

# FLOWNEX<sup>®</sup>

SIMULATION ENVIRONMENT **HRSG**

Flownex<sup>®</sup> SE determines pressure drop [flow] and heat transfer [temperature] for the connected components of a complete system in steady state and transient, e.g. pumps or compressors, pipes, valves, tanks and heat exchangers.

## TYPICAL USES:

### ANALYSIS

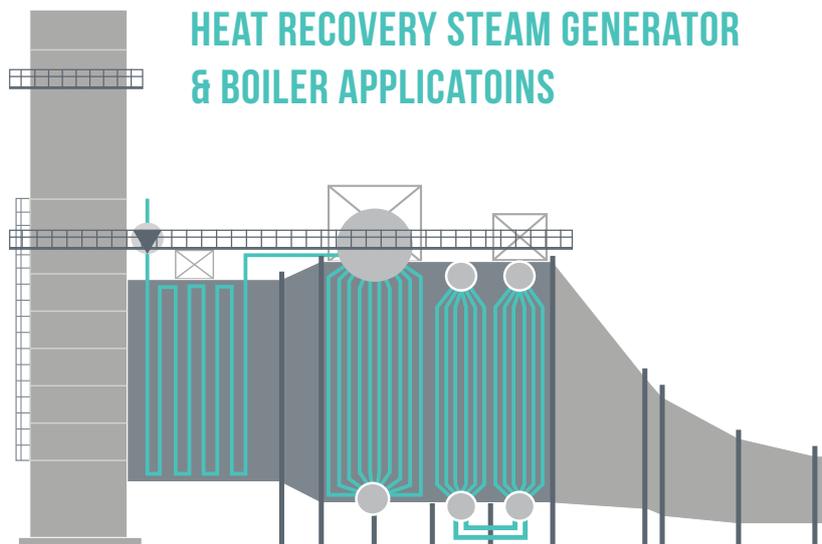
- Simulation.
- Performance assessment.
- Modification assessment.
- Fault root cause assessment.

### DESIGN

- System sizing.
- Component sizing.
- Determining operating ranges.
- Flow, temperature, pressure, power consumption, etc.
- Testing of control philosophy.

### TRAINING

- System behavior examination
- Performing basic flow and heat transfer calculations.
- Thermo hydraulic principles and properties referencing.



## HEAT RECOVERY STEAM GENERATOR & BOILER APPLICATIONS

**BRINGING NUCLEAR  
QUALITY AND STANDARDS  
TO SYSTEM SIMULATION**

Flownex<sup>®</sup> is developed in an ISO 9001:2008 quality assurance system and NQA1 supplier approved environment.

