

RBC 400

Overview

Refinery and petrochemical waste treatment

Treatment of oily waste containing high salt concentrations

Soil Bioremediation

(aliphatic hydrocarbons, polyaromatic, solvents, DRO, TPH, complex HC, hard COD)

A special blend of microbial cultures selected and adapted to degrade alkanes, and which is also highly effective on BTEX, DRO, phenol, polynuclear aromatics, sulphides, alcohols, and other similar solvents in land bioremediation and waste water treatment applications. This product can improve removal of toxic or difficult to degrade complex mixtures of organic compounds. In waste water treatment applications improves settlement of biological solids, corrects low or inconsistent MLVSS, and controls foam due to incompletely degraded organics.

Technical description

RBC 400 is capable of biodegrading a wide variety of organic contaminants found in many types of industrial waste water and hydrocarbon contaminated soils. This includes most aliphatic and aromatic petroleum hydrocarbons not readily degraded by conventional treatment. The mixture contains a number of microbial strains with the ability to degrade hydrocarbons, substituted hydrocarbons, phenolic compounds, TPH, DRO, ketones, fatty acids, surfactants, and a variety of organic compounds. The RBC 400 microbial activity is also designed to increase the rate of BOD, COD and TOC removal.

Petroleum oil is toxic for most life forms and a cause of pollution in the environment, which leads to major ecological problems. Many hydrocarbon-contaminated environments are characterized by low or elevated temperatures, acidic or alkaline pH, high salt concentrations or high pressure. Hydrocarbon-degrading microorganisms adapted to grow and thrive in these environments play an important role in the biological treatment of polluted extreme habitats. The biodegradation of a wide range of hydrocarbons, including aliphatic, aromatic, halogenated and nitrated compounds has been shown to occur in various extreme habitats with selected highly adapted bacteria cultures.

RBC 400 is a proprietary formulation of selected microorganisms capable of degrading alkyl and poly aromatic hydrocarbons. The bacteria can function at moderate up to high salinity environments. The bacterial consortium contained in RBC 400 is highly efficient in degrading petroleum oil and is highly adaptable and versatile in extreme conditions, coping well with high concentrations of sodium ions for the bioremediation of oil-polluted soils, marshes and industrial waste waters contaminated by aromatic

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hydrocarbons or chlorinated hydrocarbons. The bacteria in RBC 400 are hydrocarbon clastic organisms, which means they can divide something in parts, in this case hydrocarbons, which they can then metabolise or mobilise to make available to the indigenous microflora. The majority of microorganisms in remediation products predominantly use sugars and simple organic carbon molecules or amino acids for their source of carbon and energy. By contrast, cultures selected for inclusion in RBC 400 include bacterial strains capable of metabolising just alkanes, others with the ability to split polyaromatic rings, and fungi to degrade complex hydrocarbons and reduce metal toxicity.

The use of RBC 400 for the biodegradation of hydrocarbons with low water solubility has been proven to work effectively within a broad spectrum of temperatures and environmental conditions. The microorganisms present in RBC 400 produce bio-surfactants which also aid the process of degradation. The production of bio-surfactants which create the ability to reduce surface and interfacial tensions make them suitable for environmental applications where hydrophobic compounds are concerned. The biodegradability and lower toxicity of bio-surfactants compared to chemical surfactants is ecologically valuable. The production of bio-surfactants produced by the bacteria cultures in RBC 400 produces an extra layer of material (rhamnolipid) that forms along the cell membrane. Furthermore, they are also emulsifiers, which serve to create the oil/water emulsion, thus making oil more soluble. The bio-surfactants produced by the bacteria in RBC 400 form a biofilm around oil droplets in seawater or high salinity environments, which then proceed to use the bio-surfactants and metabolism to degrade the oil into a water-soluble substance. Bio-surfactant production is also an essential property for soil washing applications since hydrocarbons can be physically removed from soil particulates to be later treated in the aqueous phase (by biological, chemical or physical methods)

Key features & advantages

Can live in salinities ranging from 1-10%.
Performs within a broad temperature range from between 4°C to 35°C.
Can degrade a wide range of alkyl, aromatic and substituted hydrocarbons.
Utilizes a wide variety of alkanes, a type of hydrocarbon in its metabolic process as its source of energy to break down oil into harmless compounds.
The bacteria cultures in RBC 400 produce a bio-surfactant.
Effective for the treatment waste waters containing large amounts of aromatics (eg COD >50,000 mg/l) and land remediation projects (eg TPH >50,000 mg/kg)
Improves maximum rates of organic removal as measured by BOD, COD and TOC.
Provides higher bacterial growth to improve stability in response to organic overloads.
Reduces toxicity to autotrophic nitrifiers to allow the initiation and maintenance of high rates of biological ammonia removal in waste water applications.
Provides the ability to degrade a wide spectrum of recalcitrant industrial chemicals.
Improves the waste treatment system stability.
Enhances flocculation in activated sludge.
Facilitates rapid recovery from load-related shock caused by high COD loading and flows as well as toxic upsets.
Reduces the impact of production increases or changes in effluent quality.
Enables more rapid plant, seasonal, or maintenance start-up.

Physical Aspect	brown free-flowing powder
Packaging	100 g water-soluble pouches / 10kg plastic pail 10Kg bulk powder
Stability	12 months*
Product pH Range	5.5 to 7.0
Product Density	0.7 - 0.8 g/cm ³
Moisture Content	Below 15%
Nutrient Content	Biological nutrients and stimulants Humic and fulvic acids Free protease, lipase, amylase, cellulase
Bacterial Concentration	min 3x10 ⁹ bacterial CFU per g <i>Bacillus</i> (6 species) <i>Alcanovorax</i> (1 species) <i>Pseudomonas</i> (2 species) min 1x10 ⁷ fungi CFU per g - Fungi (3 species)
Usage Conditions	Do not freeze. Take care not to inhale dusts. Avoid excessive skin contact. Refer to SDS

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Applications

RBC 400 can be used for multiple applications from waste water and leachate treatments to complex soil remediation projects.

RBC 400 can be used in the following areas:

- Soil remediation
- Waste water treatment plants
- Facultative lagoons
- Leachate treatments
- Holding tanks
- Aerated lagoons
- Collection systems and basins
- Waterways

Product preparation

For waste Water Treatment

RBC 400 may be added directly to the waste influent stream or aerated basin. For toxic wastes or short retention times, re-hydration for between 30 to 90 minutes prior to its addition to a waste system is recommended, using 9L of water per 500g of RBC 400. For best results, the make-up water temperature range should be between 21°C and 31°C.

For Soil Bio-Remediation

See information provided in our Services Section

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Optimum conditions for use

The bacteria in RBC 400 perform within a pH range of between 6.5 and 8.5, with optimum activity near a pH of 7.0. Temperature affects the growth rate of the bacterial population and activity improves with a temperature of between 30°C and 37°C. No appreciable activity can be expected below 5°C and above 55°C.

Storage and handling

- Store in a dry place at room temperature. The recommended storage temperature is within a range of 1°C and 23°C.
- Avoid excessive inhalation.
- Avoid eye contact.
- Wash hands thoroughly with warm, soapy water after handling.

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