

Sanitation cases (under construction)

- A. Dry toilets
- B. Water flushed toilets
- C. Urinals
- D. Storage/conveyance

A. Dry toilets

Dry toilets have no water flush. They mostly have a drop hole vertically below the seat of hole. Pits can be lined in unstable soils or when groundwater contamination is a risk. Size/depth of pit holes is depending on the intensity of use, the possibilities for emptying and the groundwater level. Superstructures can be simple or more sophisticated, depending the economic situation and the risk of vandalism. The dropping point can be a squatting hole with foot supports (in more modern way a French or a Turkish toilet) or a raised seat/squatting pan.

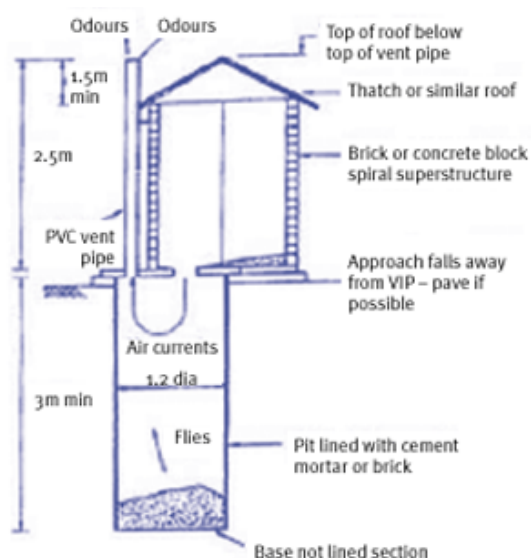
Arbo-loo



A simple shallow low cost toilet. The superstructure is movable. The drop hole is shallow. When the pit is full, the superstructure is moved to a new pit and the old pit is covered with soil and a tree is planted. Mind that trees are not planted too close to buildings as roots may damage the foundation in the years after.

The Arbo-loo can only be built as stand alone latrine

Simple VIP-latrine



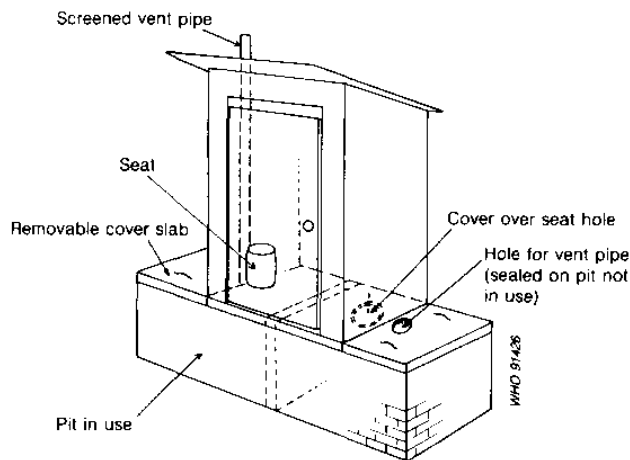
WaterAid

Most common is a series of separate VIP latrines. Essential is the presence of a Vent pipe, covered with a fly screen. The base/floor should be stable and smooth, for which the use of a sanplat is recommended.

Most common is the rectangular design. In Zimbabwe, the Blair or Elephantes latrine has a curved entrance, which eliminates the costly door.

The VIP-latrine can also be built in series inside a larger sanitation building.

Double Vault VIP-latrine



This VIP latrine has 2 alternative holes, connected to two different pits. When one pit is full, the hole is switched and the sludge in the first hole can remain untouched. After one year this hole can be emptied without health risk. Most double vault latrines are used in eco-sanitation as a composting toilet.

The double vault VIP-latrine can also be built in series inside a larger sanitation building.

Xipoti modular latrine



A more sophisticated pit latrine with a plastic floor, a plastic seat with cover. Additional parts can be a child seat and a urine diversion. The Xipoti was developed in South Africa (Envirosan) and introduced in Mozambique. Kentainers Kenya is also producing similar models.

The Xipoti-latrine can also be built in series inside a larger sanitation building.

Plastic mobile latrine



A pre-fab mobile plastic sanitation unit. Advantage is the easy cleaning and the easy moving when the pit is full. Disadvantage is poor ventilation with consequent heat and smell. These pre-fabs are both as stand alones and as block units. They are also available with urine diversion. It is for example produced by Kentainers in Kenya, Aquasan and other companies.

The plastic mobile latrine can only be used as stand alone, but can also be put in series.

