



Construction & Development

Mechanism of the Product's Action in the presence of Hydrocarbons

MPCD

1. Introduction:

The physical principle at the base of the product is the biodegradation of the hydrocarbons through the breakdown of their molecular chain providing a conditioned nutrient for the microbial population present in the atmosphere.

Unlike traditional methods like bio-pile or Farm Lands that take very long periods and very specific conditions to operate, the product renders the hydrocarbons readily digestible facilitating and speeding up the hydrocarbons' biodegradation by acting as a catalyser for the microbial/bacteria activity dramatically reducing the time required to decontaminate the polluted site which is now counted in days rather than months needed with the traditional methods.

The surfactant present in the product breaks the heavy hydrocarbon chain ($C > 12$) into individual smaller particles or monomers (molecular disgregation). The sodium metasilicate (like all the alkaline silicates) comes in contact with the hydrocarbons to form silicate compounds. Such silicate compounds have the characteristic of low solubility, not being toxic and easily solvable. Moreover the alkaline silicates create a gelatinous film that isolates the monomers (molecular disgregation) that have precipitated and as soon as they have formed avoiding their recombination into the original hydrocarbon's chain. The sodium carbonate has the function of stabilizing the precipitation process and the entrapment of the monomers.


After the finalisation of the cycle including the atmosphere micro-organisms' action which will bring the polluted soil within the European norms the residues will be silicates and CO_2 .

Other major advantages of this technology are:

- The decontamination can be performed right at the polluted site,
- By decontaminating at the polluted site there is no need to transport the treated soil to expensive special and approved discharge sites.
- This technology does not require special equipment allowing the operator to easily reach polluted sites otherwise difficult to attain with the machinery normally used by traditional technologies.

The Product's action can be summarised as follows:

BREAKING OF THE CHAINS
(MOLECULAR DISGREGATION)
ENTRAPMENT OF THE POLLUTER
FORMATION OF AN EMULSION
ACTION OF DEGRADATION
(ATMOSPHERE MICRO-ORGANISMS)

 Construction & Development Corp.

Viale Andrea Doria 24, 20124 Milano, ITALIA, Tel + 39 02 6707 0989, Fax + 39 02 6738 7833
P.O. Box 451506 – Miami, FL. 33245 - 1506, USA, Tel + 1 800 685 2213, Fax + 1 800 928 1186

www.mpcd.info



Construction & Development


2. Product's Chemical Composition

- Sodium Metasilicate (0,16%– 1,1%)
- Sodium Carbonate (0,15%– 0.9%)
- Surfactant (0,02% - 0,08%)
- Water (97,5% – 99,1%)

3. Product Specifications

The product doesn't contain toxic solvents and it is classified as follows:

- Rapidly and readily biodegradable (tests made as per OECD 301-B regulations)
- It is not an irritant to skin. (test made according to the regulations OECD 404)
- Animals do not show toxic side effects when administered a single oral dose (test made according to the regulations OECD 401)
- It is not an irritant for eyes (test made according to the regulations OECD 401)
- Silicates and sodium carbonates are allowed even in biologic agriculture according to the Reg. CEE 2091/91 and its successive modifications
- The Quality Test made by Chemical Specialties Manufactures Association assigned a high cleaning index
- The product doesn't contain arsenicals, iodine, formaldehyde, mercury compounds, phenols, abrasives, free hetero glycolic acids, soaps, free sodium or caustic potasil, oil, distillations of any kind and sodium orthosilicate.
- The product is not inflammable.
- The product is a powerful absorbent and is particularly efficient in the eliminations of smells, though being odourless itself.

 Construction & Development Corp.

Viale Andrea Doria 24, 20124 Milano, ITALIA ,Tel + 39 02 6707 0989, Fax + 39 02 6738 7833
P.O. Box 451506 – Miami, FL. 33245 - 1506, USA, Tel + 1 800 685 2213, Fax + 1 800 928 1186

www.mpcd.info



Construction & Development

BIOSINFO:

Microorganisms BIOSINFO natural, non-pathogenic, are associated with natural mineral materials compatible with them and variable particle size and adapted - (carbonate of marine origin, volcanic stone, aluminum silicate). These brackets facilitate nesting and fixing bacterial biofilm, providing a wealth of trace elements that makes them more active, stronger, more breeding (metabolic activity and enzyme kinetics).

Micro-organisms associated with these minerals create their own ecosystem stability, support high toxic concentrations (eg up to 250 mg / l free chlorine), avoid the loss of exo-enzymes for the colonization and continuous flow processing continuously, creating specific food chains, opening the door to ordinary bacteria. Depending on their specificity, micro-organisms are fully committed to their work degradation toxic pollutant effluent. The nesting allows the coexistence of bacterial strains mutually incompatible.

The phenomena of energy conservation between bacterial membrane polarization and wall supports explain minerals of electronic, ionic or metallic.

TECHNICAL DATA OF MICRO-ORGANISMS (natural - no-GM)

* Micro-organisms in Group 1, requiring no special precautions, banal saprophytic, ie all bacteria, fungi, viruses, except those designated in the following categories and whose use is study or legally prohibited.


