

COMPO *news*

I N T E R N A T I O N A L

Edition IFAT 2010

New Earth Solutions Group is expanding

England: More compost and MBT plants are designed, built and opened.

Mumbai goes Recycling!

The starting signal has been given!

Commencement of composting in the first Austrian newEARTH plant

MBT Linkenbach relies on extract aeration!

Reducing exhaust air emissions

COMPOtemp, COMPOtemp GPRS, COMPOwatch

TracTurn IV How about a little bit more? More throughput? More power? More efficiency?



Editorial

There are now 50 compost and/or MBT plants, which we have designed and delivered for our customers. This gives us the confidence that today we speak not only as a leading solution provider, with an emphasis on creativity and high R & D, but also with real operational experience.

The economic crisis and the associated capital constraints that Municipalities worldwide are facing is giving us further opportunities. The days of plenty are gone. Efficiency and cost consciousness are returning as the principal deciding factors in both public and private competitive tendering procedures. As a specialized engineering company for biological waste treatment and a system supplier for key components, we see it as our duty to transform our knowhow and experience into added value for our customers. We feel obliged to assess the potential along with risks properly and to plan and build efficient plants as our main concern and focus.

Yours sincerely,

Managing Director Compost Systems GmbH



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Mumbai goes Recycling! The starting signal has been given!

The time has come. The design is done. The contracts for the first construction phase of a new waste disposal and recycling facility in Mumbai have been signed. Compost Systems will deliver the first components for the composting plant this year.

The second construction phase should follow quickly after the first one.

Over twenty million people live in the Mumbai region. The precise number is uncertain because of those living unreported in poverty stricken areas. 1.2 million tons/year, or more precisely 4,000 tons of waste daily, will be processed at the treatment plant of the Indian company "Antony Lara". This amounts to about 40 % of the daily waste generated in Austria! This is the largest waste input contract that Compost Systems has ever equipped.

The total installation will comprise eight individual plants operating in parallel. The incoming waste will be processed in these plants after an intensive pre-sorting to produce high quality compost. Quite different from Europe, India's waste is to a large extent (ca. 80 %) organic.

At present, many people in India earn a living by sorting discarded trash on the street. This waste separation works so well that in fact only few recyclables remain in the material being delivered to the landfill. Once cans, batteries, metals and other recyclables have already been "sorted out" from the garbage on the streets, there is still competition for every remaining kilo of non-organic recyclable material at the landfill area. The recycling of the remaining organic recyclables has so far been done by seagulls, rodents and vultures. Up to five hundred jobs for sorters in proper working conditions on the sorting conveyors will be created by the new facility. Gone will be the days of waste separation on the streets and at the landfill in the blazing midday sun. Minimum hygienic standards and secure jobs have become catchwords in India.

What is good for people is also good for the environment. This project is to avoid 1.5 million tons of CO₂ equivalent emissions in future. The plant will be built by Antony Lara Enviro Solutions PVT. Ltd. The company is part of Antony Waste Handling Cell Pvt. With operational facilities in the major cities of India, Antony is one of the leading waste management companies in the country. With their own fleet of over 1,000 refuse collection vehicles that have been produced under license by another group company to meet Western standards, Antony transports the bulk of waste. Antony Waste received the Indian environmental protection award for exceptional accomplishments in 2009. This waste composting plant (MBT) will be the largest plant in India and will serve as a showcase for the entire Asian region. Ample interest far beyond the borders of India has already been shown.



Currently, grass and bushes are growing at the site for the proposed compost plant.

Waste management, traffic and road safety are among the main problems of the Indian local politics in the congested areas.

New Earth Solutions Group is expanding England: More compost and MBT plants are designed, built and opened.

In 2002 the construction of the first newEARTH compost and MBT plant for New Earth Solutions Ltd in Canford/Wimborne Dorset began in southern England. The plant was opened in 2003 and the technology was put to the test. Since 2006, New Earth Solutions Group has been expanding rapidly and opened compost and MBT plants all over England.

New Earth Solutions Group Ltd is an English company that has devoted itself to building and operation of waste treatment facilities. With the development of the eponymous newEARTH treatment process in collaboration with Compost Systems it was possible to kill two birds with one stone. While many components could be standardized, the procedure remained flexible enough to handle domestic refuse or organic waste in the

same plant AND meet the strict requirements of the English authorities in relation to emissions and sanitization.

With the expansion of the prototype plant at Canford in Southern England in 2006, the first step towards the commercialization of the procedure was achieved. The plant's original acceptance capacity of 15,000 tons of domestic refuse per year had been increased to 50,000 tons

of segregated kitchen waste a year. In 2008 the plant was then returned back to its original purpose of being an MBT plant. With the addition of a processing and sorting system the plant now takes up to 100,000 tons of domestic refuse per year, separates recyclables completely and produces soil out of the organic fraction, which is used in the restoration of a neighboring landfill.

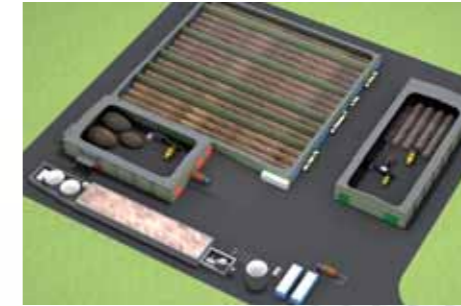


The construction of the plant at Blaise Farm in the county Kent by New Earth 2008 was the first step in the rollout program via the UK. The 50,000 tons of organic waste per year comprising separately collected kitchen and garden waste that the plant can treat is collected mainly from the surrounding communities and but the plant also benefits from its geographical proximity to London. The high grade compost produced is used on agricultural land in the vicinity.



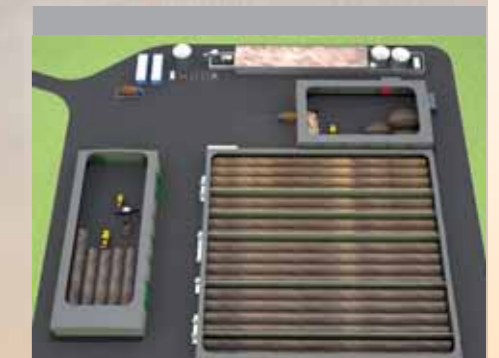
In Autumn 2009 construction work began on another newEARTH-MBT plant in the county of Leicestershire, where New Earth will treat the County's residual municipal waste. After robust contract negotiations (which are not usual in England) construction began in autumn 2009. As at Canford, the plant will be able to process up to 100,000 tons of domestic refuse.

As with the other plants, the approved newEARTH treatment process will be used. This sophisticated technology achieves the necessary degradation rates in a short period of time and the final product CLO (compost like output) will



be used for the restoration of an adjacent landfill and other similar sites.

In England there are exacting standards for the proof of the complete sanitization of any food waste derived compost that is to be used on land. The rules of the ABPR Animal by-product Regulation (ECN 1774/2002) must be strictly adhered to. This means a complete record of the process from waste receipt to product despatch, including all process temperatures must be kept. Thanks to Compost System's fully automated process, the data recording in the background and the wireless probes – this is a straightforward process.



