

eSpring™ Product Guide



Why a Product Guide?

The purpose of this Product Guide is to provide you with a comprehensive overview of the eSpring™ Water Purifier. In order to share your knowledge of this product with others, you need to know more than features and benefits; you need to know how it works, what makes it superior to other systems, and why people should buy it. You'll find all of that information and more in this Product Guide, from product demonstrations to technology comparisons to magazine articles and more. In short, everything you need to know to successfully share the eSpring Water Purifier story.

We encourage you to carefully read through this Guide to see all that it offers you, and then use it often for reference. You can also print out (online) or copy sections to give to others, too. We think you'll find it to be a very valuable and educational tool.

Thank you!



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Why eSpring?

A superior product to meet a growing need.

We have long been recognized as a leading producer of drinking water treatment systems. Since 1984, our company has sold more than 3.5 million water treatment systems. To take advantage of our strong market position, We now offer the eSpring™ Water Purifier, part of the growing brand of water-related products, and a system that performs better than any unit we have ever offered.

eSpring: The World's Best Source of Water.

As the first in-home system to combine ultraviolet light technology with a patented multi-stage carbon-block filter, the eSpring Water Purifier provides you with more than clean, clear, delicious water. It also gives you peace of mind knowing that no other in-home system is certified to effectively remove more potential health effect contaminants. So you can be confident that the water your family drinks is as clean as it can possibly be, and that it has met the highest standards for clean water quality.

Other systems treat drinking water. eSpring purifies it.

eSpring™ is better than tap water.

- Destroys more than 99.99% of waterborne, disease-causing bacteria and viruses in drinking water.
- Effectively removes more than 140 potential health-effect contaminants including lead, mercury, radon and protozoan parasites.
- Reduces potential carcinogens that can be found in drinking water.
- Is certified to meet three separate international standards of water quality by NSF International.
- Dramatically improves the taste, odour and clarity of water.
- Does not remove beneficial minerals such as calcium, magnesium, and fluoride.

Easy to use features add more benefits.

The eSpring Water Purifier also offers many features you'll appreciate:

- It installs easily.
- It works well at all household water pressures, from very low (15 psi or 103.4KPa) to very high (125 psi or 862KPa).
- It is more convenient (and less costly) than bottled water.
- It has a high flow rate to fill your glass or container quickly.

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Water and Wellness: Why Water Is Good for You.

We all know water is essential to live. But most of us are not aware of the crucial role water plays in virtually every organ and function of our bodies. Water does more than sustain life. Good water can actually improve our health, our fitness, and even our appearance.

What happens without water?

We can go for weeks at a time without food, but we will die in a matter of days without water – even faster in warm climates where perspiration causes us to lose water quickly. Going without water can have disastrous results:

- A 1% deficit in the body's water creates thirst.
- A 5% deficit causes a slight fever.
- A 10% deficit and the tongue swells, kidneys start to fail, and the muscles go into spasms. Walking becomes impossible.
- At or before 20% loss, skin cracks, organs grind to a halt, and death occurs.

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What water does in the body

Water is the single most important nutrient the body takes in; every cell, tissue, and organ needs water to function properly:

- Water transports essential water-soluble vitamins and nutrients (such as protein, minerals, vitamins B & C) that cells, tissues, and organs need to function properly.
- Water moistens our eyes, mouth, and nasal passages, helping organs perform properly and keeping us physically comfortable.
- Water helps regulate body temperature, keeping the body cool when it is hot and insulating it when outside conditions are cold.
- Water allows the body's cells to retain their structure and carries oxygen to the cells.
- Water cushions the organs and acts as a shock absorber to minimize stress and damage to organs.
- Water provides optimum lubrication for joints.
- Water flushes kidneys to rid the body of toxic substances.
- Water carries solid waste from the body.
- Water balances electrolytes (minerals such as potassium, sodium, and chloride) that help regulate body temperature and control blood pressure.
- Water is a valuable source of trace minerals, such as manganese, magnesium, cobalt, and copper.

Why eSpring? contnued...

- The replaceable filter/cartridge is designed to meet the average cooking and drinking water needs of a family of six for one year or 5,000 litres (1,320 gallons), whichever comes first.
- Replacements are simple and require no tools.
- The base unit is constructed of durable, high-impact plastic.
- It comes with a two-year limited warranty on parts and labour, and a satisfaction guarantee.
- It has a smart, sleek, space-saving design.
- It is designed, assembled and manufactured at our World Headquarters in the USA.

Technology gives added performance:

- The UV bulb switches on only when you turn on the tap, so water always flows cold. And because the bulb is not on all the time, you do not waste energy.
- A patented monitor display lets you know the system is functioning properly.
- Electronic "smart chips" provide worry-free monitoring and let you know when replacement is required.
- The monitor automatically resets itself when replacement is complete.
- Requires a regular grounded outlet.

The eSpring™ Water Purifier is truly the first of its kind in many respects:

- the first in-home system to combine a patented carbon-block filter with ultraviolet light and an electronic monitoring system
- the only system documented to effectively remove lead, protozoan cysts, THMs and more than 140 contaminants.
- the first system in the world to meet NSF/ANSI Standards 42, 53 and 55 – three internationally recognized water quality standards (See page 70).
- certified by NSF International for the reduction of more health-effect contaminants than any other UV carbon-based system.
- the first system to use wireless inductive coupling technology to increase safety and reliability.



Water and Wellness: Why Water is Good for You.contnued...

Drinking water can improve your health and well-being.

- Water helps maintain blood volume, which maintains your energy.
- Proper hydration improves your concentration and reaction time, especially during exercise.
- Water increases the number of calories you burn during regular daily activities.
- Water can help lessen the stomach distress concentrated medicines can cause.
- Water helps rid the body of excess sodium, which can cause fluid retention.
- Studies* show links between high water consumption and reduced risk of minor ailments, such as colds, constipation, and urinary tract infections, to more serious conditions, including kidney stones and bladder cancer.
- Frequent water intake prevents dehydration among the very young and old. (Dehydration is one of the leading causes of hospital admissions for those over 65 years old.)
- Water may help you lose weight and improve your appearance.
- The body often mistakes thirst for hunger pangs, so people often eat snacks when their bodies are thirsty, not hungry. Studies show that people who drink large amounts of water usually feel less hungry.

- Water gives you more energy during exercise and increases the calories you burn during exercise.
- Studies indicate that water may also help reduce fat deposits.
- Water helps hydrate the skin, leaving it smoother, softer, more supple, and more wrinkle-free. (Water reaches the skin last; if the body doesn't get enough water, the skin will feel the effects sooner than any other organ.)

How much water you need?

Your body needs water even if you do not feel thirsty.

- While individual needs depend on many factors, as a general guideline, the average person should drink between 1.5 and 2.5 litres of water (about 1.5 – 2.5 quarts) every day. (Check out our Water Intake Calculator at www.espring.com to find out more about how much water you should drink based on your exercise habits and your current weight.)
- Beverages with caffeine – coffee, tea, and colas – actually dehydrate the body, robbing the organs by using more water to process than they provide.
- Alcoholic beverages also cause dehydration.
- Juices and sports drinks quench the body's thirst, but they may also provide unwanted calories.

A variety of sources were used for this data, including the Center for Disease Control, the Water Quality Association, the American Cancer Society, the American Dietetic Association, and the American Heart Association. (USA)

Eight Reasons to Choose the eSpring Water Purifier

The multi-billion dollar home water treatment market is growing at a double-digit rate. And the eSpring™ Water Purifier meets the growing demand for quality water. It offers a superior combination of performance, convenience and value for your customers - and high PV/BV for you.

