

PET and CRYSTALLIZER SYSTEMS

PET is a "semi-crystalline" thermoplastic, meaning it has both crystalline and amorphous regions within its molecular structure. The crystalline portion develops where the molecules can align themselves in a very compact linear structure. Otherwise, the molecules are set in a random or amorphous pattern.

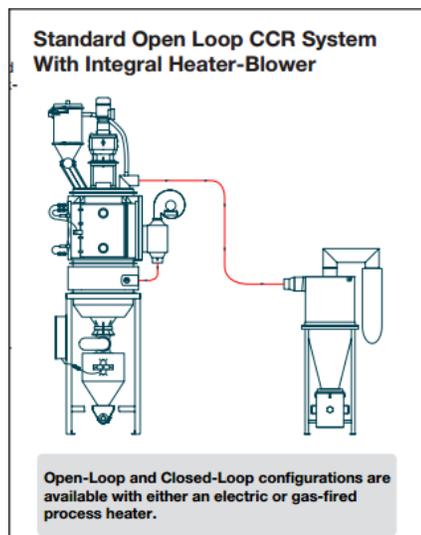
Virgin PET resin is sold in crystallized form so that it can be dried before being melt processed. Un-crystallized PET becomes sticky and clumps when its temperature reaches 175°F. This is PET's glass transition temperature; the point at which the amorphous portion begins to soften. Recycled PET may have to be crystallized prior to drying to avoid drying difficulties. Crystallization permits trouble-free drying in conventional equipment at 280°F-320°F.

Most PET drying is done in dehumidifying hoppers using hot air at a very low dew point. The dehumidified air passes through a bed of PET to extract moisture from the resin. A desiccant material, such as silica, absorbs moisture from the circulating air. Wheel and dual desiccant bed systems are common desiccant drying systems. Either a time cycle or a predetermined decrease in air dew point is used to shift airflow from one bed to the other.

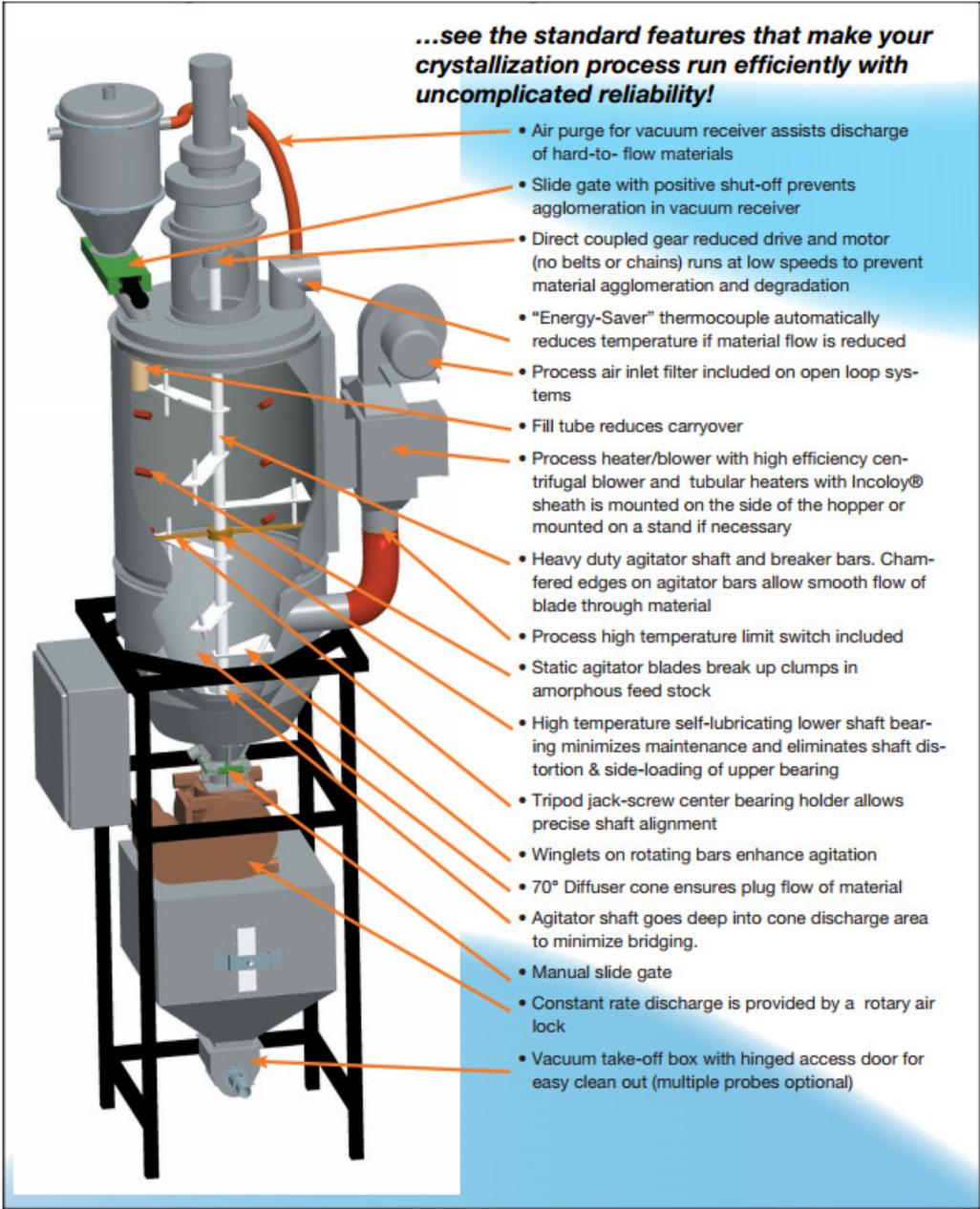
The sticking (or agglomeration) problem in dryers will worsen as a higher percent of the mix consists of amorphous material. A rule of thumb is that a crystallizer is not required if the amorphous portion of the feed stream is less than 20% of the total. For some end-product manufacturers, it is not feasible or cost-effective to maintain the amorphous portion at a content level low enough to prevent this phenomenon.

