Proposed Revision to International Plumbing Code 2012 (as proposed to the ICC for IPC 2015[1])

Table 604.4

Proponent: Edward R. Osann, Natural Resources Defense Council (eosann@nrdc.org); Harry Misuriello, American Council for an Energy-Efficient Economy, representing himself (misuriello@verizon.net)

Revise Table 604.4 as follows:

TABLE 604.4
MAXIMUM FLOW RATES AND CONSUMPTION
FOR PLUMBING FIXTURES AND FIXTURE FITTINGS[b]

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY
Lavatory, private	~~2.2~~ 1.5 gpm at 60 psi
Lavatory, public (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm @ 60 psi
Shower head[a]	2.5 2.0 gpm at 80 psi
Sink faucet	2.2 gpm at 60 psi
Urinal	~~1.0~~ 0.5 gallons per flushing cycle
Water closet	~~1.6~~ 1.3 gallons per flushing cycle[c]

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m,1 pound per square inch = 6.895 kPa.
a. A hand-held shower spray is also a shower head.
b. Consumption tolerances shall be determined from referenced standards.
c. The effective flush volume for a dual-flush water closet is defined as the composite, average flush volume of two reduced flushes and one full flush.

Reason:

The maximum flow rates and water consumption levels in the current Table 604.4 for water closets, shower heads, and lavatory faucets equate to nationwide standards enacted nearly 20 years ago. In December, 2010, the US Department of Energy determined that states were no longer preempted from adopting more stringent efficiency standards for these products. (*Federal Register*, Vol. 75, No. 245, December 22, 2010, p. 80289; this document is attached).

Today, fixtures and fittings that perform well at flush volumes and flow rates lower than the values in Table 604.4 are widely available. Since 2006, the establishment of the WaterSense voluntary labeling program for water efficient products and services by the Environmental Protection Agency has provided a framework for the recognition of products that are substantially more efficient than minimum federal requirements while maintaining full functionality and customer satisfaction. WaterSense criteria were established for tank-type toilets (1.28 gpf) in 2007; lavatory faucets (1.5 gpm @ 60 psi) in 2007; urinals (0.5 gpf) in 2009; and showerheads (2.0 gpm @ 80 psi) in 2010. Manufacturers have responded by bringing large numbers of models to market that meet or exceed WaterSense specifications. Based on the most recent reports by WaterSense partners, the following figures regarding the number of WaterSense labeled models available as of December 2012 indicate the widespread availability and commercial viability of plumbing products that are more efficient than the federal minimum standards shown in the current Table 604.4:

- Urinals — 47 models of fixtures from 9 brands; 41 models of valves from 4 brands
- Tank-type water closets — 1,475 models from 87 brands
- Lavatory faucets and accessories — 5,207 models from 134 brands
- Showerheads — 808 models from 45 brands

With the pace of introduction of new models that meet WaterSense specifications, it is reasonable to expect that these figures will be substantially larger by 2015.

[1] Statistics regarding the availability of fixtures meeting the proposed standards have been updated from the original ICC submission, to reflect the greater number of models available as of Dec. 2012.

Improving the water efficiency of water closets, urinals, shower heads, and lavatory faucets in new construction will save building owners money and reduce the likelihood of municipal water and wastewater capacity constraints that can lead to moratoria on new connections.

NRDC estimates that nationwide adoption of the revised values in this proposal, effective 2016, can be expected to save:

- 243.1 million gallons of water per day by 2030;
- More than 2.8 billion kilowatt hours per year by 2030;
- More than 178 hundred million therms of natural gas per year by 2030; and
- Consumers will realize more than $2.18 billion dollars in reduced energy and water costs.

Cost Impact:

While the costs of plumbing fixtures and fittings vary greatly due to style, trim, colors, and materials, the incremental cost of greater efficiency alone for products meeting the flush volumes and flow rates contained in this proposal is negligible. This code change proposal will not increase the cost of construction.

