

Toledo Water Utilities
PO Box 220
860 Reservoir Lane
Toledo, OR 97391

DIVER INSPECTION REPORT

Ammon

1 MG ON-GRADE STEEL-WELDED



Summary of Contents:

Written Report with Recommendations
Repair Cost Estimates



896 E 400 S #310 | New Harmony, UT 84757 | 1-866-237-3483

INSPECTION REPORT

Ammon 1,000,000 Gallon On-Grade Steel-Welded

Dimensions: 76' Dia. x 30'H

Inspection Date: 02-26-2024

Section A-1: General

An inspection and cleaning of the ground level water tank was conducted by Advanced Diving Services Inc. on according to contract number 23-248.

The inspection was conducted by certified dive personnel. An electronic recording is included with this report to provide video documentation of the inspection and cleaning work completed.

Sec. A-1.1 Scope

Every steel water storage tank, standpipe, or reservoir should be carefully inspected prior to repair and/or repainting and at any time when leakage or some other apparent deterioration is observed. In any event, **all water tanks should be thoroughly inspected at intervals of not more than five years** (*American Water Works Association*, M42 1998, p 132).

Sec. A-1.2 Inspection Service

Advanced Diving Services Incorporated (ADS) began commercially inspecting water storage tanks in April 2000. ADS is certified in Commercial Diving, Offshore Safety & Survival, Red Cross CPR and First Aid, Hazardous Materials Incident, Response Operations, YMCA Advanced Scuba, Liquid Penetrant - Levels I & II, Magnetic Particle - Levels I & II, Ultrasonic – Levels I & II, Rope Access Technician - Level I, Chevron Riggers Endorsement and Nuclear Quality Assurance.

ADS adhere to American Water Works Association standards for inspecting and repairing water tanks, AWWA D101-53. All Dive Maintenance Technicians and associated in-tank equipment are fully disinfected according to AWWA Standard C652-92 before entering potable water. All ADS operations pertaining to Diving and Confined Space, conducted on your system follow all applicable OSHA, AWWA, and ADCI standards, procedures, and regulations (including 1910.401 thru 1910.441). All inspection personnel are fully qualified commercial dive maintenance technicians certified in ASNT Non-Destructive testing. All our repair, sealing and coating materials meet or exceed NSF 60 & 61 standards.

Sec. A-1.3 Responsibility

Advanced Diving Services (ADS) is fully licensed and insured to provide commercial diving services. ADS carries property damage and liability insurance with a combined single limit per occurrence of \$2,000,000, aggregate \$2,000,000. ADS reasonably protect the tank/reservoir owner/agent against claims arising out of the inspection or cleaning work we provide.

Sec. A-1.4 Draining of Tank

During inspection and or cleaning, reservoir water levels must be kept at or near full capacity unless noted otherwise. On the date of inspection water level was near full capacity.

Sec. A-1.5 Work Included

Inspections include field examination of the tank exterior, cleaning, and a full color video report of the tank interior conducted by certified dive personnel. Inspection work does not include repairs, except that, if vent screens, cotter pins or nut pins are found to be missing, they may be replaced at once, or reported promptly to the tank/reservoir owner/agent for replacement. No repairs were made immediately after inspection.

Section A-2: **Executive Report Summary**

Sec. A-2.1 Condition of Paint

Exterior Paint

The exterior wall coating is in fair condition. It is flaking, peeling and shows vandalism in Q2 and Q3. See images #1-16. **Recommend full exterior recoat.**

The roof coating is in fair condition. It is peeling paint and has damage from water puddling. There is some debris accumulation and bio-growth on the roof. **It is recommended to power wash the surface and provide area paint repairs.** See images #17-20.

Interior Walls

Interior walls are in fair condition with areas of coating failure. See images #32 and 35. **Recommend spot epoxy repairs.**

Interior Ceiling

Ceiling is in poor condition with condensation above the water line, deterioration present, corrosion, and blistering. See images #27-28. **Recommend interior ceiling recoat.**

Tank Floor

The tank floor is in poor condition with significant areas of corrosion nodules. See images #38-40. **Recommend immediate spot epoxy repairs.**

Sec. A-2.2 Pitting

No pitting was observed. Pitting may be found under rust nodules located on floor, walls, ceiling and interior plumbing.

