

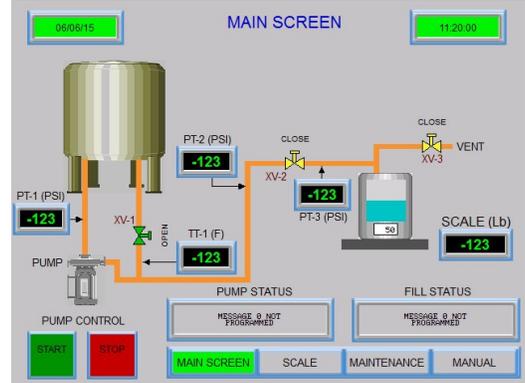
# LiquiFill – Automated Liquid Cylinder Filling

Spec Sheet

The **LiquiFill Automatic Liquid Cylinder Filling System** is primarily designed to **reduce the losses** inherent in conventional filling methods. This process institutes “top” filling, whereby the liquid is sprayed into the vapor phase of the liquid cylinder. LiquiFill also reduces the labor required while decreasing fill times to between 3 and 4 minutes per cylinder. Liquid cylinders are filled by weight, using a **centrifugal pump**. The entire process is controlled by a small PLC (programmable logic controller), Operator interface screen and scale controller, all of which are highly reliable due to their solid-state construction and industrial compatibility.

### LiquiFill-1

Automated liquid cylinder filling system, consisting of a single pump, manifold and control system to fill (1) liquid cylinder on an unattended basis. The system assures that product is being continually delivered while time loss for cooling blow-down is virtually eliminated.



### LiquiFill-2

Automated liquid cylinder filling system, consisting of a single pump, manifold and control system to fill (2) liquid cylinders on an unattended basis. The system assures that product is being continually delivered while time loss for cooling blow-down is virtually eliminated.



### Features:

- Low losses
- Reduced filler interaction time
- PLC controlled with touchscreen
- Little to NO blow-down

### Includes:

- Single or Dual manifolds
- Centrifugal pump
- Color touchscreen
- Automatic valves
- Single or dual scales
- Gauges, safeties, hose and bypass
- Pressure transducers and thermocouples



## LiquiFill – Automated Liquid Cylinder Filling

### Theory of Operation

Conventional "Gravity Fill" or "Pressure Transfer" methods of filling liquid cylinders result in losses of up to 30%. This is due to the pressurized liquid in the bulk storage vessel partially flashing as it is transferred into a liquid cylinder that is at a much lower pressure.

The LiquiFill System reduces this loss due to two factors.

- a) The use of a centrifugal pump allows the liquid to be transferred without dropping the pressure.
- b) By rapidly filling into the vent connection of a "cold" liquid cylinder the incoming liquid will re-condense the entrapped vapor thereby eliminating the necessity for venting, resulting in losses close to zero.

However, it is not always possible to fill a liquid cylinder that is "cold" (contains some residual product). A "hot" cylinder must be cooled to liquid temperature before it will begin filling. The liquid needed to provide this cooling is lost product, regardless of the fill method. LiquiFill simply minimizes this loss and the subsequent filling until full.

Utilizing the centrifugal pump filling into the vent connection, of the liquid cylinder, the pressure will rise due to the vaporization of product which provides the cooling. Should the pressure rise to 180 PSI a small amount of vapor can vent until the pressure drops to 90 PSI. The filling then continues until 180 PSI is again reached and venting drops the pressure back to 90 PSI. This cycle may repeat several times until the liquid cylinder is cold enough so that the vapor re-condenses rapidly enough to allow the cylinder to fill to the full weight.



*Liquid cylinders that have a low working pressure (22-50 PSI) should be filled by the "bottom fill" method with the vent valve open to allow continual venting during fill.*