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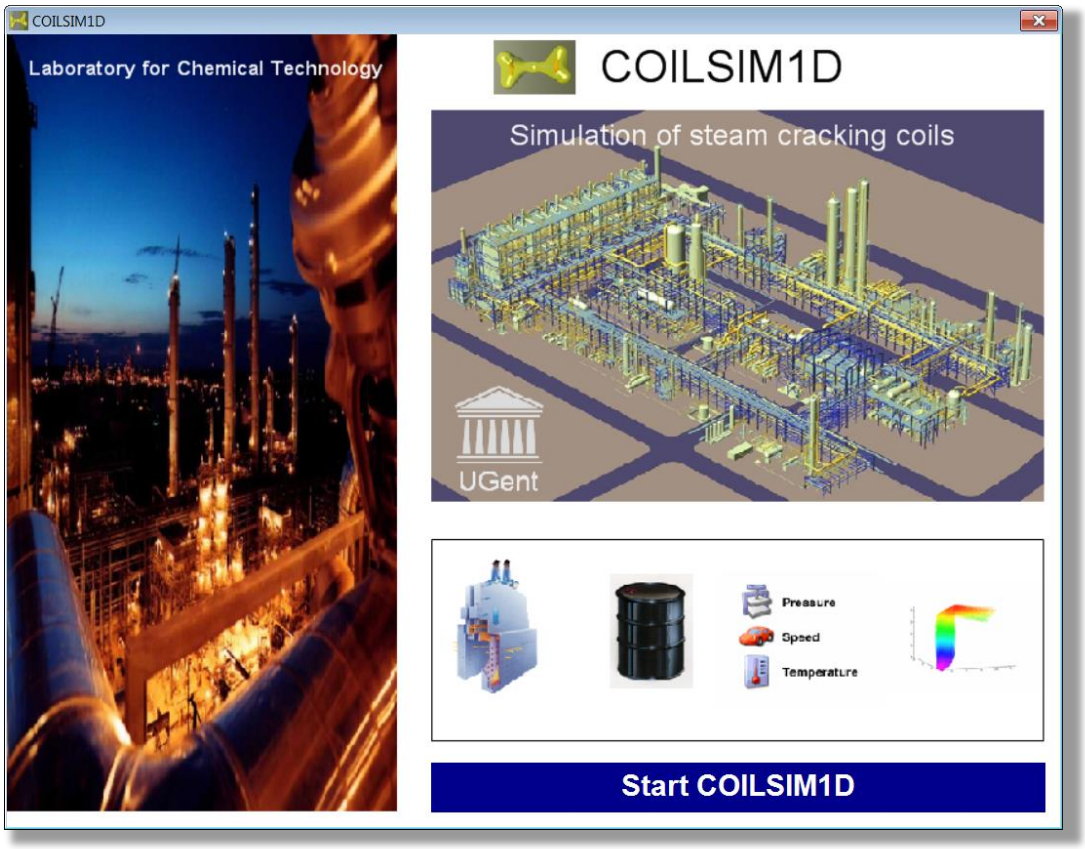
LCT Laboratory for Chemical Technology



COILSIM1D

The simulation and optimization software for the ethylene industry

COILSIM1D

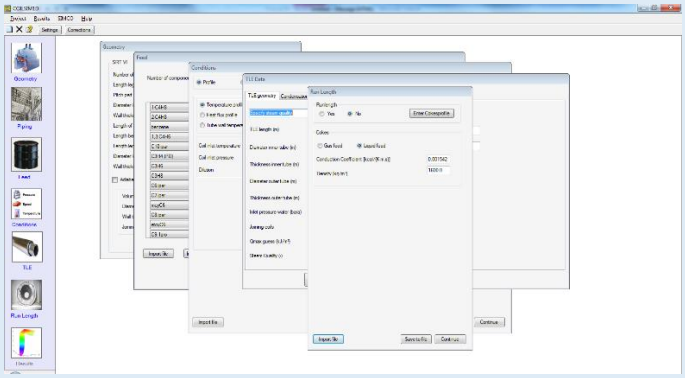
COILSIM1D boosts **profitability** of steam crackers by maximizing yields and optimizing the process, using highly **accurate** reactor simulations for a broad range of **feedstocks,** reactor **geometries** and operating **conditions.**

It is the result of more than **40 years** of expertise of the Laboratory for Chemical Technology (LCT) in independent research and **modeling** of thermal cracking reactions. The **microkinetic** model incorporated in COILSIM1D is the broadest and most **accurate** reaction **network** for steam cracking of hydrocarbons.

