



## VMGSIM 10.0 RELEASE HIGHLIGHTS

### VMGSIM 10.0 IS PACKED WITH NEW AND ENHANCED FUNCTIONALITY DESIGNED TO INCREASE YOUR PRODUCTIVITY

Whether you work in the upstream, midstream or downstream industries, VMGSim 10.0 has something for you. Our new pipeline visualization module allows flow assurance studies to be a few clicks away in both steady state and dynamics. The new membrane, detailed fired heater and burner unit operations as well as extensive enhancement to the multisided heat exchanger allow you to dig deeper into the details of your processes.

This new release also boasts new rigorous hydrocrackers, hydrotreaters and visbreakers unit operations. As with our existing suite of reactor models all of these are built to be easily tuned if necessary and integrated into your refinery-wide simulation models. In addition we have made exciting improvements to our dynamics, oil characterization and thermodynamic engines.

## DYNAMICS

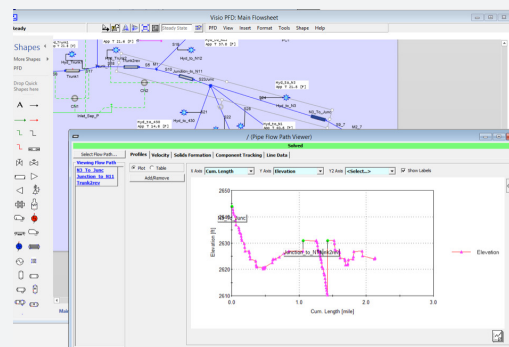
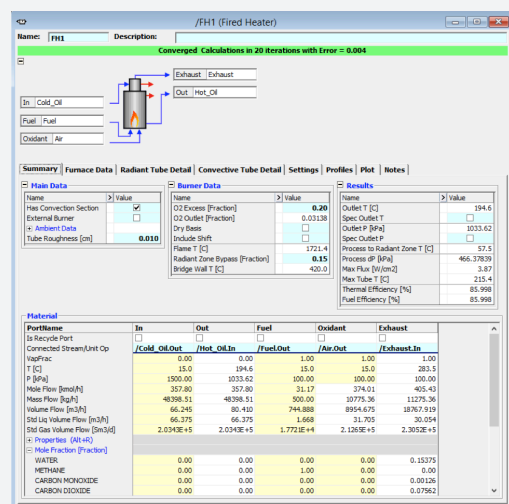
- Ability to integrate different parts of a model with different step sizes, and to adjust the step sizes based on convergence and error magnitude.
- Option in integrator to use 2nd order BDF integration.
- Feature to accelerate to steady state / stop when steady state reached.
- Shortcut thermodynamic models for faster simulations.
- Pipe rupture / blowdown.
- Flow in pipe annulus / concentric flow.
- Separator internals (buckets and weirs).
- Column Builder assistant.
- Unequal phase split in tee junctions.
- Diener Schmidt method (ISO 4126 part 10) for flashing choke.

## NEW UNIT OPERATIONS

- Membrane Unit Operation - gas-gas or liquid-gas (pervaporator) membranes.
- Fired Heater Unit Operation - detailed vertical fired tube heater model.
- Burner Unit Operation - performs a variety of combustion calculations.

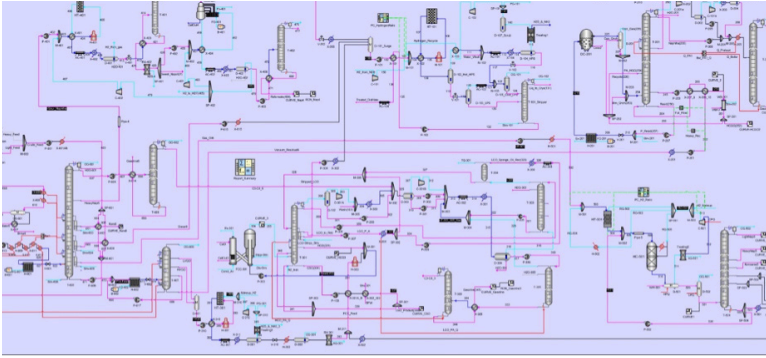
## PIPELINES

- Module to inspect profiles of “pipeline paths” by allowing users to select a list of connected pipelines and inspect the main variables in a single plot.
- Added a dedicated tab to display profiles that are typical to flow assurance such as hydrates, waxes, phase envelope.
- Elevation profile import with GIS data (lat / lon).
- Overall improvements to the layout of form to input elevation profiles.
- General improvements to the pipe form.



