



The Uniform Plumbing Code
and the International Plumbing Code

The Real Story



Plumbing codes should have real-world implications, rooted in scientific data. Their primary purpose is to govern products and systems to ensure health, safety and welfare.

After public health and safety considerations have been addressed, the next priority is to ensure that plumbing codes are developed to the right balance between short-term building costs and long-term operating and maintenance costs.

In 2019, the International Code Council (ICC) published a report titled *“The Economic Impact of the International Plumbing Code.”* The stated intent of the report is to highlight differences between ICC’s *International Plumbing Code (IPC)* and the *Uniform Plumbing Code (UPC®)* from the International Association of Plumbing and Mechanical Officials (IAPMO).

The report does not stand up to technical scrutiny. It creates an illusion of cost savings using calculations based on exaggerated building design, such as:

- **A single-family home size of 4,500 sq. ft. while the U.S. median is just under 2,355 sq. ft.¹**



- **An apartment size of 2,000 sq. ft. while the U.S. average is 882 sq. ft.²**



- **An elementary school classroom ceiling height of 21 feet.**

¹ New Single Family Home Sizes, First Quarter 2019 Date, Eye on Housing, NAHB, May 2019
<http://eyeonhousing.org/2019/05/new-single-family-home-size-first-quarter-2019-data/>

² The average apartment size of the Largest U.S. Cities, Rent Café, June 2019
<https://www.rentcafe.com/blog/rental-market/2019-mid-year-rent-report-national-average-rent-ends-first-half-year-1465/>



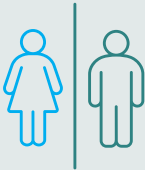
We respect healthy competition, but we cannot abide intentionally misleading data. The conclusions derived and reported by the ICC are simply incorrect.

Building code officials need to feel confident in the data they use to make decisions that will impact the personal safety and business interests of the homes and businesses in their region.

This document seeks to set the record straight.

FLAWED COMPARISONS

Starting with the exaggerated building sizes, the ICC report makes basic errors when applying the *UPC*, adding such costs as:



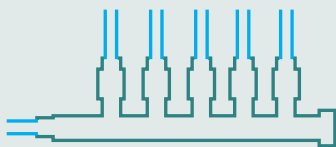
Improperly adding two toilets and three lavatories for the *UPC* office prototype.



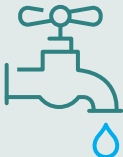
Spreading plumbing fixtures out across an improbable 4,500-square-foot home with a roof peak 12 feet higher than the interior space while also increasing the number of roof penetrations.



Utilizing a cold-water supply piping for the office prototype two times the size for the *UPC* building instead of using the size required by the code.



Omitting the *UPC*-allowed PEX piping system and including CPVC piping twice in the cost estimate.



Incorrectly calculating the residential prototype water supply fixture units and requiring larger water supply lines.

The ICC Report fails to include additional costs that would be required using the *IPC*:



Does not account for the cost of the required air admittance valve access panels.



Fails to mention the costs for troubleshooting and replacing AAVs, which are transferred to home owners and building owners when AAVs inevitably fail.



Five additional ICC code books (*IRC, IBC, IMC, IFGC* and *IECC*) are required, at a cost of about \$500, in order to match the information on installations contained in the *UPC*.

A 2003 study conducted by **Edward Saltzberg**, PE, CEM, CIPE, **J. Richard Wagner**, PE, CIPE, and **Robert Payne**, comparing the plumbing cost of a typical family residence (the floor plan for the 1,800-square-foot model house was selected from a *Better Homes and Gardens* publication) between the *UPC* and the *ICC International Residential Code (IRC)*, found that the *UPC*-built home cost just \$69.24 more – a difference that could be called negligible at worst.³ The report’s authors concluded the following:



The writers feel that the IRC allowance of the use of air admittance valves, as opposed to installing vents through the roof, and the limited number of cleanouts with the IRC system is not in the consumers’ best interest and does not create appreciable savings for the developer, the contractor, or the homeowner. In addition, the authors feel that what little cost differences occur will be more than offset by the anticipated future maintenance and service costs created by use of the IRC.

