COMPOnews

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New version of the proven series CMC ST 300

Editorial

Environmental technology is going to demand our attention intensively in coming years. Without doubt, waste management and sustainable resource management will be of particular importance.

In light of a world-wide shortage of resources, a continuing increase in CO_2 emissions (which briefly dropped due to the global economic crisis 2008-2009) and prognoses that predict an increase of the world population to 10 billion people in this century, the political will to take the necessary steps to make the changes we need in sustainability and resource conservation is lamentably much too limited.

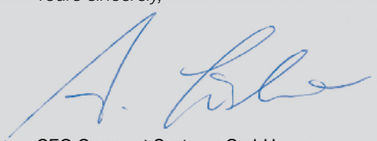
If in the framework of the UN climate goal agreements the big change in the trend was actually discussed, the last fig leaf for the international policy still fell at the latest, since the collapse of the CO_2 emissions trade and exposed the full extent of the impotence and incompetence. The economic self-interests of the great powers are simply too great. And while China and India are growing accustomed to the advantages of automobiles, the coal power plants are being cranked up to maximum output again here in Europe. Not many of the once-ambitious goals remained except for empty promises and declarations of intent.

However, we can still hope that, in the course of the burgeoning financial recovery, forces will once again awaken that see environmental technology not as a cost trap but as an opportunity. A lot of measures can be implemented immediately and with low financial commitments, while others will in fact have quite an invigorating effect on the economy. The potential waiting to be unleashed is certainly enormous.

We can still hope that the politicians in Europe and the rest of the world will slowly come back together and redeem the promises that have, to date, remained empty, with positive actions.

In this sense we thank all of those who fight alongside us for their tenacity to keep the faith even in thankless times - faith in emission reduction, recycling, alternative energy and most of all, faith in those who represent our interests in the world of politics.

Yours sincerely,



CEO Compost Systems GmbH

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Compost Systems in Columbia Control Ambiental Bogotá

Nos permiten presentar.....Allow us to introduce:

David Diaz has been working in compost management for more than 10 years and is operating his own composting plant in Bogotá. Sewage sludge, industrial sludge, green waste, agricultural waste and other commercial waste of organic nature are processed into high grade compost.

David Diaz, CEO Control Ambiental Bogotá

Using a self-founded marketing and distribution company, the compost is then distributed in the whole county. Bogotá is known for intensive rose and flower cultivation. The year-round spring like conditions, which ensure an outside temperature of 20 °C provide the basis for especially successful cultivation.

It is only 6 years ago since David Diaz began composting in classical style with a tractor-pulled turning machine from Compost Systems.

Rose waste being processed into compost

Composting plant owned by David Diaz

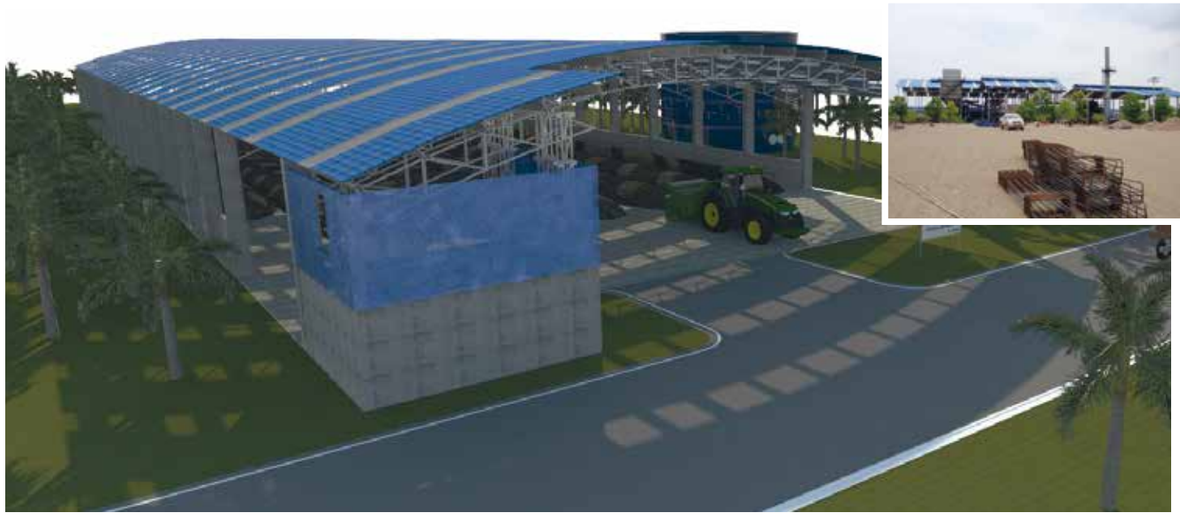
Test and demo plant with the COMPOnent aeration system

Turning machine CMC ST 300

Turning machine TracTurn

David Diaz is now operating more than 18 separate composting plants in contracted operations with several tractor-pulled turning machines. He closes the virtuous cycle for rose growers by processing their rose waste into especially nice-smelling compost which is in turn used for the roses' cultivation substrate. In 2012 the plant was expanded into a test and demo plant with a COMPOnent aeration system. The fully functional demo plant with a processing capacity of 5,000 t of waste per year has since successfully „helped" blending the different available raw materials with each other in the process. In order to further increase the capacity of the plant, a TracTurn compost turner was added. The expansion course of the successful businessman David Diaz is now taking great steps forward. The first external contracts have been signed beyond the city boundaries whilst Diaz as the operator has assumed responsibility for three large plants. Compost Systems is now running at full speed and working on building these three plants.

Each of these new plants will have an annual capacity of more than 100,000 t. Compost Systems is not just the designer but also supplier of the aeration, automation and turning system. In Summer 2014 the plants will start operating at full load. Until then boredom of any kind will be impossible for Compost Systems and David Diaz .



Rendering of one of the plants currently under construction

MBT plant Écorpain

Box composting in Écorpain is, after the plant at Chaumont the second one built with Bioreva as general contractor and Compost Systems as technology supplier. Veolia, the well-known name in the waste handling industry will operate the new plant.

