**Section 175.500 Interior Lining and Lining Inspection of USTs**

a) Tank Lining Requirements. Lining of tanks shall no longer be allowed for all permit applications received on or after January 1, 2011. Existing lined tanks shall be allowed to use lining as a primary method of corrosion protection only if the tanks continue to pass the lining inspections as provided in this Section. Tanks failing to pass the lining inspection criteria will not be allowed to be touched up, repaired, totally relined or put back into use and shall be placed out of service immediately and decommissioned within 60 days after the lining inspection. As an alternative to decommissioning after a tank fails an internal lining inspection, that tank may be upgraded by installing a self-structural tank provided the tank material and installation procedure are third party listed for its intended use, and shall meet all other requirements of OSFM rules. Installation shall meet all requirements of the UL 1316 certification and the installer's recommended procedures and instructions, as well as established industry guidelines. The upgrade shall require submission of an OSFM Upgrade permit application within 60 days after the failed lining inspection, and the work may only be performed by an OSFM-licensed contractor in accordance with 41 Ill. Adm. Code 172. The permit application shall be accompanied by either a passing tank precision test report or a site assessment report based on soil borings taken around each tank being upgraded. This kind of upgrade shall be designated as an OSI activity that may not proceed without the presence of an STSS on site. If the upgrade permit application is not submitted within 60 days after the failed lining inspection, any tank that failed its lining inspection shall be decommissioned.

1) The manufacturers of materials used to line tanks for the storage of petroleum or hazardous substances shall certify compatibility of the lining material with products to be stored by submitting to OSFM data as required by Section A4.6 of NLPA 631. On or after May 2, 2023, only tanks that are double-walled and equipped with interstitial monitoring may be lined for purposes of compatibility. Testing and inspection of linings and lining materials shall meet the specifications and procedures required by NLPA 631.

2) Interior Lining Procedures. Tanks that are double-walled and equipped with interstitial monitoring may be lined only once by following the steps outlined in this Section.

A) Tank Entry. Before entering tanks, the procedures described in API 2015, incorporated by reference in 41 Ill. Adm. Code 174.210, shall be complied with. These requirements include checking the oxygen content inside the tank with a properly calibrated oxygen monitor. At all times, personnel entering the tank shall be equipped with positive pressure air supplied equipment with full face enclosure and safety harness connected to a safety line held by an attendant located outside the tank and using a tripod with a mechanical winch adequate to lift the person and equipment working inside the tank. Oil and water resistant rubber or neoprene boots and gloves shall be worn. Clothing shall cover the arms, legs, torso and head of tank entry personnel. Disposable clothing, impervious to product, is preferred. Clothing saturated with product shall be removed immediately upon departure from the tank. Tests with the combustible gas indicator and oxygen monitor shall be performed periodically in the tank to ascertain that the tank vapors and oxygen content are in the safe range. It shall be recognized that if the tank is perforated, product or vapors that have leaked into the soil may re-enter the tank through a perforation. The vent line shall remain clear and unobstructed to allow continuous ventilation. All other lines and openings shall be plugged or capped off to insure no liquids or vapors may enter the tank during the lining operation.

B) Structural Criteria. Prior to the application of lining, a structural criteria inspection shall be performed and the results of that inspection documented, as to whether the tank or tanks to be lined meet each of the structural criteria to be eligible to be lined pursuant to NLPA 631, and this subsection (a)(2)(B). The records from the structural criteria inspection shall be retained by the owner/operator for the life of the tank. Lining of tanks shall not be allowed if:

i) The shell or heads are more than 2% out of round;

ii) The shell or heads have one or more flat spots that have a cross measurement greater than the radius of the tank endcap;

iii) The shell or heads have any dent with a cross measurement greater than the radius of the tank endcap;

iv) The shell or heads have any dent that protrudes into the tank a distance greater than one inch for every foot of tank radius;

v) The shell or head has any seam split greater than ½ inch wide or 1/6 of the circumference of the tank in length;

vi) The unrepaired shell or head thickness is less than 75% of the original tank thickness;

vii) The number of perforations, not larger than ½ inch, per 500 square feet of tank exceeds the limits in Table A10.4.2.4 of NLPA 631; or

viii) There are any welded repairs on the inside of the tank.

