



# Dishing the Dirt

A Compost Solution for Every Situation





Published in 2016.

The Saskatchewan Waste Reduction Council thanks the City of Saskatoon and the City of Regina for funding this year-long study, and our brave volunteer testers for participating. While all numerical data comes from our biweekly surveys, the recommendations and conclusions expressed are the views of the authors.

For questions about the Dishing the Dirt project or additional composting information and support, contact the SWRC's composting hotline at **306-931-3249** or **compost@swrc.ca**.



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# Executive Summary

In 2014, the Saskatchewan Waste Reduction Council undertook a comprehensive study of 26 different onsite compost methods with financial support from the cities of Saskatoon and Regina. Each of these compost systems were tested by a different Saskatchewan household, office, or community garden over the course of one year.

The purpose of this study was to investigate a variety of different composting options in order to identify which methods work best in different kinds of households or institutions. The end goal was to create a set of simple recommendations that would help households and institutions pick a composting method that works well for them. It was also meant to test these compost methods in the Saskatchewan climate.

The compost bins and other systems were chosen to reflect a number of shapes, sizes, methods and price ranges. All systems chosen were either available at local retailers or online. Volunteers were sourced via word of mouth and had a range of composting experience. Volunteers reported on their inputs, moisture levels, time and effort, amount of finished compost and any problems that occurred.

We tested stationary bins, tumbling bins, in-the-dirt methods, and indoor methods. One general finding was that the relative price of a compost system was not a reliable indicator of how well it worked. Another finding was that the choice of optimal compost system depended on whether the user was a “hands-on” or a “hands-off” composter. Hands-on composters generally had more composting experience and knowledge and had more time available to tend their compost systems. Hands-off composters were still happy to divert their organic waste but had less familiarity and time to spend. This distinction had implications for which systems worked best for each group.

The stationary bins varied by their balance of airflow and insulation, how they were meant to be aerated, and their capacity. Of these differences, capacity proved the most important. We found that hands-on households who could keep their piles active could make do with lower capacity bins, while hands-off households did better with large stationary bins that could be run at a slower pace without filling up prematurely. The larger bins were also better for those who wished to continue diverting their organic waste in winter, as they had more room to stockpile frozen materials.

The tumbling bins generally had small capacities, and worked best for hands-on households. Tumblers can be easier to aerate than stationary bins and are more rodent-proof. However our tumblers were considerably more expensive than the stationary bins and did not fare well in winter. Their small capacity didn't allow for much frozen waste and their doors sometimes froze shut.

The in-the-dirt systems were some of the most simple and cheap methods of composting we found, and could work well for hands-off households. However they are generally inaccessible in the winter months and not available to those with no free garden space.



While the indoor composting options worked well for our volunteers, these systems leave less margin for error as odor and pests are more problematic in indoor spaces. These systems function through the winter, but are not suitable for handling yard waste and require a more hands-on approach.

Three composting options were identified as not ideal for Saskatchewan's climate, particularly for beginner composters. The Green Cone requires extremely well-draining soil to work correctly and ceases functioning for several months in winter. The Earth Maker is too small to work properly for most people, and its cost did not translate to its quality. Lastly, the Lee Valley Wire Mesh is virtually identical to a compost heap, which is free, and therefore isn't worth the cost.

It is important to properly match a household or institution to the right compost method. Determining what methods their space allows, as well as what fits best with their level of experience and available time is key to their composting success.





# Introduction

The Saskatchewan Waste Reduction Council is dedicated to helping the people of Saskatchewan reduce waste. Onsite composting diverts organic materials from the landfill, while also reducing transportation-related costs (including fuel-use and greenhouse gas emissions) due to less material needing to be collected from the curb. Additional benefits of composting include:

- Further reducing greenhouse gas emissions through proper management of organic waste. (When organic materials such as food and yard waste are sent to the landfill instead of composted, they decompose slowly in a nearly airless environment, which creates methane gas.)
- Creating a valuable soil amendment that improves plant and soil health.
- Helping conserve water and reduce pest problems in gardens.

As the largest urban centres in Saskatchewan, Saskatoon and Regina also have an interest in diverting organic waste from landfill. Saskatoon's 2012 waste audit revealed that compostable food and yard materials make up 43% of residential waste during the summer. Regina's waste assessment from 2007 similarly showed that 41% of summer residential waste was food and yard materials. If more of these organic materials can be composted onsite rather than collected and processed municipally, it will create savings and environmental benefits for both cities.

## Study Purpose:

Statistics Canada (Composting by Households in Canada, 2013) indicates that 61% of Canadian households do some kind of composting. In Saskatchewan, however, this is only true for 47% of households. Saskatchewan is behind the rest of the country in terms of diverting organics from the waste stream, and could do more to promote backyard and onsite composting.

In this context, the SWRC wanted to address two major concerns with typical composting programs:

- **Composting is often treated in a "one-size-fits-all" manner.** Typical composting advice and guides are aimed at households with an outdoor yard, some form of garden, and a serious interest in making finished compost for their own use. While gardeners with yards do make up a significant portion of the households that currently compost in Saskatchewan, this overlooks many other groups, such as people with no outdoor space, people looking for minimum-effort methods, and institutions such as schools or offices. People in 'atypical' situations may believe that they can't compost because the commonly promoted solution doesn't work for them.
- **There needs to be more Saskatchewan-based research on onsite composting options.** Compost guides and testimonials that are not based on climates similar to the Canadian Prairies are not necessarily applicable here. Additionally, some compost technologies, such as bokashi fermentation, are well established in other regions but are still quite novel here. These methods need to be tested in a Saskatchewan context to see if they are a good fit.

The Dishing the Dirt project addressed these concerns by undertaking Saskatchewan-specific research on a wide range of composting methods to identify the ones that work best for different kinds of households, or other institutions, with different levels of experience. The project was meant to create a compendium of compost knowledge that could be used by both individual residents and municipalities to enhance their composting efforts.

Our initial goal was to test 20-25 different compost systems and create explanatory and promotional materials from our findings. We hope to revisit our findings periodically by testing new compost systems as they become available in Saskatchewan.

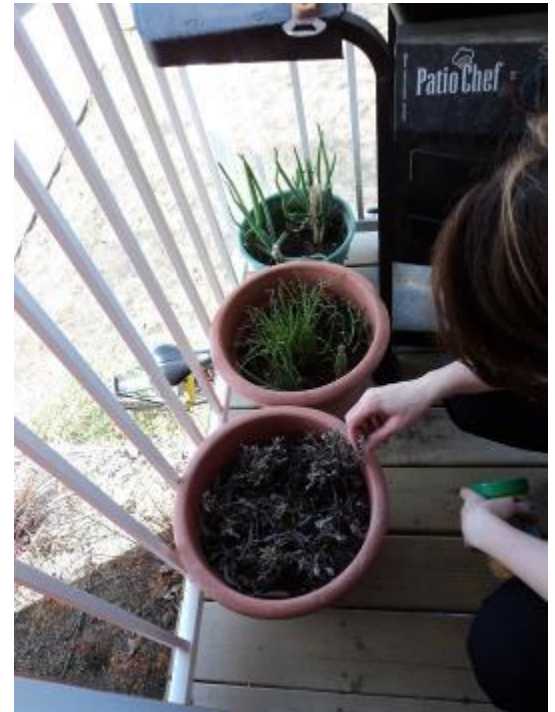
# Methodology

## Choosing Compost Systems to Test

The Dishing the Dirt project began by identifying different compost systems appropriate for testing. We wanted to represent a wider range of options than the usual outdoor bin. So, in addition to outdoor bins, we included indoor systems as well as outdoor systems without bins. We also sought to represent systems that were both homemade and purchased, with a variety of price levels. Narrowing in on individual systems to test was done with the collective knowledge of the Saskatoon Compost Coaches (formerly Saskatoon Master Composters) as well as the 2010 book, *Composting for Canada*.

We also took into account what compost systems were commonly available for purchase from local gardening and hardware retailers. If a commercial compost system identified as important and influential wasn't available from a local retailer, we checked if they were available directly from the manufacturer or from a secondary retail site such as Amazon.ca. If a commercial compost system was not available either from a local retailer or online, it was dropped from the study. From our composting knowledge and survey of retailers, we settled on 25 different systems.

Finding volunteers to test the systems was done primarily through word-of-mouth among City of Saskatoon employees, City of Regina employees, and the Saskatoon Master Composters. Where possible, we recruited people who already owned one of the identified compost systems. Otherwise, we purchased or built the compost systems ourselves and matched them up with willing volunteers. While most volunteers were residential households, three systems were tested by a community garden and two systems were tested by different office buildings. In a single case a volunteer approached *us* to ask to participate in the study. We agreed and the compost tub was added to the study in December of 2014, bringing our total to 26.



## Selecting Measurement Criteria



Each volunteer reported on the number of people in the household, what type of outdoor or indoor space they had available, whether they had any mobility or strength concerns, and how much experience they had with composting. We also asked each volunteer their reasons for composting, what they intended to add as inputs, how much time they had to spend, what they planned to do with any finished compost, and how comfortable they felt dealing with the “yuck” factor.

We recorded each compost system's dimensions, features, maximum capacity, and price. Where it was relevant, the volunteers were provided with a compost thermometer and a 10 litre plastic pail for measuring materials going in and out of the system.



Volunteers testing outdoor systems reported on:

- ease of use
- volume and types of materials added
- moisture levels and amount of water added
- time and effort spent stirring or aerating
- any problems (e.g., bad smells or vermin)
- how much finished compost was harvested
- amount of effort involved in harvesting
- overall satisfaction with the bin over time

Additional measurements were tailored to the characteristics of specific outdoor systems. For the Green Cone, we measured how much bacterial accelerator was added. For trench composting, volunteers kept track of how deeply the waste was buried and checked how decomposed a dug-up section was after six months and twelve months. Similarly, for the sheet compost, volunteers tracked how deep the layers were and how broken down the materials were each month.

Each of the indoor methods required additional criteria as well. For the vermicomposting systems, we asked where the bin was kept, what type of bedding was used, and whether the worms were “keeping up” with the amount of scraps added. For the Naturemill, volunteers tracked how much baking soda was added, whether citrus and pineapple scraps were kept under the recommended limit, and if the composter had any mechanical problems. With the bokashi bucket, volunteers noted how much bokashi bran was added, when buckets were filled and set aside to ferment, and when they were finished fermenting.

## The Testing Period

Testing began in May 2014 with an online survey that collected information about the household. After this, data on the compost system operations were collected biweekly using an online survey.

The intent was to test all systems for an entire year from May of 2014 to May of 2015. It was important to measure how the systems functioned during winter as this is a long season in Saskatchewan. Participants with outdoor systems received an abbreviated version of the biweekly survey during the winter months.

Some systems entered the study late or ended their participation early. The blue barrel system did not begin measuring inputs until June. The indoor compost tub was started as an experiment by an experienced composter in December, after she approached us to join the project. The volunteer testing the Earthmaker moved in April 2015 and elected to leave the survey at that time. The mulch volunteer also left a month early. Finally, the volunteers for three systems—the Ecomposter, dual-compartment tumbler, and vertical tumbler—stopped using their systems at some point in the winter and did not restart them until May 2015. As far as we can tell, the shorter testing periods did not significantly impacted our results and conclusions.

All volunteers also took part in a phone interview midway through the test period to address any problems encountered so far and to discuss how the winter months had impacted their system.





## Data Collation

Each system's size, price, and features were recorded when the system was purchased or built. Data on the inputs, watering, aerating, and finished compost is from the volunteer online surveys. Tester satisfaction is the average of all satisfaction measurements during the year — on a 10-point scale, a rating of 1-3 is counted as extremely low, 4-5 as low, 6-7 as moderate, 8-9 as high, and 10 as very high. Other information in the profiles, such as the “yuck” factor, complexity of use, and recommendations, were based on the volunteers' comments and our own composting knowledge.

# Results

## Overview

The 26 compost systems we tested fit into four categories: stationary bins, tumbling bins, in-the-dirt methods, and indoor systems.

Major findings:

1) the cost of a given compost system was not directly related to how well it worked. For example, although tumbling compost bins were consistently more expensive than stationary compost bins, we did not find the tumbling bins to be easier to use or more effective at making finished compost.

2) some performance results depended on the *combination* of the specific system and the blend of inputs and attention that a household put into it. This was especially true for two factors: how much heat the system produced and how quickly finished compost was created. How hot an aerobic compost system got depended partly on the size and insulation of the system, and partly on whether the materials were chopped up, balanced, and kept damp by the volunteers. Even compost bins with less than the recommended cubic metre of volume could still reach over 60°C with the right ingredients and technique.

From these results, we differentiated between two major “styles” of composting households: “hands-on” and “hands-off.” Some households have the composting knowledge and time available to keep a compost system's contents balanced, damp, and aerated. These households are often active gardeners with several years of composting experience. The hands-on composting households are generally more confident composters that can do well even with more complex systems. Other households have less time and attention to spare, and do not consistently keep their compost system's contents balanced, damp, or aerated. These hands-off composters are happy to divert their organic waste into a compost system, but need a system that doesn't require a lot of tending to function properly. It is important to match the system to the household's compost style; both types of households will produce compost and divert waste if they find a good match.



## Results by Compost Category

### *Stationary Compost Bins*

A large variety of stationary compost bins are available at retail centres, and a quick google search shows blueprints for building a half-dozen others. We tested nine retail and four home-built models. We were interested in whether any of the small differences in the bins' designs affected their function. We also sought to identify which characteristics worked best for different household situations. All stationary bins require an outdoor space, and all, except the blue barrel and the Aerobin 400, work best when they can be situated directly on grass or soil rather than gravel or concrete.

As mentioned, we found that a bin's relative price was not directly related to how well it functioned. While the expensive Aerobin 400 made fast, hot compost out of moderate amounts of yard and food waste, other similarly priced bins such as the Earthmaker had multiple problems that made them less functional than many of their cheaper counterparts.

Rather than price, we found that a determining factor for a stationary bin's effectiveness was how well it balanced airflow and moisture retention. The Aerobin 400 worked very well because it is both well-aerated by its internal air pipes and tightly insulated, which prevents the contents from becoming too dry. Looking at our stationary bins through this lens, we realised that all of them were sufficiently aerated (although the blue barrels do require a length of drilled PVC pipe), but some of them were too open to have good moisture retention. The Lee Valley wire compost bin and Lee Valley bracket bin both have very little insulation, as do the wooden stacking bin and three-bin pallet compost. In some of these cases, moisture retention could be improved by simply covering some airspaces or adding a lid.

Another difference that proved important was how the bins were designed to be aerated or stirred. All of the retail bins, as well as the blue barrels and the wooden stacking bin, are designed to be stirred from the top. Several different volunteers remarked that this was frustrating and awkward to do with a garden fork. For this type of stationary bins, we recommend households invest in a compost aerator—a long, narrow tool with folding wings or a corkscrew on the end that facilitates mixing. Only two bins — the wooden two-bin composter and the three-bin pallet compost — were designed to be aerated and mixed from the front. For these stationary bins, a garden fork works better than a compost aerator.



