PROMACH

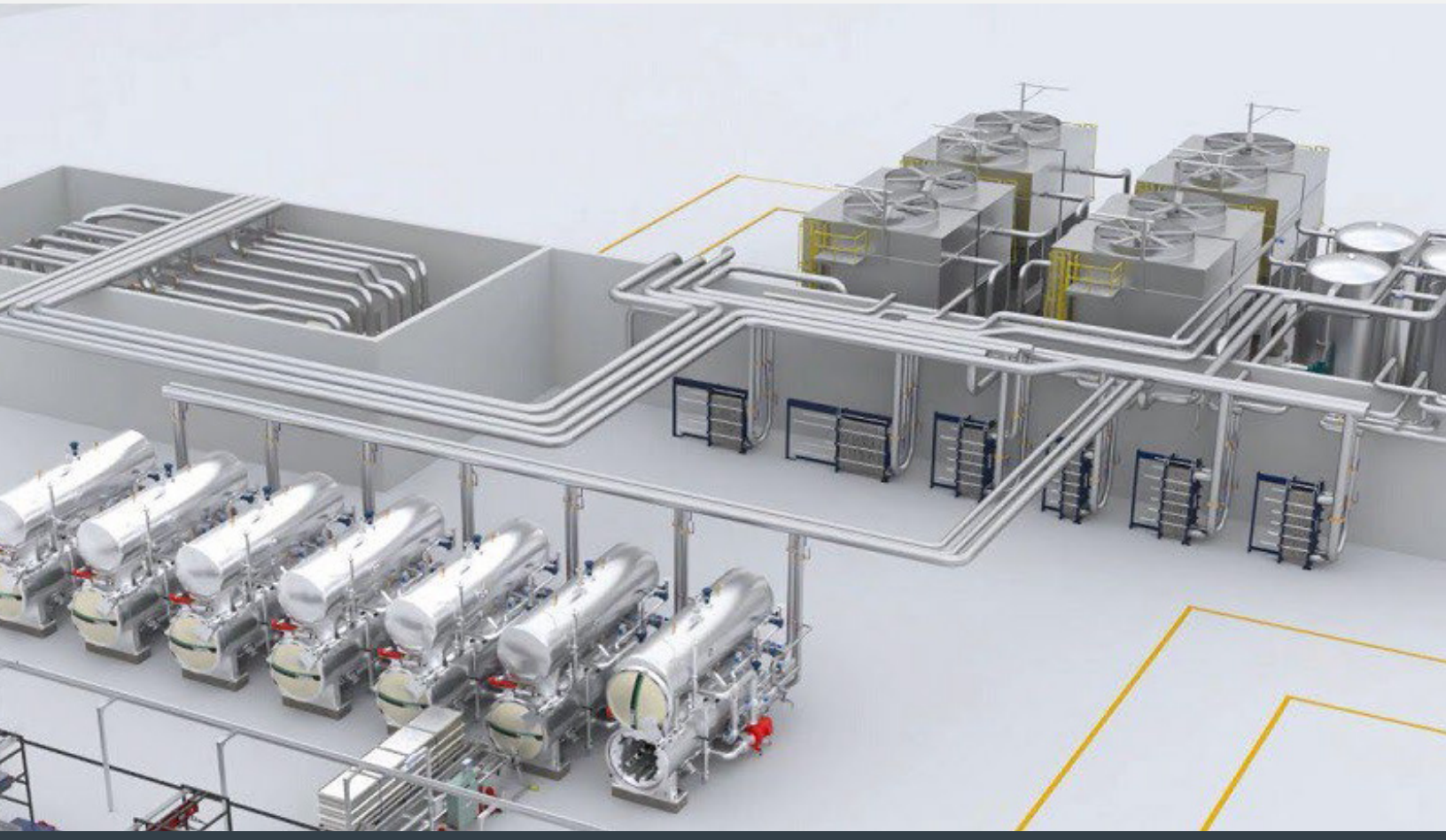
ALLPAX

Retort Water Recovery Systems

Reduce Water Consumption, Increase Sustainability

With the industry focus on sustainability and the efficient use of resources in mind, Allpax has developed solutions that food and beverage manufacturers can employ to improve their bottom line. Options for **mitigating the use of large amounts of water and energy consumed in retort operations** include hot and temperate water reclamation for all batch retort processes including:

