US Composting Council®

COMPOST EQUIPMENT GUIDE

For Small-Scale & Institutional Use




compostingcouncil.org/equipmentguide

Cover photos (from left): Signal Mountain Lodge composting, Grand Teton National Park (Courtesy National Park Service); Mercedes-Benz Stadium, Joe Lamp'l (Growing A Greener World-PBS) and Scott Jenkins, Stadium GM; Princeton University students/FOR Solutions equipment (Credit Tom Grimes); Earth Flow, Green Mountain Technologies.

The US Composting Council receives numerous inquiries from institutions and workplaces like yours about composting. Some are looking for sources to pick up their organic landscaping trimmings and food scraps, but others want to handle the material on their own property. If your area does not have a compost manufacturing facility that can accept your organics, this may be a good alternative.

Some may want to use the finished compost for internal landscaping purposes, or may have a robust facilities department that is excited to make compost in-house for sale or outside use.

Whatever the reason, we put together the first edition of this guide this summer to help you in your search for equipment to use at your campus, hospital, corporate property or other institution. We thank the members and other equipment suppliers – and the advertisers whose assistance helped with this project—and hope it will help you as you develop your composting program.

NOTE: While the purpose of this guide is to provide a one-stop resource for institutions to review and source in-vessel and on-site composting technologies, in presenting this resource guide, US Composting Council does not specifically endorse any one system or product.

What is Compost?

This very basic definition makes a difference in the equipment you will choose.

The definition was just updated in 2018 by The American Association of Food and Plant Control Officials, a body made up of the U.S. regulators of compost products.

Compost is ...

"The product manufactured through the controlled aerobic, biological decomposition of biodegradable materials. The product has undergone mesophilic and thermophilic temperatures, which significantly reduces the viability of pathogens and weed seeds, and stabilizes the carbon such that it is beneficial to plant growth. Compost is typically used as a soil amendment, but may also contribute plant nutrients."

The USCC's STA Certified Compost program, through the Test Methods for Composting and Compost (TMECC), uses strict parameters for the end product as well.

Many processes and equipment types have been invented and marketed to pretreat and decompose organic materials along the path to finished compost, but it is important to ensure that the end product meets the definitions above if you plan to use the compost to grow plants.

Using Compost at Your Facility, Campus or Institution

Consult with your groundskeeping staff or landscape contractor to assist you on the specifications for compost use on your campus or facility. The end use will help determine the type and scale of equipment required to purchase.

This guide will provide basic guidelines on the materials produced in each of its three equipment sections: ***pretreatment; in-vessel and support equipment.***

Resources

Compost

AAPFCO Definition of Compost: aapfco.org

Compost Benefits Factsheet, USCC: compostingcouncil.org/factsheets

Seal of Testing Assurance Program: compostingcouncil.org/page CompostManufacturersSTA

TMECC Protocols: compostingcouncil.org/tmecc

Composters Who Take Food Waste: compostingcouncil.org/participants

PreTreatment

Composting Collaborative PreTreatment Directory: compostingcollaborative.org/pretreatment-directory/

Campus Composting

Post-landfill Action Network: postlandfill.org/food-recovery-manual

Association for the Advancement of Sustainability in Higher Education (AASHE): aashe.org

College and University Recycling Coalition (CURC): curc3r.org

Food Scrap Composting on College Campuses: A Step by Step Guide (FOR Solutions): forsolutionsllc.com/ebooks

Workplace Composting: compostingcouncil.org/page/workplacecomposting

Pretreatment

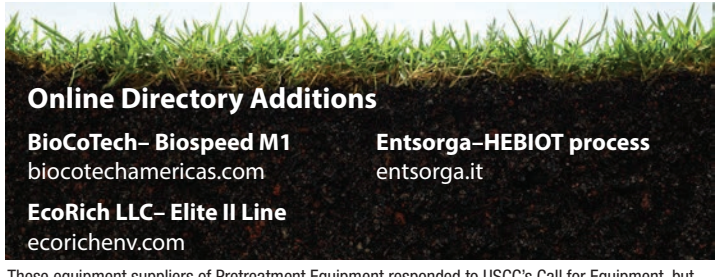
The Composting Collaborative, a project of the US Composting Council, GreenBlue, and *BioCycle* Magazine, through a grant from the U.S. EPA, conducted a study and assembled an online directory of systems designed to process organic material prior to composting.

compostingcollaborative.org/pretreatment-directory

Pretreatment systems (sometimes called "preprocessing systems or dehydrators") treat or process organic food waste onsite through biologic or thermal means. There are two general categories for pretreatment systems – wet and dry.

