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HIGH EFFICIENCY ANAEROBIC PROCESS THROUGH PRESS EXTRUSION

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WASTE TO ENERGY

- Municipal solid waste is a great source of energy
- Since the beginning the idea was to produce energy simply burning the waste
- Such a process has very low efficiency: 600 – 700 kWh/ton of incoming MWS
- The reason is to search into the composition of waste: more than 35 % of the MWS is biological organic, burn this material means BURN WATER

WASTE TO ENERGY: IMPROVE THE EFFICIENCY

- The biological organic present in the MWS can give a great amount of energy via anaerobic digestion process
- There are different anaerobic digestion plants such as dry fermenters or wet or semi-dry ones
- In all of them the key of the process is the pretreatment of the incoming organic stream

IMPORTANCE OF THE PRETREATMENT

- To be fed into the digester the organic fraction must be reduced in size and cleaned from in- desiderate materials such as stones, glasses, plastics,…
- In order to obtain an organic fraction suitable for a digestion plant was developed the press-extrusion process.

THE PRESS-EXTRUSION PROCESS

- The municipal solid waste is squeezed with very high pressure in a perforated extrusion chamber, the organic fraction behaves like a fluid and is expelled through the holes.
- The mechanical effect, to which the material is submitted in the compression and extrusion phase, causes a fractionating of the parts forming the wet phase and allows for a rapid fermentation process.

