IDEAS™ Product Catalog

ENGINEERED SUCCESS

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IDEAS LIBRARIES AND OBJECTS

IDEAS is an industry-leading process simulator for the global kraft pulp and paper, mineral processing, oil sands operations, potash operations, and power industry. It offers powerful steady-state and dynamic modeling capabilities as a complete package for all your simulation needs.

Products	Description
IDEAS Bronze	Steady-State Package
IDEAS Silver	Steady-State + Tanks and Control Dynamics
IDEAS Gold	Fully Dynamic Package
Industry-specific Add-on • Pulp Mill-B • Mineral Processing-B • Power- B	 - Modeling of Pulp and Paper Process - Modeling of Mineral Processing Plants - Modeling of Coal & Gas-fired Power Plants

The above-mentioned base packages have the following libraries as a part of each product.

Library	Bronze	Silver	Gold
Dynamic Data Exchange	✓	✓	✓
Executives	✓	✓	✓
Financial	✓	✓	✓
Logic	✓	✓	✓
Macro Primitives	✓	✓	✓
Macro Unit Ops	✓	✓	✓
Material Properties	✓	✓	✓
Math Tools	✓	✓	✓
Optimization	✓	✓	✓
Plotters	✓	✓	✓
Tools	✓	✓	✓
Tools_Utilities	✓	✓	✓
Transmitters	✓	✓	✓
Analog Controls	×	✓	✓
Identification & Tune	×	✓	✓

Library	Bronze	Silver	Gold
PLC	×	✓	✓
Tanks Dynamic	×	✓	✓
Transfer Function	×	✓	✓
Heat Exchangers	×	×	✓
Nodes	×	×	✓
Pipes & Valves	×	×	✓
Pumps & Compressors	×	×	✓

BASE PRODUCTS

The following pages list the objects that are included in all the libraries of the IDEAS **Bronze**, **Silver**, and **Gold** base products:

Analog Controls
- Calibrator
- Controller On/Off
- Controller PID
- Electric Actuator
- Lead/Lag Filter
- First Order Low Pass Filter
- Pneumatic Positioner
- Ramper
- Rate
- Scalar Delay
- Smith Predictor
- Stiction Predictor
- Stiction/Backlash
- Transport Delay

Dynamic Data Exchange
- DDE Variable Connector
- DDECalc
- DDECommand
- DDEDialog
- DDEMultiConnector
- DDEReceive
- DDEScalar
- DDESend
- Dialog Box Data Exporter
- Scenario Importer
- Stream Exporter

Executives
- Discrete/Cont. Executive
- Display Errors
- Display Manager
- Global Unit Selector
- SOLVER-FLUID FLOW
- Snapshot
- Stream Color
- Stream Number
- Stream Number Center

Financial
- Cost Splitter
- Energy Cost
- Energy Cost Accumulator
- Manpower Cost
- Manpower Cost Accumulator
- Material Cost
- Material Cost Accumulator
- Operating Cost Delta
- System Cost Accumulator
- Transmitter

Heat Exchangers
- HX Fitter
- HeatX-Condensing Left
- HeatX-Condensing Right
- HeatX-Shell&Tube
- Heater Co-Curr.-Left
- Heater Co-Curr.-Right
- Heater Counter-Curr.-Left
- Heater Counter-Curr.-Right
- Heater/Boiling
- Heater/Condensing
- Pipe-w/HExch(M)
- Pipe-w/Heat Exchange

Logic
- And - 2 Inputs
- And - 3 Inputs
- And - 4 Inputs
- And - 5 Inputs
- And - 6 Inputs
- Counter Up/Down
- DCS - Auto/Manual Switch
- DCS - Digital Output
- DCS - Digital Output (L)
- DCS - Indicator
- DCS - Start PB
- DCS - Start/Stop Switch
- DCS - Stop PB
- DCS - User-Defined PB
- Equal
- Field - Auto/Manual Switch
- Field - Digital Input
- Field - Digital Input (L)
- Field - Digital Output
- Field - Digital Output (L)
- Field - Start PB
- Field - Start/Stop Switch
- Field - Stop PB
- Field - User-Defined PB
- First Out
- Greater Than
- High-Low Limit
- Less Than
- Not
- Or - 2 Inputs
- Or - 3 Inputs
- Or - 4 Inputs
- Or - 5 Inputs
- Or - 6 Inputs
- Set/Reset
- Timer - Off Delay
- Timer - On Delay
- Timer - Retentive
- Timer - Timing
- Transitional - Negative
- Transitional - Positive

