HOMEBIOGAS®

THE MULCH BASIN:

AN ECOLOGICAL SOLUTION FOR TREATING HOMEBIOGAS BIO-TOILET EFFLUENT

HOW DO I TREAT IT?

Effluent that comes out of the HomeBiogas system when it is connected to the Bio-Toilet should be handled differently than when you are feeding a HomeBiogas system with only food waste or animal manure. Even though the waste from the toilet goes through a pathogen-reducing anaerobic digestion process, it still needs to be contained for safety and health reasons.

THIS MEANS TWO THINGS:

The effluent should be diverted directly to a treatment solution without potential for user contact.

Effluent should not be fed directly to plants, but rather incorporated into a treatment solution.

WHAT'S MEANT BY "TREATMENT SOLUTION"?

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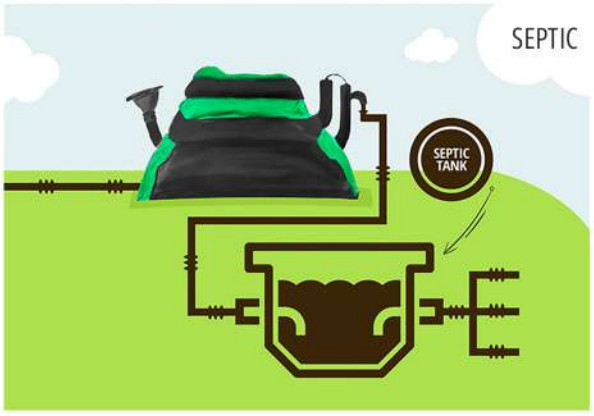
THERE ARE TWO MAIN TYPES OF SOLUTIONS FOR TREATING THE EFFLUENT THAT WE RECOMMEND.

1

CONNECT TO AN EXISTING WASTE MANAGEMENT SYSTEM

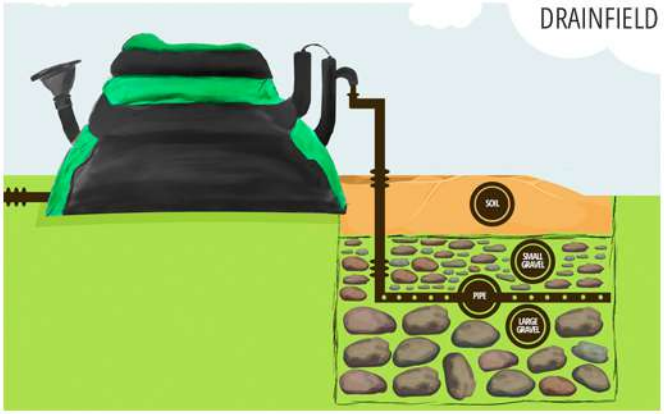
Run the effluent back into a septic tank or sewage system, using the pipes to connect to our original plumbing. We recommend getting the help of a technician or plumber for this.



2

USE AN ECOLOGICAL METHOD

Make a mulch basin or drainfield where the effluent is diverted to an area where it's filtered and provides hydration and nutrients for plants. You can implement either of these solutions by yourself without the help of a technician or a plumber.



WHAT SHOULD I BE AWARE OF WHEN TREATING IT?

There are a number of considerations you want to make before installing a drainfield. First, you should check with your local authorities on the regulations for treating sewage on your property. The following guidelines are recommendations based on a survey of typical regulations, but does not replace the local laws that are relevant to your jurisdiction.

OUR GUIDELINES:

Trees should be cleared within a 3.3m radius

The discharge pipe should be at least 2m from property boundaries

Keep a clearance of at least 33 meters from private wells

The discharge pipe should be at least 15m away from any downhill with an decline of more than 25%

The discharge pipe should have sufficient clearance from your house so there is no risk of backflow

Avoid placement near an area of standing water

WHAT IS A MULCH BASIN?

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AND WHY IS IT A GOOD SOLUTION FOR TREATING THE EFFLUENT FROM THE HOMEBIOGAS BIO-TOILET?

