

# A Critical Review of Rentokil Initial's “Plus by Initial Service” for the Treatment, Handling, Collection and Transport of Sanitary Waste

May 2015

David A Baldwin, PhD, MSACNASP, MSACI  
EnChem Consultants cc,  
16, Kaaimans Boulevard  
Kraaibosch Manor,  
Box 10324,  
George, 6530, South Africa

## 1 Introduction

Rentokil Initial South Africa has requested Dr David Baldwin of EnChem Consultants cc to review the new *Plus by Initial Service* that has been developed for the management of *Feminine Hygiene Units*. The scope of this report includes the programme's ability to meet its major goals of providing multiple levels of hygiene protection to customers and staff from pathogens that are often present in the sanitary waste and preventing odour that can develop in the waste when stored. The programme has also been checked against the Health Care Risk Waste Regulations published in June 2012 that classifies Sanitary Waste as a health care risk waste. Typical bacteria that can be present in sanitary waste include *Staphylococcus aureus* and *Escherichia coli* and possibly even the AIDS virus.

The new *Plus by Initial Service* includes:

1. Puncture proof feminine hygiene units impregnated with silver ions;
2. Scented, antimicrobial and biodegradable bin liners ("Cheree");
3. A natural mineral and essential plant oils deodorising granules, "Sanitact Green";
4. An SABS registered surface disinfectant/detergent that is used during the service of the unit;
5. Puncture proof medical wheelie bins for collection and transport of the waste to the Initial Depot; and
6. A standard operating procedure (SOP) for rendering of the entire service that is used for staff training to ensure that the service is rendered effectively and safely at all times.

In this review, the approach used was to evaluate the effectiveness of each component of the Plus by Initial Service and, where appropriate, search the literature for scientific publications that indicate that key elements, such as the use of silver ions, antimicrobial bin liners and the essential plant oils, etc are capable of meeting the goals stated for the service. In addition, evaluate test data obtained both in the laboratory and in the field of the effectiveness of the system in meeting the major hygiene goals of the service including any legislative requirements that may apply.

## 2 Review

The Plus by Initial Service is a proactive and comprehensive approach to the management of risk wastes, such as potentially pathogenic sanitary waste, **where multiple barriers are used to provide a far higher level of hygiene protection than would be offered by a single barrier.**

### 2.1 Feminine Hygiene Units (FHU)

Puncture proof feminine hygiene units are used to collect and store the waste in the toilets for up to one month. The use of puncture proof bins is important to protect

customers and staff from needle pricks and cuts, as occasionally the public disposes syringes and other sharp objects in the bins. The Signature bins are impregnated with silver ions which have been known for many years to kill bacteria at very low concentration in water and keep it fresh. The moistness of the sanitary waste provides an ideal environment for the silver in the bins to maintain a low level of pathogens on the surface of the bins.

Swab tests on the base and sides of 16 bins at various locations at schools in Durban were very successful. The tests were undertaken by a SANAS accredited laboratory and all swabs met the SA National Standard for bacteria that is included in the health care risk waste legislation, i.e. <100 colony forming units and non-detection of *Staphylococcus aureus* and *Escherichia coli*. Durban was selected as the test area in South Africa because the more tropical conditions prove a greater challenge to the system than cooler climates.

## **2.2 Cheree bin liners**

Cheree biodegradable, fragranced and sanitized polyethylene liners are used to line the bins. They are impregnated with low amounts of a well known biocide that is present in many hygiene products, including those used in hospitals and other potentially high risk areas. A search of the literature indicates that the bactericide that is used is highly effective against a wide range of pathogenic bacteria and viruses. A fragrance is also present in the liners and it assists in minimising and masking any odour that may develop.

*The bin liners thus pose a second barrier to reduce the growth of any pathogens that may be present in the sanitary waste.*

The use of biodegradable plastics has greatly increased over the last few years, as concern over the extremely long lifetime of conventional plastics in the environment has increased. The Cheree bin liners are made of polyethylene that includes ~2% of a totally degradable plastic additive (TDPA). For plastics, degradability refers to change in chemical structure and loss in mechanical properties caused by a specific environment, resulting in the plastic breaking down into small fragments. Biodegradability results from the actions of naturally occurring micro-organisms such as bacteria, fungi and algae and results in the plastic fragments being consumed for example if the plastic is disposed to landfill. The Cheree bin liners are thus more friendly to the environment than normal polyethylene bags.

## **2.3 Sanitact Green**

*A third barrier to the development of pathogenic bacteria and odours is provided by Sanitact Green. Sanitact Green consists of base mineral granules that are impregnated with a proprietary blend of several essential oils. The vapour phase*

activity antibacterial and antiviral activity of essential oils is well documented in medical and scientific literature. A review of the literature indicates that provided a suitable mixture of essential oils is chosen a formulation can suppress the activity of a wide range of bacteria due to the various compounds in the vapour phase. Viruses, such as *Herpes Simplex* and even AIDS, are easily suppressed by the Sanitact Green, although any viruses entering the Plus Initial Sanitary bins would be dead within a few hours without living cells to infect and grow on.

