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AUTHORIZED SALES REP - IMPORTERS/EXPORTERS

TIETJEN
DAS ORIGINAL



IMPROVING THE EFFECTIVE USE OF RESOURCES

CONDITIONING ORGANIC WASTE – RELIABLE, STRAIGHTFORWARD AND COST-EFFICIENT

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WASTE SHOULD NOT BE WASTED!

For almost 200 years, more and more goods have been produced, exchanged and consumed. More consumption has always meant more waste.

The increase in waste volumes goes hand-in-hand with negative environmental impacts, in particular pollution and climate change. Today the pollution is extreme – especially in metropolitan areas, in rivers and in our oceans. This waste is not mere worthless mass but consists of diverse fractions that can definitely be recycled.

Meanwhile, international efforts are being stepped up to protect our planet's soil and water and to stop the mountains and islands of garbage from growing. For the sake of a sustainable world and ethical business, the different substances should be recycled. Biogenic material flows – so-called „biowaste" – make up a significant part of a sustainable waste management system. With them, material and energy recovery can be efficiently combined. The aim is to optimize the interaction of nutrient and carbon recycling, provide energy, reduce CO_2 emissions by replacing fossil fuels, and achieve favorable treatment costs with high added value.

SEPARATION PAYS OFF!

Organic waste is usually contaminated with a wide variety of foreign substances. Inhomogeneous material flows arise as a mixture of organic and inorganic contents that are collected in different ways and differ internationally, regionally and seasonally. Plastics comprise a large portion of these foreign substances.

The reliable separation of organic matter and foreign matter is of crucial importance for the energy recovery and material recycling of biowaste. The more successful the separation at the beginning of the process, the more economical are all subsequent steps.

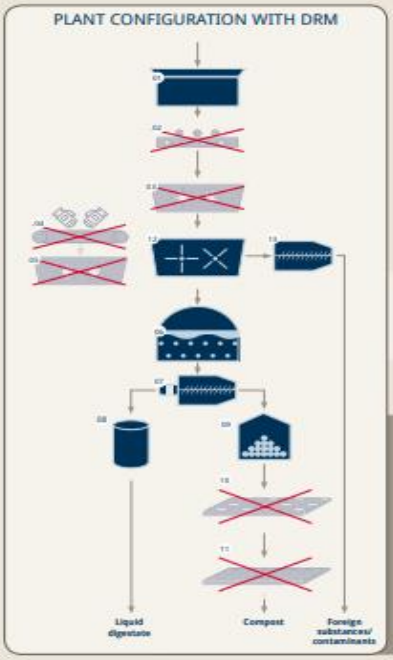
The Tietjen Double Rotor Mill (DRM) system provides a cost-efficient system design from a single source. In contrast to conventional process technologies, the DRM allows for high-precision separation of organic substances from all foreign substances at the beginning of material preparation, for example plastic packaging. The separation performance is pioneering, because these purity levels of the organic and inorganic fractions at high throughput have never been achieved – until now. The shredded and mixed organics can then be used optimally for energy and material production, while the foreign substances can be sorted for heating use.

01 Organic waste with foreign matter
02 DRM Separation Mill
03 Foreign substances separated (solid phase)
04 Organics separated (liquid phase)
05 Biogas plant (energy utilization)
06 Compost (recycling)

TIETJEN – SYSTEM EXPERTISE

ORGANIC WASTE RECOVERY – FEWER STEPS, GREATER SIMPLICITY

PLANT CONFIGURATION WITH DRM



In conventional plant configurations for processing and recycling organic waste, a number of process steps are required to separate the foreign substances. Usually, different screening techniques are used at different stages of the process.
With the Tietjen Double Rotor Mill (DRM), the shredding of biowaste and the reliable discharge of foreign substances and contaminants take place simultaneously. In a DRM plant configuration, up to five process steps are eliminated.

The diagram shows the process flow.

