



# WaterSense at Work

Commercial Kitchen Equipment

## 4.4 Commercial Steam Cookers



Best Management Practices for  
Commercial and Institutional Facilities



February 2025

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WaterSense® is a voluntary partnership program sponsored by the U.S. Environmental Protection Agency (EPA) that seeks to protect the nation’s water supply by transforming the market for water-efficient products, services, and practices.

*WaterSense at Work* is a compilation of water efficiency best management practices intended to help commercial and institutional facility owners and managers from multiple sectors understand and better manage their water use. It provides guidance to help establish an effective facility water management program and identify projects and practices that can reduce facility water use.

An overview of the sections in *WaterSense at Work* is below. This document, covering water efficiency for commercial steam cookers, is part of **Section 4: Commercial Kitchen Equipment**. The complete library of best management practices is available at [www.epa.gov/watersense/best-management-practices](http://www.epa.gov/watersense/best-management-practices). WaterSense has also developed worksheets to assist with water management planning and case studies that highlight successful water efficiency efforts of building owners and facility managers throughout the country, available at [www.epa.gov/watersense/commercial-buildings](http://www.epa.gov/watersense/commercial-buildings).

- **Section 1. Getting Started With Water Management**
  - **Section 2. Water Use Monitoring**
  - **Section 3. Sanitary Fixtures and Equipment**
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  - **Section 5. Outdoor Water Use**
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EPA 832-F-23-003  
Office of Water  
U.S. Environmental Protection Agency  
February 2025

This document is one section from *WaterSense at Work: Best Management Practices for Commercial and Institutional Facilities* (EPA-832-F-23-003). Other sections can be downloaded from [www.epa.gov/watersense/best-management-practices](http://www.epa.gov/watersense/best-management-practices). Sections will be reviewed and periodically updated to reflect new information. The work was supported under contract 68HERC20D0026 with Eastern Research Group, Inc. (ERG).

## Overview

Commercial steam cookers, also known as food steamers, are commercial kitchen appliances that use steam in a closed compartment to cook food. There are two types of steam cookers: boiler-based and boilerless.

Boiler-based (or steam-generation) steam cookers have a boiler built into the unit or are connected to a central boiler, which delivers food-grade steam to the heating compartment. Steam that does not condense on the food escapes as a mixture of steam and condensate through a drain. In addition, some water is continuously bled from the steam cooker to help reduce and manage scale buildup.

Boiler-based steam cookers also use large amounts of water to further condense the steam and to cool (temper) the condensate water to less than 140°F (60°C) before it enters the sewer system. Most boiler-based steam cookers offer a standby setting, which maintains the boiler in a ready-to-use state. In many instances, the condensate cooling water will continue to flow even when the steam cooker is in standby mode, particularly if the condensate cooling water is controlled by a valve that must be manually turned on and off. Some boiler-based steam cookers allow for the condensate cooling water to be turned off while the steamer is in standby mode. Steamers that are timer-controlled will automatically switch into standby mode at the end of the set cook time, minimizing the amount of water wasted while the unit is not in use.

Boilerless steam cookers can be either completely unconnected to any water supply (i.e., connectionless) or can be connected to a water supply to keep the water reservoir full. Boilerless steam cookers have an individual reservoir where water is heated below the steam trays to create the steam and do not require a dedicated drain for condensate or the addition of cooling (tempering) water. A small amount of steam is vented through the top of the steam cooker, but what is not vented or condensed on the food returns as condensate to the reservoir. Since the hot condensate is recycled, the overall consumption of steam is reduced, and therefore less energy and water are needed. Connectionless steam cookers are manually drained and refilled as needed. Boilerless steam cookers that are connected to a water supply have a float valve that maintains the water level in the reservoir, but unlike the boiler-based steam cookers, there is no continuous flow of water. This type of



*Peas in a steam cooker*

steam cooker is usually as efficient as other connectionless models that are not connected to a water supply.

