buyers' guide

No. 6
Information for buyers of site construction related products

My previous Buyers' Guide covered construction works in the ground, including slabs and drainage. Since then, the Buyers' Guides have featured turners and mixers and bioaerosols and odour control, and in this edition we have returned again to consider site infrastructure and related purchases.

By choosing topics for site construction we have tried to include fixed and semi-fixed items which will be needed at most commercial composting plants, that is all those ancillaries which are most commonly bundled into the construction phase of a project. Many of these items might not be essential to processing compost, but they do make life a lot easier, save money, protect the environment, and/or help to keep your site safe and legal! Contact details for the companies mentioned in the text and others can be found in the table which accompanies this article.

This edition of the Buyers' Guide has been written by Steve Last, Technical Director, Enviros Consulting, Enviros House, Shrewsbury, Shropshire (steve.last@enviros.com).

Chamber covers and frames

TAKE care to specify heavy duty cast iron versions for all trafficked areas. Stanton's Double Triangular LockLid type (600 mm square) are suitable for most access chambers, should be easier to work free from the impacted material and lift than single covers. The Watershed range of gully grates is also popular. There are also some excellent stainless steel access covers available from manufacturers such as Jones of Oswestry and with health and safety concerns regarding lifting injury rising all the time it is well worth considering the additional cost of a balance weighted cover design such as those available from Jones. These covers are designed with hinges and balance weighting to require very little effort to lift. Still on the subject of health and safety, another worthwhile investment will be a manhole cover lifting tool, and many are available. All are designed to apply assisted leverage to raise hard to lift covers, and the most sophisticated are also wheeled, and prevent the possible accidental loss of the cover into the chamber. It is certain that composting site drainage will always tend to accumulate silt, and regular chamber access for drain cleaning will be inevitable.

Kerbing

Standard bull nose kerbing is available from any building materials supplier. Nevertheless, laying kerbing has been cited as liable to cause long term back injury to labourers installing it. These heavy units require manual handling and manipulation to bed them firmly and to haunch them in lean-mix concrete to exacting tolerances of line and level. If substantial lengths of kerbing are to be installed your installation contractor should provide readily available non-powered lifting equipment to reduce back strain during installation.

The need for such assistance in lifting heavy kerb blocks has recently been neatly sidetracked by the new kerbing now available in recycled plastic materials such as Tempakerb. In addition, the choice of this material will be likely to strike a chord with the ethos of composting.

Crash barriers

Armco is the household name in crash barriers and is available from a number of suppliers (Safety by Design, Corus Ayrton). Crash barriers should be installed anywhere where vehicular access will take place close to an unguarded edge, or where overrunning would cause injury or damage. Crash barriers will need to be fitted beside ramps to weighbridges, and to prevent or reduce the effects of overrunning into kiosks, and accommodation.

Fences

Generic specification using fences (and indeed matching gates) manufactured to the British Standard BS 1722, and the EN (European replacement standard) is a popular option enabling the specifier to call up a standard gate height and pattern as described, and drawn in the code. The buyer can be certain to

obtain a wide range of competitive quotations for these very standard pattern fences and gates and such a choice usually produces a very cost effective resulting installation. However, many more stylish and very good proprietary variants on fencing (and gates) are available.

There are nationwide fencing contractors such as Jacksons or Steelway Fensecure who will provide a wide range of their own designs, and every district will also have its local fencers offering very competitive rates, but possibly a more limited range of styles.

For legal reasons it is advisable that site fences and gates are of sufficient height and possess suitable cranked and barbed or razor barbed wire to comply with the minimum requirements to classify the fence as 'security'.

Palisade fences are often chosen for their apparent strength and thickness. However, your Buyers' Guide author considers that all palisades used to fence facilities such as composting sites should be provided with a structural grade concrete sill and pales which are both riveted as normal to the upper and lower rails but also extend downwards, and are cast into the concrete sill at ground level. You will see too many palisades pales which have been levered off the lower rivets. This enables children free access through a fence which often appears remain physically intact and secure until subjected to detailed inspection.