Macro Primitives
- Flow Max

Flow Set
Header
Mixer
Monitor
Output Doubler
Phase Separator
Pressure Drop
Pressure Set
Separator
Separator2
Splitter
Stream M x N
Stream Selector-1x2
Stream Selector-2x1
Supervisor
Macro Unit Ops
Condenser
Conveyor-Constant Speed
Cooling Tower
Distillation Tray
Distributor
Equilibrium Reactor
Evaporator
Flash
Fluid Mover
HX Unit
HX Unit w_Zones
Heater
Reactor RX
Stream Delay Time
Tank
Turbine
Material Properties
Breakage Curve Fitter
Bulk Density Assign
Component Property
Element Selector150
Froth Density Assign
MP 1 Variable Curve Fitter
MP 2 Variable Curve Fitter

MP Assembler
MP Converter++
MPArray_Test
Material Properties
PSD Assign
PSD Data
PSD Shifter
Sink
Stream Source
Nodes
Node N/M
Node Separator
Node-1 in-1 out
Node-1 in-2 out
Node-1 in-3 out
Node-2 in-1 out
Node-2 in-2 out
Node-2 in-3 out
Node-3 in-1 out
Node-3 in-2 out
Node-3 in-3 out
Node-MP Converter
Phase Mixer
Optimization
Advanced Optimizer
Case Study Manager
Evolutionary Optimizer
Grid Search
Simulated Annealing
Pipes & Valves
Duct with Damper
PRV
PVRV
Pipe
Pipe-Delay
Pipe-Desuperheater
Pipe-Wall Temp
Pipe-w/Shutoff
Pipe-wReactions

Restriction Orifice
Valve-Control
Valve-Control/Shutoff
Valve-Isolating
PLC
ADD-PLC
AFI
AND
CTD
CTU
DIV
EQU
End
GEQ
GRT
Join L
Join T
Join TT
LEQ
LES
MOV
MUL
NEG
NEQ
NOT
ONS
OR
OTE
OTL
OTU
PLC Controller
PLC Input
PLC Output
PowerRail
Pushbutton - N.C.
Pushbutton - N.O.
RES
RTO
SQR
SUB
Split L

Split T
Split TT
TOF
TON
TRUE
XIC
XIO
XOR
Plotters
Plotter, I/O-Scan
Plotter++, I/O Scan
Plotter, MultiSim-Scan
Plotter, Scatter (4)-Scan
Plotter, Scatter-Scan
Plotter, Worm
Plotter, Bar Chart
Pumps & Compressors
Compressor-Centrifugal
Compressor-Reciprocating
Gas Mover-Centrifugal
Motor Drive
Pump Centrifugal w/Motor
Pump Curve Fitter
Pump-Reciprocating
Pump-Rotary
Thermocompressor
Tanks Dynamic
Decanter w/Weir
Decanter w/Weir++
Outlet Multiplier
Tank w/Reactions
Tank-Accumulator
Tank-Incompressible
Tank-Multiphase Sphere
Tank-Multiphase-Horiz.
Tank-Multiphase-Horiz. 4/4
Tank-Multiphase-Vert.
Tank-Multiphase-Vert. 4/4
Tank-Plug Flow2

Tools
Add_c
Array to Scalar
Constant_c
Conversion Table_c
Data Collection
Divide_c
Equation++
Equation_c
ExcelConnect
External Code Interface
Global Mass Balance
H-M&E Balance
Input Data_c
Input Function_c
Input Select
Input Validation Block
Integrator
InterModel Communicator
Intersection Finder
Max Value
Max2_c
Min Value
Moving Average
Multiple Scalars 10
Multiple Scalars 10-Out
Multiply_c
Noise Generator
Output Select
PSD Balance Checker
Scalar Reader
Scalars to Array
Selector
Sequencer
Sequencer Input
Set Pop-up Menu
Slider
Stream Initializer
Subtract_c
Switch

