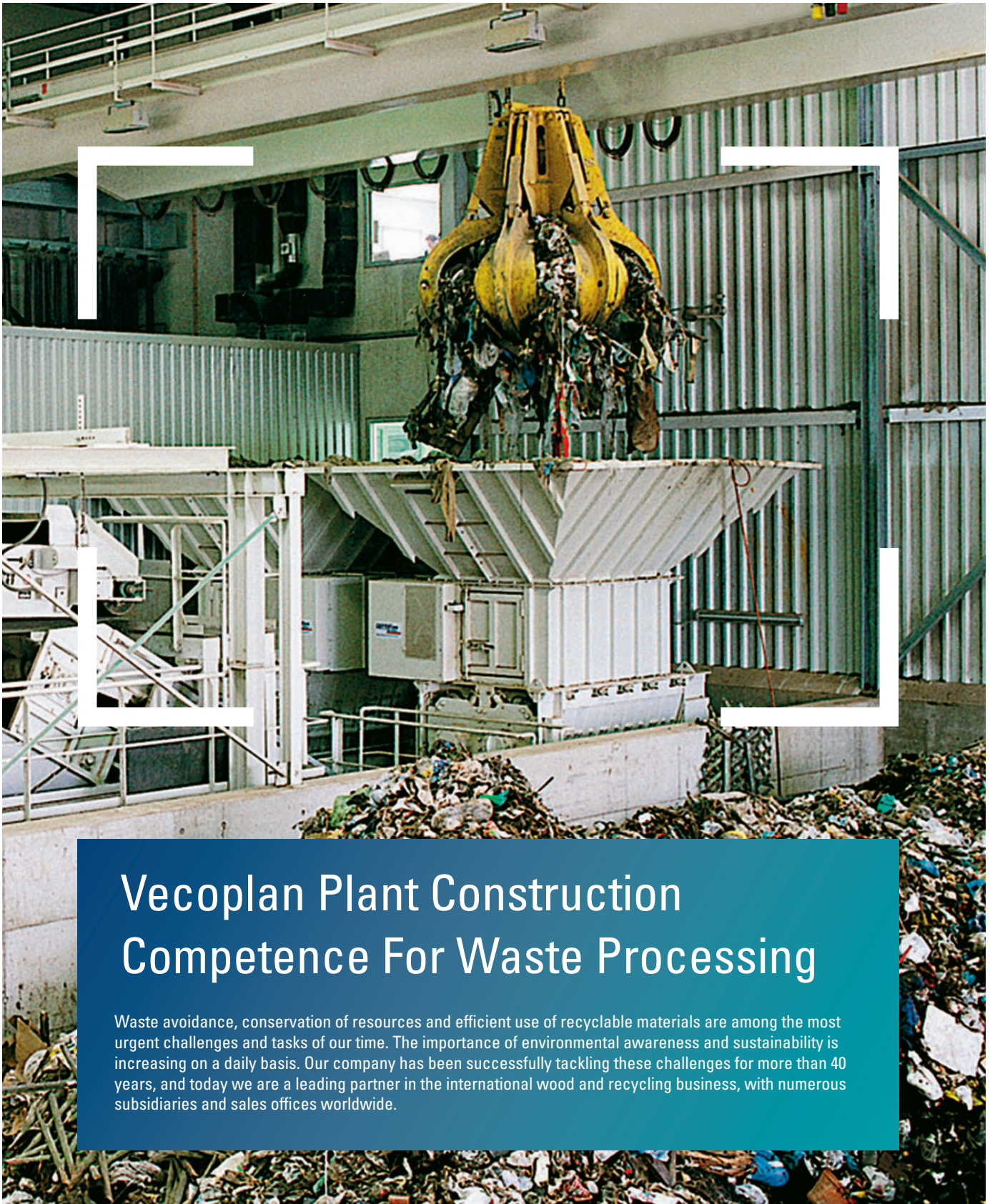


Competence
For Waste

Vecoplan[®]



Vecoplan Plant Construction Competence For Waste Processing

Waste avoidance, conservation of resources and efficient use of recyclable materials are among the most urgent challenges and tasks of our time. The importance of environmental awareness and sustainability is increasing on a daily basis. Our company has been successfully tackling these challenges for more than 40 years, and today we are a leading partner in the international wood and recycling business, with numerous subsidiaries and sales offices worldwide.