Écorpain lies in western France, ca. 40 km from Le Mans. At the location there has already been a landfill and a simple processing facility for composting. In order to benefit from the existing infrastructure, the old plant was largely demolished. Only the reception area with feed hoppers for mechanical processing was incorporated into the new plant following a general overhaul.
The household waste delivered (around 20,000 t/a) is screened down to 50 mm. After around 3-5 days in the composting drum, the homogenised material is transferred to the composting area. Weekly one of the 4 composting tunnels is filled. The aeration times and irrigation intervals are set automatically by the control system depending on the progress in degradation. After around 4 weeks the material is transferred to the aerated curing area. There 6 more weeks curing time are possible. The exhaust air from the entire plant (mechanical preparation, intensive and curing phase) is conditioned in a scrubber and purified in a biofilter.

The long curing time and the complex post-preparation allow the manufacture of "CLO" = "Compost Like Output" which can be used for re-cultivating purposes.

Operator: Veolia
GC: Bioreva
Construction time: ca. 1 year
Commissioned: 2012/2013
Input: 20,000 t/a MBT 0-50 mm
4 aerated boxes as main reactor
6 aerated windrows as curing area

Composting and MBT plant Pragersko

Slovenia insists on regional designs in implementing the EU-Landfill Ordinance. In Summer 2014 the plant at Pragersko (Region Slovenska Bystrica) will start operation.

Since Autumn of 2013 it has been working industriously in Pragersko in order to process annually 3,000 t of separately collected bio waste and to allow for 3,000 t of mechanically prepared household waste from the region of Slovenska Bystrica to be processed in the future. To keep up with the cost pressure on the waste market, even at these small amounts, the newEARTH technology from Compost Systems is used in the plant in Pragersko. This system combines the advantages of windrow composting (low operation cost) with the advantages of a closed system (controlled emission management).
In each of the 25 m long halves of the hall bio waste resp. MBT material will be processed. In spite of separate waste streams, it is possible to share the infrastructure (exhaust air, biofilter) as well as the devices (wheel loader, turner) and thus achieve the cost efficiency.

The plant should be in full operation in Summer 2014

Construction time: ca. 8 months
Planned commissioning: Summer 2014
Input: 3,000 t/a MBT, 3,000 t/a bio waste
newEARTH system
Turner: TracTurn

Slovenia

Composting and MBT plant Puconci

With the commissioning of the mechanical processing and tunnel composting, a year-long retrofitting into the latest waste treatment facility in Slovenia was successfully completed in CERO Puconci.

It took a long time before the first boxes could be filled. The delay to start construction of the tunnel composting meant that considerably less finance was available for the work. It was also not possible to deviate from the existing construction permit so no changes could be made in the building design. Together with the principal we worked to optimise the originally proposed technology and still meet the new, strict disposal criteria for landfill material.

Thanks to the change from positive aeration in the tunnel composting to negative aeration (a better option for irrigating the material) not only the efficiency was increased but also the quantity of exhaust air was considerably reduced. Through this the exhaust air treatment as well as the aeration system was optimised. In turn this reduced the total electrical demand (and with it of course energy consumption) by over 50 % !

In the MBT curing area the switch from the proposed tunnel turner to the TracTurn turning system increased the area efficiency (no tacking area, no “driving isle” for the vehicle) meant that the number of composting halls could be reduced from 3 to 2. An additional benefit for the operator is that there is a sparel warehouse for RDF material (substitute fuel). Another advantage is that the tractor needed to operate the TracTurn can be used for other work (towing vehicle for sweepers, container trailer, sieve manipulation).

The bio waste curing is carried out on the existing green waste curing area (which was already equipped with Compost Systems technology in 2006). Thanks to the TracTurn’s functionality which is independent of the windrow width, it was possible to save on the existing tunnel turner. This allows a 50 % increase in the use of the curing area. It was possible to adapt the existing curing area to accept the increased input quantities without additional investment cost.

Since February 2013 the plant at CERO Puconci has been able to handle 14,000 t MBT material and 9,000 t separately collected bio waste. 2 tunnels are assigned for a 2-week bio waste process, in the remaining 8 tunnels MBT material is processed for 4 weeks.

As all 10 tunnels have the same equipment, the operation can be adapted to possible variations or changes between MBT and bio material.

MBT material will continue to be composted in both aerated curing platforms to meet the landfill criteria.

After around 6-8 weeks the bio waste from the aerated curing will be screened down to 20 mm and used for agriculture.

The tunnel composting is arranged in a closed configuration so that all the exhaust air can be treated by an acid scrubber and a biofilter. Also the exhaust air from the first curing weeks will be treated through a biofilter on the bio waste curing platform.

CERO Puconci is the first plant in Slovenia (and at time of printing the only one) which meets the stricter Slovenian landfill criteria as of 01.01.2014.

Construction time: ca. 8 months
Commissioned: February 2013
Input: 14,000 t/a MBT material,
9.000 t/a bio waste
10 negative-aerated boxes
8 aerated MBT windrows
6 aerated bio waste windrows
Turner: TracTurn

Composting plant Schabs

With the commissioning of the fifth composting box, expansion phase II is completed. Without interrupting the plant operation it was possible to increase processing capacity by 25 % within two month's construction time.

Operator: District authorities in Schabs

Construction time: 2 months

Commissioned: start of 2014

Input: ca. 4,000 t bio waste and green waste

5 aerated boxes

A possible expansion was already considered as an option during initial planning. The complete plant infrastructure (biofilter, box ventilation, control system and also COMPOtainer) was designed with adequate reserves to allow expansion at any time. The plant primarily processes bio and green waste from the collecting area of the district of Schabs into high grade compost.

After around 2-4 weeks of process time in the boxes the raw compost is further treated on the curing are for 2 more months. After screening the compost is primarily used in landscape design.

Composting plant Neumarkt/St. Florian

Construction time: ca. 6 months

Commissioned: 2012/2013

Input: ca. 2,500 t bio and green waste

3 positive-aerated boxes with membrane covers

The task in Sankt Florian was not unfamiliar to us:

- Replacement of existing aeration systems with state of the art technlogy
- Increase processing capacity
- Reduction of construction cost by using the existing infrastructure
- Use of existing machine pool

The COMPObox technology provides a cost-effective solution. After extending the existing walls it was possible to install the COMPObox construction. The aeration ducts were later inserted into the floors of the boxes. The aeration fans and the control cabinet was mounted and protected on the sides of the boxes. The loading and unloading of boxes is carried out using the existing wheel loaders. For plants of this size, a very efficient and cost-effective solution can be achieved with the COMPObox membrane technology. Exhaust air including CO_2 and water vapour can escape through the membrane. Odorous substances and water are retained inside the box.