Wet: Aerobic digesters, also referred to as liquefiers or biodigesters, are wet systems using fresh water to dilute solids in combination with microorganisms to "digest" food waste into a liquid effluent that can be sent "down the drain" via sewer to a wastewater treatment plant, now more commonly referred to as a "wastewater resource recovery facility" ("WRRF"), or pumped to a holding tank for transport to third-party locations like an anaerobic digestion facility, a commercial composting site or a WRRF that accepts "outside" food waste (not conveyed via sewer).

Dry: Dehydrators and accelerated composters are dry systems. They dehydrate food waste through high temperature heating or through slow turning and agitation over a longer period of time. Outputs from dry systems can be cured into mature compost onsite or transported to a dedicated compost manufacturing facility. Dry output is sometimes also used for livestock bedding on farms or as an input for animal or fish feed.



Online Directory Additions

BioCoTech– Biospeed M1
biocotechamericas.com

Entsorga–HEBIOT process
entsorga.it

EcoRich LLC– Elite II Line
ecorichenv.com

These equipment suppliers of Pretreatment Equipment responded to USCC's Call for Equipment, but are not in the online Pretreatment Guide.

Composting of food scraps on college and university campuses is growing. Photo courtesy of Northland College.

Rocket system at New York City's High Line Park, with Friends of the High Line, courtesy Food Waste Experts.

Steps to Take in Selecting Your Equipment

Step 1: Waste Audit You've audited your institution's waste and know how much food scrap and green waste (if you are collecting both) you will be generating for your compost.

Step 2: End Use Decide what you will be doing with your end product! This step is paramount to establishing a successful compost system, but it is especially important for institutions for whom operating a compost facility is NOT your first order of business. Will you be using it on site? List out all of the possible uses of your compost. Will it be cured on site or off site?

Step 3: Space/Support Equipment Where will this equipment be located? Is it a secure site? Is it a covered area? Can loaders and trucks access the area? What support equipment do you have or need to manage the composting process, curing and distribution of finished product?

Pretreatment systems do not produce compost, but can be a useful step along the way. They are ideal if you have determined that your material will be cheaper going to a composter (in other words, you are reducing volume for easier transport). If you intend to use your compost, determine the actions that need to be taken to cure the material to turn it into finished compost!

In-vessel Composting

In-vessel composting systems allow you to batch your organics – food scrap, yard trimmings, biosolids, manure, animal mortalities are all possible feedstocks – and are popular because they take up less land, produce little to no leachate and odor when operated properly, and speed up organics processing. Systems vary in size, temperature-moisture-aeration processes. The compost must still cure for a period of weeks to months to allow microbes to complete their work and the material to cool. They range in types from vertical plug-flow, horizontal plug-flow, (meaning they are loaded on a periodic basis while "finished" compost is discharged from the opposite end of the system; air is piped in to travel through the composting mass) or agitated manually to incorporate air brought up through the floor of the system.

Support Equipment for Space & Capacity

Some facilities, such as large corporate or university campuses with grounds departments, hospitals, detention centers, and urban gardens, have space, capacity and labor resources to allow for more traditional outdoor composting in windrow, aerated static pile or combination systems.

Our guide focuses on smaller skid steers, loaders, turners and other equipment meant to work in tight spaces by facilities collecting and composting a maximum of 3-5 tons of food scraps per month.

