



Ecological Sewage Treatment and Disposal Assessment

System type:

3 Compost Toilets :

(Wagon toilet, Rising Sun and Angel's toilet)

Location:

The New Inn
Brilley
Herefordshire
HR3 6HE



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Composting Toilets

Compost toilets provide complete sewage treatment in-situ without using any water for flushing.

Human excreta falls into a composting chamber beneath the toilet pedestal. Naturally occurring bacteria, fungi, worms and other decomposing organisms thrive on this organic matter as a food source, and in the process break it down into humus, or 'compost'.

To achieve optimal composting conditions attention needs to be given to the use of an appropriate "soak" material, controlling moisture through urine separation, and a ventilation system. Urine is diverted to minimise leachate and avoid anaerobic conditions within the chamber

Human excreta potentially contains pathogenic bacteria, viruses and protozoa, and may be dangerous to human health. Composting kills all these human pathogens and the finished compost is safe and free from odour. Composted material is removed, usually once per year, and is an excellent soil conditioner, ideal for use on ornamental flowers and shrubs.

Basic Design Criteria

- Chamber size: $1/8 \text{ m}^3$ per person per year for urine separated compost toilet (That is $0.5 \text{ m} \times 0.5 \text{ m} \times 0.5 \text{ m}$)
- Chamber 1m from groundwater
- Collection above topsoil to utilise bacteria
- Ratproof
- Urine separation
- Twin chambers

Compost Toilets at The New Inn, Brilley

There are three compost toilets at The New Inn.

All are single chamber composting toilets, with two of the collection chambers below soil surface. They have no urine separation or ventilation.

The percolation value of the soil at each compost toilet location is 48Vp, and groundwater levels do not lie within one metre of the base of the chambers.

The site is not in a groundwater protection zone.

The toilets have 2 users, 4 days a week, which gives a Person Equivalent of 1.2 per toilet.

The chambers are single vaults, not divided.

Toilet 1: 'Wagon Toilet'

Useage (Person Equivalent): 1.2 PE

Sizings: The toilet chamber is generously sized for 1.2PE occupancy (90 x 90 x 70).

Distance from watercourse: 50m

Base of chamber elevation: 70cm below ground

Recommended Improvements:

Although groundwater is more than 1m from base of chamber CAT have concerns of lack of treatment of leachate. The system is not utilising the subsoil. Therefore CAT recommend adding urine separation either to a soakaway or to be collected for use as fertiliser.

Toilet 2: 'Rising Sun'

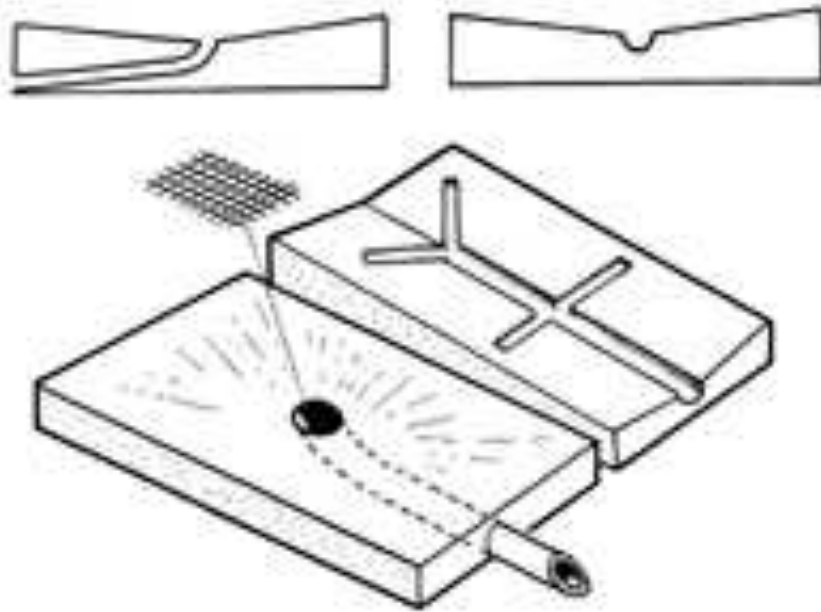
Sizings: The chamber is slightly undersized for its occupancy (50cm x 50cm x 50cm) and should be increased by 0.3m³

Distance from water course: 11m

Base of chamber elevation: 80cm below ground level

Recommended Improvements:

The chamber is within 15m of a watercourse. CAT recommend urine separation. It is also recommended that an impermeable base is created, with piped disposal of leachate to a soakaway further from watercourse (for example a concrete pad with pipe). When emptying the chamber a layer of fresh compost should be added to seed the chamber with aerobic bacteria and microorganisms.



Chamber base drainage

Another option would be to install a pedestal and contained chamber that can be emptied and compost on elsewhere such as this from Natsol

<http://natsol.co.uk/compost-toilet-products/compact/>

or this from Separett

<http://www.eco-toilets.co.uk/shop/villa-9010-toilet/>

In these cases the solid waste does not come in to contact with the environment at all.

Toilet 3: 'Angels Toilet'

Sizings: The chamber is generously sized for occupancy (50cm x 50 x 50)

Base of chamber elevation: 50cm below ground level

Distance from water course: 25m

Recommended Improvements:

Although groundwater is more than 1m from base of chamber CAT have concerns of lack of treatment of leachate. The system is not utilising the subsoil. Therefore CAT recommend adding urine separation either to a soakaway or to be collected for use as fertiliser.



Rising sun toilet



Wagon toilet

Additional considerations

CAT generally recommend a twin chamber design for compost toilets. This allows a resting period of one year in order for the excreta to compost completely. The toilets at The New Inn are single chamber. This means that the chambers will have to be emptied after one year and 'composted on' elsewhere for a further year.

This secondary composting site must be rat proof and 1m from groundwater. Ideally on good depth of topsoil or in a contained bin.



Rat proof composting

Urine Separation Design detail

Urine separation systems can be self-built, or proprietary urine separating compost toilet pedestals are available.

Urine is best separated using a waterless urinal for men and a funnel type system in the pedestal for women.

For retrofitting : <https://www.freerangedesigns.co.uk/index.php/urine-separator-for-compost-toilet.html>

