Pharmafilter A Cleaner Hospital
A Cleaner World Significantly Affecting The Quality Of The Patient's Environment And Safety

Introduction

Pharmafilter represents a change in the way we work that positively enhances the work environment, patient safety and care.

It is an environmentally friendly way of dealing with the complex waste, sewage and waste water streams emanating from hospitals

It is a thoroughly integrated waste management system that at every interface delivers significant improvement in the handling, removal and treatment of waste streams arising in hospitals.

Logistically and historically, waste in hospitals is removed and separated into various categories. This activity requires both significant staffing hours, physical infrastructure and recording of waste types. This process requires the use of sorting rooms, internal, external storage and transporting waste through public corridors and lifts.

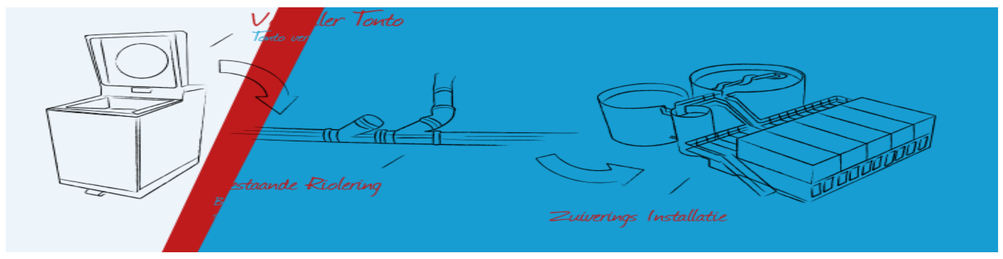
Pharmafilter system greatly simplifies the methods by which waste is handled and decontaminated and therefore reduces overall costs.

The Process

Starting with the Tonto high tech shredding units that are installed in service or utility rooms convenient to areas of waste output. The Tonto processes all waste generated in the department and ward from healthcare risk waste, food, sharps, materials contaminated with blood, soiled, pharmaceuticals, paper, plastics, biodegradable bedpans and urine collection units.

Waste no longer leaves the hospital through corridors and lifts therefore reducing the exposure to and risk posed by hazardous waste to patients, staff and visitors. The Tonto grinds these waste materials to a particulate size so they can be easily accommodated and transported by the hospitals existing sewer network.

We are now at a point where the hospital waste has exited the building and the Pharmafilter on site plant picks up the external sewer and automatically decontaminates and separates all constituents of this mixed waste stream; sewage, organics and water.



The treatment process engages several patented technology processes resulting in outputs free of viruses, pathogens harmful bacteria, pharmaceuticals and other trace contaminants.

In exploiting this technology the user has reduced their staff and patients exposure to hazardous waste and the time, effort and cost involved in its treatment. The system treatment sets a new standard environmentally and in terms of its efficiency. The on site plant produces its own electricity, notably it produces water of a quality that can be reused in the hospital. It reduces mixed waste (including hazardous) by 50% of volume including 90% of organic waste representing another cost benefit.

Hospital Waste Water Treatment Description

The waste water from hospitals contains high concentrations of pharmaceuticals, such as antibiotics, painkillers, cyto- toxic substances, heart medicines and contrast media. Through urine and faeces these substances are discharged to the waste water system and despite excellent biological treatment in wastewater treatment plants, eventually discharged into surface water. It is suggested that these toxic and carcinogenic kinds of compounds are responsible for disrupting water life and cause disease and malformation in water organisms by their hormone disrupting activity among others. At this moment these kinds of substances are the emerging substances in environmental policy.

Characterization of Hospital Waste Water

Hospitals can be seen as a "hot-spot" of pharmaceutical emission because here there is a high load of pharmaceuticals used and emitted through hospital wastewater into the municipal sewerage. It has been well established that sewage treatment plant and more globally, all water compartment (effluent to river) are reservoirs of antibiotics resistant bacteria where horizontal transfer shapes the future evolution of resistance determinants (Szczepanowski et al. 2009; Moura et al. 2007; Martinez 2009, Zhang, et al. 2009).

As a consequence, the emergence of antibiotic resistant genes (ARGs) in the water environment is becoming of increasing worldwide concern. Hundreds of various ARGs encoding resistance to a broad range of antibiotics have been found in microorganisms, distributed in surface water, groundwater, hospital wastewaters, in sewage, waste water treatment plants, and even in drinking water and bottled water (Barraud & M.-C. Ploy 2011a; Falcone-Dias et al. 2012). Source Pills Report 2012

Waste Stream Handling and Protocols

The handling of food waste and general waste processing in hospitals requires a lot of time and space. In preparation of food, cleaning and washing has severe logistical challenges and disadvantages. It takes a lot of time and space (kitchen, transportation, lifts, washing kitchen). The handling of bedpans is also time consuming because every bedpan has to be washed and disinfected. There is also a severe risk of cross contamination during this handling process. Pharmafilter is a system in which all waste and wastewater streams in hospitals are combined. The waste water flow includes the solid waste in the form of bio plastic bedpans, urinals, kitchen refuse, general waste, and healthcare risk waste is also processed. Optimization of handling and hygiene in the hospital is encountered by the use of bio plastics for bedpans, urinals and other single use disposables. All solid waste is processed by a Tonto shredder; the small particles from this shredder are flushed through the existing sewer system to the Pharmafilter onsite central liquid / solid separation unit. The solid fraction is fed into a Pharmafilter digester tank, digested and fully decontaminated. This process produces biogas, which is reused to power the plant.

The on site Pharmafilter plant which completely removes the medicines and endocrine disruptors in the waste water treatment phase

Decontamination of Waste and Waste Water Results

Waste

The above process and treatment results in the decontamination and significant reductions in the volume and waste type emanating from hospitals, therefore delivering a vast reduction in road movements of waste trucks and costs of removal for transportation and processing. Digestate from the digester is disinfected by the thermophilic (high temperature) conditions in the digester and an extra disinfection step is introduced to the dewatered sludge so it can be used (proven technology) beneficially.

Waste Water

The water streams from the hospital sewers and digester are treated in the on site Pharmafilter plant engaging a new patented design .The biologic treatment is for extra removal of nitrogen and phosphorus. The water from this high tech waste water treatment plant is crystal clear, disinfected and with very low nitrogen and phosphorus content can be discharged to sewer. The wastewater is now free of the previously high concentrations of pharmaceuticals, such as antibiotics, painkillers and heart medicines. The water is now ready to be reused for the flushing of the Tono shredde, toilets and other beneficial applications such as boiler feed or garden water.

Independent Source

The effluent from the hospital is fully purified in four steps and cleansed of all harmful substances such as medicinal residues, cytostatics, contrast liquids, endocrine substances. bacteria and viruses. Samples show that all medicinal residues found in the waste water are eliminated to below the detection limit.

Medicinal waste in the water is no longer detectable. 99.9% savings on the waste water charge.

The purified water is suitable for flushing the Tonto, toilets, cooling towers and other process applications.

Up to 40% reuse of water is achievable.

Bert Palsma, Chairman of the Steering Committee

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