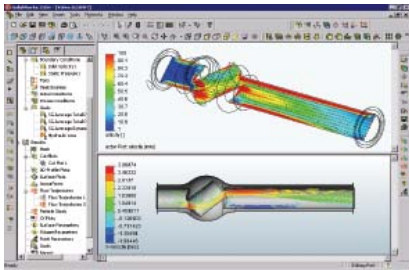


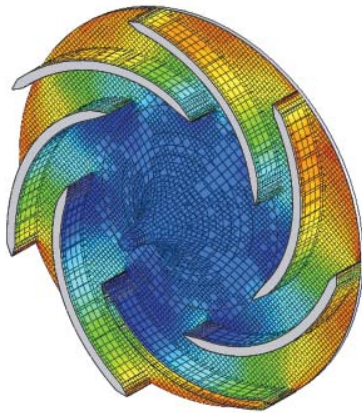
# COSMOSFloWorks 2005 OVERVIEW

EASILY SIMULATE FLUID AND GAS FLOWS WITHIN SOLIDWORKS

COSMOSFloWorks™ is the first easy-to-use fluid flow simulation and thermal analysis program that is fully embedded inside SolidWorks. Understand, validate, and improve new product ideas during the design phase ... not after!



Visualize swirling flows for various valve-opening configurations by plotting vorticity directly on a SolidWorks valve model, making it easy to spot recirculation and predict cavities in the flow.



Identify structural failures that can occur due to fluid pressure regions by combining the analysis power of COSMOSFloWorks and COSMOSWorks®. Plot the pressure distribution profile in COSMOSFloWorks and easily transfer these pressures to COSMOSWorks to perform a stress analysis.

The original fluid flow simulation tool developed exclusively for SolidWorks users, COSMOSFloWorks enables you to understand, validate, and improve your designs immediately within SolidWorks so you can design not just better, but smarter.

**Optimize the quality of your SolidWorks designs.** COSMOSFloWorks gives you insight into parts or assemblies related to fluid flow, heat transfer and forces on immersed or surrounding solids. Using COSMOSFloWorks, you can save resources by conducting flow and heat transfer simulations on virtual prototypes, shorten time-to-market by creating better designs faster, and reduce outsourcing.

**The only fluid flow simulation product fully integrated with SolidWorks.** Unlike other fluid flow programs, COSMOSFloWorks allows users to immediately create designs and analyze them without having to transfer the data to the analysis code. COSMOSFloWorks is incredibly easy to use; you simply tell the software what you're interested in instead of having to translate analysis goals into numerical convergence criteria, iteration numbers, and relaxation factors.

**Enhanced applications suitable for a wide variety of industries.** COSMOSFloWorks can analyze a wide range of real fluids such as juice, ice cream, honey, plastic melts, toothpaste, and blood, which makes it ideal for engineers in nearly every industry.

- Designers of electronic devices (computers, audio/video, etc.) can check for efficient cooling by simulating convection and conduction within their designs;
- Land-, air-, and marine-vehicle designers can achieve maximum performance at lowest cost: manifolds, brake systems, engine cooling jackets, flow around a wing or through a rocket nozzle, flow around an immersed body;
- Hydraulic/pneumatic systems manufacturers can improve their designs regarding flow distribution and pressure drop;
- HVAC equipment manufacturers can optimize product performance: flow through ducts, heat exchangers, flow and temperature distributors in rooms to determine duct locations, etc;
- Chemical process and oil manufacturers can better understand flow through valves or mixing vessels, etc;
- Designers who are involved with rotating machines like pumps, impellers, and propellers can study and understand complex rotational flow.

## Bundles

### COSMOSFloWorks Standard

- Compressible/incompressible flow
- External/internal flow
- Steady-state and transient flows
- Conjugate heat transfer
- Comprehensive database with predefined fluids and fan curves
- Mesh controls
- Mesh-based visualization and output
- Porous media
- Particle tracking

### COSMOSFloWorks PE

The features of Standard PLUS

- Non-Newtonian liquids
- Surface-to-surface radiation
- Solar radiation
- Rotating frame
- Zooming technique: Transfer results of one analysis as initial and boundary condition for new simulations
- Parametric tools
- Export results as FEA loads for use with COSMOSWorks

### COSMOSWorks Professional with Flow Standard

- COSMOSWorks Professional
- COSMOSFloWorks Standard

## Supported Languages

- English
- Japanese

## System Requirements

- SolidWorks 2004 or higher
- Pentium®- or AMD Athlon™-class processor
- Microsoft® Windows XP Professional or Windows 2000
- 256 MB RAM or greater
- 200 MB disk space or greater
- CD-ROM drive
- Pointing device
- OpenGL hardware graphic support recommended

## CAD integration

- COSMOSFloWorks is fully embedded within the SolidWorks Windows®-native environment
- Automatically detects fluid volume from SolidWorks models and distinguishes between fluid and solid regions. Eliminates the need to create the "fluid volume" as a separate part

## Physical modeling

- External and internal flow
- Steady-state and time-dependent fluid flow, heat and mass transfer analysis
- Automatic laminar/turbulent solution with transition
- Incompressible viscous flow
- Compressible viscous flow that includes subsonic, transonic, and supersonic flow regimes
- Conjugate heat transfer (both conduction and convection)
- Natural and forced convection
- Wall roughness model
- Parametric tool to study "what if" scenarios
- Porous media
- Rotating frame of reference\*
- Non-Newtonian liquids\*
- Surface-to-surface radiation\*
- Time-dependent solar radiation\*
- Moving wall\*

## Boundary conditions

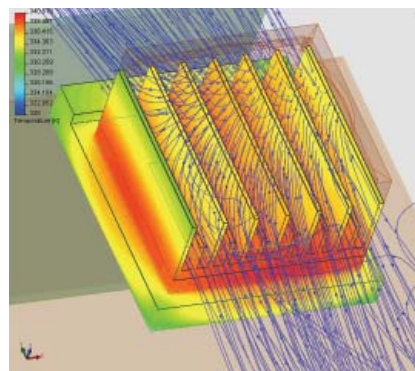
- Openings: mass flow, volume flow, velocity, pressure, temperature, and concentration (chemical species)
- Volumetric and surface heat source, heat transfer coefficient, emissivity
- Symmetry boundary condition
- Time and coordinate-dependent boundary conditions, sources, and initial conditions
- External and internal fans with predefined fan curves
- Direction, swirl, or predefined profiles for flow boundary condition
- Zooming technique: transfer results of one analysis as initial and boundary condition for new simulations

## Mesh generation

- Automatic mesh generation in fluid and solid regions eliminating the need to manually identify an optimum mesh
- Automatic mesh refinement in small geometric features like narrow channels, thin walls, etc.
- Solution adaptive mesh generation

## Results visualization

- Dynamic monitoring of results and goals during analysis
- Direct display of results on the SolidWorks model
- Full support of the flexible model coloring and transparency concept of SolidWorks for perfect result pictures
- Three-dimensional flow trajectories
- Particle tracking model: spherical particles with density and size
- Animation of results
- Plot any solution or derived quantity on SolidWorks planes or surfaces: contours, vectors, isolines
- Plot flexible colored isosurfaces of any solution or derived quantity
- Plot any solution or derived quantity along a curve defined by SolidWorks sketch
- Support of local coordinate systems for results
- Probe tool to query results at any location in the model
- Output of solution, derived and integrated quantities to Microsoft Excel
- Automatic design reports in Microsoft Word format



Study the effectiveness of cooling for different layouts of electronic components by plotting temperatures and visualizing trajectories of the cooling fluid.

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