

Selected MSW production plants

The solid waste mechanical sorting and selected MSW production plants can make part of a integrated system for the disposal of MSW. They produce:

- MSW to be fed to WtE plant;
- an organic stabilized fraction, to be used for soil reclamation;
- ferrous materials, to be inserted in the secondary raw material circuit;
- solid rejects, to be disposed of in landfills.



STIR- Caivano selected MSW production plant

The waste mechanical sorting section consists of more lines operating in parallel. Each of them includes the following stages:

Preliminary shredding

Each line provides, as a first treatment, MSW size reduction and bag tearing through a low speed rotary shredding machine.

Primary screening

After shredding, waste dimensional classification is carried out in a primary rotary drum sieve, with 120 mm screen hole size.

Drum sieve rotation speed is adjustable, in order to optimize the separated screening flows, allowing to conform with variations of the waste characteristics. In the primary screening section the material is separated into two streams:

- *primary tailing*, the oversieve fraction with particle size >120 mm, extracted from the drum terminal end;

- *primary fine fraction*, the undersieve fraction with particle size <120 mm, discharged through hoppers onto a conveyor belt along the whole drum length.

Primary tailing treatment

The primary tailing, consisting mainly of non-putrescible materials, having quite high heat value, is discharged by gravity from the terminal end of the primary screen, and is transferred by belt conveyors to the manual sorting section, where operators remove big sized and non-desirable materials.

Secondary screening

The primary fine fraction undergoes a secondary screening in a rotary drum sieve, identical to the primary one, but with a smaller screen hole size (60 mm). In the secondary screening section the primary fine fraction is separated into two streams:

- *secondary tailing*, the oversieve fraction with particle size >60 mm, extracted from the drum terminal end;
- *secondary fine fraction*, the undersieve fraction with particle size <60 mm, discharged through hoppers onto a conveyor belt along the whole drum length.



Ballistic classification of the secondary tailing

The secondary tailing, consisting of materials sized between 60 and 120 mm, includes a remarkable quantity of materials having high heat value. However it is not suitable to be sent to combustion as it is, since it still contains organic materials and solid aggregates. It therefore undergoes further processing, for separating those materials. A ballistic classifier is provided for this purpose.

Along the transfer path from secondary screening to ballistic classifier, an electromagnetic separator set over the belt conveyor separates ferrous materials contained in the secondary tailing, if any.

The material fed into the ballistic classifier is divided by the same into three streams, depending on its physical properties:

- a light fraction, consisting of high heating value materials (paper, plastic film, textiles, etc.), which is fed to MSW packing section;
- a heavy fraction, consisting of heavy, discarded materials such as: hard plastics, stone, etc., which is to be disposed of in landfill;

- a screened fraction, consisting of materials passing through the screening section of the classifier, and containing the wet remaining organic portion (biomass), to be conveyed to the stabilization section.



Aerobic biomass stabilization

The secondary fine fraction and the screened material out of the ballistic classifier are stored in windrows in a covered yard. The residence time there is almost 28 days, during which the windrows are periodically flipped over by a suitable turning machine, in order to increase the porosity and homogeneity of the material and allow a better oxygen transport, and humidity and temperature control.

The biomass is this way transformed into an organic stabilized fraction that can be used for soil reclamation (quarries filling). Biomass sanitation is also achieved during the stabilization process.

Selected MSW packing section

Selected MSW, consisting of the primary tailings and the light fraction separated in the ballistic clarifier, is conveyed to the packing section, where it can be directly loaded on trucks by means of a loading press, or it can be packed in 1-1,2 m³ bales, wrapped into polyethylene sheet for long-period storage.

As a reference the design data of a selected MSW production plant are given hereafter.

Composition of inlet MSW:

Materials	% in weight as collected	Lower Heat Value LHV [kJ/kg]
Organic matter	30,99	3313
Green cut	2,67	3663
Paper, board	26,65	12127
Plastics	11,35	23689
Glasses	5,20	0
Stones	1,54	0
Metals	3,38	0
Textiles	4,00	13640
Leather, hides	1,24	5414
Wood	2,09	12384
Bulk material	0,66	7406
Napkins	2,79	4057
Fine materials	6,32	2347
Others	1,12	3779
Total	100,0	8265

Water content (%) 36,9

Material flows:

	tons/year	% of MSW
INLET		
Municipal solid waste	607.000	100
OUTLET		
Separated flows		
• Total selected MSW recovery	218.412	36,0
• Ferrous materials	15.157	2,5
• Rejects to disposal	86.413	14,3
• Organic fraction to stabilization	287.018	47,2
Total	607.000	100