Boiler-based steam cookers may be preferred for commercial kitchens that prepare food made-to-order or have large-scale food production needs, since the supplied steam can cook food more quickly and is available in high volume without the need for refilling. Kitchens with low to moderate steam cooker use may prefer a boilerless steam cooker, which requires less maintenance and is the most energy- and water-efficient. Inefficient boiler-based steam cookers can use up to 40 gallons (151 liters) of water per hour, while efficient boiler-based steam cookers use only 5 gallons (19 liters) of water per hour or less. Connectionless steam cookers typically use 3 gallons (11 liters) of water per hour or less.<sup>1</sup>

### Combination Ovens

Commercial steam cookers can provide similar cooking functions as combination ovens. While steam cookers focus solely on steaming, combination ovens are more versatile, offering additional cooking modes such as convection and the ability to combine steam and convection for a wider range of cooking applications. Review *WaterSense at Work Section 4.3 Combination Ovens* at [www.epa.gov/watersense/best-management-practices](http://www.epa.gov/watersense/best-management-practices) for more information on saving water in combination ovens.

Water quality can significantly impact the performance of a steam cooker. Poor-quality water, such as hard water with high levels of minerals, can cause issues such as scale buildup, decreased efficiency, and damage to components. If necessary, facilities should use filtered or softened water to mitigate these issues, ensuring better performance, longer equipment lifespan, and consistent food quality from the steam cooker.

*WaterSense at Work Section 7.1 Water Purification* at [www.epa.gov/watersense/best-management-practices](http://www.epa.gov/watersense/best-management-practices) provides an overview of water efficiency considerations for water treatment.

To address efficiency in steam cookers, ENERGY STAR® has developed voluntary criteria to certify energy-efficient—and water-efficient—boilerless and boiler-based (referred to as steam-generation) steam cookers. ENERGY STAR certified models must hold three pans or larger and meet minimum cooking efficiency and maximum idle energy rate requirements. They may incorporate more efficient steam delivery systems, better steam control, increased insulation, smart condensate cooling water controls, and/or connectionless designs to reduce water and energy consumption.<sup>2</sup>

ENERGY STAR certified steam cookers are typically 60 percent more energy-efficient and 90 percent more water-efficient than standard steam cooker models—using an average of

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<sup>1</sup> New York City Environmental Protection. *Restaurant Managers Guide to Water Efficiency*. Page 5. [www.nyc.gov/assets/dep/downloads/pdf/water/drinking-water/restaurant-managers-guide-to-water-efficiency.pdf](http://www.nyc.gov/assets/dep/downloads/pdf/water/drinking-water/restaurant-managers-guide-to-water-efficiency.pdf).

<sup>2</sup> ENERGY STAR. 2017-2018. *ENERGY STAR Guide for Cafes, Restaurants, and Institutional Kitchens*. [www.energystar.gov/sites/default/files/asset/document/ES%20Restaurant%20Guide%202017-2018%20v16.pdf](http://www.energystar.gov/sites/default/files/asset/document/ES%20Restaurant%20Guide%202017-2018%20v16.pdf).



3 gallons (11 liters) of water per hour, while standard models typically use up to 40 gallons (151 liters) of water per hour.<sup>3</sup>

## Operation, Maintenance, and User Education

For optimum steam cooker efficiency, consider the following:

- Use batch production as opposed to staged loading of food pans (i.e., do not continuously open the door to load and unload food pans).
- In a multi-pan steamer, if possible, fill the steam cooker to capacity instead of cooking one pan at a time.
- Keep the doors closed while the steamer is operating.
- If the machine can operate compartments separately, use only as many steamer compartments as needed.
- Use a timer to ensure that the steam cooker returns to standby mode after use.
- Turn the steam cooker off during long periods of non-use. This will reduce water and energy use associated with keeping the steam cooker in standby mode.
- Fix and repair any water or steam leaks.
- Inspect and repair door gaskets and hinges to ensure steam is not escaping, which can increase water consumption.
- If the facility's water is hard or not within the manufacturer's specifications, use filtered or softened water for steam cooker use.
- Inspect and descale steam cookers at least twice per year to remove any deposit buildup in the steam cooker, boiler, or other related equipment.

