KEE
ISSUE 2
THE SOLUTION TO WATER POLLUTION NEWSLETTER
INSIGHT

THIS ISSUE

Just some of the features in this issue – and more . . .❑

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visit our web site
www.keeprocess.com
or email
sales@keeprocess.com.

NEW RANGE TAKES A WELL EARNED HOLIDAY

KEE first launched the BioDisc self-contained wastewater treatment plant in the early 1970s and since then has continued to make improvements to this popular system. In 1990 the use of packaged plant technology was revolutionised through the introduction of KEE's patented Managed Flow technology, which achieves a consistently high quality of output. The process is particularly suitable for small and medium treatment systems, where the flow received and wastewater character varies substantially throughout the day. The system had previously only been suitable for large installations made up of a number of components. This was the first time that the technology had been applied to a single packaged unit.

Over the last twelve months, KEE has been developing the system even further. The new range has improved features such as low profile covers, which make the units more discreet. These covers also provide easier access for maintenance of the mechanical components. An internal platform has been added, to provide safer work access and the whole design concept has been addressed, to simplify the installation of the units.

The first unit from the new BioDisc range has recently been sent to Granada in the Caribbean. The plant is for the Bel Air Plantation and will serve a hotel and restaurant complex, along with nearby residential properties. A number of options were considered for this project, but the KEE BioDisc was chosen because of its reliability, simplicity and minimal operating and maintenance requirements. In addition, since the BioDisc is a packaged unit, the site requirements are minimised and potential problems are reduced. These were important factors in the selection of the KEE system. ❖

The New 1600 BioDisc being loaded at the docks on its way to Granada in the Caribbean.

PROVING THE QUALITY OF SERVICE

Quality is a very important aspect of what KEE does and the company is always working to improve its Quality Management System. While formerly accredited with ISO 9002:1994, the company has been working towards upgrading its accreditation to the newly released standard of ISO 9001:2000.

Since publishing this original article KEE Process Ltd and KEE Services Ltd have achieved BSI recognition:

BSI™

ISO 9001

(IMS) PAS 99
IMR 512239
IMR 517921
(QMS)
FM 515540
FS 517918
(OHS)
OHSAS 18001
OHS 515542
OHS 517920
(EMS)
EMS 515541
EMS 517919

KEE is proud to announce that the company has now reached this very high standard of quality management and has received the new accreditation. This means that KEE's customers are assured of a consistently high level of service and quality, as the company continually strives to meet and exceed the stringent quality objectives set by the standard. ❖

CARING for Clients 24Hrs a Day

SINCE ITS RE-LAUNCH in 2000, KEE has set itself a business mission to offer not only custom designed solutions for wastewater treatment systems, but also an unparalleled level of service.

This service includes the on site operation of treatment plants and round the clock care. KEE can take over the operation of a client's system, providing regular site visits to maintain the unit and the surrounding area. These regular checks can ensure the smooth and continued running of a treatment system and prevent unnecessary problems from arising. They can also supply spares.

KEE also offer clients an annual operation contract, which more and more clients are taking up. Engineers can visit individual sites to discuss a fixed price maintenance and operation contract for each client, based on their specific needs.

For clients who do not need as much assistance as an annual contract, KEE has a dedicated team of service engineers who can supply and fit spare parts at short notice. And those clients who want to do the work themselves can call the spares department on a free phone number, who will send them standard spares within 24 hours.

For spares and service, call free on:

0800 389 0457

KEE HAS IT COVERED

THE NEEDTO PROTECT the environment is at the forefront of KEE's developmental strategy. Coupled with the fact that many wastewater treatment plants need to be located close to the residential areas they serve, means that these structures need to be securely covered.

KEE is now able to offer GRP (Glass Fibre Reinforced Poly-ester) composite covers with many of its products. These covers can be custom made to suit any shape and size of treatment unit. Despite being very lightweight, they have been designed to withstand wind and heavy snow loads; they can also accommodate pedestrian load-ing to defined criteria.

