



DATASHEET

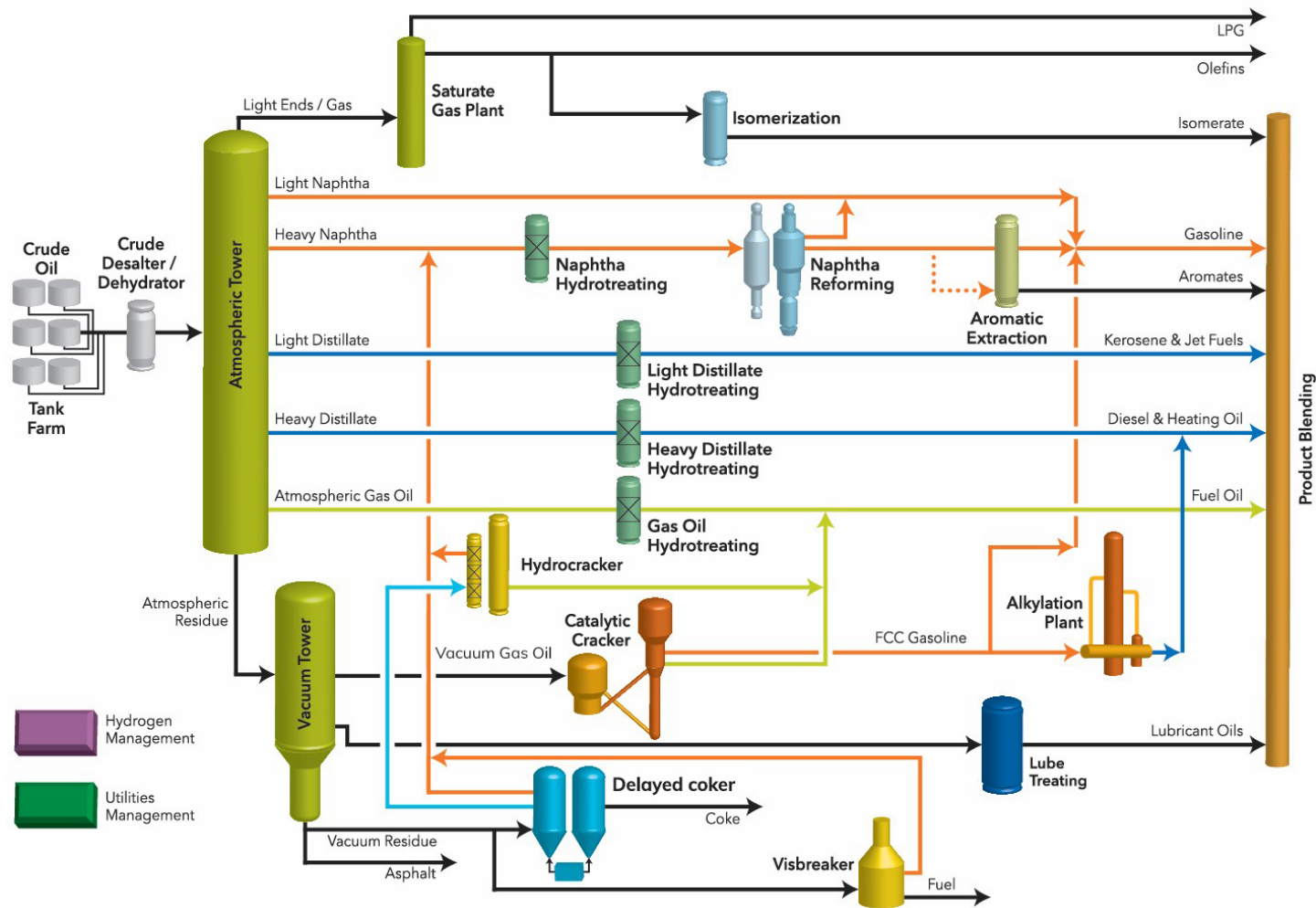
AVEVA™ PRO/II™ Simulation: Refinery reactor models

AVEVA PRO/II Simulation's refinery reactor models are an essential tool to design one of the most important units in a refinery. Users can rigorously model, analyze and optimize reactor units, maximising engineering efficiency and the plants overall profitability. With a variety of reactor models available, all based on the proven models of AVEVA Process Optimization, engineers can accurately predict plant behavior, at steady state, across a wide range of operating conditions.

Overview

The value of reactor models in a refinery cannot be overstated. Using poorly designed reactors can have detrimental effects on product yield and the overall refinery profitability. AVEVA PRO/II Simulation's reactor models allow for rigorous modeling and optimization of these units across a wide range of operating conditions.

Users can perform operational analysis, engineering studies and enhance process design using a wide selection of reactor models.



AVEVA refinery reactor model portfolio

Key features

- Rigorous kinetics and thermodynamics for accurate modeling of processes over wide range of operating conditions
- Operational analysis of the reactors and catalysts
- Product composition, properties, and yield prediction
- Reactor modeling of reactor units, including auxiliary equipment
- Catalyst activities and reaction constants tunable with changing feeds and operating conditions
- Feed evaluations

Reactor models available

Isomerization

- Converts n-paraffins to iso-paraffins to increase octane values
 - Supports two operation modes: isothermal & adiabatic
 - Manipulates recycle compositions to maximize product octane numbers
 - Feed and products are all pure components

Visbreaker

- Reduces the quantity and viscosity of heavy oils from crude distillation and performs cracking to produce lighter products
 - Simulates the whole unit, including furnace/ reactor, fractionator, and fuel oil blend
 - Predicts product yields, vapor product composition and liquid product qualities
 - Calculates the amount cutter stock required to meet viscosity specifications

Delayed coker

- Thermal cracking of residual oil to gasoil and coke
 - Simulates the reactor unit including the coke drum and fractionator
 - Supports three different feed types: residual oil, FCC fractionator slurry oil and tar
 - Calculate the vapor product compositions and key refinery inspection properties of the liquid products

Hydrofluoric alkylation

- Converts light naphtha (C6- olefins) to high-octane alkylate for gasoline blend with hydrofluoric acid catalysis
 - Simulates the reaction zone and the acid settler
 - Predicts isobutane conversion, alkylate & acid soluble oil rates and RON & MON

Sulfuric acid alkylation

- Converts light naphtha (C6- olefins) to high-octane alkylate for gasoline blend with sulfuric acid catalysis
 - Simulates the reaction zone and the acid settler
 - Predicts alkylate yields, RON, MON, acid consumption and spent acid composition

Hydroprocessing

- Performs cracking and removal of sulfur, oxygen, nitrogen, and metals from process streams
 - Supports various hydrotreating and hydrocracking of different process streams
 - Predicts product composition and properties such as sulfur and nitrogen contents
 - Supports molecule-based grouping for feed and product characterization and reaction kinetics

Benefits

- Economic assessment of reactor conversion and yield behavior
- Conduct case studies to:
 - Assess the economic and sustainability impact between configurations
 - Mitigate bottlenecks
 - Perform sensitivity analysis
- Enhance process design for:
 - Changes in feed quality and conditions
 - Operating modes
 - Analyzing changes in design configurations
- Support linear programming (LP) vector updates

Learn more about AVEVA PRO/II Simulation's rigorous reactor models, [watch our reactor model demo video](#).

For more information about AVEVA PRO/II Simulation, [please visit our product page](#).