### Turning Out Black Gold: Ecological Toilet Designs

Composting toilets come in all shapes, sizes and designs. They all sterilize feces by either composting them or drying them out. Here’s how they do it:

<table>
<thead>
<tr>
<th>Composting Toilet</th>
<th>Dry Toilet</th>
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<tbody>
<tr>
<td>o Urine may be separated out to decrease odor.</td>
<td>o Urine is always separated out.</td>
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<tr>
<td>o A few handfuls of finished compost added after each use introduce microorganisms, which break down fecal matter.</td>
<td>o Receptacle is vented for airflow, which dries out feces.</td>
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<tr>
<td>o Wood shavings or similar bulky organic material added after each use create air spaces that support microbial activity.</td>
<td>o A cup or two of lime or ash mixed with soil added after each use raises pH.</td>
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<tr>
<td>o Venting is crucial to prevent odors and provide oxygen for bacterial decomposition.</td>
<td>o Pathogens are killed by the combination of high pH and the inhospitable dry environment.</td>
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<tr>
<td>o Pathogens are killed by predation from the microorganisms, and through natural die off, which speeds up as the temperature rises.</td>
<td>o Toilet paper won't break down in the dry environment; it is collected in a wastebasket to burn or bury later.</td>
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<tr>
<td>o Toilet paper, used sparingly, breaks down.</td>
<td>Final Product: A nutrient-rich soil amendment that looks like instant coffee and smells like healthy soil.</td>
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</tbody>
</table>

Final product: Moist humus similar to garden compost.

The two-vault batch toilet, the most common design worldwide, can be used with either dry or composting systems.

The next design consideration is whether to buy or build a continuous or batch system. There are many designs to choose from; which you choose depends on the space constraints of your bathroom or outhouse and how much maintenance you are willing to do.
Continuous composting system

- A drum, vault, or other container is filled completely. Then it is sealed with ventilation in place and allowed to sit until contents have composted or dried out completely.
- The process takes from six months to two years, depending on temperature and how quickly the container was filled.
- While the full bin is curing, a new bin is being filled.

**Advantages:**
- Easy to add capacity is the need arises. If bathroom space is limited, use smaller containers and switch out the bins more often.

**Disadvantages:**
- Requires space to store containers and maintenance to switch out containers.

Batch System

- New material is added to the top of the bin.
- Finished compost is harvested from the bottom.
- The container needs to be large enough to fill at a rate that lets material on the bottom decompose fully, yet leaves room for new deposits on top.
- Humus is harvested from the bottom on a regular basis.

**Advantage:** No containers to move around.

**Disadvantages:**
- Requires space in or below the bathroom to accommodate large amounts of composting or dehydrating feces.
  - If storage area is not sized properly, it's tricky to add more space.

5-gallon bucket humanure collector
The final consideration is what type of vent to use. Electric vents draw air through the vent pipe with a fan, which can be solar powered. Passive solar vents use the sun to heat air inside a dark-colored pipe. The heated air rises, creating a flow of air that carries odors from toilet out the top of the pipe.