Sec. A-2.3 General Tank Condition

Sanitary/Security Survey

No perimeter fence is present. Vandalism is observed in Q2 and Q3 with graffiti. Roof hatch have locking device.

Access Hatch

Access hatch is in good condition with a lock. The access hatch is missing a gasket. See image #23.

Recommend installing roof access hatch gasket to meet watertight roof standards.

Exterior Ladder

Exterior ladder is in good condition without a lock on the ladder. A ladder cage is present. See image #17. **Recommend removing exterior ladder cage and installing a locking ladder security provision as per OSHA standards. See page 21.**

Vents and Screens

The roof vent is in fair condition. See image #21.

Interior Ladder

Ladder is in fair condition with a ladder cage present. See images #24 and 29-30. **Recommend spot repair to interior ladder and removing interior ladder cage as per OSHA standards. See page 21.**

Overflow

Internal overflow is in good condition.

Interior Plumbing

The interior plumbing is in good condition with some coating failure observed. A silt stop is present. See image #34.

Anodes

None observed.

Sample Tap

No sample tap was observed at inspection. If one is not present, it is recommended to add one to meet the standard.

Manways

Interior manway is in good condition, although the gasket is in fair condition. See image #35.

Float

The water level float and assembly are in poor condition. The float has a broken line. See images #32-33. **Recommend installing a new bracket and line for float.**

Tank Turnover

The single inlet/outlet pipe configuration in this tank may not support tank turnover. Temperature reading to indicate stratification were in normal range.

Sediment

Average compacted silt and debris depth was less than 1".

Water Condition

Water condition was good with no oil present on the surface, light particulates in the water, and good visibility. The water temperature was within normal range. See pages #18-19.

Sec. A-2.4 Repair Work Performed

Cleaning/removal of sediment and loose floor debris were performed. **Confined space entry placards were installed on the exterior manway and roof access hatch. See page 15.**

Sec. A-2.5 Recommendations

See page 20 for a complete list of recommendations.

Section A-3: Inspection Details

INSPECTION AND RESERVOIR DATA

Customer Name:	Toledo Water Utilities	Reservoir Name:	Ammon
Contact Person:	Zachary Dues	Location:	Toledo, OR
Contact Phone:	541-336-2610	Type:	On-Grade
Job Number:	23-248	Material:	Steel-Welded
Inspection Date:	02-26-2024	Capacity:	1,000,000
Dive Supervisor:	Kelly Allen	Diameter:	76'
Diver:	Joe Mesa	Height:	30'
Tender:	Ethan Taylor	Floor S.F.:	4,534
Last Inspection:	n/a	Built By:	
Last Cleaned By:	n/a	Built Date:	
Weather Condition:		Courses	4

A-3a. Reservoir Condition, Safety and Sanitary Review

Applicable Industry Standard Design Criteria:

Sanitary Survey, AWWA, OSHA, and Washington State Administrative Code

1. OAR 333-061-0050(6) Finished water storage facilities – Distribution Systems.
2. AWWA Standard D-100-11 Welded Steel
3. NFPA 22
4. OSHA

Inspection Item	Standard	Pass	Fail	Notes
	1. OAR 333-061-0050(6)			Recommendation
1. Roof	(6)(J) Finished water storage facilities shall have watertight roofs. When the access manhole is on the roof there shall be a curbing around opening and a lockable watertight cover that overlaps the curbing.	PASS		
Ladder	(K) Shall have internal ladder		FAIL	Remove ladder cage and spot epoxy repair needed.
Vent Screen	(L) screened roof vent	PASS		
Overflow	(M) overflow pipe with sufficient diameter to handle the maximum flow into the tank, with outlet angle-flap valve and airgap	PASS		
Silt Stop	(N) A silt stop at outlet pipe	PASS		
Circulation	(O) If single inlet/outlet provisions shall be made to ensure an adequate exchange of water to prevent degradation of water quality	PASS		
	2. AWWA D-100-11 Standards			
Fence	Security Fence			N/A
Grade	Site Grade	PASS		
Gate	Locking Gate			N/A
Outlet	7.2.1 4" Min Silt Stop	PASS		
Overflow Screen	7.3 Overflow Screen or Flap Valve	PASS		
Support Brackets	Overflow Support Brackets	PASS		
Ladder	7.4.1 OSHA Compliant Ladder	PASS		
	7.4.2.1 Ladder at least 16" Wide Not less than 3/4" rungs 12" rung spacing	PASS		
	7.4.2.2 Outside Ladder 8' to roof min.	PASS		
Roof Railings	7.4.2.3 Roof over 2/12 slope has railings	PASS		
	7.4.2.4 Inside ladder from hatch to floor	PASS		

