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Green Building Update

Codes & Standards

Water Efficiency Provisions

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watersmart'14™
INNOVATIONS

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Maximum Performance

ANSI Standards

- What *is* an ANSI standard?
  - American National Standards Institute
    - Private, not-for-profit organization
  - "…promoting and facilitating voluntary consensus standards and ensuring their integrity"
  - ANSI is not a standards developer
  - Standards are not the law until legislated or adopted into code or regulation
- Many standards are not ANSI standards

“Green Building” Guidelines

- Numerous national green building GUIDELINES…
  - USGBC LEED Program: “LEED V.4”
  - U.S. EPA WaterSense for New Homes
  - CHPS - Collaborative for High Performance Schools
  - GGHC - Green Guide for Health Care™
  - Built Green™
  - Florida Water Star℠
  - Environments for Living® (Masco)
  - Build-it-Green™

NATIONAL GREEN BUILDING STANDARDS, CODES, & GUIDELINES
with water use efficiency provisions

	Applications	Guidelines, code or standard?	Code-adoptable language?	Minimum thresholds or points?	Status
California: CalGreen	Residential & non-residential	**Code**	Yes	Minimum thresholds	Became effective in 2011; continuing development & expansion
USGBC LEED-NC et.al.	All except Single Family Residential	Guidelines	No	Prerequisite + points	LEED v.4 mandates 20% reduction from baseline; other significant changes
USGBC LEED-Homes	Single Family Residential (SFR)	Guidelines	No	Both	Active – being updated
Green Globes – Green Bldg Initiative 01-200XP	Residential above 3 stories + all commercial	**ANSI Standard**	Yes	Points	Final standard ANSI-approved; published in April 2010; update process beginning in 2014
ASHRAE SS189.1 – High Performance Buildings	Residential above 3 stories + all commercial	**ANSI Standard**	Yes	Minimum thresholds	Final standard ANSI-approved; published in January 2010; version 2 released 2011; now in sustaining process
ASHRAE S191P – Water Efficiency	All except SFR	**ANSI Standard**	Yes	Minimum thresholds	First public comment period completed; revised draft to be released for second public comment period in 2014
ICC 700 - NAHB Green Bldg Standard for Homes	Residential	**ANSI Standard**	Yes	Points	Final standard ANSI-approved; published in Jan 2009 as ICC-700
IAPMO Green Plumbing & Mechanical Code Supplement	Residential above 3 stories + all commercial	**Code**	Yes	Minimum thresholds	Final version 2 released In April 2012; version 3 programmed for 2015
ICC Green Construction Code	Residential above 3 stories + all commercial	**Code**	Yes	Minimum thresholds	Final (first) version released March 2012; now finalizing 2015 version
U.S. EPA WaterSense for New Homes	Residential	Guidelines	No	Minimum thresholds	Final specification issued in December 2009

NATIONAL GREEN BUILDING STANDARDS, GUIDELINES & CODES
Comparison of specific water use efficiency provisions – maximum water use

PLUMBING: TOILETS & URINALS	CalGREEN[1] (provisions effective Jan 1, 2014)	LEED V.4 July 2014	ASHRAE SS189.1[1] (v.2-2011)	ASHRAE S191P (Public review draft v.1)	ICC 700-2008 (with NAHB)	IAPMO Green Plumbing & Mech Code Supplement (v.2-2012)	ICC Green Code (v.1 Final-2012)
Residential toilets OR "private" setting in commercial – **FLUSHOMETER TYPE** (gals per flush)	HET: 1.28g[2]	*No individual maximums specified.* *Mandatory to reduce aggregate water consump-tion by at least 20% from "baseline"*	HET: 1.28g[2]	HET: 1.28g[2]	HET: 1.28g	HET: 1.28g[2]	HET: 1.28g[2]
Residential toilets – **TANK TYPE** (gallons per flush)	HET: 1.28g[2] + WaterSense		HET: 1.28g[2] + WaterSense	HET: 1.28g[2] + WaterSense		HET: 1.28g[2] + WaterSense	HET: 1.28g[2] + WaterSense
Commercial toilets "public" setting and remote[3] (gals/flush)	HET: 1.28g[2] Tank-type must comply with WaterSense		HET: 1.28g[2] Tank-type must comply with WaterSense	HET: 1.28g[2] Tank-type must comply with WaterSense		1.6g[4]	1.6g[4]
Commercial toilets – "public" setting and non-remote (gallons/flush)						HET: 1.28g[2]	HET: 1.28g[5]
Flushing urinals (gallons per flush)	HEU: 0.5 gpf		HEU: 0.5 gpf	HEU: 0.5g + WaterSense	HEU: 0.5 gpf	HEU: 0.5g + WaterSense	HEU: 0.5g + WaterSense
Non-water urinals	Permitted		Permitted	Permitted		Permitted; requires upstream discharges to drain from other fixtures or fittings	

