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This program is funded by California utility customers and administered by Pacific Gas and Electric Company, San Diego Gas & Electric Company (SDG&E®), and Southern California Edison Company under the auspices of the California Public Utilities Commission and in support of the California Energy Commission.

Factsheet on UPC Appendix M “Peak Water Demand Calculator”

The purpose of this factsheet is to provide information about an opportunity to adopt into a plumbing code an alternative methodology for sizing water pipes in new residential buildings as prescribed in 2021 Uniform Plumbing Code (UPC) Appendix M “Peak Water Demand Calculator.”

Scope of 2021 UPC Appendix M	2021 UPC Appendix M provides a method for estimating the demand load for the building water supply and principal branches for single family and multifamily dwellings with water-conserving plumbing fixtures, fixture fittings, and appliances.
Background	<p>Key points about UPC Appendix M “Peak Water Demand Calculator”:</p> <ul style="list-style-type: none"> • Peer-reviewed alternative pipe sizing methodology that was developed in response to the increased prevalence of low-flow fixtures in California and other states. • Culmination of a multi-year project, 2011- 2017, sponsored by the International Association of Plumbing and Mechanical Officials (IAPMO). • First major update of water pipe sizing in buildings in over 80 years. • Available as an Excel-based tool. • Added as Appendix M “Peak Water Demand Calculator” to 2018 IAPMO UPC for the first time; Appendix M was approved to remain in 2021 UPC.
Benefits	<p>Using 2021 UPC Appendix M “Peak Water Demand Calculator” to size water pipes results in:</p> <ul style="list-style-type: none"> • Reduced public health and safety risk and improved water quality due to shorter water dwell times in premise plumbing systems. • Water and embedded energy savings due to faster hot water delivery times. • Additional energy savings due to decreased heat loss in distribution system, particularly in multifamily buildings with a recirculation system. • Construction cost savings due to smaller diameter pipes and fittings, less pipe insulation material, and reduced water service entrance size. <p>Water savings from applying UPC Appendix M will support California Water Conservation statutes, 2018 AB 1668 and SB 606. These statutes established targets for indoor residential water use of 55 gallons per capita per day (gpcd) starting in 2022, 52.5 gpcd – in 2025, and 50 gpcd – in 2030.</p>
Adoption in CA	<ul style="list-style-type: none"> • In 2019 California Plumbing Code (CPC) code cycle, 2018 UPC was adopted but not its Appendix M. • Effective with the 2019 CPC edition, three cities in California – Foster City, San Jose, and Stockton – adopted the voluntary use of Appendix M. • The California Energy Commission is considering incorporating a new credit in 2022 Compliance Software (CBECC-Res) for projects using UPC Appendix M for pipe sizing in multifamily dwellings. • Local jurisdictions in California can adopt 2021 UPC Appendix M within their jurisdiction; California statewide adoption will remove the need for this additional step.
Adoption Status Outside of CA	<ul style="list-style-type: none"> • In 2018, State of Nevada adopted UPC Appendix M into 2018 Nevada Plumbing Code. • In 2020, State of North Dakota adopted UPC Appendix M into 2018 North Dakota Plumbing Code (effective April 1, 2020). • In 2021, State of Oregon adopted UPC Appendix M into 2021 Oregon Plumbing Specialty Code (effective April 1, 2021). • In 2021, City of Seattle and King County, Washington, adopted UPC Appendix M into 2018 Seattle Plumbing Code. • State of New Mexico is considering the adoption of UPC Appendix M into 2021 New Mexico Plumbing Code.

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- More Information**
- **2021 UPC, Appendix M** “Peak Water Demand Calculator”
<http://epubs.iapmo.org/2021/UPC/#p=453>
<https://www.iapmo.org/water-demand-calculator/>
 - **2017 Study** on Peak Water Demand by S. Buchberger et al. (basis for Water Demand Calculator)
<https://www.iapmo.org/media/3857/peak-water-demand-study-executive-summary.pdf>
 - **2020 Study** on Water Demand Calculator by Stantec (assessment of cost savings from using Water Demand Calculator)
<https://www.iapmo.org/group/update/stantec-wdc-savings-study>
https://www.iapmo.org/media/25276/water_demand_calculator_report_summary.pdf
 - **2021 Report** on Connection Fees and Service Charges by Meter Size by Alliance for Water Efficiency (assessment of cost savings from downsizing meters)
<https://www.iapmo.org/media/25939/awe-meter-size-connection-fee-research.pdf>
 - **Case Study** on Applying Water Demand Calculator on a Project in the State of New York
<https://www.phcpropros.com/articles/11971-practically-perfect-plumbing-in-multifamily>
 - **Training Presentation** on How to Use Water Demand Calculator from 2017 IAPMO Annual Conference
<https://youtu.be/TWKPFt1pu3U>
 - Adoption of UPC Appendix M into **Foster City** Municipal Code
<https://www.codepublishing.com/CA/FosterCity/?FosterCity15/FosterCity1516.html&?>
 - Adoption of UPC Appendix M into **San Jose** Municipal Code
https://library.municode.com/ca/san_jose/codes/code_of_ordinances?nodeId=TIT24TECO_CH24.04PLCO_PT1ADCPPR
 - Adoption of UPC Appendix M into **Stockton** Municipal Code
<https://qcode.us/codes/stockton/> (Title 15, Chapter 15.16)
 - Adoption of UPC Appendix M into 2018 **Seattle** Plumbing Code
<https://www.seattle.gov/Documents/Departments/SDCI/Codes/PlumbingCode/2018SeattlePlumbingCode.pdf>
 - Adoption of UPC Appendix M into 2018 **Nevada** Plumbing Code
<https://up.codes/viewer/nevada/upc-2018/chapter/M/peak-water-demand-calculator#M>
 - Adoption of UPC Appendix M into 2018 **North Dakota** Plumbing Code
<https://casetext.com/regulation/north-dakota-administrative-code/title-62-state-board-of-plumbing/article-62-031-plumbing-installation-standards/chapter-62-031-01-administration/section-62-031-01-01-effective-412020conformance-with-the-north-dakota-plumbing-code>
 - Adoption of UPC Appendix M into 2021 **Oregon** Plumbing Specialty Code
<https://epubs.iapmo.org/2021/OPC/>
 - Consideration of Adoption of UPC Appendix M into 2021 **New Mexico** Plumbing Code
https://www.rld.nm.gov/wp-content/uploads/2021/10/2021-09-23-Plumbing-Code-2021-14.8.2-FINAL_Review2DB-FINAL.pdf
 - **2018 California Water Conservation statutes** AB 1668 and SB 606
https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/california_statutes.html
 - **2022 California Energy Code** (2022 Title 22, Part 6), Proposed Measure C “CPC Appendix M Sizing”
<https://title24stakeholders.com/measures/cycle-2022/multifamily-domestic-hot-water/>
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