Within just 6 months it was possible to complete the general renovation of the plant and put the COMPObox system into operation.

Composting plant Žlutice

Regent Plus completes the production cycle and generates high quality compost from agricultural production waste.

Operator: Regent Plus Žlutice spol. s.r.o

Construction time: ca. 8 months

Commissioned: Summer 2013

Input: 15,000 t of agricultural wastes

8 aerated windrows

Turner: TracTurn

For several years, Regent Plus has been operating a 2,000 hectare organic farm in the Czech Republic. Beside the animal stalls a biogas plant was constructed for generating energy from manure. The waste heat from the biogas plant is used in a fruit drying plant.

To be able to make best use of the accumulating digestate as well as agricultural production waste, a composting plant has been operated since August 2013.

As no „imported waste" in the conventional sense is processed at the plant the final product is completely free of impurities and is exceptionally well suited for producing high-quality compost substrates.

Around 15,000 t of digestate, straw, silage, grass, animal stall manure, etc. are processed into compost at the plant every year. The material is weekly turned with the TracTurn.

After approx. 8-10 weeks of process time the compost is screened down and can be marketed as bagged product.

The plant was designed so that the windrows can be operated in positive or negative (with the biofilter) aeration mode.

Composting plant Kobra

With the composting plant Kobra 3 composting plants are now equipped with Compost Systems technology in a 50 km radius in the northern Czech Republic.

The location in Údlice was perfectly suited for the construction of a composting plant. On the site of a former sand pit all the required infrastructure was already in place and there was also a good road connection suitable for heavy lorries. In addition, excavated soil and sand for subsequent blending are available in sufficient quantity for the planned production of soil substrates. Around 15,000 t of sludge, bio waste and green waste will be processed annually into compost. Sludge and green waste is set up on the 80 m long aerated composting area. Bio waste including bulking material is first sanitised in the upstream COMPOboxes. After 8-10 weeks of process time it is combined with sand and soil in order to produce soil substrates. The exhaust air from the boxes and the first windrows on the curing area is treated in a biofilter. Weekly windrow turning is carried out using a TracTurn, which is also used to thoroughly mix the soil substrates.

The exhaust air from the curing boxes as well as from the first windrows of the curing area is treated using a biofilter.

Operator: Kobra Údlice s.r.o.
Construction time: ca. 8 months
Commissioned: Autumn 2013
Input: 15,000 t sludge, bio waste, green waste
2 COMPOboxes for sanitisation
8 aerated windrows
Turner: TracTurn

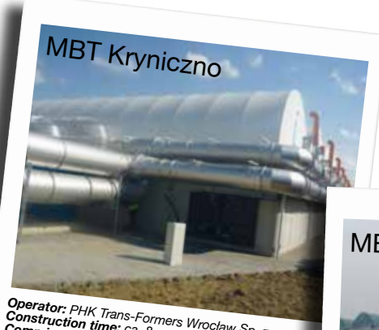
MBT – Market developments and Best Practice examples

2012 was a very important year for Poland. The first reason for this was the Europe Championship in Football. The second was the REVOLUTION in waste management.
To implement the waste materials guideline (2008/98/WE) numerous laws were passed that ultimately resulted in the complete re-structuring of the Polish market.
Communities are now obligated to organise and manage waste collection and treatment. Previously this was done by private companies. Poland has been divided into regions with each region requiring at least one waste treatment facility. These regional plants (MBT or waste incineration plants) must ensure that the waste from at least 150,000 residents is collected and treated. The separation of materials is crucial for increasing the recycling rate. Plastic, cardboard and paper, glass, metals, hazardous waste and green waste shall be collected.
There are precise regulations for MBT plants. The organic content, which is mostly in the fraction 0-80 mm, must be mechanically separated. This fraction must then be treated in a closed reactor (box, hall) for at least two weeks after which the AT_4 value (AT_4 = respiration activity) must be below 20 mg O_2. The plant must be equipped with an exhaust air treatment system as well as a water and leachate collection system (according to BAT, Best Available Technology). After the intensive composting phase the waste should be further treated in an open windrow. The process is considered to be a D8 treatment process (treatment of biological waste for landfill use) meaning that most plants need an IPPC permit (Integrated Pollution Prevention and Control) (IVU-Guideline). Considering the occurrence of waste in Poland (ca. 330 kg/year/resident; Source: Eurostat) a MBT plant must be designed for at least 50,000 t/a. The organic fraction (0-80 mm) constitutes 48-52 % of this quantity meaning that the biological treatment stage of a MBT plant must be built for at least 25,000 t/a.
In a current report (Source: AK NOVA for GOOS XI 2013) it was found that after 2 years virtually none of the plants meet the aforementioned requirements. Of around 120 plants, which were declared as being MBT in 2013, only 35 were classified as suitable meaning that around 70 % of the existing plants do not meet the current requirements. The IPPC regulations were invariably ignored and the plants were operated according to the criteria prior to the decision in 2012. Many plants only completed their environmental certification shortly before the waste guideline came into effect. This allowed them to continue their plant operating as regional MBT plants for the next 3 years (vacatio legis - „transition period“), even if they do not have the required technology and capacity. As a result, we now observe large divergences in technology, capacity and equipment, which lead to very different standards in waste processing.
Considering that at the start of 2015 all plants must meet these requirements, we can expect a huge demand on the market. The challenge is great – the entire market must be analysed, existing plants must be upgraded and planned plants must be built in a short period.

Compost System is ready to meet this challenge – the cost-effective implementation of a complete plant project in compliance with the rigorous legal and environmental requirements. Our experience enables us to plan and operate plants efficiently. Along with the planning of new plants we also use existing plants to minimise the cost for new structure. Additionally our engineering department can provide the required documentation for the EIS (Environmental Impact Statement) to assist in the speedy granting of permits.

Regional distribution of MBT plants in Lower Silesia.
Plants marked in red are plants with Compost Systems technology.