Tools_Utilities
Block Opener
Convergence-Transmitter
Converger-LR
Converger-UL
Count Blocks
DBD Exchange
Data Tracker++
Dialog Box Saver
Dialog Variable Transmitter
Diameter Set
Event Log
F&D Reader
Find Global BN
General Curve Fitter
Graph Digitizer
H Animate Level
H Animate Number
H Animate Status
H Lock
HBlock Help
Hierarchy Opener
LED Indicator
Level Animation
Max/Min Alarm
Model Compare
Model Protection
Navigator
Stream Number Corrector
Text Jump
User Message
Worksheet Breakpoint
Worksheet Inspector
Transmitters
Capacitance Probe
Display M&M Grid
Display M&M Grid Legend
Display Master
Display Stream
Display-S P&P

Display-S S&P	Transmitter-DP	Transmitter-Partial Pressure
Flowsheet Table	Transmitter-Density	Transmitter-Phase Flow
Stream Analyzer	Transmitter-Digester Property	Transmitter-Pressure
Stream Reference	Transmitter-Element Content	Transmitter-Solids
Transmitter-Alkali	Transmitter-Element Flow	Transmitter-Surface Tension
Transmitter-Approx pH	Transmitter-Enthalpy	Transmitter-Temperature
Transmitter-Approx_Conductivity	Transmitter-Entropy	Transmitter-Velocity
Transmitter-Component	Transmitter-Flow	Transmitter-Viscosity
Transmitter-Component Flow	Transmitter-Humidity	Universal Transmitter
Transmitter-Cp	Transmitter-Kappa	Worksheet Data
	Transmitter-PSD	

INDUSTRY-SPECIFIC ADD-ON PRODUCTS

Pulp Mill - B Library	Modeling of Pulp and Paper Process
Bleach Tower Steady State	The **Bleach Tower Steady State** object is used to simulate the steady-state operation of a variety of pulp mill bleach tower stages.
Causticizer	The **Causticizer** object is a Macro object that simulates the operation of a causticizing tank in the chemical recovery area of a pulp mill.
Charge	The **Charge** object is a Macro utility object that can be used to charge the required amount of cooking chemicals (from white liquor and dilution water from black liquor streams) to achieve the desired pulping conditions in the feed stream
Clarifier	The **Clarifier** object is a Macro object that simulates the operation of a liquid clarifier, such as a green liquor clarifier or a white liquor clarifier, in a pulp mill.
Cyclone - 1 stage	The macro **Cyclone** objects are to simulate the operation of cyclone pulp cleaners.
Cyclone - 2 stage	The Cyclone - 2 Stage object is a combination of two (2) Cyclone - 1 Stage objects. In this object, the Accept stream from the second stage is recycled and mixed into the feed of the first stage.
Cyclone - Reverse	The **Reverse Cyclone** object can be used to simulate reverse cyclones where lightweight contaminants (such as plastics) are removed from the top of the cyclone.
Digester - Batch	The **Digester - Batch** Macro object can be used to do calculations and stream component conversions from wood components to dissolved solids in liquor.
Gas Scrubber	The **Gas Scrubber** object is a Macro object that selectively scrubs a few components of an incoming gas stream with a liquid stream. Stage efficiencies for each component being scrubbed, and the total effective number of stages, are specified by the user.
Lime Kiln	The **Lime Kiln** object is a Macro object that can be used to simulate the operation of a lime kiln in the chemical recovery area. The lime kiln is usually used in a pulp mill to convert CaCO3 to CaO by incineration. The resulting re-burnt lime (CaO) can be used as the input lime for slaking. The reaction in a lime kiln is accomplished by burning large quantities of fuel and air along with lime mud from the mud filter.
Mud Filter	The **Mud Filter** object is a Macro object that is used to simulate the operation of a drum mud filter in the chemical recovery area of a pulp mill.
Nelson Efficiencies	The **Nelson Efficiencies** object is a Macro object that can be used to set the separation efficiency parameters for Separators. This object will calculate the separation efficiencies for each solid component in the stream using user-supplied Q values and the Nelson screening equations.
Precipitator	The **Precipitator** object is a Macro object that can be used to simulate the operation of an electrostatic precipitator in the chemical recovery area. The collection efficiency can either be specified through the dialog box or the scalar connector Eff. The Eff connector value overrides the dialog box value.
Press M	The **Press M** object is a Macro object that can be used to simulate a process where a stream, containing a mixture of solids and liquids, is thickened by removing part of the liquid.
Recovery Boiler	The **Recovery Boiler** object is a Macro object that can be used to simulate the operation of a recovery boiler. Recovery boilers are used in pulp mills to recover spent cooking chemicals and

