BIO MINERALS TECHNOLOGIES, INC.

How to build your own Microbial Mineral Tea brewer

The documented benefits of well-made microbial mineral tea are substantial, especially when you use the right source materials. The obstacles, for many, include the equipment required and the time to brew. However, both can be overcome with minimal planning and effort.

Bio Minerals Technologies has been teaching farmers how to brew high-quality microbial mineral tea for years. We also sell the brewing supplies, and pre-manufactured brewing tanks of all sizes. However, we have also given away the plans, parts lists, and general instructions for building your own tanks and many farmers have done so successfully. In fact, we are getting so many request for the build-your-own information that we have decided to put the instructions into a single document for easier access and distribution.

We include instructions here for three sizes of brewers: 1,500-1,700 gallons, 275 gallons (tote), and 55 gallons (barrel).

These are not the only sizes that can be made, but the instructions can be adapted to whatever size you need. We have farms with 2,000, 6,000, even 10,000 gallon tanks and they successfully brew all through the farming season.

A successful brewer consists of the following items:

- Storage tank
- Brewing basket
- Brew bags
- Aeration system
- Air source
- Dispensing valves

Specific instructions and examples are given below.

Large Brewer – 1,500 gallon

For farm and field applications, this is our most common size. A full brewer will generate enough microbial mineral tea to cover 100 acres at 15 gallons/acre.

Parts list

- Brewing Tank – qty 1
- Tank frame – qty 1
- Basket frame – qty 1
- Regenerative Blower – qty 1
    - Atlantic Blower AB-301 2HP (single-phase)
- 2” “suction” hose – 17’
  Actual length depends on placement of the blower and distance to the bottom of the tank.

(Note: We use “suction” hose on the air output side because the wire ribbing helps prevent kinking or collapse during transport and operation)

- Banjo 2” bulkhead fitting – qty 2
- 2” braided hose – qty 3-5’
- Banjo 2” valves – qty 1

Atlantic Blower is out of Texas and their number is 214-216-6763, or they can be purchased through us at Bio Minerals Technologies, 435-753-2086

Consumables

- 30” x 30” filtration bags – qty 4
  These bags can be purchased from Bio Minerals Technologies. With proper care, the bags can last for several years before they need replacing. When the bags are not in use, store them out of the sunlight to prevent sun rot.

Example Pictures and Instructions

The least expensive way to build a 1,500-gallon brewer is to use a flat bottom tank with the top cut out to make room for the basket frame. The pictures below show a tank we use in one of our brewers. The dimensions of this tank are 87” diameter and 60” tall.

In order to move the tank around as needed, we built a frame for it. The frame holds the tank secure and gives us the space to attach the valves as well as the rigidity for the brewing basket. The top of the upper ring should be just above the top rim of the tank to hold it secure and to provide the support for the brewing basket.

***Note**: The following measurements are for our specific 87" x 60" tank. If you are using a different size tank, adjust your measurements accordingly.*

The uprights of the frame are 4” x 4” x ¼” steel posts, 77” tall.

The feet are ½” steel plate measuring 9” x 9”. Be sure to cut a hole in the center so water can drain out of the upright posts.

The ladder rungs are ¾” x 16” steel rods spaced every 12” from the bottom.

At the top of each post is a 3.5” D-ring (4080 lb capacity) with weldable retainer.

The inside dimensions from post to post are 61.5 on the square (post corner to post corner) and 90” on the diagonal (face to face).

The lower channel connecting the uprights is 4” channel.

The top ring that connects the posts is bent 2” angle steel. The inside diameter on the ring is 90”.

The center ring for the floor is 10” OD steel pipe and the cross pieces to connect it are the same 4” channel.

Here is the floor of the frame, welded together, with the cutout in the center for the tank’s drain valve. There is a 2” slope from the outside of the frame to the center ring.

