THE STORAGE COMPONENT LIBRARY (GENERAL DESCRIPTIONS)

TYPE 502: THREE STAGE AQUASTAT IN HEATING

A three stage aquastat is modeled to output three ON/OFF control functions that can be used to control a fluid cooling system having up to a three stage heating source.

TYPE 503: THREE STAGE AQUASTAT IN COOLING

A three stage aquastat is modeled to output three ON/OFF control functions that can be used to control a fluid cooling system having up to a three stage cooling source.

TYPE 531: RECTANGULAR STORAGE TANK WITH OPTIONAL IMMERSED HEAT EXCHANGERS

This subroutine models a rectangular cross section fluid-filled, constant volume storage tank with immersed heat exchangers as shown in Figure 1 below. The fluid in the storage tank interacts with the fluid in the heat exchangers (through heat transfer with the immersed heat exchangers), with the environment (through thermal losses from the top, bottom and edges) and with up to two flow streams that pass into and out of the storage tank. The tank is divided into isothermal temperature nodes (to model stratification observed in storage tanks) where the user controls the degree of stratification through the specification of the number of "nodes". Each constant-volume node is assumed to be isothermal and interacts thermally with the nodes above and below through several mechanisms; fluid conduction between nodes, and through fluid movement (either forced movement from inlet flow streams or natural destratification mixing due to temperature inversions in the tank). The user has the ability to specify one of four different immersed heat exchanger types (or no HX if desired); horizontal tube bank, vertical tube bank, serpentine tube, or coiled tube. Auxiliary heat may be provided to each isothermal node individually; through the use if INPUTs to the model. The model also considers temperature-dependent fluid properties for either pure water, an ethylene glycol and water solution, or a propylene glycol and water solution for both the tank and heat exchanger fluids.

TYPE 532: SPHERICAL STORAGE TANK WITH OPTIONAL IMMERSED HEAT EXCHANGERS

This subroutine models a spherical fluid-filled, constant volume storage tank with immersed heat exchangers as shown in Figure 1 below. The fluid in the storage tank interacts with the fluid in the heat exchangers (through heat transfer with the immersed heat exchangers), with the environment (through thermal losses from the top, bottom and edges) and with up to two flow streams that pass into and out of the storage tank. The tank is divided into isothermal temperature nodes (to model stratification observed in storage tanks) where the user controls the degree of stratification through the specification of the number of "nodes." Each constant-volume node is assumed to be isothermal and interacts thermally with the nodes above and below through several mechanisms; fluid conduction between nodes, and through fluid movement (either forced movement from inlet flow streams or natural destratification mixing due to temperature inversions in the tank). The user has the ability to specify one of four different immersed heat exchanger types (or no HX if desired); horizontal tube bank, vertical tube bank, serpentine tube, or coiled tube. Auxiliary heat may be provided to each isothermal node individually; through the use if INPUTs to the model. The model also considers temperature-dependent fluid properties for either pure water, an ethylene glycol and water solution, or a propylene glycol and water solution for both the tank and heat exchanger fluids.

TYPE 533: HORIZONTALLY CYLINDRICAL STORAGE TANK WITH OPTIONAL IMMERSED HEAT EXCHANGERS

This subroutine models a fluid-filled, constant volume storage tank with immersed heat exchangers. This component models a cylindrical tank with a horizontal configuration as shown in Figure 1 below. The fluid in the storage tank interacts with the fluid in the heat exchangers (through heat transfer with the immersed heat exchangers), with the environment (through thermal losses from the left end, right end and edges) and with up to two flow streams that pass into and out of the storage tank. The tank is divided into isothermal temperature nodes (to model stratification observed in storage tanks) where the user controls the degree of stratification through the specification of the number of "nodes". Each constant-volume node is assumed to be isothermal and interacts thermally with the nodes above and below through several mechanisms; fluid conduction between nodes, and through fluid movement (either forced movement from inlet flow streams or natural destratification mixing due to temperature inversions in the tank). The user has the ability to specify one of four different immersed heat exchanger types (or no HX if desired); horizontal tube bank, vertical tube bank, serpentine tube, or coiled tube. Auxiliary heat may be provided to each isothermal node individually; through the use if INPUTs to the model. The model also considers temperature-dependent fluid properties for either pure water, an ethylene glycol and water solution, or a propylene glycol and water solution for both the tank and heat exchanger fluids.

TYPE 534: VERTICALLY CYLINDRICAL STORAGE TANK WITH OPTIONAL IMMERSED HEAT EXCHANGERS

This subroutine models a fluid-filled, constant volume storage tank with immersed heat exchangers. This component models a cylindrical tank with a vertical configuration as shown in Figure 1 below. The fluid in the storage tank interacts with the fluid in the heat exchangers (through heat transfer with the immersed heat exchangers), with the environment (through thermal losses from the top, bottom and edges) and with up to two flow streams that pass into and out of the storage tank. The tank is divided into isothermal temperature nodes (to model stratification observed in storage tanks) where the user controls the degree of stratification through the specification of the number of "nodes". Each constant-volume node is assumed to be isothermal and interacts thermally with the nodes above and below through several mechanisms; fluid conduction between nodes, and through fluid movement (either forced movement from inlet flow streams or natural destratification mixing due to temperature inversions in the tank). The user has the ability to specify one of four different immersed heat exchanger types (or no HX if desired); horizontal tube bank, vertical tube bank, serpentine tube, or coiled tube. Auxiliary heat may be provided to each isothermal node individually; through the use if INPUTs to the model. The model also considers temperature-dependent fluid properties for either pure water, an ethylene glycol and water solution, or a propylene glycol and water solution for both the tank and heat exchanger fluids.