[1] Prescriptive option only

NATIONAL GREEN BUILDING STANDARDS, GUIDELINES & CODES
Comparison of specific water use efficiency provisions – maximum water use

PLUMBING: FAUCETS & SHOWERS	CalGREEN[6] (provisions effective Jan 1, 2014)	LEED V.4 July 2014	ASHRAE SS189.1[1] (v.2-2011)	ASHRAE S191P (Public review draft v.1)	ICC 700-2008 (with NAHB)	IAPMO Green Plumbing & Mech Code Supplement (v.2-2012)	ICC Green Code (v.1 Final-2012)
Residential & commercial "private" lavatory faucets (gallons/minute)	1.5 gpm[7]	*No individual maximums specified.* *Mandatory to reduce aggregate water consumption by at least 20% from "baseline"*	1.5 gpm + WaterSense[8]	1.5 gpm + WaterSense	1.5 gpm	1.5 gpm + WaterSense[7]	1.5 gpm + WaterSense[7]
Commercial & non-residential "public" lavatory faucets (gals/min.)	0.5 gpm[9]		0.5 gpm	0.5 gpm		0.5 gpm	0.5 gpm
Commercial kitchen & bar sink faucets (gallons per minute)	1.8 gpm[10]		Hands-free in food prep area & in dish room of comm'l kitchen				2.2 gpm[11]
Commercial metering faucets (gallons per cycle[12])	0.20 gpc		0.25 gpc	0.25 gpc		0.25 gpc	0.25 gpc
Residential kitchen faucets (gallons per minute)	1.8 gpm; allows temporary override to 2.2 gpm		2.2 gpm	2.2 gpm		1.8 gpm; allows temporary override to 2.2 gpm	2.2 gpm
Residential showerheads (gallons per minute)	2.0 gpm + WaterSense		2.0 gpm	2.0 gpm	2.5 gpm	2.0 gpm	2.0 gpm + WaterSense
Non-residential showerheads (gallons per minute)	2.0 gpm + WaterSense						

[6] Prescriptive option only

NATIONAL GREEN BUILDING STANDARDS, GUIDELINES & CODES
Comparison of specific water use efficiency provisions – maximum water use

PLUMBING: MISCEL-LANEOUS	CalGREEN[1] (provisions effective Jan 1, 2014)	LEED V.4 July 2014	ASHRAE SS189.1 [1] (v.2-2011)	ASHRAE S191P (Public review draft v.1)	ICC 700-2008 (with NAHB)	IAPMO Green Plumbing & Mech Code Supplement (v.2-2012)	ICC Green Code (v.1 Final-2012)
Residential shower valve (automatic compensating valve)						Meet ASSE 1016 OR ASME A112.18.1/CSA B125.1 for temp control when tested at 2.0 gpm	
Tub spout diverter leakage (gallons per minute)	0.01 gpm when new; 0.05 gpm after 15,000 cycles[2]					0.1 gpm	0.1 gpm
Commercial pre-rinse spray valve (gallons per minute)		1.3 gpm	1.3 gpm	1.3 gpm + WaterSense		1.3 gpm with auto shut-off	1.3 gpm with auto shut-off
Drinking fountain – manual (gallons per minute)						Auto shut-off	0.7 gpm with auto shut-off
Drinking fountain – metered (gallons per cycle)							0.25 gpc

NATIONAL GREEN BUILDING STANDARDS, GUIDELINES & CODES
Comparison of specific water use efficiency provisions – maximum water use

