Water Conservation Design Standards

For State Buildings and Institutions of Higher Education Facilities

Effective: January 1, 2021
Published: April 2020

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SECO
State Energy Conservation Office

ACKNOWLEDGEMENTS

The State Energy Conservation Office (SECO) wishes to thank the tireless representatives of various state agencies and higher educational institutions that provided technical, policy and regulatory advice during the development of the updated Water Conservation Design Standards. SECO would like to acknowledge the members, as well as their respective organizations, for their time and invaluable input.

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BACKGROUND

In 2001, the 77th Texas Legislative session directed SECO to develop a set of water efficiency standards for state-funded buildings (Tex. Gov. Code §447.004). With help from the Texas Water Development Board and the City of Austin Water Conservation Office, SECO developed the Texas Water Guidelines in 2002. In 2011 and 2016, the guidelines were revised and titled the Texas Water Conservation Design Standards. This is the third revision of those standards.

The Standards shall be followed for new state facilities and major renovation projects as defined by Texas Administrative Code Rule §19.33 (Tex. Admin. Code §19.33). The Standards should also be considered when purchasing new equipment, making modifications to existing systems, or equipment that equals more than half the original purchase price of the equipment. The Standards should also be considered when upgrading existing equipment that works but is nearing the end of its life expectancy. A systematic approach should be used when examining water use and using the Standards. The final goal of the Standards is to balance water, wastewater, energy and related costs to achieve the lowest life cycle costs when purchasing new equipment, replacing old equipment or making modifications to existing equipment.

INTRODUCTION

Many communities in Texas have investments in water conservation and efficiency. These investments have resulted in reductions in per capita demand and water supply system efficiency. Significant opportunity still exists for greater water-use efficiency that will result in economic, public health and environmental benefits.

Texas' economy is directly linked to its natural resources. Water is a critical natural resource that is affected by rainfall and development. Seasonal rainfall varies significantly from year to year. Development and weather can severely deplete water supplies.

Water conservation and efficiency is critical to ensuring the state's long-term economic health. It is becoming increasingly important as water demand rises.

PURPOSE OF WATER CONSERVATION STANDARDS

These Water Conservation Design Standards set targets for water conservation and water-use efficiency. These Standards also provide guidance on effective conservation measures to meet the statewide goals identified in Texas Government Code §447.004.

Water conservation is a strategy or combination of strategies for reducing the volume of water withdrawn from a water supply source, for reducing the loss or waste of water, for maintaining or improving the efficiency in the use of water, for increasing the recycling and reuse of water and for preventing the pollution of water. In this document the terms water conservation and water efficiency are used interchangeably.

The Standards focus on water conservation best management practices (BMP). BMPs are efficiency measures that save a quantifiable amount of water, either directly or indirectly, and can be implemented within a specific time frame. The Standards are achievable, implementable and practical measures that should be used in the planning, construction and renovation of buildings used by state agencies and higher education institutions.

IMPLEMENTATION OF THE WATER CONSERVATION STANDARDS

The Water Conservation Design Standards shall be followed in all new construction and major renovation activities. These Standards should be considered in all programs affecting the planning and management of Texas' water resources. The Standards and recommendations outlined in this document reflect the most current technical and operational knowledge about water-use efficiency.

OVERVIEW

The Standards' goals are to:

1. Implement water conservation in all new state-owned buildings to accurately account for water use and demonstrate water saving techniques and concepts to the public.
2. Integrate water conservation and efficiency measures into all aspects of state-owned buildings including: major renovation projects; purchase of new related equipment to replace existing equipment; modifications to existing systems; and upgrades to existing equipment.
3. Maximize the efficiency of public water supply systems.
4. Promote public awareness of the long-term economic and environmental benefits of conserving water.

DEFINITIONS

Alternative onsite water- means rainwater, air-conditioner condensate, foundation drain water, storm water, cooling tower blowdown, swimming pool backwash and drain water, reverse osmosis reject water, or any other source of water considered appropriate by the Texas Commission on Environmental Quality (TCEQ).

Automatic shut-off device - an active system that stops the flow of water automatically when a leak is detected or a programmable system that stops the flow of water when the equipment is not in use.

Blowdown – the portion of the circulating water flow in a heat transfer process that is removed in order to maintain the amount of dissolved solids and other impurities at an acceptable level.

Closed loop system- a system that has no contact with the outside environment.

