

CATALYTIC MINERALISATION TECHNOLOGY



ENCO

ENCO s.r.o. was established in 1993 and it has acted in the field of machine industry since its establishment. The main activity of the company is CNC sheet metal processing, custom manufacturing, the production of construction elements for clean premises, production and sale of operating tables and medical devices.

Nowadays, **ENCO s.r.o.** employs more than 500 people in Slovakia. Headquarters, company management and top management seats in Bratislava, subsidiaries - production enterprises are located at the distance of 80 – 150 km from Bratislava. Almost 90% of the production of the company is exported to the customers from Germany, the Netherlands, Denmark, Hungary, Belgium, Austria and the Czech Republic. Thanks to the high demands of our customers, many-year experience, modern technologies and highly qualified staff, **ENCO s.r.o.** can deliver the products to its customers at the supreme quality level for a long time. The recent new product developed by the company in cooperation with a patent holder is a catalytic mineralisation technology.

CATALYTIC MINERALISATION TECHNOLOGY



is an innovative patent solution for waste disposal, based on CATALYTIC MINERALISATION technology – low-temperature mineralisation and gasification with the catalytic treatment of reaction gases with the possibility of recovering thermal and electric energy.

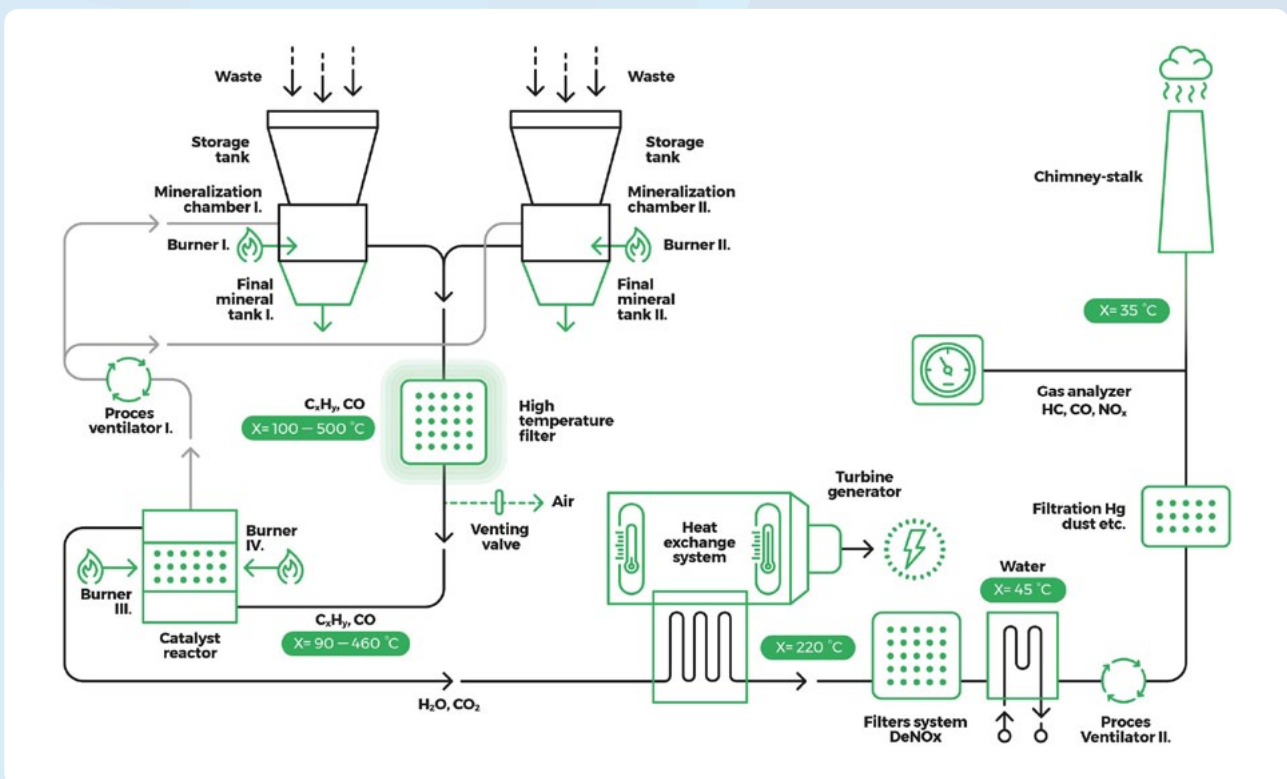
The technology falls into **BAT (Best Available Technology)** category according to the Directive 96/61 EC.

Thanks to the process low temperature, which does not exceed 520 °C, and without the presence of a flame, it does not generate harmful waste substances such as NO₂, dioxins, furans, CO, methane and others.

Main advantages of the technology:

- Low process temperature, no harmful substances are released.
- Reduction of the volume and weight of waste by 80-99%, thanks to which the need for land-filling is completely eliminated or significantly reduced.
- No harmful emissions, only CO₂ and water vapour are produced.
- Low operating and energy costs.
- Modular structure for the treatment of various types of waste.
- Efficient heat and power generation during the process.

The technological process results in an **80-99% reduction in waste volume**, depending on the composition of the waste, the complete drainage of waste, the complete elimination of the odour of the waste, and the destruction of all viruses and bacteria. The technology is currently available in a size variant of 20 tons of waste processed per day, while the chambers can be interconnected and their capacity shall be then added up.



TYPES OF PROCESSED WASTE AND OUTPUT MATERIALS

Input material is an **organic waste** of various types, while when using additional modules it is possible to treat some types of **hazardous, liquid and hospital waste**.



