DOCKETED		
Docket Number:	22-AAER-05	
Project Title:	Appliance Efficiency Regulations for Water Closets	
TN #:	260694	
Document Title:	Workshop Presentation Slides on Water Closets	
Description: Staff presentation slides for the December 18, 2024 water closets workshop.		
Filer:	Jessica Lopez	
Organization:	California Energy Commission	
Submitter Role:	Commission Staff	
Submission Date:	12/18/2024 8:51:27 AM	
Docketed Date:	12/18/2024	



Water Closets

Staff Workshop on Proposed Appliance Efficiency Standards

December 18, 2024 11:00 AM to 1:00 PM PST



Time	Торіс	Presenter
11:00 am	Welcome	David Johnson, Supervisor
11:05 am	Opening Remarks	David Hochschild, Chair
11:20 am	Additional Remarks	Peter Strait, Branch Manager
11:25 am	Logistics	David Johnson, Supervisor
11:30 am	Overview of Proposed Standards	Jessica Lopez, Project Lead
12:15 pm	Public Comments	Jessica Lopez
01:00 pm	Adjourn	



David Hochschild

Chair California Energy Commission





Peter Strait

Appliance Efficiency Branch Manager



- All lines are muted
- · Comments will be taken at the end of the presentation
- For general clarifying question type your question in the Q&A section
- To comment raise hand to speak
 - Online: Raise your hand, host will give you the ability to speak, then caller must push unmute
 - Cell phone: Raise your hand by pushing *9, host will give you the ability to speak, then caller must push *6 to mute and unmute
- This workshop will be recorded
- State your name and affiliation when speaking



Overview of Staff's Analysis of Proposed Efficiency Standards for Water Closets

Staff Presentation by

Jessica Lopez



Rulemaking History

Overview of Proposed Standards

Staff Analysis: Market Availability & Technical Feasibility

Staff Analysis: Cost Effectiveness & Statewide Savings

Environmental Impacts & Benefits

Next Steps

Public Comments



Rulemaking History





Pre-Rulemaking History of Water Closets (Toilets)

On October 12, 2022, CEC adopts Order Instituting Rulemaking (OIR) On December 14, 2022, CEC releases Request for Information (RFI) and Invitation to Submit Proposals (ITSP) On November 6, 2024, CEC publishes Draft Staff Report for Water Closets

Current Status in Rulemaking Process





Overview of Proposed Standards





Title 20 Appliance Efficiency Regulations

- 1601 Scope
- 1602 Definitions
 - 1603 Testing: All Appliances
- 1604 Test Methods for Specific Appliances
- 1605 Energy Performance, Energy Design, Water Performance, and Water Design Standards
 - 1605.1 Federal & State Standards for Federally-Regulated Appliances
 - 1605.2 State Standards for Federally-Regulated Appliances
 - 1605.3 State Standards for Non-Federally-Regulated Appliances
- 1606 Filling By Manufacturers; Listing of Appliances in MAEDbS
- 1607 Marking of Appliances
- 1608 Compliance, Enforcement, and General Administrative Matters
- 1609 Administrative Civil Penalties







Proposed Term Updates

- "blowout toilet" to "blowout water closet."
- "electromechanical hydraulic water closet" to "power-assisted water closet."
- "flushometer tank water closet" to "pressure-assisted water closet."
- "vacuum-type water closet" to "vacuum-assisted water closet."

Proposed Modifications/Additions

- Flushometer tank definition modified to align with DOE.
- Adding a definition for flushometer valve water closets.
- Water closet definition modified to closely align with DOE and ASME 112.19.2.



Existing Test Procedure

• Federal Test Procedure:

10 CFR Section 430.23(u) — Appendix T to Subpart B of Part 430, which references **Sections 7.1.1** (including Table 5), 7.1.2, 7.1.3, 7.1.4, and 7.1.5 of ASME A112.19.2/CSA B45.1 Version 2018, *Ceramic Plumbing Fixtures*.

Proposed Updates

 No Changes to Federal Test Procedure



Existing Test Procedure

California State Test Procedure:

Waste extraction test, **Section 7.10** of ASME A112.19.2/CSA B45.1, Version 2013, *Ceramic Plumbing Fixtures*.