Edward Saltzberg, PE, CEM, CIPE, J. | **Richard Wagner**, PE, CIPE | **Robert Payne**



Yet for the past 17 years, the ICC has not only continued to claim the *IPC* is significantly less expensive, it has now published a distorted report that applies flawed and intellectually dishonest metrics to restate this false claim. In fact, while the ICC attempts to focus attention on exaggerated comparative cost savings, an independent study confirmed that the overall **2018 ICC code changes increased costs on average 7.57% for commercial buildings and 14.20% for homes in just one code cycle.**¹

Disingenuous misinformation such as the ICC report can lead to unsound policies and distrust among constituents when promised savings and environmental benefits are not and cannot be realized, especially when small businesses must bear the substantial costs of purchasing code books.

³ Code Enforcement Officials, Members of Plumbing Code Adoption Boards, and Interested Members of the Plumbing Community, Edward Saltzberg, PE, CEM, CIPE, J. Richard Wagner, PE, CIPE, Robert Payne, June 2003

⁴ Evaluation of the Cost Impact of 2018 ICC Prescriptive Code Changes, RINKER-CR-2018-103, http://www.floridabuilding.org/fbc/publications/Research_2017-2018/UF/FinalReportCodeCostImpactDraft.pdf

AIR ADMITTANCE VALVES (AAVs) AND THE CODES: LET'S GET REAL!

The voting membership of the *UPC* and the *IPC* disagree on allowing the unencumbered use of AAVs in all applications. Since the use of AAVs is foundational to some of the cost-saving claims in the ICC report, it's important to understand some key points.



What happens when AAVs fail?

It is usually detected when an occupant smells a foul odor or hears a strange siphon noise from a sink's drain. It takes a plumbing professional to diagnose the problem, determine which AAV has failed and replace it.

The cost of replacing an AAV varies depending on how long it takes to diagnose the problem and the ease of access to the failed valve. Sewer gas emitting into a home or structure from a failed AAV potentially supports mold growth and exposes occupants to pathogens causing diseases and other harmful elements.

Of course, all costs to replace AAVs and make repairs resulting from a failed valve are borne by the homeowner or building owner. By not allowing the free use of AAVs, the *UPC* Technical Committee and voting members fully understand that every jurisdiction using the *UPC* is free to amend it should it wish to allow the use of AAVs in all applications or in limited applications. Through its default position of disallowing AAVs, the *UPC* ensures that every jurisdiction that wishes to allow the use of AAVs does so after full consideration of the pros and cons of the decision.

For example, the state of Nevada, which adopts the *UPC*, allows the use of AAVs. Conversely, the city of New York, which adopts the *IPC*, does not allow the use of AAVs.

However, in yet another glaring error, the ICC's report does not consider these jurisdictional revisions in its calculations.

THE FAMILY OF CODES ARGUMENTS: LET'S GET REAL!

The ICC often states that its codes are developed as a family of codes and, as such, work to assure a higher level of compatibility between construction codes.

However, the *UPC* integrates fully and effortlessly with codes produced by other bodies, such as the *National Electrical Code*, which is developed independently by the National Fire Protection Association.

The *UPC* is compatible with any building code, providing both prescriptive and performance-based provisions for plumbing systems in today's increasingly complex buildings.





KEY (AND REAL) DIFFERENCES BETWEEN THE *UPC* AND THE *IPC*

IAPMO's leadership addressing the most important issues facing the plumbing industry over the past two decades connects us to a variety of subject-matter experts in the fields of plumbing, water efficiency and public health.

The *UPC* is a consensus-based document developed by subject-matter experts representing the broad range of the industry. Changes must be approved by a supermajority: a two-thirds affirmative vote of our diverse stakeholders, including installers, manufacturers, environmentalists, contractors, code officials, and engineers – all people very knowledgeable about plumbing.

This is why the *UPC* qualifies as an American National Standard as accredited by the American National Standards Institute.

