tech insight

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Covered Aerated Static Pile (ASP) Composting

Managed Organic Recycling (MOR) employs the in-vessel (covered) aerated static pile (ASP) composting technology to make a nutrient-rich soil amendment. This is a process whereby organic feedstock materials are processed in four separate steps; 1) mixing, 2) active composting, 3) stabilization/curing and 4) screening finished product.

THE PROCESS

Mixing

Active Composting

Stabilization & Curing

Screening

1 Mixing The mixing step is critical to achieving an efficient composting process. Mix design must take into account the bulk densities, moisture concentrations, and carbon to nitrogen ratios of the feedstock materials. Bulking agents are often required to adjust mix characteristics. Porosity in the mix is also important to the ASP process since there will be no turning during the composting phases. Typically, design parameters for most feedstock materials in the mix are: moisture concentration 60 percent, C:N ratio 30-40, and air-lled porosity about 40 percent. Mixing may be defined to be 'batch' or 'continuous'. Mixing equipment includes as pug mills, agricultural tub-grinders and windrow turners. Alternately mixing may be effectively accomplished with front-end loaders.

2 Active Composting The next step in the ASP composting process is active composting. During this phase, which last about four weeks, complex organic materials are a biodegraded by organisms that only use oxygen as the electron acceptor. Thus, these organisms convert complex organics to CO_2 and water, while at the same time generating heat— piles can easily reach temperatures above 150 degrees F. This part of the process is also referred to as the pathogen destruction phase. The US Environmental Protection Agency Rule 503 (PFRP) requires that temperatures in the pile reach a minimum of 141 degrees F for at least three consecutive days). Another benefit of active composting is the destruction of odorous compounds, such as VOCs and inorganic compounds —nitrogen and sulfur. This usually occurs within the first 10 to 15 days in the active composting phase.

Positive aeration is the preferred method of supplying air to the pile, since not only are horsepower requirements lower, but air distribution throughout the pile is more uniform.

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The air demand can range anywhere from 750 to 1,200 CFH per dry ton of compostable material.

3 Stabilization & Curing Following the active composting phase, the pile is remixed / transferred to the stabilization/curing phase. It is in this phase that mesophilic organisms take over and begin the stabilization and curing of the feedstock materials. This phase can take between two to four weeks as the oxygen uptake rate slows and the maturity of the compost increases (Finished compost is considered stable and mature when its oxygen uptake rate is less than .08mg CO_2 per gram of organic matter and Solvita Index is above 6. Mesophilic organisms are more efficient in the stabilization/curing process. To provide the best environment for these organisms to thrive temperature should be maintained around 120 degrees F.

4 Screening Finally, after the active composting and stabilization/curing phases the finished product is ready for screening. Depending on the end use, varying screen sizes ranging from ¼ to 2-inches are employed. Smaller sizes are used for top dressing applications while the larger screen sizes are used for landscaping products. Finished product may be sold in bulk or

How ASP Technology Works

Dr. Eliot Epstein developed the aerated static pile (ASP) technology at the US Department of Agriculture in 1968. Since then he has been involved in the planning and design of over 200 composting facilities. John Bouey, P.E. has worked with Eliot on the first biosolids composting pilot study in 1980 for the Central Valley Water Reclamation Facility in Salt Lake City, UT. The study showed that even raw biosolids could be successfully composted and kill virtually all pathogens. Today Eliot and John have taken the ASP composting technology one step further by adding a cover system. Now the piles can be aerated in the positive aeration mode eliminating the need for biofilters— for odor control— and produce a Class A soil amendment product in less than six weeks.

ASP Technology

A : Air is released throughout the piles using a 6" AirFloor® pipes, to supply the necessary oxygen to micro-organisms that aid in decomposition.

B : Oxygen is released

C : Moisture is both contained and released

D : Carbon dioxide molecules escape

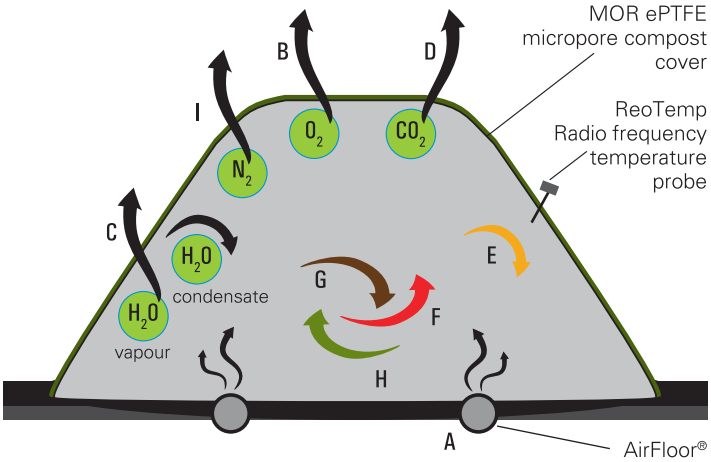
E : Micro-organisms accelerate decomposition

F : Heat is trapped

G : Odor is contained

H : Volatile organic compounds (VOC's) are contained

I : Nitrogen is released



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