* These micro-organisms have been audited by search and enumeration of common germs and research and counts of pathogenic bacteria commonly sought in investigations by a laboratory official - no pathogens, Salmonella Enterobacteriaceae pathogens, anaerobic sulfite- reductive and Staphylococcus aureus

* PHYSICAL PROPERTIES: bulk density of between 0.88 and 1

Appearance: white powder or a light gray sand - pH: 7 to 8.4

* COUNTING BACTERIAL MEDIUM: Over 10 (4) cfu / gram.

MOLECULAR ADSORPTION

 Construction & Development Corp.

Viale Andrea Doria 24, 20124 Milano, ITALIA ,Tel + 39 02 6707 0989, Fax + 39 02 6738 7833
P.O. Box 451506 – Miami, FL. 33245 - 1506, USA, Tel + 1 800 685 2213, Fax + 1 800 928 1186

www.mpcd.info



Construction & Development

The extreme porosity, up to 39% of total minerals, offers an S / V available about 400 m / cm³. They operate like a real "molecular sieve" - the molecules in the medium to be treated, are absorbed and trapped in the pores, in decreasing order, with water as far ahead:

$H_2O \Rightarrow NH_3 \Rightarrow SO_2 \Rightarrow H_2S \Rightarrow CO_2 \Rightarrow CH_4$

The bacterial breeding will transform into a single molecule of ions in polluted water.

Eutrophication - DYSTROPHISATION

The effect of flocculation of TSS, promotes action by restoring the purifying and processing phytoplankton photosynthesis in favor of zooplankton. The decrease of soluble phosphate is primarily involved in this action.

The strong presence of bacterial colonies in our natural environment, allows degradation "as and" extent of organic matter (nitrogen). The micro-algae (blue - green) · are rivaled in their development by nutrient competition.

For eutrophication, the treatment is often valid for several years, at an initial shock treatment, then maintenance doses reduced every year.


The application periods are most favorable from March to June and from September to November.

EFFECT ON ORGANIC VASE

The rapid implementation of our micro-organisms on the funds, will allow a complete mineralization of mud or oil, with an observable reduction in the early months.

The volume reduction is due to the amount of material removed at the dissolution of some mineral ions by balancing the water and the release of interstitial water retained by the organic material (a sponge) after degradation. Is the result of successive phenomena:

- Precipitation in SS on the bottom
- Absorption of organic matter and nutrient minerals in our formulations

 Construction & Development Corp.

Viale Andrea Doria 24, 20124 Milano, ITALIA ,Tel + 39 02 6707 0989, Fax + 39 02 6738 7833
P.O. Box 451506 – Miami, FL. 33245 - 1506, USA, Tel + 1 800 685 2213, Fax + 1 800 928 1186

www.mpcd.info



Construction & Development

Thermal Desorption Process:

Thermal desorption is a technology that utilizes heat to increase the volatility of organic contamination (hydrocarbon) such that they can be separated from the soil.


Soil is heated in a chamber in which water, organic contaminants and certain metals are vaporized. A gas or vacuum system transports vaporized water and contaminants to an off-gas (i.e. air emission) treatment system. The system aims to volatilize contaminants, while attempting not to oxidize them.

In order to accommodate all industry needs, Thermo Desorption Process has developed a safe and reliable mobile thermal desorption system (the Thermo Desorption Process Plant) which involves three difference phases:

- pre-treatment and feeding compartment (storage, crushing, screening, blending, pre drying, power sector to heat treatment, etc)
- thermal desorption (proper desorption treatment system, distribution systems and /or removal of pollutants in the gas phase: double desorption, post-combustion chamber, a unit of abatement of gas pollutants, etc.)
- cooler plant and heat recovery (compartment that includes facilities for the exchange between the gaseous products of thermal treatment, energy recovery, storage units, solid waste collection process, the units of continuous monitoring of gaseous emissions, etc.)

Each of these processes comprises one or more modules that are installed on mobile trailers that operate independently one from another.

The Thermo Desorption Process plant can, therefore, meet all on-site treatment needs, making it one of the most flexible solutions capable of being customized for all customer needs. For example, thanks to a heater exchanger, approximately 80% of heat energy used in the process would be recovered. This allows to break down energy request; so consumption of natural gas for heat production in thermal desorption is very low, reducing atmospheric emissions. Thermo Desorption Process's thermal desorption recover the intrinsic energy kept in the organic pollutant as well. In this way, thanks to overthrow of natural gas consumption, operating costs are really light.

 Construction & Development Corp.

Viale Andrea Doria 24, 20124 Milano, ITALIA ,Tel + 39 02 6707 0989, Fax + 39 02 6738 7833
P.O. Box 451506 – Miami, FL. 33245 - 1506, USA, Tel + 1 800 685 2213, Fax + 1 800 928 1186

www.mpcd.info



Construction & Development

AIR EMISSIONS:

The pollutants resulted are drawn to an afterburner chamber. What comes out from that are just harmless substances. Through a system of continuous detection (FID) air emissions are always checked to ensure compliance with the limits of laws. Anyway, what comes out from the chimney is just water vapor, CO₂, CO and some oxide of substances like sulfur and nitrogen. The on line control allows us to keep checked the situation and act quickly if necessary.

