



# Measure Guidelines for EnergySmart Grocer (ESG)

**EnergySmart**  
**grocer**

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# Measure Guidelines for EnergySmart Grocer (ESG)

| Table of Contents                   |  | Page |
|-------------------------------------|--|------|
| <b>Cases</b>                        |  |      |
| 1.                                  | Low Open Case to New Reach-in . . . . .  | 1    |
| 2.                                  | Medium Temperature Open Case to New Reach-in . . . . .   | 1    |
| 3.                                  | Low Temperature Reach-in to New High-Efficiency Reach-in . . . . .   | 2    |
| 4.                                  | Standard Doors to Low/No Anti-Sweat Heat Doors for Low Temperature Reach-in . . . . .  | 2    |
| 5.                                  | No Doors to Doors. . . . .   | 3    |
| <b>Controls</b>                     |  |      |
| 6.                                  | Anti-Sweat Heater (ASH) Controls . . . . .   | 4    |
| 7.                                  | Walk-in Evaporator Fan Control – ECM – Low & Medium Temperature . . . . .  | 4    |
| <b>Strip Curtains</b>               |  |      |
| 8.                                  | Strip Curtains for Walk-in Boxes . . . . .   | 5    |
| <b>Night Covers</b>                 |  |      |
| 9.                                  | Night Covers for Vertical Open Cases . . . . .   | 5    |
| <b>Motors</b>                       |  |      |
| 10.                                 | Shaded Pole Fan Motor to ECM in Display Cases. . . . .   | 6    |
| 11.                                 | Shaded Pole to ECM in Walk-in . . . . .  | 6    |
| 12.                                 | Shaded Pole to Permanent Magnet Synchronous Motor . . . . .  | 6    |
| 13.                                 | Motors Mixed Baseline – Shaded Pole and Electronically Commutated Motors<br>to Permanent Magnet Synchronous Motor in Display Cases . . . . . | 7    |
| 14.                                 | PSC to ECM in Display Cases . . . . .  | 7    |
| 15.                                 | PSC to ECM in Walk-in Evaporator . . . . .   | 7    |
| 16.                                 | VFD on Condenser Fan Motor. . . . .  | 7    |
| <b>Condensers &amp; Compressors</b> |  |      |
| 17.                                 | Reduced Head Pressure for Multiplex Compressor System . . . . .  | 7    |
| 18.                                 | Floating Head Pressure Controls . . . . .  | 7    |
| 19.                                 | Floating Suction Pressure Controls. . . . .  | 7    |
| 20.                                 | High-Efficiency Multiplex Compressor System—Custom Measure . . . . .   | 8    |
| 21.                                 | Efficient/Oversized Air or Evaporative Condenser for Multiplex-Custom Measure . . . . .  | 8    |

## Refrigeration Retrofits

“Low temperature” covers evaporator temperatures below 0°F.

“Medium temperature” covers evaporator temperatures between 1°F and 35°F.

### These guidelines are subject to change without notice.

Please check with your Field Energy Analyst to confirm that your proposed installation meets requirements or call 1.800.683.0483 to speak with an EnergySmart Grocer representative. If you have a custom measure that yields equal or greater energy savings, you may request an engineering review to determine whether it qualifies for an incentive.

# Cases

## 1. Low Temperature Open Case to New Reach-in

Must replace an existing low temperature open vertical display case with a new low temperature high-efficiency reach-in case.

| Existing Equipment Requirements   | Replacement Equipment Requirements   |
|---|--|
| T-8/10/12 lamps   | LED lamps listed on the Mass Save Interim Pre-Qualified LED Fixture List or DesignLights Consortium™ ( <a href="http://masssave.com/business">masssave.com/business</a> or <a href="http://designlights.org">designlights.org</a> ). |
| No doors  | Glass doors  |
| Shaded pole fan motors/ECM  | ECM fan motors   |
| <p><b>Exclusions:</b> Refurbished cases are not eligible for incentive; replacement case must be new and have zero in-service hours.<br/>New case length must be equal to or shorter than original case.</p>  |  |
| <p><b>Recommendations:</b> Customer should consider using compressor capacity modulation mechanisms (such as VFDs, cylinder un-loaders, evaporator pressure regulating valves and re-setting to higher suction pressures/temperatures). If heated doors are installed with the new case, It is recommend that anti-sweat heater controls are utilized (see measure #8) for additional energy savings and an incentive opportunity.<br/>If no/low heat doors are installed with the new LT case, then an additional incentive is available (see measure #5).</p> |  |
| <p><b>Units:</b> Linear feet of case</p>  |  |

