Better Drying

Through Technology & Maintenance

Gas-saving tips from right-sizing loads to advanced analytical systems and more

Textile service operators can do plenty to maximize the efficiency of their dryers. Key steps include preventative and corrective maintenance to ensure peak performance throughout the life of the equipment. Also, ensuring that load sizes are in line with manufacturers' capacity recommendations can help you get ROI on every therm of natural gas your dryers use.

By Todd Pfeiffer and Ryan Blair

According to the U.S. Department of Energy, the price of natural gas has increased nearly 200% over the past five years. During this same period, industrial dryers have continued to consume nearly one-third of the energy used at a typical laundry plant. As a result, laundry operators across the country are constantly struggling to find new ways to increase dryer efficiency and decrease costs.

Opportunities for savings

For laundries considering the purchase of new dryers, you must carefully research the available makes and models to ensure that the features and capacities match the application. There are also many new technologies available today that weren't available on industrial dryers 10 or 15 years ago, such as various types of sensors to detect when goods are dry, variable-frequency drives for blowers or baskets, or automatic lint collection and removal. Once the right dryer is selected for the application, the laundry operator must ensure that the dryer is installed in accordance with the manufacturer's recommendations to ensure the most efficient operation. Errors with sizing or routing of inlet and exhaust ducting can cause significant negative impact on a new dryer's performance right from the start.

For laundries with existing dryers, there are many actions you can take to make certain that these dryers operate as efficiently as possible. First and foremost, proper preventative and corrective maintenance will ensure that these dryers are capable of operating at peak performance throughout their life cycle. Secondly, ensuring that goods flow and load capacities are matched to the dryer's capabilities can greatly influence processing efficiency. For example, staging soiled goods to equally mix products that require short and long dry times will make the washroom most productive. Additionally, running load sizes matched as closely as possible with the dryer's recommended capacity will ensure a higher level of energy efficiency than running under-loaded or over-loaded.

There are several other key features and techniques that operators should pay particular attention to if they want to improve efficiency. Here are a few tips that could help:

Dryer ducting

During installation, follow the original equipment manufacturer's recommendations. If bends are required, use two 45-degree bends instead of one 90-degree bend. A 90-degree bend will increase static pressure and reduce airflow through the dryer. Avoid using conical caps on exhaust ducts since these items create a significant amount of back pressure. Instead, consider "no loss stacks" or goose necks when possible. Also, do not install screens over the duct inlet or exhaust, and refrain from using plant make-up air to feed the dryer.

Plastic buildup in baskets

In addition to increasing static pressure and trapping excessive heat in the basket, plastic buildup restricts airflow, thereby increasing dry times significantly. You can easily control this problem by applying Teflon® basket coatings, improving the soil sort process, or planning a regular basket cleaning and panel swap out procedure using removable or replaceable basket panels.

Clogged filters

Clogged lint filters also increase both static pressure and basket temperature while reducing airflow. Clogged combustion filters starve the burner of oxygen, causing it to run inefficiently. This problem leads to longer dry times and wasted energy. To avoid this problem, operators should inspect and clean lint filters daily as part of a standard preventive-maintenance program. Some dryers feature lint "digesting" burners, which eliminate the need for combustion filters altogether. Recently, dryer manufacturers, such

as G.A. Braun Inc., have developed new patented lint-collection systems with differential pressure switches that indicate when a filter is clogged. The new technology allows machines to maintain an optimal level of performance.

Seals

Bad seals create air leaks, allowing the main blower to pull air from the laundry space while bypassing the burner and basket. This problem causes the uneven drying of goods including hot and cold spots, or spot drying. Additionally, longer dry times, increased natural gas consumption and damage to the goods may occur. In order to avoid this problem, operators should regularly inspect and replace seals. Such maintenance efforts often pay off with a quick return on investment due to reduced gas consumption and increased throughput.

Overloading/underloading dryers

Overloading dryers prevents air from flowing through the goods and leads to uneven drying. At the same time, underloading dryers causes air to bypass the goods, thus preventing the necessary heat and airflow from reaching the goods. Both mistakes can lead to longer dry times and higher operating costs. Operators should regularly refer to the operator's manual for the recommended basket capacity range and load dryers to the recommended dry goods weight specified by the manufacturer.

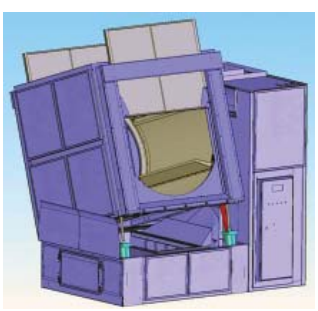
Extracting

The extracting process is the easiest, cheapest and quickest way to reduce dry times and conserve energy. Ideally, goods should be extracted to at least 40-60% moisture retention, depending on the type of goods and the type of extraction process. The more moisture removed during extraction, the more time and energy you'll save in the drying process. Insufficiently extracted goods retain excess moisture. This significantly lengthens dry times and the amount of energy consumed. Extracting with warm water also helps to reduce the moisture retention of goods.

