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The World of Swimming Pools Bath and Spa

AESTHETICS AND EFFICIENCY

Kairav Engineer

Executive Director, Astral Limited

An Exclusive interview

26

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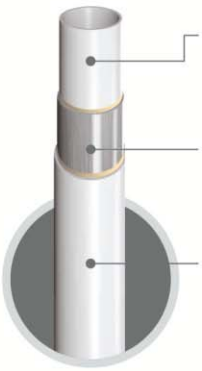

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MY PAGE

Dear Readers,

Festivals are in the air across the country even as international conflicts peak. Amidst this, India is emerging as one of the world's strongest economies, the largest democracy, and one of the oldest civilizations. Yet, when it comes to water, self-reliance remains a distant goal.

This monsoon has blessed us with good rains, thanks to continuous public and private efforts to mitigate climate change. However, limited water resources and a growing population mean we still have a long way to go. The idea of a "third world war on water" is not literal, but a stark metaphor for the instability driven by scarcity, pollution, and mismanagement, further aggravated by climate change.

Population growth, agriculture, and industry continue to put immense pressure on freshwater resources, while melting glaciers, altered rainfall, and rising temperatures make availability unpredictable. In India, inter-state river disputes reflect these challenges, with 17 major rivers shared among states, creating a complex governance puzzle. Preventing conflict requires awareness, stronger legal mechanisms, cooperative water-sharing agreements, efficient technologies, and active community participation.

Against this backdrop, the **September issue of Indian Plumbing Today** explores *"Aesthetics to Efficiency – The World of Swimming Pools, Bath and Spa."* The **2025 Uniform Swimming Pool Code–India (USPC-I)**, jointly developed and revised by Indian Plumbing Association and International Association of Plumbing and Mechanical Officials (IAPMO), India, in 2025 is a comprehensive guide that covers design, construction materials, and methods for Swimming Pools, Spa and Hot Tubs in India. Articles cover balancing design with efficiency, heat pumps for pools, and innovative bio swimming pools. Pools in hospitality and residential spaces must combine aesthetics with technical expertise for maximum efficiency—and we hope this issue offers fresh perspectives.

Meanwhile, **Indian Plumbing Professionals League 2025**, IPA's largest chapter-level program, is underway across the country with Bengaluru and Ahmedabad Chapters taking the lead. Other Chapters are also prepping up fast. We wish all participants success in leveraging this unique knowledge-sharing platform.

Looking ahead, the **31st Indian Plumbing Conference** will take place in Kolkata from 13th–15th November, themed *"Sustainable Smart Water Management."* With a strong lineup of national and international experts, this event promises unmatched learning and networking. Delegate registrations are now open—secure your seat today!

Together, let's build conversations that move us from water conflict toward water resilience.

Dipen Mehta
Member, IPT Editorial Board
Past Chair, IPA Ahmedabad Chapter

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BALANCING AESTHETICS WITH EFFICIENCY

- Muthu Venkata Selvam

Today, in the world of **Swimming Pool technicality**, efficiency and performance are the vital components while selecting products. Every effort is being taken to ensure water saving is the key criteria while selecting products. This article details a few of new green products & technologies made available in Indian pool industry.

THE FIRST & MOST IMPORTANT PRODUCT IS ACTIVATED FILTER MEDIA.

Media plays a very important role in the beauty of pool water added with sanitation.

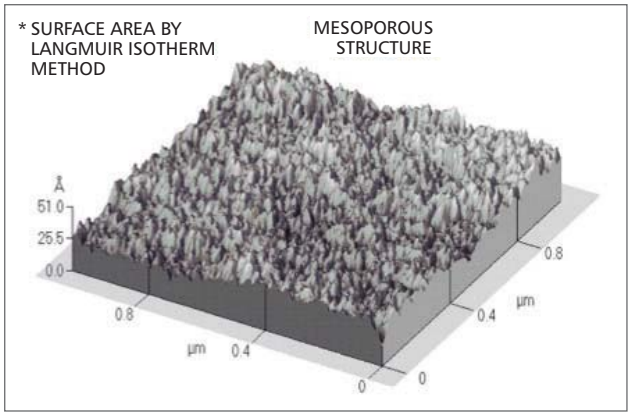
Activated Filter Media (AFM)

Activated Filter Media (AFM) is important and highly efficient for water filtration due to its quality of self-sterilizing which enhances mechanical and electrostatic filtration properties. These are made of recycled green and brown glass.

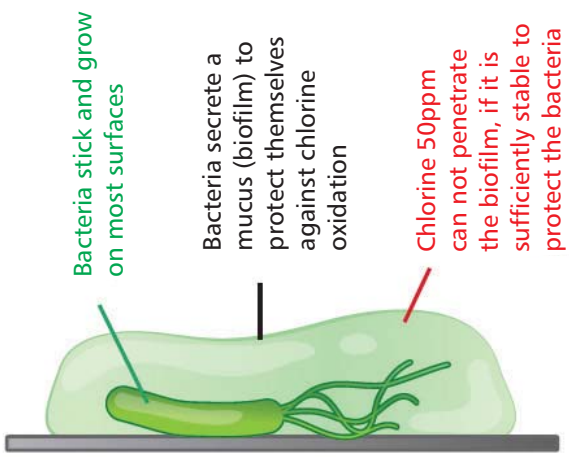
AFM's efficiency & performance are achieved through its indigenous manufacturing process that custom-engineers the glass granules.

Key Advantages of AFM

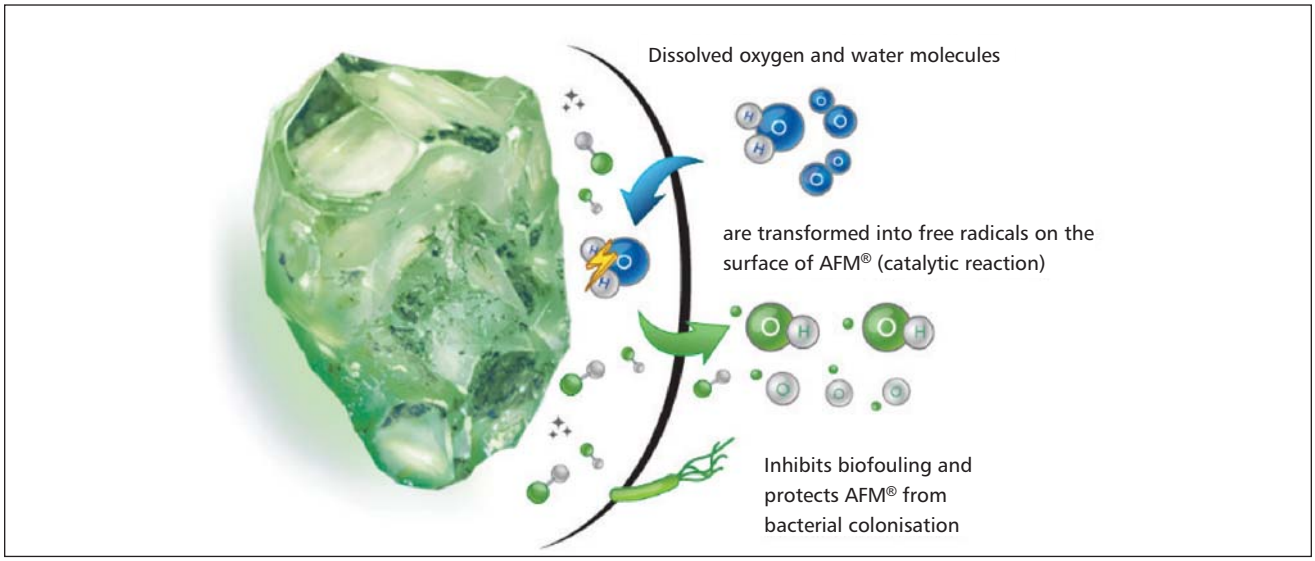
1. **Ideal hydraulic properties:** AFM granules, with their shape and size, ensure excellent hydraulic characteristics by preventing the channeling of unfiltered water.
2. **Increased surface area:** Thermal and chemical activation process increases the surface area of glass by up to 300 times (compared to sand). This provides more area for adsorption and catalytic reactions.



3. **Electrostatic filtration:** The same activation process gives this glass a strong negative charge which attracts and captures positively charged particles, heavy metals, and organic molecules, including those too small for simple mechanical filtration, which thus increases filtration capability & filters upto 1 micron sized particles.
4. **Self-sterilizing action:** The catalytic surface, which features metal oxides from the specific glass used, generates free radicals in the presence of oxygen or oxidizing agents. These free radicals oxidize pollutants and disinfect the media surface, preventing bacteria and biofilm from growing. This also prevents the bacterial conversion of urea into the harmful trichloramines that cause the strong "chlorine" smell and irritate the skin, eyes, and lungs.



Bacteria cling to surfaces (walls, floor, piping systems and especially in the filter media)



5. **Reduced backwashing:** Since it resists bio fouling and minimizes channeling, it retains particles more effectively and requires less frequent and shorter backwashing cycles-resulting in significant savings of water, energy, and costs.
6. **Longer lifespan and stability:** Since glass has longer life, these often lasts 10–15 years or more, significantly reducing long-term costs.
7. **Reduced chemical consumption:** Superior filtration performance, reduced backwashing & no biofilm mean less sanitizer, reducing the consumption of chlorine and other chemicals.
8. **Environmentally friendly and sustainable:** Made from 100% recycled glass bottles, reducing landfill waste. Energy-efficient and water-saving operation helps promote sustainability.

BETTER QUALITY WATER MEANS BETTER AESTHETICS IN POOL TILING & FINISHES

MULTICYCLONE FILTERS:

The next important product I would like to talk is Multicyclone filters, which are also called as prefilters.

These filters use centrifugal force to remove up to 80% of incoming dirt and sediment before it ever reaches your main filter. This significantly reduces the workload on your primary filter and provides major savings in water, energy, and maintenance

1. **Centrifugal effect:** Water enters through hydro cyclones tangentially, which creates a powerful centrifugal effect that spins and separates debris from the water.
2. **Sediment separation:** Heavier dirt and sediment are pushed to the outer wall and spiral downwards.
3. **Filtered water exit:** The cleaner, filtered water reverses direction and spirals up through the delivery outlet and continuing to the main filter.
4. **Easy disposal:** Accumulated sediment is easily disposed, which uses only about 15 liters of water (saves a high quantum of water due to less backwash in main media filter).
5. **Improved filtration and circulation:** Since media filter is not always loaded much, the filtration rate & hydraulic efficiency are improved.
6. **Simple, long-lasting design:** No moving parts-which makes it durable and low-maintenance.

VARIABLE SPEED DRIVES(VSD)

Actual amount of energy savings will depend on the

specific application, including the pump's size, its usage patterns, and the characteristics of the pool & water feature.

Every project is unique & different, which requires factoring in the resistance caused by the pump's elevation, the distance of the pipe runs and its pressure loss, and demand of water at different features. Also, the pool & water feature are called a closed loop system (as the same water is sucked & discharged back to same place). Since we have fixed head & flow pumps as standard pump, VSD comes in handy as green product.

1. **Drive technology:** These models use a full inverter drive and brushless DC motor, which can automatically adjust pump's speed and water flow.
2. **Energy/Life-saving modes:** These pumps have the ability to run at lower speeds during periods of low demand, which saves energy to a great extent. Also, the life of the pumps increases when they run at lower speed.
3. **Efficiency rating:** These pumps come with highest energy efficiency & a six-star rating.

CONCLUSION

The modern pool industry is moving beyond aesthetics alone. With green technologies like AFM, multicyclone filters, and VSD pumps, pool owners can achieve crystal-clear water, energy savings, reduced chemical consumption, and sustainability, all while maintaining the visual appeal of their pools. Balancing aesthetics with efficiency is no longer optional—it is the new standard.

Muthu Venkata Selvam
Co-Founder, AQVASTAR

Muthu Venkata Selvam is the Co-Founder of Aqvastar, a leading consulting and product specialist firm focused on water features, pools, and smart irrigation systems. With over three decades of hands-on experience across India, Oman and the Middle East, he is widely recognized for his expertise in delivering complex water-centric solutions across residential, commercial, industrial and public infrastructure projects.

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BIO SWIMMING POOLS

- Srivathsan Seshadri

Sustainable Net Zero Wastage Pool solution

How do I make my Swimming Pool sustainable?

Is it possible to make swimming pools that are Net Zero Water and Waste pools?

This would mean designing pools in such a way that no water is wasted and almost every drop is reused, recycled or replenished.

BIO POOLS: The future of swimming pools

As sustainability takes center stage in the built environment, conventional swimming pools—often reliant on chemicals, excessive water, and high energy use—are giving way to bio swimming pools. These innovative, net-zero wastage systems recycle every drop of water, harness rainwater as a source, and use natural filtration methods without harmful chemicals. With backwash water safely repurposed for irrigation and advanced eco-friendly disinfection technologies in place, bio pools not only conserve water and energy but also contribute to greener landscapes. They represent a vital shift from luxury to responsibility, making swimming pools more aligned with sustainable living and future-ready design.

Biopools with no chemicals

Suited for above and below ground installation.

- 100% biological
- Water savings (by backwash with blower)
- Energy saving (Variable Speed pump/low pressure)
- Backwash water 100% recyclable
- Possibility to "Retrofit" existing pools into biopools

1. USING RAINWATER AS A SOURCE FOR SWIMMING POOLS

Rain water can be directly taken from the collector tank:

A large capacity pre-filter will collects waste particles (like leaves and debris).

Instead of conventional media filters, beadfilter removes the smaller waste particles (down to 5 micron) bacteria remove organic waste and/or harmful bacteria.

The UV-C unit destroys any algae, bacteria, fungus or virus that are still in the water after the filter

This makes the incoming water perfectly suited for pool use.

In case the mineral content of the pool water (alkalinity and general hardness) are diluted too much, we can simply add alkalinity or hardness enhancers.

