

# Easy Upgrades Grocery Refrigeration Worksheet



**Effective January 5, 2009.** Please complete this worksheet for any energy-saving grocery refrigeration equipment, controls and other retrofits. To qualify, the project must meet the applicable specifications on the back of this sheet. Your total incentive for each measure will be the quantity multiplied by the per unit incentive ( $Q \times I = TI$ ). When completed, attach this worksheet to your application form.

Easy Upgrades Application # EZ \_\_\_\_\_

Installing	Replacing	Quantity (Units)	Incentive (Per Unit)	Total Incentive	
<b>Refrigeration Cases</b>					
G1	Efficient, medium-temp open	Standard medium-temp open case	_____ linear foot	\$20.00	\$ _____
G2	Efficient, medium-temp reach-in	Standard medium-temp open case	_____ linear foot	\$100.00	\$ _____
G3	Efficient, low-temp reach-in	Standard low-temp reach-in	_____ linear foot	\$150.00	\$ _____
G4	Efficient, low-temp reach-in	Standard low-temp open case	_____ linear foot	\$150.00	\$ _____
G5	Efficient, low-temp reach-in	Standard low-temp coffin case	_____ linear foot	\$55.00	\$ _____
G6	Vertical night covers	No covers present	_____ linear foot	\$9.00	\$ _____
G7	Horizontal night covers	No covers present	_____ linear foot	\$5.00	\$ _____
G8	Refrigeration line insulation	No insulation present	_____ linear foot	\$1.00	\$ _____
G9	Door gasket—walk-in	No or damaged door gasket	_____ linear foot	\$2.00	\$ _____
G10	Door gasket—reach-in	Damaged door gasket	_____ linear foot	\$1.00	\$ _____
G11	Auto-closer—walk-in	No or damaged auto closer, low-temp	_____ door	\$50.00	\$ _____
G12	Auto-closer—reach-in	Damaged auto closer, low-temp	_____ door	\$50.00	\$ _____
G13	Auto-closer—walk-in	No or damaged auto closer, med-temp	_____ door	\$40.00	\$ _____
G14	Auto-closer—reach-in	Damaged auto closer, med-temp	_____ door	\$40.00	\$ _____
G15	No-heat glass doors	Standard low-temp reach-in	_____ door	\$50.00	\$ _____
G16	Anti-sweat heat (ASH) controls	Low or med-temp case w/out controls	_____ linear foot	\$20.00	\$ _____
<b>Evaporator Fans</b>					
G17	Evaporator fan controls	Med-temp walk-in with no controls	_____ fan	\$25.00	\$ _____
G18	Efficient evaporator fan motors	Med- or low-temp walk-in	_____ motor	\$100.00	\$ _____
G19	ECM case fan motors	Standard, shaded-pole fan motors	_____ motor	\$30.00	\$ _____
<b>Compressors/Condensers</b>					
G20	Efficient, low-temp compressor	Standard low-temp compressor	_____ ton	\$45.00	\$ _____
G21	Air-cooled multiplex system	Standalone air cooled display case	_____ ton	\$300.00	\$ _____
G22	Evaporative-cooled multiplex	Standalone evap cooled display case	_____ ton	\$300.00	\$ _____
G23	Efficient, air-cooled condenser	Standard air cooled condenser	_____ ton	\$100.00	\$ _____
G24	Efficient, water-cooled condenser	Standard air cooled condenser	_____ ton	\$100.00	\$ _____
G25	Efficient, evaporative condenser	Standard air cooled condenser	_____ ton	\$200.00	\$ _____
<b>Head/Suction Pressures</b>					
G26	Floating head pressure controller	Standard head pressure control	_____ hp	\$60.00	\$ _____
G27	Floating suction pressure	Standard suction pressure control	_____ hp	\$10.00	\$ _____
<b>Case/Walk-in Lighting</b>					
G28	T8 fluorescent lighting	T12 or T10 fluorescent lighting	_____ lamp	\$15.00	\$ _____
G29	LED display case lighting	T12 or T10 fluorescent lighting	_____ linear foot	\$7.00	\$ _____
G30	Fluorescent walk-in light fixture	Incandescent walk-in light fixture	_____ fixture	\$25.00	\$ _____

**Grocery Refrigeration Total \$**

\$

# Specifications for Grocery Refrigeration Measures

Effective January 5, 2009

## Refrigeration Cases

Low-temperature cases are designed to hold products at 0°F and below. Medium-temperature cases are those designed to hold products between 0 and 35°F.

