

4.7 Dipper Wells

Overview

Dipper wells are used in some restaurants, coffee houses, and ice cream shops to rinse utensils between uses. Most dipper wells have a single spigot and a valve that controls the flow of either hot or cold water into a receiving well. Shops often have dipper wells running constantly during service hours to provide a continuous exchange of the water in the well, in order to reduce the potential for bacterial growth.

Dipper wells have flow rates between 0.5 and 1.0 gallon per minute (gpm).⁴²

Food service locations should ensure that the requirements of the U.S. Department of Health and Human Services Food Code⁴³ are met when considering changes to facility operations that may involve installing, retrofitting, or replacing a dipper well.

Operation, Maintenance, and User Education

For optimal dipper well efficiency, consider the following:

- Turn off water when service periods are slow and the dipper well is not in use. Also, turn off the water to the dipper well at the end of each day. Be sure to clean the dipper well prior to restarting the water in order to remove any bacterial buildup.
- Keep the flow rate of the dipper well valve at its minimum level. Some municipalities recommend no more than 0.3 gpm.⁴⁴
- Consider rinsing utensils with a sink faucet only as needed, rather than using the dipper well.

Retrofit Options

To reduce the water use associated with a dipper well, consider installing an in-line flow restrictor to reduce the flow rate from 0.5 or 1.0 gpm to 0.3 gpm.

Replacement Options

When looking to replace dipper wells, consider these options:

- Install a push-button, metered faucet for utensil rinsing.
- If the facility has enough utensils to run full dishwasher loads, consider installing an ENERGY STAR® qualified, commercial undercounter dishwasher⁴⁵ to replace the dipper well to wash utensils after use. These commercial dishwashers can use less than 1.0 gallon per rack.

⁴² East Bay Municipal Utility District (EBMUD). 2008. *WaterSmart Guidebook—A Water-Use Efficiency Plan Review Guide for New Businesses*. Pages FOOD8-9. www.ebmud.com/for-customers/conservation-rebates-and-services/commercial/watersmart-guidebook.

⁴³ U.S. Food and Drug Administration (FDA). FDA Food Code 2009: Chapter 3—Food. Sections 3-304.11 and 3-304.12. www.fda.gov/Food/FoodSafety/RetailFoodProtection/FoodCode/FoodCode2009/ucm186451.htm.

⁴⁴ Arizona Department of Water Resources. *Implementing a Water Management Plan Checklist for Facility Managers*. Page 8. www.azwater.gov/azdwr/StatewidePlanning/Conservation2/CommercialIndustrial/FacilityManagers.htm.

⁴⁵ U.S. Environmental Protection Agency (EPA) and U.S. Energy Department's (DOE's) ENERGY STAR. Commercial Dishwashers. www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=COH.

Savings Potential

Water savings can be achieved in two ways: by retrofitting the dipper well to reduce the flow rate or by replacing a dipper well with a metered faucet or an ENERGY STAR qualified commercial undercounter dishwasher.

Dipper Well Retrofit With In-Line Flow Restrictor

Retrofitting a dipper well with an in-low flow restrictor can be a simple way to save water.

Current Water Use

To estimate the water use of an existing dipper well, identify the following information and use Equation 4-12:

- Flow rate of the existing dipper well. Most dipper wells have flow rates between 0.5 and 1.0 gpm.⁴⁶
- Average daily use time.
- Days of facility operation per year.

Equation 4-12. Water Use of Dipper Well (gallons per year)

$$= \text{Dipper Well Flow Rate} \times \text{Daily Use Time} \times \text{Days of Facility Operation}$$

Where:

- Dipper Well Flow Rate (gallons per minute)
 - Daily Use Time (minutes per day)
 - Days of Facility Operation (days per year)
-

Water Use After Retrofit

To estimate the water use after retrofitting an existing dipper well with an in-line flow restrictor, use Equation 4-12, substituting the flow rate of the retrofit in-line flow restrictor for the flow rate of the existing dipper well. An efficient, retrofit in-line flow restrictor should provide a maximum flow rate of 0.3 gpm.

Water Savings

To calculate the water savings that can be achieved from retrofitting an existing dipper well, identify the following information and use Equation 4-13:

- Current water use as calculated using Equation 4-12.
- Water use after retrofit as calculated using Equation 4-12.

⁴⁶ EBMUD, *op. cit.*

4.7 Dipper Wells

Equation 4-13. Water Savings From Dipper Well Retrofit or Replacement (gallons per year)

$$= \text{Current Water Use of Dipper Well} - \text{Water Use After Retrofit or Replacement}$$

Where:

- Current Water Use of Dipper Well (gallons per year)
 - Water Use After Retrofit or Replacement (gallons per year)
-

Payback

To calculate the simple payback from the water savings associated with retrofitting an existing dipper well, consider the equipment and installation cost of the retrofit in-line flow restrictor, the water savings as calculated in Equation 4-13, and the facility-specific cost of water and wastewater.

After retrofitting an existing dipper well with an in-line flow restrictor, facilities can save energy from the reduced hot water use. This energy savings will further reduce the payback period and increase replacement cost-effectiveness.

Dipper Well Replacement With Push-Button, Metered Faucet

Although installing a dipper well retrofit is likely the most cost-effective choice for a facility, significant water savings can also be achieved by replacing a dipper well with a push-button, metered faucet.