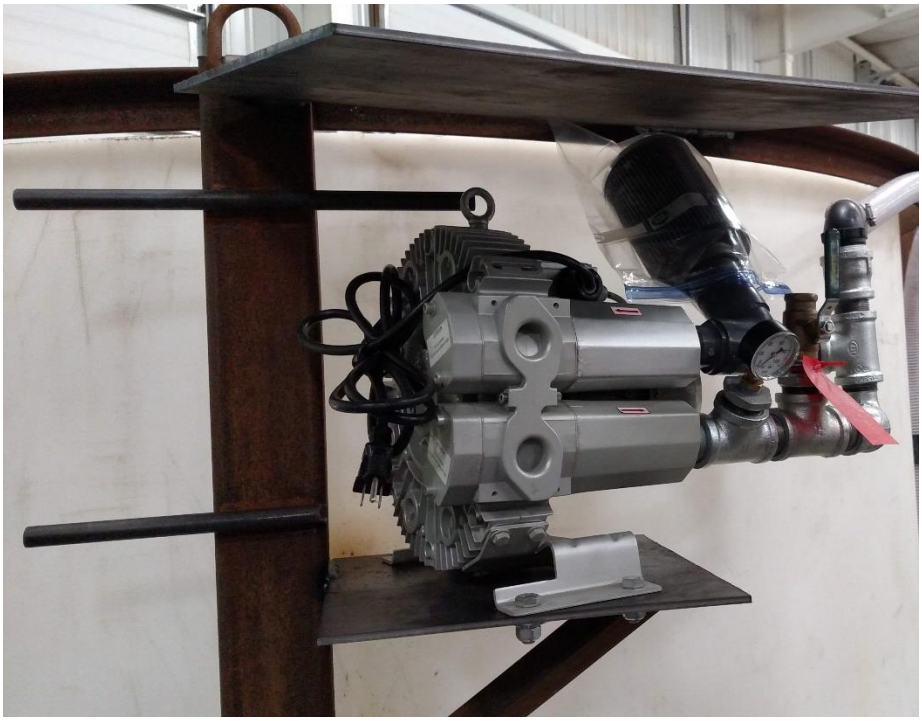
At the center of the tank floor support, we fill the 10” ring with plate steel and then cut out a hole for the 2” bulkhead fitting. The plate provides a rim to attach the bulkhead which pulls the bottom center of the tank down for better drainage.

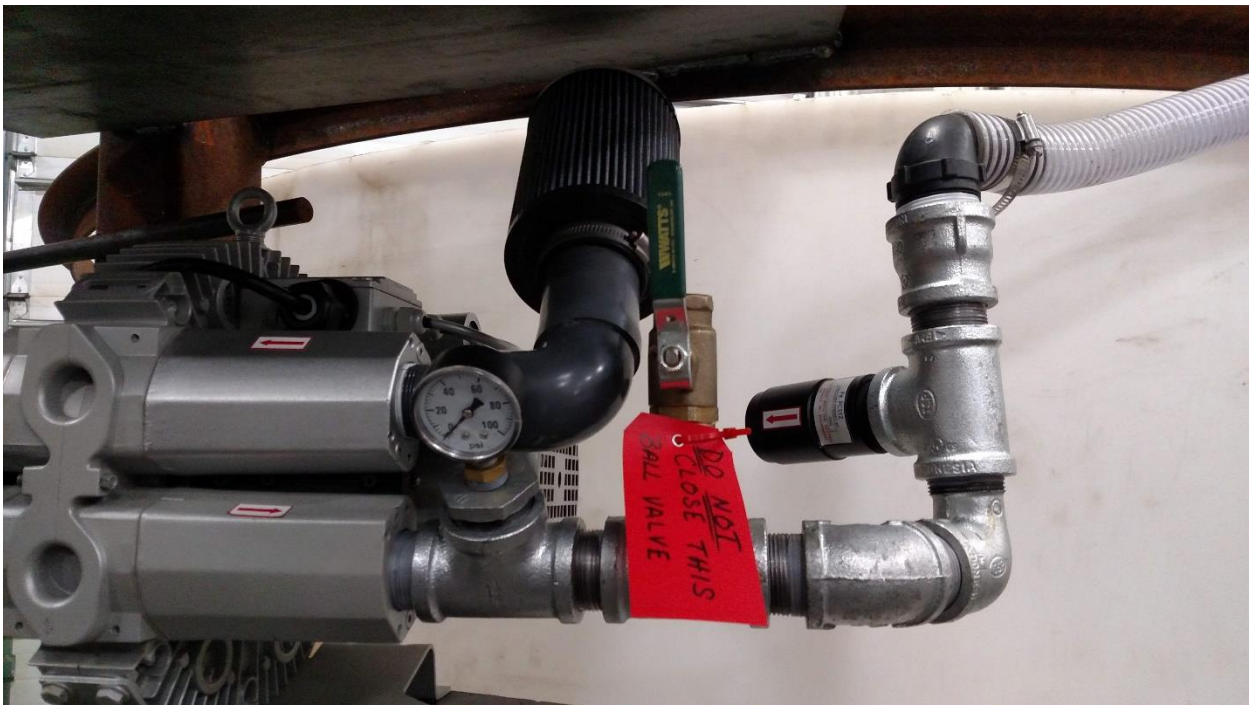
Here is the finished frame with the retaining ring welded to the top and the tank floor support completed. The pictures on the following page show the motor mount platform and valve mount platform.

