SOLIDWORKS FLOW SIMULATION

OBJECTIVE

SOLIDWORKS® Flow Simulation is a powerful Computational Fluid Dynamics (CFD) solution fully embedded within SOLIDWORKS. It enables designers and engineers to quickly and easily simulate the effect of fluid flow, heat transfer, and fluid forces that are critical to the success of their designs.

OVERVIEW

SOLIDWORKS Flow Simulation enables designers to simulate liquid and gas flow in real-world conditions, run "what if" scenarios, and efficiently analyze the effects of fluid flow, heat transfer, and related forces on or through components. Design variations can quickly be compared to make better decisions, resulting in products with superior performance

SOLIDWORKS Flow Simulation offers two flow modules that encompass industry specific tools, practices, and simulation methodologies—a Heating, Ventilation, and Air Conditioning (HVAC) module and an Electronic Cooling module. These modules are add-ons to a SOLIDWORKS Flow Simulation license.

BENEFITS

- Evaluates product performance while changing multiple variables at a rapid pace.
- Reduces time-to-market by quickly determining optimal design solutions and reducing physical prototypes.
- Enables better cost control through reduced rework and higher quality.
- Delivers more accurate proposals.

CAPABILITIES

SOLIDWORKS Flow Simulation

SOLIDWORKS Flow Simulation is a general-purpose fluid flow and heat transfer simulation tool integrated with SOLIDWORKS 3D CAD. Capable of simulating both low-speed and supersonic flows, this powerful 3D design simulation tool enables true concurrent engineering and brings the critical impact of fluid flow analysis and heat transfer into the hands of every designer. In addition to SOLIDWORKS Flow Simulation, designers can simulate the effects of fans and rotating components on the fluid flow and well as component heating and cooling.

HVAC Module

This module offers dedicated simulation tools for HVAC designers and engineers who need to simulate advanced radiation phenomena. It enables engineers to tackle the tough challenges of designing efficient cooling systems, lighting systems, or contaminant dispersion systems.

Electronic Cooling Module

This module includes dedicated simulation tools for thermal management studies. It is ideal for companies facing thermal challenges with their products, and companies that require very accurate thermal analysis of their PCB and enclosure designs.

SOLIDWORKS Flow Simulation can be used to:

- Dimension air conditioning and heating ducts with confidence, taking into account materials, isolation, and thermal comfort.
- Investigate and visualize airflow to optimize systems and air distribution.
- Test products in an environment that is as realistic as possible.
- Produce Predicted Mean Vote (PMV) and Predicted Percent Dissatisfied (PPD) HVAC results for supplying schools and government institutes.
- Design better incubators by keeping specific comfort levels for the infant and simulating where support equipment should be placed.
- Design better air conditioning installation kits for medical customers.
- Simulate electronic cooling for LED lighting.
- Validate and optimize designs using a multi-parametric Department of Energy (DOE) method.
- Test the heat exchange on AC and DC power converters.
- Simulate internal temperature control to reduce overheating issues.
- Better position fans and optimize air flux inside a design.
- Predict noise generated by your designed system.

Some capabilities above need the HVAC or Electronic Cooling Module.

SOLIDWORK Design Support

- Fully embedded in SOLIDWORKS 3D CAD
- Support SOLIDWORKS configurations and materials
- Help Documentation
- Knowledge base
- Engineering database
- eDrawings® of SOLIDWORKS Simulation results

General Fluid Flow Analysis

- 2D flow
- 3D flow
- Symmetry
- Sector Periodicity
- Internal fluid flows
- External fluid flows

Analysis Types

- Steady state and transient fluid flows
- Liquids
- Gases
- Non-Newtonian liquids
- Mixed flows
- Compressible gas and incompressible fluid flows
- Subsonic, transonic, and supersonic gas flows

Mesher

- Global Mesh Automatic and Manual settings
- Local mesh refinement

General Capabilities

- Fluid flows and heat transfer in porous media
- Flows of non-Newtonian liquids
- Flows of compressible liquids
- Real gases
- Free, forced, and mixed convection
- Fluid flows with boundary layers, including wall roughness effects
- Laminar and turbulent fluid flows
- Laminar only flow
- Multi-species fluids and multi-component solids
- Fluid flows in models with moving/rotating surfaces and/or parts
- Heat conduction in fluid, solid, and porous media with/without conjugate heat transfer and/or contact heat resistance between solids
- Heat conduction in solids only
- Gravitational effects

Advanced Capabilities

- Noise Prediction (Steady State and Transient)
- Free Surface
- Radiation Heat Transfer Between Solids
- Heat sources due to Peltier effect
- Joule heating due to direct electric current in electrically conducting solids
- Various types of thermal conductivity in solid medium
- Cavitation in incompressible water flows
- Equilibrium volume condensation of water from steam and its influence on fluid flow and heat transfer
- Relative humidity in gases and mixtures of gases
- Two-phase (fluid + particles) flows
- Periodic boundary conditions.
- Tracer Study
- Comfort Parameters
- Heat Pipes
- Thermal Joints
- Two-resistor Components
- PCBs
- Thermoelectric Coolers

DASSAULT SYSTEMES | The **3D**EXPERIENCE® Company

Americas
Dassault Systèmes
175 Wyman Street
Waltham, Massachusetts
02451-1223
USA

Europe/Middle East/Africa
Dassault Systèmes
10, rue Marcel Dassault
CS 40501
78946 Vélizy-Villacoublay Cedex
France

Asia-Pacific
Dassault Systèmes K.K.
ThinkPark Tower
2-1-1 Osaki, Shinagawa-ku,
Tokyo 141-6020
Japan