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THEME

SUSTAINABLE SMART WATER MANAGEMENT

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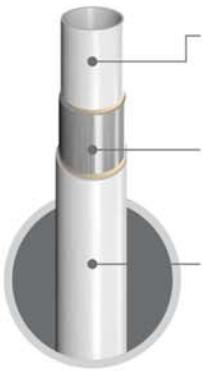

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MY PAGE

Dear Readers,

The global economic scenario is evolving rapidly, and Hon'ble Prime Minister Shri Narendra Modi's call to buy Made-in-India products is both timely and inspiring. As members of the industry, it is our collective responsibility to promote and consume indigenous products while expanding their export potential — thereby contributing to the growth of our industry, society, and nation as India moves steadily towards becoming the world's third-largest economy.

In his numerous addresses to the nation, the Hon'ble Prime Minister has repeatedly emphasized the importance of Water Saving and Conservation. Reflecting this vision, the **31st Indian Plumbing Conference**, organized by the Indian Plumbing Association (IPA), will focus on the **theme "Sustainable Smart Water Management."** The event is scheduled to be held from November 13 to 15, 2025, in Kolkata.

The conference will bring together eminent personalities and domain experts who will share their insights through panel discussions and technical sessions over two days. It promises to be an enriching experience, offering new learnings and perspectives on the future of water sustainability. We encourage all readers to complete their registrations at the earliest. The detailed programme schedule can be downloaded from www.indianplumbingconference.com, with key highlights featured in the inner pages of this issue.

IPA invites professionals from across the building and plumbing fraternity to participate in large numbers, ensuring the conference and concurrent exhibition become a grand success. A significant highlight of the event will be the **launch** of the **Revised Code on INDIA WE Stand- Water Efficiency and Sanitation Standard for the Built Environment.**

Adding to the excitement, the **Grand Finale** of the **2025 Indian Plumbing Professional League (IPPL)** will also be held in Kolkata on November 15. This fun-filled, event is a great opportunity to learn more about water, sanitation, and plumbing in an engaging setting.

The current issue of **Indian Plumbing Today (IPT)** focuses on various technical aspects of **Hot Water Systems** as we step into the winter season, especially when the Indian Meteorological Department (IMD) has issued a severe alert for the upcoming winter season, forecasting La Niña to bring freezing temperatures, snowstorms, and unpredictable weather patterns across India. The articles are designed to assist professionals in planning, managing, and executing projects of all scales with greater efficiency.

We look forward to your active participation and hope to see you in large numbers at the Indian Plumbing Conference in Kolkata this November!

Happy reading and festive greetings!

Chandra Shekhar Gupta
IPA National Vice President & Founder Member
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Intelligent and Hybrid Heat Pumps

The Next Evolution in Hot Water Systems

- Dinesh Shah

Introduction

Heat pumps have emerged as one of the most efficient and economical solutions for water heating across residential, commercial, and industrial applications. Their appeal extends beyond efficiency: compact design, environmentally friendly operation, and seamless integration with existing HVAC systems have positioned them as a preferred technology over conventional heating systems.

The global heat pump industry is experiencing rapid growth. Shorter lead times, ease of manufacturing, and increased accessibility of technology are driving adoption. Yet the real catalyst lies in **innovation** — not only in how heat pumps are built, but in how they operate within the broader energy ecosystem.

This article explores the next frontier: **intelligent hybrid heat pumps.** These systems combine multiple heat sources, advanced automation, and digital intelligence to deliver hot water *when it is needed, at the desired temperature, and with minimum power consumption*.

Technology Drivers: IoT and Big Data

Internet of Things (IoT)

IoT has become a disruptive force across industries, and heat pumps are no exception. IoT-enabled devices can exchange real-time operational data with other machines and central servers, enabling remote monitoring, diagnostics, and control.

For heat pumps, IoT provides visibility into how units perform across different ambient conditions, demand loads, and operating cycles. This information is the foundation for optimizing efficiency and serviceability.

Big Data Analytics

The continuous operation of heat pumps generates vast amounts of data. When collected and analysed, this data reveals patterns that explain performance variations between machines or sites. By understanding these patterns, manufacturers can fine-tune designs and operators can optimize system settings to maximize Coefficient of Performance (COP).

Together, IoT and Big Data lay the groundwork for **intelligent heat pumps that learn, adapt, and improve over time.**

Hybrid Heat Pumps: A Smarter Build

Defining Hybrid

Conventional heat pumps are typically designed as either:

- **Water-to-Water Systems:** recovering heat from return water and transferring it to domestic hot water.
- **Air-to-Water Systems:** extracting heat from ambient air to heat water.

A **hybrid heat pump** combines both sources into a single integrated design. Depending on conditions, it can run in water-to-water mode, air-to-water mode, or a combination of the two. This flexibility allows the system to **continuously select the mode that delivers the highest COP.**

Why Hybrid?

Each variant has limitations:

- *Water-to-Water Heat Pumps:* efficiency depends on return water temperature, flow rates, and chiller load.
- *Air-to-Water Heat Pumps:* performance varies with ambient temperature, humidity, and airflow rates.

Balancing the heat cycle under all conditions is complex. A hybrid design solves this by dynamically blending sources:

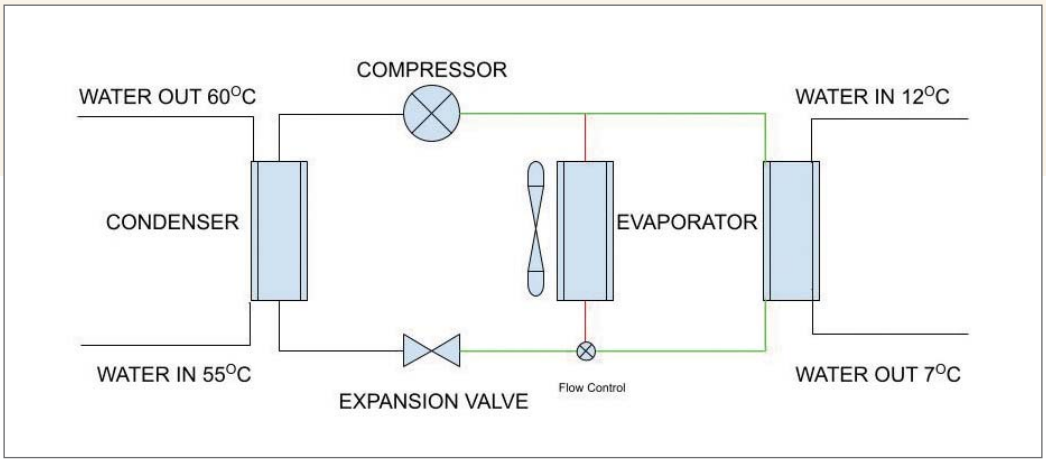
- Water-to-Water mode when chilled water loads are high.
- Air-to-Water mode when chilled water is unavailable.
- Hybrid mode when hot water demand exceeds chilled water availability.

This adaptive capability ensures stable operation and optimized efficiency across diverse conditions.

Modes of Operation – Practical Scenarios

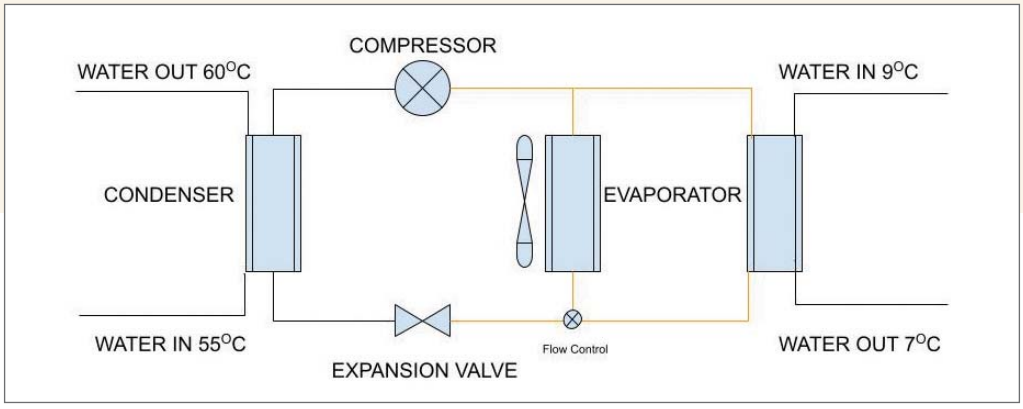
1. Hot Water 100%, Chilled Water 100%

- Mode: Water-to-Water
- Ideal balance; machine operates at maximum COP.



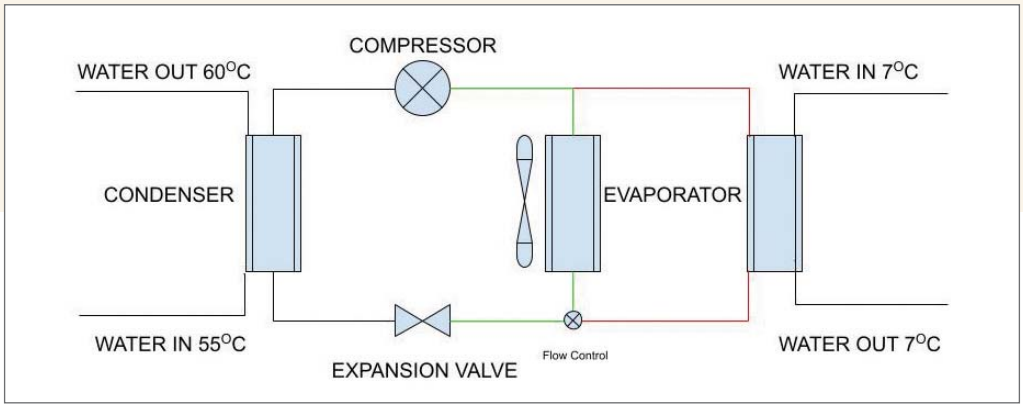
2. Hot Water 100%, Chilled Water 40%

- Mode: Hybrid (Water + Air)
- Refrigerant splits between water and air evaporators, meeting hot water load fully.



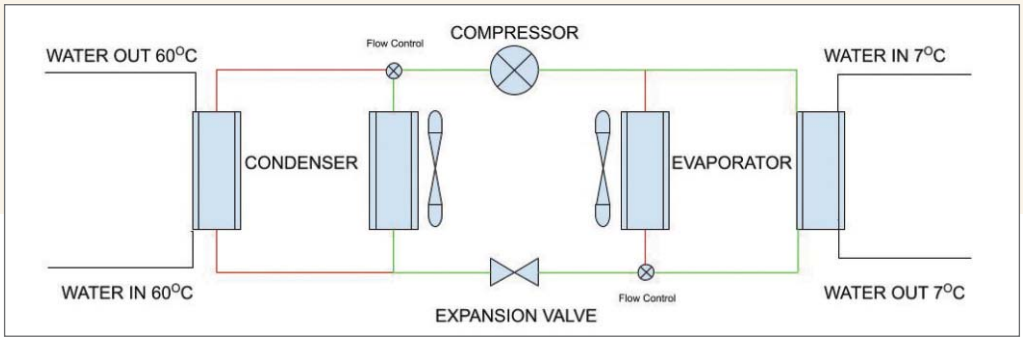
3. Hot Water 100%, Chilled Water 0%

- Mode: Air-to-Water
- Heat extracted entirely from ambient air.



4. Hot Water 0%, Chilled Water 100%

- Mode: Chiller (Water-to-Air)
- System supplies chilled water; heat is released to the atmosphere or recovered for air heating.



These scenarios demonstrate how a hybrid design can maintain operational flexibility without compromising efficiency.

From Hybrid to Intelligent

A hybrid heat pump becomes intelligent when it can interpret real-time data, learn from past operating conditions, and autonomously select the best operating mode.

Key Operating Parameters

Intelligence relies on monitoring a wide range of parameters, including:

- **Major factors:** hot water temperature, condenser and evaporator flow rates, delta T across heat exchangers, condensing and evaporating gas temperatures, ambient air temperature, humidity, airflow, etc.
- **Minor factors:** waterside pressure drops, suction and discharge temperatures, expansion valve pressure differentials, among others.

Embedded Intelligence

An internal algorithm continuously correlates these parameters with energy consumption. It calculates the best combination of air and water sourcing to maximize COP at any moment.

Example:

- At night, as HVAC demand declines but hot water demand remains, the unit shifts partially to air-source mode while still recovering heat from chilled water loops.
- In the morning, as both hot water and chilled water loads rise, the system prioritizes water-source operation for higher efficiency.

With IoT and Big Data integration, these decisions are not just reactive but predictive. The system can anticipate upcoming demand patterns, pre-condition water to the required temperature, and smooth out energy consumption over time.

Future Outlook

The evolution from conventional to hybrid, and from hybrid to intelligent, reflects a broader trend in the HVAC industry: systems are becoming **smarter, more adaptive, and more integrated with digital infrastructure.**

Intelligent hybrid heat pumps offer several advantages:

- Consistently high COP under varying conditions.
- Predictive control for energy savings.
- Flexible integration with both chilled and hot water systems.
- Reduced environmental footprint.

As buildings and industries increasingly demand sustainable, reliable, and cost-effective heating solutions, intelligent hybrid heat pumps are set to play a central role in the future of hot water and HVAC systems.

Dinesh Shah
Co- Convener, Indian Plumbing Professionals League
Director, Ensys Engineers Private Limited

Dinesh Shah is a Mechanical Engineer, and he has more than 20 years of experience in the field of Hot Water Systems. He has experience of working on more than 400 Hot Water Projects across various sectors in India and abroad.

Ensys Engineers Private Limited is one of the leading Heat Pump manufacturing companies in India. It is the only company in India to receive a 5-star energy efficient rating from IAPMO, USA. Dinesh Shah is an NEC Member from IPA Pune Chapter and Co-Convener for Indian Plumbing Professionals League. He can be reached on dinesh@ensys.in .

