FHINFINITY

BEYOND SIMULATION
TOWARDS INFINITY

FIRED HEATER SIMULATION SOFTWARE

SOFTWARE BROCHURE

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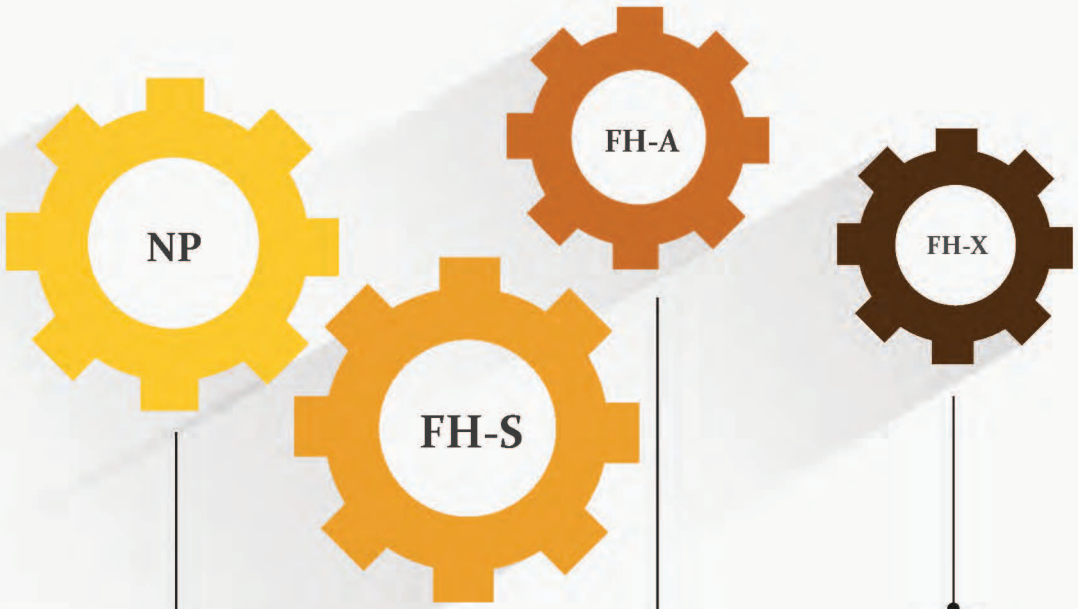
FHinfinity

General Overview

FHinfinity is an integrated environment consisting various practical modules working together to find solutions for different cases such as fuel saving, capacity increasing, operational bottlenecks as well as designing Fired Heaters.

SOFTWARE PARTS



NAFTPack

Fully extensible thermodynamic engine for calculating the physical properties of process streams.

FH-Analyzer

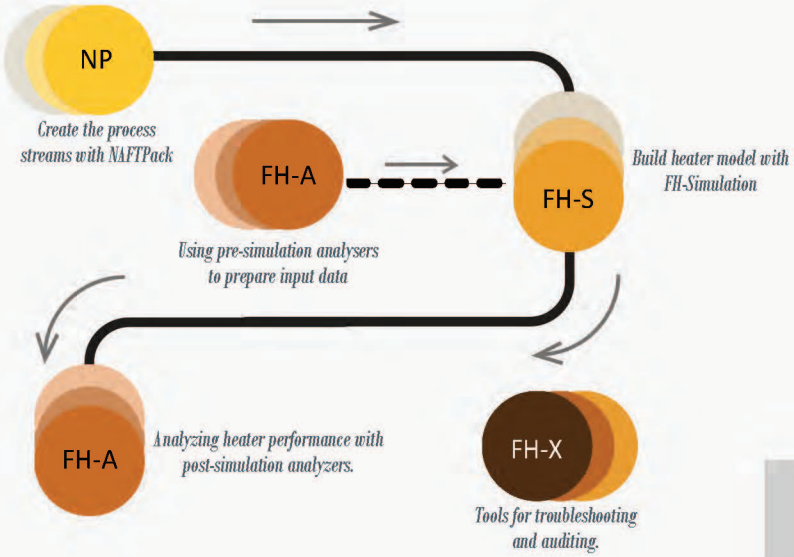
Simulation tools for heater analysis, including pre- and post-simulation capabilities and sensitivity meters.