Economic feasibility study - a cost benefit analysis of a system based on the expected life, cost, maintenance and materials of the system as compared with the cost of water saved. For automatic implementation, the cost benefit analysis will yield a breakeven point of no more than one-third the expected life of the system, which shall be a maximum of 30 years.

EPA ENERGY STAR - a joint program of the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy (DOE) helping to save money and protect the environment through energy-•- efficient products and practices.

EPA WaterSense - an EPA-sponsored partnership program that seeks to protect the future of the nation's water supply by promoting water efficiency and enhancing the market for water-efficient products, programs and practices.

Graywater - wastewater from clothes-washing machines, showers, bathtubs, hand-washing lavatories, and sinks that are not used for disposal of hazardous or toxic ingredients. Graywater does not include wastewater that has come in contact with toilet waste; from washing of material, including diapers, soiled with human excreta; or from sinks used for food preparation or disposal.

Make-up water - the water feed needed to replace that which is lost in a heat transfer process by evaporation or leakage in a closed loop system.

Non-potable water - water that is not suitable for drinking.

Once through cooling - water that is pumped through heat exchange equipment and then discharged into the environment.

Potable water - water that is fit for consumption by humans and other animals.

Rainwater harvesting - the capture, diversion, and storage of rainwater for a variety of purposes including landscape irrigation, drinking and domestic use, aquifer recharge and storm water abatement.

Reclaimed water - water from domestic or municipal wastewater that has been treated to a quality suitable for beneficial use.

Recycled water - water, which as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur.

Reuse is defined as treated wastewater that can be used for beneficial purposes.

Self-closing - a device, usually in a faucet or nozzle, which must be turned on by the user by pushing or pulling and is turned off when the user releases the handle or tap.

ABBREVIATIONS

BMP – Best Management Practices

EPA – Environmental Protection Agency

F – Fahrenheit

cfm – cubic feet per minute

gpd – gallons per day

gpf – gallons per flush gpm – gallons per minute gr - grains

psi – pounds per square inch

RO - reverse osmosis

SECO – State Energy Conservation Office

TCEQ – Texas Commission on Environmental Quality

TWDB – Texas Water Development Board

IMEF – Integrated modified energy factor, in (cu ft/kWh/cycle)

IWF – Integrated water factor, in (gal/cu ft/cycle)

1.0 IRRIGATION AND LANDSCAPE DESIGN

STANDARDS FOR IRRIGATION

1. Automatic irrigation systems shall comply with TCEQ's Water Code 12 Texas OCCUPATIONS CODE CHAPTER 1903, and 30 Tex. Admin. Code Title §344 and all local requirements.
2. Landscape irrigation systems of 2,500 square feet or greater shall be separately metered (see Section 8.0 Metering)
3. Irrigation shall employ drip, trickle, micro, low-arching, multi-stream rotational or other water-conserving technology where possible.
4. Adjustable flow control valves shall be provided on circuit remote control valves.
5. Automatic irrigation systems shall be equipped with a flow meter that stops system operation to prevent unintended waste of water from damaged or malfunctioning components.
6. Automatic irrigation systems shall be equipped with a controller capable of dual or multiple programming. Controllers shall have multiple cycle start capacity and flexible calendar programming, including the capability by day of the week or day to night interval watering. An economic feasibility study shall be conducted to assess whether the U.S. Environmental Protection Agency's WaterSense certified weather-based irrigation controllers will be installed.
7. Automatic irrigation systems shall be equipped with soil moisture sensors and rain and freeze sensor shut-off devices. Moisture sensors shall be coordinated with landscape design to ensure effective use.
8. Pressure regulating devices shall be required where water supply static pressure exceeds manufacturer's recommended operating range. This component should be installed at the control valve.
9. Serviceable check valves shall be required where elevation differential may cause low head drainage adjacent to paving areas.
10. Sprinkler head spacing shall be designed for head-to-head coverage or heads shall be spaced as per manufacturer's recommendations and adjusted for prevailing winds. The system shall be designed for minimum run-off and for a distribution uniformity of at least 65 percent.
11. Sprinkler heads shall not spray water directly on buildings or hardscape areas. The pop-up head limit shall not be less than four (4) inches.
12. Sprinklers shall not be placed along curbs, in parkways or planting islands less than six feet wide.
13. An economic feasibility study shall be conducted to assess whether an alternate site-specific source of non-potable water shall be explored and implemented.
14. Appropriate signage and purple colored pipe is required and shall identify non-potable water use for irrigation system operation.