The final key characteristic of the different stationary bins was their capacity. All of the plastic retail bins had a capacity between 0.25-0.5 m<sup>3</sup>. In the middle were the wooden stacking bin (0.68 m<sup>3</sup>), and the Lee Valley wire bin (0.62 m<sup>3</sup>). At the upper end were the Lee Valley compost bracket bin (1.37m<sup>3</sup>), the wooden two-bin composter (1.46 m<sup>3</sup>), and the three-bin pallet composter (1.25 m<sup>3</sup>). The plastic retail bins were usually too small for households that compost grass clippings or large amounts of other yard waste, which caused frustration when the bins filled up before any finished compost was produced. Thus, while smaller households with mainly food waste can rely on a single retail bin, most households with yards and/or gardens will either need more than one retail bin or a larger system.

A household's capacity requirement is affected not only by the amount of compostable materials, but also by its composting style. Hands-on households put more attention into their compost systems and make finished compost faster. Because of this, they can often use a system with a medium capacity, such as the wooden stacking bin. Meanwhile, hands-off households—those that do not intensely manage their compost systems—



take longer to create finished compost. This means they need a system with a larger capacity, such as the Lee Valley compost bracket bin or the three-bin pallet composter.

Systems with large capacities are also a better fit for households that plan to keep diverting their organic waste during winter. Stationary bins can be used in winter, but require space to allow for the fact that the materials added freeze and do not sink down or actively compost until the spring. The Earthmaker is a poor choice for households that want to compost in the winter, as its small upper chamber quickly becomes full and frozen. Other plastic bins also run the risk of filling up before winter ends. If a household or business plans to continue using an outdoor compost bin through the winter, they will need a bin with a medium or high capacity, or more than one bin.

As mentioned, the blue barrel system and the Aerobin 400 are closed on the bottom and do not need to be placed on the ground. Therefore, these systems are a good choice for households or businesses which have an outdoor space that is pavement or gravel. Unlike the other stationary bins, they could be used by households with only a concrete balcony, or businesses with a paved back alley.

Appendix V summarizes the key characteristics of the project's stationary compost bins.

### *Tumbling Compost Bins*

Like stationary bins, tumbling compost bins require an outdoor space. While they do not need to be placed on grass or soil to work, they may drip leachate that would puddle on concrete.

Tumbling compost bins are more expensive than stationary compost bins. They are also generally marketed as a faster method for making compost. Our study did not find this to be true in Saskatchewan's dry and cold climate. However our tumbling bins did show two advantages over the stationary bins.

First, they generally make it easier to mix, aerate, and harvest the contents as compared to stationary bins. The Ecomposter, dual-compartment tumbler, and Sunmar continuous composter are all designed to turn easily, even when nearly full. All three of these systems also have internal baffles that help break up clumps of compost and ensure a good mix. For harvesting, the Ecomposter can be rolled off its base to where the compost is needed, and then opened and dumped. The dual-compartment tumbler is high enough off the ground that finished compost can be dumped out into a wheelbarrow beneath it. The Sunmar continuous composter is designed so that finished compost trickles out the end when the cap is removed and the barrel turned (although we found that unfinished compost also sometimes came out). Only the vertical tumbler's upright design makes it difficult to turn and awkward to harvest.

Second, tumbling bins are rodent proof. Rodents can be a concern whenever there are large amounts of organic materials suitable for eating or nesting in. While most of our stationary bins did not get mice in them during the test period, they are not designed in a way that is specifically rodent proof. If a household with a yard is extremely concerned about the risk of mice in their compost system, a tumbling compost bin could be a good fit. This is especially true for hands-off composters who don't intend to consistently balance, stir, and dampen their compost system (all things that discourage mice from taking up residence in a stationary compost bin).



The tumbling compost bins have a smaller capacity compared to most other outdoor systems. While they require an outdoor space, they are not big enough on their own to handle even the moderate amounts of grass clippings or other yard waste that come from most urban yards. Tumbling compost bins work better as one of a multiple bin system, both because of their small capacity and because they function better as a batch composter than as a continuous one. The exception to this is the Sunmar continuous composter, which has medium capacity and a continuous flow.

A final issue with the tumbling compost bins is that they cannot be used in winter. Our testers all reported that the bins became inoperable at some point, either from the turning mechanism jamming or the lid freezing shut.

Appendix V summarizes the key characteristics of the project's tumbling compost bins.

## *In-the-Dirt Compost Methods*

The four compost methods in this category all rely on direct contact with the soil for decomposition. As such, all of them require an outdoor space. The Green Cone can be buried in a garden or grass area, although it can benefit from having plants which are heavier nitrogen-feeders than grass near it to absorb the nutrients it dissipates into the soil. Sheet composting is generally done in gardens, but can be used to create garden soil in an area that was previously grass or compacted earth. Mulching and trench composting both require garden space.

For households with the appropriate outdoor space, in-the-dirt methods provide some of the simplest and least expensive ways of breaking down organic waste. Green Cones are somewhat expensive and can be tricky to use, but sheet compost, mulch, and trench compost are all cost-free and require little to no maintenance. This makes them a great fit for hands-off households that have a garden space. None of these methods make finished compost that can be easily moved to another location, but all of them enrich the soil where they are placed.

Mulching and trench composting are also a good fit for households that do not have the right balance of ingredients for a traditional compost. Mulch works for gardening households that have a large quantity of dry, brown materials without the fresh, green materials to make them break down quickly. Trench compost is a good fit for gardening households that have the green materials, but not enough browns to balance them. Green Cones are also theoretically good for households with mainly green food waste, although the Green Cone we tested did not work well for our volunteer.

Some in-the-dirt methods can be used in winter, while others cannot. Mulching can be done at any time of year, although the brown materials used are usually not present in winter. Sheet compost can be added to all winter, as long as animals are not a concern in the exposed compost. Trench composting is generally not feasible in winter, as the ground freezes, but materials could technically be added to a pre-dug trench during the winter and buried in the spring. The Green Cone does not work in winter as its decomposition process stops below 0°C, and it is important not to overfill the small underground basket.

Appendix V summarizes the key characteristics of the project's in-the-ground options.





## Indoor Compost Methods

There are multiple options available for people who want to compost indoors. In our study we tested an electric composter, bokashi fermentation, two types of vermicomposting bins, and a plain compost tub. The price, complexity, and amount of effort required varies for each method. Again, price was not directly related to how well each system functioned. None of these methods require a yard or outdoor space to operate, although bokashi fermentation works best when the finished buckets can periodically be emptied into an outdoor compost bin or garden.

All of these methods require somewhat more skill and closer monitoring than outdoor systems to keep them acceptably neat and free of odours and pests. For the electric compost, vermicompost bins, and compost tub, their small capacity also means that they are only appropriate for dealing with moderate amounts of food waste, and are generally unsuitable for processing even small amounts of yard waste. Bokashi fermentation is done in buckets, and the capacity can be increased by adding more buckets to the system. This makes bokashi systems somewhat more flexible, but they are still generally unsuitable for yard waste.



Because these methods happen indoors, they can be done through the winter without issue.

Vermicompost bins are suitable for households with moderate amounts of food waste that do not mind interacting closely with worms and worm castings, and having to occasionally deal with fruit or fungus flies. While harvesting can be a somewhat messy process, worm castings are a potent fertilizer high in nutrients and beneficial bacteria.

Bokashi buckets are a better fit for households with a large amount of food waste, or households that prefer to keep their compost at arms length. While the food waste does have to be cut up and squashed down, the buckets spend most of the time sealed and tucked away. Once full and set aside, they can also be safely left for several months. Bokashi buckets are also a very good choice for people who want to compost *all* of their food waste, including meat and bones, as they are one of the few systems that can safely handle these inputs.

Households with outdoor composting experience can try creating a compost tub indoors. The compost tub is somewhat bigger than the other indoor options and can be an effective and inexpensive method. It can work particularly well as a winter system for people doing outdoor composting during the warmer parts of the year. However it is somewhat messier than the other indoor systems when adding waste or stirring, and requires a drip tray beneath it to catch leachate.

The Naturemill automatic compost bin works well for small households that are not interested in any of the other methods, and do not mind paying a high price for a compact, electric system. The Naturemill is an effective composter but needs its ingredients to be cut up and carefully balanced.

Appendix V summarizes the key characteristics of the project's indoor compost bins.

# Conclusions

- Expensive compost systems are not necessarily more effective.
- Composting style— “hands-on” vs “hands-off” — is a key consideration in choosing an optimal system. Hands-on households produce finished compost at a faster rate and thus can handle smaller capacity systems. They are also more willing to tackle the more complex methods. Hands-off households need a larger capacity choice so that there is enough bin space to accommodate a longer composting period. They are also happier with simpler, lower-effort methods.
- Stationary bins are appropriate for most households with outdoor space; those with a high capacity are generally a better fit for hands-off composters and households with larger quantities of yard waste.
- Tumbling bins also require an outdoor space. These more expensive bins have some advantages over stationary bins, but were not superior across the board.
- For households with the necessary garden space, the in-the-dirt compost systems are simple and effective; these methods are suitable for hands-off households.
- The indoor composting methods we tested were viable and effective, but they all require the composters to take a more hands-on approach.



# Appendix I: Stationary Compost Bin Profiles





# Stationary bin: **Garden Gourmet**

**Size:** 60 cm wide x 60 cm long x 100 cm high

**Maximum capacity:** 0.31 meters<sup>3</sup> (11 feet<sup>3</sup>)

**Price:** \$75—\$100

**Tester satisfaction:** high

**Features:** Black plastic snap-together parts, aerated sides, large square lid with two smaller doors, two sliding lower panels for accessing the lower half. Bottom open to the ground.

**What you can put in it:** Food waste (excluding meat, bones, dairy, and fats), leaves, grass clippings, other yard waste (excluding cat or dog waste).

**“Yuck” factor:** Moderate-to-low. Materials are neatly enclosed and break down with minimal interaction.

**Complexity to use:** Moderate-to-low. Some knowledge of balancing ingredients and adding water is helpful.

**In winter:** Breakdown stops, but you can keep adding materials as long as there is room.

**Mobility:** The bin is light and easy to move. You can easily lift it off the contents to harvest.

**Available at:** Seasonally at many retailers and online.



Tested by: **Lisa**



Lisa is a young adult living in rented properties on a tight budget. Over the course of the project, she lived in two different small households. In the first, there were two adults and a very small yard. All that went into the Garden Gourmet were

kitchen scraps and paper products.

The bin made the move across town with no issues. The second house had three adults and a large yard, with trees and a small garden. Grass clippings were left on the lawn; weeds and leaves went in the bin along with food waste.

Lisa is an adventurous composter; she knows what you are supposed to put in the compost bin but enjoys adding more unusual items just to see what happens. Her successful experiments include 1/2 a litre of fish heads, 2 feet of woven rattan, and a dried starfish. Her biggest failure was half a pound of spoiled cheese.

Lisa is moderately attentive to her compost but sometimes neglects the bin for a few weeks when life gets busy.

## **Results:**

**Testing period:** May 2014—May 2015

### **Inputs:**

- 603 litres of organic waste (48% greens, 32% browns, 17% dirt or finished compost, 2% other)
- Added 58 litres of water
- Aerated 9 times for a total of 38 minutes

### **Outputs:**

- 96 litres of finished compost

### **Recommendations:**

The Garden Gourmet is a good, basic bin that works well for a small household with mainly food waste. By itself, it is not big enough to deal with large amounts of grass clippings or leaves.

Its tall, narrow design is good for small spaces, but does make it difficult to get a garden fork inside. If you want to stir the contents, you really need a compost aerator (pictured) or long stick. In spite of its small size, it can heat up with the right ingredients. Lisa reported temperatures over 60°C for several days after adding a pail of high-nitrogen fruit pulp from a local juice bar.

While there are two smaller, hinged openings in the lid, it is easier to add new materials by taking the whole lid off. Similarly, while there are sliding panels at the bottom for taking out finished compost, Lisa found it worked best to simply tip the bin over and dig the compost out.

The bin's open-bottom design is not rodent proof, but Lisa reported no trouble with mice or other pests.

# Stationary bin: **Earth Machine**

**Size:** 84 cm diameter x 84 cm height

**Maximum capacity:** 0.30 meters<sup>3</sup> (11 feet<sup>3</sup>)

**Price:** \$45—75

**Tester satisfaction:** high

**Features:** Interlocking black plastic top and bottom half with air vents, twist locking lid, large lower door for accessing the bottom half. Minimum 50% recycled plastic. Bottom open to the ground.

**What you can put in it:** Food waste (excluding meat, bones, dairy, and fats), leaves, grass clippings, other yard waste (excluding cat or dog waste).

**“Yuck” factor:** Moderate-to-low. Materials are neatly enclosed and break down with minimal interaction.

**Complexity to use:** Moderate-to-low. Some knowledge of balancing ingredients and adding water is helpful.

**In winter:** Breakdown stops, but you can keep adding materials as long as there is room.

**Mobility:** The bin is light and easy to move. You can easily lift it off the contents to harvest.

**Available at:** Through the company website: [earthmachine.com](http://earthmachine.com)



## Results:

**Testing period:** May 2014—May 2015

### Inputs:

- 1435 litres of organic waste (68% greens, 29% browns, 3% dirt or finished compost, 1% other)
- Added 100 litres of water
- Aerated 10 times for a total of 42 minutes

### Outputs:

- No finished compost was harvested during the test period

### Recommendations:

The Earth Machine is a good, basic bin that can be used on its own by a small household with mainly kitchen scraps, or as one of multiple bins in a household with large amounts of yard waste. It does not have the capacity to cope with large amounts of grass, leaves, or garden waste on its own.

Earth Machine bins were designed by the ORBIS Corporation to be used by municipalities for subsidized bin sales and backyard composting promotion. They are designed to be as cheap, functional, and easy to transport in a car. However this does mean they are harder to find if your local municipality is not currently selling them.

The bins come with a 10 year replacement warranty, and can be expected to last at least several years. As is common with black plastic bins, they become more brittle over time from sun exposure. Pam has had her bin for many years, and it is beginning to crack and become less functional. The bin's open-bottom design is not rodent proof, but Pam reported no trouble with mice or other pests.

Tested by: **Pam**



Pam lives in a household of four people. They have a large yard with a garden and plenty of trees. While they leave their grass clippings on the lawn, they have a large amount of kitchen scraps, garden waste and leaves to compost. In addition to the Earth Machine, they use two other wooden

compost bins to deal with their organic materials. Even with these additional bins, they take some of their leaves to the Saskatoon's municipal compost depot each year.

Pam is an experienced and enthusiastic hands-on composter who enjoys the chance to make a useful garden product and reduce waste at the same time.



# Stationary bin: **Aerobin 400**

**Size:** 74 cm wide x 74 cm long x 120 cm high

**Maximum capacity:** 0.42 meters<sup>3</sup> (15 feet<sup>3</sup>)

**Price:** \$350—400

**Tester satisfaction:** high

**Features:** Green plastic double-insulated walls, large square lid, internal aeration tube, vermin-proof enclosed bottom, leachate reservoir with tap.

**What you can put in it:** Food waste (excluding meat, bones, dairy, and fats), leaves, grass clippings, other yard waste (excluding cat or dog waste).