Pulp Mill - B Library	Modeling of Pulp and Paper Process
	energy from the organics present in the black liquor.
Refiner	The **Refiner** object is a Macro object that simulates the operation of a disk refiner in the paper machine area. With minor modification of some default parameters, it can also be used to simulate the operation of valley beaters.
Screen – 1 Stage	The **Screen – 1 Stage** object can be used to simulate the operation of pulp screens cleaners. The separation efficiencies for the solid components are calculated based on Nelson efficiency parameters.
Screen – 2 Stage	The **Screen - 2 Stage** object is a combination of two **Screen - 1 Stage** objects. In this object, the **Accepts** streams from the second stage are recycled and mixed into the feed of the first stage.
Slaker	The **Slaker** object is a Macro object that can be used to simulate the operation of a slaker tank in the chemical recovery area of a pulp mill. The object accepts green liquor and lime inputs.
Smelt Diss. Tank	The **Smelt Diss. Tank** object is a Macro object that simulates the operation of a smelt-dissolving tank in the chemical recovery area.
Steady-State Digester	The **Steady-State Digester** object is a Macro object to model the continuous cooking process. It represents the sections of the digester vessel, including the top separation, impregnation, cooking, recirculation, extraction and washing zones. Each section has multiple chip and liquor zones to simulate the cooking process, with user-defined reaction, heat, and mass transfer rates.
Washer	The **Washer** object is a Macro object that can be used to simulate the operation of a drum washer.
Washer – Split 2	The **Washer – Split 2** object is a Macro object that can be used to simulate the operation of a drum washer with 2 split inlet.
Washer Calc	The **Washer Calc** object is a Macro object that can be used to calculate performance indicators and soda loss for a series of washers in any configuration.

Paper Machine-B	Modeling of Pulp and Paper Process
Calender BR	The **Calender** object affects the sheet apparent density and E-modulus (MD and CD) through empirical processing equations that are entered directly into the object's script.
Couch Roll BR	The **Couch Roll** object predicts the mat consistency profile along the circumference of the couch roll as a function of the applied vacuum, inlet mat consistency, wire speed, and the fiber retention
Foil/Vacuum Foil BR	The **Foil/Vacuum Foil BR** object represents the vacuum box section of a paper machine. The objective is to dewater the mat by the application of a vacuum across the mat. The dewatering rate is calculated using the Kozeny-Carman equation, which represents laminar flow through a bed of solids.
Headbox BR	The function of the **Headbox BR** is to deliver a thin jet of dilute stock (<1%) onto the wire while also controlling its pressure, consistency, and temperature. In many modern headboxes; dilution water is added directly to the stock under dry end basis weight control.

Paper Machine-B	Modeling of Pulp and Paper Process
Press BR	The **Press BR** object is based on second-order, empirical equations for dewatering, apparent density and E-modulus.
Refiner BR	The **Refiner BR** is a macro object that simulates the operation of a disk or conical refiner in the paper machine area. This object computes an expected reduction in freeness, Canadian Standard and Shopper-Riegler, and the expected generation of fines.
Shower BR-Left	The **Shower BR-Left (H-block)** object represents the shower section of a paper machine. The objective of the shower is to remove the fibers stuck to the wire.
Shower BR-Right	The **Shower BR-Right (H-block)** object represents the shower section of a paper machine. The objective of the shower is to remove the fibers stuck to the wire.
Steam Dryer BR	The **Steam Dryer BR** simulates the operation of one set of paper m/c dryers. The heat transfer to the paper and the drying of paper is calculated. The build-up of heat in the dryer cans is also calculated.
Transmitter-Basis Weight	The **Transmitter - Basis Weight** object displays the basis weight of a given stream.
Twin Wire Former BR	The **Twin Wire Former BR** represents the twin wire former section of a paper machine. The objective of the twin wire former object is to represent mat formation through the dewatering of the incoming slurry from the head box.
Vacuum Box BR	The **Vacuum Box BR** simulates the working of the vacuum box section of a paper machine. The objective of the vacuum box is to dewater the mat by the application of a vacuum across the mat.
Vacuum Box w/Hood BR	The **Vacuum Box w/Hood BR** object represents the vacuum box with steam hood section of a paper machine. The objective of the vacuum box is to dewater the mat by the application of a vacuum across the mat.