The following are eight reasons why we believe the eSpring Water Purifier is the best on the market today:

1: Cleaner, clearer, better-tasting water.

The most obvious benefit of the eSpring™ Water Purifier is the dramatic improvement in water taste, odour and clarity. It's something customers immediately notice, understand, and appreciate.

2: Better water quality.

Many systems improve the way water looks and tastes. But very few also reduce potentially harmful contaminants, and even fewer effectively eliminate waterborne bacteria and viruses. The eSpring Water Purifier does both. It effectively removes more than 140 different contaminants - and destroys more than 99.99% of waterborne bacteria and viruses.

3: Proven performance.

NSF International is a not-for-profit organization recognized worldwide as the leading independent testing and certification authority on water treatment systems. NSF International has tested and certified the eSpring Water Purifier for the reduction of more health effect contaminants than any other UV/carbon-based system it has certified.

4: Unique, advanced technology.

The eSpring Water Purifier is the first system to combine the best water treatment technologies available: carbon block filter, UV light, and electronic monitoring. The carbon filter/cartridge reduces particulates and more than 140 contaminants; UV light destroys more than 99.99% of waterborne microorganisms, and the electronic monitoring system lets users know when it's time for replacements. It is the combination of these technologies that makes our system so unique.

5: Backed by years of research.

The eSpring Water Purifier is the result of 20 years of research in water treatment technology. It was designed and developed by eSpring engineers and scientists, who have more than 270 water treatment patents worldwide, granted or pending.

6: Greater convenience.

Unlike bottled water or jug-type filters, the eSpring Water Purifier can provide all the daily drinking and cooking needs an average family requires - on demand, directly from the tap.

7: Less maintenance.

Some filters and treatment systems require filter changes every month, if not more frequently. However, the eSpring Water Purifier can provide enough water for a family of six for a full year - a total of 5,000 litres (1,320 gallons) -- before a cartridge replacement is needed.

8: Greater value.

Although the eSpring Water Purifier provides superior performance and convenience, its cost of treatment is actually less than many other systems.

Product Information

eSpring Features and Benefits

With its unique carbon block filtration and UV technology, the eSpring™ Water Purifier offers a combination of features and benefits no other treatment system can fully match.

Feature	Benefit
Patented multi-stage activated pressed carbon block filter.	Effectively removes more than 140 contaminants, including lead and mercury (more than any other carbon-based system), and reduces particulates as small as 0.2 microns. Improves water taste, odour, and clarity.
Ultraviolet lamp.	Destroys more than 99.99% of disease-causing waterborne bacteria and viruses to further improve water quality and safety.
Certified under NSF/ANSI Standards 42, 53 and 55.	Independent, third party confirmation from the world's leading experts on water treatment; provides the highest level of credibility for eSpring performance claims to enhance customer peace of mind.
Smaller, more compact unit with contemporary design.	Takes up less space for greater convenience; stylish appearance increases product's consumer appeal.
Carbon/UV filter lasts for 5,000 litres (1,320 gallons) or one year.	Great convenience with fewer cartridge changes; greater value with lower overall cartridge change costs, and lower cost per gallon.
Electronic smart chip in carbon/UV filter cartridge.	Tracks both time and gallons used to provide consumers with accurate indication of remaining filter life and peace of mind; system automatically resets itself after filter replacement.

Feature	Benefit
Inductive electronic coupling eliminates hard-wire connections between UV lamp and unit (patented feature).	More reliable operation; eliminating protruding electrical connection makes cartridge more durable and easier to install or remove.
"Instant on" UV lamp with electronic ballast.	Will not heat tap water when unit is not in use; eliminates hot water discharge after unit has been unused for long periods.
Light emitting diode (LED) display panel.	Uses easy-to-understand icons/graphics to display remaining filter life and system status.
Unit can be installed on the countertop or under counter.	Installation flexibility allows customers to place unit in the most convenient location.
Self contained electronics module.	Allows consumers to easily replace if necessary via call to Technical Hotline.
Easy to install.	No special tools needed (1).
Tubing length can be adjusted to desired length.	Customer can cut tubing to match need of installation.
Compact diverter valve.	Compact unit easily attaches to most faucets.
Comprehensive product warranty.	Warranty provides peace of mind.
Unit shipped pre-assembled.	Allows shipment of unit with carbon/UV filter already in place; reduces package size and packaging materials.
Exclusive patented product.	Covered by 7 U.S. patents with others pending.

Note (1): Depends on kitchen setting and type of kit used.

eSpring Product Standards NSF International Certification

There are many water filtration systems on the market today, and naturally, almost all claim to do a good job. But how does a consumer know which of these claims are valid? Is there a single, universally-accepted set of standards for treatment systems that allows consumers to compare the performance of one system to another?

Yes, there is – the standards required for NSF International certification. (For further information about NSF International, please refer to page 70 or visit their Web site at www.nsf.org).

The eSpring™ Water Purifier is the first system on the market to meet three major NSF water quality standards.

What does it mean when a system is NSF International certified?

To become an NSF-certified unit, a water treatment system is tested for more than its ability to trap contaminants. It must also fully meet five sets of criteria:

1. Certified contaminant reduction claims must be proven through testing performed by NSF International at its laboratories. **The eSpring Water Purifier has done this.**
2. The system must not add anything harmful to the water, and pass rigorous extraction testing for water contact materials. **The eSpring Water Purifier passed it.**
3. The system must be structurally sound and be designed to meet plumbing requirements such as pressure fluctuations. **The eSpring Water Purifier meets or exceeds those requirements.**
4. Advertising, literature and labeling must not contain any false or misleading statements. **All eSpring communication materials are verifiable and supportable.**
5. Materials and manufacturing process must be consistent and subject to annual review. **The eSpring materials and process meet these requirements.**

How often are products retested by NSF International?

Certified products are subject to a 5-year retest program.



Why are the NSF/ANSI standards pertinent to the eSpring Water Purifier?

NSF/ANSI standards provide the most comprehensive and stringent standards for judging the performance of water systems anywhere in the world.* The eSpring™ Water Purifier is the first in-home water system certified by NSF International to meet three major water quality standards:

Standard 42 - Aesthetic Effects: Tests systems for their ability to reduce drinking water contaminants that affect the taste, odour, and clarity of drinking water.

Standard 53 - Health Effects: Tests systems for their ability to reduce a wide range of drinking water contaminants, including lead, asbestos, VOCs and pesticides. Standard 53 is much more difficult to meet than Standard 42.

Standard 55 - Ultraviolet Microbiological Water Treatment: Standard 55 applies to systems that use ultraviolet light for microbial control. Very few systems meet Standard 55.

*Please note: There are many parts and sections within the NSF International standards. For a complete listing and comparison with other systems, or to learn more, please visit the very informative NSF International Web site, www.nsf.org. It covers a wide range of topics concerning public safety.



eSpring Performance Claims

Amidst all the confusing claims made by dozens of water treatment systems, which can consumers believe? In our opinion, based on 20 years of water treatment experience, the NSF/ANSI standards are the most accurate, complete and impartial indicators of actual system performance.

When a water treatment system has been certified under these standards by NSF International,* it has been tested by an impartial, independent third party organization that is recognized worldwide as a leading expert in drinking water treatment. As a result, you can have complete confidence that NSF International-certified performance claims will accurately reflect a product's real world performance. So, our customers can feel confident the eSpring™ Water Purifier will perform as claimed when it is used in their homes – and that they'll remain satisfied with its performance throughout the life of the cartridge.

