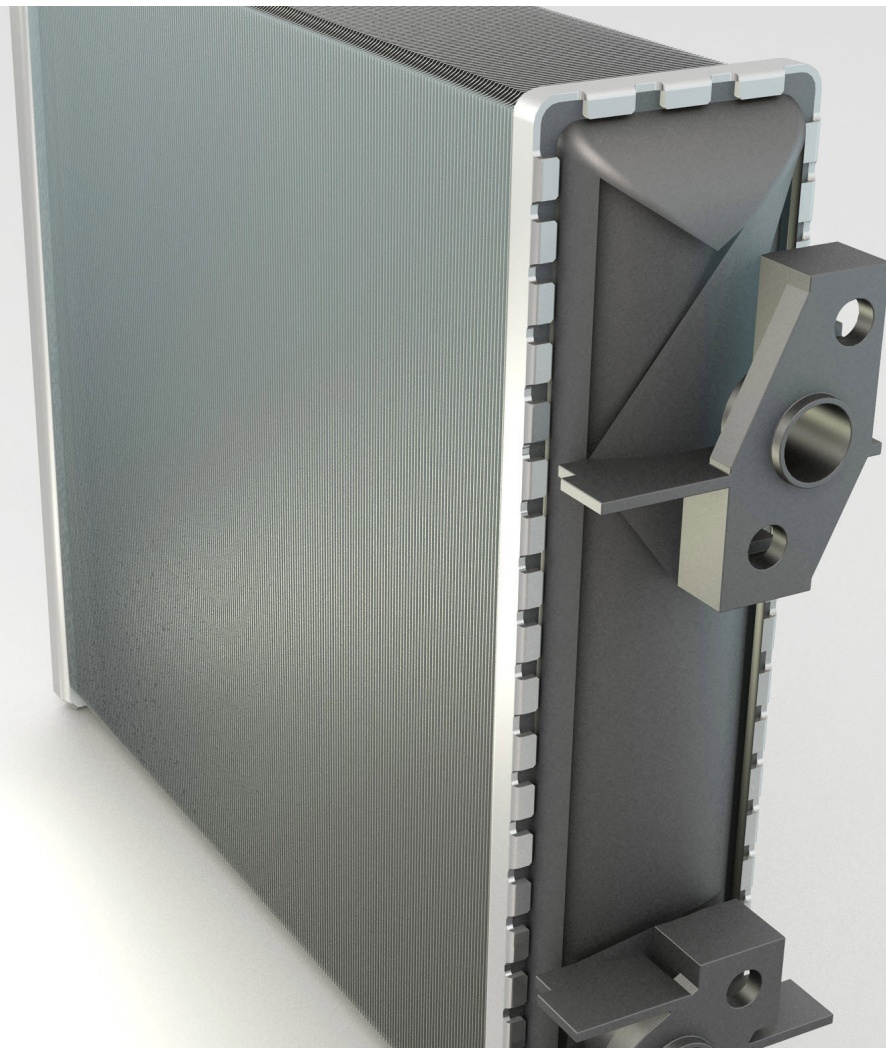




CATIA SYSTEMS ENGINEERING HEAT EXCHANGER LIBRARY

*DYNAMIC MODELING AND SIMULATION
OF HEAT EXCHANGERS WITH CATIA OR DYMOLA*



**SIMULATE
THE DYNAMIC
EFFECTS OF HEAT
EXCHANGERS FOR
COOLING & HEATING**

The Modelica based Heat Exchanger Library enables efficient modeling of radiators, heat exchangers and heat exchanger stacks in industrial and automotive applications. The library is ideal for the design and dimensioning of heat exchangers and for analyzing the impact of stacking multiple heat exchangers. The detailed, geometry-based heat exchanger models are suitable for use in cooling and heating system design.

The Heat Exchanger Library contains heat exchanger models supporting several flat tube and louvered fin designs. The models take into account the effects of inhomogeneous air flow and temperature distribution, making it possible to model the effect of heat exchanger stacking along the air flow path. The library is suitable for studying the effects of heat exchanger dimensioning and positioning and the impact they have on cooling system performance.

KEY FEATURES

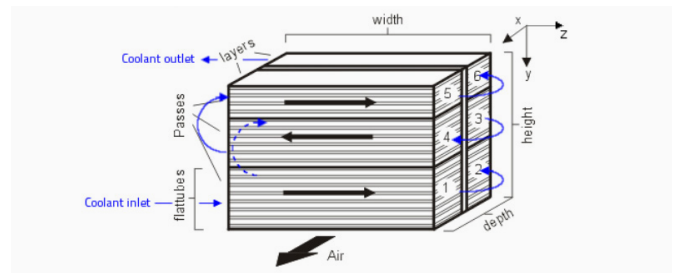
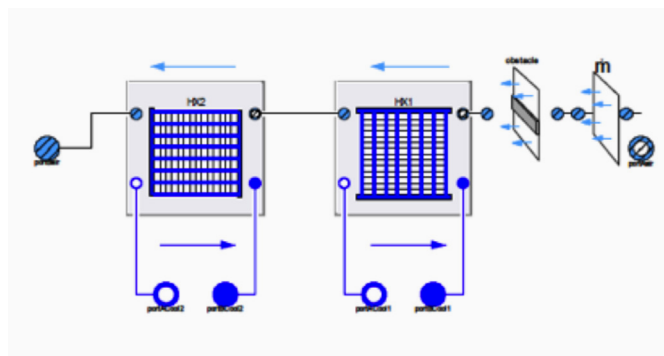
- Geometry-based heat exchanger models for system simulation
- Captures the effect of inhomogeneously distributed inlet air flow
- Ability to simulate heat exchanger stacks with different heat exchanger geometries, sizes and positioning
- Includes friction and heat transfer models for louvered fin designs
- Ability to couple with Computational Fluid Dynamics (CFD) data

INTERFACES

The Heat Exchanger Library has native interfaces to the Air Conditioning, Vapor Cycle, and Liquid Cooling Libraries for the design of complete automotive thermal management systems. The models can be coupled to CFD-derived boundary conditions on the air side, bridging the gap between CFD and multi-physical systems simulation.

TYPICAL EXAMPLE

The figure below shows a model of an example stack that consists of a single layer, horizontal air-coolant heat exchanger, which is partly covered by a double-layered vertical air-coolant heat exchanger and an obstacle in front of them, partly covering both heat exchangers.



LIBRARY CONTENTS

Heat exchanger stacks

Models of heat exchanging stacks that are suitable for use in refrigeration, air conditioning, power plant, etc.

Obstacles

Obstacle components which include additional flow resistance in flow tubes are included.

Air Routing

Models of air side adapters and routing components including adaptors to go from lumped to segmentation representations, and vice versa.

Sources

Ideal sources for gas as well as liquid flow which prescribe mass, absolute pressure, temperature and gas composition flowing out of the components are included in the library. The library content also consists of source components with discretized air connectors.

Sensors

A wide range of sensors is available which can be used in 2D-discretized air flows and for lumped flows.

Utilities

Special models used for calibration tasks, functions and low level interfaces for geometric heat exchangers are also included.

BENEFITS

- Significantly reduced costs through the efficient modeling and simulation of radiators and heat exchanger stacks
- Geometry based heat exchanger models enable rapid system simulations
- Native interface to the other Modelica libraries for complete thermal management design

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