Ansys

2021 R2
Engineering What's Ahead.

FLUIDS

Ansys Fluids

Capabilities Chart (Version 2021 R2)

● – Full Support

▲ – Limited Capability

■ – Requires More than 1 Product

FLUIDS

FLUIDS	FLUENT PRO	FLUENT	CFX	CHEMKIN-PRO	FORTE	POLYFLOW	FENSAP-ICE
General Solver Capabilities							
Comprehensive Inlet and Outlet Conditions	●	●	●	●	●	●	●
Steady-State Flow	●	●	●	●	●	●	●
Transient Flow		●	●	●	●	●	●
2-D and 3-D Flow	●	●	▲	▲	▲	●	●
Reduced Order Models (ROM)		●		●			
Time Dependent Boundary Conditions		●	●	●	●	●	●
Customizable Materials Library	●	●	●	●	●	●	●
GRANTA Materials Data for Simulation	■	■					
Fan Model	●	●	●				●
Periodic Domains		●	●	●	●	●	●
Flow-Drive Solid Motion (6DOF)		●	●		▲		●
Pressure-Based Coupled Solver	●	●	●	●	●	●	●
Density-Based Coupled Solver		●					
Dynamic/Moving-Deforming Mesh		●	●		●	●	●
Overset Mesh		●					
Immersed-Solid/MST Method for Moving Parts			●			●	●
Automatic On-the-fly Mesh Generation with Dynamic Refinement					●		
Dynamic Solution-Adaptive Mesh Refinement		●	●	▲	●		▲
Polyhedral Unstructured Solution-Adaptive Mesh Refinement		●					
Single Phase, Non-Reacting Flows							

Incompressible Flow	●	●	●	●		●	
Compressible Flow	●	●	●	●	●		●
Porous Media	●	●	●	▲	▲	●	▲
Non-Newtonian Viscosity	●	●	●			●	
Turbulence -Isotropic	●	●	●		●	●	●
Turbulence - Anisotropic (RSM)		●	●				
Turbulence - Unsteady (LES/SAS/DES)		●	●		●		●
Heat Transfer							
Natural Convection	●	●	●	●	●		●
Conduction & Conjugate Heat Transfer	●	●	●	▲	▲		●
Shell Conduction (including Multi-Layer Model)		●					
Internal Radiation - Participating Media		●	●			●	●
Internal Radiation - Transparent Media		●	●	●	●		
External Radiation		●	●				
Solare Radiation & Load		●	●				
Simplified Heat Exchange Model		●					
Non- Equilibrium Thermal Model		●	●				
Porous Media	●	●	●				
Particle Flows (Multiphase)							
Coupled Discrete Phase Modeling including Thin Wall Films		●		▲	●		●
Macroscopic Particle Model		●					
Inert Particle Tracking (with Mass)		●	●				
Liquid Droplet (including Evaporation)		●	●	▲	●		●
Combusting Particles		●	●	●	●		●
Multicomponent Droplets		●	●	▲	●		●
Discrete Element Model (DEM)		●					
Break-Up and Coalescence		●	●	▲	●		●
Erosion		●	●				
Free Surface Flows (Multiphase)							
Implicit VOF		●	●			●	

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Explicit VOF		●				●	
Coupled Level Set/VOF							●
Complex Multiphase Regime Transitions (AIAD and GENTOP Model)		●					
VOF to DPM Spray Model		●					
DPM to VOF Model		●					
Open Channel Flow and Wave		●	●				
Surface Tension		●	●		●		●
Phase Change		●	●		●		●
Cavitation		●	●		●		●
Cavitation Where Multiple Fluids and Non-Condensing Gases are Present		●	●				
Dispersed Multiphase Flows (Multiphase)							
Mixture Fraction		●	●				
Eulerian Model including Thin Wall Films		●	●		●		●
Boiling Model		●	●	▲	●		
Surface Tension		●	●		●		
Phase Change		●	●	▲	●		
Drag and Lift		●	●		●		
Wall Lubrication		●	●		●		
Heat and Mass Transfer		●	●	●	●		
Population Balance		●	●	●	●		
Reactions Between Phases		●	●	●	●		
Granular Model for Dense Bed of Solids		●					
Dense Particulate Coupling (DDPM)		●					
Reacting Flows							
Species Transport		●	●	●	●	●	
Non-Premixed Combustion		●	●	●	●		
Premixed Combustion		●	●	●	●		
Partially Premixed Combustion		●	●	●	●		
Composition PDF Transport		●	●				
Finite Rate Chemistry		●	●	●	●	●	

