XTLR Series

Crystallizing Dryer

Una-Dyn

Piovan Group

unadyn.piovan.com

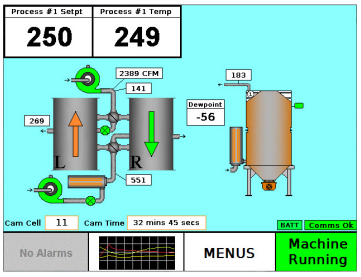
XTLR Series Crystallizer

The XTLR crystallizer incorporates many new features significantly improving the process stability of even the most demanding applications. The XTLR is engineered to maintain the velocity of the material, along with the air flow, in the critical glass transition zone of the crystallizer for superior transition into the crystalline state.
Removable breaker bars prevent the material from spinning while offering easy removal for cleaning. The unique particle separation system ensures that any lumps created during crystallization are separated prior to proceeding to the take away area.

Features:

- Energy saving - closed loop design
- Solid cone - mass flow design
- Gentle agitation
- Particle separation system - no clumps at take-off
- Detachable lower cone
- Oversized clean-out door
- Removable breaker bars
- FOCUSpro touch screen control

FOCUSpro Touch Screen Control



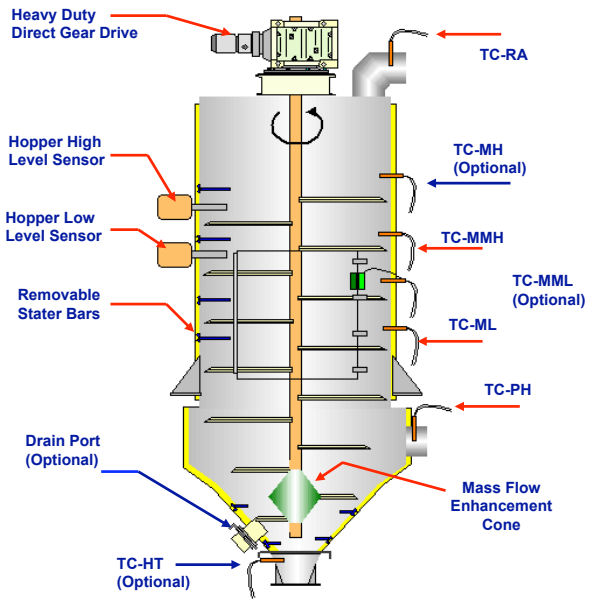
The FOCUSpro controller is an enhancement of the Focus controller – adding even more capabilities. In addition to maintaining all of the FOCUS controller's capabilities, the FOCUSpro has proportional analog capabilities.
Two proportional analog outputs allow it to control a gas-fired process heater and a process blower VFD. Two proportional analog inputs allow for process airflow and an analog hopper-level monitor.

Basic Operation

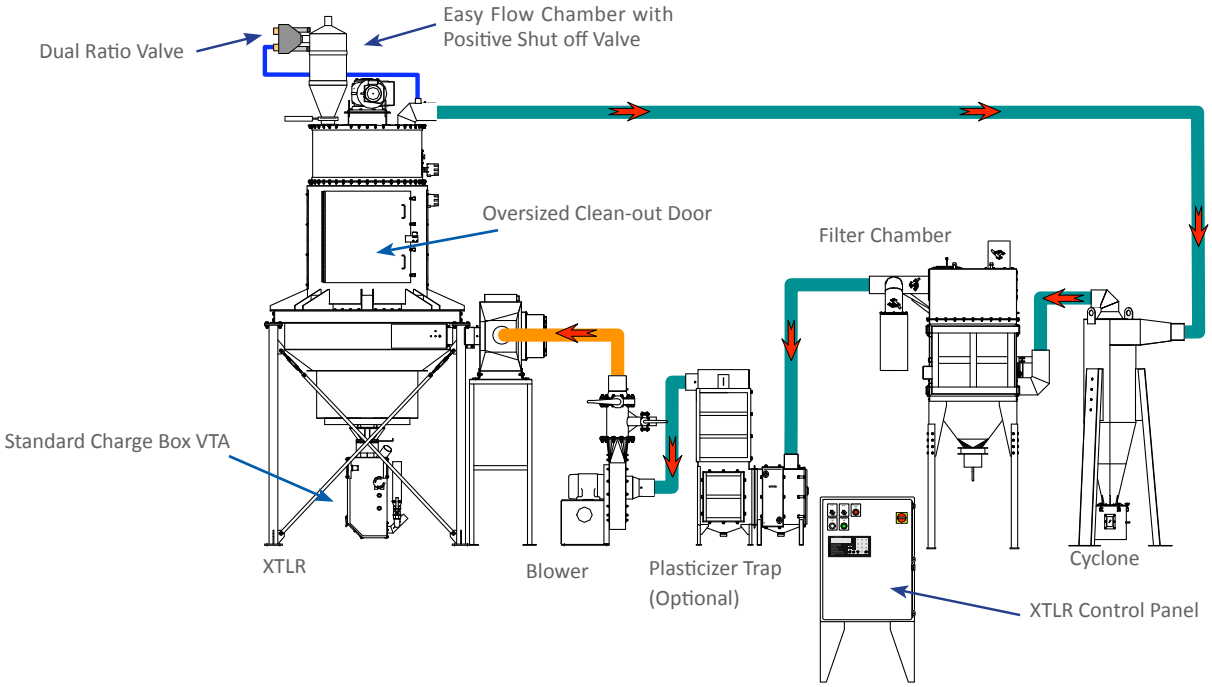
A crystallizer performs a relatively simple process in treating resin. Any amorphous resin will be raised in temperature using hot air for enough time to pass through the glass transition state. As the material surface becomes tacky the agitation of the resin will separate the clumps of agglomerated resin. The material regains its hard surface once it passes from the glass transition stage and can be dried and handled easily. Note that processing through this system is intended to produce adequate surface crystallization to enable further processing. The crystallization process will continue in the internal mass of the pellet as long as the temperature is high enough to facilitate the reaction. The goal of this process is to achieve enough surface conversion to regain a particle that will not stick to other particles. Once through this stage, the resin is suitable for transfer to a process drying unit prior to extrusion.