Proposed Revision to International Residential Code 2012 (as proposed to the ICC for IRC 2015)

P2903.2

Proponent: Edward R. Osann, Natural Resources Defense Council, on behalf of self.

Revise Table P2903.2 as follows:

TABLE P2903.2
MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS[b]

PLUMBING FIXTURE OR FIXTURE FITTING	~~PLUMBING FIXTURE OR FIXTURE FITTING~~ MAXIMUM FLOW RATE OR QUANTITY
Lavatory faucet	~~2.2~~ 1.5 gpm at 60 psi
Shower head[a]	~~2.5~~ 2.0 gpm at 80 psi
Sink faucet	2.2 gpm at 60 psi
Water closet	~~1.6~~ 1.3 gallons per flushing cycle[c]

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m,1 pound per square inch = 6.895 kPa.
a. A hand-held shower spray is also a shower head.
b. Consumption tolerances shall be determined from referenced standards.
c. The effective flush volume for a dual-flush water closet is defined as the composite, average flush volume of two reduced flushes and one full flush.

Proposed Revision to International Plumbing Code 2012
(as accepted for IPC 2015 by the ICC)

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Table 604.3

Proponent: Edward R. Osann, Natural Resources Defense Council, representing self (eosann@nrdc.org); Harry Misuriello, American Council for an Energy-Efficient Economy, representing himself (misuriello@verizon.net)

Revise as follows:

TABLE 604.3
WATER DISTRIBUTION SYSTEM DESIGN CRITERIA REQUIRED CAPACITY AT FIXTURE SUPPLY PIPE OUTLETS

FIXTURE SUPPLY OUTLET SERVING	FLOW RATE[a] (gpm)	FLOW PRESSURE (psi)
Bathtub, balanced-pressure, thermostatic or combination balanced-pressure/ thermo-static mixing valve	4	20
Bidet, thermostatic mixing valve	2	20
Combination fixture	4	8
Dishwasher, residential	2.75	8
Drinking fountain	0.75	8
Laundry tray	4	8
Lavatory, private	~~2~~ 0.8	8
Lavatory, private, mixing valve	0.8	8
Lavatory, public	0.4	8
Shower	~~3~~ 2.5	8
Shower, balanced-pressure, thermostatic or combination balanced-pressure/ thermo-static mixing valve	~~3~~ 2.5[b]	20
Sillcock, hose bibb	5	8
Sink, residential	~~2.5~~ 1.75	8
Sink, service	3	8
Urinal, valve	12	25
Water closet, blow out, flushometer Valve	25	45
Water closet, flushometer tank	1.6	20
Water closet, siphonic, flushometer Valve	25	35
Water closet, tank, close coupled	3	20
Water closet, tank, one piece	6	20

For SI: 1 pound per square inch = 6.895 kPa,1 gallon per minute = 3.785 L/m.

a. For additional requirements for flow rates and quantities, see Section 604.4.

b. Where the shower mixing valve manufacturer indicates a lower flow rating for the mixing valve, the lower value shall be applied.

Reason: TABLE 604.3 WATER DISTRIBUTION SYSTEM DESIGN CRITERIA REQUIRED CAPACITY AT FIXTURE SUPPLY PIPE OUTLETS requires plumbing distribution system design to achieve flow rates of *at least* 3 gpm for showers, 2.5 gpm for sink faucets, and 2 gpm for lavatory faucets, all of which are excessive as minimum requirements. The *minimum* flow rate for a shower in this table is above the allowable *maximum* flow rate for a showerhead as specified by Table 604.4 of this code and by the nationwide standard that has been in effect for nearly 20 years. Similarly, the minimum flow rate for lavatories does not distinguish between public and private fixtures, and thus sets a minimum flow for public lavatories that is in excess of the maximum flow allowable under Table 604.4 of this code. And for residential sinks other than service sinks, the *minimum* flow rate is again set higher than the allowable *maximum* flow rate for a sink faucet as specified by Table 604.4. For applications at the low end of the acceptable range of water pressure, these excessive minimum flow values tend to encourage the oversizing of pipes leading to fixture outlets, leaving a larger volume of cooled hot water to purge before use, and thus exacerbating the problem of the energy

and water lost while waiting for actual hot water to arrive at the fixture. In some installations, these excessive minimum values may require water pressure booster systems that might otherwise be unnecessary.