**“Yuck” factor:** Moderate-to-low. Materials are neatly enclosed and break down with minimal interaction.

**Complexity to use:** Moderate-to-low. Some knowledge of balancing ingredients is helpful. Watering unnecessary.

**In winter:** Breakdown stops once the bin freezes, but you can keep adding materials as long as there is room.

**Mobility:** The bin is fairly heavy and cannot be lifted off the contents. It must be placed on a level surface.

**Available at:** Seasonally at Costco and online.



Tested by: **Kathryn**



Kathryn has been making compost for 20 years. She lives in a four-person household with a large yard, garden, and many trees. Although she grasscycles, she still has a large amount of leaves, garden waste, food waste, and other inputs to process. Before purchasing the Aerobin, she made compost

in a large heap. Once she acquired the bin, she started processing most of her compost in it, but still keeps a heap for excess leaves and other materials. Branches from her many trees go to Saskatoon's municipal compost depot.

Kathryn is a hands-on composter and enjoys doing something good for the environment while making a useful garden product at the same time.

## Results:

**Testing period:** May 2014—May 2015

### Inputs:

- 1513 litres of organic waste (36% greens, 39% browns, 24% dirt or finished compost, 2% other)
- Aerated 4 times for a total of 2 hours 45 minutes
- Did not water; contents remained damp

### Outputs:

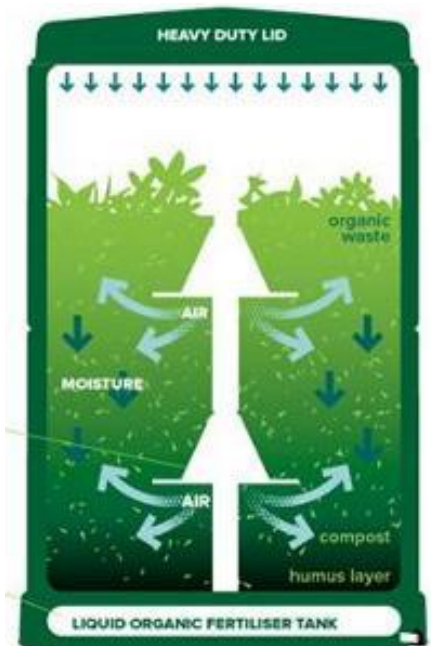
- 250 litres of finished compost

## Recommendations:

The Aerobin 400 is an expensive but effective bin. Its large size, combined with its insulated and aerated design that keeps contents hot and active, means it is able to process a relatively large amount of yard waste.

The bin's internal aeration tube provides constant, passive aeration and makes stirring the compost much less necessary. Meanwhile, its enclosed design prevents excessive moisture loss and makes watering completely unneeded. However, this second feature works so well that the contents sometimes become too wet, and need to be mixed with more dry materials. Except in winter, the bin tends to keep an internal temperature between 40-65°C, which is ideal. Its enclosed bottom is also rodent-proof.

This bin does require a level base, and sometimes the lower door becomes difficult to open. But overall it is an excellent design which facilitates fast, hot composting—although the purchase price is fairly high.



# Stationary bin: **Green Johanna**

**Size:** 82 cm diameter x 94 cm height

**Maximum capacity:** 0.33 meters<sup>3</sup> (12 feet<sup>3</sup>)

**Price:** \$275—300; \$340—365 with optional “winter jacket”

**Tester satisfaction:** high

**Features:** 100% recycled green plastic parts, large round lid, two sliding lower doors for accessing the lower half. Rodent-proof bottom with small holes for drainage and earthworms. Can be purchased with optional “winter jacket” for additional insulation.

**What you can put in it:** Most food waste (including meat, bones, and dairy but excluding fats), leaves, grass clippings, other yard waste (excluding cat or dog waste).

**“Yuck” factor:** Moderate-to-low. Materials are neatly enclosed and break down with minimal interaction.

**Complexity to use:** Moderate-to-low. Some knowledge of balancing ingredients and adding water is helpful.

**In winter:** Breakdown stops, but you can keep adding materials as long as there is room.

**Mobility:** When full the bin is very difficult to move. Contents must be removed through the doors or lid.

**Available from:** Durable Solutions Inc., Vancouver BC. (Email [info@greencone.ca](mailto:info@greencone.ca) for more details.)



Tested by: **Kinda**



Kinda lives in a household of four with a small yard and garden. Most of what she had to compost is kitchen scraps, with garden waste a close second. Leaves and sticks make up the carbon-rich brown potion of her waste.

At the start of our study, Kinda had little experience with backyard bins. Before volunteering to help with our study, she mostly used trench compost to deal with her family's food waste.

## **Results:**

**Testing period:** May 2014—May 2015

### **Inputs:**

- 1018 litres of organic waste (58% greens, 39% browns, 2% dirt or finished compost, 1% other)
- Added 15 litres of water
- Aerated 31 times for a total of 2 hours 40 minutes

### **Outputs:**

- Approximately 120 litres of finished compost

## **Recommendations:**

The Green Johanna is a decent but expensive bin that can be a good choice for a medium-sized household with mainly food waste. By itself, it is not big enough to handle large amounts of grass clippings or leaves.

Its design holds moisture better than most bins and rarely needs watering.

As advertised, this bin is rodent-proof. The holes in the plastic bottom are less than 5 mm across, making them too small for mice but large enough for earthworms. This makes it safer to add meat, bones, and dairy—another plus.

Unfortunately, the Green Johanna did not live up to its other major claim that it would remain unfrozen and active throughout the winter. Even with the optional insulating jacket, Kinda reported that her compost froze in late November and did not thaw until April. This is understandable as the bin was designed for milder climates than the Prairies. However without being able to stay warm in the wintertime, it becomes more difficult to justify the hefty price tag.

Assembling the Green Johanna requires a little bit of persistence. While putting it together, Kinda realised some of the screw holes did not line up or were missing. The enclosed bottom can also be a pain when it comes time to harvest the compost, as it means the bin cannot be lifted off the materials. Instead, finished compost must be dug out through the lower door or dumped out of the top and sorted. You could also wait for the contents to completely finish breaking down, but would need to use a second bin in the meantime.



# Stationary bin: Earthmaker

**Size:** 80 cm wide x 80 cm long x 120 cm high

**Maximum capacity:** 0.47 meters<sup>3</sup> (16.5 feet<sup>3</sup>)

**Price:** \$260—\$350

**Tester satisfaction:** high

**Features:** Black plastic structure, medium-sized removable lid, three internal chambers, attached stir-stick, large lower door. Bottom open to the ground.

**What you can put in it:** Food waste (excluding meat, bones, dairy, and fats), leaves, grass clippings, other yard waste (excluding cat or dog waste).

**“Yuck” factor:** Moderate. Fresh materials stay near the top of the bin and can attract fruit flies.

**Complexity to use:** Moderate-to-high. Materials must be transferred periodically from one chamber to the next. Some knowledge of balancing ingredients and adding water is helpful.

**In winter:** Breakdown stops, but you can keep adding materials as long as there is room in the top chamber. However this is not a lot of space.

**Mobility:** When empty, the bin is relatively light and easy to move. When in use, it is quite heavy. Emptying it completely takes some effort.

**Available at:** Previously online; currently unavailable.



Tested by: **Sharla**



Sharla grew up in a family that has always composted. During the project, Sharla lived in a household of four adults with a small yard and a garden. They used the Earthmaker to process all of their food waste, grass clippings, and garden waste.

Sharla is an attentive composter, and not easily deterred. She did not let any of the small problems with the Earthmaker’s design discourage her.

## Results:

**Testing period:** May 2014—April 2015

### Inputs:

- 773 litres of organic waste (64% greens, 34% browns, 2% dirt or finished compost)
- Added 50 litres of water
- Aerated 9 times for a total of 1 hour 55 minutes

### Outputs:

- 60 litres of finished compost

## Recommendations:

The design of the Earthmaker is meant to replicate a larger 3-bin system, with a chamber for fresh materials, one for partially-decomposed materials, and one for finished compost. It has a sliding door between its first and second chambers, and a stir-stick meant to aerate and move contents.

The bin did not function as smoothly as we hoped. There was often too much material in the first chamber to fit neatly into the second, which made it very hard to replace the sliding door afterward. (Eventually, Sharla stopped using the sliding door and found that worked better.) As well, it is difficult to stir the second chamber using the stir-stick through the small hole provided. The top chamber tended to dry out while the bottom chamber became soggy from added water. In winter, the bottom two chambers froze solid and became inaccessible.

Given these flaws, combined with the relatively high price and difficulty of finding an Earthmaker, we recommend people choose either a less expensive plastic unit or a full 3-bin system instead.





# Stationary bin: **Wooden Stacking Compost Bin**

**Size:** 92 cm wide x 92 cm long x 81 cm high

**Maximum capacity:** 0.68 meters<sup>3</sup> (24 feet<sup>3</sup>)

**Price:** \$55—75 for new lumber and hardware

**Tester satisfaction:** high

**Features:** Five large wooden tiers which fit together at the corners

**What you can put in it:** Food waste (excluding meat, bones, dairy, and fats), leaves, grass clippings, other yard waste (excluding cat or dog waste).

**“Yuck” factor:** Moderate-to-low. Materials are mostly enclosed and break down with a little interaction.

**Complexity to use:** Moderate-to-low. Some knowledge of balancing ingredients and adding water is helpful.

**In winter:** Breakdown stops, but you can keep adding materials as long as there is room.

**Mobility:** The bin is light and easy to move. You can lift the wooden tiers off individually.

**Available at:** Materials available at hardware stores; lumber scraps can also be used.



Tested by: **Dauna**

Dauna lives in a household of one with a small yard. She leaves her grass clippings on the lawn and has little garden waste. The main input for her compost system is kitchen scraps, with dry leaves to balance them out.

Dauna is an enthusiastic, hands-on composter with several years of experience making compost. She liked the wooden stacking bin and found it easy to use. She split the tiers into two shorter stacks, one for partly-finished compost and one for fresh materials.

In the past, Dauna has used a vermicompost bin to process her kitchen scraps.



## **Results:**

**Testing period:** May 2014—May 2015

### **Inputs:**

- 460 litres of organic waste (39% greens, 59% browns, 2% dirt or finished compost, 0% other)
- Added 60 litres of water
- Aerated 6 times for a total of 34 minutes

### **Outputs:**

- No finished compost was harvested during the test period

### **Recommendations:**

The wooden stacking bin is a good choice for midsized households with a moderate amount of yard waste. If 5 tiers are not quite enough space, it is easy to build 1-3 more tiers to increase the bin's height. Households with large amounts of yard waste may need a larger system or an additional bin.

The materials for this bin are quite inexpensive, and their price could be further reduced by using previously owned or salvaged lumber scraps. The bin is easy to assemble and requires only a saw, drill, and woodscrews. For the blueprint, see [appendix VI](#).

The bin's low height and open top make it very easy to access and stir. The lack of lid means that rain can keep the contents damp during wet weather, but that the compost may dry out on hot, sunny days. Snow can also fill up the bin in winter. Dauna solved this problem by stepping on the frozen contents to make more room. The bin's open-bottom design is not rodent proof, but Dauna reported no trouble with mice or other pests.

# Stationary bin: **Wooden 2-bin Compost**

**Size:** 92cm wide x 183 cm long x 92 cm high

**Maximum capacity:** 1.46 meters<sup>3</sup> (52 feet<sup>3</sup>)

**Price:** \$275—400 for new lumber and hardware

**Tester satisfaction:** high

**Features:** Two large bins with removable front slats for easy access. Wooden sides, metal mesh back, and corrugated plastic lid on a hinge. Bottom open to the ground.

**What you can put in it:** Food waste (excluding meat, bones, dairy, and fats), leaves, grass clippings, other yard waste (excluding pet waste).

**“Yuck” factor:** Moderate-to-low. Materials are enclosed and break down with a small amount of interaction.

**Complexity to use:** Moderate-to-low. Some knowledge of balancing ingredients and adding water is helpful.

**In winter:** Breakdown stops, but you can keep adding materials as long as there is room.

**Mobility:** The bin is difficult to move, even when it is empty.

**Available at:** Materials available at hardware stores; lumber scraps can also be used.



Tested by: **Angie**



Angie lives in a household with two other people as well as a small dog. Their house has a moderately -sized lawn and garden plot. They have plenty of kitchen scraps, garden waste, and leaves to process in their 2-bin system.

Grass clippings are sometimes left on the lawn and sometimes added to the bin.

After 26 years of making compost, Angie knows her way around the compost bin. She balances her ingredients and keeps the contents damp and stirred when she has the time, but leaves the bin to its own devices when life gets busy. Back and knee pain mean she has to go slow when flipping contents from one side of the bin to the other.

Angie is no carpenter but was still able to build the 2-bin system by herself. After 15 years, the bin is starting to break down, and she has plans to build a new one.

## **Results:**

**Testing period:** May 2014—May 2015

### **Inputs:**

- 3888 litres of organic waste (60% greens, 31% browns, 6% dirt or finished compost, 4% other)
- Added 232 litres of water
- Aerated 15 times for a total of 4 hours 10 minutes

### **Outputs:**

- 360 litres of finished compost

### **Recommendations:**

The 2-bin system works marvellously for households with a lot of grass, leaves, and/or garden waste to deal with. Its large capacity means that it never runs out of room, even at peak times in spring and fall. The removable front slats make it easy to access and stir the contents.

This bin has a good balance of insulation and aeration. During the test period, the contents never got soggy or smelly, which would have indicated a lack of air. At the same time, when fresh contents were added to the active side of the bin it stayed around 40-55°C, which is ideal for rapid composting.

The price tag for this bin is calculated based on buying all the lumber and metal fixing new from a hardware store. It can be significantly reduced if some of the materials are already owned or can be salvaged. The bin can be expected to last 12-15 years, longer if made of cedar. For the blueprint, see [appendix VII](#).

The bin's open-bottom design is not rodent proof, and Angie has reported mice in the compost. Mice can be discouraged, but as Angie is not bothered by them, she has not taken any measures.



# Stationary bin: **Pallet Compost**

**Size:** The Garden Patch has a row of pallet composters. For this project they tested three bins. These measured 122 cm wide x 406 cm long x 102 cm high

**Maximum capacity:** 1.25 m<sup>3</sup> (44 ft<sup>3</sup>) per stall. 3.75 meters<sup>3</sup> (132 feet<sup>3</sup>) for 3 stalls.

**Price:** With free pallets, \$5-10 for wire, rope or nails

**Tester satisfaction:** high

**Features:** Three large wooden stall made of seven wooden pallets joined at the corners. Bottom open to the ground.

**What you can put in it:** Food waste (excluding meat, bones, dairy, and fats), leaves, grass clippings, other yard waste (excluding cat or dog waste).

**“Yuck” factor:** Moderate. Materials are partly enclosed and break down with a small amount of interaction.

**Complexity to use:** Moderate-to-low. Some knowledge of balancing ingredients and adding water is helpful.

**In winter:** Breakdown stops, but you can keep adding materials as long as there is room.

**Mobility:** Not mobile—the bin system would have to be disassembled in order to move it.

**Available at:** Pallets are given away by warehouses and on free exchange sites such as [kijiji.ca](http://kijiji.ca). Wire or nails for joining are available at hardware stores.