During the glass transition phase particles become very soft and sticky and are frequently rolled over and torn. Once crystallized the material becomes very rigid and can be easily separated with gentle agitation.

TC-RA	Standard	Monitors the return air temperature of the XTLR.
TC-MH	Optional	Pre-Crystallization temperature.
TC-MMH	Standard	Material management controlled temperature
TC-MML	Optional	Mid level temperature monitor.
TC-ML	Standard	Material low level temperature.
TC-PH	Standard	Process controlled air temperature.
TC-HT	Optional	Material discharge temperature.
Hopper High Level Sensor	Standard	Controls the fill level of the XTLR, and the vacuum chamber.
Hopper Low Level Sensor	Standard	Controls the machine RUN Permit, or the Down Stream Enable.



Typical Crystallizer System



The Inline Crystallizer is used when the hot, crystalline resin is conveyed to the dryer and immediately processed. This conserves the energy already applied at the crystallizer and avoids storage of any resins. The raw material is loaded into the top of the crystallizer where it is controlled by the level switch in the upper part of the vessel. The vessel is agitated by a system of breaker bars that maintain a free flowing mix of untreated raw material and in process resin. As the resin passes through the crystallizing vessel, any remaining clumps of material are broken down to a size that is suitable for handling through the rest of the system. The bottom of the vessel is fitted with a knifegate valve or airlock metering device to control the flow of resin from the crystallizing vessel - a very important feature of the system since passage of untreated raw material from the crystallizer will result in a system blockage in the downstream machinery. The crystallizer system includes a blower and heater to deliver the required heat to the process. Proper crystallization occurs when the resin is at the glass transition temperature long enough for the reaction to occur. To conserve energy, the process air flows in a closed loop to recover the exhausted air from the crystallizer. The system includes protective and cyclone air filters as well as a gas or electric process air heater.

Typical Crystallizer System - Continued

System Cooling Crystallizer

When storing crystallized resin that will not immediately continue to a process dryer, the use of a modified Cooling Crystallizer system ensures the hot resin is cooled to a temperature low enough to avoid thermal damage once in storage. The basic crystallization process is the same as an inline crystallizer system with the exception that the resin discharge is connected directly to a second vessel with a cold air inlet at the bottom. Between the air outlet of the cooling vessel and crystallizer, a protective filter removes all particulate and an electric heater applies the necessary energy to start the crystallizing process.
Since we are recovering the hot air leaving the cooling vessel, the process will only consume a small amount of heat energy once it is in continuous operation. This type of system is recommended when resin will be processed more than 24 hours in advance of drying. Hot resin over 250ºF that is held for more than 12 hours will begin to deteriorate. This may be avoided by cooling the resin after crystallizing and then storing until needed. By using the energy from the cooler, the resin can be crystallized ahead of the process demand and yet not waste heat energy used in the crystallizing process.