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Colin Chatfield and Ashlea Keith
PIONEER WATER TANKS AMERICA

NFPA 22-18 Section 1.4 Equivalency Compliance Review
PIONEER Azevedo, 12110 East Jahant Road, Acampo, CA 95220

Pioneer Water Tanks America has requested review and comparison with the Section 1.4 Equivalency requirements of NFPA 22-18, National Fire Protection Association Standard for Water Tanks for Private Protection, acceptability for the subject project.

This tank is a Pioneer Galaxy Tank which is manufactured and fabricated in Australia, then assembled on site. The installation of the proposed tank is intended to be installed as described in NFPA 22-18 Section 1.1

1.1 Scope. This standard provides the minimum requirements for the design, construction, installation, and maintenance of tanks and accessory equipment that supply water for private fire protection, including the following:

- (1) Gravity tanks, section tanks, pressure tanks, and embankment-supported coated fabric suction tanks
- (2) Towers
- (3) Foundations
- (4) Pipe connections and fittings
- (5) Valve enclosures
- (6) Tank filling
- (7) Protection against freezing

This review is limited to the gravity tank, tank shell, openings, access ladder and connections at the tank shell, and includes:

- Steel shell and roof.
- Roof access opening installation and the access ladder.
- Water level gauge installation.
- Venting and overflow installation.
- Inlet nozzle and Outlet nozzle with anti-vortex shell installations.

All of the NFPA 22-18 requirements that are not directly connected to or are a part of the tank shell or foundation are not included in this review. The tank Owner will provide items to comply with NFPA 22-18 and includes:

- Fire department access
- Water sourcing for the Tank
- Siting for the Tank
- Valve enclosures and exterior piping connected to the Tank
- Sumps and associated pumps
- Inspections to comply with NFPA 22-18

This installation does not include a tower. The tank is understood to be installed at a location that does not require protection against freezing.

The construction, installation and details do not exactly comply with NFPA 22-18 Chapter 6 Factory Coated Bolted Steel Tanks. This review is to demonstrate compliance with NFPA 22-18 Section 1.4:

1.4 Equivalency. Nothing in this standard is intended to prevent the use of systems, methods, or devices of equivalent or superior quality ***strength, fire resistance, effectiveness, durability, and safety*** over those prescribed by this standard.

The tank is a factory coated steel tank used to store water for fire protection to the site. The Pioneer Water Tanks comply with the Australian standard "AS 2304-2100 Water Storage Tanks for Fire Protection Systems". Pioneer Water Tanks are bolted steel tank shell that supports and contain the contents with a fabric lining. The tank does not have a traditional integrated metal bottom that can allow the water from escaping the bottom like other factory coated bolted steel tanks.

Pioneer Water Tanks are similar to the design and function to all other commercially available types of bolted steel tanks. Pioneer Tanks are designed to meet all the water quality standards per NSF61, potable water designation and Australian Standard AS4020.

The tank has the intended NFPA 22-18 pipe connections and fittings:

- As discussed by NFPA 22-18 Section 7.2.2 the tank is provided discharge piping provisions as intended along with any required anti-vortex plate assembly as described by NFPA 22-18 Section 14.2.13.
- As discussed by NFPA 22-18 Section 7.2.3 the tank is provided filling piping provisions as intended.
- As discussed by NFPA 22-18 Section 7.2.5.1 intent the tank is provided water-level gauge with a polyethylene float for visual indication the exterior of the tank.

The Tank has the intended NFPA 22-18 required strength:

- The Tank has the strength to meet the strength requirements of NFPA 22-18.
- Steel shell, roof and foundation ringwall have been reviewed by a California Structural Engineer for compliance with the requirements of the 2019 California Building Code, ASCE 7-16 and AWWA D103-09 which governs the structural response to gravity, wind and seismic ground motion.

The Tank has the intended NFPA 22-18 required fire resistance:

- The Owner shall provide clearance from combustible buildings or surroundings that meets or exceeds the NFPA 22-18 requirements.
- A reinforced concrete ringwall footing supports the tank shell.
- The tank shell panels are made of a non-combustible metal coated Zinalume ®. Zinalume ® is a metallic coated sheet steel offering two to four times the corrosion resistance of galvanized steel as noted in NFPA 22-18 Section 4.4.
- The tank roof panels are made of a non-combustible metal call Zinalume ®. Zinalume ® is a metallic coated sheet steel offering two to four times the corrosion resistance of galvanized steel as noted in NFPA 22-18 Section 4.4.
- Zinalume ® has a high resistance to high operating temperatures and no additional fire resistance coating or application is being provided.
- Tank bolts are hot galvanized steel.