Appliances, Equipment, Irrigation & Alternate Water	CalGREEN (provisions effective Jan 1, 2014)	LEED V.4 July 2014	ASHRAE SS189.1 (v.2-2011)	ASHRAE S191P (Public review draft v.1)	ICC 700-2008 (with NAHB)	IAPMO Green Plumbing & Mech Code Supplement (v.2-2012)	ICC Green Code (v.1 Final-2012)
Residential dishwashers (total water per full cycle)	*(defers to Calif Energy Commiss'n)*	Energy Star	Energy Star & 5.8 gal – 22L	Energy Star & 5.8 gal – 22L	Energy Star	Energy Star	Energy Star
Residential clothes washers (water factor maximum)		Energy Star	Energy Star & WF of 6.0 gal – 23L	Energy Star & WF of 6.0 gal – 23L	Energy Star	Energy Star	Energy Star & WF of 6.0 gal – 23L
On-site reclaimed water (incl. graywater) treatment systems	*(future)*	Metered	Encouraged through the treatment and use of alternate (non-potable) sources of water		Points available for use of alternate sources	Specific provisions for equipment installation & water treatment	NSF 350 listed
Rainwater capture	*(future)*						Included
Landscape irrigation	Weather-based or soil moisture sensor-based irrigation controller req'd for landscape >1,000 sf	30% - 50% reduction from base-line calculated via WaterSense water budget tool	ET-based; smart technology; restrictions on turf		Non-mandatory provisions; some turf restrictions	75% of irrig needs satisfied with water from alternate sources; if controller used, smart controller reqd; other specific landscape provisions	If automatic irrig controller used, smart controller reqd; alternate non-potable water sources encouraged; other specific landscape provisions
Water features (fountains, etc.)		Metered	Use alternate water sources (non-potable) where available; recirculation required			Use alternate water sources (non-potable) where available	Use alternate (non-potable) water source; potable water use OK for small features.
Commercial clothes washers in <u>public access</u>: common area laundry rooms, hotels, laundromats (water factor max.)		CEE Tier 3A	Energy Star & WF of 7.5 gal (1 kL/m^3)			Energy Star where applicable	
Commercial clothes washers – all others without public access (water use maximum)		1.8 gal per pound (on-premise)	WF of 8.0 gal				

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Residential water softeners						Permitted where water hardness ≥ 8 grains/gallon; demand-initiated regeneration reqd; max water use 5 gal (19L) per 1K grains of hardness removed; salt efficiency exceeding 3400 grains of total hardness removed per kg of salt; NSF 44 listed	Demand-initiated regeneration reqd; max water use 5 gal (19L) per 1K grains of hardness removed; salt efficiency no less than 4000 grains of total hardness removed per kg of salt; NSF 44 listed
Reverse osmosis water treatment system		75% recovery req'd				NSF 58 listed; auto shut-off	
Water-powered pumps						Water-powered sump pumps prohibited, except for emergency; emergency pumps shall be at least 58% efficient	Water-powered sump pumps prohibited, except for emergency; emergency pumps shall be at least 67% efficient
Automated vehicle wash facilities						Make-up water restrictions: In-bay-40gal/vehicle; Conveyor & express type-35gal/vehicle; spray wands & foamy brushes-3.0 gpm	50% water reuse; other water restricted as follows: In-bay-40gal/vehicle; Conveyor & express type-35gal/vehicle
Self-service vehicle wash facilities							Spray wands: 3.0 gpm

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Metering and Sub-metering	CalGREEN (provisions effective Jan 1, 2014)	LEED V.4 July 2014	ASHRAE SS189.1 (v.2-2011)	ASHRAE S191P (Public review draft v.1)	ICC 700-2008 (with NAHB)	IAPMO Green Plumbing & Mech Code Supplement (v.2-2012)	ICC Green Code (v.1 Final-2012)
Metering tenant water use (usage in gallons per day)	Where non-residential tenant usage >100g + all bldgs where >1000g		Tenants or buildings where >1,000 g	Tenants or buildings where >1,000 g		Where tenant use = >500 g/day **OR** high-use occupancy **OR** total bldg area >50K sq.ft.	Where usage >1,000 g/day
Meter reclaimed water		Required					
Sub-metering process water use – industrial/commercial (usage in gals per day)		Sub-meter at least 80% of process water, including pools	Where usage >1,000 g	Where usage >1,000 g		All where usage >1,000 g	Industrial usage >1,000 g
Sub-metering ornamental water features, swimming pools, in-ground spas			Make-up water supply to all ornamental water features	Make-up water supply lines		Make-up water supply to swimming pool	Make-up water supply lines
Sub-metering cooling towers			Towers of >500 gpm flow (thru-put): make-up & blow-down water supply lines	Towers of >500 gpm flow (through-put)		Make-up water supply	Towers of 100 tons or greater: make-up and blow-down water supply lines
Sub-metering evaporative coolers			Where use in excess of 0.6 gpm: meter make-up water supply	Where use in excess of 0.6 gpm: meter make-up water supply		Where cooler has air flow in excess of 30K cfm	Where use in excess of 0.6 gpm: meter make-up water supply
Sub-metering evaporative condensers						Make-up water supply	
Sub-metering fluid coolers							