- Receiving container
- Pre-screening
- Shredder
- Manual sorting/viewing
- Secondary crushing
- Fermenter
- Separator
- Digestate storage
- Composting
- Various screening methods
- Various screening methods
- DRM system
- Dewatering screw for impurities

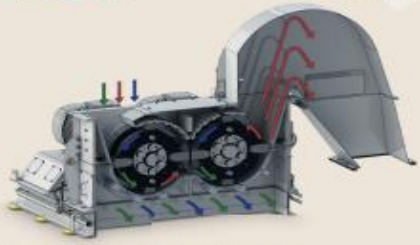
TIETJEN – GRINDING TECHNOLOGY

DRM SEPARATION MILL

The DRM Separation Mill has been designed for the reliable separation of the biogenic fraction of foreign substances, or contaminants from different waste streams. The goal is the optimal cleaning of the respective substrates right at the beginning of the process. The special design permits high separation performance with a minimum of energy. That means the DRM adds major technical as well as economic value.

- Compact, symmetrical welded / bolted stainless steel construction
- Multi-aspect process performance through impact, tearing and shearing
- Easy adaptation of the particle size structure in organic matter through frequency-controlled drive motors and easy-change sieve segments
- High tolerance to interfering and foreign substances
- Particularly easy to maintain thanks to excellent accessibility and exchangeable wearing parts
- Minimal addition of liquid – concentration of organic matter (targeted addition of process liquid if required)
- Energy-efficient through streamlined plant design
- High operational reliability through robust design

The input material is conveyed into the DRM grinding chamber via a receiving container and a screw conveyor.



In the mill, two rotors separate the organic from foreign matter.

After separation in the mill, the organics (liquid phase) are pumped into a storage tank for further processing.

The foreign matter and impurities (solid phase) drop from the mill directly into a press screw.

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TIETJEN – EXTENSIVE SYSTEM KNOW-HOW

DIFFERING COMPOSITIONS OF ORGANIC WASTE ...

Organic waste is usually contaminated with a variety of impurities and foreign matter. Many different factors affect the composition:

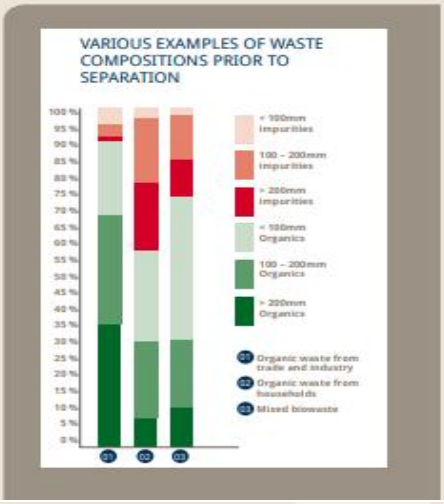
WHERE DOES THE GARBAGE COME FROM?
Food leftovers from restaurants and catering? Packaged foodstuffs from trade and industry? Market waste? Household organic waste? Garden waste?

HOW IS IT COLLECTED?
With a high degree of separation in separate waste bins? Is it highly mixed together?

WHEN WAS IT COLLECTED?
Are there large seasonal variations in composition?

Our diagram shows examples of the average compositions from different collections:

01 ORGANIC WASTE FROM TRADE AND INDUSTRY
02 ORGANIC WASTE FROM HOUSEHOLDS
03 MIXED BIOWASTE



TIETJEN – SYSTEM TECHNOLOGY

... REQUIRE DIFFERENT PLANT CONFIGURATIONS.

The DRM mill is combined with other plant components, depending on the waste composition and size of the contaminants.

The prerequisite for automatic separation with the DRM is the size, type and quantity of contaminants in the input material, e.g. metals, wood and packaging. Experience has shown that the separation of 150mm x 200mm pieces is not difficult. Large foreign bodies, e.g. beams, car wheels, braided steel mats or plastic packaging, require an increased investment – if necessary, even manual selection.

The acceptance and dosing of liquids and bulk materials can be done either via a **screw bunker** or various **push floor systems**. In our experience the use of proven technology and suitable materials is decisive here.

A **shredder** can be used. This is critical when large foreign matter is a continuous part of the flow.