A mulch basin is a well-tested ecological method used to manage and treat wastewater (including grey water and pre-treated black water). This method filters wastewater using a natural process, and then channels it directly into the soil, where it is used to irrigate and provide nutrients for trees and shrubs.

The effluent from the HomeBiogas system is an ideal source of wastewater for this method because it is low in organic solids, high in nutrients, and is immediately ready to be used in well-drained, mulch and composted soils.

From the several options you can choose from to manage and treat the effluent from the HomeBiogas system or HomeBiogas Bio-Toilet, the mulch basin is the most recommended because it is ecological, sanitary and useful.

The mulch basin method can also be used to manage and treat effluent from HomeBiogas even if it is not connected to the Bio-Toilet solution.

PREPARATION: WHAT TO CONSIDER BEFORE GETTING STARTED

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ADVANCE PLANNING

- Check your local regulations for managing wastewater.
- Place the mulch basin at least 33m from private wells and 2m from property boundaries.
- Consult a local ecologist before choosing the plants which will receive the effluent from the biodigester system.

SAFETY & SANITATION

- Make sure the effluent pipe is covered with mulch to prevent contact with animals and humans.
- Do not use the effluent to water vegetables. Only use with trees or shrubs.
- In case of working on the pipes or effluent (e.g: for maintenance), make sure to wash your hands with soap afterwards.
- Do not collect and store the effluent for future use.
- Do not handle the effluent directly.

PREPARE THE GARDEN

- In sandy soils you may need to add water retaining elements.
- If your soil is poor quality, you may need to enrich it with gardening soil or compost.
- In very heavy soils you may need to make a deeper and wider basin to allow more water retention and infiltration time.
- To start off, you can use standard irrigation to make sure new plants have enough water in the first few critical weeks.

WHAT DO YOU NEED?

TOOLS AND MATERIALS

- Garden tools for digging
- PVC pipe 50mm wide
- Piping for irrigation
- Electric drill
- Optional: leveler for placing the pipe
- Optional: additional enriched soil or compost

3 TYPES OF MULCH:

Rough wood chips

Rough mulch made of large, chunky pieces, used for natural filtration(pieces 10cm+ wide)

Fine wood shreds

Fine mulch composed of shreds from woodland or yard pruning used for natural filtration

Landscaping mulch

Landscaping mulch used as top layer for protection and aesthetics (pieces between 2-8 cm wide)

GETTING STARTED!...HOW TO CONSTRUCT A MULCH BASIN FOR YOUR HOMEBIOGAS EFFLUENT

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STEP 1 PICK THE LOCATION

The mulch basin should be located near the HomeBiogas system and toilet, and ideally in an area with existing plants that will benefit from the effluent. If your HomeBiogas system is already up and running, check the surroundings to find a useful place to direct the effluent downhill towards trees or shrubs. If you don't have existing vegetation, you can plant new plants in the area in which the effluent will be directed.

WHAT TO CONSIDER WHEN PICKING A LOCATION

It is beneficial to place the mulch basin slightly downhill from the system's outlet in order to utilize gravity to move the effluent.

The mulch basin should be surrounded by fruit trees, shrubs and ornamental plants that will benefit from the nutrient-rich effluent.

The mulch basin pipe can be placed alongside a standard irrigation line to directly provide fertilizer.

It should be in a location which will not receive surface run-off from flooding during the rainy season.

