


CC-STEADY STATE

1. **PFD:** Add excel data box to PFD. Excel data sheets (such as those generated by DataMaps in CHEMCAD) may be easily pasted into the PFD. This allows the users to display simulation data on the PFD in any format they want. The databox may be automatically updated after a new simulation run is made.
2. **CC5 Data Reconciliation and Parameter Estimation:** For online optimization, the measured plant data can be sent to CC5 through Excel or CC-OPC. This new option reconciles the plant data and finds the best parameters (such as tray efficiency, heat transfer coefficients of the exchangers, etc.) to adjust for the best fit of the actual measurement and the rigorous simulation model.
3. **User specified equation for transport property calculation:** For all library transport properties, an equation number > 1000 indicates that the user specified equation will be used. A text file corresponding to the specified equation number must be created by the user. The file name for this file is as follows: `UsrEqnXXXX.sf` (or `.pf` `.uf`) where XXXX is the equation number > 1000. The extension (`.sf`, `.pf` or `.uf`) of this file uses the CC5 file extension convention and determines the accessibility of this file. For example if `.sf` is used and the file is in CC5 program directory, the specified file can be used for all CC5 jobs. If `.uf` is used and the files are placed under the work folder, the files can be accessed by all jobs under the work folder. A sample file `UsrEqn1001.sf` in CC5 can be used as a template for the file creation. The file uses the CC5 build-in parser C language to describe the equation. Variables T, P, Tc, Pc, A, B, C, D, E and X have been declared internally by CHEMCAD and must not be re-declared in the file. In most cases, only one line in the file (such as $X = A + B * \log(T) + C * T + D * T * T + E / T$) will be sufficient for the desired calculation. If additional variables are required, these variables must be declared the same way as the C language (See CC5 parser documentation).

The printout of the sample file `UsrEqn1001.sf` is as follows: Calculate user specified property by the following equation (Equation 1001 in this example). The property value X is defined as a function of

- i. T Temperature in degree K
- ii. P Pressure in Pascal (optional)
- iii. Tc Critical temperature of the component, degree K (optional)
- iv. Pc Critical pressure of the component, Pascal (optional)
- v. DIPPR Coefficients A, B, C, D and E as defined in CHEMCAD component database. The engineering unit of return value X has the same definition as DIPPR database.
 - Density: kmol/m³
 - Vapor pressure: pascals
 - Heat of vaporization: J/kmol
 - Heat capacity: J/kmol/K
 - Viscosity: pascal-sec
 - Thermal conductivity: W/m-K
 - Surface tension: N/m

$$X = A + B * \log(T) + C * T + D * T * T + E / T$$

4. **CC-SULPAK for Sulzer packing design:** New option under packed column sizing that allows sizing Sulzer packing bed in CC by calling SulPak package. User may specify sizing the packed column section by section or tray by tray. Data is exchanged through an excel file. All Sulzer packings are supported.
5. **Flowsheet Quickview:** Allows users to quickly browse flowsheet information by mouse. This feature is active by default but may be turned off by a toolbar button or the menu view/quickview option.
6. **Move/Scale (simulation mode):** Option under the View menu to avoid unwanted graphics modification under simulation mode. When this option is turned off, the MOVE and SCALE actions are disabled under simulation mode.
7. **PFD jobbox displays CC5 job name:** A new jobbox symbol has been added to the PFD palette which displays the CC5 jobname in the job box.
8. **Add structured packings for Billet correlation:** The existing Billet correlation has been modified to handle the structured packings.



