



A Siemens Business

FloEFD™ Release Highlights

Software Version FE17.0.0

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Introduction

This document provides a high-level summary of this release. It includes a summary of the new features in this release, any authorization code changes required, any major installation changes, and any transitioning issues you should be aware of before installing.

New Features

The following new features are available in this release.

- **Free Surface.** A moving interface between two immiscible fluids (e.g. air and water) can be simulated. The VOF (Volume of Fluid) method is implemented with the assumption of incompressible flow for both of the fluids. Surface tension, phase change (cavitation, condensation, evaporation) and rotation are not currently supported. The implemented capability is intended for simulating fluid filling or evacuating cases, sloshing, as well as open flows.
- **EDA import improvements.** Heat source and Material properties can be automatically created in a FloEFD project upon exporting of the EDA geometry into CAD. The new Territory selection option allows you to consider a certain area under a chip as detailed or explicit while representing the rest of the board with fewer details. Undo capability is available in EDA Bridge.
- **FloEFDView.** A standalone free viewer of FloEFD results saved as a scene allows you to share and present 3D results of simulations without the need to have FloEFD installed. It is possible to see the original geometry, hide plots, and change minimum and maximum values in the pallet.
- **LED with radiation source.** Radiation pattern and Spectrum can be specified as radiation properties of a LED. Enabling radiation properties automatically sets the radiation source applied to the selected surface of the LED with the intensity calculated by the thermal-optical model.
- **LED. Raw data import from TeraLED.** Import non-linear LED characteristics from TeraLED as a raw table instead of coefficients of linearity (sensitivities).
- **Feature Goals – New types of goals for LEDs and Two-resistors.** For LEDs, Two resistors and Network Assemblies you can optionally define junction, case and bottom temperature goals in the definition dialog. These goals are linked to the feature to which they belong and can be removed together with the feature.
- **Radiation. Transmission curve.** As an alternative to the absorption coefficient you can now define a transmission curve to specify radiation absorption properties of a solid material.

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- **Radiation. Ray visualization improvement.** Ray visualization has been improved so you can now display only the rays traveling between selected faces. Optionally it is possible to display ray propagation before and after an intersection point.
 - **TEC. Forward Current is dependent on Goal.** TEC's forward current value can now be set as a function of a goal.
 - **Component Explorer. Add and Edit materials and sources, display total heat power, view LED and Two-resistors.** You can now add or edit heat source values and solid material properties from the Component Explorer. The display (no edit yet) of LED and Two-resistors has been added. The total value for all sources of the heat generation rate type is calculated and displayed.
 - **FFT Plot (Fast Fourier Transformation).** A new **FFT plot** allows converting a time signal to the complex frequency domain. A parameter oscillation (e.g. Pressure at a point) can be represented as a Sound Pressure Level [dB]-Frequency plot.
 - **Sector periodicity.** Sector periodicity allows for the reduction of mesh cell count and therefore calculation time for axi-symmetric tasks (for example nozzle guide vanes). Periodic boundaries can be planar or have arbitrary shapes.
 - **Film. Import film thickness as a table of points.** Importing film thickness values as a table of points can be used for transferring results of film condensation to other simulations as initial conditions.
 - **Combustion. Formula definition of fuel/oxidizer.** Possibility to set Fuel or Oxidizer as a molecular formula, for example $(\text{CH}_3)_2\text{NNH}_2$ can be written as C2H8N2.
 - **Combustion.** In cases of fuel-oxidizer mixtures at inlets, the specified temperature can be treated as the temperature of initial components or the temperature of combustion products.
 - **NIST real gas library.** A database of real gases from NIST (National Institute of Standards and technology, U.S.) with extended thermodynamic properties is included in the ADVANCED module. The extended (thousands of mega Pascal and Kelvin) properties allows for more accurate simulations in the range of extreme pressure and temperature.
 - **Full template.** Project templates now include all pre/post-processor features including features with references to geometry. For cases in which the template is applied to a different geometry the features will be kept and reselection will be required. The project template can be used for transferring projects between different models and different CAD systems with minimal effort from the user.
 - **Inlet mass flux.** A new inlet mass flux boundary condition allows you to set incoming flow in the kg/s/m^2 units.
 - **Mass and Volume flow as function of goal.** Mass Flow and Volume Flow values can now be dependent on a goal.
 - **Periodic dependency.** You can now set cycling dependency (i.e. 5s off, 5s on) by

adding two values and enabling **Periodic** option. Also available for time step.