STANDARDS FOR LANDSCAPE DESIGN

1. To maximize water retention, all projects designs shall include soil analysis and specifications appropriate to the geographic region. All landscape planting selections must be appropriate for the soil as analyzed and amended if required. Selection of native plants for landscaping that are adaptable to the existing soil conditions is encouraged to minimize the use of soil amendments.
2. Acceptable topsoil shall be free of weeds, stones larger than one inch in diameter and a minimum of 30 percent organic matter. Up to 20 percent washed sand may be added to clay-

type soils. Salvaged topsoil obtained from construction areas on site is encouraged to minimize or avoid importing topsoil from off site. Turfgrass and planting bed areas shall have a minimum top soil depth as recommended by the regional Texas AgriLife Extension Service.

3. Irrigated turfgrass shall not exceed 50 percent of landscaped areas. Exceptions: dedicated athletic fields, golf courses and driving ranges.
4. Turfgrass selection shall be determined by facility need and geographic and climatic conditions and the ability to survive on only normal rainfall. Drought tolerant turfgrass should be considered.
5. Non-turf planted areas shall have a minimum of two inches or more of mulch and cover soil surfaces to minimize soil moisture evaporation. To minimize water use, during the establishment of new plantings, fall installation of landscape is highly recommended, with winter and spring installations acceptable. Summer installation is strongly discouraged.
6. Plants recommended by the regional Texas AgriLife Extension Service shall be considered desirable.
7. Invasive plants shall not be used. Invasive plants are defined as not native to the project site and that cause or likely to cause environmental harm. At a minimum, the list of invasive species for a project site includes plants in city, county, and regional lists and state and federal noxious weeds laws. A list of invasive can be found here: TexasInvasives.org
8. Plants having similar water needs shall be grouped together and selected based on use, soil conditions, sun and shade conditions, adaptability to geographic and climatic conditions and the ability to survive normal rainfall or minimal irrigation.
9. Planning to preserve native plants and protection of native plants during construction is encouraged. Such plants include, but are not limited to:
    a. Plants that are threatened or endangered
    b. Specimen plants or exceptional examples of a particular species
    c. Plants that readily survive relocation and are useful in new or existing landscapes
    d. Native trees larger than 6” caliper size
10. The landscape design shall be coordinated with the storm water design to ensure that the maximum amount of water is retained on the property through the use of storm water BMP's such as berms, swales, terraces, rain gardens and proper contouring of landscape. Use of roof rainwater on landscape without damage to landscape (erosion, stagnant water, etc.) is encouraged and should be considered. Coordinate irrigation moisture sensors in areas where roof rainwater is used for irrigation.

2.0 HEATING, VENTILATION AND AIR CONDITIONING

The following standards are based on modern green codes and current state statutes. Cited standards include:

1. Water Efficiency Standards (ANSI-IAPMO) – 2017 chapters 4 – 7.
2. ASHRAE 181.1 – 2017 chapter 6.
3. International Green Construction Code (ICC) – 2018 chapter 6
4. SECO Water Conservation Design Standards committee

STANDARDS FOR HEATING, VENTILATION AND AIR CONDITIONING

1. Performance and procedural standards will be followed for maximum energy and water conservation allowed by the latest and most cost-effective technology that is consistent with the requirements of public health, safety and economic resources, as stated in Texas Government Code §447.004.
2. Once-through cooling is prohibited for all heating, ventilation, refrigeration and cooling equipment.
3. An economic feasibility study shall be conducted to assess whether harvesting and delivery of condensate water can be accomplished through gravity drainage or pumping, if condensate drainage would need to be treated before reuse and any other cost impact.
4. Closed loop, water-cooled equipment shall be used where possible with the exception of open-cell cooling towers.
5. An economic feasibility study shall be conducted to assess whether hybrid towers and/or geothermal (ground coil) heat pump units, combined heat and power systems using desiccant systems for HVAC dehumidification, and the use of air-cooling Variable Refrigerant Volume systems should be installed.
6. Where installed, leak detection and control devices shall comply with IAPMO IGC115. Leak detection with control devices shall not be installed where they isolate fire sprinkler systems.
7. Reclaimed (recycled) or on-site treated nonpotable water used for industrial and commercial cooling or air-conditioning shall be approved for use by the water/wastewater utility and the Authority Having Jurisdiction.
    a. A drift eliminator shall be used in a cooling system, utilizing alternate sources of water, where they aerosolized water may come in contact with employees or members of the public.
    b. A biocide shall be used to treat the cooling system recirculation water where the recycled water may come in contact with employees or members of the public.
8. When examining the cost benefit analysis of dry versus wet cooling, all additional costs of cooling tower use shall be considered, including:
    a. Energy needed to pump water in the chilled water and cooling tower loops;
    b. Cost of water and wastewater;
    c. Cost of cooling tower water treatment;
    d. Cost of labor to operate the towers;
    e. A 30-year projection of future water, wastewater and electricity costs;