## 2. Medium Temperature Open Case to New Reach-in

Must replace an existing medium temperature open vertical display case with a new high-efficiency reach-in case.

| Existing Equipment Requirements   | Replacement Equipment Requirements   |
|---|--|
| T-8/10/12 lamps   | LED lamps listed on the Mass Save Interim Pre-Qualified LED Fixture List or DesignLights Consortium™ ( <a href="http://masssave.com/business">masssave.com/business</a> or <a href="http://designlights.org">designlights.org</a> ). |
| No doors  | Glass doors  |
| Shaded pole fan motors/ECM  | ECM fan motors   |
| <p><b>Exclusions:</b> Refurbished cases are not eligible for incentive; replacement case must be new and have zero in-service hours.<br/>New case length must be equal to or shorter than original case.</p>  |  |
| <p><b>Recommendations:</b> Customer should consider using compressor capacity modulation mechanisms (such as VFDs, cylinder un-loaders, evaporator pressure regulating valves and re-setting to higher suction pressures/temperatures). If heated doors are installed with the new case, it is recommend that anti-sweat heater controls are utilized (see measure #8) for additional energy savings and incentive.</p> |  |
| <p><b>Units:</b> Linear feet of case</p>  |  |

## Cases (continued)

### 3. Low Temperature Coffin to New High-Efficiency Reach-in

| Must replace an existing low temperature reach-in or coffin case with a new high-efficiency reach-in case.   |   |
|--|---|
| Existing Equipment Requirements  | Replacement Equipment Requirements  |
| Open Coffin Case   | LED lamps listed on the Mass Save Interim Pre-Qualified LED Fixture List or DesignLights Consortium ( <a href="http://masssave.com/business">masssave.com/business</a> or <a href="http://designlights.org">designlights.org</a> ).<br>Low/no anti-sweat heat glass doors (see measure #5)<br>» Triple pane glass door.<br>» Anti-sweat heat in door rail, glass, and frame must be $\leq 0.39$ amps/ln ft of case at 120 volts.<br>» Doors must prevent condensation from occurring in the frame assembly. |
| Shaded pole or ECM fan motors  | ECM fan motors  |
| <b>Exclusions:</b> Reach-in cases replacing coffin cases must be equal to or shorter than 1/3 the original case length. Refurbished cases are not eligible for incentive; replacement case must be new and have zero in-service hours. |   |
| <b>Recommendations:</b> Customer should consider using compressor capacity modulation mechanisms (such as VFDs, cylinder un-loaders, evaporator pressure regulating valves and re-setting to higher suction pressures/temperatures).   |   |
| <b>Units:</b> Linear feet of case  |   |

### 4. Standard Doors to Low/No Anti-Sweat Heat Doors for Low Temperature Reach-in

| Must replace an existing standard glass door of a low temperature reach-in or walk-in reach-in display case with a low/no anti-sweat heat glass door. |   |
|---|---|
| Pre-Retrofit Requirements   | Post-Retrofit Requirements  |
| Glass door  | Triple pane glass door  |
| Anti-sweat heat $> 0.39$ amps/ln ft of case at 120 volts  | Anti-sweat heat in door rail, glass, and frame must be $\leq 0.39$ amps/ln ft of case at 120 volts. |
|   | Doors must prevent condensation from occurring in the frame assembly.                               |
| <b>Units:</b> Linear feet of case   |   |

