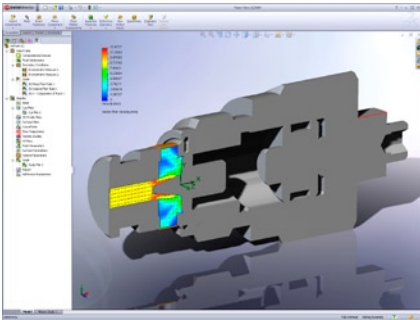


# COSMOSFloWorks

EASILY SIMULATE LIQUID AND GAS FLOWS WITHIN SOLIDWORKS® SOFTWARE

COSMOSFloWorks™ is the first easy-to-use fluid-flow simulation and thermal analysis program that is fully embedded inside SolidWorks. Now you have the confidence to innovate freely – and the security of knowing that no costly design mistakes will be passed down the line.



Visualize pressure variation along the piston valve length and automatically graph the results in Microsoft® Excel.

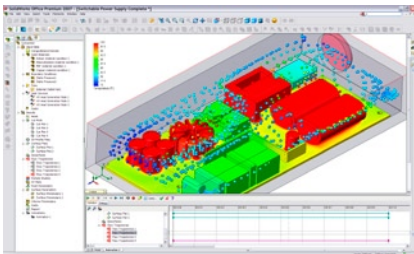
The original fluid-flow simulation tool, COSMOSFloWorks was developed exclusively for SolidWorks users. This powerful analysis software provides insight into your designs, so you can easily and quickly analyze fluid flow, heat transfer, and forces on immersed or surrounding components.

**The only fluid-flow simulation product fully integrated with SolidWorks.** With COSMOSFloWorks you no longer need to translate analysis design goals into numerical criteria and iteration numbers. Instead, you get access to a broad range of unique capabilities and built-in tools, including:

- Flow analysis – based on engineering goals.
- Design comparison – based on flow analysis using SolidWorks configurations. So you can choose the optimal design for final production.
- Analyze flow problems – based on a wizard approach.
- Automatic fluid-volume generation – based on SolidWorks assembly. Eliminates need to create fluid volume as a separate component.
- Associative flow parameters – based on SolidWorks geometry. Automatically update with changes in your design.

**Physical models for engineering applications.** COSMOSFloWorks can evaluate a wide array of real fluids, such as air, water, juice, ice cream, honey, plastic melts, toothpaste, and blood. Using COSMOSFloWorks, you can analyze the following:

- Internal flow – evaluate the flow of liquids and gases through valves, regulators, and ducts.
- External flow – calculate the flow of liquids and gases around solid bodies, such as air flow over an airplane or water flow around a submarine.
- Transient flow – simulate unsteady flow over a short time period.
- Turbulent flow – use a K-E model to illustrate flow domain turbulence, such as the gases from an aircraft engine nozzle.
- Real gas simulation – accurately solve high-pressure or low-temperature gas applications where the ideal gas approximation becomes invalid.
- Compressible flow – analyze gas flows in subsonic, transonic, and supersonic speed zones, such as the flow around an aircraft engine moving at Mach 1 speed.
- Heat transfer – evaluate conduction and convection, including natural and forced convection.
- Radiation – study heat transfer exchange between high-temperature surfaces and also calculate solar radiation.
- Wall roughness – calculate pressure drop on pipes based on surface roughness value.
- CFD-based design optimization – enhance your design based on model dimensions and flow parameters.
- Porous media – simulate components, such as industrial filters or catalytic converters, to understand how they affect your design.
- Non-Newtonian liquids – solve flow problems involving liquids such as blood, toothpaste, and plastic melts.
- Moving wall – study flows relative to a moving reference frame.
- Rotating reference frame – understand complex rotational flow inside turbo machinery, such as pumps and impellers.
- Cavitation – identify model areas where cavitation will occur.
- Humidity – calculate relative humidity inside enclosures for climate control applications.



Study the efficiency of electronic cooling and easily integrate the results into SolidWorks Animator to create high-quality animations.



**Primary industries served**

- Aerospace
- Automotive
- Biomedical
- Consumer Products
- Fans
- Food Processing
- Glass and Ceramics
- HVAC/Refrigeration
- Industrial Hygiene
- Machinery
- MEMS
- Plastic Extrusions
- Power Plant
- Process
- Pumps
- Valves and Regulators

**Supported languages**

- English
- Japanese

**System requirements**

- SolidWorks 2007 or higher
- Microsoft Windows XP Professional (32-bit and 64-bit)
- Intel® Pentium®, Intel Xeon™, Intel EM64T, AMD Athlon™, or AMD Opteron™-based processor
- 512 MB RAM or greater
- Pointing device
- CD-ROM drive

**Simulate real-world operating conditions.** COSMOSFloWorks includes several types of boundary conditions to represent real-life situations. With these capabilities, you can easily:

- Apply inlet velocities, pressures, mass- or volume-flow rates, and fans. If multiple gases are involved, you can apply mass or volume fraction.
- Simulate the effects of: heat generation by applying surface or volume heat source; cooling by applying natural or forced convection; rotating parts by applying one or more rotating frames of reference; and solar radiation.
- Study the effect of heat sinks on electronic components with heat sink emulation.
- Track the behavior of particles suspended in a flow.
- Apply time-and-coordinate dependent boundary conditions and heat sources.

**Automate fluid-flow tasks.** COSMOSFloWorks utilizes a number of automation tools to simplify the analysis process and help you to work more efficiently. As a result, you can quickly:

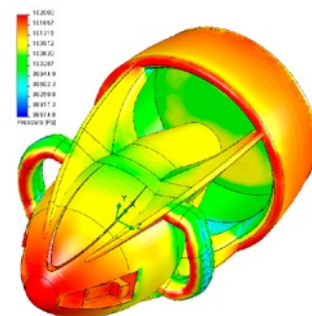
- Detect fluid volume automatically from SolidWorks geometry, thereby distinguishing between solid and fluid regions.
- Mesh both fluid and solid regions automatically.
- Improve accuracy with solution-adaptive mesh generation.
- Automatically create goal plots to evaluate pressure drop and temperature distribution once the analysis is complete.
- Save time with a built-in engineering database of commonly used liquids, gases, solid materials, fans, and units, or customize it with your own materials.
- Automatically create seal openings in the model to apply flow conditions.

**Interpret results with powerful and intuitive visualization tools.** Once you have completed your analysis, COSMOSFloWorks offers a variety of results visualization tools that allow you to gain valuable insight into the performance of your models. You can quickly:

- Study the distribution of result quantities with section plots, including velocity, pressure, vorticity, temperature, and mass fraction.
- Measure results at any location with the Point Parameter tool.
- Graph result variation along any SolidWorks sketch.
- List results and automatically export data to Microsoft Excel.
- Examine the flow trajectory inside or around the model with animated bands, 3D arrows, pipes, or spheres.

**Collaborate and share analysis results.** COSMOSFloWorks makes it easy to collaborate and share analysis results effectively with everyone involved in the product development process. You can easily:

- Generate customized engineering reports in Microsoft Word format.
- Save result plots in several standard formats, such as BMP and JPEG.
- Create animations of results using SolidWorks Animator and save as an AVI.
- Publish eDrawings® files with analysis information.



Plot pressure variation on a moving body to determine the drag forces and improve the design of moving objects.

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