f. Capital replacement costs associated with cooling towers compared with dry cooling;

g. Impact of a discharge with a high total dissolved solid content on the environment including pretreatment and Total Maximum Daily Loading (TMDL) implications, and

h. The benefits of redundant systems offered by the use of many smaller air-cooled or ground-cooled systems.

STANDARDS FOR COOLING TOWERS

1. Cooling towers shall be fitted with conductivity controllers, overflow sensors, make-up meters, and blowdown meters to manage make-up water. For cooling towers of 100 tons or more, the make-up, and overflow meters and overflow alarm shall be connected to the building's Central Energy Management System or Utility Monitoring Dashboard.

2. Cooling tower basins shall be constructed of 304 stainless steel or more corrosion resistant material such as 316 stainless or ceramic materials.

3. The quality of the water recirculating in the cooling tower system shall determine the set point for blowdown. The following table provides the concentration levels for basins constructed of 304 stainless steel. The blowdown set point should be set at no lower than 90 percent of the controlling parameter. The controlling parameter is the constituent level which is reached first based on the water quality analysis. For example, if the conductivity of the makeup water is low but silica is 27 ppm, the cycles of concentration would be limited by silica to no more than five cycles of concentration based on silica. Where the manufacture allows higher concentrations, these higher numbers shall be used for setting the blowdown concentrations.

4. Where a contractor company (rout operator) is retained to manage the water treatment for the cooling tower, the contract shall specify that the following water quality parameters are met.

Controlling Parameters *Parameters for 304 Stainless Steel Tower Basins*	
Property	**Concentration**
Conductivity (micro-ohms)	<4,000
Chlorides (ppm)	<400
Calcium Hardness ($CaCO_3$ –ppm)	<600
Silica (ppm)	<150
Sulfates	<250
Langelier Saturation Index (LSI)	+2.8

5. For cooling towers of 100 tons or more, the make-up, and overflow meters and overflow alarm shall be connected to the building's Central Energy Management System or Utility Monitoring Dashboard.

6. Provide cooling tower with drift eliminators minimize water loss. Cooling towers shall be equipped with efficiency drift eliminators that achieve drift reduction to 0.002 percent of the circulated water volume for counter flow towers and 0.005 percent for cross-flow towers.

AIR CONDITIONING CONDENSATE RECOVERY SYSTEMS

1. For buildings located in warm-humid climate zones (ASHRAE Climate Zones 1A, 2A, 3A) and have 250,000 square feet or more of air-conditioned space, a system to collect air conditioning condensate for beneficial reuse shall be installed.

STANDARDS FOR STEAM BOILERS

1. Facility heating water systems shall be used unless a steam heating system is economically feasible.
2. Steam boilers shall be equipped with conductivity controllers to control blowdown and makeup meters on the cold-water supply to the boiler.
3. Steam condensate return systems shall be installed for all steam boilers.
4. Steam boilers shall be fitted with blowdown heat exchangers to transfer heat to feed water. Where heat recovery can be used beneficially to heat boiler make-up water or for other purposes, boiler blowdown from steam boilers exceeding 15 psi and 3.4 million BTU's per hour (100 HP) shall be directed to a heat recovery system that reduces the temperature of the blowdown discharge to below 140 degrees Fahrenheit without using tempering water.

STANDARDS FOR WATER HEATING BOILERS (WATER HEATERS WITH MORE THAN 0.5 MILLION BTU'S PER HOUR)

1. The cold-water feed for all water heating systems of 0.5 million BTU's or more of capacity shall be equipped with an easily accessible water meter.
2. For water heating systems (boilers) of 1.0 million BTU's of capacity or more, the cold-water makeup meter shall be connected to the building's Central Energy Management System or Utility Monitoring Dashboard.

