



## Product-Specific Benefits with ENERGY STAR



Learn more about how ENERGY STAR qualified CFS equipment improves kitchen performance by reviewing the product-specific benefits in the following slides.

This segment details the improved performance and efficiency of the eligible CFS products, providing details on the scope of products covered by ENERGY STAR specifications, performance criteria, and also a sampling of equipment features and benefits.

The technical approaches and equipment benefits listed represent a sampling; not all of these features and benefits are represented across all ENERGY STAR qualified models.

## What Is ENERGY STAR?



- Voluntary climate protection partnership with the U.S. Environmental Protection Agency (EPA)
- Strategic approach to energy management, promoting energy efficient products and practices
- Tools and resources to help save money and protect the environment
- Influential brand recognized by over 80 percent of Americans

ENERGY STAR is a voluntary partnership between EPA and industry organizations. EPA started ENERGY STAR in 1992 to reduce greenhouse gas emissions through greater energy efficiency.

Today, EPA works with over 17,000 organizations and the ENERGY STAR label can be found on over 60 different types of products, as well as new homes and commercial and industrial buildings.

## Eligible ENERGY STAR Qualified CFS Equipment



Refrigerators and  
Freezers



Hot Food Holding  
Cabinets



Dishwashers



Ovens



Griddles



Fryers



Steam Cookers



Ice Machines



The ENERGY STAR program covers 8 commercial food service (CFS) product categories and continues to expand to cover wider scope of eligible products as EPA works to make energy efficiency in commercial kitchens a priority.

## Overview of Improved Efficiency with ENERGY STAR



Product Type	% Improved Efficiency*
Dishwashers	25% (+ 25% more water efficient)
Fryers	30%
Griddles	10-25%
Hot Food Holding Cabinets	65%
Ice Machines	15% (+10% more water efficient)
Ovens	10-25%
Refrigerators and Freezers	30%
Steamers	60%



*\*Approximated values*

ENERGY STAR qualified models offer significant improvements in energy and water efficiency when compared to standard models, as shown in the snapshot above.

# Commercial Dishwashers



Eligible Products	Ineligible Products	Key Product Criteria
<ul style="list-style-type: none"> <li>High temp (hot water sanitizing) and low temp (chemical sanitizing) machines</li> <li>Undercounter, single tank door type, single tank conveyor, and multiple tank conveyor machines</li> <li>Includes glass and pot, pan, utensil machines</li> </ul>	<ul style="list-style-type: none"> <li>Flight type* dishwashers</li> <li>Dishwashers that include an optional manual rinse after the final sanitizing rinse</li> </ul>	<p>Specification Version 1.1 <a href="#">Key Eligibility Criteria</a></p> <p>Performance requirements based on:</p> <ul style="list-style-type: none"> <li>Idle Energy Rate (kW)</li> <li>Water Consumption (gallons per rack)</li> </ul>

\*The Version 2.0 specification under development is revising performance levels for covered products and may include requirements for flight type conveyors.

The revision effort also revisits performance levels for existing product types. See [www.energystar.gov/revisedspecs](http://www.energystar.gov/revisedspecs).



Note: Pot, pan, utensil machines are already eligible, but EPA is setting specific and separate levels for this type with the Version 2.0 specification.

## Commercial Dishwashers



- **Approximately 25% more energy efficient & 25% more water efficient than standard models**
- **Examples of technical approaches to reduce energy & water consumption:**
  - Improved tank insulation
  - Improved nozzles and rinse arm designs
  - Auxiliary pre-rinse section
- **Additional equipment benefits:**
  - Quiet operation
  - Auto mode capabilities
  - Water heater/building energy savings
  - Heat recovery



Auxiliary pre-rinse section: This is essentially a multi-staging system that reuses rinse water. This technology allows for a reduction in final rinse water, which is supplied from the electric or gas booster heater. The auxiliary pre-rinse water partially rinses the dishes with the previous cycle's final rinse water, after which the current cycle's final rinse water completes the final rinse.