Because KEE can supply covers to suit each individual situation, even the structural design can be altered. They can be supplied to fit existing or new treat-ment tanks, whether they are made from concrete or steel. Numerous different hatches and openings can be included to give easy access for mainten-ance. KEE can deliver covers and install them at each customer's site, to give them and their local environment the protection that they need. ❖

High rigidity and corrosion resistant GRP enclosures for inlet channels at a 2,400,000 m^3/day Municipal WWTP.

High quality Flat GRP Enclosure retrofitted to a 23m dia circular pre-treatment tank with internal scraper mechanism supported from the cover.

Air Extraction System for GRP Cover.

GRP Covers for Archimedean Screw.

Access door for flat cover.

Top roof section of cover

KEE Helps Out in the Kitchen

KEE HASA PHILOSOPHY of developing innovative solutions for specific wastewater treatment situations.

Floor and wall mounted options neatly fit into a busy kitchen.

For a long time the company recognised that there was a need for a system that tackles problems faced by catering establishments. Pubs, hotels and restaurants need to use certain chemicals for cleaning and washing, while their kitchens generate a lot of fat, oil and grease. This can all build up, leading to blocked drains and other problems that can offend customers. While KEE has offered systems that deal with discharge from washing chemicals, such as laundry detergents and those used in dishwashers for the last ten years, there was nothing available to combat the other issues.

Now KEE has developed a system that not only remedies this problem, but also deals with chemical discharge – the new KEE BioGuard Grease Digester. This simple, unobtrusive installation contains a liquid biological solution that works 24 hours a day, containing micro-organisms that degrade fat, oil and grease. The system also ensures that the correct dosage is made at the most beneficial time. It provides many benefits to catering establishments including:

- The prevention of unpleasant odours
- The elimination of emergency call-outs
- Free running drains
- Conformity with effluent discharge regulations
- An environmentally friendly response to pollution

The BioGuard system takes up a small space in a busy kitchen and is relatively inexpensive to install. In addition to this, KEE technicians make regular visits to customers to make sure that their units are functioning properly and that the biological solution is always kept topped up. This means that kitchen staff can concentrate on doing their jobs, without having to worry about what goes on below the kitchen sink. ❖

A Smoother Drive?

KEE'S MISSION is to offer wastewater treatment solutions for a wide range of situations, from municipal customers to industrial and trade sites.

To add to this diverse range, KEE has now won the chance to design, build, install and maintain a treatment system for Mercedes Benz. A unit is required to treat surface water generated by new car preparation within a large showroom. The amount of wastewater that needs to be handled is extremely variable, so KEE was approached and asked to design a system that can deal with the specific criteria for this site, smoothing out the flow rate. ❖

A Very Good Vintage

WINE MAKING is a very seasonal process. The harvest of the grapes is the busiest time of year, lasting just a few weeks, while there are many other months of very low activity.

This seasonality is reflected in the amount of wastewater produced throughout the year. During the harvest, when the grapes are being crushed, the wastewater is very strong and highly polluted. Other processes involved in wine making produce less polluted wastewater and for three to four months of the year, little or no wastewater is produced at all.

Recently the USA Environmental Protection Agency (EPA) became concerned about how wastewater from a small winery in California was discharged and disposed of. Previously, the wastewater was released to a pond and from there into the ground. However, this was deemed unacceptable. The EPA required the wastewater to be treated to an acceptable standard before being discharged into a watercourse.

Typical small vinyard requiring wastewater treatment.

Because KEE is known for experience in dealing with fluctuating flows and pollution loads, the company was asked to investigate the requirements of the winery. A wide range of solutions and hardware were assessed for their suitability, but the final choice was a packaged plant that provides simplicity of operation, low cost of maintenance and has a small footprint area, so does not take up much valuable space.

In addition, the plant can treat the wastewater from the harvest, to produce a final discharge that is suitable to use for irrigating the vines, to grow the next year's crop. ❖

Tailor-Made Units for Hire?

When your existing wastewater treatment facility needs to be upgraded or replaced what do you do? When the flow still needs to be treated, but the unit is not working or has to be switched off, how do you manage?