- **Damping.** A new **Damping** option for goal dependency in a steady-state analysis allows avoiding extreme changes of dependent parameters by using the averaged value on the analysis interval instead.
- **Transferred HTC condition.** The Heat Transfer Coefficient value can now be taken from other calculation results files to be used as boundary conditions, including for a transient simulation.
- **Parametric Study.** You can now vary material thermal conductivity and specific heat.
- **Linked conditions from components improvement.** By disabling the **Group by Model** property you can list conditions linked from components in the main input data tree under the folders of corresponding features together with the other features of the project. This makes it easier to understand specified data in cases of complex structures of the linked components.
- **Dialog title includes name of the condition.** A new name of the boundary condition is added to the title of the dialog upon editing.
- **Multi-Isosurface.** Multiple isosurfaces can be easily created by providing the lower and upper values of a range and the number of isosurfaces in between.
- **Color bar. Horizontal legend, Logarithmic scale.** The color bar can now be displayed horizontally. The logarithmic scale can be used for the parameter values.
- **Minimum and maximum points in Cut Plots and Surface Plots.** The location and value of minimum and maximum points in cut plots and surface plots can now be displayed as callouts.
- **Normal to plane view for cut plot.** The new **Normal to Plane** option zooms a cut plot to fit and orients it in the plane of the screen.
- **Parameters. Temperature (Active Node).** For LEDs, Two-resistors, and Network Assemblies the new Temperature (Active Node) parameter displays either Junction, Top or Bottom temperatures as defined in the feature properties under the **Displayed parameter**.
- **Parameters. Gradient parameter.** For a scalar or vector component you can create gradient custom visualization parameter (gradient x, gradient y, gradient z, and the gradient magnitude). In addition **lg** and **abs** functions are added.
- **Parameters. Logarithmic vectors.** Vector length can be displayed in logarithmic scale.
- **Parameters. Display Specific and Absolute humidity.** Specific (Mass fraction of water vapor phase) and Absolute Humidity (as total mass of water presented in a given volume of gas) are added for visualization in simulations with air humidity and steam.
- **Parameters. Dynamic viscosity available as Point Goal.** Dynamic viscosity can be set as a parameter for a point goal.

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- **Parameters. Thin Channel Mode.** A new **Thin Channel Mode** parameter displays where the “Thin Channel” engineering model is activated.
 - **Information and Warnings. Rebuild error doesn’t prevent you from creating a condition.** In case you get a rebuild error on creating a condition, the condition is created but marked with error.
 - **Information and Warnings. "Don’t ask me again" for reset mesh and CD warnings.** Once you get “Do you want to reset ...” question for the mesh and computational domain you can save your decision by clicking the **Remember my choice and don’t ask me again** option. The decision can be changed later in the Options.
 - **Information and Warnings.** Information on number of cores used for a calculation and the computer name where it is solved is added to the Solver Monitor, and info log file (also available for Linux).
 - **Results files storing.** Two files are necessary to view results – cpt and fld (no need for cfld any longer). Four files are necessary to continue the calculation – cpt, fld, geom, fbd.
 - **Results Processing Speed-Up Data collection.** Collecting additional surface data accelerates creation of complex surface plots with the **Use CAD Geometry** option enabled. You can now choose whether to collect the data or not and if you yes, when to collect the data: during meshing (may increase the time needed for preparation stage) or during first loading of results (increases time needed for the first loading of results). The setting is defined in the **Calculation Control Options** for a specific project or in the **Options** as default value for all projects.
 - **Windows HPC Server and HPC Pack Job Manager for remote solver.** FloEFD calculations can be run using the Windows HPC Server and HPC Pack Job Manager.
 - **Calculation Manager.** A new **Put calculations in queue** option (available in the **Remote Solver Setup** dialog) checks the availability of unused cores on the server and put calculations in queue if not enough cores are available. In addition a member of **FloEFDAdministrators** global domain group can manage FloEFD calculations: change order of calculations in the queue, limit number of cores used by server per calculation, view Monitor, and stop running calculations.
 - **API.** You can now use API to list components and bodies, create and delete solid materials or heat source conditions.
 - **Geometry kernel upgrade.** SW OEM 2017 SP3 is incorporated.
 - **Improved geometry handling.** An **Improved geometry handling** option switches to the new FloEFD Boolean Operations kernel which is designed to heal geometry with invalid contacts and speed up CAD geometry preparation. This option might not work with all models.

Authorization Codes

No changes to authorization codes are required for this release. You may request your existing authorization codes by opening a non-technical Service Request on SupportNet:

<http://supportnet.mentor.com/>

For additional information on licensing, refer to the *Licensing Mentor Graphics Software* manual.

Licensing

This release uses the Mentor Standard Licensing v2016_2. v2016_2 requires a FLEXnet license server running at version 11.13.1.4 or higher on Windows and 11.13.1.2 or higher on Linux. If you use floating licenses, you will need to update the license server accordingly. If you see an error message that says vendor daemon is too old, that is usually an indicator that the license server needs to be updated to run this version of the client software. For additional information on licensing, refer to the Mentor Graphics Standard Licensing Manual.

Installation Information

For additional information on installation, refer to Installation Instructions manual and the help system within the installation software. You can view this manual in the Manual directory at the top level of the DVD.

Support Information

If you have questions about this software release, please log in to Support Center. You may search thousands of technical solutions, view documentation, or open a Service Request here:

<https://support.mentor.com/>

If your site is under a current support contract but you do not have a Support Center login, register today:

<https://support.mentor.com/register>

Supported Platform

- Microsoft Windows 7 Professional, Ultimate or Enterprise 64-bit edition, Windows 8, Pro or Enterprise 64-bit, Windows 10 Pro or Enterprise 64-bit
- For solver: Microsoft Windows 2012 Server x64, Windows 2012 Server R2 x64, Linux RHEL 6.6, Windows Server 2008 R2 with HPC Pack 2008 R2, Linux SUSE SLES 11
- Microsoft Office 2013, Microsoft Office 2010, Microsoft Office 2007
- Microsoft Windows Media Player 7.0 or higher
- Ethernet network adapter
- Mouse or other pointing device
- DVD-ROM drive
- 4 GB RAM minimum, more recommended
- 6 GB of free hard disk space, more required for simulation models