FH-Xtra

Auxiliary tools for troubleshooting and monitoring fired heaters.

FH-Simulation

Simulation of fired process heaters based on its geometry, tube types tube material, fuel and inlet conditions of process stream.



Integrated Application Flowchart

After creating Process Streams with NP peripheral software or other process simulators like Aspen Hysys and exporting them to the model, the heater's geometry and tube specifications are finalized, allowing for the building of the heater simulation model. Additionally, more precise fuel or burner specifications can be incorporated using pre-simulator tools. Once the model is run, post-simulator tools can be used to analyze the heater's performance.

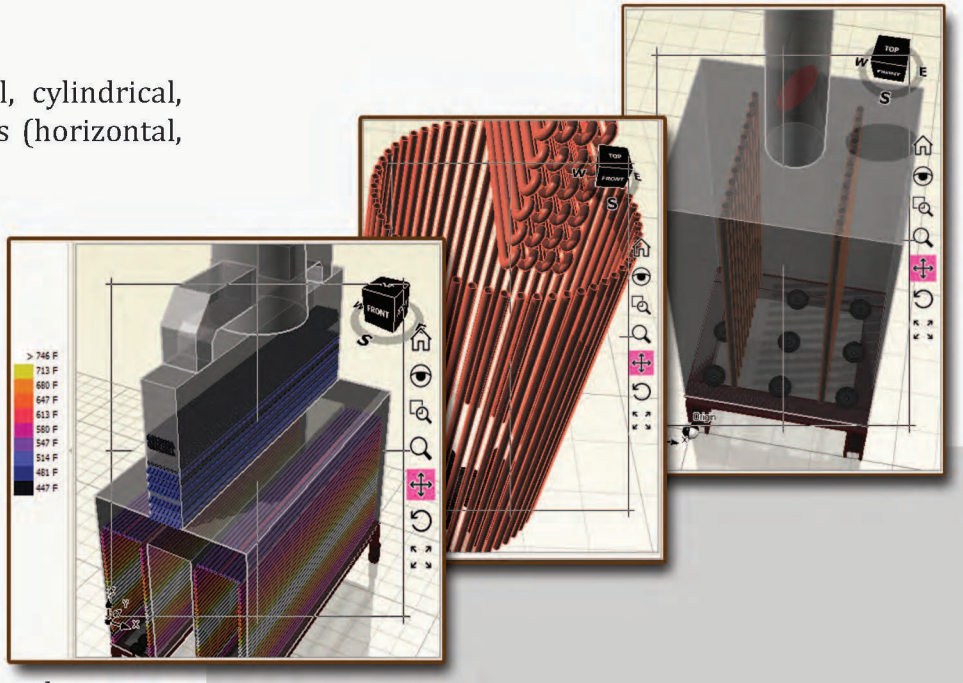
FH-Simulation

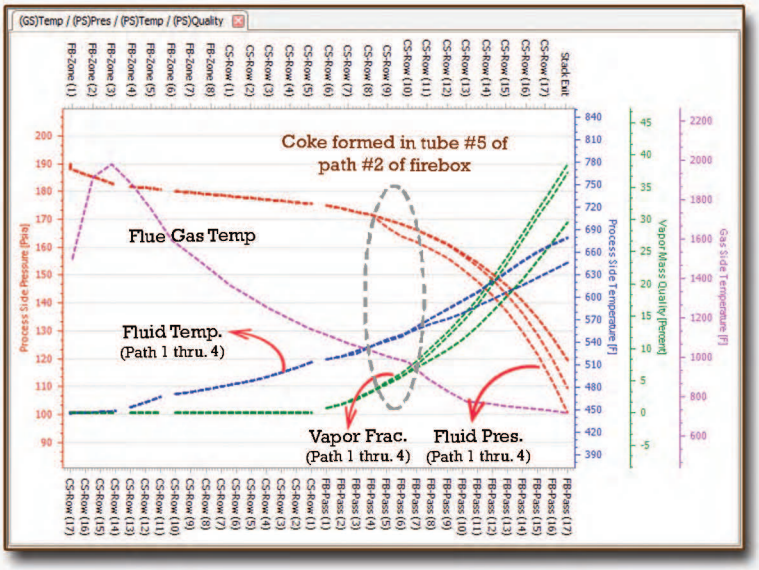
Fired Heater Simulation Environment

FH-Simulation is a user-friendly platform designed for simulating a wide range of fired heaters with various geometries, including configurations with or without convection sections and stacks.