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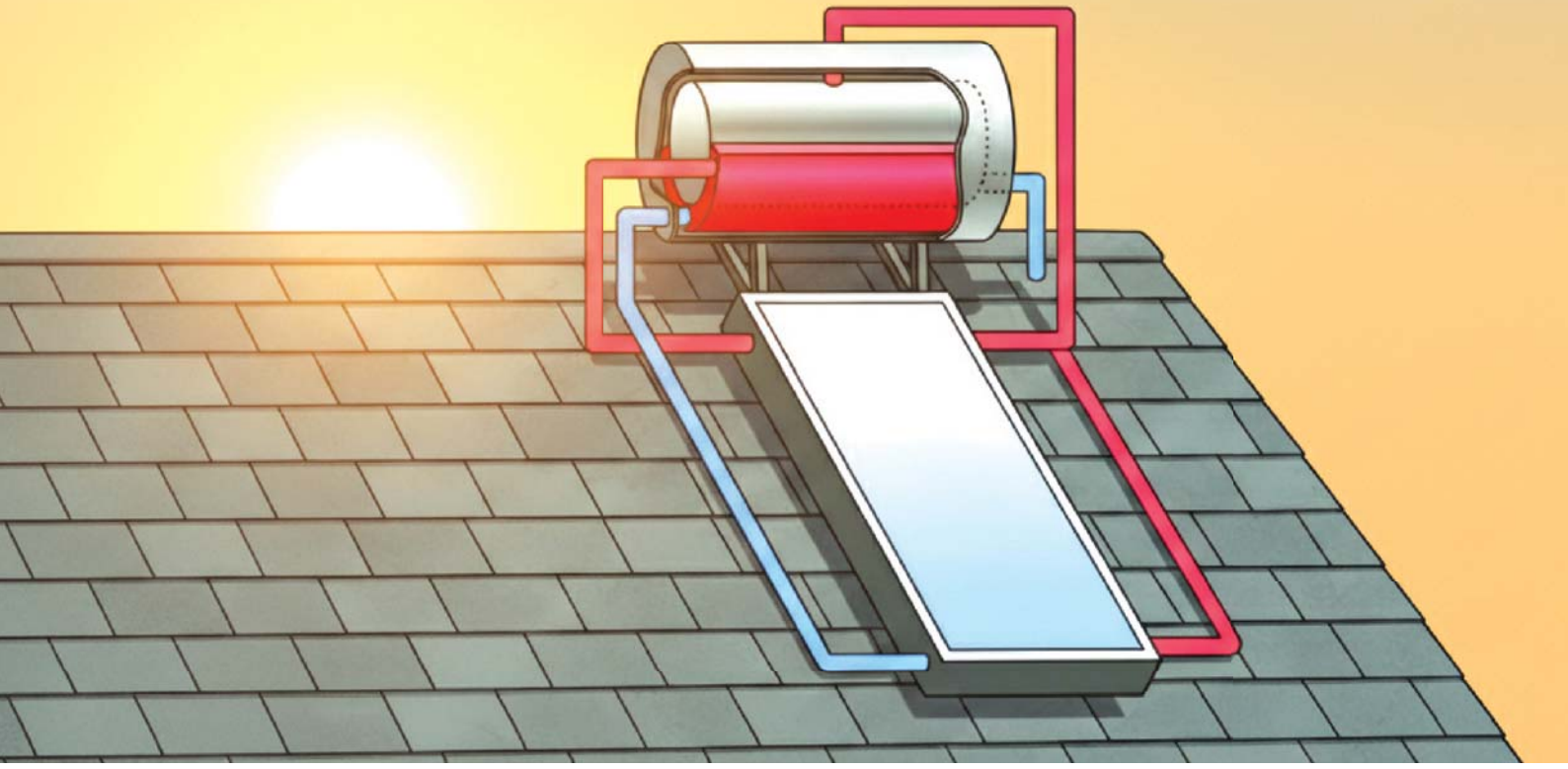
- Manjunath Naik



1 Executive Summary

India's hot water demand is rising across residential, commercial, hospitality, and healthcare sectors. To meet this sustainably, energy-efficient and scalable solutions are essential. Solar thermal systems thermosyphon, forced circulation, and drain-back and heat pumps, air-source and water-source offer proven ways to reduce electricity use, peak demand, and emissions while improving lifecycle cost.

This article outlines design principles, control logic, safety features, and deployment guidance for each technology, with emphasis on practical integration, commissioning, and maintenance.

2 Introduction

Globally and in India the case for efficient hot-water systems is growing due to economic and environmental pressures. Traditional electric and fossil-fuel heaters are energy-intensive and costly. In contrast, solar thermal collectors and modern heat pumps offer significant gains in energy efficiency, reducing grid load and operating costs.

This article outlines practical strategies for three solar thermal setups Thermosyphon, Forced Circulation, and Drain-back, and air- and water-source heat pumps. It covers system design, controls, safety, commissioning, and maintenance, with guidance on refrigerant choices to balance performance, safety, and sustainability.

3 Solar Hot-Water Systems

Solar thermal converts sunlight into useful heat for

domestic hot water (DHW) with high end-to-end efficiency. Three architectures are in scope: Thermosyphon (passive), Flooded/Forced-Circulation (active), and Drain-Back (active with automatic drainage).

3.1 Thermosyphon Solar Hot-Water System

Thermosyphon systems use buoyancy to circulate heated fluid without pumps or controllers. An insulated tank placed above solar collectors enables passive flow, reducing maintenance and failure risks ideal for sunny sites with minimal shading.

Key components include roof-mounted collectors and an elevated, insulated tank. Heated fluid rises into the tank; cooler fluid returns by gravity, repeating the cycle during sunlight hours. This setup suits single-family homes and small commercial buildings where rooftop tank placement is structurally feasible.

3.1.1 Key design, installation and Maintenance Essentials:

For effective thermosyphon system design, position the tank above the collector to enable passive flow, using short, straight risers and avoiding reverse slopes. Insulate hot pipes with UV-resistant cladding, optimize collector tilt and orientation to reduce shading, and ensure safe roof access with structural support for the tank's full weight. Install mixing valves to prevent scalding. For maintenance, inspect insulation, seals, and supports semi-annually; check and purge air-locks post-servicing; assess anode rods and tank liners as per manufacturer guidelines; and record inlet/outlet temperatures to monitor stratification and performance.

3.1.2 Controls:

Although thermosyphon is pump-free, optional temperature sensors and a simple data logger can help verify performance trends, detect abnormal stagnation temperatures, and inform seasonal adjustments to mixing valves.

3.2 Flooded (Forced-Circulation) Solar Hot-Water System

Flooded systems use pumps and a controller to circulate fluid through collectors and a plate heat exchanger, separating the collector loop from potable water. This allows flexible placement, supports larger loads, and enables precise temperature control.

Essential components include protected collectors, stratified hot-water tanks, backup electric heaters, pumps, sensors, a ΔT_on/ΔT_off controller, water conditioner, hydraulic balancing valves, non-return and pressure relief valves, air vents, isolation valves, drain points, and an expansion vessel.

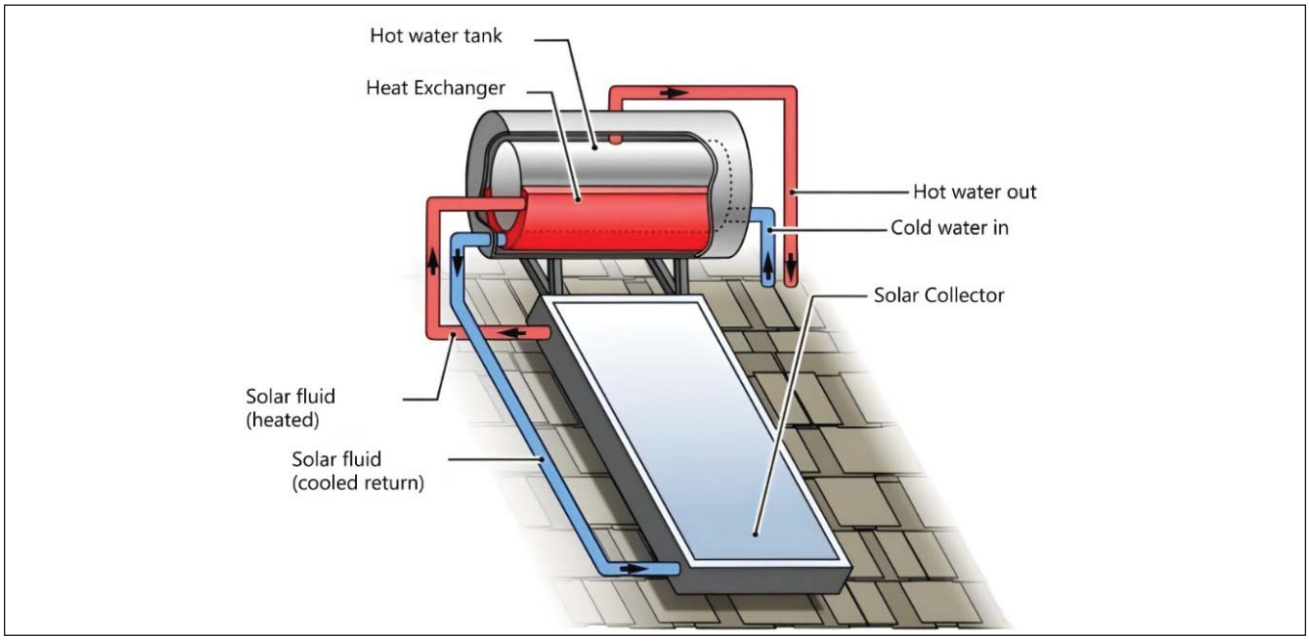


Figure 1 Thermosyphon solar hot water system

3.2.1 Hydraulic Path:

Cold water enters via the IMW for scaling control, then the CP drives flow through flooded collectors where water absorbs solar heat. Heated water passes through a plate heat exchanger that transfers energy into the potable side while keeping loops separated for hygiene and material compatibility. The DRV ensures balanced flow for multi-collector strings. In the storage tank, stratification keeps the hottest layer available for draw-off. A hot-water return, where provided, trims wait time and improves user comfort. During low irradiation or high demand, the EHWT energizes based on a tank setpoint to maintain service. To cut auxiliary energy use, tanks are sequenced so only the required vessel is heated at a given time.

3.2.2 Control Logic (ΔT Strategy):

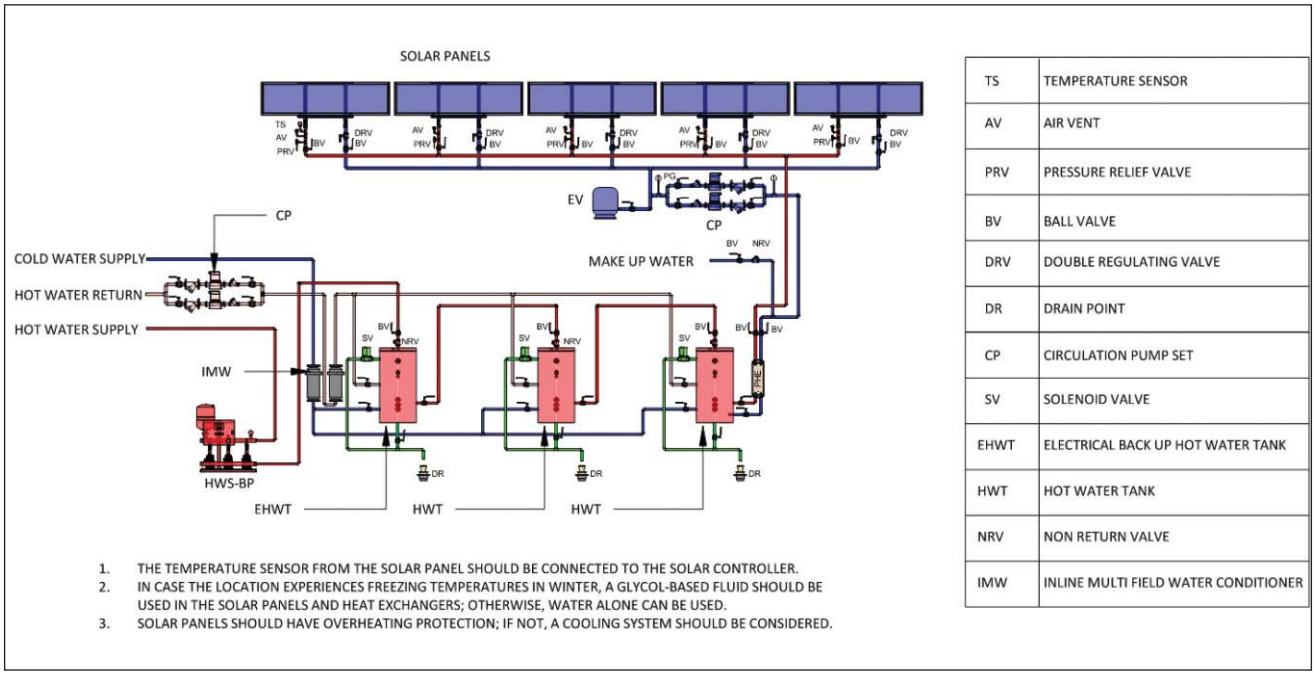
The controller starts the CP when the collector outlet (TS_collector) exceeds tank temperature (TS_tank) by ΔT_on (≈6–8°C). Pumping continues until the differential falls to ΔT_off (≈2–4°C), at which point the CP stops. If TS_tank drops below the hot-water setpoint (e.g., 60–65°C) with limited solar input, the EHWT engages. Protections include freeze prevention (glycol where applicable), overheat management, scald limits, and pressure relief to maintain system integrity.

3.2.3 Safety & Protective Measures:

- **PRV:** relieves excess pressure due to thermal expansion or fault.
- **AV:** releases trapped air at high points to avoid air-locks.
- **NRV:** prevents reverse thermosiphon at night or pump-off conditions.
- **SV/BV:** isolation for maintenance and emergency shutdowns.
- **EV:** accommodates thermal expansion volume and stabilizes pressure.
- **DR:** controlled drainage for maintenance or seasonal lay-up.
- **Scald protection:** thermostatic mixing valves maintain safe delivery temperature (≈60–65°C setpoint).

