

Raw Water Underground/Overhead Water Storage Tanks Cleaning and Disinfection Procedures

Under mentioned Procedures are established by SHEMA for inspecting/cleaning/disinfecting drinking Water storage tanks, cisterns etc or other water storage Tanks.

Inspection:

- Drain the tank and inspect the hatch and entry ladder (if present) for integrity and safe entry.

Cleaning:

- Clean the tank interior – implement all confined space Entry requirements mentioned below before entering the tank.
- Remove any accumulated Sediment/sludge from tank bottom.
- Scrub walls with a Wire brush and fresh water and remove all resulting Residue.
- *Use of cleaning materials containing Chlorine such as bleach solution or any other hazardous Material is not allowed due to the significant risks Posed to workers.*
- Conduct any structural inspection or repair that may be necessary.
- Following any maintenance measures necessary the Interior walls and floor should be rinsed with fresh Water and any remaining residue and water should be removed.

Disinfecting:

- For drinking water storage tanks add 0.13 pounds (59 Grams) of dry calcium hypochlorite (granules, pellets, Or tablets broken or crushed to sizes not larger than 6 Mm or 1/4 inch) per 1,000 gallons (3785 liters) of Volume in the tank prior to filling the tank with water to produce 10 mg/l (ppm) chlorine concentration.
- The Material should be located so that inflowing water will ensure a current of water circulating through the Calcium hypochlorite to obtain good mixing.
- There should not be anyone inside the tank during this operation.
- Fill the tank with fresh water and allow standing for 24 hours.
- After 24 hour, drain the chlorinated water from tank.
- Contact with grass or other Vegetation may cause an adverse effect due to presence of chlorine.
- Add 0.11 pounds (50 grams) of sodium metabisulfite per 1000 gallons to De-chlorinate the water. Let stand for 2 hours.
- Drain the tank, fill with fresh water and put back in Operation.
- Calcium hypochlorite should be technical grade (65 Percent (minimum) available chlorine) in granular form.
- Sodium Meta bisulfate (technical grade containing 98 percent (minimum) sodium Meta bisulfate) is available as fine Granular crystals.
- Material Safety data sheets should be provided for review for data and guidance on toxic properties, safe handling, use, Storage and disposal.

Confined space entry requirements:

The following Procedures apply to entry of all water storage tanks.

- The primary safety and health concerns in entering water tanks/cisterns are lack of oxygen, fluids Entering the vessel and possible electrical/mechanical Hazards, should there be electrical equipment such as a Submersible pump in any of the vessels.
- Oxygen deficiency can result from displacement by other gases but more likely in this case by biological or chemical reactions i.e. Rusting, presence of organic matter.
- The required strategy for safe tank entry is to take measures to remove the hazards and then have an emergency response plan for Extricating workers in case something unexpected occurs.
- Health units should be notified when a confined space entry activity is scheduled so that emergency response is available in the event of an accident.
- After water is drained, depressurize and mechanically blank off the incoming water line(s) and physically lock the water valve(s) closed.
- Physically lock out electrical circuits supplying any electrical equipment such as water pumps Contained in the vessel or feeding the vessel.
- Open all hatches/ports and mechanically ventilate the vessel with forced air blowers for 24 hours. Ideally there should be at least two Large openings on opposite ends of the vessel so that air pumped into one will flow throughout the tank and exit at the other end, with no short Circuiting.
- If only one opening is present or if openings are not at opposite ends of the vessel, Attach a large diameter hose to the fan.
- Insert the hose through the opening and run it to the end of the tank furthest from the opening and ventilate for 24 hours before entry.
- Air introduced will then flow back through the vessel and exit the main opening. Care must be taken to ensure that the fan System is strong enough to overcome resistance created by the hose and still convey a reasonably high volume of air.
- Ventilation should be provided whenever anyone is in the tank. If work stops for a day or so, ventilate for another 24 hours before anyone can re-enter.
- This procedure can be Modified and shortened if you have a qualified Individual measure the oxygen concentration with a properly calibrated oxygen detector prior to Beginning work each day.
- Tank workers have appropriate personal Protective equipment for the job. i.e. Eye protection and possibly Respiratory protection if manual cleaning/scraping of the tank surface produces airborne particulate.
- Use of electrical mechanical means i.e. grinders Etc. Is not recommended since they can create more severe hazards including high particulate levels, severe hazardous noise problems and possibly electrical hazards.
- Any individual working inside the vessel should be Equipped with a safety harness/lifeline.
- One Individual should always be outside the tank monitoring the operation, available to implement emergency extraction of workers should the need Arise.

- This emergency procedure should be preplanned and workers trained in its Implementation.
- Depending on the physical Situation other equipment may be needed to successfully extract an individual from a vessel.