ASSEMBLY INSTALLATION

FALLING FILM CHILLER - MODEL FR3



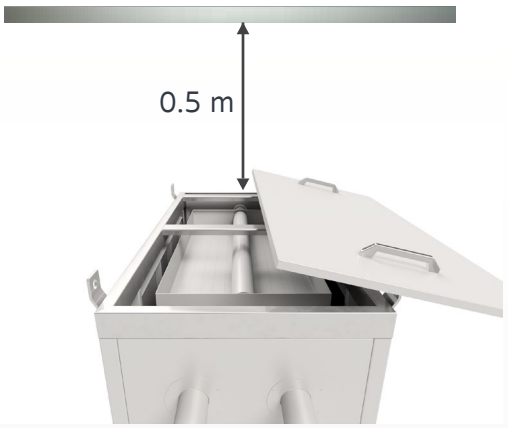
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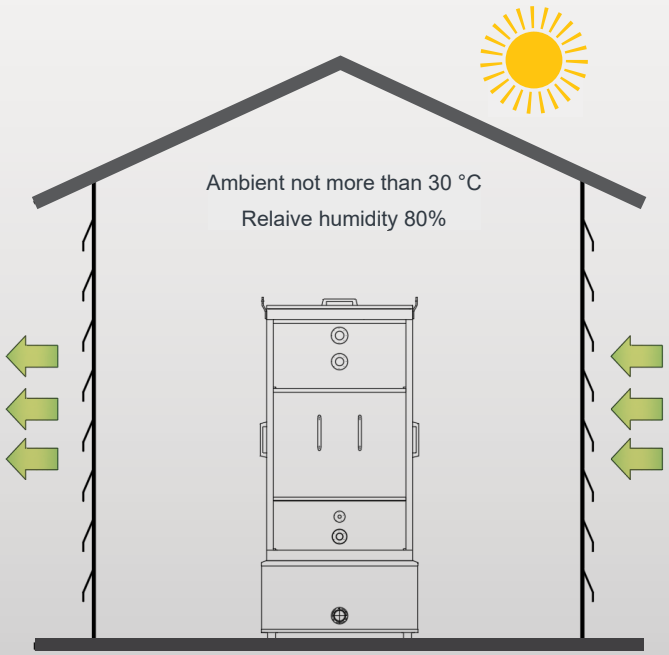
1. PREPARATION OF THE AREA FOR MACHINE INSTALLATION

- It is advisable to install it near the place of cool water is used, to prevent any temperature change in the water before it reaches the point of use.
- Install it close to the condensing unit and in a location where it is convenient to run the refrigerant lines and electrical cables.
- There should be approximately 0.5 meters of space around the machine.