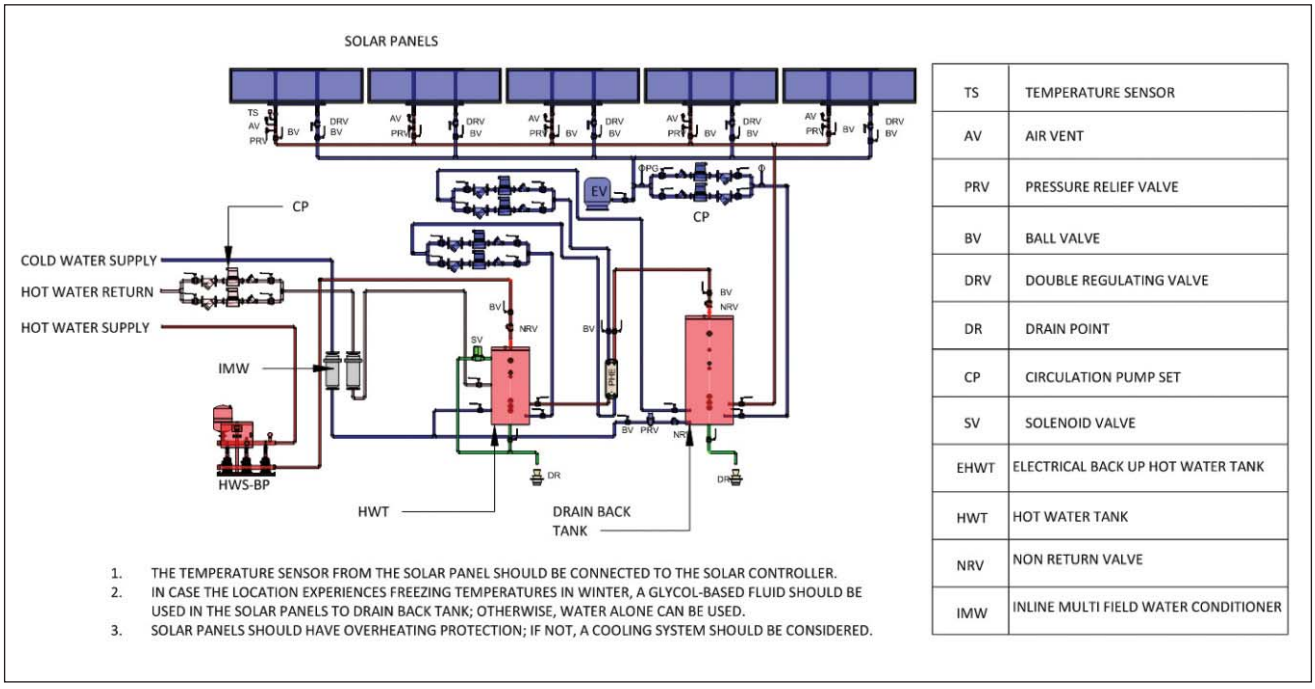
3.3 Drain-Back Solar Hot-Water System

Drain-back systems preserve the functional advantages of active circulation while providing automatic freeze and stagnation protection. When solar input is inadequate or shutdown is commanded, the collector loop drains by gravity into a drain-back tank, leaving collectors empty. This eliminates standing water during freezing conditions and mitigates overstress at high stagnation temperatures. Upon sunrise and sufficient ΔT, pumps refill the loop and resume



TS	TEMPERATURE SENSOR
AV	AIR VENT
PRV	PRESSURE RELIEF VALVE
BV	BALL VALVE
DRV	DOUBLE REGULATING VALVE
DR	DRAIN POINT
CP	CIRCULATION PUMP SET
SV	SOLENOID VALVE
EHWT	ELECTRICAL BACK UP HOT WATER TANK
HWT	HOT WATER TANK
NRV	NON RETURN VALVE
IMW	INLINE MULTI FIELD WATER CONDITIONER

Figure 2 Flooded Solar Hot water system



TS	TEMPERATURE SENSOR
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EHWT	ELECTRICAL BACK UP HOT WATER TANK
HWT	HOT WATER TANK
NRV	NON RETURN VALVE
IMW	INLINE MULTI FIELD WATER CONDITIONER

Figure 3 Drain Back Solar Hot water system

heat collection via a plate heat exchanger into the storage tank. Auxiliary heat (EHWT) ensures service continuity during extended low-sun periods.

3.3.1 Control & Protection Highlights:

- **Differential control:** CP starts at TS_collector ≥ TS_tank + ΔT_on and stops at ≤ TS_tank + ΔT_off.
- **Automatic drainage:** DR opens on freeze detection, power-off, or high-temperature protection logic.
- NRV ensures intended flow direction and avoids unintended siphoning.
- AV maintains air management during refill and operation.

Drain-back is compelling for continental climates with sub-zero winter temperatures, high summer irradiance, or sites where antifreeze maintenance is undesirable.

4 Heat-Pump Hot-Water Systems

Heat pumps use vapor-compression to convert low-grade heat into usable hot water. They can work alone or with solar thermal systems to boost renewable energy use and reduce backup energy needs.

Types include air source (ASHP), water source (WSHP), and geothermal. ASHPs draw heat from ambient air; WSHPs use water bodies like lakes or groundwater. This article focuses on ASHPs and WSHPs due to their efficiency, easy installation, and broad suitability for residential and commercial use.

4.1 Water-Source Heat Pump (WSHP)

A WSHP extracts heat from groundwater, lakes, or other water bodies via source loops and transfers it into DHW through a condenser/heat exchanger. Compared with ambient air, water temperatures are often more stable, enabling favourable COP and reliable year-round operation. The system monitors source and tank temperatures and modulates compressor and pumps accordingly. Safety features PRV, AV, NRV, water conditioning protect equipment and maintain water quality.

4.1.1 Operating Sequence

- **Cold Water Intake:** Water enters the heat pump's evaporator coil.
- **Heat Absorption:** Heat transfers to the refrigerant, warming the water.
- **Compression:** The refrigerant is compressed into high-pressure vapor.
- **Heat Transfer:** Heat is released via the condenser coil to warm tank water.

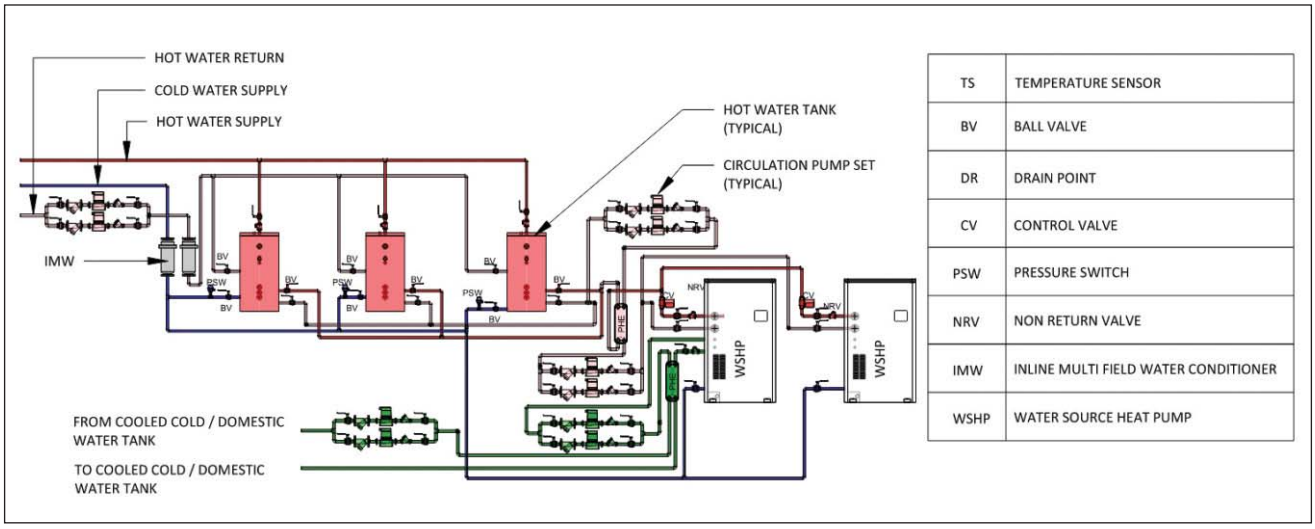

Figure 4 Water Source Heat Pump

- **Condensation:** Refrigerant cools and returns to liquid form for reuse.
- **Cooling Benefit:** Cooled water helps prevent legionella and can be reused.
- **Monitoring:** Sensors regulate temperature, optimizing energy use and safety.

4.2 Air-Source Heat Pump (ASHP)

ASHPs draw heat from ambient air using an outdoor unit containing the evaporator, compressor, and condenser. Modern variable-speed hardware and intelligent defrost cycles enable efficient operation even at low outdoor temperatures. Hot water is stored in a tank. Automatic controls modulate compressor speed and pump flow to match load while minimizing energy use.

4.2.1 ASHP Sequence:

Air source heat pumps draw outdoor air through a vent, using an evaporator coil with low-boiling-point refrigerant to extract heat even in cold conditions. The refrigerant vapor is compressed to raise its temperature, then transfers heat to water via the condenser coil before condensing back to liquid. Heated water is stored in an insulated tank, while sensors regulate temperature to prevent overheating. Advanced features like variable-speed compressors and defrost cycles maintain efficiency in cold weather.

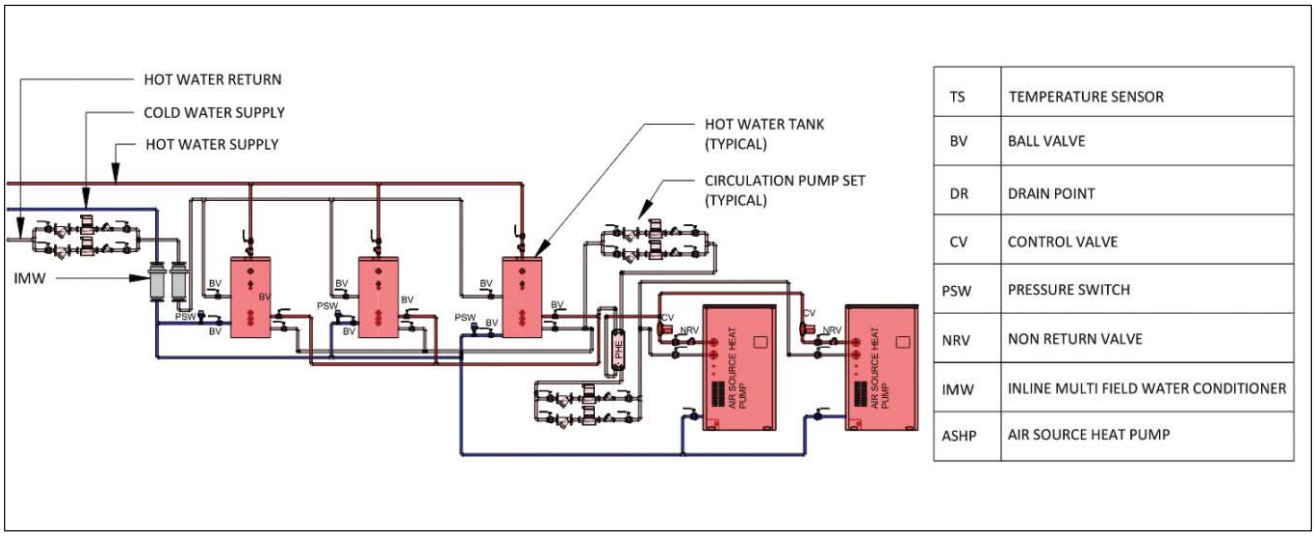

Figure 5 Air Source Heat Pump

4.2.2 Practical Considerations:

Install units away from occupied windows, with vibration isolation and attention to wind direction. Maintain clearances for airflow and service access, ensure proper drainage for defrost condensate, and use thermostatic mixing valves to control water temperature and prevent scalding.

5 Hybrid Systems: Solar Thermal with Heat Pumps

Hybrid systems combine solar collectors with ASHP or WSHP to boost renewable energy use and system resilience. In a series-preheat setup, solar warms the tank before the heat pump finishes heating, improving efficiency. In parallel assist, both feed a shared tank, with controls favouring solar when ΔT is optimal and activating the heat pump as needed. Controls should prioritize low-emission sources, prevent system conflict, and ensure only one backup tank operates at a time to avoid energy waste.

6 Refrigerant Selection & Safety

Refrigerant choice impacts efficiency, environmental footprint, system design, and safety. Common types include R410A and R32 (high efficiency, moderate to high GWP), R134a/R407C (specific uses), and low-GWP natural options like R290, R600a, and CO_2 (R744). CO_2 and natural refrigerants are gaining popularity for sustainability. Safety classes (A1, A2L, A3) determine ventilation and leak protocols; CO_2 systems need high-pressure designs. Selection should balance performance, emissions, regulations, and service support.

7 Design Approach & Sizing

Effective design begins with profiling daily hot water demand and sizing storage to match peak use while maximizing solar gain. Tanks should allow thermal layering, with mixing valves ensuring safe delivery temperatures. Overheating-protected solar collectors use smart coatings that reduce absorption and increase heat emission during stagnation, protecting components. Collector area should match solar fraction goals, oriented south with tilt near local latitude, and placed to avoid shading. Pumps must be properly sized, with DRVs and NRVs for flow control, sloped piping to prevent air pockets, and AVs at high points. Insulate all piping, using UV-resistant covers outdoors. Controls should use ΔT_on/ΔT_off logic, stagger tank setpoints, and integrate with BMS for monitoring and alarms. Protection strategies vary by system: thermosyphon needs mixing valves, flooded systems require glycol or trace heat, and drain-back systems need reliable slopes and seasonal testing. Delivery temperatures should stay below 65°C to prevent scalding. Water quality is maintained with IMW conditioning, compatible materials, and cleanout access for routine flushing.

8 Electrical & Controls Integration

Reliable sensors and control logic are key to safe, efficient operation. The solar pump (CP) runs based on temperature difference between collector and tank. Backup systems (EHWT or heat pump) should modulate gradually to avoid short cycling.

BMS integration enables energy tracking and early fault detection via ΔT changes. Key alarms include high temperature, pressure, leaks, and flow loss.

Recommended Points List:

- Collector outlet temperature (TS_collector)
- Tank top/bottom temperatures (TS_tank)
- Pump status and pressure
- EHWT status and setpoints
- Collector loop flow sensor
- PRV lift counter and leak sensors

9 Commissioning & Maintenance Overview

Effective commissioning ensures hydraulic, thermal, and control systems perform as intended. Key steps include pressure testing, verifying component placement (IMW, AV, NRV, DRV), testing temperature controls (ΔT_on/ΔT_off), backup heater sequencing, and safety features like freeze and overheat protection. Initial performance data such as collector outlet temperature and tank stratification should be recorded. For ongoing maintenance, inspect collectors, insulation, supports, and pipework quarterly. Biannual checks should cover pumps, strainers, regulators, and vents, including cleaning or replacing water conditioner media. Annually, verify mixing valve settings and test PRVs. Monitor temperature differences and energy meters to detect buildup or faults, and schedule cleaning ahead of peak usage periods.

10 Application Scenarios

Thermosyphon systems are ideal for residential setups where the tank can be placed above roof-

mounted collectors, offering simple, low-maintenance heating for single-family homes in sunny climates. Flooded systems suit larger buildings like hotels or hospitals, providing high-capacity hot water with flexible collector placement and precise control. Drainback systems work well in cold or hot climates, protecting against freezing and overheating while extending equipment life. Air Source Heat Pumps (ASHP) are efficient and easy to install for residential buildings with grid access, especially in temperate zones. Water Source Heat Pumps (WSHP) serve commercial and institutional facilities, delivering hot and chilled water with high efficiency and lower operating costs by leveraging natural water sources.

11 Risks & Mitigations

- **Freeze damage (active loops):** Use drain-back or glycol/trace heat; confirm slopes and drainage.
- **Stagnation/overheat:** Over-temperature shutdown; coatings that reduce absorption at high temperatures; adequate expansion volume.
- **Scaling/fouling:** IMW, filtration, periodic flushing; monitor ΔT trends for early detection.
- **Noise/vibration (ASHP):** Isolation pads, placement strategy, and airflow clearances.
- **Controls conflicts:** Use of locks and setpoint limits to prevent simultaneous heating sources from working against each other.
- **Water quality/hygiene:** Maintain storage temperatures and use mixing valves; follow potable-water material compatibility.

12 Conclusion

Thermosyphon, forced circulation, drain-back systems, and heat pumps offer flexible, low-carbon hot water solutions for diverse climates and project types. Smart controls (e.g., ΔT_on/ΔT_off), solar prioritization, and backup management enhance efficiency and reliability.

Hybrid systems boost resilience and cost-effectiveness. Proper commissioning and proactive maintenance ensure optimal performance, supporting sustainability goals and preparing assets for a low-emission future.

