


# WaterSense at Work

## Commercial Kitchen Equipment

# 4.9 Food Disposal Equipment

Best Management Practices for Commercial and Institutional Facilities

EPA WaterSense

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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 food disposal equipment, 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. 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.




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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. 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

Disposing of food waste prior to dishwashing can be a very water- and energy-intensive process, depending upon the food disposal method used. Scrap collectors, food disposers, waste pulpers, and trough-fed versions of these items, are typical food disposal equipment options in a commercial kitchen. In addition, pre-rinse spray valves can be used as part of a commercial kitchen's pre-rinse operation, and some facilities use wash-down sprayers even though they aren't intended for this purpose. Best management practices for saving water using these two types of equipment can be found in *WaterSense at Work, Section 4.1 Pre-Rinse Spray Valves* and *Section 4.8 Wash-Down Sprayers* at www.epa.gov/watersense/best-management-practices. This section covers food disposal systems, typically downstream of other pre-rinse operations.[1,2,3]

*Food disposer*

### Scrap Collectors

Scrap collectors have a continuous waterfall that rapidly flushes water over dishes and utensils, catching food waste in a large deep well with a perforated basket inside. Fresh water typically flows at a rate of 1 to 3 gallons per minute (gpm) (4 to 11 liters per minute [lpm]), while 8 to 30 gpm (30 to 114 lpm) of water is recirculated through the system. Kitchen staff periodically remove the perforated waste baskets and empty collected food waste into a waste or compost bin. Standard models flow continuously, regardless of

[1] Delagah, Amin and Angelo Karas (Frontier Energy). July 2018. *Pre-Rinse Operations Field Evaluation Report*. Prepared for Innovation Conservation Program. Pages 40-41. www.bewaterwise.com/assets/2015icp-profrontierenergy.pdf.
[2] Frontier Energy, Inc. and Gas Technology Institute. 2022. *Advanced Water Heating for Foodservice*. Prepared for the Southern California Gas Company. https://caenergywise.com/design-guides/Advanced-Water-Heating-Design-Guide.pdf.
[3] Koeller and Company and H.W. (Bill) Hoffman & Associates, LLC. June 2010. *A Report on Potential Best Management Practices—Commercial Dishwashers*. Prepared for the California Urban Water Conservation Council. https://calwep.org/wp-content/uploads/2021/03/Commercial-Dishwashers-PBMP-2010.pdf.

whether employees are scraping dishes. Advanced models can include timers or occupancy sensors, so that water flow stops when they are not in use.

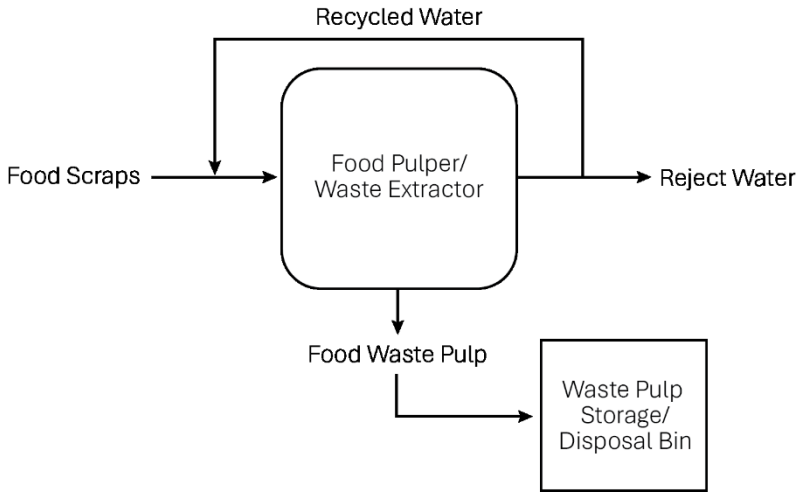
### Food Disposers

Food disposers use sharp, spinning blades to grind food waste and mix it with cold water so that it makes a slurry and can pass through the plumbing system as wastewater. Fresh water is automatically injected into the grinding cavity at a rate between 3 and 10 gpm (11 and 38 lpm). However, food disposers are usually activated by a button, and water only flows when activated. Some systems have advanced controls that will deliver a higher or lower flow rate of water based on whether the system senses a grind load. Some also use timers to stop water flow if no grind load has been detected for a certain amount of time.

### Waste Pulpers

Waste pulpers operate by crushing food waste into a pulp (i.e., slurry), extracting excess water from the pulp, then sending the pulp waste to a bin for later disposal or composting. Waste pulpers typically operate by using 2 to 3 gpm (8 to 11 lpm) of fresh water. Some recirculate water through the system itself or through a sluice trough. Figure 1 illustrates the food pulping process.