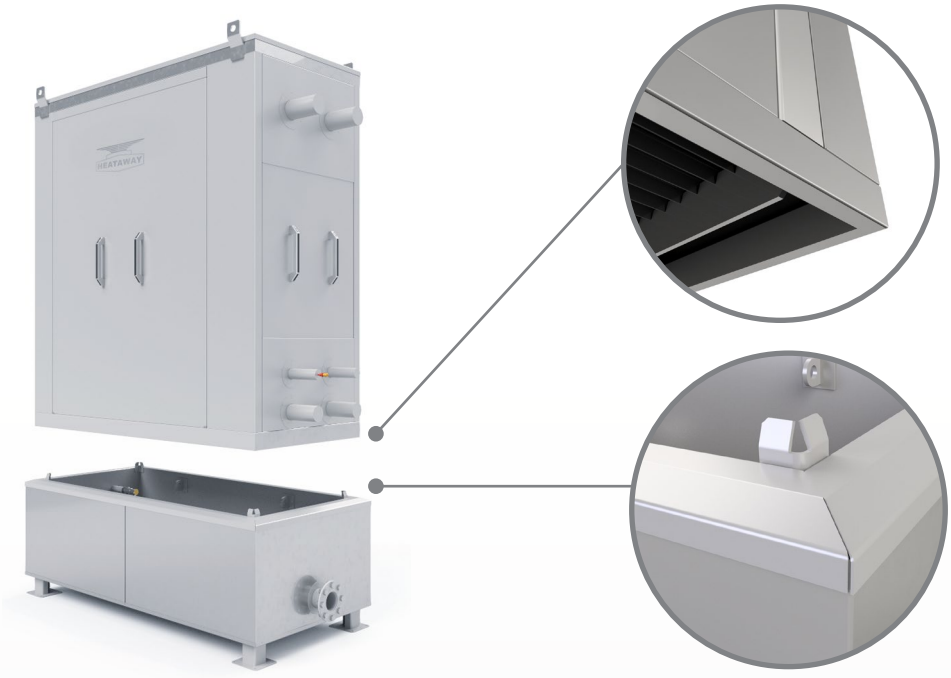




- There should be a sheltered room that does not have direct sunlight exposure, with a surrounding temperature of no more than 30°C.
- There should be a well air circulation system that allows air flow and maintains humidity levels above 80%.
- Avoid using the areas close to the seaside, chemical production facilities, lime production facilities, or areas with unusually high acid or alkaline conditions because it may cause corrosion or rust on the surface of stainless steel.

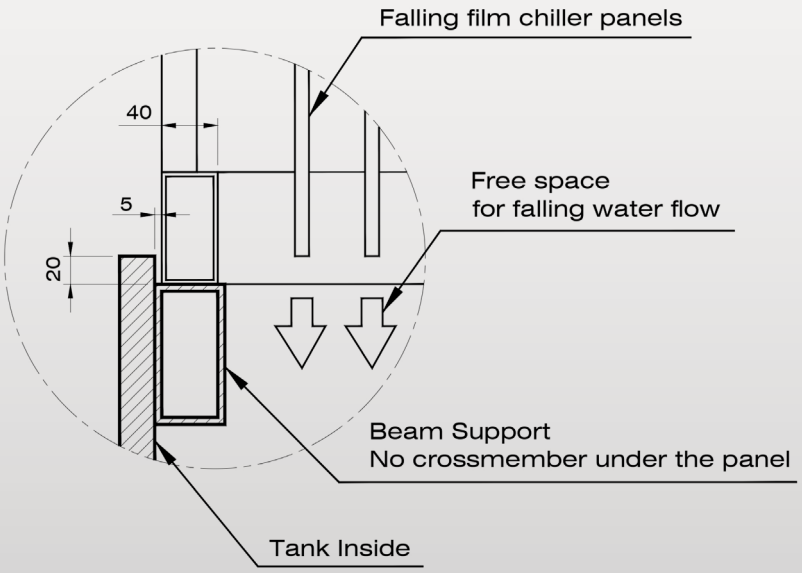


2. THE ASSEMBLY OF MACHINERY

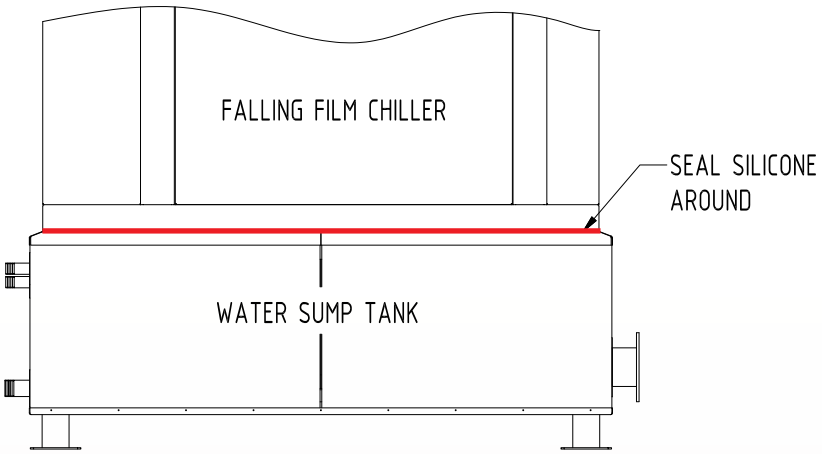


In the case of assembling the Falling Film Chiller into the Water Sump Tank (Additional), there will be a guideline tool to facilitate the assembly process. This tool will be located at the inside corner of the Falling Film Chiller.

In the cases where you need to assemble the Falling Film Chiller onto a water tank that the customer has constructed, it is recommended that the water tank have a beam to support the Falling Film Chiller. The assembly should place the frame of the machine parallel to the beam of the water tank. Be cautious not to make the beam too wide, as it may obstruct the flow of water.

