

THE PLANT

The plant operates a biological treatment to stabilize the organic fraction (also called “undersize resulting from MSW undifferentiated screening”); the process allows to obtain the reduction of both weight and volume and the disinfection of urban waste, according to the application and optimization of the biological reactions that normally occur in nature. The system is built with high quality standards and technical solutions according to the actual legislation and environmental protection; the plant stands for a complete integrated management of municipal waste, making possible the landfill disposal of non recoverable residuals. It is also part of a greater factory for the waste treatment, in which best solutions can be chosen for each fraction of waste.



TREATMENT CAPACITY

Number of lanes	60
Storage volume of each lane	548 m ³
Capacity of the plant	315,000 ton/year

THE COMPANY

OWAC Engineering Company is located in Palermo, Via Resuttana 360, Sicily, Italy; the company has been operating in the “waste to energy” for many years and has a long time experience in the field of management consultings for the development and diversification of industrial assets. In particular the company develops its activities in the designing and building of waste treatment plants and environmental remediation.

The more relevant characteristic of OWAC’s activities is the development of an idea, the designing of the system and the management of the construction works all culminating with the start-up of the initiative. Therefore OWAC is the catalyst for all the phases which bring to the final start-up of industrial plants.

The working team is very flexible, qualified and adaptable, able to develop all the required activities with care, high precision and “tailor made” solutions. Company references and activities, both in progress and already made, are available on our website.



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AEROBIC
BIOSTABILIZATION PLANT



INTRODUCTION

As part of our ongoing commitment to the environment protection and the need to increase the raising demands of innovation, OWAC Engineering Company has designed and developed the construction of an aerobic biostabilization plant for Sicola Trasporti S.r.l., a company which has been engaged in waste disposal for the Municipality of Catania and surrounding cities for many years. This system is well integrated into a mechanical treatment plant and landfills industrial area and represents one of the few high-scale example of the “waste industry” system.



European Waste Codes: 020101, 020102, 020103, 020106, 020107, 020201, 020202, 020203, 020204, 020301, 020304, 020305, 020403, 020501, 020502, 020601, 020603, 020701, 020702, 020704, 020705, 030101, 030102, 030103, 030105, 030301, 030302, 030308, 040107, 100101, 100102, 100103, 150101, 150103, 190501, 190502, 190503, 190601, 190602, 190804, 190805, 190812, 190814, 190902, 191212, 191304, 191306, 200108, 200201, 200302, 200303.

THE WASTE

The input waste is the so called underscreen deriving from the previous mechanical treatment of undifferentiated municipal solid waste. In particular the plant was designed to process about 315,000 ton/year. So, n. 60 concrete lanes were built, each of one has a net volume of about 548 m³ for the biostabilization process.

THE PROCESS

The process that is developed in the plant consists of an aerobic biological treatment in which bacteria degrade the organic substance contained in waste. The final material is disinfected, without putrescent fraction and therefore it has a limited production of VOCs (Volatile Organic Compounds). During the bio-stabilization process, due to the high temperature reached, the waste loses much of its moisture. The final result at the end of the process is the decrease in volume and in weight of about 30% compared to the starting conditions. The stabilized waste can be used for the daily cover foriland II (at least in the lower layers) or can be directed to disposal with a smaller volume and devoid of putrescent fraction, solving the long-standing problem of biogas production, typical for not-treated waste.



THE LANES FOR BIOSTABILIZATION

The process takes place within n. 60 concrete lanes which are provided, on the bottom, of a system for the insufflation of the air necessary for the develop of the biological reactions. The air is uniformly distributed through five parallel canals which are extended throughout the length of the lane. During the process, the level of temperature, humidity and interstitial oxygen are monitored; so the air insufflation is modulated on the basis of the recorded data.

A significant aspect is linked to the emission of odorous substances; these are retained within the lanes through the use of breathable cloth cover. In particular, during the process of oxidation of the putrescible fraction, the temperature increase generated by the degradation, causes the evaporation of the interstitial water creating a thin film in contact with the cloth itself. All this, together with a very small “plot” (0.2 µm), constitutes a mechanical barrier for the odorous molecules leaving transpire, however, the smaller ones (oxygen, carbon dioxide, water vapor).



This sort of micro-screen has the important task of intercepting and return the odorous molecules to the bio-oxidative activity, thus avoiding the diffusion in the air of about 95% of the spores of bacteria and pathogens.

THE PROCESS PHASES

The stabilization process has a duration of about 25 days; during this period, the first phase is called “active” and the more easily biodegradable organic matter degrades with a disinfection of the waste.

During this phase a rapid increase of temperature occurs and the pathogenic microorganisms are killed; since an excessive increase could also entail the death of the bacteria necessary for the process itself, temperature is constantly monitored and maintained below 60 °C through a correct control of the air flow blown.

After the active phase, which lasts about five days, a “maturation” phase follows, which is longer than the previous one; it is characterized by the conversion and stabilization of the material, with the formation of humic substances.

The most important parameters for the process are constantly monitored; they are: the temperature, which increases because the process is exothermic, the humidity and the oxygen level, which are essential for the biomass activity.

ENVIRONMENTAL PROTECTION

All the issues regarding the protection of environmental matrices are been kept under great attention. In particular, waterproof layers are provided under foundation of each lane; the layers are:

- HDPE, which ensures perfect waterproofing to leachates and has excellent resistance to acids, alkalis, saline solutions and organic solvents;
- Geonet, which provides mechanical protection to HDPE during the placing of the other layers;

- Non-woven fabric, which attenuates any irregular or sharp parts of the soil and avoids any HDPE punctures.

The leachate, which is produced by the mass of the waste during the stabilization process, is then drained into grids and a collecting network for the wastewater disposal; then the leachate is pumped into external storage tanks. Wastewater deriving from the washing of the trucks tires in the front areas of each lane are also drained into the same grids.