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Sub-metering boilers		Make-up water supply to boilers: drawing more than 100K gallons annually **or** rated at 500K Btu/hr or more	Steam & hot water boilers rated at 500K Btu/hr or more	Steam & hot water boilers rated at 500K Btu/hr or more		Make-up water supply to boilers collectively exceeding 1 mil Btu/hr	Make-up water supply to boilers: drawing more than 100K gallons annually **or** rated at 500K Btu/hr or more
Sub-meter indoor plumbing fixtures & fittings		Required. Alternate path of calculated use is provided.					
Sub-meter domestic hot water		Meter at least 80% of domestic hot water					
Sub-meter health care processes		Meter process water systems, e.g. purified water, dietary dept., laundry, labs, physio-therapy/hydrotherapy, surgical & hydronics					
Sub-metering irrigation	Where non-residential landscape >1,000 sq.ft.**	Meter at least 80% of irrigated landscape, excluding Xeriscaping and native vegetation	Where total irrigated landscape >25,000 sq.ft.	Where total irrigated landscape >5,000 sq.ft.		Yes, >2,500 sq.ft. irrig landscape	Yes, all irrig systems that are automatic
Building Meter Data Management System			Require remote data communication to central system, recording hourly consumption data			Requires means of communicating metered water data to user; direct connection to central building system not required	Meters must be capable of con-necting & communi- cating water use data; direct connec-tion to central bldg system not req'd

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Commercial Food Service	CalGREEN (provisions effective Jan 1, 2014)	LEED V.4 July 2014	ASHRAE SS189.1 (v.2-2011)	ASHRAE S191P (Public review draft v.1)	ICC 700-2008 (with NAHB)	IAPMO Green Plumbing & Mech Code Supplement (v.2-2012)	ICC Green Code (v.1 Final-2012)
Commercial food service – cubed ice makers	*(defers to Calif Energy Commission on food service appliances)*	Energy Star (or equiv.)	Energy Star (air cooled)	Energy Star (air cooled)		Energy Star (air cooled)	Energy Star (air cooled)
Commercial food service – all other ice makers not covered by Energy Star							25 gal per 100 lbs. of ice produced; air cooled
Commercial food service – connectionless steam cooker (gal per hour)		2.0 to 6.0g per pan (cook-to-order = 5 to 10g per pan max)	2.0g	2.0g per pan		5.0g per pan	2.0g per pan
Commercial food service – connected steam cooker (max gals per hour)						5.0g per pan	5.0g per pan
Commercial food service – dishwashers (max gallons)		Energy Star + 0.9 to 1.6 gal per rack depending on type; Rackless flight-type DWs = 180 gal/hr max	Energy Star	Energy Star where applicable; Rackless flight-type DWs = 160 gal/hr maximum		Energy Star	Energy Star OR 2.2 gal/rack OR 2.2 gpm for rackless
Commercial food service – combination ovens (max gallons/hr)		1.5 to 3.5 g per pan	10g	3.5 g per pan		3.5 g per pan	3.5 g per pan
Commercial food service – dipper wells (gallons per minute)				Max flow per minute equal to the capacity of the DW, not to exceed 1.0 gpm		Max flow per minute equal to the capacity of the DW, not to exceed 2.2 gpm	1.0 gpm
Commercial food waste disposers (max gals per minute)		No load: 1.0 g Full load: 3.0 to 8.0 g					No load: 1.0 g Full load: 8.0 g
Commercial food scrap collector or pulper (max gallons/minute)		2.0 g					

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Commercial pre-rinse spray valve (gallons per minute)		1.3 gpm	1.3 gpm	1.3 gpm		1.3 gpm with auto shut-off	1.3 gpm with auto shut-off
Commercial kitchen faucets (gallons per minute)	1.8 gpm; allows temporary override to 2.2 gpm		Hands-free in food prep area & in dish room of comm'l kitchen	Hands-free in food prep area & in dish room of comm'l kitchen			2.2 gpm

Key points…

- ✓ Many national standards...many national codes
  - ALL are written in “code adoptable” language
  - ALL are different!
  - All or a part of each can be adopted into local ordinances
- ✓ Proliferation of other “local” and “regional” guidelines and codes…
  - Confuses the public and industry
  - Leads to less-than-optimum requirements
  - Wastes resources - time and money

Plan of Action…

(for water-efficiency practitioners & advocates)

- There is more to “green” life than toilets, urinals, and smart controllers!!
- Become familiar with the provisions of the standards and codes
- Encourage your local authorities to incorporate or reference existing national standards/codes…
  - …either all or in part
  - …instead of developing their own codes and guidelines without recognizing work already done!

Thank you…

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