We attach a 2” output valve in the bottom to dispense the tea and provide a cleanout for the tank. We use 2” Banjo quick-connect fittings to make it easy out in the field.

Note the valve bracket attached to the frame for the clean-out valve. It keeps the valve stable, brings it out where we can reach it, and prevents breakage.

We build a platform for the blower and mount it to the side of the tank frame. We weld a plate over the top as well to protect it from the weather and to prevent rust and water damage.

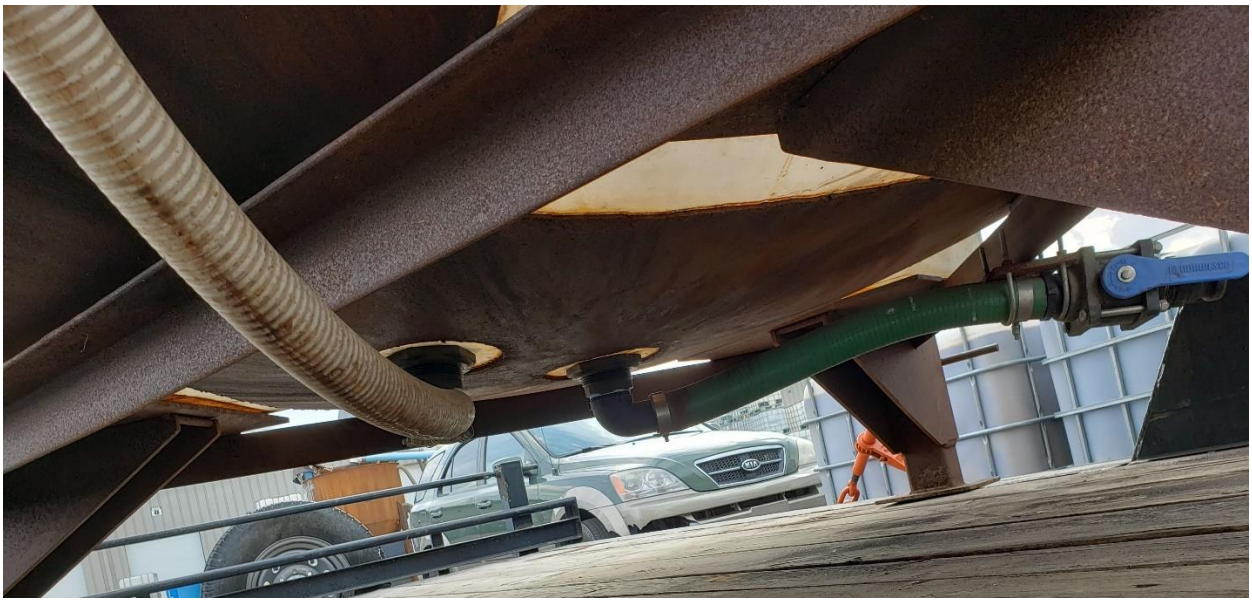




The air input filter is pointing up and toward the back of the cover. On the air output side, there is a pressure gauge, followed by a ball valve which allows you to adjust the airflow into the brewer. Following the air escape ball valve is a pressure relief valve which provides a failsafe setting for the blower. After the pressure relief valve, we run the air hose into the tank.