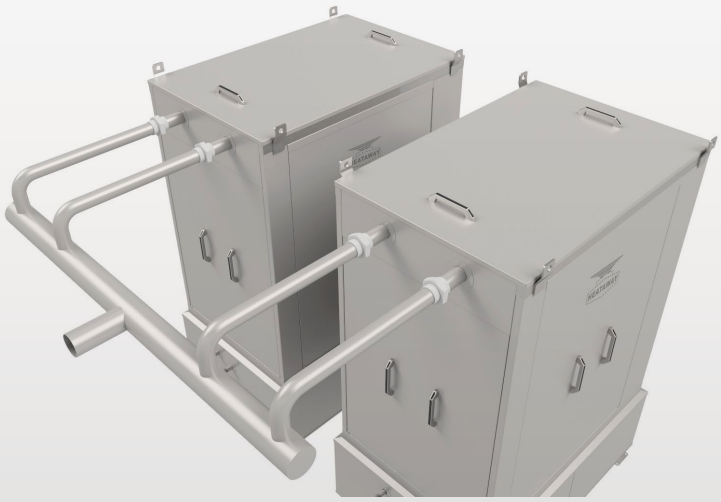


When assembling the Falling Film Chiller into a water sump tank or a water tank that the customer has constructed, there may be joints formed between the machine and the tank. It is recommended to use food-grade silicone to seal these joints as mentioned.



3. WATER CONNECTING

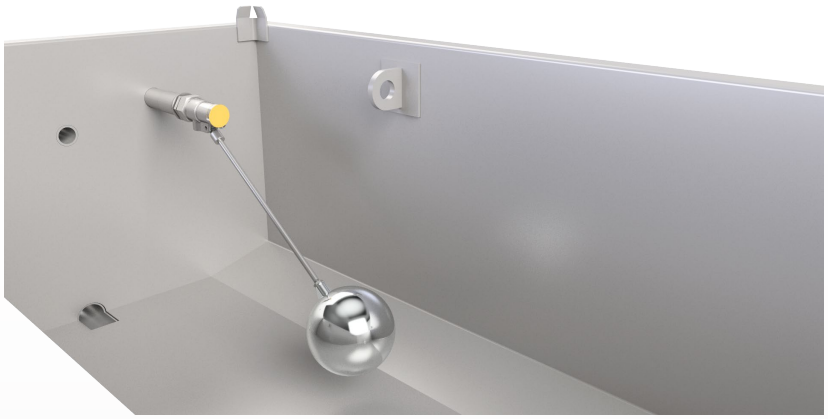
The water tray is designed to be suitable for the water flow rate of each specific model. Water flows into the water tray and is distributed through a water distribution pipe. The water then flows through the holes in the tray and cascades onto both sides of the falling film plate. The water level inside the water tray is maintained between 40 to 70 mm, depending on the designed flow rate. Inside the water tray, there is also an overflow pipe designed to drain excess water in case the flow rate exceeds the specified capacity.



It is recommended to use a pipe with a header, and the pipe should run vertically from the header into the water tray, as shown in the provided diagram. The distance between the header and the machine should be no less than 1 meter to facilitate servicing. The flow pattern of water into the water tray will depend on the specific design, and it can be either direct input from the customer or a rotational flow into the water sump tank.

The Water sump tank (Additional) is an auxiliary device used to deliver chilled water to the process. Due to its small size, it is not suitable for storage.

For processes that use a closed-loop chilled water system, water loss can occur to compensate for this water loss, There is an option to install a float valve within the water sump tank. This float valve will refill the water in the process.



4. CONNECTING SYSTEM

When installing the refrigeration system, it must be done by a knowledgeable and expertise technician.

After installing the Falling Film Chiller, it is recommended to connecting pipe from the chiller to the refrigeration system to prevent stress damage to the plate due to thermal and mechanical expansion from piping connections.

