF THE YEAR

Water tanks are not only functional, they're iconic – emblematic of a community's or district's sense of camaraderie and self-expression. It is for this reason that, each year, Tnemec names a "Tank of the Year" winner, recognizing and celebrating the aesthetic, creative and innovative applications of Tnemec coatings on water tanks. New construction or renovation projects may be nominated, and all tank styles are eligible.

If you would like to nominate a favorite water tank, contact your Tnemec coatings consultant, or visit tnemec.com/tankoftheyear.



right: 2013 Tnemec Tank of the Year
Mt. Vernon, IL



left: 2016 Tnemec Tank of the Year
Ann Arbor, MI



right: 2011 Tnemec Tank of the Year
Hollywood, FL

DUE RECOGNITION

"We had great community support with this project and have received many compliments and inquiries from other villages. We're delighted to receive this national recognition."

– JIM BOWLES
Superintendent of Sewer and Water
Village of Lake Villa
2008 Tank of the Year Winner

right: 2014 Tnemec Tank of the Year
Midland, TX



DESIGN YOUR WINNING WATER TANK ONLINE

Utilize our innovative, web-based design tool to select tank styles, choose from a wide palette of colors, and add graphics, text and a logo. Then view it in a virtual environment from different perspectives to get a more accurate visualization of the finished design.

VISIT TNEMEC.COM/TANK3D



INNOVATION IN EVERY COAT™

Tnemec Company Inc. 6800 Corporate Drive Kansas City, Missouri 64120-1372 1-800-TNEMEC1 Fax: 816-483-3969 tnemec.com

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NSF/ANSI/ CAN 600



On **January 1, 2023**, NSF will implement new extraction criteria for xylene, ethylbenzene and toluene. The extraction criteria found in the NSF/ANSI/CAN Std. 600 (NSF 600) reference standard will require all coatings in contact with potable water to meet new, lower extraction levels. These new limits will severely restrict product offerings from most coating and lining manufacturers, and only coatings with extractables of xylene less than 0.09 mg/L, ethylbenzene less than 0.14 mg/L and toluene less than 0.06 mg/L, will be certified for use on potable water structures and components.

As a leader in the water tank industry, Tnemec is well-prepared for these changes, and has been anticipating potential rule and regulation changes like these for years. Our company has many full coating and lining systems that will comply with the new NSF extraction criteria, including coating systems that have been applied to potable water tanks and piping for decades.

Tnemec has also introduced several coatings that will allow owners and engineers to update their water tank and treatment specifications with innovative, low VOC products. These coatings are formulated to perform

WE'RE READY FOR NSF 600. ARE YOU?

While this extraction criteria for xylene, ethylbenzene, and toluene is not being implemented until **January 1, 2023**, it may be beneficial to start reviewing project specifications now for any future projects. Tnemec is happy to assist in providing our customers with additional information on this standard, as well as information on other upcoming technology that will meet and exceed these new guidelines.

For more information, contact your local Tnemec representative or **visit tnemec.com/NSF600**.

as well as, if not better than, previous technologies, and will help prepare specifiers for the next phase of potable water protection.

NSF 600 Compliant Coatings →



NSF 600 COATINGS WITH YEARS OF PROVEN PERFORMANCE IN THE FIELD

SERIES 91-H₂O HYDRO-ZINC® *Introduced in 1997*

Standard zinc-rich urethane primer for water tanks used across North America.

SERIES N140 POTA-POX PLUS *Introduced in 1999*

Reliable epoxy coating certified for use as potable water primer, intermediate coat or stripe coat.

SERIES 22 EPOXOLINE *Introduced in 2001*

High-build, 100% solids epoxy lining built to protect steel and concrete surfaces.

SERIES 406 ELASTO-SHIELD® *Introduced in 2002*

Fast setting polyurethane lining used on steel and concrete potable water structures.

SERIES 94-H₂O HYDRO-ZINC® *Introduced in 2003*

Zinc-rich urethane primer applied on countless water tank interiors and exteriors.

SERIES L140 POTA-POX® PLUS *Introduced in 2005*

Low VOC, versatile epoxy coating suitable for potable water.

SERIES FC22 EPOXOLINE *Introduced in 2008*

Fast-cure, 100% solids epoxy lining built to protect steel and concrete surfaces.

INNOVATIVE NEW PRODUCTS NOW AVAILABLE FOR NSF 600 REQUIREMENTS

SERIES 21 EPOXOLINE®

High-solids epoxy lining that can be used on the interior and exterior of steel or concrete tanks, pipes, valves, pumps, and other equipment in potable water service.

SERIES 98-H₂O HYDRO-ZINC

Innovative, waterborne zinc-rich epoxy primer offering extended protection on the interior and exterior of potable water storage tanks.

SERIES 1220 TNE MEC EPOXY

Unique, low VOC, water-based epoxy coating featuring HydroLink technology, ideal for use in potable water tanks and water treatment facilities.

Learn more about NSF 600 and its effect on coating selection and specification by contacting your local Tnemec representative or visiting tnemec.com/NSF600.

Published technical data, instructions and pricing are subject to change without notice. Contact your Tnemec technical representative for current technical data, instructions and pricing. Warranty information: The service life of Tnemec's coatings will vary. For warranty, limitation of seller's liability and product information, please refer to Tnemec Product Data Sheets at tnemec.com or contact your Tnemec technical representative. © Tnemec Company, Inc. 2022 FLYNSF



INNOVATION IN EVERY COAT.™

HYDRO-ZINC®

INTERIOR AND EXTERIOR CORROSION PROTECTION
FOR STEEL POTABLE WATER TANKS





A PRIMER BUILT FOR LONGEVITY

Hydro-Zinc is formulated to protect your most valuable assets, and keep them protected for longer. As the most commonly used primer for water storage tanks, Hydro-Zinc has been extensively tested in the lab and in the field, showcasing unprecedented performance and reliability.

