

Commercial Refrigeration

Commercial and industrial refrigeration systems can be very energy intense and expensive to operate. However, there are a variety of newer products and controls technologies that can be implemented to increase the efficiency of refrigeration systems. Strategies include both mechanical refrigeration system upgrades such as fan motors and a variety of other products that help reduce refrigeration system losses due to air infiltration such as night curtains.

MULTIDECK CASE DOORS

- Existing open multi-deck style cases can be retrofitted with doors that are designed to fit right onto the open multi-deck style cases.
- Multideck case doors provide an estimated 70-82% reduction in refrigeration energy use compared to open cases.

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ANTI-SWEAT HEAT CONTROLS

- Standard glass doors on grocery refrigerator and freezer cases typically use anti-sweat (anti-condensation) heaters in the frames and mullions, which operate continuously to prevent moisture buildup.
- Anti-sweat heater controls ensure that refrigerated door heaters do not run continuously when not needed.
- Anti-sweat heater controls provide 30-90% reduction of the annual energy consumed by door heaters and reduce heat load in these refrigerator and freezer cases.

REFRIGERATED CASE NIGHT COVERS

- Deployed when grocery centers close overnight, night covers insulate cold refrigeration cases while maintaining the desired displayed food temperature. Night covers are typically constructed of a flexible, woven fabric.
- Night covers offer savings of up to 35% of the cases annual energy consumption dependent on the number of hours the curtain is used.



WALK-IN FREEZER AND COOLER STRIP CURTAINS

- Strip curtains reduce refrigeration load by limiting heat transfer from adjacent warm, humid spaces when walk-in doors are open. As a result, compressor run time and energy consumption is reduced.
- Strip curtains must be at least 0.06 inches thick.
- Low temperature strip curtains must be used for low temperature applications.

ELECTRONICALLY COMMUTATED MOTOR (ECM) COMPRESSOR AND CONDENSER FAN MOTORS

- Replacing existing shaded pole and permanent split capacitor motors with higher efficiency electronically commutated motors (ECMs) on condensers and compressors provide savings via the increased motor efficiency of the ECM.
- ECM motors consume 50-75% less energy than shaded pole and permanent split capacitor (PSC) motors while doing equal work.

DEMAND DEFROST CONTROLS

- Evaporator coils in walk-in freezers will accumulate ice unless they are periodically defrosted. Defrosting introduces heat to the coils, temporarily reducing their ability to exchange heat. Electronic demand defrost controls use sensors and control algorithms to monitor operating conditions and initiate defrost cycles only when needed.
- Demand defrost controls help to reduce overall defrost cycle time and commonly cuts defrost cycle annual energy consumption by 20%.

EVAPORATOR FAN MOTORS

- By replacing an existing, working standard-efficiency shaded-pole or permanent split capacitor (PSC) evaporator fan motor in refrigerated display cases or walk-in coolers with an electronically commutated motor (ECM) you can reduce fan energy consumption by 50-75%.

EVAPORATOR FAN SPEED CONTROLS

- Adding controls to vary the speed of evaporator fan motors in walk-in coolers and freezers can provide between 13-59% energy savings compared to using standard shaded pole and permanent split capacitor motors without speed controls.

LOW-HEAT AND NO-HEAT DOORS

- Replacing standard refrigerated case doors, which incorporate electric resistance heaters in the door, with more efficient doors that have a smaller electric resistance heaters (low heat doors) or no heaters at all (no heat doors) can provide significant door energy savings in the range of 20-100%.
- Cuts Compressor Runtime: Less heat means the refrigeration system runs less, which is a huge energy saver, as refrigeration is 50% of a supermarket's energy bill.
- Improves HVAC Efficiency: By keeping cold air in and warm air out, less energy is needed for air conditioning and heating.

FLOATING HEAD PRESSURE CONTROLS

- Reducing the compressor discharge pressure reduces the pressure ratio across the compressor and improves operating efficiency. Many systems have controls that maintain a minimum condensing pressure to ensure proper operation of all components. By using head pressure controls to lower condensing pressure during cooler ambient conditions, refrigeration systems can operate more efficiently and save energy.
- Floating head pressure controls typically offer significant savings. Annual energy savings often range from 5-15% for general systems, but can reach 20-40% or even higher (up to 45%) in cooler climates or with advanced VFD retrofits.