2. BACKWASHING FILTERS WITH AIR SCOURING

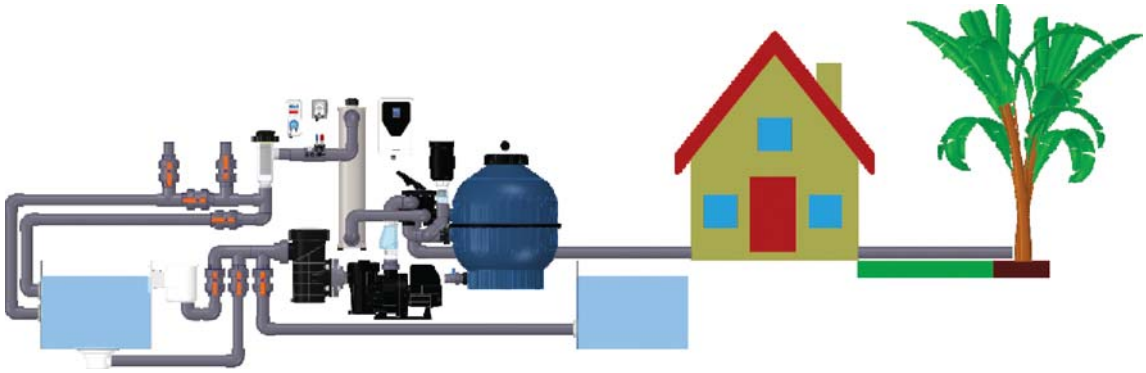
Backwashing

Periodically reversing water currents, backwashing serves to **dislodge and expel any trapped dirt particles within the filter media.** This routine is recommended every two weeks, or at least once a month, depending on factors such as pool size, usage patterns, and the characteristics of your filtration system.

The frequency of backwashing hinges on the filter head loss, calculated by subtracting the highest pressure reading from the lowest displayed on the gauges. If the result exceeds 0.6 bar, initiating a backwash is advisable. A prudent approach involves more frequent, shorter backwashing sessions, reducing power consumption and maintaining a stable filtration flow rate.

Air scouring

To increase the efficiency and sustainability of the backwashing process, this can be combined with air backwashing in the first stage, thus reducing water consumption. The air scouring process **injects air through a dedicated connection at the filter's base or via the backwash water inlet**. Notably, air scouring consumes only electricity, enhancing its efficiency compared to conventional backwashing methods. The water saving by using air scouring methods in backwashing is to the tune of **50% to 80%** compared to conventional backwashing methods.



3. USING BACKWASH WATER 100% FOR SHRUBS AND TREES

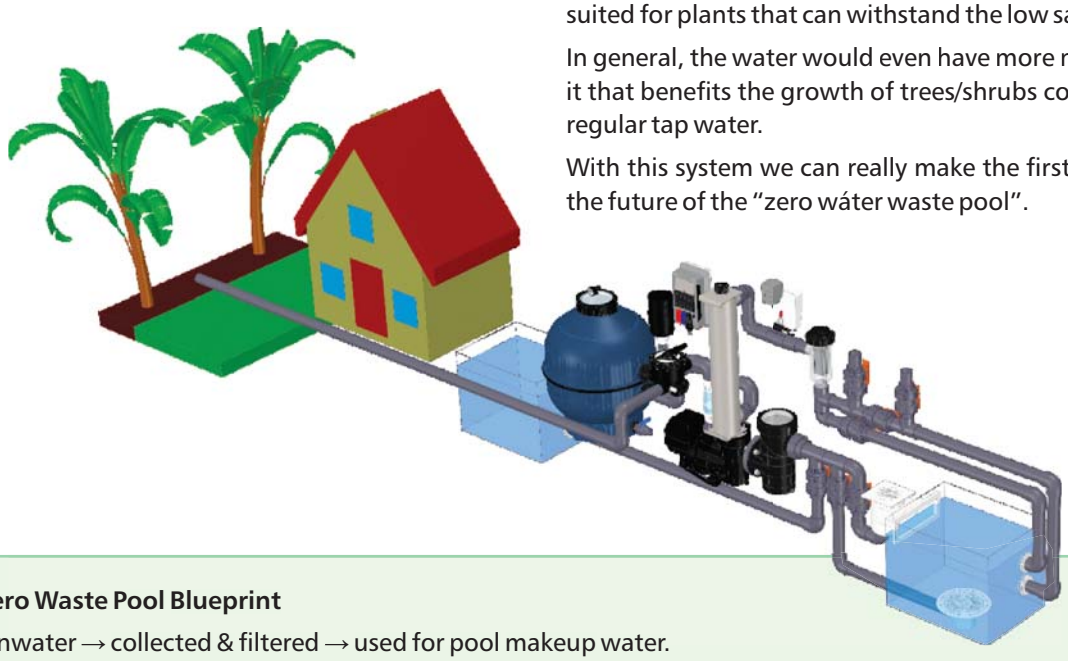
In traditional chlorinated/salt pools, the backwash water is not suited for irrigation, mainly for 2 reasons:

1. The backwash water has too many solids that can block the irrigation system (like sprinklers/driplines)
2. The backwash water contains too much salt and/or chemicals (chlorine) that can harm the plants/ grass/ trees

With BioPools filtration and disinfection systems, the backwash water can be used for shrubs and trees (that need a lot of water) directly. Instead of using the sprinkler system, we can use the backwash water pipe directly into the tree/shrubs area. As the water has no/low chemicals and no or low salt (1g/l), it is perfectly suited for plants that can withstand the low salinity.

In general, the water would even have more nutrients in it that benefits the growth of trees/shrubs compared to regular tap water.

With this system we can really make the first steps into the future of the "zero wáter waste pool".



Net-Zero Waste Pool Blueprint

1. Rainwater → collected & filtered → used for pool makeup water.
2. Backwash water → low / no chemical discharge → treated onsite → reused for irrigation or returned to pool.
3. Filtration → Bead filtration with air scouring backwash → no/minimal wastewater.
4. Disinfection → advanced eco-friendly tech (AOP, Neolysis, Low salt Hydrolysis).
5. Evaporation control → covers, shading, smart sensors.
6. Circular loop → **Pool** → **Treatment** → **Reuse** → **Pool**.

Srivathsan Seshadri
Sales Manager – Swimming Pool Consulting

Srivathsan Seshadri is a Business Development Manager at Fluidra India Pvt. Ltd., with over eight years of expertise in sales, key account management, and strategic growth. He has successfully executed projects across hospitality, institutions, and government sectors, delivering customer-focused solutions and consistently surpassing business targets. He can be reached on srivatsan@fluidra.com.

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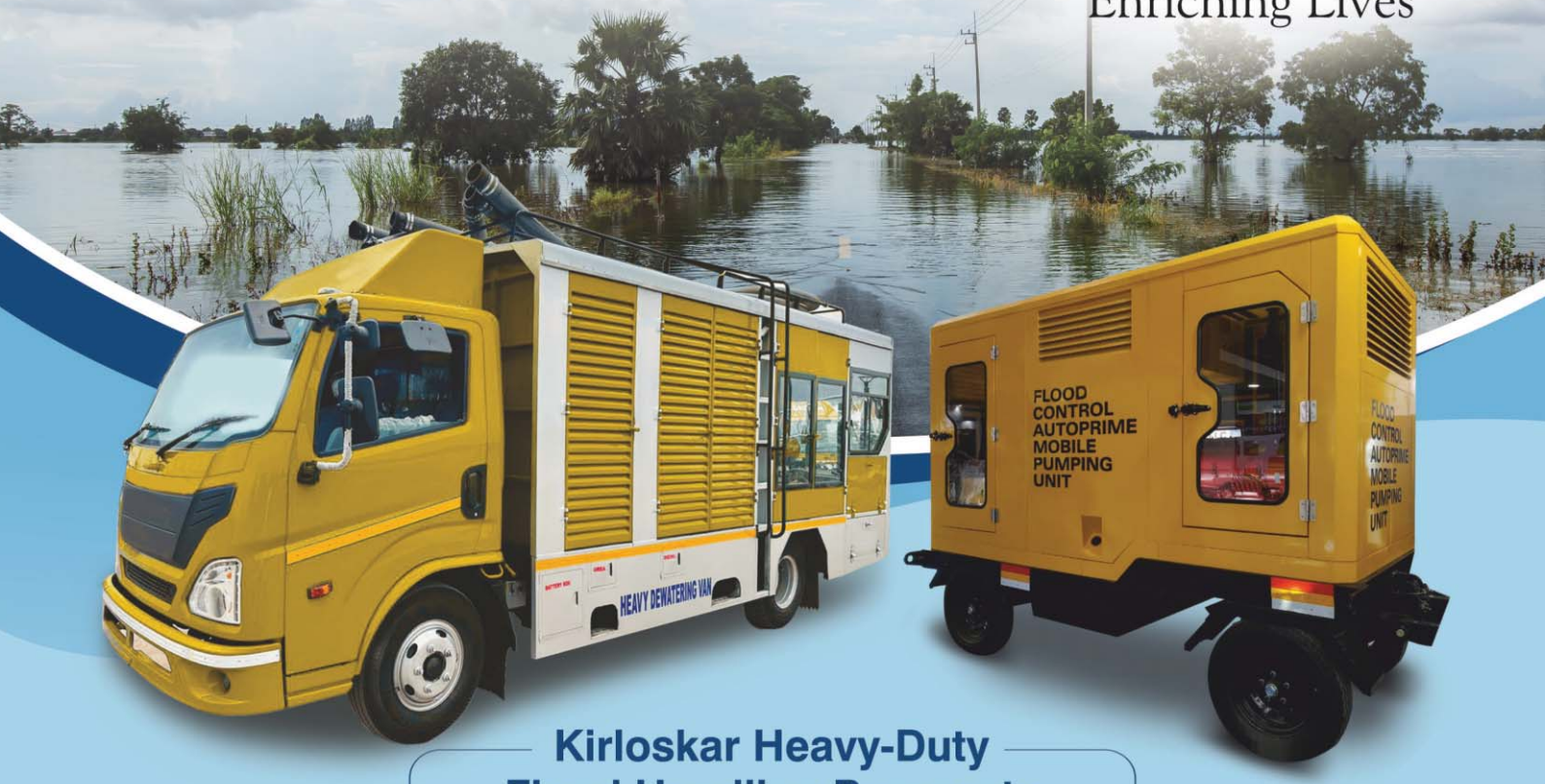

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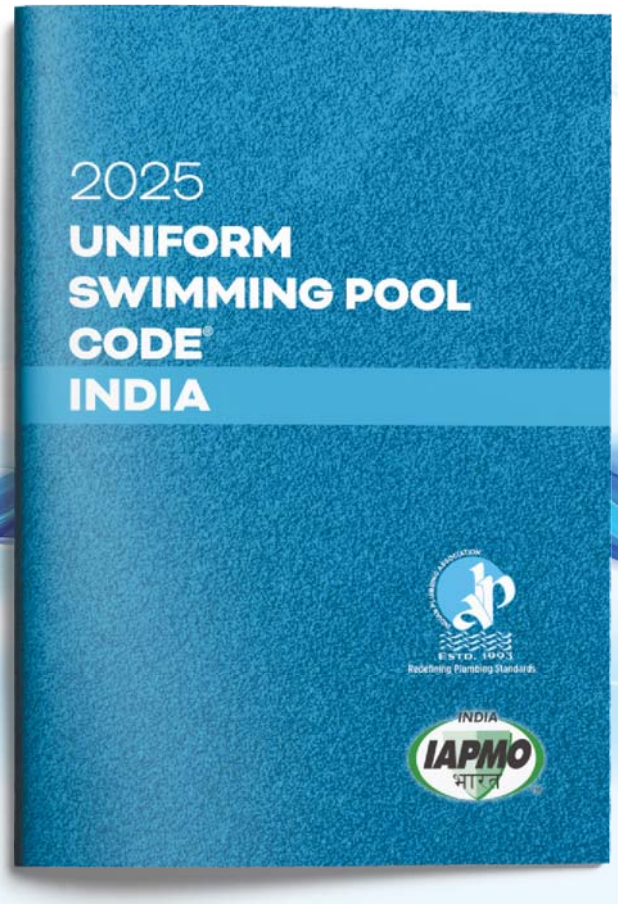
2025 Uniform Swimming Pool Code–India

-Nivedita Sharma

A Blueprint for Safety, Efficiency, and Sustainability



Swimming pools, baths, and spas have evolved from being symbols of luxury into essential features of residential complexes, hospitality projects, wellness centres, and public recreational spaces. While their aesthetic appeal remains undeniable, today's-built environment demands more—efficiency, safety, sustainability, and compliance. This is where engineering excellence and updated codes come into play.

Balancing Beauty with Responsibility

Designing a swimming pool is not only about creating a visually pleasing amenity; it is also about ensuring **life safety** and **public health protection.** Pool depth, for instance, is a critical factor. Casual swimming pools should not exceed **1.25 meters**, reducing drowning risks, while competitive pools must adhere to the standards of sporting bodies, including diving board heights.

Health protection is equally vital. Competition pools generate heavier organic loads due to high physical activity, requiring **filtration cycles as short as one hour, compared to six hours** for leisure pools. Thoughtful design features—steps, handrails, and periphery support—must also be integrated for user safety and accessibility.

The Role of the 2025 Uniform Swimming Pool Code–India

To support engineers, contractors, and designers in addressing these challenges, the **2025 Uniform Swimming Pool Code–India (USPC-I)**, jointly developed and revised by Indian Plumbing Association and International Association of Plumbing and Mechanical Officials (IAPMO), India, in 2025 serves as a comprehensive guide. It covers not just **design, construction materials, and methods,** but also critical aspects such as:

- Water quality and treatment
- Filtration, drainage, and overflow systems
- Pumps, water heaters, and circulation requirements

- Safety provisions for users
- Aquatic recreational features such as slides and diving equipment
- Wastewater disposal and energy-efficient operations

Why This Code Matters

The USPC-I is more than a reference manual—it is a framework for the future:

- **User Safety:** Clear norms for circulation, disinfection, and construction standards.
- **Efficiency:** Emphasis on energy and water conservation to lower lifecycle costs.
- **Standardization:** A uniform approach for MEP consultants, contractors, and regulators nationwide.
- **Public Health:** Benchmarks for hygiene, sanitation, and safe water management.

What's New in the 2025 Revision of the Swimming Pool Code?

The revised 2025 Uniform Swimming Pool Code–India (USPC-I) introduces several important updates to strengthen safety, efficiency, and technical clarity:

a) **New Definitions Added** – The code now includes additional definitions to align with evolving practices and technologies, ensuring greater clarity for designers and contractors.

b) **Filter Head Loss Guidance Revised** – The earlier highlighted typical values of head loss through filters have been removed, providing flexibility for engineers to design based on actual system performance.

c) **Pressure Filter Systems Introduced** – A new section on Pressure Filter Systems has been incorporated, reflecting their growing application in modern pool designs.

d) **Turnover Time Modifications** – Revisions have been made to turnover times for pools, balancing water quality requirements with operational efficiency.

e) **Heat Pump Sizing Guidance** – In the Water Heater & Vents section, a note on heat pump sizing has been added, supporting energy-efficient pool heating practices.