Auto mode capabilities: Some manufacturers equip their dish machine units with smart controls or timers that will set the machine in an energy saving or sleep mode after an extended period of time of inactivity. This can be pre-set by the operator. Additionally, sensors may be installed to automatically shut off the pumps and conveyor when no racks are running through.

# Commercial Fryers



Eligible Products	Ineligible Products	Key Product Criteria
<ul style="list-style-type: none"> <li>▪ Gas and electric open-deep fat fryers</li> <li>▪ Standard frypot sizes (not greater than 15 inches )</li> <li>▪ Large vat fryers (18-24 inches)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Models &lt; 12 inches wide or &gt; 24 inches wide</li> <li>▪ Closed vat fryers</li> </ul>	<p>Specification Version 2.0*  <a href="#">Key Eligibility Criteria</a></p> <p>Performance requirements based on:</p> <ul style="list-style-type: none"> <li>▪ Cooking energy efficiency (%)</li> <li>▪ Idle Energy Rate (Btu/h or watts)</li> </ul>

Specification expanded in 2011.



## Commercial Fryers



- **Approximately 30% more energy efficient than standard models**
- **Examples of technical approaches to reduce energy consumption:**
  - Advanced gas heat exchanger designs
  - Advanced electrical heat transfer technologies
  - Thermostats with improved accuracy
  - Frypot insulation (electric only)
- **Additional equipment benefits:**
  - Continuous production capacity & higher pound-per-hour production rates
  - Quicker comparable recovery process
  - Improved oil conservation and management, improved ease of cleaning



### Advanced gas heat exchanger designs

**Recirculation Tubes:** Routes the flue gasses through or around the sides of the frypot to provide a greater effective heat-transfer surface to the hot gasses.

**Powered Burners:** Burners with a blower to force the fuel/air mixture into the burner at the optimum rate.

**Infrared Burners:** Transfers heat to the frypot through metal plates that radiates heat more evenly than an open flame.

### Advanced electrical heat transfer technologies

**Low Watt-Density Elements:** Provide an even distribution of heat to the frying oil by spreading the power across a greater surface area.

**Thermostats:** Solid-state thermostats can be more sensitive, empowering fryers to recover quicker and maintain temperature. It has been shown that smaller fluctuations in oil temperature can increase efficiency and productivity.

Manufacturers do not insulate the gas models due to safety limitations.



# Commercial Griddles




Eligible Products	Ineligible Products	Key Product Criteria
<ul style="list-style-type: none"> <li>▪ Thermostatically controlled gas and electric models</li> <li>▪ Single- and double-sided models</li> </ul>	<ul style="list-style-type: none"> <li>▪ Manually controlled griddles</li> <li>▪ Fry-top ranges</li> </ul>	<p>Specification Version 1.1  <a href="#">Key Eligibility Criteria</a></p> <p>Performance requirements based on:</p> <ul style="list-style-type: none"> <li>▪ Cooking energy efficiency (%)</li> <li>▪ Idle Energy Rate (Btu/h per ft<sup>2</sup> or watts per ft<sup>2</sup>)</li> </ul>

Specification took effect in 2009.



## Commercial Griddles



- **Approximately 10-25% more energy efficient than standard models**
  - **Examples of technical approaches to reduce energy consumption:**
    - Strategic placement of thermocouples
    - Double sided griddles
    - Use of highly conductive or reflective plate materials
    - Improved thermostatic controls
    - Sub-griddle insulation (electric only)
  - **Additional equipment benefits:**
    - Improved cooking performance
    - High production capacity
    - Improved/more even heat distribution
-  Easier to clean



**Double sided griddles:** These griddles are more energy efficient because the operator does not need to flip the food product during cooking. Instead the top and the bottom of the product can be cooked simultaneously.

**Reflective plate material:** Some manufacturers offer griddles with a chrome-finished cooking surface which is easier to clean and radiates less heat into the kitchen and exhibits lower heat loss during idle and cooking.

**Thermostatic Controls:** Heating elements or gas burners that are controlled by a solid-state thermostat which is usually embedded in the plate itself.

