RhinoCFD

Powered by PHOENICS

RhinoCFD v3.1.1 Release Notes

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1 Introduction

The latest version of RhinoCFD is here: RhinoCFD version 3.1.1 for Rhino 8, which officially makes RhinoCFD compatible with Rhino 8. This version also brings with it additions and improvements to pre-processing, post-processing and the solver (PHOENICS' Earth). These updates provide improved usability, added UI features, expanded physical modelling capabilities, as well as corrections and fixes across RhinoCFD. Some features are highlighted below and a more extensive list of what's new in v3.1.1 will follow soon.

A number of bug fixes and code reliability changes have been made.

2 Pre- and Post-Processing Enhancements

2.1 Improved compatibility and responsiveness

RhinoCFD v3.1.1 is streamlined for use with Rhino 8, offering better integration with Rhino and thus better performance and a more responsive interface. For example, the computational grid now reacts more quickly to geometry changes, whether objects are added/removed, moved, or copied, making setup more intuitive and less error-prone. Menu and file loading speeds have been improved too.

2.2 Monitor Plot Window

A brand-new Monitor Plot Window provides real-time tracking of residuals, corrections, spot values, and other solver data during a run, helping users quickly assess simulation progression and convergence. The monitor and the simulation have been decoupled from one another to make interaction more responsive.

2.3 New physics and modelling options

- The Spalart-Allmaras turbulence has been added.
- Pasquill stability criteria are now available within the Wind Object, enabling better characterization of atmospheric conditions.
- The Ergun equation and porous-material pressure drop calculations within BLOCKAGE regions has been added.
- BLOCKAGE regions can also now include **thermal capacity** effects in surface heat balance calculations, offering greater fidelity in thermal simulations.

2.4 Expanded turbulence modelling

Inlet Object settings have been updated with two additional options for defining turbulence:

- Intensity + Viscosity Ratio: Calculates inlet turbulence using the ratio of turbulent to laminar viscosity.
- Intensity + Length Scale: Allows direct specification of Prandtl's mixing length alongside turbulence intensity.

These additions give users greater flexibility when setting up boundary conditions and improve the accuracy of simulations across different flow regimes.

2.5 Post-processing improvements

Mathematical expressions can now be used directly within post-processing through scalar fields (e.g. "U1+V1"). Both long and short names are supported, enabling faster custom analysis and visualization. A new testing check reduces the chance of choosing an invalid scalar function.

Added interpolation for cell wise data even for scalars with only Point data. This shows the user how coarse the grid is and the reliability of the interpolated data (large changes in a scalar across a large cell are clarified).

The colour of the result probes (for positioning cutplanes, sample point for isosurfaces and soon) can now be user chosen to make the probes less or more clear to the user.

Inappropriate post process icons cannot be clicked until some results have been loaded.

The minimum and maximum locations of a scalar are now shown as spheres. Although this does mean that only a single point is shown as the maximum position the user can create an isosurface with a value near the minimum (or maximum) to get an impression of how extensive the maxima/minima are.

Warnings are given if a result probe is outside the calculation domain.

2.6 Pre-processing improvements

The PHOENICS only objects (for example inlets & outlets, walls, NULL objects) are deleted on exit from RhinoCFD. This allows the user to concentrate on improving the CAD model without damaging the CFD properties. The description of the PHOENICS objects (size and CFD properties) is retained in the CAD file and they will be recreated at the positions that they occupied in the previous run of RhinoCFD, allowing the CFD solution to be developed in parallel with the mechanical objects.

Inappropriate pre-processing icons cannot be clicked until RhinoCFD is running.

3 Solver and Under-the-Hood Improvements

RhinoCFD v3.1.1 builds on top of CHAM's PHOENICS, and thereby inherits many of the recent enhancements made in PHOE2023 and PHOE2025, ensuring RhinoCFD users benefit from those improvements, and solver developments. Full details here.

- General improvements to robustness through updated solver defaults.
- Post-processing performance boosts to handle large datasets more smoothly.
- Support for the Spalart-Allmaras turbulence model.
- Implementation of VOF boiling and condensation mechanisms, including a new surface tension model.
- Expanded non-Newtonian fluid modelling capabilities.

4 Fixes and Stability

This release addressed a wide range of issues reported by users, including:

- Corrected display of invisible probes.
- Eliminated crashes when RhinoCFD was not yet loaded.
- Improved stability when copy-pasting while RhinoCFD is active.
- Safe handling of intermediate output files while a simulation is running.
- Corrected grid, scalar key, and domain-related display issues in certain cases.
- Improved UI consistency, including font scaling in the pre-processing panels.
- Fixed the non-functional "Show First/Last Time Step" option.

These fixes, combined with on-going solver refinements, make v3.1.1 the most stable RhinoCFD yet.

5 Known Issues

Some limitations still remain and will be addresses in a future release:

- Cylindrical-polar grids are not yet fully compatible with Rhino 8.
- Changes to the VOF models require further work on RhinoCFD Marine.