Gates

In the UK gates are invariably of the hinge and post variety. Generic specification using the British Standard BS 1722, and the EN (European replacement standard) is a popular option enabling the specifier to call up a standard gate height and pattern as described and drawn in the code in a wide range of materials. With the standards it is possible to use a variety of woods, galvanised mild steel, coated steels, and reinforced concrete.

However, many very good proprietary and more stylish variants are available to a composting operator seeking a more individual look for the perimeter of his establishment.

It is important to note that a gate style which is popular internationally is also worth considering for composting sites. This is the self-powered sliding gate such as the one provided by Jacksons which simply moves as one unit with guide rails in the roadway and guide posts at each side of the carriageway. The gate is fitted with a micro-switch or other detection device so that it stops automatically.

This type of gate does require a carriageway width of land in which to travel into as it opens. If sufficient space is available for this there is a significant advantage in that the gate itself and the hinge is out of the way and far less prone to damage from errant site vehicles. The simple powered opening and closure system has the advantage to busy site owners of ensuring improved security. A range of security options are available for powered gates ranging from auto opening on arrival of any vehicle, to the use of regular user log-in cards and transponders. At the lowest level of security achievable for powered gates, at least casual pedestrians can be prevented from entering the potentially dangerous environment of a composting site.

Rising vehicle barriers

Most composting site entrances are unmanned. As a minimum standard, unmanned composting site entrances should possess a normally closed automatic barrier for health and safety reasons. Manning levels on composting sites are not normally high enough to ensure that unauthorised entry will be seen by site operatives on all occasions. Rising barriers are provided by Frontier Pitts Ltd.

Weighbridges

Weighbridges come in two basic configurations 'built-in or buried', and surface mounted. Clearly, surface mounted versions are the lower capital (construction) cost option. However, all surface mounted bridges will, by definition, be raised and present a higher health and safety risk of falling from the raised platform of the bridge.

It is also important to appreciate that as vehicles approach a raised bridge they will need to travel up a ramp on to the bridge, and downward afterwards. The vehicle will not be able to turn significantly while on the ramps. This usually means that a surface mounted weighbridge needs significantly more space in front and behind it. On many sites such space is not available, and recourse to the below ground bridge style becomes unavoidable.

All weighbridge bases require reliable drainage, and regular removal of debris. It is important that access for cleaning below a weighbridge is given adequate thought. Particularly at composting facilities there will be a tendency for large quantities of fine matter to build up over time.

Vehicle axle weighing systems are available to businesses running only their own fleets into facilities. This, in theory, could remove the need for fixed weighbridges. However, it is assumed that, for the foreseeable future, composting facilities will need to accept loads from vehicles which will not be a part of any axle load weighing equipped fleet. Weighbridge suppliers include Avery Weightronix, Mettler-Toledo, Shering Weighing and Parker Weighing Systems.

Parker Eurodeck Weighbridge

Parker Eurodeck Weighbridge

Retaining walls and push walls

Common retaining wall systems available are:

- reinforced concrete, cast in-situ and pre-cast (based upon and L-shaped cross section)
- reinforced concrete A-frame shaped and self supporting
- crib walling
- reinforced earth.

Only the first two are normally suitable as push walls - walls capable of withstanding bucket forces - as required for bulk materials storage, sorting, and as side and end-walls in in-vessel composting bays.

Concrete specifications for walls must be chosen both for strength and durability. In-vessel conditions are a particularly corrosive environment for materials, in part due to the elevated carbon dioxide levels created by biological respiration during composting, which produces weak carbolic acid.

Traditional reinforced concrete walls will normally be L-shaped with a small 'heel' at the back. This helps to reduce overturning ground pressures when fully loaded with material heaped on one side only. The cover of the reinforcement is usually increased substantially over that needed either for structural strength or for corrosion protection, in order to provide a sacrificial thickness for wear. At least a 40 mm cover for the steel is normal, and additional cover may be provided.

