WaterSense at Work

Getting Started With Water Management

1.4 Codes, Standards, and Voluntary Programs for Water Efficiency

Best Management Practices for Commercial and Institutional Facilities

EPA WaterSense

November 2023

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 codes, standards, and voluntary programs for water efficiency, is part of **Section 1: Getting Started With Water Management**. The complete list 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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Getting Started With Water Management

Codes, Standards, and Voluntary Programs for Water Efficiency

EPA WaterSense

Overview

Codes and standards are an important mechanism for addressing the efficiency of plumbing equipment, water-using appliances, and building water use. In addition, voluntary programs and guidelines are a way that facilities looking to incorporate water-using products and practices can ensure efficiency and performance.

Standards

Standards specify uniform technical criteria, methods, processes, and practices by which performance is measured or proper design is implemented. Standards can be developed by industry groups or via an open process managed by independent standards development organizations (SDOs). Usually, these processes seek broad agreement of most stakeholder participants (i.e., more than a simple majority) and resolution of objections of the minority, but not necessarily unanimity.[1] Standards developed by organizations accredited through the American National Standards Institute (ANSI), for example, are considered consensus-based standards. Compliance with standards is considered voluntary unless they have been adopted into law through legislation or regulation.

Table 1 on the next page lists some of the organizations in the United States that develop standards related to commercial and institutional water-using products and equipment and water use in buildings.

In 1992, Congress enacted the Energy Policy Act (EPAct)[2]—and later, EPAct 2005—both of which established maximum water consumption limits for many plumbing products and water-using appliances sold in the United States. Where applicable, EPAct references relevant consensus-based standards, making their compliance mandatory. The U.S. Department of Energy (DOE) is responsible for implementing and enforcing the requirements established under EPAct. Information on the standards and test procedures

[1] American Society of Mechanical Engineers. Standards & Certification FAQ. www.asme.org/codes-standards/publications-information/faq.
[2] U.S. Congress. October 24, 1992. *Public Law 102-486 Energy Policy Act of 1992*. www.congress.gov/bill/102nd-congress/house-bill/776.

for covered products is available on the DOE website at www.energy.gov/eere/buildings/standards-and-test-procedures.

Table 1. Water-Using Product, Equipment, and Building Standards Development Organizations

Standards Development Organization	Products or Equipment Addressed
American Society of Agricultural and Biological Engineers (ASABE)	Irrigation equipment
American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)	Buildings, water heaters, humidifiers, and other building equipment
American Society of Mechanical Engineers (ASME)	Plumbing products
ASSE International (formerly the American Society of Sanitary Engineering)	Plumbing products
ASTM International (formerly the American Society for Testing and Materials)	Foodservice equipment and medical equipment
Association for the Advancement of Medical Instrumentation (AAMI)	Medical equipment
Canadian Standards Association (CSA)	Plumbing products
International Association of Plumbing and Mechanical Officials (IAPMO)	Plumbing products and systems
International Code Council (ICC)	Buildings and plumbing systems
NSF (formerly the National Sanitation Foundation and NSF International)	Commercial kitchen equipment and drinking water treatment units

The water-using products and appliances covered by EPAct include:

- Toilets
- Urinals
- Faucets (residential lavatory, kitchen, and commercial lavatory)
- Showerheads
- Residential clothes washers
- Commercial clothes washers
- Residential dishwashers
- Commercial ice makers
- Pre-rinse spray valves

Codes

Codes provide the criteria necessary to protect public health, safety, and welfare related to building construction and occupancy. Codes can also be adopted into law through regulation, making their compliance mandatory. Codes often reference standards, which provide the details for how to comply with specific requirements.

Plumbing codes are the primary code mechanism governing how water is used in buildings. This includes provisions for supply, distribution, disposal, and water use of specific products, equipment, and systems. There are two primary model plumbing code development organizations in the United States. IAPMO produces the Uniform Plumbing Code (UPC), and ICC produces the International Plumbing Code (IPC). These plumbing codes have no legal status in and of themselves, but they serve as models and, in many cases, have been adopted into law by most state and local jurisdictions.