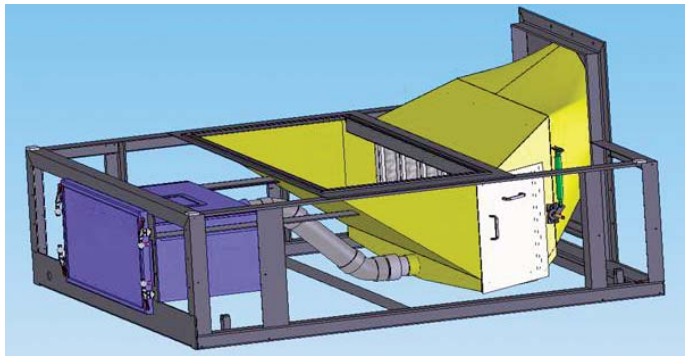
Technological Innovations

In addition to the techniques described above, recent technological advances including 3-D modeling, computational fluid dynamics (CFD), finite element analysis (FEA) and others have been instrumental in improving dryer capability and efficiency levels during the design phase of product development.

3-D modeling

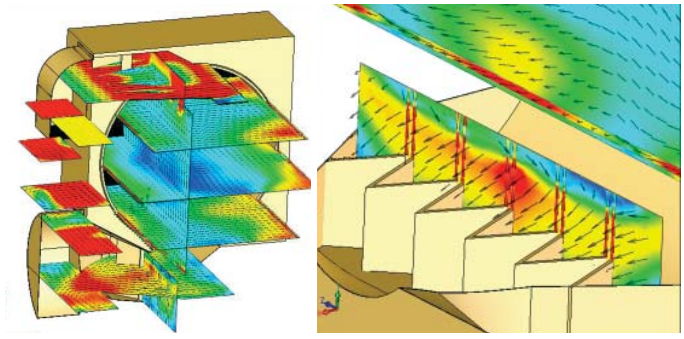


3-D modeling helps eliminate sealing gaps that might be overlooked when working with 2-D drawings. The models can be imported into FEA and CFD modeling software, which allows for the design of complex shapes that previously were impossible to develop using old drafting techniques.

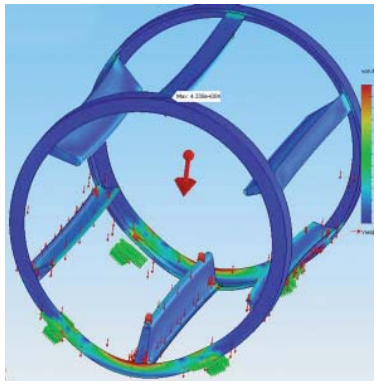


CFD analysis

Since the two most important factors in drying goods are airflow and temperature, manufacturers such as G.A. Braun use computational fluid dynamics to improve airflow and air mixing throughout the dryer. The CFD technology helps remove eddy currents, causing the temperature distribution in the basket to improve.



Finite element analysis



Finite element analysis technology allows dryer manufacturers to analyze stresses, vibrations, fatigue and thermal stresses in a particular component. The technology helps manufacturers design dryer components that can withstand these stresses, which improves the expected lifespan of the parts.

Improved sealing and insulation

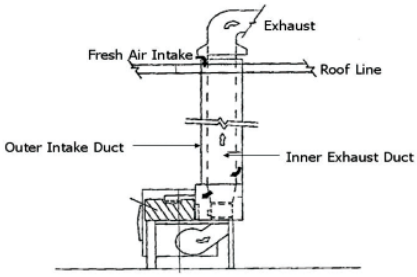
New improvements in door and basket seals have helped eliminate air leaks. In addition, the improvement of dryer insulating techniques has resulted in dryers that contain heat better than before.

Line burner technology

Burners can create hot and cold spots, or nonuniformed heating, in dryers. This problem results in either over-dried or wet goods. However, recent line burner technology simplifies the application

of uniform heat distribution by applying the heat evenly across the dryer basket surface area.

Coaxial ducting



Coaxial ductwork acts as a heat exchanger that allows operators to increase the air inlet temperature without re-introducing moisture-laden air back into the dryer. Typically, there is a 1° F in heat transfer per one foot of coaxial ducting that results in a significant net energy savings on an annualized basis.

Dryers: Seek continuous improvement

Dryers often create a bottleneck in the flow of materials through the laundry and necessitate unmerited capital spending. As gas prices remain high, energy conservation will continue to dominate the focus of business owners and plant operators. Purchasing quality equipment isn't enough. Commercial laundries must continuously invest in maintenance programs and new technology, while simultaneously analyzing operations to identify opportunities to improve efficiency.

There are many ways to keep your dryers running efficiently to save energy. To stay current on these issues, operators should refer to an owner's manual or speak to a manufacturer's representative. TR

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