Mineral Processing - B Library	Modeling of Mining Process
AG/SAG Mill	The **AG/SAG Mill** object is used to simulate the steady-state operation of autogenous or semi-autogenous grinding equipment in mineral processing plants.
Ball Mill	The **Ball Mill** object is used to simulate the steady-state operation of the ball mill grinding equipment in mineral processing plants.
Belt Filter	The **Belt Filter** H-Block has been modeled assuming a five-stage process: a formation zone, 3 wash zones, and a drying zone. Each zone is modeled using the Filter object. Display and input items have been cloned out of the respective stages for an easy overview. Users are free to manipulate the hierarchal object or the display to suit their individual needs.
Carbon In Column/Leach/Pulp	**Carbon in Column/Leach/Pulp** object models the adsorption of a metal-bearing ion on the ion-exchange site of an activated charcoal surface when it comes into physical contact with metal-laden aqueous solution.
Centrifuge	The **Centrifuge** object represents a dewatering process where the liquid phase is separated from the solids to achieve the required solids concentrations in the cake and in the centrate.
CIP Calculations	The **CIP Cal** (**Carbon in Column/Leach/Pulp Calculation**) object is used to calculate the organic matter phase and aqueous phase separation efficiencies for the **Carbon in Column/Leach/Pulp** object based on the organic matter and aqueous flow, carbon loss in aqueous phase, and the moisture of the organic matter phase leaving the object.
Crusher	**Crusher** object models a basic comminution operation in which the particle size distribution of the feed stream is reduced while conserving mass.
Crystallizer	The **Crystallizer** object is used to simulate the precipitation of solids dissolved in the inlet stream's liquid phase. The object computes the temperature of the system and the compositions of the overhead vapor and product stream, which contains the precipitated solid and the remainder of the liquid phase.
Dissolver	In crystallization processes, there are operations where a sub-saturated solution will be in contact with soluble solids (crystals) and some of the crystals dissolve to create a saturated solution. These types of operations can be modeled using the **Dissolver** object. The **Dissolver** is a Macro type object, i.e., it does not have any volume. The object accepts the inlet flow containing solvent and soluble solids (crystals) and performs the solubility calculations based on the stream's composition and temperature.
Drier-MP	The **Drier-MP** object is used to calculate the flow rate of hot, dry gas required to reduce the moisture content in the object's feed stream to a predefined level.
Electrowinning	The **Electrowinning** object calculates the operating temperature and the metal production rate as well as the conversion of the chemical reaction and the power consumption. These metrics are computed using several user-supplied parameters which will be described in detail in the input parameters overview.