The use of a **bag opener** is often useful for opening plastic bags and wrapping material without too much particle size reduction. This has a positive influence on the separation results. It stops all large contaminants, which can be easily removed by hand. For „lean" system technology the bag opener is usually integrated into the storage container.

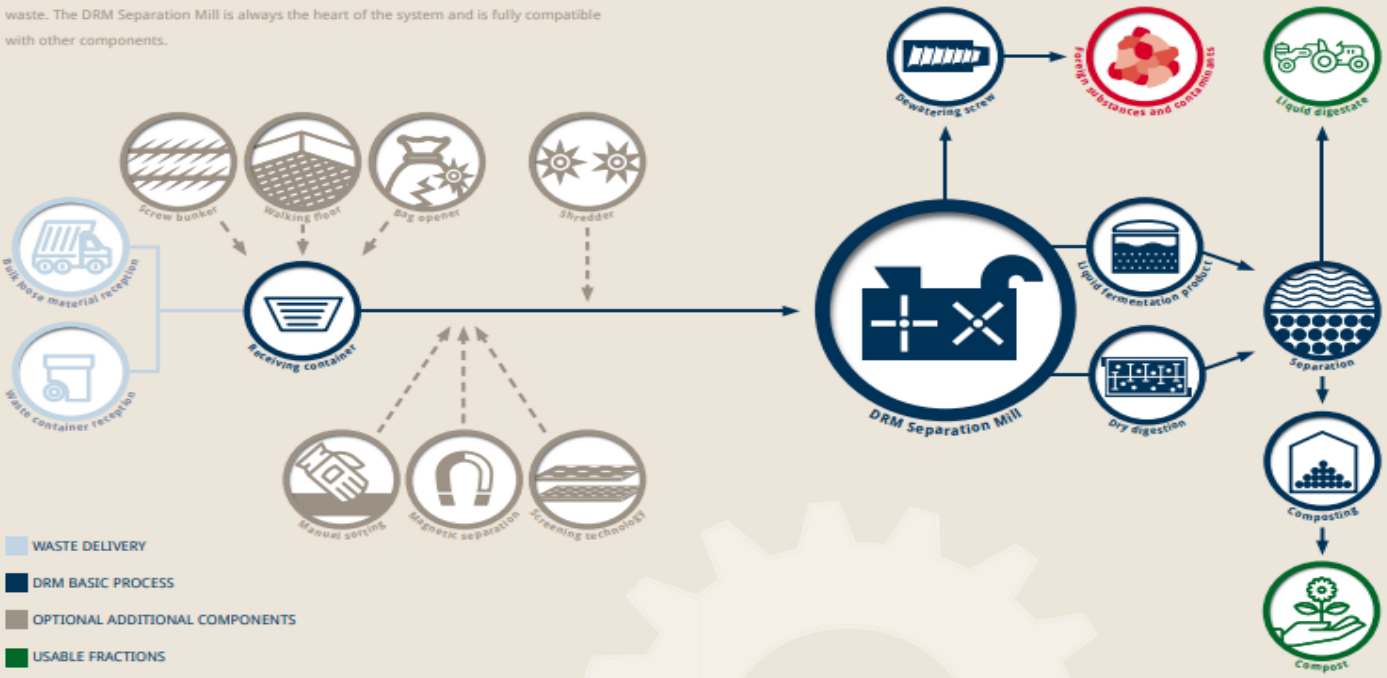
Star screens are an alternative to the shredder when large parts are to be continuously removed from the process without crushing them.

Overhead **conveyor magnets** can be provided to remove ferrous material from the process before comminution.

TIETJEN – SYSTEM TECHNOLOGY

CUSTOMIZED PLANT DESIGN

The configuration of an installation depends on the average expected composition of the waste. The DRM Separation Mill is always the heart of the system and is fully compatible with other components.



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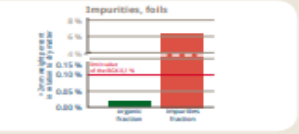
TIETJEN – SYSTEM TECHNOLOGY

OUTSTANDING SEPARATION PERFORMANCE

Worldwide, there are very different demands for waste recycling. Some countries still lack guidelines, while in others increasingly sustainable management systems are used to control biogenic material flows.