3.0 REFRIGERATON AND WATER TREATMENT

STANDARDS FOR REFRIGERATION

1. Use of Domestic Water for once through cooling of equipment is prohibited.
2. Water-cooled refrigeration systems shall be supplied by a re-circulating system.
3. All ice machines shall meet EPA ENERGY STAR certification standards.

STANDARDS FOR WATER TREATMENT

1. Water softeners shall be equipped with demand-initiated regeneration control systems. If water softening is used, regeneration shall be controlled by actual hardness or by a flow volume control that is based on the hardness of the water to be softened. Softeners that use timers for recharging are prohibited.
2. Central reverse osmosis or nano-filtration systems shall reuse reject water for landscape irrigation or other beneficial purposes where the quality of the reject water allows. (Beneficial purposes include but are not limited to the following: other process use, cooling tower make-up, toilet or urinal flushing, vehicle rinse, laundry and aesthetic fountain make-up).
3. Central reverse osmosis systems shall have at a minimum 75 percent recovery rate.
4. Central distillation systems shall recover 85 percent of feed water.

5. Point-of-Use Reverse Osmosis Water Treatment Systems installed in residential occupancies shall be provided with automatic shut-off valves to prevent discharge when there is no call for producing treated water. Reverse osmosis water treatment systems shall be listed to meet NSF/ANSI Standard 58.

4.0 RAINWATER HARVESTING, RECLAIMED WATER, RECYCLED WATER, AND REUSE

1. Rainwater harvesting, recycled water and reuse systems shall comply with all state and local laws regarding public safety and health as stated in the Tex. Gov. Code §447.004 and TCEQ Chapter 210 – Use of Reclaimed Water, Subchapter C.
2. Treated graywater and alternate on-site reclaimed system technologies, including rainwater harvesting, condensate collection, or cooling tower blowdown, or a combination thereof, for non-potable indoor use and outdoor water-use shall be incorporated into the design and construction of each new building with a roof measuring at least 10,000 square feet. Alternative on-site water is defined as rainwater, air-conditioner condensate, foundation drain water, storm water, cooling tower blowdown, swimming pool backwash and drain water, reverse osmosis reject water, or any other source of water considered appropriate by the Texas Commission on Environmental Quality (TCEQ).
3. Additional alternative onsite water sources can include, but are not limited to: rainwater, storm water ponds, reverse osmosis and nano-filtration reject water, foundation drain water, pool backwash water, pool water discharged to maintain water quality, graywater, wastewater treatment effluent and steam condensate that is not returned to the boiler.
4. Provide SECO with the documentation of the appropriate analysis that determines if incorporating the design standard is not economically feasible. This shall apply to available alternative on-site water sources.

STANDARDS FOR RAINWATER HARVESTING

1. Structures connected to the public water supply and containing a rainwater harvesting system for indoor use shall comply with 30 Tex. Admin. Code § 290(d) and all local requirements.
2. An economic feasibility study shall be conducted to assess whether harvesting and delivery can be accomplished through gravity drainage or pumping, or if rainwater would need to be treated before reuse, as well as any other cost impact.
3. Monthly rainfall rates and expected run-off capture shall be analyzed to size the catchment area and the storage capacity to meet water demand through the longest expected interval without rain. Reference: TWDB's *The Texas Manual on Rainwater Harvesting, Third Edition*, Chapter 4: Water Balance and System Sizing to determine storage capacity and Appendix B: Rainfall Data for average precipitation rates.
4. Plumbing and installation guidance for installing a rainwater harvesting system can be found in "Rainwater Catchment Design and Installation Standards", from the American Rainwater Catchment System Association and the American Society of Plumbing Engineers.

STANDARDS FOR RECLAIMED WATER, RECYCLED WATER AND REUSE

1. On-site reclaimed, recycled and reuse water systems shall be designed, installed and implemented according to 30 Tex. Admin. Code § 210 and shall comply with local requirements.
2. On-site graywater reuse systems shall be designed, installed and implemented according to 30 Tex. Admin. Code § 285 (h), and shall comply with local requirements.