Under this proposal, public lavatories would be distinguished from private lavatories, single-handle mixing valves for private lavatories would be recognized, and the minimum flow rates for lavatory, residential sink, and shower supply pipes would be adjusted downward. Minimum flow rates for showers would be set at 2.5 gpm, or such lower flow rate as would match the manufacturer's minimum rated flow for the mixing valve to provide the level of thermal protection prescribed by the industry standard. The minimum flow rate for a residential sink, other than a service sink, would be set at 1.75 gpm, which is 80 percent of the value of the maximum flow rate allowed by this code under Table 604.4. The minimum flow rate for a public lavatory would be set at 0.4 gpm, 80 percent of the value of the maximum flow rate allowed by this code under Table 604.4. The minimum flow rate for a private lavatory would be set at 0.8 gpm, which is the minimum flow rate prescribed for private lavatory faucets by the US EPA's WaterSense specification (version 1.0, October 2007).

Cost Impact: This proposal will have the effect of reducing the diameter of pipe that is allowed to serve lavatories, sinks, and showers in some installations, and may also eliminate the need for water pressure booster systems in some applications. This code change proposal will not increase the cost of construction.

P90-12

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

T604.3-P-OSANN

Proposed Revision to International Residential Code 2012 (as proposed to the ICC for IRC 2015)

P2903.1

Proponent: Edward R. Osann, Natural Resources Defense Council, on behalf of self.

Revise Table P2903.1 as follows:

TABLE P2903.1
REQUIRED CAPACITIES AT POINT OF OUTLET DISCHARGE

FIXTURE AT POINT OF OUTLET	FLOW RATE (gpm)	FLOW PRESSURE (psi)
Bathtub, pressure-balanced or thermostatic mixing valve	4	20
Bidet, thermostatic mixing	2	20
Dishwasher	2.75	8
Laundry tub	4	8
Lavatory	~~2~~ 0.8	8
Shower, pressure-balancing or thermostatic mixing valve	~~3~~ 2.5[a]	20
Sillcock, hose bibb	5	8
Sink	~~2.5~~ 1.75	8
Water closet, flushometer tank	1.6	20
Water closet, tank, close coupled	3	20
Water closet, tank, one-piece	6	20

a. Minimum flow rate may be lower when matched to the level of the manufacturer's minimum rated flow of the mixing valve.

For SI: 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

Note: Each change proposed here for Table P2903.1 has been accepted for Table 604.3 in the 2015 version of the International Plumbing Code.

Proposed Revision to
International Plumbing Code 2012
(as accepted for IPC 2015 by the ICC)

Section 1101.2; new definitions

Proponents: Karen Hobbs, Natural Resources Defense Council, representing self (khobbs@nrdc.org); Eddie Van Giesen, BRAE Rainwater Technologies, representing self; Maureen Traxler, representing City of Seattle Dept of Planning & Development; Dave Cantrell, Public Health-Seattle and King County; Harry Misuriello. American Council for an Energy-Efficient Economy

Add new definitions as follows:

RAINWATER. Water from natural precipitation.

STORMWATER: Natural precipitation, including snowmelt, that has contacted a surface at grade or below grade.

Revise as follows:

1101.2 Where required. Disposal. All Rainwater from roofs, and stormwater from paved areas, yards, courts and courtyards shall drain ~~into a separate storm *sewer* system, or a combined *sewer* system, or~~ to an *approved* place of disposal. For one- and two-family dwellings, and where *approved*, storm water is permitted to discharge onto flat areas, such as streets or lawns, provided that the storm water flows away from the building.