4.1 Connecting the DX-direct expansion evaporator

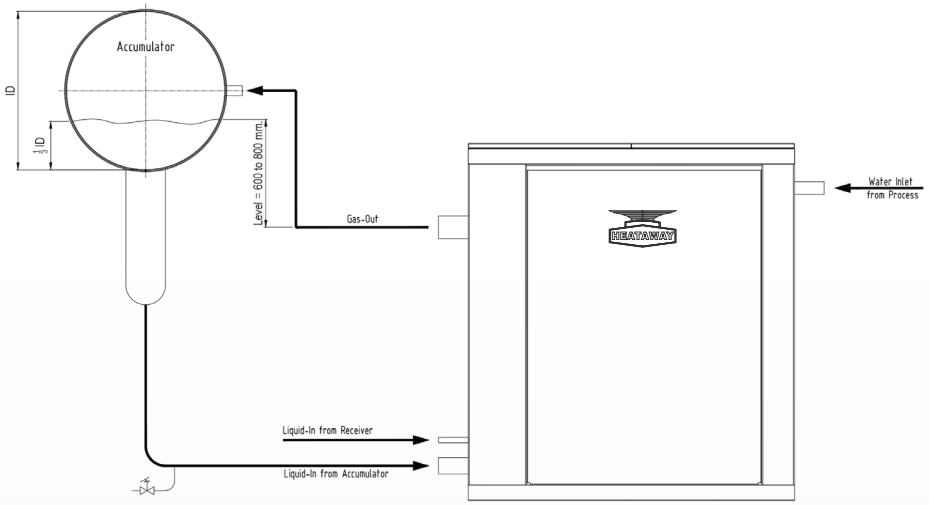
The DX-direct expansion evaporator can only be used with refrigeration systems that utilize Freon as the refrigerant. The refrigerant is depressurized using an expansion valve and distributed to individual plates through a refrigerant distributor. (It is recommended to use an electronic expansion valve for this purpose.)



In case of a oil collect inside the evaporator-plate, the oil can be returned by a short procedure, either by suction through the dx-injection pipe (at the common pipe in front of the venturi distributor), or alternatively by injecting hot-gas into this dx-injection pipe.

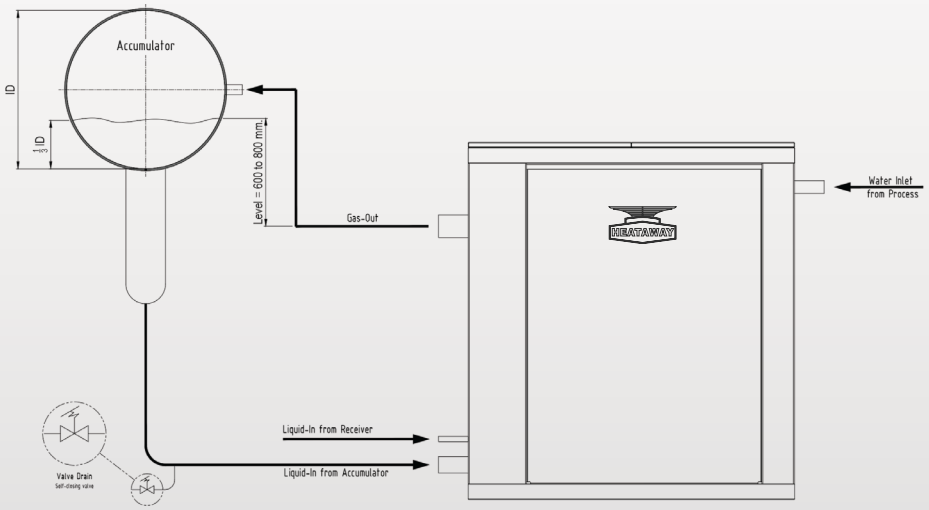
4.2 Connecting the Flooded evaporator

The Flooded system is a refrigeration system that relies on the head pressure of the refrigerant stored in the accumulator, which is connected to the evaporator, to facilitate circulation and heat exchange. Level usually is between 600 – 800 mm for freon and NH3



4.3 De-oiling

For an evaporator using ammonia as the refrigerant as a Flooded refrigeration system, there is a drainpipe located at the bottom of the evaporator. Ammonia, in comparison to oil, has a lower density, which causes the oil within the evaporator to settle at the bottom."



The rate of oil drain will depend on the operating time in each specific case. To ensure safety in the operation, it is recommended to use “self-closing valves” for the oil drain valves.

