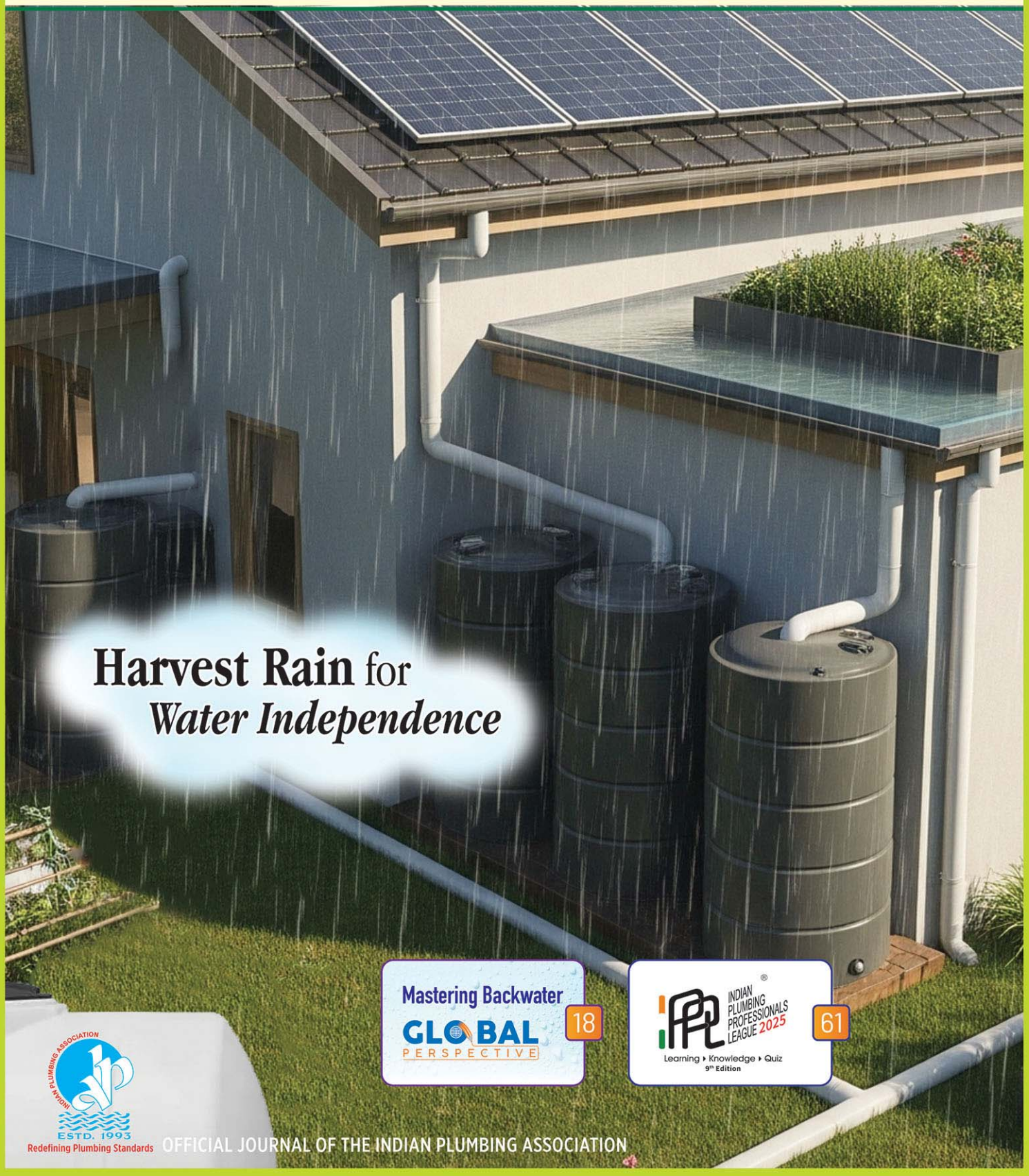
www.indianplumbing.org

Indian Plumbing Today

Vol 07/ Issue 04/ July 2025

Annual Subscription : ₹ 240



Harvest Rain for *Water Independence*

INDIAN PLUMBING ASSOCIATION ESTD. 1993
Redefining Plumbing Standards

OFFICIAL JOURNAL OF THE INDIAN PLUMBING ASSOCIATION

MULTIPEX

ASTRAL PIPES

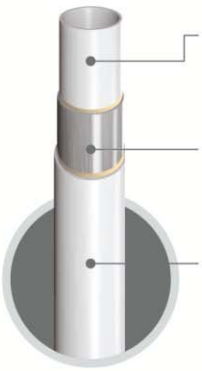
METAL TOUGH.
PEX SMART.

PERFORMANCE AND DURABILITY, ROLLED INTO ONE

Designed for ***Hot***
and ***Cold*** *Water Systems*

Meet the future of piping with Astral MultiPex- a next-genPEX-AL-PEX multilayer pipe built for unmatched strength, flexibility, and thermal resilience. Perfect for homes, commercial spaces and high-performance systems, it ensures leak-proof, hassle-free, and long-lasting efficiency.

At its core lies an
intelligent 3-layer construction:



PEX Inner Layer
- Ensures smooth water flow and corrosion resistance

Aluminium Core
- Adds strength, stability, and prevents oxygen diffusion

PEX Outer Layer
- Provides flexibility, impact resistance, and durability

To meet diverse installation needs, MultiPex fittings come in two advanced joining systems: Compression fitting (Crimping) and Press fitting (Push-fit system).

Scan to know more about the product

| 81415 55555 | sales@astralltd.com | www.astralpipes.com

Published by
Chandra Shekhar Gupta

Printed by
Chandra Shekhar Gupta

On behalf of
Indian Plumbing Association

Printed at
Infinity Advertising Services Pvt. Ltd.,
Plot No. 171 & 172, Sector 58
Faridabad – 121 004. Haryana

Published from
Indian Plumbing Association
416, DLF Prime Tower
79 & 80, Okhla Phase 1
New Delhi – 110 020.

Editor
Sharatchandra Venkat Rao

Sub Editor
Nivedita Sharma
Mob: +919667591004

G M - Marketing & Events
Sushanta Sinha
Mob: +919599001282

Design
Naveen Jaiswal
Studio Detail

Share your feedback at:
acep@indianplumbing.org /
hq@indianplumbing.org

MY PAGE

India is often unable to effectively harness its monsoon rainfall due to a combination of factors including poor infrastructure, inadequate storage facilities and lack of awareness about water conservation techniques. This leads to both water scarcity during dry periods and flooding during heavy rainfall highlighting the need for improved water management systems. Thus the overall water footprint is always in the negative and hence there is an over reliance on ground water. To add to the woes climate change is also altering monsoon patterns leading to erratic rainfall, more intense downpours and prolonged dry spells.

Therefore an integrated water management approach emphasising on Rain water Harvesting both surface and rooftop, water efficient irrigation, ground water recharge and awareness campaigns need to be stepped up. Seized from this shortfall the Government has started an initiative "Jal Sanchay Jan Bhaagidari" which is a community driven water conservation program launched by the Jal Shakti Ministry. It aims to construct around 24,800 rainwater harvesting structures. It is the duty of every citizen to support this initiative and contribute their part so as to ensure long term sustainability.

Building Water Independence – One Drop at a Time

This issue of *Indian Plumbing Today* focuses on the theme of **Rainwater Harvesting**—a subject that's more relevant than ever in the face of urban water stress. We've curated an engaging lineup of articles and case studies demonstrating how rainwater harvesting, whether at a household or community scale, can pave the way to water independence.

This edition also explores exciting innovations—from modular rainwater harvesting structures ideal for space-constrained urban areas to data-driven recharge systems that make water management more intelligent and efficient.

IPPL 2025: In a new Avatar

We're excited to announce the launch of IPPL 2025, now reimagined with joint certification from NSDC (National Skill Development Council) and IPA. If you know building professionals who are looking to enhance project delivery, elevate plumbing quality standards, and drive cost-effectiveness, then Indian Plumbing Professionals League is the platform for them.

We urge all members to become IPPL ambassadors and help us spread the word about this national knowledge initiative, which will be conducted across IPA Chapters from August to October.

IPA Neerathon: 3rd Edition to kick off soon

IPA Neerathon – Run4Water returns with events in Chennai, Bengaluru, and Delhi in September, October, and December respectively. This chapter initiative by IPA extends the message of water conservation beyond the plumbing fraternity and into the wider public.

You can find more information in the Future Events section of this issue or by visiting ipaneerathon.com.

Together, let's continue to be champions of change for a water-secure future.

Sharat V. Rao
Managing Editor, Indian Plumbing Today
National Joint Secretary, Indian Plumbing Association

CONTENTS

PRINCE PIPES

Skolan safe | PREMIUM SILENT PP DRAINAGE SYSTEM

Product Range | **Pipes & Fittings :** 58, 78, 90, 110, 135, 160, 200mm

Ostendorf Kunststoffe | MADE IN GERMANY

- Noise insulation 12db @ 2 lps flow rate
- Polypropylene with mineral filled compounds
- Patented 3 lip seal guarantees leak-proof installation
- High impact resistance
- Chemical resistance can handle waste liquids with pH value of 2 to12

PRINCE PIPES AND FITTINGS LIMITED

info@princepipes.com | www.princepipes.com | **Toll Free: 1800 267 7555** (Please call between 10 am to 6 pm) | 6399 489 999

For Guaranteed **Trouble-Free Service**

SANT

VALVES

SINCE 1953

BRASS . BRONZE . CAST IRON . CAST STEEL . STAINLESS STEEL . FORGED STEEL

SANT VALVES

Suitable for

WATER . OIL . GAS . STEAM . AIR

IBR . BIS . ISO 9001 : 2015

Certified

Other products by SANT GROUP

- Water Meters / Flow Meters
- Forged MS Pipe Fittings
- DI Pipe Fittings (UL / FM)
- Composite Pipe & Brass Fittings
- Malleable Pipe Fittings

info@santvalves.com
www.santvalves.com

Sant Valves Pvt. Ltd., G.T.Road By Pass, Jalandhar 144012 (Pb.)
P : 0181 508 4693/94/95, 260 2522, 260 3074 F : 0181 506 2270

Rooftop Rainwater Harvesting:

A Supplemental Solution for Water Scarcity

- S. Vishwanath

Rainwater harvesting (RWH), the practice of collecting and storing rainwater for later use, is gaining traction in many urban areas including Bengaluru, India. This surge in popularity stems from two key factors:

1. **Government Mandates** – Most new buildings must now install RWH systems to qualify for a municipal water connection or comply with building bye-laws.
2. **Depleting Groundwater** – Many areas in the city lack piped water supply, forcing residents to rely on fast-depleting groundwater either through borewells or water tankers. RWH provides a crucial supplementary source.

In India, rainwater harvesting encompasses both direct storage in tanks and managed aquifer recharge (replenishing groundwater). Effective RWH design requires understanding local rainfall patterns-intensity, distribution, and total precipitation. Bengaluru receives 970 mm of annual rainfall, spread across 8 months, with peak intensity reaching 180 mm/hour but for a few minutes. Since rainfall is well-distributed, storage requirements are more manageable than in regions with short, intense monsoons.

Rainfall pattern: The source of rainfall data is usually the Indian Meteorological Department (IMD). However, state level data may be available from other sources such as the Karnataka State Natural Disaster Monitoring Centre (KSNDMC) which has its own weather stations and collects much more granular data. While a monthly rainfall data is good enough for a basic design, for more sophisticated and well calibrated design daily rainfall data with a demand supply balance will help optimise both storage and recharge systems.

Most of India would have a monsoon season of four months but some cities can differ. Bengaluru for

example has a bi-modal peak with one peak in May followed by another in September. Well distributed rainfall can make for smaller storage structures and thus reduce cost of rainwater harvesting.

Rainfall Data: Bengaluru

Month	Rainfall (mm)	Rainy Days
January	1.9	0.2
February	5.4	0.4
March	18.5	1.1
April	41.5	3.1
May	107.4	6.7
June	106.5	6.2
July	112.9	7.2
August	147.0	9.9
September	212.8	9.8
October	168.3	8.3
November	48.9	3.8
December	15.7	1.4
TOTAL	986.9	58.1

Systems: A well-planned RWH system includes:

- **Catchment** (roofs, paved surfaces) – Catchments need to be clean and easy to access and maintain. One improvement is to use heat reflective paints to cool the inside but also to be cleaned easily. The coefficient of run-off of such roofs is also high.
- **Conveyance** (gutters, pipes) – Generally of PVC, they should also be designed to be cleaned easily especially leaf litter.
- **First rain separation** (to discard initial runoff containing pollutants) – Usually designed to separate the first 2 mm of rainwater which has the maximum dust and debris.
- **Filtration** – Can be DIY (do-it-yourself) using sand, gravel and charcoal. Many ready-made filters are now available in the market designed specifically to keep the water clean. These are mostly pre-filters before storage or recharge. If rainwater is stored, post filters can also be designed based on the quality of water required.
- **Storage** - (tanks, barrels, sumps)
- **Recharge** (replenishing groundwater via wells or percolation pits) – Recharge structures have to be designed carefully. Of special importance is that the catchment should be clean and free from contaminants such as sewage or solid waste. Based on the lithological and aquifer characteristics and ability to absorb water recharge structures need to be designed and implemented.

Often, RWH is treated as an afterthought—tacked onto a project at the end, leading to **aesthetic and functional inefficiencies.** However, when integrated **early in the design process**, it enhances both efficiency and visual harmony.

IS – 15797:2008 Guidelines for rooftop rainwater harvesting is a standard document for reference in designing rainwater harvesting systems. IS: 2527: 1984 is another referral document for example in sizing rainwater pipes for rooftop drainage.

IS : 2527 - 1984

TABLE 3 SIZES OF RAINWATER PIPES FOR ROOF DRAINAGE

Sl No.	Dia of Pipe	Average Rate of Rainfall in mm/h					
	mm	50	75	100	125	150	200
		Roof Areas, m²					
i)	50	13·4	8·7	6·6	5·3	4·4	3·3
ii)	65	24·1	16·0	12·0	9·6	8·0	6·0
iii)	75	40·8	27·0	20·4	16·3	13·6	10·2
iv)	100	85·4	57·0	42·7	34·2	28·5	21·3
v)	125	—	—	80·5	64·3	53·5	40·0
vi)	150	—	—	—	—	83·6	62·7

5.3.4 A bell mouth inlet at the roof surface is found to gives better drainage effect provided proper slopes are given to the roof surface. The spacing of pipes depends on the position of windows and openings but 6 m apart is a reasonable distance.

The following projects demonstrate how RWH can be seamlessly incorporated into design from the outset.

Case Study 1: Sans Souci Residence

Location: Northern Bengaluru

Plot Size: 1,500 sq ft

This single-family home maximizes rainwater collection through a **multi-level system**:

1. Rooftop Harvesting

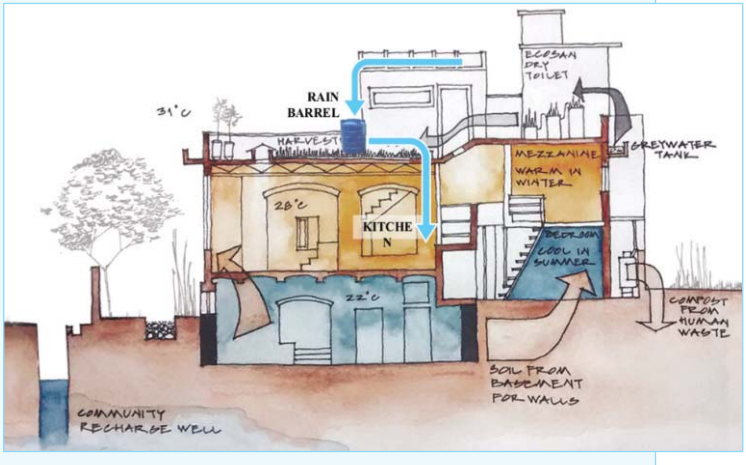
- The sloped roof, coated with **heat-reflective white paint,** directs rainwater into a **rain barrel.**
- A small filter purifies this water for **drinking and cooking.**

2. Ground-Level Collection

- Additional rain barrels at the rear collect water from another roof section.
- This water is pumped to the terrace for bathing and laundry (rainwater's softness reduces detergent use).

3. Underground Storage & Recharge

- An underground tank stores both municipal supply (available only 2–3 days/week) and filtered rainwater.



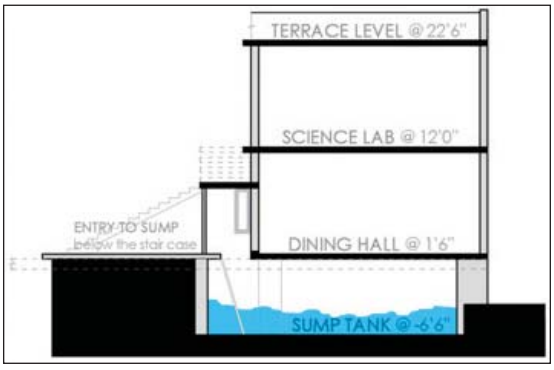
- Excess runoff from paved areas feeds a **12-ft-deep recharge well**, replenishing groundwater.

Case Study 2: Private school in North Bengaluru

Location: Northern Bengaluru

Site Area: 0.43 acres – Roof area 7300 sq.ft.