## Retrofit Options

There are currently no known retrofit options available on the market to increase the water efficiency of steam cookers.

## Replacement Options

Steam cookers come in several sizes with varying numbers of boiler pans. Be sure to choose a steam cooker that is the appropriate size for the steam cooking needs of the facility. A larger than necessary steam cooker will waste water and energy to heat unused compartment space.

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<sup>3</sup> ENERGY STAR. Commercial Steam Cookers. [www.energystar.gov/products/commercial\\_steam\\_cookers](http://www.energystar.gov/products/commercial_steam_cookers).

When purchasing a new steam cooker or replacing an existing one, choose models that are ENERGY STAR certified by using ENERGY STAR's Product Finder at [www.energystar.gov/productfinder/product/certified-commercial-steam-cookers/results](http://www.energystar.gov/productfinder/product/certified-commercial-steam-cookers/results).

## Savings Potential

ENERGY STAR certified steam cookers are up to 60 percent more energy-efficient and 90 percent more water-efficient than standard steam cooker models.<sup>4</sup> Traditional boiler-based steam cookers use as much as 40 gallons (151 liters) of water per hour. Switching to an ENERGY STAR certified steam cooker can reduce that water use to 3 gallons (11 liters) of water per hour or less.

Use ENERGY STAR's Commercial Food Service (CFS) Equipment Calculator at [www.energystar.gov/partner-resources/energy-star-training-center/commercial-food-service](http://www.energystar.gov/partner-resources/energy-star-training-center/commercial-food-service) to estimate facility-specific water, energy, and cost savings for replacing an existing boiler-based steam cooker with an ENERGY STAR certified model.

California Energy Wise also has energy cost calculators at [www.caenergywise.com/calculators/](http://www.caenergywise.com/calculators/) which can be used to calculate the savings potential from replacing many types of commercial kitchen equipment, including steam cookers.

Alternatively, to estimate facility-specific water and energy savings and payback, the facility can also use the following information.

### *Current Water Use*

To estimate the water use of a steam cooker, identify the following information and use Equation 1 on the next page:

- Water use rate of the existing steam cooker, typically provided in gallons or liters per hour.
- Average daily use time.
- Days of facility operation per year.

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<sup>4</sup> *Ibid.*

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**Equation 1. Water Use of Steam Cooker (gallons or liters per year)**

**= Steam Cooker Water Use Rate x Daily Use Time x Days of Operation**

Where:

- Steam Cooker Water Use Rate: Gallons or liters per hour
  - Daily Use Time: Hours per day
  - Days of Operation: Days per year
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***Water Use After Replacement***

To estimate the water use of a replacement steam cooker, use Equation 1, substituting the replacement steam cooker's water use. ENERGY STAR certified steam cookers typically use 3 gallons (11 liters) or less per hour. The water use rate of specific ENERGY STAR certified models can be found by downloading ENERGY STAR's list of certified steam cookers.<sup>5</sup>

***Water Savings***

To calculate water savings that can be achieved from replacing an existing steam cooker, identify the following information and use Equation 2:

- Current water use as calculated using Equation 1.
  - Water use after replacement as calculated using Equation 1.
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**Equation 2. Water Savings From Steam Cooker Replacement (gallons or liters per year)**

**= Current Water Use of Steam Cooker – Water Use of Steam Cooker After Replacement**

Where:

- Current Water Use of Steam Cooker: Gallons or liters per year
  - Water Use of Steam Cooker After Replacement: Gallons or liters per year
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<sup>5</sup> *Ibid.*

### Energy Savings

By switching to an ENERGY STAR certified steam cooker, facilities can save a significant amount of energy by reducing water use and improving steam delivery efficiency. These energy savings will further reduce the payback period and increase replacement cost-effectiveness.

To calculate facility-specific energy savings from replacing an existing steam cooker, use ENERGY STAR's CFS Equipment Calculator or California Energy Wise's Energy Cost Calculator for steam cookers described above.<sup>6,7</sup>

### Payback

To calculate the simple payback associated with the water and energy savings from replacing an existing steam cooker, consider using the California Energy Wise or ENERGY STAR calculators described above.

