Industrial Tests with a New Mechanical – physical RMSW Processing Plant in Búslakpuszta, Hungary

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7th International Conference on Sustainable Solid Waste Management 26-29 June 2019, Heraklion, Crete
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• Preliminaries
• The design of the RMSW (residual municipal solid wastes) mechanical – physical processing technology.
• The built processing plant in Búslakpuszta – Zalaegerszeg, Hungary
• Industrial tests with the technology
• Conclusion
A consortium formed from a machine and technology producer (3B Hungary Ltd.), a scientific partner (the Institute of Raw Materials Preparation and Environmental Processing, University of Miskolc), and a public waste managing service company (Zala-Müllex Ltd.) has started the development and construction of an RMSW processing technology targeting no-landfilling for this waste stream.

**GINOP-2.1.1-15-2016-00904**  “Development of new equipment production for the low and medium capacity RMSW processing technologies”
Preliminaries - Sampling

**Sampling** (Zalaegerszeg-Búslakpuszta 2016. October 10 – 14):
MSZ 21420 28 and 29 Hungarian Standards
More detailed analysis
History of developments:

- Model machines
- Model KLME separator
- 400 mm wide „pilot scale” KLME separator
- 1200 mm wide industrial size KLME separator
Photo of the 400 mm wide KLME pilot scale machine:
industrial prototype KLME in the production plant
This is the 27th RMSW processing plant in Hungary.
The 1st almost completely Hungarian made one.
Location: Zalaegerszeg –
The factory hall. The final shredder (METSO).
The feed and the bag opener.
Feeding belt conveyor before the drum sieve.
The drum sieve and the KLME separator.
Hammer mill for pre-shredding
Csőke B., Rácz Á., Nagy Z., Németh Sz.
Principle of KLME (combined magnetic, eddy-current and air flow separator)

Main technological units:
1. Vibrated feeder
2. Air nozzle
3. Magnetic drum
4. Rotated auxiliary cylinder
5. Exhaust cage
6. Eddy current separator

Numbers and short names of products:
I. Magnetic
II. Inert
III. Al
IV. 3D
V. 2D
The NIR (near infrared) sorters.

German camera and software.

Subcontractor: MTA SZTAKI

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First industrial experiment. 23 May, 2018

Materials in all outputs, but clogging was found in many places.

Redesign and modification of the KLME.

The KLME separator with nailed roller schematics:

Main technological units:
1. Vibrated feeder
2. Air nozzle
3. Magnetic drum
4. Rotated auxiliary cylinder
5. **Nailed roller**
6. Eddy current separator

Numbers and short names of products:
I. Magnetic
II. Inert
III. Al
IV. 3D
V. 2D
Results of the 24 July, 2018 industrial test

Main technical parameters of the 24 July, 2018 industrial test (nailed roller 2D separator):

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moving floor conveyor speed</td>
<td>0.05 m/s</td>
</tr>
<tr>
<td>Revolution number of the bag opener rotor</td>
<td>4.8</td>
</tr>
<tr>
<td>Revolution number of the bag opener rotor</td>
<td>1/min</td>
</tr>
<tr>
<td>Tangential speed of the drum sieve perimeter</td>
<td>1.13 m/s</td>
</tr>
<tr>
<td>KLME air nozzle air flow rate (blow in)</td>
<td>4800 m³/h</td>
</tr>
<tr>
<td>KLME air nozzle air flow rate, sucked out from the KLME</td>
<td>7400 m³/h</td>
</tr>
<tr>
<td>Revolution number of the eddy-current separator pole motor</td>
<td>2800</td>
</tr>
<tr>
<td>Revolution number of the eddy-current separator pole motor</td>
<td>1/min</td>
</tr>
<tr>
<td>NIR1 and NIR2 feed belt conveyor speed</td>
<td>3 m/s</td>
</tr>
<tr>
<td>Belt conveyor speed before the Metso rotary-shredder</td>
<td>1 m/s</td>
</tr>
</tbody>
</table>
Results of the 24 July, 2018 industrial test

Al product

Fe product

Bio fraction
Results of the 24 July, 2018 industrial test

Inert product

RDF

PET
inauguration ceremony at 13 July, 2018
Further modifications and tests

Main technological units:
1. Belt conveyor feeder
2. Air nozzle
3. Magnetic drum
4. Rotated auxiliary cylinder
5. **Coanda roller**
6. Eddy current separator

Numbers and short names of products:
I. Magnetic
II. Inert
III. Al
IV. 3D
V. 2D

The KLME separator with **Coanda roller** schematics
Conclusion

- The municipality of Zalaegerszeg has decided to improve their MSW managing in the future, namely they would like to decrease landfilling near to 0%.

- The first stage of this conceptual plan is almost fulfilled because a new, almost completely Hungarian made mechanical-physical RMSW processing plant was inaugurated on 13 July, 2018 at Búslakpuszta, Hungary.

- Since then, after the redesign of the KLME separator the plant is in normal operation.

- The KLME separator was equipped with a Coanda roller. The house of the KLME separator was also modified because of the experienced air beam distraction by nearby walls.

- If the blown-in air beam hits the upper part of the Coanda roller the evolving Coanda effect helps for the 2D particles separation.
Thank You for Your attention!

The described work/article was carried out as part of the „Sustainable Raw Material Management Thematic Network – RING 2017”, EFOP-3.6.2-16-2017-00010 project in the framework of the Széchenyi2020 Program. The realization of this project is supported by the European Union, co-financed by the European Social Fund.