

A Description of Eco-Toilets

Toilets are plumbing fixtures that move sanitary waste to areas for treatment and/or disposal. The most common toilets in US homes are flush-type toilets that use varying amounts of water to move waste out of the house to either a treatment plant or an on-site septic system. The resulting “wastewater” is subsequently treated to remove the various contaminants.

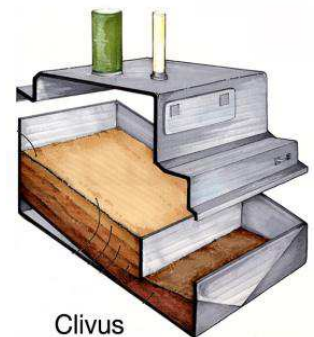
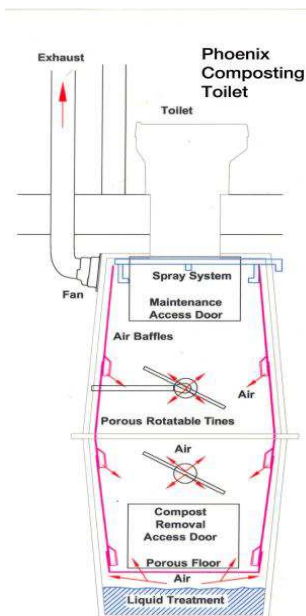
The term “eco-toilet” broadly refers to any toilets that by design minimize the contamination of clean water and also may have other environmental benefits. Eco-toilets range from toilets that merely package human waste for collection and disposal (thereby avoiding the mixing of wastes with clean water and minimizing the volume for easier disposal) to toilets that create nutrient-rich compost from human waste. Composting toilets use little or no water to send “waste” to chambers where it decomposes naturally in the presence of air, turning it into carbon-dioxide, water, and compost. A variant of the simple composting toilet incorporates urine diversion (separation of urine from the solid fecal matter) and collects the urine in a separate container. This may allow for nutrient recovery from the urine.

In your home, the composting toilet would have two main components: the toilet in your bathroom and the compost bin or bio-chamber.

The **toilet** can take a variety of forms. The simplest toilet is a “dry” type that uses no water and is simply connected to a chute that leads to the composter. Micro-flush (using very small amounts of water) or foam-flush (using a biodegradable foam) are also available. In most situations dry toilets are located directly above the composter, however with micro-flush and foam flush toilets there are some ability to offset the toilets to some degree, using sloped chutes to deliver the waste to the composter. In some instance, a vacuum microflush toilet can even be located on the same floor as the composter or in a more remote part of the home not directly above the composter.

The **compost bin or bio-chamber** is most commonly located on a lower floor, in a basement or crawlspace, or it could be placed outside in an accessible vault, a small outbuilding or shed. Compost bins come in different sizes and are made of a durable material that lasts indefinitely. They are sealed and vented to prevent escape of odors into living areas and are configured to allow for the aerobic breakdown of the wastes and occasional turning of the compost. In general, the fresh wastes are separated from the more mature composted wastes to allow for the latter’s occasional removal.

Sun-Mar Composting System



Clivus Composting Toilet



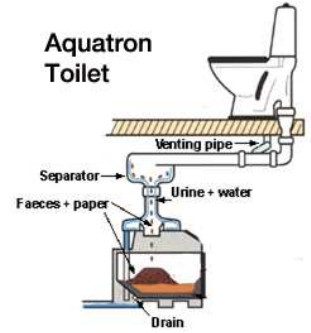
Envirolet Composting System



Urine-Diverting, Flush Toilets



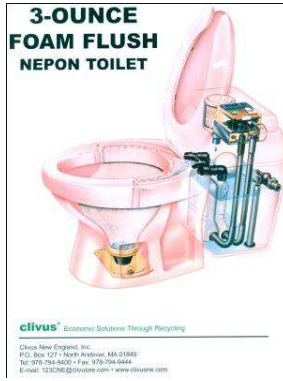
Packaging Toilet



Aquatron Toilet



Separett



3-OUNCE FOAM FLUSH NEPON TOILET



Waterless Urinal

You can see a variety of systems on display, and speak with people who own eco-toilets at: The Green Center at Alchemy Farm, contact: Hilde Maingay/Earle Barnhart 508-563-3101

