

## Water Purifiers Unlimited All that you wanted to know



### Do homes really need a water purifier?

*The need to install drinking water safeguards, whether the humble water filter or a perfect water purifier, generally arises only when one feels the heat and scare of news headlines like 'Floods! Drinking Water...Gastro', 'Leptospirosis takes its toll'... or worse, a futuristic threat like 'Bio terrorism...in drinking water'. But the fact is that the alarm bell should ring every fine day because no tap water or ground water is 100 per cent safe.*

Ask about company details and service - key factors to safeguard your health

- Ensure that the product is from a company that thoroughly knows water purification – useful indicator is the number of years of experience and presence in this field.
- Remember, while a purifier conditions or traps impurities, its filtering elements become a storehouse of dirt and disease-causing organisms. Service is required for periodic washing, sanitising and replacement of these filters. An indicator to ensure good after sales service is the size of the service network, and a 24 x 7 help response.
- Get the best value from your product with an Annual Maintenance Contract (AMC). This ensures long term efficient performance of the product.

### Technologies and challenges on the move

For an industry that deals with consumer conveniences as well as health and environmental issues, the challenge for new products is to keep simple, no matter how complex the technologies may be. It's easy to do this when the basic claim is to remove bad taste or odour or to soften, but today consumers expect much more than this - they expect products to address their health concerns as well as wastage of water, added minerals in the product water, and sanitising of the purifier system.

Emerging water purification technologies to address these expectations are:

EDI based Water Purifiers that perform like RO purifiers with respect to removal of germs, harmful chemicals and excess salts. A typical purifier system comprising an electro-deionisation block in combination with sediment filtration and a BAC filter is at an advanced stage of commercialisation. These purifiers have low waste water (reject water), nearly one-tenth the water wasted by RO. They are on-line systems with no storage tanks, and also have an option for taste adjustment of purified water.

Water Purification Anti-microbial Media composed of silver ions on zeolite or on an exchange resin as the carrier media. This media ensures the long lasting release of silver as the active anti-microbial ingredient to sanitise pre-filters and also to disinfect drinking water. Besides food, apparel and consumer products, the manufacturers

of this media have narrowed down on the vertical segment of water treatment.

Self Sanitising Home RO - Purifier that automatically sanitises all the filter elements and storage tank periodically and also keeps water stored in bottle fresh and bacteria free for several hours. This feature gives the filter elements and the RO elements freedom from bio-fouling and hence extends product life. Ion Exchange (India) Ltd. has spearheaded this proprietary feature in select models.

Ozone-based On-line Water Purifiers and Pure Watermaker from Atmospheric Moisture are some of the other emerging technology products appearing on the shelves.

### Some useful abbreviations

TTHM - Total trihalomethanes, a by-product of drinking water disinfection.

HAA - Haloacetic acids, a by-product of drinking water disinfection.

Bacteria - A unicellular micro organism of size around 0.22  $\mu$ . 0.5 $\mu$ , can be seen using a microscope.

Virus - A unicellular micro organism of size around 0.01 $\mu$  -0.1 $\mu$ , can be seen only through electron microscope.

Pathogen - Disease causing organism.

BAC - Bacteriostatic Activated Carbon.

UV Dosage - UV dose is the product of ultra violet light intensity and exposure time expressed in mJ/cm<sup>2</sup>. (254 nanometers wavelength & 40 microwatts energy recommended for drinking water).

SRCD - Sustained Release Contact Disinfectant.

IS 10500 - Indian standard 10500 for non-packaged drinking water.

USEPA - United States Environment Protection Agency.

### More Information - A Click away!

Enjoy an animated presentation on what each kind of purifier can do for you. Log on to [ieiknowledgepark.com/Employee Corner/Train Yourself/Comparison - drinking water purification methods](http://ieiknowledgepark.com/Employee_Corner/Train_Yourself/Comparison_drinking_water_purification_methods)

### Get trained!

Get yourself informed on drinking water using an interactive animation CD:-  
 Contact [kirti.itagi@ionexchange.co.in](mailto:kirti.itagi@ionexchange.co.in)

### Consider this

- Municipal water treatment plants are miles away from our homes.
- Treated water from municipal plants invariably gets contaminated with sewage during distribution.
- Chlorine introduced during disinfection process by treatment plants can form harmful disinfection by-products such as TTHMs (total trihalomethanes) and HAAs (haloacetic acids) in drinking water. These chemicals are known carcinogens or cancer causing.
- How clean are underground and overhead tanks of apartments and residential complexes?
- Municipal water treatment may be just good enough to take away germs of water borne diseases but cannot remove harmful chemicals introduced in lakes or in pipelines during distribution.
- Ground water contamination with industrial chemicals.
- Does a water purifier ensure complete removal of harmful chemical, excessive salts and all germs from drinking water?