	Standard	Pass	Fail	Notes
	1. AWWA D- 100 continued			Recommendations
Roof Opening	7.4.3.1 A roof opening with hinged cover and hasp for locking shall be provided near outside ladder or roof ladder. The opening shall be a minimum of 24". The opening shall have a curb at least 4" high, and the cover will have a downward overlap of at least 2".	PASS		
Hatch Size	Roof Hatch Dimension	36"x36.5"		
Second Roof Opening	7.4.3.2 An additional roof opening with a removable cover having an opening dimension or diameter of at least 20" and a 4" minimum height neck shall be provided at or near the center of the tank. The opening may be used as a vent opening, provided the vent is removable.	PASS		
Manways	7.4.4 Two shell manholes shall be provided in the first ring of the tank shell. If any access cover weighs more than 50 lbs., a hinge or davit shall be provided. At least one manhole shall be circular with a minimum diameter of 30".	PASS		
Roof Vent(s)	7.5 Tanks equipped with roofs shall have a vent with a capacity to pass air so that the maximum flow rate of water, either entering or leaving the tank, excessive pressure will not be developed. The overflow pipe shall not be considered a tank vent.	PASS		35"x31"
	7.5.1 At least one vent shall be located near the center of the tank.	PASS		
	7.5.2 The vent shall be designed and constructed to prevent the entrance of birds or animals.	PASS		
	EPA Region 8 Standards			
Roof Vent(s)	Downturned vent opening shall be at least 24" above the horizontal roof surface.			N/A
	Not having a #24 mesh vent screen triggers a significant deficiency.	PASS		
	Buried or Semi-buried tanks must have downturned vents.			N/A
	Elevated tank vent screens must be a minimum of 8" above roof surface	PASS		
	Chimney vents must have a hood to cover that extends down to cover the screen.	PASS		

Other Considerations

Item	Standard	Pass	Fail	Notes
Documentation	Photos or video taken If no, why not?	PASS		Photo and Video Documentation
Contamination	Contamination in the tank (e.g., floating debris, insects, other animal contamination, roots etc.)?	PASS		
Water	Water turbid, discolored, stale or foul?	PASS		
	Is stored water routinely turned over (standpipe with valves or mechanical mixer), even in times of low demand?	PASS		
Cathodic	Cathodic protection functioning appropriately? (Missing anodes, tank corrosion present)			None observed.
Interior Coating	Interior coating: blistering, peeling, scaling, rusting, any irregularities or other failure?		FAIL	Corrosion present. Full recoat recommended.
Exterior coating	Exterior coating: blistering, peeling, scaling, rusting, any irregularities, or other failure?		FAIL	Corrosion present. Full recoat recommended.
Sidewalls	Structural deficiencies, any irregularities or other failure?	PASS		
Interior roof	Structural deficiencies, any irregularities or other failure?		FAIL	Corrosion present. Full interior recoat recommended.
Interior roof hatch	Structural deficiencies, any irregularities or other failure?	PASS		Install gasket.
Tank Floor	Floor corrosion or any structural deficiencies or irregularities?	PASS		Corrosion present. Epoxy repairs recommended.
Floor Sediment	Type and depth of floor sediment Was sediment before cleaning over ¼” (effective depth of chlorine penetration)?		FAIL	1” removed with cleaning
Tank Penetrations	Tank penetrations (joints, gaskets), as seen from interior, adequately sealed?	PASS		
Watertight roof	When viewed from inside the tank, is there visible daylight around the hatches, vents, joints, or other fixtures? If yes, document location where light can be observed.	PASS		
	2. Standard NFPA 22			
Ventilation	Is there adequate ventilation as defined by NFPA with ventilation 1 ½ times the greater capacity of the inlet or outlet.	PASS		
Inlet Size	Inlet pipe diameter			10”
Outlet Size	Outlet pipe diameter			10”
Roof Vent Size	Roof Vent diameter			35”x31”
	3. Misc. OSHA Standards			
Confined Space	Are confined space entry placards in place on or near reservoir access points?	PASS		Placards installed.
Ladder Cage	Are ladder cage(s) present?	PASS		Recommend removal of ladder cage per OSHA standards. See page 22.
Fall arrest	Are personal fall arrest systems in place?	PASS		
Access	Are locking ladder gate(s) present?		FAIL	No locking device observed.
Other	Any other concerns?			



