IDEAS Release Notes

IDEAS™ v6.0.0

Date issued: March 25, 2014
Revision No.: 1

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Introduction

This document contains Release Notes for the IDEAS Process Simulation Software package.

> All information in this document refers to IDEAS build number 6.0.0.995 produced by ANDRITZ Inc. on February 14, 2014.

Deliverables

This deliverable comprises:

- IDEAS Process Simulation Software
- IDEAS Process Simulation Software tutorials, examples, and user manual

Installation and Uninstallation

- To install the IDEAS software package, follow the installation instructions in the “IDEAS Installation Instructions” document. {R1}.
- To uninstall the IDEAS software package, follow the uninstallation instructions in the “IDEAS Installation Instructions” document {R1}.

IDEAS Platform Enhancements

New Stream Structure

- Unlimited number of components in the stream.
- Reduced RAM usage.
- Faster model opening, initialization and execution.

Multi-Core Processor Support

- Parallel computing option in Pressure-Flow network solver.

New Thermochemistry Library Interface

- Interface to high temperature thermodynamic package ChemSage, which can be used to predict phase equilibrium calculations in high temperature mining unit operations such as smelting.
- ChemSage (.dat and .cst) thermochemical data files are required for IDEAS ChemApp interface functionality. ChemSage .cst files can be generated using FactSage Equilib moduleChemApp. which provides calculation capabilities of the ChemSage Gibbs free energy minimizer. It consists of a rich set of subroutines, which provides all the necessary tools for the calculation of complex multicomponent, multiphase equilibrium, and the determination of associated thermodynamic properties of the system, its phases, and their constituents.
- Interface to VMG, OLI, HSC are available similar to the previous IDEAS version.
- All third party data files are now located in the <...\App Path\Component Records\Databanks> folder.

Worksheet Upgrade

- Worksheets saved with IDEAS v5.0.x can be opened in IDEAS v6.0.0 following the instructions provided in the document “Upgrading v500 worksheet to v600” {R2}. If upgrading v4 worksheets, the user will have to first upgrade the worksheet to v5.0.0 and then open it in v6.0.0.
- Snapshots from v5.0.x, with a few exceptions, are supported in this version of IDEAS as described later on in this document.

Developers Kit Object Upgrade

- Some function calls have been modified in this version of IDEAS. Follow instructions outlined in “IDEAS v600 Boundary Dev Kit Manual” {R3} and “IDEAS v600 PF Developers Kit Manual” {R4} to update the code and recompile v5.0.0 Boundary Developers Kit objects and PF Developers Kit objects, respectively.

Enhanced Worksheet Level Options

Pipe Fitting Resistance and Pipe Selection Tool

- Option to specify fittings (number and type of elbows, bends, etc.) for K-value estimation.
- Option to define Pipe Schedules instead of diameters.

Tyler Mesh Numbers for Particle Size Distribution Calculations

- Option to use Tyler Mesh numbers for defining particle sizes in objects with Particle Size Distribution handling capabilities.

Bulk Density in Solids Modeling

- Use of bulk density in streams with dry particulate solids.

Boiling Point Elevation

- Additional model to compute global BPE, which integrates molality of dissolved solids.

User Experience

- Database table (containing version details, block numbers, etc.) of all blocks used in the worksheet is created on opening a worksheet.
- Database table contains three previous states, which is helpful in restoring previous state data during troubleshooting, where state is a list of object versions used while opening a model.
- Faster model debugging: Double-click on the block number in a message window message to navigate to the block's dialog box.

User Assistance

- Comprehensive context-sensitive help documentation for objects in libraries.
- Updated IDEAS User Manual {R5}.
- New "IDEAS Steady State Mineral Processing Tutorial" {R6} and "IDEAS Dynamic Tutorial" {R7} for new users, and as references for existing users.

- Upgraded example models with descriptions (with a cross-reference list of objects and their related example models, for quick reference).

Rotating Icons

- All new IDEAS objects, and many existing objects, use the rotating icons feature. There are a reduced number of objects in some libraries (compared to previous IDEAS versions) since a single object (with rotating icon) now replaces multiple objects (with the same functionality but different icons).
- Conversion to the new icon structure is automatically carried out during the worksheet upgrade procedure.

New Libraries

Mineral Processing Library

This library replaces the Hydromet library in v5.0.0, and expands it by adding twelve (12) new “Bronze” level (steady-state) objects.