- **Saturated Steam**
- **Water Immersion**
- **Water Spray & Cascade**
- **Steam/Air**
- **ImmersaFlow®**



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Direct Cooling Applications - Saturated Steam & Water Immersion

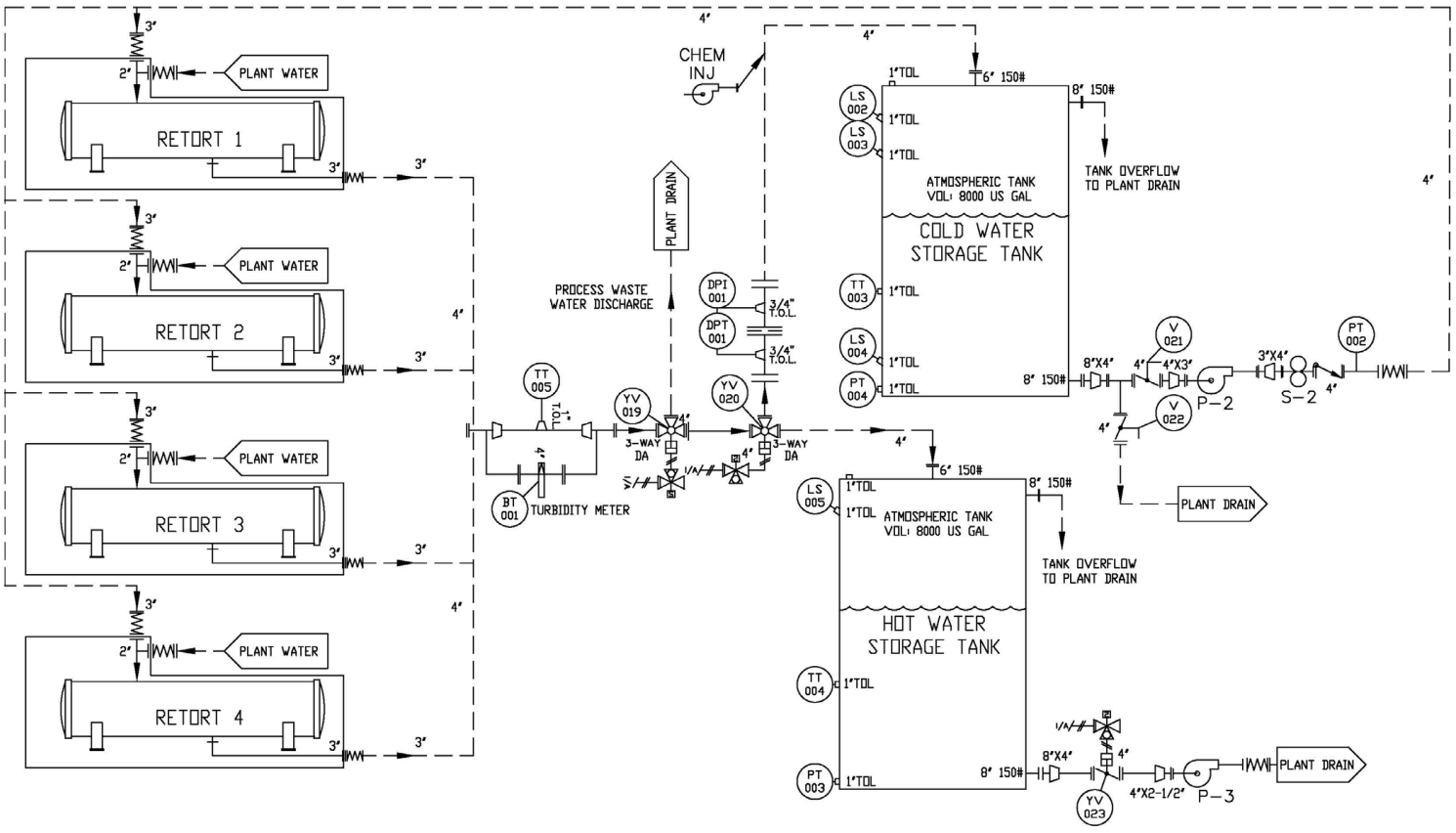
During the cooling process the vessel is flooded via bottom inlets or overhead spray bars. Initial hot discharge (temperature as high as 210°F/99°C) is recovered in the preheat reservoir (water immersion) or pumped to a hot water storage tank (saturated steam). During the latter portion of cooling, temperate water (≤120°F/49°C) is diverted to a "cold" water storage tank. To ensure the water is of acceptable quality, discharged water flows through a turbidity meter and a temperature probe, and one of the following actions are taken:

1. Heat energy from discharged hot water, of acceptable quality can be dissipated in cooling towers or heat exchangers for reuse in subsequent retort cooling steps (closed loop system), used in CIP systems or preheating boiler make-up water. In some closed loop systems, the water is further cooled using chillers then stored for reuse.

2. In instances where container damage or other factors render the hot water quality unusable in the above applications, the water can still be filtered and used in indirect heating applications. After the heat is extracted, it is discharged to a waste water system.

3. Temperate water of sufficient quality can be stored and reused during the beginning of the cooling step where the difference in temperature (Δ T) is sufficient to cool the hot product (250°F/121°C). When retort temperature approaches the temperature of the reclaim water, the retort switches to a colder water source via a 3-way valve. The colder water may be from well or municipal source or in closed loop systems, from cooling towers or chillers.

Piping and instrumentation diagram of a direct cooling water recovery system



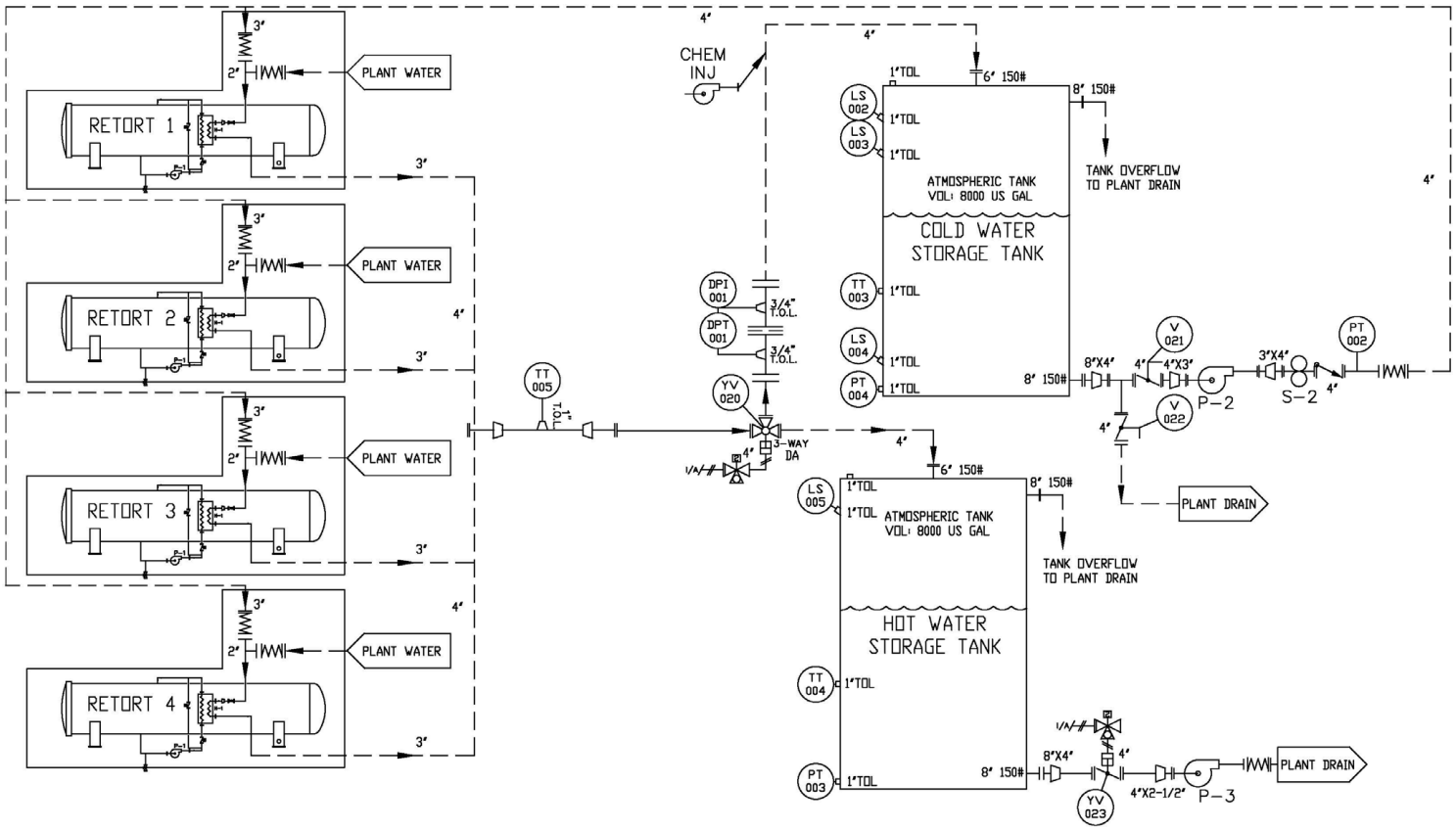
Indirect Cooling Applications - Water Spray, Water Cascade, Steam/Air & ImmersaFlow®

In retort processes using indirect cooling, both process & cooling water are circulated through a heat exchanger. Because of this, there is no direct contact between the two streams, therefore there is no need for the cooling water discharge to pass through a turbidity meter to ensure it is clean. Initial hot heat exchanger discharge (temperature as high as 210°F/99°C is pumped to a hot water storage tank. During the latter portion of cooling, temperate water (≤120°F/49°C) is diverted to a "cold" water storage tank. Cooling water discharge passes a temperature probe, and one of the following actions are taken:

1. Heat energy from discharged hot water can be dissipated in cooling towers or heat exchangers for reuse in subsequent retort cooling steps (closed loop system), used in CIP systems or as boiler make-up water. In some closed loop systems, the water is further cooled using chillers then stored for reuse.

2. Temperate water of sufficient quality can be stored and reused during the beginning of the cooling step where the difference in temperature (Δ T) is sufficient to cool the hot product (250°F/121°C).When retort temperature approaches the temperature of the reclaim water, the retort switches to a colder water source via a 3-way valve. The colder water may be from well or municipal source or enclosed loop systems, cooling towers or chillers.

Piping and instrumentation diagram of an indirect cooling water recovery system. Note absence of turbidity meter and plant drain upstream of 3-way valve to tanks.



Typical Major Water Recovery System Components

Cooling Towers

Heat Exchangers

Pumps & Tanks

Chillers

Efficiency Factors

As indicated above, the water in the reclaim tank is reused to initially cool the next retort batch. The water recovery system efficiency can vary significantly depending on multiple factors.

1. Temperature of the cooling water
2. Overlap of cooling processes on the line
3. Length of cooling process

Estimated Savings

Depending on the factors listed above, the water recovery system can **reduce retort water usage up to 100%.**