The mineral powder does not contain any harmful substances and it can be deposited in ordinary landfills or used as an admixture in concrete, as a base material for roads, buildings, etc.



Other products of the process are water and CO₂. Metal, glass and other non-degradable materials entering the process remain unchanged at the outlet and they are subsequently separated for reuse and recycling.

Comparison with available technologies

	PYROLYSIS	PLASMA	CATALYTIC MINERALISATION
Temperature	800-1200°C	3000-10000°C	350-550°C
Input segregation of materials	yes	yes	no
Hazardous waste disposal	only after demanding modifications	only after demanding modifications	yes
Production of dioxins	yes	Yes (reversal synthesis)	no
Energy intensity	high	very high	low
Operation costs	high	high	low
Recovery of scrap material	after demanding segregation	after demanding segregation	simple after process termination
Extracting raw materials from process gases	impossible	impossible	simple, according to the contents of elements
Emission purity level	only after the installation of an additional equipment	only after the installation of an additional equipment	very high, just CO ₂ and water vapour are produced
Recovery of thermal and electrical energy	yes, after the installation of an additional unit and generator	yes, after the installation of an additional unit and generator	yes, generators are incorporated in the device
Range of treatment options for various types of waste	limited	limited	almost unlimited
Construction demands	high	very high	low
Demands for built-up area	great with regards to the necessity of storage and segregation	great with regards to the necessity of storage and segregation	Minimal handling areas

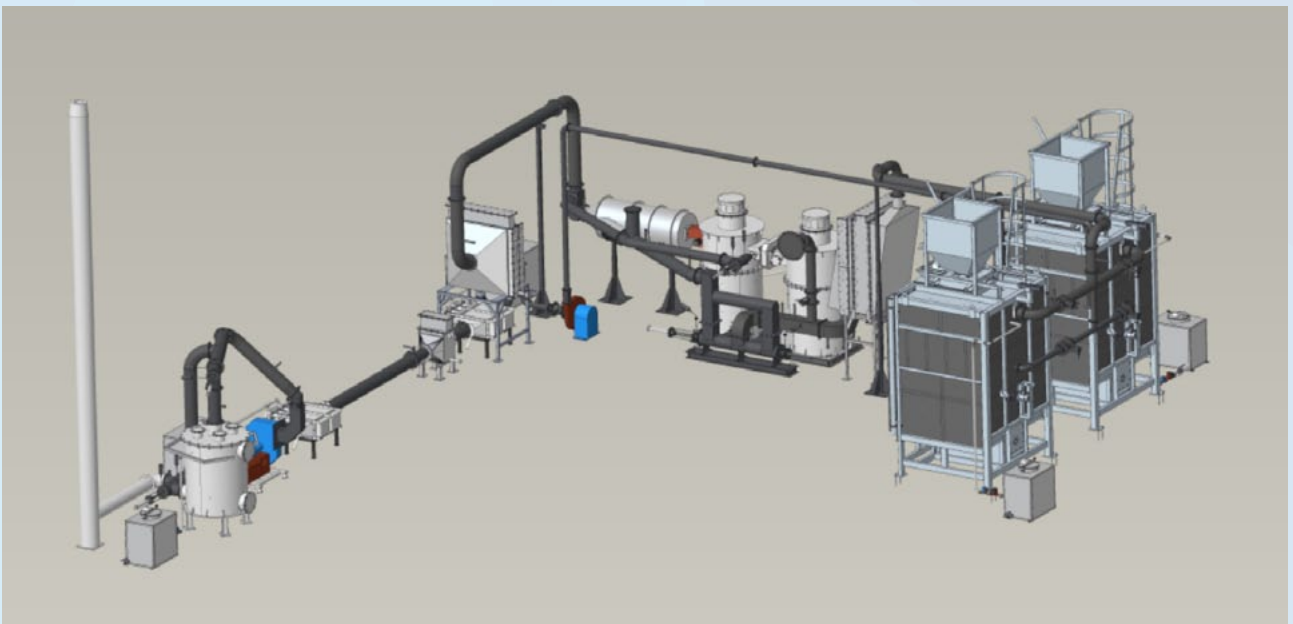
BRIEF DESCRIPTION OF THE TECHNOLOGY

After treatment of the input waste by separation and crushing to the desired fraction up to 50 mm, it is transported by a conveyor to the reaction chamber reservoir from which the reaction chamber is gravitationally filled. The process of mineralization, gasification and utilization begins in a reaction chamber. Temperatures range from 500 to 550 °C depending on the type of processed waste.

Catalytic mineralization is the process in which a mineral is produced from organic materials. The volume of input waste is reduced by 20 - 100 times depending on its composition. The processed - neutralized waste comes out of the reaction chamber in the form of a fine mineral powder and is then transported by a discharge conveyor to the collection container from the container located in its bottom part. After the mineralization process, the technical gas purification process begins. The temperature is adjusted and reduced to 400 °C to prevent damage to the catalysts.



The catalysts work at the optimum temperature. The gas decomposes on the catalysts to produce CO and CO₂ and nitrogen compounds NO_x. From the gas, chlorine compounds are decomposed, which are further processed or alkalisied (trapping of substances based on a medium) on the sorbents and CO₂ is produced.



The post-reaction gas is subsequently purified in a reverse oxidizer. The purification level is 99.9%.

Subsequently, the gas is transported to the heat exchanger, where its temperature is reduced to 35 °C and from there it is transported to the chimney, where it is discharged into the atmosphere in the form of water vapour CO_2 and H_2O . If we capture H_2O , which volume is 600l/t of waste, only CO_2 is released into the atmosphere.