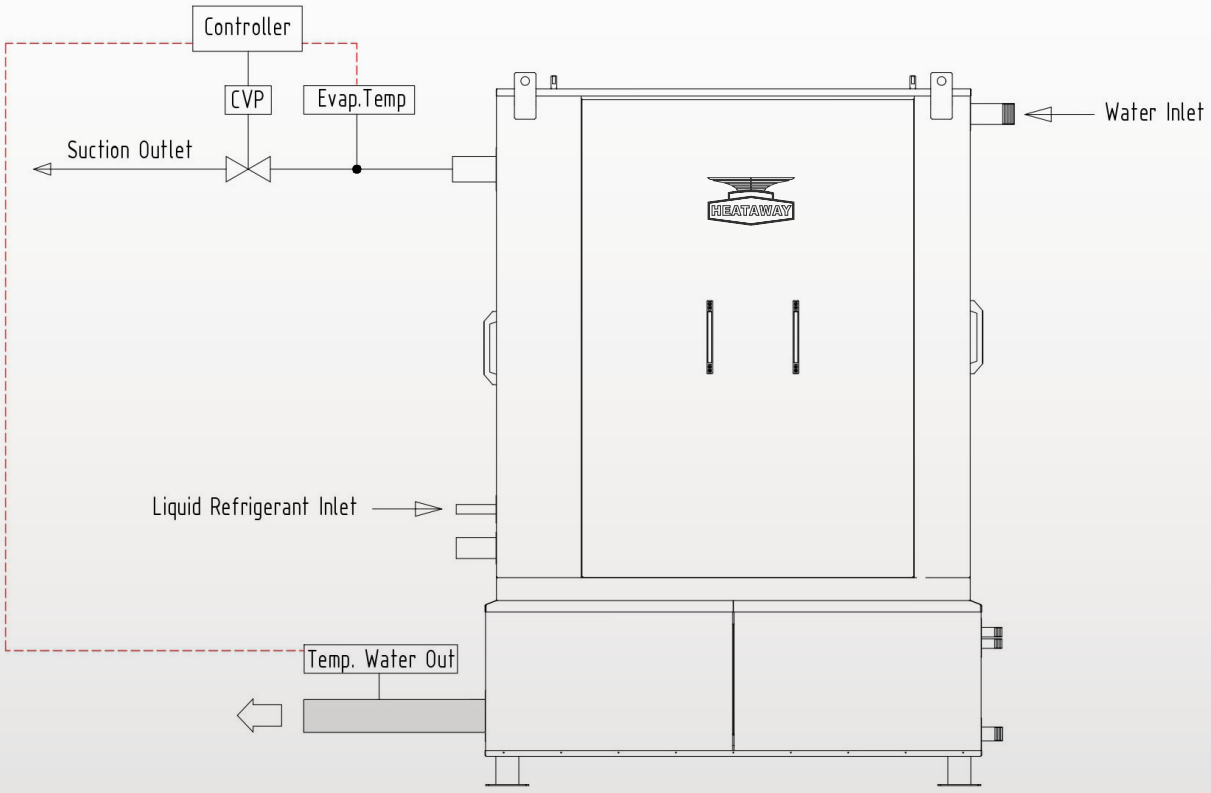
5. TEMPERATURE CONTROL

Falling film chiller is designed to lower the temperature of water to be close to its freezing point. To prevent ice formation on the plates, it is recommended to control the evaporating temperature, ensuring it does not fall below -4°C. This includes controlling both the water temperature and flow rate as per the design specifications.

While ice formation on the plates may occur, it does not damage the evaporator. This is one of the advantages of using a Falling film chiller, especially when the requirement of very low temperatures water.

Therefore, it is essential to have a control system for refrigeration based on the temperature of the water exiting the evaporator.

If the temperature of the water exiting is lower than the design specifications, it is necessary to increase the evaporating temperature. This control requires precision and should be use of sensors and PID controller."



"The image above is an example of controlling the suction pressure based on reading the water outlet temperature. If the water outlet temperature drops below 1°C, the controller will adjust the evaporation temperature to a higher setting."

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ASSEMBLY INSTALLATION
FOR FALLING FILM CHILLER - MODEL FR3

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