Since its introduction in 1997, Hydro-Zinc has been applied to over 23,000 water tanks, helping to extend the service life of each tank and provide the lowest life cycle cost for utility companies and municipalities throughout North America.

Hydro-Zinc showcases the best corrosion protection in the industry while being contractor- and budget-friendly. Plus, every gallon of Hydro-Zinc sold is backed by unmatched customer and technical support, through every phase of your project.

91-H₂O DATASHEET

94-H₂O DATASHEET



THE HYDRO-ZINC PRODUCTS

Series 91-H₂O and Series 94-H₂O Hydro-Zinc are zinc-rich, moisture-cured urethane primers, certified for use on potable water tanks. These primers provide unmatched corrosion protection to the interior and exterior of steel water tanks, eliminating the need and added cost of two

HYDRO-ZINC COATINGS

Series 91-H₂O – Two-component, moisture-cured, aromatic urethane zinc-rich primer

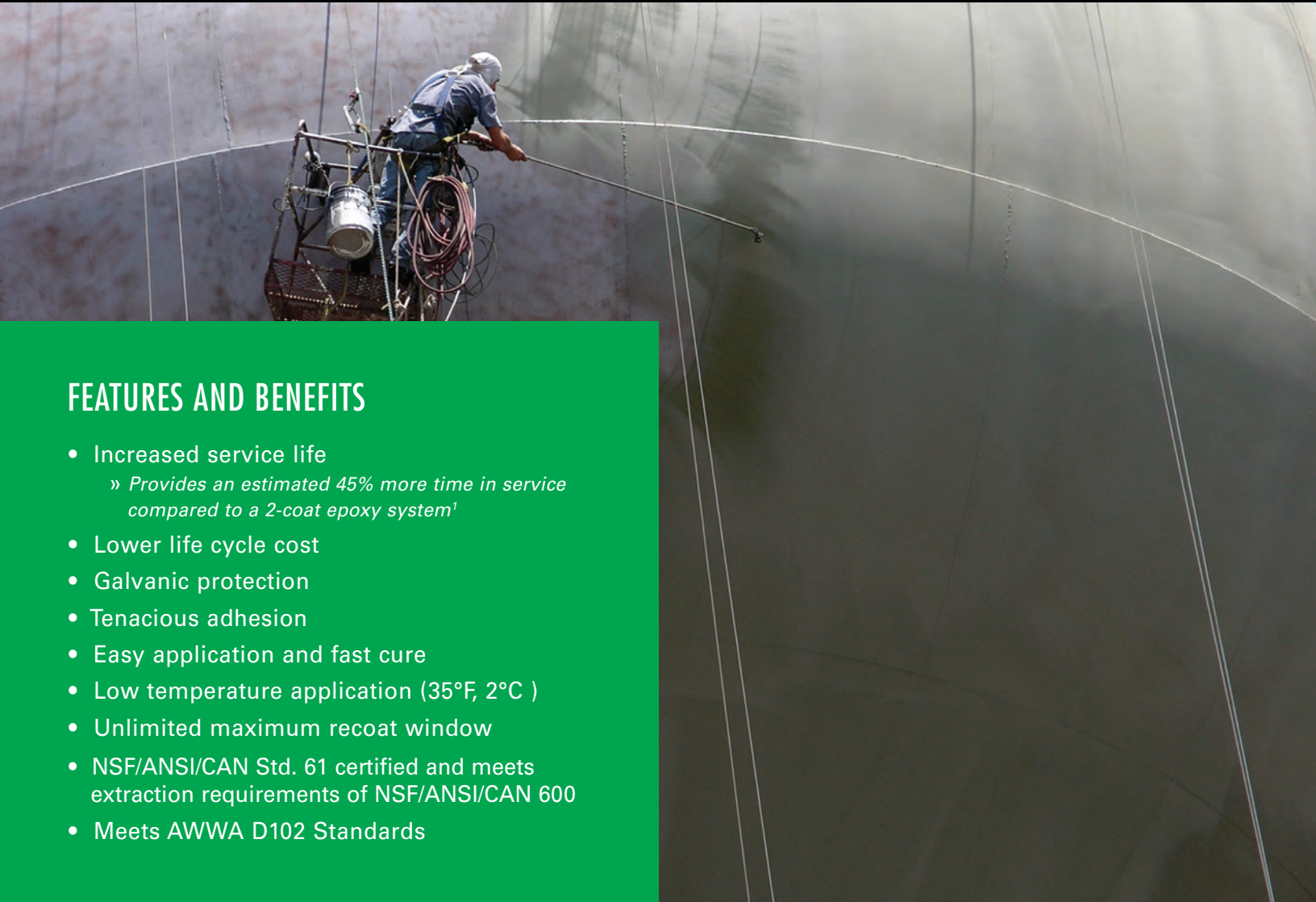
Series 94-H₂O – Single-component, low VOC, moisture-cured, aromatic urethane zinc-rich primer

different primers. Hydro-Zinc also cures quickly and can be topcoated at surface temperatures as low as 35°F (2°C).

Series 91-H₂O is a two-component primer while Series 94-H₂O is a single-component primer. Both products, especially when used as part of a full high-performance coating or lining system, help give water storage tanks the longest service life possible, delivering the lowest life cycle cost and the most sustainable solution on the market today.