Built on a partly rocky plot, the school's design minimizes foundation costs while prioritizing water conservation:



From a 7300 square feet roof area rainwater is collected in the 60,000 litre sump tank

1. Rooftop Collection

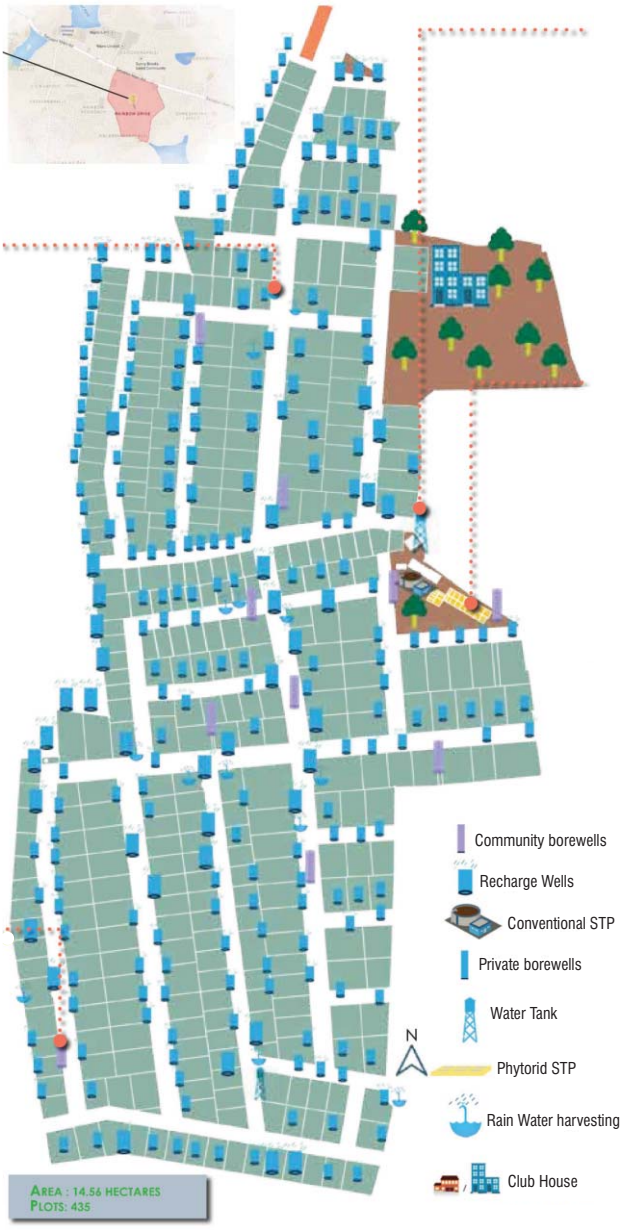
- A **60,000-litre underground tank** captures rainwater from a **7,300 sq ft terrace**, supplying **drinking and cooking water.**
- The tank's top doubles as the dining area floor.

2. Stormwater Harvesting

- Filtered stormwater is stored in a second tank for **limited irrigation** (native, drought-resistant plants only).

3. Closed-Loop Water System

- **Blackwater** and greywater is treated in a wastewater treatment plant and reused for flushing, eliminating external water dependency.



Case Study 3: A gated community

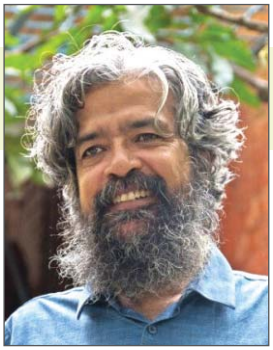
Situated in the east of the city with no connections to the city water network the community was dependent on groundwater for all its needs. By banning individual private borewells, drilling community level borewells, metering every connection and fixing a tariff for water the community was able to become sustainable for water. A Wastewater treatment plant was set up and it supplied treated used water to every household free of cost.

Most importantly it mandated rainwater harvesting for every house. Many of the 300 individual homes in the community collected rainwater but almost all made recharge wells to place rainwater into the aquifer. This not only brought up the groundwater table but also made water availability sustainable.

Key Takeaways

- Early integration of RWH ensures efficiency and aesthetic cohesion.
- Multi-use systems (e.g., combining municipal and rainwater storage) cut costs.
- Closed-loop designs (like Buddhi School's wastewater recycling) can eliminate external water needs.

By treating rainwater harvesting as a core design element, Bengaluru's community is paving the way for sustainable urban water management.



Ar. Vishwanath Srikantaiah, Rainman of Bengaluru
Co-Founder, Biome Environmental Solutions

Vishwanath founded Biome Environmental Solutions in 1998 with his wife Vidya Vishwanath. Also known as "Zen Rain Man," he is a water activist and vlogger who is known for his work in rainwater harvesting and sustainable sanitation. He founded the Rainwater Club, an NGO based in Bengaluru, which serves as a platform for conversations and information sharing about rainwater harvesting.

He is a graduate from the prestigious BMS College of Architecture Bangalore, having national and international experience as a Designer. He can be reached on zenrainman@gmail.com.

Sudesh Group
35 Years of excellence

APL APOLLO WATER TANKS
Made for life

Revolutionizing water storage
Ensures safety in every drop

SilverX
NANO SILVER TECHNOLOGY

- Long-Lasting Protection
- Improved Water Quality
- Reduced Risk of Waterborne Diseases
- Maintenance-Free
- Non-Toxic and Safe

ANTI MICROBIAL 3 LAYERS PROTECTION

Available Colors

Available Sizes

500, 700, 1000, 1500, 2000, 3000, 5000, 7500 and 10,000 Ltrs.

15 YEARS WARRANTY *T&C Apply

1800-121-3737 | 8130098024 | www.apollopipes.com | Follow us on:

ENGINEERING GROUNDWATER WISDOM

How LD College of Engineering - Ahmedabad

Pioneered a Data-Driven Rainwater Recharge System

A first-of-its-kind initiative integrates students, science, and sustainability to secure the future of groundwater on a historic Indian campus.

- Tejas Joshi, Niral Shah & Biplabketan Paul

Abstract

Despite receiving adequate annual rainfall, India continues to experience severe groundwater stress, largely due to poor rainwater conservation practices, excessive extraction, and limited public and academic understanding of hydrogeological systems.

To address these challenges, L.D. College of Engineering (LDCE), Ahmedabad, has implemented a scientifically designed, data-driven groundwater recharge system within the campus. This initiative integrates essential hydrogeological methodologies with student-led implementation, offering a replicable framework for sustainable water management in institutional settings.

The project pursued two core objectives:

(1) To develop a robust groundwater recharge system tailored to local geological and hydrological conditions.

(2) To cultivate young water professionals by involving students in each stage of the initiative, from field investigation to infrastructure deployment and monitoring.

The initiative is supported by the Climate Change Department of Gujarat and the Gujarat Energy Development Agency (GEDA), adopting a multi-stage methodology grounded in empirical science.

The project was carried out from inception to maintenance under kind leadership of Dr Chaitanya Sanghvi (Professor & HOD – Applied Mechanics) and support of other academicians and mentors of the college.

Geophysical resistivity surveys were employed to identify aquifer-bearing zones, followed by terrain analysis to optimize recharge well placement. Historical rainfall data (more than 30 years) and real-time water usage metrics informed system design parameters. Students actively participated in core technical activities, including soil sampling, sieve analysis, electro-logging, and lithological profiling, gaining practical experience in environmental and geotechnical engineering.

The recharge system includes smart water meters and a centralized digital dashboard for real-time monitoring and remote data access. Since commissioning in December 2023, the system has recharged over 540 cubic meters of groundwater and is eligible for water credit certification under emerging sustainability frameworks.

This initiative exemplifies how academic institutions can serve as testbeds for climate-resilient infrastructure, bridging scientific knowledge and applied engineering. The LD College of Engineering model offers a scalable solution for achieving net zero water goals while empowering future engineers with hands-on expertise in sustainable groundwater management.

Introduction: Recharging What Lies Beneath

India receives more than enough rain annually to meet its domestic and agricultural water needs. Yet, regions across the country face chronic water scarcity. This contradiction arises not from a lack of water, but from the **inability to capture, store, and recharge it effectively.** As cities expand and impermeable surfaces multiply, rainwater runoff is lost instead of replenishing vital aquifers.

In this context, **L.D. College of Engineering (LDCE), Ahmedabad**—one of India's oldest and most respected engineering institutions—undertook a strategic initiative: to **design and implement a scientific groundwater recharge system on campus,** while using it as a live educational platform for student involvement.

Context: Groundwater Misconceptions and the Need for Scientific Thinking

Public perception of groundwater is often rooted in myths. One common belief is that underground rivers flow beneath us. In reality, water exists in the interconnected voids between soil grains and within fractures of rocks. The storage and movement of groundwater depend entirely on the physical properties of the subsurface material.

Despite this, hydrogeology remains underemphasized in both academic curriculum and policy planning. Most groundwater-related data in India is generalized, based on assumption or historical averages, with limited site-specific measurement. As a result, groundwater planning often lacks scientific credibility, especially in urban and peri-urban environments where usage is high and recharge is minimal.

LDCE's initiative was structured around eliminating these knowledge gaps through data-driven design, technical validation, and real-time monitoring.

Campus Profile and Water Demand

Established in June 1948, LDCE is located at coordinates **23.03393°N**, **72.54651°E** and spans approximately **77 acres.** The campus includes academic departments, hostels, laboratories, offices, and residential quarters. With a student body of over 6,000, the daily water demand is substantial, especially for:

- Hostel and sanitation facilities
- Building floor maintenance
- Landscape irrigation

Most of this demand is met through **borewell-based groundwater extraction**, with limited rainwater harvesting infrastructure.

Objectives and Strategic Collaboration

Primary Objective

To create a groundwater recharge system capable of supporting the long-term water needs of the campus, with data-backed design and future scalability.

Secondary Objective

To develop young water professionals by directly involving students in field investigations, system design, and implementation processes, thus fostering technical competence and environmental stewardship.

This initiative was jointly supported by the Climate Change Department of Gujarat and the Gujarat Energy Development Agency (GEDA).

Scientific and Technical Methodology

The project methodology followed a multi-phase approach with a clear technical roadmap. Each decision was based on quantifiable field data and validated through scientific tools.

1. Resistivity Survey for Subsurface Mapping

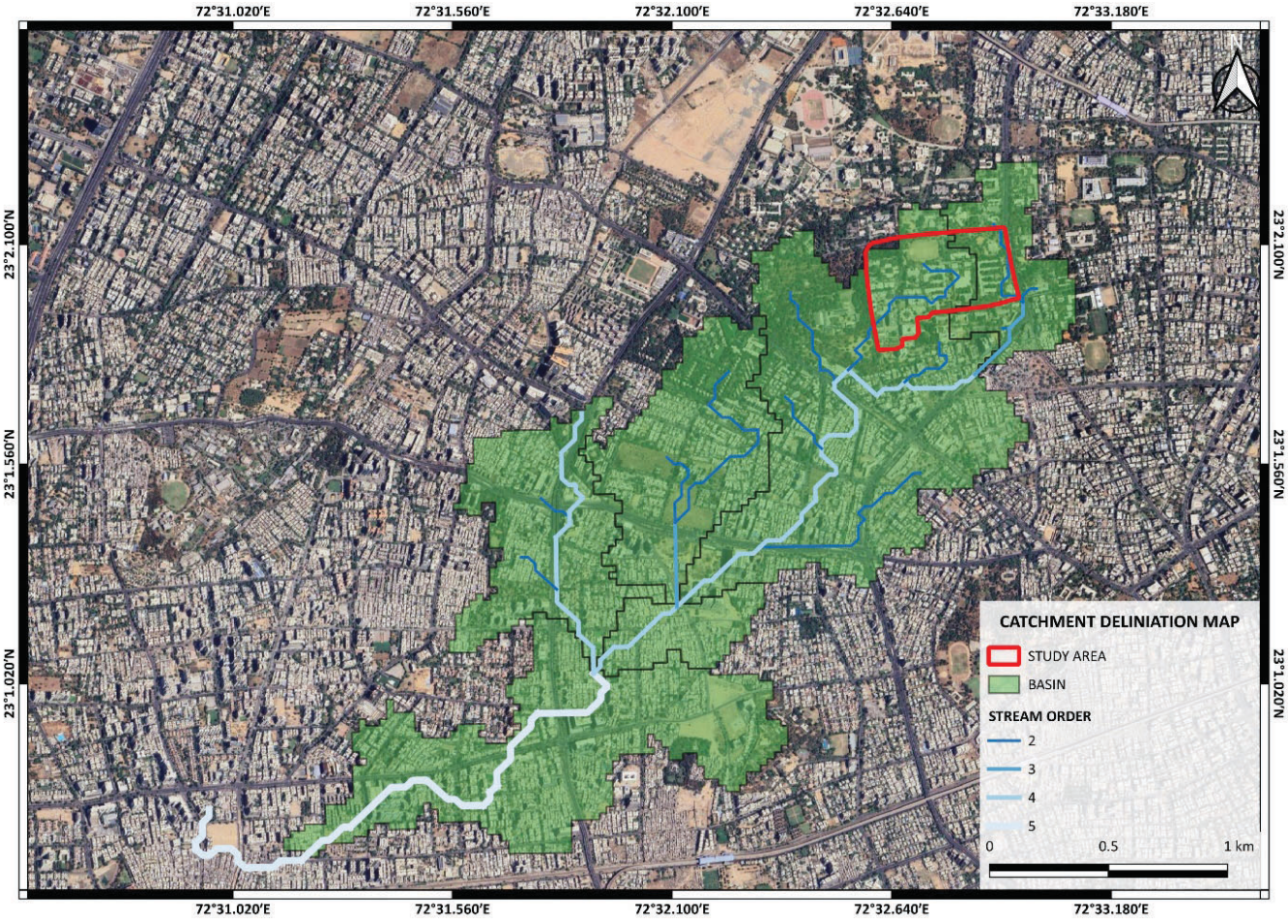
A detailed geophysical survey was conducted to map subsurface geology. The resistivity results revealed the depth of aquifer-bearing formations—identifying **porous and permeable zones ideal for recharge.**

2. Water Demand Estimation

Actual on-site water flow was measured from taps and washrooms, while borewell pumping durations and student occupancy data were used to calculate **daily and seasonal water requirements**. This ensured that the recharge system could be designed with a target capacity in mind.

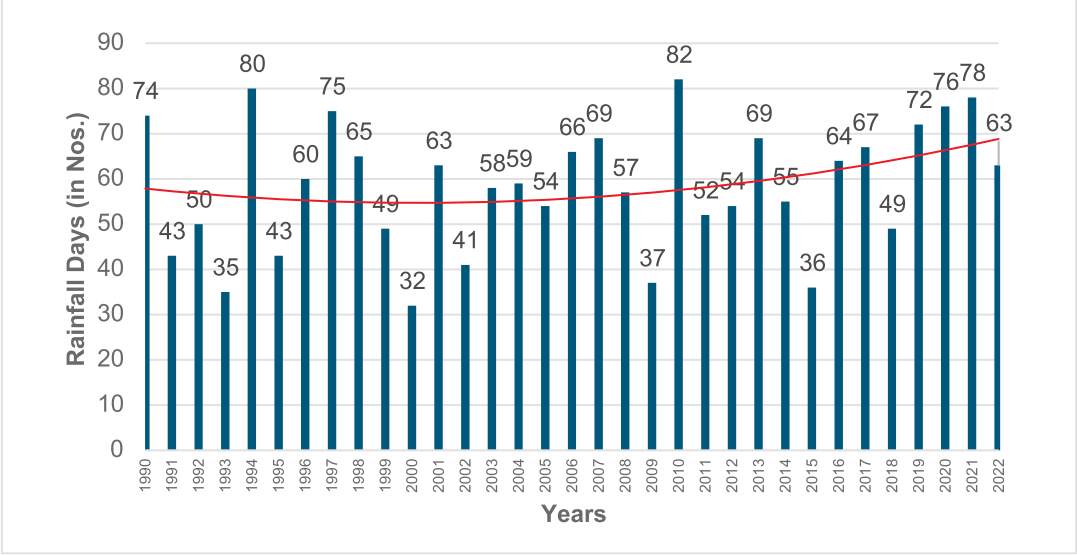
3. Watershed Positioning

Surface runoff patterns were mapped using **natural slope gradients and terrain analysis** to determine the best locations for diverting rainwater into recharge structures. The campus boundary was evaluated and identified that it lay within the **upstream zone of the local watershed** and natural surface flow is observed from northeast to southwest direction.



4. Historical Rainfall Data Analysis

More than thirty years historical rainfall data was analysed to determine the number of effective rainy days per year. This enabled precise estimation of **potential annual recharge volume.** (Data source – Indian Meteorological Department - Pune)

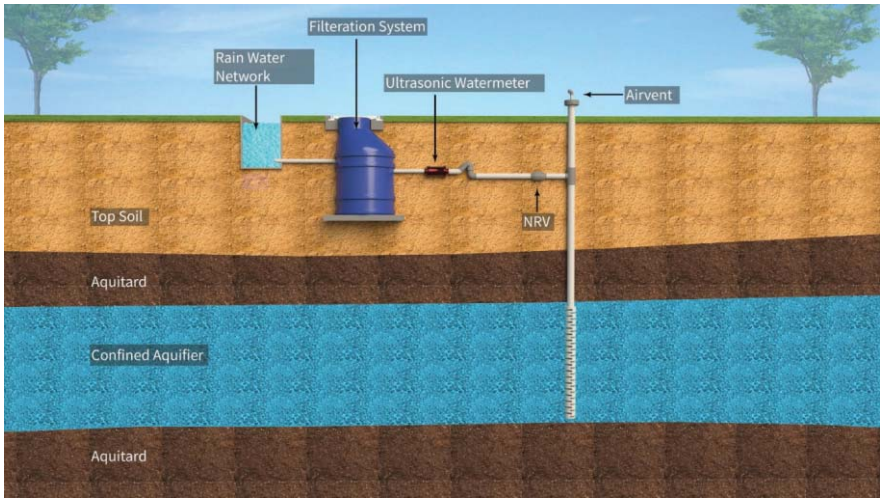


Student Involvement and Learning Outcomes

Students played a central role in executing various field and laboratory activities under expert supervision:

- **Soil sample collection** during bore drilling to compare with resistivity data
- Creation of a **litho-pipe**, a vertical miniature showing actual soil strata for academic display
- **Sieve analysis** to assess grain size distribution and porosity
- **Electro-logging** to validate subsurface layers and water-bearing zones
- Final **pipe assembly design**, tailored to real geological data
- Installation of **filter chambers, water meters,** and surface inspection units
- **Tanker recharge testing** to determine percolation and infiltration rates

These activities offered hands-on learning in **geotechnical engineering, hydrology, environmental design,** and **real-time monitoring systems**—skills that are rarely addressed in typical undergraduate coursework.

