Compost Systems

2022 Edition

INTERNATIONAL

COMPO news

The LARGEST BIOWASTE PLANT IN AUSTRIA has opened!

REERDIGUNG
A new path for the final journey!

News from Down Under

Editorial

Aurel Lübke

Managing Director
Compost Systems GmbH

Corona had us in its grip and, in one way or another, it still does. And it has taught us many lessons. We have learned to communicate online. Even fashion has changed along with this. If we see someone wearing a Ralph Lauren button-down shirt in combination with a pair of Bermuda shorts at the supermarket checkout, we spot a typical home office outfit.

While Greta Thunberg is vociferously telling politicians off, each and every one of us is now involved in discussions.

Of course, whether or not masks and vaccinations should be compulsory is open to debate. But fortunately, we no longer need to dispute about avoiding waste, collecting waste or even processing waste. Aside from a few remaining holdouts who would still like to keep using landfill sites and replace them with residual waste incineration in 2050, we are happy to see a broad consensus. The vast majority has realised that we are FINITE – and so are our resources. Not a day goes by without reports about plastic in the ocean, microplastics in food products, food waste and methane emissions from landfills.

Yet only 20 % of the waste generated every day around the world is recycled professionally and in a more or less environmentally friendly way. Still a long way to go for us and our fellows. That's why we will never tire of doing what we are good at: building plants that put the organic part of the waste back into the cycle and feed the non-organic part into material recycling. Ensuring that, in the end, only the waste that cannot be recycled in a better or more environmentally friendly way is sent for thermal recycling.

And so, piece by piece we are fighting to leave our children a clean environment.

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Reerdigung

A new path for the final journey!

At the end of a life's journey, the question as to how the body of a deceased person should be dealt with often arises.

In Europe, deceased persons are traditionally buried either in the ground or by cremation. While the deceased have been buried in the ground and in cemeteries for thousands of years, modern crematoria and urn burials have only existed for about 150 years.

From today's perspective, both ways of laying a body to rest also have unwelcome effects that affect our environment: Under certain circumstances, burials in the ground can impair the quality of groundwater. Cremations cause millions of tons of CO_2 emissions worldwide. In addition, there are questions concerning the costs of burial and grave leasing, or the space requirements of cemeteries in urban environments.

Since February 2022, there is now a third way for the last journey: The Reerdigung!

Supported by funeral homes, faith communities, ministries and the Lutheran Church in northern Germany, the Reerdigung could revolutionize our funeral culture.

On the way to eternity.

In the cycle of life

Compost Systems has developed the Reerdigung process on behalf of *Meine Erde* from Berlin.

In essence, a Reerdigung corresponds to the well-known process in which the shape of a person changes after death: The human body, supported by microorganisms, turns into soil in a short time.

It is precisely this all-natural composting process that Compost Systems uses for its technologically sophisticated, controlled process, keeping aesthetic, moral and theological issues at the forefront of people's minds.

Compost Systems and Meine Erde set themselves the goal of meeting the highest standards for the reverent and at the same time innovative treatment of the deceased, thereby also fulfilling an important social task.

For this purpose, the innovators devised a steel cocoon, similar to an ancient sarcophagus. In this cocoon, the body is bedded on plant materials such as flowers, green cuttings and straw. The cocoon is then sealed and moved to the so-called honeycomb, a wooden enclosure to ensure the resting of the dead. Now the cycle of nature begins - but in the case of the Reerdigung, it is also computer-controlled and monitored at a distance by means of a control system. The automation guarantees that the cocoon does not have to be opened at any time during the Reerdigung.

Within a few weeks, the body now largely decomposes into soil. Almost without energy being required and without environmentally harmful substances being released.

At the end of every Reerdigung is a new beginning.

Technically supported by the innovative work of Compost Systems, nature has created new life from death.

Cocoon and honeycomb: A system that gives nature its space.

Technology helps nature with its work

The revolutionary Reerdigung process of Compost Systems and Meine Erde is good for nature. Once the Reerdigung is complete, natural processes with human help have turned death into new life.

Now the freshly obtained soil can be spread in cemeteries. New life can be planted in the soil. Possibly a tree will grow in it. Possibly a place will be created there to remember loved ones.

Nature is good. From death comes new life.

Even in the largest country in the world, there is not enough space to simply bury waste.

Between the Volga, the Urals and political unrest.

Yegoryevsk and Povarovo, Russia

The Greater Moscow Region is home to up to 20 million people. In spite of military conflicts, the metropolis continues to produce vast amounts of domestic waste, which not only fills the local landfills, but also produces enormous amounts of environmentally harmful gases. The entire infrastructure is constantly being pushed to its limits.

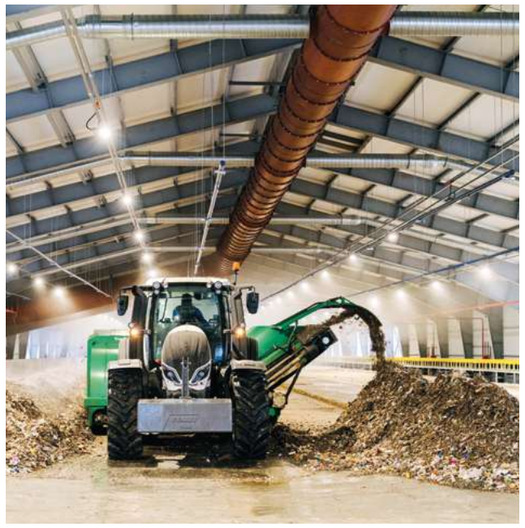
The Eco-Line company is right in the middle of it, not just on the sidelines. A waste logistics company that holds significant market shares in the waste management industry in the Moscow region. With two newly built large-scale plants, each of which processes about 1,000 t of household waste per day, the company has impressed top politicians and administrators with the latest technology in modern waste management. The technology for biological waste treatment and air purification was provided by Compost Systems as a system supplier.

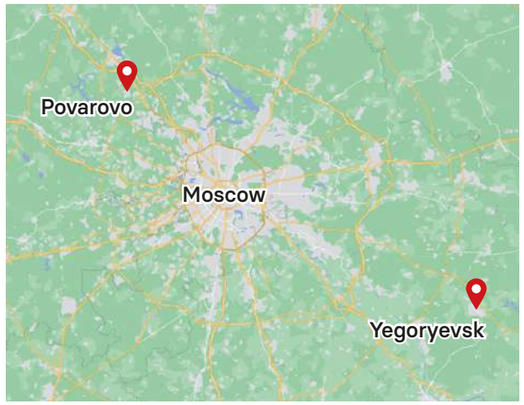
At the Yegoryevsk and Povarovo sites, Russia's two largest waste treatment plants with integrated biological treatment steps for the stabilisation of organic waste and the production of compost and for the recultivation of the existing landfill were built in 2020 and 2021.

Until now, Russia was rather a latecomer in the field of waste management. The recycling industry is poorly developed, partly due to the lack of political will so far, but also to a long and cold winter, which definitely requires new and different recycling strategies than Europe considers standard. This is why, for example, there are very high proportions of glass in the residual waste, much of which ends up in the residual waste bin owing to a lack of infrastructure or a lack of willingness to recycle on the part of the population.

