

Barracuda - CPF[®]D Engineering Software Modules

Computational-Particle-Fluid-Dynamics (CPF[®]D) for *Fast & Accurate*
Industrial fluid / particle engineering simulations

Modular Software Structure

- A. Complete CPF[®]D Software Package**
 - a. Graphical User Interface (GUI), semi-automatic Grid Generator, CPF[®]D 'coupled' fluid-particle 'Solver', Postprocessor (GMV), Restart, InterACT, Support Package
 - b. Discrete Element Method for true particles possessing and size and/or density variation; millions of 'computational particles' simulated; dilute to close-packed
 - c. Particle engineering physics models: solid phase stress tensor: static/dynamic friction coefficients; wall restitution; wall wear; attrition metric; RTD; more
 - d. Gaseous Species for unlimited distinct chemical species; built-in properties
 - e. Special Flow BCs including radial flows; unstructured boundary grid
 - f. *InterACT* utility for dynamic changes (while running simulation) to your velocity BCs, timestep, graphics output, restart IC files, convergence criteria, more
 - g. Restarts allowing dynamic changes to boundary conditions, e.g., velocity
 - h. Training Manuals and electronic project files for cyclone, DB reactor, riser, more
 - i. 3D Stereographics enabled postprocessor
 - j. Barracuda is available *only for Linux operating systems*
- B. Gas Compressibility Module**
 - a. Formal gas-phase compressibility (P,T) with Ideal Gas Equation of State
- C. Particles and Fluid Thermal Module**
 - a. Particles energy equations
 - b. Fluid-phase energy equation
 - c. Interphase heat transfer with fully-conservative fluid-to-particle thermal coupling
 - d. Walls and structures heat transfer
- D. Particle Residual Gas Release or Liquid-Injection & Vaporization Module (Q4 2007)**
 - a. Particle outgassing from any species using various rate-law models
 - b. Liquid droplet injection from any interior or boundary domain location
 - c. Liquid coating onto dry particles with subsequent phase change (vaporization)
- E. Chemical Reactions module (Q4 2007)**
 - a. Reaction chemistry, fully coupled to fluid/particle/energy, including solid catalyst
 - b. Intelligent GUI for chemical reaction engineering