KEE Free Standing BioDisc Single Piece packaged plant delivered for ready deployment.

The answer is to divert the flow through a temporary treatment unit. KEE are now offering equipment for rental to do just this. They have recently supplied Williams Industrial Services in Northern Ireland with an above ground free standing plant, which is able to treat their full flow, to the required standard. This meant that the existing plant could be relieved of its normal duty, while it was being upgraded. The main treatment units were actually being demolished and completely re-built, so the KEE BioDiscs were able take over for the entire period of the project.

KEE has an extensive range of units to choose from, to suit most sites. The company can also manufacture equipment to specific criteria, if the existing equipment in their inventory does not match the requirements. How many other companies will go to these lengths, when you only want to hire the equipment for a few weeks? ❖

A BETTER WAY TO PROTECT THE ENVIRONMENT

BioDisc package single piece plant including phosphorus removal to under 1 mg/l.

ENVIRONMENTAL AGENCIES across the world are becoming more concerned about the quality and efficiency of biological wastewater treatment, setting higher and more stringent standards.

Until recently, reduction in oxygen demand, suspended solids and ammoniacal nitrogen was thought to be sufficient to avoid any long-term pollution. However, the need for nutrient removal is now seen as a must, with the removal of total nitrogen and phosphorus from wastewater becoming a major concern.

Over the last fifteen years, KEE has offered simple package plants for removing phosphorus, obtaining Third Party Accreditation and type approval for their small plants to reduce phosphorus levels below required levels. During the last five years, KEE has also become more involved with the reduction of total nitrogen to below specified levels in treated wastewater.

Independent verification of KEE's equipment was undertaken by a state sponsored study in the USA. This concluded that not only is the KEE plant the most reliable but it has the lowest operational costs. Simple control techniques are used in the designs, to ensure that the units can be operated by almost anyone. This is consistent with KEE's philosophy of simplicity of plant design, reliability and low operating costs over its lifetime.

KEE's packaged plant uses a simple approach for achieving the required nutrient removal from wastewater and installations have been made throughout the USA, UK, Scandinavia and even Hong Kong. ❖

KEE Bio-Guard
The Grease Digester

The Biological Solution for Clear Results

For many pubs, hotels and restaurants, the build up of fat, oil and grease (FOG) is an everyday occurrence, due to food preparation and dish washing. It can lead to a mixture of problems, most of which can result in hygiene problems, unhappy customers and lost revenues.

Temporary Solutions
Chemicals can temporarily liquefy fat and grease, but this is only a short-term solution, with the problem being transferred down the line to the main drains and sewage treatment plant. Increasingly stringent environmental laws will soon make this an expensive option.

Drainage specialists can remove blockages, but frequent call-outs are expensive and it is not a permanent cure. More frequent emptying of the fat trap can help, but this is expensive, unpleasant and time-consuming.

Clearly Better
The build up of FOG can be permanently overcome by treating drains with a biological FOG digester.

KEE Bio-Guard is a liquid biological solution that works 24 hours a day. The system contains micro-organisms that degrade FOG and ensures that the correct dosage is made at the most beneficial time. It can save time by preventing costly or embarrassing problems.

Maintaining Clear Flow – KEE Bio-Guard ensures:

- Prevention of unpleasant odours
- Elimination of emergency call-outs
- Free running drains
- Conformity with effluent discharge regulations
- An environmentally friendly response to pollution

KEE PLUS

A force waiting to serve you

A KEE SERVICE THAT IS COMMITTED TO IMPROVING THE ENVIRONMENT

Solutions for Water-Based Pollution Control

The 'PLUS' service that KEE now offers is committed to providing a customized solution to domestic, commercial and industrial wastewater treatment applications.

With a focus on protecting the environment, KEE offers an extensive range of processes and services for the physical, chemical and biological treatment of waste and surface water. From small residential developments to entire villages, from hotels and office complexes to large industrial sites, KEE has the expertise and experience to help clients safeguard their environment.

Continuous investment in research and development allows KEE to apply leading technology for the future.

A Long-Term Commitment To Customer Care

The KEE Plus service comprises a complete range of options, from simple servicing and repairs through to full service, maintenance and comprehensive on site plant operation.

