FILTER DESIGN SOFTWARE

Solid-Liquid Separation Equipment
Selection – Design – Simulation - Education – Training

Filter Design Software (FDS) has been developed from the successful p^C-SELECT software that has been used by numerous filtration equipment and user companies since it was launched in 1991. FDS is a result of a collaboration with companies in the equipment supply, pharmaceutical, fine chemical and mining industry sectors where the software has been tested during its development.

FDS is an aid to equipment specification and is also a training and educational tool for use by both industry and academia – so it contains many explanations, pictures and diagrams of equipment. The simulation procedures have in-built constraints that arise due to equipment design features that affect the operation of the equipment, along with many guides to aid correct input of data.

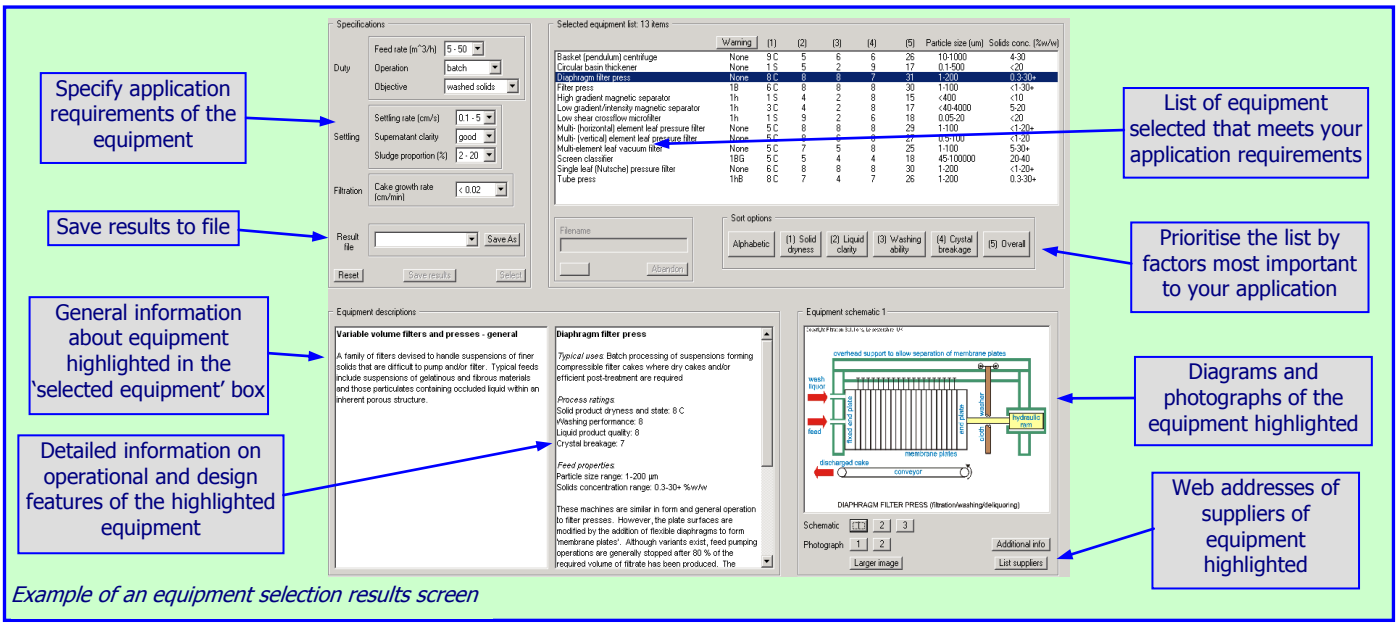
FDS is industry tested, intelligent and interactive software that is designed to be user friendly for those users who may not be familiar with the bewildering choice that exists amongst solid-liquid separation equipment. FDS is also a valuable tool for the solid-liquid separation equipment expert.

FDS is a sequence of interlinked modules that can be used independently from one another. The full set of FDS modules offers many capabilities, including:

- A catalogue and explanation of the main operational and design features of 70+ equipment types
- Full analysis capabilities of leaf filter, jar sedimentation and expression test results to give the relevant parameters for scale-up and simulation of solid-liquid separation equipment
- Comparison of data sets from a range of tests or trials
- Simulation of 20+ types of vacuum and pressure filters
- The ability to import data files from other software (e.g. Excel® spreadsheets)
- Web access to equipment suppliers.

SELECTION MODULE & EQUIPMENT CATALOGUE

The equipment catalogue, which can be called up from the opening screen, is designed for use as a reference manual - it gives technical information and diagrams and photographs about all of the generic types of equipment stored in FDS.