MBT Kryniczno



Operator: PHK Trans-Formers Wrocław Sp. z o.o.
Construction time: ca. 8 months
Commissioned: June 2013
50,000 t/a MBT material 0-80 mm
16 negative aerated boxes
Curing: 6 + 1 aerated windrows

MBT Zawiszów

Operator: PUO Swidnica Sp. z. o. o.
Construction time: ca. 7 months
Commissioned: Sept. 2013
21,000 t/a MBT material 0-80 mm
8 negative aerated boxes
Curing: 7+1 aerated windrows
Turner: TracTurn

MBT Gać

Operator: ZGO Sp. z. o. o.
Construction time: ca. 6 months
Commissioned: July 2013
Phase I.: 27,000 t/a MBT material 0-80 mm and bio waste
Phase II.: 27,000 t/a digestate 0-60 mm and MBT material 0-80mm (added)
6 positive aerated boxes

Schabs, IT

Operator: Bezirksgemeinschaft Eisacktal
Construction time: ca. 4 months, expansion ca. 2 months
Commissioned: 2012 (4 boxes); 03/2014
expansion (+1 box)
4,000 t/a bio waste
5 negative aerated boxes

Puconci, SLO

Operator: CERO Puconci d.o.o.
Construction time: ca. 8 months (expansion)
Commissioned: 2008, expansion 2012/13
9,000 t/a bio waste, 14,000 t/a MBT material
10 negative aerated boxes (2 x bio, 8 x MBT)
Curing: 8 positive aerated windrows (MBT)
6 positive /negative aerated windrows (bio) with biofilter
Turner: TracTurn

MBT Jaroszów

Operator: ECU Sp. z o.o. (Veolia)
Construction time: ca. 7 months
Commissioned: Sept. 2013
42,000 t/a MBT material 0-80 mm
16 negative aerated boxes
Curing: 8+1 aerated windrows
Turner: TracTurn

MBT Rymań

Operator: Sita Jantra Sp. z. o. o.
Construction time: ca. 5 months
Commissioned: Dec. 2013
21,000 t/a MBT material 0-80 mm
8 negative aerated boxes
Curing: 8 aerated windrows

Composting plant Łeba

Operator: Klaeranlage SW „Łeba" Sp. z o.o.
Construction time: ca. 9 months
Commissioned: Jan. 2013
3,000 t/a sludge and bulking material
peaked cover June-August
8 negative/positive aerated windrows
Turner: CMC SF 300

Composting plant Oleśnica

Operator: MGK Sp. z. o. o.
Construction time: under construction
Commissioned: planned early 2014
Input: 10,000 t/a sludge and bulking material
4 negative aerated boxes

Composting plant Lubań

Operator: ZGiUK Sp. z. o. o.
Construction time: under construction
Commissioned: planned early 2014
15,000 t/a MBT material 0-80 mm
4,000 t/a bio waste
5 negative aerated boxes
1 positive aerated RDF drying box
Curing: 6 aerated windrows
4 positive aerated windrows bio-composting
Turner: TracTurn

MBT Chlewnica

Operator: Elwoz Sp. z. o. o.
Construction time: under construction
Commissioned: planned early 2014
10,000 t/a MBT material 0-80 mm
4 negative aerated boxes
Curing: 6 aerated windrows
Turner: TracTurn

Pragersko, SLO

Operator: Komunala Slovenska Bistrica d.o.o.
Construction time: under construction
Commissioned: planned for Summer 2014
3,000 t/a bio waste, 3,000 t/a MBT material
5+1 negative aerated windrows (MBT)
5 positive aerated windrows (BIO)
Curing: 4 positive aerated windrows
Turner: TracTurn

St. Florian, IT

Operator: ECOROTT GmbH
Construction time: ca. 3 months
Commissioned: 2012
2,500 t/a bio waste, green waste
3 positive aerated curing boxes

Ecorpain, F

Operator: Veolia
Construction time: ca. 6 months
Commissioned: 2012
20,000 t/a MBT material
4 negative aerated boxes
Curing: 6 negative aerated windrows

Control Ambiental, CO

Operator: Control Ambiental
Phase I: Construction time: ca. 6 months
Commissioned: 2012/2013
5,000 t/a sludge, green waste
Phase II: additional 10,000 t/a capacity
6 + 1 positive aerated windrows
under construction
Turner: TracTurn

Žlutice, CZ

Operator: REGENT PLUS Žlutice spol. s.r.o.
Construction time: ca. 6 months
Commissioned: 2013
15,000 t/a digestate, green waste
8 negative or positive aerated windrows
Turner: TracTurn

Kobra, CZ

Operator: Kobra Údlice s.r.o.
Construction time: ca. 7 months
Commissioned: 2013
15,000 t/a bio waste, sludge, green waste
2 negative aerated halls
2 negative aerated windrows
6 positive aerated windrows
Turner: TracTurn

Airtight hydraulic doors

Reception hall

Biofilter

Box ventilation

COMPOtainer, the prefabricated blower station

Corrosion-resistant metal construction

Air conditioning

COMPOair S aeration duct

Concrete wall three to four meters high

Wireless process monitoring probes

Computer controlled irrigation

Condensate knockout pot

Main control station for computer monitoring

Ryman, Poland

Box composting with aerated maturation

Machine technology

TracTurn - Around the world

Compost Systems has now been marketing the TracTurn compost turner for four years and in so doing has developed a market niche. To date more than two dozen machines have been produced and delivered and the benefits to the users have became clearer and clearer.
Thanks to the new generation of tractors above the 200 HP level, which many manufacturers tout as TOP workhorses, the TracTurn is supported by an existing industry, which can respond much better to customer service needs than a manufacturer of a niche product would ever be able to, especially internationally. So the focus for Compost Systems` development can be on turning technology and leaving engines, hydraulics, chassis, cabin, etc. to the respected manufacturers of the latest modern farm machinery! "Good things take time" goes the old saying. An intensive period of development and refinement lies behind the TracTurn. In recent years it has been possible to reduce wear considerably and simultaneously to increase the turning performance. In the meantime the turner is used in the widest variety of applications, for example in drying bark with biosolids.
As before, the uniqueness of this turner lies in its use of space. No other turning machine we know of can turn more material on the same amount of space. Thanks to absence of the "driving isle" and the lateral cutting units, nearly every shape - triangle or trapezoid shape, 3 m or 20 m width - can be turned.
The only limitation lies in the height of the windrows, which is restricted by the driver's vantage point but the maximum windrow height of 2.3 m is also the limit for successful bio-degradation of the material in dynamic composting systems.

TracTurn at around 3,800 operating hours in only 18 months

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 "Machine Technology – Second-hand machines".