The Povarovo and Yegoryevsk sites will therefore each process about 1,000 t of household waste per day in the future. The screened fractions with organic content will be treated in the section of the plant technologically equipped by Compost Systems. While the newEARTH process is used at the Yegoryevsk plant, the customer at the Povarovo site has opted for the COMPObox process. It should be mentioned that a partially constructed plant from a local supplier already existed at the Yegoryevsk site, but it could not meet the requirements and had to be scrapped after several unsuccessful attempts.

The plant in Yegoryevsk went into operation at the beginning of 2021, while the plant in Povarovo started operation in spring 2022.





Composting sewage sludge in the Vistula Delta of Northern Poland

Elbląg, Poland

Operator:	Waterworks Elbląg
Completion:	Summer 2022
Waste types:	Sewage sludge
Capacity:	20,000 t/year

Scope of supply:
Engineering and Consulting,
Aeration technology, ICA system,
Air cleaning, Box roofs, Door systems,
TracTurn, Screening station

Quite some time ago, the waterworks in Elbląg, northern Poland, decided to make composting part of their sewage sludge strategy. The operator of the sewage treatment plant already has an existing composting facility and has been selling its product under the name DIATOMIX for years.

Finished DIATOMIX compost is particularly recommended for use on light soils with low humus content or for recultivation projects. However, neighbours repeatedly experienced unpleasant odours from the existing plant. In addition, the operator repeatedly struggled with excessively wet piles caused by high precipitation. This, together with very long composting times of up to 6 months, prompted the operator to redesign and optimise the plant. As part of the expansion and upgrading of the existing sewage treatment plant, the project included the modernisation of the composting facility. The aim was to significantly reduce the composting time, to make the facility independent of the weather by installing a roof, and to reduce the odour pollution for neighbouring residents to a possible minimum.

The newly planned plant, with an annual capacity of up to 20,000 t of input material, includes a roofed main composting facility with suction ventilation for collecting the process air in the first weeks of composting, followed by exhaust air purification via a biofilter. In addition, an innovative “cold start aid” for cold or frozen piles was integrated, especially for winter operation, as well as a secondary composting system including compost storage to ensure compost sales in spring.

With a new hygiene concept, the logistics routes were also redefined and a machine washing station was integrated to prevent cross-contamination or re-contamination, thus guaranteeing a hygienically safe end product. A permanently integrated stationary screening unit rounds off the logistical optimisation of the plant.

With the supply of COMPOair ventilation pipes, Compost Systems secures the heart of the process control system, which can be operated as pressure or suction ventilation. At the same time, the ventilation pipe drains off any leachate water that is formed directly in the pipe.

With co-financing from the European Union’s funding for infrastructure and the environment, construction of the plant began in 2021. Commissioning is planned for the summer of 2022.

Biological waste treatment in Slovakia

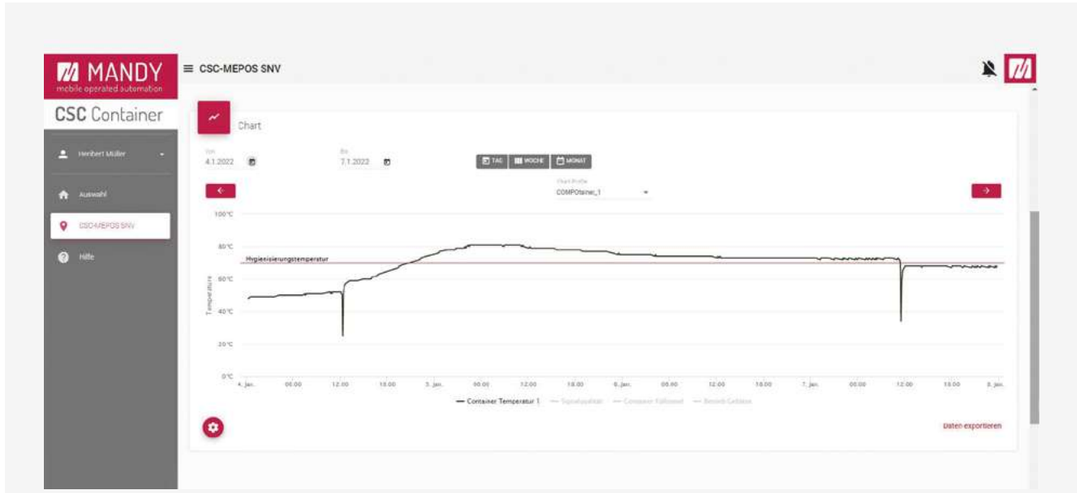
Compliance with the legal regulations of the European Union with regard to the biogenic content of waste involves a great deal of construction activity in Slovakia. To keep transport distances short, decentralisation is being strategically pursued.

Composting separately collected biogenic waste

In accordance with the EU regulations on the separate collection of biowaste, organic waste has been collected and composted in Slovakia since 2016. Since 2021, every household must be connected to the collection system for food waste. The separately collected food waste has to be hygienised as Category III (Animal By-Product) at 70 °C for min. one hour according to the Slovak national regulations. There are two solutions for making existing green waste composting plants fit for Category III material.

Smaller plants resort to the CSC-Container – these units are capable of sanitizing between 20 m³ (approx. 10 – 12 t) or 30 m³ (approx. 15 – 18 t), depending on the design. The container can be easily manipulated and emptied via a standardised hook lift system. A continuous measurement of the temperature in the container provides the necessary verification of the hygienisation temperature. Since the container's exhaust air is treated via membranes, only low emissions are to be expected during this odour-intensive degradation phase. After hygienisation is complete, the material can continue to be processed in the existing plant.

With this system, an existing plant can be easily expanded to treat Category III waste without any construction work.



For higher annual throughputs, the COMPObox system is used. In this system, hygienisation is carried out in a box that is closed with a hinged gate. After hygienisation is completed, the phase in the boxes can still be extended to obtain odour-stable material for further treatment on the open secondary composting system. Exhaust air treatment can be carried out in the box system in a similar way to the CSC-Container via a membrane or via a separate exhaust air treatment system (washbox and biofilter). In 2021, three boxes were added to the existing plant in Dolný Hričov.

In addition, the construction of the composting plant in Kežmarok was started.

Processing of household waste

With the amendment of the Slovakian Landfill Ordinance, as of January 1, 2023, it is no longer possible in Slovakia to landfill waste with a content of more than 5 % (m/m) of organically bound carbon (TOC) without treatment. Operators will thus be forced to introduce a biological treatment step, as is common practice in the EU, to be able to continue operating the existing landfills for bulk waste. Similar to countries such as Poland or Slovenia, Slovakia follows the concept of a classic MBT plant (mechanical biological treatment plant). Likewise, the limits to be met for landfilling AT4 < 10 mg O_2/g DM or GS21 < 20 Nl/kg DM correspond to the European standard.

In 2027, an additional criterion for the calorific value of less than 6,000 kJ/kg DM will be introduced for the authorisation to landfill.

Based on its expertise in the treatment of the "heavy" fraction of MSW acquired internationally over the past 15 years and the broad spectrum of successfully implemented MBT plants, Compost Systems has already signed two construction contracts for MBT plants in Slovakia.