*Please see page 70 for more information on NSF International listings.

Performance Claims

The following section provides a listing of eSpring Water Purifier product claims. For a description of the laboratory testing that was conducted to document these claims, please refer to page 78.



eSpring™ Performance Claims

1. Effectively removes chlorine.
2. Effectively removes chloramine.
3. Improves taste, odour, and clarity of water.
4. Improves taste of beverages made with filtered water.
5. Effectively removes more than 140 organic contaminants from water, such as volatile organic compounds (VOCs), pesticides, and trihalomethanes.
6. Effectively removes more than 13 disinfection by-products.
7. Effectively removes more than 30 pesticides and pesticide by-products.
8. Effectively removes vinyl chloride.
9. Effectively removes Microcystin LR, the most common algae toxin.
10. Effectively removes particulates down to 0.2 microns, including asbestos, sediment, dirt, and scale.
11. Effectively removes lead in drinking water.
12. Effectively removes mercury in drinking water.
13. Effectively removes radon and radon decay products in drinking water.
14. Effectively removes waterborne parasites larger than 3 to 4 microns.
15. Does not remove beneficial minerals, such as calcium, magnesium, and fluoride.
16. Effectively removes MTBE (Methyl Tertiary Butyl Ether).
17. Ultraviolet light destroys more than 99.99% of waterborne disease causing bacteria and viruses in drinking water.
18. Ultraviolet light destroys Cryptosporidium.
19. The carbon filter will treat drinking and cooking water for 5,000 litres (1,320 gallons) or one year, whichever comes first, enough to meet the needs of a family of 6.
20. Convenient, replaceable carbon/UV cartridge.
21. Attaches to most standard kitchen water faucets.
22. Uses exclusive patented technology. U.S. patents 4,753,728; 4,859,386; 5,017,318; 6,368,504; 5,573,666; 5,529,689; 6,436,299. Additional U.S. and International patents granted or pending.

Please note: Contaminants or other substances referenced in this section are not necessarily in your drinking water. When the filter indicator signals end of life, the filter must be changed to ensure performance.

eSpring Combines the Best Technologies

One of the things that makes the eSpring™ Water Purifier so unique is that it has combined the best water treatment technologies available – pressed activated carbon block and ultraviolet light – and enhanced them with even more features, including electronic monitoring, instant-on operation and “smart chip” technology.

Carbon Filter Technology

Inside the eSpring Water Purifier is an activated pressed carbon-block filter. This patented multi-stage carbon block effectively removes:

- Chlorine taste and odour
- Particulates, improving clarity
- More than 140 possible health-effect contaminants, including lead, mercury, VOCs, disinfection by-products like THMs, and the gasoline additive MTBE.

How it works

Carbon filtration has long been the technology of choice for home water treatment systems, but our patented eSpring carbon filter does much more.

Most health-related contaminants (pesticides and their by-products, VOCs, THMs) contain carbon molecules, and carbon molecules tend to bond together. So contaminants in tap water will tend to bond with the carbon block filter.



Activation increases the carbon surface

We “activate” the carbon through a special heat process that creates thousands of pores. This increases the surface area available to attract contaminants. The carbon is then pressed together to create a fixed carbon block. This increased surface area increases the ability of our filter to attract and “trap” carbon-based contaminants as water passes through the block. Various other organic contaminants also tend to adhere to the porous surface, so the carbon-block filter acts as a magnet for contaminants. No other in-home system reduces more possible health-effect contaminants.

Our patented carbon block filter:

- Traps particulates 300% smaller than the diameter of a human hair.
- Will treat up to 5,000 litres (1,320 gallons) of water in one year – enough for the average family of six.
- Seven patents granted and several pending.

Good nutrients pass through

While most health-effect contaminants are carbon based, many beneficial minerals like calcium, magnesium and tooth-decay-fighting fluoride are not. That means they do not form a bond with the carbon filter; they simply pass through it and remain in the water.

Ultra-violet Light Technology

Ultra-violet (UV) light technology takes the eSpring™ Water Purifier to the next level of in-home water purifiers by doing what carbon alone cannot do: It destroys microorganisms.

How it works

The eSpring Water Purifier's UV bulb, located in the center of the cartridge, delivers up to 80 millijoules/cm² (units of measure) of UV light – enough to destroy more than 99.99% of bacteria and viruses that may be in drinking water.

Wireless connections

Another eSpring technology first – and another patented feature – is the wireless (inductive electronic) coupling used between the UV lamp and the unit. This completely isolates the UV bulb from the power source, the way some cellular telephones are separate from their chargers.

Water always flows cold

Turning on the tap activates a sensor that turns the bulb on instantly. Because the bulb is not on all the time, it does not waste energy or heat the standing water, so water always flows cold.

System is durable

Eliminating hard-wired electrical connections makes replacing the cartridge simple and protects the system, making it more durable.

Smart chip technology

“Smart chips” in the eSpring monitor keep track of the UV lamp and filter life, and an LED display lets you know when the cartridge needs to be replaced.

Monitor Technology

The eSpring™ electronic monitoring system is another of the advanced features that differentiates the system from all others.

It alerts you if there is any problem, if the UV bulb stops working, for example.

It tells you when to replace the cartridge so you always know your water is receiving the full benefit of the eSpring Water Purifier.

It is convenient because it keeps track of these things on its own. It gives you both an audio and visual indication when it is time for a replacement, so you do not have to remember to do it yourself. The monitor resets automatically when a new cartridge is installed. It is so advanced, it automatically “reads” the life of any cartridge inserted, whether that cartridge is new, half-used, or completely used.



Competitive Information and Comparisons

This section compares the eSpring™ pressed carbon block/UV light technology with other technologies on the market.

Comparison With Other Water Treatment Technologies

Method	Description	Advantages	Disadvantages
eSpring Pressed Carbon Block/UV Filter Cartridge.	Water is forced through pressed activated carbon filter. Water is then exposed to ultraviolet light, which destroys waterborne microorganisms.	Effectively removes more than 140 contaminants, including pesticides, industrial chemicals, organic and inorganic compounds, and particulates in sizes down to 0.2 microns. UV light inactivates more than 99.99% of bacteria and viruses. Carbon/UV filter lasts up to 1 year or 5,000 litres (1,320 gallons), whichever comes first. Supplies treated water on demand directly from your tap at 3.4 lpm (0.9 gpm).	Higher initial cost than many alternatives. However, long life and low maintenance costs reduce overall cost of treated water.
Boiling	Water is boiled for 20 minutes to kill potentially hazardous waterborne microorganisms.	Reduces bacteria, viruses and cysts – if water is boiled for a minimum of 20 minutes.	Does not reduce particulates, or many inorganic or organic compounds. Will not improve water taste, colour or odour. Is very inconvenient and time-consuming.

Method	Description	Advantages	Disadvantages
Bottled Water	Can be produced from spring water, mineral water, tap water, distilled water.	Perceived to be higher quality in terms of taste, odour, clarity, microbiological and chemical contamination.	Uncertain quality. Most bottled waters are treated to improve taste and appearance only – and may still contain bacteria, organic and inorganic compounds. Expensive and inconvenient.
Ceramic Filters	Water is forced through ceramic media; the small pores in the media prevent large particles from passing through.	Reduces large particulates. Ceramic filter is reusable after cleaning. Reduces bacteria over short term.	Requires periodic cleaning and disinfection. Does not reduce organics, and/or inorganics contaminants or viruses.
Pitcher-Type/Pour-Through Filters	Granulated activated carbon and/or resin reduces contaminants as water passes through filter.	Improves taste and clarity. Resin may reduce hardness if present.	Filter life is limited – usually one month or less. Jug filters treat limited water volumes and are slow to process. Limited performance claims for organic/inorganic contaminants. Expensive to maintain.
Mineral Pots	Pour-through units that use gravity to trickle water over coral, sand, or similar stone to add minerals to the water.	No installation needed. Adds calcium and magnesium to the water.	Does not effectively reduce bacteria and viruses, organic or inorganic contaminants. Adding other technologies is not very effective due to low efficiency of the pour-through design.
Hollow Fiber	Porous membrane screens out small particulates and bacteria.	Reduces particulates well. Reduces bacteria over short term.	Not effective at reduction of organic or inorganic contaminants, or viruses. Must have chlorine present to be effective; therefore, low efficiency when used with carbon. Over time, carbon prefilter may interfere with fiber performance.