The clumps that form due to sticking of amorphous or partly amorphous resin do not break up as the temperature rises. In fact, they will stick to the container walls and thermocouples and cause bridging as the clumps grow. Drying of the non-sticking resin becomes inefficient and some of the bridged material will heat degrade and reduce product quality.

Crystallizers are drying hoppers equipped with agitators that break up the clumps. The crystallizers generally are positioned just above a series of dryers. Slow agitation is used to prevent agglomeration and creation of fines. The transition from amorphous to crystalline PET takes 10-20 minutes at 270°-300°F. The crystallized material then is conveyed into a hopper dryer.



...see the standard features that make your crystallization process run efficiently with uncomplicated reliability!



- Air purge for vacuum receiver assists discharge of hard-to- flow materials
- Slide gate with positive shut-off prevents agglomeration in vacuum receiver
- Direct coupled gear reduced drive and motor (no belts or chains) runs at low speeds to prevent material agglomeration and degradation
- "Energy-Saver" thermocouple automatically reduces temperature if material flow is reduced
- Process air inlet filter included on open loop systems
- Fill tube reduces carryover
- Process heater/blower with high efficiency centrifugal blower and tubular heaters with Incoloy® sheath is mounted on the side of the hopper or mounted on a stand if necessary
- Heavy duty agitator shaft and breaker bars. Chamfered edges on agitator bars allow smooth flow of blade through material
- Process high temperature limit switch included
- Static agitator blades break up clumps in amorphous feed stock
- High temperature self-lubricating lower shaft bearing minimizes maintenance and eliminates shaft distortion & side-loading of upper bearing
- Tripod jack-screw center bearing holder allows precise shaft alignment
- Winglets on rotating bars enhance agitation
- 70° Diffuser cone ensures plug flow of material
- Agitator shaft goes deep into cone discharge area to minimize bridging.
- Manual slide gate
- Constant rate discharge is provided by a rotary air lock
- Vacuum take-off box with hinged access door for easy clean out (multiple probes optional)

CCR with standard voltage 460V/3ph/60Hz	Hopper Capacity		Overall Width		Overall Depth		Overall Height	
	cu. ft.	liters	in.	cm	in.	cm	in.	cm
Part Number								
CCR-100	4.5	127	42	107	50	127	130	330
CCR-250	11.5	326	42	107	50	127	194	493
CCR-500	23	650	42	107	50	127	200	508
CCR-750	34	960	42	107	50	127	209	531
CCR-1000	46	1300	52	132	60	152	209	531
CCR-1500	68	1925	56	142	64	163	221	561
CCR-2000	91	2575	60	152	68	173	269	683
CCR-3000	136	3850	64	163	72	183	262	666
CCR-4000	182	5150	70	178	78	198	274	696

The CCR Model roughly translates into the number of pounds per hour the unit is designed to process