Compost turner
CMC ST 300
Year of construction: 2014
Price on request!

Compost turner
TracTurn
Year of construction: 2006
ca. 3,500 operating hours
Price on request!

Willibald TBU 3P
Year of construction: 2006
Weight: 4,000 kg
Turning performance: ca. 300-500 m³/h
Price on request!

CMC ST 300 - the logical consequence

With the new version of the proven series CMC ST 300 Compost Systems presents a complete re-design after 24 years, not just a facelift.

On September 19th, 2013 Compost Systems officially presented the new tractor-pulled compost turner CMC ST 300 at the equipment demoday of the Austrian Composting Association. The new model does not just have a new paint job, but some very important technical innovations.
The turning rotor has completely been re-worked to give “more output, less wear”. Likewise the complete frame construction has been made considerably more warp-resistance and robust in the new model. The new design of the rotor tunnel has received very good feedback from operators. Thanks to its new conical shape it provides the material being pushed out a lot of room and allows the rotor to do its work unhindered. Also interesting is the fact that the rotor now needs a lot less power and thus can be operated with around 20 % less speed – in the sense of material protecting turning.
Consequently diesel consumption reduces by around 15 % even with the 20 % performance increase, wholly in the keeping with the intention of saving energy.
Production for sale has started and the first machines were delivered at the beginning of 2014.

CMC SF 300 MD

2 years ago the new generation of the CMC SF 300 MD was unveiled for the first time. It presents a continuation of the successful history from the 1990’s.

The basis for this turning technology is the fact, that windrows with more than 3 m width and a maximum height of 1.5 m can only remain aerobic using either active aeration or very high proportion of bulking material which has become a scarce in recent years due to the biomass boom.
With a new rotor driveline and a powerful caterpillar drive the CMC SF 300 MD was improved to meet the needs of our customers. In the spirit of the saying “It’s good when it gets better and the price still fits!” the rotor drive in the new model is directly driven by a PTO shaft as in tractor driven machines, that means that the rotor speed is no longer controlled by the hydraulics but by the engine RPM. So for fresh windrows the throttle lever is pushed more forward, while in the case of half-finished or finished ones the drive motor is kept just above idle.
The facelift presented in June 2014 is also wholly new. Although the basic principle remains the same, the new series has some added technical details. The machine also has the new model of the turning rotor with that the new CMC ST 300 achieved new levels of performance. The rotor tunnel also has more clearance at the top and was increased in size by around 20 cm. The drive shaft was expanded with an automatic clutch governor, which provides a lot of operational safety and most of all ease of operation. All in all the CMC SF 300 MD remains a real bargain in terms of price-performance ratio. This does not just refer to motor performance. With a turning output above 1000 m³/h and a windrow cross-section of 3.5 m² the turning machine really lets performance-freaks get their money’s worth. Finally, we should emphasise that the most important thing is still looking after the compost windrow (oxygen supply, perfect mixture) in order to achieve the best composting results and here the CMC SF 300 MD is definitely in its element.

Membrane composting

Membrane composting is a technology which is meant to simulate a closed system in static reactor units by means of semi-permeable membranes, where the membrane also takes on the odour reduction functions.

Again and again, this technology can cause a fair amount of uncertainty with the Town Planning and other Regulatory Authorities, but also among controlling agencies in various countries.

How does membrane composting work?

Most membrane systems are static reactor units: No regularly turned windrows in more or less large reactor units. Principally of course there is nothing opposing dynamic turning processes, but the rather extensive manipulation and the process admittedly exclude per se a dynamic composting with repeated turning each week. The process is always linked with active aeration. The air permeability of the membrane alone does not suffice to provide adequate oxygen, but it must be 'forcibly aerated'. Here it is important to make sure that the air supplied may never exceed the air permeability of the membrane because the membrane would in that case "lift off" and the air would escape. The aeration process is controlled via the temperature or oxygen measurement.

Originally the plan was to save on expensive roofs with this technology. However, it has been shown that many plants have to be covered, in some countries even completely closed. The membrane serves the purpose of odour filtration and heat retention in order to create a more homogenous temperature in the windrow. It also should prevent rain from penetrating the compost material. There are always some questions that we get from planners, operators and authorities. Since Compost Systems is a provider of such systems, we note that we have neither an exclusive claim to this Know-how nor do the explanations and disclosures below have a claim to completeness.

Variant 1: Membrane lies directly on the material.

Variant 2: Drive-in silo with fixed membrane

Variant 3: Box system with integrated membrane cover

Loading and unloading the box without removing the membrane

Is membrane composting a closed system?

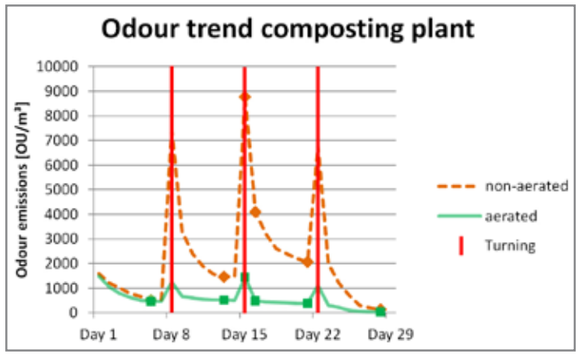
Basically there are 3 currently known and available variants. With **Variant 1** the windrow is placed on a level surface and then covered with the membrane. **Variant 2** known as the "drive-in silo" has the material to be composted put into a tunnel with higher or lower side walls and then covered with a membrane. **Variant 3** is slightly different with the membrane integrated into the tunnel or box roof. The membrane remains constantly fixed on the structure and is not moved during filling, unloading or turning. In this variant it is important that the doors are built to be airtight.

All three systems are in principle closed systems as long as the membrane stays on or the end door is closed. Of course when new material is added or material is transferred to the next processing step, the door must be opened or the membrane removed. This is a special disadvantage as when the material is moved, the greatest emissions are generated.