Reason:
As documented in the Natural Resources Defense Council (NRDC) report, "Rooftops to Rivers II" (available at http://www.nrdc.org/water/pollution/rooftopsii/files/rooftopstoriversII.pdf), many cities recognize the unnecessary stress to their wastewater systems caused by having roofs and other paved areas draining directly into the sewer system, when other options exist, such as having those same surfaces drain to open, unpaved areas or captured for reuse through a rainwater harvesting system. Cities often require that roofs and paved areas drain into open, unpaved areas where the rainwater can either be infiltrated into the ground, evapotranspirated, or captured for later reuse. Many cities also have mandatory downspout disconnection programs for existing construction and many are considering mandatory downspout disconnections for new construction.

Many municipalities and states recognize the beneficial use of rainwater. For example:

- The State of Georgia, in 2009, after experiencing extreme drought conditions in 2007 and 2008, amended its state plumbing codes and issued detailed rainwater harvesting guidelines to authorize the use of captured rooftop rainwater for both indoor and outdoor non-potable applications.
- The State of Texas established a Rainwater Harvesting Evaluation Committee in 2005 and directed the state's Water Development Board and other agencies to formulate recommendations for minimum water quality standards for potable and non-potable indoor use and ways in which the state can further promote rainwater harvesting.
- The City of Portland, Oregon allows the use of rainwater for indoor and outdoor non-potable applications, and, when properly treated, to replace potable water supply.
- The City of Tuscon, Arizona, in 2010, put into effect a rainwater harvesting ordinance that requires new developments to meet 50 percent of their landscaping water requirements by harvesting rainwater.
- The states of Virginia, Oregon, and Washington have all also adopted guidelines for design and use of rainwater harvesting systems, and an estimated 30,000 to 60,000 people in the state of Hawaii (up to nearly 5 percent of the state's population) rely on rainwater to meet their water supply needs.

Reusing rainwater can also help extend the useful life of built water infrastructure. The costs to repair and replace our nation's aging water infrastructure are enormous, with investment needs of $298 billion or more over the next 20 years, according to the U.S. Environmental Protection Agency (USEPA, 2008; http://water.epa.gov/scitech/datait/databases/cwns/upload/cwns2008rtc.pdf). In 2009, the American Society of Civil Engineers gave the nation's wastewater facilities a grade of D-minus due to their condition (American Society of Civil Engineers, 2009; http://www.infrastructurereportcard.org/sites/default/files/RC2009_full_report.pdf).

SECTION M1507
MECHANICAL VENTILATION

M1507.1 General.
Where local exhaust or whole-house mechanical ventilation is provided, the equipment shall be designed in accordance with this section.

M1507.2 Recirculation of air.
Exhaust air from bathrooms and toilet rooms shall not be recirculated within a residence or to another *dwelling unit* and shall be exhausted directly to the outdoors, or through an air-to-air, heat- or energy- recovery ventilator designed to meet the conditions of this section. Exhaust air from bathrooms and toilet rooms shall not discharge into an *attic*, crawl space or other areas inside the building

M1507.3 Whole-house mechanical ventilation system.
Whole-house mechanical ventilation systems shall be designed in accordance with Sections M1507.3.1 through M1507.3.3.

M1507.3.1 System design.
The whole-house ventilation system shall consist of one or more supply and/or exhaust fans, or a combination of such, and associated ducts and controls. Local exhaust or supply fans are permitted to serve as part of such a system. Outdoor air ducts connected to the return side of an air handler shall be considered to provide supply ventilation. The amount of outdoor air shall be approximately equal to the amount of exhaust air. Infiltration, controlled or uncontrolled, shall not be considered as a source of outdoor air in order to satisfy M1507.3.3.

M1507.3.2 System controls.
The whole-house mechanical ventilation system shall be provided with controls that enable manual override.

M1507.3.3 Mechanical ventilation rate.
The whole-house mechanical ventilation system shall provide outdoor air at a continuous rate of not less than that determined in accordance with Table M1507.3.3(1).