Focusing on the many issues faced by each individual installation, the KEE Plus service can help prevent potential problems, before they become costly or hazardous situations.

From installation of the most appropriate equipment to routine inspections and maintenance, each of KEE's clients has differing needs. However, the aim is always the same, the provision of competent support for the effortless, long-term management of wastewater.

For more information on the KEE Plus service, call free on:

0800 389 0457

Soaking Up More Sunshine

AN INCREASED NUMBER of holidaymakers have been jetting off to the Caribbean in recent years, to make the most of the warmth and the sunshine. While tourism is an important source of income, it has also lead to problems at Grand Cayman International Airport, where the sewage treatment works became overloaded and were not working effectively.

Along with Waste Water Solutions International, KEE investigated the problem. They suggested the installation of one of KEE's packaged units that was more suitable to the needs of the busy airport. Installed last year, the plant has been in continuous operation without any problems of overloading. In addition, it is able to treat wastewater to a suitable standard so that it can be discharged into a nearby watercourse without out any risk of pollution.

At the same time, KEE has been busy upgrading a failed extended aeration plant at Discovery Bay Hotel in Barbados, in conjunction with US partners, WWSI. The new plant was installed and put into operation without any interruption to the hotel's business – the hotel's owner did not even know that it was up and running until he signed the cheque. The discharge from the plant is of such high quality that it is now used for irrigating the hotel gardens. This was the first one of KEE's units to be installed on the island and due to the recommendations of the Discovery Bay Hotel, there may be many more to come. ❖

A HIGHLY RECOMMENDED SOLUTION

ACS DESIGN IN THE USA has recently been involved in the construction of a brand new hotel complex, including a golf course and residential resort.

When the time came to find a solution to the wastewater generated by the site, ACS decided to listen to recommendations. They evaluated many products that are on the market, including those in the KEE range and they also talked a number of companies who use KEE installations.

The hotel complex required a simple unit with a low cost of operation, which KEE could provide through the installation of a prefabricated unit. They found that other customers were impressed with the quality of KEE's equipment and especially with the after sales service that they receive. These recommendations combined to convince ACS that KEE could provide them with the ideal solution. ❖

KEE RBC Technology
Biological Treatments for Wastewater

Clear Solutions for Wastewater Treatment Systems

RBC installations can be arranged to make up the total required media surface for the biological stage of treatment plants, for larger flows from industrial sites to small towns.

THE KEE GROUP OF COMPANIES is committed to providing a customised approach to domestic, commercial and industrial wastewater treatment applications.