CHEMCAD SUITE – Version 5.5 New Features

9. User specified std vapor reference temperature: A new page under the Engineering Units selection has been added to allow the users to specify their own standard vapor reference temperature. The default setting is 60 F for English units and 0 C for SI units.
10. Atmospheric pressure definition for gauge pressure specification: Users may specify their own atmospheric pressure definition for gauge pressure specification. Default is 14.6959 psia.
11. Solid for combustion: Define combustion solid as a new option under "New Component". User may specify element types such as C, H, O, S, Si and their weight percent. Heating value and heat capacity of the solid may also be given. The combustion solid defined here can be used in the Gibbs reactor to simulate the oxidation process.
12. Flowsheet warnings and error: New option under the VIEW menu to mark a unit op id box with red for errors and yellow for warnings.
13. New ASME steam table: New steam table recommended for near saturated conditions below 2000 psia. This new option is defined in the enthalpy input screen.
14. Option for coloring the cut stream in red under View/Mark cut streams: Cut streams are colored in red by default. The user may turn this option off.
15. BIP Regression Regress ALL missing BIPs from UNIFAC VLE, UNIFAC LLE or Modified UNIFAC: In addition to entering a pair of components for the regression of BIPs from UNIFAC/Modified UNIFAC, all missing BIPs can be regressed simultaneously by entering a check mark on "Regress all missing BIPs" on the regression input screen.
16. Mark the BIPs which are user specified or generated from UNIFAC or data regression: BIP data generated from UNIFAC, data regression or entered by user will be identified by asterisk (*) in the printout.
17. Add "Fillup Matrix by UNIFAC/UNIFAC LLE/Modified UNIFAC" button to the edit BIP screen: The new button will regress all missing BIPs from UNIFAC/UNIFAC LLE/Modified UNIFAC and fill up the BIP matrix.
18. License manager 7.2 added: The new License manager prevents the META unit (subflowsheet) from requiring additional licenses from the user.
19. Workbook name added to macro calls in Excel unit and user rate expression.
20. User specified pressure drop calculation in pipe module: Users may write their own pressure drop equation in C++ for pipe calculation.
21. Plot pipe profile: Internal pressure/stream properties can be plotted for pipe with number of segments > 1. The internal stream properties such as density and viscosities can be plotted for a pipe with multiple segments.
22. Specify the row/column ranges in excel datamap: An easy way to specify the datamap for multiple streams.
23. GIBS: Option in Gibbs reactor to calculate the required air/O2 flowrate for combustion calculation.
24. Specify relative humidity of an air stream by right clicking a stream and selecting this option from the popup menu.
25. Increase number of side streams from 4 to 10 in SCDS.
26. Copy/Paste flowsheet: The new option allows you to copy and paste the entire flowsheet or part of the flowsheet to the same job or different CC5 jobs. All engineering information is transferred automatically to the new flowsheet.
27. Copy unit op parameters.
28. Complete excel output: The new Excel output includes topology, thermodynamics, streams, unit operations, tray profile etc are placed under different worksheets for easy access.

**CC-DYNAMICS**

1. Take snapshot / Load snapshot for OPC and OTS (Operator Training System) application. For dynamic simulation, snapshots of the flowsheet can be taken at anytime during the simulation. The snapshot can load into the flowsheet memory afterward to "rewind" the dynamic time and flowsheet information.
2. Option to disable ramp control for dynamic simulation.
3. Improved dynamic algorithm to allow reverse flow back to DVSL.
4. Conversion of the unit op specification between steady state flow driven mode and dynamic state pressure driven mode. This option is under run/convergence input dialog.

CC-THERM

1. Option allowing user specified LMTD correction factor. This option allows the user to overwrite the LMTD correction factor calculated by the program with a user specified value.
2. New vibration report format indicating location of vibration and vibration criteria. An asterisk (*) is placed in the vibration analysis table indicating that vibration or damaging may occur. The placement of the sign indicates the location and type of vibration. The vibration criteria are added to the report for convenient reference.
3. Addition of overtone check of 2, 3, and 4 octaves for acoustic vibration, instead of only the primary tone as in earlier versions. This addition makes the vibration check more comprehensive.
4. Replace natural frequency calculation for U-bend with TEMA method.
5. Addition of axial tube stress multiplier to natural frequency calculation. User is allowed to specify axial tube stress. The program will use it in calculating tube natural frequency for vibration analysis.
6. Replace acoustic vibration calculation with TEMA method.
7. Addition of condition B and C for acoustic resonance check as required by TEMA (see TEMA, paragraph V-12.42 and V-12.43).
8. Addition of vibration amplitude calculation and check. This addition allows the user to check possible damage to the tubes when vibration occurs.
9. Replace critical velocity calculation with the TEMA method.
10. Addition of U-bend efficiency to heat transfer area calculation. This allows a portion of U-bend area to be included in the overall heat transfer area.
11. Addition of CC-THERM report in Excel format.