Crystallizers Library

This is a new, “Gold” level library with the following dynamic, high-fidelity objects:

Dissolver	The Dissolver accepts the inlet flow containing solvent and soluble solids (crystals) and performs the solubility calculations based on the stream’s composition and temperature. This is a Macro object.
Draft Tube Crystallizer	It provides a crystallizer configuration with a draft tube in the settling zone, running from the top of the compaction zone to the top of the settling zone.
Forced Circulation Crystallizer	This crystallizer object has a feature that allows recirculation of slurry containing crystals from the settling zone to the zone of supersaturated liquid for further growth.
Open Chamber Crystallizer	This crystallizer object has two chambers, one of which is maintained at vacuum, and the other chamber is open to atmosphere. The brine overflows from this second chamber.

Chemical Unit Ops Library

Mass and heat transfer processes involved in multiphase systems can be modeled using the objects in this library.

Feed/Side-draw Tray	This object is used for simulating a single distillation tray with feed and side draw ports. This object requires VMG thermodynamic package.
Tray Tower	Enriching / stripping sections can be simulated using this object. This object requires VMG thermodynamic package.
Distillation Column	A dynamic object used for simulating a complete distillation column. It simultaneously solves the feed, enriching and stripping sections.
Ion Exchange	A distributed system model of Ion Exchange, which accounts for the mass transfer effects of ionic species in the liquid and the reaction kinetics for ion and solid resin interaction.
Gas-Liquid contactor	A generic object used for simulating the gas-liquid mass transfer operations such as absorption and gas cooling.

Advanced Math Library

Applied mathematical formulations and numerical methods provided in this library serve as an advanced process analytic tool.

Kalman Filter	A linear algebra tool for predicting the state variables of a system based on the field measurements. The object operates recursively on streams of noisy input data to produce statistically optimal estimate of underlying system state. The Kalman Filter is a widely applied concept in time series analysis, in signal processing and econometrics, and can be used in Real-Time model-predictive systems.
4D Interpolation	This tool is used for interpolation among four variables constrained by two degrees of freedom.
Model Finder	This tool is used for searching the best fit model from a set of pre-defined models, in a least square manner. This object can be used in Real-Time model-predictive systems to automatically determine the best model for a data set.

Pyrometallurgy Library

This library consists of objects used for simulating the unit operations involved in high temperature pyrometallurgical and off-gas treatment plants.

Catalytic Converter	This object simulates the sulfur dioxide conversion reaction in a packed bed of catalyst and predicts the temperature of the system, accounting for the enthalpy of the exothermic reaction.
ChemApp Thermo Analyzer	Interface to ChemSage data files
Drying Tower	A gas–liquid contacting tower used for modeling the gas drying process.
Feed Bin	The feed storage and discharge dynamics in a feed bin can be simulated using this object.
Packed Bed Tower	A gas-liquid tower for predicting the mass and heat exchange in packed towers.
Post Combustion	This object is used for modeling the post-combustion reaction of the unreacted species in the off-gas stream of a smelter, roaster or any pyrometallurgy reactors.
Quench Tower	A gas-liquid tower for quenching of hot gas using a liquid.
Radial Flow Scrubber	Scrubbing of impurities from gas using a liquid can be simulated using this object.
Roaster	This object simulates the roasting mechanism in a fluidized bed roaster.

Excel Tool Pack

Contains a set of Excel tools for worksheet interaction.

Model Comparison	Tool to compare two models – all input and output dialog variables.
IDEAS DBD	This Design By Database tool expands the use of IDEAS to connect to 3rd party databases. This tool facilitates model connectivity and control via MS Excel. The end user has the ability to edit all dialog inputs (in every object of a model) and the ability to retrieve all dialog outputs (from every object of a model).
IDEAS OPC Bridge/Mirror	OPC bridge/mirroring between IDEAS and any other OPC server. OPC DA 2.0 compliant.

New Objects in Existing Libraries

Object Description	Library
Centrifuge	**Mineral Processing-B**
Crushers with icon options: Generic, Gyratory and Jaw Crushers	**Mineral Processing-B**
Drier The object is a hierarchical structure built using basic IDEAS Macro objects.	**Mineral Processing-B**
Filters - Press, Disk, Drum, Pressure	**Mineral Processing-B**
Flotation Column This object represents a flotation machine where the recoveries of individual components are calculated from the flotation kinetics data.	**Mineral Processing-B**
Flotation Cell	**Mineral Processing-B**
Gravity Separator	**Mineral Processing-B**
Heavy Media Separator The object separates the solids in the incoming stream according to the washability curves.	**Mineral Processing-B**
High Pressure Grinding Rolls	**Mineral Processing-B**
Hydrocyclone Plitt The classification is predicted based on Plitt's model.	**Mineral Processing-B**
Hydrocyclone SR (Separation Ratio) A simplified hydrocyclone separation process, where the splits of liquids are defined by the user; the solids splits either are defined or are calculated in the object from the separation function.	**Mineral Processing-B**
Magnetic Separator	**Mineral Processing-B**
Mills, with icon options: SAG, Ball, Rod, Tower and ISA mill	**Mineral Processing-B**