Mineral Processing - B Library	Modeling of Mining Process
EW-Calculations	The **EW-Calculations** object is used to calculate the reaction conversion and the electrical energy for the **Electrowinning** object based on the current density, current efficiency, number of cells, cell voltage, number of cathodes per cell, cathode side surface area, mole flow rate of the salt compound, coefficient of metal element in salt compound, and the number of electrons per mole of salt compound.
Feeders	The **Feeders** object represents a mechanical device that defines flow rates of solids in ore processing plants.
Filter	The **Filter** object represents the filtering and washing operations where an incoming slurry containing solids in an aqueous solution is separated into filtrate and cake (solids rich) streams. A wash solution is used to displace incoming liquor that may be present in the cake.
Flotation	The **Flotation** object calculates the slurry residence time and applies the first order kinetics formula to calculate the recoveries of individual stream components into the froth.
Flotation Column	The **Flotation Column** object performs identical functionality as the **Flotation** object in this library.
Flotation Kinetics Fitter	The **Flotation Kinetics Fitter** object is used to calculate Rmax and k coefficients for the flotation kinetics model used in the Flotation and Flotation Column objects. The object allows comparing experimental data with model predictions of the recoveries for different “k” values.
Gas Cleaner	The **Gas Cleaner** (Object Choices: ESP (Electrostatic Precipitator) or Gas Cyclone) objects represent the solids rejection from a gas stream.
Gas Scrubber	The **Gas Scrubber** object is used to model the removal of contaminants from a multi-component vapor stream using a liquid that reacts with the contaminant and thus reduces the amount of undesired compounds in the vapor phase.
Gravity Separator	The **Gravity Separator** object is used to separate incoming slurry (water + solids) into a concentrate and tailings based on the user specification for the two outlet streams.
Heavy Media Separator	The **Heavy Media Separator** object is used to separate the incoming feed into Accepts and Rejects streams based on the user specified washability curves. The most common application of the object is for washing coal, though various other applications are also possible (e.g., Recycling).
HPGR-MP	The **High Pressure Grinding Rolls** (**HPGR-MP**) object has the same functionality as the **Crusher** objects described above. However, HPGR is offered as a separate object due to its unique role in mineral processing flow sheets.
Hydrocyclone Plitt	The **Hydrocyclone** object classifies the solids portion of the feed, which is assumed to enter the object with a defined PSD. The object predicts the pressure drop across the cyclone as a function of feed conditions (flow rate, solids compositions, etc.), the number of cyclones, and the geometry.
Hydrocyclone SR	The **Hydrocyclone SR** (Separation Ratios) object represents a simplified hydrocyclone separation process. Instead of calculating how the feed stream components will be separated based on the hydrocyclone geometry and the feed flow rate and PSD, the splits

Mineral Processing - B Library	Modeling of Mining Process
	of liquids are defined by the user and the solids splits are either defined or are calculated in the object from the separation function.
Macro Crusher	**Macro Crusher** object models a basic comminution operation in which the particle size distribution of the feed stream is reduced to a new size according to the user-defined P80, while conserving mass. Some small shifting in the output PSD is possible via the S connector to simulate the effect of variations in the operating conditions. The object calculates the power required to accomplish the particle size reduction from F80 to P80.
Magnetic Separator	The **Magnetic Separator** object is used to separate incoming slurry (water + solids) into a concentrate and tailings based on the user specification for the two outlet streams.
Mills	The **Mill** object models a basic comminution operation in which the particle size distribution of the feed stream is reduced to a new size according to a user-defined P80 while conserving mass. With a small shift in the P50, it is possible to simulate the effect variation in the operating conditions such as ore hardness, ball charge, liner conditions, etc. The object calculates the power consumption required to accomplish the reduction in the solid's d80.
Mineral Concentrator	The **Mineral Concentrator** object is used to separate incoming slurry (water + solids) into a concentrate and tailings based on the user specification for the two outlet streams.
Preheater	The **Preheater** object is used to heat an incoming slurry or solution with recovered steam. This object first mixes the feed and the recycled steam and then vents the excess steam. The object computes the outlet temperature of the slurry based on the steam flow rate and steam inlet temperature.
Pressure Acid Leach Autoclave	Autoclaves are pressure vessels where ore is reacted with acid at high pressures in order to extract the desired metal (e.g., nickel). The **Pressure Acid Leach Autoclave** object simulates the high-pressure reaction and gas separation. The object requires the user to provide the chemical reactions and the operating pressure for the reactor.
Screen	The **Screen** object models a process in which the solids in the feed stream are separated into the Oversize (O/S) stream and the Undersize (U/S) stream. The split ratio is governed by the relationship between the feed rate and PSD and the properties of the screen. The object can represent both dry and wet screening operations.
Single Compartment Autoclave	The **Single Compartment Autoclave** object is used when the intermediate reactions and additions of reagents, air, cooling water, and steam are not of interest to the user and the autoclave unit can be analyzed as a whole. This object consists of one reactor together with mixers and a gas phase separator.
Solvent Extraction	The **Solvent Extraction** object selects and transfers metal ions from an impure aqueous phase via an organic phase to a second pure aqueous phase from which the metal of value can be recovered by other processes such as electrowinning, crystallization, and precipitation.
Spiral Classifier	The **Spiral Classifier** object splits the solids in the feed according to their Particle Size Distribution (PSD) according to the predefined classification curve. The liquid phase is separated from the solids to achieve the required solids concentrations in the overflow and in the rejected solids stream.