## REFINING

- Hydrotreater unit operation - desulfurization and denitrogenation catalytic fixed bed reactor.
- Hydrocracker unit operation - moving or fixed bed catalytic hydrocracker.
- Visbreaker unit operation - mild thermal cracking reactor or upgraders.
- Included detailed light ends kinetic tuning parameters in all PIONA molecular structure reactors for C1 to C4 range.
- Added Service Time coke thickness calculation option to the Ethylene cracking furnace unit operation for start to end service time performance solutions.

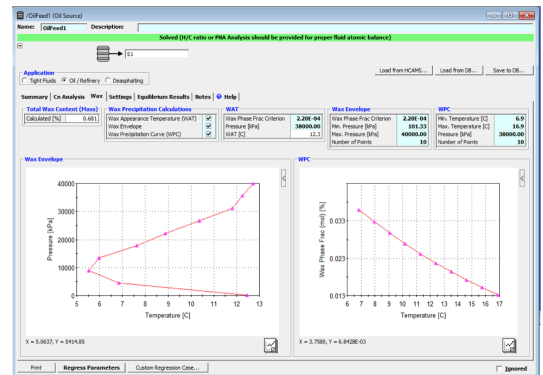


## THERMODYNAMICS

- Implementation of Wax Phase modeling. Waxy oil characterizations can be achieved using PIONA Characterization technique. Wax Precipitation calculations include Wax Appearance temperature, Wax Envelopes and Wax Precipitation curves.
- Extensive review of data to validate and improve where appropriate the estimations of several systems of importance to the oil and gas industry. Some of the mixtures reviewed include components such as glycols, H<sub>2</sub>, H<sub>2</sub>O, CO, CO<sub>2</sub>, BTEX, and light hydrocarbons among others.
- Added support for the VMGRefprop GERG property package.
- Added Lower and Upper Explosive Limits to the list of Pure Component properties.
- Added Methane Number and Stoichiometric Air to Fuel Ratio calculations to the Refinery Special Properties unit operation.
- Added Kinematic Viscosity to the list of properties that can be fitted in the OilProp Unit operation.

## RECYCLES & CONTROLLERS

- Redesigned the convergence manager to expose more details related to the status of controllers and recycles.
- Added a Convergence Plot tab to the Flowsheet form that provides a graphical representation of the convergence of controllers and recycles.
- Added a Recycle Detail tab which can be used to configure tolerances per variable and to view the status of the iteration variables.



## OIL CHARACTERIZATION

- Added Oil Analysis Unit Operation - this unit operation is able to produce oil analyses similar to those reported by analytical laboratories. Physical properties and curves are calculated for whole crude oils and their cuts.
- Added Swelling Test (Swe) to the list of experiments available in the PVT Analysis unit operation.
- Added Bulk Properties (Molecular Weight, Density and Saturation Pressure) calculations to the C<sub>n</sub> Analysis unit operation.

## EMISSIONS

- Added an overall emissions summary (flash, tank, loading) to the Emissions Manager.
- Added a module for Loading emissions inside of the Tank Emissions utility.

## MISCELLANEOUS

- Added air to flow ratio variables to Claus Oxygen Calculator and Claus Fired Heater.
- Option in Multisided Heat Exchanger to solve with shortcut flash models that are automatically updated to preserve the accuracy of rigorous flashes. Typical cases may be sped up by a factor of 10.
- Varied improvements to the feature set of the heat exchanger and air cooler rating options.
- Enhanced foreign language support for PFD Stencils, Case Study, Model Regression, Optimizer, Towers & Oil Characterization environment.
- Support for integers in Optimizer when using Nelder Mead.