In some cases the exhaust air of composting halls show up to 200 times the load of bio-aerosols than it is found in normal fresh air. If however the composting material in a reactor hall is moved with machines, the quantity of bio-aerosols can increase by up to 100-times and easily reach 100,000 to 200,000 cfu/m^3 (colony forming units). The situation is similar with odour emissions. Air from a windrow generally has a load of approx. 10,000 to 100,000 OU/m^3 (odour units). This corresponds to around 20 to 200-times the units that the TA Luft in Germany prescribes as the upper limit for acceptable emissions. If this air is released during the turning process, then clearly the membrane has no ability to control the emissions. Of course the closed box has certain advantages here but in the absence of box ventilation and a biofilter, escape of bio-aerosols or odours through the door cannot be excluded. A recent trend for trying to keep the emissions in the box by using a rapid opening door and immediately closing the door after each bucket full is removed indicates a severe misunderstanding lacking in practical relevance.

If emissions such as water vapour do not escape from the box, sight will then be basically ZERO after the second scoop and continuing the work with heavy equipment in the box is prevented for technical safety. Complete enclosures are also both in demand and necessary for sanitation purposes. If raw material is being composted, that requires a permit in accordance with the criteria of the ABPR (Animal By-Products Regulations) then in many EU member states the waste acceptance and treatment must be fulfilled in a closed system through to the end of the sanitising phase. Here the question remains: How is setting up and turning the windrows possible in a closed system and how can rodents or other vermin be kept away from the raw material? For this reason the detailed requirements need to be clarified in advance with the relevant veterinarian's office in order to avoid uncomfortable surprises later. We should also mention that gradual ageing of the membranes will increase the chance of mechanical damage. Once there is a hole in the membrane the closed system is lost because the excess pressure from the aeration fan will drive the process air out of the windrow like a chimney.

To sum up, one can really only talk of a closed system if a closed hall is actually provided and all treatment steps occur in that closed hall. Membrane technology as described above can only really deliver a partially closed system, in which the periods when the membrane is not in position can possibly be the most odour-intensive of all plant operations.



The highest odour loads occur during turning. Exactly in this moment the membrane does not prevent the emissions.

Process air escaping through a hole in the membrane.

Research and development

How long is the lifetime of a membrane?

This is where the manufacturer's warranty is paramount. Normally, an operational lifespan of around 5 years is guaranteed, where the guarantee is always only applicable to UV resistance and tear resistance. If a membrane is mechanically damaged, e.g. by glass, metal or other foreign bodies, the manufacturer's warranty is generally voided due to external damage. The manufacturer also normally refuses every guarantee and warranty if the cover is damaged during rolling or unrolling (e.g. if the membrane freezes to the ground in the winter).

How does the biology in the process work?

Basically one could assert that the biological processes under a membrane proceed in the same way as they do in other systems. Here too, bacteria are responsible for breaking down material. The expansion of the heating core to the outer edges should work especially well since the membrane provides a certain thermal protection and this has been observed in practice. This, however, means that the process temperatures can at times become too hot (90 °C and higher have already been observed). Admittedly this has very little to do with any microbiological process. The fact that every membrane has limited air permeability must also be kept in mind. The air permeability and therefore the process cooling cannot just be increased, since the membrane would then be overloaded. In practice, a 1 to 1.5 times air exchange is required. If the biological process is running well, though, considerably higher air exchange rates can be necessary and the membrane can rapidly turn into a bottleneck. Please also note that this is for pure positive aeration. It also means that there can be excess drying directly above the air outlets. This dry zone will then gradually move outward. This means that homogeneity of moisture in the material can only be ensured by turning. Whether a 3-week turning cycle by unloading is adequate or it should instead be shortened to meet process engineering requirements, must be checked in each specific case. Due to the preparation of the material for a static process, it is also recommended that adequate bulking agent is incorporated, since the options for improving the air flow during a static system are limited. In respect of curing time, the process takes up to 50 % longer as a rule. Whereas in static reactor boxes the material can be released to curing after around 4 weeks, membrane systems need around 2x3 weeks processing time to achieve a similar degree of decomposition.

How is the cost situation?

A simple answer here would be wrong! The right answer of course depends on a great number of factors. Basically some savings are possible thanks to a potential reduction in construction cost. However, if a hall or roofing is planned for a solution with a membrane, the savings are rapidly used up.

The membrane solution is made especially attractive by the fact that the biofilter can be saved. This means however, that no additional exhaust air streams can be treated, e.g. exhaust air from the hall or the reception. The membrane solution becomes really expensive if the system must be kept in a closed hall in order to ensure a closed system. It should also be considered, that replacing the membrane every 5 years can be very expensive. In terms of operation the technology has very low energy cost because the fans are very small and have a low energy consumption. If turning is required it's a different story, one which can be very labour-intensive since one needs to move the membrane. In winter time handling frozen membranes can quickly lead to frustration for those doing the work. Here the solution with the membrane as the roof of a box has shown definitive and significant advantages and proven to be considerably easier to operate. We should also mention that the restrained biological process and increased need for bulking material also increases the need for space, which is linked to higher investment cost.

Leachate can flow out from the sides of the membrane. This water can in certain circumstances cause higher odour emissions than the windrow itself!

How is the odour situation?

As already mentioned, one can only refer to closed system if the cover is also on top of the material. This means that there is no protection of any kind during turning, setting up and screening. If, however, the membrane is applied to the material or the box is closed, the odour filtration is very good in our experience assuming that the membrane is very well sealed along the edges and there is no damage. We should also mention here that adding sufficient bulking material is absolutely necessary because accumulating leachate water can flow out from the sides of the membrane. This leachate water can in certain circumstances cause higher odour emissions than the compost windrow itself.

Summary

Based on our experiences membrane solutions can certainly be justified and be used in daily practice. In certain cases this can also save investment cost. One should however make sure that all cost are taken into account, because the supposed savings can rapidly turn out to be cost traps in reality or just be completely divorced from practice. Where a membrane is deemed a true closed system or not depends on national regulations. In making arrangements with the neighbours, one must give them fair warning that there is no protection from the emissions when turning or handling the compose and in odour-intensive periods. Climate conditions must also be taken into consideration. The colder it gets, the harder the operation is during winter months. The increased need for space may not be omitted from calculations. The high process temperatures during the process are a question of taste. When composting bio waste, they are generally undesirable but play a subordinate role in the treatment of residual waste, as long as the landfill criteria is met. We thus recommend to check any case in detail. Often a pretty façade conceals what comes later. In suitable cases and under adequate legal framing conditions, a membrane solution can definitely be efficient. But not always!

Technology search in Tunisia

Tunisia has, like most countries in northern Africa, a problem with unlicensed landfills and their attendant problems.