In international comparisons the regulations in Switzerland are very progressive. It is precisely distinguished in reusable fractions and waste for thermal disposal. The treatment of sewage, sludge and contaminated biowaste is of particular importance. In Germany other regulations apply, e.g. the Biological Waste Ordinance (BioAbfV), the Fertilizer Ordinance (DüMV) and the quality requirement of the Federal Quality Assurance Association Compost e.V. (BGK).



Separation performance of DRM technology: Plastics (foils) >2mm in relation to dry matter. The relevant limit value of 0.1% by weight of the dry matter is clearly undershot.

The total area of a maximum of 15 cm² plastic per liter of liquid is not reached and thus the quality criterion of the BGK is met.

The outstanding results of the substance separation in just one step are the unique selling point of the DRM Separation Mill, and thus form the basis for a high-performance, lean plant complex.

TIETJEN – SYSTEM TECHNOLOGY

COMPATIBLE WITH DIFFERENT BIO-MECHANICAL PROCESSING METHODS

Worldwide, different targets for treatment of residues require a powerful, robust technology that can be adapted to the respective conditions.

CONSIDERATIONS OF ENERGY USE AND MATERIAL RECYCLING IN JUST ONE STEP
The particular situation and the potential of biogenic residues on-site determine high-quality utilization. Energy recovery from biowaste requires fermentation in a gas line, regardless of the construction method (liquid fermentation or dry fermentation). In either case, the purity of the material significantly influences system efficiency. For this reason, the best possible separation of fermentable material and impurities is a fundamental requirement.

Liquid fermentation requires fine digestion of the material. In addition to the separation of impurities, the Double Rotor Mill increases the surface area of the organic material and thus increases the specific gas yield (methane) of the subsequent fermentation section. At the same time, the homogenization of the material reduces viscosity and relieves subsequent process stages. Easier precipitation of silicates (sand) results in less wear and tear, floating layers in the fermenter are reduced, and pump and agitator loads are reduced. Overall, this creates the best conditions for hygenic results.

If dry fermentation is required instead of liquid fermentation, then clean structural material can be added to the substrate, which is separated at the end of the process and then added again (circulation), or a composting system is supplied. The separated liquid phase provides for the best possible separation of substances at the beginning of the treatment.

The Double Rotor Mill is highly compact, simple and safe to handle. Thanks to its excellent separation results, it can be integrated into almost any possible Mechanical Biological Treatment (MBT) process plant design.

TIETJEN – REFERENCES

TIETJEN DRM AT WORK

The innovative DRM process has been successful for over 10 years and is in multiple use by a major international company. Further systems are currently being installed in Germany and Switzerland.

2014

In 2014 we built a highly automated processing plant for commercial biowaste. It is designed for a throughput of up to 200 t/d in single-shift operation. The processing plant is operated by only one employee and loaded by truck drivers, who collect and deliver all the food and domestic waste in 120 l and 240 l containers. The biowaste can also be accepted in large collection bins and processed in a DRM Separation Mill.

SCOPE:

- Planning and execution of the processing plant
- Acceptance container with discharge system and walk-in platform
- Container emptying with downstream washing machine and empty bin storage
- DRM 800 Separation Mill
- Storage tanks
- Receiving container with stirrer (dough hook)
- Pipe construction with pumps, gate valves, pressure and volume gauges
- Assembly, documentation, commissioning and process support for a perfect operational launch

Raw material receiving area

2017

2017 saw the construction of an automatic processing plant for biowaste in northern Germany. This is a small processing plant with a daily processing volume of approx. 20 t in a single-shift operation. It has an open holding tank, a semi-automatic tipping station for containers, and a DRM Separation Mill for processing. The controls are integrated into a central switchboard.

SCOPE:

- Planning and execution of the treatment plant
- Receiving container with homogenization and discharge system
- Container chute with overspill
- DRM Separation Mill
- Central control
- Assembly, documentation, commissioning and test-period process support for processing difficult input materials.