New Earth is embarking on further expansion with a new location near Bristol. The design work is practically done and the contractor for the civil and building works has been appointed. With a capacity of ca. 120,000 tons per year this MBT plant is going to be the largest from New Earth Solutions. The plant is to commence operations in the early summer of 2011. This is a real challenge, considering the size of the facility and the complexity of the tech-

nology. Nevertheless, the company is confident about completing the construction of the plant on schedule. The plant is required for a waste disposal contract that New Earth has secured from the region's "West of England Municipal Partnership",

New Earth Solutions Group is actively considering new sites and with the growing requirement from Municipal-

ities for this type of treatment as an alternative to the increasingly costly landfill disposal, is set to install and operate further plants in England, Wales and Scotland so extending their market position. For Compost Systems as a system supplier for the entire biological process this is a challenge, "which we are (confident we can meet?) happy to accept "!

Salzburg Waste Disposal, Siggerwiesen 1 satisfied customer = 2 plants

In 2007, 2,400 m² of the compost hall for digestate and green waste was equipped with the COMPONent ventilation system. Conclusion, after two years of operation – composting time was shortened and odour emissions reduced! Therefore, at the reconstruction of the curing area for MBT plant in 2010, we have resorted to the tried and tested aeration and control system of Compost Systems.

The specifications for the renovation of existing plants are usually the same: increase the plant's intake capacity, reduce any odour pollution, the best possible integration of existing buildings and the existing treatment and control technology. In case of the digestate and green waste composting of the SAB, the exist-

ing compost hall was retro-fitted with new aeration lines at 2 m centre to centre. This allowed the existing trapezoidal pile turner at the plant to be re-used, but it can also be changed to triangular windrow composting in the future. Similarly, the ventilation system was designed for the maximum reduction of odour pollution as

well as negative and positive pressure aeration. The simple and rapid installing of the concrete aeration pipes needed only a short downtime for the plant. Annually, up to 25,000 tons of digestate from the upstream biogas plant including structural material can be processed to high-quality compost within 6-8 weeks.



Blower station green waste compost



Composting area



Automatic temperature monitoring

The positive experiences with the ventilation system at the composting plant prompted the operator to entrust Compost Systems with the configuration of the MBT curing area to achieve secure compliance with landfill criteria. In contrast to composting, the MBT's priority is to maximize the material reduction

(= mineralisation). For the aeration system, this means that the energy output of the material had to be maximized by the control of the suction rate. At the same time it was necessary to instal an ideal material irrigation, system, integrated into the plant's control system. Due to the increased odour potential of the MBT ma-

terial, all aeration pipes are exhausted and the exhaust air has to be cleaned through a biofilter. The plant's construction allows, with a 4-week composting cycle, up to 20,000 m³ of MBT curing material (0-25 mm fraction) to be processed per year, pending the achievement of Austria's landfill regulation criteria.



Finished composting area MBT



Blower station MBT plant



Building of the MBT windrow

Commencement of Composting in the First Austrian newEARTH Plant

After nearly two years in the planning and approval phases, the first compost windrows could be installed in the first Austrian newEARTH plant.

In the mid-nineties, the company Posch GmbH started composting on their own open triangular windrow pad in Ternitz (Lower Austria). Odour problems and the desire to expand the plant from 2,000 tons to more than 14,000 tons of green waste and sludge per year posed a challenge for the plant design. Part of the design brief was that the existing system components as well as the existing triangular windrow turner should be integrated into the new system concept. The solution, which both increased the plant capacity and significantly reduced the odour situation, was to provide an enclosed negative aerated compost reactor hall with aerated curing. The exhaust air purification takes place in a biofilter next to the new compost hall. Existing plant components have been integrated into the new system concept as a delivery area and a storage area for the finished compost. By using a space-saving COMPOTainer, the entire air and control system could be incorporated into

the space available. The enclosed reactor kept the influence of cold, snow and precipitation to a minimum during the winter months. This allowed the composting operation to continue through the winter months thus enabling the plant to achieve its full operational potential

Odour emissions are minimized by the aeration of the pile. The remaining emissions are captured by the enclosure of the windrows and are also treated by the biofilter. Since the modified plant has come on stream, odour pollution has been slashed, to the satisfaction of both local residents and the authorities. The modified plant has also achieved its design efficiency. These modifications have demonstrated the advantages of both enclosing the process as well as using triangular composting windrows. The overall concept of the plant with the enclosed reactor and aerated curing area plus the automatic temperature

monitor and process controlling/process record are a cost-effective solution for operating a compost plant in (odour) sensitive areas.



Compact construction method



Ideal light conditions in the hall

AWV District Jennersdorf, Heiligenkreuz

The compost plant of the sanitary district Jennersdorf in Heiligenkreuz in Lafnitztal can process up to 20,000 tons of organic raw materials on eight aerated piles.

In the covered compost hall, eight aeration piles, each about 90 m long that have been installed. The nearby railway connection allowed a cost-effective and climate-sparing delivery of the aeration pipes per wagon. Each year,

up to 20,000 tons of digestate sludge as well as green and garden waste are processed to produce quality sludge compost. The aeration technology has been designed to operate in both positive and negative modes with the ex-

hausted air in the negative mode being appropriately treated (biofilter). The pre-mounted delivered ventilation container will provide protection from weather and reduce fan noise.



Delivery of the pipes by train



Looking into the compost hall



Pre-mounted fan container

Reduction of exhaust air and emissions? MBT Linkenbach relies on extract ventilation!

After years of experience with negative aerated windrows and the exact distribution of air along the entire pile, MBT Linkenbach (district Neuwied) chose the COMPOair aeration system. The volume of exhaust air is matched to the composting conditions and the cost of exhaust air treatment in the RTO (regenerative thermal oxidation – burning of the exhaust air) is reduced to a minimum. The odour test carried out before and after construction certified that the COMPOair aeration system has reduced the emissions up to 80%.



Looking into the compost hall

The MBT Linkenbach processes 90,000 tons of domestic and commercial waste a year. After a three to four weeks pre-composting in an enclosed system, the landfill fraction will continue composting on the negatively aerated compost area until the statutory residue criteria has been achieved.

To carry this out, a sheltered curing hall was built with 1,800 linear metres of COMPOair aeration ducts. A total of 12,000 m² is available in the hall for composting for up to twelve weeks. The windrows are turned with a mobi-

le turner. A design study for the project, showed that through controlled exhaust extraction at the base of the windrow, 80% of the emissions, especially the diffused emissions, could be passed to the exhaust air treatment system. This has great significance in the overall emission balance of a MBT plant and thus, decisively influences the choice of the location. Particular attention is paid to the consistent aeration over the entire windrow length. Thus for low exhaust quantities, a minimal air exchange at every point of the windrow can be



Blower Station



Delivery of the compost material

achieved and still minimize the total amount of unrefined exhaust air. Another reason why the district Neuwied has chosen COMPOair aeration ducts, is their existing long-term positive experiences with COMPOair aeration ducts used in negative aeration systems. The low susceptibility to congestion of the aeration jets and the extremely high mechanical, biological, chemical and thermal resilience is the result of many years of experience in the organic waste treatment.