FEATURES AND BENEFITS

- Increased service life
 - » Provides an estimated 45% more time in service compared to a 2-coat epoxy system¹
- Lower life cycle cost
- Galvanic protection
- Tenacious adhesion
- Easy application and fast cure
- Low temperature application (35°F, 2°C)
- Unlimited maximum recoat window
- NSF/ANSI/CAN Std. 61 certified and meets extraction requirements of NSF/ANSI/CAN 600
- Meets AWWA D102 Standards





REGULATION FRIENDLY

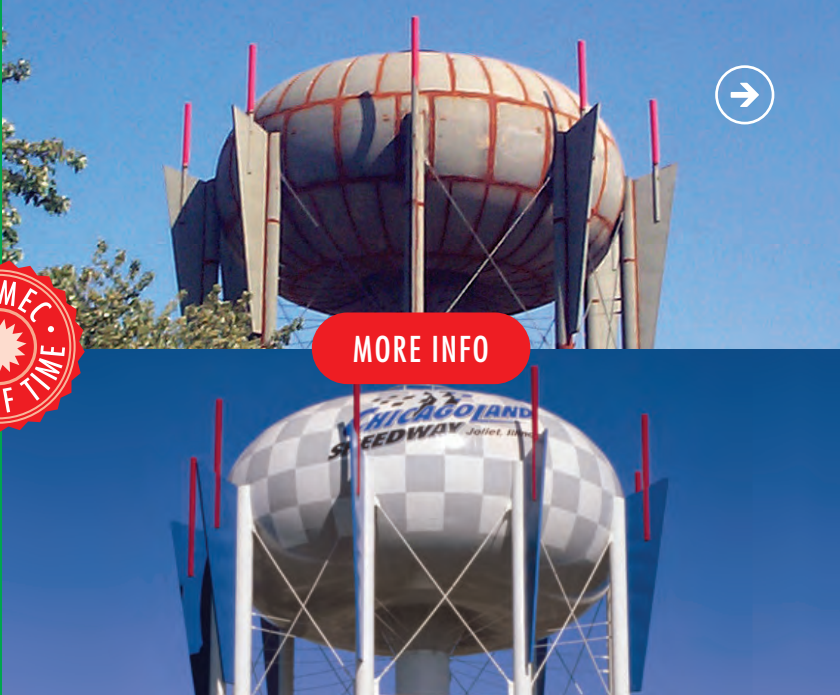
The properties of Hydro-Zinc make it an excellent choice for priming both sides of steel plates in the largest fabrication shops and for subsequent use in the field after tank erection. It is compliant throughout North America with versions featuring low hazardous air pollutant (HAP) levels and less than 100 grams per litre volatile organic compounds (VOCs).



JOLIET, IL • Adjacent to the Chicagoland Speedway and named the SPFA's Tank of the Year in 2001, this one-million-gallon water tank garnered a lot of attention after using a Tnemec coatings system. When erected in 2000, the interior and exterior steel received a spray-applied prime coat of Series 91-H₂O Hydro-Zinc, followed by a high-performance intermediate and finish coat. After two decades in service, Joliet's water tank is a long way from the finish line, still standing tall and shining high above the racetrack.



[MORE INFO](#)

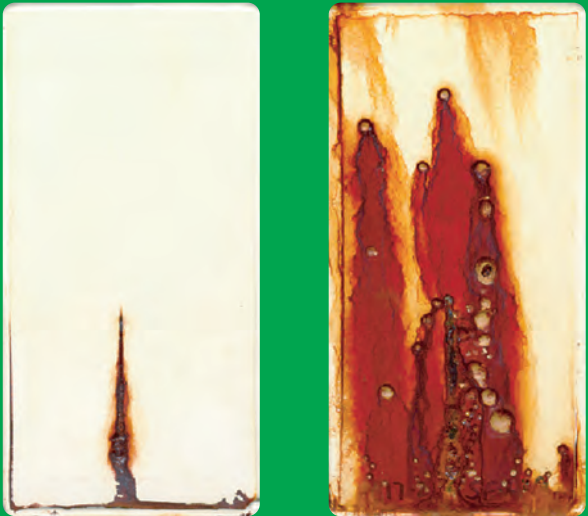


INSPECTIONS As the leading provider of coatings for water storage tanks, Tnemec has monitored field evaluations of its Hydro-Zinc primer since its first use. Divers performing inspections have described the interior surfaces as being in very good condition with coatings 99.9 to 100 percent intact². Many inspections performed more than a decade after the original applications have provided evidence that the existing coating systems have not deteriorated and continue to provide enhanced corrosion protection.

After years of evaluation and research, Hydro-Zinc was applied to its first water tank interior in 1997 and became the first zinc-rich primer to be certified in accordance with NSF/ANSI Std. 61. Since then, Hydro-Zinc primers have been applied to over 23,000 water tanks worldwide.

SALT SPRAY EXPOSURE TEST

Both panels were SSPC-SP10 abrasive blasted, coated and then placed in a salt fog cabinet (ASTM B 117). After 10,000 hours of Salt Spray (Fog) exposure, the panel primed with Tnemec's Series 91-H₂O (left panel) exhibited no failure on the plane surfaces and excellent protection at the scribe. The standard three-coat epoxy system on the right did not measure up nearly as well.



[MORE INFO](#)



ROSEMONT, IL • In need of coatings that would last after having been repainted twice in less than a decade, a high-performance Tnemec coatings system was chosen for this water tank in Rosemont, IL. In 2006, Hydro-Zinc was spray-applied to the exterior of the tank, followed by an acrylic polyurethane, then the rose design was applied with Tnemec's long-lasting fluoropolymer, HydroFlon. Protected with advanced coating technology, tanks like Rosemont will remain intact for years, even decades, with Hydro-Zinc underneath.



LOOKING FOR MORE INFORMATION ABOUT HYDRO-ZINC?

Reach out to a knowledgeable and
reliable representative near you.

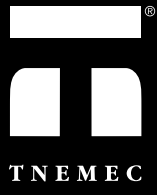
FIND REP

¹ NACE Paper No. 10673: Expected Service Life and Cost Considerations for Maintenance and New Construction Protective Coating Work.

² Huron Shore Regional Utility Authority tank maintenance inspections.

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HydroFlon



FOR A LASTING IMPRESSION

COAT WITH BRILLIANCE





**DARREE FIELDS ELEVATED STORAGE TANK —
DUBLIN, OH**

To comply with Ohio's environmental regulations for VOC content limits and to create what came to be an award-winning tank, the Darree Fields elevated storage tank utilized a low-VOC version of HydroFlon. The tank, which stands near a sports complex and features silhouettes of sports figures, was chosen as Tnemec's 2009 Tank of the Year.