(#1) Exterior Coating Condition #1



(#4) Exterior Coating Condition #2



(#2) Manway and Exterior Coating Condition #1



(#5) Exterior Coating Condition #3



(#3) Manway and Exterior Coating Condition #2



(#6) Exterior Coating Condition #4



(#7) Exterior Coating Condition #5



(#10) Exterior Coating Condition #8



(#8) Exterior Coating Condition #6



(#11) Exterior Coating Condition #9



(#9) Exterior Coating Condition #7



(#12) Exterior Coating Condition #10



(#13) Exterior Coating Condition #11



(#16) Exterior Coating Condition #14



(#14) Exterior Coating Condition #12



(#17) Exterior Ladder and Ladder Cage, Roof Penetrations, Roof Access Hatch, Exterior Electrical, and Roof Coating Condition



(#15) Exterior Coating Condition #13



(#18) Roof Coating Condition #1



(#19) Roof Coating Condition #2



(#22) Roof Access Hatch and Lock



(#20) Roof Coating Condition #3



(#23) Roof Access Hatch Missing Gasket



(#21) Roof Vent



(#24) Roof Access Hatch Interior and Interior Ladder with Ladder Cage



(#25) Interior Ladder Above the Water Line #1



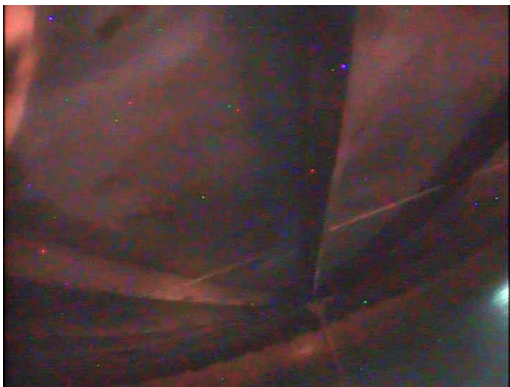
(#28) Ceiling #2



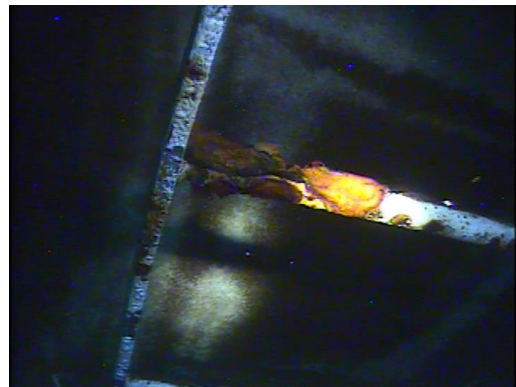
(#26) Interior Ladder Above the Water Line #2



