PSE is a leading worldwide provider of Advanced Process Modelling tools and expertise for model-based engineering.

ADVANCED PROCESS MODELLING FOR SOLIDS PROCESSES

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The Advanced Process Modelling company

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ADVANCED PROCESS MODELLING FOR SOLIDS PROCESSES

Many solids processes fail to reach more than 60% of design capacity and require 10x longer to start up than those involving only gas-liquid streams. They are also very capital and energy-intensive.

Businesses use gSOLIDS® advanced process models, validated against lab or plant data, to make better, faster and safer design and operating decisions for their solids processes.

gSOLIDS is developed in close co-operation with lead users in the pharma, chemicals and food industries to combine the power of advanced process modelling with a user-friendly interface for scientists and engineers.

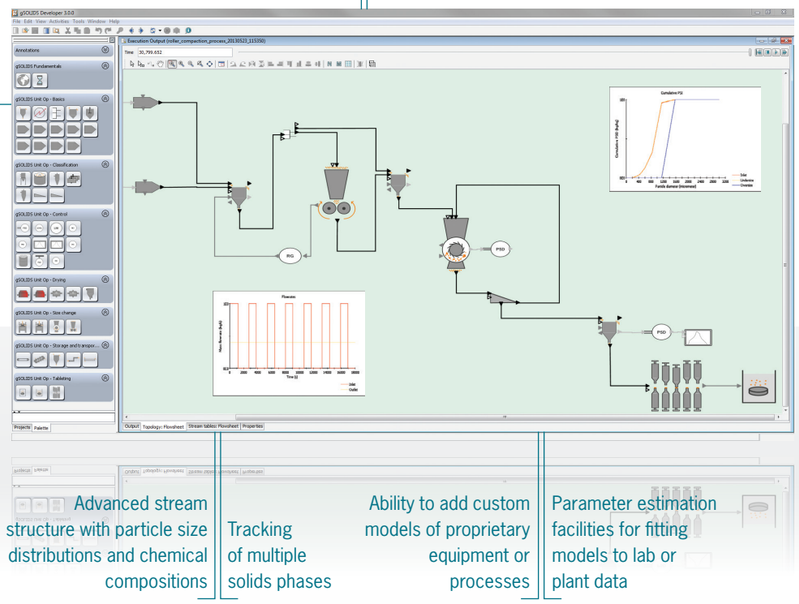
gSOLIDS is built on PSE's powerful gPROMS® platform.
Options include:

- gCRYSTAL®
- Hybrid Multizonal CFD interface for equipment scale-up studies
- gO:RUN for execution via MS Excel, web or other custom interface
- gO:CAPE-OPEN for execution within CAPE-OPEN compliant flowsheeting environments

Steady state and dynamic simulation and optimisation

Drag-and-drop flowsheeting

Library of common unit operations for solids processes



Advanced stream structure with particle size distributions and chemical compositions

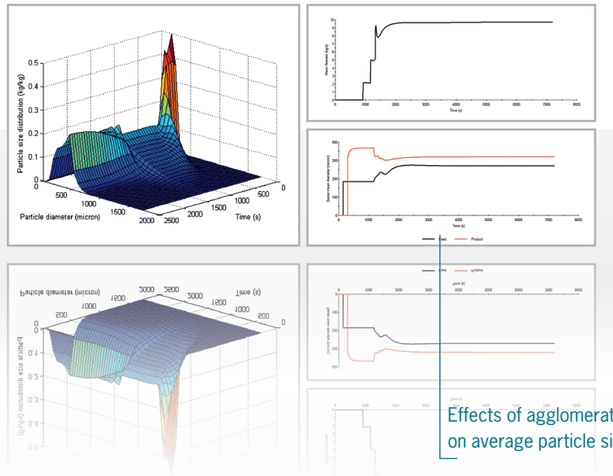
Tracking of multiple solids phases

Ability to add custom models of proprietary equipment or processes

Parameter estimation facilities for fitting models to lab or plant data

Particle size distribution during startup

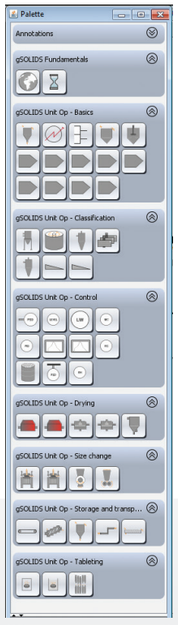
Production rate



Effects of agglomeration on average particle size

Unit operations

Basics
- Feeder
- Heater
- Junction
- Mixing tank
- Reactor
- Sink (vapour, liquid, solids)
- Source (vapour, liquid, solids)



Classification
- Baghouse
- Centrifuge
- Cyclone
- Electrostatic precipitator
- Hydrocyclone
- Screen (steady state, dynamic)

Control
- Holdup sensor
- Level control
- LIW control
- Moisture content sensor
- PID Controller
- PSD comparison
- PSD monitor
- Roll gap control
- Sieve analyser
- Stream sensor
- Vapour analyser

Drying
- Dryer
- Dryer agglomerator
- Fluid bed dryer
- Fluid bed dryer agglomerator
- Spray dryer

Size change
- Agglomerator
- Agglomerator with breakage
- Mill
- Roller compactor

Storage & transportation
- Belt conveyor
- Bucket conveyor
- Hopper
- Pneumatic conveyor
- Screw conveyor

Tableting
- Tablet coater
- Tablet dissolver
- Tablet press

APPLICATIONS & BENEFITS

Extract better information from fewer experiments
Use gSOLIDS' integrated model validation capabilities to estimate model parameters and their accuracy (confidence intervals) from one or more steady-state or dynamic experiments.

Quantify the risk associated with imperfect knowledge of your process
In practice you will never have full knowledge of a process as neither models nor measurements are perfect. gSOLIDS allows you to understand how imperfect process knowledge, captured by the parameters' confidence intervals, translates to uncertainty in model predictions for process optimisation and scale-up.

Design information rich experiments
Sometimes the business risk associated with uncertainty in model predictions is considered too large and additional experimentation is required to reduce the uncertainty. With gSOLIDS you can design a minimal programme of experiments required to obtain sufficient parameter accuracy.

Robust and efficient batch processes
Reduce batch-to-batch variability by designing robust recipes that ensure high asset utilisation and on-spec product quality (PSD and composition). gSOLIDS can simultaneously consider decision variables related to equipment design as well as the operation of that equipment.

Batch to continuous
Transfer your manufacturing process from batch to continuous operation without having to change your R&D set-up and techniques. Use gSOLIDS to capture knowledge from lab-scale batch experiments and apply that knowledge to the optimal design and operation of a continuous, manufacturing scale process.

Flexible and reliable continuous processes
Use gSOLIDS' steady-state and dynamic optimisation capabilities to determine the optimum configuration in terms of type and size of equipment, recycle structures, optimal operating conditions as well as start-up and shutdown procedures. This approach results in an economically optimal process subject to product quality, operability and safety constraints.

SCOPE

gSOLIDS delivers a step-increase in capability to engineers and scientists responsible for the design and operation of industrial solids processes.

- full steady-state and dynamic modelling
- ability to robustly handle large numbers of recycles
- rigorous optimisation taking into account many flowsheet and equipment design variables simultaneously
- estimation of kinetic parameters using multiple data sets simultaneously
- intuitive handling of complex operating procedures for batch and semi-continuous processes
- connection with existing proprietary models
- custom modelling facilities to develop new models
- upstream integration with gCRYSTAL and gas-liquid process models for integrated design.