

AquaProtect

Anti-Legionella Tap Water Systems



The system to the left is AquaProtect T1 and the system to the right is AquaProtect T2 connected to a reaction tank.

Applications

AquaProtect is a tap water system which uses continuous thermal disinfection of incoming and circulating water to provide legionella-free domestic hot water for buildings such as hospitals, hotels, nursing homes, prisons and similar institutions.

Legionella bacteria occur in low numbers in natural environments such as rivers, lakes and reservoirs and can survive temperatures as low as 6°C and as high as 50°C. From these natural habitats, the bacteria can migrate into man-made water systems. Enclosed, warm storage vessels, blind spots in pipe-work and water systems containing stagnant water provide an ideal environment in which the bugs can flourish, particularly if sludge, sediment and scale are present for them to feed on. Studies have shown that many hot water systems contain legionella and other bacteria at various concentration rates.

Inhaled in tiny water droplets, legionella bacteria can cause legionnaire's disease which is potentially fatal to humans, especially those made more vulnerable because of age or illness.

AquaProtect uses recovered heat to disinfect hot water and no additional energy input is required.

Features and benefits

- Disinfection at 70°C of all incoming water.
- Continuous disinfection of the circulation loop.
- Adaptable holding time to comply with local rules.
- Domestic hot water supply at appropriate temperature (60°C) to avoid scalding at the tap.
- Up to 13 m³/h of disinfected water.
- Continuous circulation through the system.
- Possibility to run thermal treatment of the network.
- Temperature safety function to ensure that only disinfected water enters the reaction tank (AquaProtect T2 only).
- Heat exchangers for all applications and conditions.
- Electronic control.

Working Principle

AquaProtect uses two heat exchangers. One is connected to the heat source (boiler, district heating network, etc) and is used to disinfect water at 70°C.

The other heat exchanger is used on one side to cool water from 70°C down to a suitable temperature for a hot tap water network (60°C). The heat recovered in the process is used to pre-heat incoming and circulating water before it enters the disinfection heat exchanger where it is heated to 70°C.

Once heated to 70°C, the disinfected water needs to be held at this temperature for a given time to ensure eradication of bacteria.

A range of tank sizes enables the appropriate tank to be selected to ensure that the hold time (1 minute, 6 minutes, etc) complies with local or national regulations. This can be achieved by using either a standard storage vessel or a reaction tank with a special internal configuration that controls the direction of flow.

In semi-instantaneous systems, disinfected water flows to a storage vessel where it is stored until the peak demand period occurs (a combined reaction tank can offer both functionalities. See hydraulic chart on the back page. AquaProtect T1 Instantaneous does not use a storage vessel but still need a holding tank).

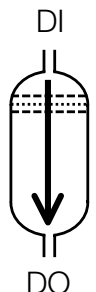

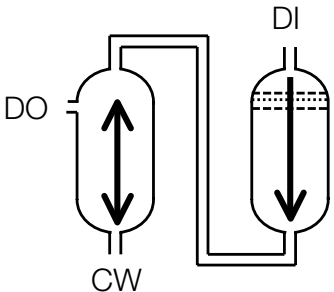
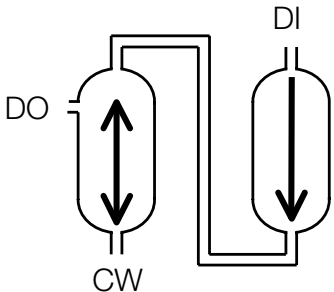

From this storage vessel, disinfected water flows to the cooling heat exchanger. A mixing valve ensures that domestic hot water is provided at the right temperature (60°C) by mixing disinfected water at 70°C with cooled water coming from the storage vessel. To eliminate any risk of infection, only disinfected water is used.

During peak periods, disinfected water is drawn off from the top of the storage vessel to the network by water entering the network.

When there is no or limited demand the water in the storage vessel is continuously replenished. Circulation through the system ensures that the water is drawn from the bottom of the storage vessel to be pre-heated and then disinfected before being stored.

AquaProtect T2 is supplied with a temperature safety function which ensures that only disinfected water enters the reaction tank. Water that hasn't attained the disinfection temperature is diverted to the beginning of the process to ensure that it finally reaches 70°C. This function can be very useful in cases of low capacity on the primary side, or in the event of scaling.

Possible tank combination:

AquaProtect T1 Instantaneous		AquaProtect T1 Semi-Instantaneous & AquaProtect T2		AquaProtect T2 Combined
				
One Reaction Tank (holding tank)	One Storage Vessel used as holding tank	One Storage Vessel and One Reaction Tank (holding tank)	One Storage Vessel and One Storage Vessel used as holding tank	Combined Reaction Tank (holding tank and storage vessel)

DI = Disinfected Water In

DO = Disinfected Water Out

CW = Cold Water In or To Pre-Heating HE

Equipments

AquaProtect				
Disinfection temperature	70°C			
Holding temperature	70°C			
Distribution temperature	60°C			
Circulation return continuous disinfection	Yes			
Periodic net disinfection	Yes			
By-pass renewable energy connection	Optional			
	AquaProtect T1	AquaProtect T2	T2 Combined	
Temperature safety function	–	Yes		
Available controller	Alfa Laval Micro 2000 Special	Samson 5479 with/without Communication Interface RS485		
Heat exchanger	Plates & Gaskets	Plates & Gaskets	Copper Brazed	Copper Brazed
Process	Instantaneous	Semi- instantaneous	Semi- instantaneous	
Holding tank	Needed		Needed	Combined reaction tank needed
Storage vessel	–	Needed	Needed	
Excessive tapping protection	–		Optional	
Over-heating protection	–	Yes	–	–

For additional features or AlfaNova Heat Exchanger, please consult.