To calculate savings, consider the equipment and installation cost of the replacement steam cooker, the water savings as calculated using Equation 2, the energy savings calculated using the California Energy Wise or ENERGY STAR calculator, and the facility-specific cost of water, wastewater, and energy.

Rebates and other incentives can also impact the cost savings and payback of replacing old equipment. Local water utilities may offer rebates to offset the cost of a new, energy- and/or water-efficient commercial steam cooker. More information about potential rebates can be found at [www.energystar.gov/rebate-finder](http://www.energystar.gov/rebate-finder).

## Additional Resources

Alliance for Water Efficiency. March 2017. *Commercial Kitchens Water Use Efficiency and Best Practices Guide*. <https://allianceforwaterefficiency.org/resource/commercial-kitchens-guide/>.

California Energy Wise. Energy Cost Calculators. [www.caenergywise.com/calculators/](http://www.caenergywise.com/calculators/).

ENERGY STAR. 2017-2018. *ENERGY STAR Guide for Cafes, Restaurants, and Institutional Kitchens*. [www.energystar.gov/sites/default/files/asset/document/ES%20Restaurant%20Guide%202017-2018%20v16.pdf](http://www.energystar.gov/sites/default/files/asset/document/ES%20Restaurant%20Guide%202017-2018%20v16.pdf).

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<sup>6</sup> ENERGY STAR. Commercial Kitchen Equipment Tools, Materials and Resources. [www.energystar.gov/partner-resources/energy-star-training-center/commercial-food-service](http://www.energystar.gov/partner-resources/energy-star-training-center/commercial-food-service).

<sup>7</sup> California Energy Wise. Energy Cost Calculators. [www.caenergywise.com/calculators/](http://www.caenergywise.com/calculators/).



ENERGY STAR. Commercial Kitchen Equipment Tools, Materials and Resources. [www.energystar.gov/partner-resources/energy-star-training-center/commercial-food-service](http://www.energystar.gov/partner-resources/energy-star-training-center/commercial-food-service).

ENERGY STAR. Commercial Steam Cookers. [www.energystar.gov/products/commercial\\_steam\\_cookers](http://www.energystar.gov/products/commercial_steam_cookers).

Fisher-Nickel, Inc. and John Koeller. June 2005. *Evaluating the Water Savings Potential of Commercial “Connectionless” Food Steamers*. Prepared for Metropolitan Water District and East Bay Municipal Utility District.

Katom. *Commercial Food Steamers Buyers’ Guide*. [www.katom.com/learning-center/steamers-buyers-guide.html](http://www.katom.com/learning-center/steamers-buyers-guide.html)

New York City Environmental Protection. *Restaurant Managers Guide to Water Efficiency*. [www.nyc.gov/assets/dep/downloads/pdf/water/drinking-water/restaurant-managers-guide-to-water-efficiency.pdf](http://www.nyc.gov/assets/dep/downloads/pdf/water/drinking-water/restaurant-managers-guide-to-water-efficiency.pdf).

Southern California Gas Company. 2021/2022. *Natural Gas Foodservice Equipment Cleaning & Maintaining User’s Guide*. [www.caenergywise.com/design-guides/SCG\\_FSEC\\_CleaningGuide\\_FE-v2-published.pdf](http://www.caenergywise.com/design-guides/SCG_FSEC_CleaningGuide_FE-v2-published.pdf).

Texas Water Development Board. May 2018. *Best Management Practices for Commercial and Institutional Water Users*. [www.twdb.texas.gov/conservation/BMPs/CI/index.asp](http://www.twdb.texas.gov/conservation/BMPs/CI/index.asp).

U.S. Department of Energy Federal Energy Management Program. Best Management Practice #11: Commercial Kitchen Equipment. [www.energy.gov/femp/best-management-practice-11-commercial-kitchen-equipment](http://www.energy.gov/femp/best-management-practice-11-commercial-kitchen-equipment).

## Disclaimer

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United States Environmental Protection Agency

(4204M)

EPA 832-F-23-003

February 2025

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