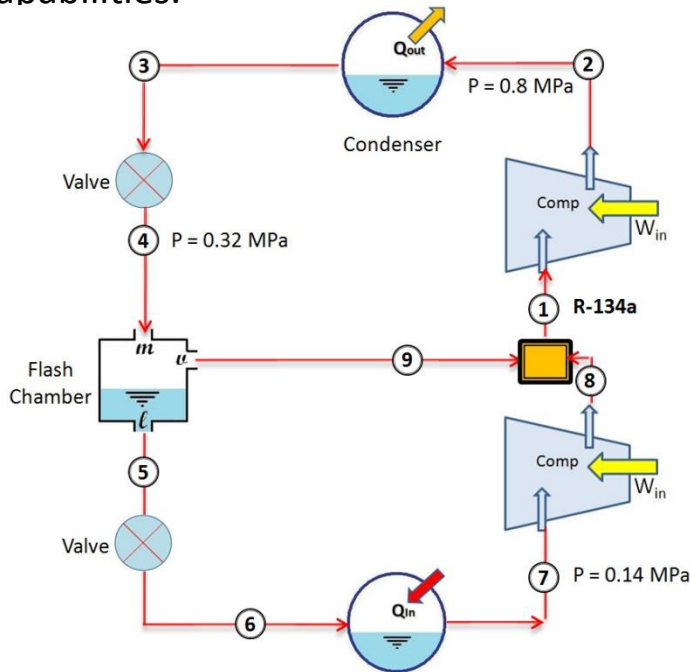


TESuite[®] Variable Fidelity Analysis

TESuite software package is designed to provide the system engineers the most advanced modeling and simulation tool for efficient thermal analysis and assessment of thermal management system capabilities.

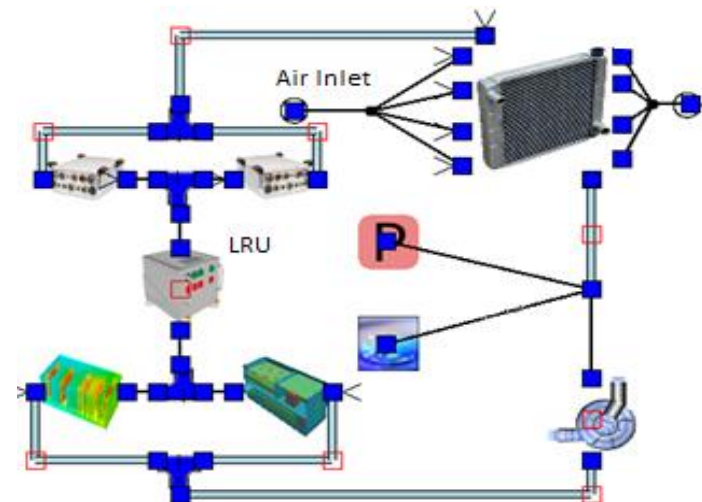


Efficient and Accurate

- The ultimate environment for the design and analysis of integrated thermal management strategies at the platform, subsystem, and component levels.
- Rapid analysis with desired degree of detail.
- The first package to truly bring together the simplicity of drag and drop modeling and the power of detailed 3D CFD and Heat Transfer, with a single click of the mouse.

Differentiating Capabilities:

- NIST Fluids Library as well as User-Defined Fluids
- Drag-and-Drop User Interface
- Customizable Parts
- Full Thermodynamics Analysis Capability
- Steady-state and Transient Analysis