THE VM2035 EXTRUDER PRESS

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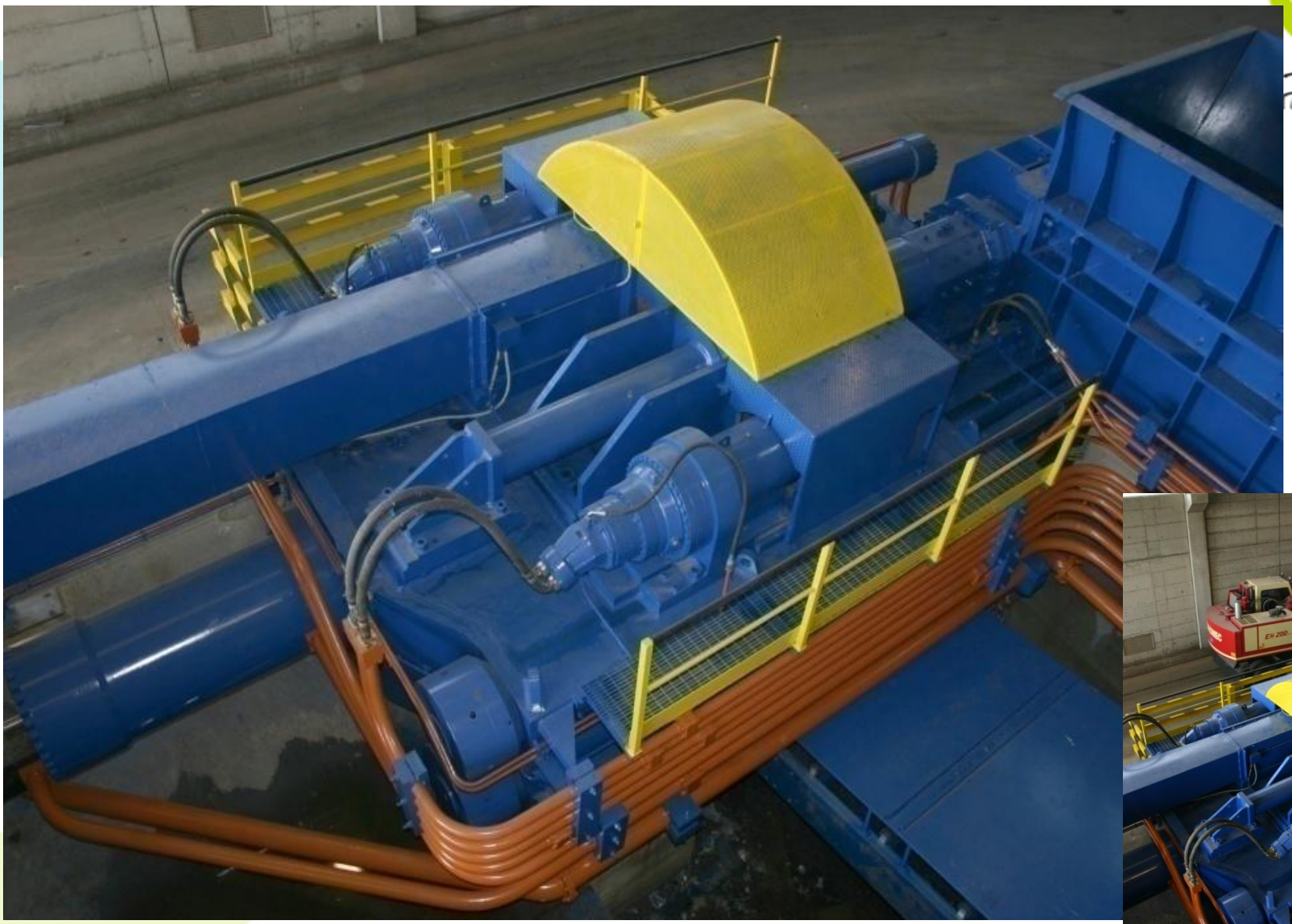