In-Vessel Composting

Product&Name	Product Description	Company Website	Capacity Daily/Total (lbs or as noted)
Actium Grande Continuous Composter	largest Actium Rotating Compost Drum insulated stainless steel unit.	CompostDrum.com	
Actium Classic Continuous Composter	insulated stainless steel rotating composter, uses gear motor for turning	CompostDrum.com	
Actium Batch Composter	insulated 55 Cubic Feet rotating drum/ manual crank for turning	CompostDrum.com	
BioReactor Composting System	rotating drum composter with low power friction drives	xactsystemscomposting.com	TOTAL daily-all SW input; total 70% of reactor
CityPod® S	onsite invessel aerobic composter	vertal.ca	100 daily/19 tpy
CityPod® M	onsite invessel aerobic composter	vertal.ca	220 daily/40 tpy
CityPod® L	onsite invessel aerobic composter	vertal.ca	495 daily/90 tpy
CityPod® XL	onsite invessel aerobic composter	vertal.ca	835 daily/152 tpy
Daritech EnviroDrum	blower pulls air countercurrent composting material flow; negative air contains odors; exhaust is piped to a biofilter.	daritech.com/products.html	2yd3- 20yd3/7yd3- 60yd3
Earth Flow Model 20	fully-automated mixing, aeration & moisture addition process.	compostingtechnology.com	0.8 TPD @ 14 day retention/22 yards
Earth Flow Model 24	fully-automated mixing, aeration & moisture addition process.	compostingtechnology.com	1.0 TPD @ 14 day retention/27 yards
Earth Flow Model 30	fully-automated mixing, aeration & moisture addition process.	compostingtechnology.com	1.3 TPD @ 14 day retention/33 yards
Earth Flow Model 40	fully-automated mixing, aeration & moisture addition process.	compostingtechnology.com	1.7 TPD @ 14 day retention/45 yards
Earth Flow 20-IM	fully-automated mixing, aeration & moisture thermophilic composting in 14-21 days	compostingtechnology.com	0.7 TPD @ 14 day retention
Earth Flow 40-IM	fully-automated mixing, aeration & moisture thermophilic composting in 14-21 days	compostingtechnology.com	.15 TPD @ 14 day retention
O2 Compost Cornerstone Compost system	training program including system design, aeration equipment package, training manual, unlimited technical support.	O2compost.com	scalable; larger bay capacity = 100 cy.
Rocket A500	static unit w/mixing shaft	foodwastexperts.com	57/798
Rocket A700	static unit w/mixing shaft	foodwastexperts.com	127/1778
Rocket A900	static unit w/mixing shaft	foodwastexperts.com	325/4550
Rocket A1200	static unit w/mixing shaft	foodwastexperts.com	654/9156
Rocket B1400	static unit w/mixing shaft	foodwastexperts.com	2204/30856
Rocket B2500	static unit w/mixing shaft	foodwastexperts.com	6614/95596

For more details, visit compostingcouncil.org/equipmentguide.

Feedstock*	Bulking Agent/CY	Cure Time for Finished Compost	Dimensions/Footprint
All	passive aeration; biofiltration from dry carbon source	8 weeks	6' x 24' x 8'
All	passive aeration	continuous flow	4' x 26' x 5'
All	aeration by drum turn; biofiltration through dry carbon sources.	8 weeks	4' x 6' x 7'
All except AM plus biosolids, hatchery, msw, & slaughterhouse	any carbon source/depends on Bioreactor size	approx. 21 days	From 5' diameter X 10' L to 10' diameter X 60'L/same
All except AM/T	wood pellets/15% of incoming composting material	6 weeks in drum/no addl. curing	10'L x 4'3"W x 4'4"H/15'x 9'
All except AM/T	wood pellets/15% of incoming composting material	6 weeks in drum/no addl. curing	15'L x 4'3"W x 4'4"H/20'x 9'
All except AM/T	wood pellets/15% of incoming composting material	6 weeks in drum/no addl. curing	16'5"L x 4'7"W x 5'4"H/24'x 10'
All except AM/T	wood pellets/15% of incoming composting material	6 weeks in drum/no addl. curing	18'3"L x 6'5"W x 6'8"H/27' x 12'
All	Wood chips shavings / 2:1-3:1 relative to food scraps.	up to 60 days	5'x14'- 8' x 40', 10'-12' W x 30'-60' L
All	wood chips, horse manure/bedding, shredded landscape waste, carbon/nitrogen	1-2 months	21'L x 8'4"W x 10'H to peak of roof/est. 36' x 26'
All	wood chips, horse manure/bedding, shredded landscape waste, carbon/nitrogen	1-2 months	25'L x 8'4"W x 10'H to peak of roof/est. 40' x 26'
All	wood chips, horse manure/bedding, shredded landscape waste, carbon/nitrogen	1-2 months	31'L x 8'4"W x 10'H to peak of roof /est. 46' x 26'
All	wood chips, horse manure/bedding, shredded landscape waste, carbon/nitrogen	1-2 months	41'L x 8'4"W x 10'H to peak of roof/est. 56' x 26'
All	wood chips, horse manure/bedding, shredded landscape waste, carbon/nitrogen	1-2 months	21'L x 8'4"W x 10'H to peak of roof
All	wood chips, horse manure/bedding, shredded landscape waste, carbon/nitrogen	1-2 months	31'L x 8'4"W x 10'H to peak of roof
All	wood chips, sawdust, stall bedding material/3 parts bulking material- 1 part wet waste	active composting 21-30 days; Curing additional 30-60 days	From 4' x 4' x 4' to block bay systems 20' x 50' x 8' per bay/16 SF to 5,000 SF up
All	wood chips/.4 Cy weekly	3-4 weeks	2.3W x 8.2L x 4.3H
All	wood chips/.8CYweekly	3-4 weeks	3W x 9.9L x 4.6H
All	wood chips/2.27CY weekly	3-4 weeks	3.3W x 13.1L x 5.3H
All	wood chips/24.57CY weekly	3-4 weeks	5W x 23.7L x 6H
All	wood chips/1.1T/Day	3-4 weeks	10W x 29.2L x 8.6H
All	wood chips 3.3T/Day	3-4 weeks	12.5W x 41L x 8.2H