Participation in Code and Standard Development

Codes and standards are typically developed by voluntary committees of interested parties. Most SDOs require development committees to have representative participation from stakeholders impacted by the code or standard. Participation in code and standard committees is open to everyone, and there are many ways to contribute. Facility managers have a much-needed role to play because SDOs often find it difficult to get sufficient representation of user interest. There are several benefits to facility managers' participation, including access to a network of other experts involved in the development process—manufacturers, builders, regulators, testing and certification organizations, and other users. Also, by participating, facility managers have an opportunity to shape the future of these codes and standards, helping to make them more useful and relevant to the design, manufacture or construction, and operation of products and buildings.

Calling All Stakeholders

When developing product specifications, WaterSense often participates in voluntary standards development committees to engage with stakeholders, who come together with a wide range of knowledge to develop performance testing criteria and discuss water efficiency thresholds. WaterSense encourages facility managers and other commercial and institutional stakeholders to review the specifications in development and get involved in products relevant to them.

To learn more, visit WaterSense's website at www.epa.gov/watersense/products-development.

Water-Efficiency Codes, Standards, and Voluntary Programs

Historically, standards and codes have focused primarily on protecting public health and safety. However, in the past few decades, water efficiency has emerged as an equally important issue that has been incorporated into codes and standards in many places. More recently, voluntary programs have been created to specifically address water uses and water efficiency of products and buildings to go above and beyond federal law and the established codes and standards.

Water-Efficient Products

Voluntary programs exist that seek to leverage public/private partnerships and use market-based incentives (e.g., a certification label) to further improve the water efficiency

and performance of individual products and appliances beyond the requirements established by EPAct or the conventional products available in the marketplace. Notable national voluntary programs specifying product and appliance water efficiency include the U.S. Environmental Protection Agency's (EPA's) WaterSense® program,[3] ENERGY STAR®,[4] and the Consortium for Energy Efficiency (CEE).[5]

- WaterSense is a voluntary partnership program sponsored by EPA that develops specifications for water-efficient, high-performing products. Products that are independently certified to meet WaterSense criteria for water efficiency and performance earn the WaterSense label, which distinguishes them from standard products on the market. WaterSense has developed specifications for both residential and commercial products. For more information, visit the WaterSense website at www.epa.gov/watersense.

- ENERGY STAR is a joint public/private partnership program sponsored by EPA and DOE that develops specifications for energy-efficient products and buildings. Products that meet ENERGY STAR criteria are independently certified to earn the ENERGY STAR label, which distinguishes them from standard products on the market. ENERGY STAR has developed specifications for many water-using products, including dishwashers, clothes washers, and commercial kitchen equipment. For more information, visit the ENERGY STAR website at www.energystar.gov.

- CEE is a non-profit consortium of efficiency program administrators that promotes the use of energy-efficient products, technologies, and services. Where there is significant opportunity and interest from its membership, CEE develops national initiatives that can be used as templates for individual energy-efficiency programs. Related to water efficiency, CEE has developed initiatives for commercial ice makers, residential clothes washers and dishwashers, and some commercial kitchen equipment. For more information, visit the CEE website at www.cee1.org/.

Table 2 on the next page summarizes the water-using products that are addressed by the voluntary certification programs discussed above.

[3] EPA's WaterSense program. www.epa.gov/watersense/watersense-products.
[4] ENERGY STAR. www.energystar.gov/products/business.
[5] Consortium for Energy Efficiency. www.cee1.org/.

Table 2. Water-Using Products Addressed by Voluntary Programs

Product Category	WaterSense	ENERGY STAR	CEE
Plumbing Products			
Toilets	✓		
Flushing Urinals	✓		
Private-Use Lavatory Faucets	✓		
Showerheads	✓		
Household Appliances			
Residential Clothes Washers		✓	✓
Residential Dishwashers		✓	✓
Irrigation Products			
Irrigation Controllers	✓		
Spray Sprinkler Bodies	✓		
Other Commercial Products			
Commercial Clothes Washers		✓	
Commercial Dishwashers		✓	
Commercial Ice Makers		✓	✓
Commercial Combination Ovens		✓	
Commercial Pre-Rinse Spray Valves	Sunset[6]		
Commercial Steam Cookers		✓[7]	✓