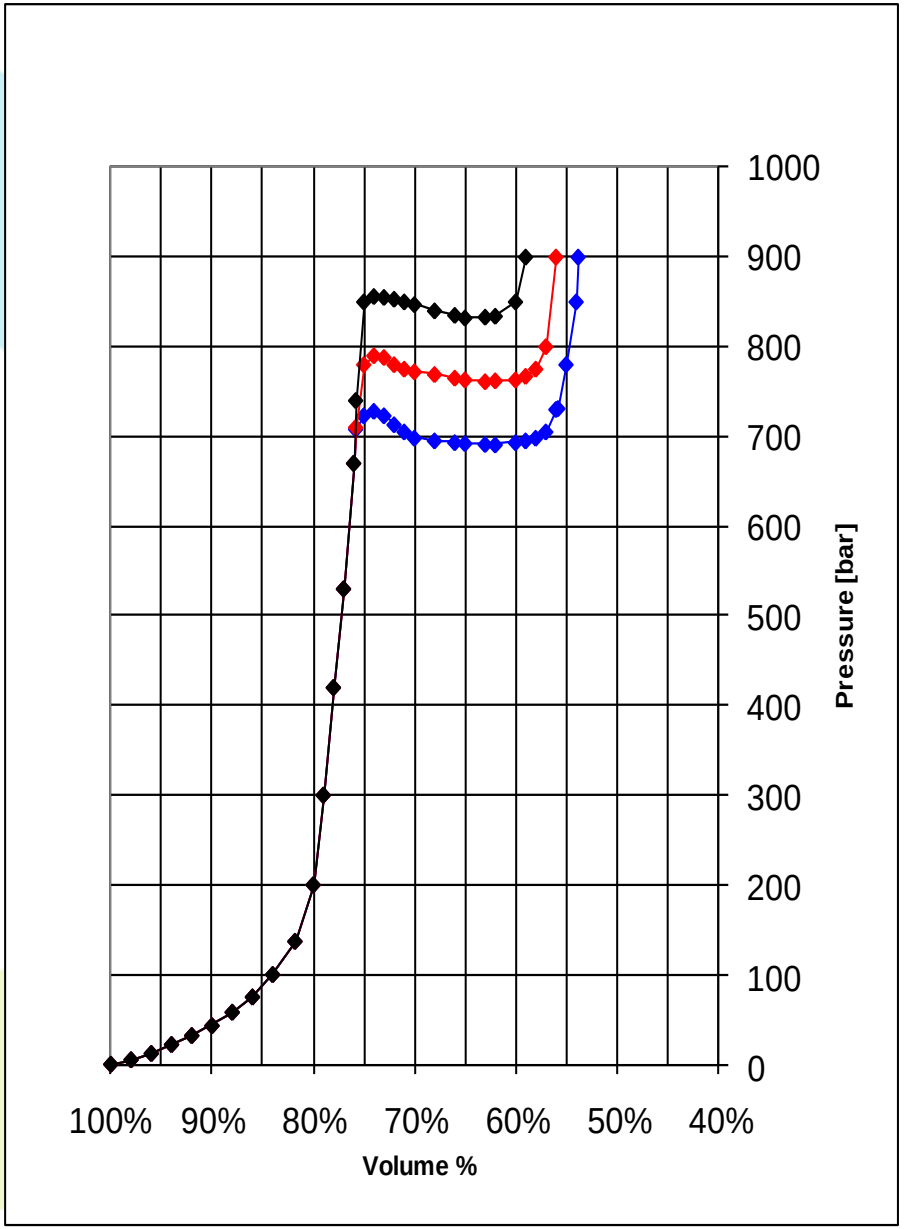
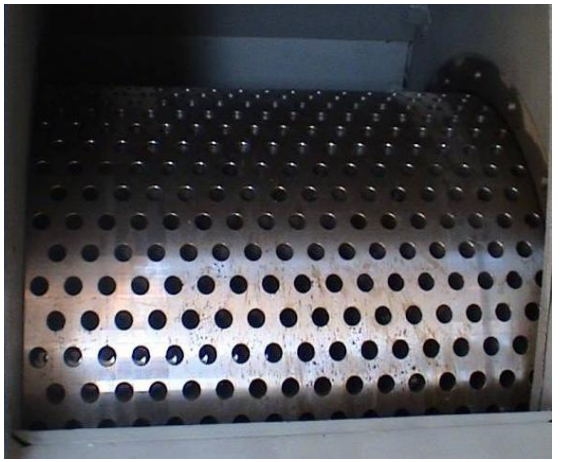
Tişçe ekolojike



