



## YOUR ADVANTAGES

Splitting & decomposition from 85 % to 98 % of oil spills within a few weeks

Remediation with other hydrocarbons (e.g. pesticides) polluted soils

Reduction of oil odour within one day

Environmental protection through nitrate-free operation

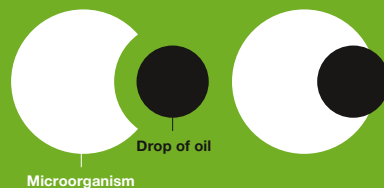
Increasing the microorganisms present in the soil by the amount of 20 times

Strengthening of natural self-healing powers

Awarded the European Innovation Prize for Microorganisms microorganism

## SCHEMATIC REPRESENTATION OF THE PROCESS IN BIOLOGICAL SOIL REMEDIATION:

Microorganisms eat oil or other biological degradable contaminants



Microorganisms digest the oil and convert it on carbon dioxide and water



Microorganisms emit carbon dioxide and water from oil



### Wöbking GmbH

Rheinstraße 36  
49090 Osnabrück/Hafen

Phone +49 (0)541 / 62867  
Fax +49 (0)541 / 682460

info@woebking.com  
www.woebking.com

### International Correspondence:

**Russia & Mexico** (deutsch, español, english, italiano, русский)

Fernando Martinez Z.

Phone +49 (0) 6322 / 9858289  
Mobile +49 152 / 33565131

technology@martinezimmobilien.com

## BIOLOGICAL SOIL REMEDIATION - A TASK FOR FUTURE

The often careless handling of problematic substances in the past and the current risks of our modern industrial society are constantly confronting us with the task of the redevelopment of contaminated soils, river banks and beaches. The diversity of pollutions requires a method That principally has a broadly diversified effect against many pollutants, is as simple as possible but can be applied cost-effectively at the same time.

Wöbking has established itself as a specialist for sustainable environmental protection. Our know-how and our many years of experience have enabled us to develop Biocrack®, a innovative product that meets many challenges.

## BIOCRACK® - SIMPLE APPLICATION

Biocrack® can be used as a liquid emulsion with the in-situ process very simple and fast via conventional sprinkler systems can be deployed. It is also suitable for the Renovation by rental method, for bioreactors or for small Damage on the spot.

## BIOCRACK® ACTIVATES SELF-CLEANING FORCES

As a patented, liquid nutrient concentrate, Biocrack® stimulates the propagation of the naturally present oil degrading bacteria. There is a targeted proliferation of these organisms. The metabolism of these organisms is responsible for the complete breakdown in CO<sub>2</sub> and water. Biocrack® remains clean soil it is free of nitrate and completely harmless.

Biocrack® eliminates all biodegradable fats and oils, especially petrochemical products, solvents, nitrogen-containing compounds and fungicide residues. For the remediation of contamination with heavy metals and organic-chlorine- and nitro-compounds, the use is limited.

## WHICH MATERIALS/CONTAMINATIONS TO REHABILITATE WITH BIOCRACK®?

### Rule of thumb:

n-Alkanes and Alkenes up to a C-chain length of 40; as well as iso- and cyclo-alkanes, which are basically biologically degradable

### Mineral oil hydrocarbons:

Petrol, diesel, kerosene, heavy fuel oil, n-paraffins (up to chain length C19)

### Aromatics:

Benzene, toluene, xylene, cresol, ethylbenzene, cumene, resorcinol, Hydroquinone, Phenol, Xylenol, Napthol, Naphthalene

### N-containing compounds:

Aniline, pyridine, urea, acetonitrile

### Other:

Carboxylic acids (benzoic acid, athranilic acid, etc.), ketones and alcohols

## APPLICATION AREAS:

- in-situ process
- rental procedure
- bioreactors

## DOSING:

depending on remediation method, soil type, etc.

**Rule of thumb:** x kg MOH\*/tonne of soil - multiplied by factor 0.2 = x litre Biocrack/tonne floor

\*Mineral oil hydrocarbon

### Application recommendation

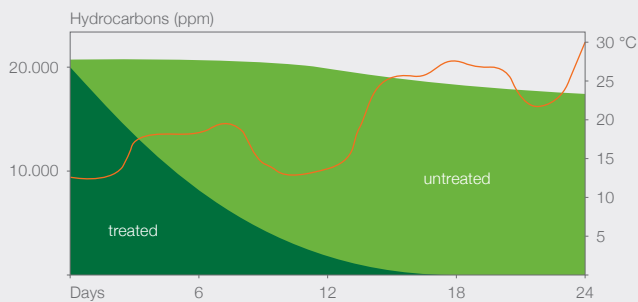
Use from 8-10 °C soil temperature possible. After application it has to be irrigated in, briefly.

Article	Product / Formulation	Note	Application	Water	Note	Packing
11006	Biocrack®	Slight damage Has to be repeated after 2-3 weeks if necessary	20 g/m <sup>2</sup>	600 l/ha	has to be irrigated	10 kg can

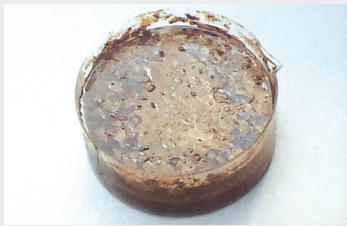
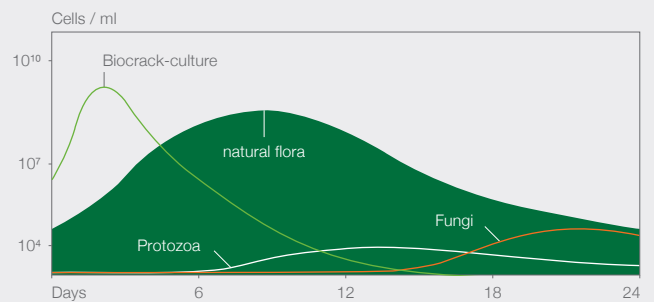
## APPLICATION POSSIBILITIES OF BIOCRACK®

### BIOCRACK®-EFFECT IN FRESHWATER/SHORE AREAS

#### Hydrocarbon degradation



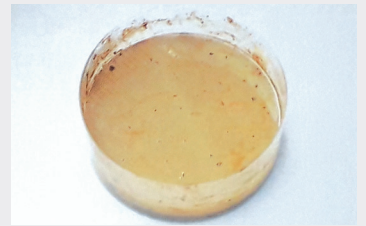
#### Succession of the bioflora



without treatment after 30 days,  
15.000 mg/l



„Oil-contaminated water surface“,  
20.000 mg/l



Biocrack®-effect after 30 days,  
< 1.000 mg/l

### BIOCRACK®-EFFECT IN SEAWATER/BEACH ZONES

Test result by Rogaland Research/Norway on Biocrack®'s effect on oil degradation: „... Biocrack® promotes oil degradation in a sand/oil/sea-water mixture. 50% of seawater contacted oil was degraded within 12 days. ...“

### BIOCRACK®-EFFECT IN SOIL

**Soil contamination:** • Mineral oil C11 - C40; 6,000 mg/kg

**Remediation technique:** • Biobed

**Remediation time:** • < 60 days

**Success control:** • „Holland A“ = 100 mg/kg

**Remediation success:** • „Holland A“ = 100 mg/kg