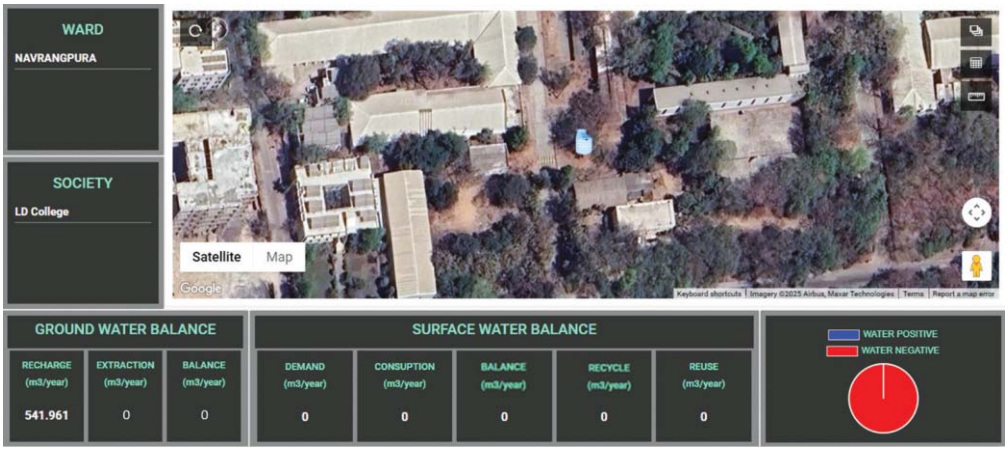


Real-Time Monitoring and Smart Infrastructure

To convert the recharge wells into smart infrastructure, the following components were added:

- Digital water meters to track recharge volumes
- A centralized dashboard that records and displays recharge data at set intervals
- Optional integration for remote access and analysis of recharge rates over time

This level of instrumentation ensures that recharge data is authentic, measurable, and reportable, forming the basis for future expansion, auditing, and even monetization through water credits. Total 540 Cumt water is recharged since its commissioning date of December 2023.



Outcome and Legacy

Key Results:

- Functional recharge wells designed using scientific methods
- Student-led validation of design assumptions with field data
- **Water credits eligibility** backed by measured recharge data
- Live dashboard enabling **data-based water infrastructure planning**
- Regular maintenance by LDCE staff to ensure long-term performance

This project has become a **model for campus-based water sustainability**, demonstrating that infrastructure projects can be integrated with **learning ecosystems** to foster a generation of water-aware professionals.

Scalability and Next Steps

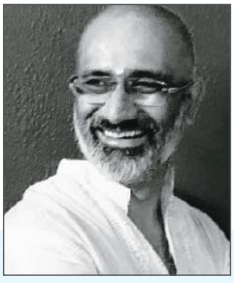
The system now provides a **template** for other colleges, institutions, and government campuses to:

- Quantify their water footprint
- Design recharge structures scientifically
- Use real-time data for achieving **net zero water goals**

Conclusion

What began as a technical pilot at LD College of Engineering has evolved into a landmark in educational sustainability infrastructure. It not only addressed groundwater depletion on a practical level but also filled a critical educational gap by demystifying hydrogeology for students.

The project proves that with the right data, the right tools, and the right involvement, even complex environmental problems like groundwater recharge can be solved—one well, one student, and one drop at a time.

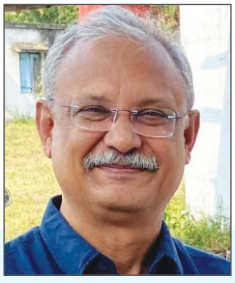


Tejas Joshi
Founder
Space Elements

Tejas Joshi is a seasoned sustainability professional with nearly 30 years of experience in the domain of sustainable development and ecological planning. He is a Sustainability Expert and a hydrological Strategist. He leads Space Elements, a HSGF design consultancy based in Ahmedabad, recognised for its cutting-edge work in hydrology-integrated design, bringing together surface water, groundwater, and flood analysis under a unified framework. Space Elements is an empanelled consultant for aquifer mapping for the Gujarat Urban Development Mission under the AMRUT 2.0 initiative. Tejas can be reached on tejas@space-elements.in.

Niral Shah
Managing Director
of Aquatics Group of Companies

Niral Shah is a seasoned water solutions professional with over two decades of hands-on experience in designing, implementing, and scaling sustainable water infrastructure across India. As Managing Director of Aquatics Group of Companies, Mr. Shah has played a key role in shaping solution design strategies alongside leading technical consultants. His deep involvement in project procurement, plant commissioning, and team development has made him a trusted advisor in both industrial and building services segments. He is an active Executive Committee Member of the Indian Plumbing Association (Ahmedabad Chapter) and a vocal advocate for policy reforms, industry best practices, and technical innovation in water management. He can be reached on niralshah@aquaticsindia.com.



Biplabketan Paul
Director, Naireeta Services & SGIF;
Board Member, Gujarat Ecology Commission

Biplabketan Paul is a globally acclaimed expert in water management, climate change, DRR & Innovation with footprints across India, South East Asia, East Asia and Africa. He is the innovator of BHUNGROO®, a unique drought and flood defeating technology. He is the sole Indian, who has been felicitated by Hon President of India, Rwandan President and US President for his water innovation. He is a member of the jury and mentors of the IIT Kanpur's Innovation & Incubation Center; he is also jury of India government's DST's BIO-innovation program as well as UN's Climate Innovation Lab. He is also one of the directors of Gujarat Ecology Commission (a state PSU). He can be reached on biplab@naireetaservices.com

LEAKPROOF PIPES

INFINITE PEACE OF MIND

birlanu
LEAKPROOF PIPES

BUILD YOUR WORLD

TRUFiT TECHNOLOGY

- Comprehensive Range
- Sustainable Solutions
- Innovative Solutions*
- In-House CPVC Compound**

Get in touch

*India's 1st 100% Heavy Metal free uPVC Range
**India's 1st In-House CPVC Compound (under patent)

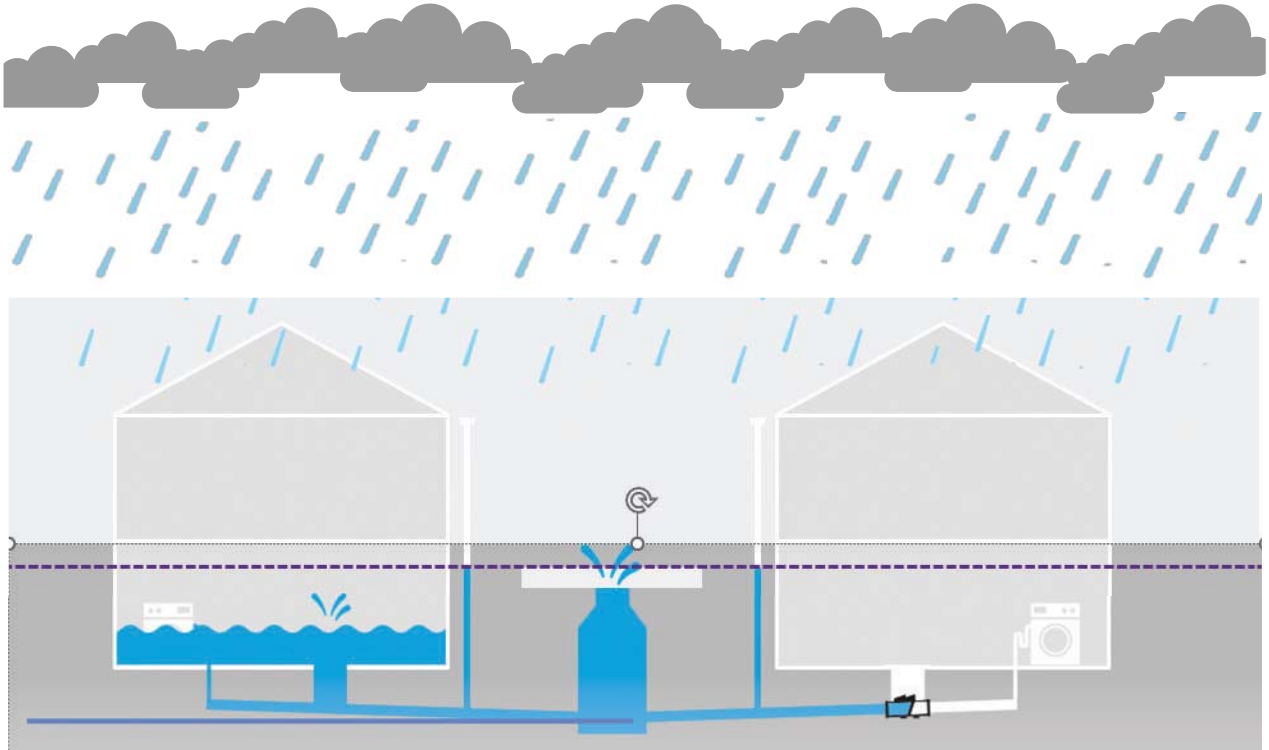
GLOBAL PERSPECTIVE

Mastering Backwater

Smart Solutions for Safety and Continuity

- Roland Priller

Everything specialists must know!
What is back water and which criteria must be considered for the correct product choice?
A guideline to understand the risks and select the safest and most economic solution.

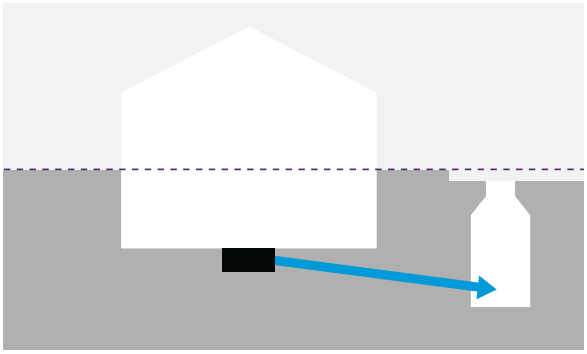


Water drainage without back water protection: Heavy rain, clogging or overloading of the public sewer system may reverse the flow of waste water and flood connected buildings and properties. This causes severe damage and health risks.

Water drainage system with backwater protection:
Anti flooding devices prevent against back water by automatic closure of the flap. If dewatering is also required during backwater or the slope to the sewer is insufficient, pumps with a back water loop must be used.

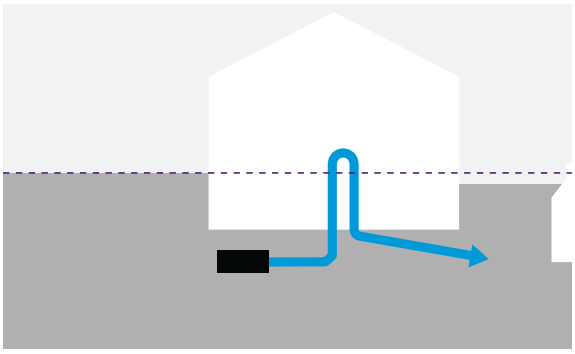
Flooding from backwater can cause extensive damage, costly repairs, and significant downtime. Properly specified backwater protection safeguards buildings—especially those with basement or cellar installations—against rising sewer levels. This article outlines the problem, key criteria for product selection, and proven solutions for comprehensive backwater protection.

Slope to the public sewer



Sufficient slope to the public sewer

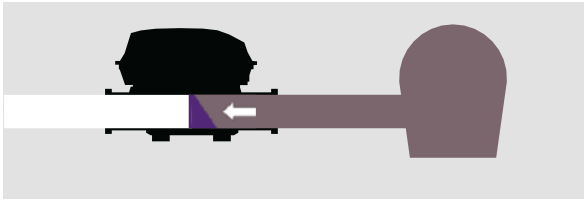
Hybrid lifting system or waste water lifting pumps with back may flow loop may be used in any case. If drainage is not required during backwater, also back water valves may be applied.



Insufficient slope to the public sewer

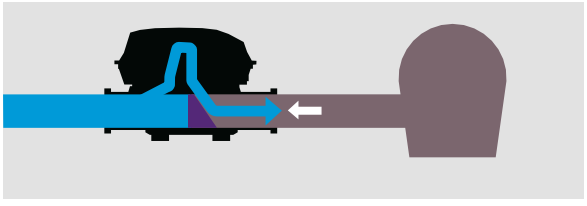
If the public sewer is higher than the basement level, the wastewater must be lifted to the sewage pipe with a lifting pump via a backwater loop.

Function of hybrid lifting system



Protects in the event of backwater

A backwater valve system prevents wastewater from the public sewer from backing up through the drainage pipe and flooding the building.



Disposes in the event of backwater

Despite backwater from the public sewer and closed backwater flap(s), domestic waste-water can be disposed of via a pump system. This ensures that the building's drainage system functions even in the event of backwater.

Understanding the Threat of Backwater

Backwater occurs when sewer levels rise—typically due to heavy rain, blockages, or hydraulic overload—and cause sewage to flow backward into a building's drainage system. This reverse flow leads to severe flooding of sanitary appliances located below the flood level, resulting in structural damage, contamination, and significant health and financial risks.

Assessing the Risks

Key impacts of backwater flooding:

- Structural damage and loss of assets
- Electrical and mechanical system failure
- Health hazards from contamination
- High repair and insurance costs

Choosing the Right Protection System

Before selecting a backwater protection solution, specialists must evaluate:

- Flood level in relation to sanitary appliances
- Type of wastewater (rainwater, greywater, or blackwater)
- Whether uninterrupted drainage is required during backflow
- Slope to the public sewer
- Location of installation (centralized or decentralized)
- Risk of vermin, corrosion, or difficult access
- Maintenance requirements and ease of inspection

◆ Types of Backwater Protection Systems

1. Passive Backwater Protection

These systems rely on gravity and simple mechanical components. A flap closes automatically during backflow, preventing sewage ingress.

Type of Water	Flap System & Closure Mechanism
Rainwater	1 mechanical flap (gravity-activated)
Greywater (no faeces)	2 mechanical flaps + emergency closure (gravity)
Blackwater (with faeces)	Electrically powered closure + emergency backup

- Ideal for systems where slope to sewer is sufficient
- Requires regular inspection and easy-to-use, tool-free maintenance

2. Wastewater Lifting Systems

Used when drainage must continue even during backflow. These systems collect wastewater and lift it over a backwater loop using a pump.

✔ Ensures continuous drainage

⚠ Requires dependable maintenance to prevent pump failure

3. Hybrid Lifting Systems: The Smart Alternative

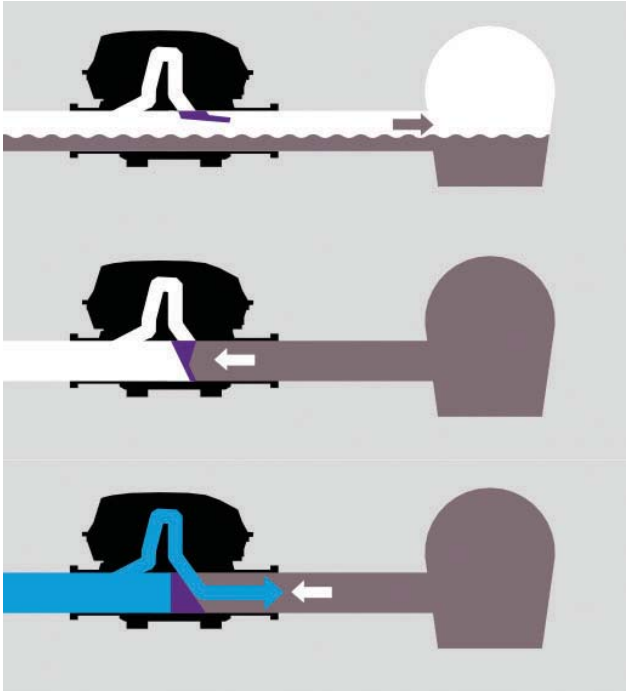
A hybrid system combines gravity drainage and pump support:

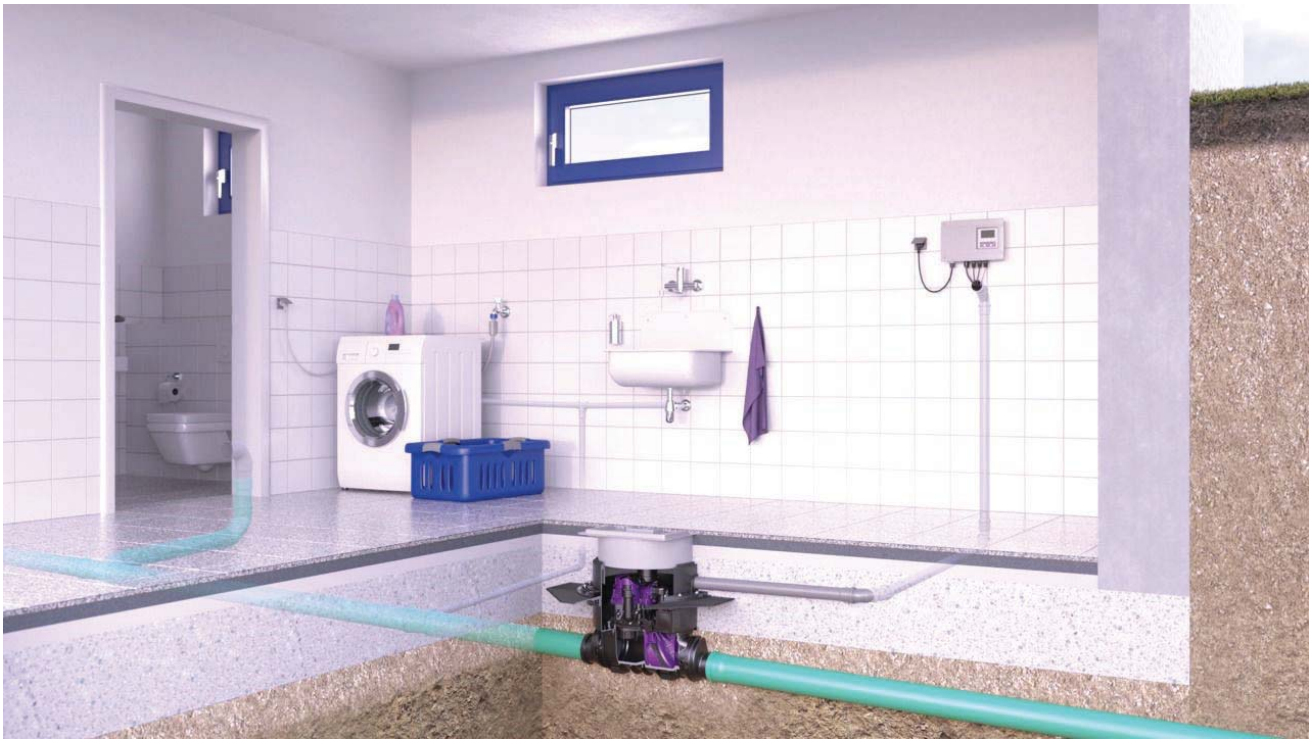
- Under normal flow, wastewater discharges via gravity
- During backwater, a flap closes and a pump lifts wastewater over the backwater loop
- Smart systems can provide emergency drainage even during power failure via backup mechanisms

Example:

Pumpfix F

- Automatically switches between gravity and pump
- Handles greywater, blackwater, and emergency heating system overflows
- Maintains drainage even in failure conditions





4. Pipe Flap Valves: Open-End Protection

For pipes discharging into rivers, lakes, or stormwater channels, these fully passive polymer valves:

- Prevent backflow and vermin intrusion
- Require no power or sensors
- Support pipe sizes from Ø110 mm to Ø1000 mm
- Are ideal for seawater, leachate, ponds, and stormwater systems

5. Design and Maintenance Considerations

- **Quick-release closures** enable tool-free cleaning
- **Modular components** simplify repairs
- **Polymer construction** resists corrosion, salt, and chemicals

Conclusion

Backwater protection is not optional—it's critical for building resilience. By choosing the appropriate solution—whether passive, active, hybrid, or flap valves—engineers can prevent catastrophic flooding and ensure operational continuity. Regular maintenance and thoughtful system design are key to long-term reliability.