These changes make the 2025 USPC-I more relevant, practical, and aligned with today's sustainability goals while maintaining its focus on safety, hygiene, and compliance.

The Road Ahead

India is witnessing a surge in **real estate, hospitality, and wellness-driven developments**, all of which increasingly include pools and spas. The 2025 Swimming Pool Code arrives at the right time to equip professionals with structured, reliable guidelines that balance **aesthetics with efficiency**.

Conclusion

Swimming pools are no longer just design highlights; they are complex engineered systems that demand foresight and responsibility. The 2025 USPC-I provides the knowledge and framework to create pools that are not only beautiful but also safe, efficient, and sustainable. For MEP consultants, design engineers, and contractors, this is the moment to embrace the code and lead the industry toward a smarter, healthier future.

For more information or to get a copy of the code, please write to us on hq@indianplumbing.org.

Nivedita Sharma
Senior Manager, Communication & Publications, IPA
Sub Editor, Indian Plumbing Today Magazine

Nivedita Sharma, Senior Manager – Communication & Publications, IPA, and Sub Editor of *Indian Plumbing Today*, brings 15+ years of experience in marketing and communication across water, agri-business, and FMCG. A strong advocate for sustainability, she specializes in editorial strategy, public relations, and digital outreach. She holds a PG in Management and is a certified CMO from IIM, Lucknow. She can be reached on acep@indianplumbing.org.

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FATALITIES AND POOL SAFETY

- Mathew Jacob

Introduction

Swimming pools provide recreation and fitness, but they also carry significant risks. Numerous drowning incidents and suction entrapments highlight the urgent need for safety measures. This report highlights real-life cases, safety devices, and international standards for preventing such tragedies.

1. Drowning Incidents:

Drowning is one of the leading causes of unintentional injury deaths worldwide.

WHO estimates: **~236,000 deaths annually** due to drowning (2023 data).

Children under 5 years are at highest risk in pools.

Several tragic incidents underscore the importance of pool safety and supervision:

- **Rourkela:** A 4-year-old girl drowned in a swimming pool (Times of India).
  Drown: Tragic drowning incident of 4-year-old girl in Rourkela swimming pool | Bhubaneswar News - Times of India (indiatimes.com)
  https://timesofindia.indiatimes.com/city/bhubaneswar/tragic-drowning-incident-of-4-year-old-girl-in-rourkela-swimming-pool/articleshow/111563568.cms
- **Wanowrie, Pune:** A 17-year-old drowned in a public pool (Times of India).
  Wanowrie: Death By Negligence Case In Pool Drowning Accident | Pune News - Times of India (indiatimes.com)
  https://timesofindia.indiatimes.com/city/pune/death-by-negligence-case-in-pool-drowning-accident/articleshow/90429754.cms
- **Bengaluru:** Two teenagers drowned; the coach was arrested (Indian Express).
  Two teenagers drown in Bengaluru's swimming pool; coach arrested | Bangalore News - The Indian Express
  https://indianexpress.com/article/cities/bangalore/two-teenagers-drown-in-bengalurus-swimming-pool-coach-arrested-8415790/

To avoid drowning incidents - Pool Safety Devices

A) Pool Alarms

Pool alarms detect unexpected falls into the water. Certified to European standards, they emit a loud alarm (≥100 dB) when immersion is detected and include wind-control technology to prevent false alarms. They are recommended for pools up to 12 m × 5 m.

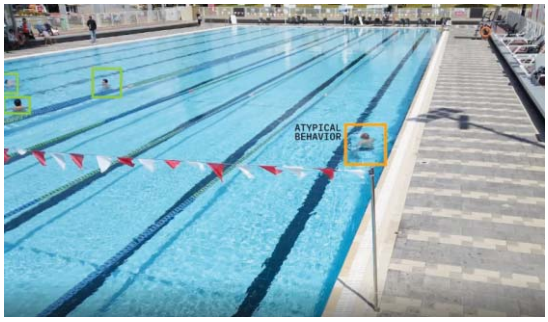
Figure 1: Example of Pool Safety Alarm

B) Pool Safety Barriers

Safety barriers prevent unsupervised access to pools. Transparent textile material ensures visibility, while UV protection improves durability. They comply with French standard NFP 90-306 and feature dual-action closures for safe access.

C) AI- integrated surveillance cameras:

AI-powered Safety-as-a-Service platform designed to elevate aquatic safety and pool operations. It transforms standard CCTV cameras into intelligent safety tools that track swimmer behaviour, detect risks early, and alert lifeguards in real time via smart devices.



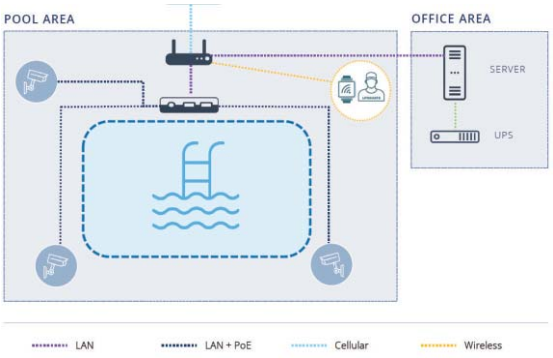


Figure 3: Example of AI powered Safety monitors

2. Drain Suction Entrapment: A Powerful Force Beneath

"Drain suction deaths" (also called entrapment deaths) are tragic incidents that occur in swimming pools, spas, and hot tubs when a person becomes trapped by the powerful suction of a pool or spa drain. This usually involves hair, limbs, clothing, or the body being pulled against the suction outlet, preventing escape and leading to drowning or severe injury.

Faulty or missing drain covers can create deadly suction forces of up to 350 pounds. This risk, known as suction entrapment, can trap swimmers underwater, leading to serious injury or death.

Types of Entrapment:

Hair entrapment – Hair sucked and tangled in the drain cover.

Limb entrapment – Arm or leg stuck inside an open pipe or broken cover.

Body entrapment – Suction holds the torso or back tightly against the drain.

Mechanical entrapment – Jewellery, clothing, or bathing suits caught.

Evisceration / disembowelment – Rare but catastrophic injuries from sitting on an uncovered drain (especially in wading/kiddie pools).

Reported Cases

- Hotel pool accident: 8-year-old fatally trapped (NY Post).
  https://nypost.com/2024/03/27/us-news/hotel-pool-where-girl-8-was-fatally-sucked-in-found-with-multiple-violations/
- Noida: 9-year-old drowned after vent entrapment (Indian Express).
  https://www.nbcnews.com/id/wbna23744434
- International cases of severe injury (NBC, YouTube).
  https://www.youtube.com/watch?v=GXHYOlsrRqs

Figure 3: Example of Drain Entrapment Hazards

Figure 4: Example of VGBA certified drain and suction inlet fittings

Virginia Graeme Baker Case

In 2002, 7-year-old Virginia Graeme Baker drowned after being trapped by a spa drain. Her death led to the Virginia Graeme Baker Pool & Spa Safety Act (2007), mandating anti-entrapment drain covers and safety systems across the U.S.

Prevention & Safety Measures

- Dual or multiple main drains – Reduces suction force at any single point.
- Anti-entrapment drain covers – Dome shaped or unblock able covers that prevent suction lock. VGBA tested and certified fixtures.
- Safety vacuum release systems (SVRS) – SVRS devices detect sudden suction blockages and release pressure within a second. They function with or without drain covers, adding an essential layer of protection.
- No swimming near drains – Educate children not to play around suction outlets.
- Routine inspections – Check that covers are secure, not cracked, and compliant with safety standards.
- Emergency shut-off switches – Allow immediate pump shutdown in case of entrapment.
- Rely on skimmers or overflows instead of drains for circulation.

Mathew Jacob
Managing Director, Fluidra

Mathew Jacob Nambiath, with over 25 years in India's pool and wellness industry, has been instrumental in shaping its growth with the Fluidra Group since 2000. As whole-time director of Fluidra India since 2019, he has driven consistent double-digit growth, pioneering innovations in water management and eco-friendly pool solutions. Known for integrity and vision, he champions sustainability, customer loyalty, and transforming pools into ecosystems of wellness, technology, and memorable experiences. He can be reached on mjacob@astralpool.in

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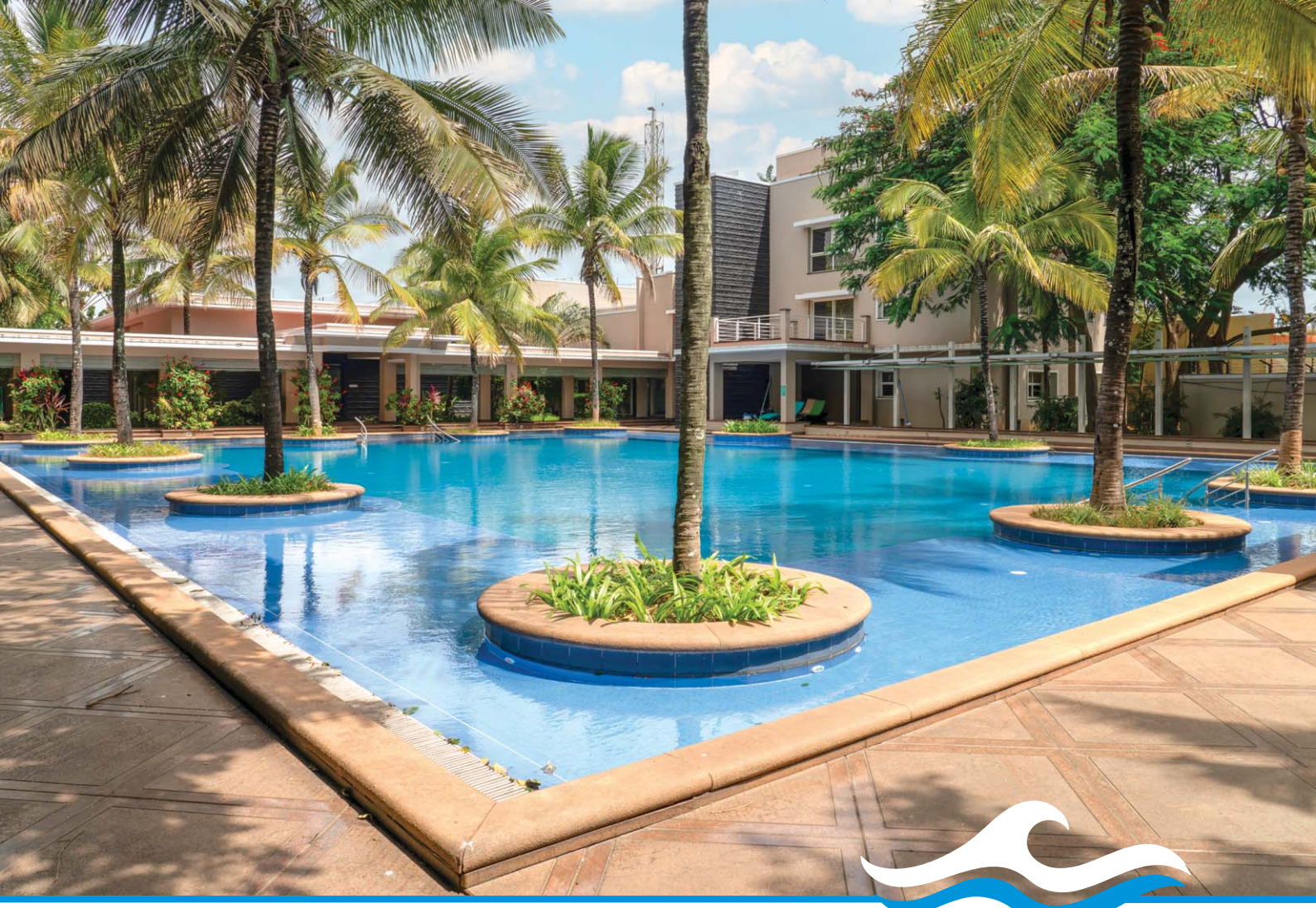


Aesthetics to Efficiency – The World of Swimming Pools and Water Bodies

- Damothiran V

Water has held an enduring place in human culture and architecture. From the monumental Roman baths to the tranquil Zen ponds of Asia, from opulent palace fountains to contemporary infinity pools, the presence of water in built environments has always symbolized both utility and beauty. In the modern age, swimming pools, baths, spas, and decorative water features embody not just luxury but also engineering precision, operational efficiency, and environmental responsibility.

In India and globally, the growing focus on sustainability has forced a rethinking of how these water bodies are designed, built, and maintained. While aesthetics remains central, functionality, safety, and efficiency are equally vital to ensure long-term viability. This article explores the interplay of design, technology, and sustainability in the world of swimming pools and water features—combining artistry with engineering.

The Aesthetic Dimension

A swimming pool or water feature is far more than a utilitarian reservoir—it is an architectural statement, a lifestyle choice, and a wellness space. The visual and sensory experience they create defines how users engage with them.

Design Integration: Modern pools are designed as seamless extensions of living spaces. Infinity edges, natural stone cladding, water curtains, and cascades bring fluidity to build forms. Residential projects often integrate pools with landscaped gardens or terraces, while resorts and spas use water features to create calming focal points.

Material & Color Palette: The choice of finishes directly influences both durability and aesthetics. Ceramic mosaics, glass tiles, and quartz aggregates are popular due to their resistance to water chemistry and ability to reflect light. Natural tones blend with landscapes, while bold, vibrant tiles can create striking artistic impressions.

Lighting & Ambience: Lighting transforms pools into nocturnal attractions. Underwater LED systems and fiber-optic effects enhance mood and safety. Pools thus evolve into multi-dimensional experiences, shifting from tranquil daytime sanctuaries to vibrant evening spectacles.

The Need for Efficiency

In India, where water scarcity and rising energy costs are pressing concerns, efficiency is not optional—it is essential. Sustainable design balances indulgence with conservation.

Water Circulation & Filtration: High-efficiency circulation systems with variable-speed pumps significantly reduce energy use. Proper hydraulic design ensures even flow distribution, eliminating dead zones and improving water quality. Advanced filtration media, such as multi-layer sand or activated glass, minimize backwashing and water wastage.