**Figure 1. Waste Pulper System Diagram**




### Sluice Trough

Scrap collectors, food disposers, and waste pulpers can all have a sluice trough system upstream. A sluice trough is a large channel typically built into a stainless steel table, where dishes and food waste can be deposited and rinsed. Water, typically recirculated from elsewhere in the food disposal process, is provided continuously at the top of the trough, and fresh water is added from several nozzles built into the system. Built-in nozzles

use between 2 to 3 gpm (8 to 11 lpm) of fresh water each, and 8 to 30 gpm (30 to 114 lpm) of water can be recirculated from a scrap collector or waste pulper.

*Sluice trough*

### Food Strainers and Other Alternatives

Food strainers are an alternative to traditional food disposal equipment (e.g., scrap collectors, food disposers, and waste pulpers). As food scraps are rinsed from dishes, often using a pre-rinse spray valve, a scrap or strainer basket in the bottom of the sink captures the waste for later disposal or composting. The food strainer itself doesn't use water; water use is associated with the pre-rinse spray valve. Use and efficiency of commercial pre-rinse spray valves is discussed further in *WaterSense at Work Section 4.1 Pre-Rinse Spray Valves* at www.epa.gov/watersense/best-management-practices.

Alternatively, if the facility has a high-throughput commercial dishwasher that can handle some extra food waste, staff can manually scrape food waste into waste bins by hand and place dishes directly into the dishwasher, using no water for pre-rinsing. See *WaterSense at Work Section 4.10 Dishwashers* at www.epa.gov/watersense/best-management-practices for more information about commercial dishwasher equipment.

## Operation, Maintenance, and User Education

For optimum food disposal efficiency, consider the following:

- Make a commitment to reducing food waste at your facility. Use resources from the U.S. Environmental Protection Agency, ReFED, and the National Restaurant Association to get started.[4,5,6]
- Scrape dishes using a scraper, squeegee, or absorbent into a composting bin or trash receptacle prior to rinsing food waste into the food disposal system.[7,8]

[4] U.S. Environmental Protection Agency (EPA). Sustainable Management of Food. www.epa.gov/sustainable-management-food.
[5] ReFED. 2018. Restaurant Food Waste Action Guide. https://refed.org/downloads/Restaurant_Guide_Web.pdf.
[6] National Restaurant Association. Food Waste Reduction. https://restaurant.org/education-and-resources/learning-center/business-operations/sustainability/food-waste-reduction/.
[7] EPA. Sustainable Management of Food: Composting. www.epa.gov/sustainable-management-food/composting.
[8] Southwest Florida Water Management District. Water Conservation in Restaurants. www.swfwmd.state.fl.us/residents/water-conservation/water-conservation-restaurants.

- Ensure staff are not using wash-down sprayers to rinse food waste into food disposal equipment, as they are not intended for this purpose.
- Where possible, turn off the water to the food disposal system during idle periods when the system is not in use and when the facility is closed.
- Do not pour grease into the food disposal system. Doing so can clog pipes over time.

*Restaurant staff composting food waste*

- Do not place any hard objects into the food disposal system. This can dull the blades, reducing the unit's efficiency.
- Run cold water through the food disposal system instead of hot water. This will reduce the energy use associated with heating the water. It will also help to keep the system cool.
- Regularly inspect and clean the food disposal system to make sure the blades are sharp and the system is not clogged with debris.
- Ensure the system is using the minimum water flow rate necessary per manufacturer specifications.

## Retrofit Options

To reduce the water use associated with food disposal equipment, consider installing timers or occupancy sensors so they only operate at full flow rate when in use. For food disposers specifically, consider installing a device that can sense if there is a grind load and adjust the disposer's flow rate accordingly.

## Replacement Options

To eliminate food disposal equipment water use altogether, skip pre-rinsing by scraping dishes and placing them directly into the commercial dishwasher if the equipment allows (typically possible for flight-type dishwashers). Alternatively, use a pre-rinse spray valve to rinse dishes and collect food waste using a food strainer in the bottom of the sink instead of using traditional food disposal equipment.

If a facility needs to purchase new traditional food disposal equipment or replace existing equipment, consider these options:

- Choose equipment that recycles water through the system and uses minimal fresh water.

- Ensure equipment has timers or occupancy sensors so that it is only operating when in use.
- If choosing a food disposer, ensure that it can sense if there is a grind load and adjust the water flow to the system accordingly.

