Ansys

Ansys Fluids

Capabilities Chart (Version 2023 R2)

● – Full Support

▲ – Limited Capability

■ – Requires More than 1 Product

/ FLUIDS	CFD PRO	CFD PREMIUM	CFD ENTERPRISE	BLADEMODELER	VISTA TF
FLUENT CAPABILITIES					
Steady-State Flow	●	●	●		
Transient Flow	●	●	●		
2D and 3D Flow	●	●	●		
Compressible and Incompressible Flow	●	●	●		
Customizable Material Properties	●	●	●		
Non-Newtonian Viscosity	●	●	●		
Real fluids models (steam, refrigerants, cryogenics, NIST data)		●	●		
Pressure-Based Solver	●	●	●		
Density-Based Solver		●	●		
Native Multi-GPU Solver			●		
Coupled and Segregated Solvers	●	●	●		
Subsonic Flow	●	●	●		
Supersonic and Hypersonic Flow		●	●		
Turbulence – RANS models	●	●	●		
Turbulence - LES/SAS/DES		●	●		
Heat Transfer - Natural Convection, Conduction and CHT	●	●	●		
Heat Transfer - Shell Conduction		●	●		
Thermal Radiation - Participating & Transparent Media		●	●		
ECAD import for PCB thermal modeling		●	●		
Expressions, inc. functions of solution values	●	●	●		

Flow-Drive Solid Motion (6-DOF)		●	●		
Porous Media	●	●	●		
Reduced Order Model (ROM) creation		●	●		
Dynamic/Moving-Deforming Mesh		●	●		
Overset Mesh		●	●		
Dynamic Solution-Adaptive Mesh Refinement		●	●		
Fan Model	●	●	●		
Virtual Blade Model		●	●		
Inert and Massless Particle Tracking	●	●	●		
Coupled Particle Tracking (with Mass)		●	●		
Wall Film Modeling		●	●		
Macroscopic Particle Model		●	●		
Reacting/Combusting Particles		●	●		
Particle Break-Up and Coalescence		●	●		
Dense Particle Coupling (DDPM) and Granular Particle modeling		●	●		
Wall Erosion Modeling		●	●		
Discrete Element Model (DEM)		●	●		
Free Surface VOF model		●	●		
Regime change between particle and free surface (VOF <-> DPM)		●	●		
Multiphase flow modeling		●	●		
Complex Multiphase Regime Transitions		●	●		
Surface Tension		●	●		
Gas – Liquid – Solid Phase Change models, including Cavitation, Boiling, Evaporation, Condensation, Solidification and Melting		●	●		
Reactions Between Fluid Phases		●	●		
Non-reacting Multicomponent Flow/Species Transport	●	●	●		
Reacting Multicomponent Flow/Species Transport		●	●		
Extensive Combustion modeling including FGM		●	●		
Finite Rate Chemistry modeling		●	●		
Pollutants and Soot Modeling		●	●		

Ability to use Model Fuel Library Reaction Mechanisms		●	●		
Comprehensive Surface-Kinetics		●	●		
Flamelet Table Generation		●	●		
Virtual cooling hole models (effusion and blade film cooling)		●	●		
Electrochemistry modeling for Li-ion Batteries		●	●		
Battery swelling modeling		●	●		
Battery life modeling		●	●		
Fuel Cell modeling		●	●		
Multiple Stationary & Rotating Reference Frames	●	●	●		
Periodic Interfaces		●	●		
Mixing Plane/Stage Frame Change Interface		●	●		
Sliding-Mesh/Transient Rotor-Stator Frame Change Interface		●	●		
Pitch Change across Frame Change Interfaces		●	●		
Aerodynamic damping (Blade Flutter)		●	●		
Dedicated Aerodynamics workspace (Fluent Aero)			●		
In-flight Aircraft Icing modeling			●		
Adjoint Solver for Shape Optimization		●	●		
Parameter-driven mesh morphing and optimization		●	●		
Parameters	●	●	●		
Design Point Studies	●	●	●		
Design of Experiments	●	●	●		
Local Parallel Solving	●	●	●		
Distributed Parallel Solving		●	●		
Batch solving		●	●		
Parallel Solving on Cloud launched from Desktop		●	●		
Workbench Integration		●	●		
Simulation Reports	●	●	●		
Functional Mockup Unit (FMU) Coupling		●	●		
Fluid Structure Interaction (FSI) with Ansys Mechanical		■	■		
Fluid Thermal Deformation with Ansys Mechanical		■	■		