Mineral Processing - B Library	Modeling of Mining Process
Spiral Separator	The **Spiral Separator** object is used to separate incoming slurry (water + solids) into a concentrate and tailings based on the user specification for the two outlet streams.
Stirred Media Mill	The **Stirred Media Mill** steady-state object is used to simulate the steady-state operation of basic comminution in mineral processing plants.
SX Calculations	The **SX Calculations** (Solvent Extraction) object is used to calculate the organic phase and aqueous phase separation efficiencies.
SX Unit	The **SX Unit** object is used to model the extraction of a metal compound from an impure aqueous phase via an organic phase to a second pure aqueous phase from which the metal of value can be recovered by other processes such as electrowinning, crystallization, and precipitation.
Thickener	The **Thickener** object is used to model the use of a wash solution to divide the components of an incoming slurry into the overflow and the underflow (solids rich) outlets given the solids contents in the respective streams.
Tower Mill	The **Tower Mill** steady-state object is used to simulate the steady-state operation of basic comminution in mineral processing plants.

Power - B Library	Modeling of Power Plants
Boiler	The **Boiler** object simulates the operation of either a boiler changing a liquid to a vapor or a superheater adding heat to a vapor. The object calculates the amount of heat generated by burning input fuels and determines the increase in the enthalpy of the inlet stream. The object also calculates the properties of steam at the outlet with respect to the outlet pressure and the amount of heat generated per unit mass of the inlet stream.
Combustion Turbine	The **Combustion Turbine** object represents a steady- state (Macro) turbo-generator or turbo drive. The object combines a compressor, a combustion chamber and gas turbine functionality in one unit.
Desuperheater	The **Desuperheater** object is used to bring a superheated steam/vapor stream to saturation conditions by quenching with cold water.
Gas Turbine	The **Gas Turbine** object represents a steady-state single stage turbo-generator or turbo drive. It can be configured as either a “conventional turbine” or a “demand turbine.” The conventional turbine accepts the hot gas as defined by the upstream object and calculates the amount of energy produced.
Macro Burner	The **Macro Burner** object simulates the operation of combustion equipment burning solid fuel (coal), liquid fuel (oil fuel), or gas fuel (natural gas). The object calculates the adiabatic outlet temperature assuming that complete combustion occurred and determines the flue gas compositions at the outlet.
Power Boiler	The **Power Boiler** object simulates the operation of a boiler changing a liquid to a vapor through three key components: the economizer, drum, and superheater. The object calculates the amount of heat required by heating the inlet stream (water) to a superheated vapor (steam). The object also calculates the properties of steam at the outlet with respect to the outlet pressure and temperature.

Power - B Library	Modeling of Power Plants
Steam Deaerator	The **Deaerator** object is used to combine multiple inlet flows plus one steam flow into one outlet flow at saturation condition.
Steam Distributor	The **Steam Distributor** object is used to split a single stream into six (6) flows to provide greater flexibility when building a model.
Steam Header	The **Steam Header** object is a Macro object that can be used to simulate the operation of **Steam Header** pipes.
Turbine	The **Turbine** object is used to simulate a single stage turbo-generator (or can be connected in series to simulate a multistage turbo-generator as shown in Figure 2) for steam power applications or as a demand turbine (see Figure 3), which calculates the demand steam flow at given required power
Turbine - 2 Sections	The **Turbine - 2 Sections** macro object simulates the operation of 2-stage steam turbines in a power generating plant.
Turbine - 3 Sections	The **Turbine - 3 Sections** macro object simulates the operation of 3-stage steam turbines in a power generating plant.
Turbine Curve Fitter	The **Turbine Curve Fitter** object is used to define up to ten (10) throttle flow and exhaust sets of values and to calculate up to ten (10) efficiency values based on the throttle flow and exhaust enthalpy (h) values.