Therma-Flite
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**PROCESS COMPARISON OF INDIRECTLY HEATED DRYERS.**

**STICKING:**

In the infamous plastic stage of the bio solids the material in process tends to stick to anything it comes in contact with. Some sludge more than others. With a large single rotor, whether it is continuous flow or batch, the material sticks until enough heat has driven into the sludge to cause it to start to dry and shrink. As the material shrinks it tends to fall off of the rotor and at that point can start to break up and process. In some cases a portion of the sludge can be baked into a clump before being released from the single rotor, presenting as a ball with a wet center when discharged.

In the **Bio-Scru** system the dual, counter rotating/intermeshed, Holo-Scrus force the sludge to separate from the rotors and start the efficient drying process from the start. The proprietary design of the Holo-Scru technology continually mixes the material in process to cause particle relocation from beginning to the end of the drying process. By forcing this particle relocation to the heated surfaces the drying process is much more efficient than the single rotor system.

**SLUDGE OVER HEATING**:
In the batch process the drying chamber is totally filled with wet sludge. As the process progresses the volume of the material reduces (typically 5 to 1) leaving the chamber with a large area of air space for dust to build up. Additionally, at the end of the process there is little to no steam to blanket the air space and reduce the oxygen. The end of the cycle is the critical time for the possibility of a dust explosion or fire. The batch unit requires that a stream of water be introduced to the chamber prior to opening the discharge door so that the dust and oxygen are reduced so that the potential for fire is reduced.

With the single rotor, continuous flow design, most commonly seen in the municipal market (Dragon), the same situation applies as far as the air space created by the reduction of volume. Though this system does have a continuous release of steam from the sludge, the outer chamber rotates counter to the rotor. This rotating outer chamber makes it impossible to closely monitor the temperature within the critical areas of the process chamber. Even with PLC control the safety and automation of the system is impaired by the lack of intricate monitoring by multiple sensing points within the processing zone of the chamber.

The **Therma-Flite Bio-Scru system**, with the proprietary design of the Holo-Scru dual auger system, keeps the sludge at a consistent level though out the chamber. By keeping a constant level the maximum area of the heated surface is used for efficient

heat transfer through out the drying process. Furthermore, by holding this controlled level of the sludge, the design of the continuous process of the Bio-Scru, allows the steam given off from the drying process to blanket the sealed drying chamber to reduce the oxygen and dust level.

As the process goes into shut-down mode the temperature is reduced so that the remaining steam, at the reduced temperature, insures safety from auto ignition of the dust or sludge even as the material is evacuated from the chamber. Because the outer chamber is stationary and heated by thermal fluid (not additional burners) sensing of the effects on the sludge as it moves through the process is intricate. With this multiple sensing point method, and PLC control of the process, the optimum of safety and efficiency is possible while reducing the need for operator attention to a minimum.

The Therma-Flite, Bio-Scru dryer system is designed for safety and efficiency.

- Indirect heat to eliminate the potential for hot spots.
- Dryer chamber design reduces free air space within the chamber.
- Dual, intermeshing, counter rotating Holo-Scrus to insure forced sludge break up.
- Proprietary design of the Holo-Scru to keep the level of sludge constant throughout the chamber, to insure optimum safety and efficiency. This constant level also keeps the free space within the chamber to a minimum.
- Continual purging of the chamber, using the evaporated water, to maintain reduced oxygen and dust level.
- Intimate muli-point sensing, and PLC control, to insure strict process control for automation and safety.
- **All** hot oil circulation areas of the system are **ASME** code stamped per ASME section VIII, division 1.
- Though the controlled free space of the Bio-Scru chamber, and the blanket provided by the evaporating water, assures safety from fire, an automatic inert gas purge is available for over temperature conditions.
- Individual project requirements, building layout, and other perimeters will determine design requirements. The Therma-Flite system can be supplied to meet requirements as dictated by local code and engineering requirements.