Ask yourself once again! Do I really need a water purifier? The answer is obvious.

### What the world around you thinks about this ...

Millions of people worldover choose to bring safeguards for drinking water right into their homes. Trust in local water distribution agencies is very limited and hence every home aspires to have the right water purifier at the Point of Entry (POE) to their home or at the Point-of-Use (POU) on the tap.

With the wide varieties of bottled water seen on shelves, people are keenly aware of the importance

of good drinking water and they would like to provide protection right at home.

The consumer is getting smarter; consumers are willing to take responsibility for their own wellbeing, they know that distribution of clean water is a difficult task, and are therefore ready to accept the responsibility and not expect government to do everything for them

### Which is the right purifier for me?

There are several water purifier products on the shelves or knocking at your door. Guard against ignorance while choosing a water purifier. Beware of deceptive sales talk and false claims about products.

### Understand how various kinds of purifiers work

**Storage Type Candle Filters:** The filter candles have pores that are just good enough to trap dirt, mud and certain bacteria. But unfortunately these deep pores become the breeding grounds for millions of bacteria which unload someday into your glass of water and cause symptoms of diarrhoea.

An examination of numerous candle filters with claims of removal of bacteria and other pathogens shows that most filters give pathetic performance and fail the test.

*What they do:* Candle filters only make water appear visually clean and clear. They do not remove disease-causing germs, harmful chemicals and excess salts from water.

**Storage Type Candle Purifiers:** If your concern is only germ-free water then candle purifiers can satisfy your primary health concern and your pocket.

Storage type purifiers are used when tap water or continuous water is not available, hence one can pour the water to be treated into the upper container of the filter for purification.

Storage type purifiers are available as counter top models. These purifiers not only filter out particles and mud but also bacteria and viruses.

Most good candle purifiers include stages of micron filtration, disinfection using either iodide based resin media or chlorine based media, and bacteriostatic carbon (BAC) filtration. Insist on having a BAC filter at the last stage. The candles need to be washed or replaced regularly to keep the media effective.

*What they do:* Candle purifiers offer reasonably clear water, free from disease causing bacteria and viruses. They do not remove disease causing harmful chemicals and excess salts from water.

**On-line Purifiers:** Unlike storage type water purifiers, on-line water purifiers give purified water instantly. These purifiers are suitable where tap water with adequate pressure is available. On-line purifiers are available as counter top, wall mounted and under the counter (UTC) models. These purifiers may be Ultra Violet (UV), halogenated resin or Ultra Filtration (UF) based.

**UV Purifiers:** A UV purifier may incorporate stages of sediment filtration, carbon filtration and an ultra violet (UV) lamp. The UV light energy works by damaging the DNA structure of the micro-organisms; UV rays do not kill germs but only inactivate them and these micro-organisms can reactivate under favourable conditions, allowing them to multiply and cause diseases.

A reliable and good UV purifier needs to have the following:

- UV dosage monitor – A device to check and warn on the UV dosage (expressed in  $\mu\text{W}\cdot\text{sec}/\text{cm}^2$ ) to ensure inactivation of the target organisms.
- Water conditioning pre-filter – Contaminants in the inlet water absorb or block UV light making the UV rays ineffective. These contaminants have to be effectively filtered.
- A flow control device – to ensure correct flow, since UV dosages are calculated for a given flow.
- Built-in voltage stability – A stabilised power source to ensure correct UV light dosage

from the UV tube light.

- The pre-filters need regular replacement or washing; a loose pre-filter or a dying UV lamp will be ineffective in purifying water.

*What they do:* UV purifiers primarily inactivate disease-causing organisms in water. They do not remove disease causing harmful chemicals and excess salts from water.

**Halogenated Resin-based Purifiers:** They work by releasing trace elements of halogens (generally iodine or chlorine) in water to kill bacteria and viruses completely. Purifiers from the Zero B range use SRCD resins.

A good resin-based purifier needs to have:

- Adequate pre-filtration.
- A device to indicate or cut off the purifier when cartridge life is over.
- A BAC filter to remove remaining traces of iodine, colour and bad odour from the inlet water.
- The purifier cartridge needs periodic backwashing and replacement to make the purifier effective.

