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Liquid Dosing Systems

It is frequently necessary to incorporate metered liquid or gas components into an integrated feeding system for applications such as food production or plastics compounding extrusion. Often the liquid components must be metered in proportion to dry ingredients and usually synchronized with the operation of the dry product dosers or feeders with an integrated gravimetric or volumetric feeder control system.

Precision liquid and gas metering systems vary greatly in design and complexity, depending upon the characteristics of the fluids and specific application requirements, but typically include as a minimum a liquid reservoir and a suitable pump with the necessary complement of valves and instrumentation. Integrated liquid dosing systems may be as simple as a liquid tank with a positive displacement diaphragm or gear pump with volumetric controls, or as complex as a gravimetric loss-in-weight temperature control reservoir with heated process piping and jacketed pump.

Arbo modular liquid reservoirs

The Arbo modular D/35 and D/100 gravimetric product lines include special liquid dosing reservoirs mounted to Arbo's modular weighing frame as illustrated in figure 1.

Arbo DP/35 and DP/100 gravimetric reservoirs are available in unheated or, for higher viscosity fluids, with integral electric resistance heaters or in a jacketed design for water or oil heating systems. Insulated jackets are available for high temperature applications.

The Arbo modular liquid reservoirs facilitate implementation of liquid metering systems into gravimetric loss-in-weight feeding systems.



KDA-DP/35 Reservoir

Pumps

Depending upon specific process requirements, almost any type of variable speed pump design may be incorporated into an Arbo integrated feeding system. Pumps with some degree of positive displacement discharge, such as the Zenith gear pump or the Lewa variable stroke diaphragm pump illustrated on the right are frequently selected. Application requirements such as fluid viscosity and/or operating pressure often determine the pump.



Zenith gear pump



Lewa diaphragm pump



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Control Instrumentation & Valving

Liquid components in Arbo engineered integrated feeding systems are typically controlled by an Arbo gravimetric control system such as the Arbo Multiline system illustrated to the right. This fully integrated system is capable of controlling up to eight ingredients.

Process instrumentation for liquid components are designed to suit the application and may include pressure relief valves, back pressure valves, sampling valves, pressure gauges and transmitters, level switches and high pressure injection valves.

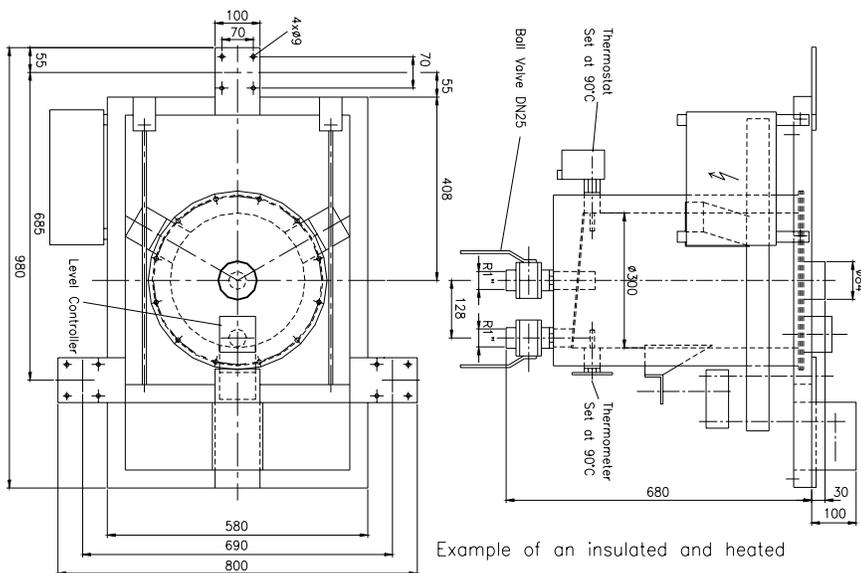


A LIW touch screen controller Uniline allows Master-Slave configuration of the liquid feeder with the upstream process control. The feed rate of the Master-Slave configuration can be setup as target follow, master flow target ratio or accept inputs from a coriolis flow meter



Volumetric Systems

It is sometimes possible to achieve adequate fluid metering accuracy with volumetrically controlled feeders and volumetric pumping systems. Illustrated on the right are Lewa diaphragm or piston pump based systems. They can easily be incorporated into an Arbo volumetric control feeding system.



Example of an insulated and heated ARBO LIW liquid feeder