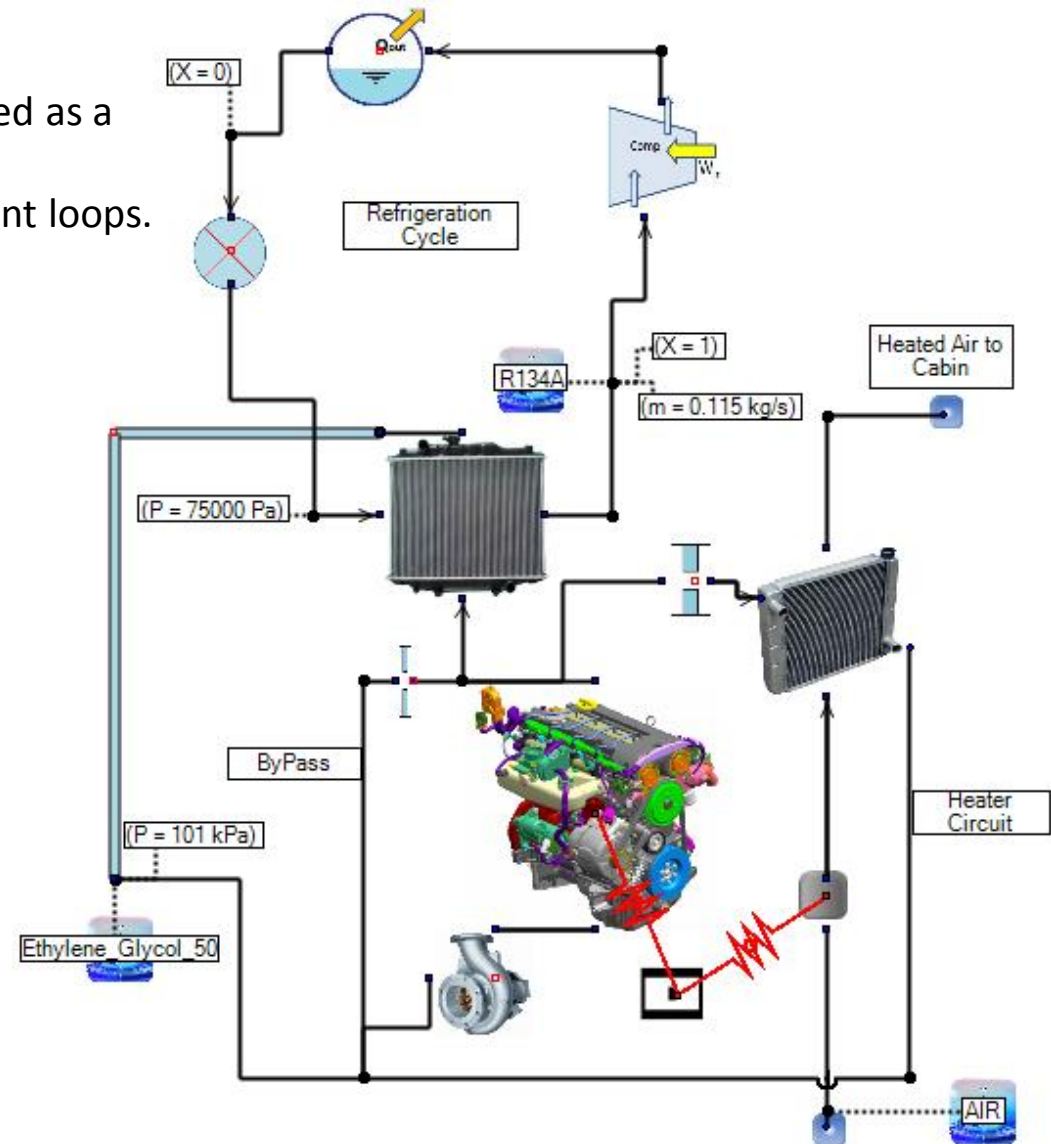
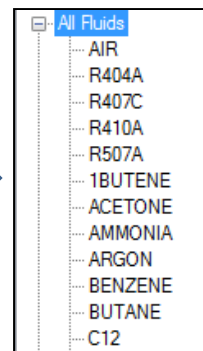
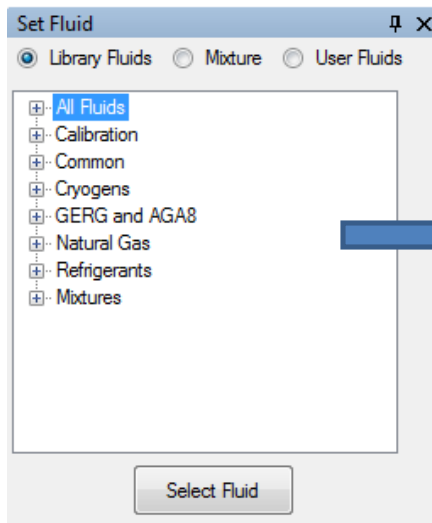


TESuite[®] Variable Fidelity Analysis

Modeling Approach

- A complex engineering system is represented as a network of parts and flow paths.
- Direct interaction of air, liquid and refrigerant loops.
 - Select parts
 - Connect parts to define flow paths
 - Choose loop fluid
 - Set BC's, load cases and run

Fluid definition



TESuite[®] Variable Fidelity Analysis

Parts Definition

Parts are completely customizable and are selected from the “Parts Library”.