## **Results:**

**Testing period:** May 2014—May 2015

### **Inputs:**

- 1580 litres of organic waste (85% greens, 15% browns, 0% dirt or finished compost, 0% other)
- Added 25 litres of water
- Aerated 4 times for a total of 30 minutes

### **Outputs:**

- 100 litres of finished compost

### **Recommendations:**

Pallet compost bins are a fantastic choice for community gardens or households with large amounts of yard waste. They have a massive capacity which can be adjusted by building more or fewer stalls. (We recommend building at least two stalls so that contents can be shifted back and forth for aeration and harvesting.) Pallet bins are generally too large for households that don't produce a lot of yard waste.

Pallet bins are very inexpensive to build, as used wooden pallets can usually be found for free.

The open front of a pallet bin makes it extremely easy to mix and move the contents. Additional pallets can be used to make closable front doors for the stalls if desired, but they should be attached in a way that still lets them open to one side. The pallets do have large air spaces, which increase aeration but also increase the amount of watering required to keep contents damp. The bin's open-bottom design is not rodent proof, but the Garden Patch reported no trouble with mice or other pests.

The main drawback of pallet composters is their rough appearance, which some households dislike.

Tested by: **The Saskatoon Food Bank Garden Patch**



The Garden Patch is a large community garden run by the Saskatoon Food Bank and Learning Centre, and tended by a huge team of volunteers. They have large amounts of

garden waste to compost, which they balance with sawdust and straw. They have built eight pallet stalls in total, but our study only kept track of three.

The community garden is active from May to September. They harvest finished compost in the spring from the bottom of the compost piles. Partially broken-down materials are returned to the bins for another season.



# Stationary bin: Co-op Garden Composter

**Size:** 80 cm diameter x 80 cm height

**Maximum capacity:** 0.25 meters<sup>3</sup> (9 feet<sup>3</sup>)

**Price:** \$75—80

**Tester satisfaction:** moderate

**Features:** Solid green plastic bin with twist locking lid. Removable lower door for accessing the bottom of the bin. Bottom open to the ground.

**What you can put in it:** Food waste (excluding meat, bones, dairy, and fats), leaves, grass clippings, other yard waste (excluding cat or dog waste).

**“Yuck” factor:** Moderate-to-low. Materials are neatly enclosed and break down with minimal interaction.

**Complexity to use:** Moderate-to-low. Some knowledge of balancing ingredients and adding water is helpful.

**In winter:** Breakdown stops, but you can keep adding materials as long as there is room.

**Mobility:** The bin is light and easy to move. You can easily lift it off the contents to harvest.

**Available at:** Seasonally at Saskatoon Co-op Home Centres.



Tested by: **Karen**



Karen is a busy professional and mother who always has a dozen projects on the go. She runs a large-scale waste management and composting company, but before this project had little experience of small-scale composting. She is

interested in composting to help the environment and reduce her household's waste, but has a very small amount of time to tend her backyard bin. This makes her a hands-off composter. She appreciates the short, compact shape of the Co-op bin and how little fuss it is to use.

Karen lives in a household of four with a large yard and small, raised garden. Normally, she has a medium amount of food waste, garden scraps, and green grass clippings to compost. However, for several months of the test period, these organic materials were going to her workplace to start a new compost project there, rather than into her home Co-op bin. If all of her organic materials stayed at home, she likely would have needed a second bin to deal with her volume of yard waste.

## Results:

**Testing period:** May 2014—May 2015

### Inputs:

- 400 litres of organic waste (65% greens, 33% browns, 3% dirt or finished compost, 0% other)
- Added 20 litres of water
- Aerated 13 times for a total of 2 hours

### Outputs:

- No finished compost was harvested during the test period

### Recommendations:

The Co-op Garden Composter is a decent no-frills bin for a small household with mainly kitchen scraps to process. It can also function as an inexpensive second bin for households looking for more space. It can handle small amounts of yard waste, but is not big enough to compost large amounts of grass clippings or garden plants on its own.

Unlike most plastic compost bins which require some assembly, this bin comes in one solid piece. This makes it quite difficult to transport with a small vehicle. Its short, wide stature makes it easier to stir than some taller plastic bins, although we still recommend a compost aerator rather than a garden fork. There are no aeration holes in the bin, however the lower door and top lid provide some airflow. Karen reported that the lower door would sometimes pop off when the bin was quite full.

The bin's open-bottom design is not rodent-proof, Karen reported no trouble with mice or other pests.

# Stationary bin: **Blue Barrel**

**Size (per barrel):** 61 cm wide x 61 cm long x 88 cm high

**Maximum capacity (per barrel):** 0.21 meters<sup>3</sup> (7.5 feet<sup>3</sup>)

**Price (per barrel):** \$10—\$30

**Total barrels used:** 4

**Tester satisfaction:** moderate

**Features:** Plain 55-gallon barrel with the top sawn off and placed loosely on top. Closed bottom.

**What you can put in it:** Food waste (excluding meat, bones, dairy, and fats), leaves, grass clippings, other yard waste (excluding cat or dog waste).

**“Yuck” factor:** During the testing period, very high. After improving the system following the test period, moderate.

**Complexity to use:** Moderate. To work properly, knowledge of balancing ingredients, moisture, and aeration is necessary.

**In winter:** Breakdown stops, but you can keep adding materials as long as there is room.

**Mobility:** When full, the barrels are very difficult to move.

**Available at:** Food grade barrels are commonly sold on free exchange sites such as [kijiji.ca](http://kijiji.ca).



Tested by: **The Two Twenty**



The Two Twenty is a coworking office space, where several dozen different non-profit groups and small companies operate. Approximately 110 people regularly use the building, producing a large amount of coffee grounds, fruit peels, and other scraps from the communal kitchen. The barrels were installed in order to divert this food waste from going to the landfill. Dry leaves, sawdust, and later, dry dirt were acquired from outside the building to balance the wet ingredients.

The Two Twenty has a small, concrete parking area in the back alley where the compost barrels were kept under a staircase. The barrels were chosen as a compost system because they are completely enclosed and would not drip any leachate onto the concrete.

## **Results:**

**Testing period:** June 2014—May 2015

### **Inputs:**

- 1415 litres of organic waste (56% greens, 38% browns, 6% dirt or finished compost, 0% other)
- Added 24 litres of water
- Aerated 5 times for a total of 2 hours 40 minutes

### **Outputs:**

- During the testing period, no usable finished compost was produced

### **Recommendations:**

Blue barrels are an efficient and cheap way to process organic waste in a small, paved space. More or fewer barrels can be acquired to fit the amount of inputs. However they must be set up carefully to avoid serious problems.

When the testing period began, the barrel system was still a new experiment. While it succeeded in not leaking on the concrete, the compost stayed consistently too wet, turned anaerobic and released extremely unpleasant smells when stirred. Breakdown was slow to non-existent.

After the testing period, major improvements were made. Six inches of woodchips were placed in the bottom of each barrel to absorb liquid. A length of 2" PVC pipe with holes drilled along it was added to each active barrel to provide airflow. In addition to sawdust, dry dirt was also added to balance the food waste. With these changes the system began to work well and the smell disappeared. The bins are now producing finished compost.

The only unsolved issue is fruit flies, which appear in large numbers during the summer and fall.



# Stationary bin: Lee Valley Bracket Compost Bin

**Size:** The test bin was 92 cm wide x 92 cm long x 92 cm high, but it can vary based on what length of planks are used up to a maximum dimension of 122 cm wide x 122 cm long x 92 cm high.

**Maximum capacity:** The test bin's capacity was 0.31 meters<sup>3</sup> (11 feet<sup>3</sup>). A bin with the maximum dimensions would be 1.37 meters<sup>3</sup> (48 feet<sup>3</sup>).

**Price:** Without lumber, \$90—100. With lumber, \$125—200

**Tester satisfaction:** moderate

**Features:** Main product consists of four metal corner brackets with spaces for five slanted wooden planks. Planks can be cut to fit a household's specifications, but should not exceed 122 cm (48"). Planks can be screwed into the brackets, but some should be left loose for easy access. Bottom is open to the ground.

**What you can put in it:** Food waste (excluding meat, bones, dairy, and fats), leaves, grass clippings, other yard waste (excluding cat or dog waste).

**"Yuck" factor:** Moderate. Materials are mostly enclosed and break down with a small amount of interaction.

**Complexity to use:** Moderate-to-low. Some knowledge of balancing ingredients and adding water is helpful.

**In winter:** Breakdown stops, but you can keep adding materials as long as there is room.

**Mobility:** The bin is somewhat difficult to move once the planks are screwed in, but can be completely dissembled without too much effort.

**Available at:** Lee Valley Tools Ltd.

Tested by: **Matthew**



Matthew lives in a household of five with a large yard and various shrubs, trees and perennials. They have a lot of plant materials and grass clippings to compost, as well as some kitchen scraps and dry leaves.

Matthew was completely new to composting at the start of the test period, but willing to give it a try. He is a busy father and professional with very little free time to spend on his compost system. He is a hands-off composter — adding

materials as they are created and letting the pile break down at its own pace. Partly as a result of this, Matthew did not harvest any finished compost from his bin during the test period.



## Results:

**Testing period:** May 2014—May 2015

### Inputs:

- 925 litres of organic waste (78% greens, 19% browns, 2% dirt or finished compost, 0% other)
- Added 80 litres of water
- Aerated 18 times for a total of 59 minutes

### Outputs:

- No finished compost was harvested during the test period

### Recommendations:

The bracket bin has a large, flexible capacity and works well for households with a large amount of yard waste. For a similar price to several of the plastic bins tested by this study, the bracket bin provides far more capacity and its large opening is easier to stir with a garden fork.

Aesthetically-minded gardeners may also prefer this bin rather than a plastic bin because of its attractive, natural appearance. However it does require a larger space than a typical plastic bin.

The slant of the slats prevents materials from falling out of the sides. The large spaces also allow a lot of air to get into the pile, improving aeration. However this also allows the compost to dry out quite quickly, which does mean regular watering is necessary for fast results. If speed is not an issue, as it was not for Matthew's household, materials can simply be piled up for a few years without worrying about moisture or stirring.

The open top of the bin of the bin makes it very convenient to add materials, but could allow the bin to fill up with snow in winter. An improvised lid or covering would prevent this.

# Stationary bin: Lee Valley Wire Compost Bin

**Size:** 91 cm wide x 91 cm long x 76 cm high

**Maximum capacity:** 0.62 meters<sup>3</sup> (22 feet<sup>3</sup>)

**Price:** \$35—50

**Tester satisfaction:** moderate

**Features:** Four movable sides made of 1/8" coated steel wire with large spaces. Bottom open to the ground.

**What you can put in it:** Food waste (excluding meat, bones, dairy, and fats), leaves, grass clippings, other yard waste (excluding cat or dog waste).

**"Yuck" factor:** Moderate-to-low. Materials are enclosed but can spill out and be untidy. Open design may attract mice.

**Complexity to use:** Moderate-to-low. Some knowledge of balancing ingredients and adding water is helpful.

**In winter:** Breakdown stops, but you can keep adding materials as long as there is room.

**Mobility:** The bin is light and easy to move. You can easily lift it off the contents to harvest.

**Available at:** Lee Valley Tools Ltd.



Tested by: **Megan**



Megan lives in a household of four with a small yard and a medium-sized garden. She has several years of experience with composting and appreciates making a valuable soil additive to improve her garden soil.

Throughout the year, Megan's household has a large amount of yard waste to compost, including garden

plants, grass clippings and tree leaves. They also produce quite a bit of food scraps from their active kitchen.

Megan does not have a lot of free time to spend puttering with her compost. Before the test period, her household composted in a heap, which was left to break down largely on its own.

## Results:

**Testing period:** May 2014—May 2015

### Inputs:

- 2632 litres of organic waste (64% greens, 29% browns, 5% dirt or finished compost, 2% other)
- Added 250 litres of water
- Aerated 12 times for a total of 1 hour 45 minutes

### Outputs:

- 180 litres of finished compost

### Recommendations:

While this wire compost bin's low price tag and large capacity made it initially seem attractive, we did not find it to be an effective bin for producing compost.

The wire sides did not provide enough insulation to keep the materials from drying out, which meant breakdown was very slow. To fix this would have required near-daily watering, which was impractical for the amount of time and attention Megan had to spare. The spaces in the wire sides were several inches wide, which also allowed some material to fall through the gaps. The wire sides and open bottom do not keep out rodents, and Megan reported seeing at least one mouse during the year. Finally, to avoid damaging the wires, Megan had to take extra care when turning the contents and had difficulty digging into the corners.

While the wire bin did not actively hinder the composting process, its results were not significantly better than simply using an open compost heap.

The wire bin could be useful for storing leaves or other coarse organic material.



# Stationary bin: **Soilsaver**

**Size:** 71 cm wide x 71 cm long x 81 cm high

**Maximum capacity:** 0.40 meters<sup>3</sup> (14 feet<sup>3</sup>)

**Price:** \$75—\$100

**Tester satisfaction:** low

**Features:** Four black plastic sides connected by nuts and bolts, large square lid with locking handles, two sliding lower panels for accessing the lower half. Bottom open to the ground.

**What you can put in it:** Food waste (excluding meat, bones, dairy, and fats), leaves, grass clippings, other yard waste (excluding cat or dog waste).

**“Yuck” factor:** Moderate-to-low. Materials are neatly enclosed and break down with minimal interaction.

**Complexity to use:** Moderate-to-low. Some knowledge of balancing ingredients and adding water is helpful.

**In winter:** Breakdown stops, but you can keep adding materials as long as there is room.

**Mobility:** The bin is light and easy to move. You can easily lift it off the contents to harvest.

**Available at:** Seasonally at many retailers and online.



## **Results:**

**Testing period:** May 2014—May 2015

### **Inputs:**

- 488 litres of organic waste (51% greens, 19% browns, 30% dirt or finished compost, 0% other)
- Added 90 litres of water
- Aerated 5 times for a total of 45 minutes

### **Outputs:**

- No finished compost was harvested during the test period

### **Recommendations:**

The Soilsaver is a relatively inexpensive, basic plastic bin that can work well for small households with mainly food waste. As Tina realised during the test period, it is not big enough to handle large amounts of yard waste. Households with a lot of garden waste, tree leaves, or grass clippings will need a larger system or additional bins.

While shorter and wider than some black plastic bins, the Soilsaver is still an awkward shape for trying to stir the contents with a garden fork. To mix the compost effectively, one would need a compost aerator or to physically move the bin off the pile and refill it. It would also be possible to vertically insert a length of PVC pipe with holes drilled along the sides to provide passive aeration.

There are no small openings in the top so the entire lid must be lifted off when adding materials. The bin's open-bottom design is not rodent proof, but Tina reported no trouble with mice over the testing period.

Tested by: **Tina**

Tina lives in a household of four people. They have a large yard that produces plenty of grass clippings and garden waste but few leaves or other brown materials to balance their bin.

Tina's interest in composting is practical. She is an avid gardener and was hoping to create finished compost quickly. The bin's contents did not break down as rapidly as she had hoped, and she quickly realised it did not have the capacity to handle all her inputs. This understandably led to a lot of frustration, and contributed to Tina not using the bin through the colder months.