(#29) Interior Ladder Cage



(#27) Ceiling #1



(#30) Interior Ladder Corrosion



(#31) Interior Ladder Base and Floor Nodules



(#34) Inlet/Outlet with Silt Stop



(#32) Float and Wires



(#35) Interior Manway



(#33) Float and Wire Guides Broken at Floor Attachment



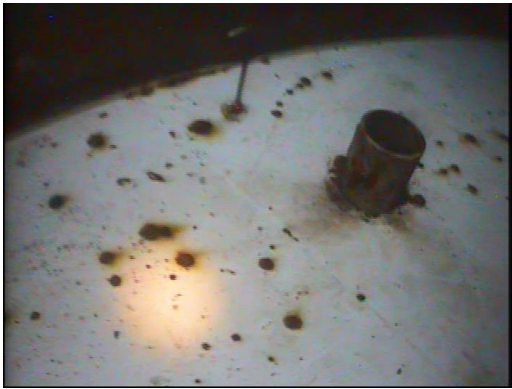
(#36) Overflow Pipe



(#37) Overflow Bell



(#40) Floor Condition Q4



(#38) Floor Condition Q1



(#41) Floor Cleaning #1



(#39) Floor Condition Q3



(#42) Floor Cleaning #2

Repairs Performed



(#43) Before Confined Space Entry Placard Installed on Manway



(#46) After Confined Space Entry Placard Installed on Roof Access Hatch



(#44) After Confined Space Entry Placard Installed on Manway



(#45) Before Confined Space Entry Placard Installed on Roof Access Hatch
















Corrosion Evaluation

The tank interior showed heavy corrosion. Corrosion density was between 3 and 4 on the ASTM standard rating chart.

The interior ceiling beams showed very heavy corrosion. Corrosion density was between 3 and 4 on the ASTM standard rating chart.

The interior floor showed heavy corrosion. Corrosion density was between 3 and 4 on the ASTM standard rating chart.

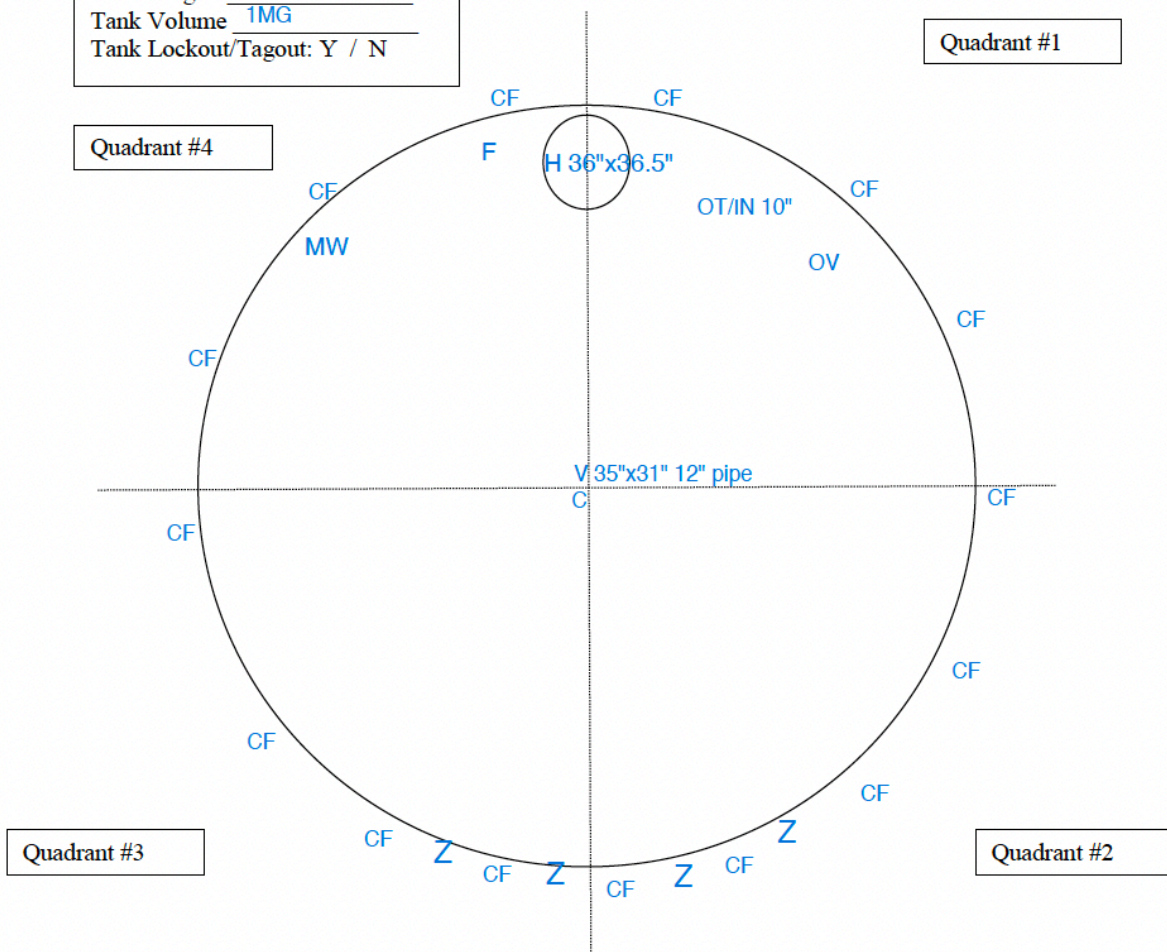
The depth of corrosion was not measured.

