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TechNotes
TECHNICAL PRODUCT INFORMATION and COMPARATIVE DATA

How Important Is Quick Material Change?

The short answer is this; Quick Material Change is often the most significant area of savings that processors can achieve in the preparation and transfer of materials. Additional savings are realized from reductions in energy, material waste, labor costs, and the elimination of clutter on the production floor. Increased space on the production floor can accommodate additional process machines and to top it all off, processors benefit from improved process stability which results in uniform quality.

Today, we live in the world of ***"FAST".*** Almost everything gets done faster today than it did 10 or 15 years ago…with the possible exception of getting airline baggage to the carousel when we land. Think of how much faster we communicate with each other. It's pretty astounding.

Things have speeded up in plastics processing as well. There have been lots of advances in Quick Mold Change and what's that all about? It's about decreasing process machine downtime…increasing production time…getting more parts out the door, faster! And you accomplish all this just by getting the mold changed as quickly as possible. Many processors have adopted quick mold change methods but are they really reaping the full benefit?

Here's where QMC (Quick Material Change) comes in. What's the sense of having quick mold change if the operator has to wait around for a fresh batch of new resin? There goes production time out the window. Isn't it funny that QMC can stand for Quick Mold Change *OR* Quick Material Change? They should go hand-in hand but it's surprising how many molders have Quick Mold Change without Quick Material Change.

The cost of a process machine being offline while waiting for material can be staggering.

10 machines x 1 material change/shift x 3 shifts =30 changes/day x 1 hr. of time saved/change = 30 hours x $30/hr. x 350 days = $382,500 Savings!
Plug your values into the QMC Savings Calculator to see the results for your plant.
QMC Savings Calculator

There are other benefits that go with QMC depending on how often you make material changes and your current level of efficiency. You will not only increase production time, you will reduce energy usage, labor, material waste and, as a bonus – you'll more efficiently use the space you have available. *The result of all these savings is a payback that is measured in months…not years.* Now, let's see how QMC fits in with all of these benefits.

When it comes to changing materials there are several scenarios. It's bad enough if the material doesn't have to be dried and you are only waiting for someone to move the bulk container of old material out of the way and bring a new container with a different material. But, if that material has to be dried, there are multiple operations required before you can start making new parts. Let's examine two possibilities.

Example of QMC Savings:
Fixed, Press-Side or Machine-Mounted Dryers:

- Empty dryer hopper…wasting time and probably spilling material
- Clean out hopper loader and material lines
- Remove the bulk container just used
- Bring in bulk container of new material
- Fill hopper and wait up to 4 hours for it to dry
- Clean up spilled material in work area so no one falls

You are losing a full 4-6 hours of production time depending on how long it takes to clean the material out of the hopper and loader …plus…have you ever estimated the cost of the wasted material and the additional labor to perform this operation?

Portable Press-Side Dryers:

- Roll portable dryer away to a holding area
- Remove the bulk container just used
- Roll fresh portable dryer into position at the process machine
- Bring in bulk container of new material
- Clean out material lines and make new hose connections
- Start making parts **IF** the dryer has been turned "ON" for a sufficient amount of time to pre-dry the material.
- If the material is not sufficiently pre-dried, you make bad parts OR wait for the material to get dry.

In this case, you are losing less production time – maybe 1-2 hours on average – but once again, have you ever calculated the real costs here? First, you have the energy used to keep material "at the ready", and you run the risk of over-dried or under-dried material – producing bad parts. Again, you have the extra labor to move materials and dryers around and then there is the cost of that space used for the holding area. There is also the scheduling of which materials have to be pre-dried and in what quantities.

There is another possibility…or probability, when talking about several different dryers running the same material. These dryers are often of different vintages, possibly from different suppliers and may have different throughputs. With all of these variables, it is next to impossible to expect that your parts will be of the same quality. There are just too many differences to expect process stability. Defective parts can mean a loss of customers. It definitely means an increase in regrind and a loss of material.

So, what does Quick Material Change have to do with turning these high costs into profitable production time and how do you get it working for you?