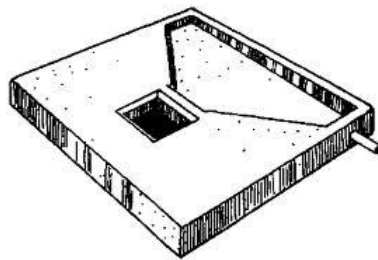
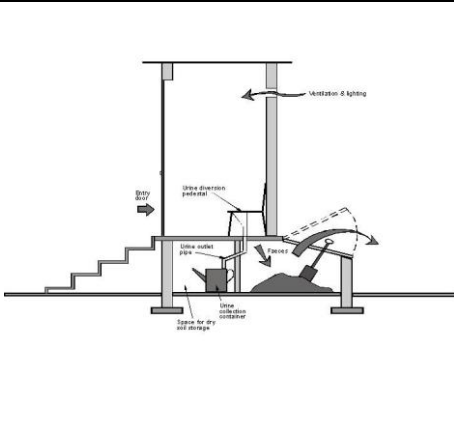
Dry composting toilets



Dry composting toilets have a double vault system with alternative holes. When one box is full, the hole is switched. Due to exposure to sun heat on black plates, the composting process is quick and after some month, the black soil can be removed as save compost. This technology can be used with urine diversion.

Dry composting toilets can be put in series

Dry Ecosan Separation toilets



The principle of ecosan separation toilets is that the urine is diverted and the feces are collected. There are many devices that do separate the urine from the feces. They can be built in in the squat-hole of a sanplat or in the squat pan of a seat. The feces can be collected in composting chamber or in a removable bucket (or bag), that is easily accessible. In the latter case, care should be taken with handling the buckets. The urine can be drained to a flower field or to a jerrycan.

Dry composting toilets can be put in series

B. Water flushed toilets

Water flushed toilets are very common in the western world and in Asia. They are considered as hygienic, but need good cleaning and presence of water. The water seal prevent odours and children do not need to have the fear to fall in. Another advantage of water flushed toilets is that the collection pit is not by definition below the hole and superstructure, but can be next to it, which might support the stability. Big disadvantage is the enormous water demand and the additional need for large sewer or storage capacity of the sludge/waste water. Blockage by solid waste or excess paper is a common problem.

| Pour flush toilets | |
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| | <p>Pour flush toilets are very common in Asia, where water is also used for anal cleansing. They have a small shallow water seal. Urine diversion is possible. The S-shape of the water seal determines how much water is needed for flushing. To reduce water requirements, it is advisable to collect toilet paper or other dry cleansing materials separately.</p> <p>The waterseal at the bottom of the Pour Flush Toilet or pan should have a slope of 25 to 30°. Water seals should be made out of plastic or ceramic to prevent clogs and to make cleaning easier (concrete may clog more easily if it is rough or textured). The optimal depth of the water seal is approximately 2cm to minimize the water required to flush the excreta. The trap should be approximately 7cm in diameter.</p> |
| <p>The Pour Flush Toilet requires (much) less water than a traditional cistern Flush Toilet. However, because a smaller amount of water is used, the Pour Flush Toilet may clog more easily and thus require more maintenance.</p> | |

| Flush Toilets | |
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| | |
| <p>Flush toilets are considered as 'modern' and 'sophisticated' and associated with wealth. They need about 7-10 liters to flush. Water saving devices are possible if one has to flush urine only. Hygiene measures can be taken to protect the seat. In some cultures, pupils have to learn not to sit with their feet on top of the seat.</p> | |

C. Urinals

Urinals can be for boys and in some countries also for girls. They can be flushed with water, but can also be 'dry'. They can be single/individual or for groups (walls). The urine can be kept separate and be used in agriculture/gardening by direct drainage or by bringing the collected urine to the garden..

Dry individual urinal



Example of Wall mounted urinal, Mexico (photo WASTE), Insert: "Eco-lily" in Ethiopia (photo SUDEA).

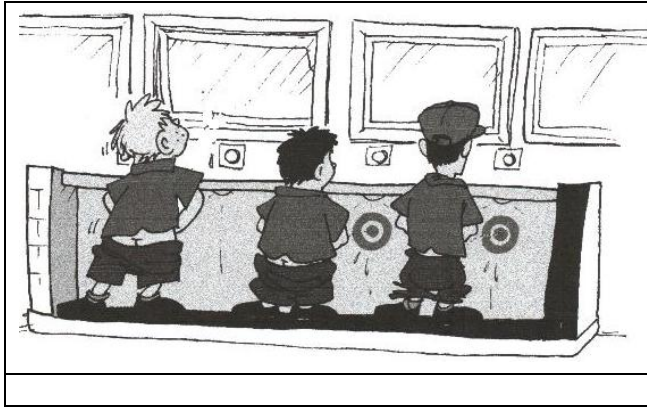
Girls urinal (examples)



In some countries, girls can also use urinals. The example shows a girls' urinal on a jerrycan and a girls' urine gutter. The individual urinal needs to have more length than the boys one.

