

# Breakthrough Vacuum Aeration Tank Technology Achieves 99%<sup>+</sup> Removal Efficiency and Reduces Carbon Costs



## LSTE-10

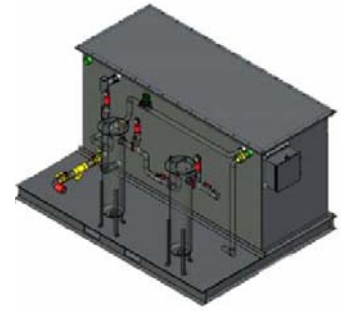
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AERATION TANK

Liquid Separation Technology and Equipment, LLC. has patented and patent-pending designs that mechanically separates various compounds from source contamination utilizing each contaminant's unique chemical and physical properties. The technology can be configured and equipped for multiple sources, as a single phase application for liquid or vapors, or in a dual phase application to treat both.

The key to the LSTE-10 ability to achieve 99%<sup>+</sup> removal efficiency for petroleum hydrocarbons and BTEX and 90%<sup>+</sup> removal efficiency for MTBE is its patent-pending multi-chambered vacuum aeration tank ("VAT"). In the VAT, contaminated groundwater enters the tank which is maintained under a vacuum, where it is gently aerated with 8 SCFM of air for 15 to 60 minutes. This low-vacuum retention time can be varied according to the concentration of the contaminants in the groundwater and the discharge requirements.

The LSTE vacuum aeration tank technology was recently evaluated using a prepared synthetic petroleum hydrocarbon influent and contaminated groundwater from a gasoline service station where high concentrations of gasoline and MTBE were present in the groundwater.

The prepared synthetic waste stream contained gasoline hydrocarbons, benzene, toluene, ethyl benzene and xylenes ("BTEX"), chlorinated hydrocarbons, trichloroethylene, perchloroethylene and 1,1,1-trichloroethane ("TCE, PCE, TCA") and MTBE. The initial concentrations treated were approximately 1,500 parts-per-billion ("ppb") for gasoline hydrocarbons, 200 ppb for each BTEX compound, and 300 ppb for TCE and PCE. The MTBE concentration was 620 and 340 ppb PCE.

The VAT achieved an average gasoline hydrocarbon removal efficiency of 91%, BTEX, TCE, PCE and TCA were removed with a 99% efficiency. Less than 1 ppb of BTEX, TCE, PCE & TCA were detected in the effluent from the VAT.

MTBE was removed with a 77% efficiency; with the addition of the vacuum separator tower module, the MTBE removal was increased to 92%.

The LSTE-10 was also operated using contaminated groundwater from a service station undergoing groundwater remediation. Similar removal efficiencies were obtained for petroleum hydrocarbons even though the groundwater was significantly more contaminated. The average MTBE removal efficiency was 97%.

The VAT is one component of the LSTE-10 modular "Plug & Play" Platform. The LSTE-10 modular plug and play concept allows environmental remediation to be fine tuned to a specific project. The right equipment at the start of the project may quickly become a costly white elephant as the original equipment quickly becomes oversized and unnecessary for the job at hand. The plug and play modular concept allows the right equipment to be used as contaminant concentrations change during the course of the remediation. This flexibility maintains overall cost effectiveness and reduces project maintenance and operation costs.

The 8 SCFM air stream from the VAT requires treatment to meet typical air district requirements. The LSTE-10's modular platform allows the use of a catalytic oxidizer. The need for the catalytic oxidizer (99%<sup>+</sup> destruction efficiency) is entirely dependent on the mass of contaminants to be destroyed. The higher the concentration of contaminants to be treated, the more efficient and economical the catalytic oxidizer is to operate. If the concentration of contaminants to be removed are low, or at a concentration that it is not efficient or economical to operate the catalytic oxidizer, simple disposable carbon adsorbers are connected to the VAT to treat the air stream. These adsorbers are much smaller than those required for standard air strippers due to the relatively low air flow to be treated. This reduces the noise, volume of carbon required for proper treatment of the contaminated air stream, and maintains the small foot print requirements for the total treatment unit. Carbon adsorbers also require little to no maintenance, especially when compared to the catalytic oxidizer.

The LSTE's patent-pending vacuum aeration tank removes petroleum hydrocarbons and chlorinated solvents from groundwater to less than 1 ppb, with a MTBE removal efficiency of 92%. The VAT is the initial treatment module for the LSTE-10's modular Plug & Play platform which allows for the use of the most appropriate and proper sized treatment module at the beginning of the remediation and is easily modified with other LSTE modules to maintain efficient and cost effect remediation of soil vapor or contaminated groundwater throughout the project's life.