Waste treatment in Greece

Peloponnese, Greece

Deep down in the south of Europe, where Spartacus once lived as one of the sons of Greek mythology – who, as a slave of the Romans, still serves as a role model for Italy's trade unions and who, as a true martyr, stood up to all-powerful Rome. There, where once upon a time the African continent pushed an island onto the mainland, thus turning it into a peninsula. A spot that many Greeks and non-Greeks alike would describe as "perhaps the most beautiful place in the world".

Surrounded by the Aegean Sea and popular with sailors because of its good winds – even those at home enjoy the delicious olives from Kalamata.

But no matter how legendary such a magical place may be, it is not spared the woes of modern development. Modern waste disposal and recycling, for example, has also been a major problem on the peninsula for many years.

Back in 2013, the Peloponnese provincial administration began to address the issue by launching a tender for clean waste treatment. Yet between political bickering and other legal issues, a number of hurdles delayed the realisation of the facilities. It was not until 2021 that the green light was finally given for the construction of three state-of-the-art waste treatment plants. The majority of the waste generated in the Peloponnese will in future be processed at three sites in Tripoli, Sparta and Kalamata. With a processing capacity of more than 200,000 t of household waste per year in the three plants, totalling an investment of more than 150 million euros, recycling will be vigorously promoted and biogas will be produced in addition to compost.

In February 2022, the first plant stage in Tripoli went into operation. This plant will temporarily process around 100,000 t of household waste per year in a simplified process without a biogas stage. At the end of the year, the fermentation stage will also be added.

Archaeological finds are not uncommon in such a legendary area, where the Olympic Games had their origin in ancient times. Such historical sites were also unearthed at the beginning of the construction work in Sparta and Kalamata, which have delayed the planned construction progress so far. By the end of 2022, however, these plants should also be in operation.

Compost Systems, as a full-service provider for aerobic treatment, including waste air treatment, will support the general contractor and operator, Terna Energy, as a subcontractor in the successful operation of the plants for the next 25 years. Our team is looking forward to realising another project with Terna Energy in Greece after the successful project implementation in Epirus in 2018.

Operator:	Terna Energy
Completion:	End of 2022
Waste types:	Household waste
Capacity:	200,000 t/year

Scope of supply:
Engineering and Consulting,
Aeration technology, ICA system,
Air cleaning, TracTurn, Membrane
and Membrane roller

ERDENREICH KREMS - The largest biowaste plant in Austria has opened!

Krems-Gneixendorf, Austria

The Brantner Group is one of the largest waste management companies in Austria and operates several composting facilities in eastern Austria. Compost Systems has been working with the Brantner Group for more than 15 years in the area of machinery, and an aeration system from Compost Systems has been in use at one of their composting plants for the past 10 years.

Conveniently located in the centre of eastern Austria, a composting plant with an associated soil plant is being built next to the established site in Krems. When designing the plant, the focus was always on ensuring high compost quality. Drawing on many years of experience in composting, it was clear that a plant with regularly rotated triangular piles would be built.

Considering the size of the plant, an enclosed configuration is used for the first, odour-intensive 4 weeks of composting, followed by another 8 weeks of aerated composting in the open air.

The optimised process control of temperature, aeration and humidity combined with the highest technical standards in exhaust air collection and exhaust air cleaning make the plant the most innovative and state-of-the-art and, with an annual capacity of 35,000 t of biogenic waste and 10,000 t of excavated soil, it's also the largest enclosed biogenic treatment plant in Austria!

Operator:	Brantner Österreich GmbH
Operational since:	2021
Waste types:	Biowaste, Green waste
Capacity:	35,000 t/year

Scope of supply:
Engineering and Consulting,
Aeration technology, ICA system,
Air cleaning, TracTurn

Composting waste from sewage treatment plants

Sewage waste is the waste that is mechanically separated from the rake upstream of a sewage treatment plant to prevent undesired clogging of pumps and drains in the sewage treatment plant itself. Women's toiletries, condoms and wet wipes are the "top items" among the components; the latter in particular regularly exasperate the sewage plant operators as "pump killers" due to their high tensile strength.

Disregarding the interesting origin of these special input materials and looking at the physical facts from a purely analytical point of view, the self-heating properties and the water content certainly permit biological drying. Equipped with a high water-absorbing capacity due to its original purpose, the waterlogged pile of sewage treatment plant waste must be protected from moisture penetration by the weather during the composting process, and the neighbourhood must be made aware of as few odours as possible from the biological degradation process. So it's obviously a green light for the use of a COMPObox. In five completely closed boxes, the accumulating material is biologically processed for several weeks. The aeration in the soil ensures a controlled oxygen supply depending on the material activity, with sufficient air exchange guaranteeing aerobic conditions. Controlled degradation or stabilisation of the organic matter is ensured. The complete process exhaust air is cleaned via a washer with a downstream biofilter stage.

The plant of BSR Bodensanierung Recycling GmbH is scheduled to go into operation in the second quarter of 2022 and will be able to process approximately 7,000 t per year.

Operator:	BSR Bodensanierung Recycling GmbH
Completion:	Q2 2022
Waste types:	Sewage sludge
Capacity:	7,000 t/year

Scope of supply:
Engineering and Consulting,
Aeration technology, ICA system,
Air cleaning, Box roofs, Door systems

Neuhofen an der Zenn, Germany

Measuring brings facts!

The new legal regulations of the EU states are increasingly based on climate-friendly methods of processing biogenic residues. This includes avoiding unnecessary methane emissions during processing. What is referred to as "slip emissions" in the biogas / fermentation sector is called faulty fermentation in composting.

As is well known, faulty anaerobic fermentation in compost is also associated with a large number of substances that we perceive with our nose as a foul odour. Despite common myths, we do not even smell methane gas, which is 25 times more harmful to the climate than CO_2.

That's why measurement is also an indispensable basic requirement in modern composting. In the past, measuring CO_2 was the simple and sufficient method of monitoring the gas balance in the process. Today, a combined gas measuring device for CO_2, O_2 and CH_4 is regarded as the state of the art.

The fact remains to be mentioned that, in recent years, not only have plant operators become the proud owners of modern gas measuring devices, but also countless experts and inspectors working on behalf of the legislation. In practice, this can be quite unpleasant for an operator.

! Methane is the second most harmful greenhouse gas (after CO_2).

Methane is a serious issue in livestock farming, but also in landfills or in natural gas and oil extraction. A lot of methane is released recklessly and senselessly, especially in fracking. Improper composting can release methane in significant quantities and may well double or triple the CO_2 footprint of a composting plant. This means that monitoring and preventing methane formation is a MUST in modern composting!

! Where do large amounts of methane emissions occur?

Storage sites of biowaste, sewage sludge and other raw materials, as well as compost that was not quite ready and "relapses". Keyword compost storage, initial phase of composting sewage sludge or digestate, mixing intervals that are too long, material mixtures that are too heavy, compost heaps that are too large, mixtures that are too wet.

Large quantities of methane are produced especially during the storage of manure. This can sometimes be more than 50 % by volume. Especially if the manure comes from ruminant animals, which already supply the material with the right bacteria in their digestive tract. However, poultry manure or pig manure can also generate considerable methane emissions.

Aeration system for small windrows

The aeration system was originally developed to support or activate the chimney effect, which is no longer consistently present in large compost windrow heights (up to approx. 2.5 m), and thus to be able to create aerobic conditions throughout the entire windrow independently of the turning cycle. Turning in the main composting phase can thus be reduced to the function of mixing/homogenising about once a week.