These strategies help building owners adopt cleaner energy, cut emissions, and maintain dependable hot water systems.

13 Appendix A — Abbreviations

- ASHP — Air-Source Heat Pump
- AV — Automatic Air Vent
- BMS — Building Management System
- BV — Ball Valve
- COP — Coefficient of Performance
- CP — Circulation Pump
- DHW — Domestic Hot Water
- DRV — Double Regulating Valve
- ΔT_on /ΔT_off — Differential temperature thresholds for pump control
- EHWT — Electrical Hot-Water Tank (auxiliary/backup)
- EV — Expansion Vessel
- IMW — Inline Multi-field Water Conditioner
- NRV — Non-Return Valve
- PRV — Pressure Relief Valve
- TS — Temperature Sensor
- WSHP — Water-Source Heat Pump

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Manjunath Naik is a Chartered Engineer (CEng) with an MSc, is working as a Senior Public Health professional at Buro Happold. With extensive expertise in public health engineering and building services, he brings a wealth of knowledge in sustainable design, safety, and environmental health standards. Manjunath is recognized for his professional excellence through multiple fellowships, including FCIBSE, FCIPHE, and CFPS. He can be reached at naik.manju117@gmail.com

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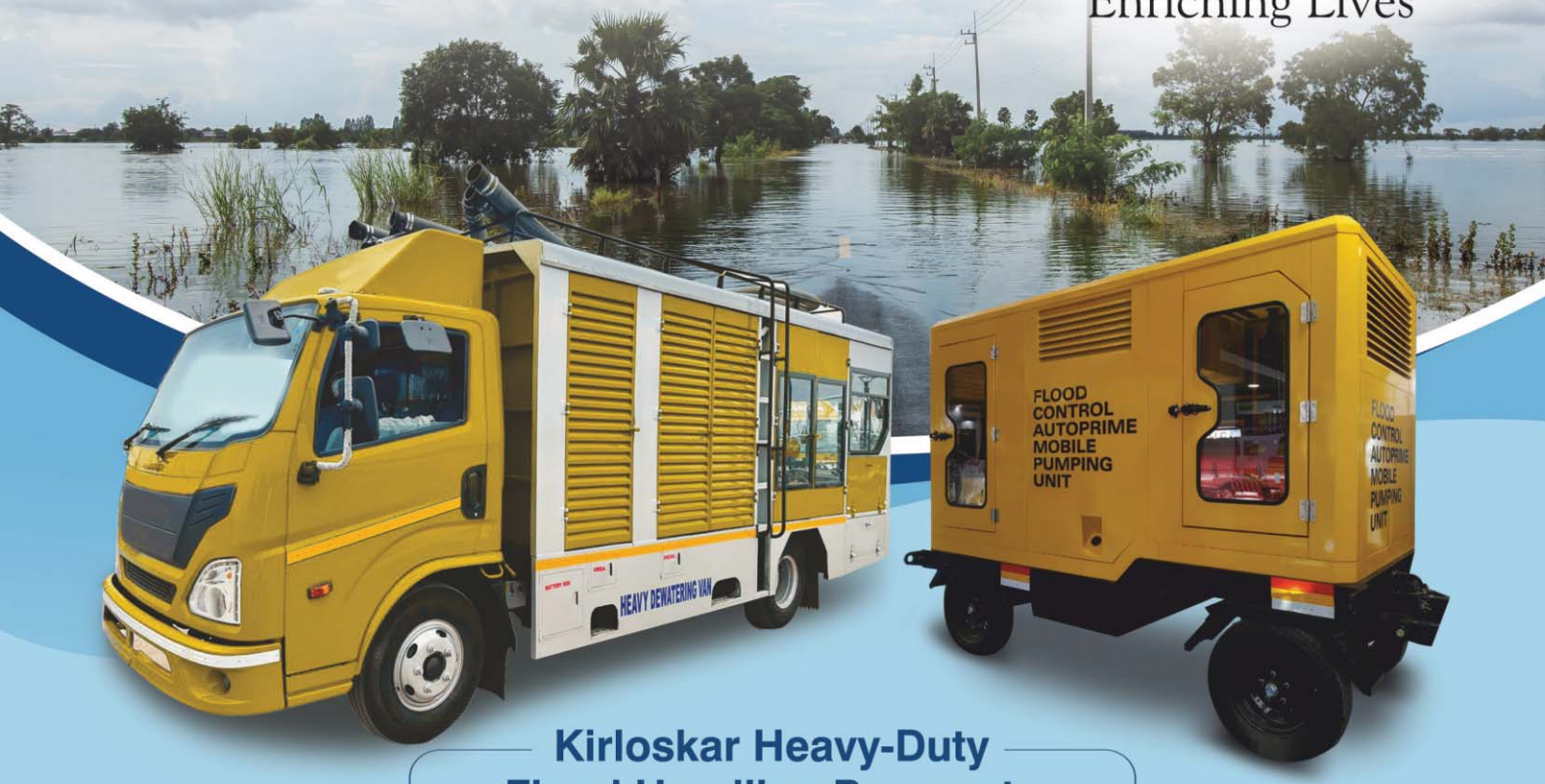

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WHY HEAT PUMPS ARE LESS EFFICIENT THAN YOU THINK

- Devang Shah

Imagine this: you are finally upgrading your bathroom with a state-of-the-art **heat pump water heater.** You have heard it is the most energy-efficient, luxurious way to get hot water. You are excited because it promises both savings and comfort.

But here is the twist: what you see is not always what you get.

The Hidden Reality

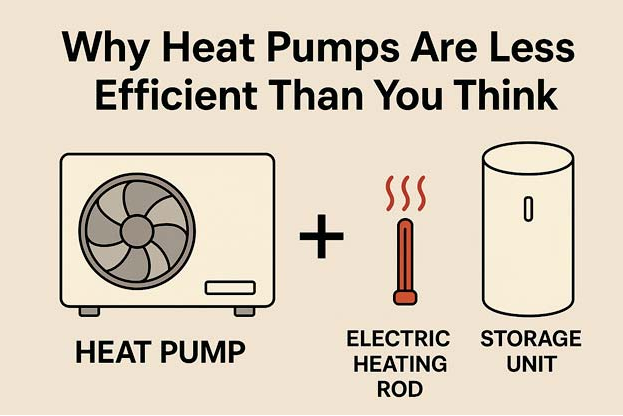
Heat pumps are inherently very efficient. By leveraging ambient air or water temperatures, they can deliver hot water at a fraction of the energy a conventional electric heater uses. On paper, it is a marvel. In practice, many users discover something disheartening: their energy bills are not as low as promised.

Why? Because most heat pumps in the market are designed with a crucial imbalance. The main heating component, *the heart of the system, is often undersized.* To compensate, manufacturers add backup heaters, conventional rods that consume energy at a far higher cost. The very feature touted as energy-efficient is often just a marketing facade.

Breaking Down the Heat Pump

A heat pump water system has three key components

1. Heating storage: Often marketed as the most visible and tangible feature. It is not very expensive, but sellers highlight it because users love bigger tanks.
2. Heat pump capacity: The true powerhouse. This determines how much hot water the system can produce efficiently. Yet, it is frequently downsized, ignored in marketing, or poorly understood by consumers.
3. Backup heaters: Expensive, energy-hungry, and ideally avoidable



The problem is sellers focus on storage size and efficiency claims while the system's real energy performance, the heat pump capacity, is sidelined.

Naive users unknowingly pay for a system that may rely heavily on conventional heating.

Why Manufacturers Do This

The answer is simple: cost and sales. A smaller heat pump costs less to produce, is easier to sell, and fits neatly into the attractive efficiency narrative. The backup rods handle peak demand quietly consuming energy at full throttle, while the user remains unaware.

Where Users Get Lost

Most homeowners do not monitor their heat pump's actual energy usage. The lack of digital tracking means they never realize how often the backup heater kicks in or how much energy is being wasted. They assume the efficiency is constant, when in reality, the savings vary dramatically depending on usage and system sizing.

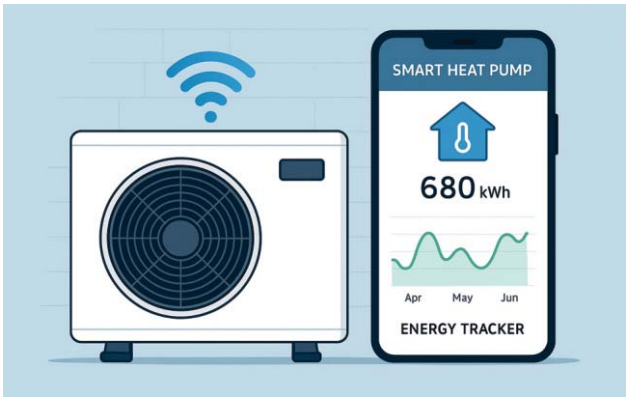
The Solution: Informed Choices

The first step is awareness. Users must understand that the most important metric when buying a heat pump is its heating capacity, not the storage size or even the efficiency label. A well-sized heat pump minimizes reliance on backup rods, reducing both energy bills and environmental impact.

Awareness alone is not enough. To truly harness efficiency, digitization is essential. Smart monitoring allows users to

- Track actual energy usage in real-time
- Identify when the backup heater is running
- Make informed decisions like turning off backup heaters during non-peak hours
- Focus on preventive maintenance, detecting issues like scale buildup or low refrigerant pressure before they reduce performance

Digital tools transform a black box appliance into a transparent system, giving control back to the user.



A New Era of Heat Pumps

The promise of heat pumps is not broken; it is just incomplete. With proper sizing, informed choices, and smart monitoring, users can enjoy the luxurious comfort and energy savings heat pumps are designed for. Without it, even the most efficient unit can quietly become a costly electric rod in disguise.

Next time you shop for a heat pump, ask the hard questions: How big is the heat pump? How often does the backup heater run? Can I monitor my energy usage digitally? These are not technical nitpicks; they are the difference between savings and surprise bills.

The truth is, heat pumps are only as efficient as you let them be. In a world where every kilowatt-hour counts, ignorance is expensive.

Devang Shah
Director, Devyami Pumps

Devang Shah is the Director of Devyami Automatic Pumps & Controls Pvt. Ltd.; one stop water solution from Vadodara, Gujarat. He began his journey in 1996 with a strong engineering foundation. A pioneer in water technology, he introduced heat pump solutions for domestic use in India as early as 2006, earning a certificate from the Bureau of Energy Efficiency for this innovation. With a passion for R&D, he has developed multiple in-house solutions in both water and electronics technologies, driving practical and sustainable advancements in the industry. He can be reached on devang@devyami.com.

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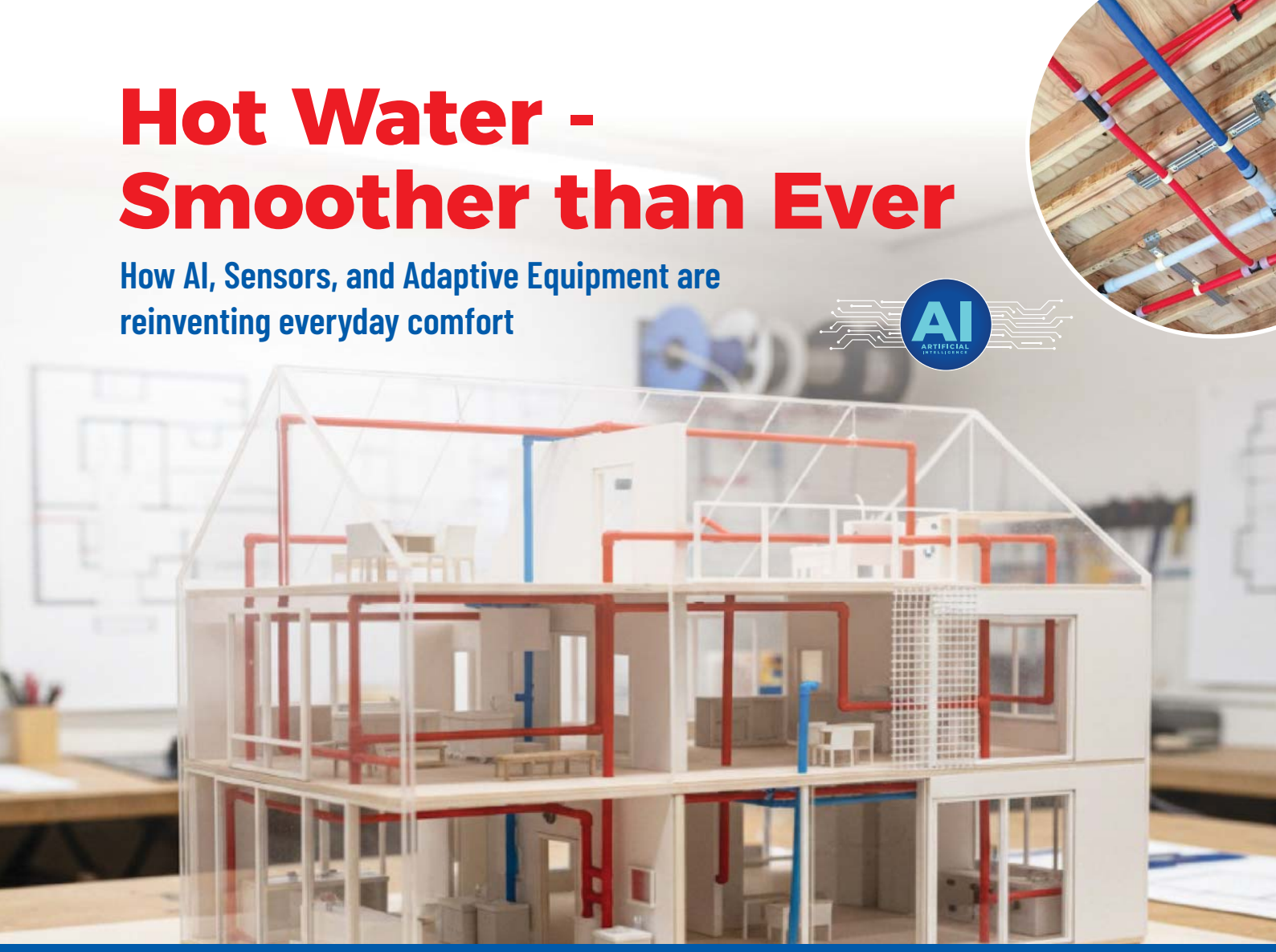

- Aditi Mishra

Flowing Comfort in Everyday Life

~ The Silent Thread of Daily Comfort

On a fine winter morning, when the chill lingers in the air, what's the one thing that brings instant relief? For most of us, it's the soothing embrace of hot water. Whether it's the steam curling from a shower, the quiet luxury of a warm bath, or the comfort of tea poured into a waiting cup, hot water represents more than function. It is warmth, renewal, and a daily indulgence that flows seamlessly into modern living.

