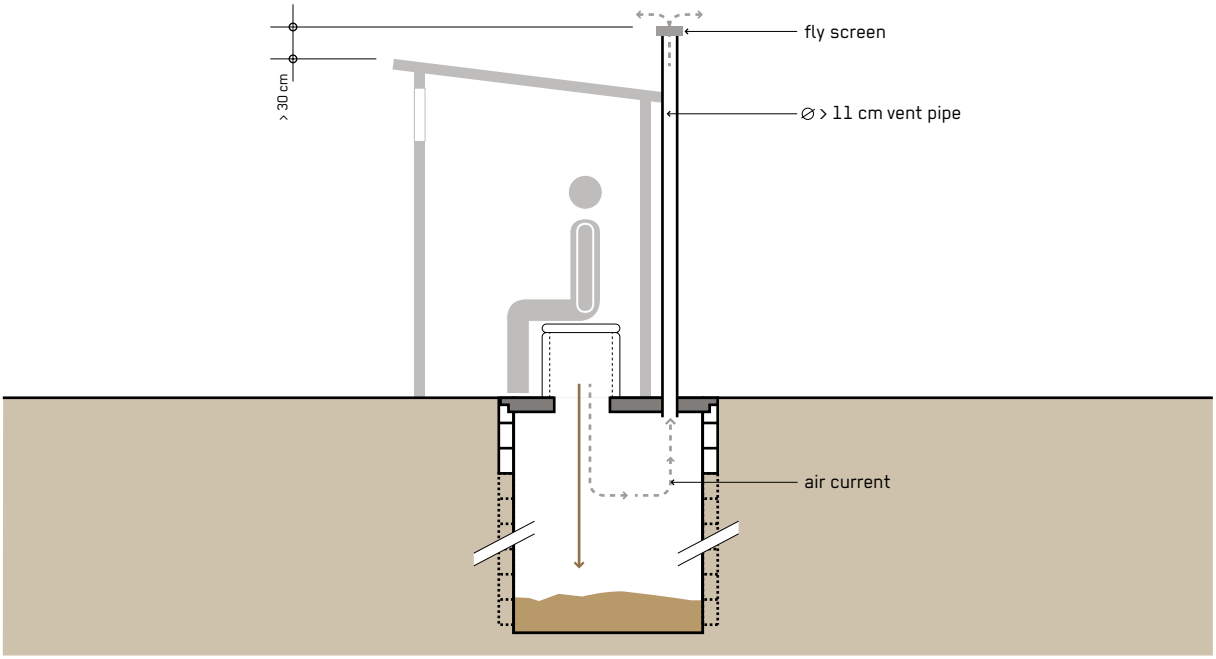
Single Ventilated Improved Pit (VIP)

Phase of Emergency	Application Level / Scale	Management Level	Objectives / Key Features
* Acute Response ** Stabilisation ** Recovery	** Household ** Neighbourhood City	** Household ** Shared * Public	Excreta containment, Sludge volume reduction, Reduction of odour and flies
Space Required	**Technical Complexity**	**Inputs**	**Outputs**
* Little	* Low	● Excreta, ● Faeces, ● Blackwater, (● Anal Cleansing Water), (● Dry Cleansing Materials)	● Sludge



The Single VIP is seen as an improvement over the Single Pit Latrine (S.3) because continuous airflow through the ventilation pipe prevents odours and acts as a trap for flies as they escape towards the light.

When correctly designed, built, used and maintained, Single VIPs can be completely odour-free. 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 eventually die. The ventilation also allows odours to escape and minimises the attraction for flies.

Design Considerations: The only design difference to a Single Pit Latrine is the ventilation. All other design considerations are covered in the Simple Pit Latrine sheet **(S.3)**. For the ventilation, a straight vent pipe is needed with an internal diameter of at least 11 cm and reaching more than 30 cm above the highest point of the toilet superstructure. Wind passing over the top creates a suction pressure within the pipe and induces an air circulation. Air is drawn through the user interface into the pit and moves up the vent pipe. The vent works best in windy areas and surrounding objects, such as trees or houses, should not interfere with the air stream. Where there is little wind, effectiveness can be improved by painting the pipe black. The heat difference between pit (cool) and vent (warm) creates an additional updraft. To test ventilation efficacy, a smoking stick or similar object can be held over the user interface; the smoke should then be pulled down into the pit. The mesh size of the fly screen must be large enough to prevent clogging with dust and allow air to circulate. The toilet interior must be kept dark (or the toilet hole kept closed with a lid) so that flies in the pit are attracted to the light of the vent pipe. VIPs without dark interiors, or with uncovered defecation holes, reduce odour but not flies.