A common design criterion applied to the structural design of push walls is to identify the maximum bucket thrust which would be imparted on the wall by reference to plant manufacturer's performance specification manuals. For retaining walls the structural designer then allows for a dynamic design loading case for maximum bucket impact which

might occur at any point on the wall.

In addition to the bucket force loading on a push wall, all loading cases for the worst case/most dense weights of materials stored against the wall must be considered and analysed. All structural wall design must be undertaken by suitably qualified structural engineers.

Crib walling can be low cost, and usually involves the progressive raising of a proprietary cellular wall, which stack on above the other. Voids created by the stacking of the crib walling units are normally filled with soil or soil making materials. This means that plants can grow within the individual (usually concrete) units adding greatly to the visual appeal of the site, and to stability through the root growth developed over time.

Reinforced concrete A-frame shaped and self-supporting walls are very popular in the composting industry, and deservedly so. The A-frame option may be bolted down to enhance strength against horizontal shear during pushing actions created by the normal activities of moving compost into and out of each bay.

Usually the A-frame walling systems have the added benefit of a central void. This void between each side wall of the 'A' can be used for air circulation, ducting etc.

Whichever type of walling is chosen, it should be noted that high temperatures will be created in the composting waste and any reinforced concrete designer should be appraised of the high atmospheric temperature range between the compost tunnels internally and the temperature outside. It is this high temperature difference across walls which results in stresses in the resulting structures, and may create cracking at a later date.

Scaffolding and maintenance access systems

Many scaffolding and maintenance systems are available on the market. The best will repay the investment against traditional steel pole type scaffolding over a short period, while at the same time reducing health and safety risks.

Before choosing an access system from the wide range available, Buyers' Guide recommends that the site manager first lists all working at height activities which take place on site and completes a risk assessment for each. On completing the risk assessment the manager will then hold a comprehensive list of the risks which need to be reduced by the chosen access system.

This is the time to call in the scaffolding and maintenance access systems suppliers, to discuss both health and safety benefits as well as time and cost savings of course. Above all, if operators continue to place a high degree of reliance on the use of ladders and traditional tubular steel 'erect and dismantle' scaffolding, they must ensure that only the most experienced operatives install and use such systems. There are also a large number of regulations which apply to the design and use of scaffolding systems, all of which must be complied with at all times. Proprietary access systems are designed to comply with the regulations from the ground up and this is a great advantage and training in the use of these systems is also available.

Buyers' Guide recommends careful attention by management to working at height on site. After all – falls from heights are the most common form of accident in the United Kingdom, and anything which can be done to reduce them should be taken.

Landscaping and site screening

Most composting sites which would benefit from screening due to proximity to neighbours suffer from a shortage of space. As a result, the landscaping possibilities are much reduced or minimal. However, many landscape architects are skilled at optimising use of space by skilled planting. The use of 'green walls' can significantly reduce noise, above the capability of hard walling, and tree screening can also provide unquantifiable benefits in the reduction of wind speed at ground level, and therefore dust migration and bioaerosols off-site.

Buyers' Guide would suggest that it will often be worthwhile discussing your plans with a landscape architect during the site planning stage. Similarly, if a planned site extension raises concerns from neighbours a good landscaping professional may be able to suggest landscaping and screening options which would otherwise not have been considered. This will present the application in the best possible light when submitted to planners.

All structural wall design must be undertaken by suitably qualified structural engineers

Lightweight and moveable roofing systems for general storage areas

There are many proprietary lightweight and moveable roofing systems available on the general market. These range from fabric covered steel framed systems such as those supplied by Rubb Buildings Ltd to air supported systems. Where wide open spans are required these may need to be made to a bespoke structural design by engaging a structural engineer, particularly if specific planning constraints dictate maximum heights, and/or specific non-standard materials/finishes.

Where odours are of particular concern a very high level of attention to airtight detailing may be necessary. Some systems are much better than others in this respect, and the maintenance of airtight capability may be compromised in time with the less robust covering materials. General suppliers are likely to be less focussed upon these aspects of design than the specialist providers to the compost industry.