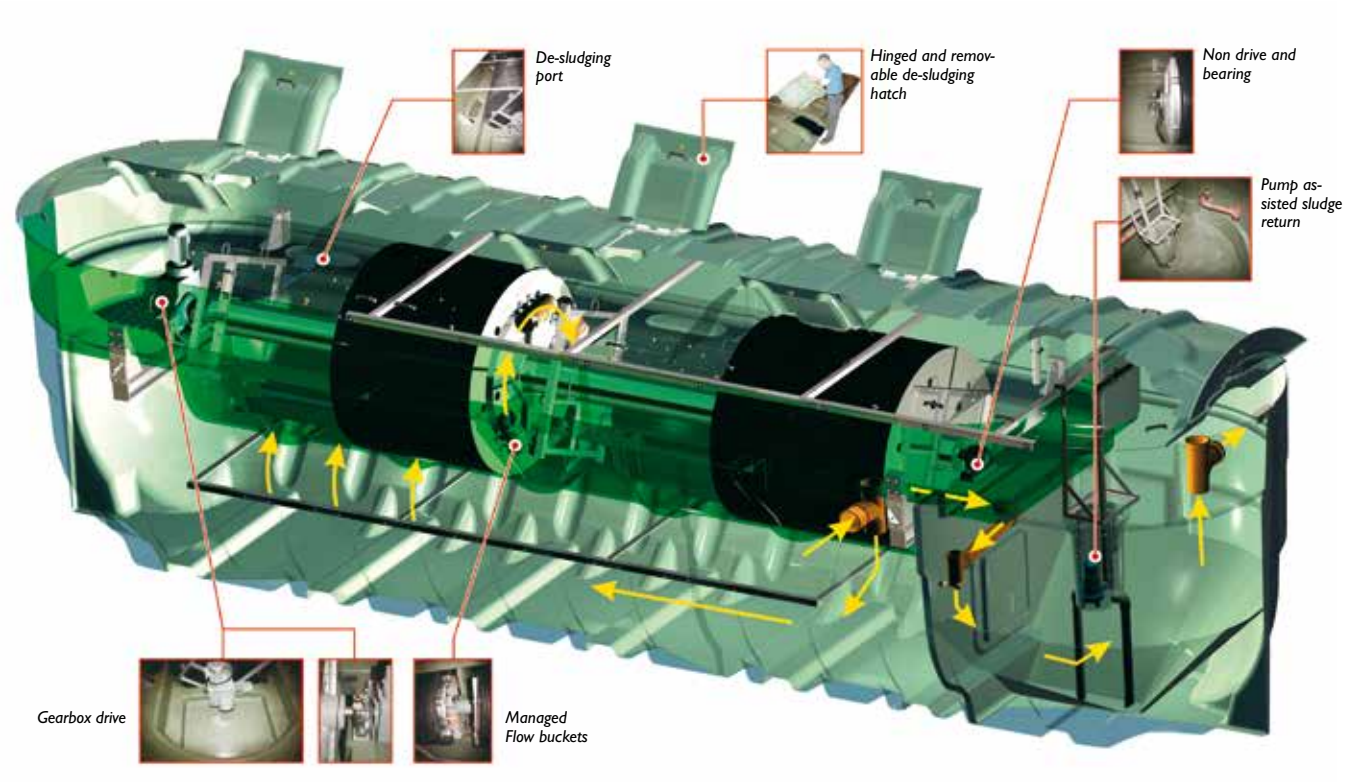
Developing highly effective solutions, KEE can provide innovative systems to treat every individual situation and requirement. By continuously upgrading these solutions, they are able to keep in step with the rapid changes in environmental and health regulations that affect your business.

With a comprehensive range of products and many years of experience, KEE can create a close relationship with your company, to develop the most appropriate solution.

With expertise in many different markets, KEE can offer significant advantages to customers, across numerous industries, service businesses and housing municipalities.

Central to the KEE's RBC treatment technology of wastewater is the Rotating Biological Contactor (RBC), which supports a biologically active film, or biomass, of aerobic micro-organisms.

RBC Technology can be applied to a huge range of situations, depending on the site and the volume of wastewater to be treated. From single homes to large housing developments; from small guest houses to international hotels; from leisure centres to huge hospitals, KEE provides the clear solution. ❖



Glossary of Frequently Asked Questions

Q. What is BOD_5?

A: — BOD_5 stands for 5 days biochemical oxygen demand. This is the amount of dissolved oxygen consumed by microbial activity when a sample of effluent is incubated at 20°C. If the incubation period is 5 days it is a 5-day BOD.

Q. What is Suspended Solids?

A: — Suspended Solids is a measure of solids in suspension in an effluent sample. It is measured by filtering the effluent through filter paper and drying the solids at 105°C after the filter cake is washed.

Q. What is COD (Chemical Oxygen Demand)?

A: — COD is a measure of oxygen consumed by chemical oxidation of matter present in an effluent sample.

Q. What is DWF (Dry Weather Flow)?

A: — This is the amount of average daily flow of wastewater that needs to be treated by a plant. Dry weather flow excludes all flows due to rainfall or ground infiltration into the drain.

Q. What is Peak Flow Rate?

A: — This is a measure of maximum instantaneous flow rate to be received at a Treatment Plant.

Q. What is FFT (Full Flow to Treatment)?

A: — FFT is the maximum flow which can be treated by a plant.

Q. What is HRT (Hydraulic Retention Time)?

A: — HRT is the resident time for wastewater in the various unit operations of wastewater at a given rate of flow.