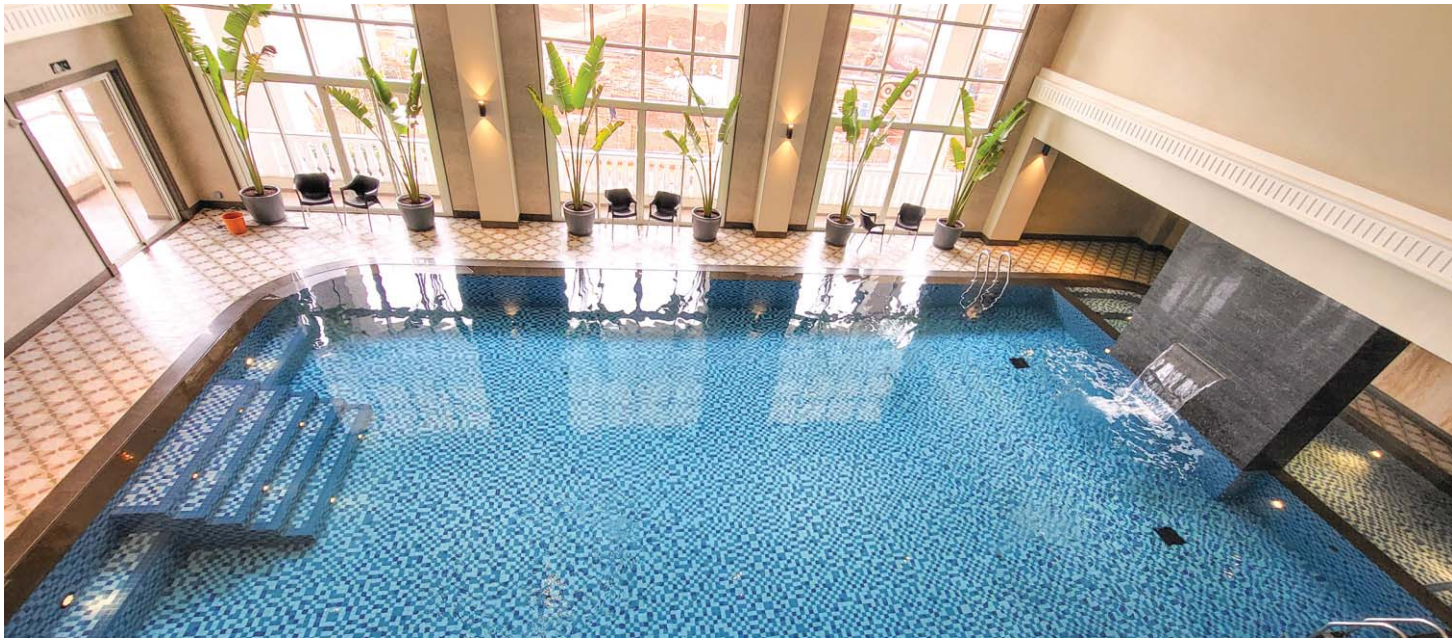
Heating & Cooling: For heated pools, inverter-based heat pumps are increasingly used. These systems modulate output based on demand, minimizing energy consumption compared to conventional boilers or electric heaters.

Water Treatment: Modern treatment systems reduce dependence on chemicals. UV disinfection and ozone systems kill pathogens without residual side effects, ensuring safer water and fewer chlorination by-products. This not only reduces operating costs but also aligns with sustainability goals.

Types of Swimming Pools

Swimming pools are classified based on water collection and circulation systems. Two primary types dominate: Skimmer pools and Overflow pools.

Skimmer Type: A skimmer system uses recessed overflow devices that draw surface water into the filtration system. Typically used in smaller pools. Skimmers are placed on the windward side to maximize surface debris removal. Made from ABS or stainless steel for durability. Return inlets are placed opposite the skimmers for balanced circulation.



Overflow Type: Overflow pools are designed with perimeter channels that collect surface water displaced by swimmers. It is commonly used in large public or commercial pools. Overflow water drains into a balancing tank, ensuring continuous skimming and water level stability. Overflow gratings must be slip-resistant, safe for barefoot walking, and durable.

Special Pool Variants

Wading Pools: Designed for toddlers and young children. Depth limited to 300–600 mm for safety. Simple shapes ensure clear sightlines for supervision. Accessibility via wide walk-in steps or ramps.

Equipment Sizing – The Heart of Pool Design

Correct sizing circulation and treatment equipment ensures safety, comfort, and efficiency. The following technical parameters are central to pool design.

Pool Volume: This is the basic factor for designing the pool.

Formula for Pool Volume:

Pool Volume (m^3) = Surface Area (m^2) × Water Depth (m)

For large pools, system volume also includes water in filters, balance tanks, and pipelines.

Turnover Rate: Indicates how long it takes for the circulation system to process the entire pool water volume.

Formula for Turnover Rate

Turnover Rate (hours) = Pool Volume (m^3)/Flow Rate (m^3/hour)

Formula for Required Flow Rate

Flow Rate (m^3/hour) = Pool Volume (m^3)/Turnover Time (hours)

Typical Turnover Times:

Private pool	: 4–6 h
Public leisure pool	: 1.5–4 h
Spa/whirlpool	: 0.25–1 h
Water features/fountains	: 0.5–2 h

Inlets (Return Fittings): Returns the filtered water uniformly into the pool. Flow velocity must not exceed 2 m/s to avoid turbulence. It is made of ABS or stainless steel. Each inlet typically handles 9–12 m^3/h.

Formula for Required Inlet:

No. of inlets = Flow Rate (m^3/hour) /Flow per inlet (m^3/hour)

Main Drains: Located at the deepest point. Equipped with anti-vortex grating to prevent entrapment. Dual drains are spaced 2 m apart for safety. Flow per drain: 15–80 m^3/h.

Formula for Required Main Drain:

No. of Main Drains = Flow Rate (m^3/hour) /Flow per main drain (m^3/hour)

Overflow Gratings: Critical for overflow pools. Made from UV-stabilized PVC, ABS, or stainless steel. Must withstand 150 kg pedestrian load. Slot width ≤ 8 mm to avoid toe entrapment.

Vacuum Points: Installed 200 mm below waterline. Allow suction cleaning without draining pool. Each point covers 10 m radius.

Pool Lights: Use low-voltage LEDs (≤ 12 V; in some cases, 24 V allowed). Waterproof housing is rated IP68. Require proper earthing and transformers for safety.

Ladders and Access: Stainless steel ladders with dual handrails. Concrete walk-in steps and ramps for accessibility. Ladder spacing ≤ 20 m apart.

Mechanical and Hydraulic Systems

Pump Sizing: Must deliver required flow rate against ≥10 m water head. Pipework sizing is critical to minimize head losses. No undersized piping–diameters must support design flows.

Filter Sizing: Filtration velocity determines water quality.

Private pools: 50 $m^3/h/m^2$.

Public pools: 30 $m^3/h/m^2$.

Children's pools: 20 $m^3/h/m^2$.

Filtration media: silica sand, gravel, or advanced media.

Balancing Tank: Stores displaced water in overflow pools. Must hold 7–10% of pool volume or bather displacement. In addition, the balancing tank should be designed to store not only the surge water from bathers but also the rainwater that falls on the pool. Also, provision should be made for draining the excess rainwater directly from the swimming pool to external drain.

Plant Room: Houses pumps, filters, dosing systems, and controls. It should be near deepest pool end to reduce head loss. Requires good ventilation, drainage sump, chemical storage separation, and security.

Safety Measures

Safety is paramount. Design and operation must prevent accidents. Lifeguards and trained supervisors are mandatory. Prominent signage: Depth markers, No diving zones. Deck surfaces must be slip-resistant. Rescue equipment: life buoys, graphite hooks, first-aid kits. Water chemistry: regular monitoring of chlorine, pH, alkalinity. CPR training for staff.

Variable Speed Drives (VSDs)

VSDs regulate pump speed and torque. Adjust flow dynamically for cascades, fountains, or jets. Improve aesthetics with programmable water displays. Save energy by reducing unnecessary high-speed operation. Extend pump life by minimizing mechanical stress. Integrate with lighting and music for multimedia shows.

Water Features Beyond Pools

Water features enhance landscapes and microclimates. They cool air, mask noise, and provide aesthetic delight.

Fountains: Use specialized nozzles such as foam, bell, fan jet, cascade, clear stream.

Formula: Q pump = N × Q nozzle × 60

Where Q pump = Pump capacity (lph),

N = Number of nozzles,

Q nozzle = Flow rate per nozzle (lpm)

Waterfalls:

Two types: Trickling falls (15–50 L/min/m) and sheet falls (80–200 L/min/m).

Formula: Q pump = L × Q m × 60

Where Q pump = Pump capacity (lph),

L = Length of waterfall (m),

Q m = Flow rate per meter (lpm/m)

Turnover & Balancing: Turnover: 2–6 h for water features.

Balancing tank volume = greater of 15 minutes of design flow, or 10% of total volume.

Conclusion

Swimming pools and water features have evolved from luxury indulgences into sophisticated systems that merge aesthetics with sustainability. In India's water-stressed environment, efficient circulation, proper filtration, advanced disinfection, and responsible water management are not negotiable—they are essential.

With thoughtful design, correctly sized equipment, and modern controls like VSDs, pools can be safe, beautiful, and sustainable. As industry advances, the challenge is not merely to build water bodies as lifestyle symbols, but to redefine them as models of efficiency, resilience, and environmental responsibility.

Damothiran V
Sr. General Manager, Sobha Ltd

Damothiran V, a Mechanical Engineer from Sri Ramakrishna Engineering College, brings 20 years of expertise in Environmental Services. Currently Sr. General Manager at Sobha Ltd, he specializes in statutory compliance, design, and execution of large-scale projects. He has delivered 200+ STPs and WTPs, along with iconic swimming pools and water bodies, shaping sustainable, functional, and aesthetic solutions for large- scale residential and commercial developments. He can be reached on damothiran.v@sobha.com

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Turning Underutilized Space into a Functional Living Area

- Julien Viard

Basements are often overlooked as valuable spaces in a home, typically used for storage or left unused. However, with some creativity and the right renovations, these areas can be transformed into functional living spaces that add real convenience and value to your home. Converting a basement into a bathroom or kitchen is a practical way to expand your living area.

Adding these amenities doesn't have to be complicated with the right plumbing solutions. Modern plumbing systems, such as wastewater pumping solutions, allow you to install sinks, toilets, and other fixtures even in spaces without easy access to traditional drainage. Reimagining and upgrading your basement can make your home more versatile and accommodating for family and guests.

Key Considerations Before Starting a Basement Renovation

Evaluate the Space:

First, look at the layout and size of your basement. Think about where you want to add new amenities like a bathroom. This will help you make the most of the space and plan for where everything will go.

Plan for Plumbing and Drainage:

Basements don't always have easy access to drainage, which can make adding sinks, toilets, or washing machines tricky. Consider using special plumbing systems like lifting pumps or grey water pumps. These systems help move wastewater even from below-ground areas, making new installations possible.

1. Adding a Bathroom in Your Basement

Adding a bathroom in your basement can bring great convenience, but it does come with some challenges. Here's a look at how to tackle these issues:

1. **Challenges and Solutions:** The main challenge is the lack of gravity-fed drainage, which is typically needed to move wastewater up and out of the basement. For spaces below ground level, installing a macerator pump is an effective solution. Macerator pumps grind waste and pump it up to connect with the main plumbing line, making it easy to add a bathroom even when traditional drainage isn't available.
2. **Choosing the Right Fixtures and Layout:** In a smaller basement space, compact, space-saving fixtures are essential. Consider corner sinks, slim toilets, and compact showers to maximize space. Also, good lighting is crucial—use brighter, cooler lights to open up the room and make it feel more inviting.

Here's an example product for your solution

A macerator pump is an ideal choice for basement bathrooms. These products are specifically designed to handle bathroom waste efficiently, providing a simple and reliable solution for basements without direct drainage.

2. Adding a Kitchen in Your Basement

Creating a kitchen in your basement can be a game-changer, adding convenience, optimizing space, and even boosting your home's value.

1. **Why a Basement Kitchen:** Adding a kitchen to the basement frees up space in other parts of the house and keeps the noise and mess out of your main living areas. It's a practical way to make better use of often underutilized basement space.


Before


After

2. **Considerations for a Functional Kitchen Setup:** For an effective kitchen, you'll need a reliable water supply, efficient drainage, and some noise control. Since basements are below the main plumbing lines, using a grey water pump is ideal for managing wastewater from kitchen.

Basements are often underutilized spaces that hold tremendous potential. With the right planning and modern plumbing solutions, these areas can be transformed into functional living spaces, adding value to your home and enhancing convenience.

Modern pumping solutions, like macerators, grey water pumps, and lifting stations make installations such as bathrooms or kitchens easy, affordable, and practical. These pumps eliminate the need for complex plumbing, allowing you to set up essential amenities without expensive renovations or floor excavations.

If you're considering upgrading your basement, now's the perfect time to explore how innovative plumbing solutions can turn your underused spaces into valuable, functional areas.

Julien Viard
Country Manager, SFA Pumps India Pvt. Ltd.

Julien Viard holds a Masters of Science in International Business and has worked for SFA Group since 2015. After 7 years of handling the Middle Eastern and the South Asian markets, Julien decided to shift his focus to the Indian market. As a Country Manager, he is currently in charge of the entire operations of SFA Group's Indian subsidiary, SFA Pumps India Pvt. Ltd. He is enthusiastic, energetic, a go-getter, and always keen to share his knowledge of wastewater pumps with his peers. He can be reached on jviard@sfapumps.in

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AN EXCLUSIVE CONVERSATION WITH KAIRAV ENGINEER

Excerpts from an interview by
Nivedita Sharma
Sub Editor, Indian Plumbing Today

Kairav Engineer is the Executive Director at Astral Limited, managing divisions including pipes, bathware, water tanks, and brand communications, while devising brand and corporate strategies. Joining Astral in 2011, he has excelled in business development, branding, and product innovation, significantly driving company growth. With degrees in Industrial Engineering and Management from Georgia Tech, he spearheaded Astral's diversification into sealants, paints, and sanitary-ware. Recognized by Forbes India and Asia One, Kairav is also a passionate wildlife photographer, avid reader, and dedicated futurist.

1. The Indian pipes and fittings industry is growing rapidly. What are the key factors driving this growth, and where do you see the biggest opportunities emerging in the next few years?

