

**db technologies BV**

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Attn. Mr. Károly Takács

Date: 21.05.2014

Offer number: 2014074

Subject: **Offer AD plant 24 KT/a**

Your reference: Offer for Oroszlány, 40.000 t/a MSW

Dear Mr. Károly Takács,

Herewith we would like to thank you for your interest in our company. Please find enclosed our price quotation for the delivery of the items listed on the attachment. To our offer our sales conditions apply. You can download our sales conditions from our website www.dbtechnologiesbv.nl under conditions. Should you desire any further information, please do not hesitate to contact us at phone number + 31- (0) 6 – 557 28 237. We trust to have supplied you with an attractive offer.

Yours sincerely,

db Technologies BV

Karl Dirkes
Sales Director

KvK/Chamber of Commerce
BTW/VAT
Rabobank

Apeldoorn 08168035
NL8191.67.216.B01

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Fermentation Plant**Throughput total capacity 24 000 t/year****Biogas plant:****1 sludge receiving storage tank 390 m³****1 hydrolysis tank, 1000 m³****1 methane digester tank 2900 m³****1 screw press separator and decanter****1 water tank 560m³****2 CHP 560 KW el**

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Biogas Plant

- Item -1 Technical Description of the installation
- Item -2 1 substrate storage tank, capacity 390 m³,
 with gas-tight cover
- 1 hydrolysis digesters, capacity 1000 m³,
 with gas storage tank
- 1 Main digesters, capacity 2900 m³,
 with gas storage tank
- 1 Technology container
- 4 pumps units
- 1 Screw press separator and decanter
- 1 water storage tank 560 m³ with gas-tight cover
- 1 Set of pipelines
- 1 Set of platforms and walkways
- 1 Biogas analysis devices for continuous measurement
 of the CH₄, CO₂, H₂S and O₂ content
- 1 CHP units 2x 560 KW
- 1 Switch and control cabinet
 based on the SIEMENS controller S7
- Item -3 1 Installation Commissioning and test operation
 Electrical installation
- Item -4 customs responsibilities
- Item -5 Economic data
- Item -6 Not including in the delivery

1) Technical Description

Procedure

We offer you a double-stage biogas plant (hydrolysis and methane step) with a thermophilically operated vertical wet digester. The digester provides the ideal fermentation procedure for substrates which have a high TS and a high TVS after the Orex press and cleaning system content and keeps the fermentation process free of unnecessary amounts of water. Below we would like to give you more details about the plant which we are offering and its advantages.

Substrate processing

We propose buffering the solid substrates in a substrate storage tank, capacity 390 m³, with gas-tight cover. The storage tank is large enough to store three days amount of in feed substrate. The Following a request by the plant controller, is a pump system removes the substrate fully automatically from the storage tank and supplies it to the digesters. The storage tank is covered with a gas tight on the top of the tank. After the pressing and cleaning of the in feed substrate the structure of the substrate is broken and the gas drops out very fast.

Hygienization

Between hydrolysis and the methane tank there is installed a hygienisation. This Thermdesk system heats the material up to 70 degrees. This temperature will be hold one hour on this temperature. The Thermdesk system will hygienisation the substrate and heated up the methane tank.

Fermentation

The digester is a vertical with mixers inside. This design allows the digester to be operated with high dry substance content and with a large percentage of structural material. The digester is operated thermophilically to enable a high degradation rate at minimized dwell times. Therefore, the DB TECHNOLOGIES method allows the greatest possible flexibility with respect to fermentable substrates even if the volumes of liquid are minimized. In addition, it also offers the option of quasi-hygenization at a dwell time of more than 24 hours.

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Separation

The fermentation residue is removed from the digester and supplied to a screw separator by means of a hose pump. The liquid phase remains in the final storage tank and is used in agriculture as a liquid fertilizer

As the separator flow rates depend greatly on the substrate, the separator may have to be operated up to 12 hours a day. At night and at weekends it is not essential to operate the separators. If material is not removed from the digesters via the separators

Final storage tank

The liquid fertilizer is stored temporarily in a final storage tank. To minimize door emissions, the tank is provided with a gas-tight cover. Agitators enable the fermentation residue to be agitated and homogenized. To be able to perform inspection work without difficulty, final storage tanks and digesters are fitted with large-scale pressure doors.

Biogas management

The digester roof is formed by a double-diaphragm carrier air roof. This allows the motor output of the combined heat and power plant to be adjusted to changing biogas production.

Air which is metered into the digester biologically desulfurizes the biogas and supplies it to the CHP via a pipeline system.

Virtually all fermentable substrates can be used with the plant offered by db TECHNOLOGIES. This flexibility with reference to the raw materials means greater substrate reliability and availability in an unknown future

Design of the entire plant

Substrate quality and gas yields are subject to marked regional and seasonal fluctuations. When projecting gas production, we have reverted to empirical inspections and our own inspections of the "ZAK Kaiserslautern" and Vossano Italia material and to published values.

Biogas plant

After the Orex press, the separated organic input materials run through the biogas plant.

Substrates

Organic

input materials

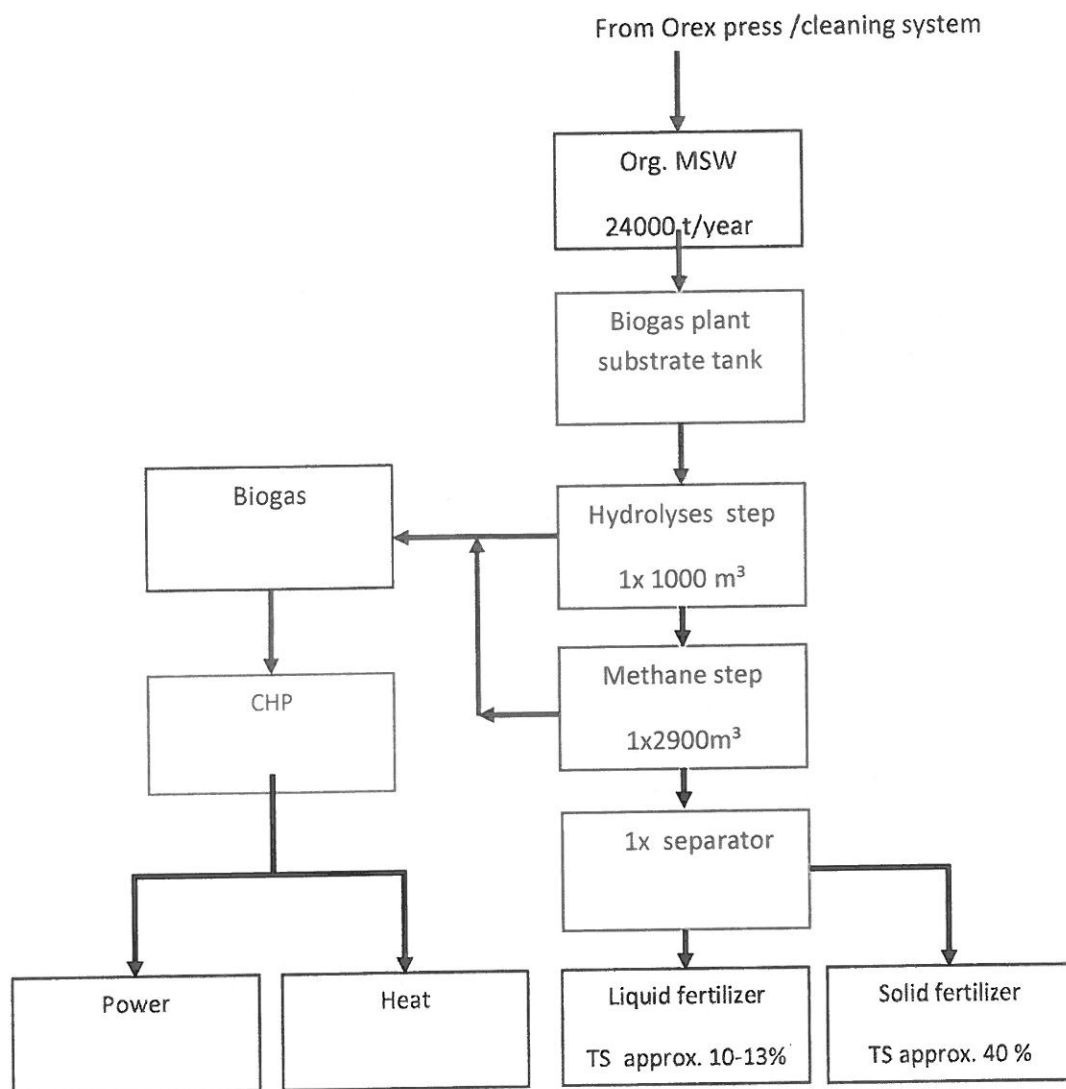
:40,000Tons/year (MSW: municipal solid wastes from the Orex press)

Specific biogas yields

Organic

input materials

: TS 25-30 %

 120-140 Nm³/t


(MSW: municipal solid wastes)

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Energy requirement**Biogas plant****Electrical power**

Auxiliary power requirement:
Connected load :

87 kW \pm 10%
160 kVA

Thermal heat output**Operating Equipment**

Lubricating requirement
for agitator shafts :

100 kg/year

Personnel requirement

Full-time staff are required to operate, maintain, repair and service the fermentation plant. Ensure that the plant is visually inspected at least once a day, even at weekends and on bank holidays. Substrate processing and logistics are not considered. If irregularities occur during operation, the plant operators responsible will also be informed via SMS.

In the event of major maintenance and repairs, it may be necessary to resort to an external workforce and companies.

2) Description of the equipment**a) Building site facilities**

One-off installation and removal of building site facilities for the complete period of the project, consisting of an office container for the site management, scaffolding, tools for installation of the subsequent items including transport, travel expenses to and from the site by personnel, personnel and reserve costs during the preparation and clearance period. Repositioning and rearrangement activities are excluded.

This item also includes the design plan for the biogas plant, with all the graphics and calculations necessary for the montage and the execution of the construction works.

b) In-feeding system

The in-feeding system consists in a pump which recirculates liquid coming from the end storage tank, and a hopper feed pump which uses this liquid phase to homogenize the material it has previously shredded. This hopper feed pump will be the QuickMix pump from the company Vogelsang or similar.

This hopper feed pump has the characteristic that together with a laterally attached liquid phase, it mashes coarse solids into a homogeneous suspension. The suspension is then distributed to the pump chamber, which passes it to the digester, all in one step. Co-substrates are introduced after they are well mashed and treated, resulting in higher gas yield and significantly lower operating costs.

c) Sludge storage 1x 390 m³

After the cleaning process, the substrate material comes by pumps into the final storage tank. The concrete tank has a similar assessment to the temperature fluctuations. For a sufficient homogenization four submersible mixers are provided.

Over the final storage tank there is a gas storage roof, identical to that of the methane stage. The recirculation to the main digester takes place via a progressive cavity pump.

The detailed description of the equipment and needed activities that conform the fermentation residue storage is the following:

- 1 reinforced concrete biogas digester. This biogas digester have the next characteristics:
 - The measures of this tank are 12 m in diameter and a height of 5m, having a capacity of 500m³. They will be built at earth-level.
 - The concrete has a high water penetration resistance in chemical attacking environments in accordance with DIN 1045.
 - 1 sump pump with a diameter of 0,6 m.
 - Three central posts, with a total height between 5.00 and 5.50m, and 0.60 m diameter with a foundation on the bottom plate and mushroom cap 2.40 m in diameter monolithic reinforced concrete, to accommodate a wood beam layer with safety net.
 - One opening on each tank wall, in order to be able to go in the tank if needed, which will be closed by a pressure flap of 600x800mm that consists of a concreted steel frame with sealing collar and hinged, lockable door pressure stainless steel (V2A)
 - 3 meter long terminal lugs for potential equalization, one per tank.
 - Concrete monitoring of each tank consisting of internal and external monitoring according to DIN 1045-3
High and low pressure protection, made out of PE80 with VA installation angle and response pressure of 3,0 mbar high pressure or 1,0 mbar low pressure, in each tank.

