DEPARTMENT OF ADMINISTRATIVE SERVICES

PROPOSED CHANGE OF THE CONNECTICUT STATE BUILDING CODE AND FIRE SAFETY CODE

DATE SUBMITTED: 5/28/2021

CODE INFORMATION

Proposed change to: ☑ Building Code ☐ Fire Safety Code

Code section(s): International Residential Code - Appendix AP

PROPONENT INFORMATION

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PROPOSAL INFORMATION

Description of change and reason for change (attach additional information as needed):

Add reference to IAPMO's Peak Water Demand Calculator (WDC) from the 2020 Water Efficie

Proposed text change, addition or deletion (attach additional information as needed):

Amend Appendix AP, Section AP101.1.1 and add new Sections AP301.1 and AP301.2 (See A

Supporting data and documents (attach additional information as needed)

Attached supporting documents include: Water Demand Calculator Overview, Stantec WDC St

☐ **This Proposal is original material.** (Note: Original material is considered to be the submitter's own idea based on or as a result of his/her own experience, thought or research and, to the best of his/her knowledge, is not copied from another source.)

☑ **This Comment is not original material, its source (if known) is as follows:** (such as material / code development proposal from a prior development cycle or proposal submitted to model code committee etc.)

IAPMO's Peak Water Demand Calculator is codified in both the Unifom Plumbing Code, Ap

☐ **I would like to make an in-person presentation of my proposal.**

Release

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Proponent's Signature

Printed Name

PLEASE EMAIL (PREFERRED) TO DAS.CodesStandards@CT.GOV OR MAIL OR FAX (SEE BELOW)

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CT Codes & Amendments - Proposed Amendment to 2021 IRC

APPENDIX AP
Sizing of Water Piping System

Section AP101 General
AP101.1 Scope.
AP101.1.1 ~~Two~~ Procedures This Appendix outlines ~~two~~ procedures for sizing a water piping system (see Sections E103.3, ~~and~~ E201.1, and E301.1). The design procedures are based on the minimum static pressure available from the supply source, the head changes in the system caused by friction and elevation, and the rates of flow necessary for operation of various fixtures.
(remaining sections remain the same)

AP301 Selection of Pipe Size
AP301.1 The Water Demand Calculator Method. The water piping system for single- and multi-family dwellings with water-conserving plumbing fixtures, fixture fittings, and appliances shall be sized in accordance with the 2020 Water Efficiency and Sanitation Standard (WE-Stand) Appendix C.

AP301.2 Water Demand Calculator. The estimated design flow rate for the building main and principal branches and risers shall be determined by the IAPMO Water Demand Calculator available for download at http://www.iapmo.org/water-demand-calculator/

Why the IAPMO Water Demand Calculator?

Over 70 years ago the United States National Bureau of Standards developed a theoretically rigorous and convenient graphical approach for estimating the 99th percentile of water use in public facilities under the expedient assumption of congested conditions. Since then, the NBS approach (often called Hunter's curves) has been incorporated into design codes for plumbing systems around the globe. However, the performance of water fixtures and the uses of drinking water have changed markedly over the years. Experience now indicates that Hunter's curves often overestimate actual water demands. This can lead to over-sized plumbing systems which inflate construction costs and pose public health hazards due to prolonged stagnation and potential microbial (e.g., *Legionella*) contamination. There is widespread recognition of a need to update methods for estimating peak water demands in plumbing systems to better reflect today's high efficiency water fixtures and realistically account for non-congested conditions in a variety of end use applications (e.g., residential, commercial, institutional, etc). Benefits of updating the traditional NBS method for estimating peak water demands include reduced construction costs, greater protection from health hazards, and provision of safe sustainable plumbing systems that encourage water and energy conservation among a broad spectrum of end users.

The IAPMO Water Demand Calculator is a simple extension to Hunter's method that generates the full probability distribution of the water demand in a plumbing system. The computational methods for estimating water supply demand for single and multi-family dwellings are coded into the Water Demand Calculator and offered as an improved method to avoid over-design resulting from Hunter's Curve as the current method used in U.S. plumbing codes.

WDC Cost Saving Estimates from Stantec Architecture / Engineering Study

Cost Savings (US Dollars / Percent)

NEW YORK CITY Single-Family Home Savings $ / %		
Savings vs.	Copper	PEX
UPC ($)	$401	$56
UPC (%)	2%	0.3%
IRC ($)	$1,126	$81
IRC (%)	4%	0.4%

PITTSBURGH Single-Family Home Savings $ / %		
Savings vs.	Copper	PEX
UPC ($)	$299	$48
UPC (%)	2%	0.4%
IRC ($)	$857	$72
IRC (%)	6%	1%

OKLAHOMA CITY Single-Family Home Savings $ / %		
Savings vs.	Copper	PEX
UPC ($)	$277	$287
UPC (%)	2%	3%
IRC ($)	$804	$74
IRC (%)	7%	1%

NEW YORK CITY 6-Unit Multi-Family Savings $ / %		
Savings vs.	Copper	PEX
UPC ($)	$3,995	$9,482
UPC (%)	3%	8%
IPC ($)	$7,602	$9,012
IPC (%)	5%	8%

PITTSBURGH 6-Unit Multi-Family Savings $ / %		
Savings vs.	Copper	PEX
UPC ($)	$3,150	$8,509
UPC (%)	4%	12%
IPC ($)	$6,156	$8,212
IPC (%)	7%	12%

OKLAHOMA CITY 6-Unit Multi-Family Savings $ / %		
Savings vs.	Copper	PEX
UPC ($)	$3,037	$7,821
UPC (%)	5%	15%
IPC ($)	$6,033	$8,668
IPC (%)	9%	16%

NEW YORK CITY 45-Unit Multi-Family Savings $ / %		
Savings vs.	Copper	PEX
UPC ($)	$52,409	$33,154
UPC (%)	8%	5%
IPC ($)	$58,877	$26,494
IPC (%)	9%	4%

PITTSBURGH 45-Unit Multi-Family Savings $ / %		
Savings vs.	Copper	PEX
UPC ($)	$40,686	$28,226
UPC (%)	10%	8%
IPC ($)	$44,987	$22,535
IPC (%)	11%	6%

OKLAHOMA CITY 45-Unit Multi-Family Savings $ / %		
Savings vs.	Copper	PEX
UPC ($)	$38,800	$28,520
UPC (%)	12%	10%
IPC ($)	$42,441	$22,761
IPC (%)	13%	8%