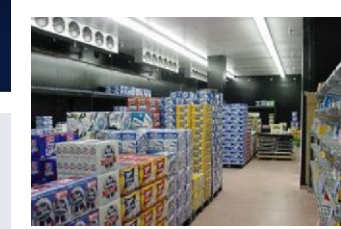




Michaels Engineering Energy Brief

WALK-IN COOLER MAINTENANCE



SUGGESTIONS...

Do you have certain Energy Efficiency topics you'd like to know more about? Send an email with your suggestion to the author listed below and your topic might become a future Energy Brief!

DID YOU KNOW...

...Freezing water can do significant structural damage to a freezer; especially older ones where cracks allow water to seep in, then freeze and expand.

...To effectively remove heat, the condenser should be placed in a well-ventilated area where the temperature is controlled to allow heat to be removed easily.

MEET THE AUTHOR



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➔ OPERATION AND MAINTENANCE

The ubiquitous walk in cooler or freezer is an essential part of many cafeterias, restaurants and convenience stores. It is also a large energy user in these facilities but is rarely considered until problems emerge. Problems include failure to maintain pressure and compressor failure, both of which can result in expensive losses to the products stored in the cooler. These problems, as well as unnecessarily high energy use, can be avoided by observing equipment and taking corrective action.

➔ EVAPORATORS

Moisture from the air freezes onto the evaporator coils (the cooling coils in the freezer) and forms an insulating barrier to heat transfer. Airflow also decreases as the passages narrow due to ice buildup. Each evaporator has a defrost cycle to melt frost/ice that has built-up on the evaporator coils. Water from the melted ice is drained from the freezer...Ideally.

It is not unusual, however, to find evaporators in a state of poor maintenance. For many evaporator units, the ice is not melted or the water is not properly drained, resulting in a block of ice taking over the evaporator. When the coil freezes, heat transfer is greatly reduced resulting in the compressor working harder and longer. It works harder because the suction pressure drops making the compressor work at a higher differential pressure, thus requiring more power. It works longer because heat transfer is reduced. When ice buildup is excessive, the compressor will run all the time and the freezer temperature setpoint will not be maintained.

As the ice melts, the water has to drain out of the freezer. This doesn't always occur. Trapped water that freezes can do significant structural damage to a freezer; especially older ones where cracks allow water to seep in, then freeze and expand. Stalactites and stalagmites of ice appearing in your freezer are reason for swift action to avoid costly damage.



➔ CONDENSERS

The condenser coil of the refrigeration system removes heat from the system. It is not unusual to find condensers located in enclosed spaces or spaces with inadequate air flow to remove heat from the space. The temperature around the compressor rises resulting in higher head pressure for the compressor, which again increases compressor power.

To effectively remove heat, the condenser should be placed in a well-ventilated area where the temperature is controlled to allow heat to be removed easily. Enclosed spaces will require openings for cooling air intake and exhaust. In many cases, a fan will be required to move enough air through the space. If the condenser heat is never needed, it should be exhausted directly outside if possible. In cases where it may be used for space heating, such as for a nearby dry storage room, controls may be installed to direct the flow indoors for heating, and outdoors when heating is not required. Condenser coils should also be checked regularly for cleanliness. Dust and debris will act like ice buildup on an evaporator coil. It will insulate the heat transfer surface and reduce airflow, which will make the compressor run harder and longer. In extreme cases, compressors may fail.

➔ CONCLUSION

These operations and maintenance issues should be addressed to avoid excessive energy use and costly repairs, as well as potential product loss. Additional energy saving measures for freezers and coolers will be covered in a future brief.