

## Supplement to Earth Tub Operating Instructions

Note: these instructions are not intended to stand alone, but are a supplement to the Operating Instructions and the Troubleshooting guide included in the Earth Tub Operations and Maintenance Manual prepared by Green Mountain Technologies.

### Starting a new tub

Put 6 cubic feet of large bark chips (about 2 inch diameter, available from garden centers) on the floor of the tub. Make sure the metal grate is well-covered. These large chips keep the small particles from falling through the metal grate.

Alternatively, cover metal grate with a piece of mulch cloth. Make sure the cloth lies flat so it won't get caught on the auger.

Fill the tub about 1/2 full with dry sawdust/wood shavings mix. Distribute it evenly around the tub. This material absorbs the moisture from the food scraps. It also provides aeration spaces.

### Adding food scraps

It is possible to add as much as 1000 pounds of food scraps in one day to a new tub that is half full of sawdust. When the tub has been going for a while, there will be less 'head room' and scraps must be added slower. Be sure to add sawdust or bread to balance the moisture. Distribute evenly over the surface of the tub, either by moving the opening port around the tub or by pushing the material across the tub with a gardening implement. The auger is meant to mix materials vertically, not horizontally.

### Acceptable materials for composting

- Vegetables and fruits—large items like pumpkins and watermelons must be cut in half. Do not add cardoon, a vegetable that is like a 1.5 foot long stick, as it could potentially overload the auger.
- Bread—OK to leave paper wrappers on, whole uncut loaves are fine. Bread is useful for balancing the moisture levels of vegetables.
- Salad mix—must remove plastic bags.
- Coffee grounds and filters, tea bags.
- Meat, cheese, etc, up to 10 percent of tub by weight. Holiday dinner scraps are no problem.
- Holiday dinner scraps, including biodegradable plates, cups, napkins, placemats. Must be carefully sorted to exclude glass. Non-biodegradables, like creamer packets, etc., should be removed. BioCorp utensils, used for the Holiday dinner in 2000, did not decompose fully. Soaking them in water before composting does not seem to have any appreciable affect. They can be composted if they are put through a garden-variety yard waste grinder first. Otherwise, consider using plastic utensils and sterilizing them in a dishwasher for later use with the lunch program for volunteers. Alternatively, try another brand of biodegradable utensils or put up with the contamination in the finished compost.
- Garden debris from Grey Bears facility—it can be added if it is chopped small enough so it won't wrap around the auger. We prefer to reserve the space in the tubs for food scraps, and compost the garden debris behind the office, near the garden.

### Adding sawdust

You will need to add more sawdust periodically as the compost mixture gets too moist. Compost moisture can also be adjusted by adding bread, but some sawdust will be needed to keep the compost texture somewhat crumbly. If the compost moisture level is good but the structure is like clay, sawdust is needed

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for aeration. Also, if the compost smells like ammonia, more sawdust is needed to balance the high nitrogen levels in the food scraps.

#### **Mixing with the auger**

Move lid only when auger is turning. Trying to move the lid when the auger is not running may damage auger.

Ideally, lid should make one revolution every 5 minutes. Remember that the auger is meant to mix materials vertically, not horizontally. Turning the lid this slowly allows maximum mixing of the material. Turning the lid rapidly also accomplishes mixing, but some of the energy you use is wasted. To thoroughly mix the material after adding a large volume of food scraps or sawdust, it may be necessary to make up to five revolutions.

It is easier to turn the lid counterclockwise, but the electric cord to the auger eventually gets twisted. When it does, turn off the auger, open the little box and unplug the auger and untwist the cord. (This should be done each day.) Alternatively, turn the lid equally in each direction.

It is best to rotate the tub with the auger near the center of the tub first, then work the auger gradually out to mix the material further from the center. This makes it easier to turn the tubs, and there is less load on the auger.

Always auger after adding food scraps. The goal is to cover the food scraps, so they can start composting and they won't attract flies.