Some states and municipalities have enacted regulations requiring water-efficient products (i.e., those that have efficiency levels lower than the applicable DOE standard) for all sales or within new construction or renovation projects. The Appliance Standards Awareness Project (ASAP) maintains a current list of states that have adopted regulations pertaining to water-efficient products.[8] In some cases, these regulations require products to achieve efficiency levels (e.g., flow rate, flush volume) that are lower than the criteria set by WaterSense. It is important to note that some state or municipal requirements reference only the efficiency level and do not address performance criteria that are required by WaterSense specifications. To ensure that products will provide both water savings and consumer satisfaction, it is recommended that purchasers look to buy WaterSense labeled products that have efficiency levels that will meet state requirements, such as WaterSense labeled showerheads that flow at 1.8 gallons per minute (gpm) (6.8 liters per minute [lpm]) (compared to WaterSense maximum flow rate of 2.0 gpm [7.6 lpm]).

[6] WaterSense previously labeled commercial pre-rinse spray valves. However, DOE developed federal energy conservation standards requiring all commercial pre-rinse spray valves to meet or exceed WaterSense's previously established water efficiency criteria. EPA therefore sunset its specification in 2019.
[7] The *ENERGY STAR Product Specification for Commercial Steam Cookers, Version 1.2* does not include requirements for water use.
[8] Appliance Standards Awareness Project. State Standards. https://appliance-standards.org/states.

To further encourage the adoption of water-efficient products and appliances, local jurisdictions or utilities may offer rebates or incentive programs. In many instances, the incentives are provided for products recognized or labeled by the national voluntary programs discussed above. WaterSense maintains a list of rebate opportunities it has been notified of by its partners at www.epa.gov/watersense/rebate-finder. ENERGY STAR has a rebate finder at www.energystar.gov/rebate-finder. Interested purchasers should always check with their local water and energy utilities to see what incentives may be available.

Water-Efficient Buildings

As with products, substantial progress has been made to address water use and efficiency in building plumbing systems and whole buildings, primarily as part of a larger movement to improve the environmental performance of buildings. Another driver for more efficient buildings is tied to building performance standards in some cities and states with requirements for buildings to report on energy and water use.[9] Traditionally, building and plumbing codes have addressed health and safety in plumbing and building water use. Now green building standards, codes, and voluntary guidelines are available that also address water-efficient design or construction practices, technologies, performance thresholds, and metrics.

WaterSense Labeled Homes

The *WaterSense Specification for Homes* applies to both single-family homes and multifamily buildings. Existing homes renovated for water efficiency are also eligible. Homes certified to the specification use at least 30 percent less water compared to typical new construction. Builders, property managers, and other stakeholders can learn more about the WaterSense labeled homes program at www.epa.gov/watersense/homes.

In the world of green building, there is a distinction between green building standards and codes and green building guidelines. As with the discussion of standards above, green building standards and codes are written in language that is enforceable and ready for adoption into law by legislation or regulation, so that their compliance becomes mandatory. Green building guidelines, on the other hand, are not written in enforceable language and are usually intended to be voluntary. Both provide thresholds for efficiency that go above and beyond the established building and plumbing codes and standards.

For example, EPA developed the *WaterSense Specification for Homes* that applies to both single-family and multifamily homes. Homes certified to this specification use at least 30 percent less water compared to homes built with characteristics typical of new construction (i.e., based on national

[9] Institute for Market Transformation (IMT). "Building Performance Standards." www.imt.org/public-policy/building-performance-standards/.

standards and common design and landscape practices). This specification is a voluntary guideline used by builders to demonstrate whole house water efficiency.

Table 3 shows the prominent national green building codes, standards, and voluntary guidelines that address water efficiency in commercial and institutional buildings. The Alliance for Water Efficiency (AWE) also maintains a chart comparing the water-efficiency criteria of several of these national green building codes, standards, and guidelines.[10]

Table 3. National Green Building Codes, Standards, and Voluntary Guidelines

Primary Developing Organization	Title	Standard, Code, or Guideline
EPA WaterSense	WaterSense Specification for Homes[11]	Guideline
U.S. Green Building Council (USGBC)	LEED® Rating Systems[12]	Guideline
ASHRAE	ASHRAE 90.1 – Energy Standard for Sites and Buildings Except Low-Rise Residential Buildings	ANSI Standard
ASHRAE	ASHRAE/ICC/USGBC/IES 189.1–Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings	ANSI Standard
ASHRAE	ASHRAE 191–Standard for Water Balances and Efficiency in Mechanical and Process Systems (in development)	ANSI Standard
Green Building Initiative (GBI)	ANSI/GBI 01–Green Globes Assessment Protocol for Commercial Buildings	ANSI Standard
IAPMO	Water Efficiency and Sanitation Standard for the Built Environment (WE•Stand)	ANSI Standard
ICC	International Green Construction Code	Code