Teenage girls prefer some privacy that can be provided with separation walls.

Urine gutter/shared urinals

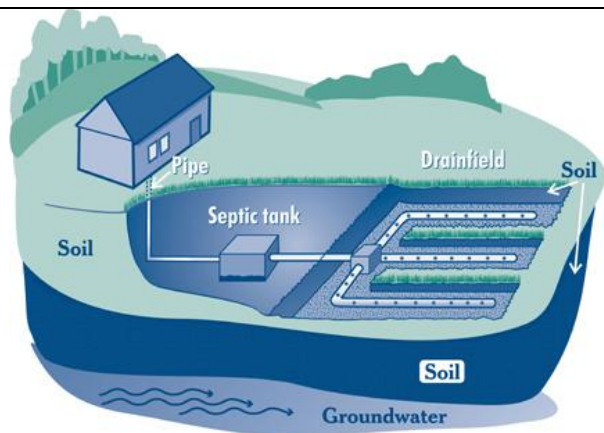
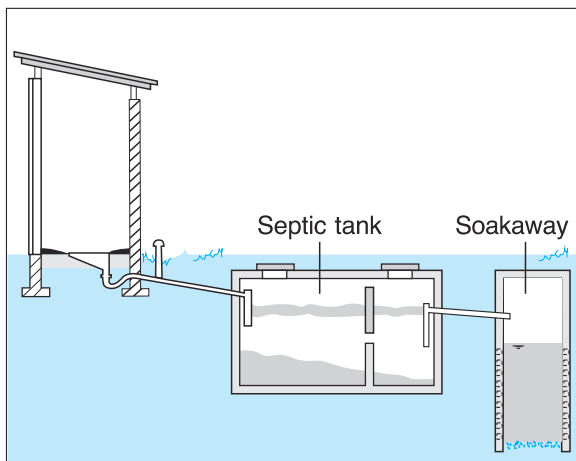


The boys urine gutter is a cost saving device. They can be wet or dry. Care is to be taken on splashing. Some boys and some cultures require more privacy than others.

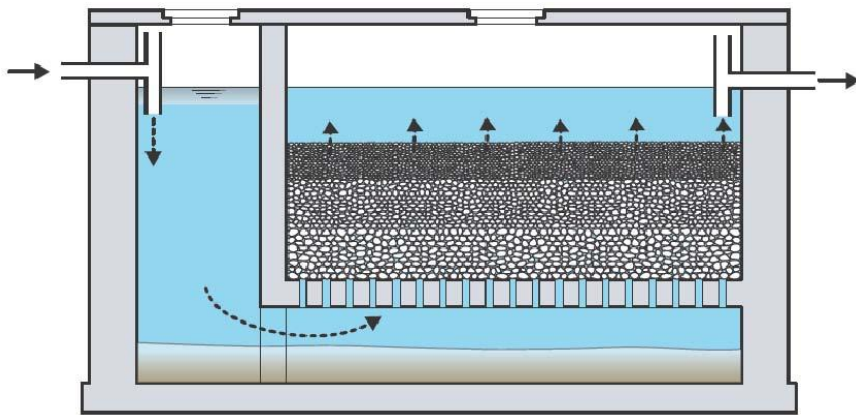
D. Storage and conveyance

The most common storage is a 'dry' pit, or the composting chamber. More sophisticated models are shown below.