Comparison With Other Water Treatment Technologies, continued

Method	Description	Advantages	Disadvantages
Alkaline Ion Water	Alkaline water is produced by electrolytic water generator.	Is reported to produce water with high pH in small molecular water clusters which is supposed to penetrate into cells more easily.	No controlled clinical studies to prove effectiveness of alkaline water with humans. Cannot effectively reduce chlorine, organic, or inorganic contaminants from drinking water. Produces both alkaline and acidic water streams.
Distillation	Water is heated. Water turns to steam, some contaminants left behind, cools back to water in a separate container.	Reduces chlorine and THMs. Reduces compounds. Reduces bacteria and viruses.	Removes minerals. Generates heat. Slow, often noisy. Concentration of organics with low boiling point, such as chloroform, can be higher in product water.
Reverse Osmosis	Water pressure pushes water through a thin membrane. Contaminants are rejected by the membrane.	Reduces inorganic compounds. Can be designed to reduce organic compounds.	Reduces minerals. Slow. Can be wasteful of water. Not considered an effective barrier against bacteria and viruses. Over time, membrane can become fouled and performance can decline.
Silver Treatment	Silver is mixed with carbon to maintain the advantages of carbon filtration and to control bacteria.	Marginally effective against certain pathogenic bacteria.	With allowable levels of silver, it does not effectively kill or control growth of nonpathogenic (non-harmful) bacteria. Adds silver to water. Not effective against viruses.
Granular Activated Carbon	Loosely packed carbon adsorbs contaminants from water as water passes over granules.	Reduces chlorine. Reduces organic compounds. Leaves minerals.	May "channel," reducing effectiveness. Does not reduce inorganic compounds, bacteria or viruses.

Method	Description	Advantages	Disadvantages
Pressed Carbon Block	Water pressure forces water through a solid block of activated carbon. Contaminants are reduced through physical screening adsorption, or hydrogen bonding as water passes through the block.	Reduces chlorine, THMs and most organic compounds. Leaves minerals. Efficient; no "channeling." Offers depth filtration of particulates as small as 0.2 microns.	Not effective for reduction of most inorganic compounds, bacteria, or viruses.
Ultraviolet Light	Water is guided past intense UV rays.	Destroys bacteria and viruses.	Not effective against carbon based organics or inorganics.
Ion Exchange	Water is passed through bed with resin. Ions are exchanged while counter ion is released (usually chloride).	Effectively reduces nitrates, sulfates and arsenic.	Tends to make water corrosive. Competing ions reduce capacity. Requires regeneration with brine solution.



Questions and Answers

For your convenience, the questions and answers regarding the eSpring™ Water Purifier are categorized by those relating to:

[Pressed Carbon Block Filter](#)

[Ultraviolet Lamp](#)

[Installation and Use](#)

[Competitive Systems and Treatment Technologies](#)

[Overall Product](#)



Pressed Carbon Block Filter

Q. What is activated pressed carbon?

A. "Activated" means the carbon has been processed to create pores within the carbon itself. This increases the carbon's surface area. "Pressed" means the carbon has been compacted into a porous block, using special patented technology. When water comes in contact with the activated carbon, chemicals and particulates are trapped in the pores. The walls of these porous channels will also adsorb (see glossary) various organic contaminants. As porosity and surface area increase, so does the activated carbon's ability to filter contaminants.

Q. Will the carbon filter remove all contaminants?

A. Activated carbon readily bonds to and adsorbs many organic carbon-based compounds such as pesticides and herbicides. It does not have an equivalent removal capacity for inorganic compounds such as iron, lime, nitrates, salt, or soluble heavy metals like chromium or cadmium. The carbon used in the eSpring™ filter has a special distribution of three pore types:

- Macropores are large pores that remove larger compounds (atomic mass more than 10,000 units).
- Transition Pores remove medium-sized compounds with atomic mass around 500 units, such as pesticides.
- Micropores remove small compounds with atomic mass less than 100 units, like THMs.

Q. Why does the filter allow minerals to pass through?

A. The carbon in the filter bonds with organic, carbon-based compounds. Minerals and other inorganic compounds do not have a carbon base. Therefore, a bond usually will not form with the carbon, and the minerals will remain in solution in the water and pass through the filter.

Q. Which inorganic compounds will the eSpring Water Purifier remove?

A. It is possible for a well-designed carbon filter to remove certain inorganic contaminants. Our company has documented that its carbon filter can effectively remove lead, mercury and radon. There are complicated reasons why the eSpring cartridge is effective at removing lead and other select compounds. But in simplest terms, removal results from the limited attraction these materials have to carbon combined with other water chemistry.

Pressed Carbon Block Filter, continued

Our company has evaluated the eSpring™ Water Purifier for the removal of other inorganic materials. But to date, only a few inorganic materials have been certified to meet the strict removal guidelines that have been established. We will not claim removal of any material unless we are certain of its removal at the end of filter life.

In general, any broad claims a carbon filter marketer makes about inorganic compound removal should be questioned. We do not know of any carbon system that is capable of removing a wide range of inorganic materials throughout the life of the filter.

Q. Will the eSpring Water Purifier remove nitrates?

A. No. For the reasons stated above, the eSpring system cannot remove nitrates.

Q. Chlorine does not have a carbon base, yet the eSpring Water Purifier removes it. How is this possible?

A. Chlorine is one of the few exceptions to the carbon-based rule. Chlorine reacts with the carbon filter surface and is converted to chloride. This reaction eliminates the chlorine and its offensive taste and odour. The level of chloride – which is tasteless, odourless and not known to present any health risks – is less than 1% of that found in a typical glass of water, and less than 0.1% of the amount ingested in a normal diet during a typical day. To a consumer, the elimination of the chlorine taste and odour is key. The chloride level is insignificant and should not pose any concern.

Q. Do carbon filters breed bacteria?

A. If there are bacteria present in the incoming water, they may grow in a carbon filter overnight, or during periods of inactivity. This is true for all carbon filters on the market – including those treated with silver. The eSpring Water Purifier uses ultraviolet light to destroy any bacteria present in water after it leaves the carbon filter.

Q. I have heard that some ceramic filters kill bacteria. Is this true?

A. Some ceramic filters may remove some specific bacteria for a short period of time. However, this removal becomes very unreliable the longer the filter is used. Whenever a filter marketer makes a claim like this, ask for documented test results showing removal capability at the end of the filter's rated life.

Q. What is the carbon block filter's non-woven prefilter made of?

A. Unlike cloth fabric, which is made of woven fibers, non-woven fabric is produced as a single sheet or layer. The non-woven material used in the eSpring™ cartridge is a synthetic polymer material known as polypropylene. Polypropylene is inert – which means it will not chemically react or decompose during the life of the filter.