The Soilsaver was assigned to Tina through our research project but it was not a good match for her household's needs. As hands-off composters with a large amount of food waste, grass clipping and garden plants, a larger capacity bin and/or trench composting may have been more appropriate. A larger capacity bin would have had room to process more materials, and trench composting could have dealt with their excess greens while directly enriching their garden soil.

# Appendix II: **Tumbling Compost Bin Profiles**





# Tumbling bin: **Ecomposter**

**Size:** 81 cm diameter

**Maximum capacity:** 0.27 meters<sup>3</sup> (9.5 feet<sup>3</sup>)

**Price:** \$175—225

**Tester satisfaction:** high

**Features:** Black plastic panels, locking round lid, aeration tubes extending inwards and acting as internal baffles. Comes with round stand.

**What you can put in it:** Kitchen scraps (excluding meat, bones, dairy, and fats), leaves, grass clippings, other yard waste (excluding cat or dog waste).

**“Yuck” factor:** Moderate-to-low. Materials are neatly enclosed and break down with minimal interaction.

**Complexity to use:** Moderate-to-low. Some knowledge of balancing ingredients and adding water is helpful.

**In winter:** Breakdown stops, but you can keep adding materials as long as there is room. However the lid may freeze shut.

**Mobility:** The bin is made to roll and is easy to move to a new location, although too heavy to lift when full.

**Available at:** Previously online; currently unavailable.



Tested by: **Heather**



Heather lives in a household of two on an acreage outside of Saskatoon. She has several years of experience with outdoor compost bins. Her yard gives her plenty of grass clippings, tree leaves, and other yard waste to compost, along with the scraps from her kitchen.

Heather thought the Ecomposter was fun to use, but ultimately too small to be practical for her needs. She enjoyed rolling the ball around, and her large yard gave her plenty of room. When the ball filled up in October, she set it aside and did not return to it in the spring.

## **Results:**

**Testing period:** May 2014—October 2015

### **Inputs:**

- 278 litres of organic waste (55% greens, 45% browns, 0% dirt or finished compost, 0% other)
- Added 10 litres of water
- Aerated 7 times for a total of 8 minutes

### **Outputs:**

- No finished compost was harvested during the test period

## **Recommendations:**

The Ecomposter can be fun to roll around, especially for children. It can work well as a very small tumbler for people with mainly food waste or only small amounts of yard waste, but is far too small to deal with large amounts of yard waste on its own. It may also be too small to heat up effectively.

As with other tumbling bins, it works best to combine the ball with at least one other system. Tumbling bins are built for batch compost rather than continuous use. This means filling a bin with organic waste and then switching to a different bin while the first bin matures. This makes harvesting much easier. The first bin should still be turned and kept moist during this time.

The ball arrives in pieces and needs to be assembled. Heather reported that the attached instructions were very clear and she was done in less than two hours.

As shown in the picture, the ball is built with aeration tubes that extend inward into the compost. These tubes provide a good balance between airflow and preventing materials from drying out. They also act as internal baffles to break up and mix materials when rolled. The ball is not watertight, which prevents it getting soggy inside but does mean the base gets a bit mucky from leachate. The lid is tight-fitting and does not warp.

# Tumbling bin: **Dual-compartment Tumbler**

**Size:** 66 cm wide x 71 cm long x 91 cm high

**Maximum capacity:** 0.14 meters<sup>3</sup> (5 feet<sup>3</sup>)

**Price:** \$100—125

**Tester satisfaction:** high

**Features:** Black plastic barrel split into two chambers on metal stand. Sliding plastic door, adjustable vent and small internal baffles.

**What you can put in it:** Kitchen scraps (excluding meat, bones, dairy, and fats), leaves, grass clippings, other yard waste (excluding cat or dog waste).

**“Yuck” factor:** Moderate-to-low. Materials are neatly enclosed and break down with minimal interaction.

**Complexity to use:** Moderate-to-low. Some knowledge of balancing ingredients and adding water is helpful.

**In winter:** Breakdown stops, but you can keep adding materials as long as there is room. However the lid may freeze shut.

**Mobility:** The bin is very easy to move when empty and moderately easy to move when full.

**Available at:** Lee Valley Tools Ltd.



Tested by: **Amber**

Amber is a busy young woman living on an acreage in a household of four. She strives to compost everything she can from her home and farm, including cooked food, meat, and bones. Amber uses a variety of different compost systems, and also feeds food scraps to her chickens. At the start of our test period, she had already been using the dual-compartment tumbler for six months.

Amber is an experienced and adventurous composter, but her full life makes it difficult to consistently monitor a compost bin. She is sometimes away for several weeks at a time.

## **Results:**

**Testing period:** May 2014—January 2015

### **Inputs:**

- 193 litres of organic waste (69% greens, 17% browns, 3% dirt or finished compost, 12% other)
- Added 2.5 litres of water
- Aerated 13 times for a total of 50 minutes

### **Outputs:**

- No finished compost was harvested during the test period

## **Recommendations:**

The dual-compartment tumbler is a good, simple system for a one-to-two person household with small amounts of food waste and little to no yard waste. On its own, it is not sufficient to deal with large amounts of food waste or even moderate amounts of yard waste.

For a tumbling bin, it is relatively inexpensive. Because it is off the ground and enclosed, it is also rodent-proof.

Tumbling bins are built for batch compost. The Lee Valley tumbler makes this easy by splitting its barrel into two smaller compartments, which can be filled one at a time. This can work quite well, although if you have more than a little organic waste it is easy to fill the second compartment before the first has finished curing. While the compartments are too small to hold onto a lot of heat, Amber reported temperatures between 35-40°C in the active side of the tumbler.

As with other tumbling bins, a major drawback of the Lee Valley tumbler is that it becomes difficult to use in winter. While you can keep adding organic materials as long as there is room, the small capacity makes it more likely the bin will fill up before spring. As well, the plastic sliding door becomes brittle in the cold and can easily freeze shut, making it susceptible to breaking.



# Tumbling bin: **Vertical Tumbler**

**Size:** 74cm wide x 79 cm long x 80 cm high

**Maximum capacity:** 0.18 meters<sup>3</sup> (6.5 feet<sup>3</sup>)

**Price:** \$140—160

**Tester satisfaction:** moderate

**Features:** Brown plastic barrel set on a metal axle and plastic stand. Twist-lock plastic lid.

**What you can put in it:** Kitchen scraps (excluding meat, bones, dairy, and fats), leaves, grass clippings, other yard waste (excluding cat or dog waste).

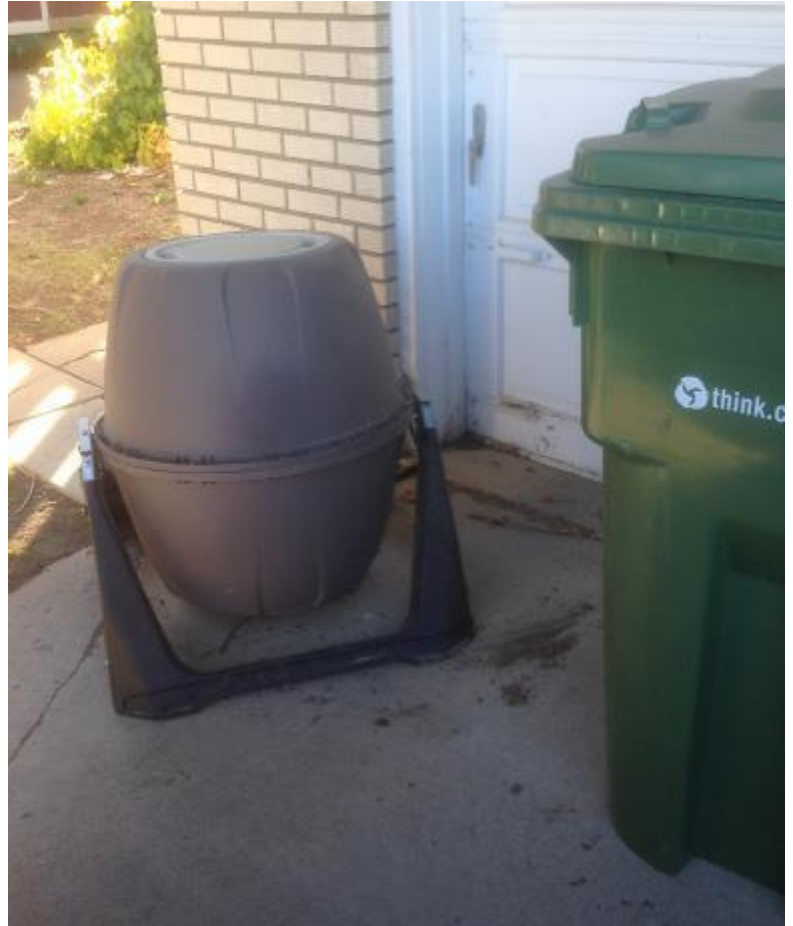
**“Yuck” factor:** Moderate-to-low. Materials are neatly enclosed and break down with minimal interaction.

**Complexity to use:** Moderate-to-low. Some knowledge of balancing ingredients and adding water is helpful.

**In winter:** Breakdown stops, but you can keep adding materials as long as there is room. However the lid may freeze shut.

**Mobility:** The bin is very easy to move when empty and moderately difficult to move when full.

**Available at:** Seasonally at Home Hardware and online.



Tested by: **Martha**

Martha lives in a three-person household with a moderate amount of food scraps from their house and yard waste from their lawn and flowerbeds. She is interested in diverting her organic waste from the landfill, but doesn't want to have to give a lot of attention to a compost system or mess around with smelly materials. In the past, she has made several attempts to compost more regularly but always stops over the winter months.

While Martha is a reluctant, hands-off composter, she hopes to keep using the vertical tumbler in the future. Though it isn't a perfect design, she appreciates that it is neatly contained and can deal with being neglected for several weeks at a time.

## **Results:**

**Testing period:** May 2014—November 2014

### **Inputs:**

- 153 litres of organic waste (58% greens, 29% browns, 14% dirt or finished compost, 0% other)
- Added no water.
- Aerated 21 times for a total of 15 minutes

### **Outputs:**

- No finished compost was harvested during the test period

## **Recommendations:**

The vertical tumbler is a decent system for a small-to-medium household with mostly kitchen scraps or moderate amounts of yard waste. On its own, it is not sufficient to deal with large amounts of organic material. As with other tumbling bins, it works best combined with at least one other system, so that one can be used while the other is full and processing.

For a tumbling bin, the vertical tumbler is moderately priced. Because it is off the ground and enclosed, it is rodent proof.

The vertical tumbler arrives in pieces and needs to be put together. Assembly is a little tricky, as several internal components are a tight fit. While putting Martha's bin together, a small plastic piece actually snapped off—however this did not end up impeding the bin's function.

Unlike most tumbling bins, which turn on a horizontal axis, this bin flips end-over-end. Martha reported that when the bin was getting full, this meant it was actually quite difficult and heavy to turn over. This makes the bin unsuitable for people with limited upper body strength or injuries. However the design does make it easier to pour finished compost out than most horizontal bins.

# Tumbling bin: Sun-Mar Continuous Composter

**Size:** 71 cm wide x 89 cm long x 117 cm high

**Maximum capacity:** 0.40 meters<sup>3</sup> (14 feet<sup>3</sup>)

**Price:** \$500—550

**Tester satisfaction:** moderate

**Features:** Green plastic barrel with second internal chamber, end cap for opening or closing second chamber, plastic stand and handle attached to shaft-and-gear turning mechanism. Large sliding door for adding waste and three small vents for air exchange.

**What you can put in it:** Kitchen scraps (excluding meat, bones, dairy, and fats), leaves, grass clippings, other yard waste (excluding cat or dog waste).

**“Yuck” factor:** Low. Materials are neatly enclosed and break down without direct interaction.

**Complexity to use:** Moderate-to-low. Some knowledge of balancing ingredients and adding water is helpful.

**In winter:** Breakdown stops, the turning mechanism freezes up, and the lid may freeze shut. It is not recommended to keep using the Sun-Mar in winter.

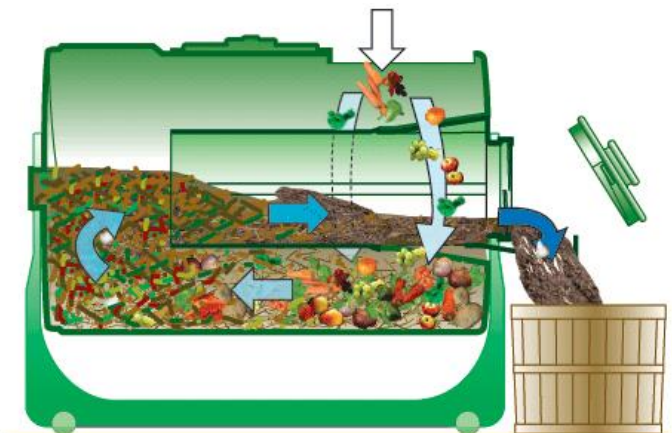
**Mobility:** The bin is easy to move on level surfaces as it has casters. It is difficult to move on soft or rough surfaces.

**Available at:** Seasonally at many retailers and online.

Tested by: **SARC**

SARC is a non-profit association representing community-based organizations that provide residential, developmental, and employment supports to individuals with disabilities. They have 27 staff at their main office building, and were looking for a way compost their food scraps and smaller amounts of yard waste onsite. They wanted a compost system that could go in their outdoor patio area, and which wouldn't cause trouble with insects or mice.

Employees took turns adding compost and turning the bin. While there was always someone around to tend the compost, no one in particular was responsible for it.



## Results:

**Testing period:** May 2014—May 2015

### Inputs:

- 1048 litres of organic waste (71% greens, 25% browns, 0% dirt or finished compost, 5% other)
- Added 120 litres of water
- Aerated 45 times for a total of 1 hour 11 minutes

### Outputs:

- 70 litres of finished compost

### Recommendations:

The Sun-Mar Continuous Composter is a decent composting option for small offices or businesses with a moderate amount of food waste or yard waste to process. Because it is off the ground and enclosed, it is rodent proof, which is important for many offices. The turning mechanism makes it easy to aerate even large loads. However it is quite expensive, and the “continuous” function of the design does not work as consistently as claimed. It is also difficult or impossible to use the bin in winter.

The Sun-Mar has two chambers; an outer one and an inner one. According to the manufacturers, materials will move through the chambers slowly and come out the end as finished compost. However SARC found that the compost that came out was not consistently finished, and had to sort some materials back into the bin.

In winter, SARC found that the lid, contents, and turning mechanism all froze up, making it impossible to add materials or turn.



# Appendix III: In-the-Dirt Compost Method Profiles





# In the dirt: **Mulch**

**Size:** Possible for any size of garden bed.

**Maximum capacity:** Close to plants, mulch should not be piled more than 4 inches deep. Between plants, mulch can be piled as deep as desired.

**Price:** free

**Tester satisfaction:** high

**What you can put in it:** Dry brown materials such as leaves, straw, dry grass clippings or woodchips.

**“Yuck” factor:** None. Dry brown materials break down slowly with no smell.

**Complexity to use:** Low. Material is piled and left. It may be necessary to pull excess mulch off of plants in spring.