AquaProtect T2 Combined can easily be connected to the Combined Reaction Tank which has a 6 min holding time.

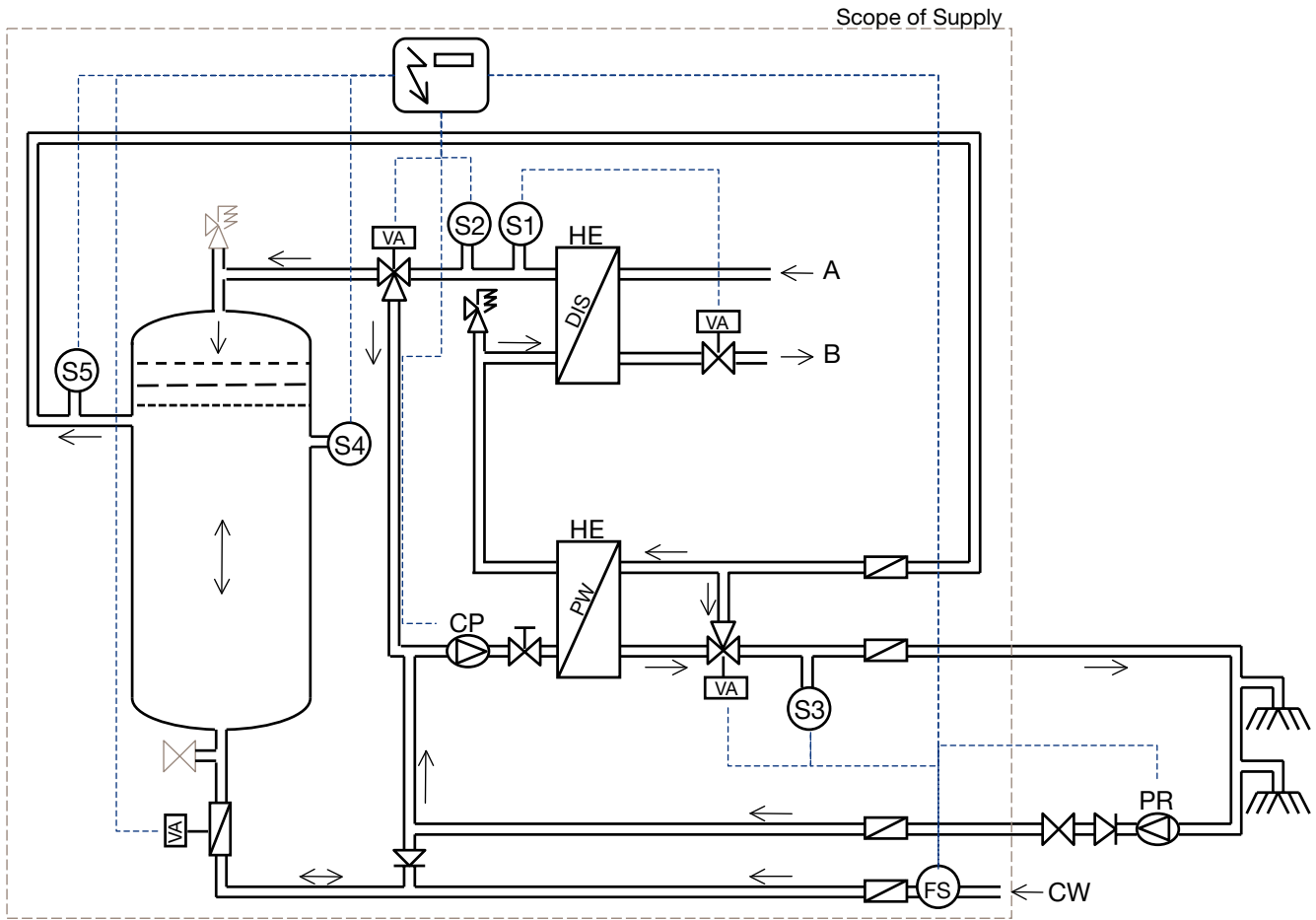
Examples of holding time according to holding tank size:

For an AquaProtect providing 5 m³/h flow rate of disinfected water

Holding tank	300L	500L	750L
Holding time	3 min	6 min	9 min
Operating limits	Primary		
Maximum operating pressure	25 Bar		
Maximum operating temperature	130°C		

Maximum pressure and temperature differ according to model and type of heat exchanger.

Hydraulic chart



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|---|----------------------------|---------------------------------|
| A From District Heating Network / Boiler | PW Pre-Heating HE | VA Primary Control Valve |
| B To District Heating Network / Boiler | DIS Disinfecting HE | FS Flow Switch |
| CW Cold Water Inlet | CP Charging Pump | S Temperature Sensor |
| HE Heat Exchanger | PR Circulation Pump | |

Note: The illustration above shows a semi-instantaneous system using a combined reaction tank. The use of 2 separate tanks may have to be considered for larger application. Tank(s) are not part of the AquaProtect Scope of Supply and should be ordered separately.

AquaProtect is also available with 2 or 3-port electronic control on the primary side of the disinfection heat exchanger.

Test Requirements

AquaProtect is built in compliance with PED CE 97/23 Art 3.3 or PED 1 and CE 73/23 electrical regulation. AquaProtect is assembled, wired and tested prior to shipment.