Roland Priller
Expert Manager
Dipl.-Ing., KESSEL SE + Co. KG

Based on more than 40 years of wastewater experience, Roland Priller became responsible for standardization and product compliance as an expert manager at KESSEL SE + Co. KG. Since more than 20 years he is involved in international standardization of wastewater products and drainage systems on the DIN, CEN and ISO level. Being also involved in the innovation process, he accompanied many developments from the first idea to market implementation.

Nowadays he shares his knowledge with design engineers and wastewater authorities as a speaker or author at technical platforms.

LEADER VALVES LIMITED

SINCE 1950

VALVES FOR PLUMBING, FIRE FIGHTING, HVAC, POWER, OIL & GAS, CHEMICAL, PHARMA, STEEL, SUGAR, CEMENT, SOLVENT, TEXTILE, MARINE

AAP KA LEADER DIL SE INDIAN

OUR PRODUCTS

BRASS / BRONZE / GUN METAL VALVES • CAST IRON / DUCTILE IRON VALVES • BOILER MOUNTINGS
FORGE FITTINGS • CAST STEEL VALVES • FORGED STEEL VALVES

ISO 45001:2018 BUREAU VERITAS Certification · UKAS QUALITY MANAGEMENT 008 · CE 0343 · TÜV NORD AD 2000-merkblatt W0 · License No. : 6D-0346 For Ball Valve, Check Valve License No. : 6DD-0018 For Bolted Bonnet Steel Gate Valve · IS : 778 IS :13114 IS :13095 IS :14846 · IBR APPROVED · IRCLASS Indian Register of Shipping

LEADER VALVES LIMITED

S-3, S-4, Industrial Town, Jalandhar-144 004 (India). Ph. : 0181-2490666, 777, 888, 999 Fax : 0181-2290894
E-mail : info@leadervalves.com, Website : www.leadervalves.com

Rainwater Harvesting in 2025:

Sustainable Solutions

- Nirav Saraiya

As cities across India confront growing water stress, unpredictable monsoons, and rising demand for sustainable infrastructure, **rainwater harvesting (RWH)** has emerged as one of the most practical and impactful solutions for both urban and semi-urban areas. In 2025, this isn't just a compliance requirement or an eco-conscious gesture—it's a strategic investment in long-term water security, sustainability, and climate resilience.

Today's RWH systems are engineered using advanced **hydrogeological assessments, multi-layer filtration systems**, and dual-mode recharge-storage units that either replenish groundwater aquifers or store clean water for reuse. In metro cities—where monsoon runoff often leads to waterlogging—properly designed RWH infrastructure can significantly reduce urban flooding while also replenishing depleting water tables.

The success of any RWH system depends on a combination of factors: local rainfall intensity, rooftop area, soil percolation characteristics, and a scientifically planned filtration and recharge mechanism. Even a medium-sized residential complex with a catchment area of 10,000 sq. ft. can harvest and recharge nearly **9 lakh litres of rainwater** during a single monsoon season. With proper maintenance, the system can last over **25 years**, with filter replacements being the only recurring cost.

Authors' organization working in the area of rainwater Harvesting has designed prestigious RWH systems for iconic sites like the **Prince of Wales Museum (Mumbai), NMMC Head Office (Navi Mumbai), Godrej Industries Ltd. (Gujarat), and Mahindra & Mahindra (Zahirabad) & many other Public / Private sector organizations.** Each of these projects was tailored to suit the specific geological and hydrological conditions of the site, ensuring not only maximum water collection but also long-term recharge capacity and water quality safety.

In today's urban planning, aesthetics matter just as much as efficiency. These rainwater harvesting systems are designed to blend invisibly into the landscape—whether it's underground filtration tanks, smart grates on paved surfaces, or integrated rooftop systems. For high-end residential towers and green-certified campuses, the firm offers **custom-built concealed systems** that combine rainwater reuse with groundwater recharge, all while maintaining the architectural elegance of the space.

The importance of maintaining RWH systems is often overlooked. If integrated with **annual inspections**, easy-to-clean filtration chambers, and **IoT-enabled water level sensors** & Flow meters to ensure real-time system monitoring, Rainwater harvesting can yield great results. The company also offers post-installation support contracts for large facilities to ensure the long-term functionality of the system.

As per government mandates and urban planning laws in several states, plots over 300 sq. m are now required to include RWH systems. Vivaan Water & Enviro Solutions Pvt. Ltd. We must ensure that these implementations are not merely checkbox exercises but are robust, scientifically designed, and engineered to deliver results—helping recharge borewells, improve soil moisture retention, and reduce dependency on external water supply sources.

In a world increasingly vulnerable to water scarcity, efficient rainwater harvesting models stand as a model of what sustainable, scalable, and scientifically sound water management should look like. it's about **restoring balance to our water systems**, one project at a time.

Engaging with esteemed educational institutions and both public and private sector organizations to advocate for effective rainwater harvesting systems and to raise awareness of the long-term consequences of failing to safeguard this critical natural resource is a service to the nation.

Our Success Stories

1. Project: Ambrosial Heights - Santacruz

Significant improvements in groundwater, water reuse, and cost savings were achieved within six months of project implementation. The increment in the groundwater table has been observed after one monsoon.

Size of Rainwater Harvesting Unit (RWH)	:	1Unit
Recharging Pit	:	3.0 Mtr. x 3.0 Mtr. x 3.0 Mtr. Depth
First Flush Chamber	:	0.9 Mtr. x 0.6Mtr. x 1.0 Mtr. Depth
Filter Screen (SS304)	:	6" x 12" dia of 0.5 Mtr. Length.

Key Point: The volume of rainwater generated annually from the rooftop is considered 2.5 mt yearly. 763.34 cu.mt.

Achievement – Earlier there was blackish water turned to be non – potable water. Before implementation the groundwater table was at 55ft, after doing rainwater harvesting implementation groundwater table increased to 22ft.

2. Project: Nav Dariya Mahal – Napean Sea Road

A total of 3,600 cubic meters of rainwater is recharged annually through the implementation of a ROOFTOP RAINWATER HARVESTING system. This sustainable solution has led to a significant improvement in borewell yield, ensuring greater water availability throughout the year.

Size of Rainwater Harvesting Unit (RWH)	:	2 Unit
Recharge pi	:	3m x 3m x 4m depth.
First flush chamber	:	0.9m x 0.6m x 1.0m depth.
Filter Screen (SS304)	:	6" x 12" dia of 0.5 Mtr. Length.

Key Point: The volume of rainwater generated annually has Increased groundwater table and aquifer recharge.

Achievement – Before doing Rainwater Harvesting system the Borewell yield is at 200 L.P.H to 300 L.P.H. After implementation of Rainwater Harvesting system the Borewell yield increased upto 700 L.P.H significantly.

3. Project: Prince of Wales Museum (Chhatrapati Shivaji Maharaj Vastu Sangrahalaya) (CSMVS)- Colaba

- Before the implementation of Rainwater Harvesting, the site relied heavily on borewell water for gardening and flushing, resulting in an inconsistent supply and raising sustainability concerns.
- The daily water requirement for gardening was approximately 10,000 liters, placing significant stress on local groundwater resources.
- **Approximately 50% of rooftop rainwater was effectively captured by redirecting downtake pipes to the borewell.** This project demonstrated the successful integration of rainwater harvesting with borewell systems, promoting healthier vegetation and long-term water sustainability.

Size of Recharging Pit :

Valve Chamber	: 0.9 Mt x 0.9 Mt x 1.2 Mt dept
Recharging Pit	: 5 Mt x 5 Mt x 4 Mt depth
Vee wire screen kit of 3 Mtr lenght installed on mouth of Borewell	

Key Point : After the installation of a rainwater harvesting system, water availability and sustainability improved substantially. The borewell recharging capacity increased to over 35,000 liters per day, enhancing groundwater levels and overall irrigation efficiency.

Regular demonstrations are conducted at the site to educate students, their teachers, and government officials on the benefits of rainwater harvesting and its importance for future generations.

Achievement – Earlier Borewell yield was 3000 L.P.D. After successful implementation of Rainwater Harvesting the Borewell yield drastically increased upto 35,000 L.P.D. Water level increased water quality improved drastically from 35 ft to 18 ft.

Nirav Saraiya
Director
Vivaan Water and Enviro Solutions

Nirav Saraiya, is a seasoned expert and trusted provider of specialized services in Rainwater Auditing, Harvesting, Water Management, and Plumbing Design. With a portfolio of over 10,000 rainwater harvesting projects across India, his work covers a wide range of residential buildings, IT parks, Commercial and Industrial complexes. Under his leadership, several projects have received prestigious certifications, including the USGBC LEED Core and Shell Platinum Certification from the United States and the IGBC National-level Certification for the successful completion of projects across India. He can be reached on vivaan.director@yahoo.com.

KESSEL

Mastering Backwater: Don't Let It Flood!

Smart solutions for every building

Heavy rain, clogging or overloading of the public sewer system may reverse the flow of waste water and flood connected buildings and properties. This causes severe damage and health risks.

Smart backwater protection prevent buildings effectively and increase operational readiness. Go for the safest and most efficient solution!

join us
for a seminar
info@kessel.in

KESSEL INDIA DRAINAGE PRIVATE LIMITED
DSM-158 • 1st Floor • DLF Commercial Tower • Moti Nagar • Delhi-110015
+91 8287955568 • +91 11 4019 4441 • marketing@kessel.in • www.kessel.in

mastering **water**

CENTRE OF INTERNATIONAL PLUMBING PRACTICES

Centre of International Plumbing Practices

An initiative of

Indian Plumbing Association & Goa Engineering College

Experiential Learning and Knowledge Centre

for

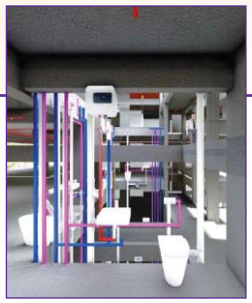
PLUMBING & BUILDING FRATERNITY

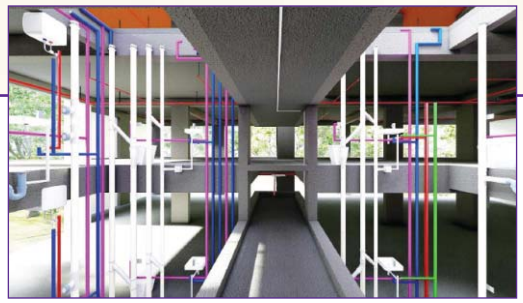
Centre of International Plumbing Practices

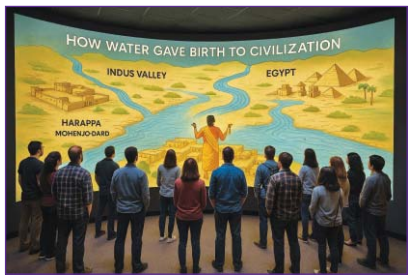
To demonstrate latest plumbing products, equipment and fittings

A need of every modern built space

Office I Residential I Hotels I Hospitals I Institutions and like







An artistic view of Live demonstrations in the COIPP building

COIPP Team meeting Sh. Pramod Sawant, Honourable CM of Goa

Actual Site image as on June 2025

An appeal to
Donate Generously
under 80 G of IT act and
under CSR

INDIAN PLUMBING ASSOCIATION
416, DLF Prime Towers, F-79 & 80,
Okhla Phase –I, New Delhi 110020
Email: hq@indianplumbing.org,
goa@indianplumbing.org

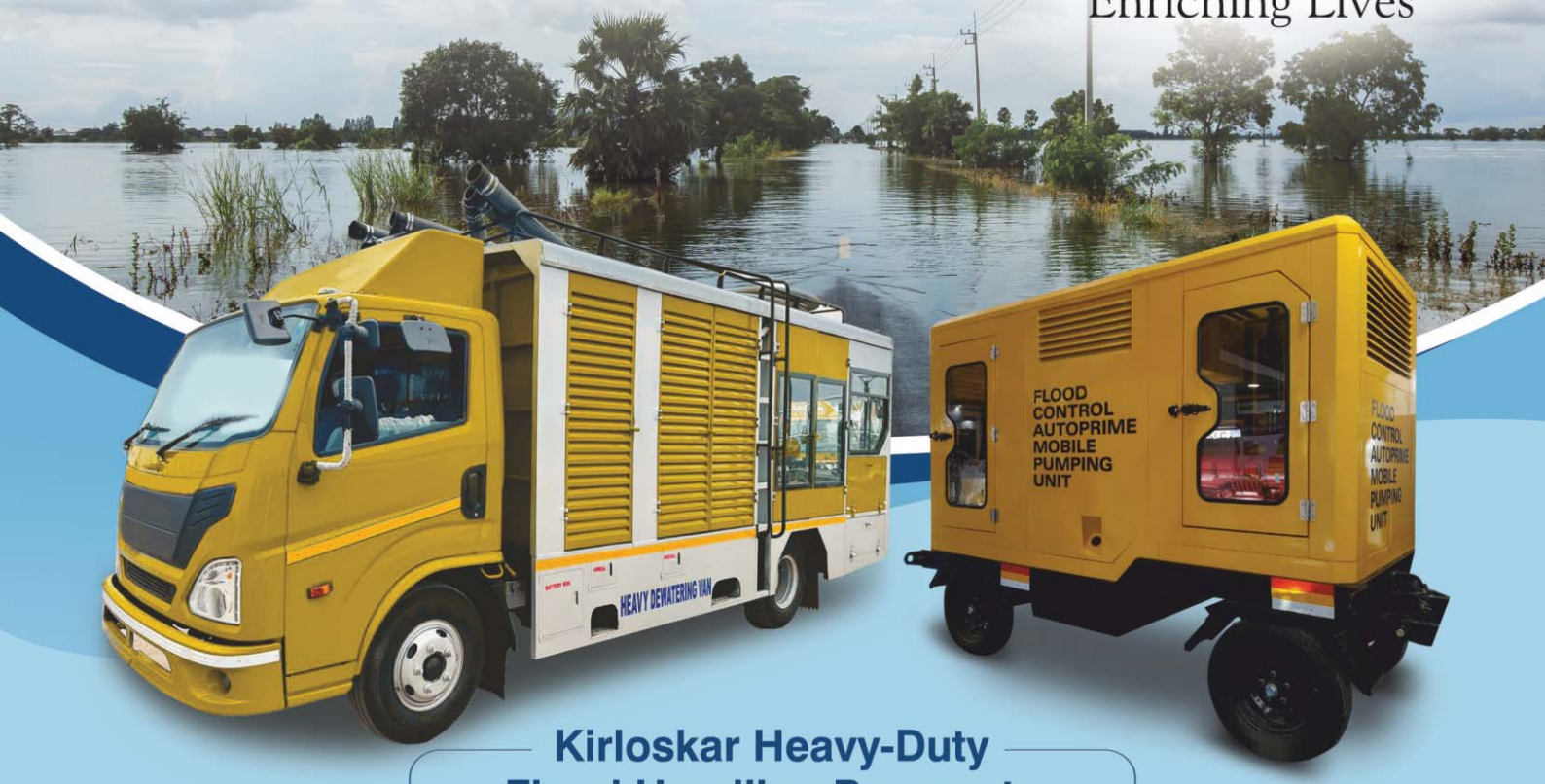
CENTRE OF INTERNATIONAL PLUMBING PRACTICES
Goa Engineering College
Farmagudi Ponda- Goa - 403401
M: 96899 39609

Life as usual...