Specialist lightweight and moveable covers and systems for in-vessel roofing

Over the last few years we have seen the development of a variety of specialist lightweight and moveable covers and systems which are specifically aimed at the in-vessel compost tunnel roofing market. These range from fabric covered steel framed systems such as those supplied by Summit Structures, to the humble but extremely cost effective Polytunnel.

Roofing systems for use as containment for the air-space

Collinson InnerLiner

above in-vessel composting plant tunnels are subject to highly corrosive conditions and significant temperature gradients across the structure, especially in winter. Airtightness is also integral to allowing adequate control of the atmosphere above the compost and insulation may be needed. A visit made to at least one existing installation before purchase is almost mandatory.

Careful attention is essential with regard to the ability of the roofing to withstand not only external wind and air pressure stresses but also those which the internal airflow control system above the compost will impose.

Moveable fabric covered systems which may move on rails on top of the tunnel sidewalls, fold back or to the vertical during tunnel emptying and filling hold many attractions not least in providing a low aerosol and a naturally lit working environment. However, care is needed to ensure that fabric does not become damaged by accidental contact with the mechanical shovel during compost handling and some systems are better than others in this respect.

When considering specialist roofing, it is worth obtaining relative costings from a civil engineering contractor for the use of the humble concrete walled and roofed tunnel.

In fact, in-situ reinforced concrete walled and roofed in-vessel systems remain the most popular roofing type. The author has found that the concrete option (surprisingly when the low cost of fabric membrane material is considered) will often prove more robust and cost effective when considered over a 10 year or longer period when at least some repair costs will normally be needed for fabric roof equivalents.

When considering specialist roofing, it is worth obtaining relative costings from a civil engineering contractor

On sites where there is a shortage of space, the concrete roofed in-vessel tunnel option will often be chosen to enable the significant space saving obtained by placing fans and control rooms etc on top of the tunnels. Indeed, bio-filters have on some occasions also been sited above tunnels.

Complete proprietary in-vessel systems

The provision of a complete proprietary turnkey single supplier in-vessel system holds many attractions for many composting site operators. A number of companies are experts in this field, both nationally and internationally.

Visits to existing plants and talking to site managers and operatives are an invaluable way for the purchaser to understand the strengths and weaknesses of each system. Composting is a very young industry and as it matures the number of acknowledged 'best' ways to do things will no doubt reduce. However, this is an industry where there will always be so many variables from the nature of the waste accepted to the site, to the level of investment available, to the final product and marketing intent, that 'one size fits all' is unlikely to ever occur.

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Construction service suppliers