Q. Why does a newly-installed filter discharge treated water that contains black particles?

A. This is normal. Those black particles are carbon dust left from the filter manufacturing process. Simply allow the water to flow, and the dust will be rinsed away in a few minutes. Besides, allowing water to initially flow for several minutes will thoroughly wet the filter and increase its adsorption capabilities.

Q. Does the eSpring Water Purifier change water pH?

A. Yes, initially. The carbon activation process leaves an alkaline surface on the carbon that is similar to baking soda. This alkaline surface raises the pH of water that initially passes through the filter to the 9-10 range. This pH shift is well within the acceptable range for drinking water. After approximately 58 litres (15 gallons) have passed through the filter, the pH level drops to about 8.5. After 190 litres (50 gallons) have passed through, water pH is between 7 and 8, nearly identical to untreated water.

Q. My treated water has white particles or flakes floating in it that are not present in my untreated water. What are they?

A. The primary cause for white particles in treated water is water hardness. Treated water may have a slightly higher pH than untreated water. This can cause dissolved calcium and magnesium – beneficial minerals – to precipitate and form white or gray flakes that sink to the bottom of the container. These particles generally appear shortly after the installation of a new filter in hard water conditions. Temperature may also be a contributing factor.

Q. Why do calcium and magnesium precipitate more often when boiling treated water than untreated water?

A. Calcium and magnesium, the water hardness minerals, become less soluble as temperatures increase. An increase in water pH – which occurs during the eSpring purification process – can also cause minerals to precipitate. When you combine these two factors by boiling eSpring water, the precipitation is more likely to occur. (In addition, freezing water also causes minerals to precipitate – which is why white specks can sometimes be seen in ice cubes made with eSpring water.)

Pressed Carbon Block Filter, continued

Q. Why does a surface film sometimes form on coffee or tea made with treated water?

A. Scientists who have studied this phenomenon have found it is caused by a reaction of the calcium in hard water and natural compounds in coffee and tea. Since treated water may have a slightly higher pH, this makes the reaction more likely. This problem only occurs in hard water.

Q. It has been a year since I installed my eSpring™ Water Purifier, and the flow rate has not declined. Do I still need to replace the cartridge?

A. Yes. Flow rate is primarily a measure of the physical particulate removal properties of your filter. If your water has high concentrations of solid particulates, the filter may clog before one year, reducing flow. If your water has a low solid particulate level, the filter may not clog for several years. However, filter life is based both on physical removal properties and chemical adsorption removal. Beyond one year, we cannot guarantee the filter will still remove the many contaminants that require chemical adsorption. Since these contaminants are often tasteless and odourless, the only certain way to assure your cartridge will continue to remove them is to replace the cartridge when the system's monitor indicates.

Q. Can the contaminants that build up inside the carbon filter contaminate water coming out of the system?

A. As long as the filter is properly used and replaced as recommended, this is not an issue.

Q. If only one person uses the system, can it go longer than one year without carbon filter replacement?

A. No. To maintain the performance claimed and documented by our company, the cartridge must be changed every year – regardless of the amount of water treated. Research has shown that large compounds are initially removed by large pores, but through time will diffuse and begin to plug several of the small pores. This reduces the number of the small pores available to capture the small compounds, and our capacity to remove the small compounds (THMs) is reduced. This diffusion of large compounds and plugging of the small pores occurs over time and is not just dependent on the number of litres filtered. So, to assure that our filter continues to remove the smallest compounds we say it does, it needs to be replaced at least once a year regardless of the number of litres filtered. If it is not, the small compounds may not be filtered out.

Q. Will one end of the carbon block filter be used up faster than the other end?

A. No. That would only happen if water flow was from one end of the filter to another. The eSpring™ Water Purifier is designed so that water flows radially inward from the outside along the entire length of the filter. This means that contaminants are dispersed evenly throughout the filter.

Q. How do I dispose of a used carbon filter?

A. Contaminants that are adsorbed into the carbon block filter are tightly bonded to the carbon, and will not be released back into the environment, so filter can be disposed of along with normal refuse. The UV lamp contains a small amount of mercury, similar to fluorescent lamp, and should be disposed of according to local regulations.

Ultraviolet Lamp

Q. What is ultraviolet light? Does it make water radioactive?

A. It has been conclusively proven that the ultraviolet light used in the eSpring™ Water Purifier is safe for use in your home. Ultraviolet (UV) light is a form of radiant energy, similar to visible light and radio waves. Like these other forms of radiant energy, UV energy is emitted – or “radiates” – from a source and travels at the speed of light through air and space. For this reason, any form of radiant energy may be referred to as “radiation” – whether it comes from the sun, a light bulb, or the UV lamp in the eSpring Water Purifier.

“Radiation” is not synonymous with “radioactivity.” Radioactivity refers only to materials that emit nuclear radiation, such as uranium. There are no radioactive materials inside the eSpring Water Purifier.

Q. Is ultraviolet light commonly used to treat water?

A. Yes. UV light was first used to treat water in 1919, and is well-recognized as an effective method for treating water without the use of chemicals. It is often used by food processors, beverage companies, bottled water suppliers, pharmaceutical manufacturers and others to treat water used in their production processes.

Q. Can water accidentally reach the UV bulb and damage it or the unit?

A. No. The UV bulb is completely isolated from the water path.

Q. Is the cartridge used in the eSpring Water Purifier an exclusive design?

A. The design of the carbon/ultraviolet cartridge of the eSpring Water Purifier is exclusive and has 7 patents (see page 59).



Installation and Use

Q. Does the eSpring Water Purifier reduce a water tap's flow rate?

A. After installing an eSpring™ Water Purifier, the flow rate for unfiltered water will remain unchanged. However, filtered water will flow at a maximum rate of 3.4 lpm (0.9 gpm). This lower flow rate provides adequate contact time between the water, the carbon particle filter, and the UV lamp to assure proper treatment.

Q. Is there a direct relationship between incoming water pressure and flow rate?

Which is better, low pressure/flow or high pressure/flow?

A. There is a direct relationship; low pressure will result in low flow. However, the difference in particulate removal performance between the low and high pressure limits of the system is insignificant. Lower pressure would provide slightly better removal due to longer contact time. The diverter and/or auxiliary faucet valve has a built-in flow controller to limit the maximum flow rate.

Q. Why should the unit be operated for 30 seconds after periods of inactivity?

A. If the unit has been inactive, bacteria could grow in the water present within the outlet tubing and diverter. A 30 second flush clears all this water out of the system, replacing it with water treated by the UV lamp.

Q. Does water treated by the eSpring Water Purifier require boiling?

A. No. Boiling is intended to destroy harmful bacteria. The eSpring Water Purifier destroys more than 99.99% of potentially harmful waterborne organisms, totally eliminating the need for boiling.

Q. What will happen if I run hot water through the eSpring Water Purifier?

A. It is unlikely that running hot water through the eSpring Water Purifier will cause any physical damage. However, cold water is recommended for other reasons. The activated carbon's efficiency is greater with cold water than hot. Tests have shown that optimal removal and adsorption efficiency occur when the water is at an average 25° C temperature. Higher temperatures will reduce filter efficiency. Contaminants remain bonded to carbon in cool water. When exposed to hot water, some difficult-to-remove contaminants may detach from the carbon and enter the treated water stream. Finally, the use of hot water may cause the structural integrity of the unit to be compromised.

Installation and Use, continued

Q. Are there conditions in which you should not use the eSpring™ Water Purifier?

A. Yes. Power outages, boil advisories or when water has been deemed not-potable. After boil order, call your local public health department/water supplier to determine safety.

