

Central Drying & Conveying of Plastics

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While a thorough business analysis is always the best way to go, basic business sense is enough to tell you that a centralized system for drying plastics and conveying them to injection or extrusion systems in a plant is better than separate systems at each machine. Buying, operating, and maintaining two or three central dryers is more efficient than doing the same for ten, twenty, or fifty dryers on individual processing machines. As great as that cost advantage may be – energy savings alone may justify it – cost reduction is but one of many compelling reasons to go central.

Central Drying & Conveying Provides a Range of Advantages

Even this list of centralized drying and conveying advantages is incomplete, and keep in mind that each of these advantages yields multiple benefits:

- Precisely dried material = process stability, less waste, fewer quality issues.
- Fewer materials handling people needed.
- No material-related traffic on the shop floor.
- Energy savings with one central dryer vs. many smaller dryers.
- Energy reductions can earn substantial rebates from utility supplier/government .
- Floor space for gaylords, dryers, etc. can hold new value-adding machines.
- Loading the wrong material into a machine can be virtually eliminated.
- Maintenance is reduced due to having fewer machines.
- Safety improves with clear passages and much less climbing on machines.

- Faster changeovers thanks to built-in purging increases uptime.
- Process troubleshooting is easier with assured material conditioning.
- Control is simplified and more comprehensive.

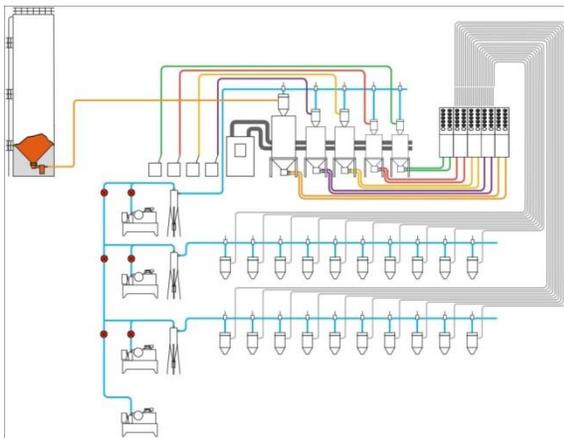
Central system technology is well proven, with hundreds and probably thousands of systems running today. Also proven is that centralizing is not just for larger shops. Many smaller facilities are now profiting from centralized drying and handling. The level of quality and cost improvement is quite similar regardless of the shop size.

While centralized drying and conveying is a big advantage for almost all shops, there are exceptions. Determining if a central system is right your facility is not rocket science. It requires information on the processing facility and its plans, and then a bit of analysis. Any decision should be made on a specific facility, both as it is and as it is projected to be going forward. Before we get to some decision points lets look closer at central drying/conveying itself.

Basics of Central Material Drying & Conveying

In a typical central system, a dryer produces -40°F dew point process air but has no process heater of its own. The dry air is piped to multiple drying hoppers, still in the central area, each with a heater/blower. The hoppers can contain various types of resins in different colors.

The heater on each hopper can be adjusted to precisely match the drying temperature of the material in that hopper and the blower is sized to provide proper airflow for each hopper.



The capacity and throughput of the central dryer is matched to the number of hoppers that it serves. A system may consist of more than one central dryer, each serving multiple hoppers, with the overall materials system matched to the facility's overall needs.

The central system's conveying design feeds incoming material to the drying hoppers. After the material has been properly conditioned, it is then conveyed via piping to the processing machines.

Controls Add Major Advantages

Central systems utilize a material selection manifold to shuttle a material from its source to a selected process machine. Older style manifolds, which

rely solely on the operator to match the correct material to the correct process machine, have resulted in some disastrous errors, including parts being made of the wrong material for hours.



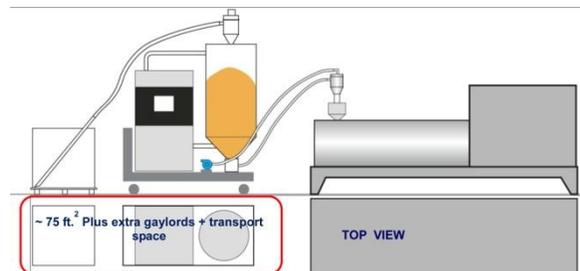
A single operator using a manifold like this one directs the right materials to the right machines, making changeovers both faster and more secure.

