OPTI COOL

AIR OR WATER COOLED FROZEN YOGURT MACHINES?

THE INFORMED CHOICE

Frozen yogurt machines, along with all refrigeration and freezing equipment, require an efficient exchange of heat from the evaporator, (the area being cooled), to the outside environment. In the case of frozen yogurt equipment the evaporator is the freezing cylinders where the liquid yogurt mix is frozen into the finished product your customers enjoy. This is made possible by cooling the condenser with either air or water. Air cooled condensers employ cooling fins and fan generated air flow that removes the heat from the machine like a radiator in a car. Water cooled condensers run cooler water around the refrigeration coils to absorb the heat and carry it out of the machine. Both systems can work well under the proper conditions. As you will see later it is these conditions that will determine which cooling system is best for your operation.

Why is this choice so important?

Choosing between air and water cooled frozen yogurt equipment has never been more important. With traditional yogurt stores using two to three machines the choice was less impacting due to the ability of most locations' air conditioning to handle the heat generated by the equipment. The advent of multiple machine store applications with as many as 10 frozen yogurt machines has increased the importance of this choice due to its effect on the equipment's efficiency, productivity, cost of operation and environmental impact.

Which form of cooling is better?

Water cooling is best, almost always. Consistent removal of the heat generated in the refrigeration process is key to optimal operation. It is generally recognized that water cooled, because of the consistent inlet water temperature, is superior to air cooled in maintaining a stable operating environment. Because air cooled equipment is subject to varying ambient temperatures within its operating space it tends to be less consistent in its efficiency and product quality and capacity. Air cooled equipment increases the ambient temperatures through its own heat expulsion and may cause inefficiency due to the air cooled condenser "breathing" its own heated air.

When air cooled and when water cooled?

Having said the above, it does not mean that water cooled is always the recommended cooling method.

The following situations may warrant the use of air cooled machines.

- Only one or two machines are being used and the operating space is large enough to accommodate the heat rejection of the equipment and the spacing of the machines; and
- There is enough air conditioning capacity to handle the heat rejection of the machines and electricity is affordable.

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- When water cooled equipment is prohibited by statute within the store location's jurisdiction..
- The water quality is so poor that water cooled condensers will be adversely affected.
- When the cost of water is prohibitive compared to air conditioning, (equipment and electricity), expense.
- Any combination of the above conditions.

When would water cooled machines be recommended as optimum?

- When sufficient air flow for the equipment's condensers is not possible due to the number of machines to be installed and the operating space available. (When machines are required to be placed side by side.)
- Hot ambient operating space such as non-air conditioned locations.
- Where water quality and cost is not an issue or an adverse factor.

Recommendation:

- Whenever possible, water cooling is recommended as the superior choice due to the consistent and efficient operation of the machines which in turn leads to superior product quality, higher production capability, and MUCH lower operating costs.

Closed Loop Cooling Systems

- By employing a closed loop cooling system a store may operate multiple water cooled machines without the negative aspects of water cooled equipment. Generally speaking, the closed loop cooling system negates all of the "down side" to water cooled equipment.
  For example:
  - The coolant (Glycol/Water mix) is contained in a closed loop so there is no water expense from dumping down the drain.
  - There is minimal environmental impact because of no water waste and reduction in the electricity needed to operate additional air conditioning.
  - The operator saves considerable amount of money due to no water and less electricity costs. This savings is usually enough to pay for the closed loop system in less than 2 years.

Temperature Limitations of Closed Loop Glycol Systems:

The efficiency and effectiveness of closed loop glycol systems begins to drop at ambient temperatures of 85 degrees and are nearly completely ineffective at and above ambient temperatures of 107 degrees. In general, using the National Weather Service's published historical data for average high temperatures at a location, if the highest average is 95 or below, a basic closed loop system will nearly always work.

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Temperature Limitations of Closed Loop Glycol Systems (continued):

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There are options for high ambient temperature mitigation for closed loop systems. They range in cost from installing a "misting" system on the glycol system coil, installation of commercially available "pre-chill" evaporative cooling packages, installation of a small "booster" coil assembly in air conditioned area in the store to be used when the outdoor ambient exceeds 100 degrees, to the most expensive "chiller" systems with their own refrigeration compressor to actually refrigerate the glycol.

CONCLUSIONS:

1. Water cooled soft serve machines are far more efficient than air cooled. They run cooler, use less power, put far less heat in the nearby environment, and have a lower failure rate of critical components.
2. In most every instance of multiple soft serve machine (more than 5 compressors) installation, the long-term cost benefit analysis dictates using a closed loop (recirculating) glycol system. Even with the initial additional component and installation cost, there is the expectation of a 100% R.O.I. within the first 36 months of operation, and in some cases within the first 12 months depending on the cost of power in a locality.
3. We have been specifying, designing, building, and working with closed loop glycol systems for over 30 years. We know what works, and what doesn't.

Call us with your specific needs. We'll be happy to help.