Q. Does the location and installation of the unit affect its performance?

A. As long as the unit is positioned upright, it will perform properly, whether it is installed on a counter or under a counter. When installing the unit, carefully follow the installation instructions in the Owner's Manual.

Q. What should I do if the Water Purifier does not fit my customer's tap?

A. The diverter valve and adapters included with the system are designed to fit nearly all taps in your market. However, a customer may have an unusual tap design that will not work with the adapters. Call customer service to determine if there is a special adapter available. In these circumstances, if one of the special adapters does not work, we recommend that the customer use the under-counter mounting option, if possible. Another alternative is to have the customer install a new faucet. If the customer is unwilling to do the above options, the system cannot be used in the household.

Q. What effect would voltage surges have on the Water Purifier's electronics?

A. The system design is very resistant to voltage spikes.

Q. Is the Owner's Manual referring to the inside or the outside of the housing when it states, "do not use vegetable oil, petroleum jelly, or other lubricants, ammonia, alcohols, acids or strong cleaning solutions"?

A. The main concern is the housing. Components could be weakened by these strong solutions over time and the solutions may cause discoloration.

Q. Can treated water be stored?

A. Yes. To prevent treated water from becoming contaminated, store in a clean container with a tight-fitting lid. If properly refrigerated in an airtight container, treated water may be stored for up to one week.

Q. Will oil and smoke in the kitchen cause any damage to the Water Purifier?

A. Normally, kitchen oil and smoke will not damage the unit. However, if the unit is not regularly cleaned, it may discolour over time. To keep the unit clean, simply wipe the unit with diluted DISH DROPS™ Liquid Dishwashing Detergent.

Q. Will the carbon filter prematurely plug up if it treats high sediment water?

A. Even when processing water with high sediment contents, the eSpring™ Water Purifier's carbon block particle filter will usually last for its full rated life: one year or 5,000 litres (1,320 gallons). In situations where extremely high sediment concentrations are encountered, filter life may be shortened.

Q. How long does water need to be in contact with the pressed carbon filter or UV lamp for effective removal of organic contaminants and bacteria?

A. Contact time with the carbon filter and UV lamp is only one factor that determines water treatment performance. The eSpring Water Purifier has been designed so that sufficient contact time is maintained throughout the range of flow rates specified for the unit. Other conditions that affect performance include the type of carbon used, the design of the carbon filter, and the intensity of the UV light, among other factors.



Competitive Systems and Treatment Technologies

Q. How does the eSpring™ Water Purifier compare to a given specific competitor?

A. As a general rule, we do not publish research on specific competitors. It is our policy to sell our products on their own merits, not by degrading our competitors. However, we do keep ourselves informed of the latest technological developments to provide you with all the information you need to clearly establish the eSpring Water Purifier as a performance and value leader. We believe the best approach is to evaluate the competitor's claims – and then compare these claims to published information about the eSpring Water Purifier. This Product Guide provides basic information on the advantages and disadvantages of various technologies. When evaluating competitive claims, ask these questions:

1. Which specific removal claims are made?
2. Are there test results available for each claim?
3. Was there any third party verification of test results?
4. If they have the NSF certification, what standards have they been certified under and for what specific contaminants. Also, look for verification of flow rate and capacity.
5. Do test results show data from the end of the filter life – as do all eSpring test results? Test results taken from the end of filter life assure that the unit will provide at least this level of performance for its entire life. If test results are taken from the beginning of a filter's life, there is no way to know how much performance will deteriorate over the life of the filter.



Q. Some competitors claim their systems are endorsed by the U.S. Environmental Protection Agency (EPA).

A. These claims are false and misleading. The U.S. EPA does not endorse or approve water treatment systems or suppliers. It is true that the U.S. EPA assigns registration numbers to certain products. But these registrations are not endorsements, as some manufacturers suggest. The U.S. EPA registration does not signify anything about the product's ability to remove contaminants.

Q. What is the Gold Seal Approval?

A. The WQA developed the Gold Seal program to help consumers choose high quality water treatment products. It awards the Gold Seal only to those systems that have met or exceeded industry standards (see below). The eSpring Water Purifier has been awarded the Gold Seal.

Gold Seal requirements

- Product performance testing measures contaminant reduction capabilities over the life of the water treatment product.
- Structural integrity testing measures durability under pressurization beyond the usual demands of home water systems and simulates 10 years normal use.
- Materials safety assurance confirms nothing harmful will be added to the water.
- Literature reviews ensure the Water Quality Association's high Code of Ethics standards in product advertising, labeling and installation instructions.

Customers can easily identify WQA-validated products by looking for the Gold Seal mark or through product listings in the Validated Water Treatment Equipment Directory available from the WQA.

The Water Quality Association

The WQA is dedicated to promoting the highest standards of honesty, integrity, fair dealing and professionalism in the water treatment improvement industry, and committed to stringent product testing. WQA represents more than 2,200 member companies in the U.S. and nearly 400 in 82 other countries.

Competitive Systems and Treatment Technologies, continued

Q. Why do some companies claim their filters will “purify” any water? Does eSpring™ make the same claim?

A. U.S. EPA guidelines define a water “purifier” as a treatment system that removes/disinfects potential disease-carrying microorganisms in water, including bacteria, viruses and protozoan cysts. The eSpring Water Purifier is one of the few units that meet this demanding criteria. If competitors are claiming “water purification,” look for validation of bacteria, virus and cyst removal. If there is no validation, the “purification” claim is not appropriate.

Q. Can the life of a carbon filter be extended by backflushing to rinse out contaminants?

A. No. Although some manufacturers promote backflushing (subjecting filter to a flow of untreated water in the opposite direction) as a way to increase filter life, it will actually reduce the life of a carbon filter – for these reasons:

1. As water is processed through a carbon filter, contaminants load up in layers, with the highest concentrations on the outside of the filter. These layers gradually build up inward, and when the layers reach the core of the filter, the filter must be discarded.
2. Backflushing the filter would allow contaminants to build up on the inside of the filter.
3. When the filter is returned to normal operation, the contaminants that built up on the inside of the filter may begin to release into the treated water, reducing the filter's effectiveness. Experts are in agreement that backflushing is not appropriate for carbon filters.

Q. A competitor performed a demonstration that used electricity to compare filtered water from their system and the eSpring Water Purifier. The eSpring water turned brownish while their water remained clear. Why?

A. The demonstration used a process called electrolysis, which demonstrates the removal of minerals and salts from drinking water. If there are minerals in the water, it will conduct electricity. If no minerals are present, the water will not conduct electricity. Therefore, if an iron electrode is placed in mineral-bearing water, the electricity will cause the iron to oxidize or rust. This oxidization mixes with the water, turning it a brown colour. This demonstration does not indicate the amount of contaminants in the water. It merely indicates the presence of minerals. And as you know, one of the advantages of the eSpring Water Purifier is that it retains beneficial minerals like calcium and magnesium.

In the past, this misleading demonstration has been used by some dealers who sold reverse osmosis systems. Since then, the test has been declared an unethical demonstration by the Water Quality Association.

Q. What is the ozone water treatment method? Is it effective?

A. Ozone is a unique form of oxygen that is used to help control bacteria and viruses. Ozone is generated by an electric arc or a special ultraviolet light.

Advantages:

- Kills bacteria and viruses.

Disadvantages:

- Very difficult to obtain consistent efficiency.
- Not generally effective against organic or inorganic contaminants.

Q. What is iodine treatment?

A. Iodine is a disinfectant that is sometimes added to water to kill bacteria and viruses.

Advantages:

- Kills bacteria and viruses.