Hot water has long been woven into the fabric of everyday routines. It safeguards hygiene, refreshes the body, and restores the mind. A warm bath stimulates circulation, relaxes tense muscles, and provides a sense of calm after a demanding day. In kitchens and households, hot water silently enables countless tasks such as cooking, cleaning, and preparing beverages that punctuate life with comfort. It is, quite simply, essential.

The Age of Inconvenience - The Challenges of Past

~ Yesterday's Heat, Today's Memory

In earlier decades, the promise of hot water came with a long list of compromises, many of which stemmed from the technical limitations of older heating systems. Traditional immersion rods and coil heaters, for example, were notorious for being inefficient and unsafe. They consumed large amounts of electricity while heating only small batches of water, and their exposed elements often posed a risk of electric shocks.

Conventional storage geysers, though more advanced, brought their own set of problems. Their heating elements were slow to raise water temperatures, often taking 15–20 minutes to deliver usable hot water. Another technical drawback was **heat loss**. Older tanks lacked proper insulation, causing stored hot water to



gradually cool down, even when not in use. This "standby heat loss" meant the heater had to constantly reheat water, resulting in significant energy waste and higher electricity bills. Pressure management was equally problematic; early geysers often failed under fluctuating water supply, leading to uneven flow or even leakage.

In essence, older systems delivered hot water, but never smoothly. The limitations of slow heating elements, poor insulation, unreliable thermostats, and inconsistent flow meant that comfort was always conditional, dependent on time, patience, and tolerance for inefficiency.

The New Smooth Experience

Technology has completely redefined how we experience hot water. Modern geysers, instant heaters, and smart devices ensure continuous flow, consistent temperature, and remarkable energy efficiency. No more waiting, no more interruption, just seamless comfort on demand. Hot water today is not only reliable but also "smoother than ever," designed to adapt to our fast-paced lives with ease.

Here are five breakthroughs that are quietly transforming the way we enjoy comfort at home and at work.

1. AI-Powered Demand Prediction

Comfort on Cue

Ever notice how your mornings follow a rhythm? Coffee, shower, breakfast. AI-powered hot water systems can pick up on those habits. By studying when you usually need hot water, they heat only when required, so you get comfort without waste.

"No more waiting, no more wasting - AI learns your lifestyle."

This means no cold surprises in the shower, no energy wasted reheating when nobody's home, and, for bigger facilities like hotels, huge savings on energy bills.

2. Smart Sensors for Leak & Pressure Control

The Silent Guardians

Leaks often start small but can quickly become disasters. That's where smart sensors step in. These tiny protectors quietly monitor your water system 24/7, spotting even the smallest changes in pressure or flow.

Get an alert on your phone before a drip turns into a flood. For homeowners, it's peace of mind. For businesses, it's fewer repairs and less downtime.

"Smart sensors catch problems before you even know they exist."

3. Turning Tanks into Thermal Batteries: Smart Grid–Integrated Heating

The Hidden Powerhouses

Think of your hot water tank as a secret energy battery. With smart grid integration, heaters can warm water when electricity is cheapest, or when renewable energy like solar is at its peak.

Instead of straining the grid at night, your tank stores clean energy during the day. That means lower bills for

you and a lighter carbon footprint for everyone.

"Your hot water tank could become your home's greenest battery."

4. Efficiency Without Downtime: Quick-Flush Maintenance

The Seamless Sustainers

Sediment buildup is the hidden enemy of water heaters. It makes systems work harder, wastes energy, and shortens their lifespan. Enter the quick-flush system, which cleans out tanks automatically. No more calling in a technician every few months, flushing can be scheduled or even triggered remotely. The result? Smooth performance, lower energy use, and hot water that lasts longer.

"Automatic flushing keeps heaters young and efficient."

5. Adaptive Burners & Bluetooth Diagnostics: Smart Boiler Controls

The Precision Tuners

Today's boilers aren't just mechanical, they're intelligent. Adaptive burners fine-tune themselves to deliver the right amount of heat with less fuel. And with Bluetooth diagnostics, technicians can connect to your boiler with a phone, checking performance in minutes instead of hours.

That means faster servicing, fewer breakdowns, and lower energy bills. For you, it's a comfort you don't have to think twice about.

"Boilers are learning to listen, adapt, and even talk back."

Future Outlook

Behind the comfort lies a greener promise. Today's hot water systems are designed to save energy, reduce waste, and support sustainability. Eco-friendly heaters, smart sensors, and grid-integrated systems make sure we enjoy smooth hot water without straining natural resources. Comfort now comes with a lighter environmental footprint.

The future of hot water is even smarter. Imagine heaters that predict your routine, tanks that store renewable energy, or systems you can control with your voice or a mobile app. With IoT integration and AI-powered prediction, hot water is no longer just reactive, it adapts to your lifestyle.

Conclusion

Hot water has evolved from being a basic household necessity into an intelligent, seamless experience that blends comfort, efficiency, and sustainability. It is no longer just about heating water; it's about enhancing living.

Hot water is no longer just a necessity, it's an experience, smoother than ever.

Aditi Mishra
Content Writer, Indian Plumbing Association

Aditi Mishra is a Content Writer at the Indian Plumbing Association, blending creativity with strategy to deliver impactful content. With a background in English (Hons) and an MBA in Marketing, she brings four years of professional experience across a wide range of projects, specializing in content creation, editing, and communication strategies. She can be reached at content.ipahq@indianplumbing.org

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Valves in Building Service

- Jitendra. M

Valves are critical components in plumbing systems, enabling regulation, control, and safety of fluid distribution networks. This topic discusses various valve types commonly used in plumbing, their material considerations, applicable standards, and selection parameters.

Valve is a mechanical device that regulates, directs or controls the flow of fluids. Word valve is derived from Latin – Valva – which means moving part of a door. Valves generally used in plumbing can be broadly considered under the following types-

- Ball Valves
- Butterfly valves
- Gate Valves
- Pressure reducing valves
- Check valves (Non return valve, foot valve)
- Special purpose valves (Pressure relief valve, vacuum relief valve etc)

Some of the important factors for selection of valves are fluid, temperature, pressure rating, climatic conditions, usage & maintenance requirements. As per IS 2065 testing shall be carried out at 1.5 times the working pressure, this should be considered while finalizing pressure rating required for valves. Example – for a water line under 8 bar pressure - required pressure rating will be 12 bar, hence nearest available higher rating of 16 bar (PN 16) shall be considered.

Ball valve is a type of shut of valve that controls the flow of liquids or gases by rotating a hollow ball with a hole through its center. Ball valves made of PVC, UPVC, CPVC, thermoplastics are suitable for low pressure PVC piping systems like Irrigation system, low rise residential buildings. Forged brass ball valves are widely used in plumbing including high rise buildings. Fig 1 indicates the components of a two-piece design forged brass ball valve.

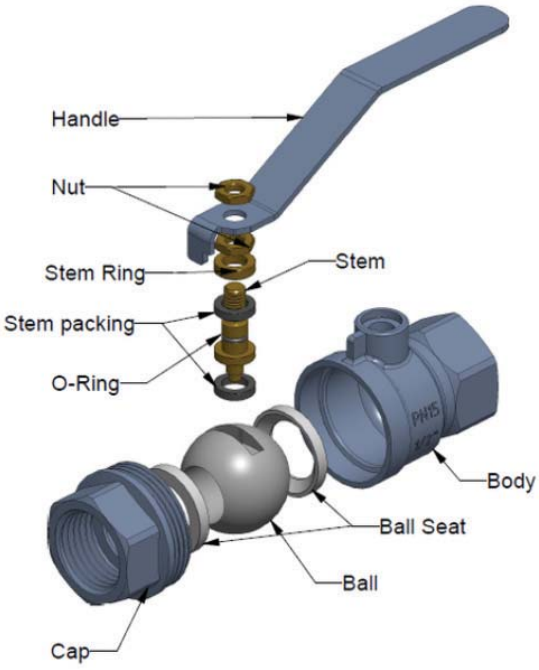


Fig 1

Recently, IS 19315 - Ball valves for water works purposes specification is published, earlier IS 13114 (Forged brass gate, globe and check valves for water works purposes – specification) was referred to check the specification of materials used in forged brass ball valve. IS19315 mentions specific grade of brass to be used for body & connectors (cap/bonnet) for consideration under low lead- and lead-free category. Surprisingly the code doesn't specify the same grade to be used for ball. Technically, the ball is recommended to be of the same grade of body & connectors since it will be in contact with water. Though the code doesn't specify the percentage of lead content for each category, proposed brass grades roughly correspond to 0.6 to 2% for low lead ball valves and 0.2% for lead free ball valves.

For humid climatic conditions the handle is recommended to be of SS or aluminium.

Ball valves are available in full bore and reduced bore variants. Following table indicates the difference in minimum bore for each type. It can be noted that minimum bore of a given size reduced bore valve will be similar to minimum bore size of one size lower full-bore valve. Considering the significant reduction in bore, reduced bore ball valves are not recommended for gravity-based water supply system.

	Minimum bore diameter in mm	
DN	**Full bore**	**Reduced bore**
15	**12.7**	8
20	19	**12.7**

Dezincification is the process of zinc leaching out of brass, leaving the metal porous and weak. High chloride content, CO_2 and low pH are primary reasons. Dezincification resistant brass (DZR) uses additives like phosphorous, arsenic to overcome this issue.

Butterfly Valve is a shut off valve that controls the flow of liquids by a rotating disk. Generally, for 50 mm and higher sizes butterfly valves are used. Since the movement of the disc resembles wings of the butterfly, these valves are called Butterfly valves.

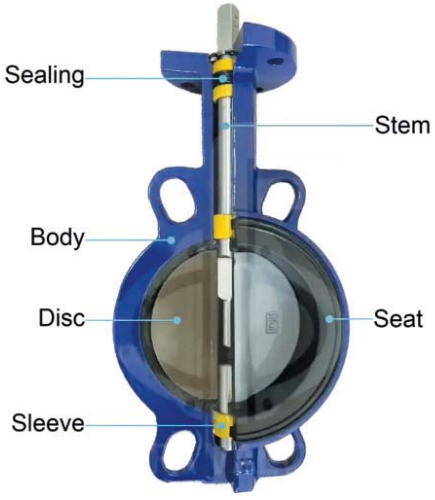


Fig 2

Fig 2 indicates the components of a butterfly valve. IS 13095 has class designation and MOC recommendation as stated below. Integrally moulded seat/liners are preferred over replaceable liners in plumbing applications. SS discs are recommended for harsh water conditions. Valves up to 150mm are recommended with lever and higher sizes with gear operation.

Material	Nominal Pipe sizes	Working Pressure (MPa)		
		Class 125	Class 150	Class 300
Cast Iron	NPS < 12	1.38	-	-
	NPS 14 to 24	1.03	-	-
	NPS > 30	1.03	-	-
Ductile Iron	All	-	1.72	4.4
Steels	All	-	1.96	5.11

Butterfly valves with electrical actuators can be used for automation of overhead tank or underground tank filling. Valves will be actuated through a control panel based on the tank levels in such arrangement. Similar arrangements are also used in STP for automation of the treatment process. These valves can be easily integrated with SCADA/PLC systems.

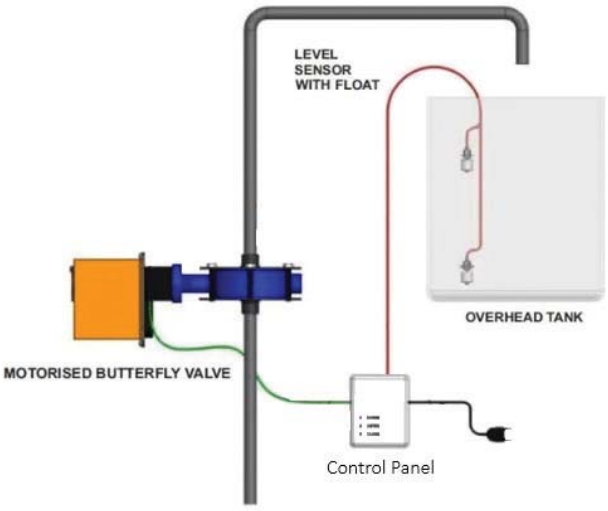


Fig 3

Gate valve is a valve which opens by lifting a barrier i.e. disc/wedge moves vertically to open and close (refer Fig 4). These are called gate valves considering resemblance with gates of dam and castles/forts which move vertically.

In a rising stem valve, the stem moves up and down with the gate, providing a visual indication of the valve's position (refer Fig 5). Non-raising stem gate valves will have stem nut within the valve body in contact with the medium, hence will not be visible.

Sluice valves are commonly used for water mains of bigger diameter. Extended stems are used for operating valves without the need of accessing the entire valve or chamber.

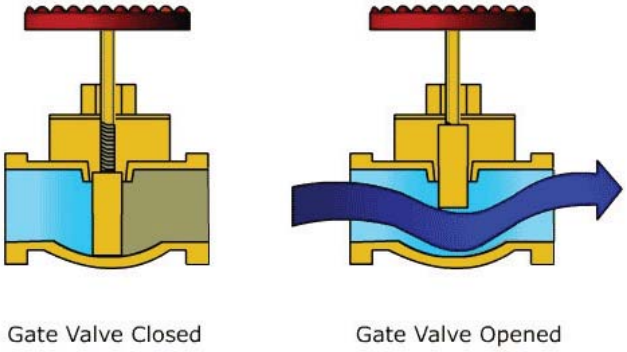


Fig 4

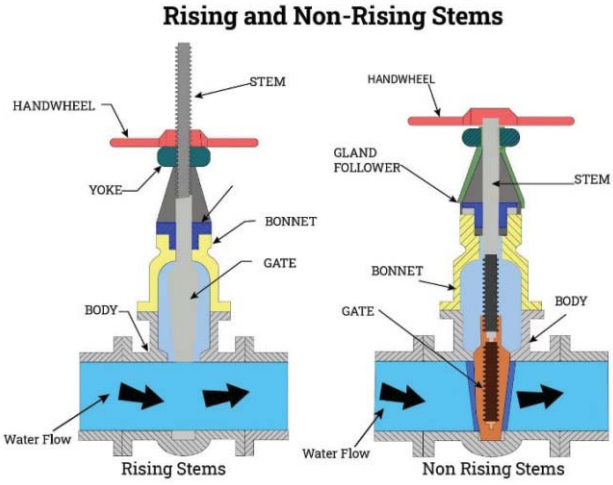


Fig 5

Knife gate valves (refer Fig 6) operate using a sharpened blade or gate that is raised and lowered to control or block the flow of fluid. These valves are useful for wastewater, sewer lines, sludge lines. Providing them at the inlet of STP can be useful for diversion among different modules of STP & help protect STP during floods/ during construction. These valves are also useful for making bypass arrangement of a grease trap.

Fig 6

Air release valves help remove air from the system with the help of a float mechanism. Smaller air release valves (Fig 7) comprise a float attached to an arm and pivot which seal the opening in the valve while floating. These are recommended to be provided above water supply raiser of each zone in buildings.