COAT WITH

HYDROFLON

For a brilliant water tank to remain brilliant, it needs the highest level of protection. Whether a tank displays a city name, a high school mascot or a simple design, it should last for the long haul. For tanks to resist damaging elements and stand protected, Tnemec created HydroFlon. An advanced fluoropolymer topcoat, HydroFlon provides long-term protection that retains gloss, color and beauty. Tanks remain sources of community pride and identification for years when coated with HydroFlon.

HydroFlon, like all of Tnemec's products, is backed by unequalled support. Actively involved in the coatings industry, Tnemec coating consultants have the experience and knowledge to assist customers with customized system recommendations that ensure the best long-term results. And Tnemec's coating consultants are supported by some of the most knowledgeable technical service representatives in the industry.

right: 2013 Tnemec Tank of the Year –
Mt. Vernon, IL



HYDROFLON BENEFITS

- Unsurpassed color and gloss retention
- Excellent protection and durability
- Easy application — brush, roll or spray
- High solids and excellent coverage rates
- Avoids skips in finish common with clear coat applications
- Easy to touch-up and repair
- Available in virtually any color
- Available in gloss and semi-gloss finishes
- Product is readily available and manufactured within standard lead time
- Low-VOC formulations available



right: 2010 Thiemec Tank of the Year – Newton, KS

DURABILITY PROVEN FOR DECADES

Specified for proven durability, color options and ease of application, HydroFlon has a life expectancy that surpasses traditional polyurethane topcoats. As an added benefit, it can eliminate the need for a clear-coat, saving application time and lowering labor costs compared to the alternative 4-coat system. HydroFlon conforms to AWWA Outside Coating System No. 4 (OCS-4) by exceeding the weathering requirements of AAMA 2604. HydroFlon is also available in a low-VOC formulation that is compliant with air pollution regulations throughout the U.S. and Canada.

FIGURE 1: COLOR CHANGE (WHITE)

QUV Exposure (ASTM D4587)

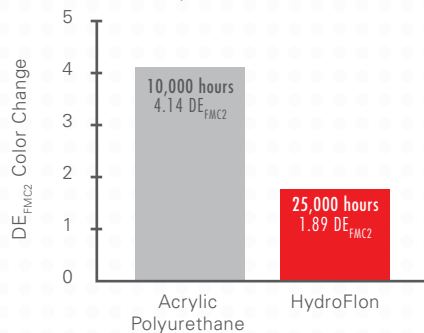


FIGURE 2: GLOSS RETENTION (WHITE)

QUV Exposure (ASTM D4587)

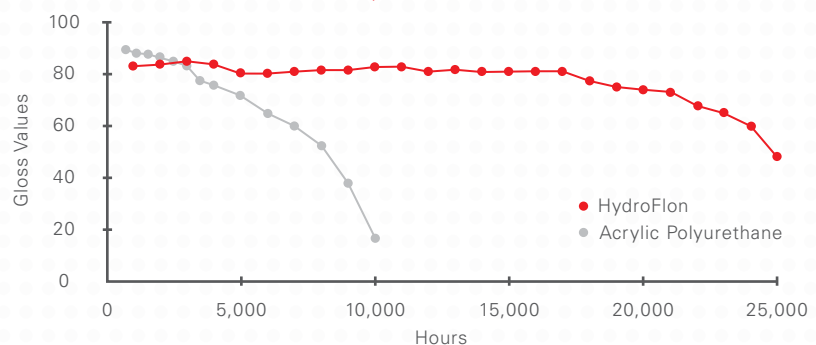


FIGURE 3: COLOR CHANGE (WHITE)

EMMAQUA Exterior Exposure (ASTM D4141)

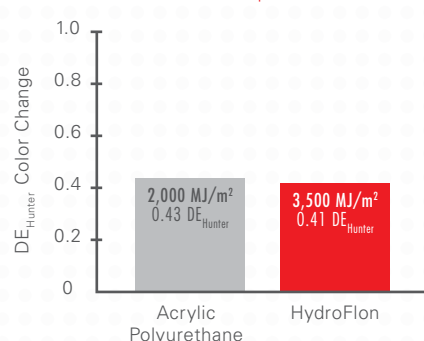
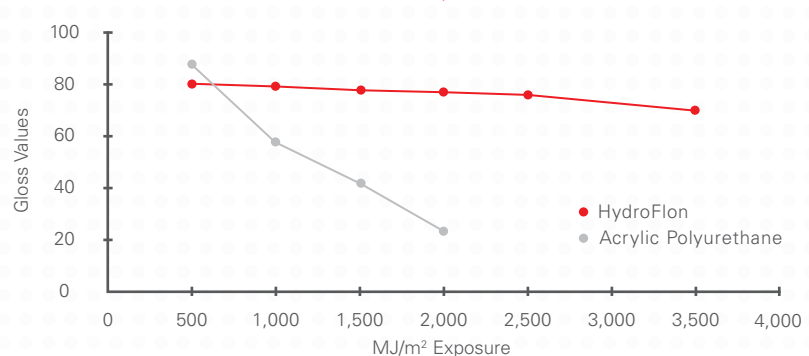


FIGURE 4: GLOSS RETENTION (WHITE)

EMMAQUA Exterior Exposure (ASTM D4141)



HYDROFLON VERSUS ACRYLIC POLYURETHANE **Figure 1** As illustrated on this graph, HydroFlon showed far less color change after accelerated QUV exposure at 25,000 hours than a standard acrylic polyurethane measured after only 10,000 hours. **Figure 2** This graph demonstrates that the gloss retention readings after 5,000 hours of QUV testing on a standard polyurethane showed a dramatic drop while, in comparison, HydroFlon showed no sign of a significant decrease until after 20,000 hours. **Figure 3** After testing for color change at 3,500 MJ/m² in accelerated EMMAQUA testing, HydroFlon showed slightly less change than a standard acrylic polyurethane after 2,000 MJ/m². **Figure 4** As demonstrated in this graph, the gloss retention of a standard acrylic polyurethane began to decrease greatly after 500 MJ/m² of EMMAQUA testing, while HydroFlon holds steady until 3,500 MJ/m² where it only begins to decrease slightly.