Company	Contact Name	Contact Number	Email	Website
Firstgrade Recycling Systems Ltd	Alan Valentine	07771 818462	alan@first-grade.co.uk	www.first-grade.co.uk
Celtic Composting UK Ltd	Peter Hewitt	020 7870 8897	phewitt@celticcomposting.co.uk	www.celticcomposting.com
Fans & Blowers Ltd	Bill Dawes	01278 784004	fab-sales@btconnect.com	www.fansandblowers.com
Roller Compacted Concete Company	John Donegan	01778 394400	info@rollercompactedconcrete.co.uk	www.rollercompactedconcrete.co.uk
Summit Structures Ltd	Danny Jackson	01270 620 475	djackson@summitstructures.com	www.summitstructures.com
Milbury Systems Ltd	Brian Mees	01275 857799	sales@milbury.com	www.milbury.com
Collinson plc	Daniel Collinson	01995 606451	tms.sales@collinson.co.uk	www.collinson.co.uk
seepex UK Ltd	Damian Clifford	01935 472376	sales@seepex.co.uk	www.seepex.com
Veldeman Structure Solutions	Kurt Vanleysen	(0032)89 47 31 31	logistics-industrial@veldemangroup.be	www.veldemangroup.be
Hippowash	Carol Godfrey	01270 252669	carol.godfrey@hippowash.com	www.hippowash.com
Envar Ltd.	Peter Davies	01487 849 852	peter.davies@adas.co.uk	www.adas.co.uk
RPS Consulting Engineers	Lorraine Herity	+353 (0)1 2020870	lorraine.herity@rpsgroup.com	www.rpsgroup.com/ireland
Covered Systems Ltd	John Jardine	01449 672896	info@coveredsystems.co.uk	www.coveredsystems.co.uk
New Earth Solutions	Peter Mills	01202 583700	peter@newearthsolutions.co.uk	www.newearthsolutions.co.uk
Enviros Consulting Ltd	Joe Short	07966 547484	joe.short@enviros.com	www.enviros.com
Jack Moody Limited	Mark Beasley	01922 417648	sales@jackmoodylimited.co.uk	www.jackmoodyltd.co.uk
Gemini Data Loggers UK Ltd	Nigel Palmer	0044 (0) 1243813000	info@tinytag.info	www.tinytag.info
Cornerstone Systems Ltd	Gareth Hughes	01785 818020	gareth@cornerstonesystems.co.uk	www.cornerstonesystems.co.uk
FFS Ltd	Jim O'Hara	07725 467 408	jim_ffsltd@yahoo.co.uk	
Active Compost Limited	Dr. Robin Szmidt	01292 442306	info@activecompost.com	www.activecompost.com
Parker Weighing Systems		01865 85 85 65	sales@parker-weighing.co.uk	www.parker-weighing.co.uk
Jones of Oswestry		01691 653 251	sales@jonesofoswestry.com	www.jonesofoswestry.com
Tempakerb Ltd		01685 814 604	tempakerb@msn.com	www.tempakerb.co.uk
Safety by Design		01977 555 532	sales@safetybydesign.co.uk	www.safetybydesign.co.uk
Corus Ayrton		01633 290 011		www.corusconstruction.com
Jacksons Fencing		01233 750 393	sales@jackson-fencing.co.uk	www.jacksons-fencing.co.uk
Steelway Fensecure		01902 490 919	sales@fensecure.co.uk	www.fensecure.co.uk
Frontier Pitts Ltd		01293 548 301	sales@frontierpitts.co.uk	www.frontierpitts.com
Avery Weightronix		0870 905 0084		www.averyweigh-tronix.com
Mettler - Toledo		0116 234 5074	enquire.mtuk@mt.com	www.uk.mt.com/home
Shering Weighing		01383 621 505	sales@shering.com	www.shering.com
Rubb Buildings Ltd		0191 482 2211	info@rubb.co.uk	www.rubb.com
Stanton (Saint-Gobain Pipelines)		0115 930 5000		www.saint-gobain-pipelines.co.uk

Service										
Consultancy	Temporary structures	Bespoke flooring manufacturers	Walls	Biofilters	Weighbridges	Covering systems for tunnels	Wheel wash equipment	Storage lagoons for leachate collection	Fan & air handling equipment	Others
									X	
X	X	X	X	X		X	X	X		
									X	
										Concrete hard standings
	X					X				In-vessel composting & windrow buildings
X	X	X	X	X		X		X		
	X									
X										Maceration/grinding/pumping equipment
	X									
							X			Integrated water/chemical recycling
X				X						Site design, financial modelling
	X	X	X	X	X	X	X	X	X	
X	X	X	X	X		X		X	X	Compost Aeration System
										Complete Design, Build & Finance packages
X		X	X	X	X	X	X	X	X	Composting control systems
X			X	X				X		Concrete floors
										Temperature monitoring; Data logging (Wired and wireless data loggers)
										Temperature monitoring
X										Composting esp. difficult feedstocks, plant design and build, odour control, energy from wastes,
X		X		X					X	Self-build support
					X					
										Lintels & access covers
										Kerbing
										Crash barriers
										Crash barriers
										Fencing
										Fencing
										Barriers
					X					
					X					
					X					
										Roofing systems
										Chamber covers & frames