

Breakthrough Vacuum Aeration Tank Technology Achieves 99%⁺ Removal Efficiency and Reduces Carbon Costs Over Standard Air Strippers



LSTE-10

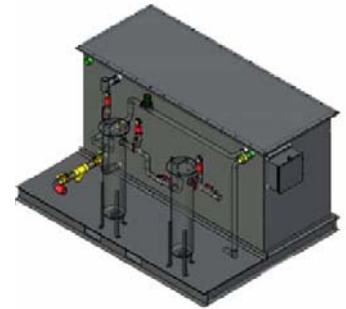
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AERATION TANK

Liquid Separation Technologies and Equipment, LLC. has patented and patent-pending designs that mechanically separate 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 LSTE-10's Vacuum Aeration Tank ("VAT") quietly, efficiently and economically strips the chemicals from groundwater into a contaminated air stream. This makes the LSTE-10 VAT highly cost efficient because activated carbon used to adsorb chemicals from an air stream adsorb 10 times more chemical than activated carbon used in water applications. This reduces activated carbon costs.

The LSTE-10's VAT was recently evaluated using both 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 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 and TCA was 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 key to the LSTE-10 ability to achieve 99%⁺ removal efficiency for petroleum hydrocarbons, chlorinated solvents, and BTEX and 92%⁺ removal efficiency for MTBE is its patent-pending multi-chambered 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. This is a much lower airflow and longer treatment time than a conventional air stripper which uses approximately 100 to 300 SCFM of air and a retention time of a few minutes.

The 8 SCFM air stream from the VAT, just like the 100 to 300 SCFM from a conventional air stripper requires treatment to meet typical Air District requirements. Many remediation systems use a catalytic oxidizer to destroy the contaminants because the concentration of contaminants in the air stream are initially high. 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, carbon adsorbers are used. In most remediation systems, due to design inflexibility, the use of catalytic oxidizers continues long past the point they are economical.

The VAT and catalytic oxidizer are individual components of the LSTE-10 modular "Plug & Play" remediation platform. As the use of the catalytic oxidizer becomes inefficient and uneconomical due to the natural reduction in concentration of contaminants in the air stream, the LSTE-10 modular Plug & Play concept allows the replacement of the catalytic oxidizer with small, activated carbon adsorbers. These adsorbers are much smaller than those required for standard air strippers due to the relatively low airflow to be treated using the LSTE-10 (8 SCFM versus 100 to 200 SCFM for conventional air strippers). Due to the relatively larger airflow necessary for conventional air strippers, large (more expensive) carbon adsorbers are required to achieve the necessary retention for effective contaminant removal. Additionally, the LSTE-10's use of the small carbon adsorbers maintains the small footprint advantage of the LSTE-10 Plug & Play remediation platform.

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 LSTE-10's modular Plug & 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.