In Beja, a city in the north of Tunisia, a landfill has been built to western standards for years already. Now the plan is to test optimised pre-treatment of residual waste to western standards in order to improve operations at the landfill and reduce emissions. Various technologies for optimised pre-treatment of household and/or residual waste will be tested under the framework of an international research project that is largely financed by the German KfW. Compost Systems has been selected as the supplier for process engineering for the test plant in an international call for tenders.
Essentially this deals with all process aeration including the process controls, turning system and various covers as rain or emission protection.
The project, which will last around 1 year, will test various treatment procedures to determine their various advantages and disadvantages. Several universities and research institutes will collaborate as supervising organisations, collecting and evaluating the relevant data.
The results should be available in early 2015 and provide important benchmarks for northern Africa. We are pleased to work on the project and apply our expertise.

Load capacity of concrete aeration pipes

For a person who is not a structural engineer it is often difficult to imagine what the fact means, that our aeration pipes can withstand a peak compression force in an uninstalled condition of more than 180 kN/m acc. to NORM 85074:2012 (EN 1916:2008).
To better present this information we considered a simple test structure: The concrete aeration pipes are placed on a gravel surface (not 100 % level and compression degree < 100 %) without lateral packing (simulation of a ,,worst case“ installation) and then driven over with various heavy equipment.

Test 1

Test 2

Test 1: *Driving over the aeration pipe with a wheel loader*
In this test a wheel loader commonly used in composting was used to simulate the manipulation. The wheel loader was ballasted so that the vehicle weight (around 13 t) plus an added weight (ca. 3 t) only affects the front wheels so that a load of 8 t is reached on each front wheel.

Test 2: *Driving over the aeration pipe with the heaviest equipment*
The heaviest equipment we had was a 44 t excavator. Loading it with a 2 t concrete block with a fully extended extension arm it was possible to achieve a concentration of ballast weight on one side of 33 t (16.5 t per wheel). For a better sense of scale the „conventional“ wheel loader used in test 1 is also in the picture.

Summary: The tests clearly show that the aeration pipes can be driven over by any equipment used on a composting facility without any problems. The test protocols from quality supervision show that it would take equipment weighing twice that used in test 2 to reach breaking load of these pipes. A video of the test can be viewed at:

The mystery of „Compost tea“

Some of the most unbelievable stories about compost tea have been making the rounds in the composting scene for years. Compost Systems started an Austria-wide field experiment with a kick-off-seminar.

Compost tea, a liquid extract of compost, has a number of positive effects attributed to it. According to reports from experienced professionals, compost tea stimulates growth and prevents disease in plants, stimulates the soil metabolism, has fertilising effects and improves the shelf-life of fruits and vegetables, etc. The important thing is using high-quality compost.
The Austria-wide initiative „Compost Quality” began with the Seminar „Compost tea“ on February 26th, 2014 in the Francisco Josephinum in Wieselburg. Uta Lübke, who has 40 years of experience in compost, gave a presentation on what someone has to pay attention in order to produce compost. Ton Van der Lee, a successful user of compost tea for 15 years and expert from Holland, explained the topic of ‘compost tea’ and its uses to the participants in the seminar.
The Austria-wide project „Field test Compost tea“ was also introduced in this event. In this large-scale parallel test the effects of compost tea on various plant cultures will be tested through the entire Austrian agricultural landscape. Compost Systems is providing quality-assured compost tea for practical tests at several different locations. To ensure that the effect of compost tea is representative, one and the same CMC compost (controlled microbial composting) will be used for compost tea production at all locations. The field test will be monitored and executed in collaboration with Austrian research institutions and international experts.

The CSC-Container:

Collection and storage of organic waste plays an essential role in the composting process. For that reason Compost Systems has developed a collection, sanitisation and composting container.

Collection and storage of organic wastes plays an essential role in organic waste treatment. Odour problems and poor process conditions that are caused by lack of oxygen present challenges for waste management operators. In the case of waste containing meat, which is included in Categories 2 and 3 of the ABPR (Animal By-Products Regulations), sanitisation in a closed reactor and a sanitisation proof are required in most EU countries. For this reason, in the framework of an academic master thesis by our employee Roman Lugmayr, the CSC-Container (Collection - Sanitisation - Composting) was developed for decentralised waste treatment. The technology for the CSC-Container was derived from our long-proven COMPOnent aeration system. To prevent odour emissions, the container is equipped with a semi-permeable membrane. Other logistics and documentation tools were integrated and tested in several experiments with different input materials and process times.

Collection - Sanitisation-Composting

Gas measurements

Partially anaerobic waste was deliberately used, producing high methane concentrations at the beginning of the process (CH_4 11 %[v/v]; CO_2 30-45 %[v/v]). Using the active aeration, the anaerobic milieu was switched to aerobic in one single day. CH_4 stayed below the detection limit for the entire duration of the test. The other windrow gases were always in the aerobic range (CO_2 < 12 %, O_2 > 7-12 % [v/v]).

Process control

The automatic temperature control keeps the temperature constantly at the prescribed sanitisation temperature so that sanitisation is achieved in the first two weeks of curing. The odour emissions associated with the intensive phase could be reduced with a semi-permeable membrane by more than 90 %.

Mass loss

The active composting process releases a lot of water as vapour along with CO_2, which leads to a process-based mass loss. In the case of bio waste with/without irrigation a mass loss of 40-50 % of the input mass over 4 weeks was measured. Tests with MBT material showed a mass loss 30-40 %. With MBT material the loss of mass depends particularly on the organic content and the input moisture of the material.

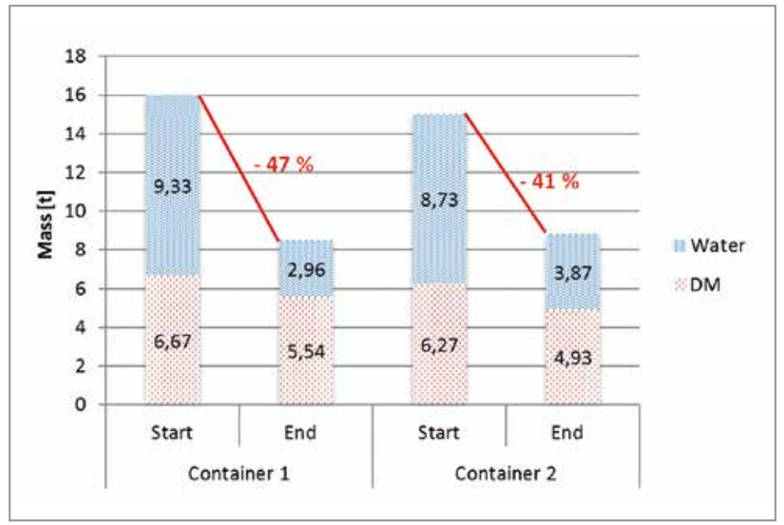
Independence from location

The integrated GPRS-tracking module makes it possible to use the CSC-Container at any location. The location and current process data can be accessed via PC or tablet anywhere and anytime using a web page.