Double membrane roof for gas storing which will be provided and installed, consisting in:

- Air-supported roof with spherical segment, made out of 900g/m² PVC. The manufacturer is Mehler and the type 8556.
 - Gas membrane with spherical segment, made out of 950g/m² PVC. The manufacturer is Ferrari and the type Stamoid 4739Fr.
 - 75 m of flat iron, V2A
 - Middle support, V4A with a length of 1 m
 - Material for installation
- Connect metrology with the pressure terminal, for each tank, including:
- Pressure circuit of the double membrane roof
 - Connection of the pressure controller to the gas system
- For the connection of the different elements, including for example pipelines or nozzles, it will be needed to drill tap holes into the concrete. All the necessary holes will after be coated with epoxy, according to manufacturer's instructions.

d) Hydrolysis tank, capacity 1,000 m³, with gas-tight

The hydrolysis tank designed as an upright tank is used as a fermentation tank and biogas storage tank.

The final storage tank is designed in segments as a round tank open at the top.

All required supports and openings for operation of the final storage tank.

The tank is sealed at the top by a gas-tight canvas cover. The diaphragm is attached gas-tight to the digester by screws and clamping rails. Design with center support.

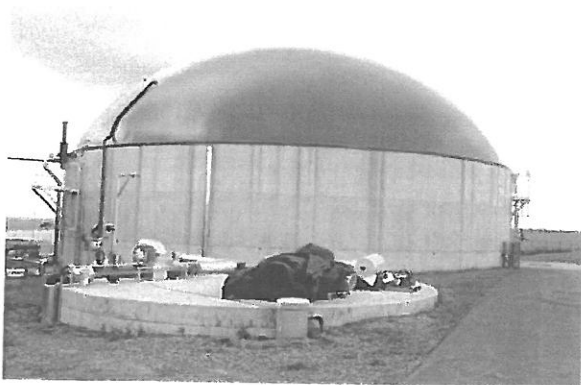
Permitted snow load 750 N/m².

Submersible motor agitators for mixing the substrate.

Gas overpressure and under pressure protection.

Fill level monitor max.

For drainage the final storage tank has a connection for a suction vehicle.



Technical Data

Tank

Quantity	: 1	Qty.
Material	: In-situ concrete / prefabricated parts	
Operating temperature	: max. 35-55	°C

Tank dimensions

Inner diameter	: approx.	16,000 mm
Wall height	:	5,800 mm
Filling height	:	5,000 mm
capacity	: Net	1,000 m ³

Gas storage tank

Quantity	:	1 Qty.
Device type	: Double-diaphragm roof	
Biogas capacity	: max.	500 m ³
Snow load	:	0.75 kN/m ²
Agitator		
- quantity	:	3 Qty.
- type	: Submersible agitator motor	
- motor power	: each	13 kW
- speed	:	480 1/min

Sensor System

Temperature sensors	: Pt 100 with immersion sleeves
Max. measurement of substrate	: Probe
Fill level measurement of substrate	: Pressurized container
Fill level measurement of biogas	: Cable length transducer / pressurized container

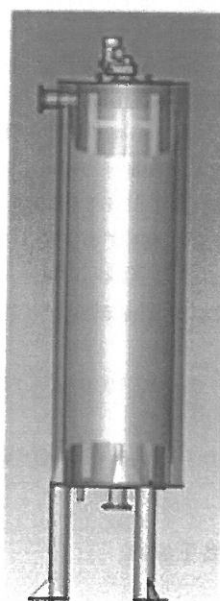
Scope of Delivery

- 1 Set of connecting pieces for biogas and substrate as well as supports and openings for operation.
- 1 Gas-tight cover with fastening system.
- 3 Submersible agitators for mixing the substrate, fastening system for agitator, can be lifted and swivelled, made of stainless steel. Cable winch and cable with sealed bushing. Small platform with ladder and back rest.
- 1 Gas overpressure and under-pressure protection.
- 1 Overfill protection max.

- 1 Drainage station consisting of pipe feed-through, pipe connection for suction vehicle with double barrier.
- 2 Inspection windows.
- 1 Set of installation material, consisting of small parts, connectors, locking and sealing elements.

e) Hygienization of the supstrate with ThermDes

ThermDes – Thermische Desintegration[®]



In the ThermDes unit, the substrate is heated up to about 70°C. By cell decomposition of bacteria strains from the first tank and due to the destruction of all existing pathogens and weed seeds, additional material is released. This enables that the cell structure of persistent and, otherwise, impossible to degrade available materials can be further digested, reducing at the same time the residence times needed.

Technical Specifications:

Pieces : 4x
Height: 5,70 m
Diameter: 1,35 m
Container volume: 2,6 m
Heating coil length: 286 m
Insulation thickness: 60 mm
Stirrer motor: 1,1 kW

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Temperature monitoring: PT100, Ex-Design
Energy consumed (20 up to 70 1h) 190 KW batch 73,3 KW th/Ton

After being warmed and sufficiently homogenized, the substrate goes through the ThermDes® with the help of an eccentric pump. Here is the substrate heated up to 70 °C and therefore broken down. In addition, is the cell structure difficult to degrade and otherwise within reasonable time periods not converted in the degradation process of the available materials. So this further fermentation in the ThermDes® enables shorter residence times. The ThermDes® has a volume of approximately 2,6 m³.

f) Final digestion tank, capacity 2,900 m³, with gas-tight

The final storage tank designed as an upright tank is used as a fermentation tank and biogas storage tank.

The final storage tank is designed in segments as a round tank open at the top.

All required supports and openings for operation of the final storage tank.

The tank is sealed at the top by a gas-tight canvas cover. The diaphragm is attached gas-tight to the digester by screws and clamping rails. Design with center support.

Permitted snow load 750 N/m².

Submersible motor agitators for mixing the substrate.

Gas overpressure and under-pressure protection.

Fill level monitor max.

For drainage the final storage tank has a connection for a suction vehicle.

Technical Data Tank

Quantity	:	1	Qty.
Material	:	In-situ concrete / prefabricated parts	
Operating temperature	:	max. 30	°C

Tank dimensions

Inner diameter	:	approx.	25,000 mm
Wall height	:		6,800 mm
Filling height	:		6000 mm
capacity	:	Net	2900 m ³

Gas storage tank

Quantity	:	1	Qty.
Device type	:	Double-diaphragm roof	
Biogas capacity	:	max.	1,000 m ³

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Snow load	:	0.75 kN/m ²
Agitator		
- quantity	:	3 Qty.
- type	:	Submersible agitator motor
- motor power	:	each 13 kW
- speed	:	480 1/min

Sensor System

Temperature sensors	:	Pt 100 with immersion sleeves
Max. measurement of substrate	:	Probe
Fill level measurement of substrate	:	Pressurized container
Fill level measurement of biogas	:	Cable length transducer / pressurized container

Scope of Delivery

- 1 Set of connecting pieces for biogas and substrate as well as supports and openings for operation.
- 1 Gas-tight cover with fastening system.
- 3 Submersible agitators for mixing the substrate, fastening system for agitator, can be lifted and swivelled, made of stainless steel. Cable winch and cable with sealed bushing. Small platform with ladder and back rest.
- 1 Gas overpressure and under-pressure protection.
- 1 Overfill protection max.
- 1 Drainage station consisting of pipe feed-through, pipe connection for suction vehicle with double barrier.
- 2 Inspection windows.
- 1 Set of installation material, consisting of small parts, connectors, locking and sealing elements.

g) Pipeline installation

This item includes the installation of the pipelines, including all the accessories such as holders, panels or annulus seals. In this case, we are taking into account the following pipelines:

- Substrate Pipelines:
 - Substrate pipelines running above ground level can be made out either of steel or PE100. The ones that are built with steel (1.0345) have a DN150 with an overall size of 168,3x4,5 mm. While the ones made out of PE100 have a DN150 with overall size 160x14,6mm, an operation pressure of SDR11, and are in accordance to DIN 8071/8075 DVGW.

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- The pipelines that have to run underground are made out of PE100. They have a DN150 with overall size 160x14,6mm, an operation pressure of SDR11, and are in accordance to DIN 8074/8075 DVGW.

The substrate pipelines that have to be built in this biogas plant are roughly the following:

- Substrate pipeline from the in-feeding technology to the digesters.
- Pipeline over the digesters roof
- Substrate pipeline from the digesters to the cleaning system, including substrate pumps (including temperature sensors and pressure monitoring)
- Heating pipelines:

The heating pipelines consist in the pipelines which run from the CHP units to the digesters. These pipelines which take the heat from the CHP to the digesters are made out of PE-hard resistance foam and covered by a protection coating of PE-LD. That makes possible that this pipes can be buried underground. They have an operation temperature of 95°C and a pressure of 6 bars. The size of these pipelines is 32+32/111 mm. The pipelines include all the necessary accessories such as elbows, L-forms and fittings.

This item not only includes the substrate pipelines installation including accessories such as holders, panels or seals. It also includes the installation of two pumps in order to drive the digested material from the digesters to the cleaning system. This two pumps will be eccentric screw pumps and each of them will pump the material coming from half of the digesters, that means each of them will have to pump the material coming from 4 digesters into the cleaning system provided by the company db-technologies B.V.

All the necessary tap hole drilling with the corresponding seals and all pipeline isolation are also included in this item.

h) Gas technology

In this item, we include, on the one hand, all the necessary gas pipelines that have to be built, and on the other hand the gas storing technology in the digesters.

Regarding the biogas pipelines, we can find to types of pipes depending on whether they are installed above or below ground level.

- Biogas pipelines which run above ground level are made out of stainless steel (1.4571) with a DN250.
- Biogas pipelines running underground are made out of PE100 according to DIN 8074/8075. They are pressure pipes with an operating pressure of SDR11. With a DN250, being the rod length of 6m.

The biogas pipelines that have to be built in this biogas plant are roughly the following:

- Biogas pipeline from the digesters and the fermentation residue storage to the condensate separator (Material: PE), including electrical gas valves to control the gas sample. Maximum 5m each pipeline provided on site in the pipeline ditch.
- Biogas pipeline from condensate separator to container where CHP will be installed. Maximum 10m provided on site in the pipeline ditch.