KAKELA WATER STORAGE TANK – KAUAI, HI

The Kakela Water Storage Tank on the tropical island of Kauai, Hawaii, continues to serve as an enduring testament for the color and gloss retention of HydroFlon. With more than 10 years of exterior weathering in tropical sunlight, hot weather, humidity and frequent rains, the HydroFlon topcoat remains intact without any visual change in color and gloss.



PROVIDENCE AT PAINTED LAKES WATER TOWER – LAKE VILLA, IL

What started as a routine recoat project for the water tank in the Village of Lake Villa, Illinois, ended up a source of pride for the entire community and the winner of Tnemec's 2008 Tank of the Year award. HydroFlon was used to preserve the high school's eagle mascot that was painted on the tank with funds raised by the booster club. The unprecedented long-term color and gloss retention of HydroFlon will ensure the eagle mascot remains high above the community.

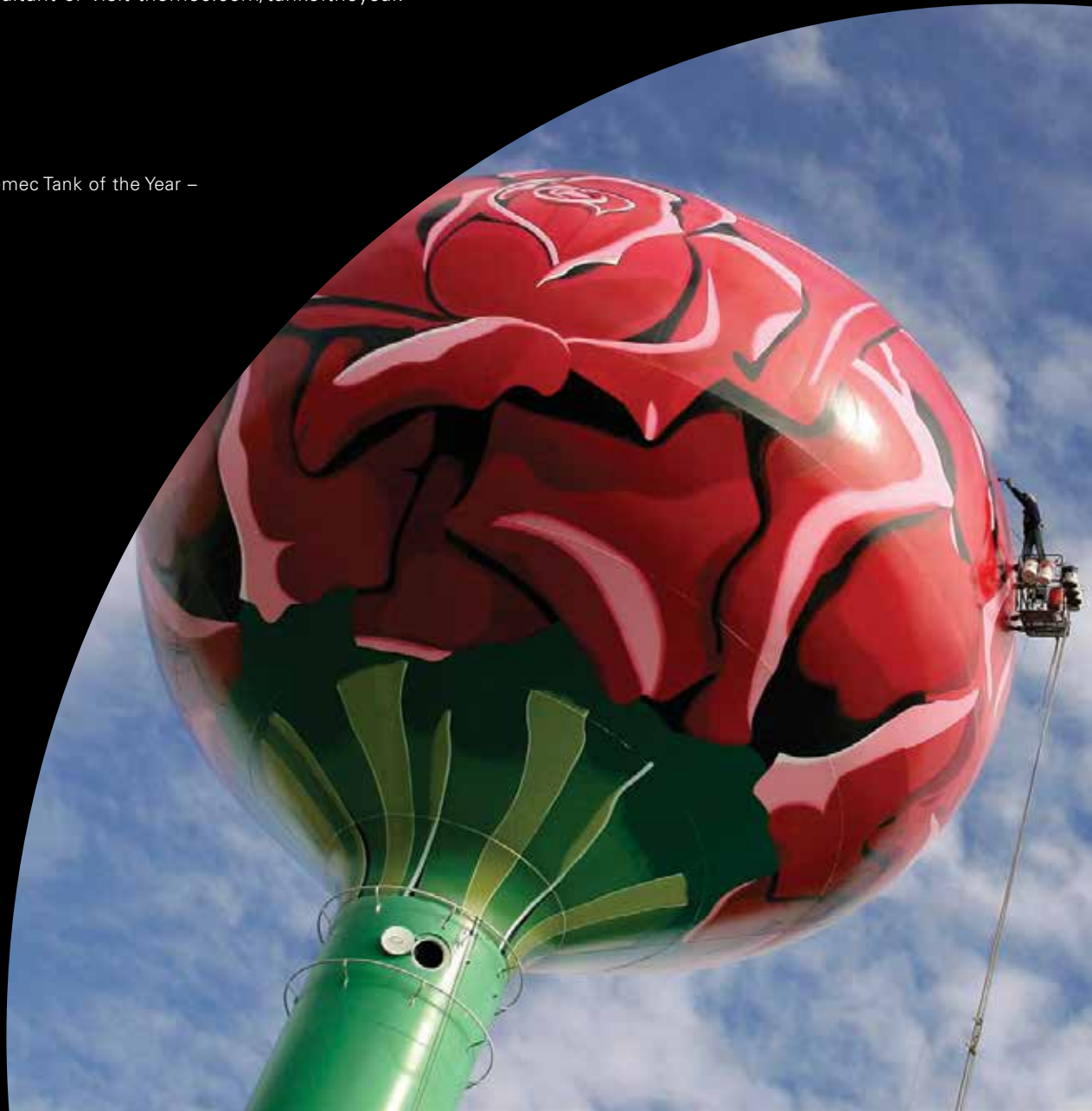


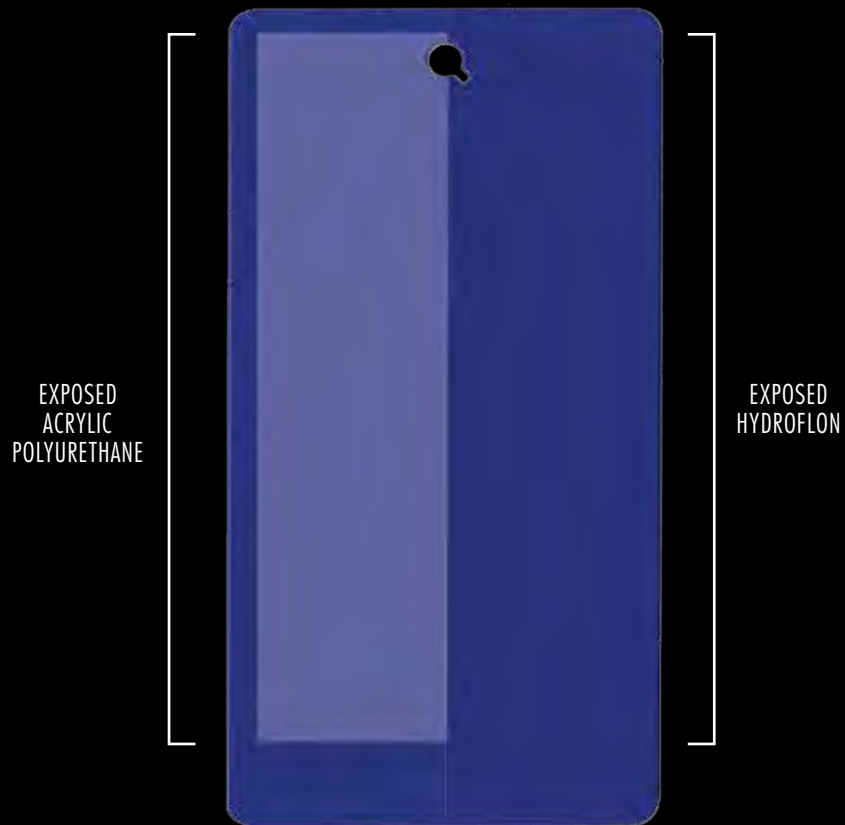
TANK OF

THE YEAR

Each year, Tnemec names a "Tank of the Year" to recognize and celebrate aesthetic, creative and innovative uses of Tnemec coatings on water storage tanks, most of which are coated with HydroFlon. New construction and renovation projects may be nominated and all tank styles are eligible for entry. Creative project teams are thinking about water tanks in a new way, and the chosen winners demonstrate the durability and beauty of Tnemec coatings. To nominate a water tank, contact your local Tnemec coatings consultant or visit tnmec.com/tankoftheyear.

right: 2006 Tnemec Tank of the Year –
Rosemont, IL





This panel demonstrates the difference in aesthetic topcoat performance between an acrylic polyurethane (left side) and Tnemec's HydroFlon (right side) after 10,000 hours of QUV testing.



INNOVATION IN EVERY COAT™

Tnemec Company Incorporated 6800 Corporate Drive Kansas City, Missouri 64120-1372 1-800-TNEMEC1 Fax: 816-483-3969 www.tnemec.com

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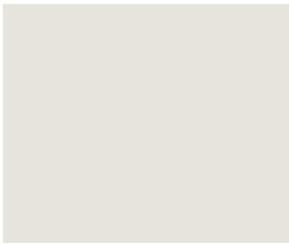
COLORBOOK



