# Sulsim®6
SULPHUR PLANT SIMULATOR

The World's Leading Sulphur Plant Simulator

Sulsim®6, the latest release of Sulphur Experts' comprehensive Sulphur Plant Simulator, now allows direct linking of multiple upstream processing units with the sulphur plant and tail gas clean-up unit, within the HYSYS framework. Process streams generated in HYSYS /AMSIM can be passed directly to pre-built SULSIM configurations and the result generated in SULSIM can similarly be passed back to HYSYS for further processing.

Sulsim®6 uses an interactive graphical interface, allowing total specification of the plant flowsheet, and features all of the units normally included within the modified-Claus plant, including incinerators and a variety of tail gas units

Interactive flowsheet specification enables installation or removal of individual units for the various supported processes including the Modified Claus process, sub-dewpoint Claus, Selective Oxidation and various Tail Gas Clean-up processes. The selected plant configuration is then graphically displayed. This high degree of flexibility allows all sulphur plant configurations normally associated with the gas processing and refining industries to be modelled.
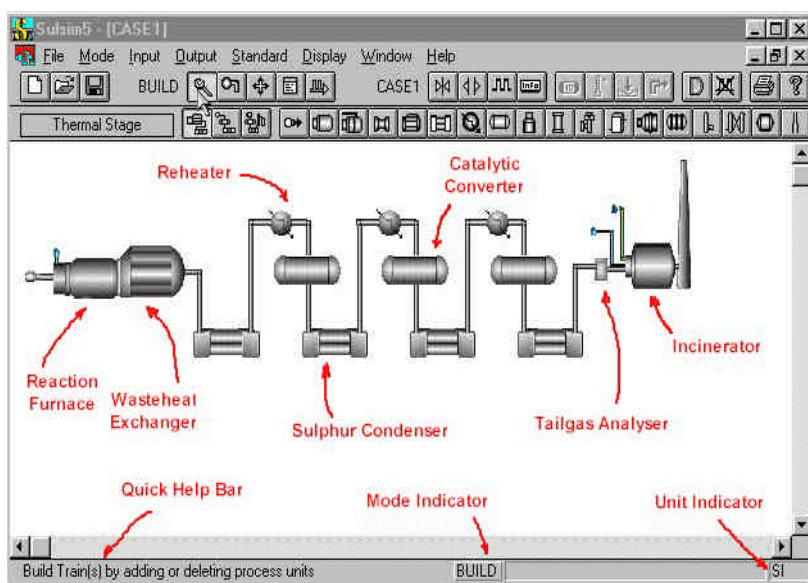
The program accepts multiple feed streams to the Claus reaction furnace, as well as to any downstream point. The program also allows for recycling of process gas streams. This enables processing of a variety of input streams, such as sour water stripper gas, amine plant regenerator gas, fuel gas, and tail gas recycle streams. It performs the calculations on a unit by unit basis from the reaction furnace through to the incinerator or tail gas unit, producing complete heat and material balances.

Sulsim®6 supports multiple (up to four), parallel processing trains to allow for simulation of the entire sulphur recovery complex in a single simulation case. Sulsim®6 will also support partial plant configurations to allow simulation of any single or any combination of individual units in the process.

Advantages of Sulsim®6

HYSYS/AMSIM Link
The ability to run Sulsim®6 within the framework of HYSYS allows seamless simulation of process complexes that include a sulphur plant and tail gas clean-up unit.

Export to Spreadsheet
Sulsim®6 adds an export capability to Microsoft Excel that is accessed from the File – Export to Excel menu selection. The export function transfers the results of the simulations to a newly created workbook that includes the material balance, performance summary and composition summary. The material balance includes a graphic image of the

SULSIM process flow sheet together with the solved material balance stream information such as temperature, pressure, enthalpy and composition. The table options are completely User defined.

PFD Export
The process flow diagram (PFD) contains all stream information for the process. The diagram can be manipulated in SULSIM to produce the desired layout and then exported in to Excel for subsequent manipulation.

Prompt for Delete
Sulsim®6 now prompts the user for confirmation before deleting a flow sheet object.

Case Handling
Sulsim®6 accepts all Sulsim®5 cases and introduces advanced case handling capability.