Built-in FEA solver for Fluid-Structural and Fluid-Thermal Stress coupling		●	●		
Fluid Electro-Thermal Interaction		■	■		
Electromechanical Thermal Management		■	■		
Aero-optics		■	■		
Aero Acoustics and Vibro Acoustics		●	●		
Acoustic-Structural		●	●		
Fluid Magnetohydrodynamics (MHD)		●	●		
FLUENT MESHING CAPABILITIES					
Polyhedral, Poly-Hexcore, Hexcore, Tet and Prism meshing	●	●	●		
Mosaic-Enabled Meshing Technology	●	●	●		
Task-Based Workflow - Watertight Geometries	●	●	●		
Task-Based Workflow - Fault Tolerant Geometries		●	●		
Parallel Mesh Generation	●	●	●		
Wrap meshing		●	●		
Rapid Octree meshing		●	●		
CFX CAPABILITIES					
Steady-State Flow		●	●		
Transient Flow		●	●		
Customizable Material Properties		●	●		
Non-Newtonian Viscosity		●	●		
Real fluids models (steam, refrigerants, cryogenics, NIST data)		●	●		
Flow-Drive Solid Motion (6-DOF)		●	●		
Pressure-Based Coupled Solver		●	●		
Expressions, inc. functions of solution values		●	●		
Dynamic/Moving-Deforming Mesh		●	●		
Compressible and Incompressible Flow		●	●		
Porous Media		●	●		
Subsonic Flow		●	●		
Supersonic Flow		●	●		
Turbulence – RANS models		●	●		

Turbulence - LES/SAS/DES		●	●		
Heat Transfer - Natural Convection, Conduction and CHT		●	●		
Thermal Radiation - Participating & Transparent Media		●	●		
Particle Tracking (Discrete Phase Modeling)		●	●		
Liquid Droplets (including Evaporation)		●	●		
Reacting/Combusting Particles		●	●		
Wall Erosion Modeling		●	●		
Free Surface VOF model		●	●		
Surface Tension		●	●		
Multiphase flow modeling (Eulerian)		●	●		
Gas – Liquid – Solid Phase Change models, including Cavitation, Boiling, Evaporation and Condensation		●	●		
Reactions Between Fluid Phases		●	●		
Multicomponent Flow/Species Transport		●	●		
Combustion modeling		●	●		
Acoustics / Aerodynamic noise		●	●		
Blade film cooling model		●	●		
Multiple Stationary & Rotating Reference Frames		●	●		
Periodic Interfaces		●	●		
Mixing Plane/Stage Frame Change Interface		●	●		
Transient Rotor-Stator Frame Change Interface		●	●		
Pitch Change across Frame Change Interfaces		●	●		
Aerodynamic Damping (Blade Flutter Analysis)		●	●		
Transient Blade Row		●	●		
Time Transformation		●	●		
Fourier Transformation		●	●		
Harmonic Analysis		●	●		
Automated Speedline / Performance Map creation		●	●		
Local and Distributed Parallel Solving		●	●		
Parallel Solving on Cloud launched from Desktop		●	●		