Multiphase Reactions				●			
Pollutants and Soot Modeling		●	●	●	●		
Sparse Chemistry Solver with Dynamic Cell Clustering and Dynamic Adaptive Chemistry		●		●	●		
Ability to Use Model Fuel Library Mechanisms		●		●	●		
Flame-speed from Fuel-Component Library		●		●	●		
DPIK Spark-Ignition Model				▲	●		
Flame-Propagation Using Level-Set Method (G-Equation)					●		
Internal Combustion Engine Specific Solution				●	●		
0-D/1-D/2-D Reactor Models and Reactor Networks				●			
Plasma Reactions				●			
Comprehensive Surface-Kinetics		●		●			
Chemical and Phase Equilibrium		●		●			
Flamelet Table Generation		●		●			
Flame speed and Ignition Table Generation				●			
Reaction Sensitivity, Uncertainty and Path Analysis				●			
Surrogate Blend Formulation and Optimization				●			
Mechanism Reduction				●			
Detailed Electrochemistry Model for Li-ion Batteries		●					
Turbomachinery							
MRF/Frozen-Rotor	●	●	●				
Sliding-Mesh/Stage		●	●				
Transient Blade Row			●				
Pitch Change		●	●				
Time Transformation			●				
Fourier Transformation			●				
Harmonic Analysis			●				
Blade Flutter Analysis			●				
Performance Maps			●				
In-Flight Icing							
Simulation of Standard Droplets, SLD and Ice Crystals		●					●

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Inclusion of Vapor/Humidity Effects on Icing		●					●
Icing Environments of Appendices C, O (SLD) and D (Ice Crystals)		●					●
Various Pre-Defined Droplet Size Distributions		●					●
Simulation of Rime, Glaze and Mixed Icing		●					●
Single and Multi-Shot Icing Simulations with Mesh Deformation for Prediction of Ice Accretion and Aerodynamic Performance Degradation		●					●
Single and Multi-Shot Icing Simulations with Automatic Re-Meshing for Prediction of Ice Accretion and Aerodynamic Performance Degradation							●
Conjugate Heat Transfer (CHT) for Anti and De-Icing Simulations			■				▲
Ice Cracking							●
Ice Shedding							●
Optimization							
Parameters		●	●	●	■	●	
Design Point Studies		●	●	●	■	●	
Correlation Analysis		●	●			●	
Design of Experiments		●	●	■	■	●	
Sensitivity Analysis		●	●	●		●	
Goal Drive Optimization		●	●			●	
Six Sigma Analysis		●	●			●	
Adjoint Solver for Shape Optimization		●					
Adjoint Solver Supports Rotating Reference Frames and Conjugate Heat Transfer		●					
Multi-Objective Constrained Optimization		●					
Mesh Morphing (RBF Morph)		■					
High Rheology Material							
Viscoelasticity						●	
Specialty Extrusion Models						●	
Specialty Blow Molding Models						●	
Specialty Fiber Spinning Models						●	
HPC							
Parallel Solving on Local PC Option	●	●	●	●	●	●	●
Parallel Solving over Network Option	●	●	●	■	●	●	●

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Parallel Solving over Cloud launched from Desktop		●					
GPU Support		●					
Parallel Mesh Generation		●					
Pre- and Post-Processing							
Compare Multiple Runs, Datasets, Physics, Graphs in a Single Window		●	●	●	●	●	●
Simulation Reports	●	●	●				
Advanced, Automated Data Exchange		●	●			●	●
Accurate Data Interpolation between Dissimilar Meshes		●	●				●
Multiphysics							
Drag-n-Drop Multiphysics		●	●			●	
Direct Coupling between Physics		●	●	●			
Collaborative Workflows		●	●				
Fully Managed Co-Simulation		●	●				
Flexiable Solver Coupling Options		●	●				●
Functional Mock Up Unit (FMU) Coupling		●	●				
Force Induced Motion/Deformation		■	■				
Fluid Thermal Deformation		■	■			●	
Fluid-Structure Interaction							
Intrinsic FSI		●			●		
Thermo-elasticity		●					
Convection Cooled Electronics		●	●				
Conduction Cooled Electronics		●	●				
Electro-Thermal Interaction							
High Frequency Thermal Management		●	●				
Electromechanical Thermal Management		●	●				
Aero-Vibro Acoustics		●					
Acoustic-Structural		●	●				
Other Coupled Interactions							
Fluid Magnetohydrodynamics		●	●				
Support ACT Simulation Apps		●					

Ease of Use and Productivity							
Mosaic-Enabled Meshing Technology	●	●					
Task-Based Workflow - Watertight Geometries	●	●					
Task-Based Workflow - Fault Tolerant Geometries		●					
Directly Enter Expressions	●	●	●				
Parallel Solving with Ansys Cloud Launched from Desktop		●					
Parallel Solving with Ansys Cloud Launched from VDI	●	●	●			●	