PERFORMANCE AND QUALITY AT THE HIGHEST LEVEL



Innovative
Technologies

Refuse
Derived Fuel

Recovery of
Recyclable Materials

Biological
Drying

WASTE TREATMENT

Gas, Electricity
Heat

Turnkey
Systems

Worldwide

Anaerobic
Fermentation

VECOPLAN PLANT CONSTRUCTION

VECOPLAN AG has many years of experience in plant construction. We are your reliable partner for mechanical and biological processing of household and industrial wastes. With its own production facility in Bad Marienberg, an exceedingly high quality standard, qualified, highly motivated employees and first-class, robust, durable products, VECOPLAN sets standards in international plant construction. In the modern waste industry, processing plants are the key to an environmentally friendly treatment of wastes. Many recyclable materials can be recovered from waste. Gas, electricity, heat and refuse derived fuels can be obtained from the most varied waste fractions.

VECOPLAN AG plans, manufactures and delivers turnkey plants worldwide for environmentally friendly and sustainable processing of household and industrial wastes. We combine our know-how in the area of mechanical processing with proven processes for biological waste treatment through cooperation with competent cooperative partners

For the areas:

Biological waste drying:	Waste Tec GmbH
Anaerobic fermentation:	BTA International GmbH

Our competence for the entire plant is in demand, from acceptance of waste, the separation of different material streams to delivery of gas, electricity, heat and refuse derived fuel.

We offer optimal solutions for:

- Mechanical processing of household and industrial wastes
- Biological drying and stabilization
- Anaerobic fermentation
- Processing of refuse derived fuel
- Recovery of recyclable materials



Recyclable materials from household and industrial wastes can be separated from the mixture of wastes with mechanical processing and supplied to recycling. VECOPLAN processing plants separate recyclable materials according to size, composition or material properties according to customer request. Taking into account the input material and customer requests, VECOPLAN engineers combine various process steps such as.

precrushing > filtering > inspection (magnetic, visual, gravimetric)
manual sorting > secondary crushing > storing > loading

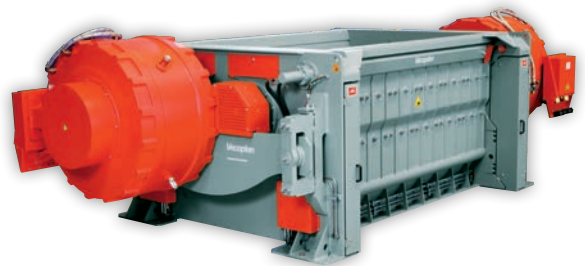
for the recovery of recyclable materials and production of refuse derived fuels.

PRE-CRUSHING

Pre-crushing produces a homogeneous, separable material stream for the downstream biological or mechanical processing. The special requirements of the following processes can be met by a number of different type series.

The pre-crusher can be loaded by wheel loader, gripper, chain conveyor, vibration conveyor or steel plate conveyors. Depending on the input material, throughput rates of up to 100 Mg/h can be achieved with a pre-crusher.

VECOPLAN pre-crushers are delivered with hydraulic or HiTorc energy-saving drive.



SCREEN

The production and determination of particle size and particle distribution is very important for many areas of mechanical and biological processing. Screens are used for producing defined particle grading and mass flows for downstream treatment processes.

Depending on the application, drum screens, disc- and star-screens, vibration screens, oscillating screens or a combination of the aforementioned screen machines are integrated into the processing line.



CONVEYORS

To combine the individual process steps into a compact, efficient system, continuous conveyors are used.

VECOPLAN'S product line ranges from a simple, open conveyor belt to a completely enclosed conveyor device like a chain conveyor or conveyor belt with residual material scraper and a number of different type series, which can be tailored to the respective application according to the customer and process requirements.



SEPARATION

The main requirements of a modern processing plant include the recovery of recyclable materials such as ferrous metal, non-ferrous metal, mixed plastics and individual plastic fractions as well as the separation of inert substances.