- Simple Parts
- Complex Parts - Defined using a collection of simple parts
- 3D Parts – Analyzed using CFD/CHT

Parts Properties Menu

Compressor Properties

Name
compressor

Heat Rate
 0 Watt

Efficiency %
 80

Power
 3.5 kWatt

Pressure Ratio

Inlet/Outlet Parameters

Height Change

Inlet Cross Section Area

Outlet Cross Section Area

Surroundings

Apply Cancel

Units

User Variables

Checked variables are known input (constant or variable)
Unchecked variables are: Calculated (primary variables) or Effect neglected (secondary variables)

Library Components

Search [] All

Library Parts

- basic
 - Complex Ports
 - Connectors and Valves
 - Default
 - Fans and Pumps
 - Heat Exchangers
 - Heat Sources
 - Inlets and Outlets
 - Pipes and Ducts
 - Pressure Loss
 - Thermal Connections
- thermodynamic
- 3d
- default

Name	Date Modified	Path
Boiler	2013/03/25 ...	C:\TE Suite (32-bit)\parts\t...
Compressor	2013/03/25 ...	C:\TE Suite (32-bit)\parts\t...
Condenser	2013/03/25 ...	C:\TE Suite (32-bit)\parts\t...
Divider	2013/03/25 ...	C:\TE Suite (32-bit)\parts\t...
Endpoint TC	2013/03/25 ...	C:\TE Suite (32-bit)\parts\t...
Evaporator	2013/03/25 ...	C:\TE Suite (32-bit)\parts\t...

TESuite[®] Variable Fidelity Analysis

Complex Mathematical Expressions

Parts behavior can be controlled using complex mathematical expressions using functions and tables.

- Tables - Define ranges for the independent variable
- Functions - prescribe the behavior in each range

Independent Variable and its ranges

“Math-Look” window for illustration of algebraic expressions

The screenshot shows the TESuite software interface. The main window is titled 'Full Model Orifice' and has tabs for 'General', 'Solver Props', 'User Props', 'Tables', and 'Form Layout'. The 'Tables' tab is active, showing a table named 'Kres'. The table has two rows: one for the independent variable '0' and one for the range '0.015'. The 'Value' column contains the algebraic expression $(0.707 \cdot (1 - T \cdot A12[1])^{0.37} + 1 - T \cdot A12[1])^2 \cdot (1/T \cdot A12[1])^2$. The 'Default Independent Variable' is set to 'Length[Centimeter]/Diameter_th[Centimeter]'. The 'Best Fit Curve-Interpolates' radio button is selected. The 'Tabular Data' section is visible, and the 'Apply' and 'Cancel' buttons are at the bottom.

The 'Calculator' window is open, showing the same algebraic expression: $(0.707 \cdot (1 - A12^{0.37}) + 1 - A12)^2 \cdot (1/A12)^2$. The calculator has a numeric keypad and function buttons like 'bks', 'abs', '+', '-', 'log', 'sin', 'cos', 'tan', 'sqrt', 'e^x', 'Pi', 'i', 'ln', 'cos', 'sin', 'log', '+', '-', '(', ')', '^', 'bks', 'abs', 'Apply', 'Cancel', and 'C'.

Ind. Var.	Value
0	$(0.707 \cdot (1 - T \cdot A12[1])^{0.37} + 1 - T \cdot A12[1])^2 \cdot (1/T \cdot A12[1])^2$
0.015	$(0.5 \cdot (1 - T \cdot A12[1])^{0.75} + T \cdot \text{Tau}[1] \cdot (1 - T \cdot A12[1])^{1.375} + (1 - T \cdot A12[1])^{0.75})^2 \cdot (1/T \cdot A12[1])^2$