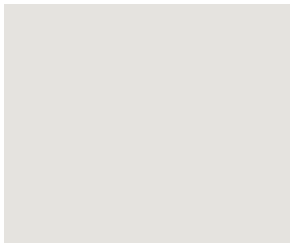
WHITES



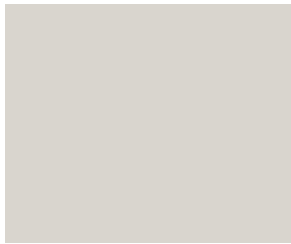
00WH Tnemec White ▲
LRV 84%



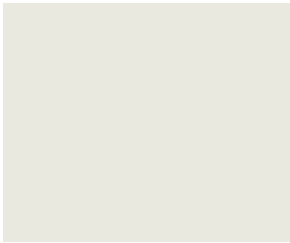
06WH Albatross ▲
LRV 82%



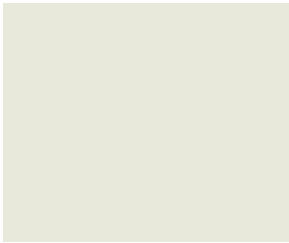
07WH Winter Mist ▲
LRV 80%



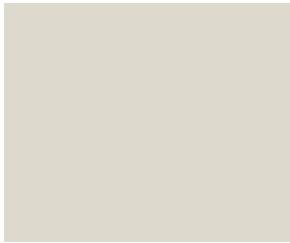
08WH Acropolis ▲
LRV 72%



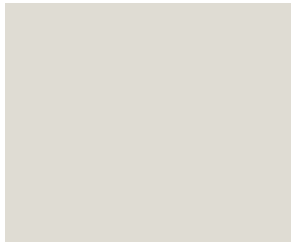
01WH Ash White ▲
LRV 84%



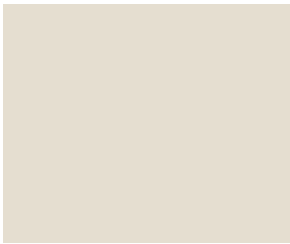
02WH Iceberg ▲
LRV 84%



03WH Daisy ▲
LRV 75%



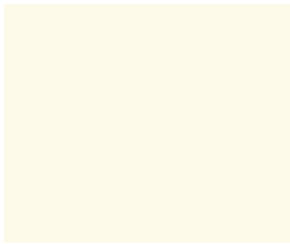
04WH Silver Pearl ▲
LRV 76%



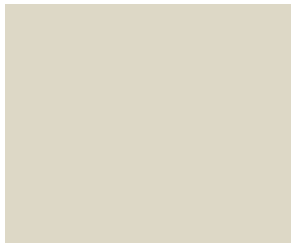
12WH Milkweed ▲
LRV 78%



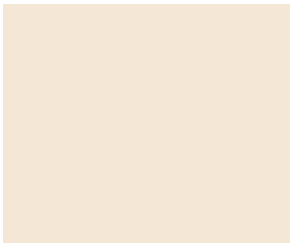
13WH French Vanilla ▲
LRV 73%



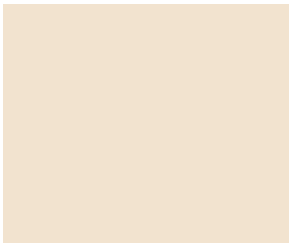
14WH Veiled ▲
LRV 78%



15WH Aspen ▲
LRV 72%



15BR Pale ▲
LRV 83%



22BR Nova ▲
LRV 81%



57BR Cloud ▲
LRV 75%

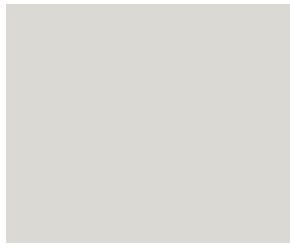


79BR Coliseum ▲
LRV 67%

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LRV = Light Reflectance Value ▲ Standard color and gloss warranty is available in this color for Fluoronor and HydroFlon products. Other colors may be included. Contact your Tnemec representative for more information.

GRAYS



30GR Comet ▲
LRV 75%



24GR Lightpole ▲
LRV 62%



43GR Constellation ▲
LRV 71%



37GR Gradation ▲
LRV 65%



25GR Grey Day ▲
LRV 46%



31GR Slate Gray ▲
LRV 61%



57GR Aluminum ▲
LRV 46%



38GR Dove Gray ▲
LRV 58%



33GR Gray – ANSI No. 61 ▲
LRV 33%



32GR Light Gray – ANSI No. 70 ▲
LRV 44%



46GR Sinkler ▲
LRV 26%



39GR Pigeon ▲
LRV 42%



35GR Black ▲
LRV 4%



34GR Deep Space ▲
LRV 12%



48GR Moon Shadow ▲
LRV 10%