Exception: The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25-percent of each 4-hour segment and the ventilation rate prescribed in Table M1507.3.3(1) is multiplied by the factor determined in accordance with Table M1507.3.3(2).

TABLE M1507.3.3(1)
CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0 – 1	2 – 3	4 – 5	6 – 7	> 7
	Airflow in CFM				
< 1,500	30	45	60	75	90
1,501 – 3,000	45	60	75	90	105
3,001 – 4,500	60	75	90	105	120
4,501 – 6,000	75	90	105	120	135
6,001 – 7,500	90	105	120	135	150
> 7,500	105	120	135	150	165

For SI: 1 square foot = 0.0929 m^2, 1 cubic foot per minute = 0.0004719 m^3/s.

TABLE M1507.3.3(2)
INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION RATE FACTORS[a, b]

RUN-TIME PERCENTAGE IN EACH 4-HOUR SEGMENT	25%	33%	50%	66%	75%	100%
Factor[a]	4	3	2	1.5	1.3	1.0

a. For ventilation system run time values between those given, the factors are permitted to be determined by interpolation.
b. Extrapolation beyond the table is prohibited.

M1507.4 Local exhaust rates.
Local exhaust systems shall be designed to have the capacity to exhaust the minimum air flow rate determined in accordance with Table M1507.4.

TABLE M1507.4
MINIMUM REQUIRED LOCAL EXHAUST RATES FOR ONE- AND TWO-FAMILY DWELLINGS

AREA TO BE EXHAUSTED	EXHAUST RATES
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms-Toilet Rooms	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s.

Proposed Revision to
International Mechanical Code 2012
(as accepted for IMC 2015 by the ICC)

908.8(NEW), Chapter 15

Proponent: Tracy Quinn, P.E., Natural Resources Defense Council

Add new text as follows:

908.8 Cooling Towers. Cooling towers (both open circuit and closed circuit type) and evaporative condensers shall comply with Section 908.8.1 and 908.8.2.

908.8.1 Conductivity or Flow-based Control of Cycles of Concentration. Cooling towers and evaporative condensers shall include controls that automate system bleed based on conductivity, fraction of metered makeup volume, metered bleed volume, recirculating pump run time, or bleed time.

908.8.2 Drift Eliminators. Cooling towers and evaporative condensers shall be equipped with drift eliminators that have a maximum drift rate of 0.005 percent of the circulated water flow rate as established in the equipment's design specifications.

Reason:

The complexity of managing cooling systems, combined with the high operational and financial cost of early failure of a cooling tower, can result in an overly conservative approach to tower bleed frequency. The code change proposed here aims to ensure that all cooling towers covered by the IMC have the controls necessary to maximize cycles of concentration. Optimized bleed frequency will yield savings to the operator on water and wastewater charges and treatment chemical costs, more than paying for the addition of the automated bleed controls.

By reducing the escape of liquid water and dissolved minerals and treatment chemicals, drift eliminators mitigate important health and safety concerns, including ice accumulation and the dispersion of chemicals, as well as reducing water loss and the potential for property damage. These objectives must be balanced with the need to maintain tower operation without excessive impedance to airflow that can degrade its efficiency. Most new towers include high efficiency, low pressure drop drift eliminators, and drift eliminators are widely available today from a variety of suppliers that can meet these objectives while achieving the drift reduction criterion stated in proposed section 908.8.2.

Baltimore Aircoil Company (BAC) is recognized as the world's largest manufacturer of evaporative cooling, thermal storage, and heat transfer equipment. BAC products are sold to the commercial building market as components for air conditioning systems, to the food industry for air conditioning and refrigeration applications, and to a broad range of industries for process and power equipment cooling. BAC has worked with NRDC as well as representatives of other organizations to develop a consensus proposal on cooling towers for the International Mechanical Code. As a result of these efforts, BAC supports the adoption of this consensus proposal in the IMC.