Proposed Updates

- Sections of ASME A112.19.2/CSA B45.1 Version 2018:
 - Section 7.5 Granule and ball test
 - $_{\odot}$ Section 7.6 Surface wash test
 - Section 7.7 Drain line transport characterization test
 - \circ 7.8 Overflow test
 - $_{\odot}$ 7.9 Waste extraction test
 - Section 7.12 and 7.13
 Adjustability tests



Staff proposes that test lab reports include the reporting requirements specified in:

- CCR, Title 20, Section 1606, Table X
- Each of the following sections of ASME A112.19.2/CSA B45.1-2018:
 Section 7.5 Granule and ball test

Section 7.6 Surface wash test

Section 7.7 Drain line transport characterization test

- Section 7.8 Overflow test (for gravity tank-type water closets only)
- \circ Section 7.9 Waste extraction test
- Section 7.12 or 7.13 Adjustability tests (for gravity tank-type water closets only)





Proposed Effective Date: December 1, 2026, or one year from the adoption date.



Additions

- Water closet type (one- or two-piece)
- Flush type (single or dual)
- Tank model number (two-piece water closets only)
- Bowl model number (two-piece water closets only)
- Reduced flush volume (dual-flush water closets only)
- Full flush volume

Additions for Transition/Restructuring

- Dual-flush effective flush volume
- Urinal flush volume



Replacements

- Electromechanical hydraulic water closet to power-assisted water closet
- Flushometer tank water closet to pressure-assisted water closet
- Vacuum-type water closet to vacuum-assisted water closet

Removed

- Water Consumption (dual-flush effective volume for dual-flush water closet)
- Waste extraction value (grams)
- Passes waste extraction test (True, False)



Staff Analysis: Market Availability & Technical Feasibility



Market Availability: Single-Flush

- Most single-flush toilets have a flush volume of 1.28 gpf
- Second highest of number of single-flush toilets have a flush volume of 1 gpf
 - Fraction of compliant models: 16.4%
- Similar results with data from California's MAEDbS
 - Fraction of compliant models: 13.0%



Chart 1: Single-Flush Toilets by Flush Volume

Source: U.S. EPA Water Sense

Market Availability: Dual-Flush

 The shaded area demonstrates the number of models that would meet the proposed efficiency standard for dual-flush toilets — a full-flush volume of 1.28 gpf and a reducedflush volume of 0.8 gpf

 Fraction of compliant models: 15.5%

- Similar results with the data from California's MAEDbS
 - Fraction of compliant models: 14.0%



Chart 2: Dual-Flush Toilets by Flush Volume

Source: U.S. EPA Water Sense

Technical Feasibility – Part 1

- Presumably, manufacturers complete all performance criteria in ASME A112.19.2/CSA B45.1 to ensure their products can be:
 - Registered to U.S. EPA
 WaterSense
 - $\circ\, \text{Receive}$ a MaP score
 - Can be installed in California residential and commercial applications
 - Marketed as ASME-certified

Table 1: Performance Criteria for Water Closets

ASME A112.19.2/CSA B45.1 Performance Criteria	Federal Regulations	California's Title 20 Appliance Efficiency Regulations	U.S. EPA WaterSense	MaP Test Protocol (By Reference)	CALGreen & California Plumbing Code (By Reference)
Water Consumption Test	Yes	Yes	Yes	Yes	Yes
Granule and Ball Test	No	No	Yes	Yes	Yes
Surface Wash Test	No	No	Yes	Yes	Yes
Drain Line Transport Characterization Test	No	No	Yes	Yes	Yes
Overflow Test	No	No	Yes	Yes	Yes
Waste Extraction Test	No	Yes	Yes	Yes	Yes
Adjustability Test	No	No	Yes	Yes	Yes

Technical Feasibility – Part 2

This graph illustrates the 409 MaP premium models listed in MaP database, both single-flush toilets (269 models) and dual-flush toilets (140 models), that exceed the minimum waste extraction test in ASME A112.19.2/CSA B45.1 Version 2018.