For the separation, processing aggregates such as pneumatic separators, ballistic separators, density sorters, overband magnetic separators, whirler-type separators or visual sorting systems are combined in the respective process steps according to project requirements.

Manual sorting or a combination of automatic and manual sorting can also be implemented depending on the project requirements.



POST-CRUSHING

The pre-separated fractions are further processed into a high-quality refuse derived fuel with a patented rotor system. Particle sizes of 10 to 100 mm can be defined during crushing as needed. A throughput rate of up to 20 Mg/h per machine can be achieved here.

The optimal post-crusher is selected from different type series. Robust, proved and tested components secured from impurities, such as:

- HiTorc-drive
- Pneumatic lowerable counterknife bar (Flipper)
- Oscillating screen
- Hydraulic bridge breaker offer the operator low operating costs, increased operational safety and availability.

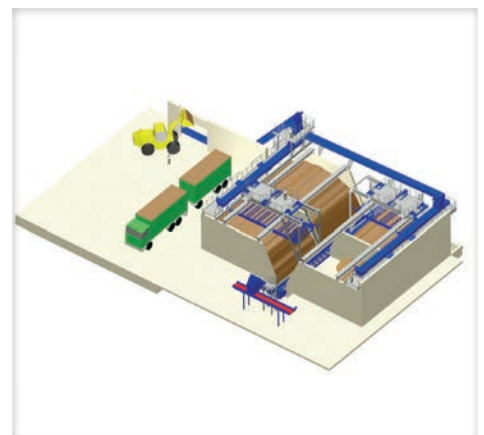


STORAGE

The storage of processed refuse derived fuels places great demands on the storage systems. Large storage volumes and high throughput rates must be achieved for the loading and discharge of silo systems.

The mixing of different fuel qualities into a homogenous refuse derived fuel with consistent heating value is another advantage of the storage systems built by VECOPLAN.

The continuous loading of downstream processing steps is ensured by systems customized for the the case of application.



BIOLOGICAL DRYING

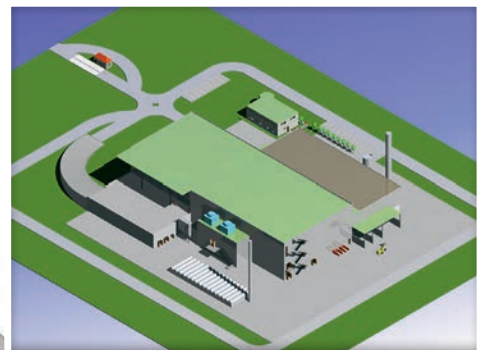
In cooperation with WasteTec GmbH, one of the leading specialists in the field of biological waste drying, Vecoplan delivers turnkey systems for the biological drying and mechanical processing of wastes. The plant design is geared each time to the country- and customer specific requirements.

Household waste has a great potential for recyclable materials. Using biological drying and a mechanical processing adapted to the respective need, these materials can be recovered. Biological drying significantly improves the sortability of household waste and the quality of the sorted materials. Flammable materials such as plastics, wood, rubber and organic components can be very efficiently separated from non-flammable materials such as metal, glass, stones, etc. with pneumatic separators, density sorters, etc. and converted into a high-quality refuse derived fuel.

The refuse derived fuel (RDF) produced in this way has a number of significant advantages compared to fresh waste, which qualifies it as an ideal industrial fuel. A high concentration of renewable organic components significantly reduces the CO₂ - emission during combustion compared to fossil fuels. The nearly doubled heating value combined with a heavy metal content reduced by up to 90% compared to fresh waste are important requirements for use in power and cement plants. The dry RDF, such as fossil fuels, can also be stored temporarily and thus used as needed.

The production of RDF based on long-term waste disposal agreements creates planning and investment security for its customers. In combination with the environmentally friendly effect, this is an enormous advantage, since neither the availability nor the price of fossil fuels are foreseeable in the long-term.

Isometry of a mechanical biological stabilization (MBS) plant



MBS Geel, Belgium

PRINCIPLE OF BIOLOGICAL DRYING

Biological drying enables an energy- and time-saving reduction of the residual moisture from household waste by an aerobic degradation process. By means of forced ventilation, simple degradable organic substances are biologically converted into heat, and the moisture is thus discharged from the waste. Other than the forced ventilation, no additional energy is required to reduce the residual moisture content to less than 20%.