As we already mentioned some items before, each digester has the corresponding gas storing sack on the roof. The sacks are at the same time covered by a pitched roof which protects them from negative effects. Each gas storing sack has a volume of approximately 135 m³.

i) Condensate separator

This item consists of:

- The condensate separator itself which is made out of PE. Attached you can find a sketch with the dimension of the equipment.
- The condensate pump which is an eccentric pump F4 PP/EPDM with a 3-phase AC motor (EEx eIT3) that works at 0,25 kW, with a rotational speed of 450 rpm a voltage between 230/400V and a frequency of 50 Hz. It includes 25 m of condensate pipeline in order to make the necessary connections.
- 2x compact seals KB 240/168mm, coated with V2A and with EPDM rubber quality.

j) Biological Desulphurisation

This item consists of:

- 1 Instrument nozzle made out of 1.4571 material and including a spherical valve DN 50, PN 10 and also made out of 1.4571 material. It will have the corresponding annulus seal for each tap hole with DN 100 and an average tube of 60,3mm which will be provided and installed, it has V4A screws and nitrile rubber quality (oil-resistant). Further details on sizing check the attached documentation.
- The necessary socket fittings, such as elbows, unidirectional valves...
- A panel for the equipment.
- 50 m of textile hosepipe.
- A conical suspended matter analyser made out of stainless steel and borosilicate glass. The effective range is 20-120 L air/min and has an accuracy of 2,5% the end value. It can work up to 20 bars.
- Small compressor with a voltage of 220 V, a frequency of 50 Hz and a power input of 215 W. The operation pressure is 0.2 bar and has a range of pressures between 0,05-0,3 bar; at the operation pressure, the fan efficiency is 200L /min.

k) Gas analysis

In this position we find:

- Biogas analytical device: Model INCA 4000 T100, it has the following ranges of measure:

Methane	0-100 % Vol.	+/- 1%
Carbon dioxide	0-100 % Vol.	+/- 1%
Oxygen	0-25 % Vol.	+/- 2%
Hydrogen Sulphide	0-10.000 ppm	+/- 15%

It has 2 measuring point. The overall size of the device is 740x630x220 mm and its weight is around 29 kilos. The protection class is IP42 and the interface is Profibus-DP. The pump has an output of 20 L/h.

- The connection material needed such as 50 m of pneumatic tube with a diameter of 6mm.
- Small compressor in order to control the valve sets in this item.

l) Plant control

The plant control item includes the following equipment and activities:

- Electric cabinets
- Planning, circuit design and programming of the PLC.
- Horizontal panel and its coupling with weighing cells
- Metrology
- Electrical installations, including material and cable laying.
- Commissioning
- CHP coupling

m) Technical Container

The dimensions of this technical container are 3058/2438/2850 mm and an interior height of 2500 mm. It has galvanized frame, standard insulation with mineral wool, PVC flooring, welded seams and the walls and ceiling are made out of white chipboard. External color: RAL 6005, green moss. It is intended to accommodate the cabinets for control. The price includes transportation but the foundations have to be provided on site.

n)
Screw press separator

The screw press is designed specifically for the dewatering / separation of fermentation residue from dry fermentation plants.

The pressure in the press builds up by a conical screw with adjusted rib heights and a special spiral design.

The press zone length can be adjusted at a standstill and adapted to the particular characteristics of the supply. The reduced torque level allows simplified damping as a combination of the press zone length and pneumatically engageable fins.

The screw press has many advantages, e.g.:

- Screw with special spiral design for high flow rates;
- Manual adjustment of the plug length to the characteristic of the substance;
- Closed hood system - extraction possible;
- Screw flanged - simple installation;
- Change sieve basket system - simple installation;
- Optimized wear protection.

Technical Data

Dry content supply	:	15 - 24 %
Dry content of pressed material	:	40 - 45 %
Dry content of pressed water:		18 - 22 %
Throughput per machine	:	6 - 10 t/h
Screw shaft		
- speed	:	7 - 21 1/min
- installed power of motor	:	22 kW
- power requirement for operation	:	6.7 - 20 kW
Dimensions		
- length	:	5,355 mm
- width	:	1,180 mm
- height	:	1,020 mm
Weight	:	5,500 kg

o) CHP-Unit,

The CHP's are placed into a container. The containers are both thermal –as noise insulated. The containers are foreseen with an entrance door and with any needed breakthroughs for ventilation and other media. It is also equipped with lightning and electric plugs.

The containers with the CHP's are completely pre-assembled with every device and are delivered on-site. All components are pre-wired and pre-ducted. After assembly on-site a testing is done.

Theuses biomass generating sets based on Dresser Rand Guascor SFGLD series, with will include the engines accessories , engines gas train and combined gas booster, engines and adjacent equipment control panel, engine exhaust gas system with exhaust gas heat exchanger, engine LT dump cooling system HT watersystem of the unit, engineering of equipment (pumps dump coolers regulation valves) including dump cooling for the full LT and part wise for the HT system The offered Biogas CHP system will have at full load on output 1x560 KWel, HT water(95 degrees) capacity 1x 560 kwth The proposed total system existing out of 1 CHP units will vary in power between 80-100 % load. The CHP's sustains out of the following components.

- CHP aggregate
- Container
- Gas-safety instruction sequence
- Condenser
- Container-ventilation
- Electrical cabinet with system control
- Display
- Gas treatment
- Gas condensation
- Active coal filter
- flare

Technical specifications:

All Technical specifications are data from the CHP manufacturer. The relevant tolerances must be taken into account.

Technical specifications:

All Technical specifications are data from the CHP manufacturer. The relevant tolerances must be taken into account.

Generator

Generator manufacturer: Leroy Somer / Stamford or Equal

Voltage / frequency 400 VAC / 50 Hz

Electrical data:

Efficiency: 40%

Power output: 630 kW

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Biogas Methane content:	maximum ca. 60% (average 18,88 MJ/m3)
Measurements container	
Max Length:	11.000 mm
Max Width:	3.000 mm
Max Height:	3.000 mm
Weight (ready for service):	23.000 kg
Noise (in 10m clearance):	70 dB(A)

Scope of delivery:

1x Biogas CHP container installation, 560 kW el. With all adjacent equipment and controls to make electrical and thermal energy available, incl. SS steel exhaust pipe
Inclusive an open skid unit with gas blower and gas treatment (heater) according to the mentioned specifications.

2 Gas quantity measurement instruments

Container ventilation system, including filters, air ducting

3) Installation / commissioning

subject to our enclosed terms of installation

Execution of mechanical installation, commissioning and the trial run, in addition to instruction of the operating and maintenance personnel for the described scope of delivery, are **included in the total price**.

The following work and services are included in this price: Provision of required installation personnel and the required tools.

⇒ Commissioning

When the installation is complete, the plant is commissioned. The equipment and substrate required for the commissioning are procured by the customer (AG) at his own expense. In the course of the commissioning the functionality of all components must be verified in the entire system.

Limitation of the Safety and Health Plan

On receipt of an order db technologies will provide the contractual services in compliance with the currently valid industrial safety regulations.

Building owner obligations according to the building site regulations (in particular the preparation of a Safety and Health Plan and the activity of a coordinator) are not included in the contractual services.

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Electrical installation

⇒ complete for all the electrical devices included in our scope of delivery

Design

Design according to the relevant VDE regulations.

Technical Data

Operating voltage	:	400/50 V/Hz
Control voltage for safety features	:	230/50 V/Hz

Installing Control Cabinets

The installation location of the control cabinet is provided in the technology building.

Scope of Delivery

All electrical cables with the required number of wires laid and connected in a way suitable for proper functioning. Delivery and laying of cable trays, junction boxes, armoured steel tubes and the associated fastenings.

Safety Concept

All specifications of the safety regulations for biogas plants (Technical Information 4 of the agricultural professional trade association September 2008) and the listed standards, regulations and provisions are included in the scope of delivery of db technologies.

The fermentation tanks and final storage tanks are secured against unacceptably high pressures by overpressure/under pressure protection (syphon principle); furthermore the gas fill level is detected by sensors and processed by the controller.

Furthermore, the soft cover of the digesters is a safety feature because the roof will yield and protect the tank from damage if all other safety measures against unacceptably high pressures fail.

The small roof areas of the main digesters feature not only the overpressure/under pressure protection, but also overpressure flaps which open e.g. if the overpressure protection is blocked by rising substrate.

Fault messages are sent by SMS to freely selectable telephone numbers. The fault messages are combined in priority groups and can be moved to different numbers.

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Of course, the entire scope of delivery of db technologies, CE-certified, and an explosion protection document will be handed over to the plant operator before commissioning.

4) Customer's responsibilities

Foundations / building ground / building

Building ground report

The building ground must withstand a surface pressure of 25 t/m² without subsidence; freedom from water assumed

Delivery building with lighting, electrics, exhaust air system

Foundations and base plates unless included in the db technologies scope of delivery

Concrete work unless included in the db technologies scope of deliver.

Tanks/pipelines

Fresh water line up to the technology building

Connection of all dewatering lines

Electrical System

Electrical connections and cables from the mains to the control cabinet in the technology building

Transformer installation and connection to the energy supply company

Low-voltage distribution

Operating Materials

Energy and media for installation, commissioning and trial operation of the plant

Heat/heating oil for commissioning the plant

Water for leak-tightness test

General

DSL telephone line up to the technology building and CHP container

Licenses and license fees

Official acceptance by experts

Expert opinion for license planning

5) Economic data

Scope of works and services

The electromechanical part includes:
the engineering, mounting and cold start-up of:

anaerobic digestion units, being:

- 1x dosing units
- 1x dosing screws
- 1x conveyor screws
- 1x feeding pumps
- 1 Digestors hydrolysis
- 1 digestors methane step
- 1x pumps units
- 1x emergency ventilators

Also included in this item are the necessary pipes, instrumentation, appendages, valves, insulation, steel supports and walking floors.

1x dewatering units, being:

- 1x press water pumps
- 1x water tank

Also included in this item are the necessary pipes, instrumentation, appendages, valves, insulation, steel supports and walking floors.

- 1 gas treatment and valorization unit, being:
- 1 gas storage with water seal and condensate vessel
- 1 flare
- 1 cooling unit
- 1 blowers

Also included in this item are the necessary pipes, instrumentation, appendages, valves, insulation, steel supports and walking floors.

1 x CHP motors 630MW

1x the electrical installation, being:

- the switch cabinets
- the electrical wiring for power supply and instrumentation
- 1 PLC and 2 PCs with software
- programming and visualization

-the warm start-up of the installation, being:

- initiation of the reactors
- delivery of the inoculums for the biological start-up of the reactors
- supervision of during this period
- training of the staff, which will be responsible later for the operation of the
- installation, during 1 working week

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Buying price

The price for the complete installation

amounts to: **total price with CHPs € 3.240.600,00, excl VAT**

Time schedule

Delivery date: 38-40 weeks after the order confirmation (signed contract) and first payment.

Payment due dates and conditions

Terms of payment: purely net

- 15 % 10 days from placement of order
- 15 % 90 days from placement of order
- 50 % before delivery, but no later than 30 days
after "ready-to-ship" notification
- 15 % after completion of the installation,
but no later than 3 months after delivery
- 5 % after acceptance, but no later than 30 days
after production start

Upon placement of order we are to receive a standby Letter of Credit from a first class bank in the amount of the order value, minus the first down-payment made.

Shipment of the plant : deliver to the place

Warranty : The claims for defects fall under the statute of limitations without shift limitation 12 months from acceptance, however within 12 months at the latest from the start of operation at the customer's own responsibility.

Wear parts are excluded.

Validity of the offer : 3 months

In case of a cost increase, particularly due to an increase in wages and/or increase of the material prices, 10 % superior to the one at the date of the conclusion of the contract, Orex press technologies is entitled to adjust the single instalments on each payment date. DB technologies shall provide evidence of the cost increase to the customer on demand.

We wish to point out specifically that our liability for consequential damage, i.e. damage not arising directly from the delivered item, is, in general, excluded. This does not affect our liability in accordance with section H.

The information stated above regarding procedural instructions, performance and weight data, and the overall values shall apply as guaranteed data.

Although the delivered plant is a special item of machinery, you have the right to return the plant in the event that performance of contract after subsequent improvements has failed, provided that it has not been possible to make an appropriate settlement by means of a reduction. All further rights are excluded.