*What they do:* Halogenated resin-based purifiers remove disease-causing organisms from water. They do not remove harmful chemicals and excess salts from water

**UF based On-line Purifiers:** Although this emerging technology was available a few years ago primarily for industrial applications, now the scaling down of the technology into compact self contained POE systems has changed the equation. A typical purifier may have the following stages - a micron filter, BAC filter and UF filtration.

The hollow fibre membranes resemble strands of spaghetti with hollow pores. The surface of the fibres containing millions of micropores (0.02 micron nominal) serves as a physical barrier to turbidity and pathogens. Thousands of such tough, flexible and cleanable fibres provide adequate surface area for an on-demand flow.

Adequate pre-filtration, timely backwashing or flushing is the key to efficient working of an on-line UF system.

A membrane based system physically blocks all organisms while a UV purifier only inactivates the disease-causing organisms.

*What they do:* UF purifiers, besides offering high clarity water, separate and throw out all disease-causing organisms and some harmful chemicals from the treated water. They do not remove all harmful chemicals and excessive salts from water.

**Reverse Osmosis (RO) based Purifiers:**

If your concern is complete removal of all known disease-causing bacteria, viruses, harmful chemicals and excessive salts from water, then turn towards the RO purifier.

This is the big daddy of water purifiers. The reason – it separates and throws out all impurities from water.

A good home RO system comprises the following stages - a sediment micron filter (5–10 microns), a BAC filter, and a RO element followed by a back-up purifier as the last stage.

The RO membrane is the key element of this system – a spirally wound flat sheet membrane with pores of sizes as small as 0.0001 microns (also mentioned as molecular weight cut-off) virtually blocks all contaminants and allows water molecules and essential amounts of salts to seep through.

Insist on having the pre-filter outside the unit to remove primary muddiness from the water as this will enhance the product life. Other features such as automatic flushing and automatic tank level control enhance the life of the membrane.

The only limitation of a RO purifier despite all its good points is:

- The wastage of water in the reject line which may vary between 60–80% for a typical model.
- The storage tanks require periodic cleaning to prevent breeding of slime (bacteria) and other organisms coming from the external environment; specifically the hydro-pneumatic (HN) tank which is a sealed unit.
- The RO purifier is a service intensive product; it requires periodic cleaning or replacement of the filters to protect the life of the expensive RO membrane and to sanitise the storage tanks. Hence ensure availability of a good service network with the seller.

*What they do:* The purified water tastes good and is free of excessive salts, harmful chemicals and disease-causing organisms.

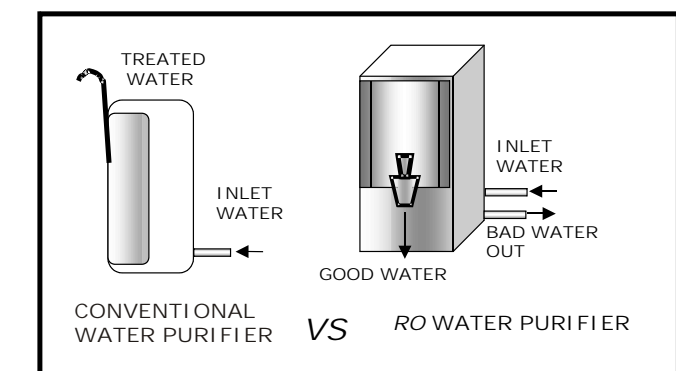
RO Purifiers - Various Versions

Home RO purifiers are available as:

- Counter top units
- Wall mounted models with a built-in storage tank.
- Under the counter models with a pressurised HN tank.

## RO Purifiers - The big difference!

Conventional purifiers have an inlet line and a purified water line. The inlet water comes out as treated water after partial contaminant removal and some conditioning and with the same salty hard taste. This often makes consumers insecure about whether the water coming out is properly treated.



A special feature of most membrane based purifiers is that the inlet water is split into a good water line (permeate water line) that has assured purity and a bad water line (reject water line) that is thrown out.

Test protocols make it mandatory to have a back-up purifier after an RO (either a halogenated resin carbon stage or a UV) to protect the user against accidental puncture or failure of the RO membrane.

## Before buying a purifier ask questions

Being aware of popular brands of water purifiers in the market is not enough. Ask these questions before buying a purifier:

- Is the product tested and certified from an accredited laboratory for the basic claims of removal of disease causing germs? The purified water needs to meet the drinking water standard (IS 10500 desirable limits) for India.
- Is the product tested and certified from an accredited laboratory for the claim of complete removal of all organisms, harmful chemicals and for any specific chemical like pesticide, arsenic etc. Does the product meet other international drinking water standards (USEPA - maximum contaminant level)