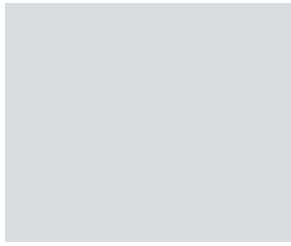


41GR Hammerhead ▲
LRV 17%

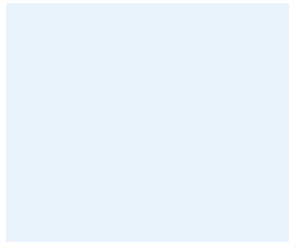
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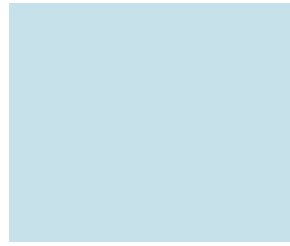
BLUES



57BL Steam ▲
LRV 76%



15BL Tank White ▲
LRV 83%



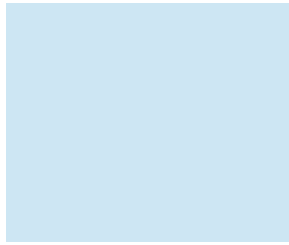
22BL Spring Rain ▲
LRV 76%



37BL Teardrop ▲
LRV 70%



59BL Seaspray ▲
LRV 55%



29BL Springwater ▲
LRV 75%



23BL Robin's Egg ▲
LRV 72%



39BL Delft Blue ▲
LRV 60%



61BL Blue Ribbon ▲
LRV 32%



09BL Cold Wind ▲
LRV 65%



25BL Fountainbleu ▲
LRV 50%



40BL Pika Blue ▲
LRV 41%



55BL Mysterious ▲
LRV 15%



11BL Canal Blue ▲
LRV 45%



26BL Clear Sky ▲
LRV 40%



41BL Lagoon ▲
LRV 24%



63BL Navy Blue ▲
LRV 9%



14BL Cadet Blue ▲
LRV 11%



28BL Pond
LRV 18%

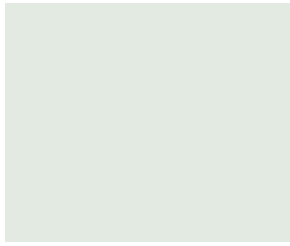


42BL Blue Channel ▲
LRV 19%

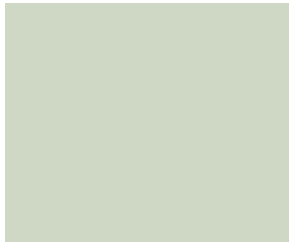
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GREENS



78GN Cumulus ▲
LRV 81%



92GN Marshall Green ▲
LRV 74%



106GN Bottle Green ▲
LRV 74%



51GN Sage ▲
LRV 72%



94GN Moonseed ▲
LRV 57%



108GN Ginger Mist ▲
LRV 58%



37GN Irish Spring ▲
LRV 71%



52GN Aztec Grass ▲
LRV 63%



96GN Zucchini ▲
LRV 27%



110GN Clover ▲
LRV 31%



10GN Aqua Sky ▲
LRV 71%



54GN Granny Smith ▲
LRV 38%



28GN Shannon's Isle ▲
LRV 13%



90GN Brahm Grass ▲
LRV 24%



13GN Mermaid ▲
LRV 29%



56GN Moss ▲
LRV 21%



21GN Fairway ▲
LRV 15%



91GN Balsam ▲
LRV 14%



14GN Bluegrass ▲
LRV 15%

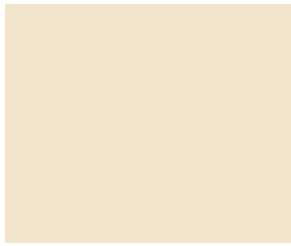


112GN Foliage ▲
LRV 11%

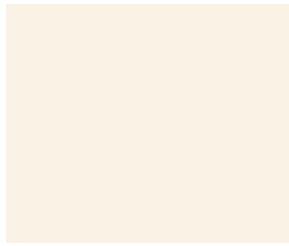
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BEIGES, TANS AND REDS