**In winter:** Mulch protects sensitive plants from winter-kill.

**Mobility:** The system cannot be moved.

Tested by: **Nancy**

Nancy lives in a household of three with a small yard and garden. She has kept a ramshackle compost bin for decades, but only started mulching four years before the study as a way to use up her excess tree leaves. She also appreciates the mulch for protecting her strawberries in the wintertime and suppressing weeds. Nancy and her husband travel back and forth between their city home and a grain farm throughout the growing season—it is important to her to not have the weeds get out of control while she is gone.

## **Results:**

**Testing period:** May 2014—November 2014

### **Inputs:**

- 920 litres of organic waste (100% browns)
- Watering and aerating unnecessary

### **Outputs:**

- Mulch does not produce finished compost.

### **Recommendations:**

Mulching is an excellent, cost-free way for community gardens or households with garden space to use up large amounts of dry brown material. The materials can be added whenever is convenient. For example, tree leaves can be added in fall and left to break down all year.

The mulch protects perennials from winter-kill and helps to suppress weed growth in spring and summer. (It is best not to use leaves mixed with tree seeds if possible, as these will sprout.) Mulch also helps keep soil damp and protect plant roots from rapid temperature changes.

As the mulch slowly decomposes, it adds valuable organic matter to the soil beneath. Nancy says her garden soil is noticeable looser and more fertile since she began mulching. Leaf mulch is also a haven for ladybugs, which help control aphid infestations.





# In the dirt: **Sheet Compost**

**Size:** Our test area was 1 meter<sup>2</sup>, but sheet compost can be used in any size of garden bed.

**Maximum capacity:** Layers can be piled from 20-100 cm high over as large a space as desired.

**Price:** free

**Tester satisfaction:** high

**What you can put in it:** Kitchen scraps (excluding meat, bones, dairy, and fats), leaves, grass clippings, other yard waste (excluding cat or dog waste).

**“Yuck” factor:** Low. Assembled layers do not have to be disturbed and can be covered by vegetation.

**Complexity to use:** Low. Layers are assembled and left, or planted on.

**In winter:** Breakdown stops, but materials can still be added in layers as they are available.

**Mobility:** The system cannot be moved.



## Tested by: **The Saskatoon Food Bank Garden Patch**

The Garden Patch is a large community garden run by the Saskatoon Food Bank and Learning Centre, and tended by a huge team of volunteers. They have an enormous amount of garden waste, and enjoy trying different compost methods with it. The community garden is active from the beginning of May to the end of September.

### **Results:**

**Testing period:** May 2014—May 2015

#### **Inputs:**

- 98 litres of organic waste (90% greens, 10% browns, 0% dirt or finished compost, 0% other)
- Watering and aerating unnecessary

#### **Outputs:**

- Finished compost is in-place and not measurable.

### **Recommendations:**

Sheet compost is a great, free way for community gardens or households with gardens use up a large amount of compostable materials without sacrificing growing space. Layers of greens and browns are assembled directly on the soil. The final layer should be browns. Compost-loving plants, such as squash or beans, can be grown on top in a small amount of dirt. These plants will benefit from the nutrients and microbial activity of the compost. The Garden Patch planted squash in their sheet compost, which grew large and lush and proved more resistant to powdery mildew than the squash grown directly in soil. The sheet compost also retains moisture better than plain soil.

Sheet compost is generally meant to be assembled all at once, although more layers can be added as long as nothing has been planted on top. In the following spring, compost from the area can be raked outwards to cover more ground if desired. Partially-decomposed piles can be added to and planted in again.

#### **Bonus tip: Grow Piles**

In addition to their sheet compost, the Garden Patch also experimented with two 'grow piles,' in 2014. Grow piles are very similar to sheet compost, but generally built thicker and higher. (The Garden Patch's sheet compost was 30 cm thick, while a grow pile is typically 100 cm.) A length of PVC pipe with holes drilled in it is laid horizontally through the lower third of the pile for aeration. Squash planted in these grow piles grew even more enthusiastically than those in the regular sheet compost.

# In the dirt: **Trench Compost**

**Size:** 30—50 cm deep, no maximum width or length.

**Maximum capacity:** As the trench is filled, room must be left to cover organic waste with 10—20 cm of soil.

**Price:** free

**Tester satisfaction:** high

**What you can put in it:** Most food waste (including meat, bones, and dairy but excluding fats), leaves, grass clippings, other yard waste (excluding cat or dog waste).

**“Yuck” factor:** Low. Materials are buried as they are added and decompose under the soil.

**Complexity to use:** Low. Materials are buried and left.

**In winter:** Additional trench cannot be dug, but pre-dug trenches can still be added to. Cover with set-aside loose soil if possible.

**Mobility:** The system cannot be moved.

## **Recommendations:**

Trench compost is a great, cost-free way for community gardens or households with garden space to process food waste and green plant material. Unlike traditional composting, it is not necessary to add dry brown materials such as leaves or woodchips to balance the wet greens. For this reason trench composting is a particular good solution for those without an easy source of browns. (If both browns and greens need to be processed, we recommend pairing trench composting with mulching.)

Plants growing next to a trench compost will benefit from the nutrients, moisture retention, and increased microbial activity. The Garden Patch planted winter squash and tomatoes next to their trench. These plants did very well over the summer and showed slightly increased resistance to powdery mildew.

After several months, or in the following spring



Example of filled trench compost before burying. Not from our test.

season, seeds and seedlings can be planted directly into the old trench. Over time, trench composting will make garden soil richer and easier to till.

Trench composts require a small amount of forward planning in late fall, when enough trench should be dug to accommodate food waste during the winter. The loose dirt can be saved for covering scraps.



Tested by: **The Saskatoon Food Bank Garden Patch**

The Garden Patch is a large community garden run by the Saskatoon Food Bank and Learning Centre, and tended by a huge team of volunteers. They have an enormous amount of garden waste every year, and enjoy trying different compost methods with it. The community garden is active from the beginning of May to the end of September.

## **Results:**

**Testing period:** May 2014—May 2015

### **Inputs:**

- 340 litres of organic waste (100% greens)
- Watering and aerating unnecessary

### **Outputs:**

- Finished compost is in-place and not measurable.



# Digester: **Green Cone**

**Size:** 38 cm diameter, 42 cm depth below the ground, 70 cm height above the ground

**Maximum capacity:** 0.08 meters<sup>3</sup> (2.8 feet<sup>3</sup>)

**Price:** \$150—175

**Tester satisfaction:** low

**Features:** Black plastic underground basket, double-walled green plastic cone with hinged lid.

**What you can put in it:** All food waste (including meat, bones, dairy and fats), and pet waste (including cat or dog waste). Not meant for grass, leaves, or other yard waste.

**“Yuck” factor:** Moderate-to-high. Materials are neatly enclosed and normally break down with a minimum of interaction. However if not working properly food and pet waste can build up in the bin. Residual “slurry” needs to be emptied every 2-5 years.

**Complexity to use:** Variable. When working properly, low. Waste is added and left to digest. Accelerator powder or septic starter is sometimes required.

**In winter:** Breakdown stops, and you should not overfill the underground basket.

**Mobility:** The cone is very difficult to move once buried.

**Available at:** Durable Solutions Inc., Vancouver BC. (Check [green-cones-in-the-west.myshopify.com/](http://green-cones-in-the-west.myshopify.com/) or email [info@greencone.ca](mailto:info@greencone.ca) for more details.)



Tested by: **Brie**



Brie is a veteran composter with several years of experience using different methods. She lives in a household with three people and a dog. They have a large yard with sunny and shady areas and clay-heavy soil.

Brie was looking forward to being able to recycle her household’s food and pet waste into the ground. However her experience with the Green Cone left her frustrated and hesitant to recommend the cone to anyone else.

## **Results:**

**Testing period:** May 2014—May 2015

### **Inputs:**

- 83 litres organic waste (food waste and dog feces)
- 1/2 cup of accelerator powder

### **Outputs:**

- The Green Cone does not produce finished compost

## **Recommendations:**

The Green Cone is meant to be a simple way for households to divert food and pet waste that can’t go in a traditional compost bin. However it is not inexpensive, and requires a specific set of parameters to work properly.

The main basket of the cone is buried underground, while the above-ground portion provides airflow and captures the sun’s heat. With small additions of accelerator powder, the cone promises to digest and liquefy 4.5 litres of waste every 1-3 days. Surrounding plants can benefit from the nutrient-rich runoff.

The cone requires excellent drainage, which caused some difficulty in our test. In spite of battling tree roots to dig extra drainage room below and around the cone, as recommended, the basket frequently filled with rainwater or snowmelt, halting digestion.

The cone is meant to stay hot from captured sunlight. Brie’s cone was in a sunny spot in the yard, also as recommended. While Brie’s cone did tend to be 5-15°C warmer than the surrounding air, this was still not enough to prevent the cone from freezing in winter. When frozen, digestion stops and the small basket quickly fills up with waste.

In short, the Green Cone requires sandy soil, a sunny location, and periodic additions of accelerator powder or septic starter to run smoothly. Even with these conditions filled, it will not be usable year-round in Saskatchewan and takes some time to restart in spring.

# Appendix IV: Indoor Compost Method Profiles





# Indoor method: **Compost Tub**

**Size:** Our bin was 40 cm wide x 61 cm long x 42 cm high, but any large tub can be used.

**Maximum capacity:** The bin can hold a total of 0.10 meters<sup>3</sup> (3.6 feet<sup>3</sup>).

**Price:** \$5—15

**Tester satisfaction:** very high

**Features:** Large tub with lid. Holes drilled in the sides and bottom, set on top of plastic tray on a second lid.

**What you can put in it:** Food waste (excluding meat, bones, dairy, and fats), small amounts of plant material, shredded paper and dryer lint. Requires dirt.

**“Yuck” factor:** Moderate. Materials are neatly enclosed but need to be checked and stirred often. Will not smell with proper care.

**Complexity to use:** Moderate-to-high. Contents must be carefully balanced and monitored to avoid smells or leaks.

**Mobility:** The bin is easy to move, though somewhat heavy when full.

**Available at:** Tubs available at many home stores.



Tested by: **Bev**



Bev is a very confident composter with many years of experience making compost outdoors. That is what led her to try the adventurous step of creating an indoor compost bin over the winter.

She designed her bin based on an internet tutorial that suggested layering dry dirt, shredded paper, and food waste indoors. In a single large tub, Bev was able to successfully process the food waste of her three person household, as well as dry dirt from their many annual planters and shredded paper from their home office. She then used the finished compost as part of a potting mix for the next generation of potted plants.

Although smaller than an outdoor bin, the compost still consistently heated up to 35–40°C. Bev set up the bin in her unfinished basement, but said the waste processed with so little smell she could have done it upstairs in her living space. She was extremely pleased with the results of her experiment and plans to do it again.

## **Results:**

**Testing period:** December 2014—May 2015

### **Inputs:**

- 216 litres of organic waste (64% greens, 13% browns, 24% dirt or finished compost, 0% other)
- Added 0.6 litres of water
- Aerated 9 times for a total of 48 minutes

### **Outputs:**

- 102 litres of finished compost

### **Recommendations:**

Creating an indoor compost tub is a viable method for experienced, hands-on composters to deal with their food waste indoors. People new to composting should probably try to master the process outdoors first. An indoor compost tub is especially convenient for people who have a lot of annual potted plants, as the dead pots can be added to the compost tub for dry dirt, and the finished compost can be used as part of a potting mix for new plants.

An indoor tub must follow a few guidelines. The tub needs holes in the sides and bottom for aeration and drainage. It should be slightly elevated off the drip tray to improve airflow. The first layer must be dry dirt and shredded paper. More paper and dirt should be added with each addition of food waste. If the system seems to be getting too wet, leave the lid off or add paper. Materials will shrink down significantly, but when the bin is too full, finished compost should be harvested by hand into a second container and stored until needed.

# Indoor method: **Worm Factory**

**Size:** 41 cm wide x 41 cm long x 62 cm high. Each tier is 9 cm tall.

**Maximum capacity:** This depends on the size of the worm colony; red wigglers can eat their weight in food waste and bedding in a day. Sandra added approximately 4 litres of food waste a week.

**Price:** \$80—125 for bin, \$10—25 for red wigglers

**Tester satisfaction:** very high

**Features:** Four green plastic tiers with perforated bottoms, strong base with spigot for excess liquid.

**What you can put in it:** Kitchen scraps (excluding meat, bones, dairy, and fats), shredded paper. Not meant for large amounts of yard waste, but small amounts of dry leaves can be used for bedding.

**“Yuck” factor:** Moderate. Requires dealing with large numbers of red wiggler worms, and can sometimes attract flies.

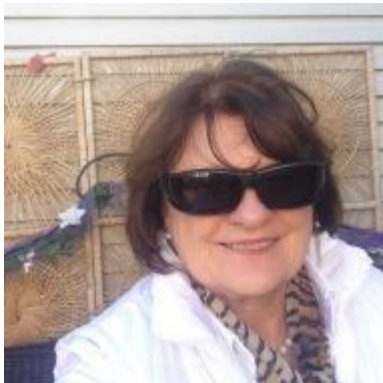
**Complexity to use:** Moderate-to-high. Some knowledge of bedding, caring for worms, and eliminating flies is necessary.

**Mobility:** The bin is easy to move. It is quite heavy when full, but the tiers can be moved individually.

**Available at:** Bin at The Better Good (Saskatoon) and online. Saskatchewan worm suppliers listed at [goo.gl/XyZsPQ](http://goo.gl/XyZsPQ).



Tested by: **Sandra**



Sandra is a red wiggler worm breeder and supplier in Saskatoon. She has many vermicomposting bins going at all times, and recycles food waste from her own two-person household as well as waste from neighbours and one small restaurant. She has plenty of time to dedicate to her vermicompost bins.

Sandra was delighted to receive the Worm Factory for our study. She set it up using the bedding supplied with the bin and her own squirm of worms. She replenished the bedding over time with newspaper.

While vermicomposting is generally used indoors, Sandra kept her Worm Factory outside during the late spring, summer, and early fall. In the colder months, she brought it into her heated garage, where the temperature stayed around 10°C. While outside in the sun, she noticed the bin got dry faster and more frequently. The top lid also warped in the sun and no longer fits properly. In the garage, the worms became somewhat sluggish from the low temperature and consumed less food waste.

Sandra uses the worm tea from the spigot to water her cedars, grass and perennials.

## **Results:**

**Testing period:** May 2014—May 2015

### **Inputs:**

- Began with bedding of shredded cardboard, soil, rock dust, and crushed pumice
- 200 litres of organic waste (food waste, dryer lint, vacuum dust, dog hair)
- Added 40-60 sheets of newspaper bedding during the test period (exact volume unknown)
- Added 34 litres of water

### **Outputs:**

- 171 litres of worm castings

### **Recommendations:**

The Worm Factory is a good system for processing food waste indoors or outside during mild weather. It uses red wiggler worms to eat food scraps and turn them into high-nutrient worm castings. It does require some knowledge of vermicomposting, and especially, how to avoid getting fruit flies or fungus gnats in the bin. Sandra buries food waste carefully and sprays neem oil on the top bedding to discourage flies.