Efficient cases have low- or no-heat glass doors, efficient fan motors, efficient lighting and evaporators that raise the suction temperature set point by at least 3°F. Incentive will be based on the prior case length if the new one is longer than what was replaced.

Night covers installed on an otherwise open case must be applied for a period of at least six hours in a 24-hour period, must not be objected to by the case manufacturer and should have small perforated holes to decrease moisture build up. Consider using compressor capacity modulation mechanisms (variable speed drive or unloader) and a liquid line solenoid for freeze protection with this measure.

Refrigeration line insulation applied to bare refrigeration suction lines of 2¼ inches or less on existing equipment can qualify for this incentive. Insulation must be flexible closed-cell nitrile rubber or equivalent. Low-temp lines must have 1-inch insulation thickness while med-temp lines need at least ¾-inch. Where exposed to outside weather, insulation must have manufacturer-approved metal jacketing or reflective outdoor sealant paint.

When replacing a worn gasket, new reach-in door gaskets must meet the manufacturer's installation specifications for dimension, material, attachment method and magnetism.

Auto-closers for glass doors are eligible where the reach-in door has a minimum perimeter of 15 feet. Both reach-in and walk-in doors, must firmly close from any open position of 1 inch or more. Only full replacements or repairs with replacement of hard parts qualify.

No-heat doors are insulated with double- or triple-pane glass with low-E glass coatings and low-conductivity filler gas (such as argon), and no electric resistance heating.

Anti-sweat heat controls for door rail, glass, or frame heaters must use "on demand" defrost controls that sense space humidity or glass moisture. Controls must cycle or turn off heat when no condensate is present.

## Evaporator Fans

Evaporator fan controllers for walk-ins must reduce airflow when the compressor(s) cycle off and there is no refrigerant flow through the evaporator coil. They must cut fan motor power by at least 75 percent during the compressor "off" cycle and must control a minimum fan load of 1/20 hp that operated continuously and at full speed prior.

An efficient fan motor is an electronically commutated motor (ECM), permanent split capacitor (PSC) or solid-state commutated (SCC) motor installed in walk-ins or refrigerated cases replacing a standard efficiency shaded-pole motor. For walk-ins, this applies only on evaporator fans of at least 10 inches in diameter.

## Compressors/Condensers

A qualifying multiplex compressor system must include floating head pressure controls and mechanical subcooling of 5°F or more at design conditions. Condenser fans must be staged or use VSDs. Disc valve compressors replacing reed valves can qualify where the evaporator temp is -10°F or less.

Air-cooled condensers must operate at a 10°F temperature differential (TD) or less for low-temp cases, a 15°F TD or less for medium-temp cases, and evap condensers must operate with a 25°F TD or less above the wet bulb temperature. Water cooled condensers must operate in a closed loop; single-pass cooling is not eligible.

Efficient condenser retrofits have floating head pressure controls, staged or VSD fans, must operate with subcooling of 5°F or more at design conditions and have a TD of 8°F or less for low-temp systems, 13°F or less for med-temp systems and 18°F or less for evap condensers. Minimum average integrated part-load efficiency (EER) should be 105 for air-cooled condensers and 240 for evap condensers.

## Head/Suction Pressures

Incentive for both pressure controls are based on system compressor hp. Floating head pressure controls apply to multiplex systems with fixed controls. System must be converted to floating controls with staged or VSD controlled fans with a minimum saturated condenser temperature of no more than 70°F.

Floating-suction pressure controls that convert an existing multiplex system from fixed controls require the suction pressure to be adjusted to the highest point that can still maintain setpoint temperatures on the suction circuit.

## Case/Walk-in Lighting

Retrofits of T8 fluorescent lamps with electronic ballasts replacing T12 or T10 case lighting in medium-temp cases are eligible. Refrigerated display case lighting replaced with light emitting diodes (LEDs) are eligible for an incentive based on the prior length of fluorescent lamps (in feet). Documentation of the prior lighting must be provided.

Hardwired T8 or compact fluorescent lamp (CFL) fixtures replacing incandescent lighting in walk-ins can qualify where the lamps and ballasts are rated to start at -20°F. Screw-in CFLs may use the Lighting/Controls worksheet.

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**Note 1:** Manufacturer specification sheets for major installed equipment must accompany the final application form.

**Note 2:** Energy Management Systems (EMS) for refrigeration equipment can apply for incentives on the HVAC/Controls worksheet where HVAC equipment is also controlled.

**Note 3:** VSDs for variably-loaded motors of 5 hp and larger can apply for incentives on the Motors/Controls worksheet.