MBT Erbenschwang – aerated curing area

Within only two months, an aerated curing area for 11,500 tons of MBT curing material for EVA Erbenschwanger Verwertungs- und Abfallentsorgungs GesmbH was constructed as a buffering for seasonal quantity fluctuations.

On the MBT plant of EVA Erbenschwanger Verwertungs- und Abfallentsorgungs GesmbH, 40,000 tons of domestic and domestic-like industrial waste a year from the districts Bad Tölz-Wolfratshausen and Weilheim-Schongau are processed. To accommodate seasonal fluctuations in the quantity delivered, an aerated curing area was built. The 700 m² curing area was integrated into an existing hall and could be put into service after only two months of construction time. The aeration pipes were retro-fitted on

the existing area, so the existing structure could be used again. With a demountable concrete wall, the aeration area is separated into 5 sections or boxes, each section having 6 aeration rows.

Per box, about 220 tons of material can be processed. At three to four weeks composting time, the annual capacity is at 11,500 tons of landfill material. Once a week, a wheel loader moves the composting material from one box

to another. Each box area is separately controlled – so the suction performance and the suction duration can be matched to the material requirements. The air extracted from the box is purified via the existing biofilter. As the five box fans and the control cabinet were completely pre-wired in the supplied COMPOTainer – the interfaces to other suppliers were minor and the final commissioning could be rapidly achieved.



Hauling of the aeration pipes



Aerator container in country style



Aerated compost hall

It's never too late...

During the summer months, a two-week "window" had to be enough to upgrade the compost plant Traismauer with the COMPOair aeration technology.

Day after day, sewage sludge is produced at the sanitary district near Traisen and has to be placed at the compost plant. Storage capacities are not available for this and so any interruptions of the operations are costly. Hence there was only a time span of two weeks to retro-fit the plant with the COMPOair aeration system. To keep the cost of re-

paving low, only about 1 m wide asphalt strip was cut out and a 70-80 cm wide working trench was dug.

With well planned handling, it took only two men with lifters (excavators) to lay the COMPOair pipes. The remaining void in the trench around the aeration pipes was filled in with lean-mix

concrete or trench filling material. After that, the re-paving of the access strip could begin.

In just two weeks, the COMPOair aeration system was installed and the down time was reduced to a minimum.



Overburden



Hauling pipes



Finished compost plant

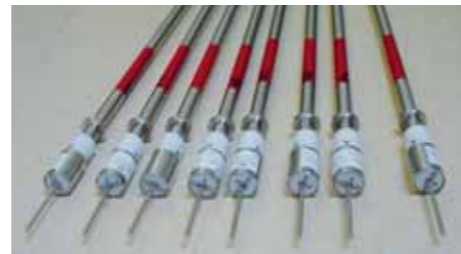
New layout for the automatic windrow temperature detection COMPOtemp

The new "Lead-Free" regulations of the European Union, which prohibit the use of lead, mercury and other hazardous substances in electronic equipment, have caused a headache for electronics manufacturers. Components could not longer be soldered and other well known methods of joining can result in "concealed abnormalities".

Our tried and tested system for automatic windrow temperature detection COMPOtemp uses a number of electronic components to be able to send the temperature data of the individual windrow to the data-capture and storage software. The above-mentioned "Lead-Free" regulation was, for us as well, a

complete rethinking of the components we should use. We made a virtue of necessity, revised the entire "entrails" of the temperature probes and installed the latest available components, combined with recent findings in antenna technology.

Our customers can now benefit from another enhancement of wireless range with a simultaneous extension of battery life. The temperature probes are available with one, three or five temperature measuring points. A visualization of the current windrow temperature takes place as usual via COMPOwatch or COMPOscan.



COMPOtemp remote probes



COMPOtemp remote probes in use

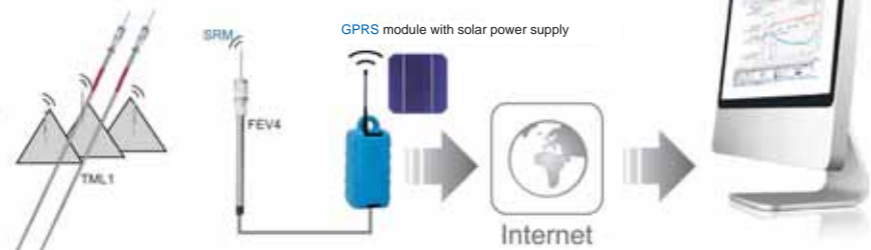
COMPOtemp GPRS – Online temperature measurement independent of any power supply

The linking of a GPRS transmitter with the proven COMPOtemp temperature monitor facilitates continuous temperature monitoring at remote compost plants without their own power supply.

The degradation temperature is the most significant parameter for the operator in his compost plant – degradation performance, pile activity, proof of sanitization etc. are determined by the temperature. Therefore, we have relied for a long time on wireless temperature probes for continuous recording of windrow temperature.

In addition to the temperature probes, only an ordinary computer for the recording and representation was needed at the compost plant.

Now we have gone a step further and are using the mobile phone network for data transmission. Thus, even at remote plants without offices or power supply, a continuous automatic re-



ording of the windrow temperature can be made.

The system builds upon the tested COMPOtemp temperature monitoring system: From the temperature probes the temperatures are transmitted, as usual, via radio signal to a radio receiver. This is connected to a GPRS modem and via the mobile network the temperature

data is sent to a central server. Through the keyword protected customer service, it is possible to make a query and a processing order of the windrow temperatures with any internet access point. The temperature probes have their own power supply. The radio receiver is powered by a solar panel including a backup battery, so no power connection is necessary for the entire system. Of course, the automatic measured temperatures could also be linked to our documentation software COMPOreport and thus, all required sanitization proofs, as well as statutory mandated records can be kept electronically.

lar panel including a backup battery, so no power connection is necessary for the entire system. Of course, the automatic measured temperatures could also be linked to our documentation software COMPOreport and thus, all required sanitization proofs, as well as statutory mandated records can be kept electronically.

COMPOwatch – automatic windrow temperature monitoring

The windrow temperature is an important parameter in the composting process – for example: pile activity and proof of sanitization etc. are determined by the temperature. COMPOwatch is the convenient way to determine the temperature quickly and automatically.

The working principle of COMPOwatch is actually quite simple. Using temperature probes, the temperature is recorded at several points of the windrow. The transmission to the processing computer takes place via radio signals. Thus, no more annoying cables are in the way, which could be damaged by implements (turners, wheel loaders, etc). Through electronic recording

and visualization on the computer, the current temperature and temperature development can be observed at all times. Using wireless enables the transmission of the temperature over a range of several hundred meters, thus the evaluation can be made conveniently on the office computer within the compost plant.

COMPOwatch is already in use in

numerous facilities throughout Europe to record the proof of sanitization of the ECN 1774. The system allows the recording of a windrow temperature at any time of the day or night, regardless of the weather, is carried out easily and continuously.