You can see the line below as it runs from the blower, across the top, and down the right-hand leg. We use a 2" bulkhead fitting to pass the air to the inside of the tank. To hold the line in place, we weld several metal sleeves to the frame and pass the line through the sleeves.

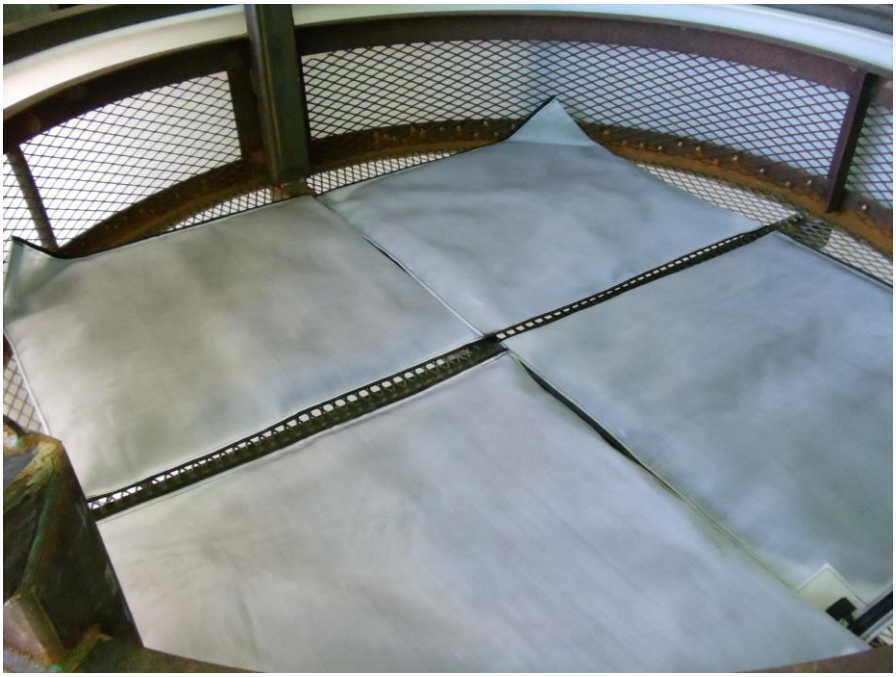
The hose is simply run to the bulkhead fitting at the bottom of the tank and the air is released freely inside the tank. This picture shows the bulkhead fitting on the bottom side of the tank, but we have lately put them just off-center on the bottom of the tank. The picture below shows a view of the underside of a brewer with the drain on the right (green hose) and the air supply line on the left.



The basket frame for our white tank is a 4.5’ x 4.5’ x 2’ basket with arms that extend far enough to rest on the top of the tank frame (actual length will vary with your tank and frame).

The basket frame is made from 2” x 2” x 3/16” angle steel and the sides and bottom are cut from ¾” flat expanded plate. We put the D rings and weldable retainers on each corner to allow us to lift it easily with a chain and fork lift or tractor.

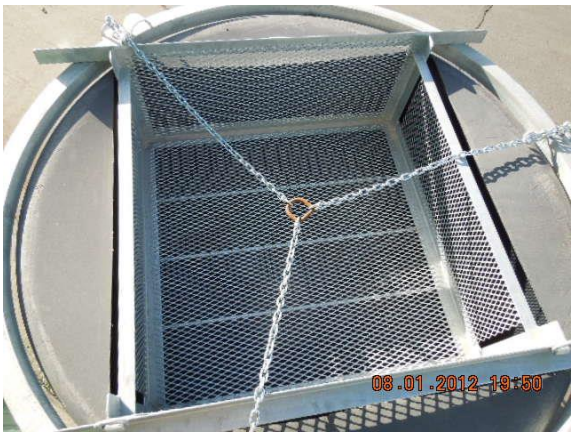
When in use, the filter bags are laid out flat inside the basket frame. Always spread out the material inside the bags as flat and thin as possible to maximize air and water circulation.