THE PRESS-EXTRUSION DIAGRAM





THE ORGANIC FRACTION

- The extruded organic fraction (40 % of the incoming MWS) is essentially formed by organic substances (foodstuff refuse) with low quantities of various fibers, plastic materials and inert.
- The physical appearance is that of a semi-fluid, fine-grain paste.
- The main characteristics are:
  - Humidity: 50-55%
  - Organic Substance content: 34-36 %
  - Inert materials: 6-8%
  - wood, paper, plastic: 8%

THE DRY FRACTION

- The extruded dry fraction (60 % of the incoming MSW) is composed by plastic, cardboard, wood together with the powdered inert.
- The main characteristics are:
  - Humidity: 25 %
  - Calorific level: 13.000 – 15.000 kJ/kg
  - Inert content: 25 %
  - Density: 0,5-0,8 Mg/m^3

- From 1 Mg of dry fraction is possible to obtain roughly 1100 kWh

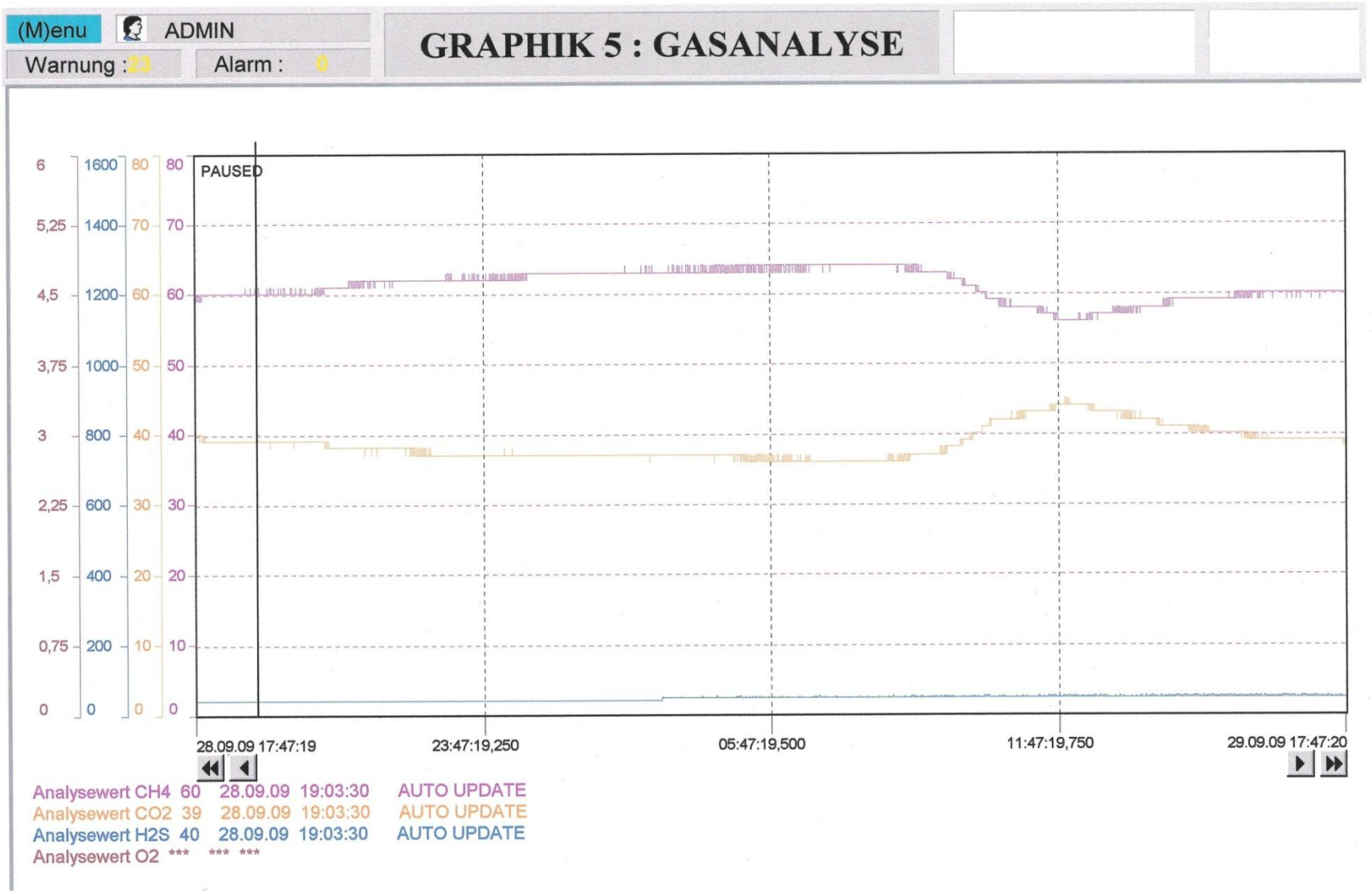
THE ANAEROBIC DIGESTION

- Because of the chemical and physical characteristics the extruded organic fraction is suitable to be utilized to produce energy via anaerobic digestion.

THE BIOGAS TO ENERGY PRODUCTION

- The production of BIOGAS is 180-250 Nm^3/Mg of organic fraction.
- The main characteristics of the BIOGAS are:
  - CH4: 60 %
  - CO2: 40 %
  - H2S: < 100 ppm
- From one ton of organic fraction is possible to obtain roughly from 360-400 kWh and 300 000 kcal.

THE BIOGAS COMPOSITION



CONCLUSIONS

- The press-extrusion process allows to produce energy both with dry and wet fraction.
- High efficiency of the overall process
- Sensible reduction of the costs.
- Sensible reduction of the environmental global impact of the MWS treatment process

THANK YOU FOR THE ATTENTION

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