The following companies have composting toilet products that are approved as "alternative systems" by the Massachusetts Plumbing Board:

Clivus Multrum (price quotes available through website at: <http://clivusne.com/costs-residential-bathrooms.php> Contact person: Lisa Truchon, 978.794.9400)

Advanced Composting Systems/Phoenix (price quotes available through: Ben Goldberg, 413-586-3699 ben@compostingtoilet.com; www.compostingtoilet.com)

Eco-tech/Carousel (price quotes available through: David DelPorto (978)-338-4000, www.ecological-engineering.com/carousel.html or <http://ecotechproducts.net/>)

Sun-Mar (expected to be sold through Eastman's Hardware, 150 Main St. Falmouth, Ma. 508-548-0407 <http://www.sun-mar.com/index.html>)

Sancor Industries/Envirolet (<http://www.envirolet.com/>)

There are also two urine-diverting (UD) toilet options available, which will require state-level plumbing product approval variances:

- Dubletten (contact Stubby Warmbold at: 908.735.8871 <http://www.dubletten.nu/wc-dubletten-en.html>)
- Worstman/EcoFlush (contact Carol Steinfeld- Ecovita at: 978.318.7033 www.ecovita.net)

The Separett is a UD/self-contained system that will also require a state-level product approval variance.

- Separett (<http://www.separett-usa.com/>) Distributors include Ben Goldberg 413-586-3699, Carol Steinfeld 978.318.7033, and others listed on the Separett website)

Other possibilities:

Pacto packaging toilet: (www.pactotoilet.com contact Jack Doyle (215)-489-1618)

Aquatron gravity-based separator for your household waste stream (contact Stubby Warmbold at: 908.735.8871 www.aquatron.se)

Residuals. Each kind of Eco-Toilet processes wastes into "residuals" which must be managed and ultimately either disposed off or recycled as fertilizer.

A Urine-diverting toilet directs the urine to temporary storage containers in the house, which are periodically collected by a licensed septage hauler and taken to a sewer plant or to a facility where it is made pathogen-free and used directly as a fertilizer or as part of further compost production.

A Composting toilet combines human wastes with added wood shavings or leaves to produce compost. The biological decomposition reduces the 'waste' material by up to 90%; much of it converts to gases including water vapor, carbon dioxide, ammonia, etc. The amount of compost produced equals about a bushel per person per year, and must be removed from the composter periodically. MA law requires that the compost be either removed by a septage hauler, or buried under 6 inches of compacted earth. If the compost toilet does not evaporate all the liquid that enters it, the excess liquid, "leachate", is stored in a container and is periodically removed by a septage hauler.

An Aquatron toilet produces compost, and also uses flushing water that is treated as wastewater and that can be combined with the household greywater.

A Packaging toilet directs human waste into a sealed biodegradable plastic package, which is periodically removed and composted, or disposed to a sewer plant.

An EcoDrum, a modular commercial composter, can be used for further composting of residuals with additional materials (wood chips, leaves, waste food, etc.) that heats the composted material to inactivate pathogens and destroy pharmaceuticals.

Greywater. Even if all of the toilets in the house are water-conserving Eco-Toilets, other wastewater is created from bathing, washing clothes and dishes, and various uses of fixtures in the house. This wastewater, often called "greywater" can be disposed of in a standard septic system. So, if you replace your toilets with composting toilets, then your existing septic system may be able to receive the greywater if it is otherwise not failed. Check with the Health Department for details if you have any questions. If your existing septic-tank leachfield is failed, it will need to be replaced with a new one. The good news is, when using a composting toilet, the leachfield only has to be 60% the size of a standard leachfield, which saves money in both materials and excavation.