When the tank is full and the air is on, air and water circulate through the filter bags, extracting biology and minerals and creating the nutritious microbial mineral tea for your fields.

Large Brewer – 1700 gallon

We also have a slope-bottomed 1,700-gallon tank that we use for the large brewers. The construction is similar to the flat-bottomed tank, just a different shape and size.



As you can see, the concept is easily adaptable to use materials you have on hand. Some of our farmers have used old milk tanks or other alternatives.

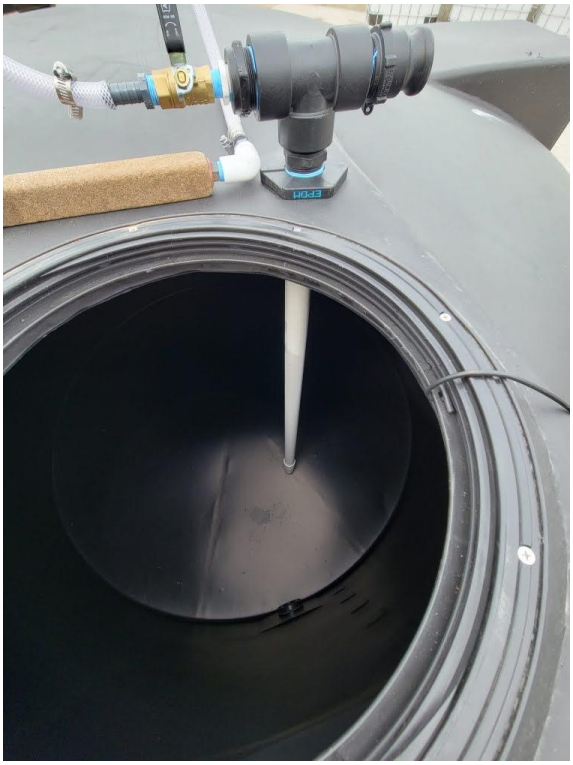
Note: If you are using a used tank, do not use a tank that has stored or held herbicides, fungicides, pesticides, or any other biological toxin. Residues from those materials can interfere with the proliferation of biology that is critical to the success of your microbial mineral tea.

Free-standing tank – 1400 gallon

We have also built several brewers from free-standing flat-bottomed poly tanks that did not need a frame. This style is not as easy to move around, so we built these on trucks or trailers for mobility, but they are certainly simpler to construct without the frame.

We use the same blowers as on the framed brewers since the water column height is similar.

As you can see in the picture, we ran the air input directly to the top of the tank and then used a PVC “T” to split the air supply. The main air is piped straight down to the bottom of the tank for circulation. A secondary line comes off the “T” and attaches to a smaller air hose with a 12” air stone that drops into the bottom of the brew bag. The air stone pushes air through the material in the brew bag, helping to efficiently extract biology and minerals from the brew materials.



The basket is manufactured to fit a standard manhole, with the bag made to fit.

Tote Brewer – 275 gallon

Our small brewer is made from a standard plastic tote and frame. It is easily transportable and very economical for smaller operations, large gardens and landscapes. Since the frame is already part of the tote, the only metalwork that needs to be done is to build the basket frame.

Parts List

- 275 gallon tote (new or used) – qty 1
- Regenerative blower (110 v) – qty 1
  AB-101 Regenerative Blower, ½ hp, from Atlantic Blower
- Basket frame – qty 1
- 1.5” flexible hose for air feed

Consumables

- 9” x 30” filter bags – qty 2
  These bags can be purchased from Bio Minerals Technologies. With proper care, the bags can last for several years before they need replacing.

Example Pictures and Instructions

Since this brewer is built from a standard tote, many people build them with used totes. As with the larger tanks, used is ok, as long as it wasn’t used for anything toxic to biology. Do not use totes that were used for herbicides, pesticides, fungicides, anti-microbial cleaning materials, etc. Also, be sure to check the drain valve for leaks before you start. The valves can be repaired or replaced if they are faulty.