Object Description	Library
Spiral Classifier	**Mineral Processing-B**
Spiral Separator	**Mineral Processing-B**
Distributor A new object to represent an open tank distributor.	**Macro Unit Ops**
Bulk Density Assign A new object to assign PSD and/or Bulk Density to any stream of dry particulate solid materials.	**Material Properties**
Froth Density Assign Option to select froth volume factor provided.	**Material Properties**
Global Optimizer An optimization based on Simulated Annealing algorithm.	**Optimization**
Centrifuge Decanter Dynamic object for dewatering solids.	**Separation-G**
Dissolved Air Floatation	**Separation-G**
Bucket Conveyor	**Material Transport-G**
Chute A new dynamic object with throughput limit and plugging.	**Material Transport-G**
Drag Conveyor	**Material Transport-G**
Screw Conveyor	**Material Transport-G**
Pipe w/Reaction Feature for performing reactions in the pipe is provided.	**Pipes & Valves**
Tank w/Reaction Feature for performing reactions in the Multiphase Tank is provided.	**Tanks Dynamic**

Object Description	Library
Equation++ It offers a generic framework for defining a system of equations with multiple inputs and outputs.	**Tools**

Enhanced Objects in Existing Libraries

Object Description	Library
Tank Incompressible Conical/pyramidal and spherical bottoms with the corresponding icons	**Tanks Dynamic**
Screen Added SPILL connector and the feature to block outlet flows if connected to a blocked Chute object Added on/off connector for Motor/Vibrator Added Bulk Density correction for O/S and U/S streams	**Separation**
Hydrocyclone Added Lynch model to calculate PSD splits	**Separation**
Thickener Option to capture selected component by settling solids	**Separation**
Slurry Pipe Object Added two generic slurry flow models: Thomas-Camp model and Thomas-Wasp model	**Material Transport**
Stream Exporter Added an option to insert new sheets into existing spreadsheets Option to define region for selecting stream number objects	**Dynamic Data Exchange**
MP Assembler Allowed component names starting with any character, and component names and formulas each being up to 28 characters long	**Material Properties**
HX Shell & Tube Option to reset defaults during simulation	**Heat Exchangers**
Pipe w/HX Option to prevent vapor formation	**Heat Exchangers**
PSD Transmitter Option to view PSD and d50 values for all solids in the stream in one display table	**Transmitters**
Display Stream Number of displayed rows increased to 10	**Transmitters**
Multiple Scalar 10 The user can define local values to be sent in the output array	**Tools**

Object Description	Library
Pump Centrifugal w/Motor New animated field to indicate that the pump is deadheaded	**Pumps & Compressors**
Flow Set Standard/Actual/Normal volumetric flow definitions added for setting the gas phase flow rate	**Macro Primitives**
Transmitter Humidity Extended the wet bulb temperature calculation range for gas temperature more than 100 °C	**Transmitter**
Worksheet Inspector Option for searching inside multiple sub-level h-blocks provided	**Tools Utilities**

Objects Removed from v6.0.0

The following objects have been removed from IDEAS v6.0.0. Worksheets created in an older version of IDEAS (containing these objects) will still open and run; however, the user will not be able to drop new instances of these objects onto the worksheet. Embedded red “X” symbol will appear on top of the obsolete objects in existing worksheets. Please see the “Replace with” column for replacement objects.

Object	Library	Replace with
Flowsheet Table	**Transmitters**	**Worksheet Data**
Pump Centrifugal	**Pumps & Compressors**	**Pump Centrifugal w/Motor**
Pump-Selectable Imp.	**Pumps & Compressors**	**Pump Centrifugal w/Motor**
Pump-Variable Speed	**Pumps & Compressors**	**Pump Centrifugal w/Motor**
Stream Marker	**Transmitters**	**Stream Number Center in Executives library**
Stream Marker TR	**Transmitters**	**Stream Number in Executives library**

Objects to be Phased Out in the Next Release

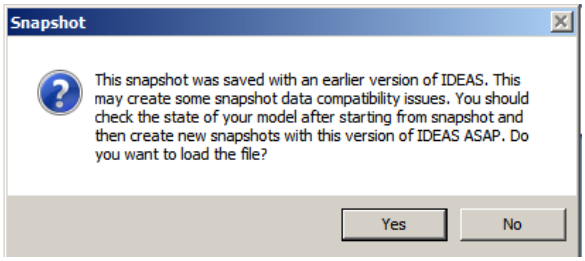
The following objects are being phased out in this version. Worksheets created in an older version of IDEAS (containing these objects) will still open and run; however, the user will not be able to drop new instances of these objects onto the worksheet. Please see the “Replace with” column for alternate options.