Inspite of flooding and water clogging during monsoons

Kirloskar

Enriching Lives



Kirloskar Heavy-Duty Flood Handling Pumpsets

30 HP to 300 HP Pumpsets
Discharge capacity up to 20,00,000 Litres Per Hour

Mumbai | Chennai | Ahmedabad | Guwahati | Patna | Kerala | Jammu & Kashmir

Autoprime Pumpsets: Plug and Play | Push Button Start | Self Priming | Remote Monitoring

COMPLETE RANGE OF PUMPS & SYSTEMS FOR BUILDING & CONSTRUCTION SECTOR

Fire-Fighting Systems I Hydropneumatic Systems I Dewatering Pumps I Domestic Pressure Boosting Systems I HVAC

KIRLOSKAR BROTHERS LIMITED

Established 1888
A Kirloskar Group Company

OUR COMPANIES

BRAYBAR PUMPS (PTY) LTD, Republic of South Africa
KPML — KARAD PROJECTS AND MOTORS LIMITED, India
KBTL — KIRLOSKAR BROTHERS (THAILAND) LIMITED, Thailand
CORROCOAT KCPL — KIRLOSKAR CORROCOAT PRIVATE LIMITED, India
KCPL — KIRLOSKAR EBARA PUMPS LIMITED, India
RODELTA — RODELTA PUMPS INTERNATIONAL B.V., The Netherlands
SPP — SPP PUMPS LIMITED, United Kingdom
SyncroFlo — SYNCROFLO, INC., U.S.A.
TKSL — THE KOLHAPUR STEEL LIMITED, India

1800 123 4443 | www.kirloskarpumps.com | marketing@kbl.co.in

BACK TO BASICS

ROLE OF WATER HAMMER ARRESTORS

- Sharat V Rao

The term "Water Hammer" is well known to engineers, contractors, maintenance personnel and other persons engaged in the plumbing and piping industry. Ever since water was first conveyed by a piping system, the destructive forces and hammer blow sounds, associated with "Water Hammer" have caused annoyances, inconvenience and costly damage.

Reaction: When water hammer occurs, a high intensity pressure wave travels back through the piping system until it reaches a point of some relief such as a large diameter riser or piping main. The shock wave will then surge back and forth between the point of relief and the point of impact until the destructive energy is dissipated in the piping system. This violent action accounts for the piping noise and vibration. (See Fig 1)

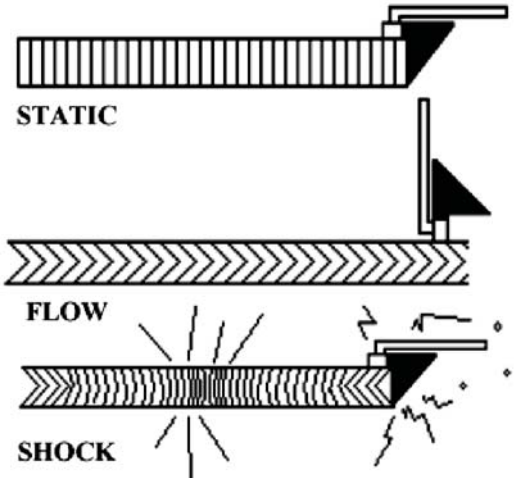


Figure - 1

In order to counter this excessive noise and vibration in the piping, these devices called 'Water Hammer Arrestors' (WHA) are used.

Water hammer arrestors are used to absorb the shock when water flowing in a piping system suddenly stops due to fast closing shut off valves, dishwashers, clothes washer and similar other equipment's. This action protects against annoying and potentially damaging effects of water hammer.

Working Principles of WHA:

Water hammer arrestors consist of a sealed copper cylinder containing compressed air and a sliding piston with double EPDM seal. The damping action exploits the compressibility of air; Fig. 2 shows the work situations of the water hammer:

1) **System working at normal operating pressure:** the sliding piston is in equilibrium position.
2) **Quick opening of the valve:** this produces a momentary negative pressure in which the water is sucked into the system while the air contained in the upper part of the cylinder expands owing to the decrease in pressure, thus occupying the entire cylinder volume.
3) **Rapid closing of the valve:** this gives rise to a pressure surge which thrusts the piston towards the top of the chamber, thus compressing the air contained there. This exerts a gradual damping action of the water hammer by opposing the thrust of the water.

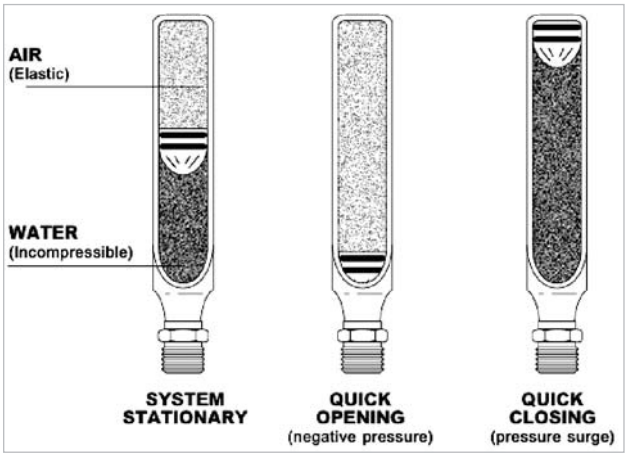


Fig 2 – Working Principles of WHA

Cause:

The common cause of shock is the quick closing of electrical, pneumatic, spring loaded valves or devices, as well as the quick hand closure of valves or fixture trim. The speed of the valve closure time, especially during the last 15% of valve closure, is directly related to the intensity of the surge pressure.

The quick valve closure generates excessive pressure in the pipe line which causes the water flow to surge back and forth in the affected segment of the pipe line which is generally termed as between the point of quick closure and the point of relief. The pressure rise can be calculated by a formula called Loukowsky's formula. Based on this formula it is understood that that the approximate maximum pressure rise that can be generated in the pipeline is to the tune of 60 times the velocity. The design velocity employed in piping systems is normally between 5 ft/sec (1.5m/sec) to 8 ft/sec (2.4m/sec) and accordingly the maximum shock pressure that the pipeline could be exposed to will be approximately 300-500 psi (21kg/cm2- 35kg/cm2)

Shock Wave:

The resultant water hammer shock wave travels back and forth in the piping. Graphic illustrations of a shock wave are shown in Fig. 3. In this illustration it will be noted that the shock wave alternately expands and contracts the piping during its occurrence. This is the destructive force which may cause any of the following conditions.

- Ruptured Piping
- Leaking Connections
- Weakened Connections
- Pipe Vibration and Noise
- Damaged Valves
- Loosened Pipe Hangers and Supports
- Ruptured Equipment's and Water Heaters

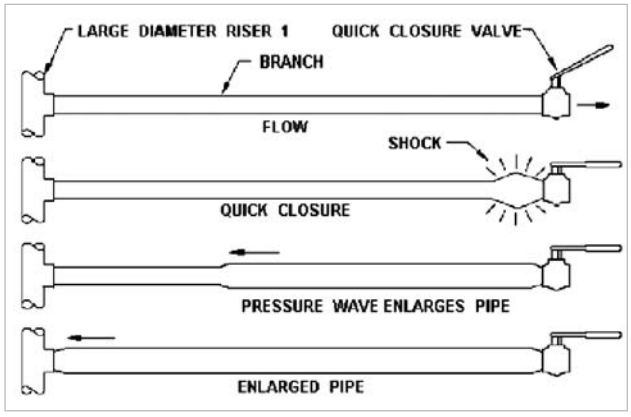


Figure – 3 – Shock Wave Generation

Noise:

Although noise is generally associated with the occurrence of water hammer it can occur without audible sound. Quick closure always creates some degree of shock - with or without noise. Therefore, the absence of noise does not indicate that water hammer or shock is non-existent in a water distribution system. System Protection Water hammer arresters prolong the service life of piping, valves, fittings, trim, equipment, apparatus and other devices which are part of a water distribution system

In order to reduce shock pressure and confine its action to the section of piping in which it occurs, a suitable means of control must be provided to absorb and dissipate the energy causing the shock. Air or gas is the most effective medium that can be used for this purpose since it is highly compressible. For many years the Air chamber has been utilized as one means for controlling shock. The unit consists of a capped piece of pipe, the same diameter as the line it serves, and its length ranges between 300 mm and 600 mm. The air chamber has been constructed in several different shapes. A rechargeable type of air chamber (see Fig 4) is generally placed at the end of a branch line or on a piping main. It has been observed that these were effective in controlling shock pressure to some degree but cannot be relied upon. This also needs constant replenishment of the air.

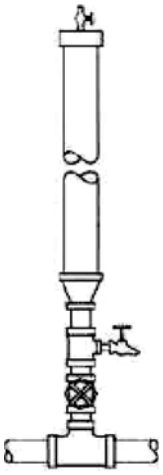


Figure - 4 – Air Chamber Rechargeable type

Sizing:

The Plumbing & Drainage Institute (PDI) has been instrumental in coding and certifying Water Hammer Arrestors. As per PDI WHA can be divided into 7 different symbols which identify the units based on their sizes. The following symbol listing has been devised to denote the range in sizes for water hammer arresters, "AA" is the smallest sized unit and "F" represents the largest unit. P.D.I. Symbols: AA-A-B-C-D-E-F define the range in sizing of WHA.

The sizing of WHA is based on the Water Supply Fixture units derived from Hunter's curves. Table (IV) lists the Fixture unit values as given in the National Plumbing Code. The Fixture Unit Table given in 2022 – UIPC-India can also be used instead. Table (V) gives the appropriate Fixture units corresponding to the PDI units AA-A-B-C-D-E-F. Examples are also shown which explains the selection process.

Placement:

Generally for protection of single equipment on any branch line WHA should be ideally placed upstream of the quick closing valve provided for the equipment to be protected such as water heaters, dishwashers, process

TABLE IV

Fixture	Type of Supply Control	Weight in Fixture – Units					
		Public			Private		
		Total	C.W	H.W	Total	C.W	H.W
Water Closet 1.66 PF	Flush Valve	8	8	-	5	5	-
Water Closet 1.66 PF	Flush Tank	5	5	-	2.5	2.5	-
Pedestal Urinal 1.06 PF	Flush Valve	4	4	-	-	-	-
Stall or Wall Urinal	Flush Valve 1.06 PF	4	4	-	-	-	-
Stall or Wall Urinal	Flush Tank 1.06 PF	2	2	-	-	-	-
Lavatory	Faucet	2	1-1/2	1-1/2	1	1	1
Bathtub	Faucet	4	2	3	2	1-1/2	1-1/2
Shower Head	Faucet	4	2	3	2	1	2
Bathroom Group	Flush Valve Closet	-	-	-	8	8	3
Bathroom Group	Flush Tank Closet	-	-	-	6	6	3
Separate Shower	Mixing Valve	-	-	-	2	1	2
Service Sink	Faucet	3	3	3	-	-	-
Laundry Tubs (1-3)	Faucet	-	-	-	3	3	3
Combination Fixture	Faucet	-	-	-	3	3	3

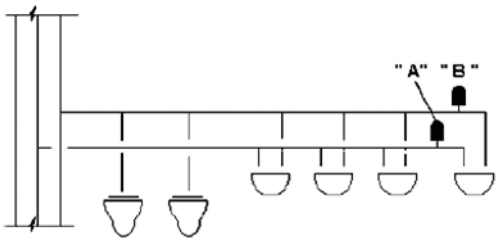
Note: - The Fixture Unit Table given in 2022-Uniform Illustrated Plumbing Code (UIPC)-India can also be referred

tanks etc. There is also a restriction on the length of the branch main from its tapping from the main pipe or riser. If the length is within 6.0m (20ft) then only one WHA of appropriate size will be required. If the length exceeds 6.0m (20ft) then an additional WHA will be required.

TABLE V							
P.D.I. UNITS	**AA**	**A**	**B**	**C**	**D**	**E**	**F**
FIXTURE-UNITS	1-3	1-11	12-32	33-60	61-113	114-154	155-330

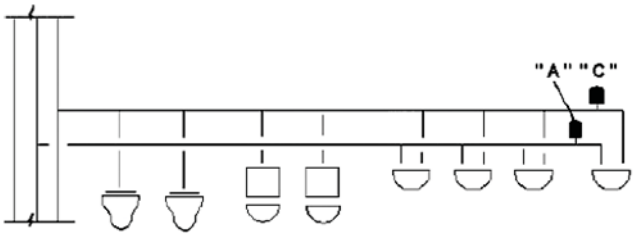
Table V will permit engineers and contractors to select the proper water hammer arrester for each application. The following examples show the relative ease with which sizing can be accomplished using Tables IV and V.

Examples



Cold
2 W.C. at 8 F.U. ea. = 16
4 Lav. at 1½ F.U. ea. = 6
Total 22
Select P.D.I. "B" Unit

4 Lav. at 1½ F.U. ea. = 6
Total 6
Select P.D.I. "A" Unit



Cold Water Branch
2 W.C. at 8 F.U. ea. =16
2 Ur. at 4 F.U. ea. = 8
4 Lav. at 1½ F.U. ea. = 6
Total 30
Select P.D.I. "B" Unit

Hot Water Branch
4 Lav. at 1½ F.U. ea. = 6
Total 6
Select P.D.I. "A" Unit

CONCLUSION

Thus it can be concluded Water hammer arrestors are very much an integral part of building and house plumbing. Increasing use of quick acting valves and fixture trims like single lever divertors has compounded the risks associated with water hammer. Unfortunately WHA is not manufactured in India and hence we have to rely on import.

References: Plumbing & Drainage Institute Standards.

Sharat V. Rao
National Joint Secretary, Indian Plumbing Association
Managing Editor, Indian Plumbing Today magazine
Convener, IPA Technical Committee

Sharat V. Rao is the Managing Director, Engineering Creations Public Health Consultancy Pvt. Ltd. Sharat V. Rao graduated from V.J.T.I, Mumbai, in 1977 and obtained his Master's Degree in Civil Engineering with Environmental Engineering subjects in 1979 from the same institute.

He is IPA National Joint Secretary and Convener, IPA Technical Committee. Prior to becoming the National Joint Secretary, he has been the Chapter Chair for IPA Mumbai Chapter for two terms. He is also fellow of the Institute of Engineers, Member of Indian Water Works Association (IWWA). He is Managing Editor, Indian Plumbing Today, the official journal of Indian Plumbing Association. He can be reached on jtsecretary@indianplumbing.org

INTRODUCING SHORTLY

SERENE | SERENE PLUS

LICENSOR poloplast GmbH & Co KG

PP Low Noise Building Drainage System

...Ensure serenity with advanced PP drainage systems

Revolutionizing Drainage

India's Quietest Drainage System

10dB at 4LPS

20 YEARS WARRANTY

GreenPro

Green-pro certified sustainable building drainage systems

- Outstanding noise insulation
- Tried & tested 3-layer technology
- World class quality & superior design
- Precision sealing system
- Quick & efficient removal of waste
- Extremely tough & high impact resistance
- Excellent chemical & heat resistance
- Exhaustive product range from 50 to 200mm sizes

Since 1942

Supreme®

People who know plastics best

Total Piping Solution

Jeevan bhar ka saath...

Listen to the voice of your soul, Not the noise of your drainage...

☎ 91-22-4043 0000
Toll Free No.: 1800-102-4707

www.supreme.co.in
@ pvc-pipes@supreme.co.in

SCAN FOR MORE DETAILS

From Runoff to Resource: Building Rain-Smart Cities

- Ankit Magan

In the ever-expanding urban heat islands of India, water is a paradox. While cities like Delhi, Chennai, and Bengaluru witness devastating floods during monsoons, they face acute water shortages just months later. This paradox is a signal—it's time we rethink how we manage rainwater in our cities.

That's where Modular Rainwater Harvesting steps in—with a mission to reimagine how cities collect, store, and reuse rainwater. It's a revolutionary technology that's transforming how urban India approaches water security.

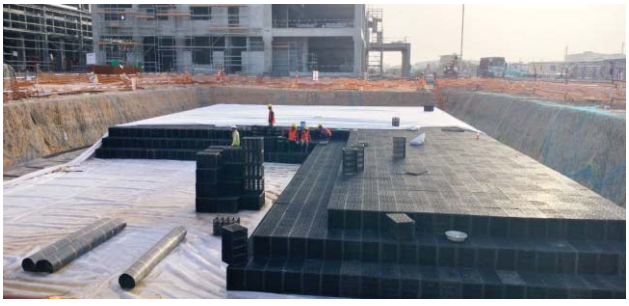
The Urban Rainwater Crisis

With unplanned urban development, impermeable surfaces have replaced natural aquifers. Rainwater rushes off rooftops and roads into drains, often ending up as runoff instead of being conserved or recharged. The groundwater tables, meanwhile, are plummeting across urban India.

To bridge this gap, rainwater harvesting (RWH) must move beyond RCC and conventional soak pits. It must evolve into smart, decentralized systems that work in tight spaces, provide real-time insights, and are fast to install. In short, it is making India rain ready.

Smart Systems – Modular Rainwater Harvesting + IOT

These modular harvesting pits are made from recycled polypropylene (PP) Modules. It is highly efficient and customizable. What makes these systems "smart" is there integration with AI-powered water intelligence suite that provide real time monitoring. This is currently getting installed in Begumpet Airport, Hyderabad.



Case Study 1: PGI Hospital, Chandigarh

At Postgraduate Institute of Medical Education & Research (PGIMER), Chandigarh – Modular RWH is getting installed. Here, space was a major constraint, and the invert level presented serious challenges. Yet, the hospital required over 150 Kiloliters of recharge capacity across multiple pits.

Solutions Delivered – Modular RWH pits were customized to fit into narrow trenches.

A dual-step filtration system (desilting chamber + micro filter) was implemented to handle urban sediment loads.

Installation was completed swiftly—within 3 days per tank—minimizing disruption to hospital operations.

After installing the modular system, it helped in flood mitigation, storm water management of the entire institution. The campus has an efficient water management system which recharges the ground water table of at least 6000 cum every year. This water that was early wasted as a surface runoff now recharges the groundwater which in turn helps in environment sustainability.

Case Study 2: Industrial Water Storage for Manufacturing Facilities

A leading manufacturer in the plumbing and piping sector recognized the critical need for a reliable and self-sustaining water source to support its production lines. With operations heavily dependent on consistent water availability, the company decided to invest in long-term, on-site water storage solutions.

Challenges were plenty—there was limited space for installing large tanks due to existing utility lines and vehicle movement corridors. The project also had to be completed within a tight timeline before the monsoon season. Additionally, maintenance had to be minimal, as on-ground staff was limited.