The Worm Factory comes with four tiers that the worms can pass between freely. Sandra found it best to have waste processing in all four tiers. When one tier is close to full, no more waste should be added to it for several weeks, after which time it can be harvested.

Excess liquid drains through to the bottom stand, where it should be tapped every 1-3 days to avoid turning anaerobic and smelly. This “worm tea” is excellent fertilizer for plants.



# Indoor method: **Vermicompost Tub**

**Size:** 40 cm wide x 61 cm long x 22 cm high

**Maximum capacity:** This depends on the size of the worm colony; red wigglers can eat their weight in food waste and bedding in a day. Kas added an average of 4.4 litres of food waste a week.

**Price:** \$5—15 for tub, \$10—25 for red wigglers

**Tester satisfaction:** high

**Features:** Large tub with lid. Holes cut in the lid for ventilation.

**What you can put in it:** Kitchen scraps (excluding meat, bones, dairy, and fats), shredded paper. Not meant for large amounts of yard waste, but small amounts of dry leaves can be used for bedding.

**“Yuck” factor:** Moderate. Requires dealing with large numbers of red wiggler worms, and can sometimes attract flies.

**Complexity to use:** Moderate-to-high. Some knowledge of bedding, caring for worms, and eliminating flies is necessary.

**Mobility:** The bin is easy to move.

**Available at:** Tubs available at many home stores. Saskatchewan worm suppliers listed at [goo.gl/XyZsPQ](http://goo.gl/XyZsPQ).



Tested by: **Kassandra**



Kas is an artistic young woman living with two roommates. She has access to an outdoor space, but still enjoys vermicomposting inside. She had been using a vermicompost bin for a year before our study, but sadly had her first squirm of worms die due to a treated wood product.

During the test there were actually two vermicompost tubs in use; one belonging to Kas and one to a roommate. This made flies slightly more difficult to control, but Kas did an excellent job with adding dry bedding and making sure scraps were totally buried.

Kas is a patient composter and uses a bit of forethought to harvest. At a certain point she stops adding food waste to one side of the bin. The worms finish processing this side and migrate to the other where the fresh food is, allowing her to scoop out the first side's worm castings without a fuss.

## **Results:**

**Testing period:** May 2014—May 2015

### **Inputs:**

- Began with bedding of shredded newspaper and soil
- 238 litres of organic waste
- Added 50-70 litres of newspaper and leaf bedding during the test period (exact volume unknown)
- Added 78 litres of water

### **Outputs:**

- 25 litres of finished compost

### **Recommendations:**

A vermicompost tub is a good, inexpensive way to process food waste indoors or outside during mild weather. It uses red wiggler worms to eat food scraps and turn them into high-nutrient worm castings.

Vermicomposting does require some knowledge of how to care for the worms and how to avoid breeding fruit flies or fungus gnats. Kas controlled fruit flies in her bin by carefully burying food scraps and adding more bedding to the top regularly. However even when taking care, it is common for a vermicompost bin to attract a small number of fungus gnats. For people who would be bothered by a small number of flies, we recommend looking at another method of indoor composting such as bokashi fermentation.

Unlike the Worm Factory, a vermicompost tub typically has no bottom drainage. This means that you have to be a bit more careful about moisture levels, and balance soggy food scraps with additions of dry bedding. The closed bottom also means that the bin does not leak and can be placed directly on carpet.

# Indoor method: NatureMill Automatic Compost Bin

**Size:** 30 cm wide x 51 cm long x 51 cm high

**Maximum capacity:** 11.3 litres weekly (0.011 meters<sup>3</sup>, 0.40 feet<sup>3</sup>)

**Price:** \$325—375

**Tester satisfaction:** high

**Features:** Black hardened Styrofoam casing with stainless steel internal components. Upper chamber for processing waste, lower chamber for harvesting finished compost.

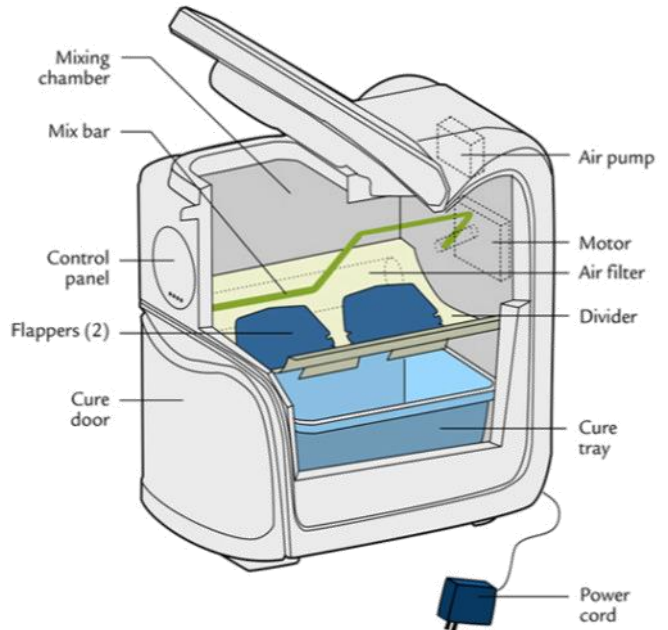
**What you can put in it:** Food waste (including meat and dairy but excluding bones and fibrous items such as corn cobs). Requires sawdust pellets and baking soda. Not meant for grass, leaves, or other yard waste.

**“Yuck” factor:** Moderate-to-low. Materials are neatly enclosed and break down with no interaction. Mild smells are sometimes present.

**Complexity to use:** Moderate-to-high. Materials must be cut up and carefully balanced to work well.

**Mobility:** The bin is very easy to move, full or empty.

**Available at:** Online at [naturemill.net](http://naturemill.net).



Tested by: **Kaelen**



Kaelen comes from a family that always made compost, and grew up familiar with how to tend an outdoor bin. Now that she's living alone in an apartment, she was looking for ways to continue diverting her food waste from the garbage.

Kaelen is a smart and dedicated composter who quickly got the hang of the somewhat-finicky Naturemill and kept it running smoothly

with the right blend of chopped food waste, sawdust pellets, and baking soda.

## Results:

**Testing period:** May 2014—May 2015

### Inputs:

- 105 litres of organic waste (89% food waste, 11% sawdust pellets)
- 2.85 cups of baking soda
- Watering and aerating unnecessary

### Outputs:

- 35 litres of finished compost

## Recommendations:

The Naturemill Automatic Compost Bin is not the cheapest or simplest method of dealing with food waste indoors. However it does do what it claims, and does it well. It is a decent option for people with no outdoor space who would prefer not to do vermicomposting or bokashi fermentation, as long as they are not turned off by the price.

It composts at a consistently hot temperature of between 50-60°C, making it safe for meat and dairy products. It cannot handle bones or corn cobs, and the remaining waste needs to be chopped to avoid jamming the mechanisms. Cabbage and broccoli can be processed, but the Naturemill warns they will produce a strong odour. Sawdust pellets, available at many hardware stores, are used to balance the greens. Baking soda is added to neutralize acids that could kill the bacterial cultures. Even with baking soda, the Naturemill asks users to limit the number of citrus peels or pineapple scraps in each load of food waste.

The Naturemill uses a continuous draw of 50 watts, similar to a nightlight. The internal mixer makes noise as it runs, but Kaelen said she quickly became accustomed to it. The mixer also sometimes jams, but tends to sort itself out within a few hours.





# Indoor method: Bokashi Bucket

**Size:** Our bucket was 30 cm wide x 24.5 cm long x 37 cm high

**Maximum capacity:** 19 litres in the bucket we tested. However larger buckets can be used and additional buckets added to the system to increase capacity.

**Price:** \$15—20 for a regular 5-gallon bucket and screw top lid or \$50—85 for a bokashi-specific bucket. Two buckets in rotation is ideal. \$15—20 for a 2.2 pound bag of bokashi bran.

**Tester satisfaction:** high

**Features:** Sealable plastic bucket. Bokashi-specific buckets have spigots for harvesting excess liquid while regular 5-gallon buckets do not.

**What you can put in it:** All food waste (including meat, bones, dairy, and fats). Not meant for large amounts of yard waste, but weeds that have gone to seed can be added to kill the seeds.

**“Yuck” factor:** Moderate-to-low. Materials are neatly enclosed. If the process is run correctly it should have a mild “pickle” smell and form white mould. If it is not run correctly it can smell putrid and form blue or green mould.

**Complexity to use:** Moderate. Materials should be cut up, bran must be added and liquid levels should be monitored. At the end of the process, the fermented waste needs to be added to the soil or an outdoor compost bin.

**Mobility:** The bucket is very easy to move.

**Available at:** Regular 5-gallon buckets available at hardware stores. Bokashi-specific buckets and bokashi bran available online.



Tested by: **Lee**



Lee lives in a two-person household in an apartment. He has used an outdoor compost bin before, but had never tried processing food waste indoors before this study. While the bokashi bucket had a bit of a learning curve at the start, Lee stuck with it and quickly figured out the right balance of waste and bran to use.

When the bucket was full and finished fermenting, Lee emptied it into his friend's compost pile.

## Results:

**Testing period:** May 2014—May 2015

### Inputs:

- 113 litres of food waste
- 7.5 litres of bokashi bran
- Watering and aerating unnecessary

### Outputs:

- 3 buckets of fermented pre-compost; approximately 54 litres

## Recommendations:

Using a bokashi bucket is a great way for those with no outdoor space to process their food waste. Unlike most compost methods, it can handle *all* food waste including meat, bones, dairy, and fat. Bokashi fermentation does require the continual purchase of bran, but the price is quite low. Finally, while the fermented waste can be stored in the bucket for up to 6 months, it will eventually need to be added to soil or a regular compost bin—meaning bokashi users will need to eventually make an arrangement with another household or community garden to accept the pre-compost. Once buried outside, the waste finishes composting in 2-4 weeks.

A bokashi bucket can also be used by a household with an outdoor compost as a way to process their meat, dairy, bones, fats, and weeds that have gone to seed.

Bokashi buckets ferment food waste using additions of inoculated bran. The process is anaerobic, so air is excluded by tamping the contents down with a pan lid and keeping the bucket sealed except to add waste. If a bokashi-specific bucket is used, the spigot should be drained every few days. In a regular 5-gallon bucket, a few litres of sawdust or another absorbent should be added to the bottom to absorb excess liquid. A screw-top lid can also be purchased to make opening and closing easier.



Example of bokashi bucket that has finished fermenting. Not from our test.

# Appendix V: Key Characteristics of Compost Systems

**Table 1: Key Stationary Compost Bin Characteristics**

| Compost system                                 | Cost           | Capacity                           | Complexity       | Method of stirring | Moisture retention | Use in winter | What can be added <sup>1</sup> |
|--|----------------|------------------------------------|------------------|--------------------|--------------------|---------------|--------------------------------|
| <a href="#">Garden Gourmet</a>                 | \$75-100       | 0.31 m <sup>3</sup>                | Moderate-to-low  | From the top       | Ok                 | Yes           | Most organics                  |
| <a href="#">Earth Machine</a>                  | \$45-75        | 0.30 m <sup>3</sup>                | Moderate-to-low  | From the top       | Ok                 | Yes           | Most organics                  |
| <a href="#">Aerobin 400</a>                    | \$350-400      | 0.42 m <sup>3</sup>                | Moderate-to-low  | From the top       | Fantastic          | Yes           | Most organics                  |
| <a href="#">Green Johanna</a>                  | \$275-300      | 0.33 m <sup>3</sup>                | Moderate-to-low  | From the top       | Fantastic          | Yes           | All organics                   |
| <a href="#">Earthmaker</a>                     | \$260-350      | 0.47 m <sup>3</sup>                | Moderate-to-high | From the top       | Ok                 | No            | Most organics                  |
| <a href="#">Wooden stacking bin</a>            | \$55-75        | 0.68 m <sup>3</sup>                | Moderate-to-low  | From the top       | Low                | Yes           | Most organics                  |
| <a href="#">Wooden 2-bin composter</a>         | \$275-400      | 1.46 m <sup>3</sup>                | Moderate-to-low  | From the front     | Ok                 | Yes           | Most organics                  |
| <a href="#">Pallet compost</a>                 | \$5-10         | 1.25 m <sup>3</sup><br>(per stall) | Moderate-to-low  | From the front     | Low                | Yes           | Most organics                  |
| <a href="#">Co-op Garden Composter</a>         | \$75-80        | 0.25 m <sup>3</sup>                | Moderate-to-low  | From the top       | Ok                 | Yes           | Most organics                  |
| <a href="#">Blue barrel</a>                    | \$10-30 (each) | 0.21 m <sup>3</sup><br>(each)      | Moderate         | From the top       | Fantastic          | Yes           | Most organics                  |
| <a href="#">Lee Valley bracket compost bin</a> | \$125-200      | 1.37 m <sup>3</sup>                | Moderate-to-low  | From the top       | Low                | Yes           | Most organics                  |
| <a href="#">Lee Valley wire compost bin</a>    | \$35-50        | 0.62 m <sup>3</sup>                | Moderate-to-low  | From the top       | Low                | Yes           | Most organics                  |
| <a href="#">Soilsaver</a>                      | \$75-100       | 0.40 m <sup>3</sup>                | Moderate-to-low  | From the top       | Ok                 | Yes           | Most organics                  |

**Table 2: Key Tumbling Compost Bin Characteristics**

| Compost system                              | Cost      | Capacity            | Complexity      | Method of stirring | Moisture retention | Use in winter | What can be added <sup>1</sup> |
|---|-----------|---------------------|-----------------|--------------------|--------------------|---------------|--------------------------------|
| <a href="#">Ecomposter</a>                  | \$175-225 | 0.27 m <sup>3</sup> | Moderate-to-low | Tumble             | Good               | No            | Most organics                  |
| <a href="#">Dual-compartment tumbler</a>    | \$100-125 | 0.14 m <sup>3</sup> | Moderate-to-low | Tumble             | Good               | No            | Most organics                  |
| <a href="#">Vertical tumbler</a>            | \$140-160 | 0.18 m <sup>3</sup> | Moderate-to-low | Tumble; not easy   | Good               | No            | Most organics                  |
| <a href="#">Sunmar continuous composter</a> | \$500-550 | 0.40 m <sup>3</sup> | Moderate-to-low | Tumble             | Good               | No            | Most organics                  |



**Table 3: Key In-the-Dirt Compost Method Characteristics**

| Compost system                 | Cost      | Capacity            | Complexity | Method of | Moisture | Use in | What can be     |
|--------------------------------|-----------|---------------------|------------|-----------|----------|--------|-----------------|
| <a href="#">Mulch</a>          | free      | ∞                   | Low        | NA        | NA       | Yes    | Brown materials |
| <a href="#">Sheet compost</a>  | free      | ∞                   | Low        | NA        | Low      | Yes    | Most organics   |
| <a href="#">Trench compost</a> | free      | ∞                   | Low        | NA        | NA       | No     | Green materials |
| <a href="#">Green Cone</a>     | \$150-175 | 0.08 m <sup>3</sup> | Variable   | NA        | Good     | No     | All food waste  |

**Table 4: Key Indoor Compost Method Characteristics**

| Compost system                                   | Cost            | Capacity                        | Complexity       | Method of stirring | Moisture retention | Use in winter | What can be added <sup>1</sup> |
|--|-----------------|---------------------------------|------------------|--------------------|--------------------|---------------|--------------------------------|
| <a href="#">Compost tub</a>                      | \$5-15          | 0.10 m <sup>3</sup>             | Moderate-to-high | From the top       | Good               | Yes           | Most organics                  |
| <a href="#">Worm Factory</a>                     | \$90-150        | 0.004 m <sup>3</sup> per week   | Moderate-to-high | NA                 | Good               | Yes           | Most food waste                |
| <a href="#">Vermicompost tub</a>                 | \$15-40         | 0.004 m <sup>3</sup> per week   | Moderate         | NA                 | Good               | Yes           | Most food waste                |
| <a href="#">Naturemill automatic compost bin</a> | \$325-375       | 0.011 m <sup>3</sup> per week   | Moderate-to-high | Automatic          | Fantastic          | Yes           | Most food waste                |
| <a href="#">Bokashi bucket</a>                   | \$30-105 (each) | 0.019 m <sup>3</sup> (per small | Moderate         | NA                 | NA                 | Yes           | All food waste                 |

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1. 'Most organics' includes all yard waste and most food waste but excludes meat, bones, grease and dairy.