Disadvantages:

- Tastes bad.
- Not effective against organic or inorganic contaminants.
- Inconvenient – a waiting period is required.
- Health concerns – the U.S. EPA recommends its use only in cases of emergency.



Competitive Systems and Treatment Technologies, continued

Q. What is TDS?

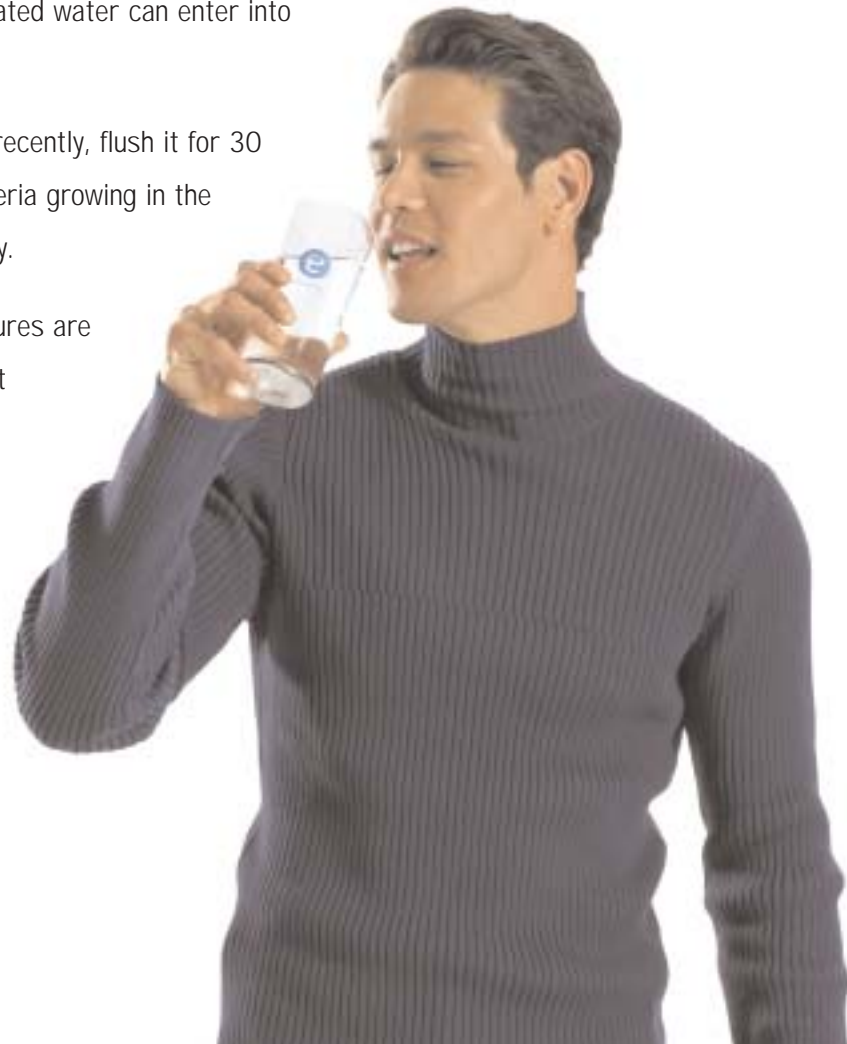
A. TDS stands for Total Dissolved Solids. It is a measure of the amount of inorganic matter in water. Some marketers of water treatment systems that have high inorganic removal capability use TDS statistics to demonstrate the effectiveness of their systems. However, it is not a balanced indication of filtering effectiveness, since it ignores organic contaminant removal rates.

Q. Why would water treated by the eSpring™ Water Purifier test positive for the presence of bacteria?

A. Bacteria control is very complicated, and many variables can affect test results. So if you encounter tests that show bacteria in eSpring water, examine the test conditions and procedures carefully:

- Is a sterilized container used to store the water sample? An unsterilized container can introduce bacteria into the sample. Containers washed by hand or in a dishwasher are not sterile.
- Were the samples evaluated immediately? Samples must be refrigerated and sampled in less than 24 hours. If not, bacteria can be introduced into the water.
- When drawing a sample, make certain the diverter valve is completely open, so that no untreated water can enter into the treated water sample.
- If the unit has not been operated recently, flush it for 30 seconds to make certain any bacteria growing in the diverter or tubing are flushed away.

If proper sampling and testing procedures are followed, test results should show that bacteria have been inactivated. However, recognize the eSpring Water Purifier does not produce sterile water – that is, water which is totally free of bacteria.



Overall Product

Q. Why should a customer buy an eSpring™ Water Purifier?

A. Those with the most obvious need for a water treatment system are those who have water that smells or tastes bad. However, customers who do not have obvious water quality problems may actually have more serious problems with waterborne contaminants. Most of these contaminants, such as bacteria and disinfection by-products, are colourless, tasteless and odourless. These contaminants cannot be easily detected, but they can pose serious health risks. Reducing these contaminants is the most important reason to invest in an eSpring Water Purifier. If a customer's only interest is in improving water taste and odour, there are many water treatment systems that can do the job adequately. There are far fewer systems that can provide meaningful reduction of organic contaminants, chemicals and pesticides. And only a handful can effectively remove bacteria and viruses. The eSpring Water Purifier can perform all these functions. In addition, our system provides treated water on demand and at a high flow rate – making it far more convenient than bottled water or boiling. It also requires very little maintenance. The result is a system that effectively removes more than 140 different contaminants, and inactivates more than 99.99% of waterborne bacteria and viruses. This is a combination of features and benefits no other system can fully match. And that is perhaps the strongest reason why your customers should purchase the eSpring Water Purifier instead of an alternative.



Overall Product, continued

Q. Does the eSpring™ Water Purifier have a warranty?

A. The warranty for the eSpring Water Purifier is equivalent to the most generous warranties offered by other water treatment systems. Due to the nature of the product, it will eventually wear out and require replacement. Therefore, a lifetime warranty is not practical. However, the eSpring Water Purifier is designed and built to deliver market-leading reliability and durability.

Q. What type of test results are provided for the eSpring Water Purifier?

A. The performance claims made for the eSpring Water Purifier are primarily based on NSF International certification tests. An NSF performance data sheet is included with every system. These tests were performed to certify the eSpring System for NSF/ANSI Standards 42 (taste, odour and clarity), 53 (health effects such as volatile organic chemicals), and 55 (UV reduction of microorganisms). These tests were performed by NSF International under stringent NSF/ANSI Standards, and, therefore, the results have the highest credibility.

Q. Who manufactures the eSpring Water Purifier?

A. The eSpring Water Purifier is produced by our own manufacturing division, Access Business Group LLC, in a state-of-the-art production facility in Ada, Michigan. This facility, completed in 1998 at a cost of more than US\$5.5 million, uses production and quality assurance technologies that meet or exceed the highest standards in the industry.



Q. What materials are used to make the eSpring™ Water Purifier?

A. The housing is constructed of various high grade engineering plastics.

Water contact parts – including the cartridge and all attachment kits – are all constructed of materials that meet NSF/ANSI Standards.

Q. Why does eSpring use plastic instead of stainless steel for the System housing?

A. A stainless steel housing would not improve eSpring Water Purifier performance in any way. It would, however, make the unit more expensive to manufacture. Instead, we chose plastic because it is strong, attractive, easy to clean, and very cost-effective. The key to system performance is the carbon filter and UV lamp. This is what makes the eSpring unit superior to the competition – not the material used for the unit housing.

Q. How can I sell the eSpring Water Purifier to a customer who is primarily interested in filtering inorganic contaminants?