6) Not included in the delivery

In the delivery is not included:

- pretreatment of the organic waste and paper waste
- waste water treatment
- storage for the water slash and supply of process water
- any high voltage electrical equipment
- transformer
- lightning protection
- central earthing
- video monitoring system for the process and/or for the complete site
- intrusion alarm system
- all exterior lighting
- all the spare and wear parts
- all tackle paths and hoists for the maintenance of the equipment hoists
(except on top of the digesters)
- all mobile equipment (shovel loader, ...)
- completion of the site, ready for building
- all demolition and disassembly works
- all temporary site facilities for the client and others
- all temporary site utilities connections
- site security and monitoring
- temporary site fence
- soil analysis
- site cleaning
- all construction works such as:
 - all the earthworks
 - all the foundations and piling
 - all the buildings
 - all the concrete works of the buildings
 - all the roads and all modifications to roads



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- the complete sewerage system with necessary connections
- design, calculations and any engineering for the civil engineering and building works
- all building services such as:
 - telecommunications
 - lighting
 - small power distribution and electrical sockets
 - heating
 - air conditioning equipment for certain rooms
 - fire detection and all the firefighting equipment
 - all furniture
- the complete sanitary installation
- the complete workshop accommodation and all tools
- the complete lab accommodation and all the lab equipment
- making and filling up of all ducts in walls, floors and roofs
- digging of all ducts for underground piping and cabling
- delivery and installation of empty pipes for underground cables
- supply and removal of water necessary for performing the water test of the digesters
- personnel , all consumables and maintenance necessary for the operation of the plant during start-up and test period
- obtaining of the permissions necessary for the construction and/or the operation of the plant
- all activities, services, equipment, materials and documents, which are not explicitly mentioned in the scope of works and services of our proposal

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Attn. Mr. Károly Takács

Date: 21.05.2014

Offer number: 2014074

Subject: **Budget Offer sorting line with Orex press 40.000 tons/year**

Your reference: Offer for Sorting 40 Kt/a

Dear Mr. Károly Takács,

Herewith we would like to thank you for your interest in our company. Please find enclosed our price quotation for the delivery of the items listed on the attachment. To our offer our sales conditions apply. Should you desire any further information, please do not hesitate to contact us at phone number + 31- (0) 6 – 557 28 237. We trust to have supplied you with an attractive offer and await your reaction with interest.

Yours sincerely,

db technologies BV

Karl Dirkes
Sales Director

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Description of the sorting installation

- Item -1 system requirements and description of the system
- Item -2 Description of the main products
- Item -3 Services to be delivered
- Item -4 Commercial part from the installation
- Item -5 Economic data
- Item -6 Not including in the delivery

b) Description of the main products from the installation

Pressing of Municipal Solid Waste (MSW) Separation into a biodegradable material and a dry fraction as a basis for RDF/SRF and/ of Recyclable materials

The Principle

Municipal solid waste is essentially composed of five main material groups:

1. Biodegradable waste.
2. Water
3. Minerals, (glass, sand, stones)
4. Metals
5. Solid rest Waste (plastic, cardboard, wood, textiles, paper etc)

By applying the Municipal Solid Waste to an extremely high pressure, the organic and wet fractions are fluidized. In the perforated compression chamber, the solid and fibrous fractions remain. The organic and wet fraction are pressed through the perforation.

The Process of the system

The system is split following phases:

- a) the trucks unload the waste on the tipping floor. With a crane or loader the waste comes in the Storage- and transport floor with drum and bag opening system
- b) After the bag opening system the waste will be transported to a coarse sieve. On this screen the waste stream will split in two fraction. The overs of the screen (recyclable materials) will be transported to the sorting conveyor. On this conveyor the material need sorted out manually with hand picking. The overs of the sorting conveyor will be transported to the RDF sorting line. The under fraction of the screen will be transported to the organic press.

- c) The under fraction of the screen is split into a dry and a wet fraction, the physical and biological characteristics of which allow for advantageous disposal systems.

The dry fraction

The dry fraction will be used as a raw material for refuse-derived fuel (RDF use as fuel for the creation of thermal or electrical energy).

It will be separated in special sorting plants

The wet Fraction

The wet organic fraction is very good biodegradable and will be transported to Anaerobic digestion, to generate biogas for energy

After Aerobic processing, the digestate can be used as a fertilizer

- d) The over fraction of the sorting conveyor and the dry fraction of the press will be transported in a coarse shredder. The pressed fraction will be opened and the sand, glass and inert will be taken out. The next steps will be screening of the sand and fines/ metal separating/ separating of the heavy fraction with a wind sifter/ separating of the glass fraction from the heavy fraction. At the end of the sorting process comes clean fuel RDF SRF out of the sorting line

A summary of the advantages

The Orex press system is among the most modern waste treatment technologies. The pressing and extrusion process is a successful option for waste handlers or recyclers, local government departments, landfill owners, territorial managers of hydro-geological departments and technicians in charge of safeguarding the environment.

The main advantages of the system are as follows:

- The calorific value of the material straight out of the press increased because of the reduction of the water content of the material therefore there is the possibility of using the dry fraction as refuse-derived fuel or as a raw material in Waste to Energy plants, gasification and pyrolysis processes or cement factories.
- The homogeneous nature of the wet organic fraction makes this fraction without any other treatment ideal for anaerobic digestion in order to produce biogas and eventually energy or Natural gas
- The homogeneous nature of the wet organic fraction makes this fraction without any other treatment also ideal for aerobic conversion to make compost.

- The Orex Press takes a lot less space than a conventional separating system with the function to separate organic wet fraction from MSW.
- The modular design and construction, allows adaptation of existing plants,
- Compared to conventional separation plants low running costs and use of low-specialized personnel. The complexity is similar to most balers.
- low cost and a short period required to commission the plant,
- less ground area required for landfill purposes and considerable extension of the life of the refuse-disposal site
- A considerable reduction in the cost of transportation if the extrusion and compaction plant is installed in a location at a lower level with respect to the collection area and if the waste-disposal plant is far from this location,

Description of the Process

The Orex Press treatment system for Solid Municipal Waste involves the use of a very simple form of refuse-disposal technology, which is considered compatible with the situation of practically any territorial or local administration department.

The process involves treatment of the solid municipal waste 'as it is collected'. The solid waste products are submitted to a high-pressure pressing and extrusion process by means of machinery constructed and patented by Orex press and transformed into two fundamental fractions, a dry fraction and a wet fraction with characteristics different from those of the original substances.

The dry phase is formed by materials which are mechanically more stable and strong such as plastic, wood, paper and cardboard, various minerals, metal etc, with the following significant physical properties:

- upstream density 0,7/0,8 t/m³ approx
- residual humidity about 18%-20%
- average calorific level > 14/16000 kj/kg
- organic(exceptwood) < 4-5 %

The wet phase is essentially formed by organic substances (foodstuff refuse) with low quantities of various fibers, plastic materials and minerals The physical appearance is that of a semi-fluid, fine-grain paste (depending on the moisture). In particular, the low quantities of glass and ceramics have a granulometric shape.

- The level of humidity is about 60-70% and there is no floatation of material from the paste-like mass.
- The upstream density is approximately 0.8-0.9 t/m³.

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- In case of anaerobic digestion
 - Biogas yield >120-140m³/h
 - CH₄ approximately 60%
- Extrusion efficiency of digestable organics approximately 95%
- All numbers depend on the infeed material.

Moreover, the mechanical effect, to which the material is submitted in the compression and extrusion phase, causes a breaking-up of the solid material forming the wet phase, which allows for a rapid fermentation process, the initiation of which is also facilitated by a raise in temperature of the extruded mass when it comes out of the extruder compactor.

Because the material is pressed through small holes in the extruder, this functions as a screen allowing only small material to reach the wet fraction.

During the compression, the solid material in the compression chamber holds itself, allowing only minor movement. Thus less solid material will end up in the wet fraction.

Because of this, mechanically hazardous material will not end up in the wet fraction. Like stainless steel knives, that could ruin pump linings. This results in a lot less downtime of fermentation

These conditions guarantee durable fermentation process.

After fermentation, The digestate could be treated by drying, screening and sifting to make the split of water, minerals and high quality stable RDF possible.

The process described above allows the user to obtain the following products from municipal solid waste (mass% number depends on the input):

- wet fraction 50-70 % approx
- dry fraction 30-50 % approx
 - Off which:
 - metals 1-3 % approx
 - sand and minerals 15-20% approx
 - remaining plastics, wood, cardboard, textiles and leather and whatever is in the solid waste.
 - The remaining organics 5% approx

All of the above products are almost biologically inert and therefore do not generate the negative effects typical for a landfill for municipal solid waste such as leachates, pollutants, biogas, and noxious odor.

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The Heart of the Process: is the Orex press system

The Orex Press compactor, which performs hyperbaric separation of waste, is the core of the system.

Operation of the machine is done by a hydraulic power pack. Controlled via PLC possibly with a Scada layer no top to make supervisory controls possible from the Orex Press factory.

Usage of products coming from the extrusion process**Dry Fraction**

The dry fraction, characterized by a degree of humidity lower than 20 %, can be used in incinerator plants, gasification, pyrolysis, cement factories systems as Refuse Derived Fuel (RDF). This contributes significantly towards the reduction of the mass of waste transferred to landfill areas and disposal sites in general and the equally significant advantage owing to a recovery of energy.

If the mineral and metal fraction are separated from the dry waste the calorific value will increase accordingly, also the amount of slag will reduce significantly since the inert fraction that is taken out is the main part of the slag

The RDF can be formed into bales or briquettes for later use. To facilitate transportation the blocks can be wrapped in (recycled) plastic.

If incineration for the conversion to energy is not an option, nor is any other thermal conversion, then the remaining option is disposal of the material to a landfill. It should be noted that the size of the mass is reduced five or six times with respect to the size of the original waste treated, this because the organic wet fraction is out of it and the dry fraction is compacted. The immediate advantage, besides the considerable saving due to the reduction in transportation cost is that of a significant increase in the life of the landfill area and simplification of the operation cost of the disposal unit itself because of the fact that the processed waste material is highly biological inert.