Materials: The latrine superstructure can be made from local materials, such as bamboo, grass matting, wood, plastic or metal sheeting (though this often heats up the interior). Pit lining materials can include brick, rot-resistant timber, bamboo, concrete, stones, or mortar plastered onto the soil. Some agencies have rapid response kits for slabs and superstructure which can be flown in for immediate use or that can be stockpiled in advance. The slab on top can be fabricated on site with a mould and cement. In the acute emergency phase, pre-fabricated plastic slabs may be used. Other slab materials such as wood or bamboo are also possible, where no other materials are available. Once the pit is full, equipment for emptying or materials for covering the pit are required. The ventilation pipe can be made from a range of materials, including PVC or metal piping, masonry, hollowed bamboo or similar.

Applicability: Single VIPs are a significant improvement over Single Pit Latrines and can be considered a viable solution in all phases of an emergency. Special attention should be paid to the anticipated groundwater level and associated risks of groundwater pollution. As no water is needed for operation it is also an appropriate solution for water scarce areas. It can be replicated quickly and implemented at scale given sufficient space. The Single VIP should be built in an area with a good breeze to ensure effective ventilation. Like other pit latrines they are not suitable in areas with rocky or compacted soils or in areas that flood frequently. VIPs rarely work as communal toilets as they are often improperly used and with unclear ownership, maintenance quickly becomes a problem.

Operation and Maintenance: General operation and maintenance (O & M) tasks include regular cleaning, ensuring the availability of water, hygiene items, soap and dry cleansing materials, conducting minor repairs and monitoring pit fill levels. Dead flies, dust and other debris should be removed from the fly screen to ensure good air flow. As pits are often misused for solid waste disposal, which can complicate pit emptying, awareness raising measures **(X.12)** should be a part of installation programmes. VIPs for general public use may have a sludge build-up rate too fast for absorption into the soil and will thus require regular emptying. If regular desludging is needed the accessibility for desludging vehicles **(C.1, C.2)** must be considered.

Health and Safety: If used and managed well, a Single VIP can provide a clean, comfortable, and acceptable toilet. Single VIPs need to be equipped with Handwashing Facilities **(U.7)**. They need to be equipped with Handwashing Facilities **(U.7)** and proper handwashing with soap after toilet use needs to be addressed as part of hygiene promotion activities **(X.12)**. As with all pit-based systems, groundwater contamination can be an issue and soil properties such as the permeability of the soil and groundwater level should be properly assessed **(X.3)** to limit exposure of water sources to microbial contamination. The Sphere minimum standards on excreta management should be consulted for further guidance. Emptying of the pit **(C.1, C.2)** should be carried out in such a way as to minimise the risk of disease transmission including personal protective equipment and hygiene promotion activities **(X.12)**. If the latrine is for communal use additional illumination at night, security guards for protection and accessibility for all users is required. Pits remain susceptible to failure and/or overflowing during floods and health risks associated with flies are not completely removed by ventilation.

Costs: Building a Single VIP can be relatively inexpensive. Costs vary depending on the availability and costs of local materials or use of prefabricated slabs and cubicles. However, cost considerations also need to reflect additional O & M requirements and potential follow-up costs like regular desludging, transport, treatment and sludge disposal/reuse.

Social Considerations: The design of the Single VIP should be discussed with the community beforehand. It should reflect local user preferences (sitter vs. squatter, anal cleansing practices, direction, positioning, screens etc.) and should account for accessibility and safety of all users including men, women, children, elderly and disabled people **(X.10)**. Potential handing over to beneficiaries and roles and responsibilities for O & M need to be agreed upon early on and closely linked to hygiene promotion **(X.12)** in order to ensure appropriate use of the facilities.

Strengths and Weaknesses:

- ⊕ Flies and odours are significantly reduced (compared to non-ventilated pits)
- ⊕ Can be built and repaired with locally available materials
- ⊕ Low (but variable) capital costs depending on materials and pit depth
- ⊕ Small land area required

- ⊖ Low pathogen reduction with possible contamination of groundwater
- ⊖ Costs to empty may be significant compared to capital costs
- ⊖ Sludge requires secondary treatment and/or appropriate discharge

→ **References and further reading material for this technology can be found on page 191**