20 temperature probes help in odour reduction at the compost plant "Jersey" on the Channel Islands – Turning takes place dependent on the windrow temperature



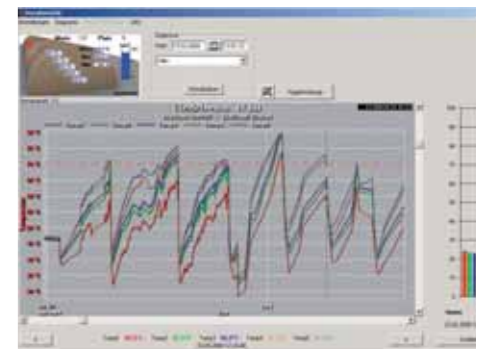
Compost plant Huemer (A) with temperature monitoring of the main compost platform



Temperature monitored professional soil manufacturing in Kranzinger Erden (A)



Temperature monitoring of MBT material

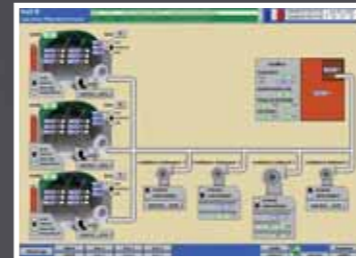
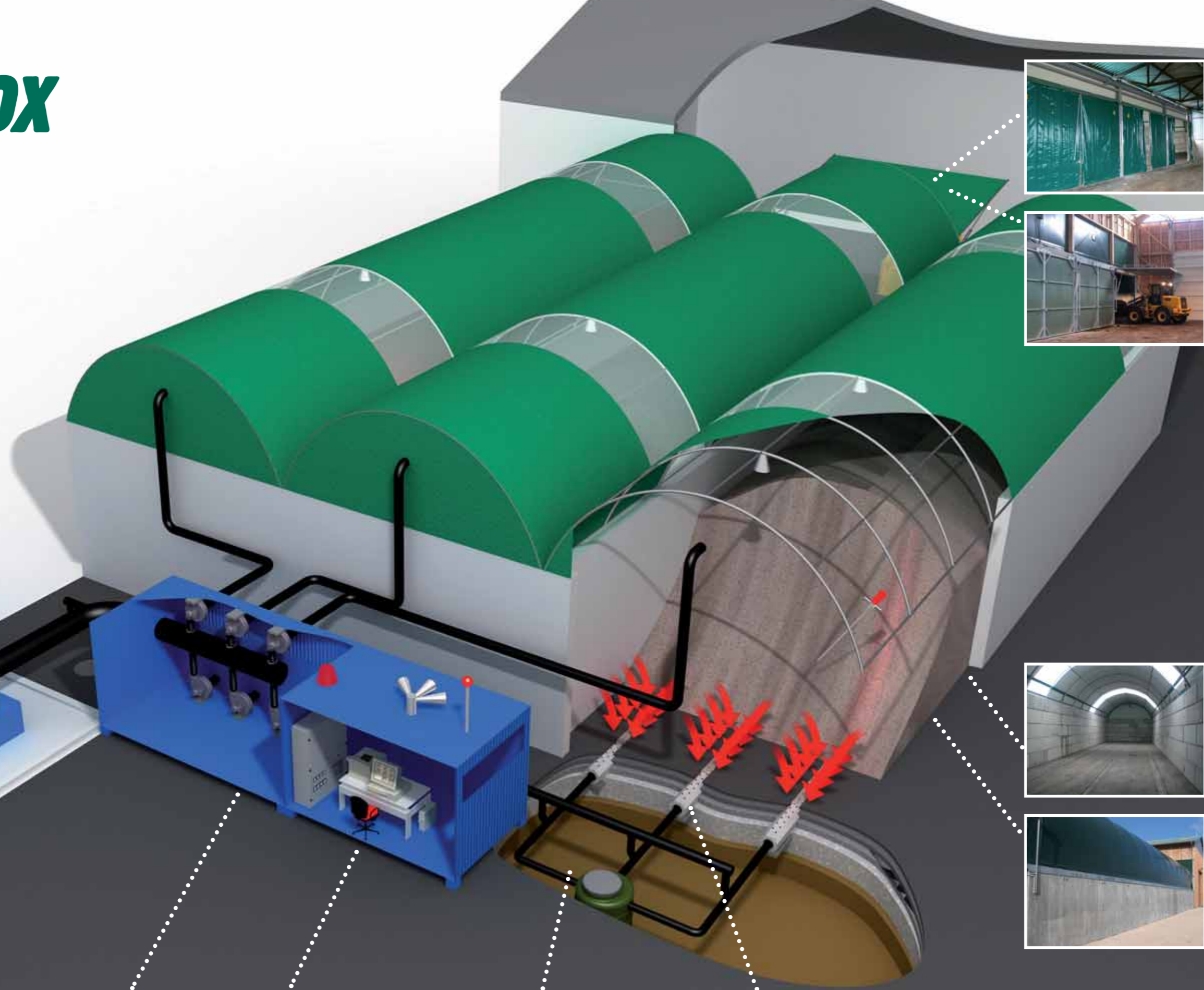


Windrow temperature display and course of time shown on the computer

newEARTH S



COMPObox



Diary of a compost plant construction

Background: In 1998, the composting plant Kanninghof was one of the first plants where the COMPOnent system was installed. After this aeration system had been highly successful for over 10 years, the operator Hubert Seiringer chose to expand his existing plant for 7,000 tons of organic waste per year with an additional plant for 10,000 tons of sewage sludge. From the experience of recent years, the plant was designed so that the "odour intense" first phase of composting could be operated with negative aeration followed by a positive pressure aeration. After only three months of construction work, the first compost windrows were built and the annual capacity of the compost plant Kanninghof had almost tripled.



Hubert Seiringer



First, was an idea...



well begun...is half done!



30.000 m³ of earthworks to be managed



leachate storage and push wall



...the plant starts shaping



unexpected difficulties - the floor needs to be stabilized with lime



finally - COMPOair, the heart of the aeration equipment, was delivered



within a very short time ...



...the eight aeration rows are laid and the area can be paved



base course and sealing tarmac...



...are built in layers



hauling of the pipes...



...building the biofilter



... connecting fans and controlling system...



...and finally after only three months building - DONE!

Box composting Chaumont, France

The sludge from two sewage plants, as well as corncobs, tree and garden waste, had to be processed cost-effectively to reach the saleable specifications. Therefore, the operator Bioreva, with 12,000 tons input material from the region Chaumont, chose the COMPObox plant.



The COMPObox plant Chaumont consists of a central delivery and processing hall where three compost boxes each are connected left and right. An potential plant expansion of two more boxes was taken into account during the design stage. After two weeks degradation period, the material is turned with a wheel loader. After a total of four weeks composting time in the COMPOboxes, the material can be cured on the shel-

tered curing area. Each COMPObox is closed with a hydraulic door. At the bottom of each box, there are three rows of COMPOair S concrete aeration ducts to ensure even air distribution. Each box is aerated with its own exhaust fan. This allows the aeration time to be adjusted to the individual ages of the degradation material. The exhaust air from the COMPOboxes and the delivery hall are purified in the biofilter. Thus, a complete

capture of any odour emissions is ensured. In each box there are remote-wireless probes to observe the degradation temperature and continuously record the temperature. The sanitization of the degradation material can be easily and reliably measured. The produced compost is used as high-quality fertilizer in the neighbouring farm as well as horticulture and landscaping.