The *National Electrical Code* is similarly accredited by ANSI. **It makes sense that both the *UPC* and the *National Electrical Code* are developed by experts who understand safety and technical considerations and are designed to reflect the view of a supermajority.**

The ICC says it follows a “government consensus process,” meaning only code officials are allowed to vote at the code cycle’s final development code hearings.

Therefore, a simple majority vote by a single stakeholder group creates a monopoly that can result in a last-minute change to the *IPC*.

IAPMO CONNECTS THE INDUSTRY

Founded in 1926, IAPMO protects the public's health and safety by working in concert with government and industry to implement comprehensive plumbing and mechanical systems around the world.

We build a bridge between generalist building inspectors and the increasingly sophisticated converging water-related technologies in the built environment today.



FOLLOW THE LEADER

The *UPC* provides the most progressive code provisions available anywhere to address the plumbing industry's most pressing concerns.



The *UPC's* Water Demand Calculator (WDC) is the first modern, statistically based pipe-sizing formula update since the 1940s. The WDC works to reduce water aging in buildings, thereby addressing both water safety and water and energy efficiency, while reducing construction costs and utility connection fees.



The 2021 *UPC* contains new provisions that address the complex and related issues of Legionella growth and scald protection, providing enforceable requirements that code officials can apply to address these growing concerns.



The 2012 *UPC* contained the first model code provisions for rainwater catchment systems in the United States, allowing for the safe installation and an approval mechanism for those important water-saving systems. Three years later, the *IPC* added remarkably similar rainwater catchment provisions.



TECHNICAL SUPPORT

IAPMO provides formal and informal interpretation services for all provisions of the *UPC* to support the industry. Contractors, tradespeople and inspectors who find themselves in discussions about proper code interpretation and application on the job site can call IAPMO toll-free at (800) 201-0335. Our code development professionals deliver immediate opinions on the code provisions, so there are no job shutdowns or delays from submitting the questions in writing and waiting for a reply.

The ICC, on the other hand, restricts its code interpretation service to only ICC members. This creates a potentially tense situation in which plumbing professionals are unable to engage with code experts on matters of public health and safety.

TECHNICAL CONTENT

The *UPC* is a far more comprehensive plumbing code than the *IPC*. Examples of technical content covered by the *UPC* and not the *IPC* include:



Appliance venting and combustion air provisions (Chapter 5)



Fuel gas (Chapter 12)



Calculating peak water demand (Appendix M)



New provisions addressing Legionella in plumbing systems (Appendix N)



Potable rainwater catchment systems (Appendix K)



Sustainable practices (Appendix L)



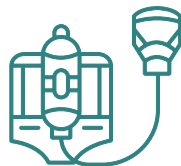
Approved methods to design the water distribution system (Chapter 6)



Medical gas (Chapter 13)



Manufactured/mobile home parks and recreational vehicle parks (Appendix E)



Firefighter breathing air replenishment systems (Appendix F)



Private sewage disposal systems (Appendix H)



Industry installation guidelines (Appendix I)

The ICC states that the *IPC* does not need to be amended for adoption; however, it obviously must be amended when it comes to these critically important issues and systems.

The *IPC* does not provide water supply fixture unit values for fixtures and does not provide water supply and distribution pipe sizing. With the *IPC*, the design of the water distribution system is left to “accepted engineering practices, as approved by the authority having jurisdiction.” However, obtaining approved water distribution designs from a registered design professional can add cost and delay projects.

CONCLUSION

Simply put, ICC's report exaggerates average building sizes, spreads out plumbing and venting systems in the most inefficient way possible, and then extrapolates data from those buildings as representative of every building built in the United States in the past 15 years.

The report demonstrates an organizational lack of technical expertise, including some code violations. It is an ineffective tool for policymakers and other stakeholders, as the purported savings and benefits it promises are based on flawed and intellectually dishonest premises.

The focus on plumbing, where ICC has a competitor, effectively hides the costs of its other codes, on which it has a monopoly.

The IAPMO consensus process and our investment in primary research can be measured in lives, water and total life-cycle costs saved.

Learn more at uniformcodes.org

SAFETY BELONGS TO EVERYONE



IAPMO HOTLINE FOR MORE INFORMATION: 800-201-0335

