



Winter Water System Freeze Protection

Working Principle

Leveraging the thermal expansion and contraction properties of matter, material scientists have identified temperature-sensitive materials capable of highly responsive thermal detection. Building on this, Beijing Winning Thermo Control Equipment Co., Ltd. has developed the "Winning" anti-freeze valve. This innovative valve precisely monitors ambient and water temperatures, enabling intelligent, fully autonomous control without the need for an external power supply.

Operation

Designed for water system freeze protection, the anti-freeze valve automatically activates as ambient temperatures drop and water temperatures approach the freezing point, initiating a "drip-based" protection mode. As the discharged water cools further, the valve autonomously increases the drainage rate to effectively balance heat loss within the system. Once the water temperature recovers, the valve automatically closes. This mechanism ensures robust freeze protection while minimizing water consumption, offering a truly green and eco-friendly solution.



Field Installation of Water Systems



Installation Precautions for Anti-Freeze Valves

The anti-freeze valve must be installed vertically facing downward, either at the pressure terminal of the pipeline (as shown in the figure) or before the pipeline enters the building. Failure to do so may result in stagnant water downstream, potentially leading to freeze protection failure in the downstream piping.

Install the valve at a location where it can accurately sense the lowest system temperature. Avoid installing it near heat sources (such as poorly sealed pipe inlets or adjacent to flue outlets), as this may prevent the valve from detecting the minimum temperature of the water supply system, rendering the freeze protection ineffective.

To minimize water discharge, thermal insulation must be applied to both the anti-freeze piping and the valve itself. If a drainage pipe is connected to the valve outlet, ensure smooth water outflow to prevent drainage blockage from interfering with the valve's normal operation.

An anti-freeze valve must be installed on every branch of the water piping that requires freeze protection.

(Please read these instructions carefully before installing the anti-freeze valve in your system.)

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Inspection and Maintenance of Anti-Freeze Valves

To ensure the anti-freeze valve functions properly, a simple test can be conducted annually before the onset of winter:

Submerge the valve in an ice-water mixture. After a few minutes, the valve will activate (open). Once removed from the ice-water mixture, the valve will gradually close. This indicates that the valve is functioning normally.

Essential Freeze Protection Knowledge

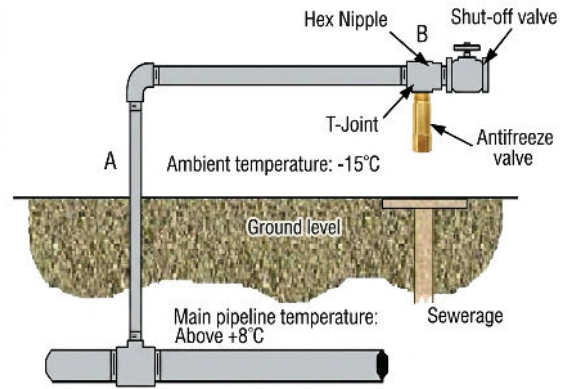
There are two fundamental methods for pipeline freeze protection: Heat Tracing (steam or electric) and Drainage. Both methods work by compensating for heat loss to maintain the thermal balance of the water within the pipes.

Heat Tracing: This involves installing electric heat tracing cables or steam tracing pipes parallel to the water pipes, wrapped in an outer layer of thermal insulation. The heat tracing elements provide heat to compensate for the thermal loss of the water, thereby achieving freeze protection. This method is commonly used in applications such as the inlet/outlet pipes of solar water heaters and various industrial process pipelines.

Drainage: This is the simplest and most commonly used method, offering the significant advantage of eliminating substantial costs associated with pipeline installation and the ongoing operation of heat tracing systems.

Specifications

Product Name	Model	Port Size	Material	Open/Close Temp. (°C)	Maximum Temp. (°C)	Maximum Pressure (MPa)	Flow Rate (Cv)	Dimensions (mm)
Freeze Protection Valve	FP15-35	DN15(1/2")	Brass	1~4	+95	1.0	0.6	φ 25*63



How It Works (As illustrated above):

If water remains stagnant, the water in the above-ground piping (Section A to B) will continuously dissipate heat into the -15°C environment until it freezes. Assuming the water at Point B is at 4°C, the valve will activate and open slightly, allowing the 8°C water from the underground main to flow out through the above-ground piping. With an appropriate flow rate, although the water temperature in the pipe will drop, it will not fall below 4°C by the time it exits Point B. If the ambient temperature continues to drop, the valve at Point B must open further to increase the flow rate, ensuring the effluent temperature remains above 4°C.

Manually dispatching personnel to adjust the valve flow rate based on temperature fluctuations is clearly economically impractical. The "Winning" Anti-Freeze Valve requires no electrical power and no manual supervision. It automatically regulates valve actuation and flow rate in response to temperature changes, providing you with an energy-efficient, convenient, and safe freeze protection solution.

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