With smaller windrow heights, up to approx. 1.8 m, the chimney effect occurs over the entire pile height, but it is necessary to turn the pile at least two to three times a week in the main composting phase so that aerobic degradation conditions can be maintained in the entire cross-section of the windrow.

This turning process, which is necessary several times a week, causes time problems for the operators of small plants, i.e. plants that are usually not operated with a full-time employee. Weather conditions and competition with other professional activities unintentionally postpone or delay the turning rhythm, which is why more and more smaller plants are resorting to aerating the main composting phase in order to reduce turning to the bare necessity of mixing once a week. It is also a benefit in terms of costs, however – the operating costs of the aeration system are significantly lower than the diesel consumption for one-time turning and the investment costs are amortised after a few years through the halving of the turning costs.

Plant examples with small windrows

Biogenic recycling plant Gnam

1,500 t Manure/Green waste, CMC ST 350

In addition to composting, the company also runs an organic farm and an electronics business – so time resources are limited. Composting is the ideal complement to organic farming; the fertiliser that is indispensable in livestock-free farming can be produced through composting.

Alongside their own agricultural processing residues, green waste from the community's citizens is processed into quality A+ compost.

Composting plant Koch

2,000 t Manure/Green waste, CMC ST 300, Fleece roller, Screening station

Betonwerk Koch GmbH is one of the largest concrete pipe and concrete manhole manufacturers in eastern Austria. Managed as a family business, sustainability is not just a buzzword at a shareholders' meeting, but the guiding philosophy of the boss. So the idea of building a composting plant may seem a little outlandish at first glance, but it fits into the picture of sustainable operation alongside other projects such as a large photovoltaic system on the roof.

The operator aims for the highest compost quality, and only raw materials without contamination are used. In addition to green and garden waste, manure and agricultural production residues are the main materials used. The compost produced is refined with additives and marketed regionally as high-quality compost.

Biogenic recycling plant G11

6,000 t Manure/Green waste, CMC ST 300, Fleece roller

G11 emerged from BioMa AG and operates a combined heat and power plant at its site in Gmünd. The idea was to create a symbiosis between a composting plant and a combined heat and power plant. Separating the fine particles (needles, dust) from the forest wood chips delivered to the plant significantly improves the quality of the material. It also produces an input material that is optimal for composting. In addition, green cuttings and agricultural waste are composted – the quality compost produced is thus free of any impurities and is further refined in the company's own composting plant with additives such as vegetable coal to produce high-quality mixtures.

France is finally developing the recovery of food biowaste!

The path of a pioneer.

Vallangoujard, France

At 40, Eric was the successful manager of a golf club in the north of Paris for 6 years, with a beautiful 18-hole course. At 40, Eric realised that his situation was not satisfactory in terms of environmental issues and the future of his children. At 40, Eric decided to create his own company to collect and recycle food waste from schools, shopping centres and households, from door-to-door collection to the sale of a high quality compost.

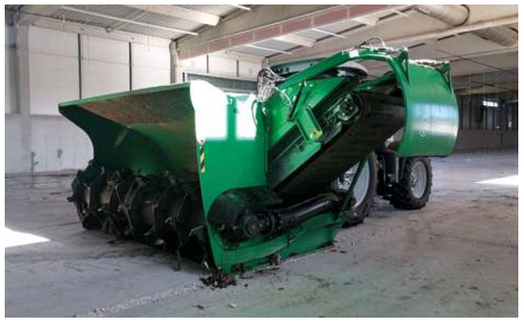
The aim of this entrepreneurial venture was to fill the gap in terms of recycling capacity to avoid wasting the organic matter so precious to soils. Even before processing 1 kg, Eric had already acquired in 2020 his first collection truck, a fleet of 240 l bins, two CSC-Containers for sanitisation and implemented a composting area on an industrial site producing biomass for urban heating. Then he waited nine months to obtain his sanitary approvals from a French administration more attentive to the sanitary crisis than to the management of biowaste.

But Eric knows that by the end of 2023, according to EEC directive and national legislation, all local authorities in France will have to set up a separate management of household biowaste and all large producers will have to use internal tools or external solutions for recycling their food waste production. Therefore, in 2021, Eric has decided not to wait for his business to grow. He has invested in two additional CSC-Containers to reach a processing capacity of 2,000 t/year.

Today, ValOrbioCompost has become a perfect reference appreciated by local authorities' consultancies to demonstrate the technical and economic relevance of local composting of biowaste using the sanitization solution in CSC-Containers.

CGO Bikarac - Composting where others go on holiday!

Šibenik, Croatia



CGO Bikarac is responsible for the disposal of waste from the region around the Croatian city of Šibenik and the surrounding islands with a total of 5 cities and 15 municipalities. Approximately 110,000 people live in this region, and as a popular tourist destination, the amount of waste delivered increases significantly during the summer months. Since the 1970s, this waste has been deposited untreated in an existing landfill at the CGO Bikarac site.

To avoid the landfilling of untreated waste, a mechanical-biological waste treatment plant was built at the south-western part of the CGO Bikarac site as part of the European Union's funding programme. Compost Systems supplied CGO Bikarac with biological stabilisation technology for heavy fractions of household waste and exhaust air treatment in addition to mechanical equipment for turning and fine processing.

The plant went into operation on schedule at the beginning of 2022 and will be able to process up to 1,500 t of separately collected biogenic waste into compost in addition to approx. 40,000 t per year of household waste in a separate treatment section.

Operator:	BIKARAC d.o.o. and Waste Management Center of Šibenik-Knin County
Operational since:	2022
Waste types:	Household waste, Biowaste
Capacity:	40,000 t/year Household waste, 1,500 t/year Biowaste

Scope of supply:
Engineering and Consulting,
Aeration technology, ICA system, Air cleaning,
Automatic temperature monitoring, TracTurn,
Semimobile screening station

Closed windrow composting

Sheltered windrow composting

Open windrow composting

sauber+stark

Composting has been carried out for more than 30 years in addition to the waste material collection centre of the district of Waidhofen/Thaya. A significant increase in the collection rate of biogenic waste made an expansion of the plant capacity urgently necessary – yet there was only limited space available.

With an optimisation of the plant logistics, conversion to a turning system with lateral shifting, installation of an aeration system with exhaust air purification via biofilters, it was possible to almost triple the capacity at the plant location. In addition, a soil plant was built to refine the compost produced into high-quality compost mixtures.

Operator:	sauber+stark GmbH
Operational since:	2021
Waste types:	Biowaste, Sewage sludge, Green waste
Capacity:	8,000 t/year

Scope of supply:
Engineering and Consulting,
Aeration technology, ICA system,
Air cleaning, TracTurn

Waidhofen/Thaya, Austria

Camperdown Compost Company

Camperdown is located in the south of Australia, about 50 km from the Great Ocean Road in the Australian state of Victoria. The operator of the local composting plant, Camperdown Compost Company, has more than 30 years of experience in the collection and composting of biogenic waste.