Manufacturers do not insulate the gas models due to safety limitations.

# Commercial Hot Food Holding Cabinets



Eligible Products	Ineligible Products	Key Product Criteria
<ul style="list-style-type: none"> <li>▪ Glass or solid door cabinets (fully enclosed)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Dual function equipment, such as cook-and-hold models</li> <li>▪ Transparent merchandising cabinets and drawer warmers</li> </ul>	<p>Specification Version 2.0*  <a href="#">Key Eligibility Criteria</a></p> <p>Performance requirements based on:</p> <ul style="list-style-type: none"> <li>▪ Idle Energy Rate (watts per ft<sup>3</sup>)</li> </ul>

Revised specification - Version 2.0 is effective October 1, 2011.



## Commercial Hot Food Holding Cabinets



- **Approximately 65% more energy efficient than standard models**
- **Examples of technical approaches to reduce energy consumption:**
  - Improved insulation
  - Temperature and humidity controls
  - Magnetic door gaskets
  - Dutch doors
- **Additional equipment benefits:**
  - Better temperature uniformity from top to bottom



# Commercial Ice Machines



Eligible Products	Ineligible Products	Key Product Criteria
<ul style="list-style-type: none"> <li>▪ Air-cooled, cube-type machines</li> <li>▪ Includes ice-making head (IMH), self-contained (SCU) and remote condensing (RCU) units</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ice machines that use water-cooled technology</li> <li>▪ Continuous type ice machines</li> </ul>	<p>Specification Version 1.1 <a href="#">Key Eligibility Criteria</a></p> <p>Performance requirements based on:</p> <ul style="list-style-type: none"> <li>▪ Harvest Rate, H (lbs ice/day)</li> <li>▪ Energy Use Limit (kWh/100 lbs ice)</li> <li>▪ Potable Water Use Limit (gal/100 lbs ice)</li> </ul>

The Version 2.0 specification under development will expand coverage to include continuous type (i.e., flake and nugget) designs. The revision effort will also revise performance levels for existing product types. See [www.energystar.gov/revisedspecs](http://www.energystar.gov/revisedspecs).



## Commercial Ice Machines



- **Approximately 15% more energy efficient & 10% more water efficient than standard models**
- **Examples of technical approaches to reduce energy & water consumption:**
  - Improved cold-compartment insulation
  - Higher efficiency compressors, fan motors and fan blades
  - Reduced harvest meltage and evaporator thermal cycling
- **Additional Equipment Benefits**
  - Quicker ice harvesting
  - Less frequent compressor start up and shutdown cycles → less maintenance



High-efficiency fan motors, for example electronically commutating motors (ECMs), have variable speed capabilities which is more efficient than a single speed motor that runs continuously on its maximum speed.

## Commercial Ovens



Eligible Products	Ineligible Products	Key Product Criteria
<ul style="list-style-type: none"> <li>Convection ovens (full - size gas and full- or half - size electric)</li> </ul>	<ul style="list-style-type: none"> <li>Combination</li> <li>Conveyor</li> <li>Slow cook-and-hold</li> <li>Deck</li> <li>Mini-rack/rack</li> <li>Range</li> <li>Rapid cook</li> <li>Rotisserie</li> <li>Laboratory grade</li> </ul>	<p>Specification Version 1.1  <a href="#">Key Eligibility Criteria</a></p> <p>Performance requirements based on:</p> <ul style="list-style-type: none"> <li>Cooking energy efficiency (%)</li> <li>Idle Energy Rate (Btu/h or kW)</li> </ul>

Specification took effect in 2009. EPA anticipates revising the specification during 2011- early 2012 to expand the scope to include other product types.



## Commercial Ovens



- **Approximately 10-25% more energy efficient than standard models**
- **Examples of technical approaches to reduce energy consumption:**
  - Direct-fired gas burners
  - Infrared burners
  - Improved insulation
  - Quality control features
  - Improved gaskets
- **Additional Equipment Benefits:**
  - Faster & more uniform cooking process
  - High production capacity



**Direct-fired gas burners:** These ovens typically position the burners below the cooking cavity and allow the hot combustion products to route through the cooking cavity rather than around it. Heat is transferred directly from the hot gasses to the food, rather than through an intermediate device, thus improving the cooking-energy efficiency.

