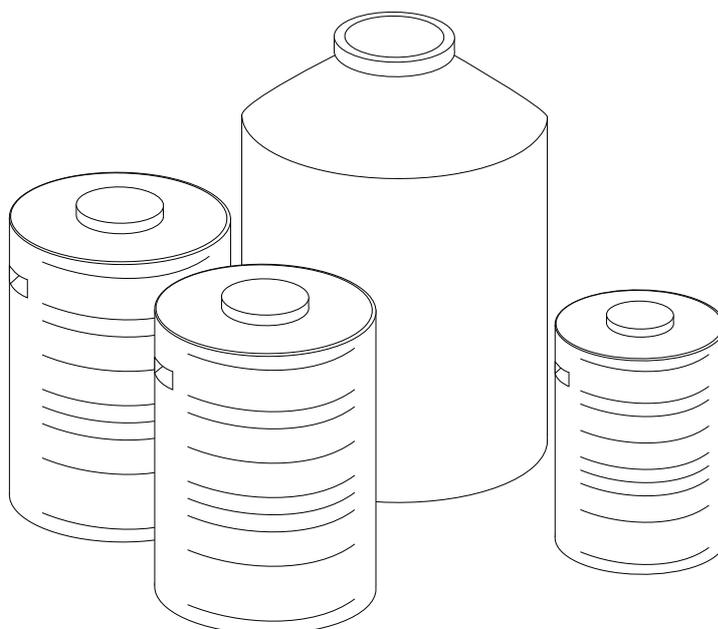


Application Level:	Management Level:	Inputs:  Urine
<input type="checkbox"/> Household <input type="checkbox"/> Neighbourhood <input type="checkbox"/> City	<input type="checkbox"/> Household <input type="checkbox"/> Shared <input type="checkbox"/> Public	Outputs:  Stored Urine



When urine cannot be used immediately or transported using a Conveyance technology (i.e., Jerry-cans, see C.1), it can be stored onsite in containers or tanks. The storage tank must then be moved or emptied into another container for transport.

The urine storage tank should be appropriately sized to accommodate the number of users and the time required to sanitize the urine. The storage guidelines for urine correspond to the temperature of storage and the intended crop for which it would be used as fertilizer, but all urine should be stored for at least 1 month before use (see WHO guidelines for specific storage and application guidelines). If a family's urine is used to fertilize crops for their own household consumption only, it can be used directly without storage.

Smaller volume storage tanks can be used and transported to another centralized storage tank at, or close to, the point of use (i.e., the farm).

Design Considerations On average, a person generates about 1.2 L of urine a day; however, this quantity may vary significantly depending on the climate and fluid consumption. Mobile storage tanks should be

made of plastic or fibreglass, but permanent ones can be comprised of concrete or plastic. Metal should be avoided as it can easily be corroded by the high pH of stored urine.

Over time, a layer of organic sludge and precipitated minerals (primarily calcium and magnesium phosphates) will form on the bottom of the tank. Any tank used for urine storage should have an opening large enough so that it can be cleaned and/or pumped out.

Neither the storage tank, nor the collection pipes should be ventilated to avoid odorous ammonia emissions, but they both need to be pressure equalized.

If the storage tank is directly connected with a pipe to the toilet or urinal, care should be taken to minimize the length of the pipe since precipitates will accumulate. Pipes should have a steep slope (> 1%), no sharp angles, and large diameters (up to 110 mm for underground pipes). They should be easily accessible in case of blockages.

To minimize odours and nitrogen loss, the tank should be filled from the bottom, i.e., the urine should flow down through a pipe and be released near the bottom of the tank. This will prevent the urine from spraying and avoid the backflow of air.

Appropriateness Urine storage tanks are most appropriate where there is a need for nutrients from fertilizer for agriculture which can be supplied by the stored urine. When there is no such need, the urine can become a source of pollution and a nuisance.

Urine storage tanks can be used in virtually every environment; tanks should be well-sealed to prevent leaks, infiltration and nitrogen loss. Urine storage tanks can be installed indoors, outdoors, above ground and below ground depending on the climate, space available, and soil.

Health Aspects/Acceptance Long-term storage is the best way to sanitize urine without the addition of chemicals or mechanical processes. The risk of disease transmission from stored urine is low. Extended storage with storage times greater than 6 months provides near complete sanitization.

Operation & Maintenance If the storage tank is emptied using a vacuum truck (see C.3), the inflow of air must be maintained at a sufficient rate to ensure that the tank does not implode due to the vacuum. A viscous sludge will accumulate on the bottom of the storage tank. When the storage tank is emptied, the sludge will usually be emptied along with the urine, but if a tap is used and the tank is never fully emptied, it may require desludging. The desludging period will depend on the composition of the urine and the storage conditions.

Mineral and salt build-up in the tank or in connecting pipes can be manually removed (sometimes with difficulty) or dissolved with a strong acid (24% acetic).

Pros & Cons

- + Simple and robust technology
- + Can be built and repaired with locally available materials
- + Low risk of pathogen transmission
- + Stored urine can be used as a fertilizer
- + Small land area required
- + No or low operating costs if self-emptied
- Mild to strong odour when opening and emptying tank
- Capital costs can be high (depending on the size and material of the tank)
- May require frequent emptying (depending on tank size)

References & Further Reading

- Kvarnström, E., Emilsson, K., Richert Stintzing, A., Johansson, M., Jönsson, H., af Petersens, E., Schönning, C., Christensen, J., Hellström, D., Qvarnström, L., Ridderstolpe, P. and Drangert, J.-O. (2006). *Urine Diversion: One Step Towards Sustainable Sanitation*. Report 2006-1, EcoSanRes: Ecosan Publications Series, Stockholm, SE. Available at: www.ecosanres.org
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