Owing to the strict COVID-19 entry requirements in Victoria, Australia (recall the 2022 Australian Open), it was not possible to provide on-site support during the entire construction period of the facility. Yet thanks to the recurring lockdowns in the last two years, we were able to actively support the construction of the plant from home, sitting in our pyjamas (due to the night-time hours!). Neither the devastating bush fires of 2020 nor the COVID pandemic of the past few years were able to significantly delay the start of the plant, and the first piles were set up on schedule in the spring of 2022.

For years, the now retrofitted plant had been working with static unaerated compost piles of over 5 m in height in a highly time-intensive process with excavators for turning. The new plant concept was designed for aerated triangular piles that are turned regularly (with a compost spreader), reducing the composting time by approximately 70 %.

The optimisation of the plant process, the installation of an aeration system under the 12 piles of the main composting phase and the conversion to triangular piles with regular turning permit the plant capacity to be doubled with almost the same plant dimensions!

Camperdown, Australia

Operator:	Camperdown Compost Company Pty Ltd.
Operational since:	2022
Waste types:	Biowaste, Green waste, Sludge, Dairy waste, Slaughterhouse waste
Capacity:	50,000 t/year

Scope of supply:
Engineering and Consulting,
Aeration technology, ICA system

Lengel GmbH

Pottendorf, Austria

Lengel GmbH already operates several biogenic recycling plants in eastern Austria. For 15 years, we have been able to support Lengel GmbH with technical approvals for 7 plant applications. The aeration system from Compost Systems has also been successfully implemented at the most recently built composting plant.

After an approval phase of over a year, construction of the approx. 10,000 t plant in Pottendorf began in the summer of 2021. The aeration technology from Compost Systems was also implemented here.

The high groundwater level on the site meant that the area had to be filled in, and only an elevated tank was possible as a leachate water collection tank. After a break in December and January due to the winter weather, the dense asphalt layer of the composting area was laid after the installation of the aeration pipes and completion of the frost layer and the mechanically stabilised base layer in April 2022. This enabled the first biogenic waste to be received at the beginning of the growing season.

Operator:	Lengel GmbH
Completion:	2022
Waste types:	Biowaste, Green waste
Capacity:	9,400 t/year

Scope of supply:
Engineering and Consulting,
Aeration technology, ICA system,
Automatic temperature monitoring

CMC ST 230 - 300 - 350

The classic tractor-pulled compost turner is to Compost Systems what the Golf is to Volkswagen. With over 30 years of experience in the construction of agricultural turners and the practical experience of countless customers worldwide, we have a stable basis for continuous further development, which we constantly incorporate into our models.

The results are clear to see! Robust and durable machines that meet more than the tough demands of composting practice.

Our customers' feedback makes us proud and gives us the impetus to make good things even better. For example, customers tell us that the newly redesigned rotor not only produces 20 % more power, but also requires 20 % less force to do so. Operators tell us that this adds up to a 36 % reduction in diesel consumption! This makes the new rotor design from Compost Systems a great choice indeed!

It's not surprising that Compost Systems turners are particularly stable in price on the second-hand market and still do their job reliably even in advanced age.

Scan to watch videos
of the CMC ST models

CMC Kompostmaschinen Manufaktur

For many years, the company Klein Fahrzeugbau in Altenburg had been one of our regular suppliers of technology. With the retirement of the previous owner Herbert Klein, Compost Systems participated in shaping the future and acquired the company's ownership shares. Since 2021, the company has been operating under the name CMC KompostmaschinenManufaktur GmbH in Altenburg as a subsidiary of Compost Systems GmbH.

There, our dedicated team manufactures composting machines for the international market with loving attention to detail. Starting with the original vehicle construction with its individual character, we switched to a production line for the series production of composting machines. With high depth of manufacturing detail, we are now able to supply our customers worldwide in the compost turner sector from our own production facilities. At the same time, we can still respond to the needs of our customers and offer tailor-made customer solutions.

Maunfaktur / COMPOnews 2022

COMPOnews 2022 / Manufaktur

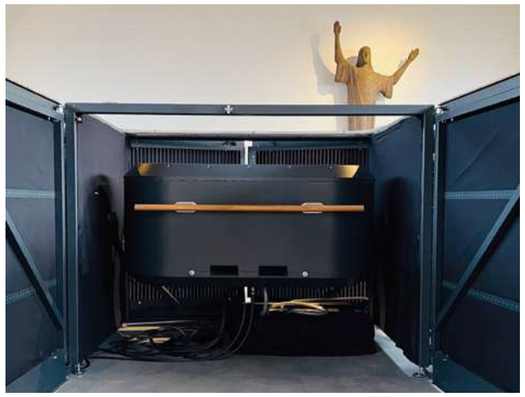
MANDY

Mobile compost pile automation

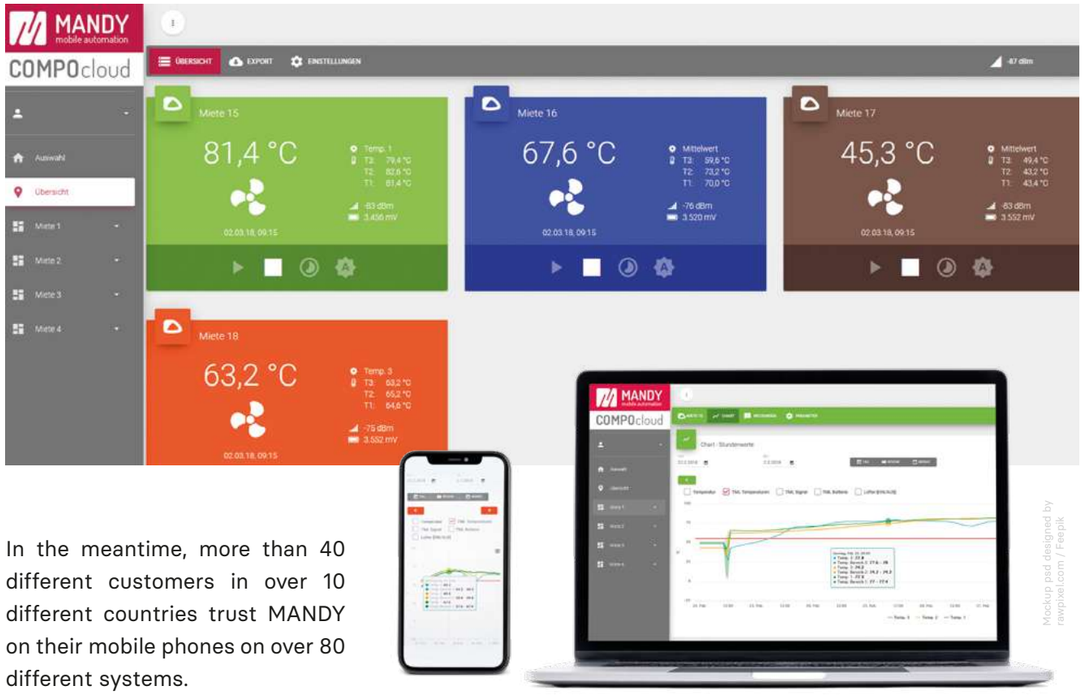
When we presented MANDY as a composting plant control app for the smartphone in 2017, it was still rather uncommon, if not unusual, for this generation of plant operators to have more than one screen full of icons. Today, 5 years later, it's hard to imagine our lives without control apps, from heating to alarm systems and video surveillance.