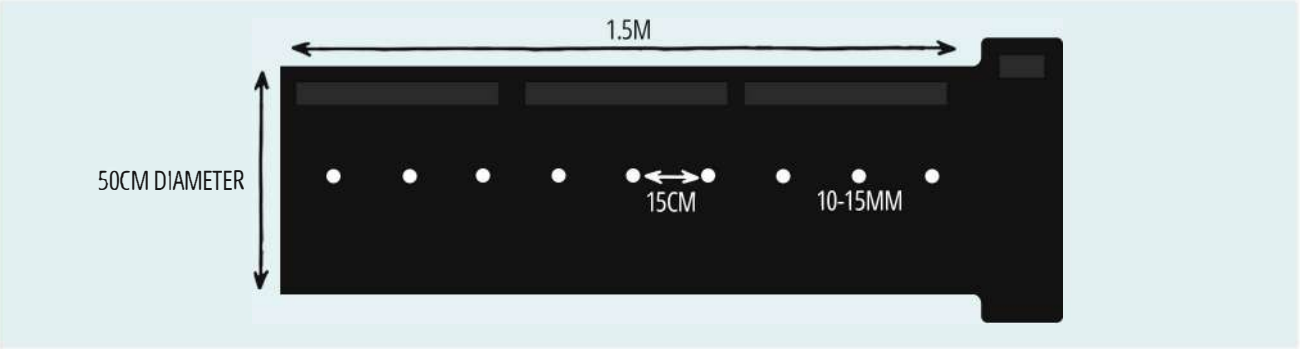
STEP 2 DIG THE DITCH

Dig a 2 meter-long, 40 cm deep, 30 cm wide ditch (basin). In very heavy soils you may need to make a deeper and wider basin to allow more water retention and infiltration time.

STEP 3

PREPARE PVC PIPE

Cut a 50mm diameter standard PVC pipe to the length of 1.5 meters, to fit in the 2m long basin. Drill holes (10-15mm wide) placed 15cm apart from each other along the length of the pipe. One end will connect to additional piping from the system, and the other end should be left open for overflow.



STEP 4

SOIL

Fill the basin with 20cm of soil, which has been mixed with local top soil. If you need to improve the quality, you can mix in compost or enriched gardening soil.

STEP 5

FINE WOOD SHREDS

Evenly spread 20-40cm of finely shredded wood mulch in the basin on top of the soil.

STEP 6

ROUGH WOOD CHIPS: LAYER 1

Evenly spread a 20cm layer of rough wood chips on top of the fine wood shreds.

STEP 7

PLACE THE PVC PIPE

Place the pipe into the basin with the holes facing down, and use a level to check that the liquid will distribute evenly.

HOMEBIOGAS MULCH BASIN

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STEP 8 ROUGH WOOD CHIPS: LAYER 2

