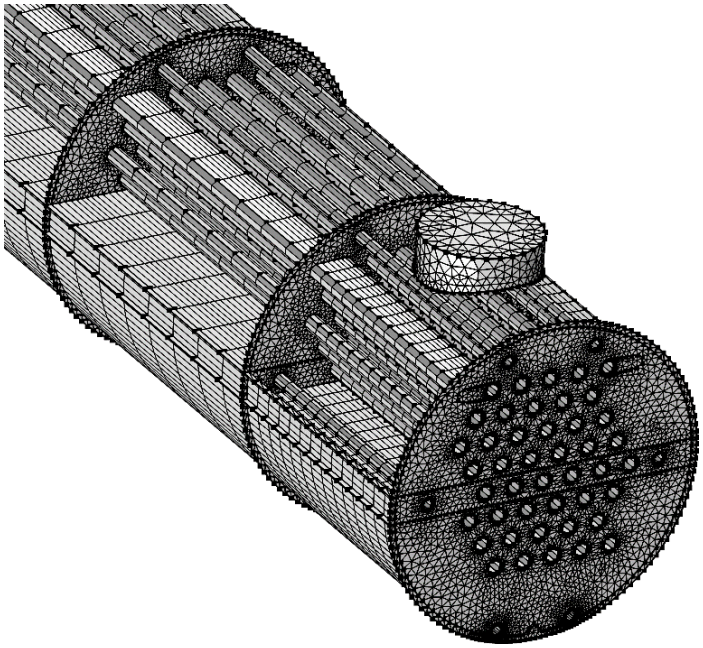
Computational Flow Analysis

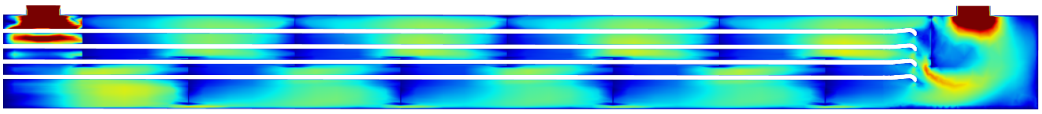
EXHEAT's all-encompassing Computational Flow Dynamics (CFD) and Finite Element Analysis (FEA) offers a variety of computational solutions for your process analysis requirements.

By utilising CFD/FEA studies during the early stages of a project, be it pre-FEED, during the main FEED study or detailed design stages, EXHEAT can assist with tailoring your thermal requirements and assisting with the design and specification of your process heaters. Should this lead to an order for our heaters, EXHEAT would be able to provide the heater as designed in a timely manner due to the prior involvement.

The analysis are not limited to just EXHEAT heaters but can be increased to include upstream and downstream pipework to confirm acceptable design, whether there is enough insulation to maintain a process temperature or if adding some additional pipework will increase the pressure drop.



Slice: Velocity Magnitude (m/s)



TYPICAL ANALYSIS

- Normal operation thermals
- Low or zero flow fault condition
- Heat loss along an outlet pipe
- Design temperature selection
- Tank heat up time or running temperatures
- Air duct heater pressure drop
- Element surface temperatures
- Room heating sizing requirement

VISUALISE THE RESULTS

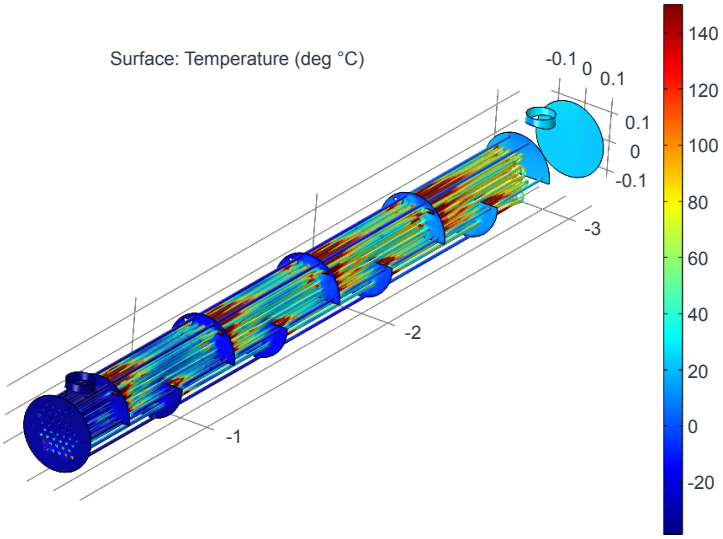
The advanced post processing capability that EXHEAT can offer will allow you to clearly visualise the results, whether they show the velocity through a heater, the surface temperature of elements or even pressure variance due to the baffled flow design implemented on many heaters.

REPORT

A comprehensive report will be produced that provides details of the information used to run the simulation, including process and geometry, output values, tables or images, depending on the analysis completed. Each report will be tailored to the analysis run and offer calculated results which can be used to affect the design of the heater or pipework should they be required to.

Rev 1.1

EXHEAT has already utilised the simulation packages to refine the design of process heaters by ensuring items such as the baffle pitches are optimised for the specific process, element temperatures remain at acceptable levels under normal operation, and the heat transfer is sufficient for process requirement.



AVAILABLE SOLUTIONS

Normal Operation

EXHEAT can simulate a heater running in normal operation and demonstrate that the appropriate design has been created for the heater. This will include such things as baffle pitches and form as well as correctly positioning the control and over-temperature sensors.

Low or Zero Flow Condition

In the event that a heater operates with a greatly reduced or zero flow situation, the elements will invariably run hotter. This could in turn cause a heater to de-energise itself by way of an over-temperature trip condition.

We can simulate this event to identify:

- At what flow rate the heater would trip.
- The overrun on the elements in case of no flow over-temperature trip.
- Heater maximum shell temperature (heat mass balance) to confirm design temperatures.

Upstream / Downstream

If supplied with 3D CAD or drawings for interconnecting pipework or ducting, EXHEAT can evaluate the temperature and flow profile through the full length of the requested pipework.

Tank Heating

Tank geometry can be constructed in-house, or this can be supplied by the client. Ambient conditions will need to be provided, after which an analysis will be completed to provide the warm-up time, holding duty or cool-down of the process along with element surface temperatures.

EXHEAT Cast Heater

EXHEAT has developed a customisation to calculate the range of standard Cast Heaters in a relatively short period of time. This cost effective analysis can be provided during the quotation stage of a project and be partially refunded against the procurement of one of EXHEAT's standard Cast Heaters.

Duct Heating

Similar to the Upstream / Downstream style study, EXHEAT can provide an analysis to provide the pressure drop as air is heated and visualise the cool-down of that air as it continues to flow along the ductwork.

Room Heating

Simple calculations can be performed to offer the duty required to heat a room and then continue to maintain that temperature when factoring in losses from the walls, ceiling, floor, door, windows and more.

Rev 1.1