Object	Library	Replace with
Separator Phase	**Macro Primitives**	**Phase Separator**
View Streams	**Tools Utilities**	**Use S-Click or D-Click option to view stream data**
Aftercooler	**Heat Exchangers**	**HeatX-Shell&Tube**
User Defined Function	**Macro Unit Ops**	**Reactor RX**
User Defined Function 40/10	**Macro Unit Ops**	**Reactor RX**

Known Compatibility Issues at Time of Release

Snapshot Compatibility

Most of the objects in this version (IDEAS v6.0.0) will retrieve their snapshots created in IDEAS v5.0.x worksheets. There are, however, a few objects for which seamless snapshot retrieval may not be possible. For those cases, the following message will be displayed when loading a snapshot file from v5.0.x.



When the snapshot is loaded, the v5.0.x model upgraded to v6.0.0 may run without any problems. However, if any of the objects with no forward snapshot compatibility are present on the worksheet, the user will see warning messages about a mismatch in the number of snapshot data in these objects.

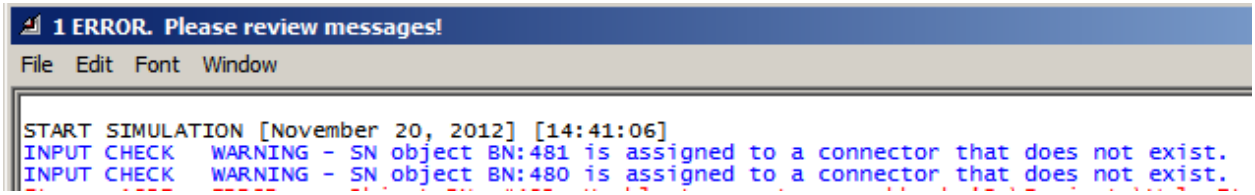
The reporting objects will start from its defaults, while all other snapshot-compatible objects will have their snapshot conditions fully restored.

Below is the list of v6.0.0 objects that will not retrieve their snapshots:

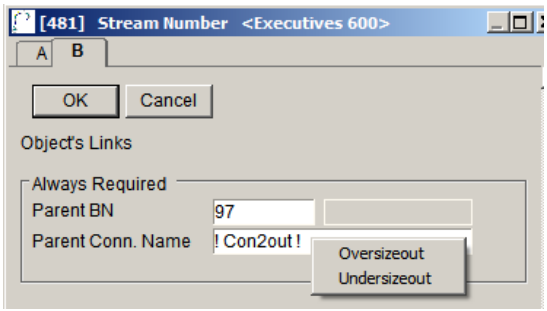
Object Description	Library
Phase Mixer	**Nodes**
Node Separator	**Nodes**
Node 2 in 3 out	**Nodes**
Transmitter Approx. pH	**Transmitters**
Screen Primitive	**Separation-G**
Conveyor	**Material Transport-G**
MP Converter++	**Material Properties**
Thermo Compressor	**Pumps & Compressors**

Screen - Primitive Connectors Names Changed

The new Screen Primitive object from Separation-G 600.lix has three outlet connectors, instead of two in v5.0.0, and the connectors' names have been changed. Due to this change, any Stream Number objects assigned the outlet streams will report an error as follows:



The user should reconnect the SN object manually by clicking on the connector name field and selecting the proper connector name from the pull-down menu: OversizeOut for previously used Con1Out and UndersizeOut for Con2out.



Hyperlinks in Help Documents (.chm)

PDF files hyperlinked in .chm may not open in IE 10 or higher.

References

R1. IDEAS Installation Instructions

R2. Upgrading v500 worksheet to v600

R3. IDEAS v600 Boundary Dev Kit Manual

R4. IDEAS v600 PF Developers Kit Manual

R5. IDEAS User Manual

R6. IDEAS Steady State Mineral Processing Tutorial

R7. IDEAS Dynamic Tutorial

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