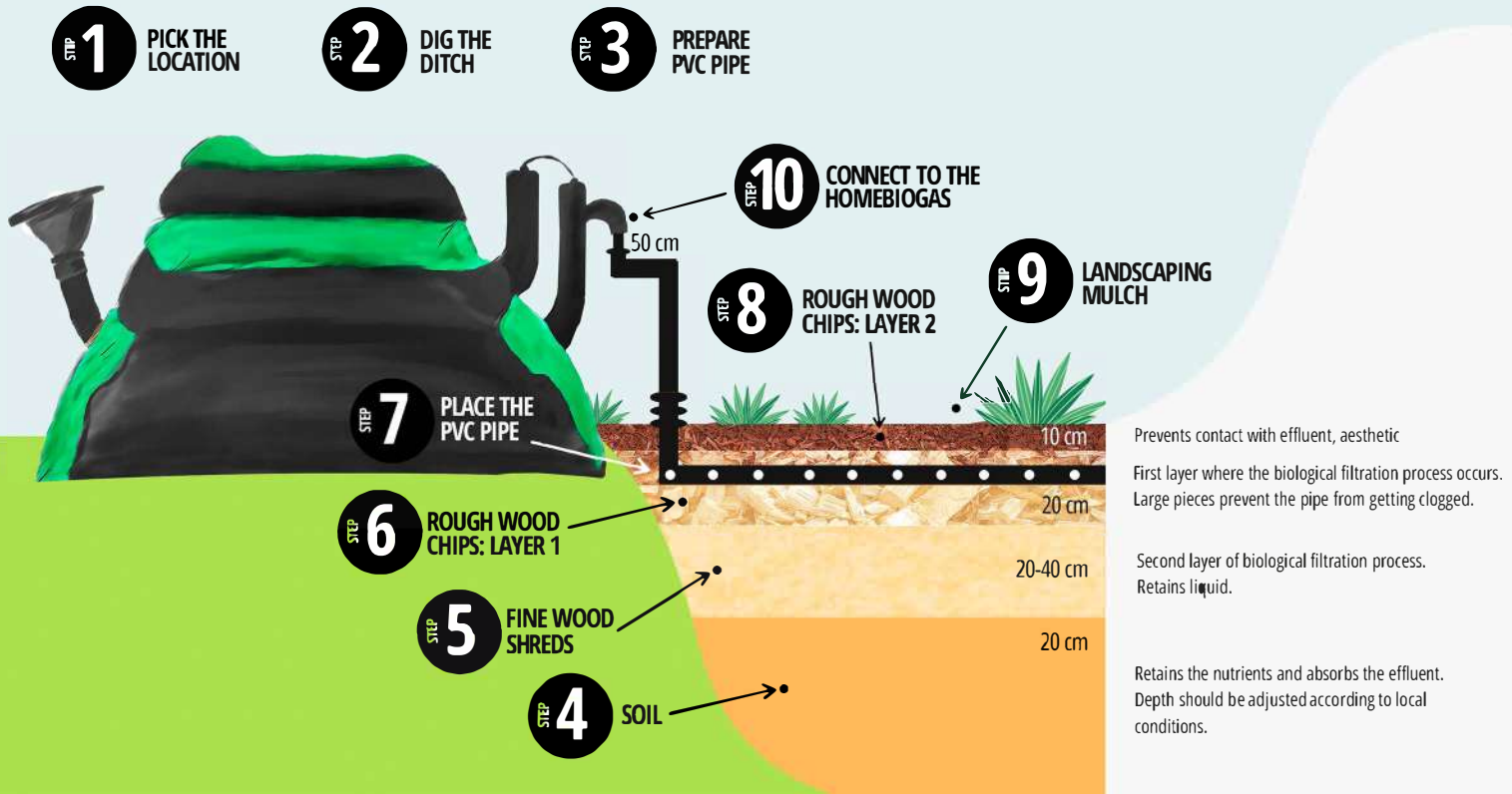
Cover the pipe with an additional layer of 10cm rough wood chips.

STEP 9 LANDSCAPING MULCH

Cover the area with landscaping mulch to prevent contact with humans or animals.

STEP 10 CONNECT TO THE HOMEBIOGAS

Use additional PVC piping to connect the HomeBiogas system to the buried pipe in the mulch basin. The effluent will be directed from the system through the pipe as the liquid is naturally displaced. When it reaches the buried pipes, the liquid will drip through the holes and be filtered through the layers you have created.



THE MULCH BASIN IS READY...

HOW TO MAINTAIN IT?

Before planting new plants... wait several weeks to allow the basin to absorb the effluent and start the biological processes. Observe and locate moist areas which are ideal for planting.

Add or replace mulch as needed, and if the PVC pipe becomes exposed.

Inspect and clean the holes in the pipe at least once every 6 months.

NOW WATCH YOUR PLANTS GROW!

SUGGESTIONS TO HELP ENHANCE THE BIOLOGICAL CONDITIONS

Mix into the soil: EM (Bokashi)

Use HomeBiogas probiotics inside your HBG system

Put red worms, Eisenia fetida, in your Mulch Basin

OTHER OPTIONS AND RECOMMENDATIONS:

It is optional to create a wicking bed or mulch-based biofilter for a semi-closed system that adds an extra usage and treatment cycle for the biogas liquid before being dispersed to the land.

You can also find more information about the different use of mulch basins at the following websites:

WWW.HARVESTINGRAINWATER.COM
WWW.OASISDESIGN.NET

Please contact us with questions and updates on your process! Your feedback is important.

INFO@HOMEBIOGAS.COM