



# U.S.-India Standards and Conformance Cooperation Project (SCCP), Phase II

**Workshop on Water and Sanitation Systems in India:  
Leveraging standards for infrastructure improvement**

**"Water Efficient Plumbing Products:  
An Approach towards Sustainable Habitat"**

**26<sup>th</sup> – 27<sup>th</sup> June 2018**

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# Water Efficiency !!



Optimizing the supply of water to the user for desired function.

The objective is **not to conserve water** by reducing the water supply quantity leading to concerning issues of compromised hygiene standards and human discomfort but to **supply the right quantity of water** to meet the functional requirement of use.

Efficient use of water is one of the underlying principles for sustainability in water management. Selection of water efficient products should be considered for both cold and hot water systems.

Use of fittings and fixtures (with maximum allowed flowrates) comprising of bath faucets, wash basin faucets, Kitchen taps, shower heads, water closets, urinals, hand held bidet sprays.

One of the important considerations to ensure performance of such fixtures and fittings with **maximum allowed flowrates** is to design systems with **correct pressures**.



Fixtures and fittings with maximum allowed flowrates should be considered mainly for areas with:

direct water consumption/human usage.



Situations where water is filled for other requirements such as bath tub fillers, washing machine and for situations where water is filled, stored, used or situation where quantity of water supply may form the intent for which water is being drawn such as fire-fighting system and swimming pools, would not qualify with water saving features/use.

The strategy of water efficiency shall also include low flush and dual flush cistern/ flushing mechanism.





# Flowrate:

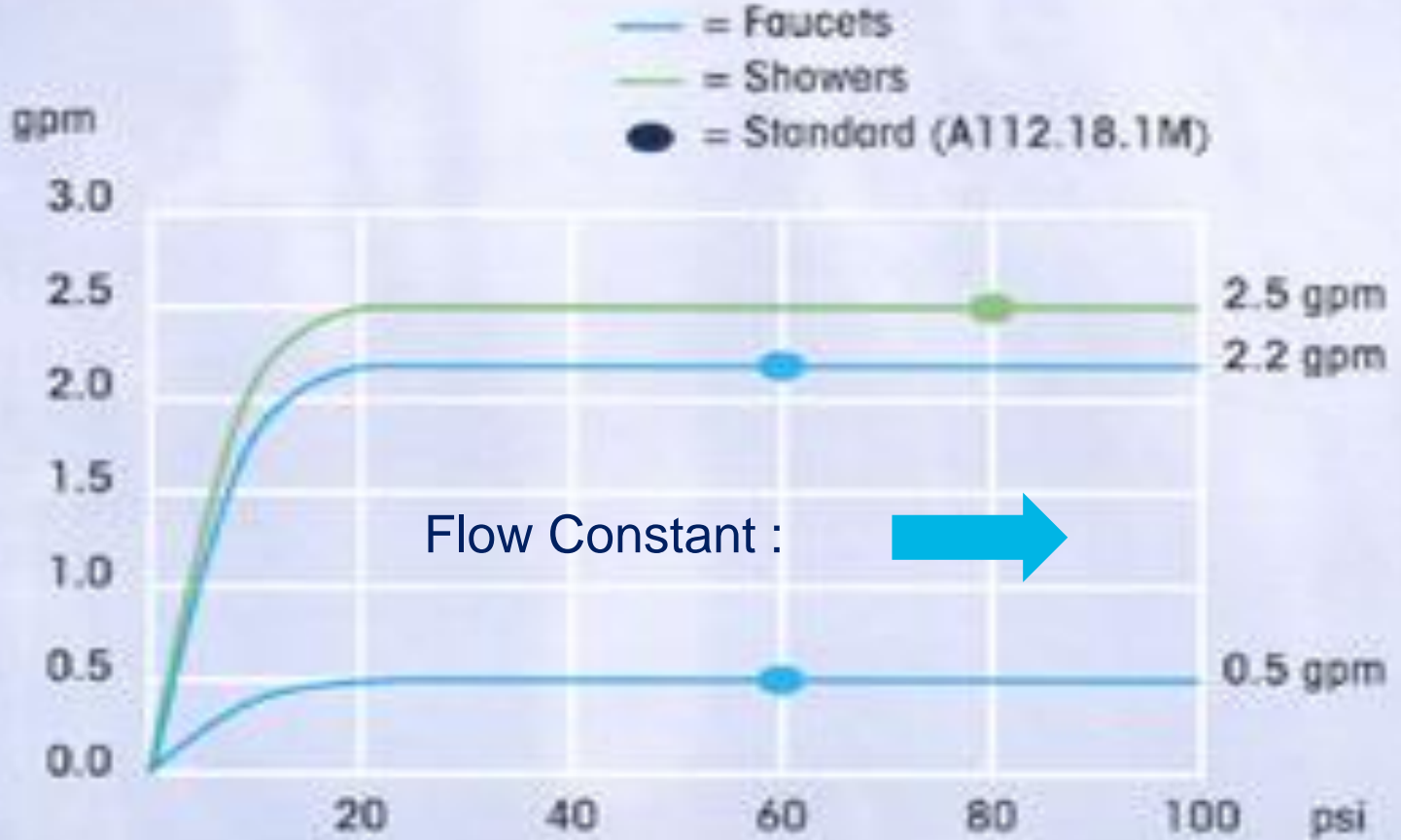
Fixtures and fittings with maximum allowed flowrates are prescribed to meet the primary objective of human sanitation and hygiene requirement.