* Feedstock all=food scrap (FS), manure (M), crop residuals (C), animal mortality(AM), silviculture (S), grass clippings (G), leaves (L), tree trimmings (T), yard trimmings (Y), BPI Certified compostable product (CP), Biosolids (B)

Composting Support Equipment

	Product & Name	Product Description	Company Website
SCREENS	CZ Screens MDS MIDI	For loaders with bucket with of 1900 mm maximum width	GrinderCrusherScreen.com
	McCloskey 512 Series Trommel	Portability and performance w/high production rates, versatility, ease of use	mccloskeyinternational.com
GRINDERS	Rotochopper CP-118 Wood Chip Processor	Sets up in minutes and ideal for regrinding of overs.	rotochopper.com
TURNERS	BrownBear Windrow Aerators	For skidsteers, compact track loaders, farm tractors, construction wheel& track loaders	brownbearcorp.com
	Kooima Tractor Turner CT1400	High capacity compost turner	kooima.com
	Scarab Turner	Windrow & self-propelled turners	scarabmfg.com
	Kooima Skid Trner® Composter	High capacity compost turner to attach to a skid loader	kooima.com
OTHER	Go-Bagger 250	Portable Debagging System	rotochopper.com
	GORE Cover System	Modular, scalable technology for food waste, yard waste green waste etc.	sustainable-generation.com

For more details, visit compostingcouncil.org/equipmentguide.

Thank you to Sustridge Consulting for their assistance with this guide.

Key Features	Electrical/Fuel Requirements	Dimensions	Footprint
4' x 7' collapsible stand trommel	Standard diesel electric	10'4"L x 6'9"W x 9'-6"H	(6'11" for transport)
180 degree swing, variable discharge height; hopper capacity of 4.5yd³ - 7.0yd³ w/extensions	Diesel electric	69'6½"L x 10'10"W x 13'6"H; Weight 80,750 lbs.; Load Ht 12'5"	103'5½"L x 49'10"W x 16'8"H
Can be fed with a skid steer or front-end loader from either side	Diesel	35'9"L x 8'2"W x 10'11"H	Dependent on machine specifics, set-up, feedstock etc.
Build own windrows; material premixing not required; windrows can be adjacent, requiring no space.	Diesel	Individual spec sheets	Individual spec sheets
Easy serviceability, easy to tow, 3" Diameter through shaft on the drum means more rigidity and higher throughput; Outside drive tire and price	None	14' X 7'	14'
Turn windrows from 8'27" W x 4'11"H	Diesel	Custom	Custom
Easy servicing, drum throws back material, 3" rotor tube = more rigidity/higher throughput	None	8'W x 4'H	24'
Fill & seal bags/ towed with a pickup truck & set up anywhere	Diesel	15'8"L X 6'10" X 8'7"	Depends on machine specifics, set-up, feedstock, etc.
Simple to operate with the blower being the only moving part: eligible for in-vessel RFPs as well	Electric blower	22'x 50' x10' (scalable)	30'x 60' (scalable)

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