



REF-SIM™ Technical Datasheet

A Yokogawa Company

Benefits

Optimise unit performance

- Determine the most profitable operation on a reformer unit, given pricing for feeds, products and utilities

Maintain the refinery LP

- Generate a consistent set of yield vectors for different feeds and severities
- Improve accuracy of modelled hydrogen production
- Regenerate data when the model or LP structure changes

Improve data quality

- Analyse data inconsistencies
- Adjust for uncertain measurements
- Generate consistent balanced data sets
- Identify source of data measurement errors

Understand unit behaviour

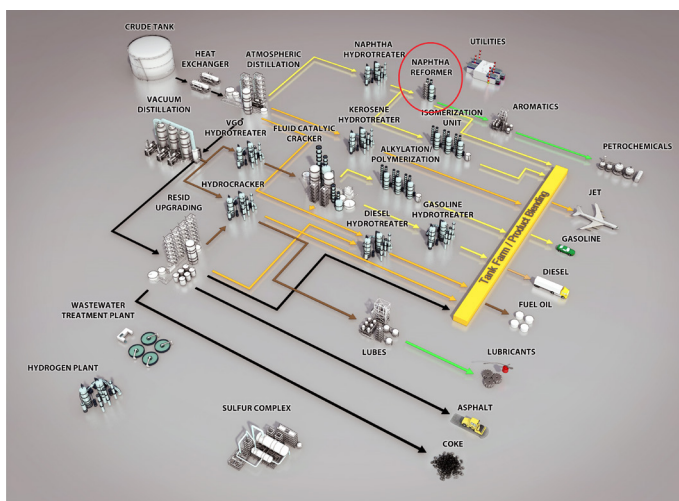
- Determine yields, product properties, catalyst life and hydrogen yields for new/purchased feedstocks for the reformer
- Train engineers and operators new to reforming by using the model to illustrate cause and effect through simulation runs

Monitor unit performance

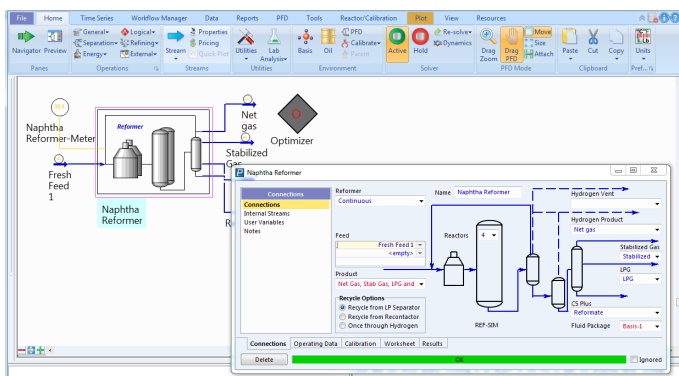
- Accurately monitor the activity decline of fixed bed reformers and estimate end-of-run life
- Track mass balance, heat balance closure, and other key process indicators
- Compare actual yields versus predicted

Overview Summary

Naphtha Reforming operation needs to respond to current economics, available feedstocks, product octane requirements, and hydrogen demand. What are the best feeds and severity for your unit given the hydrogen and octane requirements for your refinery operation? How do you determine operation based on changing demands and conditions? REF-SIM can help determine the answers to these and other important questions. It is based on a first-principles engineering framework and is an accurate, easy-to-use tool with over twenty years of application in refineries worldwide.



REF-SIM, proven over decades of use by refiners worldwide, accurately models the unit reactor section, including reaction kinetics plus all heat balance effects. Yields and properties of the light ends and reformate are shown as composite streams by carbon number and hydrocarbon type (PIONA) or by individual isomers as desired.



REF-SIM is a valuable tool in answering questions regarding the effects of feed stock properties and reactor severity on unit profitability.

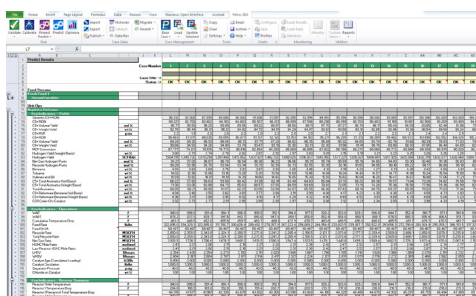


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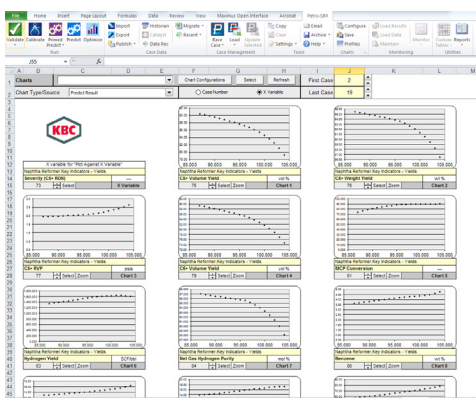
Features

- Ability to simulate multiple types of reformers: CCR, semi-regen, magnaformer, and cyclic
- Detailed carbon number feed and characterisation of C1 – C14 paraffins, aromatics, and naphthenes
- A detailed kinetic scheme incorporating the forward and reverse rates of all key reforming reactions, modelling the effects of feed quality, reactor temperature, and the hydrogen partial pressure on yields, hydrogen production, and catalyst life
- Flexible feed characterisation mechanisms for data ranging from distillation and bulk PIONA to detailed gas chromatograph (GC) analysis
- Designed to match observed yields, octane and hydrogen production rates for a given set of feed and operating conditions
- Reaction section scaling for reconfiguration studies
- A built-in data reconciliation tool for reconciling mass and elemental balances
- Automatic data validation support to assess the quality of input data to the model
- A built-in optimiser allows you to identify the most profitable operation given feed/product pricing, catalyst costs, and unit constraints
- Direct access to process data historians
- Convenient and efficient platform for developing and maintaining LP vectors



Interface Options

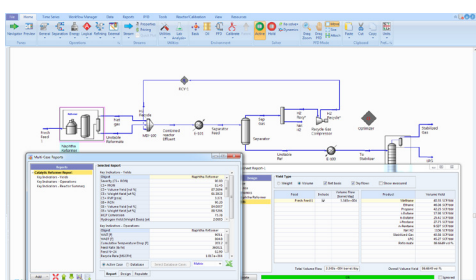
REF-SIM is available through a graphical user interface with the same user-friendly look and feel as other unit operations within the Petro-SIM family of process simulators. Make configuration changes through simple drag and drop techniques on a process flowsheet diagram, compare plant data results in a meter view, and perform case studies and optimisations all within a single environment.



REF-SIM supports a real integration with Microsoft Excel® allowing you to readily create a customisable Excel application workbook for driving calibration, prediction, and even optimisation case runs. Analyse the results of several cases directly from within this Excel environment. Multiple charting options allow easy analysis of data and model predictions, and concise summary sheets provide relevant data at a glance. Excel interfaces are automatically generated and can be customised to your specific needs.

REF-SIM™ and Petro-SIM™

REF-SIM is available within the Petro-SIM environment, because users with a Petro-SIM license can build very detailed process unit models that take advantage of Petro-SIM's sophisticated analysis tools, such as the popular LP Utility for easy generation and maintenance of LP submodels. Generate detailed models using downstream separation and auxiliary unit operations, link with assay and feed libraries and crude units to investigate feedstock effects, or use REF-SIM as part of a complete refinery wide model, at a level of detail unsurpassed by any other process simulation package.



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