

CFD simulations for your HVAC installation

SIDEA

ENGINEERING SOLUTIONS
Advanced Engineering

How can CFD help you design your HVAC setup?

During the design process of an HVAC (Heating, Ventilation and Air Conditioning) system, engineers face numerous constraints. These setups must ensure proper temperature control, thermal comfort and indoor air quality.

Several variables are used to measure thermal comfort, and can be divided in environmental factors (such as temperature range, thermal radiation, humidity, air speed and air renovation rate) and personal factors (as clothing and activity affect the rate of dissipated heat from people).

The use of computational fluid dynamics (CFD) for the assessment of these systems allows for an efficient and cost-effective design methodology for HVAC setups. With CFD simulation, it is easy to test several different power outputs, airflow rates and positions for the equipment so that numerous design iterations can be performed and assessed in reduced time frames.

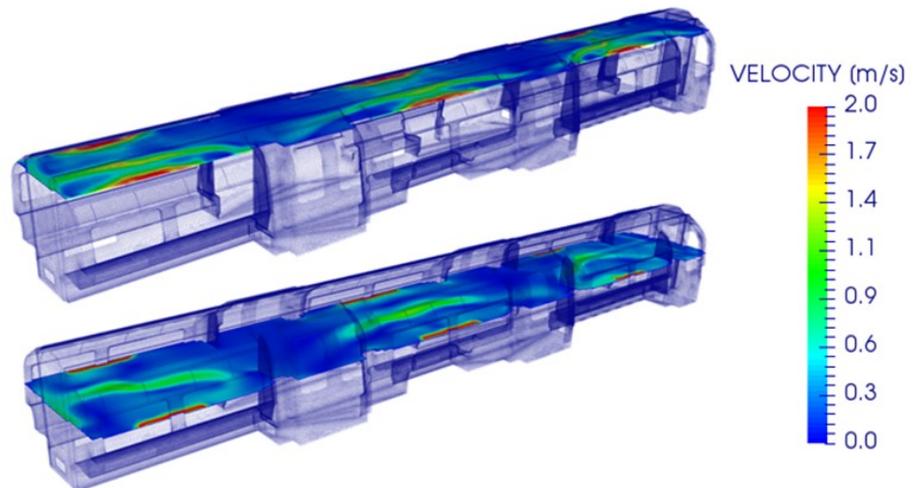
The CFD optimisation of HVAC installations allows for the proper dimensioning of the equipment, impeding wasteful distributions

with excessive thermal output and airflow rates. The ultimate challenge for the designer of the installation is to reach the most energy-efficient setup that can achieve air volume reduction while meeting the goals for air quality.

CFD is also a powerful tool for proper dimensioning of data center cooling, where scalable loads/number of machines can be a complex problem where a previous cooling configuration

can be deemed obsolete early. CFD allows to perform sensitivity analyses even when the specific thermal load is uncertain.

Using CFD is a great way of acquiring insights into the functioning of a complex ventilation setup, allowing for an in-depth analysis of the air distribution and properties, for instance, it is possible to analyse the concentration and evacuation of environmental pollutants such as carbon dioxide.



SDEA's team and experience

SDEA's Advanced Engineering team is highly specialized in the use of CFD and FEA methods in order to assess our clients' designs and projects for a wide range of industrial applications, including HVAC setups for indoor

and vehicular environments, using a variety of relevant standards such as ASHRAE 55 (for general indoor spaces), EN-14750 and EN-14813 (focused on railway rolling stock air conditioning applications)

Quick Summary

- *Optimise your design with no need for costly testing*
- *Multiple setups, wide range of operational conditions*
- *Fast and accurate*
- *Valuable information about air distribution and relevant properties*
- *External assessment for your installation*

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