

Chinese manufacturer / Factory offers guidance: How to correctly select a steam trap?

Part 1. Key Factors and Considerations for Steam Trap Selection

The most important point comes first: Steam traps must be selected based on their operating characteristics, conditions, and condensate discharge capacity; the nominal pipe size (DN) of the trap must not be the sole basis for selection. Selection should be made by consulting the manufacturer's discharge capacity charts, prioritizing condensate discharge rate and differential pressure to ensure the trap meets actual discharge requirements.

The following are the parameters, requirements, and methods users need to understand when selecting steam traps.

1. Key Parameters for Medium and Operating Conditions

1.1. Medium type: Saturated steam / Superheated steam / Condensate.

1.2. Operating pressure: Inlet pressure (maximum pressure, operating pressure); outlet backpressure (whether connected to a condensate recovery network, and the specific backpressure value); excessive backpressure can impede condensate discharge.

1.3. Operating temperature: Maximum temperature, operating temperature; for superheated steam, the degree of superheat must be specified.

1.4. Condensate discharge capacity: This is a critical parameter for trap selection. Calculate the hourly condensate generation rate (kg/h) under actual operating conditions and multiply it by a safety factor of 2~3 to determine the required discharge capacity for selection.

2. Confirmation of Trap Body Structure Type

Confirm the user's preferred structural type, or provide recommendations based on operating conditions:

2.1. Mechanical types: Float type, inverted bucket type;

2.2. Thermodynamic types: Thermodynamic Type (Disc type) steam trap;

2.3. Thermostatic types: Bellows / capsule type, liquid-filled bellows type, unfilled pure bellows type;

2.4. Body material: WCB cast steel, QT450 ductile iron, stainless steel; material requirements for internal components;

2.5. Requirement for built-in strainer: Many pipelines contain rust or impurities, so selecting a model with a built-in strainer is recommended.

3. Connection and Installation Parameters

3.1. Connection method: Flanged, threaded, or welded, along with required standards (e.g., NPT or BSPT for threads; GB/T, ANSI Class 150/300, or JIS for flanges), and flange face types (FF, RF, RJ, etc.).

3.2. Nominal Diameter (DN).

3.3. Installation orientation: Most steam traps are installed horizontally; however, some types have specific orientation requirements.

4. Important Considerations for Selection and Operation

4.1. Do not select a steam trap based solely on pipeline size; prioritize condensate discharge capacity and differential pressure. A small-bore trap may be suitable even for a large-diameter pipeline.

4.2. Backpressure must not exceed the product's maximum allowable limit. In condensate recovery systems, verify backpressure; excessive backpressure can impede drainage and cause condensate accumulation in the equipment.

4.3. In superheated steam applications, standard liquid-filled thermostatic traps are prone to failure; prioritize the use of pure bellows-type or mechanical traps.

4.4. In applications with very low differential pressure, disc-type traps may fail to close tightly, leading to continuous steam leakage; their use is not recommended.

4.5. Installing a strainer upstream of the trap is recommended to prevent rust or debris from jamming the valve mechanism, which could cause leakage or blockage.

4.6. Selection safety factor: Generally, select a capacity 2–3 times the actual discharge rate; for intermittently operated equipment (e.g., heat exchangers that cycle on and off), a factor of 3 or higher is recommended.

4.7. Installation: Ensure there is a sufficient cooling section for condensate upstream of the trap—do not install it immediately adjacent to the heat exchanger outlet. Observe flow direction markings; reverse installation is strictly prohibited.

4.8. Do not operate beyond rated pressure or temperature limits, as this will shorten service life or cause damage.

Part 2. Operating characteristics of various types of steam traps

Steam Trap Type	Mechanical Type			Thermostatic Type				Thermodynamic Type
	Free Float Type	Lever Float Type	Inverted Bucket Type	Bimetallic Strip Type	Bellows Type	Diaphragm Box Type	Liquid Expansion Type	Disc Type
Drainage Mode	Continuous drainage	Continuous drainage	Intermittent drainage	Continuous drainage	Continuous drainage	Intermittent drainage	Continuous drainage	Intermittent drainage
Capacity to Discharge Saturated Condensate	Can discharge saturated water	Can discharge saturated water	Can discharge saturated water	Only discharges water below saturation temperature	Only discharges water below saturation temperature	Only discharges water below saturation temperature	Only discharges water below saturation temperature	Discharges water close to saturation temperature
Air Venting Capacity	Requires air vent accessory	Requires air vent accessory	Slow air venting speed	Efficient large-volume air removal	Efficient large-volume air removal	Efficient large-volume air removal	Efficient large-volume air removal	Requires air vent accessory
Steam Loss	Good heat retention, low surface radiation steam loss	High steam loss via surface heat dissipation	Minor steam consumption during operation	Low	Low	Low	Low	Low
Influence of Steam Pressure Fluctuation	Adapts to wide & abrupt pressure variations	Not suitable for wide & abrupt pressure variations	Not suitable for wide & abrupt pressure variations	Not applicable	Not suitable for wide & abrupt pressure variations	Not suitable for wide & abrupt pressure variations	Not applicable	Not applicable
Backpressure Limitation	Backpressure $\leq$ 80% of inlet pressure	Backpressure $\leq$ 80% of inlet pressure	Backpressure $\leq$ 80% of inlet pressure	Requires readjustment if backpressure exceeds specified range	Backpressure $\leq$ 75% of inlet pressure	Backpressure $\leq$ 70% of inlet pressure	Backpressure $\leq$ 70% of inlet pressure	Backpressure $\leq$ 50% of inlet pressure
Application for Superheated Steam	Not applicable when fitted with bellows air vent	Applicable	Applicable, check valve required upstream of trap	Applicable	Not applicable	Not applicable	Not applicable	Applicable
Freeze Resistance	Non-freeze-resistant	Non-freeze-resistant	Non-freeze-resistant	Freeze-resistant	Freeze-resistant	Freeze-resistant	Freeze-resistant	Freeze-resistant
Water Hammer Resistance	Not resistant to water hammer	Resistant to water hammer	Resistant to water hammer	Resistant to water hammer	Not resistant to water hammer	Resistant to water hammer	Resistant to water hammer	Resistant to water hammer