STANDARD RATING CHART FOR PITS			
	A	B	C
	Density	Size	Depth
1	 $2.5 \times 10^3/m^2$	 0.5 mm ²	 0.4 mm
2	 $1 \times 10^4/m^2$	 2.0 mm ²	 0.8 mm
3	 $5 \times 10^4/m^2$	 8.0 mm ²	 1.6 mm
4	 $1 \times 10^5/m^2$	 12.5 mm ²	 3.2 mm
5	 $5 \times 10^5/m^2$	 24.5 mm ²	 6.4 mm

Source: ASTM, G 46, Fig. 2 (2000 Edition). Reprinted, with permission, copyright ASTM.

Tank Interior Sketch

Tank Diagram
 Tank Name: Ammon
 Tank Diameter: 76'
 Tank Height: 30'
 Tank Volume 1MG
 Tank Lockout/Tagout: Y / N

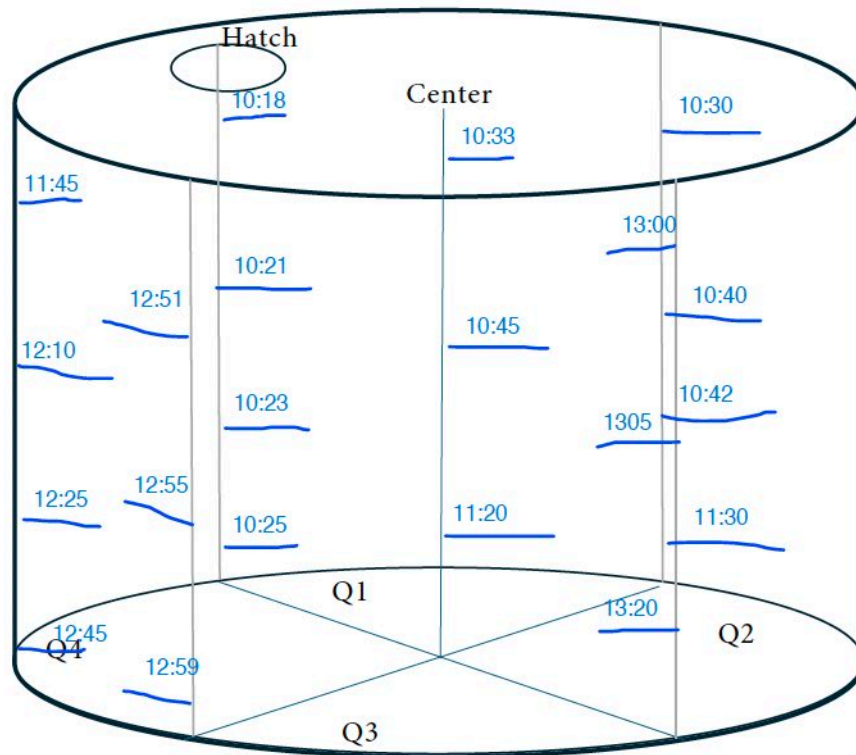


- Mark the location and size of:**
- | | |
|--|--|
| 1. V = Roof Vents <u>DIAMETER NEEDED</u> | 10. ST = Sampling Tap |
| 2. IN = Inlet (s) <u>DIAMETER NEEDED</u> | 11. MW = Manway Access Hatch (s) |
| 3. OT = Outlet (s) <u>DIAMETER NEEDED</u> | 12. OP = Other pipe penetrations |
| 4. D = Drain <u>DIAMETER NEEDED</u> | 13. Z = Vandalism |
| 5. C = Support Columns | 14. CF = Exterior Coating Failure Area(s) |
| 6. OV = Overflow Pipe | 15. IF = Interior Coating Failure Area(s) |
| 7. F = Float | 16. RN = Significant Rust Nodules |
| 8. CP = Cathodic Protection | 17. H = Second Roof Access Hatch <u>DIA. NEEDED</u> |
| 9. D = Tank Debris | 18. L = Leak in tank |

ADS, Inspection Report, p. 2