MANDY, too, has evolved. Originally developed as a control unit for small composting plants with a maximum of 6 actuators, it's now a combined platform where plants with pure temperature monitoring (COMPOwatch), standalone solutions such as composting containers (CSC-Containers) as well as composting plants with an almost unlimited number of actuators can be managed and controlled. In addition, MANDY has already been used as an irrigation control system with pump and tank filling management on a composting plant.

The idea behind MANDY is actually quite simple. The control unit, acting as the brain of the plant, is no longer directly available locally in the form of a PLC, but is located virtually on a server on the internet. The huge advantage behind this: It can be accessed by several people at the same time with any internet-capable device AND significantly lower costs, because many plants can share the costs for control and further development. Different access levels are used to assign different rights, from administrator to operator to guest. Data is further processed via a standard import into Excel.



The latest development is the conversion of existing systems to MANDY. With an operating age of around 10 to 15 years, the life expectancy of the individual components on older systems has already been significantly exceeded, visualisations based on Windows XP are no longer supported, and suitable hardware is no longer available on the market – or only second-hand. The changeover to MANDY offers a cost-efficient solution for integrating and continuing to use existing components such as temperature monitoring systems.



In the meantime, more than 40 different customers in over 10 different countries trust MANDY on their mobile phones on over 80 different systems.

The art of mastering plastic!

Everyone's talking about plastic, from microplastics in toothpaste or sewage sludge to plastic in the sea – but also plastic in compost. In fact, plastic in compost has been a controversial issue for many years, especially after some European countries drastically reduced the maximum allowable levels of plastic in compost. Not to mention that you don't want your customers or your own field to be contaminated with plastic.

Of course, it's a matter of collection. Plastic doesn't belong in the organic waste bin, nor in a compost pile. Yet the composting industry will inevitably have to cope with improperly sorted plastic, especially if the legal requirements for the collection density of biowaste are to be implemented and separate collection penetrates urban regions where, for a variety of reasons, cleanly separated collection will not be possible. The reasons for this range from cultural backgrounds and structural barriers to the protective anonymity within densely populated urban communities. Biodegradable collection aids can indeed simplify household collection and, unlike conventional plastic bags, degrade without leaving residues. Composting facilities that process biowaste will nevertheless always be confronted with interfering plastic materials, albeit now with fewer plastic straws.

So the question is, what's the easiest way to tackle the issue?

First of all, less plastic in biowaste is always better than more plastic. So any acceptance tariff should also be linked to the degree of contamination.

For the remaining plastic, a wide variety of solutions have emerged in the past few decades. One solution, which would undoubtedly be the safest from an ecological point of view, would be to sort the biowaste before each treatment. However, this is very difficult, labour-intensive and expensive due to the physical properties involved. Therefore, sorting incoming biowaste can only be economically implemented if the plant is large enough to justify a costly investment in machinery. For all other operators, biowaste first goes into the mix.

NEVER shred biowaste

This is neither an advantage for the composting process nor for the generation of odours during the first days of the process. Moreover, it is important and essential when it comes to sorting the plastic shreds later on, never to shred a plastic bag into hundreds of small plastic shreds, but to keep it as intact as possible to support later removal processes. If pre-shredding is under consideration, then this should only be carried out by a crusher with very slow speed. High-speed shredders are completely out of place in this context.

Plastic bags must be opened

If the first stage of your process takes place in a static composting system, under a membrane, in a box or simply in another static process, it must be ensured that plastic bags are opened. If the bag remains closed, anaerobic zones would form in the air-sealed space, which apart from hygienisation issues would also raise issues of odour formation.

Gone with the wind

Make sure you have taken sufficient precautions to keep flying plastic from landing on your neighbour's patio. And it doesn't even have to be your neighbour's garden – a cornfield is enough to put a permanent strain on your relationship with your neighbour. Fences help, enclosures are even better. At the very least, it makes sense to cover the compost with a compost protection fleece to protect the plastic on the surface from the wind once it has dried out.

Slowest speed of the turning drum

Unfortunately, there are still a few relics left from the early days, which could be described as the "speed fetishists" of turning technology. They're easily recognised by the high degree of contamination in the finished compost. The argument is that the turner also has a certain shredding effect, allowing the amount of screen overflow to be reduced. Also, the continuous development of "bigger is better" has required higher and higher tool speeds to build up the pile behind the drum to a sufficient size. However, all those who want to make their work with the plastic easy should bear this in mind: The slower the better!

The right time for removal

It's not possible to make a definitive statement that applies to every plant. The decisive factors are the size of the plant, the degree of contamination, the logistics and the availability of the technology. The earliest date is the completion of the hot composting process. Of course, an alternative would be after the maturation process, or even after storage before sale.

How do I take out the plastic?

Technologies exist that convey the entire compost stream via an impurity sorting system. Worth mentioning in this context is air separation over a sorting table, which is well known from grain sorting. However, this technology requires a certain basic investment and is not affordable for small plants. Alternatively, the compost can be screened. Note that the compost must be screened so finely that all (almost all) impurities wind up in the oversize material.

The oversize material is then removed from the plastic using an air classifier. Air classifiers can be combined with the screening process, or they can be used as stand-alone units. Ideally, the air classifier is combined with a magnetic separator and a stone trap.

This solution was developed by Compost Systems for a Bavarian composting community.

The machine can be operated as a stand-alone solution or in combination with a screen. The machine is mobile and can be moved from plant to plant quickly and easily by tractor.

With a capacity of between 10 and 30 cubic metres per hour, it's a great solution for small and medium-sized plants.

For larger plants, a stationary solution is recommended. In this design, impurity removal is always combined with screening.

A combined screening unit with impurity removal for the screen overflow including air classifier, stone trap and magnetic separator.

For heavily contaminated compost or MBT compost (CLO = Compost-Like Output), the only option is to run the entire fraction through the sorting system and remove plastic and heavy materials. These technologies work today with an efficiency of well over 99 %.

What should we do with the plastic?

To go straight to the point, this mixture of plastic, dust and adhesions is basically good for NOTHING. So usually, the only option is thermal recycling. If the proportion of compost and dust is very high (in dry conditions), it makes sense to screen the plastic-dust mixture again before disposal. A windless day is particularly advantageous at this point. Then things should be fine with your neighbour again.

The fine sorting of compost or CLO uses technologies similar to grain processing.

In summary, we can say that plastic will continue to be a major issue in composting in the coming years. Those who have given careful thought to their workflow in due time have a good chance of implementing the right technical solution at their facility so that they can get to grips with the problem of the constant influx of plastic. If you wait too long, you can expect extremely high costs for the disposal of screen overflow, or the screen overflow in the plant cycle will start to accumulate the plastic content until smaller and smaller amounts of plastic inevitably end up in your product. Best to give it some thought in good time.

Leachate water

The underestimated risk!

Leachate water, or the liquid substance known in the trade as ELUATE, which can contain not only nutrients but also germs – and which can also be significantly increased by precipitation – is becoming a real problem for many plants. This need not be the case, provided the issue is not overlooked during the planning stage.