5.0 PLUMBING FIXTURES AND PUMPS

STANDARDS FOR PLUMBING FIXTURES

1. All plumbing fixtures, toilets, urinals, faucets and showerheads shall comply with state plumbing standards as administered by the Texas Commission on Environmental Quality (TCEQ) as well as EPA's WaterSense Performance Standards, where applicable.
2. Water closets with flush-o-meter valve or tank-type toilets shall have a flow rate no greater than 1.28 gpf. All toilet fixtures shall be rated for 1,000 grams or 1.28 gpf as certified by the latest Maximum Performance Test.
3. Flush urinals shall have a flow rate no greater than 0.5 gpf for floor-mounted urinals and a flow rate of 0.125 gpf for wall-mounted urinals.
4. Faucets in public lavatories shall be fitted with aerators that have a flow rate no greater than 0.5 gpm where the pressure is greater than 25 psi. Lavatory faucets in public restrooms shall be self-closing or shall be equipped with automatic shut-off devices.
5. Showerheads used for non-medical purposes, as in dorms, locker rooms, etc., shall have a flow rate no greater than 2.0 gpm.
6. All drinking water fountains shall have self-closing valves.
7. All water pipes subject to freezing conditions shall be installed with appropriate freeze protection devices.
8. Special plumbing fixtures other than those mentioned above shall be chosen based on water and energy efficiency and functionality.
9. Signage requesting that leaks and other plumbing problems be promptly reported to the appropriate building management authority shall be placed in each restroom, locker room, kitchen, laundry, pool and other high water-use area. The signage shall be labeled with a phone number to report such problems.
10. Non-potable water may be used for flushing in new buildings in compliance with plumbing codes and/or ordinances as applicable.

STANDARDS FOR PUMPS

1. Water pumps shall have a mechanical seal, unless prohibited by code meeting the requirements of the International Plumbing Code.

6.0 LAUNDRY

STANDARDS FOR LAUNDRY

1. Commercial grade and residential clothes washing equipment, including coin or card operated washers, shall meet EPA ENERGY STAR certification standards.

Project Type	Current Criteria Levels (as of February 5, 2018)
ENERGY STAR Residential Clothes Washers, Front-loading (> 2.5 cu-ft)	IMEF ≥ 2.76 IWF ≤ 3.2
ENERGY STAR Residential Clothes Washers, Top-loading (> 2.5 cu-ft)	IMEF ≥ 2.06 IWF ≤ 4.3
ENERGY STAR Residential Clothes Washers (≤ 2.5 cu-ft)	IMEF ≥ 2.07 IWF ≤ 4.2
ENERGY STAR Commercial Clothes Washers, Front-loading	IMEF ≥ 2.20 IWF ≤ 4.0

Source: U.S. Environmental Protection Agency, ENERGY STAR Program, 2018.

2. Clothes washers that have double dump valves and equipment of 150 pounds capacity or greater shall be equipped so that the final rinse water can be reused in the first flush wash.
3. An economic feasibility study shall be provided to evaluate whether the use of ozone and water reclamation systems is feasible.
4. Lint capture systems shall use dry capture or wet systems that minimize water use by only using reclaimed or other on-site water sources.
5. Large commercial and industrial tunnel washers are not covered by specific codes and regulations. Manufacturers shall use best practices to maintain the highest water efficiency technology available.

7.0 FOOD SERVICE

STANDARDS FOR WAREWASHING

1. Fill and dump warewashing equipment is prohibited.
2. All warewashing equipment shall meet EPA ENERGY STAR certification standards.
3. Kitchen prerinse-spray valves shall be self-closing and shall meet the federal standards listed in the table below. (EPA WaterSense discontinued their labeled standard for pre-rinse spray valves since the federal standard is now ≤1.28 which matches the latest WaterSense specification.)

Table 7.1 Water and energy conservation standards for commercial prerinse-spray valves.

Product Class	Maximum Flow Rate (gpm)
Product Class 1 (</=5.0 ozf)	1.00
Product Class 2 (>5.0 ozf and </=8.0 ozf)	1.20
Product Class 3 (>8.0 ozf)	1.28

Source: U.S. General Services Administration, Regulations.gov, 2016.