Most of these green building programs typically address water use and efficiency in one or more of the following areas[13]:

- Plumbing fixtures and fixture fittings
- Hot water distribution
- Appliances (e.g., clothes washers, dishwashers)
- Water treatment equipment (e.g., softeners, filtering systems)
- Landscape design and landscape irrigation

[10] Alliance for Water Efficiency (AWE). US Green Specifications for Indoor Fixtures and Appliances. www.allianceforwaterefficiency.org/resources/topic/us-green-specifications-indoor-fixtures-and-appliances.
[11] EPA's WaterSense program. *WaterSense Specification for Homes*. www.epa.gov/watersense/homes-specification#version2homes.
[12] U.S. Green Building Council (USGBC). LEED Rating System. www.usgbc.org/leed.
[13] AWE. Introduction to Green Building Guidelines and Standards. www.allianceforwaterefficiency.org/resources/topic/introduction-green-building-guidelines-and-standards.

- Pools, fountains, and spas
- Cooling towers
- Decorative and recreational water features
- Water reuse and alternate sources of water (e.g., gray water, rainwater and stormwater, cooling condensate and cooling tower blowdown, foundation drain water, others)
- Specialty processes, appliances, and equipment (e.g., foodservice, medical, laboratories, laundries, others)
- Water metering and submetering
- Single-pass cooling
- Vegetated green roofs
- Building water pressure

Water-Efficient Organizations and Businesses

In addition to programs that incentivize green products and buildings, several initiatives recognize organizations and businesses for efforts to reduce their environmental impact. Many of these programs have a multi-media scope, while others are specifically focused on water efficiency.

Similar to the information presented in *WaterSense at Work Section 1.2 Water Management Planning,* the International Organization for Standardization (ISO) 46001 *Water efficiency management systems—Requirements with guidance for use* standard provides a framework to help organizations understand their water use and identify, plan, and implement measures to achieve water savings through water management activities.[14] Organizations familiar with the ISO standards for quality management (ISO 9001), environmental management (ISO 14001), and/or energy management (ISO 50001) will find the structure of this standard similar.

Some programs can help businesses meet stakeholder demand for transparency and accountability, often called corporate social responsibility or ESG (environmental, social, and governance), where it falls in a corporate structure. In fact, many companies are reporting their environmental impacts voluntarily to organizations such as the Carbon Disclosure Project (CDP) Water Disclosure Project and CEO Water Mandate to demonstrate their commitment to the environment and goodwill toward the community in a more tangible way.[15,16,17] There has also been an increase in investor interest in the

[14] International Standards Organization (ISO). *ISO 46001 Water efficiency management systems—Requirements with guidance for use*. www.iso.org/standard/68286.html.
[15] Carbon Disclosure Project. Water. www.cdp.net/en/water.
[16] Pacific Institute, et al. September 2014. The CEO Water Mandate: Corporate Water Disclosure Guidelines Toward a Common Approach to Reporting Water Issues. https://ceowatermandate.org/files/Disclosure2014.pdf.
[17] United Nations (UN) Global Compact. CEO Water Mandate. https://ceowatermandate.org/.

environmental practices of companies, as well as their performance data, for use in investment decisions.[18]

In addition to disclosure, resources are available at the national, state, or local level that can assist companies or other organizations on the path to sustainability and reduced environmental impact. In addition to EPA's WaterSense program, one national example is DOE's Better Buildings Water Savings Network[19] which aims to assist facilities in reducing water use. Overall, facility managers who actively track their water use, implement water efficiency measures, and demonstrate savings can contribute to communications about their business' commitment to sustainability.