**Infrared burners:** Combustion takes place close to the burners surface, causing it to become red-hot and emit infrared radiation to the surrounding heat transfer tube walls.

**Quality control features:** Upgraded controls include more accurate electronic sensors and thermostats, electronic ignition controls (on gas models), and programmable cooking computers which recall several cooking sequences.



# Commercial Refrigeration



Eligible Products	Ineligible Products	Key Product Criteria
<ul style="list-style-type: none"> <li>▪ Solid and glass door refrigerators</li> <li>▪ Solid and glass door freezers</li> </ul> <p><i>Examples include: Reach-in, roll-in, or pass-through units; merchandisers; undercounter units; milk coolers; back bar coolers; bottle coolers; beer-dispensing or direct draw units</i></p>	<ul style="list-style-type: none"> <li>▪ Drawer cabinets, prep tables, deli cases</li> <li>▪ Open air units</li> <li>▪ Laboratory-grade equipment</li> </ul>	<p>Specification Version 2.1 <a href="#">Key Eligibility Criteria</a></p> <p>Performance based on:</p> <ul style="list-style-type: none"> <li>▪ Maximum daily energy consumption (MDEC) (kWh/day)</li> <li>▪ MDEC is dependent upon volume, door type, and product type</li> </ul>



Specification was revised in 2010. EPA anticipates revising the specification during 2011 to address testing and high market penetration.

## Commercial Refrigeration



- **Approximately 30% more energy efficient than standard models**
- **Examples of technical approaches to reduce energy consumption:**
  - High-efficiency compressors and improved coil design
  - ECM (Electronically Commutated Motor) evaporator and condenser fan motors
  - Improved fan blade designs
  - Hot gas anti-sweat heaters for defrost
  - Improved insulation and gaskets
  - Efficient interior lighting
- **Additional Equipment Benefits:**
  - Uniform cabinet temperatures



## Commercial Steam Cookers



Eligible Products	Ineligible Products	Key Product Criteria
<ul style="list-style-type: none"> <li>▪ Electric and gas steamers</li> <li>▪ <math>\geq 3</math> pan sizes</li> <li>▪ May include countertop, wall-mounted, and floor-models</li> </ul>	<ul style="list-style-type: none"> <li>▪ Hybrid/combination products</li> </ul>	<p>Specification Version 1.2  <a href="#">Key Eligibility Criteria</a></p> <p>Performance requirements based on:</p> <ul style="list-style-type: none"> <li>▪ Cooking energy efficiency (%)</li> <li>▪ Idle Energy Rate (Btu/h or watts)</li> </ul>

Specification took effect in 2003. EPA anticipates revising the specification during 2012.



## Commercial Steam Cookers



- **Approximately 60% more energy efficient than standard models**
- **Examples of technical approaches to reduce energy consumption:**
  - “Connectionless” steamers
  - Closed-system design
  - Improved insulation
  - Low-temp standby/idle modes
  - Improved gaskets
- **Additional Equipment Benefits:**
  - 90% reduction in water consumption (connectionless models)
  - Shorter cook times
  - Higher production rates



“Connectionless” steamer: A closed-system design that produces steam by boiling water which is manually poured directly into the cooking compartment prior to operation. Though many connectionless steamers are better for batch cooking, newer technologies are enabling “a la carte” performance with more rapid recovery times.

Closed-System Design: Steam is generated inside the cavity, it condenses into water, then returns back into the water reservoir to become steam. An open-system design has an external boiler or steam generator that produces steam that enters the cooking cavity, circulates, then condenses and goes down the drain.



## Program Questions?

E-mail: [commercialfoodservice@energystar.gov](mailto:commercialfoodservice@energystar.gov)



Learn more at [energystar.gov](http://energystar.gov)



## Technical Questions?

**Product-specific e-mail accounts:**

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