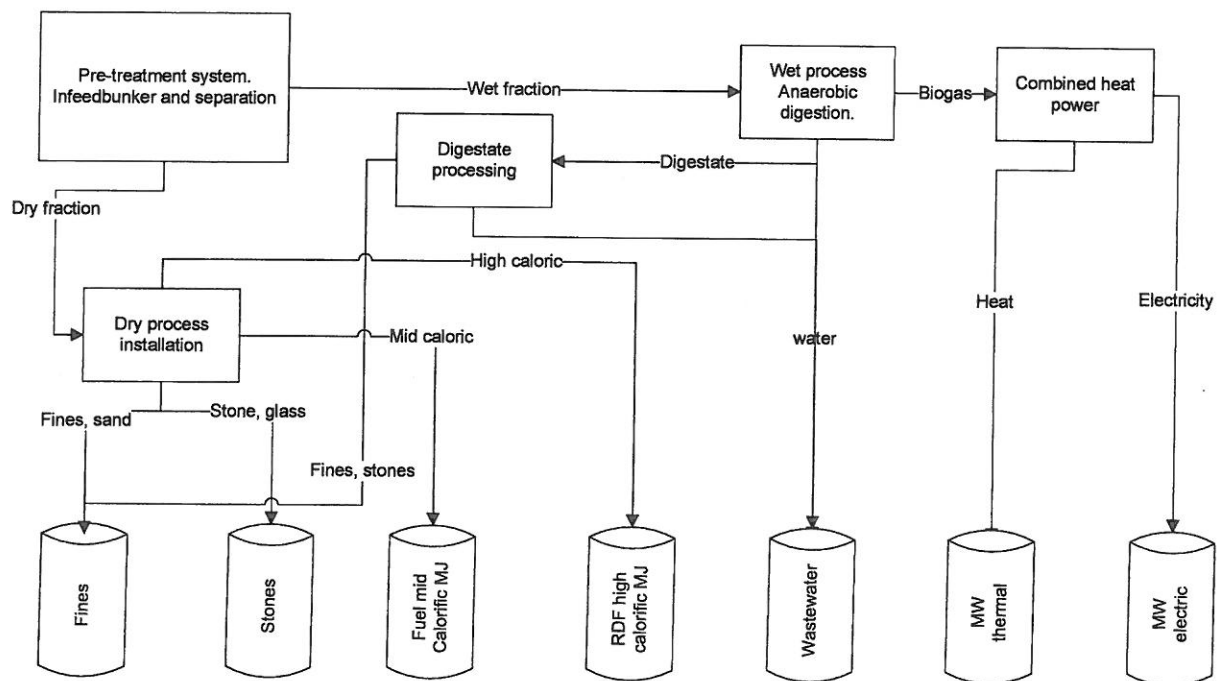
Organic Fraction

The organic fraction that is produced by the Orex Press is very suitable as raw material in digestion or composting processes because of the following reasons:

Anaerobic Digestion: the extrusion matrices are sized to optimize the amount and grain of the organic fraction and to minimize the moisture content in the dry fraction. Thus the same material is optimize for anaerobic

digestion. Anaerobic of Organic wet fraction from MSW is considered very difficult and unstable. The main reason for this is amount of inert materials in the fraction like Minerals/sand/glass, floating fraction and harmful metals like stainless steel knives and forks. Problems like proper blending is difficult with the heavies and lights, the minerals fill up the tank and reduce the space. But most severe are the cutting knives that damage the machine components. Because the raw material that comes from the press is pressed through small holes, this guarantees the no big parts will end up in the material. Resulting no downtime in the digester due to damaging material. The amount of mineral fines is a lot less then through conventional screening because the material is pressed while it is how steady not allowing the sand and glass pieces to move to the screen. The same is applicable for the film fraction, there is some small film in the material but not disturbing for the digestion process. Because of this stable raw material, it is even possible to use dry digestion systems.

Main Process flowchart



Orex Press systems is a whole new way of separating MSW into two valuable streams of material that each are more valuable with the absence of the other.

2) Description of the main products from the installation (input Mass flow 15 t/h MSW and 5/h dry waste)

2a) Storage- and transport floor with drum (Mass flow 20 t/h MSW)



Floor-length internal	: 5.000 mm
Bunker-length external	: 6.500 mm
Floor-width internal	: 2.000 mm
Bunker width external	: 2.480 mm, excluding drive unit and bearings for the metering drum
Bunker-height external	: 2.500 mm, incl. supporting legs
Drive-unit	: 1 front mounted drive unit type SF 96 DMC per bunke
Loading-height	: 2.000 mm.
Storage capacity	: approx. 20 m ³
Product specification	: MSW
Bulk density	: 0,4 T/m ³
Unloading capacity	: approx. 120 m ³ /h at full speed and max. load
Floor speed	: up to 0,5 m/min
Hydraulic power pack	: 1 x 4,0 kW
Pump capacity/pressure	: 25 l/hr at 80 bar
Tank capacity	: 160 L
Movement cycle	: Standard step-by-step cycle. Standard with backward and forward function (Be-directional)
- Floor-profiles	: standard high quality aluminium floor profiles 7 mm, alloy
Frame height approx. 500 mm incl. frame legs.	
Drive-unit	: 1 self-supporting under mounted steel sub frames with 3 hydraulic double action cylinders.
Cylinder capacity with 200 bar max.	: approx. 17 t. for each cylinder

Side- and back-walls : Constructed from 4 mm. steel plating with reinforcements. An additional double T-profile will be placed over the loading side to protect against damage caused by the loading equipment.

Example of a standard storage bunker with extended supporting frame and side walls.

Operation : The platform-floor can be switched on and off by an external signal, delivered by the customer, or by switches on the central operation board on the control-case, connected to 24VDC main supply.

Floor-speed : The floor speed is adjustable by means of a proportional adjustable flow valve.

Drum feeder : 1 manganese steel feeding drum with a diameter of approx. 1.500 mm.
The drums are provided with fingers and/or paddles across the drum.
The drum has his own drive-unit 7,5 kW, rpm 30, E-motor SEW with automatic break.
1 frequency controller (see also main control box)
The drive-unit and drum are protected against overload by using an overload protection switch controlling the floor speed.

Hydraulic aggregate consisting of:

- 1x tank incl. hydraulic oil.
 - 1x gauge-glass
 - 1x drain-valve
 - 1x level controller with 1 switch outputs and display
 - 1x temperature controller with 1 switch outputs and display
 - 1x repercussion valve
 - 1x proportional adjustable flow-valve
 - 1x E-Motor 4,0 kW - 1450 RPM - 415 VAC - IP 55.
 - 1x "Load sensing" controlled hydraulic pump.
 - 1x pressure- and relief-filter.
 - 1x manometer 0-250 bar - ø63 mm, incl. valve.
 - 1x main-valve unit.
 - 1x Oil heating system 1.000 watt with automatic temperature control.
 - 1x integrated oil cooling unit.
 - System is placed in a oil catch-pan.
- Incl. all other necessary parts.

Main-control box : 1 enclosure box Eldon, type MAD consisting of:
- 1x main control switch
- 1x Siemens S7-1200 PLC control 1x motor control groups 4,0 kW with soft starter - hydraulic pump

- 1x motor control group 7,5 kW – drum feeder drive with frequency converter (Danfoss) to control automatically the fan speed and automatic reverse control.
- 1x timer for bypass-valve
- 1x power-supply 24 VDC
- 1x local/automatic mode selector switch
- 1x loading/neutral/unloading selector switch
- 1x oil low level control indicator with 1 set points
- 1x temperature control indicator with 1 set points
- 1x floor speed control, 4 – 20mA connected with MCC (automatic mode)
- 1x potentiometer 0 – 10 V to set the floor speed
- 1x emergency stop relays
- 1x Emergency stop/reset button
- all cables and wirings are numbered

2b)Description of al conveyors

The trough conveyor is designed for transporting middleweight to heavy material. When heavy material is transported, extra impact plates are placed in the infeed of the conveyor.

Basically all the construction parts are computer aided manufactured lasered and bent steel plates. To ensure maximum quality.

The conveyor consists of a driven- and a tailsection. Between these 2 sections the conveyor is build from sectional modules.

The modules are constructed of strong 5mm sheetmetal.

At the infeed the conveyor is provided with 4mm thick sideplates. These sideplates are equipped with hatches for cleaning.

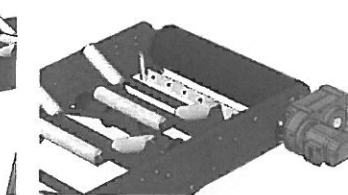
The left –and right sideframes are connected with each other with idler sets and steel supports plating.

At all infeed positions of the conveyors there are chutes to guide the material away from the side of the belt. These are constructed in 4mm sheetmetal.

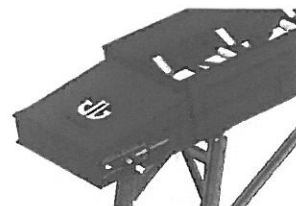
The conveyorbelt is driven by an SEW FA77 motorreductor . It is mounted directly on the driven drum shaft.



Infeed chute side plates with cleaning hatches



Driven section



Trail section

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Driven section:

The side plates of the drive section are made of 5 mm steel sheet metal.

The driven drum is Ø250mm or Ø320mm in diameter. This depends on length, width and inclination of the conveyor. This driven drum covered with 8mm rubber, ETR70, to improve traction of the belt.

A scraper, with HDPE1000 scraperblade, is placed beneath the driven drum

Tail section:

The side plates of the tail section frame are made out of 5 mm steel sheet metal.

For safety reasons, the tail section is totally closed. The top is closed with a cover.

The tail drum is Ø250mm or Ø320mm in diameter. This depends on length, width and inclination of the conveyor.

To clean the tail section a cleaning hatch is placed on both sides of the steel side frame.

The tail drum is placed in take-up bearing units with stretcher frames to easily stretch the rubber belt accordingly.

A ploughscraper, with HDPE1000 scraperblade, is placed right before the tail roller to clean material away from the inside of the belt.

Conveyor belt:

The rubber surface slides over steel trough rollers with a diameter of Ø89mm.

3 trough rollers will shape the trough form. (for the 650mm wide conveyor, 2 Ø89 trough rollers)

In the return path of the conveyor return rollers are foreseen. These rollers have a diameter of Ø89mm and have a wall thickness of 4mm. the roller is foreseen with rubber donuts, with a minimal outer diameter of Ø133mm. This is to prevent sticking of material on the rollers.

With these return rollers the conveyor should be aligned.

The conveyor is stretched on the right tension with the 2 take-up bearings with stretcher frames in the tail section.

The standard conveyor belt has a top-layer of minimal 3mm. It has minimal 2 internal layers and an under-layer of minimal 1,5 mm. The belt is wear resistant.

It has a minimum breaking strength of 250 N/mm²

Maintenance:

For safety issues it is always difficult to combine a closed conveyor with a maintenance friendly construction. For this reason we have made a lot of access possibilities so cleaning and exchange of parts is not a very complex operation

Rubberbelt: to exchange a rubberbelt for a new fully sealed one, the rear drum section can be fully taken off to replace the belt. In case the belt must be vulcanized, this can be done in the middle section of a conveyor. In case there is a sideframe on top, this can be taken off because it is build modular.

The motor is shaft mounted, this means low maintenance.

Specifications:

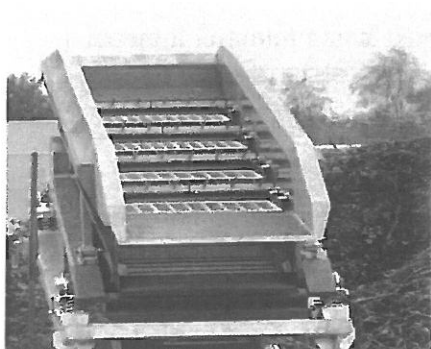
Support:	The conveyor is supported on a steel frame
Frame:	Steel
Idlersets:	Steel
Idlerrollers:	Steel, Ø89, Coating Epoxy grey aluminium – RAL9007
Returnrollers:	Steel, Ø89, Coating Epoxy grey aluminium – RAL9007, These rollers are provided with rubber donutrings
Drivedrum:	Steel Ø250mm or Ø320mm (depends on length, width and inclination) Coating grey aluminium – RAL9007 covered with 8mm rubber ETR70
Tail drum:	Steel Ø250mm or Ø320mm (depends on length, width and inclination) Coating grey aluminium – RAL9007
Conveyorbelt:	EP250/2 3+1,5Y
Plough scraper:	included
Drivedrum scraper:	included

2b) Sliderollerbelt conveyor 1800 x 19500 (Mass flow 20 t/h MSW)

Unders lamellascreen

Dimensions	: 1.200 x 19500mm
Belt speed	: 20-40 Meter per minute
Drive	: 1 x E-motors, 5,5 kW
System voltage	: 400 Volt, 50,0 Hz
Type of protection	: IP65
Belt type	: EP400/3 4+2
Cover plates	: included
High side plates	: included
Belt cleaning	: Self tensioning scraper

2c) Lamella screen (Mass flow 20 t/h MSW)



The lamella screen is designed to separate several types of material that is difficult to screen effectively. Waste like large plastic film or forest residue tend to wrap around the stars or drums of a star or drum screen, resulting in low productivity. On the lamella screen, however, this material will slide over the screen.