Main features

COILSIM1D combines a very user-friendly interface with its robust kinetic network to provide users with valuable results in just a few steps.

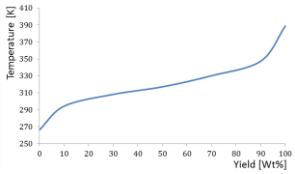
- Reactor simulations are possible with different boundary conditions
  - Fixed COT
  - Fixed P/E or M/P
  - Fixed conversion(s) or yields
- Automatic or user-specified heat flux or temperature profiles
- Feedstock reconstruction
- Furnace simulations
- TLE simulations
- Run length simulations



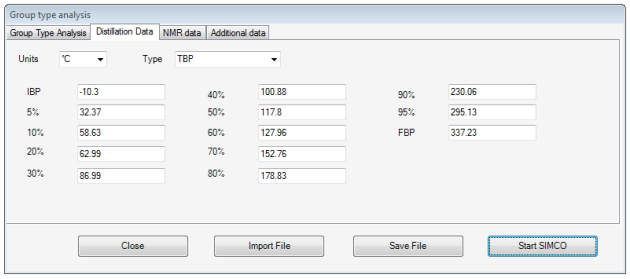
SIMCO feedstock reconstruction

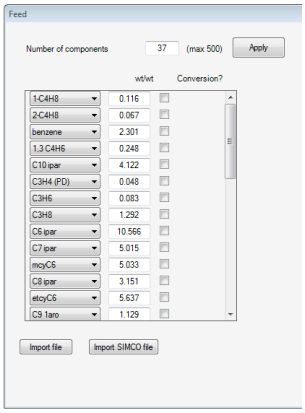
SIMCO allows users to obtain a detailed reconstructed composition of feedstocks ranging from light gases to heavy gas oils, based on common commercial indices. Sulfur-containing components can also be reconstructed

- PONA(+), PIONA(+), SOA
- Distillation data: TBP, ASTM D86, ASTM D2887
- NMR data



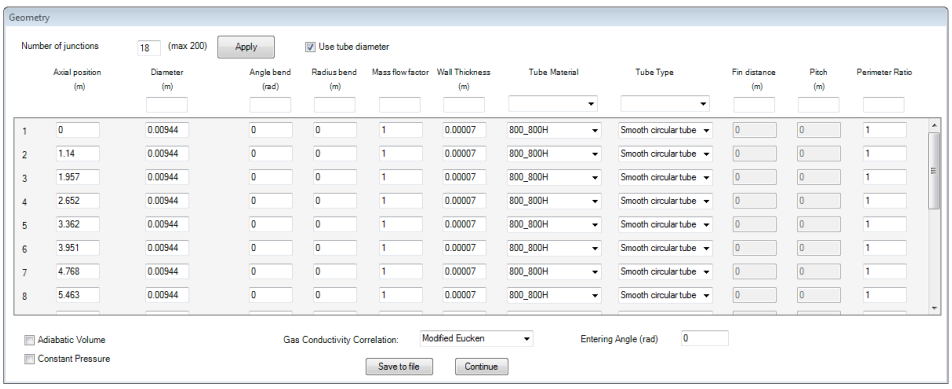
Reconstructed feedstocks can be used directly as input for reactor simulations, or users can input a detailed feed composition manually.





Reactor geometry flexibility

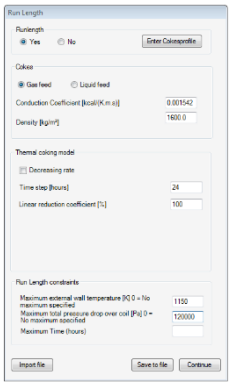
Built-in geometries of the main reactors of various manufacturers are available. Other geometries can be easily implemented with the New coil geometry tool. Various coil materials and fins (straight, riffled, spiral) are supported too.

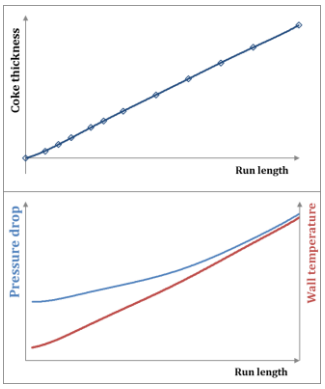


Reactor simulations

A variety of routines are implemented in COILSIM1D, allowing users to easily study different aspects of their process