DRM400 Separation Mill

Further DRM systems

Receiving container with stirrer (dough hook)

Acceptance container with tipping station

Bin acceptance platform

Acceptance container with walk-in platform

Automatic bin-washing machine

DRM800 Separation Mill

Dosing screw and storage bin (organics)

Press screw – foreign bodies

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TIETJEN – DEEP PROJECT EXPERTISE

TIETJEN GOES ALL THE WAY

You want to process biomass. We take care of the entire process for you – from start to finish.

EXPERIENCED CONSULTING
Together with you, our experts develop your ideas, within the framework of local legal requirements and conditions. We want to understand your business objectives and processes from the ground up, based on a precise definition of your project's time, financial and resource parameters.

PROJECT MANAGEMENT & COORDINATION
On your behalf we measure up the required plant dimensions on-site, provide you with technical and conceptual support, and ensure constant close consultation with your civil engineer and energy supplier. If required we will also take care of statutory formalities regarding the local municipality and supervisory authorities.

DEVELOPMENT & TESTING
Problems cannot always be solved immediately. New ideas need testing – and we place our stationary and mobile test facilities at your disposal when required, as well as our in-house laboratory and close links with a network of leading institutes and scientists.

PLANNING & CONSTRUCTION
Sound planning provides decision-makers and executives with vital information. The technical and schematic drawings and images we create with CAD design and 3D imaging technology will clearly illustrate all the details you need.

PRODUCTION & ASSEMBLY
We manufacture high-quality machines and system components according to precise planning specifications, assemble and deliver these on time according to our contractual agreement with you. When everything comes from a single source, many questions can be answered very quickly. At Tietjen we take responsibility for meeting your requirements.

COMMISSIONING & TRAINING
The pre-operations inspection and acceptance of equipment confirms contractually guaranteed conditions are fulfilled. We also ensure that all aspects of operational safety have been taken into account, that the legal requirements are met, and that appropriate instruction and/or training of your operating personnel will secure professional maintenance and inspection. Frequently, instruction is repeated periodically. At Tietjen, we take the grind out of the detail to ensure your full satisfaction.

VIEW OF A PROCESSING PLANT FOR COMMERCIAL BIOWASTE

- Waste container reception
- Bulk loose material reception
- Automatic bin-washing machine
- DRM 800 hybrid
- Empties storage area

TIETJEN – SERVICE

WE WON'T KEEP YOU WAITING

Many years of experience and innovative thinking are the basis of our services. For individual international projects we rely on a network of reliable and powerful partners.

MAINTENANCE & REPAIRS
Our experienced installation team performs reliable, on time service and repair of your equipment on-site or in our workshops. Our aim is to keep your production downtime to a minimum. Therefore, the work will frequently take place at weekends. For long-term reliability, we offer a periodic inspection, which is contractually agreed and guarantees a reliable and robust documentation. Of course, you can also count on us in case of emergencies.

SPARE PARTS SUPPLY
A significant part of our business is the supply of consumables and spare parts. Deliveries are made from our central warehouse in Schleswig-Holstein (Germany) usually within 48 hours of order, in case of an emergency, even faster. We ship worldwide with selected reliable freight forwarding and courier services. We are happy to obtain any external parts for you at short notice.

We guarantee the availability of spare parts for at least 20 years.

CONCEPT 1: ONETIME INSPECTION
- Inspection of the system
- Qualified report
- Recommendations for action
- Implementation

CONCEPT 2: IMMEDIATE MAINTENANCE
- Combined inspection and maintenance
- Provision of spare parts
- Replacement of parts, if required

CONCEPT 3: ROLLING INSPECTION
- Inspection at fixed intervals
- Regular scheduled maintenance

YOUR DECISION
We are happy to arrange an individual maintenance contract according to your plant specifications. This offers you not only a cost advantage compared with the single application maintenance measures. Also, the maintenance contract provides a maximum of comfort and safety, because we plan the necessary maintenance intervals, keep the dates in mind and ensure the smooth operation of your system.

The Grinding People

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