Leachate water is the mixture of press water, i.e. liquid from a waste product such as biowaste, and rainwater, which is carried in quantities corresponding to the local precipitation. Traditionally, leachate water is collected in containers and recycled in the process. At least, that's the plan. However, changing framework conditions always introduce new aspects that make recycling more difficult and, in the worst case, require disposal elsewhere. From then on it becomes expensive.

Animal by-products and pathogenic germs

Even before the Covid pandemic, it was forbidden to introduce leachate water, potentially contaminated with pathogenic germs, into a compost that could not guarantee sufficient hygienisation for the rest of its production period. There is room for debate about the details, but, especially since Covid, every single customer visiting the plant has mutated into a virologist, microbiologist or infectiologist and probably makes a stricter assessment than any veterinary inspection office. The fact is that leachate water can be a potential breeding ground for pathogens. This is why the veterinary officer in charge also has a decisive say in the use of leachate water.

The tank size

A leachate tank must be designed to cope with a major precipitation event. As a result of the increasingly intense heavy rainfall events caused by climate change, a leachate tank can quickly reach its limits. Bigger is better in this case, even if it's more expensive. During the winter season in particular, the need for irrigation water is lower, the tank may already be full, and there's also the possibility of heavy rainfall.

Application on fields

If you're lucky enough to have a sufficiently large field on which the application of leachate water is permitted, you can celebrate. But beware: even here, there are certain restrictions in winter that are regulated by law or simply make spreading impossible due to the accessibility of the field. In summer there may be restrictions that include a certain waiting period from the last application to the next harvest (gracing ban).

How long can I add leachate water?

In general, this is regulated in the national interpretation of the EU Animal By-Products Regulation. The rule is that product that has already been hygienised may no longer be reinfected, and the last application of leachate must be added before hygienisation. In Austria, this would mean reaching at least 60 °C between turning operations for a period of several days and several turning operations.

Leachate water stinks!

Under certain circumstances, leachate water can contribute more to the odour load of a plant than the freshly delivered material. Smart individual measures can be taken to counteract this. The separate collection of highly contaminated leachate, from the delivery for example, and the immediate use of it before decay forms, is one trick to get to the root of the problem. The less we contaminate the tank (Biological Oxygen Demand - BOD) the less we will smell when we use it. Leachate water can actually cause a significant shock load during application. The anaerobically formed decay products get into the air and can certainly spread foul odours that are not always conducive to a friendly neighbourhood.

Ideally, a mini-treatment plant can be installed that drastically reduces the BOD of the eluate and aerobically prevents the formation of volatile odorous substances.

Even simpler solutions, such as an aerating head, introduce oxygen into the tank and thus significantly reduce the odour potential for leachate water.

Sedimentation trap

Especially due to the increasing number of heavy rain events, it should be kept in mind that every such event also cleans the site. With the efficiency of a high-pressure cleaner, the rain washes sand and other solids into the tank. Without a sedimentation trap or sand trap to retain heavy matter, everything ends up in the tank. In this case, a well thought-out cleaning strategy without blocking the operation of the system makes sense. Those of us who are lazy would do well to plan in advance, because with proper planning it doesn't cost a fortune and saves inconvenient, laborious work.

Irrigation

If you want to become the proud owner of an automatic irrigation system, you should pay close attention to corrosion resistance, ease of cleaning and how insensitive the components are to dirt when selecting one.

In addition, bear in mind that the use of leachate water is only permitted in the area of the UNHYGIENISED system. In the area of hygienisation and in the area of compost storage, only fresh water, rainwater and surface water from the hygienically safe plant area may be used. This is an additional argument in favour of plant logistics with pile migration, because otherwise every pile would have to be equipped with clean and dirty water irrigation. If you use a pressure vessel for irrigation, the regulations of the veterinary inspection office (washing out the vessel after use between fresh and dirty water, etc.) must be observed.

Roofing or enclosure

A roof or enclosure significantly reduces the amount of rainwater that mixes with the process water.

In regions with high precipitation, roofing is sometimes indispensable. Although investing in a roof can be expensive, processing a disproportionate amount of leachate water is always more expensive. In this case, it is important that ONLY material that has already been fully hygienised comes out of the hall. This ensures that leachate water in the hall is potentially hazardous or contaminated and that all collected leachate water from outside can be safely added back to the maturation material. This assumes that it is collected separately.

Another point to mention is that a hall or a shelter is an excellent place to install a photovoltaic system and let the sun help pay back the investment.

Selection of the process technology

After a good evaluation of the points mentioned above, it's necessary to make a clean and realistic option assessment.

While small piles need a lot of space, making the issue of leachate water very important, larger piles need to be equipped with active aeration to ensure an optimised and emission-reduced process. Especially given that the biomass boom of recent years has largely made structural materials for composting plants a scarce commodity, mixes are becoming increasingly moist, which significantly reduces the potential use of leachate water. A clean and realistic mass and water balance are essential as a basis for planning.

Active aeration has an additional advantage in that, by setting the process parameters more "aggressively", the evaporation of water can be accelerated. This provides an additional tool for getting rid of excess water.

Sewage treatment plant as the last resort

It's important to point out here that disposal of leachate water in a sewage treatment plant is only possible if there are no disproportionate disposal fees involved. In classic composting, disposal of the leachate water in sewage treatment plants is unthinkable because it's simply too expensive.

If, for unforeseeable reasons, it should nevertheless be necessary to support the local sewage treatment plant, then it should be noted that the acceptance tariffs refer to ingredients such as BOD (biological oxygen demand) or NH_4 (ammonium), etc. So it should be clear that only water that is as lightly polluted as possible can be disposed of well and inexpensively, and it is recommended that the above measures be considered in detail once again. If you are contemplating a fixed connection to the sewer system, an indirect discharge permit would also be required!

Miracle products, additives and magic

Again and again, we are confronted with miracle drugs or sorcery. To summarise, these mainly consist of horse deworming agents, which thanks to the subsiding pandemic have now ended up in septic tanks, or expired homeopathic globules, which, however, may only be added in the potency D3. In other words: over the past few years, we've tried out countless products, tested them and found them to be USELESS!

Of course, all operators are free to convince themselves and form their own opinion, and we would indeed be pleased if we were finally proven wrong.

In summary, it's fair to say that climate change has a significant impact on the formation of leachate water. A good prognosis of the accumulation of leachate water with a good recycling concept is the basis for successful plant operation without unpleasant surprises. In some cases, false economy can wind up being very expensive.

COVERING compost

These days, protecting compost during the production phase and during storage is part of every operator's basic approach. While compost that is too moist is considered unsaleable, it also tends to form lumps and cannot be screened and processed further. On the other hand, compost that is too dry is equally undesirable. The ideal moisture level for composting is between 40 % and 60 %. In the beginning, the range above 50 % tends to be preferable, especially to allow lignin degradation, while in the later phase the composter aims for screenability, which tends to be at 35 % to 40 % moisture.

There are many reasons for keeping one's work safe from elements such as rain or snow. Yet in recent years, compost covers have also become active tools for reducing odours.

Unlike complete enclosures, however, covers with odour reduction only work when they lie on top of the material. Covers are removed during the turning process, ergo the odour-reducing effect is also inactive. Air-impermeable materials are completely unsuitable for use in the compost industry.