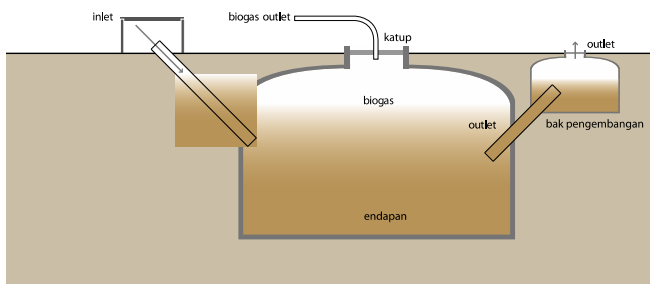
Septic tank



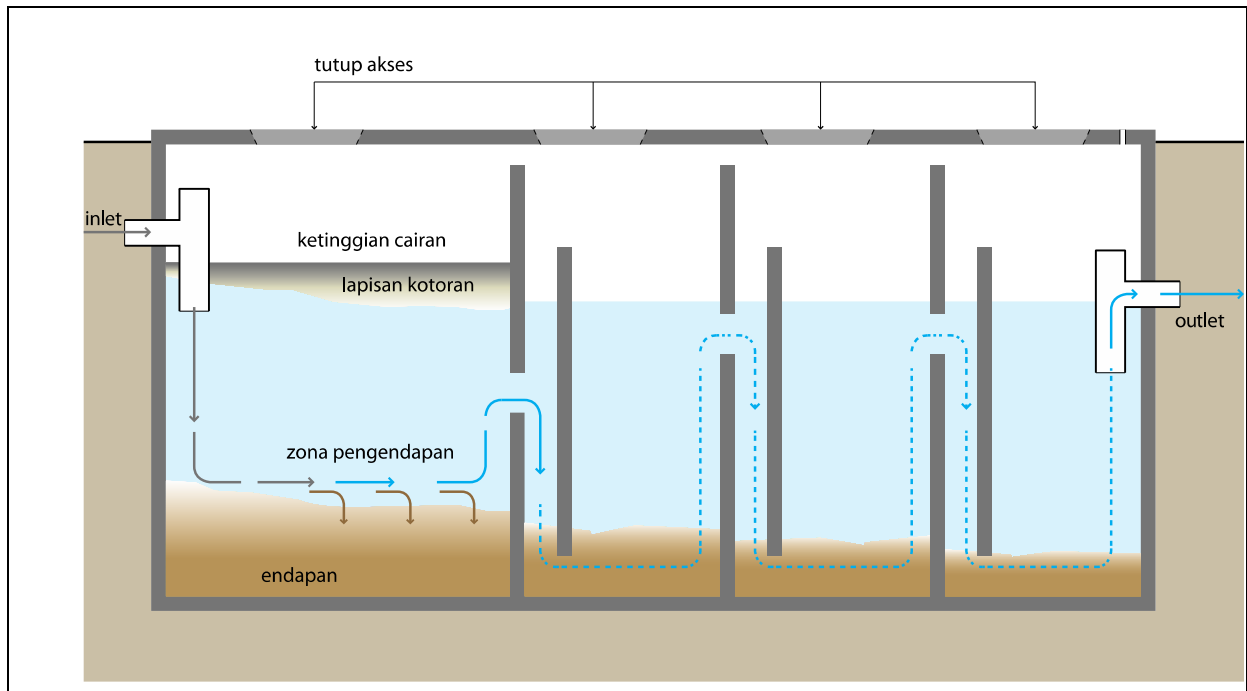
Upflow septic tank



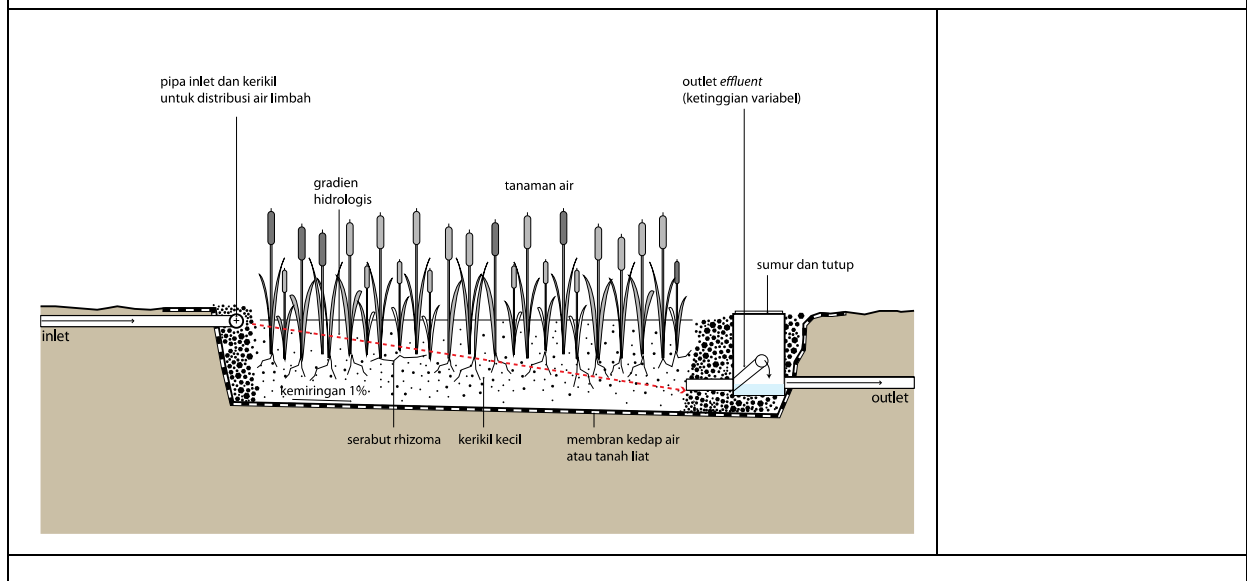
Anaerobe



Anaerobic baffle reactor



Constructed wetland



Grey water treatment