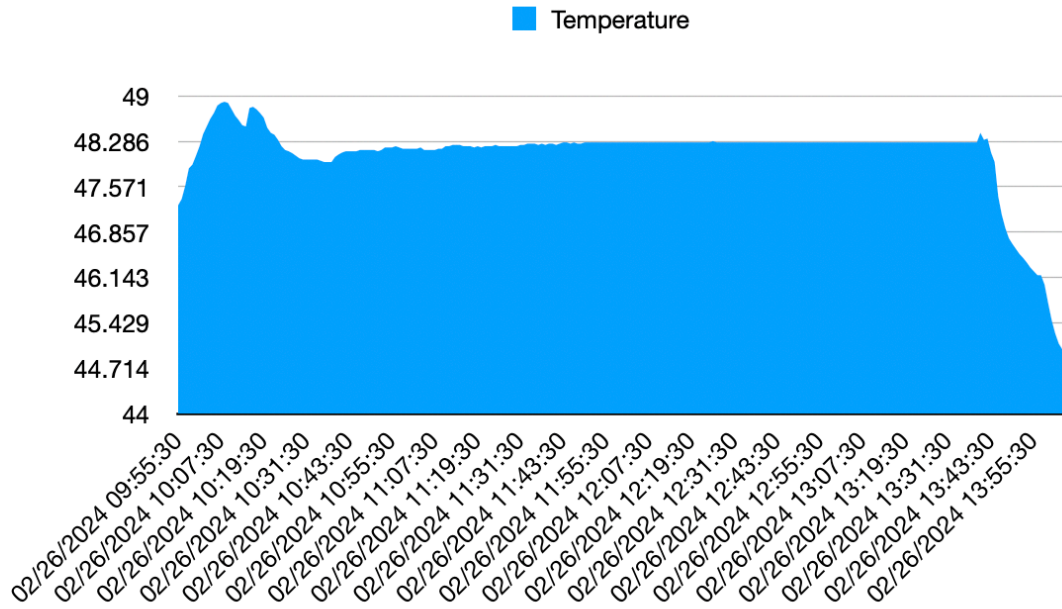
Tank Temperature Timeline Sketch, Graph, and Recommendations

Tank Inspection Time and Temperature Readings Path Diagram



Tank Ammon

Inspection Date 02/26/2024



Temperature Variation:

An indicator of Tank Turnover, Tank Damage Risk, and Water Quality

During the inspection, the tank interior temperature ranged from 48.91 degrees Fahrenheit to 44.93 degrees Fahrenheit. This is a 4-degree temperature variation in the tank. Normal temperature variation is within 10 degrees.

Conclusion and Recommendations

Tank Condition

EXTERIOR: FAIR

INTERIOR: FAIR

Recommendations

Immediate

1. Recommend removing exterior ladder cage and installing a locking ladder security provision as per OSHA standards. See page 21.
2. Recommend spot repair to interior ladder and removing interior ladder cage as per OSHA standards. See page 21.
3. Recommend power washing exterior.
4. Recommend area paint repairs to damaged areas of exterior roof.
5. Recommend installing roof access hatch gasket.
6. Recommend installing a new bracket and guide wires for interior float.
7. Interior floor and ceiling costing area repairs.

Special notes:

Recommend full exterior recoat in the next 3-5 years.