The vapour of the essential oils in Sanitact Green slowly builds up in the FHU as it is released from the granules. The vapour inhibits the growth of bacteria and as a result reduces odours that are generated as a result of decomposition. The granules therefore have an antibacterial effectiveness in their vapour phase. The pleasant odour can also mask any offensive odours for up to a month.

The base mineral granules also act as moisture absorbents and because most odours are very water soluble, this provides another mechanism for minimising the odours. In humid conditions, such as in the Durban area, odours are more noticeable. Tests on the ability of Sanitact Green to suppress odours have been undertaken all over New Zealand and in the more humid conditions found in Fiji. Field trials were also undertaken at two high activity sites in September 2014 in Durban by a SANAS registered laboratory and of the 16 bins tested only one developed a slight offensive odour due to the bin being used to dispose of food waste.

The National Regulations on health care risk waste require that if the odour from the waste is a nuisance then the waste must be treated immediately and the combination of the Cheree bin liners and the Sanitact Green meet this legal requirement.

#### **2.4 Collection of the Waste and Disinfection of the Feminine Hygiene Unit**

When the waste is collected by the Initial Representative, the bin liner containing the waste is carefully removed from the bin using puncture proof gloves and placed into a puncture proof medical waste wheelie bin.

The National Health Care Risk Waste regulations require that: “no health care risk waste must leave a generator unless containerised in rigid, leak proof and puncture resistant container” and that “all plastic bags used for the packaging of health care risk waste must be managed as health care risk waste and must not be reused”. The FHUs are then inspected for any damage, changed if necessary, and disinfected using a registered household disinfectant cleaner spray. A new bin liner is then added to the FHU and a new charge of Sanitact Green.

The Pine disinfectant cleaner spray that is used contains a non-ionic detergent plus a quaternary ammonium disinfectant. Both the detergent and quaternary ammonium compounds destroy bacteria by interfering with the function of the membrane that surrounds the organism. All the components used in the disinfectant cleaner are biodegradable, have a low toxicity to humans, and only a low impact on aquatic species.

## **2.5 Transport of Health Care Risk Waste**

The National Regulations controlling health care risk waste require that the waste must be transported in accordance with the National Road Traffic Act, Act 93 of 1996 and the relevant regulations such as SANS 10228 and SANS 10229 that control the transport and packaging of hazardous substances: UN # 3291, Medical Waste N.O.S.; Class 6.2(II). According to the requirements health care risk waste must be transported in “rigid, leak proof packaging meeting the requirements for solids, at packing group II performance level” and “packaging intended to contain sharp objects such as broken glass and needles shall be resistant to puncture”. The red wheelie bins, therefore, conform to the requirements.

## **2.6 Training of Personnel**

The National Regulations on health care risk waste require that a Company such as Rentokil Initial must demonstrate the safe management of the health care risk waste; training of relevant personnel to ensure effective cleaning; and safe working procedures to prevent injuries from sharps or biohazards. The Plus by Initial Programme includes a Standard Operating Procedure (SOP) that meets all the health and safety requirements for management of health care risk waste. The SOP gives a step by step procedure for handling, collection and transport of the waste from the premises of the generator. It includes all the procedures required to protect the staff and clients from the waste stream including very important instructions on how to avoid potential needle stick injuries and, if one does occur, a procedure that requires immediate medical attention to be obtained at a Hospital Emergency Room for testing and treatment of any potential health risks such as the development of AIDS.

The SOP is used to train technical staff and provides a standard for supervisors to be able to regularly assess conformance by staff. It is recommended that supervisors run a programme to assess conformance by doing regular conformance audits in the field.

## **3 Conclusions**

The Plus by Initial Service for the management of Sanitary Waste has been assessed in terms of the programme’s ability to meet its major goals of providing multiple levels of hygiene protection to customers and staff from pathogens that are often present in the sanitary waste and preventing odour that can develop in the

waste when stored. In addition, the programme's compliance with the provisions of the health care risk waste regulations published in 2012 has been assessed.

The Plus by Initial Service is a proactive and comprehensive approach to the management of risk wastes, such as potentially pathogenic sanitary waste, **where multiple barriers are used to provide a far higher level of protection than would be offered by a single barrier.**

These include **silver ion impregnated Signature Bins; Cheree biodegradable, fragranced and sanitized polyethylene liners;** and **Sanitact Green** in the bag that consists of base mineral granules that are impregnated with a proprietary blend of several essential oils. When serviced, the reusable bins are **sprayed with standard pine detergent/disinfectant with excellent results.** The effectiveness of each of these barriers was assessed using literature data from researchers and government agencies such as the US EPA. In addition, studies in the field in New Zealand, Fiji and South Africa have shown excellent performance in meeting the primary goals of protection against pathogens and controlling odours.

The Plus by Initial Service includes an excellent Standard Operating Procedure that is used to train technical staff and provides a standard for supervisors to be able to regularly assess conformance to the requirements by staff members.

The Plus by Initial Service meets all the requirements of the 2012 National Regulations on health care risk waste.

En-Chem Consultants cc can readily endorse the Plus by Initial Service to the Client of Rentokil Initial in South Africa as providing a higher level of protection than would be afforded by a service offering only a single barrier of protection.