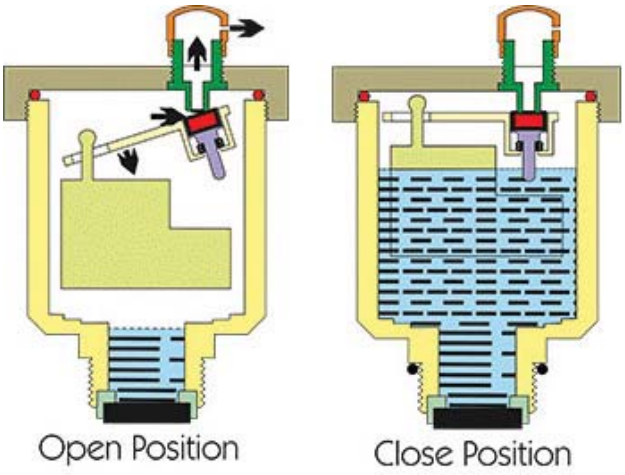


Fig 7

Single chamber air valves (single large orifice) discharge large quantities of air during the pipeline filling process and admit large volumes of air when the pipeline is drained. They use a large orifice and a float to manage the rapid inflow and outflow of air. (Fig 8)

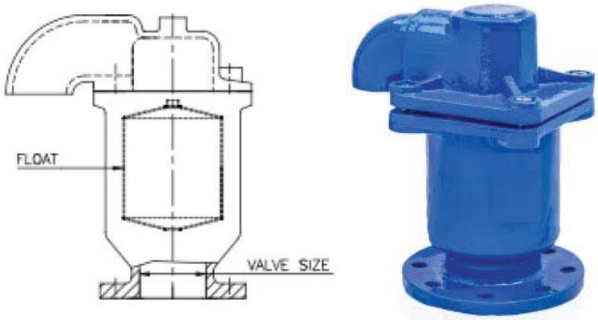
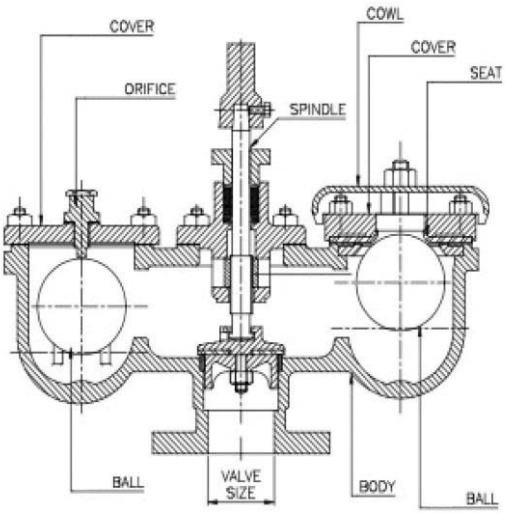


Fig 8

Double chamber air release valve, also known as a double orifice air valve, is designed to automatically release air during pipeline filling and drainage, as well as to release accumulated air during normal operation. It has two orifices, a large one for rapid air release during filling and drainage, and a smaller one for continuous air release during operation. (Fig 9)



DOUBLE AIR VALVE

Fig 9

Single or double chamber air release valves are recommended to be provided at highest points & each section of water supply mains in infrastructure development.

Pressure reducing valve (PRV) or pressure regulating valve is used to reduce pressure to the required limit. Direct acting PRV's are available in diaphragm type and piston type. Fig 10 indicates the components of diaphragm PRV. In such PRV - force of diaphragm acts against force of an adjustment spring. If the outlet pressure & therefore diaphragm force fall due to withdrawal of water, then greater force of spring causes the valve to open. The outlet pressure then increases until the force between diaphragm & spring are equal again. The inlet pressure has no influence in either

opening or closing of valve. These PRVs generally have pressure reduction ratio of 3:1, can handle varying flow rates effectively and are fairly dirt proof.

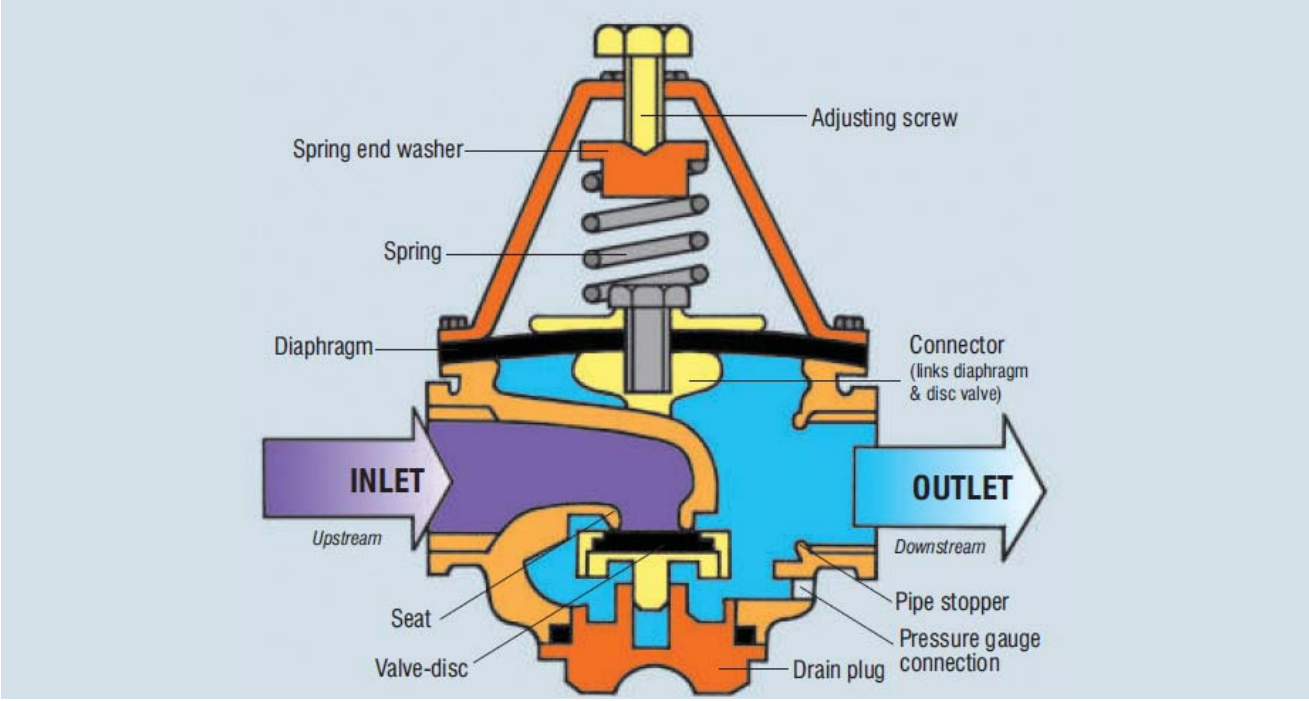
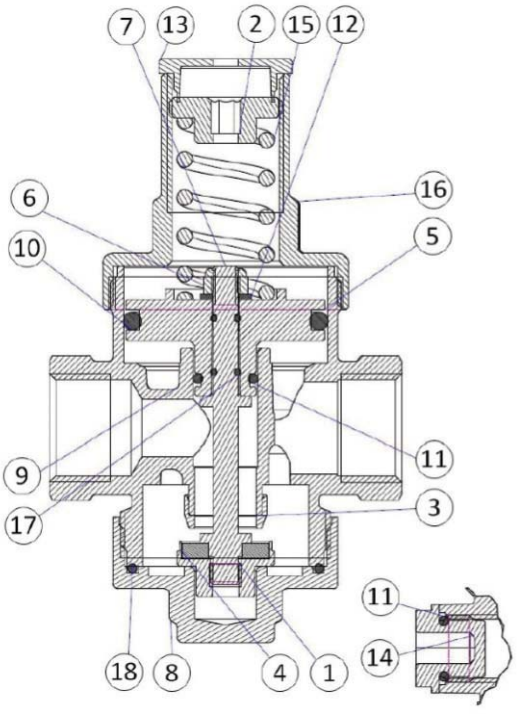


Fig 10

Piston PRV uses a sliding piston to regulate pressure, with the piston moving within a cylinder. Fig 11 indicates components of piston PRV. These PRVs generally have pressure reduction ratio of 6:1, they can handle higher pressure & are sensitive to dirt. These are compact and economical compared to diaphragm PRV.

Pilot Operated Pressure Reducing Valve utilizes a small pilot valve to control a larger main valve. Fig 12 indicates the components of pilot operated valves. The pilot valve senses downstream pressure, based on changes, directs a small amount of fluid to control the movement of a diaphragm in the main valve, thereby adjusting the valve opening. These valves offer precise pressure control. They are better suited for high pressure systems and applications requiring larger flow rates. These are large in size & generally more expensive.



1. Piston stem
2. Calibration Spring
3. Seat
4. Gasket
5. Piston
6. Piston Stop
7. Pin
8. Piston Cap
9. Body
10. O-ring
11. O-ring
12. Washer
13. Cap
14. Cap
15. Spring
16. Cap
17. O-ring
18. O-ring

Fig 11

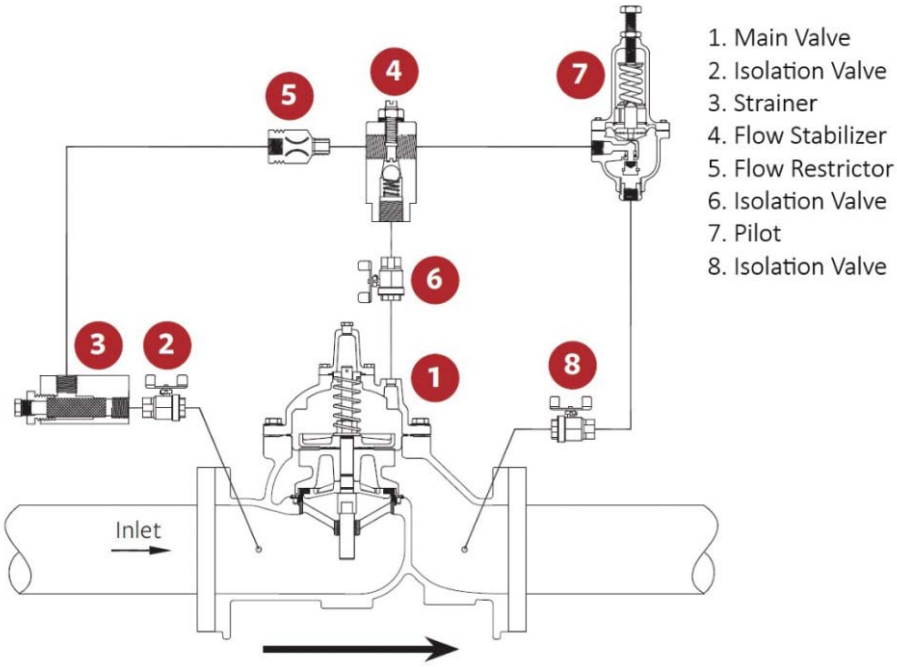


Fig 12

Check valves allow fluids to flow through them in one direction only and prevent backflow. In **lift check valve** (Fig 13) the water pressure makes the valve disc lift from the seating surface allowing flow and backflow causes the valve disc to fall back to the valve seat and cut off the flow.

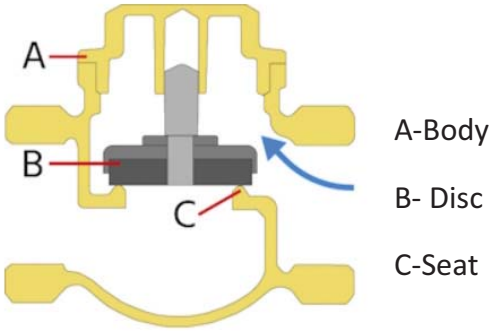


Fig 13

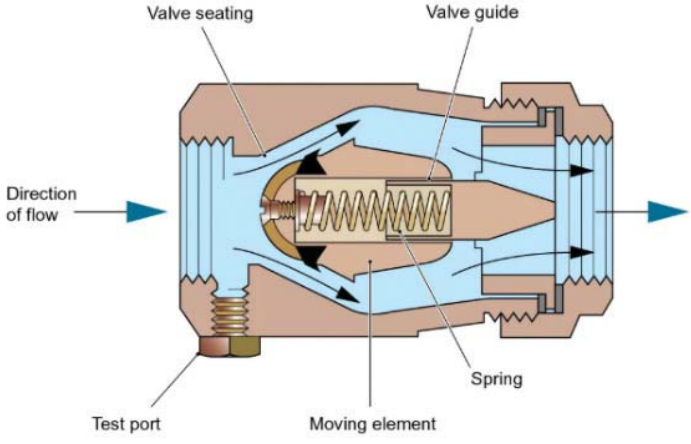


Fig 14

Multi directional NRV's (refer fig 14) are spring loaded NRV's which can be used in any direction. These type of valves are used at places which need flexibility in location of valve and for pipes of smaller diameter.

Valves with thin profile popularly known as **wafer type** check valves are available in single plate (Fig 15) and dual plate (Fig 16) design. These valves are designed for installation between flanges, hence they utilise less space. They can be installed in vertical and horizontal pipelines. Single plate design functions with the help of gravitational force whereas dual plate check valve functions with the help of spring action. Single plate NRVs are useful for low pressure & flow. Dual plate NRVs are suitable for high flow and pressure.

Fig 15

Fig 16

Ball type check valves (Fig 17) use a reinforced rubber ball to stop the flow in reverse direction.The ball moves in the designed position during the flow and falls back to the seat during a no flow condition. Since every time different surface of the ball comes in contact with the seat, it acts like self cleaning mechanism. These valves have considerably low head loss and are suitable for waste water, sewage, slurry, etc.

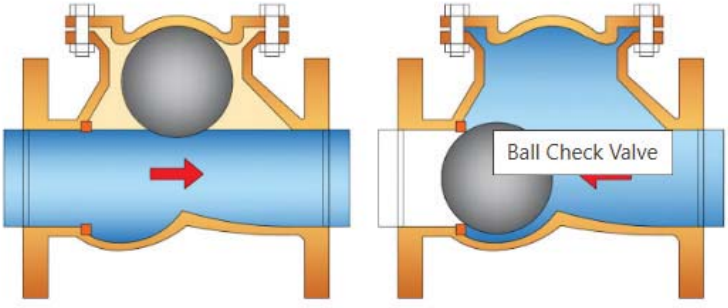


Fig 17

Back water valves are similar to the non return valves but are meant for usage in drainage application. These valves (Fig 18) are designed with a flap which operates without much pressure and remains open during normal operation but closes during the reverse flow. They are commonly used to protect the basement toilets from flooding. They are also used at storm water outlets where water level in municipal storm water drains are likely to raise during heavy rains. Valve with metal cap is recommended for use while connecting to public sewer to prevent damages by rodent. EN 13564 is the governing code for these valves.