A distinction is made between two types of covers:

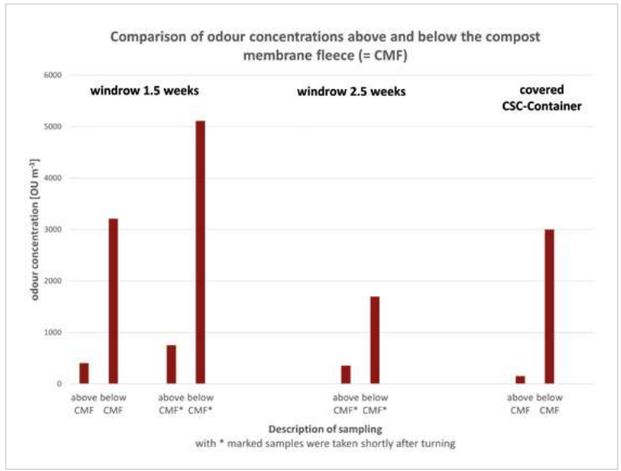
Fleece cover

A cover with an air-permeable material made of polypropylene, known as compost protection fleece. Unless the product is placed horizontally on the compost pile, water is always drained away with the terrain, in the fibre. However, an odour-reducing effect can only be observed in connection with precipitation, which hardly impresses the next-door neighbour of the compost pile, who rarely throws a barbecue party in his garden when it rains.

A cover with a membrane is much more effective in satisfying the neighbours.

Membrane cover

With membrane composting, it's important to note that it can only work in conjunction with active aeration. When it comes to membrane composting, it's crucial to understand that it's not the membrane that retains odours. Instead, it's the condensation film underneath the membrane that absorbs the odours. Membranes come in a wide variety of sizes, weights and permeabilities.



Odour testing setup.

Our NEW solution is a membrane laminated between two layers of fleece.

Fleece, which has already been used successfully in composting for 35 years, is made of UV-stabilised polypropylene. Practitioners know and appreciate its easy handling, low price and easy reparability in the event of damage. Another somewhat more expensive alternative is a laminate made of polyester and Teflon. The polyester version is physically more suitable as a covering for a roof construction, while the fleece brings its TOUGHNESS properties to bear directly on the material. For example, fleece is used to protect landfill membranes because it's largely immune to the effects of sharp objects such as glass, etc.

In any case, it's important to remember that the handling of an endless string of expletives, generally categorised as "cursing", can only be prevented by the use of machines. Membranes and fleece are heavy and dirty, especially in wet weather, and are truly impossible to handle manually.

This is why *Compost Systems* has dedicated itself to the subject for many years and offers a wide variety of solutions to make the job easier in practice. From turner-mounted winders to wheel loader-driven winders with a winding width of 12 m.

Odour membrane laminated between two layers of fleece.

Customers report: Florian Augustin from Finizio

Germany

Finizio - Future Sanitation develops comfortable and future-oriented sanitation systems that enable the waterless collection and efficient treatment of human waste. But what makes Finizio so special is the unique pilot plant for the treatment of quality-assured humus fertiliser from the contents of dry toilets (H.I.T.)!

HYCO, the hygienisation container, aerates the material in the container with only 80 W. This gets many industrious micro-organisms going at full speed, creating temperatures above 70 °C and inactivating all pathogens such as salmonella or E. coli. This doesn't produce any old compost, but humus fertiliser!

TINA THE TURNER (the CMC SF 200 from Compost Systems) is a turning machine that turns the approximately 30 m long piles once a day during the first week of composting. Its task is to optimally homogenise and oxygenate the material.

The end product – the humus fertiliser – is a controlled oxygen-supplied quality compost, unlike conventional compost!

Scan to visit
the Finizio website

Composting with a tractor-pulled machine without a tractor

! TAKE 3, PAY FOR 2! Towing vehicle, wheel loader and compost turner!

A wheel loader with a PTO is the towing vehicle on plants without an existing tractor. This is of particular relevance when used outside the agricultural sector. The perfect combination of towing vehicle, wheel loader and compost turning machine from the CMC ST series. The stepless speed control perfects the package!

Fleece handling made easy!

Every composting plant operator longs for not having to handle the compost protection fleece by hand. With this simple additional device, the fleece is simply left lying on the pile during the turning process and clamped to the guide roller, and in this way the fleece is simply pulled underneath. It's important that the fleece is guided high enough during the turning process so that the gas exchange is not impaired and the heat can also escape well from the core of the pile.

CMC ST 200 - An assembly kit conquers the olive grove

Portugal

Scan to read
the whole story

"It's the ideal that we want to achieve that counts," emphasises Matthias Held, an olive oil producer in Portugal who emigrated from Germany. "On the way to the compost production site, I drive through thousands of hectares of almond monoculture every day, which in recent years have turned whole swathes of land into "green deserts". Then I get on my little tractor and turn 250 m of compost piles. David against Goliath? We're just at the beginning, but the second compost season is already very promising."

In the spring of 2020, the tractor-drawn CMC ST 200 compost turner was delivered as an assembly kit and put together with a metal building professional from Wales, United Kingdom. Held has been running his own olive grove for a year. His overriding goals are: improving the soil with high-quality compost, green manuring and pasture rotation (*holistic management*), increasing the quality and quantity of olive oil production. Compost (approx. 250 m^3 per year, with a strong upward trend) is produced in cooperation with regional partners from cow, sheep and horse dung, shredded reeds, olive leaves and vegetable coal. Production is only possible in the winter months, as the summer temperatures of over 40 °C are too hot.

Compost testing technology

Measuring brings facts! Unless a composting process is continuously monitored, the operator is flying blind. So it's ESSENTIAL that the equipment produces reliable results easily and quickly.

Our measuring programme has been tried and tested for many years. The devices are easy and practical to operate. Our range of measuring instruments is focused on rapid measurement technology for on-site analysis at the composting plant so that the operator can make the necessary decisions quickly and unerringly.

Compost parameters

CMC soil and compost laboratory

The CMC lab kit features easy sample preparation, simple test methods and fast, meaningful results for nitrogen, pH and sulphide.

Temperature

Digital thermometer

With our digital thermometer, you can quickly obtain the temperature profile measured at your composting site.

Windrow gases

Carbon dioxide measurement

The analogue carbon dioxide meter is widely used in practice thanks to its easy handling. Pump, shake – and the gas content can be read off.

Windrow gas instrument

The digital measuring device simultaneously measures the three most important pile gases (methane CH_4, carbon dioxide CO_2 and oxygen O_2), allowing a clear description of the composting conditions.

Visit our website for more information on measurement technology

CMC compost seminar

Knowledge about compost and biological waste treatment.

Our experienced trainers impart their knowledge about compost, soil, plants and the environment, natural laws and their interrelationships based on their own experience and daily practice. In addition, the training programme includes important topics such as material flow management, quality assurance, plant planning, water, mass and air balances or the area of application of compost, soil substrates or compost tea.

For us, it's important to establish a link between theory and practice. This is why practical exercises take place directly at the composting site, where participants learn how to handle process control, conversion cycle, water balance and measuring instruments.

The target group includes not only plant operators, but also advisers, plant planners, compost users, laboratory technicians and anyone who is interested in compost and its effects.

First date: 10th to 14th October 2022
Second date: 9th to 13th October 2023
Please register as soon as possible, as the number of participants is limited!

Scan to register for our compost seminar

Compost Systems

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