

Her Majesty's Prisons

In-vessel composter

Introduction

In-vessel composters (IVCs) are installed in nearly 50 out of 120 of Her Majesty's prisons. The technology used is available in a range of capacities and has a small footprint.

Nature and quantity of waste treated on site

- Food waste from the serveries and kitchen preparation waste is treated plus wood (sawdust or sawdust in pellet form). Plate waste is not usually included as it is difficult to collect. If the IVC has spare capacity, garden waste is added.
- Typical waste processed per site per week is between 500kg to 1 tonne approx.
- Treats all food waste captured, which represents around 70-80% of total food waste produced.
- Capable of compliance with Animal By-Products Regulations and the British Standard for Composted Materials, PAS100.

Key features

Size range: 1.94x0.88x1.47 m to 6.32x2.2x2.32 m

Spatial requirements: For working and clear access an additional ~1.5m lengthways and widthways floor space e.g. T120 model = total of 13m²

Capacity: Waste processed per site per week is between 500kg to 1 tonne approx

Energy: 1 – 5 kWh/day energy dependent on size of installation

Maintenance: 30 minutes including cleaning per week.

Housing: Needs to be undercover, either inside or outside utility building

Output: Compost output (10% of input weight)



In-vessel Composter

Lessons Learnt

Best practice is to opt for the 'next size up' machine rather than one which just meets the capacity requirements. Any spare capacity can be utilised by introducing garden waste to the mix.

Importance of de-watering the food waste to produce a standard particle size and the optimum moisture content for composting.

How food is separated for treatment

Waste food is collected from serveries in 20-25 litre buckets by offenders working in the waste management unit (WMC). It is removed 3 times per day to the waste (in line with meal servings), as part of the waste collection round. This approach may vary slightly in each prison.

How the on-site treatment system is managed

- Waste management delivers a vital role in the day-to-day prison operations and, dependant on the size of the prison, the WMU can employ up to 3 offenders to complete the collection, processing of the food waste, the operation of the IVC and the recording of data from the composting process.
- Non-food items, such as plastics, are separated out by the operative from the food waste before it is put through the dewatering process
- Dewatering reduces the volume of the food waste by around 50%. The resulting dewatered waste is then mixed with a quantity of compressed sawdust wood chip pellets (ratio of 4 of food waste to 1 of sawdust) that are either purchased or sourced on site. The sawdust provides carbon content to the nitrogen-rich food (and garden) waste to ensure the process works efficiently and there is a balanced mixture of material to produce a good quality compost.
- Produces a high quality useable compost end product in around 8-12 weeks on a continuous cycle.
- For staff supervising offenders working in the WMU, a training course focussing on health and safety issues, in addition to waste legislation and best practice can be completed.

Use of outputs from treatment

Compost end product provides HMP with a 'closed loop' solution for those sites that grow fresh produce on-site. The compost is also used to develop and enrich the soil of prison gardens.

Costs

- £25,000 to £30,000 capital set up costs for an IVC with dewaterer.
- Maintenance costs are kept low due to good housekeeping; all labour is provided by offenders; utilities cost data is not available.
- Each unit treats approximately 52 tonnes a year and produces around 13 tonnes of compost.
- Cost savings are waste disposal at £150/tonne (£7,800 per annum) and avoided purchase of compost at £100/tonne (£1,300 per annum)
- Based on these figures the payback period is approximately 3 years.
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This case study is part of a series of case studies focussing on the on-site treatment of organic waste.

Other case studies in this series are:

- Eriska Hotel;
- Housing 21;
- Millets Farm Centre;
- University of Southampton;
- University of Bradford; and
- Dartington Primary school

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