

Compost Case Studies: Hop’s HotRot 1811

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The following is one of six case studies on the effectiveness and usability of large-scale composting systems in Western Canada, as part of a Masters project with the University of Saskatchewan's School of Environment and Sustainability and the SWRC. The studies provide relevant and useful information to businesses and institutions that may be interested in managing their own organics waste by implementing their own indoor and/or onsite composting system. For each study, a brief description of the system is provided before introducing the actual case usage, to help familiarise the uninitiated. With the broad range of information provided, the goal is to help businesses and organizations decide what type of indoor composting system (if any) is most appropriate for their operation.

The HotRot 1811

The HotRot 1811 is a horizontal, continuous agitation, flow through, in-vessel composting systemⁱ. The 1811 includes an enclosed hopper for automated, regular, periodic feeding of the system, as well as a rotating shaft with tines for aeration and mixingⁱ. The system monitors the compost’s temperature, pH, and CO₂ level, and regulates the levels using an exhaust fan, which produces further aeration as required, as well as avoids leachate by removing excess moisture^{i&ii}. The fan is attached to a bio-filter, guaranteeing no odor from the system’s output air. The resulting compost is discharged into an auger for further break-down of the productⁱ.

Technical Specifications ⁱⁱⁱ	
Cost	\$450,000.00 ⁱⁱ
Size (L)	12.8m (42’0”)
(W)	2.2m (7’2”)
(H)	3.3m (7’8”)
Theoretical input capacity	2500kg/day (5000L/day)
Power requirements	5.5 kW three-phase
Energy requirements	60-70 kW/day 20-35 kWh/tonne
Ventilation	Centrifugal fan and bio-filter



Source: calgary.ctvnews.ca

Hop Composting, Calgary, AB

The following information, unless otherwise specified, has been collected by interviewing Kevin Davies, the founder of Hop Composting, on May 9th and July 7th, 2016.

Hop is a craft composting company that began in 2015 in Calgary, Alberta. The system's facility has convenient access to all the waste sources, which include local restaurants, grocers, and cafes. The waste



Labelled Hop bins from clients. Photo taken by Pam Groat

is picked up with cube vans through a bin swap program. With this type of collection system, the source of the waste is known, and the facility can coordinate pickups per optimal input combination. For example, the high acidity of citrus pairs well with ash, so Hop will coordinate collection from a juice bar alongside a collection from a rotisserie to achieve this pairing. The material combinations can be optimized through the system's constant pH and moisture monitoring. All waste is sorted and paired by their compost system operators (dubbed Batchmakers), before it is processed by the

HotRot system, which minimizes contamination and improves quality. The compost is then sold to local growers, ranging from individual gardeners to farms. The company is expanding its facility in Calgary as well implementing another facility in Vancouver before the end of 2016.

Space

The system is in its own warehouse, in a central location of urban Calgary that was rezoned to accommodate the processing of compost from an odour-free vessel. The building is approximately 1200 m² (13000 ft²), with outdoor bunkers for curing the compost that are 17 feet in length by 10 feet in width by 10 feet in height (5.2m x 3m x 3m)¹. The building has sufficient space for expansion.

Materials

The system is modular, permitting many configurations and ensuring most the required equipment can be included. The business also requires bins and cube vans for collection, sorting tables for pairings and screening, and wood chips (dropped off for free from a local commercial arborist) for the bulking material.

Volume intake

One 1811 system can process 1,000,000kg/year. The facility has recently installed a second system to increase capacity to 2,000,000kg/year. All types of organic food waste can be used, limited only by ensuring appropriate pairing.

Time/effort required

Pre-processing

Collection in vans requires two full-time employees, i.e. 80 hours/week. Approximately two hours out of every 24-hour cycle are spent on the actual batch-making (pairing and manual filtering). This task is performed by two full-time Batchmakers.

Processing

The processing and monitoring of the compost is all automated, requiring minimal human intervention, unless levels are abnormal and require analysis. The resulting compost material can be collected 10-11 days after it has been inputted. The bins and facility are cleaned by the Batchmakers during the automated process time.

Post-Processing

The finished compost will discharge hourly from the HotRotⁱ. This product is transported to the outdoor bunkers via a hopper where it is rotated daily for 30-35 days for curing. Once cured, the product is screened to remove larger woodchips to be recycled through, then packaged for distribution. All the post-processing is also completed by the full-time Batchmakers.



Compost curing in bunkers. Photo taken by Pam Groat

Odour

The system has no odour, guaranteedⁱ.

Quality

Because of their high attention to ingredient sourcing, as well as a good quality system, Hop can produce compost that is 7.8 times more nutrient-dense than that of standard Alberta compost. As well, pre-processing efforts to screen the input material minimizes contamination to 0.1%, and post-processing curing ensures a Solvita maturity index of 8, meaning the product is comparable to healthy soil, with no limitations to its usage^{iv}. The compost product is tested using Canadian Council of Ministers of the Environment (CCME) standards by A & L Laboratories in Ontario.

Troubleshooting

The main form of troubleshooting was experimenting with the batch pairings to achieve the highest quality compost possible. The system's constant digital monitoring of the compost allows for up-to-date knowledge of how input material has affected the overall product.

ⁱ HotRot Organic Solutions (2015a). HotRot – a new generation composting technology. Retrieved online from <http://www.hotrotsolutions.com/images/files/HotRot%20a%20new%20generation%20composting%20system.pdf>

ⁱⁱ Davies, K., Personal Communication (May 9, 2016)

ⁱⁱⁱ HotRot Organic Solutions (2015b). HotRot 1811 composting unit. Retrieved online from <http://www.hotrotsolutions.com/pages/hotrot-1811-composting-unit?highlight=WzE4MTFd>

^{iv} Woods End Research (2002). Guide to Solvita testing for compost maturity index. Version 3.7 – 4. Retrieved online from http://www.solvita.com/pdf-files/solvita_man3.7.pdf