C) Application of Lining. Prior to the application of lining material, a ¼ inch steel reinforcing plate rolled to the contour of the tank and with minimum dimensions of 8 inches by 8 inches shall be installed under the fill (drop) tube and gauging tube. This plate shall be covered with fiberglass cloth embedded in resin. The blast-cleaned surface shall be coated within 8 hours after blasting and before any visible rusting occurs. Only those lining materials meeting the specifications in API 1631 and NLPA 631 shall be used. Manufacturer's instructions are to be complied with on handling and mixing of resin compounds, and these compounds shall be applied to the entire interior surface of the tank by the manufacturer or the manufacturer's designated distributor following the specified method of application, to the designated thickness and at the recommended application temperature. If a heater is used to accelerate the curing process, all other work which might release flammable vapors shall be halted, and the heating unit shall be attended whenever it is in operation. The coating shall be cured thoroughly to the manufacturer's specifications and checked for air pockets and pinholes using a holiday detector. If any exceptions are found, they shall be repaired to manufacturer's specifications. The licensed contractor shall protect the coated surfaces from contamination by foreign matter. The coating thickness shall be checked with an Elcometer Thickness Gauge or equivalent and tested for hardness using a Barcol Hardness Tester or equivalent to ensure compliance with manufacturer's specifications.

D) Tank Closing. If a tank has been previously lined and passes its internal inspection, the following may be done in lieu of the manway requirements of subsection (a)(2)(E):

i) A ¼ inch thick steel cover plate, rolled to the contour of the tank, shall be made to overlap the hole at least 2 inches on each side (e.g., should measure at least 26 inches by 26 inches, if manhole was cut 22 inches by 22 inches);

ii) The cover shall be used as a template to locate ¾ inch diameter holes not exceeding 5 inch centers, one inch from the edge of the cover;

iii) The cover plate shall be sandblasted to white metal on both sides, and the entire inside surface shall be coated with coating material to act as a gasket;

iv) After being bolted to the tank, the cover plate and surrounding tank surface shall be properly sandblasted, coated with coating material and allowed to cure before backfilling the hole;

E) Tank Closing after Entry Procedures. When a tank is being lined the following shall apply:

i) Attach a manway no less than 18 inches in diameter that fits the contour of the tank. This manway shall be surrounded with self-supporting material and be accessible from surface grade.

ii) The manway shall be used as a template around which will be located ¾ inch diameter holes, 5 inches apart from center to center, one inch from the edge, and overlapping the entry hole at least 2 inches on each side, or welded in place if soil conditions will allow (no contamination is present). The lining material shall extend into the neck of the manway.

F) Tank Lining Shall Conform to NLPA Standard 631. Original field notes documenting that the pre-lining inspection and tank lining application process complied with the requirements of NLPA Standard 631 shall be kept by the owner/operator for the life of the tank.

G) Within 5 years after lining, and every 5 years thereafter, the lined tank shall be internally inspected and found to be structurally sound with the lining still performing in accordance with original design specifications. An interior lining inspection permit under Section 175.300 must be obtained to do an internal inspection. The results and data from the lining inspection, including whether the tank passed or failed, shall be kept by the tank owner for the life of the UST. The licensed contractor shall notify STSS of any tanks that fail the lining inspection prior to STSS leaving the UST site.

3) Internal Lining Combined with Cathodic Protection. Some tanks may exist that were previously upgraded by both internal lining and cathodic protection. Such tanks were to be inspected for both the internal lining and the cathodic protection within 90 days after the upgrade and must continue to be maintained by regular inspections of the cathodic protection system pursuant to the requirements of Section 175.510.

b) Within 5 years after initial lining or total subsequent lining of a tank, a physical internal inspection shall be performed as follows:

1) The procedures for tank lining in subsection (a) shall be followed while entry is made into an existing UST for internal inspection purposes.

2) Once a UST has been entered, a visual inspection of the lining shall be made. The lining shall be visually inspected for obvious evidence of peeling, blistering, surface wrinkling or roughing of the lining material. No repairs of any kind to existing linings will be allowed.

A) Testing shall be done to check the thickness of the shell and heads of the tank. The average metal thickness shall be at least 75% of the original tank metal thickness. Ultrasonic testing shall be done in accordance with Chapter B7 of NLPA Standard 631.

i) Tanks not meeting the wall thickness requirements shall be condemned and not put back into service as referenced in Section B8.1 of NLPA 631.

ii) No welding or cutting will be allowed inside the tank.

B) After a lined tank passes both the visual and the tank wall thickness test, it must be tested for holidays (air pockets) in the lining material. This test shall be performed using a holiday detector with a silicon brush electrode or other acceptable instrument to ensure the integrity of the lining material. The internal inspection holiday test shall be conducted at a rate of at least 100 volts per mil of nominal lining thickness, but in no case less than 12,500 volts or more than 35,000 volts. Tanks needing repairs shall be placed out of service pursuant to subsection (a).

C) If all previous testing ensures the integrity of the lining, it shall then be tested for hardness. Lining hardness test shall be performed using a Barcol Hardness Tester or another acceptable instrument to determine that the lining was properly cured when installed or that it has not been affected by the product stored. The overall hardness must meet the lining manufacturer's specifications for the product stored. In the event that some areas pass the hardness test and other areas fail the hardness test, the tank shall be placed out of service pursuant to subsection (a).