Sulsim®6 includes all the popular features introduced in Sulsim®5 including…

- *Improved Reaction Furnace Modelling* - thermodynamic equilibrium model, empirical kinetic models for rich and lean feed cases, special models for NH_3-burning and oxygen enriched cases and the ability to modify the output to match measured plant compositions.
- *Empirical Catalyst Bed COS and CS_2 Hydrolysis Modelling* – temperature and catalyst condition based empirical data allowing accurate predictive simulations of degree of hydrolysis.
- *Converter Dewpoint Optimization Routine* – automatic convergence to a preselected dewpoint margin in each catalyst bed.
- *New Empirical Model Wasteheat Exchanger Reactions* - a comprehensive empirical model for simulating the reaction of several components (including H_2, CO, COS and H_2S) in the Wasteheat exchanger
- *Multiple Train Configurations* - a total of four parallel "trains" to be installed in a single case and simulated at one time.
- *Convergence Criteria* – variable convergence criteria to allow faster case run.
- *Flexible Air Control* - the tail gas conditions can be specified as "Air Demand", "H_2S/SO_2 ratio", "H_2S Concentration" or "SO_2 Concentration"

Hardware Requirements
Sulsim® 6 is designed to operate on an IBM PC or compatible system operating. The minimum recommended CPU is a Pentium® II (or equivalent) CPU operating at 400 MHz. The program is also completely compatible with the Windows 98/95/NT/ME/2000/XP® operating systems. The program requires a hard disk drive (2 MB available) and a graphics monitor.

For full technical descriptions of the Sulsim®6, visit our web page.

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Sulsim® 6 Technical Information

User Interface
Sulsim® 6 features a continuous screen graphics presentation of the specified plant flow sheet on a Windows® based platform and allows total flexibility in selection of input and output data to the screen, printer or disk file. The program allows for multiple trains within a single user case as well as allowing multiple cases to be open on the screen simultaneously.

Sulsim® 6 allows the user a wide range of output tables to be printed or saved to file. The content of these tables can be customized by the user to generate only the data required by the user. Typical output data might include:
- all stream flows and compositions in percentages and/or molar flow rates
- heat and material balances for each unit and as a plant summary
- individual summaries of pertinent data for each unit, including heat duties, unit and cumulative conversion and recovery efficiencies, calculated flow rates, temperatures and dewpoints, air demand, sulphur vapour and sulphur liquid production, etc.

The on screen graphic display shows the entire processing complex and allows the user to customize the "look" of the plant by manipulating each of the unit operations in the case. This allows the user to generate a hard copy output of the process flow diagram to suit the users needs. The on screen process view also allows the user to specify the display of specific plant data (temperatures, pressures and unit names) directly on the screen. This data is updated as unit specifications and simulations results are changed.

"User Friendliness"
Sulsim® 6 has been designed to be totally interactive with the user and incorporates an advanced level of program commands, and help, where necessary, the program features a set of default values pre-programmed to allow simulation runs in cases where the user does not have a complete data set.

Thermodynamic and Empirical Data
The thermodynamic data used by the program are expressed in the form established by McBride, et al, with the majority of data being obtained from that source. The sulphur vapour species data are those developed by Western Research from a combination of data obtained from the literature and observations made on the modified-Claus reaction, both in the field and in the laboratory. The thermodynamic data bank in the program is designed to accept 23 molecular species, satisfying most modified-Claus plant operations. In addition the program can accommodate all 9 sulphur vapour species of interest in any plant simulation.

The empirical data which is incorporated into many of Sulsim® 6's calculation routines have been the result of compiling plant specific data for more than 500 plant tests conducted by Sulphur Experts (formerly Western Research) over the past 20 years. These tests have been conducted at sulphur recovery facilities around the world and include plant configurations of virtually every type of SRU and TGCU currently in use.

Technical Assistance and Training
Assistance with problems relating to the operation of the program is available to the user by telephone, fax or e-mail. Sulsim® 6 is designed in such a way that the average user can reach a level of proficiency within a relatively short time. Individualized training courses are offered for those who wish to extend their knowledge of the software in order to take better advantage of the wealth of options and features available.