Workbench Integration		●	●		
Functional Mockup Unit (FMU) Coupling		●	●		
Fluid Structure Interaction (FSI) with Ansys Mechanical		■	■		
Fluid Thermal Deformation with Ansys Mechanical		■	■		
Fluid Electro-Thermal Interaction		■	■		
Electromechanical Thermal Management		■	■		
Fluid Magnetohydrodynamics (MHD)		●	●		
TURBOGRID CAPABILITIES					
Automatic block-structured Hex meshing		●	●		
Predefined block topologies for blades		●	●		
Axial, Radial and Mixed machines		●	●		
Splitter blades		●	●		
Compressors, Fans, Turbines, Pumps		●	●		
Rounded and sharp leading/trailing edges		●	●		
Partial tip clearances		●	●		
Automated hybrid meshing for secondary flow paths, complex tips, partial tip and hub gaps (buttons), and blends		●	●		
Automatic addition of approximate blends/fillets		●	●		
Support for multiple input formats (CAD, NDF, profiles/curves)		●	●		
Automatic creation of high-fidelity CAD from profile/curve input		▲	▲		
Mesh refinement maintaining consistent mesh topology		●	●		
BLADEGEN AND BLADEEDITOR CAPABILITIES					
Turbomachinery blade design				●	
Turbo-specific CAD geometry creation				●	
Single CAD definition for CFD and FEA				●	
Flow Path CAD geometry creation				●	
Blade CAD geometry creation				●	
Splitter Blade CAD geometry creation				●	
Create high fidelity variable radius blade blends				●	
Flank milled blades				●	

VISTA CAPABILITIES					
Meanline / 1D Turbomachinery Design				●	
Centrifugal Compressor Design (CCD)				●	
Centrifugal Pump Design (CPD)				●	
Radial Turbine Design (RTD)				●	
Axial Fan Design (AFD)				●	
Through-Flow Quasi-2D Analysis for Turbomachinery Design					●
Centrifugal Compressor Map creation (CCM)					●
CFD POST CAPABILITIES					
Simulation Reports		●	●		
Turbo-specific Surface and Line locators		●	●		
Turbo coordinate systems		●	●		
Turbo macros and calculations		●	●		
Multiple case file comparison		●	●		
Point, Line, Surface and Volume locators		●	●		
GPU accelerated animations		●	●		
Keyframe animations		●	●		
Charts		●	●		
Contours, Vectors, Streamlines, Particle Tracks		●	●		
Expressions and quantitative calculations		●	●		
Operating Map post-processing		●	●		
Mesh quality metrics and calculations		●	●		
Polyflow Results Post-processing	●	●	●		
POLYFLOW CAPABILITIES					
Viscoelasticity and Yield Stress models		●	●		
Extrusion & Co-extrusion modeling	●	●	●		
Blow Molding modeling	●	●	●		
Fiber Spinning modeling	●	●	●		
Thermoforming modeling	●	●	●		
Screw extruder modeling		●	●		

2D and 3D forming		●	●		
Mixers and Filling modeling		●	●		
FORTE CAPABILITIES					
Automatic On-the-fly Mesh Generation with Dynamic Refinement		●	●		
Species Transport		●	●		
Finite Rate Chemistry		●	●		
Pollutants and Soot Modeling		●	●		
Sparse Chemistry Solver Dynamic Cell Clustering Dynamic Adaptive Chemistry		●	●		
Ability to Use Model Fuel Library Mechanisms		●	●		
Flame-speed from Fuel-Component Library		●	●		
DPIK Spark-Ignition Model		●	●		
Internal Combustion Engine Specific Solution		●	●		
Ge-rotor, screw compressor and scroll compressor modeling		●	●		
CHEMKIN CAPABILITIES					
Species Transport			●		
Finite Rate Chemistry			●		
Multiphase Reactions			●		
Pollutants and Soot Modeling			●		
Sparse Chemistry Solver Dynamic Cell Clustering Dynamic Adaptive Chemistry			●		
Ability to Use Model Fuel Library Mechanisms			●		
Flame-speed from Fuel-Component Library			●		
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			●		
Reaction Workbench			●		
Model Fuel Library		●	●		
FENSAP-ICE CAPABILITIES					
Simulation of Standard Droplets, SLD and Ice Crystals			●		
Inclusion of Vapor/Humidity Effects on Icing			●		
Icing Environments of Appendices C, O (SLD) and D (Ice Crystals)			●		
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			●		
ACCESS TO ADDITIONAL APPLICATIONS					
DesignModeler				●	
Discovery Modeling / SpaceClaim		●	●		
Ansys Meshing (Workbench Meshing)	●	●	●		
ICEM CFD		●	●		
EnSight Enterprise		●	●		
DesignXplorer		●	●		