



6 Steps for Energy-Efficient Refrigeration

Not only can energy-efficient operation and proper maintenance of your refrigeration system save you money and energy, but it can help extend the product shelf life to better meet food safety requirements. As a matter of fact, the Food and Drug Administration (FDA) requires that the core temperature of perishables like fish, meat, dairy, deli, poultry, and cut produce must be at or below 41°F at all times.

Does having an energy-efficient operation mean you have to install energy-efficient equipment? Not necessarily. That's why we've provided some steps to be taken before you take the plunge and invest in energy-efficient equipment. These steps were developed to help you operate and maintain your refrigeration system more efficiently.

STEP 1 Shelve Products Properly

Proper product loading practices are mandatory in order to maintain the correct food temperature and to comply with the FDA. Here are some actions to avoid when shelving the products:

- Do not block the return air grille or the discharge air grille of a display case.
- Do not overload display shelves. You can avoid this by following the manufacturer's specified load limits.
- Do not create void spaces on the display case shelves.
- Do not stack products blocking the airflow of walk-in fan coils.

STEP 2 Maintain Optimum Space Conditions

The temperature and humidity of the air in the space around your refrigerators directly affects their operation. An air conditioning system provides suitable space humidity, and temperature for your workers' comfort, and improves the operation of the refrigeration system.

When frost builds up on your equipment coils, it increases the refrigeration energy usage and product temperature. Generally, the spaces where your refrigeration display cases, cabinets, and walk-ins are located should have temperatures between 70°F and 75°F, and a relative humidity of 45% to 50%.



STEP 3

Stop Heat and Moisture from Penetrating Into Your Refrigerated Spaces

The usual ways that heat finds its way into your refrigerated spaces are through the walls, openings and cracks of your display cases, cabinets, and walk-ins and through sources inside refrigerated cabinets such as motors, lights, anti-sweat heaters and defrost mechanisms. Here are few tips to help minimize the threat of heat getting into your refrigerated spaces:

- Use thicker insulated walls such as 5" or 6" insulated panels with tongue-n-groove rigid foam studs when retrofitting your walk-in coolers and freezers.
- Install barriers between cold and warm zones:
 - *Install night covers on multi-deck and tub type display cases.*
 - *Install swing doors or strip curtains, as well as automatic door closers, in walk-ins.*
 - *Replace worn or missing door gaskets of walk-ins and reach-ins.*
 - *Check for proper defrost operation, broken vapor barriers and insulated panels, or ajar doors if unusual ice formation appears inside walk-ins.*
- Minimize the heat dissipation of equipment inside refrigerators:
 - *Replace reach-in glass doors with special doors requiring less anti-sweat heating.*
 - *Replace T12 lamps and magnetic ballasts with T8 or super T8 lamps with electronic ballasts.*
 - *Install efficient defrost controls so that defrost is terminated based on temperature rather than time.*
 - *Install controllers to synchronize the power use of anti-sweat heaters with fluctuations in space humidity.*
 - *Install glass doors on open, multi-deck refrigerated display cases.*

STEP 4

Install Energy-Efficient Equipment

In order for your refrigeration system to operate at its optimum efficiency, you should install the proper energy-efficient components to your refrigeration system:

- ECM or PSC evaporator and condenser fan motors
- Evaporators and condensers with large surface area
- Reciprocating compressors with discus valve
- EnergyStar[®] labeled reach-in refrigerators and freezers



STEP 5

Routine Maintenance

Put in place a routine maintenance strategy and schedule. This will ensure success and protect your energy-efficiency investments. Here are some things to check for:

- Critical refrigeration pressures/temperatures and product temperatures.
- Cleanliness of evaporator and condenser coils and discharge air grilles of display cases.
- Fan coils that have objects blocking the air flow.
- Worn belts, missing suction line insulation, and failed motors in evaporator and condenser fans.
- Low refrigerant charge if bubbles are seen in the sight glass and suction and head pressures are too low.
- Overcharging of refrigerant or non-condensable gases in refrigeration lines if suction and head pressures are too high.
- Yellow color in the sight glass indicating moisture in refrigeration lines which may cause low suction and head pressures.

STEP 6

Energy Management Enforcement

You should continue to work with your staff to create an energy-efficiency environment:

- Develop an energy-efficiency policy for your facility.
- Educate your facility operators and refrigeration contractors about energy-efficiency.
- Keep close track of the process and results, and make adjustments if necessary.

We hope the information we've provided has been helpful. Following these steps can optimize the efficiency and energy usage of your refrigeration equipment. If you'd like more information about how you can improve the energy efficiency of your business, contact:

- Southern California Edison
1-800-736-4777
www.sce.com
- EnergyStar[®]
1-888-STAR-YES
www.energystar.gov
- California Energy Commission
1-800-555-7794
www.energy.ca.gov/efficiency/index.html