



INTEGRATED MECHANICAL BIOLOGICAL TREATMENT
IRAQ
PROJECT SAMPLE

Endeco



This project has been developed in collaboration with SORAIN CECCHINI TECNO

Introduction

Construction of a totally new MBT plant.

The following MBT Plant is designed to treat up to 1000 ton/day, supposed the following waste characterization:

WASTE CHARACTERIZATION	
Organic	70,0%
Plastic	6,8%
Metal	3,6%
Glass	4,0%
Paper	3,0%
Rubber	0,1%
Miscellaneous	3,0%
Garden waste	4,0%
Textiles	0,9%
Leather	0,6%
Inert	4,0%
TOTAL	100,0%

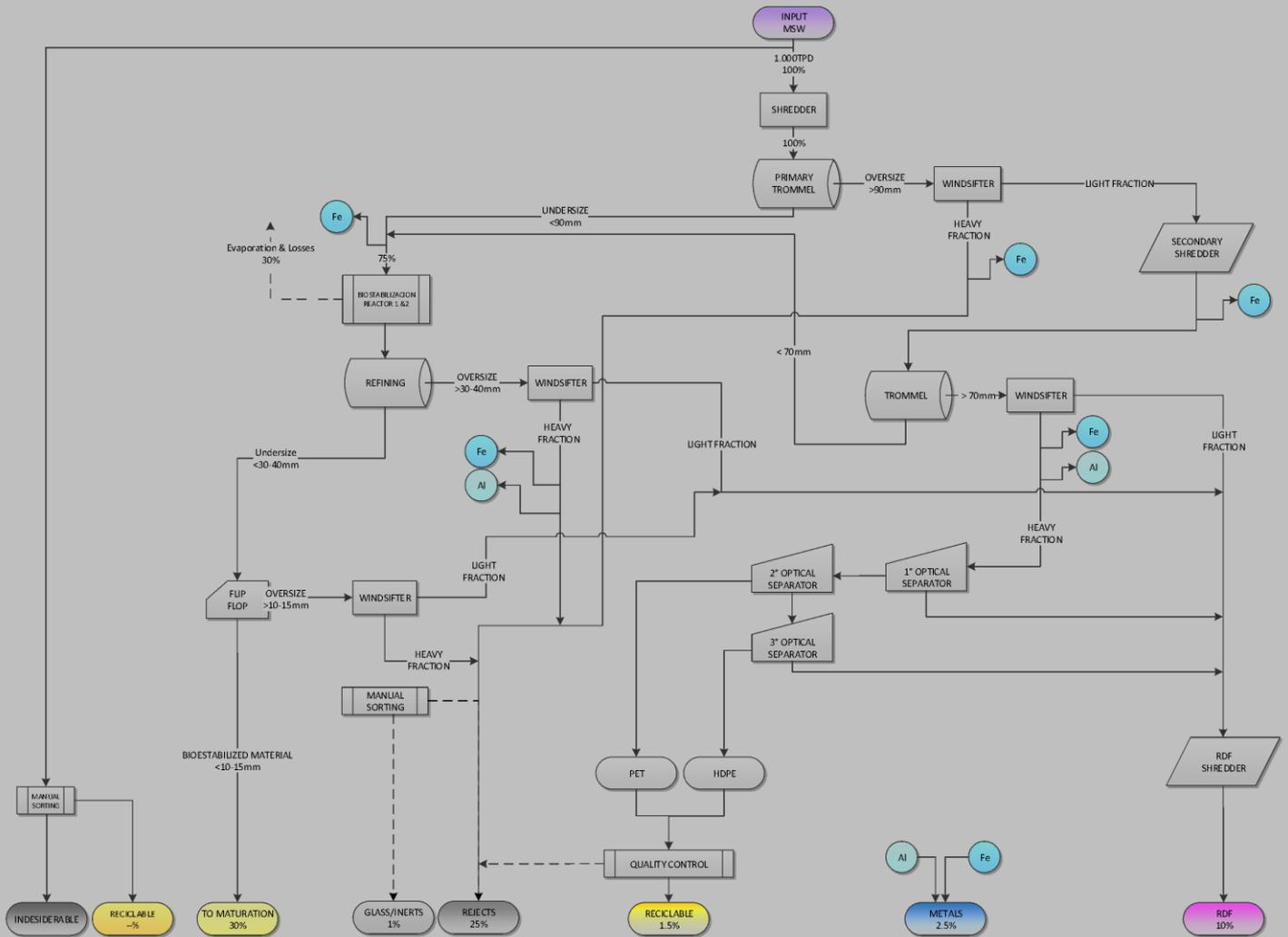
Treatment steps are described in separated sections as follows:

- Waste receiving & line feeding
- Pre-treatment & materials recovery
- Composting
- Refining

The plant is design to reach three main objectives:

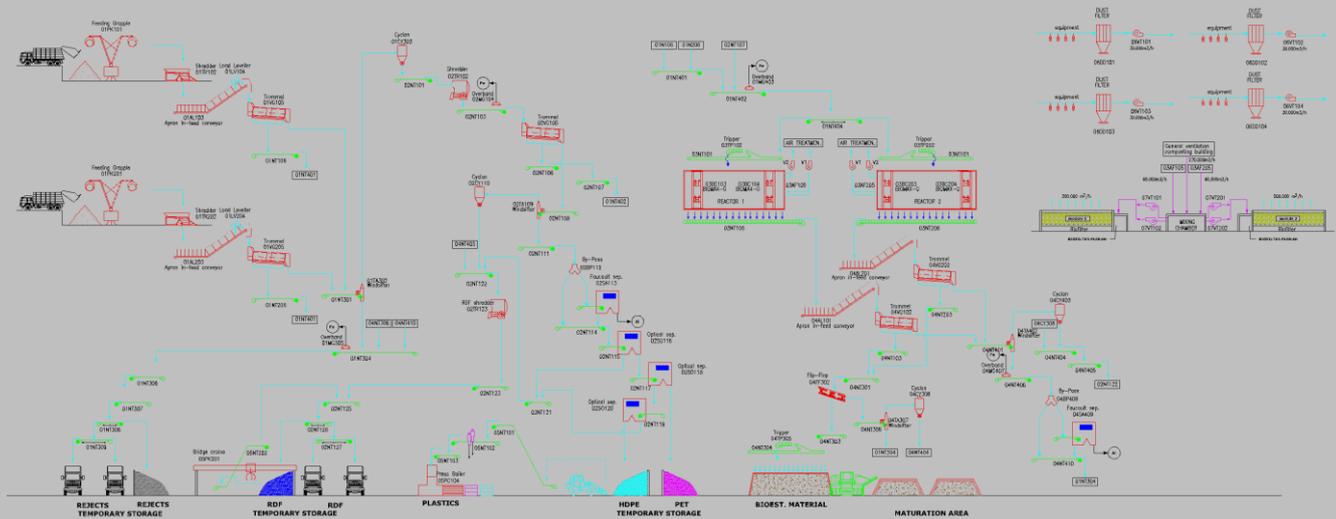
- Production of high quality compost
- Recovery of metals and plastics
- Production of RDF with high calorific value, in order to be burnable in cement kilns

The following mass balance is the result of these leading decisions and it characterizes the design of the entire project



Process description

The process shown in the flow sheet is better described in the following paragraphs.



Waste receiving

Waste trucks, after scale, will dump waste into the receiving area by means of 8 discharge points dedicated to residual MSW.

Waste receiving area is a closed building fitted with forced ventilation to avoid odour fugitive emissions.

Two special-purpose hydraulic grapples are working in the waste receiving area handling the dumped waste in the storage area and feeding the two treatment lines.



Feeding grapple

Pre-treatment & Material Recovery

Two bag-openers, one per each line, provide the splitting of the shoppers/bags containing the waste.

The grapples provide also the separation of the bulky waste and/or any other kind of visible waste that cannot be treated by the plant.