Ongoing Maintenance

- Inspection and cleaning every 3-5 years.

IMMEDIATE REPAIR

1 Remove exterior ladder cage.	1 days	1	\$3,120.00	\$3,120.00
Install locking ladder gate	1 day	1	\$4,560.00	\$4,560.00
Install ladder fall arrest system	1 day	1	\$4,560.00	\$4,560.00
2 Remove interior ladder cage	1 day	1	\$3,550.00	\$3,550.00
spot epoxy repairs to interior ladder				
3 power wash exterior	2 days	1	\$7,120.00	\$7,120.00
4 coating repairs to roof	1 day	1	\$5,280.00	\$5,280.00
5 Roof access gasket	1 day	1	\$238.00	\$238.00
6 Replace float guide wires and anchor	1 day	1	\$3,480.00	\$3,480.00
7 Interior area coating epoxy repairs	15 days	15	\$4,520.00	\$67,800.00
Total Repair Estimate				\$99,708.00

NOT-IMMEDIATE



Talk to a Fall Protection
Compliance Expert:
1-800-504-4016

New OSHA Regs and Ladder Cages

fallprotect.com/techtalk/new-osha-regs-and-ladder-cages

The new OSHA General Industry fall protection regulations that went into effect in 2017 are prompting a slew of questions on fixed ladders. If you are wondering when a fixed ladder requires fall protection, which forms of ladder fall protection are OSHA compliant, or if ladder cages still comply with OSHA's revised ruling, we have just the post for you....

If you carefully examine the new ruling, you'll note that OSHA 1910.28(b)(9) requires General Industry employers to provide fall protection on fixed ladders more than 24' above a lower level. This new requirement is important for a number of reasons. For starters, prior to the new ruling, the only real guidance on fixed ladders came from the Construction Standards— OSHA more (1926.1053(a)(18) required the use of cages, wells, ladder safety devices, or self-retracting lifelines for fixed ladders of 24 feet or more. OSHA's new ruling was designed, in part, to create more uniformity between the General Industry and Construction standards. That said, the revised ruling also breaks new ground by creating a framework to phase out the use of ladder wells and cages.

From a best practices standpoint, we have never been fans of ladder cages because they don't arrest falls. You can strike your head during a fall, lose consciousness, and create an extremely difficult rescue scenario for first responders. There are also cases of gruesome entanglements where falling workers tear off body parts during a rapid, uncontrolled descent.

The revised ruling establishes a phase out of ladder wells and cages over the next 20 years per OSHA 1910.128(b)(9)(i). Here are the implementation details:

- For caged, fixed ladders erected before November 19, 2018, employers have up to 20 years to install ladder safety or personal fall arrest systems (1910.28(b)(9)(i)(A))
- For new fixed ladders erected on or after November 19, 2018, the employer must equip the ladder with a ladder safety or personal fall arrest system (1910.28(b)(9)(i)(B))
- For ladder repairs and replacements, when an employer replaces any portion of a fixed ladder, the replacement must be equipped with a ladder safety or personal fall arrest system (1910.28(b)(9)(i)(C))
- After November 18, 2036 all fixed ladders must be equipped with a ladder safety or personal fall arrest system (1910.28(b)(9)(i)(D))

Important Note: The revised ruling doesn't require removal of ladder cages and wells prior to the final deadline (as long as their presence doesn't interfere with the use of a ladder safety system or personal fall arrest system), but stipulates after the phase-out period, alternative forms of ladder fall protection are required to ensure compliance.

We dedicated this post to a discussion of how the new OSHA regulations effect fixed ladder fall protection options, but the revised [Walking-Working Surfaces Ruling](#) is over 500 pages in length and covers a wide range of additional topics relating to ladders. If you are looking for a [summary](#) of the new fall protection regulations, we suggest downloading our [e-book](#) on this subject, or [contact the safety professionals at Diversified Fall Protection](#) for further assistance.

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All surface and underwater repairs and recommendations, except sandblasting, can be performed by Advanced Diving Services, Inc. with the reservoir remaining in service.

ADVANCED DIVING SERVICES, INC. ®



James M. Nilsson, Director