MBT Czarnówko

The requirements of the landfill regulation of the EU are even taking hold in Poland. Therefore, the landfill operator in Czarnówko decided to supplement his mechanical pre-treatment with a biological treatment step.



Lebork is a small town with 35,000 inhabitants in the north of Poland. This plant was designed so that 12,000 tons of sludge and green waste as well as 12,000 tons of organics from domestic refuse could be processed. In the future, it is also possible to compost separately collected organic waste. In the preceding sorting plant, the refuse is delivered and processed. The recyclables are sorted out through au-

tomatic sorting as well as hand-picking. The organic fraction, which mainly lies in the < 60 mm fraction, is then degraded in the composting area by the biological treatment process. The degradation process happens more or less fully automated in accordance with the COMPObox procedure. The curing of the materials takes place on a pressure aerated area to obtain the landfill criteria (MBT fraction) and to improve the compost

quality (sludge compost). The loading and unloading of the boxes as well as the moving on the curing area, is carried out cost-effectively with a wheel loader. Compost Systems supply, includes the complete process and facility design, the aeration system plus the control system including the software packages and the measuring equipment.

After Lebork followed Gdynia

With the second large compost plant being equipped with the latest technology in Northern Poland, Compost Systems is well situated in the market. The test run has been running since February 2010.

After a very lengthy tender, it was decided in autumn 2008 that the association of Compost Systems and Hydrobudowa Gdansk SA should receive an order to build an MBT plant for ECO DOLINA in Gdynia, northern Poland. Eko Dolina is a communal union "Komunalny Związek Gmin Doliny Redy i Chylonki" and was founded in 1991. The members are the municipalities of: Kosakowo, Wejherowo and cities of: Gdynia, Rumia, Reda, Wejherowo and Sopot. On 15. June 2009, the construction of the plant in Lezyce started. The extension was carried out in stages. The construction of the compost plant for MBT material formed part of the se-

cond stage and is partly financed by EU aid funds. In addition to the raw material "domestic refuse", organic waste and green waste is also processed. In this project, Compost Systems is responsible for the entire design including the detailed engineering of the construction, process engineering, regulatory submissions as well as the delivery of all process-relevant components such as the control system, aeration system, indoor aeration, waste water treatment, biofilters, etc. The plant was announced after the famous "yellow book", which means that both design and build lie within the consortium's responsibility. The procedures set by the investors

were, as usual in this type of public tenders in Poland, very strict. The consortium has nevertheless managed to build a perfectly functioning plant in a very small area. Based on the testing phases, the tender requirements of a throughput of 30,000 tons/year are met. Together with the plant in Lebork this is the second major project that Compost Systems has achieved in Poland in a short time. In the hope of a quick increase, the efforts in Poland will be enhanced again and are already rewarded with new orders this year.

*Chronology: official order in autumn 2008
Start of design: autumn 2008
Construction began: in spring 2009
Completion and cold commissioning: January 2010
Warm commissioning: March 2010*



Compost hall with screening station, curing area and biofilter



Composting hall closed



Building of the windrows

Composting in Bilina

The market in the Czech Republic is becoming aware of prime technology from Austria! The first plant based on the principle of newEARTH was completed in February and scored very good results in commissioning.

The first major plant is already completed and has been commissioned. In spring of 2009, the compost plant operator of Bilina, which is located about 100 km northwest of Prague, became aware of the system COMPONent. After some negotiation, the contract together with a local partner company for the construction was signed and sealed. The task was as follows: an existing free-standing compost plant for green waste, sludge and organic waste had to be retro-fitted with an aeration system. The plant capacity is 32,000 tons/year. The design started in the summer of 2009 for a construction start in autumn. Over the existing open field compost plant, a

two-hall structure was built. The exhaust air treatment from both the hall and the aeration fans of the windrows, is treated in a washbox with an attached biofilter. In this project, Compost Systems was responsible for the design including the detailed engineering as well as the process engineering and is the supplier of process-relevant components such as the controlling system, aeration system, hall ventilation, waste water treatment, biofilter, washbox, etc. It is also stipulated that waste, which has to be sanitized, is pre-treated in a sanitization box. This box will be equipped with a pressure aeration system with temperature control. The exhaust

air is filtered through a semi-permeable membrane. The equipment for this also comes from Compost Systems. Commissioning was completed in January 2010 with good results. The final startup of the plant took place after the warm commissioning at the end of June 2010. Many interested parties are already trekking to see the plant. It is likely that this is just the first of such plants in the Czech Republic.



Compost hall



Sanitization box



Compost hall



Blower station with biofilter

Waste centre Vrhnika – Saubermacher Slovenija

The waste centre in Vrhnika, being the second Slovenian compost plant with an aeration system from Compost Systems, has already been brought online. As with the first plant in Puconci, the client Saubermacher Slovenija and the general contractor DRAVA vodnogospodarsko podjetje Ptuj d.d. trusted our long-term experience in the construction of compost plants.

At the compost plant in Vrhnika, about 10,000 tons of separately collected biogenic waste from households as well as green and garden waste from the region around Ljubljana will be processed in the future. Compared to the previously built plant in Puconci, which was built on the "green field", the task was unlikely more difficult: There was already a compost plant existing, which had resident issues such as odour nuisance as well as capacity problems. Moreover, the existing building and the machinery (wheel loader, turner) should be used further and the plant operation had to be kept upright during the renovation. Likewise, the settling of the old landfill construction area made it difficult to pursue reconstruction. Of course, the usual time pressure was added, since the plant was actually supposed to be in operation. Not the easiest conditions, but we all know that challenges like those enrich our lives. A rigorous concept of integrating the existing delivery hall as well as a visit to an existing "sister plant" in France were able to convince the client Saubermacher in no time. The use of concrete prefab blocks "Varioblock" reduced the surface pressure of the ground which is exposed to settling and with the box

design in the form of a light round arch construction, a quick planning permission of the plant with the necessary capacity extension was permitted. The two-stage implemented construction work allowed a continuation of the composting. In the first step, the delivery hall, which was the integrated existing hall, was opened on the long side, thus creating the possibility to connect four newly constructed COMPOboxes. In these four closed boxes, the material is turned weekly and composted for a total of four weeks. Once this part of the reconstruction "phase I" had gone into operation, the former curing area was cleaned and, through the subsequently installation of COMPOair-S-aeration pipes, retro-fitted to an aerated curing area. For a better control of odour emissions, the exhaust air from the curing area is purified in the biofilter as well. After about eight to twelve weeks, the finished compost can be screened and marketed. A further increase in product quality is added by the storage of the finished compost on the newly established pressure aerated storage area. Even here, aerobic conditions until further use (mainly landscaping and horticulture) are guaranteed.



Series Agrar CMC

Still the most affordable option to produce excellent compost! The series of Agri-CMC from Compost Systems make it possible.

More than twenty years ago, the first compost turner series CMC-ST was introduced for agriculture. Since then, numerous machines have been supplied all over the world. No other machine has been built so often or been copied, and yet we continue to remain the market

leader. With working widths from 2 m to 3.5 m, the series of agricultural tractors in that size is designed for up to 120 HP. Robust, easy to handle, efficient and extremely practical for each HP used, make the machines of the CMC ST series a price-performance hit!