The primary drivers of our industry's rapid growth are India's booming infrastructure development, increasing urbanization, and the government's sustained focus on sanitation and water management. Initiatives like the Pradhan Mantri Awas Yojana (PMAY), Smart Cities Mission, and large-scale water supply projects are creating demand for modern piping solutions. Over the next few years, I see major opportunities emerging in urban infrastructure, affordable housing, smart city projects, and even specialized segments like high-speed rail corridors—where Astral Pipes have already been used. Additionally, rising awareness of hygiene and quality is driving consumers to shift towards branded, innovative products, opening up more avenues for us.

2. With rising awareness around water conservation and sustainability, how is the plumbing industry adapting its product offerings and installation practices?

The plumbing industry is changing as people and builders are giving more importance to saving water

and protecting the environment. Companies are now making pipes and fittings that last longer and can be recycled. Many products are also be tested and certified for being eco-friendly, which shows they are safe for people and the planet.

New systems are being designed to save water, reduce leakages, and even work well with rainwater harvesting. Installers are also following practices that help reduce wastage during fitting and encourage the use of energy-efficient solutions.

Going forward, the industry is focusing on water-saving systems, smart meters, and advanced technologies that help conserve both water and energy. The goal is to make plumbing not just about carrying water, but about doing it in a way that is efficient, safe, and sustainable for the future.

3. Astral has been at the forefront of plumbing innovation in India. Can you highlight a few recent product developments or technologies that are setting new benchmarks?

At Astral, innovation is the driving force behind our success, and we take pride in introducing products that set new benchmarks in the plumbing industry. Our Drain Pro and Silencio systems offer advanced, low-noise drainage solutions, making them ideal for both residential and commercial spaces where acoustic comfort is important. We have also developed an innovative range of industrial valves to serve demanding applications with reliability and efficiency. In the water storage segment, our tanks feature an anti-viral copper shield, providing added health protection, and we are proud to be the first in India to receive NSF certification for our water tanks—ensuring the highest standards of safety and hygiene. For fire protection, our UL-approved Fire Pro pipes are engineered specifically for fire sprinkler systems, delivering dependable performance in critical applications. Additionally, our Astral PowerDrain product efficiently removes excess water from the subsurface of soil, supporting healthier landscapes and structures. These advancements reflect our commitment to leading the industry with solutions that combine safety, hygiene, sustainability, and next-generation performance.

4. What is Astral planning to contribute to the industry for development in terms of water conservation and training plumbers?

At Astral, we recognize that meaningful progress in water conservation and skill development requires a hands-on approach. That's why we regularly organize plumber meets across the country, providing plumbers and contractors with the latest knowledge and practical training on new plumbing technologies and installation best practices. Looking ahead, Astral is actively working on introducing a range of water-saving products, particularly solutions designed to capture and utilize rainwater—helping communities make the most of every drop. Through these initiatives, we are committed to not only raising the bar for industry skills but also supporting India's broader goals for water conservation and sustainable growth.

5. What are Astral's immediate priorities when it comes to expansion—both geographically and in terms of product diversification?

Our immediate expansion priorities are two-fold: geographical reach and optimizing our supply chain. We are especially focused on strengthening our presence in the eastern and north-eastern regions of India, where we see significant growth potential. To serve these markets efficiently, we are establishing new manufacturing facilities in strategic locations across the country, as well as expanding our existing plants. In the pipes business, logistics play a crucial role—transporting pipes over long distances is both costly and inefficient. By having manufacturing units closer to key markets, we can ensure faster delivery, reduce logistics costs, and offer better service to our customers. This approach not only supports our growth but also enhances our competitiveness and sustainability as we continue to diversify our product offerings and increase our market presence.

In terms of products, we are diversifying into bathware, paints, sanitaryware, faucets, and construction chemicals, offering a comprehensive portfolio for the building materials sector. This strategic expansion ensures Astral's brand is synonymous with quality and reliability across multiple categories.

6. Are there specific infrastructure or government-led initiatives that Astral is aligning with to fuel its growth in the coming years?

Astral is actively aligning itself with major government-led initiatives such as the Jal Jeevan Mission, Smart Cities Mission, PMAY (affordable housing), and significant infrastructure projects like India's first bullet train corridor. By engineering our products to meet rigorous national and international standards, we are able to support the plumbing and water supply requirements of these transformative projects. Collaborating on such large-scale initiatives not only drives our growth but also allows us to contribute directly to India's vision for sustainable urban and rural infrastructure development.

7. Astral has had a longstanding association with the Indian Plumbing Association (IPA). How has this collaboration influenced product innovation, training, or industry standards?

Our collaboration with the Indian Plumbing Association (IPA) has been truly valuable for us. Through IPA, we receive direct feedback from industry experts and end-users, which helps us to continuously improve and innovate our products. By participating in IPA's events and exhibitions, we gain opportunities for meaningful discussions with plumbing professionals. This ongoing exchange of ideas helps us make plumbing systems across the country safer, more efficient, and better prepared for the future.

8. What role does quality plumbing—right from proper pipe sizing to the right fittings—play in ensuring building safety, performance, and lifecycle cost savings?

Quality plumbing is foundational to any safe and sustainable building. Proper pipe sizing and high-quality fittings not only ensures a reliable water supply but also prevent leaks, structural damage, and costly maintenance in the long run. Investing in standard-compliant materials and certified installation practices delivers significant lifecycle cost savings and guarantees safety for the occupants. At Astral, we never compromise on these basics, which is why our products are trusted nationwide.

9. What advice would you offer to MEP consultants and plumbing contractors when evaluating and selecting plumbing systems for modern, high-performance buildings?

I truly respect the vast experience and knowledge that MEP consultants and plumbing contractors bring to the table, so I hesitate to call this "advice"–it's more of a humble suggestion from my side. In my view, when evaluating plumbing systems for modern, high-performance buildings, it helps to look for solutions that meet both national and international standards and offer proven long-term durability. I have also seen the value in choosing partners who not only focus on product quality but are also committed to technical support, training, and after-sales service. And from what I've observed, careful attention to proper installation–right from jointing and slope to pressure management–can make a real difference in performance over time. Ultimately, every project is unique, and I am always eager to learn from the insights of professionals like you who work on the ground every day.

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Water Audits: The Key to Tackling Depleting Groundwater in major Indian cities

WATER SCARCITY- WATER AUDIT IS THE KEY

- Milind Shete

Major Indian cities like Mumbai, Hyderabad, Kolkata, Bengaluru, Visakhapatnam, Jaipur, and Pune are grappling with acute and worsening water depletion—primarily due to overextraction of groundwater, rampant urbanization, inadequate recharge, and changing rainfall patterns. Recent data paints a stark picture of rising water stress across these urban centres, but systematic water audits and targeted interventions can reverse or mitigate the trend.

Why Water Audits are Crucial

A comprehensive water audit can systematically address urban water crisis by:

Assessment of Sources, Supply & Demand

- Identifies all water inputs (aquifers, reservoirs, pipes), patterns of use, and discrepancies.
- Highlights mismatches between supply and rising demand, allowing for evidence-based planning of resource allocation and augmentation strategies.

Measurement & Monitoring

- Tracks actual water consumption per district/zone, uncovering inefficiencies and consumption spikes (e.g., construction or industrial clusters).
- Enables real-time management, targeted interventions, and future projections for sustainable supply.

Leak Detection & Water Losses

- Finds leaks in distribution networks and illegal tapping.
- Reducing leaks and non-revenue water directly lessens the strain on both surface and underground sources.

Efficiency Analysis: Processes and Fixtures

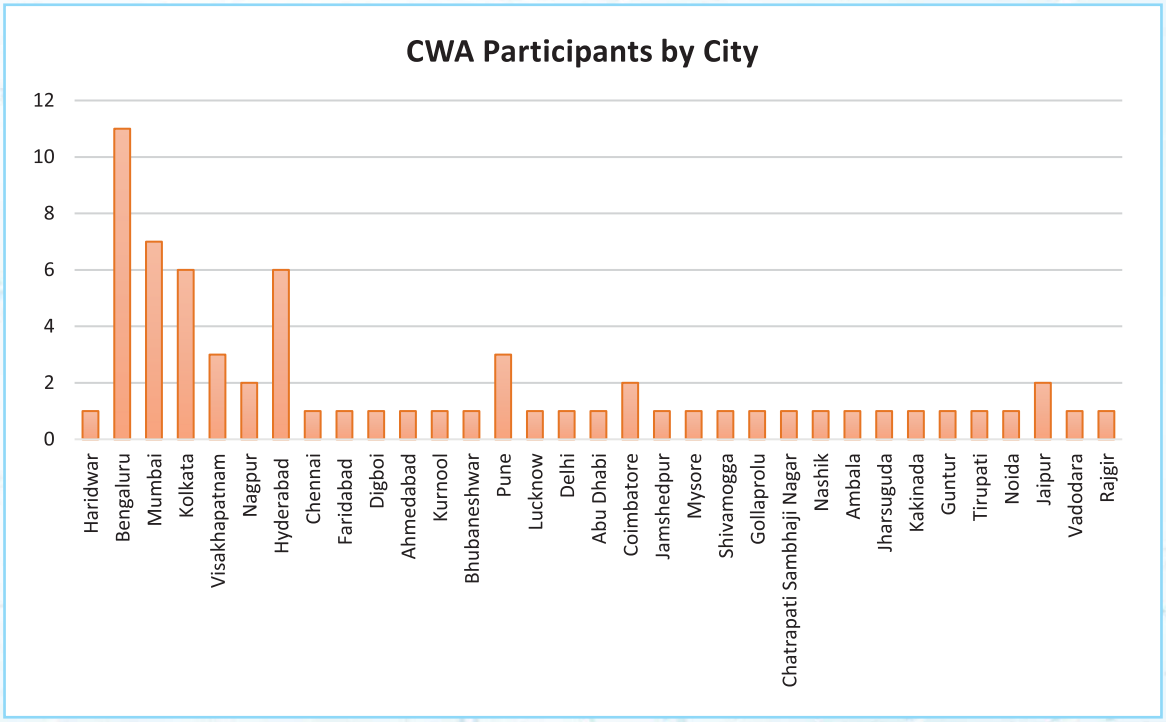
- Assesses water use in large buildings, factories, and public systems.
- Identifies high-usage operations, outdated fixtures, or inefficient industrial units for upgrades or retrofits.

Greywater Reuse & Recycling Opportunities

- Detects scope for on-site water reuse, especially in residential and commercial complexes.
- Reduces freshwater extraction by reusing water for flushing, landscaping, and construction.

Rainwater Harvesting Potential

- Assesses feasibility and impact of rooftop, surface, and recharge pit harvesting, especially where monsoon runoff is high but percolation is poor due to urbanization.



- Promotes artificial aquifer recharge, especially vital in hard-hit areas like Pune's suburbs, Bengaluru's outskirts, and Hyderabad's core.

Avinash Mishra, Former Adviser, NITI Aayog is spearheading Water Audit Council, an initiative of Indian Plumbing Association.

Water Audit Council (WAC) has taken the lead to conduct Certified Water Auditor Training co certified by NSDC (National Skill Development Council) and has empowered 66+ CWAs (Certified Water Auditors) till date.

Contact WAC for any query and more details for Water Audit across India.

Certified Water Auditors

The chart above visualizes the spread of participants, showing strong representation from **metro hubs (Mumbai, Hyderabad, Kolkata, Bangalore)** and scattered presence from tier- 2 and tier-3 cities.

Participants by Locations (CWA Batches)

- **Mumbai – 5**
- **Hyderabad – 5**
- **Kolkata – 5**
- **Bangalore/Bengaluru (combined) – 7** (noting duplicates like "Bangalore.", "Bengaluru")
- **Visakhapatnam – 2**
- **Jaipur – 2**
- **Pune – 2**
- Others (single participants each): Vadodara, Rajgir, Shivamogga, Haridwar, Chennai, Faridabad, Digboi, Ahmedabad, Delhi, Nagpur, Noida

The depleting groundwater problem in India's major cities is both acute and accelerating, risking future water security. Water audits and comprehensive interventions—including source assessments, precise flow monitoring, leakage control, infrastructure upgrades, and catchment-based solutions (like rainwater harvesting and reusing greywater)—are scientifically proven steps to address and reverse this crisis. Rapid implementation and periodic audits are essential for these metros to avoid "Day Zero" water crisis and to secure safe, adequate water for their growing urban populations.

In case if any reader is interested in getting a water audit done at any of the above locations, then you may contact us for getting the contact details of the CWAs.