The lamella screen consists of two layers. A set of cascades improves its efficiency and capacity. The top layer is a finger screen. This guides the voluminous material over the complete screen. Big pieces or film pass over all finger decks in succession. The smaller and midsize material work their way through the finger screen onto the lower positioned plates. These specially designed plates screen out the product in the desired accurate dimension. The plates are also mounted in a tiled cascade to improve the capacity and turn the material. In this way the lamella screen sorts more effectively and makes cleaning and maintenance less necessary than alternative screening methods.

The lamella screen is available in various sizes. From 1.4 up to 2.5 meters wide with lengths from 4 to 8 meters. The capacity ranges from 40m³/h up to 300m³/h depending on the material to be sorted. Screen sizes can be delivered from approximately 30mm up to 200mm.

Technical Data:

Screen width: 1600 mm

Screen length: 5000 mm

Screen size: bigger than 120mm

Motor: 15 kW

Weight: 8300 Kg

2d) Wave screen

(Mass flow 19 t/h screened MSW)

This screen separates the Material smaller than 8mm.

Description:

The flip flows creen is executed as a bolted construction. Two, relatively to each other, moving frames are supported on a support frame. Flexible screen decks are stretched between the frames. With an excenter driven unit the two frames are moved. With this movement the typical screening movement occurs. The acceleration prevents stuffing up and sticking of the material onto the screen deck.

Three movements occur with this excenter driven unit.

Crossmovement in infeed area

Material is discharged into the flip flow machine. The material falls vertical on the screen deck. Because of this vertical direction a ballistic effect occurs. The material will loosen quickly.

Linear movement in central area

This swing movement takes care of an optimal contact between material and screen deck. Because of this optimal contact high efficiency in screening is possible.



Elliptical movement in outlet area

This movement, in the opposite transport direction, slows the transportation speed. The material is thrown over extra. High size-accuracy occurs.

The machine is executed as a bolted construction and exists out of the following parts:

- internal frame
- outer frame
- Screensupport with bracket for adjusting the angle of the screen
- Flexible angle-adjustment, including fastening material
- Coverplates
- Infeed part
- Outlet part for overfraction
- Outletflanch for screened underfraction
- Driven shaft (Excenter shaft) with bearings
- Motorparts like V-belts, pulleys and motor

Technical Data:

Screen width: 1000 mm

Screen length: 4000 mm

Screen size: smaller than 10mm

Motor: 7,5 kW

Weight: 5300 Kg

2f) Trough conveyor Sorting conveyor 1400 x 10500

Inc. sorting cabin and ventilation

(Mass flow 8-10 t/h overs from MSW)

Dimensions	: 1.400 x 10.500mm
Belt speed	: 20-40 Meter per minute
Drive	: 1 x E-motors, 5,5 kW
System voltage	: 400 Volt, 50,0 Hz
Type of protection	: IP65
Belt type	: EP400/3 4+2
Cover plates	: included
High side plates	: included
Sorting chutes	: 6 normal chutes
Belt cleaning	: Self tensioning scraper



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NL-7575 EP OldenzaalE info@dbtechnologiesbv.nl
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F (+31) 541 74 50 30**2e) Sliderollerbelt conveyor 1000 x 7500****(Mass flow 16 t/h organics from MSW)**

Under lamellascreen

Dimensions	: 1.000 x 7.500mm
Belt speed	: 20-40 Meter per minute
Drive	: 1 x E-motors, 2,2 kW
System voltage	: 400 Volt, 50,0 Hz
Type of protection	: IP65
Belt type	: EP400/3 4+2
Cover plates	: included
High side plates	: included
Belt cleaning	: Self tensioning scraper

2h) Sliderollerbelt conveyor reversible 1000 x 7500**(Mass flow 16 t/h organics from MSW)**

Feeding two Orex press

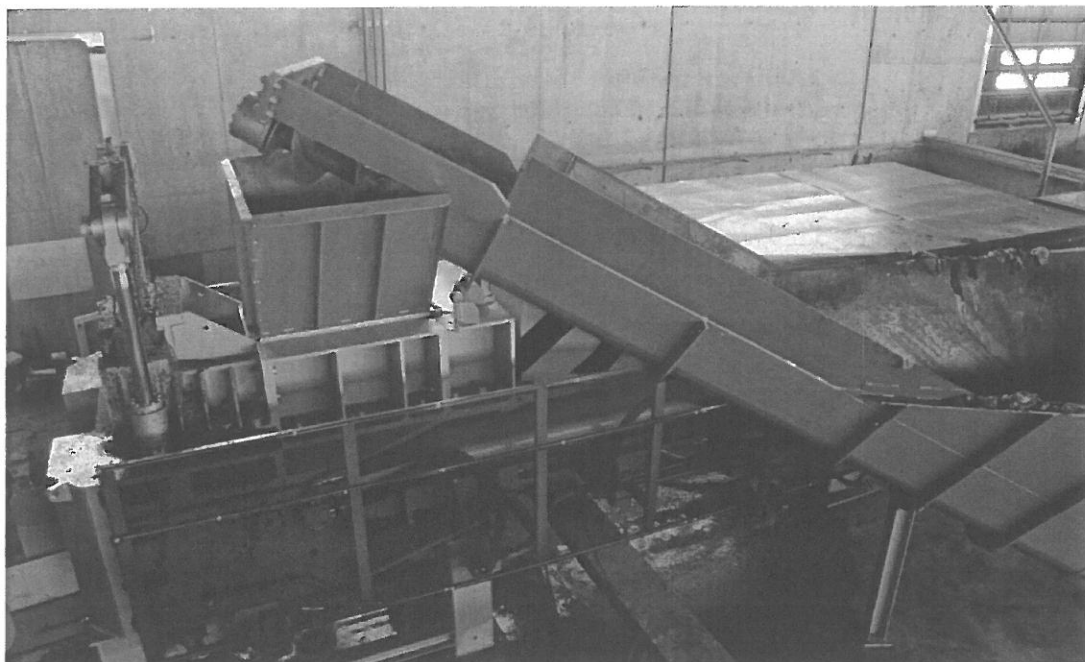
Dimensions	: 1.000 x 7.500mm
Belt speed	: 20-40 Meter per minute
Drive	: 1 x E-motors, 2,2 kW
System voltage	: 400 Volt, 50,0 Hz
Type of protection	: IP65
Belt type	: EP400/3 4+2
Cover plates	: included
High side plates	: included
Belt cleaning	: Self tensioning scraper

2j) Feeding hopper with screw for stocking material**(Mass flow 16 t/h organics from MSW)**

The hopper system contains the box for the collection of the waste after that the material goes by a big screw in hopper of the press. Thru the hopper system the waste is carried into the extrusion chamber, where it undergoes the extrusion compression treatment.

length internal	: 3.000 mm
Bunker-height external	: 1.500 mm, incl. supporting legs
Loading-height	: 1.000 mm.
Storage capacity	: approx. 2 m ³
Product specification	: MSW
Bulk density	: 0,6 T/m ³
Power	: 5,5 kW

2i) Orex Press extruder press (Mass flow 16 t/h organics from MSW)



The Orex press 500 with the capacity of 12,5 t/h (by density 500Kg/m³) described as follows:

The machine separates the incoming organic waste into wet and dry fraction.

The organic waste undergoes a very high pressure in a perforated extrusion chamber: as a result the organic fraction is pushed by the difference in pressure between the interior and exterior of the chamber and is separated from the parts mechanically more resistant (paper, carton, plastics, rubber etc.).

The products obtained on average (depending on the characteristics of the incoming organic waste) are:

- dry fraction: about 30-40 %
- wet fraction: about 60-70 %

The machine has a modular construction, the 'active part', the cylinders, the crank system and all the functional parts are located in a self-supporting structure in an electro-welded carpentry.

In the central part of the structure is installed the main cylinder and the extrusion chamber.

The extrusion process cycle is made of three distinct phases: the feeding phase, the compression and the expulsion phase.

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The main cylinder feeds the incoming organic waste from the feeding hopper into the extrusion chamber and press it. When the compression phase is finished a front door opens and the main cylinder evacuates the dry fraction from the extrusion chamber.

The working of the machine is controlled by an hydraulic power-pack.

PRINCIPAL COMPONENTS:**-Main body of the machine:**

The main body of the machine contains the feeding hopper, the main cylinder, the extrusion chamber and the front door system.

-Hydraulic station:

The hydraulic station contains of the feeding pumps of the cylinders with the relative electric driving motors, the tank of the hydraulic oil, the distribution parts, the valves and the distributors, the air operated heat exchangers, the steel pipes, and flexible pipes for in and out of the pumps and of the feeding of the cylinders, the accessories (air filters, oil filters, levels controls, pressure and temperature sensors).

Distribution:

- hydraulic drawers at four ways;
- logic elements
- mounting on blocks;

Working pressure 280 bars.

-Electric box:

The electric station consists of the electric compartment with the respective electrical apparatus, vices on board press-extruder and hydraulic station, the command panel.

The control of the functions of the machines is ensured by a PLC, with the possibility of tele-control via modem.

-Main working parts:

N° 3 principal electric motors asynchronous tri-phases with a power of 75 kW each

N° 3 pumps with variable cylinder displacement;

N° 3 pumps with fixed cylinder displacement;

Main technical characteristics:

Maximum length	8.000 mm
Maximum width	2.000 mm
Height	3.600 mm
Maximum thrust	400 tons
Installed power	235 kW
Working pressure	280 bars
Weight	56 tons
Hydraulic oil tank capacity	7.000 liters

Hourly production: 12 t/h by 500kg/m³ (it depends from the characteristics of the incoming organic waste).

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2k) Sliderollerbelt conveyor 1000 x 7500**(Mass flow 16 t/h organics from MSW)**

Conveyors organics (combination for both presses)

Dimensions	: 1.000 x 10000mm
Belt speed	: 20-40 Meter per minute
Drive	: 1 x E-motors, 2,2 kW
System voltage	: 400 Volt, 50,0 Hz
Type of protection	: IP65
Belt type	: EP400/3 4+2
Cover plates	: included
High side plates	: included
Belt cleaning	: Self tensioning scraper

2l) Sliderollerbelt conveyor 1000 x 7500**(Mass flow 16 t/h organics from MSW)**

Conveyors organics (combination for both presses) in the container

Dimensions	: 1.000 x 6000mm
Belt speed	: 20-40 Meter per minute
Drive	: 1 x E-motors, 2,2 kW
System voltage	: 400 Volt, 50,0 Hz
Type of protection	: IP65
Belt type	: EP400/3 4+2
Cover plates	: included
High side plates	: included
Belt cleaning	: Self tensioning scraper

2N) Sliderollerbelt conveyor 1000 x 11000

(Mass flow 10 t/h dry fraction after press from MSW)

Dry fraction (horizontal)

Dimensions	: 1.000 x 11000mm
Belt speed	: 20-40 Meter per minute
Drive	: 1 x E-motors, 4 kW
System voltage	: 400 Volt, 50,0 Hz
Type of protection	: IP65
Belt type	: EP400/3 4+2
Cover plates	: included
High side plates	: included
Belt cleaning	: Self tensioning scraper

2M) Primary Shredder

Material : industrial waste dry fraction of the Orex press (wooden pallets, plastics, etc.)

