

# Phoenix Composting Toilets

## Fact Sheet



The Phoenix is one of a new generation of high-capacity composting toilets. It consists of a composting chamber that is four to seven feet high and usually located in a room beneath the bathroom. Two chutes can enter the chamber, servicing two toilets from two different bathrooms. The easiest configuration of this is achieved when the bathrooms are stacked one above the other.

The Phoenix relieves many of the inconveniences and problems associated with older models of composting toilets, especially with regards to maintenance, operation, excess liquids, energy use and the quality of the end-product compost.

### FEATURES

- **Air baffles** in the tank promote aeration around the edges of the compost pile without interfering with compost movement. This promotes more rapid composting, avoids odors by keeping the pile aerobic and leads to a higher quality finished product.
- **Ventilation** is performed by a 5-watt, 12-volt AC or DC fan which aerates the compost pile and channels any odors out of the bathroom and house through a vent stack. This active, low-energy ventilation system often makes the bathroom smell *cleaner* than usual.
- **Excess liquids** are the big bugaboo of composting toilets. Liquids in the Phoenix filter through the compost pile and are collected in a tank beneath the pile. This leachate tank holds about 30 gallons and contains a peat-moss filter. Ventilation air passes over the liquid in this tank before exiting the system, thereby increasing evaporation. Leachate that does not evaporate is re-sprayed back onto the top of the compost pile in order to maintain the proper moisture content in the compost. This spray system can be manual, with a hand-operated bilge pump attached to the side of the tank, or automatic with an electric pump which re-sprays at periodic intervals. Liquids that accumulate above and beyond what can be handled via evaporation and re-spraying must be dealt with appropriately. The amount of discharged leachate will vary significantly depending on usage patterns, ambient temperature and humidity. There are various methods of dealing with this excess leachate, including a special Phoenix evaporation chamber.
- **Bulking agent** must be added on a periodic basis. This material improves aeration and adds carbon, which is important for proper composting. Light-colored wood shavings are the material of choice for the Phoenix. Avoid redwood, cedar and pressure-treated wood.
- **Rotating mixing tines** are a special and unique feature of the Phoenix. These tines are located on shafts which run horizontally from the front to the back of the compost chamber. There are one, two or three sets of these tines, depending on size. A large ratchet is attached to the front of a tine shaft to rotate it. This device mixes the compost, encouraging the movement of air and material through the pile, thereby creating a higher quality compost. Mixing of the pile should be performed at least weekly, depending on usage.
- **Separation of the new waste from finished compost** is achieved by plug-flow movement of the material down the Phoenix's composting chamber. After each mixing the shafts are left with the tines in the horizontal position, holding up the pile. This creates 'platforms' which separate the newer waste material at the top of the chamber from the older compost at the bottom.
- **Emptying of the finished compost** is performed by removing finished compost from the lowest portion of the tank through the lower access door with a long-handled rake. The compost is raked out and into a tub which is propped below the door opening. Emptying is performed every 12 - 18 months, depending on usage of the system. 'Disposal' of the finished compost should follow state and local regulations.

## RESIDENTIAL UNITS

Phoenixes come in three sizes based on the number of people using the unit, averaged on a year-round basis: two people (~10 uses/day), four people (30 uses/day), or eight people (50 uses/day). Tank capacity is heavily dependent upon the temperature of the compost pile. Warm tanks can accommodate more waste than cold tanks because heat accelerates decomposition. A minimum operating temperature of 60°F is recommended. All residential units feature tanks that measure 40" wide and 61.5" long. Heights are 53" for the 199 unit, 68" for the 200 unit, and 84" for the 201 unit. Every component of the tank has a dimension less than or equal to 34" in order to fit through a standard 36" door frame for installation.

**Standard Components** A Phoenix residential package includes a tank, one toilet with a 3 ft. length of chute, ventilation system, manual liquid re-spraying system, compost carrying bin, rake, and instructions for installation and maintenance. Wood shavings and ventilation stack pipe are not provided. It is recommended that a plumber install the vent stack. Electricity is needed only to operate the ventilation fan, which requires 120-watt hours per day. Solar-powered DC ventilation systems are available for remote locations.

**Special Configurations** The Phoenix can be used in combination with a micro-flush *SeaLand* toilet. This increases the system's aesthetic acceptability for people who do not like the 'outhouse' feel of composting toilets. It also enables the composting chamber to be situated other than directly beneath the toilet. Piping from the SeaLand to the chamber needs at least a 10% slope for this configuration to function. Another option is the use of a *vacuum-flush* toilet. This special flush system allows the toilet to be beside or even beneath the tank (see the Phoenix brochure). This is achieved through the use of a micro-flush compressed air mechanism. This system can be finicky, however, and is easily clogged by people unfamiliar with its proper use. It is also expensive, adding roughly \$1,300 to the system's cost. A vacuum flush is generally not recommended as a solo toilet but only in conjunction with another back-up toilet that can be used in the event that the vacuum flush is decommissioned because of clogging, etc.

**Installation** of a Phoenix in a simple and straightforward residential setting costs about \$500. It is also possible for a homeowner to do the installation over a long weekend if they are mechanically-minded and proficient with tools and installation instructions.

## PHOENIXES IN PUBLIC FACILITIES

Phoenixes are ideal for situations in which access is limited, discharge must be contained (e.g. environmentally sensitive areas), or where sewer and water connections are not available. In areas without access to electricity, the system can be designed to use photovoltaics to power the fan and for minimal night time lighting. A rainwater collection system is also available as an option to provide water for hand washing and facility cleaning. While designed to be tolerant of winter freezing, the public facility Phoenix is not recommended for locations where usage of the unit coincides with average temperatures below 55°F. Insulation, solar design and/or supplemental heat can be used to overcome the disadvantages posed by a cold environment.

**Public Facility Capacity** As with residential models, the capacity of a Public Facility Phoenix is directly related to the temperature of the compost pile, and a minimum average ambient temperature of 60°F is recommended. At a temperature of 65°F, Phoenix model PF200 can accommodate 30 uses per day and model PF201 can accommodate 50 uses. At 75°F, those numbers increase to 60 and 100 uses, respectively.

**Public Facility Maintenance** The quality of the finished material also depends upon proper maintenance. While the public facility Phoenix automatically ensures that proper moisture levels are maintained in the composting material, regular mixing and the frequent addition of wood shavings will result in a higher quality, odor-free compost. Compost is removed from the Phoenix at least once every year after the first year of use.



As a result of its design, the Phoenix creates compost with a minimum of energy usage and reduces waste volume by 80-90%. Its parent company is Advanced Composting Systems. For additional information on the Phoenix composting toilet, related products & service see ACS's website: [www.compostingtoilet.com](http://www.compostingtoilet.com).