The Tank has the intended NFPA 22-18 required durability:

- The steel shell panels have vertical joints that are bolted with hot dipped galvanized steel bolts, provided by fabricator, to a C-Section wind girt which provided for the shell connection as well as the overturning resistance collector that is anchored to the reinforced concrete ringwall footing. The bolts are provided a metal material covering to prevent tampering.
- The steel shell panels have horizontal joints that are bolted with hot dipped galvanized steel bolts, provided by the fabricator. The bolts are provided a plastic material covering to prevent tampering.
- As required by NFPA 22-18 Section 6.1.3.1 the tank is cylindrical.
- As required by NFPA 22-18 Section 6.1.3.2 the tank shell is field bolted.
- As required by NFPA 22-18 Section 6.1.3.3 the coating of the shell panels is factory provided.

The Tank has the intended NFPA 22-18 required quality:

- The steel tank shell supports and contain a proprietary liquid tight Aqualiner membrane liner. The liner consists of 5 layers of materials that are permanently bonded together.

- The steel tank shell liner is a polyethylene liner that is UV stabilized, resistant to mild acids, alkalis and other chemicals, which is manufactured in Australia.
- The steel tank shell liner is attached to the top hoop of the shell by TEK ® screws, provided by the manufacturer. The connection to the steel shell with a condensation strip over the screws and a superseal between the top of the shell and the roof sheets.
- The steel tank shell liner has been approved by NSF/ANSI Standard 61, Certificate 3A240-02
- The Aqualiner membrane steel tank shell liner has a thickness of 0.60 mm and is designed to operate in a temperature range of -22 degrees Fahrenheit to 158 degrees Fahrenheit.
- All shell suction penetrations are provided an internal anti-vortex fitting that prevents the liner from being pulled into the pipe opening.
- As required by NFPA 22-18 Section 4.7.1.2 describes warranty the manufacturer provides.

The Tank has the intended NFPA 22-18 required safety:

- As required by NFPA 22-18 Section 8.7.5.1 the tank is provided a roof hatch.
- As required by NFPA 22-18 Sections 8.7.7 and 4.12.5.1 intent the tank is provided a ladder to access the roof.
- As discussed by NFPA 22-18 Section 7.2.5.1 intent the tank is provided water-level gauge with a polyethylene float for visual indication the exterior of the tank.
- The tank is designed to meet all water quality standards per NSF 61, potable water designation, and Australian Standard AS4020.

As noted previously, the tank is understood to be installed at a location that does not require protection against freezing.

Upon completion of the tank installation, the tank will require an internal and external inspection by the Owner, that meets the intent of the tank test and inspection process of NFPA 22-18 Section 4.5.2, 4.7.2, 17.4 and 17.11.

- Included in the inspection process will include the liner for any damage by the Tank Manufacturer.
- Correct placement and fold placement, any observed tight spots and leakage by the Tank Manufacturer.
- As required by NFPA 22-18 Section 17.1.1.1 the authority having jurisdiction shall be notified by Owner as to the time and place of the inspection/inspections.
- As required by NFPA 22-18 Section 17.1.2 written reports of completed equipment inspection shall be provided by the Owner.
- As required by NFPA 22-18 Section 17.4 the tank shall be tested by filling it with water, and any detected leaks shall be repaired in accordance with AWWA D103 requirements.

Based upon the information provided and presented, this tank is equivalent to the specifics or intent of the requirements of NFPA 22-18 as described and outlined in NFPA 22-18 Section 1.4 Equivalency.

The right to amend, modify or expand on the information presented as information becomes available.

Please contact me at your earliest convenience with any questions or if I may be of further assistance.

Thank you very much and respectfully submitted.
SESOL, Inc.



Williston L. Warren, IV - S.E., F,SEAOC
Principal

www.linkedin.com/in/WillistonLWarrenIVSE

2017-2018 President of the National Council of Structural Engineering Associations (NCSEA)
2009-2010 President of the Structural Engineer's Association of California (SEAOC)
2008-present Member of the Code Advisory Steering Committee of the National Council of Structural Engineering Associations (NCSEA) Code Advisory Committee
2008-present Chair of the Evaluation Services Sub-Committee (ES-CAC) of the National Council of Structural Engineering Associations (NCSEA) Code Advisory Committee
2011-2017 Member of the Structural Engineering Technical Advisory Committee (SE-TAC) of the State of California Board for Professional Engineers, Land Surveyors and Geologists (PELSG)

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