Whoever wants something more luxurious, our series CMC SF is an inevitable must-have! With working widths of 2.5 m and 3 m or windrow widths up to 4 m, these self-propelled machines offer the advantage of minimal driving aisles. While the tractor still needs broad lavish aisles of 2.5 m, the self-propelling machine is content with half a meter or less.



For all those, whom the above mentioned offer is still too loud and large, there is still a special treat. The CMC SF 200 aka "BABY 200"! Electrically powered and equipped with a crawler, the "BABY 200" works quite impressively, almost completely silent, through the compost windrow. The physical limits of the windrow's size are 2 m width and 1 m height. A must for the small compost plant operator with little space!



Product innovation:

Semi-stationary screening plant: powerful, flexible and above all "affordable" were the vertices of the customer requirement specification.

Since nearly three years, the first prototype of the system has been in test mode. Up to 100 m³/h is the quite acceptable performance for the screening of compost.

Special feature: the machine is on a foundation of mobile block stones, under which the bunker is below the screen for the fine compost.

Conclusion: space-saving, efficient and most notably favourable to purchase and operate.



For further information:
a.wuerzl@compost-systems.com

TracTurn IV

How about a little bit more? More throughput?

The TracTurn IV convinces once again with its' performance and flexibility, adapting to different windrow systems, plants and materials.

The concept is simple and effective: the tractor is used as a carrier vehicle, in this case the turner is "pushed" rather than "pulled". The new generation of tractors makes it possible! With an engine power beyond the 250 HP limit and a reverse drive feature, the performance of the TracTurn IV is assured. The turning performance is estimated at 2,000 m³/h but test results have already proven a turning performance beyond the 3,000 m³/h limit. In the latest studies, terrific values for fuel consumption were apparent in comparative tests. This is not only good for the climate but also good for the wallet! The biggest difference from conventional concepts of turning is the flexible windrow width. With every turner, the windrow width becomes a problem sooner or later, the TracTurn has no issues. With its aggressive cutting mechanism, reminiscent of a trench cutting machine, the compost pile is cut easily. Thus, a 7 m wide windrow is simply turned in two passes. Once one has seen the concept in action, a range of possibilities spring to mind!

Sanitization! By moving the windrows across the platform from the entrance to

either the screening station or the final storage, it ensures that finished compost never comes in contact with fresh compost. It also ensures that material, which the turner leaves behind, is not mixed with the product again at the end with the wheel loader. Only the compost which has gone through every turning cycle can end up being the finished product. An additional bonus is the significantly more accurate mixing by the dual functioning turning drum and conveyor belt.

Logistics! The "Great Unknown" in the game that has ruined many balance sheets is the wheel loader hours! It is only a couple of hours here and there! But at the end of the year – a large number. The TracTurn fulfils a dual function. It processes the material and transports from the entrance to the outlet. That is one big difference if you consider that the efficiency of a wheeled loader moving the material will be less than 10 % of that of the TracTurn! A small additional benefit: the TracTurn can even combine windrows. A very special extra benefit is when the last windrow is also the stock pile!

Contracting! Due to the flexible features that it can handle any windrow form, it

can load extremely fast, its towing vehicle goes up to 80 km/h and it can process pretty much any kind of material with high performance - the TracTurn is particularly suitable as a contractor's machine. Besides the multiple options of using the tractor in many other applications, it can be used even without the turner!

Plant throughput! Finally, the question of added value remains! The added value 1 is definitely the increased plant throughput. The TracTurn is more space-conservative than any other product. Of course, the proven triangular windrows with driving aisles can be retained, but the windrows can also overlap to one trapezoid windrow.

The "aisle-free windrow" has proven itself in recent years! With this windrow form, the rapid degradation rate of the triangular windrow is combined with the coveted space used by the trapezoid windrow. The result is throughput, productivity and more effectiveness at the least square meters. This factor gets particular significance when plants have to be enclosed. Considering, worlds of investments lie in between open compost areas and closed compost halls.

More power? More efficiency?

Proven! At the end of the day there is still the discussion whether this is going to be the same tomorrow? The fact is, the TracTurn has already proven itself at

numerous plants for over ten years. The TracTurn is definitely proven in practice and finally freely available to the industry.



The TracTurn easily cuts windrows up to 2.3 m height apart.



Merging of two or more windrows.



Only 5-10 minutes after arrival until the turning begins.



Park, pull up, hook up...ready to go



For more than 10 years, the TracTurn has been used very successfully at this plant. The trademark is: plenty of throughput, high quality compost with little space required and fast degradation performance.



Technical data:

Working width:	3.70 m
Working height:	2.30 m
Turning quantity:	+/- 2000 m ³ /h
Driving system:	from 240 HP
Working speed:	50-600 m/h
Weight:	6,000 kg (without tractor) (18 t to 20 t with tractor)
Transport dimensions:	
	Width: 2.915 m
	Length: 5.2 m
	Height: machine height = 2.62 m + trailer height (provided by the customer)
Windrow form:	trapezoid windrow, triangular windrow, aisle-free windrow



CMC ST 300 – a 20-year success story.



CMC ST 250 turning cattle manure in Tenerife.



Over 600 machines in use worldwide.



CMC SF 200 "The Electronic Baby"

CMC SF 250

CMC SF 300

TA 400

Model	Rotor length	Max. width	Max. height	Transport width	Transport length	Weight	Turning quantity	Turning speed	Driving system
CMC ST 200	2,000 mm	2,200 mm	1,000 mm	1,800 mm	3,300 mm	1,300 kg	300 m³/h/30 HP	~200 - 500 m/h	tractor/mini loader
CMC ST 250	2,500 mm	2,800 mm	1,300 mm	2,200 mm	4,300 mm	3,800 kg	800 m³/h/60 HP	~200 - 500 m/h	tractor
CMC ST 300	3,000 mm	3,400 mm	1,600 mm	2,200 mm	4,500 mm	4,700 kg	1,000 m³/h/80 HP	~200 - 500 m/h	tractor
TA 400	4,000 mm	4,500 mm	2,000 mm	2,500 mm	8,500 mm	4,000 kg	1,500 m³/h/120 HP	~100 - 500 m/h	tractor from 100 HP
TracTurn IV	3,700 mm	optional	2,300 mm	2,800 mm	5,500 mm	6,000 kg	~2,000 m³/h	~50 - 1,000 m/h	tractor from 240 HP
CMC SF 200	2,000 mm	2,200 mm	1,000 mm	1,200 mm	2,600 mm	500 kg	up to 300 m³/h	~250 - 500 m/h	electronic 10KW 400 Volt
CMC SF 250	2,500 mm	2,900 mm	1,300 mm	2,200 mm	3,500 mm	2,000 kg	up to 1,000 m³/h	~0 - 500 m/h	Diesel John Deere 80 HP
CMC SF 300	3,000 mm	3,500 mm	1,600 mm	2,550 mm	4,000 mm	4,700 kg	up to 1,500 m³/h	~0 - 1,000 m/h	Diesel John Deere 125 HP
CMC SF 300 light	3,000 mm	3,500 mm	1,600 mm	2,550 mm	4,000 mm	3,800 kg	up to 1,500 m³/h	~0 - 1,000 m/h	Diesel Perkins 131 HP

All details are subject to change without notice, and not assured.