After bag-opening, waste is conveyed by means of apron in feed conveyors and load leveller with the aim to load and reduce peaks, into rotating trommels, one per each line, fitted with high efficiency grates.



Pre-treatment and material recovery facility

Trommels separate the waste flow into two main fractions:

- Undersize wet fraction, mainly composed of putrescible fraction, small fragments of paper and cardboard, small plastic, glass, fines and inert, undergoes ferrous separation and is then conveyed into the composting section for bio-drying process.
- Oversize dry fraction, mainly composed of plastics, cardboard, paper and textiles, is then conveyed to the area for recyclables recovery.



Screening trommel



Wind sifter and cyclone

The “heavy materials” waste flow is then subject to a ferrous separation and undergoes a control platform, where, through a manual separation, re-processable items such as organics, putrescible/card/cardboard can be conveniently recirculated within the process. The heavy items are discards and constitute the “heavy rejects”. These are automatically downloaded into a temporary rejects storage area.

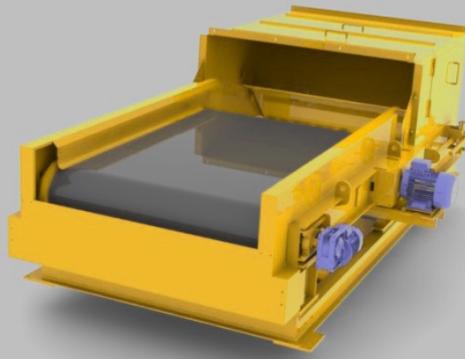
The “light materials” fraction, downloaded by means of a cyclone, after being cleaned from heavy items, is ready to undergo different treatment steps.

In details, light fraction is conveyed into a different shredder with the aim to reduce the paper and cardboard, still present in this fraction, and maintain the shape of the plastic film. After this differential shredding the fraction is sent into a dedicated trommel which cleans the plastic film from the fine material. A second step of aeraulic separation will separate the light fraction “RDF” conveys into a cyclone, to be sent into a RDF shredder.

The heavy fraction which contains plastic and metals is conveyed into the material recovery line after a ferrous separation. This line starts with a ferrous separation followed by aluminium separation.



Electromagnet separator



Non-ferrous metal separator

After the metals recovery, the fraction is subjected to plastic separation by means of optical separators in order to produce HDPE and PET.

The high putrescible fractions and other wet organic fractions, constituting the undersize material leaving the first trommel and the biodegradable part, separated from the undersize stream from the second trommel, are subjected to a ferrous metals separation and then transported up to the composting area.

Composting

The proposed system is capable of treating large quantities of organic waste by means of dynamic reactors provided with biomass turning and forced aeration. Daily turning and a continuous negative aeration provides the most efficient way to obtain in a period of time of around 6 weeks approx. an homogeneous product. The negative aeration system is composed by several pipes embedded under the biomass with different extracting points homogeneously distributed on the surface.



Composting system

Composting area is an enclosed building fitted with forced ventilation to avoid odour emissions. From the biological section, air is extracted both from the bottom of the reactors (process air) and from the general ventilation system. Air extracted by the pipes is then conveyed into the main headers, positioned on the loading wall structure, connected to centrifugal fans which bring the process air to the air treatment section.

The system is equipped by an on board irrigation system which allow to maintain the proper moisture content inside the biomass.

A reversible conveyor will allow to load both reactors in a synchronized manner with working cycles. It is realized by means of a dedicated conveyor and a tripped trolley which runs along the entire length of the reactors, distributing the material inside the reactor creating a pile.

A PLC controls in automatic mode the functioning, including turning cycle, irrigation regime and downloading system.

Refining

After the active composting process, the material will be subject to a refining treatment in order to:

- Separate compost to be sent to a maturation process
- Recover ferrous metals and aluminium
- Recover RDF material

The undersize fraction from the refinement will be downloaded automatically into the maturation area, in order to create piles to be moved by means of windrow turning machine.

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