Newer manifold systems feature Auto ID of materials, which virtually eliminates "wrong material" problems. Besides eliminating errors, material changes are simpler, faster, and are done off the processing floor. Central changeover time is a fraction of press-side time. Among the many advantages of central drying/conveying, none is a bigger game-changer than the controls. At the basic level, central controls let one person ensure that each production machine receives the correct material, that it's perfectly conditioned, and that it arrives precisely when needed. Beyond the basic level are numerous automation options that, in effect, create a materials quality assurance process. Control options allow trending, monitoring the status of the entire drying/conveying system and each line in real time, and spotting a negative trend and correcting it before it does any damage. That level of control reassures clients, especially those with the critical quality

requirements, such as companies in the food and medical sectors.

Do More With the Space You Have

A good way to understand the difference between central drying and conveying and traditional press-side resin handling is to look at a production floor with material drying and handling at each processing machine. Then mentally remove the buckets, gaylords, pallets, ladders, bags, brooms, and all the other material-handling items around the production machines. The improvement is great, but now take away the forklifts, hand trucks, and dollies that move raw material to machines, as well as the material handling people .



Drying and handling equipment at a processing machine takes about 75 ft² of floor space—which central drying and conveying opens up for profitable uses.

There is still more to be gained. Using the newly cleared aisles, haul away all the material drying and conveying hardware from each injection or extrusion system—dryers, hoppers, vacuum loaders, pumps, all of it. The open floor space you now see will allow new value-added operations, or even a new production line or two. Taking away press-side material handling equipment recovers on average about 75 sq ft of floor space per production machine — so 10 machines can give you 750 sq ft of “new” floor space, 20 machines 1500 sq ft, and so on. Room for growth



Removing individual drying and handling equipment from six injection molding machines allowed three more machines in the same floor space.

Does Central Drying/Conveying Fit Your Facility?

Here are guidelines for justifying a further look at central drying and conveying.

First some factors against centralization:

- A high-throughput (over 400-500 lb/hr) per process machine
- Portable dry/convey units suffice.
- Drying needed only occasionally.
- No space for a central drying room.

And factors in favor of centralization:

- Throughputs less than 400-500 lb./hr. per process machine.
- Single or multiple materials in multiple machines.
- A new facility or machines moving to another facility.
- More materials than machines.
- Clean room molding.
- Technical molding.
- Custom molding.
- Frequent material changes.

Skilled Perspective is Essential

Every shop processing plastics has to be considered individually. The system must fit the particular shop, and its future plans. The factors noted above for and against central drying and conveying are not absolute. Custom molders generally do more changeovers than a captive

operation—but not always. If there is no apparent space for a central facility, many have put it on a mezzanine, or in space adjacent to the production floor, or even next-door.

Besides the physical considerations, note that going from distributed to central material conditioning and conveying requires a mindset adjustment for everyone from top management to the shop floor. Training is essential. The actual changes need to be planned and orchestrated. Redundancy in both drying and conveyance should be considered carefully. And of course there is the capital investment and the payback.

Investment and Payback

Experience shows that, when the fit is right, the rewards of a central system greatly exceed the risks. Consistent material condition and delivery enables greater machine uptime, higher yield/lower defect levels, improved machine utilization, and more. Faster, cleaner changeovers enable flexibility in using more materials and offering additional products to customers. It is much easier to do the small-batch, critical-part work that brand owners prefer to keep close to them. The central system can be easily expanded or modified to add or change materials and production machines.

Every month's energy bill is lower with a central system, much lower in most cases, and so is maintenance time and expense. The payback on what it costs to start enjoying those advantages is measured in months, not years. Rebates and incentives from energy companies and government programs can play a significant role. For example, a new central drying/conveying system for a processing plant in a Midwestern U.S. state cost nearly \$600,000 fully installed.

The state government's energy-saving incentives and other programs paid nearly \$300,000 of that right off the top. Many states have similar programs.

No Reason to Go It Alone, including Cost

Once the decision to centralize drying and conveying is made, a myriad of other decisions must follow. Overall system design and location, dryer technology, dryer size, dryer capacity, pump type and specs, redundancy, controls level and options, layout of conveying tubing, hopper selection, and the list goes on. Details are many, however plenty of help is available from a reliable systems supplier, which is like having a consultant without the cost.