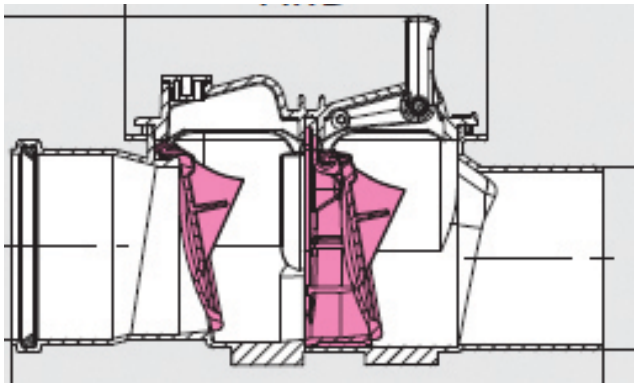
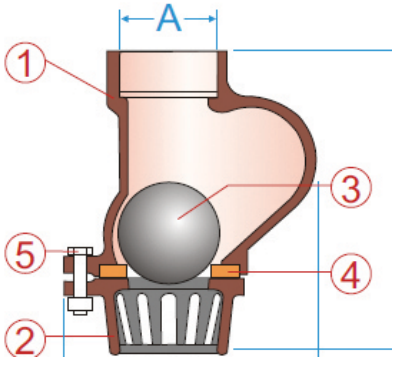


Fig 18

Foot valves are used on the suction side of pumps to retain water in the pipeline. Spring loaded foot valves (Fig 19) are useful for water supply. Ball type foot valves (Fig 20) are useful when low head loss is required and for water containing solids (waste water/ sewage/ slurry).

Fig 19



1. Body
2. Strainer
3. Ball
4. Sealing Ring
5. Fasteners

Fig 20

A float valve, also known as a ballcock, is a mechanical device that automatically controls the flow of water into a tank based on the liquid level. This type of float valve (Fig 21) functions by utilizing a float connected to a lever arm that adjusts a valve according to the liquid level, helping to prevent overflow or the tank from running dry. Materials used in float valves vary based on the application including plastic for low pressure systems and copper or SS for high pressure and industrial applications. These are also used in exposed PVC flush tanks in some models.

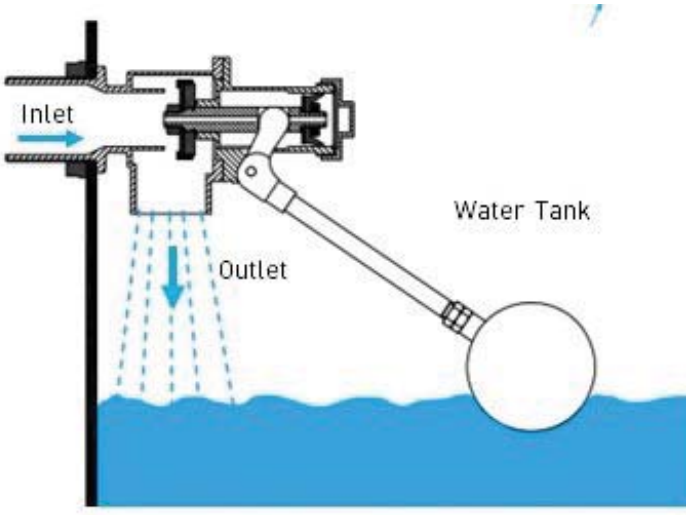


Fig 21

Float valves are available in diaphragm type also, which can withstand high inlet pressure(10 bar). In diaphragm design, the valve opens (Fig 22) when water level drops below the bottom float and stops when the water touches the top float. The height of the float can be adjusted to optimize pump switching intervals.

Fig 22

Pressure relief valves (Fig 23) are designed to open at a pre-set pressure and discharge water untill the pressure drops to acceptable levels.

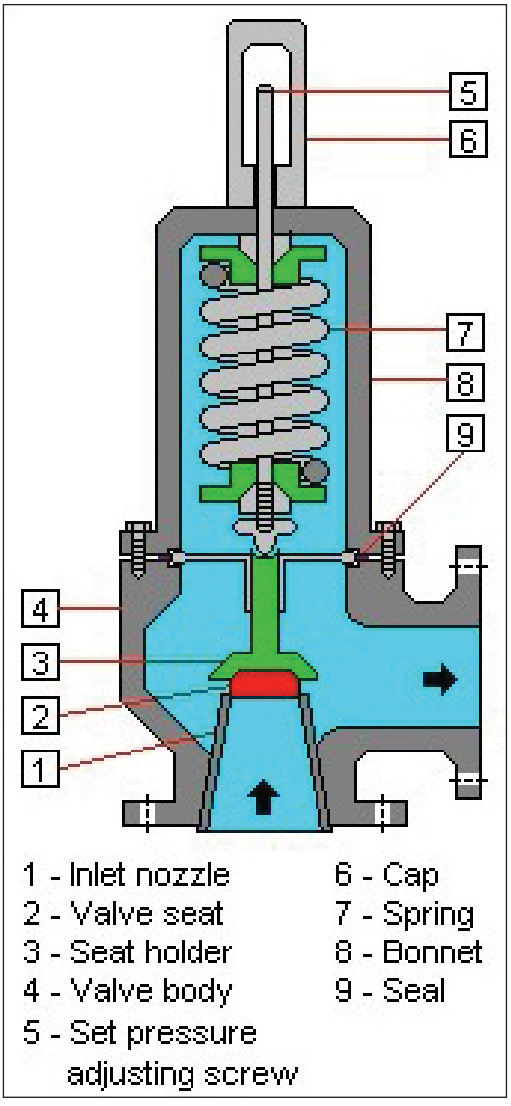
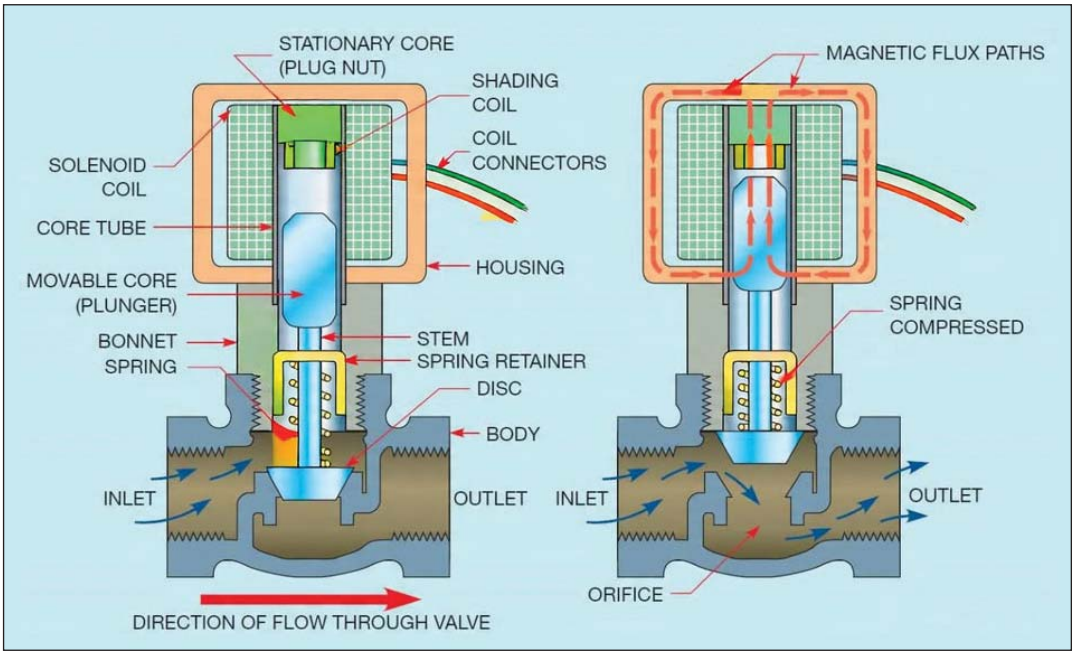


Fig 23

Vacuum relief valvesallow air into the system to prevent vacuum conditions that could damage the system.

Solenoid valves (Fig 24) are electromechanically operated valves that are opened and closed by starting or stopping of electricity. Most of the solenoid valves used in plumbing like sensor faucet, sensor operated flush valves will have solenoid valve in closed position and when the coil gets energized, valve opens allowing water to flow for present duration.



Multi-function valves are used at inlet of geyser to act as non-return valve, pressure relief valve.

Valves are important component in plumbing systems, ensuring effective flow control, system safety, and user convenience. Designers and engineers must carefully evaluate valve type, material, and operational characteristics to achieve long-term system efficiency.

Jitendra M
Vice President, Plumbing, Sobha Limited

Jitendra M is a civil engineer and a life member of Indian Plumbing Association. He has over 25 years extensive experience in plumbing & associated works. He is currently working as Vice President, Plumbing at Sobha Limited. Prior to Sobha he was associated with Bhartiya group, Potential Semac and Karthik Plumbing works Pvt Ltd. He has experience in handling various aspects like design, tendering/estimation, statutory approvals, execution, contract administration and cash flow management. He drives the project through the complete life cycle. He has delivered projects across a wide range of market sectors including commercial, retail, residential, industrial, educational and hospitals.

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IPA Student Chapter Installation at

SPA Vijayawada and KL School of Architecture, Vijayawada

School of Planning And Architecture, Vijayawada

IPA marked a significant milestone with the installation of its Student Chapters at two premier institutions—School of Planning and Architecture (SPA), Vijayawada, on 22nd September 2025, and KL School of Architecture, KL University, on 26th September 2025. These events celebrated the integration of plumbing into architectural education, fostering professional awareness and interdisciplinary collaboration.

At SPA Vijayawada, the ceremony unfolded in the Krishnaveni Sabhagaar with a vibrant cultural performance themed around the rivers of India, symbolizing the fluidity and interconnectedness of water systems. The installation was graced by Chief Guest Prof. Dr. Ramesh Srikonda, Director, SPA Vijayawada, under whose support and guidance the event was conducted. He said that the installation of the Student Chapter reflects the institution's commitment to integrating technical excellence with professional development in architectural education. Guest of Honour Bhaskar Katragadda, IPA National Treasurer, introduced the vision and activities of IPA across India and globally. Dr. Sanandepani Vajje, Chairperson, IPA Vijayawada Chapter, spoke about the importance of academic collaboration with professional bodies like IPA. Prof. Dr. Daketi Srinivas, Head of the Department of Architecture and Convenor, said that the Student Chapter would strengthen industry-academia linkages and promote sustainable design awareness. The session was followed by the Oath Ceremony and a presentation of the term plan and activities to be done in each month

KL School of Architecture,Vijayawada.

by IPA Student Chairperson **Muskan Biswas** and her enthusiastic team.

At KL School of Architecture, KL University, the IPA Student Chapter was formally launched on 26th September 2025. The ceremony was convened by Dr. A. Priya, Head of the Department and Event Convener, who welcomed the dignitaries and emphasized the importance of professional collaboration in architectural education. Dr. A.V.S. Prasad, Pro Vice Chancellor, KL University, said that the Student Chapter would foster technical awareness and industry readiness among students. Dr. K. Subbarao, Registrar, KL University, spoke about the university's commitment to bridging academic learning with real-world applications. Dr. Sandeepani Vajje, Chairperson, IPA Amaravathi Chapter, highlighted the value of academic partnerships with professional bodies like IPA. Gopi Pardhasaradhi, Guest and Industrial Expert, delivered a keynote address on emerging trends in plumbing and building services in high-rise buildings. The session concluded with the Oath Ceremony and a presentation of the term plan by Muskan Biswas, 2nd year B. Arch., IPA Student Chapter Chairperson in place of student chairman S. Yathindra Kumar and his enthusiastic team.

Through these installations, a platform has been created for students to engage with professional practice, and their future contributions are expected to become valuable assets to IPA.

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COLUMN 23

Groundwater- Use, Utilize or Exploit ?

- Chandrashekhar Hariharan

Only last year, we had cause to celebrate at the foresight that the Central Groundwater Tribunal [CGWT] had shown in ensuring that there was a regimen of water extraction that was established. All they sought—and with some firm guidelines and framework for compliance—was that every bulk water-user [over 100,000 litres a day] lowered use of borewells, increased recharge of borewells, sought some effort at harvest of rainwater that would mitigate about 35% to 50% of the water requirement of a facility, at least during the monsoon months… This also meant that the immediate shallow aquifers of any company's building or campus facility would be prepared for the non-rain months with the steady deposit of waters into the immediate subsoil layers of the area.

In this column, as recent as March this year, we expanded on how Groundwater Tribunal has been acting quietly. We detailed the positive impact of the CGWT ruling. Something happened, again quietly, reportedly with pressure from industrial and corporate water-users on the government in Karnataka. The plea was made for a retraction of the CGWT direction in the name of economics, growth, development and employment. The state's minor irrigation department proposed in June 2025 amendments to guidelines by the CGWA on issuing no objection certificates [NOC] for

groundwater extraction, and the cabinet approved with hardly any demur.

In a report that was widely published by all leading dailies, the Minor Irrigation Department said, "Due to geological reasons in certain regions, groundwater contains high levels of salinity. Such groundwater is unsuitable for industrial production, which could potentially hinder industrial growth. If industries shut down, it may lead to disruptions in the industry-based socio-economic system. Therefore… it is proposed to amend the [CGWT] guidelines to permit bulk water supply for drinking, domestic, industrial, commercial, mining and infrastructure development purposes." That was the death knell for the healthy curbs on borewells use that had been implemented in mid-2024.

Across other states, the CGWA continues to implement the guidelines but this precedent from Karnataka may make it convenient or expedient for other state governments to follow suit. Why would companies—in various building typologies and categories—protest a guideline that means well for them even in the shorter term of 2 to 3 years? Why would water-user lobbies petition state governments and ministries for something that brings hurt upon themselves even in the short run? For example, a campus with, say, 50 acres, in a place that receives 1000 mm rainfall, can secure up to 200 million litres of good, clean, low-TDS water if only it planned its land use in a way that it could learn from the rich traditional water architecture of India's past. This writer has alone helped a dozen large water-user institutions across India to save anywhere from 50 lakh to 2 Crore on water purchase, while the quantum of water stopped from being extracted has been anywhere from 50 million litres/year to 200 million litres / year. The investment made in the water infrastructure is recovered in the initial 2-2.5 years!

However, listen to this half-hearted acknowledgement from a senior facility manager of an IT Park, "We see this as a good measure. At our facility, we need nearly a million litres a day, and the NOC from the CGWA meant that we had to drop down our extraction of groundwater from our 50+ borewells to 50% of the daily demand. Where are we to get the rest? And if we bought water by tankers, they are again exploiting groundwater in the neighbourhood." Another hands-on field colleague in another company in the same IT Park, adds: "We have about 10,000 employees in a building facility that is leased by us. Our company does not own the building, and we are dependent on the owner of the building to have such water infrastructure installed. For example, the rooftop areas and harvest… we have no control over that, and yet the NOC applies to our company as well." A Board member in another such techie company says after insisting on anonymity, "We are a public limited company and are fully compliant on all such regulations and guidelines. However, when we are lease-holders of the real estate we occupy, we have no control on what we can do."