Example of an equipment selection results screen

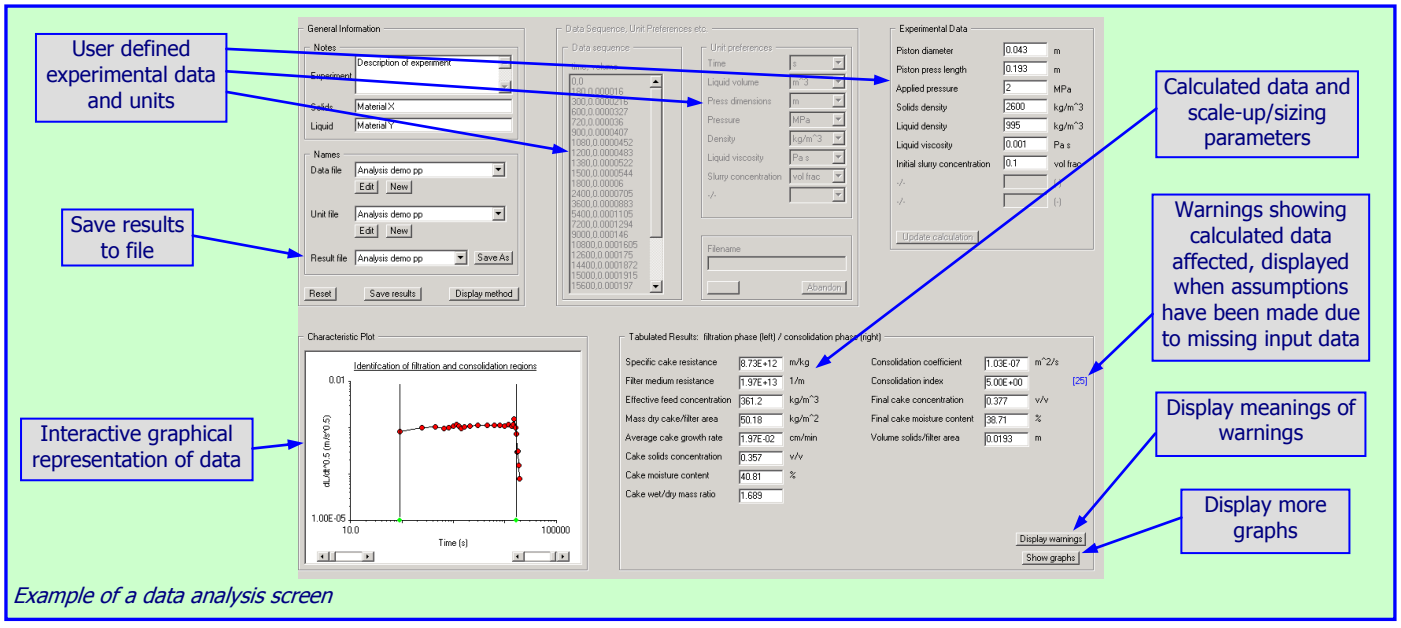
The equipment selection procedures enable selection from more than 70 solid-liquid separation equipment types, including thickeners, centrifuges, hydrocyclones, etc – there are many more if the variants within each type are counted. Selection is possible from either limited or from more extensive information – obviously, the more information that is available about the feed and the process the better the selection!

Key features in the Selection Module include:

- User specification of the process and the duty that the equipment will be expected to perform
- Automatic comparison of the specifications with the FDS database
- Ranked listing of solid-liquid separation equipment that match the specifications
- General and detailed information about solid-liquid separation equipment - technical design and operational information about each equipment item in the list is provided in a descriptive format on screen, together with diagrams and photographs
- Facility to prioritise the equipment list according to process criteria (such as cake washability, cake dryness or the damage likely to be caused to the particles)
- Identification of equipment in the list that is marginal for technical reasons
- Customisable list of web addresses of equipment suppliers and facility to paste suppliers addresses to a web browser.

DATA ANALYSIS MODULE

The tests carried out early in the assessment of a solid-liquid separation problem – for either equipment selection or to gather design data – are either a constant pressure leaf filter test (sometimes pilot scale tests may be available) and/or a jar sedimentation test. A piston press test is sometimes carried out to assess compression or consolidation effects on the separation. Whichever test is done, FDS enables rapid analysis of the measured data.



Example of a data analysis screen

After the user has entered the experimental measurements in their preferred format then FDS carries out the correct analysis. Even with well conducted tests, sometimes some of the necessary input data is missing yet the best possible analysis must be done with what information is available.

