



Energy Efficiency and Renewable Energy
Federal Energy Management Program

How to Buy an Energy-Efficient Pressureless Steamer

Why Agencies Should Buy Efficient Products

- Executive Order 13123 and FAR part 23 direct agencies to purchase products in the upper 25% of energy efficiency, including all models that qualify for the EPA/DOE ENERGY STAR® product labeling program.
- Agencies that use these guidelines to buy efficient products can realize substantial operating cost savings and help prevent pollution.
- As the world's largest consumer, the federal government can help "pull" the entire U.S. market towards greater energy efficiency, while saving taxpayer dollars.

Federal Supply Source:

- General Services Administration (GSA)
General Products Center, Fort Worth TX
Phone: (817) 978 - 4545
www.fss.gsa.gov
www.gsaadvantage.gov

For More Information:

- DOE's Federal Energy Management Program (FEMP) Help Desk and World Wide Web site have up-to-date information on energy-efficient federal procurement, including the latest versions of these recommendations.
Phone: (800) 363-3732
www.eren.doe.gov/femp/procurement
- The Food Service Technology Center (FSTC) has several fact sheets and other publications on food service equipment.
(925) 866-2844
www.fishnick.com
- The North American Association of Food Equipment Manufacturers (NAFEM) has information on standards, guidelines, and other publications on food service equipment.
Phone: (312) 245-1054
www.nafem.org
- American Society for Testing and Materials (ASTM) has test standards for food service equipment.
Phone: (610) 832-9585
www.astm.org
- Lawrence Berkeley National Laboratory provided supporting analysis for this recommendation.
Phone: (202) 646-7950

Efficiency Recommendation

Performance Metric	Recommended Level	Best Available
Cooking Energy Efficiency ^a	50% or more	70%
Idle Energy Rate ^b	0.4 kW or less	0.2 kW

- a) Based on the full-load potato efficiency test as prescribed by the ASTM Standard Test Method for the Performance of Steam Cookers (F1484).
- b) Idle energy rate is based on a single-compartment steamer. Multiple compartment steamers will have proportionately higher idle rates.

The General Services Administration (GSA) is the federal supply source for pressureless steamers, which can be purchased through GSA's Schedule 539. Request GSA vendor price lists for models that meet this energy efficiency recommendation.

For steamers purchased through commercial sources (retailer, distributor, or contractor), specify models that meet or exceed this efficiency recommendation. High-efficiency steamers can use as little as half the energy used by a standard-efficiency steamer, with little difference in initial cost. Countertop pressureless steamers offer significant improvements in efficiency and cooking performance, resulting in a lower operating cost.

High-efficiency pressureless steamers come in two types: connectionless and steam generator. Connectionless steamers do not need water and drain connections typically associated with steam cookers. Water is manually poured into a reservoir. Heating elements inside or underneath the reservoir create steam, which rises into the cooking compartment. Connectionless steamers are more energy-efficient because any steam that does not condense on the food remains in the cooking compartment rather than draining as condensate. The absence of water and drain

Definitions

Cooking energy efficiency is defined as the ratio of the energy absorbed by the food to the total energy input to the pressureless steamer.

Idle energy rate is amount of energy an appliance uses to maintain a stabilized operating temperature.

Where to Find Energy-Efficient Pressureless Steamers

How to Select Energy-Efficient Pressureless Steamers

Connectionless vs. Steam Generator Steamers

connections in this design makes installation simple and lowers maintenance costs. The compartment is simply drained daily and requires no periodic deliming. However, some connectionless steamers exhibit longer cook times than steam-generators. If fast cook times are not crucial, connectionless steamers are an excellent choice. In a steam-generator type, any steam injected into the compartment that does not condense on the food escapes down the drain as steam. An advantage of steam generator types is faster cook times and higher production rates, which uses less water and has lower idle energy rates.

Connectionless steamers vary in their technological complexity. Some units use vacuums to reduce the pressure in the cooking compartment and lower the cooking temperature, while others use fans to circulate steam during the cooking process. Various cooking modes are offered, which control the amount of energy delivered to the heating elements or the rate at which they cycle on and off. Some units have a temperature holding feature that maintains the cooking compartment at a desired temperature. Some are engineered with timers that regulate the cooking process, and shuts off the heating elements when cooking is complete. “Standby” modes reduce the operating temperature below 180°F and saves energy during periods of non-use, allowing a quicker return to a “ready-to-cook” state.

Implement an equipment start-up/shut-down schedule. For multiple compartment steamers, turn off unused compartments slow periods when not being used. Since most connectionless steamers can be preheated within 15 minutes, secondary compartments can often be turned off without significantly impacting the operation.

Technology Options

User Tips

Single Compartment, Pressureless Steamer Cost-Effectiveness Example

Performance	Base Model	Recommended Level	Best Available
Full Load Efficiency	30%	50%	70%
Idle Energy Rate	0.6 kW	0.4 kW	0.2 kW
Annual Energy Use	11,600 kWh	4,980 kWh	3,820 kWh
Annual Energy Cost	\$700	\$300	\$230
Lifetime Energy Cost	\$5,490	\$2,350	\$1,800
Lifetime Energy Cost Savings	–	\$3,140	\$3,690

Using the Cost-Effectiveness Table

In the example above, a connectionless steamer with a full-load cooking energy efficiency of 50% or more and idle energy rate of 0.4 kW or less is cost-effective if its purchase price is no more than \$3,140 above the price of the base model. The Best Available model, with a 70% cooking energy efficiency and 0.2 kW idle rate is cost-effective if its price is no more than \$3,690 above the price of the base model.

What if my Electricity Price or Compartment Size is Different?

To calculate Lifetime Energy Cost Savings for a different electricity price, multiply the savings by this ratio: $\left(\frac{\text{Your price in } \text{\$/kWh}}{6.0 \text{ \$/kWh}}\right)$. Similarly, energy costs for different compartment sizes can be estimated by applying the ratio of the steamer pan capacities: $\left(\frac{\text{Your pan capacity}}{3 \text{ pans}}\right)$.

Cost-effectiveness

Assumptions

This example is based on the steamer operating for 12 hours a day, 365 days per year, with one preheat and cooking 100 pounds/day of food. The assumed electric price is 6¢/kWh, the federal average electricity price in the U.S.

Lifetime Energy Cost is the discounted value of annual energy costs based on an average usage and an assumed steam cooker life of 10 years. Future energy price trends and a discount rate of 3.2% are based on federal guidelines (effective from April, 2002 to March, 2003).

Metric Conversions

1 therm = 100,000 Btu
 = 29.3 kWh
 = 105.5 MJ
 $^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32$
 1 cubic foot = 28.3 liters

