S.HOWES

Jacketed & Vacuum Mixers

Sample Applications:

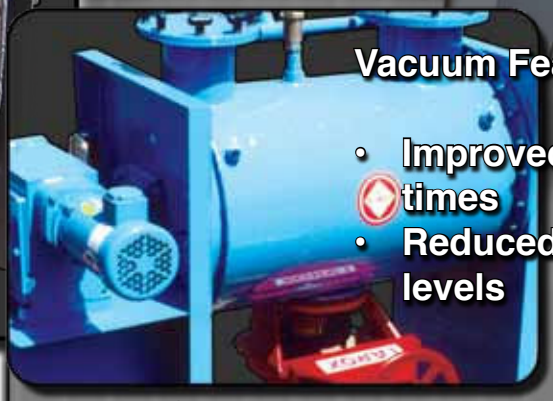
- Drying
- Polymerization
- Heat Curing
- Cooling/Freezing
- Microbial Kill
- Sintering/Calcining

Mixers & Blenders:

- Batch & Continuous
- Double Ribbon
- Paddle
- Laboratory

Jacket Features:

- ASME “U” Stamp and “R” Stamp Cerificates of Authorization
- Steam, water or hot oil for thermal treatment
- Refrigerants for cooling



Vacuum Features:

- Improved drying times
- Reduced oxygen levels

For more information
contact one of our Sales Engineers
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Jacketed & Vacuum Mixers

Member PMA PROCESS EQUIPMENT MANUFACTURERS' ASSOC.

ENGINEERED-TO-ORDER

S. Howes can assist in the design of heating and cooling equipment for your specific application. All materials are unique in their thermal heat transfer characteristics. Such factors include: particle size, density, viscosity, etc. After establishing a heat transfer coefficient, among other factors, S. Howes staff can assist in the specification of equipment for your application. Typically, this requires material testing in our lab. When testing in our lab may not be practical, equipment can be shipped to your facility for on-site testing. A technician is available to assist your staff in operating any equipment. Leverage our experience!

Heating & Cooling Mixers

Thermal treatment is provided through a thermal fluid jacket on the mixing vessel. Material is heated or cooled by direct contact with the surface area on the tank walls as the paddles and/or ribbons continuously agitate the material. Based on standard models, our engineers can design a heating or cooling mixer to your specific processing needs.

Advantages

- Cost savings as the thermal treatment is accomplished in the same time and vessel being used for mixing step
- Accurate control of batch thermal treatment time
- Good control of end material temperature

Limits

- Materials that soften on heating (thermoplastic) may smear and foul preventing satisfactory heat transfer
- Material needs to flow well during thermal treatment period to ensure homogeneous treatment
- Lower heat transfer coefficients than with convective temperature control
- Temperature of heat transfer media must be controlled to a point that will not damage the material when the material is in direct contact with thermal surface

Atmospheric Mixers (Dryers)

Conductive heating of materials through a thermal fluid jacket on the mixing vessel results in flash evaporation of volatile components such as water or organic solvents as the material agitation or transfer exposes the material to the open space at the top of the mixer. In order to continue to drive evaporation, the vapor in this free space must be removed either by convection or the assistance of a conventional fan.

Advantages

- Low capital cost: drying is accomplished in the same time and vessel being used for mixing
- Control of batch drying time and end material temperature
- Suitable for drying of either water or organic solvents
- No or low dust generation - reduced chance for dust explosions that can occur in convective type dryers
- Residence time can be adjusted to allow for the removal of "bound" moisture

Limits

- Generally for heat insensitive materials
- Materials that soften on heating (thermoplastic) may smear and foul preventing satisfactory heat transfer
- Material needs to flow well during thermal treatment to ensure homogeneous treatment
- Lower heat transfer coefficients than with convective dryers
- Temperature of heat transfer media must be controlled to a point that will not damage the material when the material is in direct contact with thermal surface

Vacuum Mixers (Dryers)

Similar to atmospheric drying, the vacuum process also reduces the atmospheric pressure within the mixer to reduce the vapor pressure of the water. This allows the evaporation of the volatile component to occur at a lower temperature than at atmospheric conditions. Based on standard models, our engineers can design a vacuum mixer/dryer to your specific processing needs.

Advantages

- Lower operating temperatures make it more suitable for heat sensitive materials such as pharmaceuticals or materials that melt at higher temperatures at atmospheric pressure
- Head space in the mixer is filled with vapor that will reduce or eliminate presence of oxygen for oxygen sensitive materials or solvents
- Batch drying time is infinitely variable depending on the residence time required

Limits

- Materials that soften on heating (thermoplastic) may smear and foul preventing satisfactory heat transfer
- Material needs to flow well during thermal treatment period to ensure homogeneous treatment
- Lower heat transfer coefficients than with convective temperature control
- Temperature of heat transfer media must be controlled to a point that will not damage the material when the material is in direct contact with thermal surface

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