## Cases (continued)

### 5. No Doors to Doors

| Must add glass doors to an existing open vertical medium temp display case.  |   |
|--|---|
| Existing Equipment Requirements  | Replacement Equipment Requirements  |
| T-8/10/12 lamps or LEDs  | LED lamps listed on the Mass Save Interim Pre-Qualified LED Fixture List or DesignLights Consortium ( <a href="http://masssave.com/business">masssave.com/business</a> or <a href="http://designlights.org">designlights.org</a> ). |
| No doors   | No heat doors   |
| <p><b>Exclusions:</b> Retrofitted door must not have anti-sweat heat in the door, rail, or frame. Not applicable to wet rack cases or integral cases.</p>  |   |
| <p><b>Additional Requirements:</b> Must replace thermal expansion valves on cases receiving doors. Refrigeration load will be reduced as a result of adding doors to cases. Must consult with refrigeration contractor to make any additional adjustments to refrigeration system capacity control as needed.</p>  |   |
| <p><b>Notes:</b> Standard Power LED lighting refers to lighting fixtures with a power consumption between 4 W/ft of luminaire and 2.5 W/ft of luminaire.<br/>           Low-power LED lighting refers to lighting fixtures with a power consumption less than 2.5 W/ft of luminaire<br/>           “French” doors are a configuration of two reach-in doors that swing open away from the center interface between the two doors. French style doors do not have a traditional mullion; instead they have overlapping gasket material that creates a temporary seal when the two doors are closed. French doors typically have lighting on the doors next to the hinges, and along the top door frame.</p> |   |
| <p><b>Units:</b> Linear foot of case</p>   |   |

# Controls

## 6. Anti-Sweat Heater (ASH) Controls

Must install a device that controls the ASH load of reach-in doors. This measure is relevant for both MT and LT reach-in glass door cases.

| Pre-Retrofit Requirements   | Post-Retrofit Requirements   |
|---|--|
| <b>Medium Temperature Case</b><br>Uncontrolled ASH present >0.20 amps/ft of case (door rail, glass and/or frame heating element combined)                         | Must automatically modulate heater output based on environmental conditions (temperature or relative humidity) as measured by a sensor that is part of the control system. |
| <b>Low Temperature Case</b><br>Uncontrolled ASH present >0.39 amps/ft of case (door rail, glass and/or frame heating element combined)                            | Must automatically modulate heater output based on environmental conditions (temperature or relative humidity) as measured by a sensor that is part of the control system. |
| <b>Additional Information:</b> If there is no amp tag to determine the door amps for the base case, please call ESG staff to help qualify the case or door frame. |  |
| <b>Units:</b> Linear feet of case   |  |

## 7. Walk-in Evaporator Fan Control – ECM – Low & Medium Temperature

Must install controls that reduces or turns off fan speed when there is no refrigerant being delivered to the evaporator.

| Existing Equipment Requirements   | Replacement Equipment Requirements  |
|---|---|
| Electronically Commutated Motor (ECM)   | Same  |
| Evap fan motor size (nameplate rated output power): 1/20th HP to 1/10th HP  | Evap fan motor size (nameplate rated output power): 1/20th HP to 1/10th HP  |
| Evap fan full speed runtime: full speed 24hrs/day except if off for defrost periods   | Evap fan full speed runtime: full speed only during call for cooling (compressor on or liquid-line solenoid open).  |
| Evap fan full speed: 1,550 RPM  | Evap fan full speed: 1,550 RPM  |
|   | Evap fan low speed: 500-600 RPM   |
|   | Alternative to low speed: On/Off Cycling. During periods when there is no refrigerant being delivered to the evaporator, eligible controllers may cycle the fans off only if they turn the fans on periodically during that time to circulate air in the walk-in (not more than 1 minute every 8 minutes or 13% of time). |
| <b>Exclusions:</b> On walk-in refrigeration circuits served by multiplex systems, liquid-line solenoid is required for adequate control; multiplex systems without liquid-line solenoid on the walk-in circuit are not eligible at this time. |   |
| <b>Units:</b> Motor controlled  |   |

# Strip Curtains

## 8. Strip Curtains for Walk-in Boxes

| Must install new strip curtains or plastic swinging doors on walk-in doorways of refrigerated spaces. |  |
|---|--|
| Pre-Retrofit Requirements   | Post-Retrofit Requirements                                     |
| No strip curtains installed   | Strip curtains $\geq 0.06$ inches thick                        |
|   | Low temp strip curtains must be used on low temp applications. |
| <b>Units:</b> Square feet of doorway (measured inside door frame)                                     |  |

# Night Covers

## 9. Night Covers for Vertical Open Cases

| Must install a cover on an otherwise open display case to decrease cooling load of the refrigerated case during off-hours.       |  |
|--|--|
| Existing Equipment Requirements  | Replacement Equipment Requirements   |
| No night cover installed   | Night covers installed and be applied for a period of at least six hours in each 24-hour period. |
| <b>Recommendations:</b> It is recommended that these film type covers have small, perforated holes to decrease moisture buildup. |  |
| <b>Units:</b> Linear foot of night cover   |  |

