

## A dryer designed for pasty materials handles solvent evaporation problems

To reduce waste disposal costs, the vitamin production unit at Hoffmann-La Roche (Grenzach-Wyhlen, Germany) was trying to eliminate the use of a costly external waste management company. At the same time, it wanted to maintain compliance with a 1990 regulation that set a limit of 25 kg/d in wastewater for dioxane, a primary solvent in vitamin production.

While using an outside source for waste removal was effective in complying with the regulation, expenses were high. The waste had to be pumped into tanks and then shipped off-site. However, because of its high viscosity, pumping was a problem. To facilitate pumping, methanol was added to reduce the viscosity. But this resulted in a twofold increase in waste volume, making this method of disposal economically prohibitive.

To save money, Hoffmann-La Roche wanted to incinerate its own waste. But to legally incinerate the waste, environmental regulations mandated the company to first remove solvents, such as aniline, dioxane, and methanol.

Therefore, the firm decided to purchase a dryer to evaporate all the

solvents. Specifically, the dryer was required to handle operating conditions of 140-150°C under a vacuum of 50 millibars. Hoffmann-La Roche also wanted to avoid its previous pumping problems that arose because of the viscosity of the waste. Thus, the firm required that the dryer be capable of discharging the remaining viscous waste, via equipment such as a screw extruder, to portable tanks to be taken to the incinerator.

Hoffmann-La Roche decided that the Discotherm B dryer from List AG (Arisdorf, Switzerland), met all of these criteria. According to Klaus Regier, a plant manager at Hoffmann-La Roche, the Discotherm B was selected because it can handle distillation of solvents and kneading of viscous materials. With a fill level of 60-75% and shaft speeds of 5 to 50 rpm, the Discotherm B is specially

designed for materials ranging from viscous liquids to pasty solids. Additionally, the dryer has a completely enclosed design, making it suitable for handling toxic materials and vacuum operation.

The Discotherm B, features a large thermal transfer area for drying materials. It consists of a cylindrical hous-

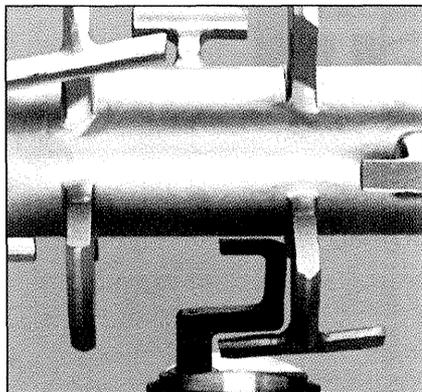
ing with a concentric agitator shaft with disc elements that can be heated or cooled. All of these features contribute to the large heat exchange area used to evaporate the solvents.

The dryer is also equipped with self-cleaning features. At the tip of the disc elements are mixing bars, used to keep the shell surface free of product accumulation. In addition, stationary hook-shaped bars set in the shell interact and clean the shaft and disk elements as they rotate.

Hoffmann-La Roche feeds the waste mixture into the Discotherm B through a flash valve. Inside the dryer, the solvents are evaporated and directed to a distillation column, where they are separated and reused as raw materials. The remaining solvent-free organic melt is discharged through a twin-screw extruder to a cooling belt where it solidifies. The solid waste is then cut into pieces and sent to an on-site incinerator for final disposal.

Once installed, the Discotherm B reduced the waste volume by 80%, with a remaining solvent content of 1%. Thus, Hoffmann-La Roche was allowed to independently incinerate its own waste, avoiding the use of a waste management firm. Additionally, money was saved by increased solvent recovery and reuse. The bottom line, Discotherm B cut disposal costs by 30%. ■

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**FIGURE 2.** Mixing and stationary hook-shaped bars are key to the self-cleaning feature

# CUT VISCIOUS WASTE DISPOSAL COSTS