To solve this, **we installed modular underground storage tanks** with a total capacity of **1650 cubic meters across three facilities,** without disrupting ongoing factory operations. The tanks were vertically stacked to make the most of the available footprint. Rainwater from factory sheds and open surfaces was routed through a carefully designed point-to-point system. External access chambers and filtration units ensured that the stored water remained clean and easy to maintain.

As a result, the company now **harvests lakhs of liters of water annually**, significantly reducing its reliance on borewells and external sources. This has not only helped **cut down water procurement costs** but also ensured **uninterrupted production during dry months**. The shift to a decentralized, resilient water strategy has also **enhanced their green credentials,** strengthening their ESG goals and moving them closer to **water neutrality.**

Feature	Modular Tanks	Conventional RWH Tanks
Installation Time	1–15 days	30+ days
Storage Efficiency	95% of tank volume	Up to 40% loss due to filter media, freeboard
Space Use	Usable under playgrounds, parking	Limited to demarcated zones
Maintenance	Easy access, minimal structure	High civil work, safety risks
Environmental Impact	Made from recycled polypropylene	Virgin materials, large footprint
Scalability	Easily extendable or portable	Not adaptable

The Road Ahead

Rain is not the problem—our ability to manage it is. It's time for cities to see rainwater not as a nuisance, but as a resource waiting to be harnessed smartly.

Let's stop letting rain go to waste. Let's start rethinking urban rainwater.

Ankit Magan
Director and Co-Founder, Retas Enviro Solutions

Ankit Magan is a seasoned waterpreneur who has been advocating for the cause of water conservation for over a decade. In 2017, he co-founded Retas along with two other visionaries, with a mission to make water management smarter, scalable, and sustainable. Since then, he has led efforts that have helped save millions of liters of water and supported multiple industries in becoming net-zero and water-positive.

His work spans urban and rural landscapes—implementing modular rainwater harvesting technologies, driving flood mitigation strategies, and collaborating with NGOs to promote low-cost solutions in underserved areas. He can be reached on maganankit@gmail.com.

Water Distribution with Proper Pipe Diameter

- Kiran Vinayak Joshi

One day, I received a call from a Project Management Consultant requesting assistance. He had recently completed an industrial project but was facing a problem with the wash area's water distribution system. There were approximately 24–25 taps installed for hand washing in the staff dining hall. However, during the trial run, after opening just 4–5 taps, no water was coming out of the remaining ones.

By that time, the tiling work had already been completed, so making changes was challenging. I asked him to send a video showing the water supply line from the overhead tank (located on the terrace) to the hand wash area.

The overhead tank was situated on the second floor, and the pipeline used was a 32 mm diameter UPVC pipe. The inlet pipe to the tank was also 32 mm, and the main distribution line supplying the taps was 32 mm as well. The problem was that the water demand exceeded the inflow capacity—there was insufficient pressure and flow beyond a few taps.

Proposed Solution (Refer to Sketch):

I advised breaking the tile line at both ends of the existing pipe and adding new 32 mm inlets, effectively converting the single line into a loop system. These new lines were to be connected to the main line coming from the tank to improve flow and balance pressure.

Additionally, I recommended the use of 2 LPM (liters per minute) aerators on the taps to reduce water flow, optimizing usage without affecting functionality.

A few days later, I received a call from the site engineer asking whether a booster pump could be used instead. I explained that while a booster pump could solve the issue, it would introduce recurring operational and maintenance costs. A gravity-based loop system, on the other hand, was a more reliable, cost-effective, and permanent solution.

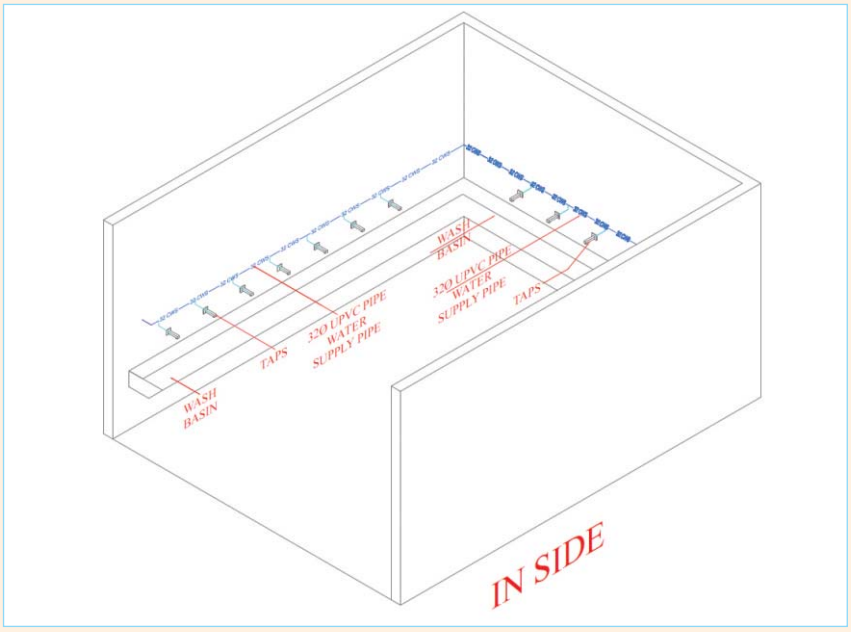
He was initially skeptical but agreed to implement the suggested changes. Four to five days later, he called back to inform me that the system was working perfectly. He admitted he had doubts initially, but the results were satisfactory.

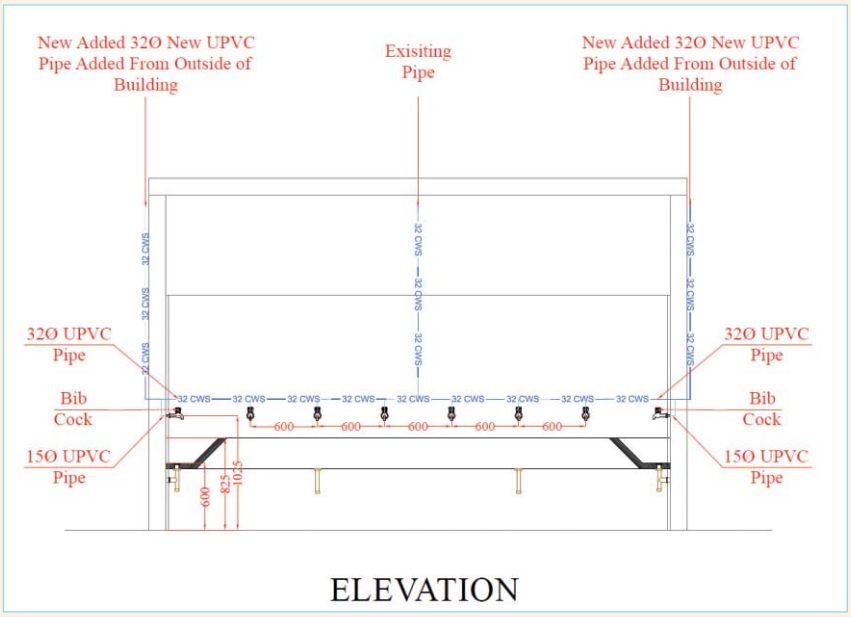
Outcome:

The system has now been functioning efficiently for over four years without any issues.

Conclusion:

While designing and executing water supply and drainage systems, it is essential to consider factors such as head, discharge, and the quantity of water required. Proper planning ensures optimal performance and long-term reliability.





Kiran Joshi
Chapter Chair, IPA Kolhapur Chapter

Kiran Vinayak Joshi is the Proprietor of the firm Kiran Joshi & Associates, a firm engaged in Public Health and Fire Fighting consultancy at Kolhapur. He has a specialization in institutional buildings, medical colleges, hospitals, hotels, villas etc and in finding water leakages & remedies.

He is a GPI Accredited Trainer and Chapter Chairman, IPA Kolhapur Chapter. He can be reached on kolhapur@indianplumbing.org

QUICK, CLEAN, SAFE AND COMPLETELY WELD-FREE.

Whether seamless, welded, galvanised, industrially painted, epoxy-resin coated or black: Viega Megapress S connects pipes with the most different surfaces. Durable and safe – from ⅜ to 4 inches!

www.viega.in
+91-959-966-4368

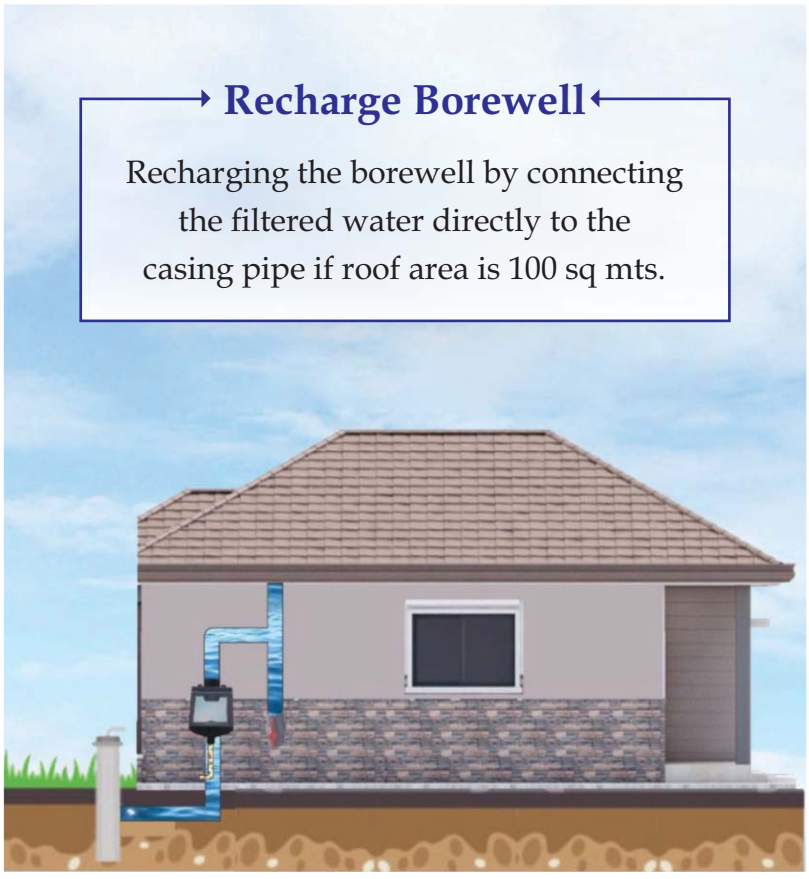
Viega India viega.india Viega India innovations@viega.in

Rethinking Urban Rainwater:

Designing Smart Harvesting Systems for Cities

- Naishal Shah

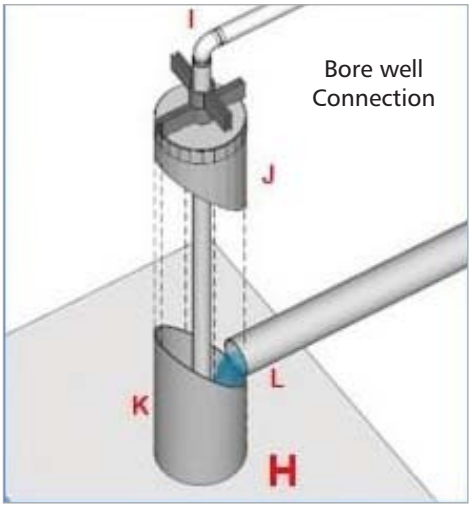
Technology when made simpler, easy and economical it achieves the mass-scale adoption otherwise it attains space in museum. It is nice to have a look at it but will have no impact on lives. This goes well with rainwater harvesting in our country where every day we are widening gap between availability of fresh rainwater and crisis of water. Have we ever asked this question to ourselves? Why? Most of us feel it is easy to save rainwater, but the implementation remains still at a bay! May be because many of us feel that it's not my cup of tea! I don't have time! It is for someone else to do or it's the government's job or not for me to do! Let's try and understand the root cause of this problem and get to the solution by the end of this article.

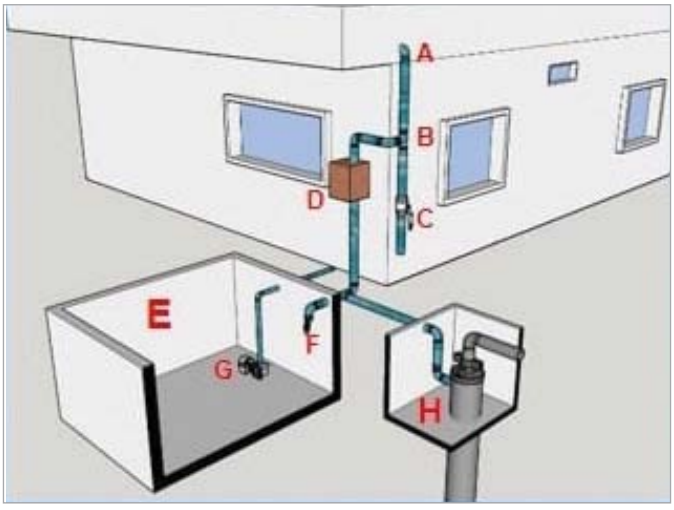


Rainwater harvesting is to raise water in resource. Let's make this clear in our mind and heart. It's not about disposing rainwater in sub surface. It's about keeping our existing resources of water like borewells, dug wells and hand pumps always full of water. The urban landscape today, in India is full of borewells all around our country. A borewell is drilled first and then the construction activity begins. All new developing areas outside municipal limits of our cities like Mumbai, Delhi, Bangalore, Hyderabad, Chennai, Ahmedabad, Pune, Jaipur, Indore are bigger than the original city in terms of area. The more this urbanisation is progressing, and the pace at which it is growing, the more stress it is mounting on our borewells (groundwater). A result of which is on an average 15 to 20% borewells are running dry across India. When a borewell runs dry, it not only results in crisis of water, but also affects the health and peace of mind of the people living in that habitat. Getting water through tankers is not only expensive and uncertain but the quality of water is also not known. And going for new borewell is involves investment of Rs. 2 to 4 lakhs depending upon the geology, depth and diameter. Making new borewell in alluvial terrain is an irritating process.

New definition of rainwater harvesting is now clear; the problem is also understood. How to act now and solve? It is simple and sensible, easy and economical for multi-storeyed apartments, institutions and individual habitats to keep their borewells full of water. Each apartment or house has a roof and rainwater down pipes that bring rainwater on the floor from where it flows on the surface and creates water logging. Flooding is the most common site that we see across cities during monsoon. Rainwater is not meant to flow outside and create trouble. It is meant to be for our borewells, our resources. Connecting rooftop pipe with inlet of filter and further connecting clean water outlet with borewell is a step that captures, filters and stores rainwater in borewell.

The borewell has two pipes, one is column pipe that extracts water from the ground riverbank and second is a casing pipe that protects the column pipe. The space between column pipe and casing pipe leads filtered rainwater to the same river from where we extract water daily. When we store pure rainwater in borewell, we not only save around one lakh rupee worth electricity cost of borewell but also retain equivalent volume of ground water in the aquifer. This also improves TDS, Hardness and pH of ground water. In addition, many multi-storeyed apartments have common complaint of low yield during peak summer. Storage of rainwater in borewell improves the productivity of borewell. Imagine if your borewell runs dry and there is no water; the only choice would be to leave the place, will be a scary situation for the family. Storage of filtered rainwater in borewell will not allow it run dry. This is a magic that maintains the health of our water resources. In the urban landscape, the moment we connect our roofs with filter and borewell, we have connected God Father i.e. 'Sky' with Mother Earth i.e. 'Groundwater'. We have completed the cycle or water automatically.





Note : **A:** Rainwater outlet, **B :** T diverter, **C:** Valve, **D:** Filter, **E:** Underground Tank, **F:** Rainwater Inlet, **G:** Submersible Pump, **H:** Existing Bore well, **I:** Pump outlet pipe, **J:** Bore well cover, **K:** Outer casing pipe, **L:** Rainwater Inlet.

A compact device that doesn't need space, is fixed next to the rooftop down pipe on wall by local plumber within two hours. The twin filters vary in terms of the size of particles they net. The first filter ensures that particles up to 500 microns are collected and allows water to pass through it. The water then collects in a small tank with a transparent cover which makes the process visible. The water then passes through the second filter that prevents the passage of particles up to 200 microns, which is the size of a hair. The water passes out of the system is pure, clean and fresh rainwater. It flows to the borewell. There are no leakages, and the filters are removable for cleaning. It has low plumbing cost as it creates a bypass in the existing pipe. Through a simple device, a house or an entire colony can be made water secure. The cost of standard rainwater harvesting devices start from Rs. 2,950. However, a traditional rainwater harvesting method costs between Rs 30,000 and Rs 35,000. The device becomes 85 to 90% cheaper.

A year of water collection from a 1,200 square feet roof can recover the investment costs with respect to water bills. Every year, such roof roof stores about 3 lakh litres of water in Mumbai where annual rainfall is about 3000 mm and one lakh litres in Bangalore where annual rainfall is 1,000 mm. No operations cost is involved. My roof, my rain and my future! Rethinking urban rainwater is addressing root cause, directing roof rainwater into a resource. With every drop of harvested rainwater, let's create a future where water scarcity is not a looming threat, but a challenge met with simple innovation – not just technology, but a ripple effect of empowerment and environmental consciousness, one rooftop at a time.

Naishal Shah
Co-Founder – Neerain Private Limited

Naishal is young face of innovation led startup NeeRain; who has dedicated his life to empower our common man to lead water secure life and thereby transform India into Water Positive Nation. He won CII's National award for excellence in water management 2022 and Water Leadership Award by The Economic Times, his work is appreciated by MOHUA, Government of India for simplicity in innovation and common man centric work.

ZOLOTO®
VALVES

Touching Lives Everyday..
Everywhere...

