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Tips for Choosing a Reliable Temperature Control System in the Pharmaceutical Industry.

When considering a temperature control system for medical processing, precision and accuracy are key. Mokon's advanced solutions are relied on by medical, pharmaceutical and biotechnology companies to help facilitate the development, manufacture and distribution of COVID-19 vaccines, therapeutics and diagnostics. Mokon plays an integral role in this operation by providing portable chillers, circulating water systems and combination heating and chilling solutions used for vessels, mixers, fermenters and bioreactors in vaccine and medicine production.

To ensure effective product control in your critical application, find out how to select the best temperature control system with these five steps.

1 | Calculate System Size

Effective selection and sizing of the temperature control system can make a significant difference in reducing waste, achieving higher quality, increasing output, realizing faster heat up and cool down rates and improved profitability.

Collecting the application details to calculate the size of the temperature control system is a crucial element to achieve accurate process temperature control. Never assume that a comparable existing installation has been effectively sized and that the proper temperature control system has been designed to deliver the product quality and throughput management you're looking for.

Sizing parameters should be determined by performing a thorough calculation of the process load conditions to ensure the correct heating, cooling and pump capacities are selected. It is essential to understand that the heating and cooling loads fluctuate depending on the fluid/materials used and complexity of the materials being processed. Therefore, the size or capacity of a temperature control system must be designed to accommodate the varying conditions that may include ambient conditions that affect system efficiency.

Typical sizing questions include equipment ambient conditions, type, shape, dimensions and weight of the container, chemical mixture specific



Combination heating/chilling system with all stainless steel cabinetry, NEMA 4X and wash down design.

1 | Calculate System Size, *continued*

heat and weight per hour being treated, process temperatures, inlet/outlet quantity and size of lines, and control requirements.

You should always include a safety factor to allow for unknown or unexpected conditions. The size of the factor is dependent on the accuracy of the wattage calculation. Generally speaking, the smaller the system with fewer variables and outside influences, the smaller the safety factor. On the other hand, the larger the system and the greater the variables and outside influences, the greater the safety factor. Here are some general safety factor guidelines:

- 20% safety factor is the average
- 30% for larger systems with varying loads, cycle times, etc.
- 200% for single-use bioreactors using film bag
- Allow for heat gain from agitator devices in mixers

2 | Find the Right Fluid



Liquid Temperature control systems provide a uniform medium to transfer heat or cooling to a process. Liquid can circulate into areas that are challenging or ineffective by other means of temperature control like steam, cartridge

heaters or heating elements for example. Control accuracy within fractions of a degree is possible with the correct system and options selected. Compact and energy efficient designs allow for control of processes in limited spaces and offer reduced operating costs.

Circulating liquid temperature control of your process can be handled through three (3) different mediums: water, water/glycol or heat transfer oil. The decision on which fluid type selected would depend upon the temperature you are trying to achieve, heating and/or cooling loads, and process flow capabilities, cycle times, material, etc.

For additional information on process heating and cooling equipment for pharmaceutical processing, contact Mokon today.

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3 | Assess Control Features

Your process control demands accuracy and reliability, while operators need easy-to-use and highly visible controls and indicating lights. Microprocessor based controls provide ultimate control performance and are configurable to meet specific application needs. These types of controls can greatly optimize your process. A variety of control features and communication options are available to ensure you are obtaining easily configured and optimal results.

4 | Plan System Installation Carefully

For optimum performance, make sure to plan out your system's location and ensure it's located in an area that provides adequate space and ventilation. Before installing/starting up any temperature control system, read the manufacturer's instruction manual and follow their installation/startup procedures carefully. Complete an inspection of all electrical and mechanical components of the system including wires, fittings, etc. If a startup checklist is provided, follow that closely.

5 | Prolong the Life of Your Temperature Control System



Preventive maintenance procedures should regularly be performed to keep the temperature control system clean and well-maintained. Performing weekly, monthly, and quarterly

checks will extend the life of your system. Refer to the procedures provided in the manufacturer's instruction manual.

By following some basic guidelines before, during and after installation, you can avoid problems and ensure that your temperature control system will provide a high level of efficiency and reliability and an extended life.



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