

## Mixers

### Combining Energy Savings & Process Improvement

#### Mixers:

**Horsepower: Up to 5,000**

**Savings: Up to 10%**

**(Depending on duty cycle.)**

Mixers are used to combine, blend, dissolve, or emulsify two or more ingredients into a uniform gas, liquid, or solid. Often times, materials are mixed to pull settled ingredients back into the solution. The mixing process may be either batch or continuous, may include heating or cooling, and may lead to chemical reactions which change basic properties of the original ingredients. The main application challenge is to maintain precise speed through changing material viscosities while protecting the mixing equipment from over-torquing or jamming.

The recipe is oftentimes considered highly proprietary because it creates a competitive advantage in the marketplace. Industries include chemical, food, materials, paper, petroleum, pharmaceuticals, plastics, rubber, and wastewater.

There are a wide variety of mixer designs including laboratory, top entry, and side entry with much of the engineering focusing on container and impeller / blade design to most efficiently get the desired results. Science and experience are major factors in vendor and mixer selection.



The recipe should include mixer speed throughout the mixing process. Optimal speed will likely change according to the consistency of the mixture and will directly affect product quality and production throughput.

AC or DC drives are used to change speed during the mixing process or to allow the mixer to be used on a greater variety of raw materials without damage. At a given torque output, reduced speed results in less energy being used.

Critical speed refers to a shaft or impeller speed at first or second order resonate frequencies. The result of operating at critical speed is high vibration, increased wear, and possible impeller failure.

# Mixer Solutions

Most mixers are designed to operate at least 20% below or above this speed. The mixer vendor should be consulted before adding an adjustable speed drive to a fixed speed mixer. They should be able to advise what shaft RPMs should be avoided. The "skip frequencies" feature is used to avoid critical speed if it fits within the desired speed range.

Batch mixers often operate in an energy mode, completing a batch when a desired amount of energy has been applied to the mix. This functionality is easily configured in a Control Techniques AC drive.

Control Techniques can evaluate your application and help you decide which variable speed solution is best for your situation.

Control Techniques provides metering to help you understand the amount of work being done in your mixing process. Available kWh energy, run-time, and running energy cost meters help you document energy and cost savings. Powerful networking options enable you to share this information with your PLC or recipe management system. Measurement is the first step towards improvement.

Even greater cost savings can be achieved using the imbedded PLC functionality to manage local I/O and provide simple recipe management.

Contact Control Techniques for assistance in identifying energy savings opportunities in your facility.



## Drives plus...

### World Class Products & Support

- Assistance estimating energy savings
- Worldwide Application & Field Service Network
- 24/7 support line +1 800 893-2321
- Custom software and panel configurations



*AC Drives fractional to 4,200 HP*