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Michaels Engineering Energy Brief

MECHANICAL DEWATERING

SUGGESTIONS...

Do you have certain Energy Efficiency topics you'd like to know more about? Send an email with your suggestion to the author listed below and your topic might become a future Energy Brief!

DID YOU KNOW...

...Removing moisture using evaporation takes 20-50 times more energy than mechanical dewatering.

...By removing 1-4% more moisture mechanically, you can save hundreds of thousands of $$ per year in energy costs for a single evaporator.

MEET THE AUTHOR

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IMPROVED INDUSTRIAL DRYING EFFICIENCY USING MECHANICAL DEWATERING

Industrial drying systems and evaporation processes are major energy users in industries such as ethanol, foods, pharmaceuticals, animal feeds, paper, starches, and gelatins.

The key to efficient industrial drying is to minimize the use of your thermal dryer. Mechanical dewatering methods are far less energy intensive. Just like at home, it makes a lot more sense to put money into a high-spin, efficient clothes washer than to spend it on an efficient clothes dryer. Removing moisture with a dryer using evaporation takes 20-50 times more energy than conventional mechanical dewatering methods.

There are various means of conventional mechanical dewatering which are often times dependent on the type of product being dried. Some “squeeze” or compress the water out of the product like filter or screw presses while others “sling” the water out using centrifugal action.

Other mechanical dewatering techniques used upstream from evaporation processes are micro, ultra, and nano filtration. These selective filtering techniques are employed with mixtures that are 80% or more moisture. Filtration dewatering systems typically remove 1-4% of the moisture but they are doing it with 30 times less energy than your most efficient evaporator. When the bulk of energy necessary to evaporate water is coming from thermal energy, a 1-4% change can equate to hundreds of thousands of dollars in gas savings annually for a single evaporator.

Instrumentation and controls should be implemented to monitor the moisture content of the feed into and out of the mechanical dewatering equipment. Optimizing the dewatering for feeds with varying moisture loads requires real-time moisture level measurement of the feed going into the dewatering equipment. This allows for the modulation of the feed flow rate up or down when moisture loads change assuring most of the moisture is removed mechanically before entering the dryer.

Many times, companies focus on dryers and evaporators since they are the greatest energy consumers, but attention needs to be spent on optimizing the upstream mechanical dewatering process. Proper instrumentation of a system's product flow, moisture levels, and energy consumption is key to managing drying processes. Remember, a few percentage points in moisture content can easily translate to hundreds of thousands of dollars annually for an industrial dryer. Large capital expenditures may not be necessary to achieve a lot of energy savings.