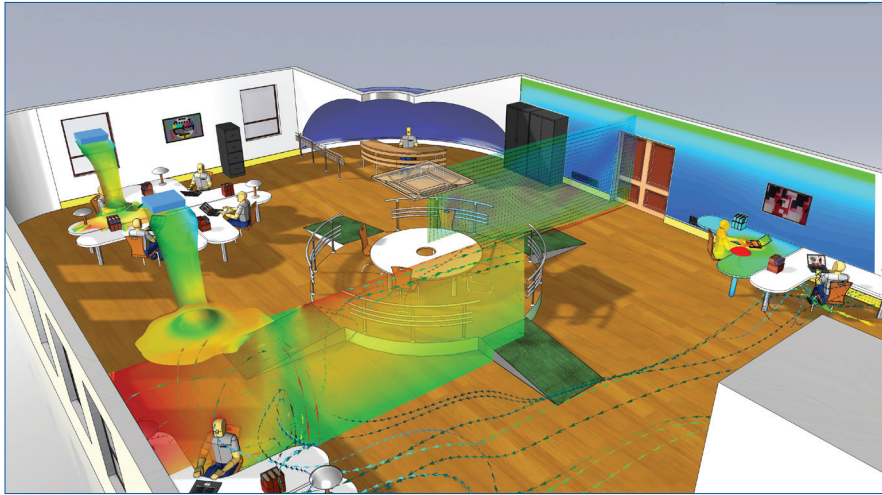# FloEFD HVAC Module

Mentor Graphics' Mechanical Analysis Division has been a leader in the simulation of airflow and temperature for the built environment since 1989. With FloEFD's concurrent CFD, software that connects directly with your CAD software, users can simulate airflow and heat transfer using 3D CAD models directly, with no need for data translations or copies.

More specifically the HVAC Module for FloEFD® provides additional capabilities for specialist analysis in support of heating, air-conditioning and ventilation applications, such as:

Comfort Parameters

To make an assessment of thermal comfort of an occupant and efficiency of the ventilation system the following comfort parameters are offered with the HVAC module:

- Predicted Mean Vote (PMV)
- Predicted Percent Dissatisfied (PPD)
- Operative Temperature (K)
- Draft Temperature (K)
- Air Diffusion Performance Index (ADPI)
- Local Air Quality Index (LAQI) for fluids
- Contaminant Removal Effectiveness (CRE) for fluids
- Flow Angle (X, Y and Z)

Customer Testimonial:

"FloEFD is a natural extension of traditional CFD that is easier to use and more intuitive for mechanical engineers."

G. Bertels, Senior Engineer, Bronswerk Heat Transfer
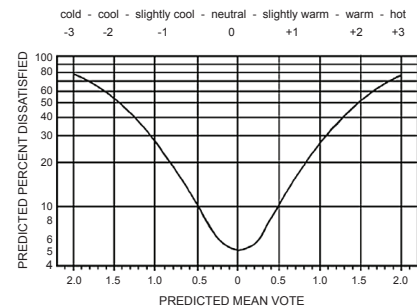
"What-if?" Testing Made Easy

One of the most powerful features of FloEFD is the ease with which you can conduct "what-if?" analyses. FloEFD makes it simple to clone/modify your models and analyze design variations. The process is very simple. Create your base model and analyze it. Then create multiple variations of your design by modifying the solid model without having to reapply boundary conditions, material properties etc. When the analysis is complete, FloEFD makes it easy to compare the results among the many options to choose your best possible design. When you are satisfied with your design, publish your report at a touch of a button. You can even publish a fully interactive 3D dynamic plot and share it with colleagues or customers.

Mentor Graphics®

The following comfort parameters are already included in the basic FloEFD software: Local Mean Age (LMA), Local Air Change Index (LACI) and Dimensionless LMA.

Advanced Radiation Model

Advanced capabilities allow for more realistic radiation simulation by capturing the following effects:

- Absorption of radiation within semi-transparent solids such as glass

- Wavelength dependency of solid and surface properties as well as spectral characteristics of radiation sources

- Specularity coefficient to ensure appropriate reflection on surfaces

- Refractive index to ensure reflection and propagation of light traveling through objects

Materials Library

Aside from the basic materials, the following items are available:

- Large database of building specific materials such as concrete, gravel, timber, asphalt and tiles

- Database of solids materials such as alloys, ceramics, metals, polymers, laminates, glasses and minerals

FloEFD allows to model the following physical phenomena:

- Complex flows in rooms (forced & natural convection)

- Ventilation and comfort models

- Industrial Hygiene

- Airflow around and through buildings

- Chemical or biological agent transport

- Simulation of relative humidity and condensation (H_2O in air)

- Simulation of flows of gas mixtures (contamination, exhaust gas emissions)

- Pressure drop optimization in equipment

- Heat transfer performance (heat exchangers)

- Determination of forces and torque on movable parts

- Determination of flow rates with fans, pumps, blowers

- Determination of flow rates through vents etc.

- Simulation of solar radiation, surface-to-surface radiation

- Particle tracking (clean rooms)

- Heat exchangers with different phases in separated cavities (eg. gas/fluid)
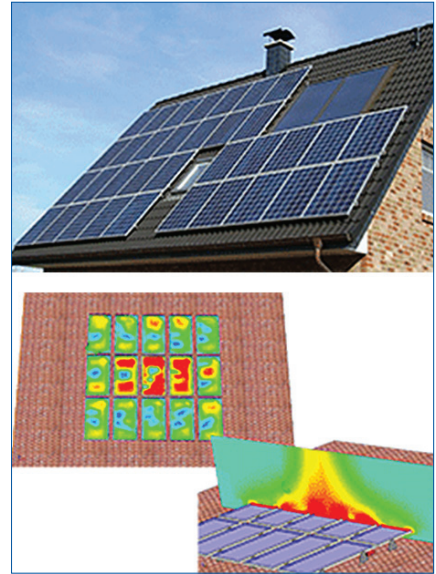
FloEFD solves the Navier-Stokes equations. FloEFD is capable of predicting both laminar and turbulent flows. FloEFD employs one system of equations to describe both laminar and turbulent flows. Moreover, transition from a laminar to turbulent state and/or vice versa is possible.

Visit www.mentor.com/company/office_locations/ for the list of Mechanical Analysis Division offices

Mentor Graphics