# Motors

## 10. Shaded Pole Fan Motor to ECM in Display Cases

| Applicable to existing shaded pole evaporator fan motors in refrigerated display cases. |   |
|---|---|
| Pre-Retrofit Requirements   | Post-Retrofit Requirements                            |
| Shaded pole motor in display case   | Electronically Commutated Motor (ECM) in display case |
| <b>Units:</b> Motor   |   |

## 11. Shaded Pole to ECM in Walk-in

| Applicable to existing shaded pole evaporator fan motors in refrigerated display cases.  |   |
|--|---|
| Pre-Retrofit Requirements  | Post-Retrofit Requirements                                  |
| Shaded pole motor in display case  | Electronically Commutated Motor (ECM) in walk-in evaporator |
| <b>Additional notes:</b> Not applicable to controlled shaded pole motors.  |   |
| <b>Recommendations:</b> This measure may be combined with “Walk-in Evaporator Fan Control – ECM” measure for additional energy savings and incentive (see measure #8). |   |
| <b>Units:</b> Motor  |   |

## 12. Shaded Pole to Permanent Magnet Synchronous Motor

| Applicable to existing shaded pole evaporator fan motors for refrigerated display cases. |                                    |
|--|------------------------------------|
| Pre-Retrofit Requirements  | Post-Retrofit Requirements         |
| Shaded pole motor in display case  | Permanent Magnet Synchronous Motor |
| <b>Units:</b> Motor  |                                    |

## 13. Motors Mixed Baseline – Shaded Pole and Electronically Commutated Motors to Permanent Magnet Synchronous Motor in Display Cases

| Applicable to existing shaded pole and ECM evaporator fan motors for refrigerated display cases. |                                    |
|--|------------------------------------|
| Pre-Retrofit Requirements  | Post-Retrofit Requirements         |
| Mixture* of shaded pole motor and ECMs in display case   | Permanent Magnet Synchronous Motor |
| <b>Units:</b> Motor  |                                    |

\*ECM motor retrofit projects should contain at least 25% shaded pole motors being retrofitted at the same time for ECMs to qualify for incentive.



## Motors (continued)

### 14. PSC to ECM in Display Cases

| Applicable to existing shaded pole evaporator fan motors for refrigerated display cases. |                                       |
|--|---------------------------------------|
| Pre-Retrofit Requirements  | Post-Retrofit Requirements            |
| Permanent Split Capacitor (PSC) motor in display case                                    | Electronically Commutated Motor (ECM) |
| <b>Units:</b> Motor  |                                       |

### 15. PSC to ECM in Walk-in Evaporator

| Applicable to existing shaded pole evaporator fan motors for refrigerated display cases. |                                       |
|--|---------------------------------------|
| Pre-Retrofit Requirements  | Post-Retrofit Requirements            |
| Permanent Split Capacitor (PSC) motor in walk-in evaporator                              | Electronically Commutated Motor (ECM) |
| <b>Exclusions:</b> Not applicable to controlled shaded pole motors.                      |                                       |

### 16. VFD on Condenser Fan Motor

| Must install variable frequency drive (VFD) on condenser fan motors.    |   |
|---|---|
| Pre-Retrofit Requirements   | Post-Retrofit Requirements                  |
| No VFD present  | All condenser fan motors controlled via VFD |
| <b>Exclusions:</b> Cannot be combined with measures that require a VFD. |   |
| <b>Units:</b> Motor nameplate horsepower                                |   |

# Condensers & Compressors

## 17. Reduced Head Pressure for Multiplex Compressor System

| Must lower the fixed head pressure setting of an existing multiplex system. |                            |
|---|----------------------------|
| Pre-Retrofit Requirements   | Post-Retrofit Requirements |
| Fixed head pressure >70°F   | Fixed head pressure <70°F  |
| <b>Units:</b> Compressor nameplate horsepower                               |                            |