60 Years

Product Alloys:

Bronze	Brass	Cast Iron	Cast Steel	Forged Steel	Stainless Steel

SERVING THE NATION FOR MORE THAN SIX DECADES

AN ISO 9001, 14001 & 45001
CERTIFIED COMPANY

Marked Certified
CERTIFICATIONS

Manufacturers :

ZOLOTO INDUSTRIES

Head Office : Zoloto House, 11th. Mile Stone, Lambra, Nakodar Road, Jalandhar-144 026 (Pb.) India.
Phones : 0181 4676666 (100 Lines) E-mail : corporate@zolotovalves.com
www.zolotovalves.com

Follow us:

Wat-er View

COLUMN 21

CERTIFYING WATER, VALIDATING TRUST

- Hariharan Chandra

In March this year before the onset of the summer and the usual clamour for water supply from citizens who think their right to water has to be sorted only by the government, the Karnataka government came up with a surprising announcement. The Dy CM and Bangalore Development Minister, D K Shivakumar, said, "With BWSSB becoming the first water utility in India to receive BIS Certification, we have set a benchmark in water quality and safety." BIS Certification ensures products meet Indian safety and quality standards, protecting consumers and promoting consumer confidence. It is a process to help validate that products meet specific quality and safety standards before they can be sold.

All these years the FSSAI has mandated the need for a BIS licence as a precondition for issuing their own FSSAI license for packaged drinking water and mineral water across the country. The certification that BIS has offered the Bangalore water utility is a first. The idea was born in the ministry of Bangalore Development, in some undefined attempt at instilling confidence in the city's water-users on the quality of water supplied. The Certification, says BIS, is valid for three years, from March this year to 2028. The certification is based on a standard that applies for 'piped drinking water supply management systems'.

It is pertinent to elaborate on the nature of the study that the BIS conducted, as is claimed by reports, before offering this certification, which is a first in India. The scope of the certification encompasses the Bengaluru Supply Board's "comprehensive water management operations, including intake from source, treatment, storage, pumping, distribution, through a piped network under its jurisdiction, and maintenance, metering and billing to consumers". The BIS goes a step further to acknowledge the Board's commitment to "sustainable water resource management, compliance with statutory and mandatory requirements, and adherence to the acceptable limits for drinking water quality standards as per IS 10500". Says an official of the water utility who was part of the certification mission, "The quality of water supplied by BWSSB is of gold quality and non-hazardous to consumer, which is the main and important factor of the certification." It will be

pertinent to have an idea about the parameters employed for testing, the size of the sample and the number of outlets that were surveyed at the end user's faucet.

What BIS is silent upon—justifiably and necessarily perhaps—is the larger and crippling challenge before the water utility or the city. No more than 40 per cent of the city's present daily demand of about 250 Crore or 2.5 billion litres, is met by the BWSSB at about a billion litres, if you were to account for the losses in leakage—or what is called Unaccounted for Water UfW]. So what happens to the 150 Cr litres [1.5 billion litres] that is drawn as groundwater in areas outside of the reach of the Water Board's distribution network?

And on the other front, there are any number of reports from Bangalore from the past, and from other cities that indicate in pretty definitive terms that Drinking Water quality in India is often poor, with many cities failing water quality tests. The water is contaminated with bacteria, viruses, coliform. A BIS water quality test found that Delhi's tap water is the most unsafe among cities tested. A BIS report of 2019 talks of water samples of 13 cities that were tested including Kolkata, Chennai, Bengaluru, Jaipur, and Lucknow. All the cities failed the water quality test. In fact, Mumbai is the only city where the samples of tap water met all parameters under Indian Standard 10500:2012, which is the specification for drinking water so far.

How crucial are certifications for any 'product'? Well, they tacitly show commitment to quality and help build a reputation. Certifications like ISO 9001 and BIS in this case are key. They are given by professionals who conduct their protocols of measuring and assessing dispassionately and with objectivity. These certifications are more than just symbols. They prove an organisation's dedication to high standards in quality and environmental care. This makes customers see the brand in a positive light, and increase its credibility.

Should other cities and water boards follow suit in India? And if the answer is yes, does it mean water utilities applying for such certification are willing to subject their distribution process to the assessment protocols of a BIS certification.

And then there are other aspects to such standards, codes, methodology for validation, and certification that relate to the more crucial aspect of mitigating the water crisis with initiatives that help a bulk water-user achieve sustainability with net zero water solutions.

Even as I was closing on this piece for July 2025, an army officer called. "What are the systems of certification available for water-users or energy consumers who want to ensure that solutions they have installed are checked out by independent certifying agencies." I realised that a part of my work over the last few weeks has been on understanding the lay of the land when it comes to figuring out what is the best option for such certification of Net Zero Water.

Different buildings need different ratings, even if they all are for water. The IGBC's Net Zero Water rating system offers a 3-tier rating of 'Near Net Zero', 'Net Zero Water' and 'Net Water Positive' as rating. This rating, however, is confined to commercial buildings, and well, apartments if there are at all apartments and RWA members aspiring to go Net Zero Water.

There is the CII GreenCo rating for 'water neutrality'. This is a rating from the Hyderabad-based Green Business Centre, which is another arm of CII and "assesses and recognizes companies for their water conservation and sustainable water management practices".

Specifically, the 'Water Neutrality' certification evaluates a facility's net water ratio, considering water augmentation against water consumption. This certification promotes companies that strive for water efficiency and actively contribute to water conservation. The certification encourages companies to reduce water consumption, implement water-efficient technologies, and to explore water recycling options. At least this rating under GreenCo, claims that this certification encourages companies to reduce water consumption, implement water-efficient technologies, and explore water recycling options.

So when does this GreenCo certification apply? If your company has some part of the raw or waste water that you buy and treat, being also used for some identified manufacturing process, then the IGBC Net Zero Water won't apply, and you have to go for this option. Even if a small part of the daily water consumption is used for some such throughput process of your company's operations, you have no choice but to go for this rating called Water Neutrality Certification.

What happens when your water consumption is very largely for a core industrial process like the manufacture of Steel ingots, or steel TMT Rebars, or glass and other such products? The GreenPro certification kicks in such cases. This is a certification that emphasizes water conservation and good, continuous water management as a key aspect of its assessment criteria. The methodology in this process of certifying a product of

any manufacturing company encourages the use of water-efficient processes and technologies. This applies more to manufacturing facilities. The certification aims to address water-related concerns by promoting measures like water-efficient products and "zero liquid discharge".

And if you look beyond the CII family of such services, you have the LEED Zero Water Certification. LEED Zero Water certification is a USGBC recognition for buildings that achieve a zero net potable water usage balance over a 12-month period. This means the amount of potable water used by the building is offset by the amount returned to the source, effectively eliminating any net water consumption.

A new rating system emerging on the horizon in India is something called Global Network for Zero and offers some options for being enabled into such certification with a process that is a little different from what CII or USGBC offer, and yet there is clearly convergence of goals on what each of them is hoping to offer or achieve for applicant water-using companies.

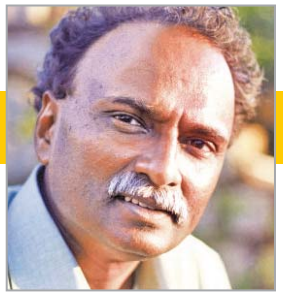
GEM from the ASSOCHAM stable is considering the creation of a certification for Net Zero Water and Net Zero Energy but are dwelling on the thought. they do not want to be another also-ran and are looking to see how they can create relevance for what they are hoping to design and devise.

Essentially all of them look at evaluating and ensuring that the building you are working on goes net zero water (NZW) and is designed to balance its water consumption with its on-site water collection and reuse, ideally returning the same amount of water to the original water source. This involves minimizing water usage, maximizing alternative water sources, and effectively managing wastewater. Examples include rainwater harvesting, greywater recycling, and water-efficient fixtures.

National Standards and Codes

To top all this up we have the National Building Code with Part 9 of the Code dealing with sewage and sanitation. There is also the CPHEEO (Central Public Health and Environmental Engineering Organisation) as a guideline from MOHUA. Both of these guidelines are important for professional water consultants and designers.

India surely needs much more as work on codes and standards that impact the water industry, if I may call it that. Plumbing technicians or plumbing designers of systems for buildings, large and small, have no independent validation agencies, That is an ecosystem that needs to be nurtured and grown as India struggles with its dwindling water resources, and grapples with the doubling of building inventory for commercial and residential building stock across India.



Chandrashekar Hariharan

The writer is a Senior Fellow at CII IGBC, and founder-trustee at AltTech Foundation and Prem Jain Memorial Trust. As a green building pioneer and a Net Zero Water/Energy exponent, he currently guides over 5 billion litres of low-carbon water for a variety of projects that he mentors.

Reach him at hariharan@alttech.foundation

HARMONY IN
QUALITY AND
DEVELOPMENT
SINCE 1950

THE NO. 1 FORGED STEEL PIPE FITTINGS & VALVES

OUR ASSOCIATES

IndianOil · HP · Petrofac · Bharat Petroleum · CPCL · RFCL · EIL · TATA STEEL · GMR · Indiabulls · JSW · VOLTAS · STERLING & WILSON · JK Cement LTD.

VIJAY CYCLE & STEEL INDUSTRIES

A8-A9 Focal Point, Jalandhar City 144 004 (Pb) India, Phones: +91-181-2604001/2/3
E-mail: info@vsfittings.com, marketing@vsfittings.com, sales@vsfittings.com
Website: www.vsfittings.com

IPA DEBATE CLUB QUESTION 14

Q

The connections for a 32mm Flush valve or a 32mm ball valve typically in shafts will require an **FTA** on the inlet connection and an **MTA** on the outlet connection.

The question is whether these should be connected by **uPVC / CPVC** Plastic thread adaptors or **uPVC / CPVC** Metal thread adaptors and the technical reason for the same?

Response 1

Recommended: uPVC/CPVC Metal (Brass or Stainless Steel) Thread Adaptors

Technical Justification:

1. Thread Strength and Durability

- **Plastic threads** (especially in uPVC/CPVC) are **softer and more prone to deformation** under stress or repeated connection/disconnection cycles.
- When screwed onto **metal valve threads** (typically brass or stainless steel), plastic threads can **easily get cross-threaded or stripped**, especially during overtightening or misalignment.
- **Metal (Brass or SS) thread inserts** provide **superior mechanical strength** and better thread integrity, ensuring a **long-lasting and leak-proof connection**.

2. Thermal Expansion & Contraction

- uPVC/CPVC plastics have **higher coefficients of thermal expansion** than metals.
- At shaft locations, if exposed to temperature fluctuations (e.g., sunlight, hot water pipes), differential expansion can cause **loosening or cracking** in plastic-thread-only joints.
- Metal inserts **resist thermal stress** and maintain better thread stability over time.

3. Preventing Leaks and Failures

- Plastic-to-metal connections without metal thread inserts are **high-risk zones** for leaks due to imperfect thread mating.

Response 1

- Metal-threaded adaptors allow **better torque control**, ensuring tight sealing with appropriate PTFE tape or thread sealant.
- Especially in **vertical shafts** or inaccessible locations, a failure means costly repairs and shutdowns. **Reliability is crucial.**

4. Code and Manufacturer Recommendations

- Many **plumbing codes and manufacturer guidelines** (e.g., ASTM D2846 for CPVC, IS 15778) **recommend or mandate brass-threaded fittings** for connections to metal valves or threaded components.
- Some manufacturer guidelines even **void warranties** if plastic-threaded fittings are used improperly.

Where Plastic Threaded Adaptors May Be Used:

- Only when the **connected fitting is also plastic**, and the joint is not subject to mechanical stress, vibration, or high temperatures.
- For **temporary connections or low-pressure systems.**

Conclusion:

Always use CPVC/uPVC metal thread adaptors when connecting to flush valves, ball valves, or any metal-threaded component. This ensures safety, durability, and code compliance.

Minesh Mahendra Shah
IPA Membership No. : L1534

Response 2

In order to connect 32mm flush or ball valves to UPVC/CPVC piping, mainly on shaft installations, it is highly advisable to use a UPVC/CPVC thread adaptors with a metal threaded insert.

The reason is that metal threads have better strength, durability, and resistance to stripping, cracking, and creep than plastic threads mostly when they have to join with something metal, like the valve threads. It makes a secure, leak-proof connection that's long-lasting and can take the stresses of tightening plus pressure plus thermal fluctuations over time.

Prasad Arjun Godse
IPA Membership No. : L-5985

Response 3

The Adopters used to fix the Brass Ball valve should be fitted with UPVC/CPVC/ metal threaded adopter's because- Mixing materials with different thermal expansion rates can lead to leaks or joint failure, especially when exposed to temperature fluctuations.

Abbas Shabbir Lehry
IPA Membership No. : L1027

Response 4

You should use Brass MTA & FTA instead of plain MTA FTA because in high pressure piping leakages start immediately. We have done a lot of projects within 2 years of PIPOLE PIPES Brand launch and seen the failures.

Regarding using CPVC or uPVC I suggest both are equally good depending on water temperature. We specialize in both and we are strong contenders among India's top 3 pipe brands—backed by performance, innovation, and trust.

For more deep knowledge request you to go through our PIPOLE PIPES TECHNICAL MANUAL which gives all details which NO MEP Consultants would find on any other brands technical manuals.

Ravi Gupta

Response 5

Recommendation to connect by metal-threaded adapters with brass inserts for flush valve and ball valve installations.

Reason: Metal threaded adapters to be connected to Ball valve and flush valve installation especially in concealed and shaft applications where maintenance is difficult - due to greater resistance to torque and improved longevity or durability.

M Durgaisingham
IPA Membership No.: L 2339

Conclusion

As can be seen from the above responses metal threaded adaptors should only be used when connecting to flush valves, ball valves etc. The basic reason is that metal threads have better strength, durability and resistance to stripping, creeping as compared to plastic threads. Metal threads also resist thermal stress better and will not cause loosening or cracking as is evident in plastic threads. In order to ensure leak proof connections, it is recommended to go for metal threaded adaptors.

Sharat V. Rao
Convener
IPA Debate Club

TRUFLO®
by hindware

TRU QUALITY
TRU COMMITMENT

Offering world-class pipes and fitting solutions inspired by the quality commitment of its flagship brand Hindware over decades.
All TRUFLO manufactured products are lead-free.

CPVC PLUMBING SYSTEM FOR HOT AND COLD WATER

Certified

GREEN PRODUCT • NSF/ANSI 14 NSF/ANSI 61

GreenPro™ | NSF/ANSI 14 UPC-I | NSF/ANSI/CAN 61 UPC-I | UPC-I

Assurance to

- Last for generations
- Water quality retention

1800-571-6655

www.truflopipes.com

Adding Green Dimension to Plumbing a knowledge sharing session by IPA Ahmedabad Chapter



The Indian Plumbing Association Ahmedabad Chapter, in collaboration with GICEA Ahmedabad, successfully organized a knowledge-sharing event titled **"Adding Green Dimension to Plumbing"** on **14th June 2025** at **GICEA Nirman Bhavan, Ahmedabad.** The event brought together a wide array of professionals from the building industry, including architects, civil engineers, MEP experts, planners, academia, and students.

Proceedings:

The event commenced with a welcome address by Apurva Shah, Chair, IPA Ahmedabad Chapter setting a warm and thoughtful tone for the insightful session ahead. Vikas Shah, Vice President of GICEA, delivered a brief introduction of the keynote speaker, Dr. Hariharan Chandrashekar, a renowned Indian ecological economist. Dr. Hariharan Chandrashekar led the session with a highly enlightening and thought-provoking presentation emphasizing the theme "Think Beyond Pipes and Pumps." He shared 12 transformative insights aimed at promoting sustainable plumbing and water management practices.

12 Key Takeaways from Dr. Harihara's Talk:

1. **Redefine Consultant Roles** – MEP/ PHE professionals must lead sustainability, beyond hydraulics.
2. **Aim for Net Zero Water** – Promote smart fixtures, reuse systems, and efficient designs.
3. **Adopt New NBC Norms** – Transition from 135 LPCD to 90 LPCD in line with updated codes.
4. **Outdated STPs Must Go** – Advocate passive and decentralized treatment systems.
5. **Avoid Overdesign** – Minimize unnecessary civil costs, potentially saving up to ₹50 lakh.
6. **Use Water-Saving Technologies** – Embrace rainwater harvesting, smart meters, and digital tracking.
7. **Bangalore Success Story** – Learn from the city's 100% reuse of wastewater and potable blackwater.
8. **Reduce Carbon Impact** – Discourage tanker-based water supplies.
9. **Sustainable Design = Business Value** – Sustainability adds long-term value for clients.
10. **Professionals Must Lead** – Go beyond compliance; work to close the water loop.
11. **Paradigm Shift Needed** – Decentralized reuse and treatment is the future.
12. **Call to Action** – PHE/MEP professionals must evolve into Natural Resource Efficiency Managers.

Participation & Engagement:

The event saw active participation from a wide range of stakeholders including: experts from the building and construction industry, MEP professionals, architects and planners, members of Student Chapters & engineering students and civil engineering professionals.

The sponsors, Ashirvad by Aliaxis and V-Guard, also contributed by presenting the technical innovations and sustainable aspects of their respective products. They interacted actively with the audience during the session.

Questions and answers were also included to make the session interesting and meaningful.

Event Team & Contributions:

The event was expertly anchored by Avani Sikka, EC Member, Ahmedabad Chapter who managed the flow of the program with efficiency and grace. Harshal Parikh, Hon. Secretary, IPA Ahmedabad Chapter, delivered the Vote of Thanks, appreciating the speaker, sponsors, attendees, and organizing members. Minesh Shah, National Secretary of IPA, also graced the event with his presence. Felicitations of the speaker and sponsors were carried out by the joint committee members of IPA and GICEA.

Acknowledgment:

Special thanks to the dedicated efforts of the organizing team and EC & SEC members including: Ketan Parikh, Chetan Vyas, Samir Raval, Jignesh Mewada, Shailendra Raval, Dipen Mehta, and Priteshbhai Sheth, whose active participation made the event a grand success.

Team GICEA & IPA Ahmedabad Chapter for curating a truly impactful and forward-looking event that brought sustainability to the forefront of plumbing and water management practices.