Before installing food disposal equipment, consider any local restrictions on systems that discharge food waste to the sanitary sewer. Some areas have banned food disposers or have placed additional sewer charges on operations using them, due to concerns about increased loads on the local wastewater treatment plant.[9] If food disposer equipment is prohibited, scrap collectors or food pulpers may offer suitable alternatives.

## Savings Potential

Conventional food disposal equipment can use a constant freshwater flow of 1 to 10 gpm (4 to 38 lpm) when in use. This water use can be significantly reduced by retrofitting equipment with timers, occupancy sensors, and/or load sensors to reduce the amount of water used when the equipment isn't processing food waste.

Water use can be eliminated by replacing the food disposal equipment with a food strainer in the sink or by dry scraping instead of pre-rinsing dishes. To estimate facility-specific water savings and payback, use the following information.

### Food Disposal Equipment Retrofit

Water use can be reduced by retrofitting existing food disposal with timers, occupancy sensors, and/or load sensors to reduce or eliminate water flow when the equipment isn't processing food waste.

*Current Water Use*

To estimate the current water use of an existing food disposal during idle periods, identify the following information and use Equation 1 on the next page:

- Flow rate of fresh water through the food disposal. Disposers have flow rates that typically range from 3 to 10 gpm (11 to 38 lpm), while scrap collectors and pulpers that utilize water recirculation typically have fresh water use that ranges from 1 to 3 gpm (4 to 11 lpm).
- Average daily idle period of the food disposal. Idle period is the time when the food disposal is turned on but not in use. While this will vary by facility, one study estimated that facility pre-rinse operations typically take 4.3 hours per day.[10] For a

[9] Delagah, Amin and Angelo Karas (Frontier Energy), *op. cit.*, Pages 40-41
[10] *Ibid.*, Page 36

facility operating 12 hours a day, this would mean an idle period of about 8 hours if the food disposal is kept on throughout the day.

- Days of facility operation per year.

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**Equation 1. Water Use of Food Disposal During Idle Periods (gallons or liters per year)**

**= Flow Rate through Food Disposal x Daily Idle Period x Days of Facility Operation**

Where:

- Flow Rate Through Food Disposal: Gallons or liters per minute
- Daily Idle Period: Minutes per day
- Days of Facility Operation: Days per year

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*Water Use After Retrofit*

To estimate the water use from an existing food disposal that is retrofitted with a timer, occupancy sensor, or load sensor, use Equation 1, substituting the reduced idle flow rate. Some of these retrofits keep fresh water flowing at a lower flow rate than normal during idle periods, while others may eliminate flow altogether while the food disposal is idle.

*Water Savings*

To calculate water savings that can be achieved from retrofitting an existing food disposal, identify the following and use Equation 2:

- Current water use as calculated using Equation 1.
- Water use after retrofit as calculated using Equation 1.

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**Equation 2. Water Savings From Food Disposal Retrofit (gallons or liters per year)**

**= Current Water Use of Food Disposal During Idle Periods – Water Use of Food Disposal During Idle Periods After Retrofit**

Where:

- Current Water Use of Food Disposal During Idle Periods: Gallons or liters per year
- Water Use of Food Disposal During Idle Periods After Retrofit: Gallons or liters per year

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*Energy Savings*

For food disposal equipment that uses hot water, a reduction in water use will also result in energy savings. The energy required to heat water depends on the fuel used for water heating (e.g., electricity, natural gas), the efficiency of the water heater, and water heater temperature set points. Since this information is not always readily available, the energy savings that can be achieved from retrofitting a food disposal system that uses hot water can be estimated using the water savings calculated using Equation 2 and the assumptions presented in Equation 3:

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**Equation 3. Energy Savings From Food Disposal Retrofit (kWh of electricity or Mcf of natural gas per year)**

**= Water Savings x Percent of Water That Is Hot x (Energy per Gallon or Liter Heated ÷ Water Heater Efficiency)**

Where:

- Water Savings: Gallons (or liters) per year
- Percent of Food Disposal Water That Is Hot: Facility-specific
- Energy per Gallon or Liter Heated [assuming 75°F (42°C) water temperature increase]:
  - 0.183 kilowatt hours (kWh) of electricity per gallon (0.048 kWh per liter); or
  - 0.0006 Mcf (thousand cubic feet) of natural gas per gallon (0.00016 Mcf per liter)
- Water Heater Efficiency (unless otherwise known by the facility):
  - 1.0 for an electric hot water heater; or
  - 0.75 for a natural gas hot water heater

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More detailed information to assist in calculating energy savings that result from saving water can be found on WaterSense's data and information web page at www.epa.gov/watersense/data-and-information-used-watersense.

