

## FILTRATION EQUIPMENT

The growth of new process industries has brought with it major problems in filtration that previously had been limited to laboratory and pilot-plant operations. Industrial filtration operations are usually performed under pressure or vacuum using filter media which is specifically designed for each operation. The following equipment can all be used with filter paper media. This fact illustrates and emphasizes the great versatility and effectiveness of filter paper.

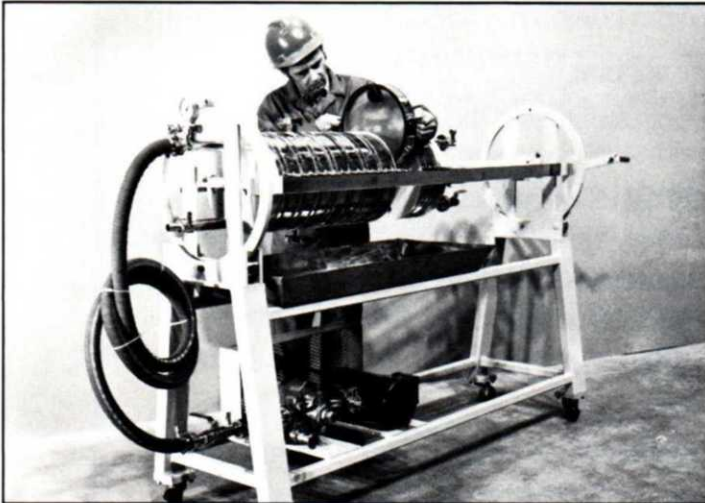


Figure 4-A

Photo courtesy of Star® Systems  
Division of Hilliard of South Carolina Inc.

### PLATE-AND-FRAME FILTER PRESSES

One well known piece of equipment in the filtration industry is the plate-and-frame filter press, see *Figures 4-A & 4-B*. This device essentially consists of a skeletal framework made of two end supports connected by two horizontal, parallel bars. The bars support multiple filter chambers that are created between the plates, frames, and the filter medium. Prior to use, the press is closed and tightened by a screw or hydraulic ram thereby forcing the plates and frames together with the edges of the filter medium acting as a gasket for each chamber.

Once closed, a pump forces slurry into the chambers. These chambers are designed so that the liquid passes through the filter medium before leaving the press.

In a plate and frame press, slurry flow through the filter press is not from chamber to chamber consecutively but to all chambers simultaneously. Each chamber fills at the same rate,



Figure 4-B

Photo courtesy of Ertel Engineering Co.

retains the same quantity of solids and delivers the same quantity of filtrate.

**HORIZONTAL PLATE FILTERS** The horizontal plate filter utilizes the same basic principles as the plate-and-frame filter. The plates, however, lie in a horizontal plane and are stacked vertically. Originally, horizontal plate filters were designed to assure a uniform distribution of filter aid over the filter plate. This even distribution is accomplished by floating the filter aid into position rather than by impacting it against the filter media as in the plate-and-frame press.

In the horizontal press, a perforated circular metal plate supports the filter paper. Filtration occurs as the slurry passes across multiple plates, which are sealed together as in the plate-and-frame press. *Figure 5* illustrates two typical horizontal-plate filters. The slurry flows into all of the filter chambers simultaneously, passes through the filter media where solids are retained and then combines in the outlet pipe for discharge.

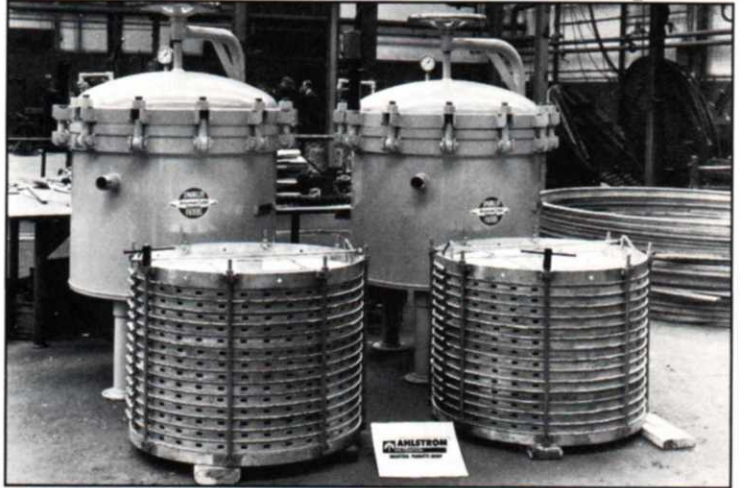


Photo courtesy of Sparkler Filters, Inc.

Figure 5

**TUBULAR FILTERS** A third category of filtration equipment is tubular filters. *Figure 6* describes a typical example of this filter. Tubular filters are designed to use either horizontal or vertical tubes. The filter paper can be wound either inside or outside of the perforated metal support.

The principal advantage of tubular filters is the fine clarity of filtrate they produce. In this filter the slurry must pass through several thicknesses of paper.

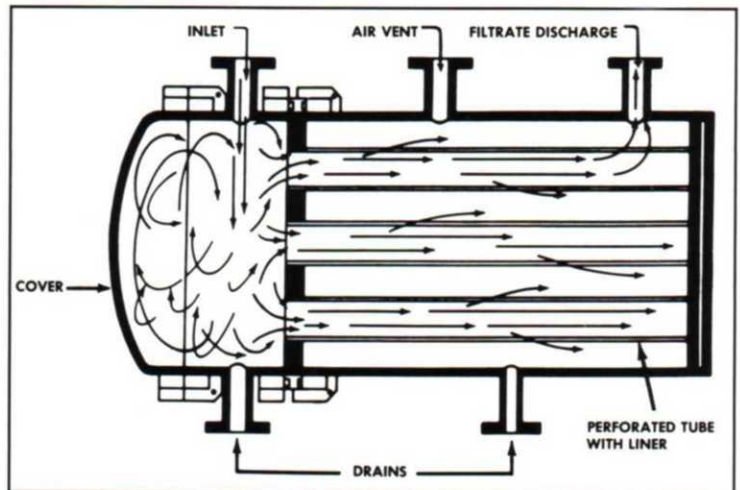


Figure 6