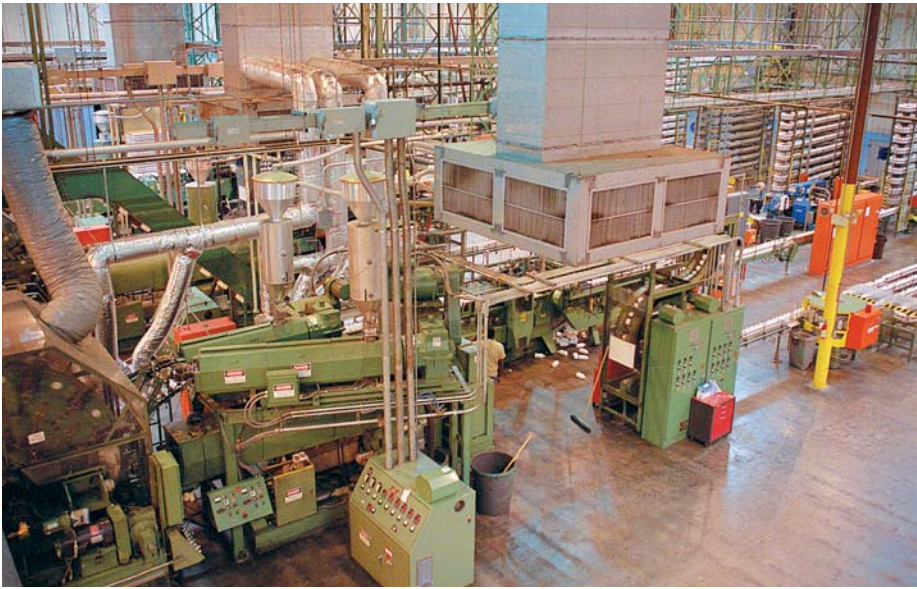


CASE STUDY



FASTER CYCLE TIME FOR HDPE BOTTLES GRAHAM PACKAGING — PORT ALLEN, LA

BACKGROUND

Graham Packaging is the world's largest processor of high density polyethylene (HDPE). At their Port Allen plant, the company produces one-quart bottles for Castrol motor oil.

When Graham acquired the facility several years ago from another company, production capacity was limited by outdated equipment. Graham quickly replaced the original blow-molders with machines which they designed and manufactured internally. These state-of-the-art molders tripled the theoretical capacity of the plant. However, the higher production rate depends partly on low-temperature cooling, and cold mold surfaces can create problems during humid weather.

THE PROBLEMS

Both production speed and profits increase substantially when low-temperature water-glycol is used for cooling the bottle molds. But when chilled molds open to release the bottles, humid air condenses on cold surfaces. This condensation, often called "mold sweat", causes several problems.

The bottle surface looks like "orange peel" because water droplets form bumps on the mold surface. Condensation also accelerates corrosion, which increases maintenance costs. Most importantly, surface deformities prevent the proper adhesion of labels. In many other plants, the theoretical capacity of blow-molding equipment is lost, because the chilled water temperature is raised to reduce condensation.

Rather than accept a low-profit production rate, Glenn Holifield, the plant maintenance engineer, used Cargocaire desiccant dehumidifiers to keep the molds dry. Without condensation, coolant temperatures can stay low, allowing continuous, high-speed operation.

Above: At the Graham Packaging plant in Port Allen near Baton Rouge, Louisiana, Cargocaire dehumidifiers are used to improve production speed and profitability by eliminating "mold sweat."



THE SOLUTION

There are two alternatives for keeping plastic molding machinery dry: 1) dehumidify the entire space, or 2) enclose each machine and feed dry air to the separate enclosures. Glenn decided against drying the room because six truck doors open directly into the room where the machines are located. The high moisture load from frequent door openings would have required very large dehumidifiers. Drying the enclosures around the machines was a more cost-effective alternative.

Originally, the project budget did not allow for purchasing dehumidifiers. To provide Graham with the benefits of faster production before capital expenditure, Munters Cargocaire arranged for Graham to rent portable dehumidifiers. Later, as capital budgets allowed, Graham installed a permanent system which included two Model HC-4500 units.