01BR Warm Sun ▲
LRV 78%



64BR Bisque ▲
LRV 82%



44BR Beige ▲
LRV 66%



10RD Barely Blush
LRV 64%



22YW Barbados ▲
LRV 72%



65BR Rock Slide ▲
LRV 67%



46BR Stable Brown ▲
LRV 46%



12RD Desert Rose
LRV 27%



03BR Washed Khaki ▲
LRV 61%



66BR Dust Bowl ▲
LRV 61%



05RD Hometown ▲
LRV 33%



14RD Red Clay ▲
LRV 14%



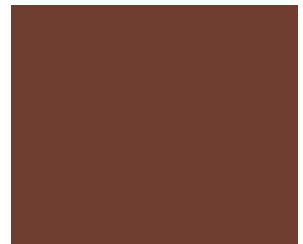
04BR Desert Sands ▲
LRV 51%



68BR Twine ▲
LRV 42%



23BR Sahara ▲
LRV 65%



07RD Terra Cotta ▲
LRV 11%



06BR Amber Canyon ▲
LRV 32%



70BR Worn Path ▲
LRV 16%



25BR Honey Roast ▲
LRV 48%

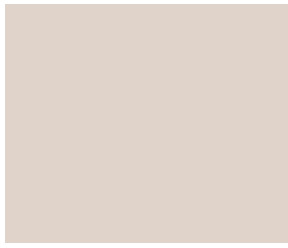


28RD Monterrey Tile
LRV 8%

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BROWNS AND YELLOWS



50RD Bare Beige ▲
LRV 74%



72BR Sand Dunes ▲
LRV 70%



01YW Sunfresh ▲
LRV 84%



08YW Lemonwater ▲
LRV 84%



81BR Lumberg ▲
LRV 49%



74BR Clay ▲
LRV 48%



03YW Oat Straw ▲
LRV 73%



10YW Flaxseed ▲
LRV 80%



83BR Kindling ▲
LRV 20%



76BR Dried Timber ▲
LRV 22%



52BR Chamois ▲
LRV 62%



11YW Daffodil
LRV 76%



85BR Medium Bronze ▲
LRV 9%



77BR Coffee Grounds ▲
LRV 12%



53BR Tiki Wood ▲
LRV 46%



12YW Corncob
LRV 72%



86BR Dark Bronze ▲
LRV 6%



84BR Weathered Bark ▲
LRV 11%



62BR Acorn ▲
LRV 22%



05YW Grapefruit ▲
LRV 59%

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BRIGHT AND SAFETY COLORS



14YW Canary Yellow
LRV 64%



04SF Tangerine Orange/Safety
LRV 29%



10SF Deep Blue Sea ▲
LRV 15%



14SF Purple Rain/Safety
LRV 17%



02SF Lemon Yellow/Safety ▲
LRV 53%



06SF Candy Apple Red/Safety ▲
LRV 14%



11SF True Blue/Safety ▲
LRV 18%



13SF Purple Mountain's Majesty
LRV 12%



03SF Bright Yellow
LRV 43%



07SF Chilean Red
LRV 9%



12SF Purple Haze ▲
LRV 8%



09SF Spearmint Green/Safety ▲
LRV 27%



05SF International Orange
LRV 17%



71RD Old Glory Red
LRV 16%



78BL Old Glory Blue
LRV 7%



08SF Hunter Green ▲
LRV 8%

NOTE: Colors represented are digital reproductions of actual standards and will vary in appearance due to differences in monitor and video card output. These digital representations should not be used to finalize color selection(s). Please contact your local Tnemec Coatings Consultant for color-accurate samples or for assistance with suitable primer and finish coat selections and color matching.

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SERIES 21 EPOXOLINE®



FULL CERTIFIED, FULLY CAPABLE HIGH-SOLIDS EPOXY COATING

The next step in the evolution of Tnemec's high-solids, epoxy linings, [Series 21 Epoxoline](#) is formulated for use on the interior and exterior of potable water tanks, pipes, pumps, valves and fittings, and is compliant with the the xylene, ethylbenzene, and toluene extraction requirements of ANSI/NSF/CAN 61/600 that will be implemented on January 1, 2023.

This two-component epoxy coating for steel and concrete substrates is formulated to offer exceptional corrosion resistance and excellent adhesion, providing the same high-performance and long service life as Tnemec's other proven potable water epoxy coatings.

Series 21 provides potable water owners and specifiers with yet another high-performance option in Tnemec's line of industry leading technologies.

FEATURES AND BENEFITS

- Meets NSF 600 extraction requirements
- Meets AWWA D102 Inside Coating Systems ICS-1, ICS-2, ICS-5 and ICS-6
- High-build properties (up to 20 mils DFT)
- High-solids formulation (82%)
- Easy airless spray application
- Superior corrosion protection
- Excellent adhesion
- Extended service life and lower life-cycle cost
- Concrete or steel applications



WE'RE READY FOR NSF 600. ARE YOU?

While this extraction criteria for xylene, ethylbenzene, and toluene is not being implemented until **January 1, 2023**, it may be beneficial to start reviewing project specifications now for any future projects. Tnemec is happy to assist in providing our customers with additional information on this standard, as well as information on other upcoming technology that will meet and exceed these new guidelines.

For more information, contact your local Tnemec representative or **visit tnemec.com/NSF600**.

(above)

SHOP-APPLIED TANK COMPONENTS Holland, Michigan

Series 21 Epoxoline was shop-applied to various structures including drive assembly sprockets and tension springs for water screens, as well as head section side plates. The coating's high film build and short recoat window improved the applicator's throughput.

THE RIGHT SYSTEM FOR YOUR PROJECT

For help determining the best coating system for your needs, contact your local Tnemec representative. Our representatives are among the most tenured and knowledgeable experts in the industry and can help you understand the benefits of specifying and applying the ideal coating system on your structures.

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