Summary

The CSC-Container optimises de centralised treatment of organic waste. Aerobic process conditions, avoidance of odour emissions and optimised degradation during the composting process are delivered with this container. It also provides completely automatic sanitisation documentation which is available online and can be downloaded at any time. This makes the CSC-Container an ideal logistical tool for waste management.

Sanitization monitoring according to the Animal By-Products Regulations



The mass loss identified in the test for bio waste lies between 40 and 50 % (process time 4 weeks).

Paper chromatography *by Dr. E. Pfeiffer*

Paper chromatography is an easy way to assess the quality of compost.

The saying “Not all that glitters is gold” is unfortunately also applicable to compost. The appearance of the compost does not allow to assess its quality. Parameters like pH value, nitrogen content, etc. may provide a quick indication but to get more details about the condition of the compost, paper chromatography using the method of Dr. Ehrenfried Pfeiffer helps.

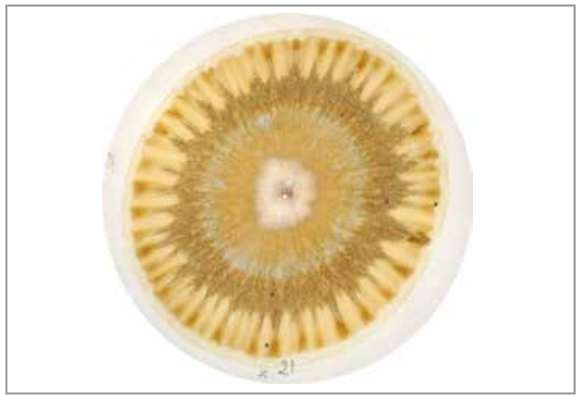
In chromatography, molecules that are dissolved in a liquid are separated by size. The dissolved sample is placed on filter paper and starts to „run“.
The smaller molecules run farther than the larger ones. Over time this produces a compost-specific image on the filter paper (chromatogram).

Chromatography is an easy way to achieve assessments of the quality and process control. Materials that are produced by microbial activity, the progress of the compost curing process as well as unwanted developments such as excess moisture or overheated process control quickly become visible in a paper chromatogram.

However, it is important that the chromatogram is interpreted by an expert with experience so that no incorrect statements are made.
The measurement of ammonia, nitrate, nitrite, sulphite and pH-value are also important for a clear interpretation of the chromatograms.

Uta Lübke, a pioneer in composting in Austria, interpreted the chromatograms with her more than 40-years of experience.

It takes on average 12 hours to generate a chromatogram.



Sample of a chrormatogram from a very mature compost

Sample of a chromatogram from a very immature compost

Gas measurement technology

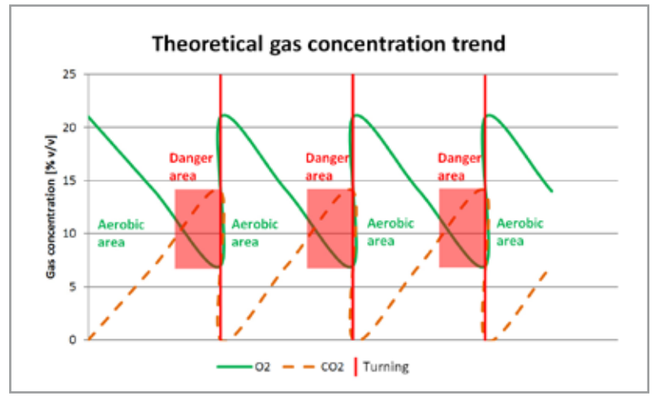
Compost quality starts with process monitoring!

Composting is a living process, which needs oxygen (O_2) just like humans do and respires it as carbon dioxide (CO_2). If there is a lack of oxygen, the aerobic bacteria that are vital for the composting process are displaced by anaerobic bacteria which produce high CO_2-emissions and methane (CH_4) is also formed which is a greenhouse gas 21-times stronger than CO_2. The results are high losses of quality and odour problems.

For the operator there are gas measurement devices that help to get a clear view of the current process. A “Must-Have” device for every operator is the analogue CO_2 meter, which measures the “respired air” from the bacteria. There is also the option of measuring the oxygen concentration in the windrow in addition. If you want to be totally sure and measure the anaerobic gases like methane, too, then there is a digital windrow gas meter which measures up to 5 different gases at the same time.

Especially important is a suitable gas monitoring if changes are made to the processing technology, windrow size, material mixture, turning system or turning intervals. Securing optimal aerobic conditions provides ideal living environment for microorganisms.

Maximum gas concentrations	
Methane CH_4	< 1 % [v/v]
Carbon dioxide CO_2	< 12 % [v/v]
Oxygen O_2	> 7-12 % [v/v]



This windrow gas meter measures up to 5 different gases at the same time. .

Reinforcement in the Compost Systems team:

>>Bettina Bazda
has been supporting us in our administrative work and disposition since April 2013.

>>Christian Austaller
is a graduate of the University for Applied Sciences in Steyr "Global Sales and Marketing" and currently studies European Energy Management" at the University for Applied Sciences in Kufstein. Christian has been working in our in-house sales and contracts since January 2014.

>>Hanna Marliere, M.Sc.
has studied "Environmental Ecology" and Biology. She has worked in the waste management sector since 2006 as an environmental consultant and project manager in environmental engineering. In 2013 she brought her years of experience to support our Polish team.

Compost Systems goes E-mobility

In 2013 Compost Systems provided an E-Scooter during plant comissioning for selected plants. One scooter was sponsored for the raffle at the equipment demoday of the Austrian Composting Association. Loads of fun! Our pleasure!

Compost SYSTEMS
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