Several sector-specific programs are also available that focus on issues and challenges common across a particular sector. For example, there are certification programs or building challenges offered in many states or municipalities to promote green hospitality or green restaurants. These programs provide recognition or facilitate information sharing between participants.[20,21] These networks can provide expert advice to find new ways to implement water-efficiency initiatives—saving water, energy, and resources at the same time. Finally, water utilities may have programs to recognize local businesses that are making an extra effort to adopt water efficient practices. For example, the Certified Blue Restaurant Program, sponsored by Long Beach Water in California, provides technical assistance and recognizes restaurants that have achieved exceptional water efficiency.[22]

Reference Resources

If installing new or replacing existing water-using products or appliances, look for products that have the earned the WaterSense label or are ENERGY STAR certified. Check with local jurisdictions or utilities regarding any water-efficiency incentives or rebates they may offer. Both WaterSense and ENERGY STAR maintain lists of some utility partners' rebate programs.

- WaterSense Rebate Finder[23]
- ENERGY STAR Rebate Finder[24]

[18] Ceres. The Ceres Aqua Gauge: A Framework for 21st Century Water Risk. www.ceres.org/resources/reports/ceres-aqua-gauge-framework-21st-century-water-risk.
[19] U.S. Department of Energy Better Buildings®. Water Savings Network. https://betterbuildingssolutioncenter.energy.gov/special-initiatives/water-savings-network.
[20] Florida Department of Environmental Protection. Green Lodging Program. https://floridadep.gov/osi/green-lodging.
[21] Virginia Green. Virginia Green Travel. www.virginiagreen.net/.
[22] Long Beach Certified Blue Restaurant Program. https://blue.lbwater.org/.
[23] EPA's WaterSense program. WaterSense Rebate Finder. www.epa.gov/watersense/rebate-finder.
[24] ENERGY STAR. ENERGY STAR Rebate Finder. www.energystar.gov/rebate-finder.

The Database of State Incentives for Renewables and Efficiency® (DSIRE®) also maintains a list of state incentives.[25]

For new construction or major renovation projects, consider following recent national green building standards, codes, or voluntary guidelines. Compliance with these green building criteria can save water and be cost-effective, especially over the life cycle of the system or building. Some of these programs even offer certification or public recognition for conformance. For example, LEED certified buildings can be advertised and marketed with the LEED logo and appropriate rating, i.e., Certified, Silver, Gold, or Platinum.

Federal facilities have additional resources available to help reduce environmental impacts. While directed at federal agencies, most of the information is also relevant and useful for non-federal audiences. The General Services Administration's Sustainable Facilities Tool provides information on a wide variety of environmental topics for facility managers, procurement officials, leasing specialists, and project managers.[26] It covers new and existing buildings of all types during the design process, as well as the operations and maintenance phase of a building's life cycle.

Additional Resources

Alliance for Water Efficiency (AWE). Green Building. www.allianceforwaterefficiency.org/resources/green-building.

American Society of Heating, Refrigeration, and Air Conditioning Engineers. www.ashrae.org/.

American Society of Mechanical Engineers. Standards & Certification FAQ. www.asme.org/codes-standards/publications-information/faq.

Consortium for Energy Efficiency, Inc. www.cee1.org/.

ENERGY STAR. www.energystar.gov.

EPA's WaterSense program. www.epa.gov/watersense.

Green Building Initiative. www.thegbi.org/.

Institute for Market Transportation. Building Performance Standards. www.imt.org/public-policy/building-performance-standards/.

[25] North Carolina (NC) Clean Energy Technology Center. Database of State Incentives for Renewables & Efficiency (DSIRE). www.dsireusa.org/.
[26] U.S. General Services Administration. Sustainable Facilities Tool. www.sftool.gov/.

International Association of Plumbing and Mechanical Officials. *Water Efficiency and Sanitation Standard for the Built Environment (WE•Stand)*. www.iapmo.org/we-stand/.

International Code Council. *International Green Construction Code® (IgCC®)*. https://codes.iccsafe.org/content/IGCC2021P2.

International Standards Organization (ISO). *ISO 46001 Water efficiency management systems—Requirements with guidance for use*. www.iso.org/standard/68286.html.

United Nations (UN) Global Compact. CEO Water Mandate. https://ceowatermandate.org/.

U.S. Department of Energy (DOE), Federal Energy Management Program (FEMP). Federal Energy Management Laws and Requirements. www.energy.gov/femp/federal-energy-management-laws-and-requirements.

U.S. General Services Administration. Sustainable Facilities Tool. www.sftool.gov/.

U.S. Green Building Council. www.usgbc.org/.

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