QMC is one of the primary benefits of a Central Resin Conveying System…and a Central Resin Conveying System is an integral part of a Central Drying System. ***Don't panic, remember that we are talking about a payback in months – not years.***

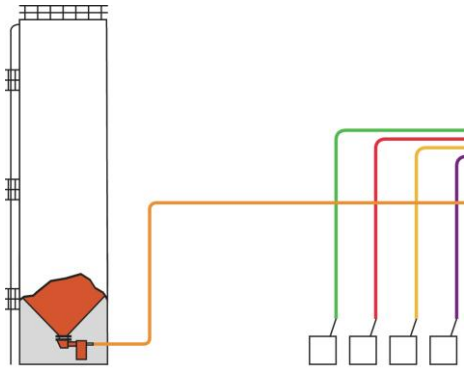
You a Candidate for a Central Drying/Conveying System With QMC If:

- You have dryers on 10 or more machines
- You have a single material that requires drying and it is required at multiple machines
- You have frequent material changes on your machines
- You use more material types than you have machines
- You have dryer to dryer quality issues when drying the same material
- You want to expand, but do not have sufficient space

How a Central Drying/Conveying System With QMC Works

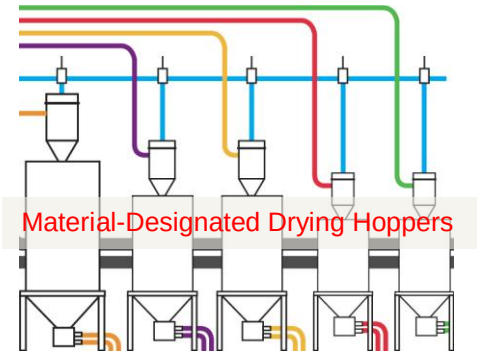
Let's break a typical Central Drying/Conveying System With QMC down into its primary sections.

1)Material Sources



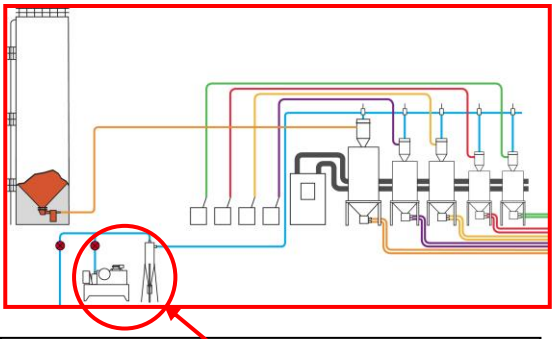
Resins can be stored in various sources including silos or bulk containers.

2)Drying Hoppers



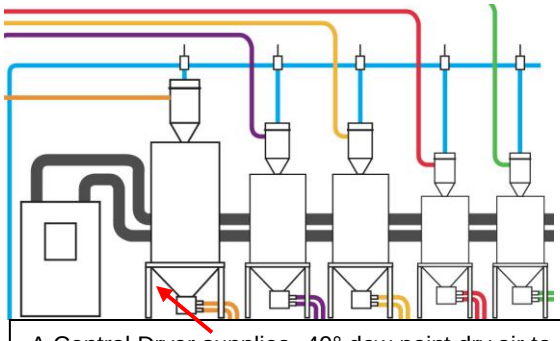
Each drying hopper is designated for a particular material.

3)Source to Drying Hopper Conveyance



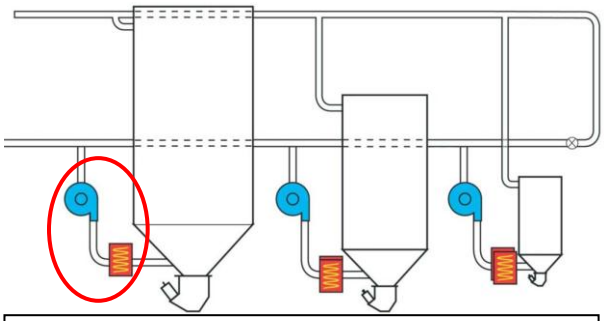
A designated vacuum pump pulls material, on demand, to a drying hopper that is material-designated

4)Central Dryer



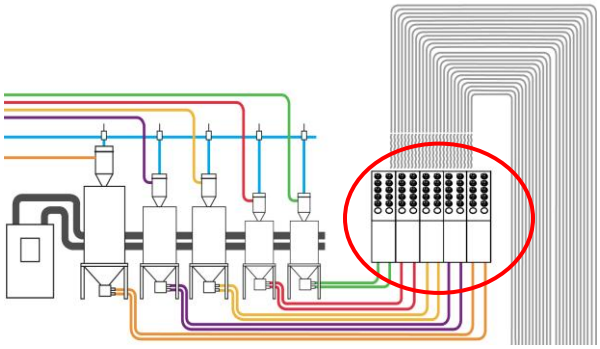
A Central Dryer supplies -40° dew point dry air to each of the hoppers through a manifold. The throughput of the dryer is matched to the total capacity of the hoppers with a safety margin for future growth.