Input : various

Output : till 150 mm

Capacity : 15-20 ton/hour

Two Shaft Shear Shredder

Standard specifications:

Feed opening : approx. 1411 x 1790 mm

Rotor diameter : 800 mm

Rotor length : 1956 mm

Rotating speed : 10 Rpm

Blades : 12 pcs - thickness 2 x 75 mm = 150 mm

Motor power : 55 + 55 kW

Total length : approx. 2392 mm

Total width : approx. 5800 mm

Total height : approx. 3327 mm

Electrical cabinet for shredder included

Overload protection included, fully adjustable

PLC controlled, Siemens. Fully programmable

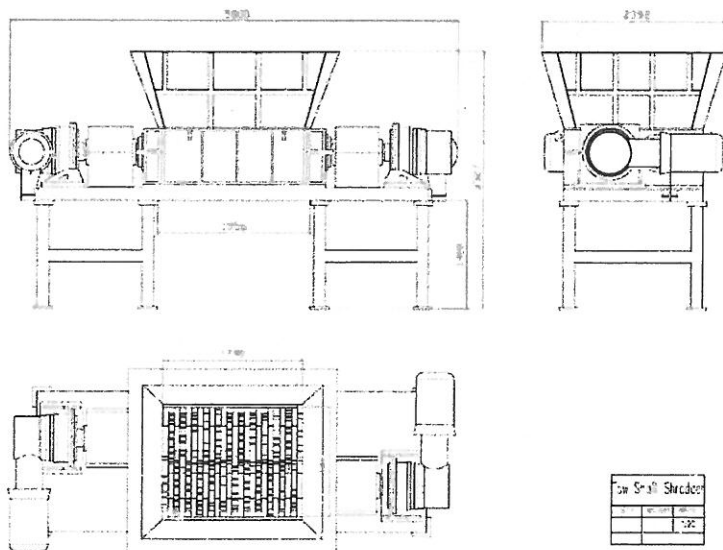
Power consumption is controlled via this PLC.

Control panel with buttons

Torque per shaft 52.5kNm

Tangential Force on the tip is at least 130kN (13T).

Radial the force can be significantly higher.



2P) Sliderollerbelt conveyor 1000 x 15000

(Mass flow 2 t/h dry fraction after press from MSW)

Dry fraction inclined

Dimensions	: 1.000 x 15000mm
Belt speed	: 20-40 Meter per minute
Drive	: 1 x E-motors, 4 kW
System voltage	: 400 Volt, 50,0 Hz
Type of protection	: IP65
Belt type	: EP400/3 4+2
Cover plates	: included
High side plates	: included
Belt cleaning	: Self tensioning scraper

2Q) Magnet with support

(Mass flow 2 t/h dry fraction after press from MSW)

A permanent magnet is placed over conveyor and transports the Fe from the conveyor into the reserved space under the conveyor. This magnet is placed on its own substructure with a chute to guide the material into a container.

Overbelt permanent magnet

Magnet 1250x778x312

Flippole 160x778x312

Height 320mm above product

Drive bonfiglioli 2,2kW 400V/50Hz

Belt EP400/3 with cleats

Weight 1815kg

Supportframe with chain connection, adjustable height

2S) Wave screen

(Mass flow 5 t/h dry fraction after press from MSW)

This screen separates the Material smaller than 10mm.

Description:

The flip flowscreen is executed as a bolted construction. Two, relatively to each other, moving frames are supported on a support frame. Flexible screen decks are stretched between the frames. With an excenter driven unit the two frames are moved. With this movement the typical screening movement occurs. The acceleration prevents stuffing up and sticking of the material onto the screen deck. Three movements occur with this excenter driven unit. Crossmovement in infeed area



Material is discharged into the flip flow machine. The material falls vertical on the screen deck. Because of this vertical direction a ballistic effect occurs. The material will loosen quickly.

Linear movement in central area

This swing movement takes care of an optimal contact between material and screen deck. Because of this optimal contact high efficiency in screening is possible.

Elliptical movement in outlet area

This movement, in the opposite transport direction, slows the transportation speed. The material is thrown over extra. High size-accuracy occurs.

The machine is executed as a bolted construction and exists out of the following parts:

- internal frame
- outer frame
- Screensupport with bracket for adjusting the angle of the screen
- Flexible angleadjustment, including fastening material
- Coverplates
- Infeed part
- Outlet part for overfraction
- Outletflanch for screened underfraction
- Driven shaft (Excenter shaft) with bearings
- Motorparts like V-belts, pulleys and motor

Technical Data:

Screen width:	1000 mm
Screen length:	4000 mm
Screen size:	smaller than 10mm
Motor:	7,5 kW
Weight:	5300 Kg

2T) windsifter

(Mass flow 16 t/h dry fraction after press from MSW)

This windsifter separates 75% of the heavy parts

This windsifter works with principles:

- Air resistance: different materials have a different air resistance

The over fraction of the flip flow screen falls through the airflow. This airflow blows the light fraction up into the bunker

The heavy material falls into another bunker

By varying the airflow, the separation level can be influenced.

Air capacity: 12.000 m³/h for 2.000 kg/h – large radial ventilator

Lighter parts are lifted up by the air flow

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2P) Sliderollerbelt conveyor 1000 x 6000

(Mass flow 0,5 t/h dry fraction after press from MSW)

Conveyors heavy fraction after wave screen

Dimensions	: 1.000 x 6000mm
Belt speed	: 20-40 Meter per minute
Drive	: 1 x E-motors, 2,2 kW
System voltage	: 400 Volt, 50,0 Hz
Type of protection	: IP65
Belt type	: EP400/3 4+2
Cover plates	: included
High side plates	: included
Belt cleaning	: Self tensioning scraper

2U) Non Fe Separator with support

Conveyor to the eddy current

Dimensions	: 2000 x 5500mm <18°
Belt speed	: 20-40 Meter per minute
Drive	: 1 x E-motors, 7,5 kW
System voltage	: 400 Volt, 50,0 Hz
Type of protection	: IP65

A Non-Ferrous separator makes use of the electrical conductivity and density of the constituents to be separated.

This Non-Ferrous separator is used to sort out the Non Fe fraction in the material-flow. The working principle is in general comparable to that of an AC motor. By applying a rotating magnetic field, electrical currents are induced in the particles to be separated. These currents produce an opposing magnetic field. This repulsive magnetic field provides the force, which energizes the particles and allows them to be separated. Particles with good electrical conductivity and a low density (i.e. aluminum and copper). are strongly influenced by the induction pulley. Particles with poor electrical conductivity and a high density (i.e. stone) are hardly influenced by the induction pulley.

Drive (vibrating feeder)	: 2 x 0,8 kW
Drive (separator)	: 4,2 kW
Drive (conveyor)	: 2,2 kW

2V) OPTION) optical sorter – 2-Way

Reflecting NIR (Near Infra Red) Spectroscopy System in combination with colour sensor for the identification of different plastics .

To sort out PVC, from a mixed stream.

- Designed Capacity: 6,0 t/h
 - Material size: 30 – 200 mm
 - Specific weight of the material: 50 kg/m³
 - Recovery rate: > 95 %
 - Sorting width: 2.800mm
 - Length of the in feed conveyor = 4,5m
 - Speed of the in feed conveyor adjustable to max. 3,0m/s
 - 64 Sensors with a horizontal distance of 31,0 mm and fibre-optic cables connected to the 64x multiplexing unit.
 - Array of 64 high speed air valves and 256 ejection nozzles.
 - Valve distance: 31,0 mm
 - 4 ejection nozzles per valve
 - Incl. supporting frame and covers
- Power supply cabinet with control terminal including MODEM for remote access



2W) OPTION) Trough conveyor 650x2500

Beltwidth: 650 mm

Length: 2500 mm

Angle: 0 grad

Side walls with roof: Over the complete length of the conveyor, sidewalls are placed

Belt: EP250/2 3+1,5 - cleated

Drive: Engine with gearbox, 1,1 kW

Drive head: Ø332, cleated with rubber

Tension head: Ø320

Speed of belt: 0,5 m/s

Coverplates: coverplates of 1,5 mm steel plates are mounted under the conveyor for safety till 2400mm high.

Support: included.

Surface: RAL 5005 blue (one layer 70 µm)

Infeedchute: included

Ploughscraper: included

Headrollerscraper: not included, because of cleats on belt

2X) OPTION) shredder, low speed machine

Input material

Description	:	overflow of screen of industrial waste
Size of input	:	<50-300mm
Pre-treatment of input	:	pre-shredded, metal sorted, screened, without foreign parts
Density of material	:	150-200kg/m ³
Feeding	:	continuous with conveyor belt

Output material

Size	:	30 mm, small percentage on oversize possible
Throughput in mg/h	:	4-5
Annual quantity	:	
Operating hours / day	:	8
Operating hours / year	:	1.800
Evacuation	:	conveyor belt, on site
Further processing	:	Burning in <u>rotary furnace</u> , cement industries

Conditions on site

Power supply	:	400V tolerance +10% -7%
Voltage	:	50 Hz +-1%
Ambient temperature	:	shredder -15°C - +40°C control box -15°C - +40°C
Dust pollution	:	shredder high dust pollution control box high dust pollution

Fresh air of control box and shredder is supplied on site.

Rotor drive	:	160 kW electro mechanical
El. drive hydraulics	:	3,0 kW
Cutting chamber dimensions	:	1900 x 1200 mm
Rotor Ø	:	1100 mm
Working width	:	1875mm
Rotational speed	:	138 rpm
Torque	:	8 300Nm

Rotor knives:

Number of cutting tools	:	24 pcs.
Knife size	:	48x32x156 mm
Main stator knives	:	12 pcs.
Knife size	:	48x32x156 mm

Side stator knives	:	12 pcs.
Knife size	:	48x32x156 mm

-) incl. pre tensioned main static knife holder
-) incl. quick change cutting system

Adjustment control

Control box	: type Rittal
Control	: Siemens PLC S7-313C, load depending
Operating panel	: Siemens OP77A
Size L/H/D	: approx. 1800/1400/300 mm
Tension	: 400 V, 50 Hz
Weight	: approx. 22.000 kg
Painting	
Machine housing, support	: RAL7012 basalt grey
Hopper	: RAL1004 golden
Screen	: RAL7012 basalt grey
Control box	: RAL7035 light grey

Included in standard scope of supply:

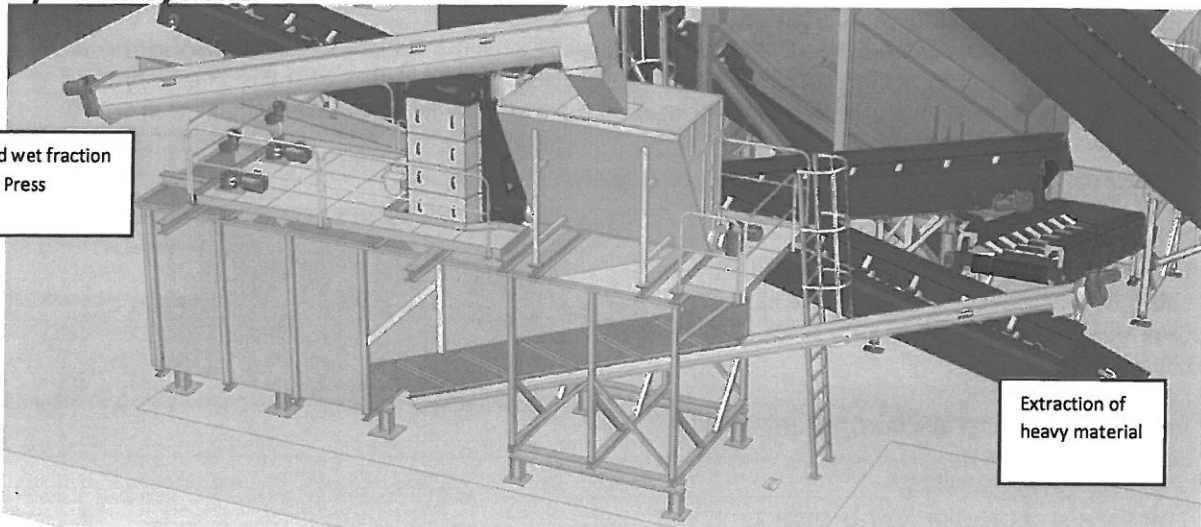
- Control
- Hopper
- Anti-vibration plates
- Central lubrication
- Modem for transition of operating data

2AA) Dynamic Cyclone System requirements:

The quoted installation is based on the following material specifications:

Type installation	: separation system for stones and plastics from organic wet fraction
Incoming materials	: fine shredded organic wet fraction
Capacity	: \pm 2-3 tons/hr

Dynamic Cyclone



The material, coming from the Orex press, contains a small part of plastics and glass/stones. Because a wet digester is projected, the fine plastics will float and the glass/stones will sink in the digester. Material builds up inside over a longer period.