The system was originally designed to dehumidify plant air and feed it to each enclosure. The air would then “purge” the enclosed space and leak back to the surrounding room through openings in the enclosures. Over time, however, Glenn continued to speed-up production by dropping the mold temperature. As he reduced the coolant temperature, the purge air configuration no longer allowed the dehumidifiers to dry the air deeply enough to prevent condensation on more humid days.

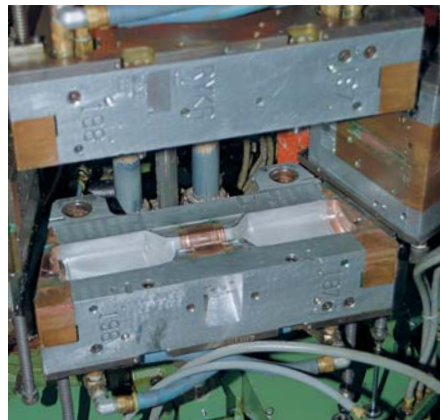
Glenn extended the capacity of the dehumidifiers by collecting and re-drying the air from the enclosures. Since that air is much less humid than air from the surrounding room, the dehumidifiers can dry the air more deeply. At the same time, flexible rubber sheets were added to form seals at the bottom of each enclosure to reduce air and moisture infiltration.

Each enclosure measures approximately 12 ft. wide by 14 ft. deep by 20 ft. high. The two HC-4500 dehumidifiers provide enough dry air to change the air inside these enclosures about once every minute.

THE RESULTS

The system can maintain humidity in the enclosures below 12% rh at 70°F. That level of dryness is normally available only during the coldest days of winter, when the air temperature outside is below 18°F. Such exceptionally dry air allows very low mold temperatures and consequently high production rates without the risk of condensation. The dry environment has allowed a 30% increase in production capacity—essentially the same result as adding a fourth blow-molder—but at far lower cost.

According to Glenn Holifield, the Cargocaire dehumidifiers are simple and reliable, requiring very little maintenance apart from changing filters and semiannual lubrication. In short, the benefits are substantial and they are achieved at minimal cost.



Cargocaire dehumidifiers blanket mold cavities with dry air. This prevents the “mold sweat” which can reduce machine capacity.

THE BENEFITS

■ 30% Production Increase

Because the dehumidified air cannot condense moisture on the molds, the coolant temperature can be reduced substantially. When parts are cooled quickly, cycle time is reduced. This allowed a 30% increase in production capacity at the Port Allen plant.

■ Improved Product Quality

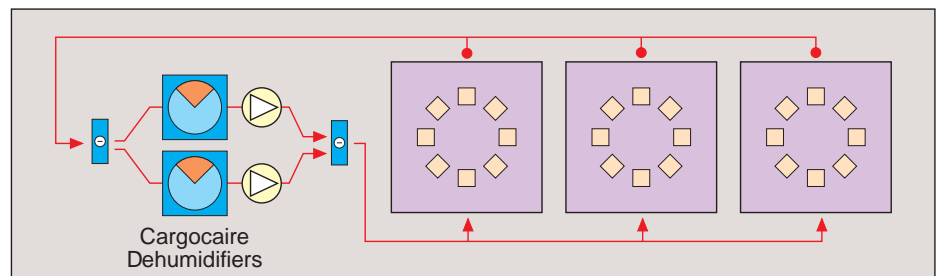
Without mold sweat, the problems of surface blemishes like “orange peel” are eliminated. With dry, smooth bottle surfaces, labels can be applied at high speed, and without risk of delamination.

■ Improved Profits Before Capital Expenditure

The Munters organization can provide rental dehumidifiers so the customer can “try-before-buying.” This allows the plant manager to experiment with optimal system configurations, and allows the profits of faster production to accumulate before spending money for a permanent installation.

■ Peak Demand Capacity Without Additional Blow-molders

Many plants have critical periods of peak production demand which force the purchase of machines that stay idle for much of the year. With Cargocaire dehumidifiers preventing mold sweat, peak production needs can be met by lowering coolant temperatures rather than by spending money to add extra molding machines.



Two Cargocaire Model HC-4500 dehumidifiers dry the air in the enclosures which surround each blow-molder. Pre-cooling before the Cargocaire units increases dehumidification capacity, and post-cooling helps cool the bottles as they exit the molds.

CARGOCAIRE
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