4. Dipper wells shall be equipped with flow restrictors and shall have a flow rate no greater than 0.2 gpm.

STANDARDS FOR GARBAGE DISPOSALS

1. Facilities shall consider composting as a method of food waste disposal.
2. Where food waste devices are installed, they shall meet the following requirements:
    a. Pulpers and Mechanical Strainers. The make-up water use for the pulpers or mechanical strainers shall not exceed 2 gpm. A flow restrictor shall be installed on the water supply to limit the water flow. However, water can be recirculated within the pulper or strainer system.
    b. Food Waste Disposers. The water use for the food waste grinder shall not exceed the 8 gpm under full load condition and 1 gpm under no-load condition. Flow restrictors shall be installed on the water supply to limit the water flow rate to a maximum of 8 gpm. A load sensing device shall be installed to monitor current demand and regulate water flow.
    c. Time Out and Shut Off. Pulpers, mechanical strainers, and food waste disposers shall have a time out system with push button to reactivate. The maximum allowable run time cycle shall be 10 minutes.
    d. Sink Drain Outlets. Where a strainer or basket is installed, they shall be readily removable.
    e. Strainer Baskets. Strainer (scrapper) baskets shall either fit over a sink compartment or be attached to a drain system. The strainer baskets shall be readily removable for emptying.

STANDARDS FOR STEAMERS, STEAM TABLES AND COMBINATION OVENS

1. Steamers shall meet EPA ENERGY STAR Certification standards. Boilerless type steamers shall consume not more than 2.0 gallons per compartment. All Boiler type steamers shall consume not more than 1.5 gallons per pan per hour.
2. Combination ovens shall not use water in the convection mode except when utilizing a moisture nozzle for food products in the oven. The total amount of water used by the moisture nozzle in the convection mode shall not exceed a half a gallon per hour per oven cavity. When operating in the steamer mode, combination ovens shall use no more than 1.5 gallons per hour per pan.

8.0 METERING

STANDARDS FOR METERING

1. Pursuant to Tex. Gov. Code §447.009, state agencies and institutions of higher education shall report water usage to SECO on an annual basis by means of the Energy and Water Management Plan (EWMP) and the Energy Star Portfolio Manager.
2. All buildings intended for daily occupation or for water-using equipment operation shall be metered separately.
3. All meters required to be used by this Section shall be capable of remote monitoring for data storage and reporting.
4. A separate meter or sub-meter shall be provided for the following:
   a. Domestic water supply serving, all cooling towers greater than 100 tons, evaporative cooling systems and fluid coolers installed in new buildings;
   b. Any single-use or equipment that consumes more than 20 percent of the total water use at a facility or does not produce wastewater;
   c. Subtenant space greater than 50,000 square feet, or water consumption that exceeds 500 gpd, or space occupied by a commercial laundry, cleaning operation, restaurant, food service, medical office, dental office, laboratory, beauty salon or barbershop;
   d. Car washes, aquariums or equivalent projects within a building using more than 1,000 gpd;
   e. Indoor and outdoor swimming pools and in-ground spas with make-up water supply lines;
   f. Make-up water to closed loop hydronic, chilled water greater than 50 tons or hot water recirculation system used for space heating (500,000 Btuh);
   g. Cold water make-up to water heating boilers of more than 500,000 Btuh;
   h. Cold water make-up to steam boilers that draw more than 100,000 gallons annually or having a capacity greater than 500,000 Btuh;
   i. Make-up water supply to an evaporative cooler having an air flow exceeding 30,000 cubic feet per minute airflow;
   j. Industrial processes consuming more than 1,000 gpd on average;
   k. Aquaculture and fish research facilities and systems using more than 500 gallons of potable water per day;
   l. Landscape irrigation systems of 2,500 square feet or greater; and
   m. All green roof systems or roof spray systems regardless of the water source.

9.0 VEHICLE SERVICES AND WASHING

STANDARDS FOR VEHICLE SERVICES

1. New facilities shall provide secondary containment to catch spills, leaks and drips from stored liquids and solvents.
2. Shop floors shall be sealed.
3. All hoses and water using equipment shall have auto shut-off and solenoid valves installed.
4. All facilities shall use pressure washers instead of hose-type cleaning.

