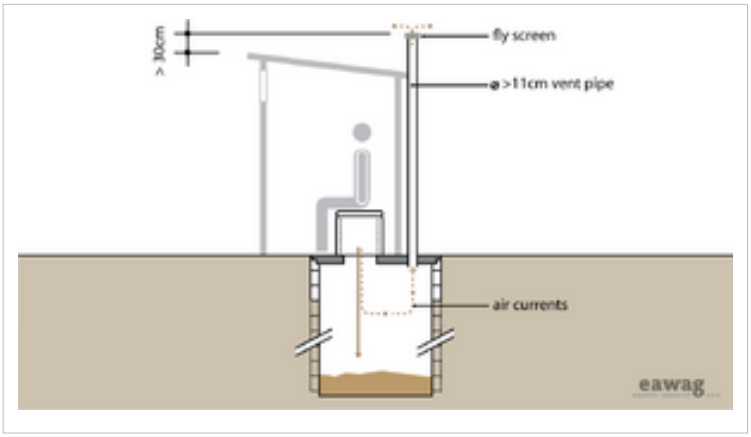
Single_Ventilated_Improved_Pit

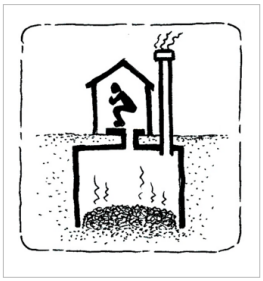
Application level		Management level	
Household	XX	Household	XX
Neighbourhood	X	Shared	XX
City		Public	X



Applicable to systems:	Languages / langues / idiomas
1	

Inputs: Excreta , Faeces , Anal cleansing water

Outputs: Faecal sludge



The Single VIP is a Ventilated, Improved Pit. It is an improvement over the Single Pit because continuous airflow through the ventilation pipe vents odours and acts as a trap for flies as they escape towards the light.

Despite their simplicity, well-designed Single VIPs can be completely smell free, and be more pleasant to use than some other water-based technologies.

Flies that hatch in the pit are attracted to the light at the top of the ventilation pipe. When they fly towards the light and try to escape they are trapped by the fly-screen and die. The ventilation also allows odours to escape and minimizes the attraction for flies.

The vent pipe should have an internal diameter of at least 110mm to a maximum of 150mm and reach more than 300mm above the highest point of the toilet superstructure. The vent works better in windy areas but where there is little wind, its effectiveness can be improved by painting the pipe black; the heat difference between the pit (cool) and the vent (warm) creates an updraft that pulls the air and odours up and out of the pit. To test the efficacy of the ventilation, a small, smoky fire can be lit in the pit; the smoke should be pulled up and out of the vent pipe and not remain in the pit or the superstructure.

The mesh size of the fly screen must be large enough to prevent clogging with dust and allow air to circulate freely. Aluminum screens, with a hole-size of 1.2 to 1.5mm have proven to be the most effective.

Care during superstructure design must be taken to ensure that flies inside the pit are not unduly attracted to light through the defecation hole either through utilization of small windows in the superstructure or provision of a removable cover for the defectation hole.

The top diameter of the Single VIP should be between 1 to 1.5mand be dug at least 3mdeep, although the deeper the better. Deep pits can last up to 15, 20, 30 or more years. As the effluent leaches from the Single VIP and migrates through unsaturated soils, faecal organisms are removed. The degree of faecal organism removal varies with soil type, distance traveled, moisture and other environmental factors and thus, it is difficult to estimate the necessary distance between a pit and a water source. A minimum distance of 30m between the pit and a water source is recommended to limit exposure to chemical and biological contamination.

Advantages	Disadvantages/limitations
- Flies and odours are significantly reduced (compared to non-ventilated pits). - Does not require a constant source of water. - Suitable for all types of user (sitters, squatters, washers and wipers). - Can be built and repaired with locally available materials - Can be used immediately after construction. - Low (but variable) capital costs depending on materials. - Small land area required.	- Sludge requires secondary treatment and/or appropriate discharge. - Costs to empty may be significant compared to capital costs. - Low reduction in BOD and pathogens.

Adequacy

Treatment processes in the Single VIP (aerobic, anaerobic, dehydration, composting or otherwise) are limited, and therefore, pathogen reduction and organic degradation is not significant. However, since the excreta are contained, pathogen transmission to the user is limited. This technology is a significant improvement over Single Pits or open defecation. Single VIPs are appropriate for rural and peri-urban areas; single pits in urban or dense areas are often difficult to empty and/or have insufficient space for infiltration. Depending on the pit depth, depth to the water table, number of users and soil conditions, some pits can be used for 20 years without emptying. VIPs are especially appropriate when water is scarce and where there is a low groundwater table. They should be located in an area with a good breeze. They are not suited for rocky or compacted soils (that are difficult to dig) or for areas that flood frequently.

Health Aspects/Acceptance

A Single VIP can be a very clean, comfortable, and well accepted sanitation option. However some health concerns exist:

- Latrine leachate can contaminate groundwater;
- Pits are susceptible to failure/overflowing during floods;
- Health risks from flies are not completely removed by ventilation.

Upgrading

A Single VIP toilet can be upgraded to a Double VIP, a Urine Diverting Dry Toilet (UDDT) if there is a use for urine, or a water-based Pour Flush Toilet if water is available. A Double VIP has the addition of an extra pit so that while one pit is in use, the contents of the full pit are draining, maturing and undergoing degradation. Pathogens are destroyed much more thoroughly in a Double VIP and therefore, the contents are less hazardous to remove from the pit, although because the contents are so solid, the contents cannot be pumped, but rather, must be manually emptied.

Maintenance

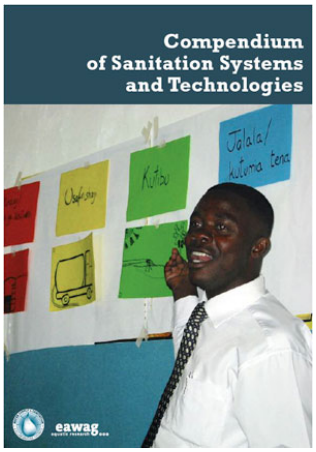
To keep the Single VIP free of flies and odours, regular cleaning and maintenance is required. Dead flies, spider webs, dust and other debris should be removed from the ventilation screen to ensure a good flow of air.

Origins

The VIP latrine was developed in the 1970s at the Blair Research Laboratory in Zimbabwe.

Acknowledgements

The material on this page was adapted from: Tilley, E. et al. (2008). Compendium of Sanitation Systems and Technologies [2], published by Sandec [3], the Department of Water and Sanitation in Developing Countries of Eawag [4], the Swiss Federal Institute of Aquatic Science and Technology, Dübendorf, Switzerland. The publication is available in English, French, and will be made available in Spanish. Available in the IRC Digital Library [5]



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References and external links

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[2] http://www.eawag.ch/organisation/abteilungen/sandec/publikationen/publications_sesp/downloads_sesp/compendium_high.pdf
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