SECURITY SYSTEM:


All of the parts of the plant for thermal desorption are made following the ATEX directives. ATEX is the conventional name of Directive 94/9/EC of the European Union for the regulation of equipment intended for use in hazardous areas. The name comes from the words and *A*tmospheres *E*xposable.

Methane is a lesser risks fuel than other liquid fuels.

That lessens the dangers for environmental and people.

WHY OUR SOLUTION SHOULD BE CHOSEN:

- Low methane's consumption
- same general benefits of the fixed heat treatment (no formation of dioxins and furans, contaminated soil still retains much of the organic and chemical properties, etc..) and, thanks to the heat recovery, lower energy demand
- Recovery for the 100% of decontaminated soil
- costs of treatment are lower compared to ex-situ treatments: processes are very easy to put into practice by eliminating problems such as transportation of material to place of treatment
- Plant can be moved quickly between different contaminated areas
- Thanks to our experience the system allows a wide range of solutions to different requirements, providing the flexibility that other systems often do not have;
- the possibility of having additional modules for water, natural gas and electricity: they can operate in any situation and with every type of material. The customer only needs to ensure a stable base for the modules (or cement paving);

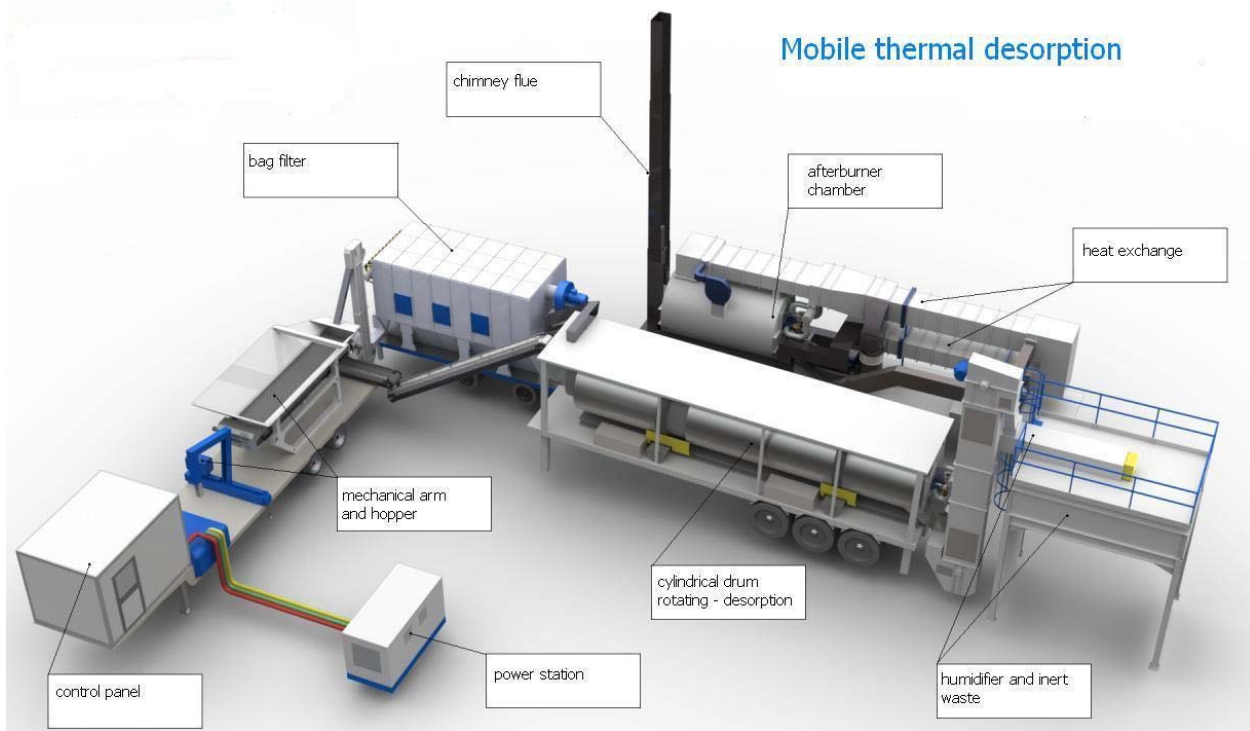
 Construction & Development Corp.

Viale Andrea Doria 24, 20124 Milano, ITALIA ,Tel + 39 02 6707 0989, Fax + 39 02 6738 7833
P.O. Box 451506 – Miami, FL. 33245 - 1506, USA, Tel + 1 800 685 2213, Fax + 1 800 928 1186

www.mpcd.info



Construction & Development



 AAA Construction & Development Corp.

Viale Andrea Doria 24, 20124 Milano, ITALIA ,Tel + 39 02 6707 0989, Fax + 39 02 6738 7833
P.O. Box 451506 – Miami, FL. 33245 - 1506, USA, Tel + 1 800 685 2213, Fax + 1 800 928 1186

www.mpcd.info