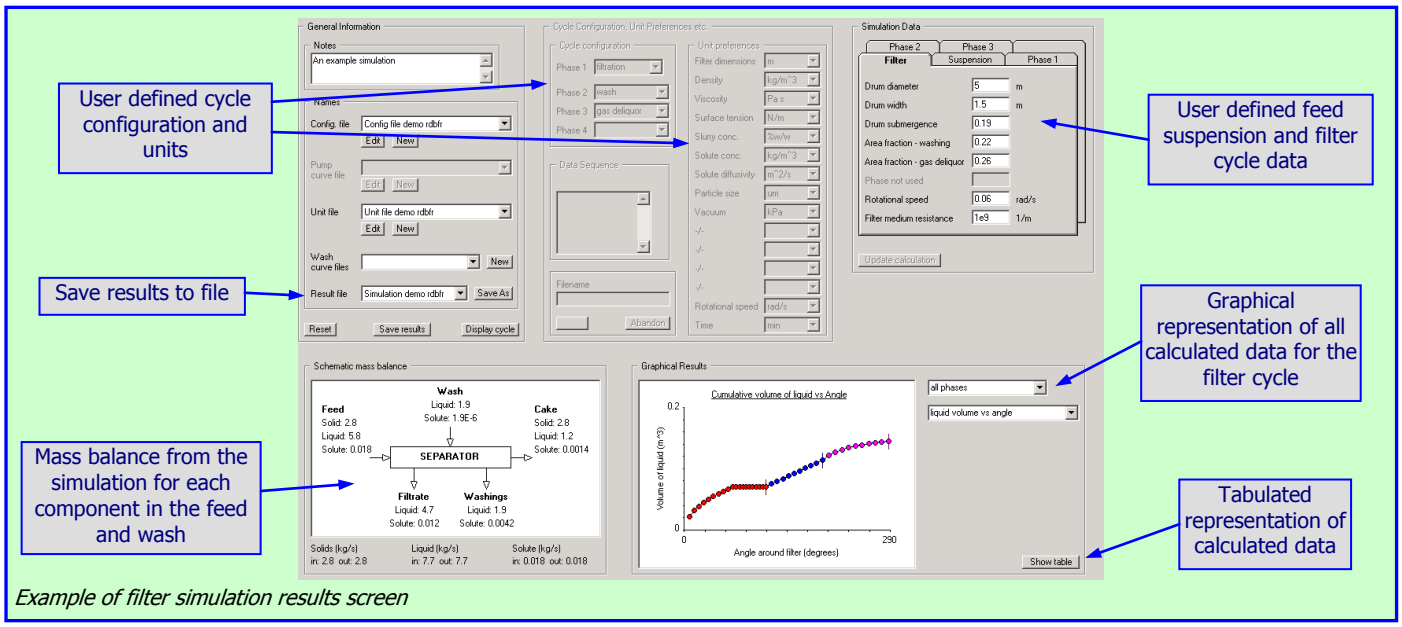
FDS deals with this situation in two ways. Firstly, when the input data are entered they are checked as far as is possible and if FDS suspects that the data may be incorrect it warns the user or does not accept the data. In many cases FDS displays a range of acceptable values for the data as a guide to what is realistic. Secondly, the calculation sequences within FDS are hierarchical. Depending on which data are missing, a sequence of assumptions are made in order to carry out the calculation. After an assumption has been made, a warning may appear against item(s) of output data on the results screen.

Key features of the Data Analysis Module include:

- Analysis of constant pressure filtration test data
- Analysis of jar test sedimentation data
- Analysis of piston press or consolidation data
- Checking of input data to protect against possible incorrect data entry
- Interactive graphical presentation of data to enable the user to input interpretations of the measured data
- Output data in graphical or tabulated format
- All data required for process design, simulation and scale-up (and much more) are output
- Data from several analyses can be compared and correlated.

SIMULATION MODULES

Two simulation modules are available – the *Vacuum Filter Simulation Module* and the *Pressure Filter Simulation Module*. These provide the calculation sequences for 10 types of vacuum filters and 11 types of pressure filters.



Example of filter simulation results screen

The first step in a simulation is to gather and input the necessary data. This requires the filter cycle – the combination of the cake formation, cake washing and cake deliquoring stages – to be defined. FDS allows for more than one washing or deliquoring in a cycle. Each stage requires its own sets of input data – which can be in the units preferred by the user.

Key features of the Simulation Modules include:

- Input of process data for the feed suspension, filter cake and filter type
- Prevention of impractical stages on particular designs of filters – (such as cake washing on a rotary disc filter)
- Simulation of different modes of cake formation (in practice this depends on the type/method of pumping the feed to the filter) – constant pressure, constant flow and variable pressure/variable flow
- Simulation of compression filtration
- Simulation of cake post-treatment processes (cake washing and cake deliquoring)
- Options to over-ride default washing and deliquoring models with experimentally measured data
- Checking of input data for its reasonableness (FDS offers a range of numerical values for the data to guide the user as to what is realistic)
- Where possible the simulation calculation sequences within FDS are hierarchical - depending on which data are missing, a sequence of assumptions are made in order to carry out the calculation
- FDS takes account of practical constraints (for example, the minimum cake thickness that can be discharged from the particular filter design) that affect the operation of the filter type
- Graphical or tabulated output of results
- On screen display of a process mass balance, indicating the input/output amounts of the solid, the liquid, and the dissolved component that is monitored during cake washing
- Results from the simulation can be saved on disk for later recall and viewing in spreadsheets.

COMPUTER REQUIREMENTS and UPDATES

FDS is supplied as a CD and will run on any personal computer operating under Windows. FDS requires 75 MB of hard disk space.

ORDER FORM

To: Filtration Solutions, 6 McCarthy Close, Whitwick, Leics, LE67 5HN, UK.
(Fax: +44 (0)1530 382038 email: filtsol@virginmedia.com)

Please supply the following:

	Number of copies	Price per copy	Total
Selection module and equipment catalogue		£450	
Data analysis module		£150	
Vacuum filter simulation module		£350	
Pressure filter simulation module		£350	
TOTAL	-	-	

All prices are in Pounds Sterling and include postage and packing.
The following discounts will be applied when more than one module is purchased on any one order:
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