

# Technical Article Series

Circular screen separator in grinding system helps pharmaceutical firm make waste unrecognizable.

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# Circular Screen Separator in Grinder System Helps Pharmaceutical Firm Make Waste Unrecognizable

In 1989, the New Jersey Department of Environmental Protection adopted an emergency rule regarding the management of regulated medical waste emphasizing packaging, marking, labeling, reporting, tracking, and an annual registration and fee payment. These provisions went into effect and the rule contains elements not covered by the previous law which requires decontamination. The elements include:

- An expanded seven-part definition of regulated medical waste;
- Packaging, marking, labeling, storage, segregation and handling requirements;
- A comprehensive regulated medical waste tracking system with no small quantity generator exemption;
- User fee and generator registration provisions;
- Preparation of an annual report of regulated medical waste generation, transportation and disposal practices.

In this law, regulated medical waste is defined and includes, among other things; culture and stocks of infectious agents; human pathological waste; human blood and blood products; used and unused sharps, including, syringes, contaminated animal waste, and specialized isolation waste. Regulated medical waste that is both treated and destroyed is no longer regulated medical waste. (Regulated medical waste is treated when the biological character is changed so as to substantially reduce or eliminate its potential for causing disease, and it is destroyed when it is processed so that it is no longer generally recognizable as medical waste.)

The 1989 law has its roots in the problem of medical waste washing up onto the hundreds of miles of New Jersey's Atlantic Ocean Beaches. Bathers became concerned with both the health threat and disgusted with the appearance of used syringes and other medical waste on the beach.

Although the new law protects swimmers and sunbathers who significantly affect the tourism income in South Jersey, it created a need for a system to decontaminate and pulverize medical waste to an unrecognizable form so it could be disposed of in a landfill. Actually, a handful of other states including Pennsylvania, New York and Connecticut also either have similar laws or are striving to meet federal regulations which require that medical waste be decontaminated and made unrecognizable.

Faced with this task, Smith Kline Beecham Pharmaceuticals, Piscataway, NJ, began using a system involving an autoclave to first decontaminate vials, syringes, rubber gloves, and other white plastics. After decontamination, the medical waste is fed into a grinder. A throat opening of about 15 by 20 inches in the grinder at Smith Kline Beecham is large enough to accommodate its needs. The grinder cutter discs are approximately 1.5 inches wide and the model used at Smith Kline Beecham has 60 cutting tips.

Because the grinder is manufactured with components that are held to the closest tolerances possible and the driving members are virtually perfectly aligned, it can be expected to give years of trouble-free service as it reduces the size of Smith Kline Beecham's vials, bottles, and other waste.

To keep the grinder clean, a stream of hot water is sprayed into it with the medical waste. The water is then separated from the pulverized waste using a 24 inch diameter Vibroscreen vibratory circular screen separator manufactured by Kason Corp.

Medical waste that has passed through the grinder screen which has openings of about 1/2 inch falls into the Vibroscreen unit where the water flows through a 20 mesh screen with 865 micron (.034 inch) openings. The wash water is then discharged into Smith Kline Beecham 's sanitary sewer system.

The solid material on the Kason screen vibrates in a clockwise pattern down to a discharge chute. The solid waste then falls into a pail which is emptied into a dumpster. Because it has been decontaminated and

made unrecognizable, the solid waste is no longer considered a medical waste and is thus suitable for landfilling.

The Vibroscreen unit incorporates a high capacity discharge, reverse tie down, and blade to ensure the waste moves quickly off the screen and out of the unit. The system operates about two hours per week and it has proven so effective that it is now also being used for destruction of non-medical waste, according to Smith Kline Beecham Pharmaceuticals Manager of Environmental Affairs Michael Rosenberg.

The screen in the Vibroscreen unit shakes rapidly by means of a gyrator that imparts adjustable multi-plane, mechanical, inertial vibrations. The pattern of vibration can be adjusted to best separate the particular solids/liquids on the screen. Variable eccentric weights at each end of a double extension shaft that extends through the gyrator are positioned to control the Vibroscreen unit's operation. The top eccentric mass controls the rate of discharge of oversize material. The bottom eccentric mass controls the rate of flow through the screen, and the bottom eccentric lead controls the screening pattern. The adjustability enables pharmaceutical firms and others to ensure highly efficient separation for various types of wastes.

Although this small system has proven cost effective and reliable for SmithKline Beecham, it could be assembled on a much larger scale for use by hospitals and laboratories. In fact, another nearby laboratory which uses plastic bags full of wastes of larger dimensions uses a larger autoclave and shredder ahead of the grinder. The Vibroscreen units are available in diameters up to 100 inches.

An expanded system would be ideal for hospitals which frequently face the headache of having an old incinerator that fails to meet today's stricter air pollution regulations. To retrofit an incineration system to meet the new standards may cost several million dollars and a completely new incineration system could cost more. The decontamination-solid-liquid waste systems cost significantly less and avoid community relations problems associated with air pollution and health threats from pathogens.