## 18. Floating Head Pressure Controls

| Must convert the head pressure controls of an existing multiplex system from fixed control to floating control.   |   |
|---|---|
| Pre-Retrofit Requirements   | Post-Retrofit Requirements  |
| Fixed head pressure >70°F   | Floating head pressure at or below 70°F   |
|   | <p><b>Air-cooled condensers</b><br/>           Must maintain an ambient following condensing setpoint of 15°F temperature differential (TD) or less between the outside air drybulb temperature and the setpoint.<br/>           Either use a variable speed drive or assume no change in fan operation. If a variable frequency drive is used it must control all condenser fans in parallel, unless the controls sequence receives pre-approval by ESG.</p> |
|   | <p><b>Evaporative-cooled condensers</b><br/>           Must maintain a wetbulb following setpoint of 17°F TD or less between the outside air wetbulb temperature and the setpoint.<br/>           Must be controlled with a variable speed drive or two-speed fan control.</p>  |
| <b>Notes:</b> TD setting should be chosen based on the system design to allow the head pressure to float down during low ambient conditions while also allowing the fans to cycle off or ramp down. |   |
| <b>Units:</b> Multiplex compressor nameplate horsepower   |   |

## 19. Floating Suction Pressure Controls

| Must convert the suction pressure controls of an existing multiplex system from fixed control to floating control. |   |
|--|---|
| Pre-Retrofit Requirements  | Post-Retrofit Requirements  |
| Fixed suction pressure set point   | Floating suction pressure   |
|  | Suction pressure must be adjusted to the highest point that can still maintain setpoint temperatures at monitored cases on the suction circuit. Must be programmed to float at least 3 PSI. |
| <b>Units:</b> Multiplex compressor nameplate horsepower  |   |

## Condensers & Compressors (continued)

### 20. High-Efficiency Multiplex Compressor System – Custom Measure

Must replace a stand alone compressor system with a high-efficiency multiplex compressor system. Below are recommendations, but not requirements for this custom measure. An engineering review of the proposed design is required to determine energy efficiency, incentive eligibility and incentive amount.

| Pre-Retrofit Requirements                          | Post-Retrofit Requirements  |
|--|---|
| Stand-alone compressor system                      | High-efficiency multiplex compressor system   |
| Air-cooled condenser – fixed pressure head         | Floating head pressure controls, air-cooled condensers:<br>Staged fans or variable speed drive.<br>Ambient following condensing setpoint of 10°F temperature differential (TD) or less between the outside air drybulb temperature and the setpoint for low temperature systems, and a 15°F TD or less for medium temperature systems. When a single circuit condenser is used, a 10°F TD or less is advised.<br>Minimum saturated condensing temperature equal to or less than 70°F. |
| Evaporative-cooled condenser – fixed pressure head | Floating head pressure controls, evaporative-cooled condensers:<br>Fans controlled by variable speed drive.<br>Wetbulb following setpoint of 25°F TD or less between the outside air wetbulb temperature and the setpoint.<br>Minimum saturated condensing temperature equal to or less than 70°F.  |

### 21. Efficient / Oversized Air or Evaporative Condenser for Multiplex – Custom Measure

Must replace an existing condenser with a new efficient/oversized condenser. Below are recommendations, but not requirements for this custom measure. An engineering review of the proposed design is required to determine energy efficiency, incentive eligibility and incentive amount.

| Pre-Retrofit Requirements                          | Post-Retrofit Requirements  |
|--|---|
| Existing condenser                                 | Efficient/oversized condenser   |
| Air-cooled condenser – fixed pressure head         | Floating head pressure controls, air-cooled condensers:<br>Stage fans or variable speed drive<br>Ambient following condensing setpoint of 8°F temperature differential (TD) or less between the outside air drybulb temperature and the setpoint for low temperature systems, and a 13°F TD or less for medium temperature systems. When a single circuit condenser is used, a 8°F TD or less is advised.<br>Minimum saturated condensing temperature equal to or less than 70°F.<br>Specific energy efficiency of condenser greater than or equal to 85 BTU/hr/W when calculated at the design TD. |
| Evaporative cooled condenser – fixed pressure head | Floating head pressure controls, evaporative-cooled condensers:<br>Fans controlled by variable speed drive.<br>Wetbulb following setpoint of 25°F TD or less between the outside air wetbulb temperature and the setpoint.<br>Minimum saturated condensing temperature equal to or less than 70°F.  |