SFA INDIA

Shaking up water

MADE IN FRANCE

COMPACT AND ROBUST WASTEWATER LIFTING PUMP!

SANICOM 1 WASTEWATER LIFTING PUMP FOR COMMERCIAL USE

- FLOOR-STANDING INSTALLATION
- IDEAL FOR HOTELS, RESTAURANTS, CAFES, AND SALONS
- DISCHARGE HEIGHT: 11 M
- MAX. FLOW RATE: 12 M3/HR
- DISCHARGE PIPE: 32 MM
- HANDLES TEMPERATURE UP TO 90°C (5 MINS MAX)

SCAN THE QR CODE TO DOWNLOAD THE BROCHURE!

CALL US TODAY

+91 70451 28608 | info@sfapumps.in | www.sfapumps.in

FROM BLUEPRINT TO REALITY

CREATING SMARTER AND GREENER SPACES TOGETHER

A Panel discussion by Indian Plumbing Association Chandigarh Chapter

IPA Chandigarh Chapter organized the panel discussion on 7th June 2025 sponsored by Flowkem. This panel discussion was attended by builders, senior engineers, architects from Tricity.

The panel discussion on Creating Smarter and Greener Spacxes Together was an extensive and interactive technical session where the discussions took place on the topic, "Creating Smarter and Greener Spaces and solutions'' and deliberations were held on the problems being faced by the engineers in this area.

The delegates were welcomed with an address by Chapter Chairman Sahil Kansal, who briefed them about the Indian Plumbing Association (IPA) and its ongoing efforts across the country to promote the development of plumbing and building services.

The panel discussion concluded with a vote of thanks by Kartik Kapoor, NEC Member, IPA Chandigarh Chapter. He thanked all the esteemed delegates of the industry who took out their valuable time to learn and improve their technical skills so that our society can be benefited and updated about the plumbing industry and gain knowledge. The panel discussion was followed by networking and dinner.

50+ years of legacy SUDHAKAR GROUP

SUDHAKAR
PIPES AND FITTINGS

QUALITY THAT CONNECTS, STRENGTH THAT LASTS.

A COMPREHENSIVE RANGE OF
PIPES & FITTINGS, PROFILE SYSTEMS, AND WIRES & CABLES

www.sudhakarind.com
info@sudhakarind.com

Toll Free: 1800 120 000 066

SudhakarPipesAndFittings
SudhakarGroup

Ahmedabad Chapter

EK PED माँ KE NAAM

IPA Ahmedabad Chapter Executive Committee Members planting trees under the "**Ek Ped Maa Ke Naam**" campaign, initiated by government of India

Bengaluru Chapter

Knowledge Sharing Session
Surface Water management Using External Drains

Balkrishna Mehta, Chair, IPA Bengaluru Chapter giving presentation on IPA activities

Audience during session

Chatrapati Shivaji Nagar (CSN) Chapter

CSN Municipal Corporation invited IPA CSN Chapter Executive committee for a field visit to city's water supply project

Pictures of IPA CSN Executive Members visiting the Water Supply Project

During the visit, IPA members shared constructive suggestions to enhance the efficiency and sustainability of the city's water supply project, contributing toward a stronger, future-ready urban infrastructure.

NATIONAL OUTREACH

Left to Right: Rohit Srivastava, Manager Outreach, IPA , meeting with Charanjit Kaur, Regional Manager, Indo-Italian Chamber of Commerce & Industry along with Gurmit Singh Arora, National President, IPA

Meeting with Dr. Sanjai Kumar, Scientist E, Department of Science and Technology, Government of India (Right)

Meeting with Manoj Gulati, Regional Director – South Asia, MD, Water.org (India) (Right)

Left to Right: Subhayu Basu, DGM, NSDC, Rohit Srivastava, Manager Outreach, IPA, Mahendra Singh Payaal, Executive Vice President, NSDC, Gurmit Singh Arora, National President, IPA, Vasu Sharma, GM, NSDC

Left To Right: Chandra Shekhar Gupta, National Vice President, IPA, meeting with Dr. Abhay Jere, Hon'ble Vice Chairman, AICTE along with Rohit Srivastava, Manager Outreach, IPA

Gurmit Singh Arora, National President, receiving the award on behalf of IPA from Naredco Mahi President Smita Patil during 4th Naredco Mahi Convention

Gurmit Singh Arora, National President with Deepa Malik, first Indian woman to ever win a medal at the Paralympics

Skill India
कौशल भारत-कुशल भारत

N·S·D·C
RE IMAGINE FUTURE

INDIAN PLUMBING ASSOCIATION
ESTD. 1993
Redefining Plumbing Standards

IPPL IN A NEW AVTAR

NSDC- IPA Certification for building industry professionals in the field of Water, Sanitation & Plumbing.

INDIAN PLUMBING PROFESSIONALS LEAGUE 2025 ®

Learning ▸ Knowledge ▸ Quiz

9th Edition

Joint Certification by NSDC and IPA

TAKEAWAYS

- Expertise for on-time delivery of projects
- 40 hours of learning (on weekends) for each participant
- Honing the cost effectiveness of projects
- Update on Latest Plumbing Technologies
- Scaling up quality standards

EXCITING PRIZE MONEY FOR THE NATIONAL WINNING TEAMS

WINNER	1st RUNNER UP	2nd RUNNER UP
Cash reward of INR 2.5 Lakhs	Cash reward of INR 2 Lakhs	Cash reward of INR 1.5 Lakhs

Learning Sessions will be conducted between August and October 2025

Grand Finale: November 15, 2025 during 31st Indian Plumbing Conference at Kolkata.

For more details and participation,

please write to support@indianplumbing.org or call +91 9560960300

INDIAN PLUMBING PROFESSIONALS LEAGUE®

Learning ▸ Knowledge ▸ Quiz

"A Competition To Unite"

How India's top plumbing professionals are applying IPPL knowledge for smarter, sustainable design

A Launchpad for Technical Growth & Confidence

Participants across the country shared that the **Indian Plumbing Professionals League (IPPL)** has been a game-changer in boosting their technical confidence and helping them master plumbing codes, material standards, and sustainable system design. We bring up a word cloud developed with collating all their responses.

The Indian Plumbing Professionals League (IPPL) is more than just a knowledge-sharing competition—it's an experience that transforms professionals into solution-driven thinkers. Here's what some of the **IPPL Chapter Winners** had to say about how it has impacted their technical understanding, work efficiency, and approach to sustainable plumbing design:

Bridging Structures and Services

How IPPL 2024 Elevated Design Approach for Sustainable Building Solutions

As a Senior Design Engineer at Design Collaborative Pvt. Ltd., I specialize in the design and analysis of structural systems for diverse building projects, including residential, commercial, and institutional developments. My focus is on creating safe, practical, and cost-effective structural solutions that harmonize with architectural vision and MEP requirements. Collaborating closely with architects, consultants, and site teams, I ensure seamless coordination and constructability of designs.

With a strong foundation in reinforced concrete and steel design, I am committed to developing structures that are technically sound, material-efficient, and service-friendly. My expertise in national codes and standards is continually enhanced through hands-on experience and interdisciplinary collaboration.

Participating in the Indian Plumbing Professional League (IPPL) 2024 has been instrumental in expanding my understanding of building systems beyond structural design. It has enriched my ability to integrate plumbing and other services into my projects, resulting in improved planning, reduced rework, and more sustainable outcomes.

I am deeply grateful to our Managing Director, Mr. Israel Gnanaraj, and my colleagues at Design Collaborative for their unwavering support and encouragement. Special thanks to Dr. Nagakarthikeyan, Chairman of the Pondicherry IPA Chapter, and our mentor, Dr. Virapan, for their invaluable guidance.

IPPL 2024 has significantly contributed to my professional growth by fostering interdisciplinary collaboration with plumbing professionals, architects, and MEP consultants. It enhanced my knowledge of plumbing codes, water efficiency standards, and the coordination of plumbing systems within structural designs, helping me minimize clashes and support sustainable construction practices.

The experience has empowered me to apply smarter plumbing solutions, such as efficient piping layouts, strategic shaft placements, and sustainable water management techniques like rainwater harvesting and greywater recycling. These improvements have led to better coordination, cost savings, reduced structural changes during construction, and long-term performance benefits.

To future IPPL participants, I say: IPPL is more than a competition—it's a platform to broaden your perspective. Engage with experts from diverse fields, stay curious, and embrace continuous learning. This experience will sharpen your technical, teamwork, and problem-solving skills, enabling you to design smarter, more integrated, and sustainable building solutions.

Shanmugapriya M
Senior Design Engineer – Structures
Design Collaborative, Pondicherry

I gained deeper insights into plumbing codes, sustainable practices, and latest technologies and I have applied water-saving and energy-efficient solutions that improved system performance.

Smarter planning and updated knowledge led to reduced material costs and more sustainable designs.

Dhirukumar Darji
Sr. Plumbing design manager
Jhaveri Associates
Ahmedabad

My increment has been the highest in the company after participating in IPPL. Knowing what kind of standard material should be used also helped in checking its quality, and this has resulted in a better quality of work.

Actually, I understood some things in the IPPL session mainly related to waste water lines, for example, pressure zone, and accordingly, I worked according to this method in the current project and got a positive experience from it.

In my opinion, IPPL is doing a very valuable job in the plumbing sector at the national level and due to this, you get to know the plumbing manufacturing companies of the world and get acquainted with the usefulness and quality of the new things that are coming out.

Ajay Somnath Oval
Senior Supervisor PHE,
Kumar Realty, Pune

"Participating in IPPL 2024 significantly strengthened my professional journey by allowing me to showcase my passion for plumbing, gain insights from industry experts, and explore innovative solutions. The connections made have opened new opportunities for collaboration and growth, making the experience impactful and inspiring. My understanding of plumbing standards and best practices improved, helping me stay current and approach projects with greater confidence. IPPL also helped me implement smarter plumbing solutions that improved water efficiency, reduced energy use, and enhanced overall system performance across projects.

Applying techniques learned through IPPL led to cost savings, improved performance, and more sustainable outcomes. Water-efficient fixtures and leak detection systems reduced maintenance and wastage, while sustainable design aligned our projects with green building standards."

S. Sanjeevi Kumar
Manager, MEP Design
Kalpataru Projects, Mumbai

"Participating in IPPL boosted my confidence, improved my industry visibility, and expanded my professional network. I gained deeper insights into plumbing codes, sustainable practices, and latest technologies and I have applied water-saving and energy-efficient solutions that improved system performance.

Ultimately, Smarter planning and updated knowledge led to reduced material costs and more sustainable designs."

Mayur Sondagar
Sr. Plumbing Design Manager
Jhaveri Associates
Ahmedabad

IPPL gave me a launchpad of further growth as it helped me to connect to legends to the plumbing world.

Effective water management was the most useful thing that I got to learn. It's first application was deployed in my newly constructed home through rain water harvesting (ground water recharging through borewell). One of the new technology application in our field that I got to know is of the use of ultra sonic sound emitting microphones incorporated in a ball's body, which will be used to detect leakage in water supply lines.

Harsh Khandelwal
Director and HOD of Design
Climatech Aircon Engineers Private Limited, Jaipur

"My participation in IPPL 2024 has enabled me to implement smarter plumbing solutions in my projects, leading to improved building efficiency, better plant operations, and effective water management.

The exposure to advanced plumbing techniques, energy-efficient fixtures, and sustainable system design has allowed me to contribute to more optimized water supply and drainage layouts in our projects.

Srinivash D
Sr. Engineer 1
Sobha Limited, Bengaluru

This really helped to learn best plumbing practices and I came to know about Many things we were ignoring during designing plumbing systems. The course has given me knowledge of sustainable and efficient products, which I am applying to project sites.

Sachin Prajapat
Senior Design Engineer,
Shreshtha Consultants
Jaipur

Participating in IPPL 2024 has been a game-changer in my career. It enhanced my visibility within the industry and boosted my confidence in taking on complex plumbing challenges. The exposure to national standards and networking opportunities with top professionals helped me grow both technically and professionally. The IPPL sessions and assessments deepened my understanding of modern plumbing codes, water safety norms, and green building techniques.

I am now more aware of global standards and how to apply them locally, ensuring compliance and excellence in every project. The knowledge gained led to more precise system design and selection of sustainable materials. This not only reduced wastage and maintenance costs but also improved overall performance, supporting LEED/BREEAM goals in a few of our green-certified projects.

Sanjay Kumar
General Manager – Projects
Vamana Group, Chandigarh

IPPL participation helped me bring meaningful improvements across all my projects. By adopting the following techniques, we've achieved significant cost savings, enhanced performance, and sustainable outcomes:

Use of low-flow fixtures, resulting in 25–30% water savings.

Reuse of treated wastewater for industrial applications, toilet flushing, and landscape irrigation.

Rainwater harvesting and its reuse for non-potable purposes, reducing dependency on fresh water sources.

Madane G
Sr. Chief Engineering Manager - CivilL&T Construction,
B&F-IC EDRCHealth, Public Space & Airports SBG, Chennai

My participation in IPPL significantly influenced the adoption of smarter plumbing solutions across our projects, yielding measurable benefits in key areas:

- **Cost Savings:** Optimizing water use with efficient fixtures and systems, along with energy savings from smarter water heating methods, has reduced utility costs. IPPL's emphasis on proactive leak detection has also helped prevent expensive repairs and water loss.
- **Sustainable Outcomes:** By implementing water-saving technologies, greywater reuse, and waste-minimizing practices, we're actively lowering the environmental footprint of our designs—aligning with long-term sustainability goals.

Prasad Arjun Godse
Quantity Surveyor,
Harsh Constructions Pvt. Ltd.
Nashik

Coming from an Environmental Engineering background, IPPL was a key stepping stone in deepening my understanding of plumbing design and materials. It boosted my confidence in tackling MEP concepts and improved my grasp of industry standards and efficient material use. The expert insights helped me make better design decisions at work. IPPL also introduced me to technologies like heat pumps, which offer clear advantages over boilers in terms of cost, space, energy use, and pollution—valuable takeaways I now apply in my projects.

Narendra K R
Engineer, Sobha Limited
Bengaluru

My participation in IPPL 2024 led to measurable improvements in cost savings, system performance, and sustainability across projects. IPPL transformed my approach from fixing problems to preventing them with smarter design delivering tangible financial, operational, and environmental benefits.

Ansari Mohammad Asif
Deputy Manager,
Senior Plumbing & Firefighting Design Engineer
Kalpataru projects
Mumbai

Redefining Plumbing Standards

Future events

IPPL 2025

Learning ▸ Knowledge ▸ Quiz

"A Competition To Unite"

August 2025 - October 2025

At 28 IPA Chapter level

Ahmedabad, Amravati, Bengaluru, Bhubaneshwar, Chandigarh, Chennai, Chatrapati Sambhaji Nagar, Coimbatore, Delhi, Goa, Hyderabad, Indore, Jaipur, Kochi, Kolhapur, Kolkata, Lucknow, Mumbai, Nagpur, Nashik, Navi Mumbai, Puducherry, Pune, Raipur, Surat, Trivandrum, Vadodara, Vishakhapatnam.

IPA Neerathon

Festival Awareness Water - RUN FOR WATER

IPA Neerathon Chennai

14th September 2025

Venue

Island Ground,
Gate No. 6, Chennai

IPA Neerathon Bengaluru

12th October 2025

Venue

St. Joseph School,
Bengaluru

IPA Neerathon Delhi

7th December 2025

Venue

Jawahar Lal Nehru Stadium
Delhi

www.indianplumbing.org

India's Largest and the only Conference on Water, Sanitation & Plumbing

Indian Plumbing Association
ESTD. 1993
Redefining Plumbing Standards

31st INDIAN PLUMBING CONFERENCE KOLKATA

THEME

SUSTAINABLE SMART WATER MANAGEMENT

Thursday	Friday	Saturday
13	14	15

NOVEMBER 2025

Biswa Bangla Mela Prangan
(Milan Mela), KOLKATA

CONFERENCE

6 Technical Sessions and Panel Discussions

Deliberation by Real Estate Developers, Architects, MEP Consultants, Policy Makers, Government officials, Academicians, Hospitality Leaders, International Domain Experts etc.

Motivational Session

Delegate Registration will open on 15th August 2025

EXHIBITION

Products from Water, Sanitation and Plumbing Industry

110 plus manufacturers from across the globe

75000 sq. ft. exhibition area

FREE Entry

NETWORKING

IPA Lifetime Achievement Award

IPA Navratna Awards

IPA Felicitations

Grand Finale of Indian Plumbing Professionals League (IPPL) 2025

INDUSTRY PARTNERS

Principal
ASTRAL PIPES • BATHWARE

Platinum: KPT Pipes
Networking Dinner: KSB Solutions. For Life.
IPA Life Time Achievement Award: wilo
IPA Navratna Awards: VS
IPA Felicitation: SKIPPER PIPES
Silver: Jain Plumbing
Delegate Kit Bag: Lubrizol
Badge Partner: SFA India

www.indianplumbing.org

FOLLOW US ON

www.indianplumbingconference.com

E mail : gm.events@indianplumbing.org

PRINCE PIPES

HT safe

LOW NOISE PP DRAINAGE SYSTEM

Noise insulation 17db @ 2 lps flow rate

Class B1 Flame Retardancy

Patented 3 lip seal guarantees leak-proof installation

High impact resistance

Polypropylene (PP)

Product Range **Pipes & Fittings:** 32, 40, 50, 75, 90, 110, 125, 160mm

Ostendorf Kunststoffe | MADE IN GERMANY

PRINCE PIPES AND FITTINGS LIMITED

info@princepipes.com | www.princepipes.com | **Toll Free: 1800 267 7555** (Please call between 10 am to 6 pm) | 6399 489 999

RNI Registration No. DELENG/2019/79105 | ₹ 20 per copy | English - Monthly
Postal Registration No. DL(S)-17/3585/24-26 | Date of Publication: 15th of Every Month
Date of Posting 20th of Every Month | Posted at Lodi Road PO, New Delhi – 110003