Using a proven and tested fuzzy-logic control system, the required air stream is regulated automatically according to the process requirements. Instead of a traditional drying system with limited drying capacity and highly diffuse emissions, VECOPLAN delivers highly efficient, environmentally friendly and completely enclosed concrete boxes, which can handle up to 15,000 Mg/a each time.

Depending on the quantity to be processed annually, two different box systems are delivered. For an annual tonnage of up to 60,000 Mg, loading with a front end loader is recommended. If there is a larger throughput rate, the use of an automatically controlled crane is recommended. Up to 13 boxes can be loaded and unloaded with a crane. No manual interventions are required due to the fully automatic crane control.



Boxes for front end loader loading



Boxes for automatic crane loading

EXHAUST AIR TREATMENT

The exhaust air emerging from the biological drying process is processed through cleaning systems that have been proven and tested over many years according to the respective requirements. The use of regenerative thermal oxidation systems (RTO) guarantees a highly-efficient destruction of all organic exhaust air components; in this way, the strictest emission standards for MBA plants are met. Alternatively, exhaust air streams can be economically yet efficiently cleaned by using washer/biofilter systems.

Closed biofilter



Regenerative thermal oxidation



ANAEROBIC FERMENTATION

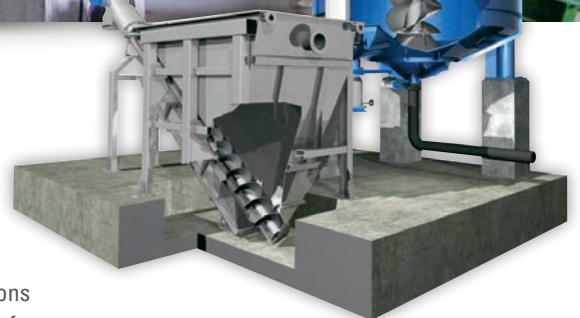
For the hydromechanical processing and subsequent fermentation of biological wastes, household waste and other municipal or industrial wastes, VECOPLAN cooperates closely with BTA International, the leading specialist in the hydromechanical processing and subsequent fermentation of organic components. The reliable separation of wastes and recycling of organic fractions into bioenergy is the key to every modern, environmentally friendly treatment of wastes.

The BTA® process is the original hydromechanical waste treatment. It consists of two central stages

- hydromechanical processing and
- subsequent anaerobic fermentation for energy generation.

The BTA® waste pulper is the central component of every hydromechanical waste processing. It was primarily developed to achieve three goals:

- The dissolving and defibration of all fermentable organic materials, if possible, for subsequent fermentation with energy generation.
- The separation of non-fermentable „heavy“ portions (stones, bones, glass, batteries, metal objects, etc.).
- The separation of non-fermentable „light“ portions (textiles, wood, plastic, films etc.).



BTA GRIT REMOVAL SYSTEM

The grit contained in waste (such as sand, glass splinters, stones, or similar things) is a central problem of every waste treatment and fermentation. It causes enormous wear and tear and congestion in fittings and pipelines. Sediment in containers and fermenters can no longer be mixed and can become as hard as concrete. A separation of grit fractions is done in the BTA® Grit Removal System.



FERMENTER SYSTEM

A complete mixing of fermentable substrates in the fermenter is a prerequisite for:

- a maximum breakdown of organic substances
- maintaining constant conditions with regard to temperature and chemical properties
- avoiding floating layers
- avoiding the sedimentation of solids

In the BTA® process, complete mixing in the fermenter is ensured by the injection of compressed biogas. The emerging biogas is condensed to the required pressure after a condensate separation using a rotary compressor and injected through gas lances into the suspension on the fermenter floor so that a convection cell forms that rises in the centre of the fermenter, moves on the fluid surface outwards and descends again on the vessel shell.

A further advantage of the gas recirculation is the lack of mechanical moving parts in the enclosed container and thus a reduced susceptibility to damage.



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Photo courtesy of the Westerwald GmbH & Co. KG MBS facility



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