5)Heater/Blower on Each Drying Hopper Allows You to Dry Different Resins Using A Single Central Dryer



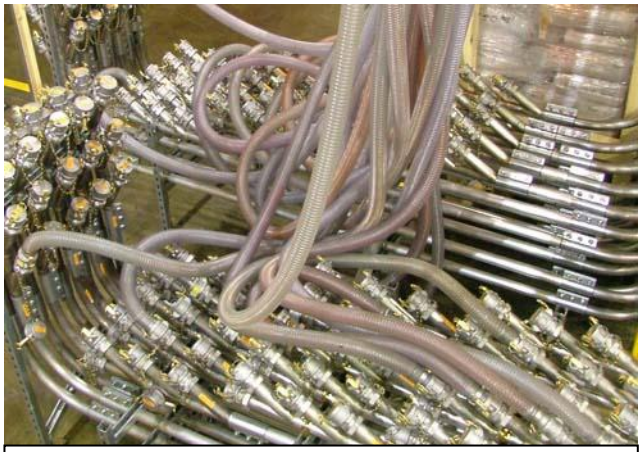
A blower, sized for proper airflow, based on hopper capacity, and a heater with temperatures adjustable up to 350° F, are mounted on each drying hopper to complement the dry air from the Central Dryer.

6)Quick Change Material Distribution w/ Auto ID

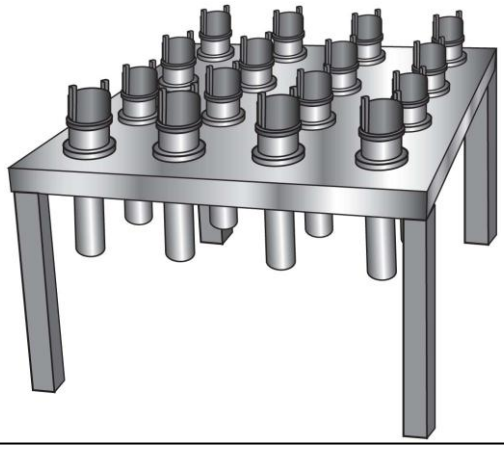


A **Quick Material Change Distribution Manifold** with Auto I.D. is used to connect pre-dried material from any drying hopper to any process machine. This can be done in seconds.

7)Comparison of Distribution Manifold Types



Open array manifolds are difficult to reach, and have line caps that have to be manually installed & locked. If a cap is not replaced, a massive vacuum leak results. Sources & destinations cannot be marked, which can result in materials going to the wrong process machine,

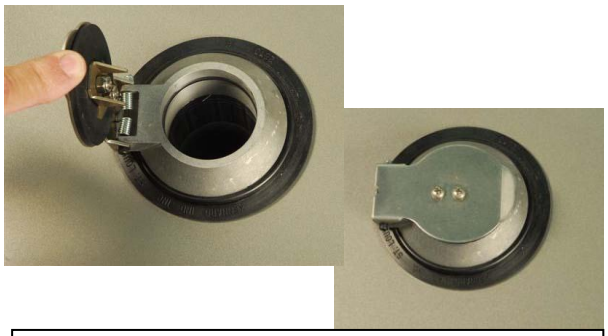


Tabletop & vertical manifolds typically have line caps that have to be installed & locked and little opportunity to mark sources & destinations, producing the same problems as open array manifolds.

8)Angled Cabinet Quick Material Change With Auto ID for Source & Destination Verification

Angled cabinet provides easy-to reach connections with clearly marked sources and destinations

Clearly marked sources & destinations minimize the chance of an incorrect connection.



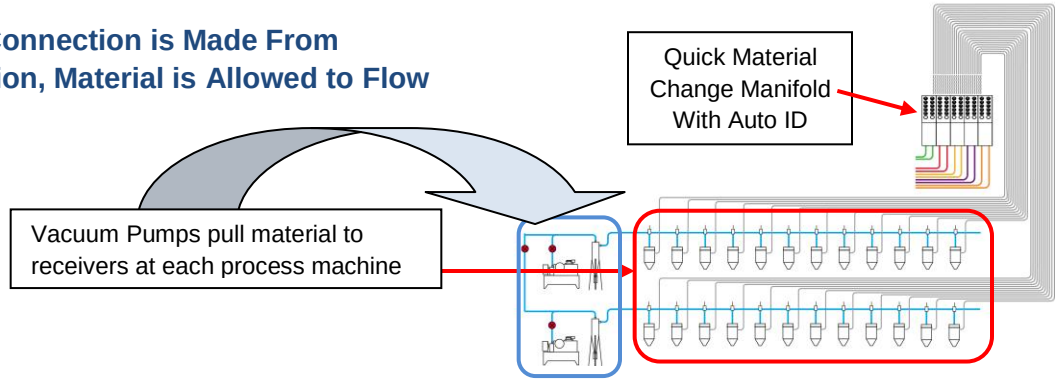
Spring-loaded, gasketed caps are easily opened but snap shut to form a positive seal

With Auto ID feature, operator enters source & destination into control. Then the source to destination connection is made at the manifold. If wrong connection is made the control won't allow conveying until connection is corrected.