Mr. Milind Shete
Regional Director, North, East and Central, IPA
Founder & Director of Mukta Group

Milind Shete has executed several award-winning projects in categories such as institutional, commercial, township, and government buildings.Milind is actively engaged in industry leadership roles. He is Past Chair of Nashik Chapter, Life Member of IWWA, and a Green Plumber Accredited Trainer by IAPMO, where he continues to promote sustainability and skill development in the plumbing sector. He can be reached on rdnorth@indinaplumbing.org

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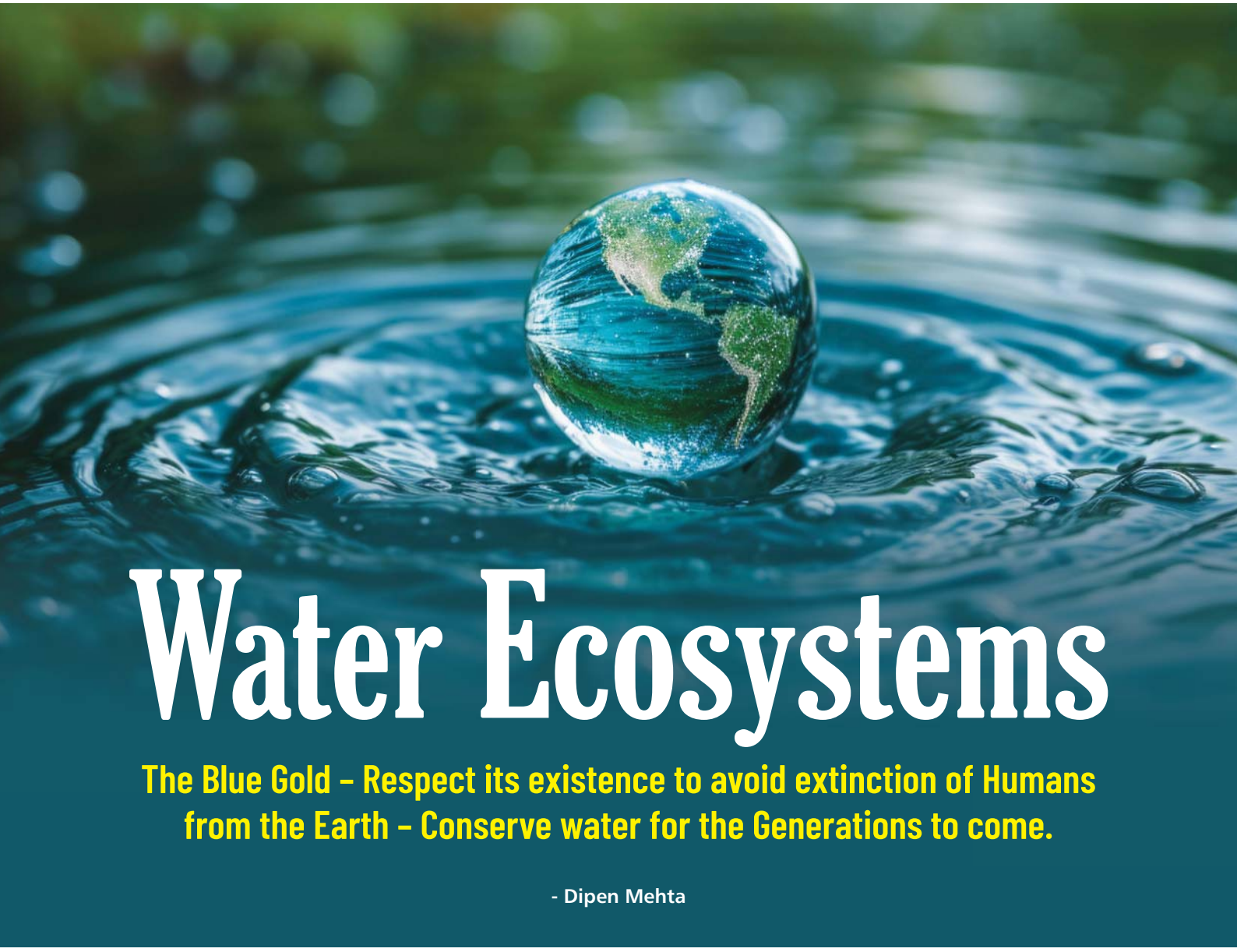
BACK TO BASICS

Co-Existence - Part 2



Water Ecosystems

The Blue Gold – Respect its existence to avoid extinction of Humans from the Earth – Conserve water for the Generations to come.

- Dipen Mehta

In the previous issue, we have understood the concepts of co-existence which is essential to prevent extinction of the human species, just like that of the dinosaurs and other species from the Earth.

A droplet of water contains two different systems –living microorganisms and non-living components.

A drop of water is a classic example of a micro-ecosystem, containing a multitude of microorganisms interacting with each other within the ecosystem, playing different roles and balancing their environment. This includes bacteria, algae, and protozoa contributing to complex biological processes within the single droplet of water.

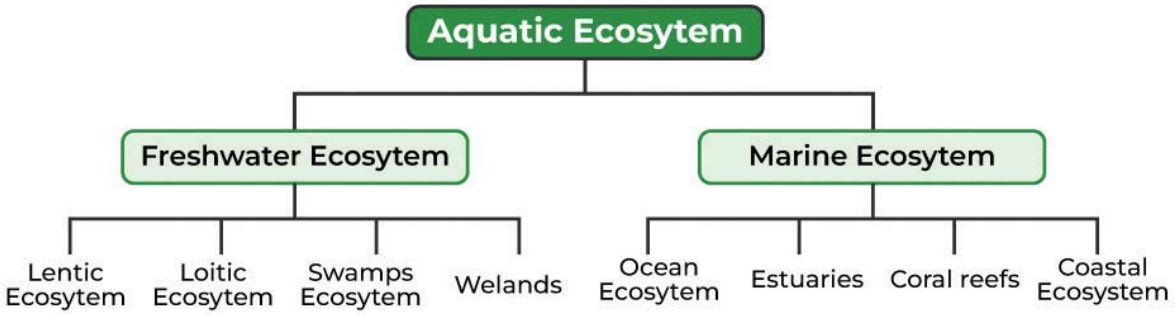
The water droplet, along with the soil minerals and atmospheric gases dissolved within the water droplet, forms the non-living (abiotic) components of water ecosystem.

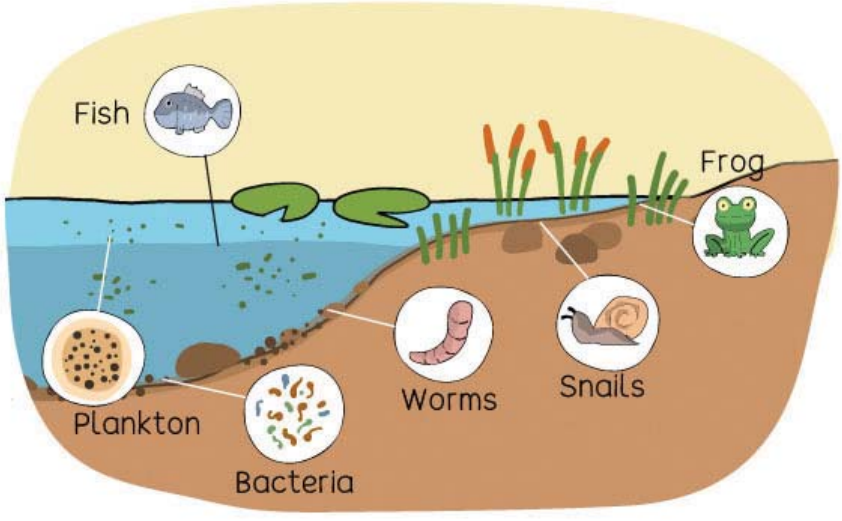
Microscopic Life: A single drop can host a multitude of microorganisms, each playing a role in the functioning of the water ecosystem.

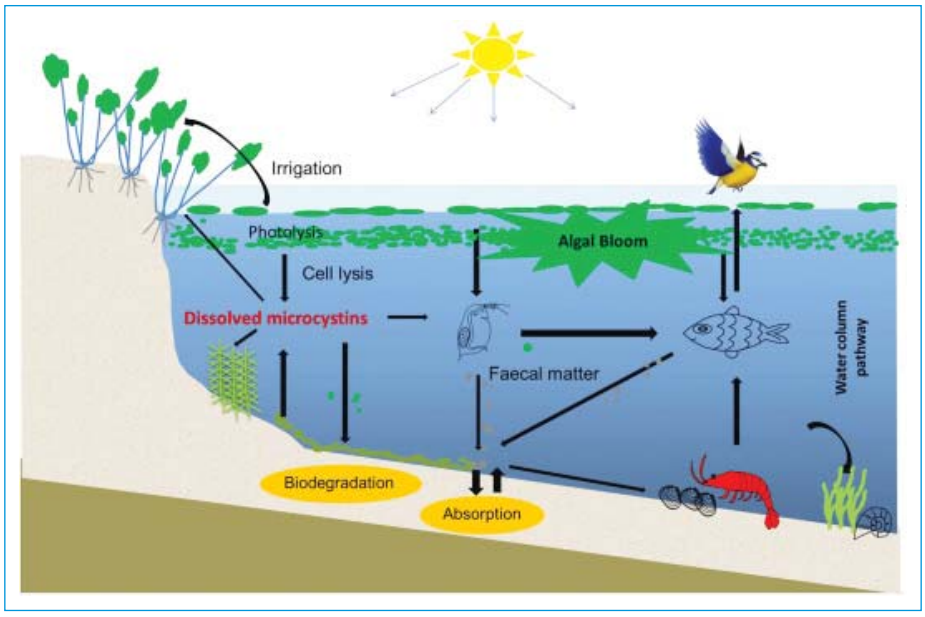
Abiotic Factors: The water, dissolved substances, and even the shape of the drop (influenced by surface tension) contribute to the physical environment within the droplet.

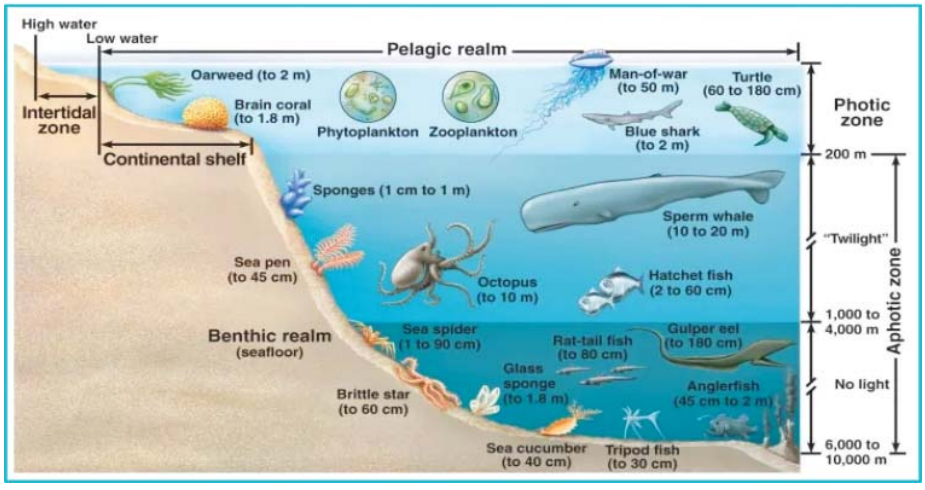
Size and Scope: A small water drop-sized ecosystem demonstrates that ecosystems can exist in various scales, from vast oceans to tiny droplets.

Real-world relevance: Understanding these miniature ecosystems of each water droplets and ultimately large water structures can provide insights into the interconnectedness of life and water including larger ecological systems.









Self-Purification of Water in Water Carriers like Rivers, Ponds, Lakes, Oceans etc.

Self-purification system of water largely depends on water ecology of the particular water storage or transportation carriers. Contribution of soil minerals, atmosphere, environment, and life in and around water at origin, and during run, keeps water ecology well balanced and develops ecosystem to fight with impurities mixed and carried away during run or longer storage period.

The Science Behind Self Purification:

Bacteriophages: These are "bacterial viruses" that specifically infect and kill harmful bacteria, helping to cleanse the water of germs in the rivers and lakes.

Revised - Bacteriophages: These are "bacterial viruses" that specifically infect and kill harmful bacteria, helping to cleanse rivers and lakes of germs.

High Dissolved Oxygen: Higher levels of dissolved oxygen aids in the natural breakdown of organic waste and keeps the water fresh for longer periods.

Natural Antimicrobial Properties: The possesses natural antimicrobial qualities that reduce the presence of harmful microorganisms.

Revised - Natural Antimicrobial Properties: The water possesses natural antimicrobial qualities that reduce the presence of harmful microorganisms.

Beneficial Minerals: Many times, the water contains beneficial minerals like calcium and magnesium.

Faster Decomposition: Due to better composition of all the above factors, water can decompose organic waste more quickly.

A Tradition of Purity: The Ganga River is the world's only freshwater river with a natural self-purification system due to 1,100 types of bacteriophages (bacteria killers) that eliminate harmful bacteria 50 times faster than others.

Ganga water's perceived purity comes from natural self-purification processes, including a unique abundance of bacteriophages that destroy harmful bacteria, high levels of dissolved oxygen that accelerate decomposition, beneficial mineral content, and natural antimicrobial properties. While the river experiences significant pollution, these natural mechanisms contribute to its remarkable ability to break down organic waste and reduce microbial contamination.

Saltwater Lakes and Dead Sea: Saltwater lakes, also known as saline lakes, are bodies of water with a higher salt concentration than freshwater lakes, often formed by high evaporation rates and lacking outlets to the ocean and the existence of salts and minerals through the weathering of surrounding rocks and by groundwater seepage.

Saltwater lakes support diverse life including microorganisms like Archaea and bacteria, brine shrimp, brine flies, and various birds that feed on them. Some specialized fish, like pupfish and cichlids, as well as certain sharks and eels, are also adapted to these saline environments or can tolerate a wide range of salinities.

Examples of Saltwater Lakes area:

- **The Caspian Sea:** The largest saltwater lake in the world by both volume and surface area.
- **The Great Salt Lake, USA:** A well-known example of a large, inland saltwater lake.
- **The Dead Sea:** A hypersaline lake bordering Israel and Jordan, famous for its high salt content. The extremely high salt content (around 34%) makes the water so dense that it's virtually impossible to sink. You'll naturally float on the surface, like a cork. While you can't swim normally, it's a unique experience to float effortlessly.

- **Chilika Lake, India:** The largest brackish water lagoon in Asia and a crucial Ramsar site.
- **Sambhar Lake, India:** India's largest inland saltwater lake and a major salt production hub.
- **Lonar Lake, India:** A unique saltwater crater lake formed by a meteorite impact.

Colour Water Lakes:

Lake water appears in various colours, primarily blue, green, or brown, due to dissolved substances, algae, and sediment, while pink lakes are caused by salt-loving algae like *Dunaliella salina* producing pigments, while vibrant or changing colours are often due to fluctuating environmental conditions or unique microbial communities.

It is very obvious that the ecology of flowing rivers, seas, saltwater lakes, freshwater lakes are different than each other. Yet, life exists in and around every water structure. It also has a significant impact on human habitats developed or dependant around water. Ancient civilisations developed around the water structures are still the classic examples reflecting the correlations between water ecology and human habitats.

In the upcoming issues, we will study more about soil ecosystem and implementation of the natural principals in household / urban plantation activities to save water.

Dipen Mehta
Editorial Board Member and Past Chair, IPA Ahmedabad Chapter
Managing Director, PCS Project Management Pvt Ltd. & Aqua Utility Designs

Dipen Mehta is a Project Management and MEP Consultant with a Bachelor of Engineering (Civil) from Saurashtra University, Rajkot. He has worked across various sectors in the building and construction industry. Mr. Mehta is a visiting faculty/ Studio Tutor for Plumbing Design Studio, Faculty of Technology, CEPT University, Ahmedabad.

He is an Editorial Board member and EC member, of IPA Ahmedabad and Past Chair, IPA Ahmedabad Chapter. He can be reached on dipenmehta.ipa@gmail.com.

