Two-Phase Thermal Fluid Library

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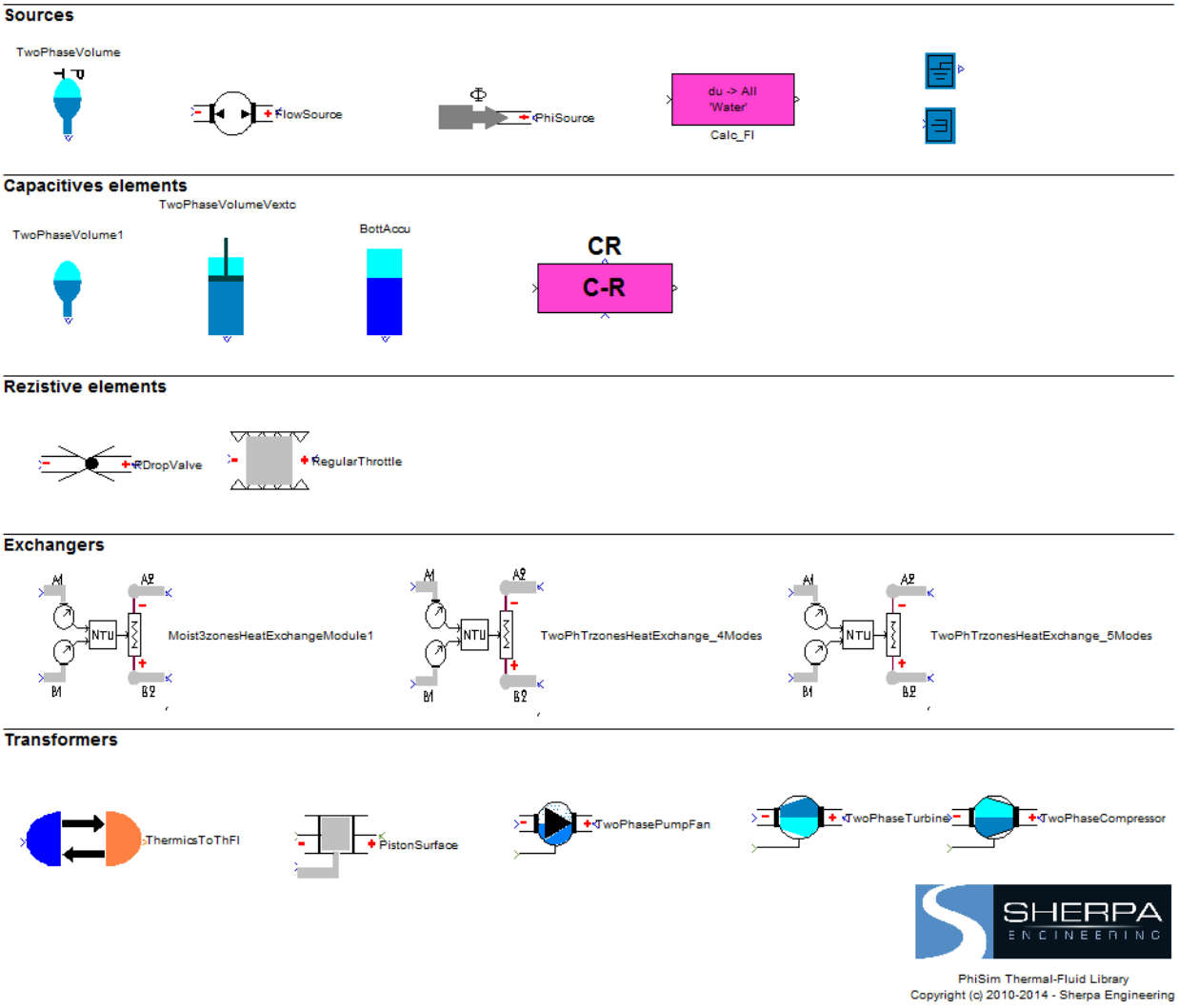
The two phase thermal fluid library contains a set of components in thermodynamics domain allowing engineers to develop a complex model of thermal fluids phenomena as cooling and heating systems, air conditioning, ranking cycle, etc.

The Two phase thermal fluid library handles several types of fluids: refrigerant fluids (R134a, R410a, R744, water, methane). These libraries can receive other fluids.



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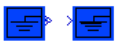
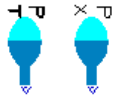
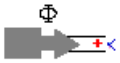
Sources

	Zero element and node	Used as a ground or terminator for PhiSim components.
	Effort source	This block is equivalent to a volume where the fluid pressure and/or temperature or quality are set to user-specified values.
	Flow source	This block is used to specify a mass flow or volume flowing through a branch of a circuit.
	Heat flow source	This block represents a heat flow at a user-specified value between two nodes in a circuit.
	Bottle/Accumulator	This block represents globally the hydraulic and thermal dynamics at liquid saturation (Bottle) or vapor saturation (Accumulator) due to the compressibility and the thermal capacity of fluid.

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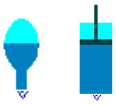
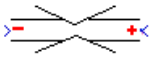
Basic elements

	Volume	Compute the effort variable in the node from the flow variables of all the elements connected to it by conservation equations and fluid properties. (The volume of the capacity can be calculated).
	Pressure drop	Represent resistance phenomena (energy dissipation).
	Pressure drop with inertia	This element represents the inertia of a hydraulic component. A loss may be associated.

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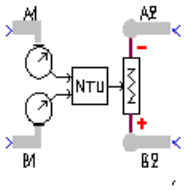
Heat Exchanger

	Heat exchanger	Compute the quasi-static heat power transferred between the inner and outer fluids in heat exchanger. It is equivalent of thermal nonlinear resistance field. The Number of Transfer Unit (NTU) method is applied for different configurations. - heat exchanger between a two-phase fluid and monophasic fluid - heat exchanger between a two-phase fluid and moist air - several type of parameterization (NTU, efficiency, heat exchange coefficient)

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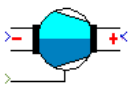
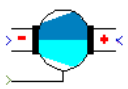
Pumps and compressors

	Rotary pump	Implement a macroscopic representation of a centrifugal pump converting mechanical energy into fluid energy.
	Volumetric compressor (2P)	Implement a macroscopic representation of a volumetric compressor for two-phase fluid.
	Turbine	Implement a macroscopic representation of a turbine for two-phase fluid.

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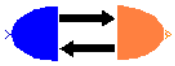
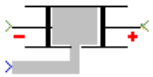
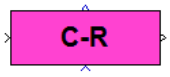
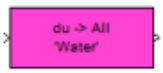
Transformation

	Thermal link	Implement the link with the Thermal library.
	Piston	Implement elementary energy transfer between a fluid volume and linear mechanics domain through a surface.
	Element C and R	This element represents a combination of an element C and an element R (super element). The R element is represented by a source flow to reduce the high frequency in a model.
	Thermal fluid properties	Tools for thermal fluid properties calculation

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