

Aeration Primer

The air we breathe contains nearly 21% oxygen at sea level. When air has been introduced into an active compost pile, either by turning or through induced airflow, the oxygen level in the pile drops off very quickly - often to less than 1% within 30 to 45 minutes. This is an extremely important principle to understand, especially if your objective is to produce high-quality compost in a relatively short amount of time and with the least amount of labor.

With aerobic composting where the oxygen level is maintained at 8% or greater, the main by-products are carbon dioxide, water and heat. With anaerobic composting, the by-products include a wide variety of complex, highly odorous chemical compounds, plus water and heat. All life forms and organic systems (i.e., composting) produce some odors. However, with aerobic composting, the quality of the odor is often described as "pleasant" and the intensity as "mild". With anaerobic composting, the odor is often "highly objectionable" and the intensity is "strong or extreme".

Aeration is the key to successful composting! Proper aeration accomplishes the following:

- ❖ Controls the pile temperature and significantly increases the rate of composting;
- ❖ Mitigates problems with offensive odors, flies and rodents;
- ❖ Destroys pathogens, parasites and weed seeds;
- ❖ Degrades vaccines, antibiotics, worming agents and pesticides;
- ❖ Produces superior quality compost with strong market value;
- ❖ Is ideal for pre-composting feedstocks for vermi-composting;
- ❖ Produces a compost rich in aerobic microbes, ideal for compost tea.

With aerated compost systems, the pile temperature must exceed 131oF (55oC) for a minimum period of three days to ensure pathogen destruction. The pile temperature can be easily controlled by adjusting the airflow into the pile. When air is first introduced into a static (non-aerated) compost pile, the resultant increased microbial activity causes the temperature of the initial mix to rise very rapidly, often to well over 150oF in 24 hours or less. Unfortunately, temperatures much over 160oF actually decrease the rate of composting by decreasing the number and diversity of the microbes in the pile. While it may seem counter-intuitive, additional airflow into the pile causes the pile temperature

to decrease by expelling (displacing) excess heat to the environment. In short, managing the frequency, duration, and volume of airflow into the pile allows the operator to optimize the composting process.



With aerated composting, the active phase typically lasts 21 to 30 days and the subsequent curing phase lasts an additional 30 to 60 days. During the active phase, the compost is not turned and, therefore, the cost for labor and equipment are significantly reduced. The cost for power to run the blower is incidental, typically only pennies per day. The O2Compost Training Program includes all of the aeration equipment required to operate a systematic and cost-effective compost operation. Each Training Program includes a high pressure / high volume blower, a timer to operate the blower, and a 36" long temperature probe.

The Training Program also includes three slide gate valve assemblies for aerated bin / bay systems or a ready-to-assemble aeration manifold for aerated static pile systems.

Although not essential, the subsequent curing phase may also be aerated to produce the highest quality finished product in the shortest amount of time. Large compost systems with multiple blowers may be operated with individual timers or a simple Programmable Logic Controller (PLC) with a touch screen interface. In all cases, the O2Compost systems are very simple to operate and highly effective. Operation becomes second nature after completing the first few batches.

It is important to understand the science and technology of composting, as well as the practical "how-to's". The O2Compost Training Program presents this rather complex scientific discussion in layman's terms and avoids the use of unnecessary scientific jargon.