# HRSG & BOILER SIMULATIONS

## STEADY-STATE DESIGN

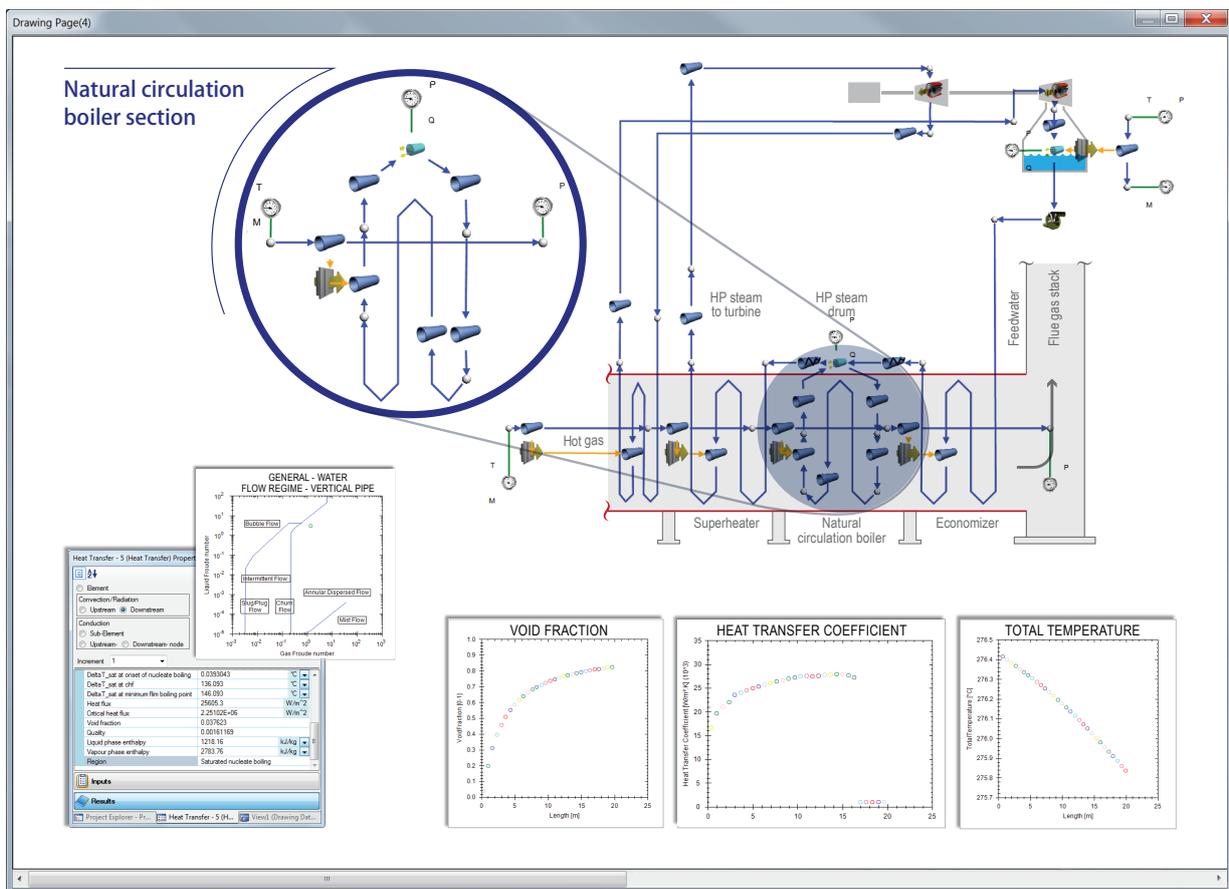
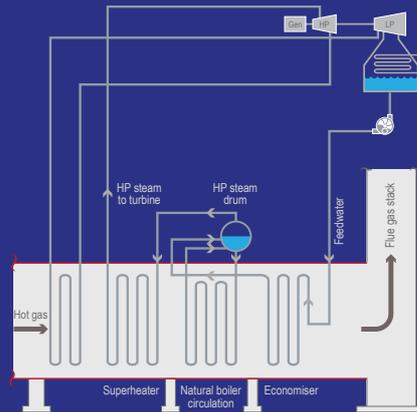
- Analysis of natural circulation boiling sections.
- Modeling and design of the heat transfer between the gas and steam side of a heat exchanger.
- Modeling of the complete system, including superheaters, economizers, evaporators, pumps, turbines, etc.
- Adaptable modeling approach according to the required level of detail.
- Assists in proper and economical design for the expected operational conditions.

## TRANSIENT ANALYSIS

- Determine rates of change in material temperatures.
- Evaluate control philosophy.
- Determine plant power ramp rates.

## APPLICATIONS

- Detection of unwanted operating conditions involving:
  - Boiling oscillations.
  - Departure of Nucleate Boiling (DNB).
- Evaluation of off-design or accident scenarios.
- Evaluation of temperature gradient during start-up.
- Evaluation of start-up, shut down and load changes.
- Flow stability analysis.
- Flow distribution.
- Balancing of flow in parallel paths.



“ Flownex proved to perform well also for simulations of start-ups (or shutdowns), making it a valuable tool for studying and optimizing such procedures. ”

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