If the correct connection is made, material flows, If the wrong connection is made, the control will not allow material to flow.

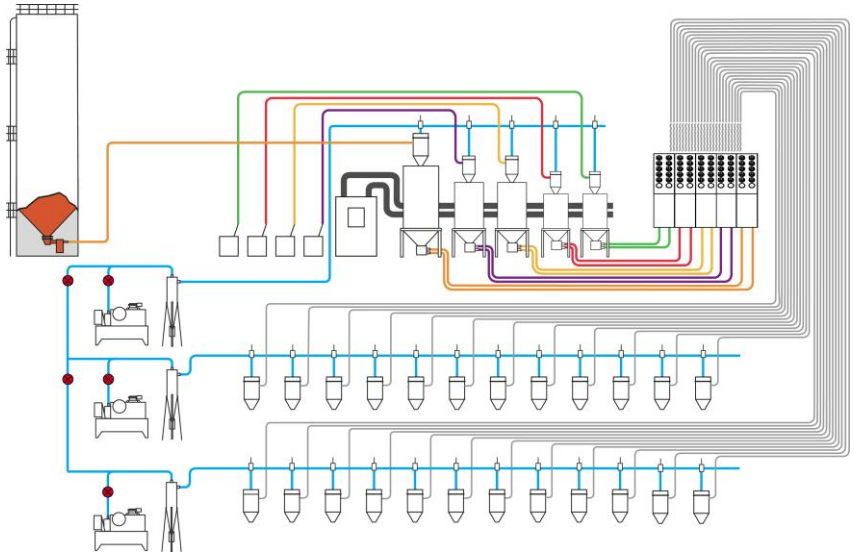
Auto ID of materials is becoming increasingly important as customers require processors to maintain records that validate everything that happens to a material from the time it arrives in the processors inventory until it is molded into a part. It is also important to the processor because the validation process reduces the incidence of rejected parts.

Once the Correct Connection is Made From Source to Destination, Material is Allowed to Flow



Money-Saving Benefits of Central Drying/Conveying with Quick Material Change

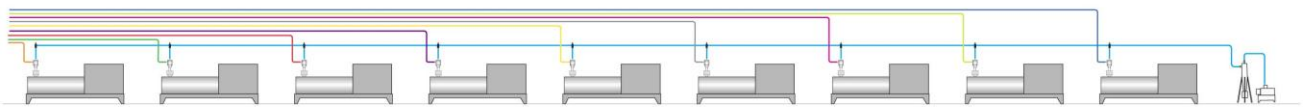
Though Quick Material Change with Auto ID for material verification is usually the area of greatest savings within a Central Drying/Conveying System, there are many other money-saving benefits because QMC is an integral part of a Central Drying/Conveying System.



- **Quick Material Change – QMC can save hundreds of thousands of dollars/year by increasing process machine uptime which means increased production.**
- **Material Verification Through Auto ID – provides important process validation data and can greatly reduce costs by eliminating the possibility of the wrong material going to a process machine.**
- **Labor Reduction – is another benefit of QMC because fewer material handlers are required.**
- **Central Drying – reduces energy costs since one dryer takes the place of many.**
- **Improved Part Quality - results from the increased process stability provided by using one dryer instead of many dryers with different drying capabilities.**
- **Energy Savings – are attained because of using fewer dryers and the elimination of individual hopper loaders in favor of more efficient vacuum pumps.**

Added Benefit:
Moving From Press-Side Dryers To Central Drying
Opens Up Space For Additional Process Machines.

You can typically fit 9 process machines into the space required for 6 process machines with portable dryers and bulk material containers.



Quick Material Change Guarantees Maximum Uptime For Your Process Machines and QMC is an integral part of a Central Drying/Conveying System Which Provides Additional Savings.

Central Dryer with Central Drying Hoppers

Quick Material Changes are made in seconds.

Central Drying Hoppers accommodate a wide range of range of process machine throughput capacities up to about 1500-2000 lb./hr. and are often located on a mezzanine.

Dry air is circulated to each hopper through a closed-loop manifold.

Each Drying Hopper is equipped with a blower, sized for that hopper and a heater with temperature adjustable up to 350° F.

Quick Material Change can save hundreds of thousands of dollars per year.

To get a quick idea of your savings, simply plug your numbers into the QMC Savings Calculator and remember…

The payback is MONTHS …not years!