D) The final test to verify that an existing lining still meets the manufacturer's original specifications shall determine the thickness of the coating. The entire interior tank lining wall surface shall be no less than 100 mils thick with a nominal (i.e., approximate) thickness of 125 mils. If any areas of the existing coating do not meet the 100 mils minimum thickness requirement, the tank shall be placed out of service pursuant to subsection (a).

E) Where applicable, interior inspections of lined fiberglass tanks shall be the same as lined steel tanks, except testing will not be required for tank thickness and for holidays in the lining material.

3) During the Operational Safety Inspection, the licensed contractor will not be allowed to either cut a new access hole into the tank, nor break open an existing entrance patch until all the required testing equipment is on site. The OSFM inspector must be on site before work may commence.

4) The entrance manhole, hole or patch opening shall be closed and sealed. When a bolted manway is to be installed as a new access opening for future access use, an upgrade permit will be required to make this type of improvement to the tank. No upgrade permit will be required if a manway is installed in conjunction with a lining permit or lining inspection permit, with manholes bolted to the tank top only in conjunction with an inspection, so as not to damage the existing lining.

5) All completed forms required by NLPA 631 shall be kept by the owner for the life of the UST.

6) Every 5 years after the initial 5 year internal inspection, the tank must be reinspected. This can be done by a physical inspection or by another method approved by OSFM.

c) UST lining and internal inspections shall meet the following OSFM requirements:

1) Secure proper permitting and obtain OSI schedule.

2) The licensed contractor shall present to OSFM inspector the OSHA Confined Space Entry permit for this job at the time of tank entry.

3) All monitoring equipment shall be maintained according to manufacturer's specifications.

4) Establish an exclusion zone, approved by the on-site STSS, within which any ignition source shall be prohibited. The use of spark producing/non-explosion proof equipment is prohibited in the vapor hazard area prior to attaining the LEL/oxygen levels required in subsection (c)(7).

5) USTs to be entered shall be isolated from all distribution lines, siphons, manifolds and manifold vent systems.

6) Remove all liquids from the tank using explosion proof pumps or hand pumps.

7) The tank atmosphere and the excavation area shall be regularly monitored, with a combustible gas indicator, for flammable or combustible vapor concentration. Monitoring of the UST shall be done at 3 levels in the tank: top, middle and bottom. Lower explosive limits (LEL) of 5% or less, or oxygen of 5% or less, shall be attained.

8) Except as otherwise provided in this Section, vapor freeing shall be done in accordance with API 1631 Section 2.4, incorporated by reference in 41 Ill. Adm. Code 174.210. Dry ice shall not be allowed as a method of inerting tanks. All inductors and diffusers must use metallic pipe. When vapor freeing the tank with compressed air or using inert gases under pressure, all devices shall be bonded to the tank, and the tank shall be grounded to a separated ground. Except when using liquid nitrogen, when using inert gases, the cylinder shall be equipped with a pressure gauge, so that no more than 5 psi can be discharged into the tank during vapor freeing procedures. To ensure and maintain proper grounding and bonding, the connections shall be tested by the contractor for continuity. This testing shall be done with equipment designed for continuity testing.

9) The STSS shall be on site before venting, cutting, cleaning or entry operations may proceed.

10) If no access exists, an opening with the minimum dimensions of 18 inches by 18 inches shall be cut in the top of the UST using non-sparking equipment in preparation for a manway. All installed manways must be accessible from surface grade by way of a non-collapsible structure.

11) Personal protective equipment shall be in accordance with API 1631.

12) Cutting, cleaning and application of lining material shall be done in accordance with manufacturer's specifications and OSFM requirements.

13) For performing internal inspections, once a tank has been reclassified as a non-hazardous confined space, a positive flow of fresh air must be supplied into the tank in lieu of supplied air and continuous monitoring must be performed during the operation

d) The following testing and records requirements shall apply to all tank lining and lining inspections activity:

1) It shall be the responsibility of the lining contractor to have a precision test performed within 3 days after the lining or lining inspection procedure completion and before the tank is put back into use and to submit the results to OSFM within 3 days after a failed test, on forms provided by OSFM (available at https://sfm.illinois.gov/about/divisions/petroleum-chemical-safety/applications-and-forms.html). This precision test shall be performed any time a UST is entered to install a manway, install a cover plate after lining, do an internal inspection of the tank, or penetrate the tank for any lining or lining inspections purpose.

2) Lining inspections records shall be maintained for the life of the UST, and the most recent inspection record shall be kept on site pursuant to Section 175.650(e). The results and data from the lining inspection, including whether the tank passed or failed, shall be kept by the owner of the tank for the life of the UST.

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