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SOLAR WATER HEATER INSTALLATION

- Kiran Joshi

About fifteen years ago, I received a call from the Associate Architect of a Senior Architect for whom I was consulting on another project—a hostel building where the plumbing work was almost complete. During a site visit, the agency responsible for installing the solar water heater raised a critical issue: the bottom of the overhead water tank was too low relative to the terrace. Specifically, the tank bottom was only 1000 mm above the terrace slab, with a tank height of 2000 mm plus a 150 mm free board.

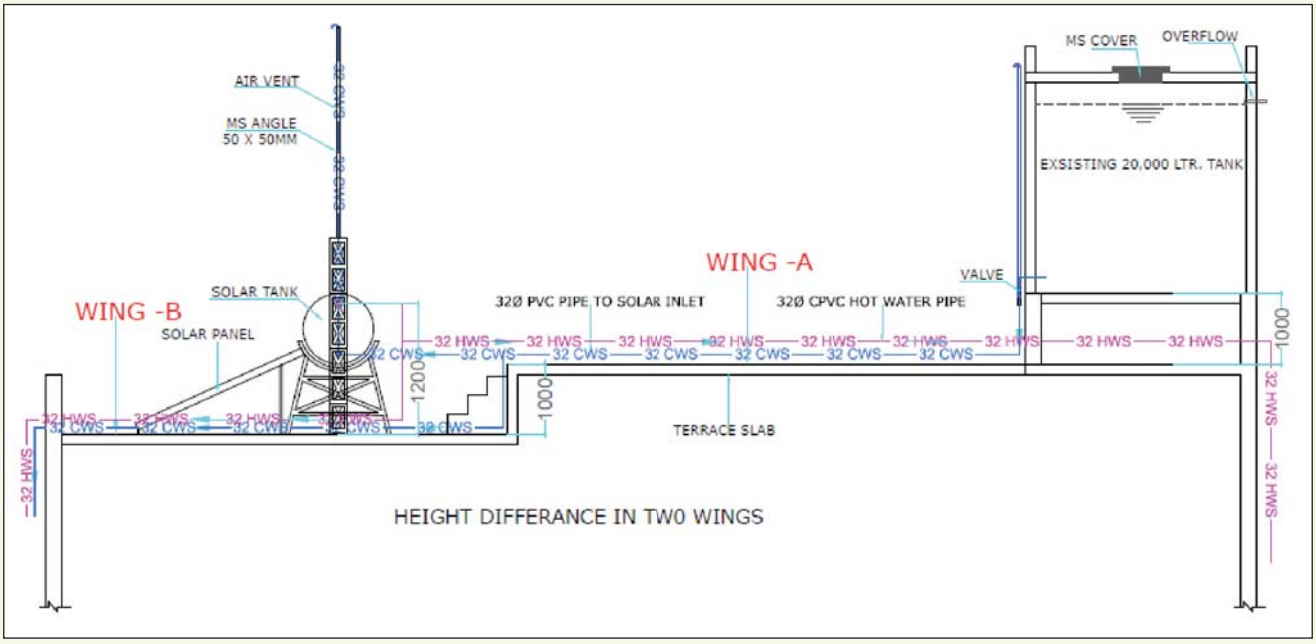
They needed a solution for installing the solar water heater. At that time, options for community toilets typically included solar water heating, wood-fired, or diesel-fired boilers.

Ideally, for solar water heater installation, the bottom of the overhead storage tank should be at least 2100 mm above the terrace slab to provide sufficient water pressure. The higher the tank, the better the pressure. In this case, the tank bottom was only 1000 mm above the slab, while the solar water tank inlet was at 1200 mm. This meant that solar water would only flow when the main tank was full, offering a head of just 300 mm—insufficient. If the water level dropped, no hot water would reach the taps. This was the site challenge.

I asked for the working CAD drawings to analyse the situation further, and found a solution. The hostel had two wings, with the second wing built 1000 mm lower than the first. By installing the solar water heater on the lower slab, I could utilize the height difference: 1000 mm vertical drop between wings, plus 1000 mm tank bottom, plus 2000 mm tank height, minus 1200 mm solar inlet height—providing a clear head of 1800 mm for the solar system.

I proceeded to install the solar water heater on the lower terrace and routed the hot water pipe up to the upper slab to serve the toilets on the top floor. The hot water line now runs across the lower slab, and the system has been working smoothly for over 12 years.

For further clarification, I have attached a drawing illustrating this arrangement.



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

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COLUMN 22

THE SCOURGE OF TDS

- Hariharan Chandra

As I set down reflections for this edition, the entire country is moving — in August and September — towards 60 days that see the best of precipitation from the ceaseless monsoon winds. Mumbai received 23 days of rain in June and is set to receive over 400 mm in August alone. In August 2024, Mumbai recorded 382 mm of rain, which was the third-lowest in six years! So, brace up for more this August.

And Jaipur waits for her rains which fall in just two months and in sharp spurts. And it gets in an entire year what a Mumbai gets in just a month and a half.

There's rainfall in effect over 40-80 hours of an entire year of 8,760 hours! They fall in short bursts. And then there is the long spell of winter and summer. Our kings saw this as an opportunity to create the millions of tanks and manmade lakes. Our corporate leaders have an important lesson to learn from these ancient masters: of storing, and sizing storage, in a way that you spend a bit more but reap the benefit for years and years when you depend less on groundwater.

Today's story is about what we do not learn from web browsers or from general news or even research reports. No one tells us that the challenge is not of water deficits. That it is of very high TDS that is debilitating humans and plants and other species. This is a story of the very basic spectra and threat that lies before us all, and which rarely gets to be written about. It is that of TDS in water that we draw from our borewells.

It's as though this problem doesn't exist at all. Worse, most business managers don't even know of the severe

crisis brewing across India and how a few companies into RO treatment make piles of cash benefiting from the misery of many bulk water users.

It is common knowledge for all water professionals that the groundwater table in over 400 districts of India (of the 770+ districts) is below 500-1000-1500 feet. Nearly all of the urban districts across the country are "water critical" by recent reports of the central and state Groundwater Tribunals (GWTs). In many cases adjacent districts to a city that have now become part of the larger agglomeration — like Hoskote or Chikkaballapur or Tumkur in Bangalore, or talukas of Baramati and Purandhar in Pune that are now declared 'semi arid'. Some of those talukas of Bengaluru were declared 'drought prone' several decades ago … in 1967! Ahmedabad's water situation is critical due to several factors, including high levels of water hardness, contamination, and scarcity. Specific areas like Vastral, Vejalpur and Thaltej are known for having some of the hardest water in the city. Additionally, groundwater levels are declining, contamination with high salinity, fluoride, nitrates, and arsenic is a concern in many districts of UP and West Bengal.

What is however not known to many millions is that TDS in all these areas of all these cities is uniformly over 700 to 2000! This is naturally occurring TDS levels. We will talk soon of the RO reject water TDS levels that hover around 5000-7000 ppm.

While the groundwater challenge is being fought out quietly with a mix of legislative and penalty-based directives from GWTs and various other water-governing agencies, there's an even larger challenge that stares us in the face in many cities: high and very high TDS.

CEOs of manufacturing plants or of realty companies in fast-growing Ahmedabad have resigned themselves to the fact that (1) they'll have to live with the reality of groundwater extraction for operating needs of their business and (2) there is no alternative to using such groundwater which is stupendously high on TDS. That there's simply no option to RO treatment for reducing TDS to levels their manufacturing process demands.

To put this dramatically … We've seen the effect of such high TDS water on lands, and on the environment. The trees are defoliated, the grass doesn't grow, the shrubs turn yellow and die. Now if that is the sort of effect they have on plants what will be its impact over years on human beings?

In Ahmedabad which barely receives 850 mm of annual rainfall over a short burst of 3-3.5 months or distant Kolkata that gets as much as 1750 mm over 8 months … the TDS levels are over 1200-1700 ppm. In the southwest corner in Trivandrum which receives 2000 mm of annual rainfall with a near-even spread of rains over nine months, areas near the coast, like Veli, experience saltwater intrusion (mostly manmade), leading to higher TDS levels. For example, one observation well in the Veli region showed a TDS concentration of 2700 ppm, indicating contamination from the Parvathy Puthanar River, and of course manmade saltwater intrusion.

So, what impacts TDS? Is it Groundwater movement that defines? Is it lithospheric composition? Or is it due to natural activities, as well as anthropogenic influences like saltwater intrusion or contamination from rivers? It is a combination of all of these. Every one of these can, and all of them combine to, affect TDS levels.

In another piece on golf courses in India some months ago — see link — we had recounted the challenge of water deficits and indiscriminate use of groundwater with inefficient pumps and subsidized energy tariffs. But the story even in those golf courses across India is, in essence, of high TDS.

One manufacturing plant in one of these cities draws from six of its own borewells, about 750,000 litres a day. The TDS is anywhere from 1200 to 1800 mg per liter. They send all of it to a set of RO plants that produce about 370,000 litres every day for the company's manufacturing need. What happens to the other half of water? That's reject water with 5000-7000 mg per litre of TDS. This is stored in an impermeable pond of 160 million litres with evaporation induced by day's searing 37-49 deg C being the only hope of getting rid of the salts! Is the company's management to be blamed for not pursuing a solution that's less hostile to the environment? Should the company reduce its manufacturing levels because they don't have Low-TDS water available? You know the answers to these questions just as well as I do.

In another secondary steel maker's 50-acre sprawl in a rich sandy loam soil region to the southeast of Bangalore, every day the operations manager buys about 275,000 litres of water from the neighborhood. TDS ranges between 700 and 1000. Out of this, the RO plant works hard to produce 125,000 litres every day of Low-TDS water that is compatible to the manufacturing process. So what happens to the rest, 150,000 litres a day or about 54-55 million litres a year? This high-TDS RO reject water with over 6000 ppm of TDS is used for

landscape and for washing requirements of about 400 workers who stay on campus. It's inhuman, unsafe. But it continues to happen in many companies — even those headed by well-meaning CEOs.

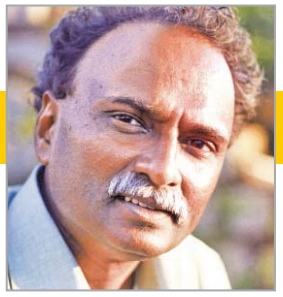
Many are willing to 'do something about it' but being no water experts, they need expert counsel from anyone who can offer them the right solution that replaces this monstrous RO process that offers less than 50% recovery with the rest being very harmful reject water, with systems that reduce TDS and help recover at 80+ percent. There's still the challenge of eliminating dangerously high salts in the residual water, but that's the best we can do.

When a farmer draws water with borewells he suffers the same challenge. And so, he pumps fertilizers and pesticides to beat the challenges that occur from not enjoying the privilege of Low-TDS water. Plants and crops and humans love water that is ideally between 50 and 200.

For reasons only experts can help us understand, the manufacture of steel, secondary steel, glass, and many other core products need water with very low TDS, of less than 10 ppm. And so, the RO makers have a field day. The need for resins and membranes as consumables for RO systems cost up to 150 per KL. Process plant engineers have no choice.

What damage high-TDS wreaks on humans and plants is easier found on web browsers. What the web world can't tell us is what we can do to stop extracting groundwater and then battle the challenge of high TDS that such deep aquifers bring. The most practical thing to do is to mitigate as much as possible by relying on Low-TDS water to the extent you can. Rainwater is the obvious solution which offers TDS of under 50 ppm. There's then the need to look at solutions beyond the current grossly inefficient process that we have lived with for over fifty years, of forcing water through a semi-permeable membrane to separate pure water from dissolved salts, ions, and other impurities. This is the messy RO process that offers just 30-40% recovery with the rest becoming a menace of reject water that no one knows how to get rid of.

Let's remember. Water is not just about the deficits and depleting groundwater tables. Even if you have water to extract, the scourge of TDS will continue to beleaguer millions of Water-users.



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

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IPA Trivandrum Chapter Training Program

"Zero Error in Plumbing in High-rise Buildings"

IPA Trivandrum Chapter successfully organized a training program for plumbers on "Zero Error in Plumbing in High-rise Buildings" on Friday, 22nd August 2025. The session was inaugurated by Er. Nandakumar K., Chapter Chairman, Shajeer Basheer, Hon. Secretary, Oommen Thomas, Hon. Treasurer, with the presence of Asger AS, EC Member.

The interactive technical session was led by Er Nandakumar K along with experienced Plumbing Consultants Shajeer Basheer and Asger AS. They provided various guidelines to minimize or negate the errors occurring in plumbing practices. They addressed practical queries and field challenges raised by participants.

The program drew an encouraging participation of 92 plumbers, including plumbing contractors. The program was well received and provided valuable knowledge-sharing, strengthening the commitment towards achieving zero error plumbing practices.

This was followed by the presentation of the sponsor, Ms. Balco Pipes. Govind, Executive Director - Balco Pipes, also shared insights on innovative piping solutions and their applications in addressing common concerns in high-rise plumbing systems.

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Raipur Chapter

IPA Raipur Chapter planted trees at Amity University, Raipur, newly formed IPA Student Chapter

Pune Chapter

IPA Pune Chapter planted 200 trees at NP farm house

Chhatrapati Sambhaji Nagar Chapter

Chhatrapati Sambhaji Nagar Chapter featured in Divya Marathi Newspaper

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भुयारी मार्गात १० एचपीच्या 'मड पंप'द्वारे करा पाण्याचा उपसा

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शिवाजीनगर भुयारी मार्गातील साचलेल्या पाण्याचा उपसा करण्यासाठी १० एचपीचे दोन 'मड पंप' उपयोगी ठरतील. त्यामुळे भुयारी मार्गात आता कोणताही अन्य प्रयोग न करता 'मड पंप' बसवल्यास ही समस्या कायमची सुटेल, असा विश्वास इंडियन प्लंबिंग असोसिएशनने व्यक्त केला आहे. 'मड पंप' स्वयंचलित असून त्याला सेन्सर आहेत. पाणी साचल्यावर ऑटोमॅटिक सुरू होतो आणि पाण्याची आवक पाहून उपसा करतो. या मड पंपाला कटर असल्याने दगड, माती, कचरा, चिखल पंपमध्ये आल्यास काहीच परिणाम होत नाही.

थोडासाही पाऊस झाला तरी भुयारी मार्गात पाणी साचते. परिणामी, भुयारी मार्ग अनेकदा बंद ठेवण्याची नामुष्की प्रशासनावर ओढावली. त्यावर 'मड पंप'चा प्रभावी उपाय होऊ शकतो. भुयारी मार्गात कुचकामी ठरलेल्या ड्रेनेज सिस्टिमला हा उत्तम पर्याय आहे, त्यातून नागरिकांची त्रासातून सुटका होऊ शकते.