Chart 3: MaP Premium Models



Technical Feasibility – Part 3

Drainline Transport in Residential Applications

- No clogging issues for pressureassisted water closets with a flush volume of **1.0 gpf** – U.S EPA WaterSense (2006)
- No clogging issues for water closets with a flush volume with as little as 0.8 gpf – PERC Study (2016)

Drainline Transport in Commercial Applications

 Water closets less than or equal to 1.0 gpf not recommended for applications with long horizontal drains and without supplemental water flow – PERC Study (2016)



Staff Analysis: Cost Effectiveness & Statewide Savings





Table 2: Incremental Costs

Compliancy	Average Cost of Single-Flush Toilets (\$/unit)	Average Cost of Dual-Flush Toilets (\$/unit)
Non-compliant	\$314	\$320
Compliant	\$312	\$306
Incremental Cost	\$O	\$O

Table 3: Costs and Lifetime Benefits

Toilet Type	Incremental Cost (\$/unit)	Lifetime Monetary Savings (\$/unit)	NPV Lifetime Benefit (\$/unit)
Single-Flush	\$0	\$147	\$103
Dual-Flush	\$0	\$262	\$183



Table 4: Statewide Savings for Single-Flush and Dual-Flush Toilets (Growth Rate Scenario)

Year	First-Year (2026)			Full-Stock Turnover (2050)		
Toilet Type	Water Savings (Mgal/year)	Embedded Energy Savings (GWh/year)	Monetary Savings (M\$)	Water Savings (Mgal/year)	Embedded Energy Savings (GWh/year)	Monetary Savings (M\$)
Single-Flush	567	3	\$7	12,157	66	\$146
Dual-Flush	76	1	\$1	3,745	20	\$45
Total	643	4	\$8	15,902	86	\$191

The market share of dual-flush toilets is 7 percent in the year 2026 and will reach 19 percent in 2050.



Environmental Impacts & Benefits





Impact on Wastewater Treatment – Part 1

- 61% of wastewater treatment facilities and 62% of wastewater collection facilities would potentially experience lower or more concentrated flows by 2030 when the indoor water use standard is lowered to 42 gpcd (gallons per capita per day).
- Treatment facilities with a **capacity of 0-5 MGD** and collection facilities that serve a **population of less than 50,000 people** are most affected.
- **44% of wastewater agencies** have experienced flow volumes equivalent to 42 gpcd for three years or longer.
- **Drought** can exacerbate ongoing issues at wastewater treatment facilities and collection systems.



- Mitigation and adaptation strategies include:
 - \odot Modernizing an aging infrastructure
 - Coating or replacing pipes to reduce corrosion and improve flow
 - $\ensuremath{\circ}$ Improving monitoring technology
 - o Adding pumping or distribution piping to improve process flexibility
 - Changing ratings for wastewater treatment facilities to be based on mass loading rather than flow
 - O Updating treatment processes to adapt to future influent flows and concentration changes

Sources:

California Department of Water Resources. 2020. *Appendices for the Residential Water Use Study*. Sacramento. <u>https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/regs/water_efficiency_legislation.html#reg-docs</u>. California State Water Resources Control Board. 2022. *Water Board Staff Preface to Task 5 Report*. Sacramento. <u>https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/regs/water_efficiency_legislation.html#reg-docs</u>.



- Extreme water conservation efforts during major drought events can be lessened through water efficiency efforts.
- Reducing water consumption has several benefits:
 - Reducing the amount of energy associated with extracting, treating, and distributing water
 - Reducing the demand for available and shrinking water supplies.
 - Improving air quality through reduced energy requirements for pumping.



Source: CALIFORNIA'S WATER SUPPLY STRATEGY Adapting to a Hotter, Drier Future, 2022, California State Agencies



Next Steps









Public Comments



Written & Oral Comments

- Comments are due by 5:00 p.m. on February 5, 2025
- Oral comments will be accepted at the end of the workshop today
- To submit electronically:

 Go to <u>https://efiling.energy.ca.gov/EComment/EComment.aspx?docketnumber=22-</u> <u>AAER-05</u>

- To send a digital copy, email to: <u>docket@energy.ca.gov</u> with docket number 22-AAER-05 and "Rulemaking on Appliance Efficiency Regulations for Water Closets" in subject line
- To send a hard copy, mail to:

California Energy Commission Docket Unit, MS-4 Docket No. 22-AAER-05 715 P Street Sacramento, California 95814



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Thank You!

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