The Evolution Of Clean Pumping

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Not surprisingly, safety has always been a top concern for food and beverage companies. So, it goes without saying that this is a precise industry, one that requires the highest standards in hygienic and sanitary production processes. Despite this emphasis on food safety, there still have been a number of scandals that have combined to give the consuming public reduced trust in the safety that the industry can provide. For example:

- The FDA issued an average of 188 Class I (the most serious) food recalls over the five-year period from 2002 to 2006. A Class I recall is one in which there is a reasonable probability that the use of, or exposure to, a product will cause serious adverse health consequences or death.
- The European Union Risk Analysis Information Network (EU-RAIN) has reported that between 10 and 30 percent of the population in industrialized countries suffers from food-borne illnesses on an annual basis.
- A survey by the Food Marketing Institute showed that consumer confidence in the safety of the food supply has dropped dramatically. After hovering in the 80th percentile for several years, it dropped to 66 percent in 2007, the lowest level since 1989. By comparison, only a decade ago, what was in a product, how good it was for you, its production process and where it came from barely registered with consumers.

Of course, there are stringent standards and regulations in place that have been designed to guarantee the safe manufacture of all types of foods and beverages. The FDA's Hazardous Analysis and Critical Control Point (HAACP) is an overarching system that has been designed for use in all segments of the food industry, from growing, harvesting, processing, manufacturing, distributing and merchandising, to preparing food for consumption.

Finding the Right Solution

Food production is a 24-hour-a-day, 365-day-a-year operation with various types of pumping equipment needed to keep the process running smoothly. As such, the HACCP system specifies a number of questions in the areas of equipment design and use that must be addressed before that equipment can be introduced to the production process:

- Does the equipment provide the time-temperature control that is necessary for safe food production?
- Is the equipment properly sized for the volume of food that will be processed?
- Can the equipment be sufficiently controlled so that the variation in performance will be within the safety tolerances required?
- Is the equipment reliable?
- Can the facility and equipment be easily cleaned and sanitized to permit the safe handling of food?

This means that all equipment used in the production of foods and beverages should be constructed and installed according to sanitary design principles with preventive maintenance and calibration schedules. Also, all procedures for cleaning and sanitation of the equipment and the facility should be written and followed with a master sanitation schedule put in place.

Moving in the direction of the HACCP assessments is the air-operated double-diaphragm pump, which was invented by Jim Wilden back in 1955.

Pump Up the Options

Well-designed turnkey process solutions demand that the plant engineer find the best match between the process requirements and the available pump technology. The diaphragm pump, now in its evolved sanitary design, can be a leading choice for the processor's fluid transfer arsenal, due to characteristics that include:

- A "duality" performance nature in which a positive-displacement pump employs the "dead heading" performance of a centrifugal pump.
- A complete absence of mechanical seals.
- Dry priming with suction lift.
- High turn-up/turn-down ratios for application flow flexibility.
- Medium-to-high flow accuracy with highly variable process conditions.

Application examples can include:

- Product filler feeding. Many fillers need to be stuffed to provide proper fill volumes. Diaphragm pumps and their constant pressure/dead-heading capability can charge the filler with the needed pressure without use of complex controls, gravity-feed tanks, surge tanks or recirculation lines.
- Batch process metering. When batching ingredients into tanks, some processes benefit from using load cell/diaphragm pump proportioning of ingredients into tanks. As diaphragm pumps can start and stop (and deadhead) at will without adverse effects, they can be a good option here.
- Ingredient unloading. Self-priming, strong suction lift and risk of dry run are applications that many would argue are best handled by this type of pump.
- Processing shear-sensitive and/or large particulates in thick or thin fluids. Diaphragm pumps offer added flexibility in handling variations in product characteristics.
- Pressure-limiting applications. Some types of filters and other processes must control maximum system pressures. The diaphragm pump can be set to not surpass that maximum system pressure without requiring relief or other sophisticated pressure control systems.

PSG is comprised of Wilden®, Blackmer®, Griswold™, Neptune™, Almatec® and Mouvex®. For more information, please e-mail Wallace Wittkoff at wallace.wittkoff@pumpsg.com *[1]* or *visit* www.pumpsg.com *[2].*

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