So, if a company has a daily demand of a million litres, and is allowed to draw only half of that from the groundwater resources, what should the facility managers do within the constraints of them only leasing the infrastructure and not owning the buildings? Will an investment in such a building made by the company be worth the while in terms of the recovery of the investment that surely comes with the reduction in cost of purchase of water? Can the owner-company be persuaded to see the economics and join the effort. Conversely , as in many other cases of companies that own multi-tenanted buildings, can the tenants or lease-holders agree to share the investment cost and reap the benefit too over the 2- or 3-year run?

Allow me to explain. A company with 1 MLD as demand and about 30 acres of land area, with about one-half of the area occupied by buildings, can secure nearly 250 million litres in cities such as Mumbai,Kolkata, Kochi, or Trivandrum, while such a facility in most other parts of the country can secure about 125 million litres. Recovering rainwater from hard surface areas such as rooftops, drives and parking lots offer greater potential for capture than rains that fall into gullies and runts and channels of the soil in the larger land area of such a campus. Both varieties of rainwater are recoverable, can avoid the heavy costs of softeners for water treatment, the hassle of reducing TDS with expensive RO treatment options, and ease the damage that is brought on deeper aquifers. There is a third kind of 'recovery' of water in any large expanse of land: drawing water from the shallow aquifers, after enriching it with the infiltration of rainwater over the rain-month and utilising such water in the non-rain months. Of course, rooftop rainwater harvesting and surface water harvesting are the first two low-cost options.

Simple open wells, with a better understanding of the contours and lineaments, and a closely monitored initiative to draw water from the subsoil layers at 10 or 20 meters can be a good and economic source of water that is high in quality, low in TSS and TDS, and is devoid of most heavy metals. The challenge of arsenic, fluoride, nitrates or iron do not arise at all if you stick to drawing water from the surface or the immediate subsoil layers! Such incidence of heavy metals is only when you exploit

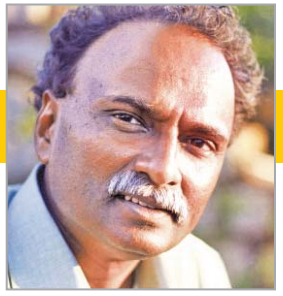
deep aquifers with those monstrous borewells. Why not see the problem for where it lies and address the solutions that are appropriate and economic? Why would we draw deep aquifer water, and then invent technology for removal of arsenic or fluoride?!

A well-known hotel chain over recent years has taken the safe and beaten track: complying with the local regulation with recharge of some public building – a school or a govt hospital – for the quantum of water that it extracts from a borewell within the hotel premises. That other building where such a recharge facility is set up can be anywhere within a 10 km radius, absurd as this may seem. It would be so much easier for such a hotel to look at simple means of securing both demand-side impact and some supply-side renewable impact in a way that the net water requirement is reduced to as little as 30%. There are technologies today that can ensure that all 100% of a facility's requirement is met completely without having to import water from the outside, or extract water from deep borewells. It is just some irrational mindsets and an obstinate refusal to accept some very simple change from the regular that is stopping this shift. It is not hard to see that used water will be the only source for fresh water in a few years from now…

Another well-known premier hotel chain takes a different view: over a 32-acre facility, with the need for 200,000 litres a day of fresh domestic water, and about 250,000 litres of 'non-domestic' water, it is going about setting a menu of solutions that will ensure a good 15-20% is gained from merely measuring-monitoring-managing with system-alerts on a daily basis; about 15% from such hard surface tops as outlined earlier in this discussion; and about 30% coming from out of the water loop with reuse of used water. This upscale hotel selling at over 1500 USD a night, is willing to go one step further: of treating tertiary-grade water into drinking-grade water with technology integration that makes this possible today at costs that are extremely viable. This hotel's dependence on borewells dropped about 50% on the first round of putting into place the low-hanging fruits of harvest and better daily water management. The second level of refinement is now in progress, and is being handled with greater care and precision. Says the GM of the hotel, "We are acutely conscious of the fact that we cannot take any chances on the quality of water for our 5-star guests. That is uppermost as priority. And what we are seeing as potential solutions is more than encouraging. We will extend this set of solutions to our other hotels in the chain, too."

Should it, therefore, be the responsible use of such groundwater with some sensible measures to deposit water back? Or should it be the judicious - utilising of groundwater with other infrastructure that complements supply of water and uses least the groundwater available? Or should it be the plain and insensitive exploitation of deep aquifers with deep borewells pumping water for several hours every day and as long as it lasts, with no care for replenishing it? The choice is obviously that of senior management. There are companies with requirements of over 1 million litres a day who have shown extraordinary expertise and commitment and have ensured that all of the water—even with the need as high—being met out of renewable options.

Clearly, doing things merely in compliance of regulation is not going to help any company into the longer term. The choice is of the discerning Board Member, CEO, or the operating managers. The key to it is of course the knowledge and competence that anyone in management brings to the challenge. A careful blend of a bunch of solutions that are already available in the marketplace [and are proven] can help you drive your company toward a world of net zero water, with financial gains and lasting water security.



Chandrashekar Hariharan

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

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IPA Neerathon 2025 – Chennai Celebrates Water Awareness Festival 3rd Time in a Row

The third edition of IPA Neerathon held in Chennai on September 14, 2025, turned out to be bigger, better, and wetter – in the most memorable way. Organized by the IPA Chennai Chapter, this water awareness festival once again reaffirmed its mission: *to make water conservation a people's movement.*

Planning with Purpose

The moment the date was finalized, the IPA Chennai team swung into action. Under the leadership of Dr. S. Virapan, the organizing committee identified three clear milestones:

1. Securing partners and sponsors
2. Maximizing participation, including professional runners and special categories runners
3. Flawless execution of the event

In assigning responsibilities, Chairman trusted his team's individual strengths and professional networks. Importantly, the team decided not to limit their outreach to the Water, Sanitation and Plumbing sector but to involve the entire construction industry ecosystem. This strategic move proved to be a turning point – Shriram Properties, a leading South Indian developer, came on board as Title Sponsor. The event drew support from across industry verticals: Jaquar (Sanitary fittings); Wabag (EPC for water treatment); SHK, KPT (Pipes) KSB, Wilo (Pumps); SRM Easwari Engg College, MGR university (Education), Sant (Valves) and URC, SSCO (EPC Construction) etc.

With 50 sponsors contributing ₹ 70 lakhs, and many continuing their support from previous editions, the IPA

Chennai Chapter team's effort in ensuring value for every sponsor was evident.

Spreading the Word

The IPA Neerathon is not just a run, but a festival of water awareness. To bring the public closer to the cause, IPA members divided themselves into sub-teams, campaigning across Chennai. For 20 days straight, they reached out to people at walking tracks, gyms, offices, schools, physical education and colleges, armed with standees and flyers.

Initially, registrations trickled in slowly. But perseverance paid off – in the final 10 days, numbers surged dramatically, reaching the magic figure of 3000 plus participants. The unveiling of T-shirts and medals during the IPA Chennai Chapter's monthly meeting also created a buzz, while inviting sponsors, chief guests, and members' families further broadened the circle of participation.

The Big Day at Island Grounds

The venue, Island Grounds, known for hosting large public expos, offered vast space but also posed challenges. Managed by the Tamil Nadu Tourism Development Corporation, the site came with strict operational guidelines. Yet, thanks to meticulous planning, the entire event setup was completed in just four hours.

At 4:30 am, as 10K runners assembled, Chennai witnessed a sudden downpour that lasted 40 minutes. Though it tested the organizing team's nerves, quick coordination with the route management team of 50 volunteers – led by marathon experts – ensured the run began safely.

The 10K professional runners set off in drizzle, followed by the 5K enthusiasts who embraced the rare thrill of running through Chennai rain. VIP's present in the event were, TV Ganesh from Shriram Properties, Dr Deivasundari from Easwari Engg College, Dr S Johnson Premkumar from YMCA College of Education, Sujal Shah Sheth, IPA National Convener, IPA Vice President Chandra Shekhar Gupta, IPA South Zone Director Rahul Dhadphale graced the flag off at different timings.

Culture Meets Cause

Between runs, the audience was treated to captivating performances – Chendamelam, Kathakali, and Mohiniyattam – blending culture with the cause. The energy was infectious, and the rain only added to the festive atmosphere.

A defining moment came with the special category run for the specially abled and visually impaired participants. Their determination drew thunderous applause, underlining the inclusive spirit of the event. The festival closed with the 3.5K fun run, followed by refreshments and a lively award ceremony.

A Rain-Kissed Celebration

What began as a challenge turned into a blessing. The rain transformed the IPA Neerathon into an unforgettable celebration of resilience, unity, and purpose. As participants joyfully remarked – *the Rain God had indeed blessed those who ran for water.*

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Visakhapatnam Chapter

Technical talk on "Integrated Water Management Initiatives and Water Conservation" by Dr. Sunil Nandipati, certified Water Auditor of IPA, ECBC 3rd party auditor and Asst Professor, Civil GITAM, on 6th September, 2025.

Distribution of 600 eco-friendly clay idols of Lord Ganesha to devotees, free of cost, courtesy of CMR Group of Companies.

"I Save Water" mission - pilot project at Andhra University on 22nd August,2025.

Inauguration of Student Chapter at Gayathri Vidya Parishad, College for Degree and PG Courses, on 12th September, 2025.

Tech talk on "Hydro Pneumatic Systems in High Rise buildings" on 3rd August, 2025.

Decennial anniversary celebration on 6th September, 2025.

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Gurmit Singh Arora, IPA National President, along with Chandra Shekhar Gupta, IPA National Vice President, attended the Bharat Buildcon held in New Delhi.

Birthday of Gurmit Singh Arora, IPA National President celebrated at IPAHQ

Gurmit Singh Arora, IPA National President along with Rohit Srivastava, IPA Manager Outreach, met Shivani Chaturvedi, Regional Director, Indo-German Chamber of Commerce

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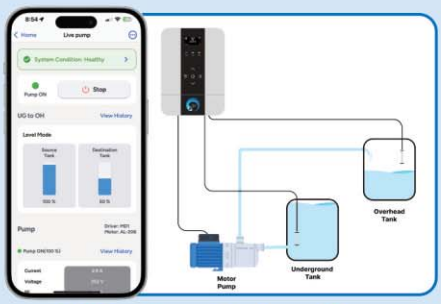
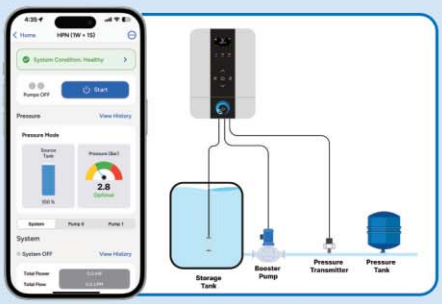
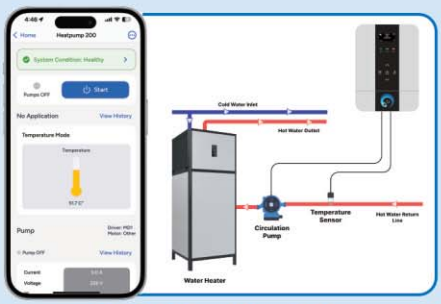


Water Level Automation



Pressure Automation



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Blood Donation Drive
The Faculty of Technology, CEPT University, in collaboration with the IPA Student Chapter and the Indian Red Cross Society (Ahmedabad District Branch), organized a Blood Donation Drive on Wednesday, 24th September 2025 and a total of 104 units of blood were collected.

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NOMINATIONS ARE INVITED FROM

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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.

CHAPTER NEWS

CHAPTER ELECTIONS

RAIPUR CHAPTER

Elections were held in IPA Raipur Chapter for the 3 years term 2025 – 28 on Wednesday, 20th Aug 2025 with the General Body Meeting. All the candidates who filed nominations were elected unanimously unopposed and have been administered an oath of office by the Returning Officer.

Returning Officer: Milind Shete, IPA Zonal Director North, Central & East, Past Chair IPA Nashik Chapter

Election Date: 20th Aug 2025

S. No.	Name of Candidate	Elected for the post
1.	**Ganesh N. Bisen**	Chairman
2.	**Rajkumar Prajapati**	Vice Chairman
3.	**Amaresh Sia**	Hon. Secretary
4.	**Amit Khare**	Hon. Joint Secretary
5.	**Mr. Utkarsh Chouhan**	Hon. Treasurer
6.	**Madhur Chandak**	Exe. Committee Member
7.	**Mustufa J Ahmed**	Exe. Committee Member
8.	**Farheen Khan**	Exe. Committee Member
9.	**Anurag Singh**	NEC Member

Milind Shete – Returning Officer, Farheen Khan – EC Member, Amit Khare – Hon. Joint Secretary, Amaresh Sia – Hon. Secretary, Anurag Singh – NEC Member, Ganesh N Bisen – Chaiman, Raj Prajapati – Vice Chairman, Mustufa J Ahmed – EC Member, Utkarsh Singh Chouhan – Hon. Treasurer

LIFE MEMBERS

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OBITUARY

Habil Soyeb Attarwala

IPA Ahmedabad EC Member

01. 07. 1962 - 04. 09. 2025

Habil Soyeb Attarwala, was the Co-Founder and Director, managing the operations as well as research and development at Furaat, with the primarily aim to innovate and lead the way in rainwater harvesting conservation. He devoted his life to reimagining how we can conserve water. With vision and determination, he pioneered rainwater harvesting solutions that were not only effective but thoughtfully designed. Under his leadership, Furaat installed over 30,000 units, conserving billions of litres of rainwater and creating an enduring legacy of impact.

He became IPA's lifetime member in February, 2017 and was elected as Ahmedabad's Executive Committee Member in 2017 and served the title till 2021. He further became the IPA Hon. Treasurer in 2024.

He was an active and dedicated member who contributed immensely to the growth of the Chapter over the years. His presence and guidance will be deeply missed, not only by the members of the Ahmedabad Chapter but also by colleagues in the National Executive Committee, with whom he shared a close bond.

Apurva Shah, IPA Ahmedabad Chapter Chairman, and his team recall his good deeds with affection:

"He was a core member of our team—calm, humble, and always supportive. A silent yet impactful worker, he offered innovative suggestions and welcomed new ideas with an open mind. His passion for water conservation was evident through his exemplary work on rainwater harvesting and innovative products at Furaat. He stood by the Chapter in every activity and will always hold a special place in our hearts."

Chandra Shekhar Gupta, National Vice President and IPA Founder Member, also expressed sorrow, recalling his valuable contributions to the growth of the Ahmedabad Chapter.

Deeply shocked by his sudden demise, **Gurmit Singh Arora, National President, IPA,** said:

"I am entirely shaken by the passing of Habil ji. I had only visited his office a few months back. He was humble, soft-spoken, and always smiling—ready to accept suggestions with grace. It is difficult to believe that he has left us at the age of just 63. Perhaps God calls back those who serve selflessly. I pray for his noble soul."

The entire **IPA National Executive Committee mourns his sudden passing** and prays for eternal peace to the departed soul. May his memory continue to inspire us, and may his soul rest in peace.

ॐ शान्तिः

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