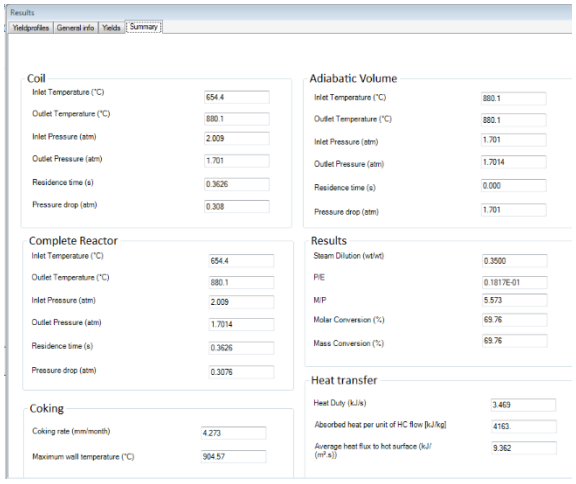
- Product distribution
- Yield maximization
  - User defines the relative importance of products
- Run length simulations
  - Specific coke deposition models for gaseous and liquid feeds
  - User-defined operational limitations (T, P)

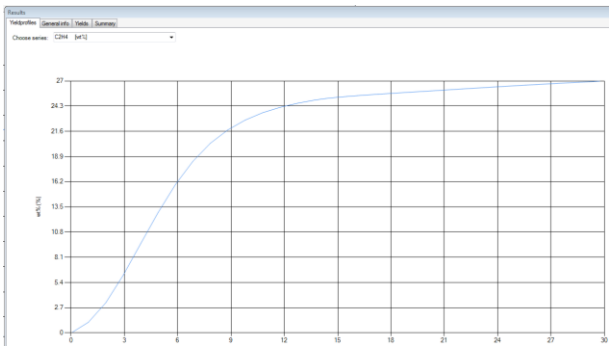




- An adiabatic volume can be included downstream of the reactor, enabling users to evaluate the effect of transfer lines on product composition.

The main simulation results are conveniently summarized in a table and presented graphically, allowing users to rapidly obtain a general overview of the outcome of the simulation.

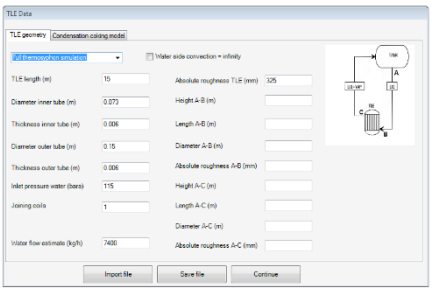




TLE simulations

COILSIM1D incorporates a TLE simulation module that enables users to carry out simulations using different boundary conditions:

- Specific mass flow of water
- Specific steam quality
- Full thermosyphon simulation



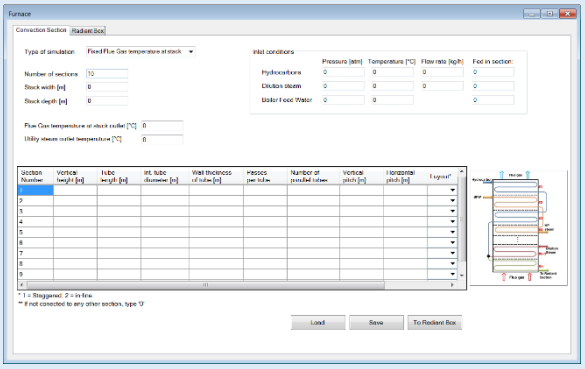
A specific model for the deposition of condensation coke is implemented for the TLE, providing users with a very accurate tool for the estimation of run length based on the intensity of fowling in this section.

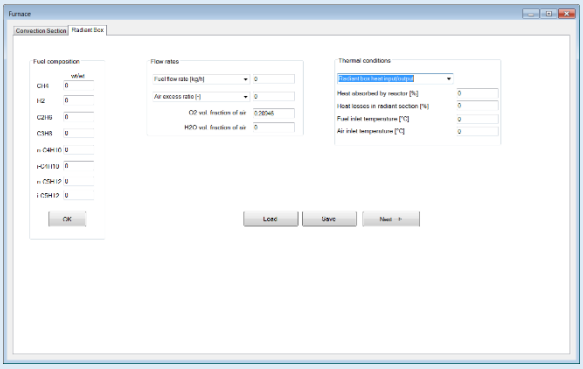
Furnace simulations*

It is the newest addition to COILSIM1D. It simulates both the radiant and convection sections of a cracking furnace, allowing users to estimate process parameters of interest:

- Flue gas temperature
- Utility steam production

COILSIM1D supports different tube bundle arrangements and allows users to customize the fuel gas composition





*Available from Version 4.0 onwards

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