Grocers

Grocery-stores typically use water for a variety of operations: spraying fresh vegetables with cold water, ice machines, deli operations, food preparation and restaurant service, photo processing, floor cleaning, and cooling refrigeration equipment with cooling towers/evaporative condensers.

Grocery operations have diversified to include fresh prepared foods, restaurants, photo processing, and more. Water uses have multiplied, too.

Cooling and Heating Systems

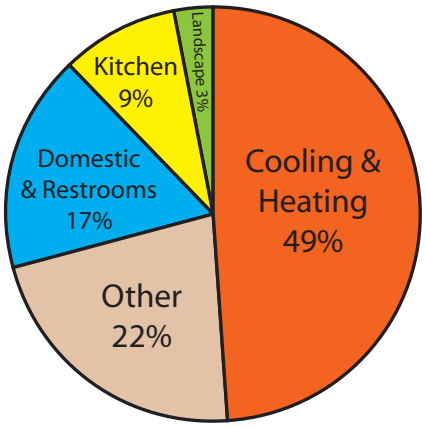
Freezers, refrigeration and cooler operations, and comfort air conditioning equipment are often linked to remote refrigeration equipment. It can be air-cooled or cooled by a cooling tower. A cooling tower functions by directing warm water from the compressor to trickle through the cooling tower, where some evaporates, cooling the remaining water, which then returns to cool the equipment.

According to recent studies of grocery stores in California, half the water used at facilities with cooling towers is used by the cooling towers themselves. In other parts of the South and Southwest, air cooling, typically with multiple rooftop units, is much more common.

The use of multiple rooftop units allows a grocery to continue to operate even if one or two units are down for repair. The use of air cooling also eliminates the cost of building and operating a cooling tower, but air-cooled units are generally less energy-efficient than systems using cooling towers, especially under full- or base-load conditions.

The type of mechanical refrigeration and air-conditioning equipment chosen has four implications for water use:

- if direct exchange air-cooled refrigeration and air conditioning are used, a grocery's water consumption could be reduced by half or more.
- if cooling towers are used, their good energy efficiency is one of the grocery's most significant water-conserving tools. ***THERM***
- even a partial use of air cooling, such as for air conditioning, could significantly reduce water use.



Typical water use in grocery stores

- if cooling towers are used, operate them as efficiently as possible to maximize cycles of concentration. ***THERM***

Refer to the **"Office Buildings"** and **"Schools"** summaries for recommendations on evaluating cooling towers *versus* air-cooling, open- *versus* closed-loop systems, and heat and hot-water system practices.

Ice and direct water-sprays are often used in vegetable displays both to maintain the products' freshness and to enhance their appeal. Vegetables appear crisp, cool, and "dew-drop" fresh.

Kitchen Equipment

Some grocers offer prepared food, both for take-out and eat-in, in addition to traditional groceries. Preparation of food for sale and scullery operations, in particular, are areas where large amounts of water are used. Selecting energy-efficient kitchen equipment helps reduce waste heat, which also has implications for water use.

Planners of kitchen facilities should choose refrigerators that have adequate space for thawing food. Thawing food under running water should be avoided. ***FOOD***

Water consumption for scullery operations, including dishwashing, can be reduced by using the following:

- pre-rinse spray valves (1.5 gpm maximum) for dish rinsing.
- strainer (scrapper) baskets in place of garbage disposals (grinders).
- dishwashers meeting efficiency standards set by the Consortium for Energy Efficiency (CEE).
- steam doors on dishwashers.
- dishwashing equipment that meets Energy Star standards. ***FOOD***

Where cooking is involved, cooking and warming devices offer many opportunities for improved water efficiency.

- Select combination ovens that use no more than 15 gallons of water per hour and comply with the California energy rebate list.
- Instead of steam tables, install dry heating tables.
- Return and reuse condensate for all boiler-type steam kettles.
- Size steam traps for proper operation to avoid dumping condensate.
- Insulate condensate-return lines.
- Use pasta cookers with a simmer mode and automatic overflow-control valves. Restrict flow to half a gallon per minute.
- Use connectionless or boilerless steamers consuming no more than 3 gallons per hour.
- Install in-line restrictors that reduce "dipper well" flow to under 0.3 gpm. ***FOOD***

Water quality is of primary concern in all food preparation and service processes.

Store Operations

Limit sprays to fresh vegetables to the amount necessary.

Photo processing should use self-contained "mini labs" that require no plumbing or washing. ***PHOTO***

Ice Machines

Ice machines use water for ice and sometimes for cooling the compressor. Select:

- ice-making machines that are air-cooled, using remote heads to expel warm air outside the work space and customer areas. Air-cooled machines are preferred over cooling-tower loops.
- energy-efficient flake or nugget machines rather than cube-ice machines. If cube-ice machines are used, those that meet CEE Tier 2 efficiency standards are preferred. Tier 3 machines are even more efficient (CEE Commercial Kitchens). ***FOOD***

Choosing energy-efficient equipment helps reduce energy waste, which has implications for water conservation both at the site of use and at the site of generation.

Plumbing

Appropriate technologies include high-efficiency toilets requiring not more than 1.3 gallons per flush and urinals which flush with 1 gallon or less (no automatically timed flushing systems), as well as self-closing faucets with flows of 0.5 gallons per minute (gpm) for hand washing. If available, and where codes and health departments permit, non-potable water may be used for flushing. ***REST***

Floor Cleaning

Recommendations for floor cleaning include:

- floor cleaning may use wet methods, but wasteful open hoses are discouraged.
- install drains close to areas where liquid discharges are expected. ***PROC***
- arrange equipment for easy use of a mop and squeegee system or floor-cleaning machine.
- install self-closing nozzles, limiting flow to 5 gpm on wash-down hoses. ***FOOD***

Submetering

Separate metering of individual units, water-using systems, or building areas is recommended where possible in order to ensure that the costs of water use and, where feasible, wastewater disposal are equitably dispersed and accounted for accurately. Reflecting actual use and costs often offers a reliable incentive for water-use efficiency. ***METER***

Other

Additional water savings can be realized by using:

- automatic-shutoff and solenoid valves on all hoses and water-using equipment. ***PROC***
- faucets on set tubs and janitorial sinks with flows not exceeding 2.2 gpm. ***REST***

The summaries for **"Restaurants and Fast-Food Outlets," "Bakery/Pastry Shops,"** and **"Industrial Bakeries"** offer additional water-efficiency measures, including some specific to grocery operations.

TIP: Conspicuously mark fire-protection plumbing so no connections will be made except for fire protection. Additionally, flow-detection meters should be installed on fire services to signal unauthorized water flows. ***REST***