Alternative fuel production through biological drying

Not all countries can build on a functioning market of finished compost. Regulations in agriculture, lack of application experience in gardening and landscaping pose surmountable hurdles in successful compost marketing after years of lobbying.

To operate a compost plant, both necessary input stream and the marketing of the output product must be guaranteed. Together with the company Trigad s.r.o., a cooperation agreement was concluded in 2008 in order to optimize the COMPOnent aeration system, which in the shortest treatment time, a biological fuel – Energo compost – can be produced. As the starting materials: sludge as well as straw/hay and green waste, only those materials were chosen which are sufficiently in abundance and without direct "marketing opportunity" on the market for waste disposal.



Based on the mixture ratio from the compost experience of the available materials, an attempt windrow of 30 tons material was piled – approx. 24 tons municipal sludge, 4 tons of hay and about 2 tons of green waste.

The aim of the experiment was to establish an alternative fuel purely by biological drying, in the shortest time period, powered by biological heat. The COMPOnent aeration system is the centrepiece of the experiment, since on the one hand, as much moisture as possible has to be carried out, but on the other hand, one has to make sure that the biological process is not "blown out", which would stop degradation and the drying process would only take place with poor effectiveness induced by the electric powered fan performance.



In order to adapt the framework conditions to the "worst-case" scenario, the experiment was started in late October. In just three weeks, the water content of 20.2 tons from the biological degradation process of the initial mixture was reduced to less than a quarter (4.6 tons).



From an energy viewpoint, the negative energy balance (sludge does not burn without an energy supply from the outside) was positive due to the water withdrawal in the biological drying process. The calorific value stood at about 12,000 kJ/kg, which is at the level of low-quality brown coal. The necessary fan power for the experimental windrow was on an hourly average of less than 0.25 kW during the period of three weeks degradation. Similarly, the turning which has to take place twice during the experimental period was energy-wise meaningless – the whole turning time of 10 min corresponds to 0.03 % of the experimental period!

The production of "Energo compost" is an attractive option for bridging the lack of compost marketing options in various countries. It is also a useful way to exploit the quantities of sludge, which due to the direct prohibition of direct dumping, is available on the market at low-price. For the plants in the Czech Republic, Energo compost has already been certified in accordance with the requirements as a certified fuel.

Currently, the planning applications of the first full size plant in the Czech Republic are already in progress – the financing of the plant is secured (the project was judged to be eligible and supported by the Czech Environment Fund) and after completion of the detail design, construction work will start shortly thereafter.

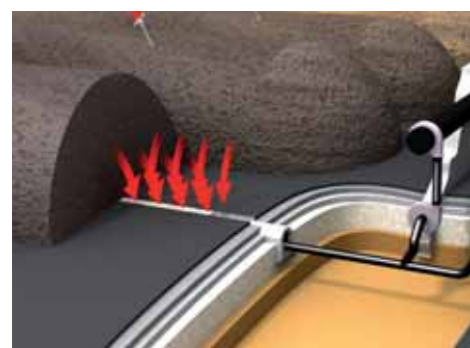


COMPONENT aeration system – Experience from more than 10 years' use

More than ten years ago, the first open compost plants were equipped with the supporting floor aeration system "COMPONENT". The practical experiences and many scientific degradation experiments proved the obvious advantages of aerated windrows compared to the non-aerated composting.

Aeration – oxygen input – gas exchange

As a preliminary note it must be said that the framework conditions for the degradation process have significantly changed within the last few years. With the recent development of the turning technology, much higher windrows are possible. When windrows with up to 1.5 m height were state of the art ten years ago, today more than 2.5 m are possible. In these now common heights (2-2.5 m) the natural chimney effect decreases drastically, which leads to the problem that the oxygen input and the gas exchange has to be done with the turning. Modern turning machines have a common performance of more than 1,500 m³/h (equate to >0.5 m³ material movement per second), which gives the gas exchange and temperature reduction just a short period of time. An additional obstacle is the material shredding and structure weakening because of the frequent turning with aggressive machines and the related increase of oxygen demand due to new surface being created by the turner. The active aeration of the "COMPONENT" aeration system enables the chimney effect in higher windrows. The pressure aeration and negative aeration guarantees an adequate oxygen supply of the degradation material at all times regardless of the turning cycle. Thereby, the turning process is reduced to an essential material mixing only.



Scheme of negative aeration

Comparison of non-aerated and aerated starting mixtures:

With the same starting mixture (starting mixture 1: organic waste + structural material, starting mixture 2: digestate + structural material, starting mixture 3: sludge + starting material) an experiment windrow was set up on an aerated and a non-aerated area. The windrows were turned at the same time, the irrigation started on demand.

Every working day, the windrow temperature and the gas composition within the windrows (CH₄, CO₂, O₂) were measured with a sensitive gas measuring instrument. Periodically, the water content, C/N ratio, organic matter and TOC were measured. Furthermore, odour measurements were done every week to record the odour development within the first four weeks of the intensive first phase degradation.

Summary of the results:

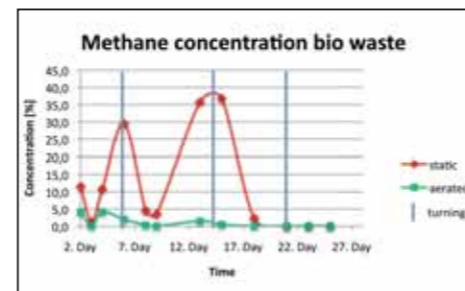
Compost parameters

The aerated material had a far more accelerated degradation progress than the non-aerated windrows due to the excellent gas exchange (supply with oxygen/extraction of degradation gases). In addition, a considerably better water regulation in aerated windrows could be proven. The lower degradation progress and the higher water content in non-aerated windrows explain the nearly 40 % higher screen rate, thus the greater screening ability of aerated windrows. Due to the control of the aeration time depending on the windrow temperature, the temperature of aerated windrows could be kept in the ideal degradation range.

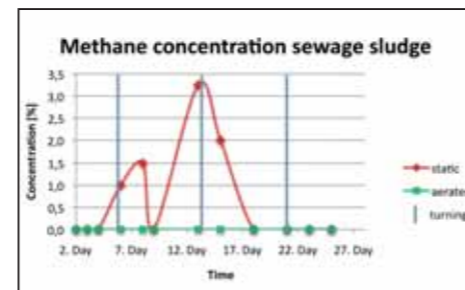
Windrow gas composition

Concerning the gas composition, the aerated sludge windrows did not show any methane contents. By comparison, the methane content of the non-aerated sludge windrows was in the range of 1 %

by volume. The maximum methane concentration within these windrows of 5 % by volume could be observed. In the non-aerated bio waste windrows, an average methane content between 10 and 15 % by volume was measured, their peaks were up to 60 % by volume! With the oxygen measurement it could be shown that the non-aerated windrows had a short increase of the oxygen content after turning, but it was consumed in a short period of time. The average oxygen content of the non-aerated windrows was at 5-7 % by volume, which was half the amount of the aerated windrows. In respect of CO₂, the aerated windrows had a considerably lower CO₂ content (factor 2 to 2.5) compared to the non-aerated windrows.



