HotRot Composting Equipment Specifications for Use

Contents

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Design Specifications

Plant specific details regarding capacity, type and quantity of wastes to be processed, and services required are detailed in the Sale and Purchase Agreement. This document details general specifications for feed quality, and operation and maintenance of equipment. This document is a guide only, additional information may be found in the Manuals supplied with the equipment.

Adherence to these guidelines is a condition of warranty cover and will ensure effective operation of the HotRot system. Failure to comply with the following guidelines may void any warranties and result in equipment damage.

Feed Quality

In any composting system, effective composting requires attention to moisture content, available volatile solids, C:N ratio and oxygen supply. Feed must have sufficient readily degradable organic matter. Excessive woody green waste or paper and cardboard may retard the composting processing. Food and animal wastes by contrast are readily degradable and provide good feedstock for the HotRot system.

Material being fed to the HotRot in-vessel composting unit must meet the specification for particle size and moisture content as outlined below. In addition, the material should: - Have an organic content of greater that 80%. - Be free of toxic compounds such as pesticides, herbicides and fungicides, as well as household bleaches and cleaning compounds. - Be free of toxic metal compounds and paint. - Have a C:N ratio of less than 40:1 and greater than 10:1.

Target Wastes

These are the waste categories for which HotRot is ideally suited. These wastes are often the most difficult and costly to dispose of and should be the main materials used to size the HotRot composting system.

These materials often need no pre-treatment although mechanical dewatering can be used and can offer a major advantage with wetter materials.

- Source separate organics (food and garden/yard waste) – including meat.
- Commercial and industrial food waste (restaurants, hotels, canteens and food manufacturing)
- Sewage sludge (biosolids) as well as other sewage residues such as screenings.
- Animal waste including faecal material, sludge or “litter” from wash-down or pens and dirty bedding. Animal mortalities.
- Animal processing wastes – offal, paunch grass, mortalities.
- Special industrial organic wastes – spent grain and hops from breweries, fruit and vegetable peelings, organic sludge from industrial wastewater treatment.

Amendments and Bulkers

These materials are traditionally referred to as “brown” waste. While organic, they are slow to degrade. On their own they can usually be easily composted in basic open-windrow systems. Their use in HotRot should be restricted to ensure the waste entering the HotRot unit has the right moisture content (45-60%) and the right porosity (usually a bulk density of 600-700kg/m3).

These materials will generally need shredding, chipping or grinding – see “maximum particle size”.

- Paper and cardboard – these materials should generally be less than 10% of any material being composted.
- Yard or garden waste – green leaf matter and lawn clippings need to be considered separately from woody tree and shrub pruning’s.
- Straw, hay and other similar materials.
- Construction and demolition timber waste – all forms including treated timber, particle and ply board can be used in the composting process with care.
- Palm fronds and similar materials may need specialist shredding.

Waste to avoid

These materials should be excluded from the composting process if possible.

- Glass – this is very difficult to remove from the final product and may represent a hazard to end-users. Oil, detergents and soaps in high concentrations will retard the composting process.
- Pesticides, herbicides, fungicides and household chemicals such as bleach other than in trace amounts. Metal items – these can damage plant and machinery.
- Plastic items – will contaminate compost and can be difficult to remove in order to get a saleable product.
- Bricks, concrete and stones – these may all result in excessive damage.
- Sand, soil and silt – in high concentrations will accelerate wear, especially of material handling equipment such as auger liners and flights.

Feed Quantity

While the feed capacity of a HotRot composting unit is highly flexible the volume of waste fed to the unit on a daily basis will greatly influence the product quality and the unit’s ability to generate sufficient heat to ensure pathogen control standards are met. Where possibly feed should be delivered as evenly as possibly over a 24-hour period, however, variations in feed rate during the day and even during weekends and public holidays can be accommodated. The use of integrated feed hoppers provides even feeding and maximises a HotRot system’s throughput. If the feed delivery rate to the site is too varied, specific advice should be obtained from HotRot to minimise the effects on the HotRot system.

Maximum Particle Size

Coarse interlacing wastes have a number of disadvantages when fed to HotRot, due to their propensity to behave as a large single mass.

These are:

- Increased strain on mechanical components
- Excessive longitudinal transport rates, and
- Reduction of system capacity by excessive void volumes.

Appropriate particle size reduction will minimise these effects and maximise system capacity.

Any 'hard' organic waste added to the HotRot composting unit must have a maximum particle size of less than 75mm in any one plane, with the ideal size being >5mm and <50mm. 'Hard' organic materials are defined as:

- Wood, wood chip, chipped or shredded branches and pruning's, and bark.
- Bones

Stones, bricks or pieces of broken stones, bricks or concrete, glass and plastic must have a maximum particle size of less than 15mm in any one plane and should constitute <5% of the feed stock mass.

Cardboard boxes and paper must be smaller than A4 (297mm x 210mm) and have a maximum thickness of 7mm (¼ inch). It is recommended, however, that pieces of cardboard should ideally be less than 150mm by 200mm (1/2 A4).

The size of soft organic waste such as fruit and vegetables will be dictated by the ability of the feed system to transport this material. In general material should be less than 200mm in size.

Feed Structure

After moisture content feed structure is also important. If sludge or food waste is the predominant waste to be processed, wood waste in the form of chipped wood, bark or green waste, will need to be added to provide structure; a good guide is that the bulk density of the waste prior to composting should be in the range of 600-700kg/m3). This is regardless of whether the waste in question meets the moisture requirements outlined above. The amount of wood waste that will be needed is dependent of the waste being processed but as a minimum would be expected to be 15-25% by mass when dealing with sludge or food.

Cardboard does not provide structure and while useful in adjusting moisture content cannot be used to substitute wood waste for structural purposes.

Limits to Motor Currents

The maximum current draw for each HotRot main drive is limited within the Control System in order to protect the motor and gearbox. Even though the motor should have the capacity to draw additional current the current limits set in the control system must not be altered or overwritten. Any adjustment to these values will void any and all warranties relating to the motor, gearbox and shaft assembly.

Feed Moisture Content

The moisture content of the feed material is the most critically important variable for the composting process and will require maximum operator vigilance.

Efficient composting requires the feed moisture content to be 40-55% by mass. Food waste (including fruit and vegetables and animal by-products) will tend to have moisture content of 80-90% and will need to be balanced by the addition of dry materials.

Dry materials can include:

- Paper and cardboard
- Wood chips
- Shredded green waste

If paper or cardboard are added, these must be kept dry prior to use. It should be noted that the amount of paper and cardboard should be restricted to no more than 10% by mass of the total mass of material to be composted. As such some wood chip or shredded green waste will also be required.

Wood chip, such as from shredded pallets, is an ideal bulking agent as the material is dry and maintains its structure during the composting process. Shredded green waste can be used but the presence of green leafy material should be minimised, as this tends to increase the moisture content of this material; the material should be well shredded as detailed above.

The moisture content of material fed to the HotRot system must be between 40 and 55% by mass. Moisture content is calculated by the following: % Moisture = (weight loss of sample on drying/initial weight) x 100

Maintenance

The operator is responsible for routine maintenance and servicing as outlined in the Operators Manuals. A maintenance log shall be maintained, failure to do so may void any equipment warranties.

Any faults or damage to equipment during the Warranty Period must be reported to the Vendor as soon as identified and no later than 48 hours after the fault or damage occurred or could reasonably be expected to have been identified.