COMMON FEATURES

- Support all firebox types (cubical, cylindrical, box, terrace) and tube orientations (horizontal, vertical, helical, arbor, U).
- Support various tube types in the convection section, including bare, finned, and studded tubes in different arrangements.
- Support all stack and flue gas systems, with or without duct and damper.
- Comprehensive combustion calculations and analyses for fuel gas, fuel oil, and combined firing.
- Support various methods for defining the process stream, including automation with common process simulators, a proprietary NP thermo-engine or manual user data input.
- Comprehensive databases for tube materials, refractories, fuel types, coke and fouling materials, etc.





ADVANCED (UNIQUE) FEATURES

- The ability to evaluate the imbalance of parallel paths with respect to flow rate, internal coke thickness, external fouling thickness, temperature, pressure, and other factors.
- Support calculations for FD fan, ID fan, air preheater, and induced/forced zone draft ducts.
- Supports calculations for transfer lines, including tubes and fittings.
- Steam or water injection for the firebox and convection section.
- Different layout for burner firing (top, down, endwall, single level, multi level, etc)
- Proprietary package for calculation of inside tube HTC considering Film, Dryout & Post-Dryout boiling regions.

FH-Analyzer

Pre & Post-Simulation Tools for Heater Analysis.

FH-Analyzer consists of a powerful set of analyzers that can be applied to a heater simulation case.
It can be used independently to perform specific heater calculations (pre-simulation tools) or to convert a design model into an operational one (post-simulation tools).

Combustion Analyzer

Comprehensive combustion calculations for all fuel types (gas, oil, combination) with categorized results for fuel, air, and flue gas characteristics. This calculation can be integrated into the main model.

Pre-Simulation

Burner Simulation

Burner simulation calculations to create capacity curves for oil and gas fuels based on burner tip specifications and quantities. This calculation can be integrated into the main model.

Pre-Simulation

Heat Loss Analyzer

Calculate heat loss and heater efficiency by assessing air infiltration and modifying the firebox refractories. The refractory layer information can be added to the main model and the corresponding datasheet page completed.

Sensitivity Meter

Tube Life Calculator

Calculates the remaining tube life fractions (minimum and average) based on tube material and heater operational history. After calculating these fractions, future operating parameters can be input to determine the exact remaining tube life.

Sensitivity Meter

Heat Flux Analyzer

Heat flux analysis of the heater when modifying, adding, or toggling the burners.

Post-Simulation

Coke Analyzer

Prediction of coke formation over a specified time period and estimation of coke formed based on tube skin temperature in various parallel paths.

Post-Simulation

Dr. Heater

Comprehensive analysis of the heater's gas and process sides based on API standards to identify operational risks and assess performance under specified conditions.

Post-Simulation

FH-Xtra

Auxiliary Tools for Inspection & Troubleshooting of Heaters.

Heater Troubleshooter; is a comprehensive tool designed to address the most common issues in heaters. It provides users with detailed reports on all potential causes and effects of problems, along with the necessary actions to resolve them.uld be taken, would be reported to the user.

Burner Troubleshooter; It is a wizard-based troubleshooter for the most common burner issues. During the troubleshooting process, the user is prompted with related questions, and based on the responses, appropriate solutions are provided.e suggested to the user until their full satisfaction.

FH OP^2 (Optimized Operation); It is an effective tool that uses a question-and-answer format to optimize heater operation.

Audit Data Table It is a practical table designed to capture all essential data for monitoring fired heaters. This data can be used for various processing tasks, such as plotting time trends of different parameters over various periods.

Audit Data Table