

Sodium Hypochlorite Tank, TK-J500A Inspection



Inspection Date: **October 4, 2018**

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Revision: **1**

Introduction

Structural Composite Technologies Ltd. conducted an inspection at the City of Winnipeg Drinking Water Treatment Plant located at Deacon's Corner, Dugald, MB. The inspection was for the Sodium Hypochlorite TK-J500A NW Tank, which has no record of inspection on SCT's inspection log.

TK-J500A is used to store 0.8% sodium hypochlorite solution. It was built in November 2007. Tank diameter is 13'-6" and height is 29'-5". Corrosion liner and main structure layer is made from AOC F010 vinyl ester resin and the outer layer is made from AOC K022 vinyl ester fire retardant resin pigmented silver gray. Corrosion layer laminate is consisting of 2 layers of synthetic veil (Nexus®) and 2 layers of 1.5 oz. mat.

The inspection was conducted visually and no other technical testing was conducted. All the observations and recommendations set forth on this inspection report were based solely on the visual inspection conducted on the tank.

Please see the following narrative, photos and drawing(s) for the details of this inspection.

General Observations

The tank was out of service at the time of inspection. It was located inside a building. The tank was cleaned out to facilitate inspection but there are some residues of the chemical contents present in the tank but these were deemed neutralized.

Tank Lid (inside) – appears to be in good condition as it is not in direct contact with the tank contents.

Tank Wall (inside) – corrosion liner is almost gone as characterized by the dryness and roughness of the wall surface (see photos).

Tank Floor (inside) – same condition as the tank wall – corrosion liner is almost gone (see photos).

Tank Appurtenances (inside) – most of the piping and flanges on the tank inside requires to be relined as well (the areas that have contact with the contents of the tank) - Downpipe with brackets and a few nozzles.

Tank (outside) Overall – overall the external features of the tank (lid and wall) appears to be in good condition:

1. There was no sign of leaking nor cracks from the tank;
2. Flanges don't have any sign of cracks nor leaks;
3. No significant corrosion observed on the flange fasteners, lugs and other metal parts on the tank.

Repair Recommendations

The inside tank wall, floor and affected appurtenances should be repaired to the following recommendations:

MATERIALS OF CONSTRUCTION

- **RESIN AND ADDITIVES:**
 - **Resin:** Recommended resin to be used to satisfy the requirement for a potable water application will be **AOC VIPEL F010-H2O**.
 - **Resin Promoter:** In order to satisfy the chemical resistance and the requirement for a potable water application, the resin should be promoted using **N,N-Dimethyl Aniline (DMA)**.
 - **Catalyst:** Required catalyst to be used during relining is **Dibenzoyl Peroxide (BPO)**.
 - **Paraffin Wax:** A paraffin wax additive shall be added to the final gel-coat resin only. Acceptable wax additive is **Air Dry 2905**.
- **SURFACING VEIL AND GLASS REINFORCEMENTS:**
 - **Veil:** **2 plies of Nexus® synthetic glass veil** is required for this application.
 - **Chopped Strand Mat:** **2 plies of 1.5 oz/ft² chopped strand mat (CSM)** shall be used in conjunction with the surfacing veil.

GENERAL WORKSITE REQUIREMENTS

1. Resin should not be promoted at the repair location. This should be done at the fabrication shop. Promoters and catalyst cannot be in contact with each other as this may create a fire hazard at site.
2. The resin temperature should be maintained (as much as possible) between 13°C and 35°C at the time of relining. Care should be observed in catalyzing the resin following the anticipated environmental conditions at the job site.
3. The tank and the work area's condition shall be evaluated before starting the lamination process. There cannot be any moisture on all the surfaces to be relined as this will impede a good adhesion of the new corrosion liner and will cause a lot of rework after. It is

recommended that the surface is also between 13°C and 35°C to achieve a good laminate bond. If working in cold condition, it is required to have a heater to keep the environment conducive for the lamination process.

4. An internal access scaffold shall be erected on the inside of the tank to gain access of the tank internal wall – top all the way to the bottom.
5. The scaffold will be dismantled when all the wall laminate is completed c/w final flood coat.

SURFACE PREPARATION REQUIREMENTS

1. All internal surfaces with the exception of the lid shall be abrasive blasted to expose the substrate of the tank structure.
2. Blast cleaned surface finish is defined as a surface with gray-white color slightly roughened to form a suitable anchor pattern for re-lining.
3. The blasted surface shall be free of all dirt, oil, grease, or any other foreign matter.
4. After blasting, all abrasive and dust shall be removed from the surfaces to be laminated by brushing, vacuuming or some other suitable means.
5. It may be necessary to use a grinder on some other areas that are not accessible during abrasive blasting i.e. scaffold base posts etc.
6. After blasting, any remaining significant pits or crevices >1/16" deep shall be filled with catalyzed filler putty to provide a smooth laminating surface.

FIELD LAMINATION PROCEDURES

1. Laminate application shall begin from the upper wall section and work shall progress down the tank shell.
2. The floor laminates shall be the last laminates applied – after dismantling the scaffolding.
3. There shall be no contamination (dust, debris, oils, water, etc.) on the surface prior to any laminate applications.
4. Since the lamination work will occur in several sections, the entire application shall be performed in an area before moving on to the next area (below).
5. Lamination resin drips, sags, over spray, etc. shall be removed completely prior to proceeding with application – normally by wiping with acetone while it is tacky.
6. Follow the recommended laminate sequence for the new corrosion liner – 2 layers of 1.5 oz/ft² of CSM followed by 2 layers of synthetic glass veil (Nexus®).
7. Let laminate cure – test barcol hardness to manufacturer's recommendation.
8. If needed, perform some hand sanding on areas that are rough and where sharp/high points are observed.
9. Apply the final flood coat on the smooth surface to finish off the liner.

