



NEW LABSCALE FILTRATION OPTIMIZATION EQUIPMENTS

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ABSTRACT

Cake filtration is one major principle of solid liquid separation techniques used to recover valuable solids in the chemical, pharmaceutical and mineral processing industries.

The theoretical laws of cake filtration have been deeply studied and several models have been proposed and are used in research and application laboratories to characterize pulps and sludges and to size industrial filters.

To comply with the requirements of laboratories willing to perform routine laboratory filtration tests in the most reproducible, accurate and traceable conditions, new filtration-compression cells have been designed. The materials chosen give them a broad field of applications (temperature, pH, solvents). Transparent walls may be used to visualize cake formation and possible particles classification. The cell bottom is designed to accept various filtering media of various types and thickness.

Auxiliary equipments are offered to simulate mixer/dryer/filters: e.g. variable speed paddle mixer, movable up/down, washing liquid and drying gas feeds, and several others.

All experimental data are recorded. Relevant curves are plotted, e.g. filtrate volume vs time, cake height, suspension temperature, and once complementary external data (cake dryness, fluid viscosity and specific gravity, clarification data...) are entered in the program, the cake characteristics (e.g. compressibility, specific resistance) and productivity data (flow rates, cumulated volumes) are calculated.

New compression-permeability cells enable to determinate accurately cake characteristics (specific resistance, porosity, compressibility) of low specific resistance as the ones formed in centrifuge or Nutsche filters.

New software is proposed to process experimental data upon the theoretical filtration model chosen. Models for optimization of machines cycles and sizing of centrifuge filters were improved by a better description of centrifuge drainage kinetics with generalised Darcy models taking into account hydraulic resistance of filtering medium. Models for Nutsche filters enable to extrapolate data obtained with a thin cake to simulate formation of a thicker cake.

The equipments and models will be briefly described; size and optimum operating characteristics, typical results and a typical application will be shown.