In two steps the amount of materials can be reduced significantly.

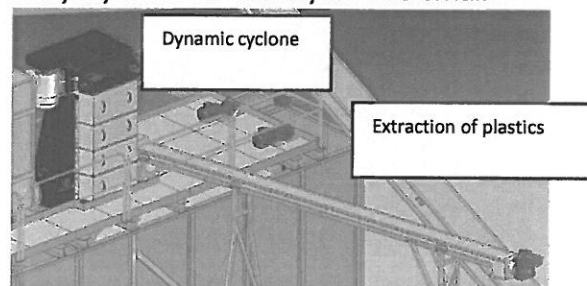
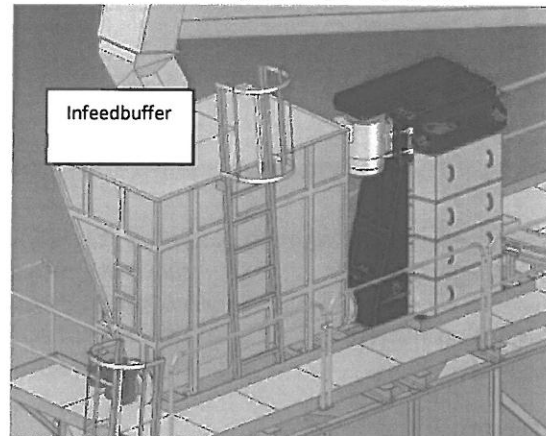
The first step is the extraction of the floating fraction by means of moisture increase and screening with centrifugal force.

The second step is the extraction of the sinking fraction in a sink process.

System Description:

Dynamic cyclone:

The organic wet fraction, is brought into a buffer tank where it could be mixed with process water coming from the digester or clean water this is done to make the material more liquid. A TS of approximately 12-18% gives a very good separating result. The material then is pushed with an auger into a chamber. This cylindrical chamber works as a cyclone. The function of a cyclone is to force material to the outside of the cylinder. This is done by a strong mixer. This mixer is positioned in the center of the cylinder and rotates the material at high speed, this creates a strong centrifugal force. The cylinder has a perforation, slightly bigger than the perforation of the press. The centrifugal force, the added water and the dimensions result in flow of the material through the perforation. The material bigger than the holes are not pushed through the material. The pressure is not big enough for that. This material is typical plastic pieces of film. The rotor inside the cyclone has blades that have an upward movement to push the plastics up inside the cyclone. Along the wall of the cyclone, the organic fraction is pressed through the holes and the remaining plastics falls over the top where it is transported away by a screw conveyor. The small pieces of film are wet.



Technical description:

Infeed buffer 2.4x1.5x2m. Aisi304; 4mm thick

One wall vertical, one wall sloped to prevent bridging

Detachable roof

Auger U320 Spiral 280mm, 3mm thick

Length 3500mm

1.5kW IP56 SEW FA77

Stainless steel Aisi 304 U-trough

Mechanical seal adjustable

Lining HDPE 10mm

Water connection (fresh water or water from digestate Screwpress)

Level sensors maximum and minimum Endress & Hauser

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Cyclone

dimensions 1.8x1.3x2.4m

Chain / pulley driven rotor

Motor 30kW 600-800rpm.

The balanced rotor is equipped with exchangeable hardox wearplates

Cylindrical perforated mesh is exchangeable

Water connection, water injectors around the cyclone cylinder to easy water flowing down in the sink tank.

Double bearings on the top (no bearings in the bottom)

The frame is thermal sinked

Frame thickness 10 and 15mm.

The coverplates are stainless steel Aisi304

Screw light fraction,

Auger U230 Spiral 190mm, 3mm thick

Screwblade 50*25mm, S355

Length: 4000mm

Output approximately 4m height

0.75kW IP56 SEW FA77

Stainless steel Aisi 304 U-trough

Mechanical seal adjustable

Lining HDPE 10mm

Supports included, thermal sink layer

Sink Tank:

The organic wet material from the cyclone then goes down to the sink tank. The material comes to rest. Heavy material like small stones glass has the time to sink down in this tank. In the bottom, there is a screw that slowly brings the sunken fraction out of the tank above water level. This tank is equipped with a max level sensor.

The tank has an overflow were the liquid comes in a second tank. This tank is equipped with agitating mixers. From this tank the liquid is pumped to the buffer tank for the digestors. The tank has minimum and maximum level sensors to initiate and stop pumping of the liquid.

Technical description:

Steel tank

Dimensions 10x2.58x3.15m (excl screw conveyor)

Volume first tank (sink tank) 12m³

Volume second tank (overflowtank) 12m³

Steeltank 4mm sheet metal

Paintlayer Epoxy coating with pacifying sink based primairy layer

Extraction screw for fine stones/glass/metals

Auger U230 Spiral 190mm, 3mm thick

Screwblade 50*25mm, S355

Length: 10m

Output approximately 3.3 m height

0.75kW IP56 SEW FA77

Stainless steel Aisi 304 U-trough

Mechanical seal adjustable

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Lining HDPE 10mm
Supports included, thermal sink layer

2 Mixing agitators, 0.37kW

Infeed Material:

Shredded food waste, source separated organics.

Material will be pumped in first buffertank by customer

Material may not contain larger metal items, if so it should be pretreated with a press.

3) Services to be delivered

Engineering

The engineering department , project engineering and R&D.

At all these departments there are several engineers working with experience with the screening and recycling industry.

Our engineering uses 2-D and 3-D drawing systems.

Handlingcost,

In the price for loading on truck are included:

- wrapping and packing (material and hours)
- Crane costs
- Loading costs (hours and material like beams, chocks, span wire etc.)

4) Commercial part from the installation

Pos nr	Description	Qty	Price
pos 2A	Bagopener with bunker	1	
pos 2B	Sliderollerbeltconveyor 1800x19500<25°	1	
pos 2C	Iamellascreen 2000x8000	1	
pos 2D	flipflowscreen 2000x8000	1	
pos 2 ^E 1	Sliderollerbeltconveyor 1000x7500	1	
pos 2F	Sorting conveyor 1200x5000-15500<18°	1	
Pos 2 ^E 2	Sliderollerbeltconveyor 1000x7500 - unders	1	
pos 2G	Iamellascreen	1	
Pos 2J1	Sliderollerbeltconveyor 1000x7500 - reversible	1	
pos 2H	conveyor - feeding Press	1	
pos 2I	Orex 500	1	
pos 2J2	screw feeding hopper	1	
pos 2K	Conveyors organics	1	
pos 2L	Conveyors organics (opvoerschroef)	1	
Pos 2M	Pre shredder	1	
Pos 2N	Sliderollerbeltconveyor 1000x8000 - dry fraction 1	1	
pos 2O	Sliderollerbeltconveyor 1000x8000 - dry fraction 2	1	
Pos 2P	Sliderollerbeltconveyor 1000x15000<25° - dry	1	
pos 2Q	fraction - inclined belt	1	
pos 2R	Permanent Magnet - Goudsmit	1	
pos 2S	flipflowscreen 1000x4000	1	
pos 2T	Windsifter excluding expansion chamber	1	
Pos 2U	Non FE separator	1	
Pos 2V	Optical sorter PVC out	option	
pos 2W	conveyor 1000x6000 - heavy	option	
Pos 2X	Fines shredder RDF	option	
pos 2Z	Platforms construction	1	
Pos 2AA	Cleaning system wet fraction incl. screws	1	
	projectengineering:	1	
	engineering:	1	
	assembly Press/ transport	1	
	supervisor	1	
	Electrical installation: (no feedcable)	1	
Price for installation			€ 2.480.900,00

Time schedule

Delivery date: 30-32 weeks after the order confirmation (signed contract) and first payment.

Delivery

The delivery is part of this offer / is listed separately.

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Payment due dates and conditions

Terms of payment: purely net

- 15 % 10 days from placement of order
- 15 % 90 days from placement of order
- 50 % before delivery, but no later than 30 days
after "ready-to-ship" notification
- 15 % after completion of the installation,
but no later than 3 months after delivery
- 5 % after acceptance, but no later than 30 days
after production start

Upon placement of order we are to receive a standby Letter of Credit from a first class bank in the amount of the order value, minus the first down-payment made.

Warranty

The seller shall be liable for the proper construction of the goods, the proper quality of the material and the careful performance included in the delivery for a period of 12 months from taking into production. The seller shall at its own expense repair or replace with new equipment that has become unusable during the period of guarantee, including the related costs of repair, alteration and installation work and freight. Not included in the warranty are wear parts.

Electrical installation

The electrical installation is part of this offer / is listed separately.

Assembly

The assembly is part of this offer / is listed separately.

Documentation

The above mentioned items will be delivered with technical documentation (schemes, drawings, etc.), manual and a list of spare parts. The documentation will be delivered in English in double.

Other provisions

The present contract in its entirety shall be governed by the laws of the Netherlands. Any disputes relating to the validity, interpretation and implementation of the present contract shall be examined in accordance with the laws of the Netherlands.

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5) Not included in the delivery

In the delivery is not included:

- any high voltage electrical equipment
- transformer
- lightning protection
- central earthing
- video monitoring system for the process and/or for the complete site
- intrusion alarm system
- all exterior lighting
- all the spare and wear parts
- all tackle paths and hoists for the maintenance of the equipment hoists
- all mobile equipment (shovel loader, ...)
- completion of the site, ready for building
- all demolition and disassembly works
- all temporary site facilities for the client and others
- all temporary site utilities connections
- site security and monitoring
- temporary site fence
- site cleaning
- all construction works such as:
 - all the earthworks
 - all the foundations and piling
 - all the buildings
 - all the concrete works of the buildings
 - all the roads and all modifications to roads
- the complete sewerage system with necessary connections
 - design, calculations and any engineering for the civil engineering and building works
- all building services such as:
 - telecommunications
 - lighting
 - small power distribution and electrical sockets
 - heating
 - air conditioning equipment for certain rooms
 - fire detection and all the firefighting equipment
 - all furniture
 - the complete sanitary installation
 - the complete workshop accommodation and all tools
 - the complete lab accommodation and all the lab equipment
- making and filling up of all ducts in walls, floors and roofs
- digging of all ducts for underground piping and cabling
- delivery and installation of empty pipes for underground cables
- supply and removal of water necessary for performing
- personnel , all consumables and maintenance

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- necessary for the operation of the plant during start-up and test period
- obtaining of the permissions necessary for the construction and/or the operation of the plant
- all activities, services, equipment, materials and documents, which are not explicitly mentioned in the scope of works and services of our proposal