

COMPARISON OF VARIOUS ASPECTS OF DIFFERENT SYSTEMS FOR DISPOSAL OF HUMAN WASTE

Parameters	Hand Flushed Water Seal Latrine (Sulabh Sauchalaya/ CBRI/UKDP Design)	EverClean Septic Tank Latrine	Conventional Septic Tank	Sewage Treatment Plant	University of Roorkee Drain Combination of Effluent of Septic Tank and Waste Water
1	2	3	4	5	6
1. Performance (i) pH (ii) C.O.D. (iii) B.O.D. (iv) Total Solids (v) Suspended Solids (vi) Volatile Solids	Not applicable (the water is directly absorbed by soil)	6.95 to 7.7 200 to 230 mg/lit 112 to 136 mg/lit 985 to 1110 mg/lit 126 to 363 mg/lit 29.5 to 72.1 mg/lit	7.2 360.0 mg/lit 362.2 mg/lit 2922.2 mg/lit 587.9 mg/lit 105.4 mg/lit	7.59 100 mg/lit 62.2 mg/lit 665.7 mg/lit 61.4 mg/lit 21.5 mg/lit	7.17 128 mg/lit 82.2 mg/lit 999.5 mg/lit 84.8 mg/lit 23.2 mg/lit
2. Physical (i) Space Requirement for 15 users (a) Tank (b) Soakage pit/ trenches (ii) Water Requirement (iii) Movability	125 cm.x 405 cm. 168 cm. deep Not required 6 to 8 lit. per use No (can not be shifted)	120 cm x 60 cm 250 cm and 125 deep Not required 8 to 10 lit per use Yes (can be shifted)	90 cm x 220 cm 150 cm deep depends upon rate of percolation of soil (about 200 cm dia) (can not be shifted) (dia for 15 users) 20 lit per use No (can not be shifted)	depends upon the population covered Effluent discharged in to river of farms 20 lit per use No (can not be shifted)	As for conventional Septic Tank Effluent discharged in to river of farms Sludge removed annually as per design, 20 lit per use No (can not be shifted)
3. Social (i) Removal of sludge (ii) Systems acceptability	Sludge removed after 2 to 3 years Very good	No sludge removal Very good	Sludge removed annually or as per design very good	Sludge removed as per design Very good	Sludge removed annually Very good
4. Construction (i) Availability of material (ii) Easy of construction (iii) Time of construction (iv) Time to Start use	Easy Skilled mason required 2 to 3 days 4 to 5 days	Easy Semi-skilled mason can construct 1 day 1 day	Easy Skilled mason required 15 to 20 days do	Difficult skilled Personnel required Depends upon design & size of plant as per design do	Easy Skilled mason required to construct 15 to 20 days do
5. Dependence on type of Soil	(i) Depends on type of soil suitable for soils with silt, fine sand and clay with average particle size as 0.2 cm. (ii) Suitable where water table is at least 2 cm. below the bottom of pit. (iii) Should be at least 6m. away from drinking water hand pump where soil particle size is 0.2 cm or less. For other soil with coarse sand and high water table areas the pit need to be sealed with impervious materials & distance from well need to be increase to 15 m.	Nil - -	Soakage system to be designed on the rate of percolation of soil - -	Nil - -	Nil - -
6. Dependence on temp and Humidity	Nil (Should remain Wet)	Nil	Nil	Nil	Nil
7. Starting of Operation	Need bacterial Development	Nil	Need bacterial seeding	Need bacterial seeding	Need bacterial seeding
8. Water requirement Starting	Nil	1000 lit to fill the tank	2250 lit to fill tank	As per design	Same as septic tank
9. Effluent disposal	Water absorbed by soil	discharged in open	Soakage channels	In river or used for	In river or used for farming

10. Pollution of underground water	High risk	drain Nil	needing large space High risk	farming Not applicable	Risk to river water
11. Distance from existing buildings	0.85 m. in clayey soil and 1.25 to 1.5 in sandy soil or equal to the depth of pit.	Nil (can be constructed inside the building)	Equal to depth of septic tank	As per design of the unit	Same as septic tank
12. Distance from drinking water well/hand pumps	1. 6m. for soil with particle size .2 cm or less. 2. 15m. for sandy soil particle size .2 to .3 cm. 3. For other high water table areas not recommended with out full soil investigations.	Nil	Soakage pit to be 15 m to 30 m away depending upon soil	Not applicable	Not applicable
13. Others					
(i) Chambers	Consists two leaching pit	Consists 1 & 1/2 chamber of pre cast Hume pipes	Consists 3 to 5 chambers	As per design	Same as Septic tank
(ii) High water table areas	Not recommended in such areas	No restriction	Difficult to const. (Need pump to remove mater)	do	do
(iii) Danger to existing buildings	May cause danger Minimum distance vary 0.85 m to 1.35 m or equal to the depth of the pit depending upon the soil conditions .	No danger to building	May cause danger to the existing building due to seepage of water if constructed near building.	do	do
(iv) manhole	Pit covers are removed For cleaning	No man hole required as no cleaning is to be done	It is essential to provide manhole for annual cleaning work	do	do
(v) Cement required	7 to 10 bags of cements	7 bags of cement	15 bags of cement.	do	do
(vi) Use of disinfectants acids etc	Should be avoided	No restriction	Should be avoided to allow proper functioning.	do	do
(vii) Effect of Black Cotton soil & Similar soil	Get Damaged	Nil	Damaged by swelling & shrinking property of soil.	Nil	Damaged by swelling & shrinking property of soil
(viii) Effect of earthquake	Get Damaged .	Nil	Get Damaged .	Get Damaged	Get Damaged
14. Durability	Limited to period of filling the leaching pits (say 3 to 5 Yrs) need cleaning after filling.	Durable, guaranteed for working more than 58 years. Without cleaning (Thought it can work longer).	Durable, can work for long time with cleaning of sludge every year.	Durable	Durable
15. Precautions	Safe distance from building and underground source of drinking water is a must. This is not always possible in congested areas, urban areas and hilly areas in such cases under-ground water may get polluted or become unsafe for drinking.	No problem of cleaning, No contact with labour, No sludge removal, No problem of safe distance. Dilution of effluent by incorporated. The size should be properly selected and should always be on higher side.	(i) Septic Tank should be cleaned regularly (ii) Labourer should take proper care to avoid physical contact of the sludge. (iii) The sludge should disposed on safe places to avoid contamination of surface water, human contact, nuisance of foul smell.	Taken care During design	Same as septic tank except the distance of sokage pit is not a problem as the effluent is discharged in open drains. Dilution of effluent with waste water should be adhered to.