A finished brewer is shown below:

The first step is to cut the opening in the top of the tote. Cut out the section between the crossbars as shown below.

Mount the regenerative blower on the back side of the tote (the side away from the drain valve).

Note: If the tote and motor are sitting outside in the weather, be sure to protect the motor from water.

Build your filter bag basket frame as shown below. You want the higher sides on the basket to keep the brew bags from falling out. The basket should be deep enough for the bags to be submerged when the tote is filled to 250 gallons.

Measurements are as follows:

Overall length: 41”
Basket length: 31”
Width: 15”
Depth: 16”
Basket sides: 10”

The ends of the basket frame should hook over the sides of the tote frame.

Now install a bulkhead fitting at the bottom of the tote, opposite of the valve, for the air supply line. Use a 1.5” threaded opening. Install a 1.5” male threaded to 1.5” barbed elbow on the outside and connect it to the output on the blower with 1.5” reinforced flexible tubing.

Once your brewer is assembled, fill the filter bags with the brewing materials and place them in the basket as shown.

Be sure the bags are flat and the material is evenly distributed for maximum air and water flow through the bags (do not stack the bags on top of each other).

You are now ready to brew!

Barrel Brewer – 55 gallon

Our barrel brewer is made from a standard 55-gallon plastic barrel. It is easily transportable and very economical for smaller operations, large gardens and landscapes. The only metalwork that needs to be done is to build the blower mount and the basket frame.

Parts List

- 55-gallon barrel (new or used) – qty 1
- Air pump (110 v) – qty 1 (Pentair Whitewater 25-watt V301 blower)
- Basket frame – qty 1
- 12" airstone (Pentair ALR30 1.5" x 12") – qty 1
- 3' flexible hose from blower to airstone

Parts for barrel drain and hose

- 1.5" bulkhead fitting (for drain) – qty 1
- 1.5" to 1.25" threaded PVC bushing – qty 1
- 1.25" threaded PVC nipple – qty 1
- 1.25" threaded PVC gate valve – qty 1
- 1.25" thread to barb PVC nipple – qty 1
- 3' x 1.25" braided hose (or however long you would like to make the dispensing hose)

Consumables

- 9" x 9" filter bags – qty 2
  These bags can be purchased from Bio Minerals Technologies. With proper care, the bags can last for many years before they need replacing.

Example Pictures and Instructions

Since this brewer is built from a barrel, many people build them with used barrels. As with the larger tanks, used is ok, as long as it wasn't used for anything toxic to biology. Do not use barrels that were used for herbicides, pesticides, fungicides, anti-microbial cleaning materials, etc.

The finished brewer shown below was built with a bigger air pump, but these pumps are noisy. The smaller V301s are much quieter and they work very well also:

An opening is cut into the barrel and the blower platform is mounted to the top. Be sure all fastenings are secure so the blower is secure.

The brew basket is designed to rest on the top of the barrel and blower platform, with the basket sitting low enough that the brew bags are completely submerged during brewing.

The general dimensions of the basket are as follows (front and side references are facing the brewer, looking across the opening to the blower at the back):

11” front to back

13” side to side

12.5” deep (from bottom of crossbars to bottom of basket frame)

8” deep basket mesh

The length of the crossbars should be enough to hang over the edge of the barrel and rest securely on the blower mount platform.

The drain at the bottom of the barrel is for dispensing the finished tea and rinsing out the barrel. This design works best when the barrel is set up on some type of pedestal, so the drain can flow easily into buckets or sprayers for dispensing.

We use a standard 1.5” bulkhead fitting, with a 1.5” to 1.25” threaded bushing to reduce the output. The valve and dispensing hose is 1.25”. All parts should be readily available at your local plumbing parts store.

We use standard 3/8” hose and fittings to connect the blower output to the airstone. A 90 degree threaded adapter on the airstone helps it to lay flat on the bottom of the barrel.

Use enough hose to allow the air stone to lay flat, but don’t leave too much extra.