Current Water Use

To estimate the current water use of an existing dipper well, use Equation 4-12.

Water Use After Replacement With Metered Faucet

To estimate the water use after replacing an existing dipper well with a push-button, metered faucet, identify the following information and use Equation 4-14:

- Flow rate of the push-button, metered faucet (in gallons per cycle).
- Average cycles used per hour.
- Average daily use time.
- Days of facility operation per year.

Equation 4-14. Water Use of Push-Button, Metered Faucet (gallons per year)

$$= \text{Flow Rate of Push-Button, Metered Faucet} \times \text{Uses per Hour} \times \text{Daily Use Time} \times \text{Days of Facility Operation}$$

Where:

- Flow Rate of Push-Button, Metered Faucet (gallons per cycle)
 - Uses per Hour (cycles per hour)
 - Daily Use Time (hours per day)
 - Days of Facility Operation (days per year)
-

Water Savings

To calculate the water savings that can be achieved from replacing an existing dipper well with a push-button, metered faucet, identify the following information and use Equation 4-13:

- Current water use as calculated using Equation 4-12.
- Water use after replacement as calculated using Equation 4-14.

Payback

To calculate the simple payback from the water savings associated with replacing an existing dipper well with a push-button, metered faucet, consider the equipment and installation cost of installing the new push-button, metered faucet; the water savings as calculated in Equation 4-13; and the facility-specific cost of water and wastewater.

After replacing an existing dipper well with a push-button, metered faucet, facilities may save energy from the reduced hot water use. This energy savings will further reduce the payback period and increase replacement cost-effectiveness.

Dipper Well Replacement With an ENERGY STAR Qualified Dishwasher

Although installing a dipper well retrofit is likely the most cost-effective choice for a facility, significant water savings can also be achieved by replacing a dipper well with an ENERGY STAR qualified commercial undercounter dishwasher.

Current Water Use

To estimate the current water use of an existing dipper well, use Equation 4-12.

4.7 Dipper Wells

Water Use After Replacement With an ENERGY STAR Qualified Dishwasher

To estimate the water use after replacing an existing dipper well with an ENERGY STAR qualified commercial undercounter dishwasher, identify the following information and use Equation 4-15:

- Water use per rack washed. A high-temperature, ENERGY STAR qualified commercial undercounter dishwasher uses 1.0 gallons per rack or less. A low-temperature model uses 1.7 gallons per rack or less.⁴⁷
- Average estimate of racks washed per day.
- Days of facility operation per year.

Equation 4-15. Water Use of an ENERGY STAR Qualified Commercial, Undercounter Dishwasher (gallons per year)

$$= \text{Water Use per Rack} \times \text{Racks Washed per Day} \times \text{Days of Facility Operation}$$

Where:

- Water Use per Rack (gallons per rack)
 - Racks Washed per Day (racks per day)
 - Days of Facility Operation (days per year)
-

Water Savings

To calculate the water savings that can be achieved from replacing an existing dipper well with an ENERGY STAR qualified commercial undercounter dishwasher, identify the following information and use Equation 4-13:

- Current water use as calculated using Equation 4-12.
- Water use after replacement as calculated using Equation 4-15.

Payback

To calculate the simple payback from the water savings associated with replacing an existing dipper well with an ENERGY STAR qualified commercial undercounter dishwasher, consider the equipment and installation cost of the new dishwasher, the water savings as calculated in Equation 4-13, and the facility-specific cost of water and wastewater. Installing a new ENERGY STAR qualified commercial undercounter dishwasher can cost approximately \$6,000.⁴⁸

The facility should also consider the energy impact of replacing the dipper well with an ENERGY STAR qualified dishwasher. The dishwasher might use less hot water than the dipper well, but it also uses energy to run cleaning cycles.

⁴⁷ EPA and DOE's ENERGY STAR. Commercial Dishwashers Key Product Criteria. www.energystar.gov/index.cfm?c=comm_dishwashers.pr_crit_comm_dishwashers.

⁴⁸ EPA and DOE's ENERGY STAR. Life Cycle Cost Estimate for 1 ENERGY STAR Qualified Commercial Dishwasher(s). www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/CalculatorCommercialDishwasher.xls.

Additional Resources

Arizona Department of Water Resources. *Implementing a Water Management Plan Checklist for Facility Managers*. Page 8. www.azwater.gov/azdwr/StatewidePlanning/Conservation2/CommercialIndustrial/FacilityManagers.htm.

Brean, Henry. June 8, 2009. "UNLV professor targets 'wasteful' dipper wells." *Las Vegas Review-Journal*. www.lvrj.com/news/47195482.html.

East Bay Municipal Utility District. 2008. *WaterSmart Guidebook—A Water-Use Efficiency Plan Review Guide for New Businesses*. Pages FOOD8-9. www.ebmud.com/for-customers/conservation-rebates-and-services/commercial/watersmart-guidebook.

EPA and DOE's ENERGY STAR. Best Practices—How to Achieve the Most Efficient Use of Water in Commercial Food Service Facilities. www.energystar.gov/index.cfm?c=healthcare.fisher_nickel_feb_2005.

EPA and DOE's ENERGY STAR. Commercial Dishwashers Key Product Criteria. www.energystar.gov/index.cfm?c=comm_dishwashers.pr_crit_comm_dishwashers.