Q. What is P.E. (Populations Equivalent)?

A: — P.E. is a notional population comprising the resident population and a conversion of trade and other effluent loads based on a flow of 200 l/day per PE or BOD_5 load of 60 g/day per PE.

Q. What is a Septic Tank?

A: — A septic tank is a compartmentalised settling tank that is designed to provide adequate conditions for settlement and anaerobic breakdown of solids from wastewater.

Q. What is a humus tank?

A: — A humus tank is also sometimes called secondary settlement tank or final settlement tank and is a tank in which settable solids or humus is separated from the effluent after it has been through biological treatment or biological reactor.

Q. What is a Primary Settlement Tank?

A: — It is a tank in which a large proportion of settable solids are removed from the influent wastewater flow.

Q. What is a Packaged Wastewater (Sewage) Treatment Plant?

A: — A packaged wastewater (sewage) treatment plant is a prefabricated single piece or a modular arrangement of factory built tanks and/or modules transported to site for installation.

Q. What is the EA (Environment Agency)?

A: — The Environment Agency in the UK is an independent Government Organisation that issues consent for discharge and monitors consented discharges and the receiving waters to ensure compliance of the discharge with the consent.

Q. What is RBC?

A: — RBC stands for Rotating Biological Contactor and is a series of structured plastic media (discs) mounted on a horizontal shaft and the whole assembly is slowly rotated whilst partially immersed in a trough filled with effluent to be treated. An active biological film establishes on the media and as the RBC is rotated it alternately brings the biomass into contact with wastewater and air to promote aerobic treatment to the wastewater.

Q. What is BAF?

A: — BAF stands for biological aerated filter and consists of an aerated tank containing submerged media. An active biomass film grows on the media and purifies the effluent by oxidising pollutants. In a BAF plant the excess biomass is removed by washing the bed of media instead of a humus tank.

Q. What is SAF (Submerged Aerated Filter)?

A: — SAF is an aerobic reactor and includes a force (compressed air from blower/compressor) aerated tank or trough full of inert media. The media supports a biologically active film for aerobic treatment of pollutants in wastewater. A final settlement tank to remove excess biomass or humus solids follows SAF.

Q. What is ASP (Activated Sludge Plant)?

A: — A plant consisting of an aeration tank which provides an enclosure for aerating and mixing suspended biomass and wastewater or mixed liquor. A final settlement tank installed after the aeration tank separates the suspended biomass which is returned to the inlet of the plant and the effluent is discharged.

Q. What is SBR?

A: — SBR stands for Sequencing Batch Reactor and is a special case of ASP. SBR includes a tank that undergoes a series of cyclic operations of (i) filling, (ii) aeration of activated sludge and wastewater or mixed liquor, (iii) settlement and (iv) decanting. Excess sludge is wasted before the cycles begin all over.

Q. What is mixed liquor?

A: — Mixed liquor is a mixture of microbial solids and wastewater present in aeration tanks of Activated Sludge Plants.

Q. What is MLSS (Mixed Liquor Suspended Solids)?

A: — MLSS is a measure of dry solids concentration in mg/l in mixed liquor in an aeration tank.

Q. What is a reed bed?

A: — A reed bed is a gravel bed carefully constructed and planted with reeds to provide secondary or tertiary treatment of wastewater.

Q. What is sludge?

A: — Sludge is a consolidated mixture of solids and water produced in a wastewater treatment plant.

Q. What is aerobic treatment?

A: — Aerobic treatment is a biological process of treatment promoted by bacteria in the presence of dissolved atmospheric oxygen.

Q. What is anaerobic treatment?

A: — Anaerobic treatment is a biological process of treatment promoted by bacteria in the absence of dissolved atmospheric oxygen.

Q. What is Nitrification?

A: — Nitrification is the oxidation of ammoniacal nitrogen to nitrate or nitrite nitrogen or both.

Q. What is eutrophication?

A: — Eutrophication is enrichment of receiving waters by nutrients enabling healthy growth of plant life. Treated wastewater could be a good source of nutrients in receiving waters.

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