मड पंप स्वयंचलित, ऑपरेटिंगही सोपे

भुयारी मार्गात ज्या ठिकाणी पाणी साचते, तिथे १० फुटाचा खड्डा बनवून ६ x २.५ फूट सिमेंटचे चेंबर बांधायचे. या चेंबर पॉइंटमध्ये १० एचपी क्षमतेचे दोन 'मड पंप' बसवता येतात. पंपाला सेन्सर असल्याने पाणी साचताच पंप सुरू होऊन पाणी उपसतो. पाण्याची जशी आवक वाढेल, तशी पंपाची स्पीडही वाढते. वीजपुरवठा आणि स्वयंचलित जनरेटर बसवता येतो. यासाठी सुमारे १० लाख रुपयांचा खर्च येऊ शकतो.

जगभरात वापरली जाणारी प्रभावी पद्धत

ड्रेन आणि पंपांचा वापर जगभरातील अनेक शहरांमध्ये यशस्वीपणे केला जातो. हे उपाय अत्यंत प्रभावी असून, कमी वेळेत जास्त पाणी बाहेर काढण्यास सक्षम आहेत. यामुळे वाहतुकीचा खोळंबा होत नाही आणि नागरिकांची गैरसोय टाळता येते.

वॉटर ड्रेन आतापर्यंत ठरला कुचकामी

भुयारी मार्गात पाणी साचत असल्याने प्रशासनाने वॉटर ड्रेन तयार केले, चेंबर उभारले. तसेच वेगवेगळ्या भागातून येणाऱ्या पाण्याची विल्हेवाट लावली जात आहे. त्यासोबतच आता मार्गावर रूफ टॉप उभारले आहे. मात्र अद्यापही ही समस्या सुटलेली नाही.

१० लाखांपर्यंत खर्च येऊ शकतो

मड पंप बसवण्यासाठी सुमारे १० लाखांपर्यंत खर्च येऊ शकतो. या कामासाठी लागणारी तांत्रिक मदत, आराखडा आणि डिझाइन इंडियन प्लंबिंग असोसिएशनच्या वतीने विनामूल्य देऊ.
-प्रभंजन महातोले, अध्यक्ष, इंडियन प्लंबिंग असो.

Nagpur Chapter

IPA Nagpur Chapter meeting Nagpur BAI office bearers for collaboration in IPPL.

Sh. SG Deolalikar's 95th birthday celebration

Sh. SG Deolalikar, IPA Chairman Emeritus, being greeted by IPA National Vice President on his 95th birthday, 31st August

From left to right:

Sh. Sushanta Sinha, GM-Events and Marketing, IPA, Smt. Sudha Deolalikar, W/o Sh. SG Deolalikar, Sh. SG Deolalikar, IPA Chairman Emeritus, Sh. Chandra Shekhar Gupta, IPA National Vice President.

INDIAN PLUMBING PROFESSIONALS LEAGUE 2025
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9th Edition

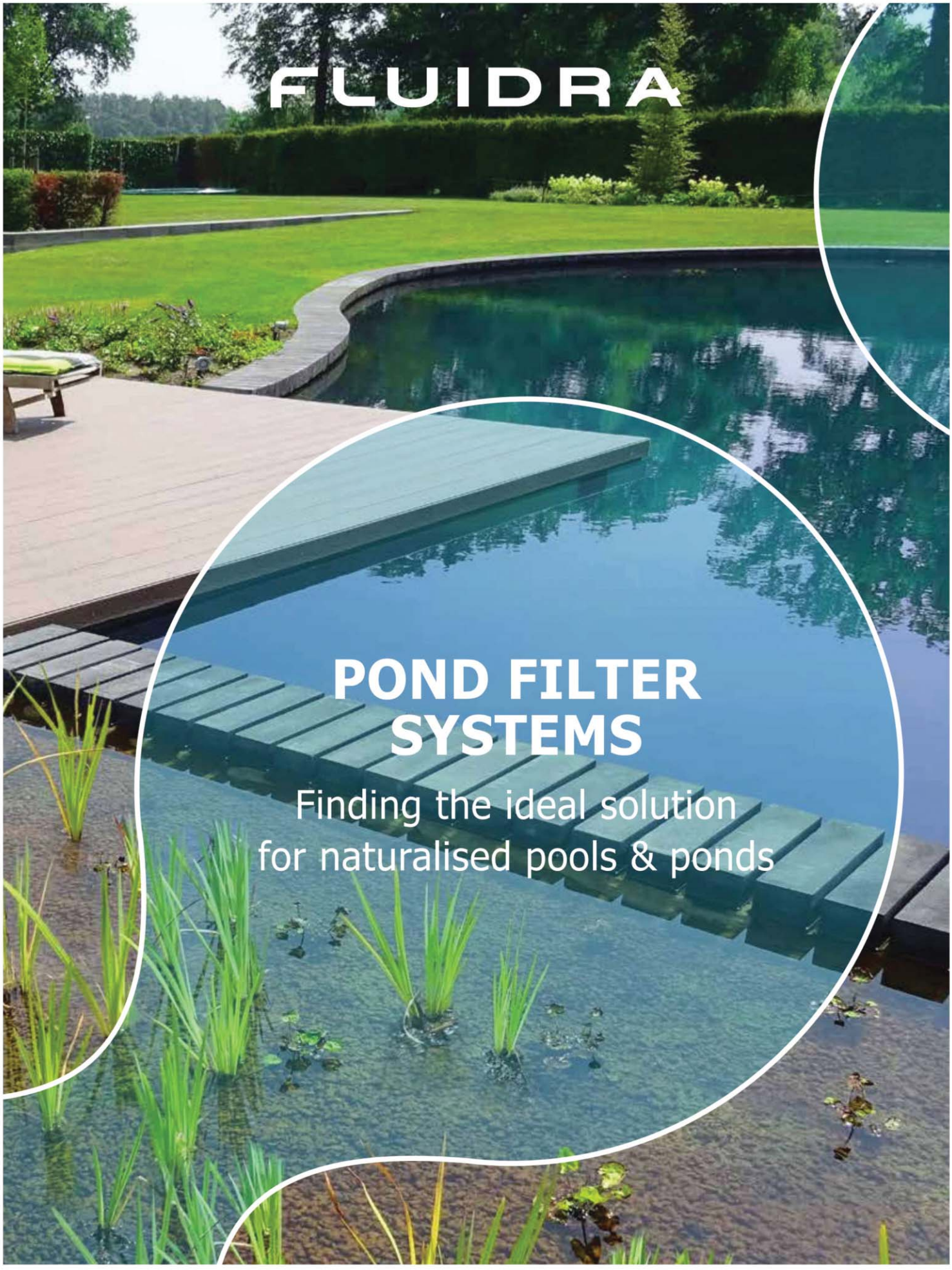
Joint Certification by NSDC and IPA

Bengaluru Chapter

IPPL 2025 (9th edition) begins in IPA Bengaluru Chapter with 30 teams

Ahmedabad Chpater

IPPL 2025 begins in Ahmedabad with 16 Teams



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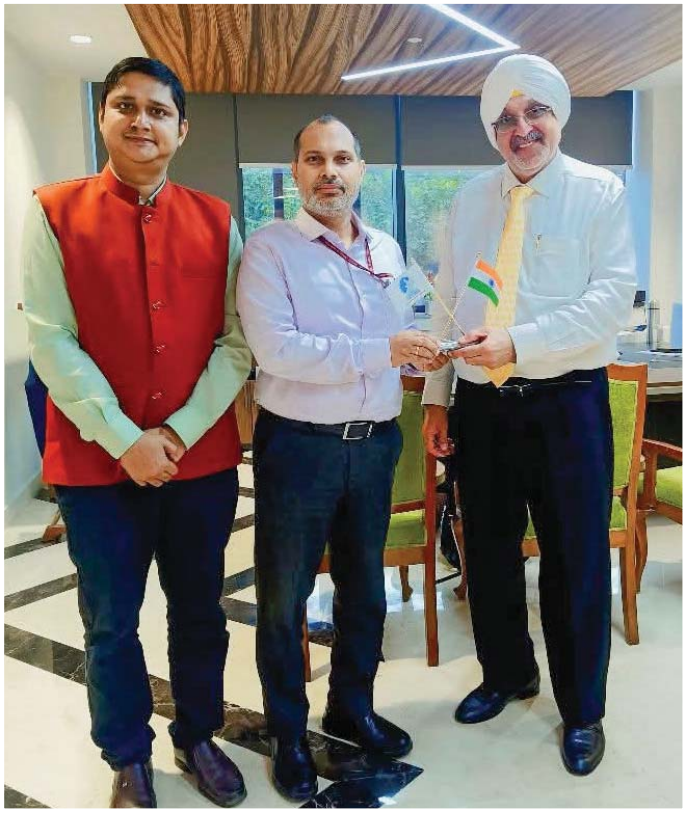
Gurmit Singh Arora, IPA National President, Chandra Shekhar Gupta, IPA National Vice President, and Rohit Srivastava, Manager – Outreach, IPA met Shri Milind Deore, Secretary, Bureau of Energy Efficiency (BEE), Ministry of Power, to invite him to the 31st Indian Plumbing Conference in Kolkata and to discuss further collaboration.



Gurmit Singh Arora, IPA National President and Rohit Srivastava, Manager - Outreach, IPA met Shri Kuldip Narayan, IAS, Joint Secretary, Ministry of Housing and Urban Affairs (MoHUA) , to invite him to the 31st Indian Plumbing Conference in Kolkata and to discuss further collaboration.

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Kehems Technologies: Pioneering Advanced HVAC Solutions & Sustainable Innovation

As industries evolve, the demand for efficient, reliable, and sustainable cooling solutions continues to rise. From pharmaceuticals and manufacturing to food processing and large-scale infrastructure, advanced HVAC systems are now integral to productivity, comfort, and energy efficiency. At the forefront of this transformation stands Kehems Technologies, a company that has redefined HVAC and thermal engineering in India.

A Legacy of Excellence

Established in 1987 by Mr. D.K. Kemkar and now led by Ms. Kshama Jain, Kehems Technologies has built a strong reputation for quality, innovation, and customer-focused solutions. Over the decades, the company has become a trusted name in HVAC, delivering customized and cost-effective systems designed to address the unique needs of Indian industries.

Cutting-Edge Solutions

Kehems Industries specializes in delivering comprehensive HVAC solutions that cater to both domestic and industrial needs. HVAC encompasses heating, ventilation, and air conditioning systems, and the firm addresses requirements across a wide spectrum—from residential comfort to large-scale industrial applications. The increasing demand for HVAC systems is driven by climate change, making air conditioning and heating essential rather than a luxury.

As the market evolves, air conditioning is becoming a necessity to ensure comfort, productivity, and the prevention of sick building syndrome. Kehems' solutions are designed to meet the growing demand for efficient and effective climate control, making HVAC systems an integral part of modern infrastructure.

Kehems Technologies is at the forefront of the HVAC industry, delivering tailored solutions that combine advanced technology and sustainability.

> **Kehems Technologies is at the forefront of the HVAC industry, delivering tailored solutions that combine advanced technology and sustainability**

"Our core focus is providing project management services so is to offer comprehensive, one-stop solutions for our clients. Whether it's installing chillers or heat pumps, our goal is to maximize efficiency and deliver optimal performance. We ensure that systems provide effective heating and cooling, offering clients a seamless experience with both hot water and chilled air applications. Our Kristherm heat pumps have been market leaders since we introduced them to India in the early 1990's," speaks Kshama Jain. Designed to meet Indian environmental and electrical conditions, the firm heat pumps range from 5.4 kW to 2000 kW, ensuring customized solutions for every client. Additionally, its thermal energy storage systems are key in promoting energy efficiency and environmental sustainability, acting as a battery for air conditioning, reducing refrigerant use, and contributing to decarbonisation efforts.

Adapting Global Innovations

The company initially partnered with French company CIAT to introduce chillers, heat pumps, and thermal energy storage systems to the Indian market. However, recognizing the differences between European and Indian conditions, Kehems adapted these products for India, improving them to suit the country's unique environmental, electrical, ambient water and labour conditions. Their focus on energy efficiency is evident in all research and development efforts, with a strong emphasis on green technology and decarbonisation. The firm's tailored HVAC solutions are customized based on client needs, such as adjusting chiller components for optimal performance in varied conditions.

Kehems Industries is poised for significant expansion with plans to introduce centrifugal technology to the Indian market. "Recently, we manufacture a diverse range of HVAC products, including screw chillers from 30 to 650 tons, Scroll Chillers from 3.5 tons-100 tons' air, and heat pumps from 5.4 to 2000 kilowatts, and thermal storage systems. As the Indian market evolves and the demand for larger applications increases, we aim to stay ahead by incorporating advanced centrifugal technology," adds Kshama Jain. Additionally, the company is focusing on research and development to integrate new, environmentally-friendly refrigerants into their systems. This initiative aligns with their commitment to sustainability and decarbonisation, positioning Kehems as a leader in eco-conscious HVAC solutions.

IPA lifetime Achievement AWARD

NOMINATIONS ARE INVITED FROM

IPA MEMBERS FOR 2025

Life Time Achievement Award is IPA's highest honour and is awarded to individuals in recognition of their exemplary services and contribution made towards the betterment of plumbing practices in the country.

Life Time Achievement Awards have been conferred upon several eminent personalities who have helped IPA make a substantial difference to the Indian plumbing industry. This Award was introduced as early as in 2003.

You may please nominate an individual with the complete contact details and a write up on his/her significant contributions and services towards the betterment of plumbing industry in India. The proposer must mention his IPA Membership Number, Chapter Name and his contact details. The nomination should reach IPA HQ before 30th October 2025. Award will be announced and conferred during 31st Indian Plumbing Conference in Kolkata scheduled to be held from 13th-15th November 2025.

Your nomination may be mailed or delivered to:

The Executive Secretary

Indian Plumbing Association

416, DLF Prime Towers, F-79 & 80, Okhla Phase-1, New Delhi 110 020.
Or email to the Executive Secretary - hq@indianplumbing.org
with a copy to the National Secretary of IPA : secretary@indianplumbing.org

Note: The final selection will be made by IPA National Executive Board from the nominations received. NEB decision would be final and not subject to any challenge.

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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

30th November 2025

Venue

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