#### **Emptying the tub**

When you have added 3000-4500 pounds of food scraps to the tub, stop adding material and let the compost 'cook' for about 2 weeks. Continue to scrape the sides weekly to mix in the outer material. To remove the compost, spread tarps below the side tub doors and run the augers. Empty the tarps into a 4x4 wood bin. You will have to use a bucket or a shovel to remove material that is not pushed out by the auger. Some of the material, that has not been reached by the auger will not be composted. Put it into the other tub.

Because we have had drainage problems, we have always emptied the tubs out completely to check drainage under the aeration floor. The manufacturer recommends emptying the tubs out completely every six months. Between times, about 1/10<sup>th</sup> of the material in the tub should be left as a starter for the next batch of compost. Compost should be allowed to 'cure' for one month before it is sold or used on the garden. Current plans call for putting the compost in buckets at the end of the curing period for sales through the Thrift Store.

#### **Record sheet**

Note materials added, recording weight. Noting volume is optional, but is useful for figuring out savings on garbage bill. Note number of 5-gallon buckets of sawdust added. If water is added, estimate number of gallons by timing how long it takes to fill up a 5-gallon bucket, and squirting compost for timed intervals. As noted at the bottom of the record sheet, we have calculated that it takes about 40 seconds to fill a 5-gallon bucket if the water is turned on hard.

#### **Temperatures**

Optimum temperatures are from 131 to 140 degrees F. It is important that temperatures reach 131 or higher and stay there for at least three days during the 'cooking' phase, after all food scraps have been added to the tubs. This ensures pathogen destruction. If temperatures are running below 131 degrees F, close the ball valve on the aeration system. If temperatures do not increase, you can shut off the blower.

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#### **Moisture level**

The compost should be as moist as a wrung out sponge. That is, if you squeeze a handful, your hand should be moist but not more than 1-5 drops of moisture should leak out. When starting a new tub, you can add moist scraps without adding sawdust (since the tub is already half-full of sawdust). Later on, if you add many wet scraps (lettuce, melons) you will need to add sawdust. Bread can help to balance wet scraps.

#### **Odor**

If compost smells strongly of ammonia, this indicates carbonaceous material is needed to balance nitrogen in the food scraps. Sawdust should be added.

#### **Daily tasks**

Check in with Russel and/or check record sheet for special instructions. Check temperatures and moisture levels. Add produce and sawdust as appropriate. Mix both tubs with augers. You should unplug and untwist the auger electrical cord at the end of each day. Make notes on record sheet as appropriate.

#### **Weekly tasks**

Scrape sides of tub, so material between tub wall and auger gets mixed in.

Check to make sure the biofilters are moist. If not, moisten them with a hose. You will need to stir the material with a shovel or pitchfork while moistening, and you may need to remove the material from the biofilter and add it in layers wetting each layer as you go.

Check hoses to make sure they are flowing and not plugged. If they get plugged, they must be disconnected and cleared out. You can try to clear them with a length of wire or connect them to the fresh water hose and blast them out.

Check sanitation around tubs and hose down/scrub with broom and bleach solution as needed. Clean tops of tubs as needed.

Listen for blower. It should always be on. When the blowers get wet, they often stop working, but they usually recover when they dry. Also, the GMT manual says you can push the black rubber knob that is visible through the air intake hole to free the blower wheel if it is stuck. If all else fails, there are a few replacement blowers in the shed.

#### **Monthly tasks**

Grease auger

#### **Tasks for when tub is empty**

Remove metal aeration floor and clear any small particles out of drainage and aeration system. Clean or replace drainage hoses as necessary for good moisture flow.

#### **Reporting problems**

Electrical problems—Circuit breakers for the tubs are at the far front corner of the Thrift Store building. If the circuit breakers flip more than once, it is almost certainly a problem with the electrical connections. Report electrical problems to Marc Kimmel. His phone numbers are at bottom of record sheet.

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Other problems--Call Karin Grobe, 427-3452 with any other problems. The phone number of the tub manufacturer, Green Mountain Technologies, is also at the bottom of the record sheet.