Comparing methane content of bio waste compost aerated/non-aerated

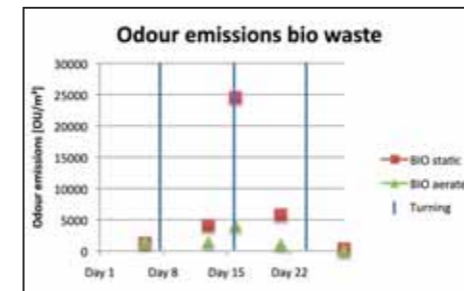


Comparing methane content of sludge compost aerated/non-aerated

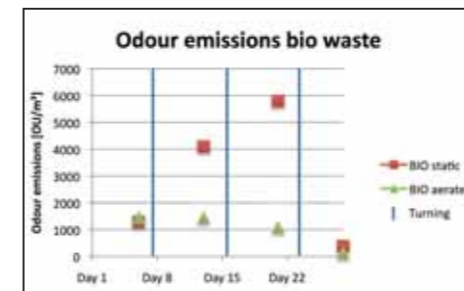
Odour development

The recording of the odour development has shown that the non-aerated windrows had a longer start-up phase at the beginning of the degradation process. Thereby, the odour development was

delayed for about one week, while the aerated windrows started the degradation process immediately and could not show any considerable odour reductions in the first few days. When the non-aerated windrows had reached the process temperature, their odour emissions were about four times higher than the aerated windrows. Especially during the turning, enormous odour concentrations were emitted due to the anaerobic degradation within the non aerated windrows, which showed their whole potential of 25,000 odour units per cubic meter (OU/m³). The average odour emissions of the non-aerated bio waste windrow were about 7,200 OU/m³, whereas the aerated windrow only averaged by 1,920 OU/m³. By the use of aeration, about 75 % of the total odour emission could be avoided.



Including emissions during turning



Without emissions during turning



Collection of the odour emissions over the entire windrow width

CO₂-Footprint

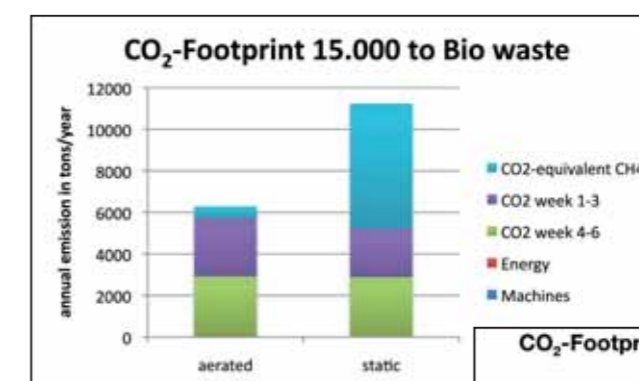
Based on the measured results of the bio waste trial windrow, a CO₂-footprint was created that showed the emissions of the process as equivalents of CO₂. The starting basis for this footprint was a composting plant with an annual capacity of 15,000 t/year of source separated kitchen waste together with green and garden waste. Other factors were the power consumption for the aeration fans and the diesel consumption for the wheel loader and turner.

The footprint shows that the formation of methane in aerated windrows was stopped within just a few days, whereas windrows without the aeration system had an eleven times higher methane output! This leads to an annual equivalent CO₂ emission of 11,238 tons, which is about 1.8 times higher than in aerated compost plants (6,285 tons). With the aerated option, a saving of 4,953 tons CO₂ is possible. By means of comparison: this amount is emitted, when a BMW X3 circles the earth about 720 times. Even a filled up Boeing 747-400 with 400 passengers, that flies 138,000 km, would emit this amount as well. With a

calculated CO₂ output of 11,400 tons, only the combustion is barely higher than the non-aerated composting process. Besides, nutrients like NPK with a value of 1,560 tons equivalent CO₂, which are retained during the composting, would be destroyed in the case of combustion.

Conclusion

The aeration supports the natural chimney effect even in higher windrows. Consequently, a greater degradation progress, a more efficient/earlier screening and a better utilization of the composting and curing area can be achieved at the same time. Due to the low energy demand of the aeration fans, the oxygen supply is much cheaper compared to turning. In addition, the formation of methane and other anaerobic (odour intensive!) degradation products are prevented by a controlled aerobic windrow. As a result, about half of the CO₂ equivalent emissions can be saved.



CO ₂ -Footprint 15.000 to/year bio waste			aerated	static
Machines			37.4 to	37.4 to
Energy			31.8 to	0.0 to
Windrow gas	CO ₂ week 1-3		1,473.0 to	1,212.0 to
	CO ₂ week 4-6		2,850.0 to	2,850.0 to
CH ₄			27.0 to	288.0 to
	CO ₂ -equivalent CH ₄		567 to	6,048 to
Total			6,285 to	11,238 to
Savings through aeration			4,953 to	

The **CMC mobile test kit** is particularly suitable for immediate testing in the field or within the compost site. Easy sample preparation, simple testing methods and fast convincing results provide immediate information and help the practitioner to discern and avoid any error.



Test options: nitrogen (nitrate, nitrite, ammonium), pH (redox), sulphide

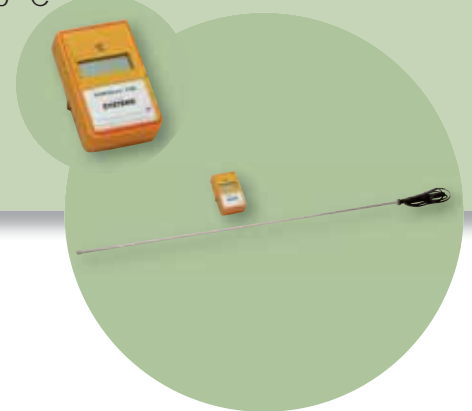
Gas analysis: Through the BREATHING of the microbes, oxygen is consumed and CO₂ is generated. Should the O₂-content fall too low or if the CO₂-content rises too high, then aeration must take place. If not aerated, anaerobic bacteria becomes prevalent, the compost will putrefy, methane develops and high losses are the result. The degradation time is extended, the compost quality minimized. With our easy to handle measuring devices, a quick overview is possible. Due to a special probe, the measured gas is pumped into the volumetric flask. The test result will show immediately!

Test options: O₂, CO₂, CH₄, H₂S, NH₃



An **instant digital display thermometer** is absolutely a compulsory measuring device for every compost facility operator. With the COMPOST SYSTEMS instant thermometer, the expert receives a rapid and accurate overview of his compost heaps.

Test options: temperature from -50 °C to +1150 °C



For further information visit www.compost-systems.com

You have or are looking for a second-hand machine?

Give us your technical data and wishes. We will gladly put you on our contact list. For more information on our second-hand machines please contact Mr. Würzl: a.wuerzl@compost-systems.com, tel.: +43 7242 350 777-14 or on our website: www.compost-systems.com under the heading "compost turner – second-hand".

Compost turning machine **SF 300** windrow width max. 3.5 metres; including fleece roller; year of manufacture: 1993/94; operating hours: approx 5,000



Compost turning machine **ST 300** windrow width max. 3.5 metres; year of manufacture: 1994