STANDARDS FOR VEHICLE WASHING

1. In bay and conveyor car and large vehicle wash facilities shall be provided with equipment to recycle and reuse at least 50 percent of the water recirculated for washing the vehicles.
2. Reject water shall be piped to a reclamation system and used for pre-soak, undercarriage, and/or initial wash.
3. Conveyor and drive-through type washes shall use no more than 15 gallons of make-up water per vehicle washed for automobiles, pickup trucks and small vans and shall have water recirculation systems.
4. Conveyor and drive-through type washes shall have a flow rate no greater than 40 gallons per vehicle washed for buses and tractor-trailer rigs.
5. Water softener recharge cycle timers are prohibited. Recharge cycles shall be controlled by instruments that measure volume of water treated or the actual quality of the water softened.
6. Deionizing equipment shall be used for water softening instead of reverse osmosis treatment.
7. Chamois wringer faucets shall be self-closing unless the RO reject water is used for vehicle washing in the recirculation system.
8. In-bay hand held spray wash equipment, including spray wands and foaming brushes, shall have a flow rate no greater than 3.0 gallons per minute and shall be equipped with trigger shut-off valves.
9. All pressure wash equipment shall be equipped with unloader valves.
10. All pressure wash equipment shall be equipped with weep holes or other devices to allow for drainage and pressure surges.

10.0 LAB FACILITIES

STANDARDS FOR LAB FACILITES INCLUDING PHOTOGRAPHY AND MEDICAL

1. Use of Domestic water for once-through cooling / process application for any laboratory (such as electron microscopes or rotary evaporators), medical or photographic equipment is prohibited.
2. Lab equipment shall employ automatic control valves that allow water flow only when the equipment is actually in use.
3. Dry hood scrubber systems shall be used where applicable. If a wet hood scrubber system must be used, then a water recirculation system shall be equipped to the system.
4. Perchloric and fume hood wash-down systems shall be installed with self-closing valves.
5. Steam sterilizer discharge of condensate or hot water shall be fitted with water tempering devices that blends cooler water with the discharge in order to not exceed 140 degrees F

before it enters a sanitary waste drain. This discharge shall comply with International Plumbing Code Chapter 8: Section 803 – Indirect/Special Wastes. The tempering water source must have an automatic shut-off device when the temperature of the condensate or hot water discharge of the steam sterilizer falls below 140 degrees F.

6. Steam sterilizers shall be equipped with a mechanical vacuum instead of a Venturi-type vacuum that uses water.
7. Sterilizers shall be installed with a re-circulating cooling system or the condensate shall be recovered for other onsite uses.
8. Dry vacuum pumps shall be used unless prohibited by local fire and safety codes that address explosive, corrosive, or oxidative gases. Other exceptions include:
   a. A teaching laboratory where aspirators are used for less than 24 hours a year; or
   b. A laboratory such as a microelectronics laboratory where fumes are so corrosive that the use of a dry vacuum pump is not feasible. In these cases, the system shall be equipped with a water recirculation system.
9. Reverse osmosis or nano-filtration reject water shall not exceed 60 percent of feed water and should be used as scrubber feed water or for other beneficial uses on site.
10. Digital imaging shall be used for new radiography, x-ray and photo processing.
11. All new film processor units for x-ray frames greater than six inches shall use a film processor water-recycling unit. Units less than or equal to 6 inches is exempt.
12. Pipette washers shall use an automatic type with programmable wash/rinse cycles vs manually operated.

11.0 POOLS, SPAS AND SPECIAL WATER FEATURES

STANDARDS FOR POOLS AND SPAS

1. Pools and spas shall be equipped with re-circulating filtration equipment and shall sub-meter the make-up water.
2. Pools with capacity of 50,000 gallons of water or less shall use cartridge filter systems or regenerative coated media filters. Per IGCC 2018, for filters with removable cartridges, only reusable cartridges and systems shall be used. For filters with backwash capability, use only pool filter equipment that includes a pressure drop gauge to determine when the filter needs to be backwashed and a sight glass enabling the operator to determine when to stop the backwash cycle.
3. In-ground pools with splash troughs shall drain back into the pool system.
4. Where practical, pools and spas shall be covered when not in use.

STANDARDS FOR SPECIAL WATER FEATURES

1. Water used for start-up and make-up water in new ornamental fountains or other new ornamental water features shall be supplied by alternative on-site water or municipally reclaimed water delivered by the local water utility acceptable to the Authority Having Jurisdiction. If alternative on-site water or municipally reclaimed water is not available within 500 feet of the building project site, potable water is allowed to be used for water features with less than 10,000-gallon capacity.
2. New ornamental fountains or other new ornamental water features greater than 3,000 gallons shall be equipped with meters and leak detection devices that shut water feature off if a leak greater than one gallon per hour is discovered.
3. New ornamental fountains or other new ornamental water features shall be installed with a re-circulating system

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