'All organics' includes all yard waste and all food waste including meat, bones, grease and dairy.

'Most food waste' includes vegetable, fruit, grain, tea, and coffee waste as well as egg shells but excludes meat, bones, grease, dairy and yard waste.

'All food waste' does not exclude meat, bones, grease and dairy but does exclude yard waste.

'Brown materials' include all carbon-rich, weathered materials such as dry leaves, dry plants, sticks, woodchips, and shredded paper products but excludes nitrogen-rich, fresh materials such as green plants and food waste.

'Green materials' include all nitrogen-rich, fresh materials such as green plants and food waste but excludes carbon-rich, weathered materials such as dry leaves, dry plants, sticks, woodchips, and shredded paper products.

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2. Our test bucket held 19 litres. However larger buckets can be used for Bokashi fermentation, and additional buckets can be added to the system to increase capacity.

## Appendix VI: Instructions for the Wooden Stacking Compost Bin



This 3-foot-square unit consists of five sections. You start the compost pile by filling one or two sections with organic matter, then stack on the other sections as you add more material.

**TIME:** Two to three hours

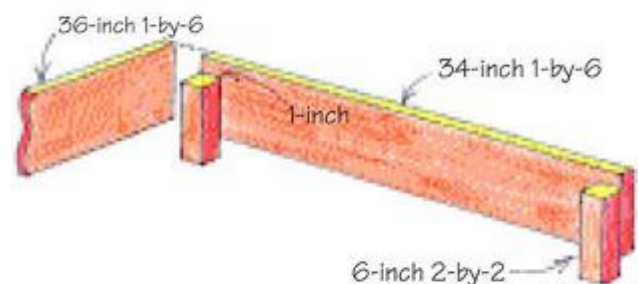
**COST:** \$50 to \$75, depending on the grade of wood (we used untreated pine)

### MATERIALS

- 60 feet 1-by-6 utility wood
- 10 feet 2-by-2 utility wood
- 80 2-inch woodscrews
- *Optional:* 1 quart of wood sealer

### DIRECTIONS

1. Saw the 1-by-6s into ten 36-inch lengths and ten 34-inch lengths; saw the 2-by-2s into 6-inch lengths.
2. Lay each of 34-inch boards over two 2-by-2s, with each 2-by-2 flush with the ends of the board but offset from the top edge by 1 inch. Drive two screws through the 1-by-6s into each 2-by-2.
3. Place one 34-inch board upside down with 2-by-2s extending upward. Place a 36-inch board against one end, flush with the top, bottom, and outside edge. Attach with two woodscrews through the 1-by-6 into the 2-by-2. Add second 34-inch board at other end of 36-inch board. Complete section with other 36-inch board, making a 36-inch square.
4. Repeat the process for each of the remaining four sections.
5. *Optional:* Apply two coats of wood sealer.

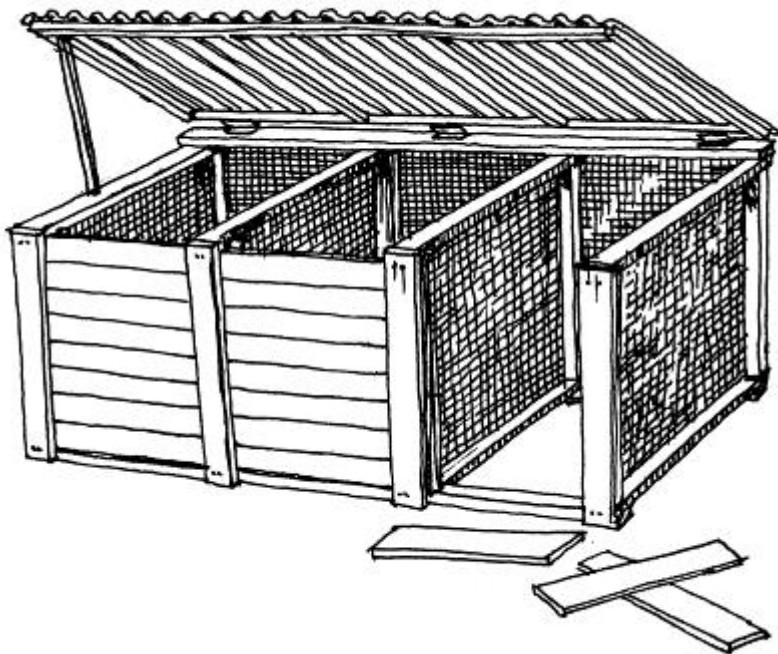




## Appendix VII: **Blueprint for the Wooden 2-bin Compost**

Note: while the original blueprint details a 3-bin compost, it is easy to adapt the bin to have fewer or more compartments.

### **WOOD & WIRE 3-BIN COMPOST**



Composting in multi-compartment bins allows large amounts of material to be processed in batches. This design permits complete turning of a pile as it is transferred from one bin to another. It accommodates piles in different stages of breakdown. One bin can be used to store leaves or other materials for future use.

A very simple three-bin unit can be built with seven shipping pallets fastened together. This more elegant design uses four identical rectangular wooden frames bolted to common top and bottom rails and covered with a fiberglass lid. Metal mesh is used to cover the back, ends and dividers. It is adapted from a design developed for the Community Composting Education Program in Seattle, Washington.

#### **VARIATIONS**

This design allows a lot of air exchange, which can lead to piles drying out quickly in prairie conditions. The metal mesh on the ends and back of the bin can be replaced with one inch dimensional lumber, with one inch gaps between boards to allow some ventilation.

It is also possible to create a separate lid for each compartment, rather than one long one.

## Materials List

| Quantity | Item   |
|----------|--|
| 3        | 2"x4"x10' boards                                       |
| 4        | 2"x4"x12' board, or 8 @ 2"x4"x6' boards                |
| 5        | 2"x2"x10' boards                                       |
| 2        | 2"x2"x6' boards  |
| 9        | 1"x6"x6' boards  |
| 22'      | ½" mesh hardware cloth (metal mesh), 36" wide          |
| 18'      | 4-oz. corrugated fiberglass, 2' wide                   |
| 3        | 8' lengths wiggle molding for fiberglass               |
| 2        | 3" zinc-plated butt hinges (plus twelve 1½" #8 screws) |
| 12       | ½x4" carriage bolts (plus nuts & washers)              |
| 2 lbs.   | 2½" galvanized siding nails                            |
| 40       | gasketed aluminum roofing nails                        |
| 4        | 4" flat corner braces (+ screws)                       |
| 4        | 3" 'T' braces (+ screws)                               |
|          | carpenter's glue                                       |

## Tools List

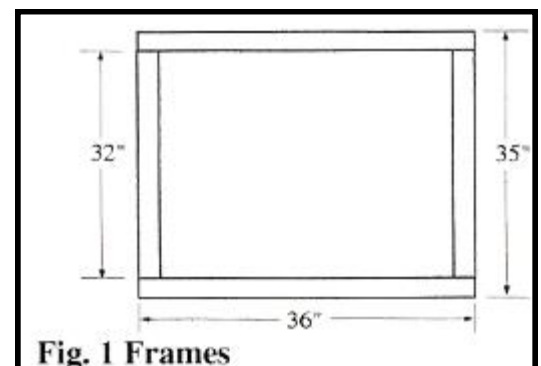
- tin snips or side cutters (for hardware cloth)
- tape measure
- carpenter's square
- power drill or hand brace
- 1/8" and ½" drill or brace bits
- crescent wrench or ¾" socket & driver
- hand tacker or power stapler with ½" staples

## Construction Sequence

### 1. End and divider frames.

- From 12' or 6' 2x4" stock, cut 8 pieces at 36" and 8 at 32".
- Butt-join with nails and glue into four 36" wide by 35" tall rectangles, as illustrated in Fig. 1.
- Cut four 37" lengths from hardware cloth stock and reinforce each edge by doubling back 1".
- Place doubled side towards wood frames and attach with staples spaced 4" apart, taking care to keep hardware cloth well tensioned and square with frames.

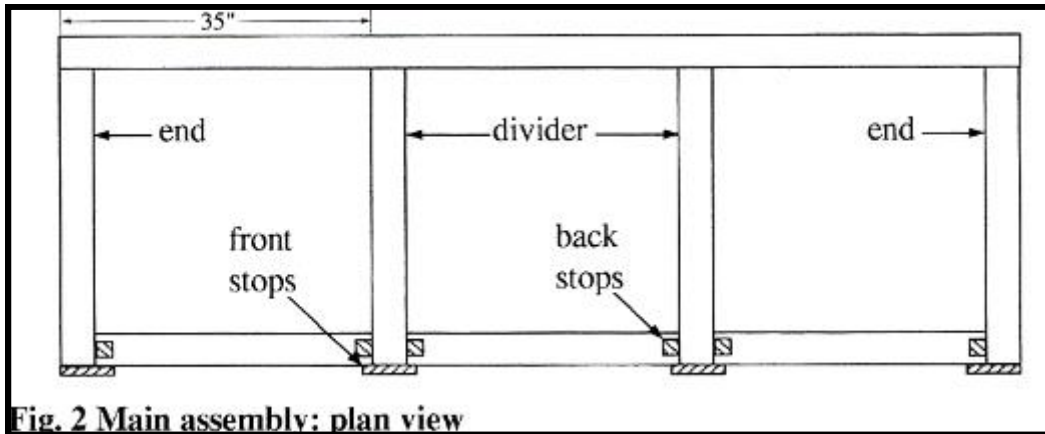
**Note:** pre-cutting all components and painting with boiled linseed oil will delay decomposition of the wood frame without contaminating the compost it contains. **Do NOT use pressure-treated wood. It will contaminate the compost.**





## 2. Main assembly.

- Trim the three 10' 2x4"s as 9' rails.
- Mark positions for outer faces of divider frames at 35" from each end, as shown in Fig. 2.



- Place two of the three rails flat on the ground with outside edges spaced 36" apart
- Stand each end frame vertical and flush with rail ends, hardware cloth on the interior face, and drill  $\frac{1}{2}$ " holes through both frame and rail into a block of scrap.
- Feed a carriage bolt up through each hole, add washer, and hand-tighten nut.
- Repeat this procedure to attach both dividers; hardware cloth can face outward to make both outer bins match, or inward to make a compact centre bin.
- Add the remaining rail at the top and back side of this assembly, aligned as for bottom rails and fastened with carriage bolts fed downward into pre-drilled  $\frac{1}{2}$ " holes.
- Adjust components to square in all directions, either with carpenter's square or by matching diagonal measurements across the top, then tighten all nuts with socket or crescent wrench.

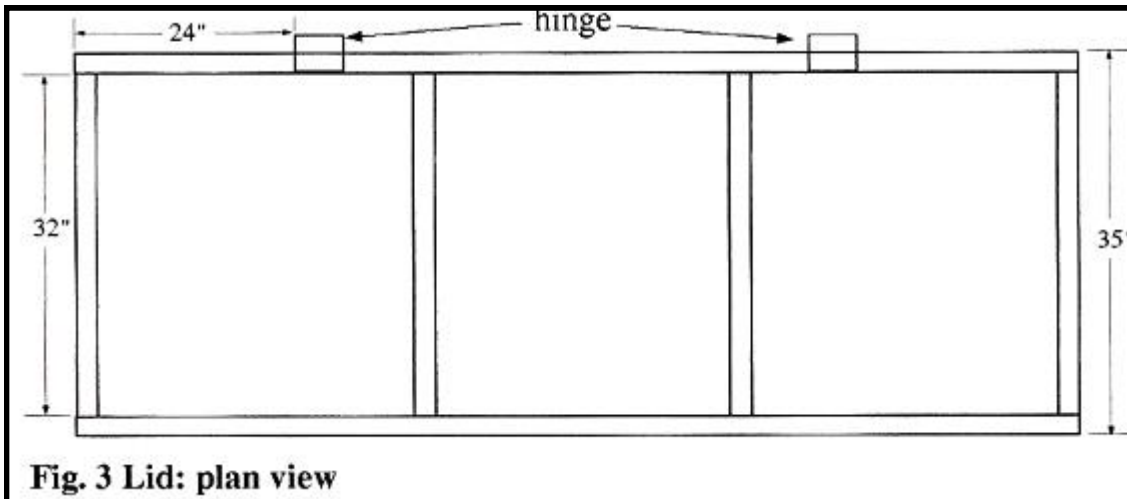
## 3. Slats and stops.

- Cut six 35" lengths from 10' 2x2" stock.
- Nail one of these lengths to each side of the front verticals of ends and dividers at 1" back from their front faces. These serve as back stops for each bin's removable front slats.
- Cut four 36" lengths from 6' 1x6" stock.
- Centre these on the front faces of end and divider frames and nail in place. These make the front stops of the slots in which the slats will be trapped.
- Cut eighteen  $30\frac{1}{2}$ " pieces from 6' 1x6" stock to make sets of six sliding slats for each bin front. See Fig. 2 for a plan view of assembly to this stage.

#### 4. Lid.

Construction of a single lid for all three bins is described below, but three individual lids may also be made (with adjustments to materials list). Substitution of light plywood gussets for the listed metal corner and 'T' braces is also possible.

- Cut remaining 2x2" stock as two 9' and four 32" pieces.
- Assemble as 9'x35" rectangular frame, shown in Fig. 3. Check for squareness; fasten ends and sides with metal corners, and interior dividers with metal 'T' braces, using 1/8" pilot drill for screw holes to avoid splitting wood.



- Cut wiggle board moulding to match front and rear rails of lid frame. Tack or clamp in place.
- Cut five 37" pieces from fiberglass stock.
- Place fiberglass pieces on lid frame with channels aligned to the lid's short dimension, overlapping each piece by one channel or more.
- Pre-drill nail holes through fiberglass and into frame every third hump, and attach with gasketed nails.
- Mark and pre-drill screw holes for hinges in underside of lid's rear rail, then attach hinges.
- Have a helper support the lid while you pre-drill matching screw holes into top of upper main assembly rail, then attach lid.