The flowrates are required to remain constant over varying inlet pressure. The flowrates lower than maximum allowed flowrates are accepted at the minimal residual pressure of 0.018 N/mm<sup>2</sup> (0.18 Kg/ Sq. cm) and are accepted to increase correspondingly (but no more than maximum allowed flowrates) with inlet pressure up to 0.42 N/mm<sup>2</sup> (4.2 Kg/ Sq.cm).





# Flowrate & Pressure:



Flow Constant : 

Pressure Increasing: 



# Water Efficient Fittings and Fixtures: Maximum Flowrates and Discharges:

4.7.3.3 The maximum flow rate and flush volumes shall be as given below:

<i>Plumbing Fixtures/Fittings</i>	<i>Maximum Flow Rate</i>
Water closets	6 litre/flush
Urinals	3.8 litre/flush
Lavatory, metered faucet (Public)	1 litre/use
Lavatory, faucet (Private)	8 litre/min
Sink, faucet	8 litre/min
Bidet, hand held spray	8 litre/min
Shower head	10 litre/min

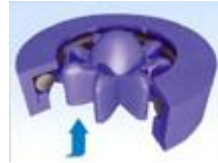
NOTE — The maximum flow rates of plumbing fixtures and fittings provided are at the pressure of 0.42 N/mm<sup>2</sup>. Water closet with dual flush cistern and urinals with reduced flush volumes are recommended. Further, users/designers are encouraged to use low flow fixtures.

# Flow Control Device



## No Pressure

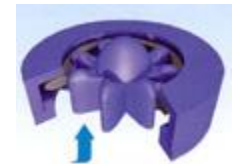
Static conditions (no flow)  
The o-ring is relaxed (Position 1).



## Normal Pressure

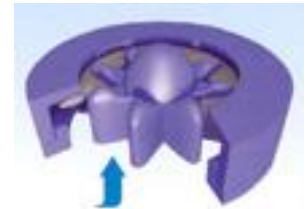
Dynamic conditions (flow)

The o-ring subjected to the line pressure is compressed into the seating area which reduces the water passage (position 2).



## High Pressure

As the pressure increases the o-ring is compressed further into the seating area and reduces the water passage further (Position 3).



As the pressure decreases the o-ring relaxes and reopens the water passage (return to position 2 and 1).





## Efficiency Overall :

### Control Flow and Low Pressure. Lowest Energy

#### Range of showerheads:

- Magna Power multi-function showerhead
- 4 exciting spray functions: normal, champagne, massage and economy
- Modern, European styling
- Anti – limescale nozzles for easy cleaning
- Easy mode changing lever
- Flow rate of 10.4 lpm @ 0.3 bar pressure
- Price – Rs 5,200

#### Magna multi – mode showerheads

- Excellent low pressure performance
- 4 invigorating spray modes: normal, soothe, force and economy
- Integrated design with contemporary styling
- Anti – limescale rub – it nozzles for easy cleaning
- Flow rate of 9.4 lpm @ 0.3 bar pressure
- Price – Rs 4,200



**TABLE 602.1 (IgCC TABLE 702.1)  
MAXIMUM FIXTURE AND FITTING FLOW RATES  
FOR REDUCED WATER CONSUMPTION<sup>f, g</sup>**