POST CURE

1. It is recommended to perform a post cure after all the laminates are completed.
2. Recommended post curing parameters are:
 - a. Minimum of 4 hours at 82°C or 180°F
 - b. minimum of 6 hours at 71°C or 160°F;
 - c. minimum of 8 hours at 60°C or 140°F.

INSPECTION PHOTOS



Photo Set 1: View of the outside of the tank showing external piping and sight strip



Photo Set 2: Tank hold down lugs: appear to be structurally sound



Photo Set 3: Tank manway & fitting flanges (outside) – no issues



Photo Set 4: View of the tank lid and appurtenances

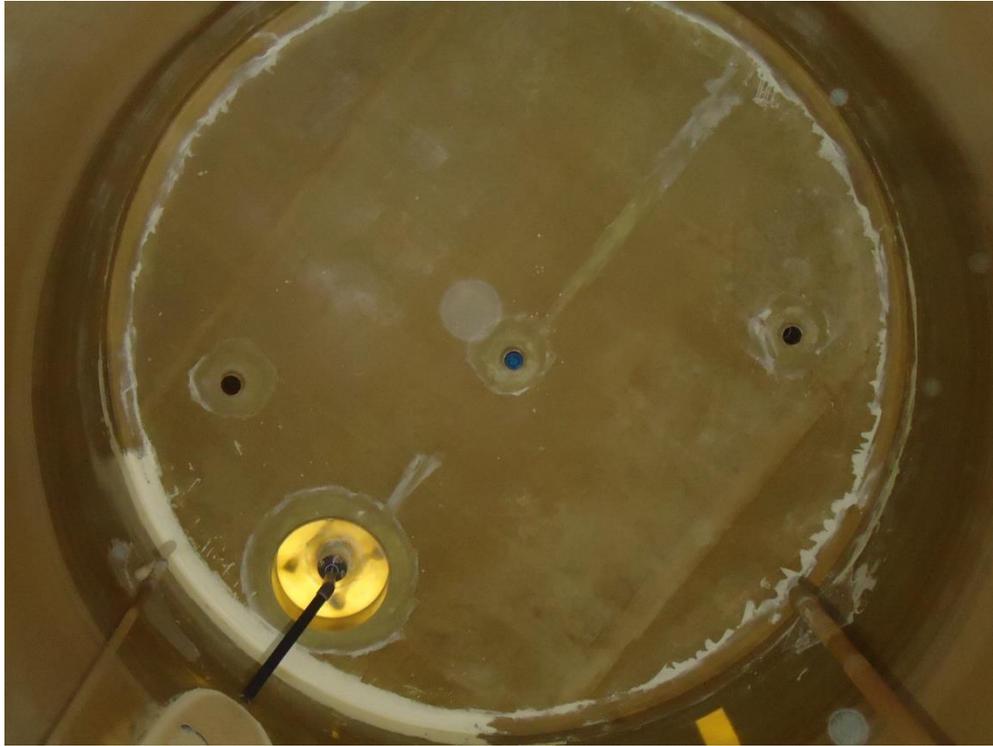


Photo Set 5: Inside view of the tank lid



Photo Set 6: Overall view of the tank wall (inside)

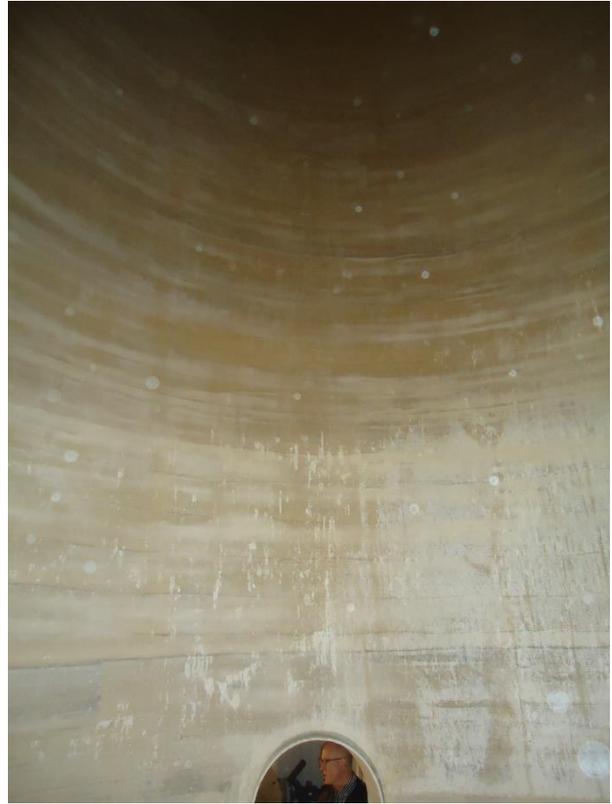


Photo Set 7: Overall view of tank wall (inside)



Photo Set 8: Overall view of tank floor (inside)



Photo Set 9: Close up view of the dryness and roughness of the tank floor



Photo Set 10: Close up view of the dryness and roughness of the tank wall



Photo Set 11: Close up view of the dryness and roughness of the tank wall



Photo Set 12: Fitting conditions from the inside



Photo Set 13: Manway stub and downpipe condition (inside)

END OF REPORT