*Payback*

To calculate the simple payback from the water savings associated with retrofitting existing food disposal equipment, consider the equipment and installation cost of the retrofit, the water and energy savings as calculated using Equation 2 and Equation 3, respectively, and the facility-specific cost of water, wastewater, and energy.

### Food Disposal Equipment Replacement With Food Strainer or Dry Scraping

Food disposal equipment water use can be eliminated all together by using a pre-rinse spray valve and collecting food waste in a food strainer in the bottom of the sink rather than sending food waste through food disposal equipment. Facilities should note that the pre-rinse spray valve will still use water, and only the food disposal equipment water use would be eliminated in this scenario.

Alternatively, a facility could employ dry scraping instead of pre-rinsing dishes if the dishwasher equipment can handle some food waste remaining. This would eliminate water use from pre-rinse operations altogether.

*Current Water Use*

To estimate the current water use of an existing food disposal, identify the following information and use Equation 4 on the next page:

- Flow rate of fresh water through the food disposal during operation. Disposers have flow rates that typically range from 3 to 10 gpm (11 to 38 lpm), while scrap collectors and pulpers that utilize water recirculation typically range from 1 to 3 gpm (4 to 11 lpm) of fresh water.
- Average daily operating time of the food disposal. One study estimated that food disposals are used approximately 4.3 hours per day.[11] The total operating time should not include idle use time.
- Days of facility operation per year.
- Water use of food disposal during idle periods, calculated using Equation 1. This should take into account any timers, occupancy sensors, or load sensors that restrict or eliminate food disposal flow rate during idle periods.

[11] *Ibid*.

**Equation 4. Water Use of Food Disposal (gallons or liters per year)**

**= (Flow Rate Through Food Disposal During Operation x Daily Operating Time x Days of Facility Operation) + Water Use of Food Disposal During Idle Periods**

Where:

- Flow Rate Through Food Disposal During Operation: Gallons or liters per minute
- Daily Operating Time: Minutes per day
- Days of Facility Operation: Days per year
- Water Use of Food Disposal During Idle Periods (as Calculated Using Equation 1): Gallons or liters per year

*Water Use After Replacement*

Using a food strainer basket in the sink instead of traditional food disposal equipment or employing dry scraping and placing dishes directly into the dishwasher both effectively eliminate water use from food disposal equipment.

*Water Savings*

Since replacing food disposal equipment with a food strainer or with dry scraping practices eliminates water use from the food disposal equipment, water savings will be equal to the current water use of the food disposal equipment calculated using Equation 4.

*Energy Savings*

Because food disposal equipment can use hot water, a reduction in water use could also result in energy savings. To calculate energy savings, enter the water savings from the replacement into Equation 3.

Since replacing food disposal equipment with a food strainer or with dry scraping practices eliminates water use from the food disposal equipment, water savings will be equal to the current water use of the food disposal equipment calculated using Equation 4.

*Payback*

To calculate the simple payback from the water savings associated with replacing existing food disposal equipment with a food strainer or dry scraping, consider the equipment and installation cost of the strainer if purchased; the cost of removing the food disposal equipment if incurred; the water and energy savings as calculated using Equation 4 and Equation 3, respectively; and the facility-specific cost of water, wastewater, and energy.

## Additional Resources

Delagah, Amin and Angelo Karas (Frontier Energy). July 2018. *Pre-Rinse Operations Field Evaluation Report*. Prepared for Innovation Conservation Program. www.bewaterwise.com/assets/2015icp-profrontierenergy.pdf.

East Bay Municipal Utility District. 2008. *WaterSmart Guidebook: A Water-Use Efficiency Plan Review Guide for New Businesses*. www.ebmud.com/water/conservation-and-rebates/commercial/watersmart-guidebook/.

Frontier Energy, Inc. and Gas Technology Institute. 2022. *Advanced Water Heating for Foodservice*. Prepared for the Southern California Gas Company. https://caenergywise.com/design-guides/Advanced-Water-Heating-Design-Guide.pdf.

Koeller and Company and H.W. (Bill) Hoffman & Associates, LLC. June 2010. *A Report on Potential Best Management Practices—Commercial Dishwashers*. Prepared for the California Urban Water Conservation Council. https://calwep.org/wp-content/uploads/2021/03/Commercial-Dishwashers-PBMP-2010.pdf.

New York City Department of Environmental Protection. December 2008. *Commercial Food Waste Disposal Study*. www.nyc.gov/assets/dep/downloads/pdf/water/wastewater/safe-disposal-harmful-products/commercial-food-waste-disposal-study.pdf.

Southwest Florida Water Management District. Water Conservation in Restaurants. www.swfwmd.state.fl.us/residents/water-conservation/water-conservation-restaurants.

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.

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