FIXTURE OR FIXTURE FITTING TYPE	MAXIMUM FLOW RATE
Showerhead <sup>a</sup>	2.0 gpm at 80 psi and WaterSense labeled
Lavatory faucet and bar sink—private	1.5 gpm at 60 psi
Lavatory faucet—public (metered)	0.25 gpc <sup>b</sup>
Lavatory faucet—public (nonmetered)	0.5 gpm at 60 psi
Kitchen faucet—private	1.8 gpm at 60 psi
Kitchen and bar sink faucets in other than dwelling units and guestrooms	2.2 gpm at 60 psi
Urinal	0.5 gpf and WaterSense labeled or nonwater urinal
Water closet—public and remote <sup>c</sup>	1.6 gpf
Water closet—public and nonremote	1.28 gpf average <sup>d, e</sup>
Water closet—tank type, private	1.28 gpf and WaterSense labeled <sup>d</sup>
Water closet—flushometer type, private	1.28 gpf <sup>e</sup>
Prerinse spray valves	1.3 gpm and WaterSense labeled
Drinking fountains (manual)	0.7 gpm
Drinking fountains (metered)	0.25 gpc <sup>b</sup>

# 2015 WEP™

## WATER EFFICIENCY PROVISIONS

OF THE INTERNATIONAL GREEN  
CONSTRUCTION CODE®

### Includes:

- High-Performance Water Use Provisions from ANSI/ASHRAE/USGBC/IES 189.1-2014 Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings
- 2015 IPC Chapter 13, Nonpotable Water Systems

# USGBC LEED\_v4 Building Design and Construction:



**WE PREREQUISITE: INDOOR WATER USE REDUCTION  
Required**

**Table 1. Baseline water consumption of fixtures and fittings**

**NBC 2016  
Flowrates**

<i>Fixture or fitting</i>	<i>Baseline (IP units)</i>	<i>Baseline (SI units)</i>
Toilet (water closet)*	1.6 gpf	6 lpf <b>6.0 LPF</b>
Urinal*	1.0 gpf	3.8 lpf <b>3.8 LPF</b>
Public lavatory (restroom) faucet	0.5 gpm at 60 psi** all others except private applications	1.9 lpm at 415 kPa, all others except private applications
Private lavatory faucets	2.2 gpm at 60 psi	8.3 lpm at 415 kPa <b>8.0 LPM</b>
Kitchen faucet (excluding faucets used exclusively for filling operations)	2.2 gpm at 60 psi	8.3 lpm at 415 kPa <b>8.0 LPM</b>
Showerhead*	2.5 gpm at 80 psi per shower stall	9.5 lpm at 550 kPa per shower stall <b>10.0 LPM</b>

**Base Case – Pre-requisite (No Credits)**

# WE CREDIT: INDOOR WATER USE REDUCTION



BD&C

1–7 points

This credit applies to

- New Construction (1–6 points)
- Core & Shell (1–6 points)
- Schools (1–7 points)
- Retail (1–7 points)
- Data Centers (1–6 points)
- Warehouses & Distribution Centers (1–6 points)
- Hospitality (1–6 points)
- Healthcare (1–7 points)

Intent

To reduce indoor water consumption.



**Table 1. Points for reducing water use**

Percentage reduction	Points (BD&C)	Points (Schools, Retail, Hospitality, Healthcare)
25%	1	1
30%	2	2
35%	3	3
40%	4	4
45%	5	5
50%	6	--

# Update on Historic Maximum Allowable Water Usage as per Rating Program in US:



## NBC 2016 Flowrates

## Flowrates/ Discharge in Litres

### Historic Maximum Allowable Water Usage

Fitting/Fixture	Pre-1992	EPAct 1992	WaterSense Post-2006	CEC Post-2016
Water closet (in gallons per flush)	5 or greater <b>6.0 LPF</b>	1.6	<b>6.0 LPF</b>	1.28
Urinals (in gallons per flush)	3 or greater <b>3.8 LPF</b>	1.0	<b>3.8 LPF</b>	0.125
Kitchen faucet (in gallons per minute)	3.5 <b>8.0 LPM</b>	2.2	<b>8.3 LPM</b>	1.8
Residential lavatory faucet (in gallons per minute)	3.5 <b>8.0 LPM</b>	2.2	<b>8.3 LPM</b>	1.2
Showerheads (in gallons per minute)	3.5 <b>10 LPM</b>	2.5	<b>9.4 LPM</b>	1.8

It is proposed presently to align to the Flowrates and Discharges as per Initial EPAct 1992 which is also prerequisite requirement of LEED Credits. Additional reduction in flowrates and discharges may be considered in Percentage Basis to yield the Star Rating Program.



# Way Forward:

Fundamentally, it is required for us to Review, Evaluate and Prepare Standards suited for our Country and Practices.



With further working by Team BIS/ IPA on the Standardization of Design Flowrates, we are confident that we will achieve more practical and viable parameters for our Culture and Practices.



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