AQUATEC-MAXCON PTY LTD PRODUCT LITERATURE

BIOPAQ ® IC

Cost Effective & Space Saving Treatment for High COD Wastewater

- The BIOPAQ® internal circulation or IC process is ideal for treating industrial wastewater containing medium to high concentrations of soluble organics (i.e. BOD in excess of 1000 mg/l). This anaerobic process requires very little energy (no aeration) and space due to the slim design of the IC reactor (see Fig 2). The BIOPAQ® process is a net energy producer by virtue of its biogas generation from the conversion of organic carbon to methane and carbon dioxide resulting in virtually no net sludge production.
- In Australia, Aquatec-Maxcon is the licensee for the Paques BIOPAQ® IC technology which has a distinguished international reputation for being highly reliable and economical.

IC REACTORS CONSUME CONSIDERABLE LESS ENERGY THAN AEROBIC SYSTEMS.

DESIGN ADVANTAGES

- Low energy requirements
- Small ''footprint'': the IC reactor's space requirement is about a tenth of that for a conventional upflow anaerobic sludge bed (UASB) reactor.
- The IC process flow sheet is uncomplicated (see Fig 1).
- Extensive design and operating data is available for many different wastes.
- The BIOPAQ® IC reactor produces a useful methane byproduct, typically 0.35 m^3/kg COD removed.
- Effluent from the BIOPAQ® IC process can be directly discharged to sewer or ''sweetened'' through an aerobic process and discharged to a water course.
- The BIOPAQ® IC reactor does not suffer fromm corrosion as all reactor internals are made from plastic material as well as utilising a special tank liner at and above the corrosive air/liquid intersurface.

APPLICATIONS

- Breweries
- Sugar Mills
- Dairies
- Soft Drink Plants
- Starch and Potato Factories
- Canneries
- Food Factories
- Paper Mills
- Other Industrial Wastewaters

AS OF 2006 THERE ARE OVER 500 BIOPAQ® PLANTS INSTALLED WORLD WIDE

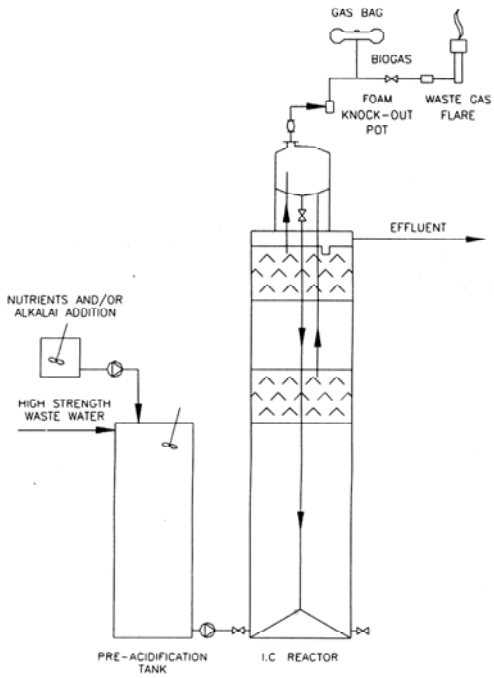

FIGURE 1 : SIMPLIFIED TYPICAL BIOPAQ I.C. PROCESS FLOW SCHEMATIC

DESIGN FEATURES

The BIOPAQ® IC process is outlined in the following steps:

i. Soluble organic components in the wastewater are partially biologically converted to volatile fatty acids (VFA's) in a preacidification step.

ii The pH of the wastewater is adjusted and nutrients are added, if required.

iii The conditioned wastewater is introduced into the IC reactor, where the conversion of soluble organics to VFA's is completed and the VFA's subsequently converted to an energy rich biogas of methane and carbon dioxide

iv The biogas may be used in a boiler or other energy conversion devices or burnt in a flare.

v The gas collection system collects biogas in the first layer of gas collection hoods generates a gas lift which forces the water/sludge up through a riser pipe and into the gas/ liquid separator on top of the reactor. This separator performs two basic functions. The first is to collect and pipe away the biogas. The second, to direct the water/sludge mixture flows through a return pipe back to the bottom of the reactor, thus establishing an internal circulation. As a result, no recirculation pumps are require.

vi Designs are based on an organic loading rate, OLR in kgCOD/(m^3d); OLRs range from 20 to 35 kgCOD/(m^3d) depending on the temperature and nature of the wastewater. Generally, the BIOPAQ® IC reactor volumetric COD loading rate is twice that of a conventional UASB reactor.

vii Due to the small IC reactor surface area, odour problems are avoided.

It is important to understand the treatability of any given waste. Aquatec-Maxcon provides on site testing of particular wastes through pilot-scale testing.

THE BIOPAQ® IC REACTOR HAS GREATLY REDUCED SPACE REQUIREMENTS COMPARED WITH CONVENTIONAL ANAEROBIC PROCESSES

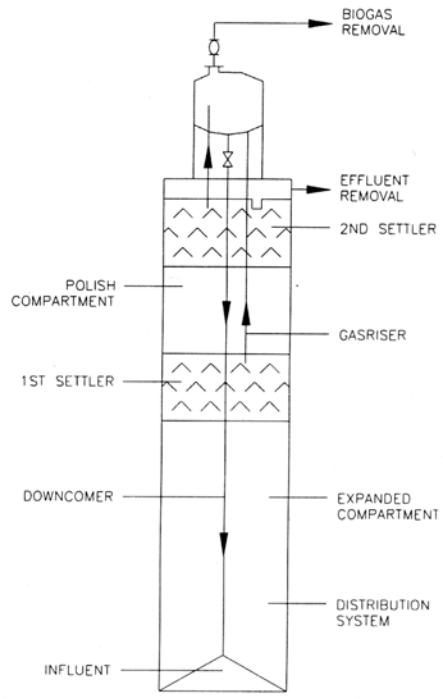

FIGURE 2 : CROSS-SECTION OF I.C. REACTOR

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