

Air Stripping

Description

Air stripping is a technology in which volatile organic compounds (VOCs) are transferred from extracted water to air. Typically, air stripping takes place in a packed tower (known as an air stripper) or an aeration tank. The “air stripper” includes a spray nozzle at the top of the tower. It sprays groundwater that has been pumped to the surface over the packing in the column. As the water descends, air is forced up through the column, stripping off the volatile compounds. Packing or baffles within the tower increase the surface area of the contaminated water that is exposed to air, thus maximizing the amount of volatilization. A sump at the bottom of the tower collects decontaminated water. Auxiliary equipment may include an air heater to improve removal efficiency and air emission “scrubbers.”

Traditional air strippers vary in height, and the height is correlated to the chemical concentration of the contaminated water. A recent innovation in air strippers is the low-profile air stripper. These units have a number of trays that are set almost horizontally. Water is cascaded over the trays to maximize air-water contact while minimizing vertical space. Because they are not so visible, they are increasingly being used for groundwater treatment.

Limitations and Concerns

Air strippers transfer contaminants from one medium to another. There is no destruction of the contaminant. Consequently, the risks of emitting pollutants into the air must be carefully evaluated. Often, the air stream (or off-gas) is treated before it is emitted to the atmosphere.

Algae, fungi, bacteria, and fine particles may foul the equipment, requiring pretreatment or periodic column cleaning.

Air stripping is effective only for water contaminated with VOC or semi-volatile concentrations with a Henry’s constant greater than 0.01. (Henry’s Law is a measure of the extent to which a chemical separates between water and air. The higher the Henry’s Law constant, the more likely substances will volatilize rather than remaining in water.) Compounds with low volatility at ambient temperature may require preheating of the groundwater.

The visual impacts associated with air strippers should be considered, as they are often viewed as a nuisance when located in residential areas.

Applicability

Air stripping is used to separate VOCs from contaminated groundwater.

Technology Development Status

Air strippers are commercial and widely used.