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## Mobile thermal desorption plant



## The Thermal Desorption Process

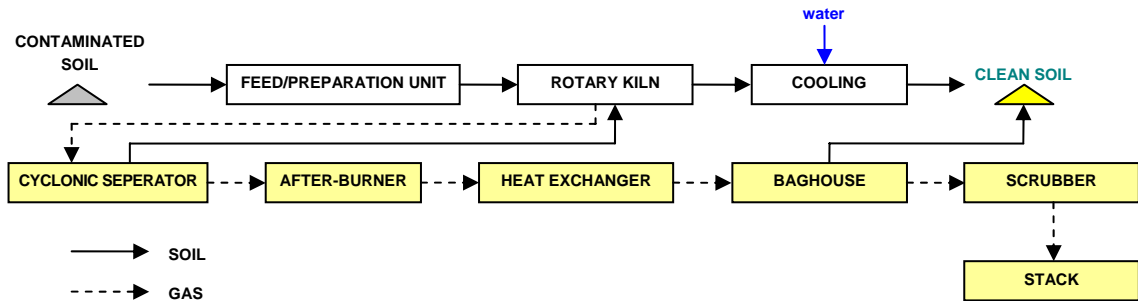
DEC's mobile thermal desorption plant is designed and constructed to effectively purify soils contaminated with coal tar, poly aromatic hydrocarbons, cyanides, mineral oils, chlorinated solvents, sulphur and mercury. The system is designed to be both versatile, highly portable and provisions are made for maximal heat recovery.

The system is based on the concept of low temperature thermal desorption which is the process of contaminant removal by transferring contaminants from one phase to another. The system is operated by targeting

an operational temperature that is slightly greater than the highest boiling point of the compounds under treatment. As the soil is heated to this point the compounds vaporize and become part of the gas stream. The gases are then removed by negative pressure and routed into the extensive gas treatment.

The soil treatment system consists of a material feed/preparation unit, rotary drum with processed material cooling and discharge system (soil treatment) and a process gas treatment system.





## Soil treatment

The material feed/preparation unit consists of two feed hoppers, a screen and a magnet. Oversized materials are crushed and introduced in the system.

The soils are treated in a rotary kiln in which contaminated materials are heated to the point at which contaminants are vaporized and become part of the gas stream.

The rotational speed of the kiln can be varied to alter retention time of the soils based on contaminant type and conditions.

The plant includes a material discharge system for mixing processed soils with water for cooling and dust control. This is accomplished by a single shaft pugmill that mixes the hot soils from the kiln and collected fines from the baghouse with water.

A baghouse with ventilator is installed on top of the soil cooler to remove and clean the produced steam.

Material is removed from the system via a belt conveyor that continually stockpiles the processed soils.

## Gas treatment

Following the soil treatment system is the process gas treatment system. This system consists of 5 major components.

First is the cyclonic separator for removal of large particulate from the kiln exhaust system. The collected dust is returned to the flame of the kiln and consequently deposited into the soil cooling pugmill where it is blended with the material exiting the drum and fines from the baghouse.

The cyclone is followed by an afterburner for oxidation of the exhaust gasses. The afterburner is a horizontal cylindrical vessel lined with insulating refractory suitable for operational temperatures up to 1100°C. A gas retention time of greater than 2 seconds is provided and a destruction efficiency for volatile organic contaminants in excess of 99% is achieved.

Following the afterburner is a heat exchanger for cooling the gasses prior to the baghouse. The heat that is released is recovered to pre heat the burner air of both rotary kiln and afterburner.

The baghouse is included for removal of particulate from the gas stream. Particulate captured in the baghouse are discharged from the process via a series of dust return augers that transport material from the

baghouse to the processed material discharge system. An induced draft fan is located downstream of the baghouse and serves as the mechanism to maintain flow throughout the system while removing products of combustion and excess air.

Finally the fan leads the air through a scrubber system. The scrubber system consists of a quench duct section followed

by a packed absorber. Scrubber blow down water is recycled in the soil cooler. The system exhaust stack is mounted on top of the scrubber section.

In the stack a continuous emission monitoring system controls the quality of the exhaust gases which comply with the strictest European regulations.



### Technical data

- Capacity: 15-30 tons/hr
- Working space: 900 m<sup>2</sup> (excluding stock piles)
- Fully automated processing system with on-line measurements of inputs and outputs
- Modular approach allows:
  - Quick mobilization / demobilization
  - Process to be tailored on-site

### Applicability

- Thermal desorption can be applied to the treatment of contaminated soils and sediments.
- Thermal desorption can remove a wide range of organic contaminants and mercury.