A. The eSpring Water Purifier will reduce some inorganic compounds like lead, mercury and radon. However, the System is designed to improve water taste, odour and clarity, to remove a broad range of organic contaminants, and to reduce bacteria and viruses. Our market research has shown that this is the kind of water treatment performance most customers want. However, if a customer needs a system that primarily removes inorganic contaminants such as salt or nitrates, the person should explore other systems that are designed specifically for this purpose.

Q. The eSpring Water Purifier removes particulates as small as 0.2 microns. Some competitive systems claim they remove particles as small as 0.1 micron. Is this a significant difference?

A. A difference of one-tenth of a micron does not provide significantly greater filtration effectiveness. Micron size is only an effective measure of the product's ability to trap particulates such as sediments and cysts. Since the smallest cysts are larger than 0.2 microns, a 0.1 micron screen will not improve efficiency. Some manufacturers claim a 0.1 micron filter will remove bacteria, since many bacteria are larger in size than 0.1 micron. Although the filter may stop the bacteria for a short period of time, its removal performance may be lower over a period of months. Even though bacteria may be larger than the

Overall Product, continued

0.1 micron pores, the bacteria can eventually pass through. However, a 0.1 micron filter may be more susceptible to premature plugging, and therefore require more frequent replacement. In addition, particle removal methods are not effective for viruses, which may be a fraction of the size of the smallest bacteria.

Q. Can the eSpring™ Water Purifier be used on private wells?

- A. The eSpring Water Purifier is intended for use with municipally-treated water or private wells that have been deemed potable. The eSpring Water Purifier has been tested with contaminant levels far higher than those likely encountered in residential water systems. If the eSpring Water Purifier is used on a private well, the well water should be tested once a year to ensure that it is still potable.



Training Materials

The following educational materials have been developed to give you a knowledgeable background when speaking about water and water treatment systems and to demonstrate the effectiveness of the eSpring™ Water Purifier. The background information and demonstrations are all essential elements in the merchandising of this product.

Sharing the Story

Who needs an eSpring Water Purifier?

An eSpring Water Purifier offers tremendous benefits to all kinds of people, from the very young to the very old, from families to athletes. Here are some of the main benefits that you can focus on when sharing the eSpring Water Purifier story with any of these groups.

Families

Families, especially those with infants and small children, will have a special interest in equipping their homes with an eSpring Water Purifier.

- Dehydration is a common problem in infants, especially those breastfed.
- The undeveloped immune systems of infants are vulnerable to infections that can be caused by contaminants in tap water.
- Water distributes essential vitamins and nutrients that are vital to the healthy development of the cells, tissues, and organs of young children.
- Water is good for the developing child...if it is good water.

Athletic/Active-Types

Good water enhances athletic performance and other physical activities.

Athletes and those who love to sweat are concerned about maintaining their healthy lifestyle. The water bottle is an important part of their life and they should fill it with eSpring purified water.

- Dehydration is a significant problem for athletes.
- Hydration promotes health, safety, and optimal physical performance for those in regular physical activity (American College of Sports Medicine).

- Water lubricates the joints, which can be stressed during physical activity.
- Water helps maintain blood volume, which maintains your energy.
- Water improves concentration and reaction time during physical activity.
- Water is good for athletes and others who are active...if it is good water.

Expecting Moms

A pregnant mother is drinking for two (or more) and is especially cautious about what she eats and drinks. She has many reasons to give herself and her baby the world's best water.

- Good hydration helps prevent dry skin, miscarriage, premature labour, constipation, hemorrhaging.
- Good hydration helps prevent chemical imbalance in your blood and therefore, your baby's blood.
- The hormones of pregnancy change the way the body stores and uses fluid, making you store extra water that can result in dehydration.
- Changes during pregnancy can cause stress on the kidneys. Hydration can reduce this stress.
- There are increased concerns that THMs (see glossary) may be linked to reproductive problems; eSpring filters THMs.
- Lead can result in anemia and low birth weight of children; eSpring removes lead.
- Expecting moms will greatly benefit from water...if it is good water.



Elderly

The elderly especially need the benefits of eSpring purified water.

- Older adults are more vulnerable to contaminants in drinking water than the general population.
- Weakened immune systems are less capable of fighting off infections, some of which are caused by contaminants in tap water.
- 10% of hospital admissions for people over age 65 for gastrointestinal (GI) illness can be blamed on harmful microbes in drinking water, according to study by Harvard School of Public Health.
- Water is essential for blood circulation.
- Water lubricates joints and protects bones.

- Water assists the excretory system and helps prevent constipation.
- Water dilutes and distributes medicine, allowing it to act more quickly and effectively, preventing stomach distress concentrated medicine can cause.
- Water is good for the general health of the elderly...if it is good water.

Points of Discussion

When sharing the eSpring story, you may encounter people who resist purchasing an eSpring Water Purifier for one reason or another. Here are some common objections along with well-founded information that may help change their thinking.

"I'll just buy bottled water."

Buying bottled water is expensive, inconvenient. (Suggestions: Perform a calculation and show how much money is spent on bottled water in a year.) The quality of bottled water is uncertain. Many bottled waters improve taste, colour or odour and may still contain bacteria, organic and inorganic compounds.

"Our municipal water system is very good."

Most water treatment facilities can produce good water. Yet chlorine is commonly used in the treatment process. When chlorine is added it can react with organic materials in the water and form THMs, such as chloroform, which is associated with increased risk of cancer. Chlorine can also make municipal water taste bad. Water can also be contaminated between the treatment facility and the home by passing through corroded pipes or pipes soldered with lead, or by sitting in storage tanks subject to microbiological contamination.

"Other types of water treatment systems cost much less."

The eSpring Water Purifier uses superior technology combining a carbon block filter, UV light, and electronic monitoring to provide the best system available. eSpring claims are verified by NSF. Compare the claims made by less expensive units. Many less expensive units treat the water for taste, appearance, and odour but are unable to filter health effect contaminants.

"My water looks and tastes fine."

Contaminants in the water that can pose serious health risks are undetectable in appearance and taste.

“The precipitation test shows that eSpring water has contaminants.”

Some water treatment product companies use the electronic precipitation test to show that competitive products have contaminants in their water. The cloudy water produced in the precipitator test simply shows the amount of ions dissolved in the water. Nearly all water has calcium, magnesium, and other dissolved salts in it, which form ions when they dissolve in water. This has no relation to the water's quality. The Water Quality Association has stated that the “likelihood is considerable that the test will mislead the public.” They recommend against using this test as a means of demonstrating water quality. (WQA Position Paper, WQA.org)

“There are too many water treatment systems on the market and I am too confused to make a choice.”

The selection of a water treatment system should be made based on claims and the verification of those claims by reliable third parties. eSpring claims have been tested and certified by NSF, a leading authority on water treatment. eSpring is one of the few systems to meet NSF Standards 42,53, and 55 for contaminant removal. eSpring has documented support for the removal of more contaminants than any other system certified by NSF.

“I’m not good at installation and I don’t want to pay for a plumber.”

Both eSpring models are very easy to install. Except in rare situations, they require no special tools or plumbing connections.

“The UV bulb uses too much electricity.”

When the unit is in standby mode, the power consumption is similar to a night light. When the water is flowing in treated mode, the power consumption is similar to a 75 watt incandescent bulb.



eSpring Product Demonstrations

How to Conduct a Demonstration

The product presentation is one of the most exciting, powerful and memorable merchandising tools you have. All the facts you tell clients about the eSpring Water Purifier cannot match the impact that occurs when they actually see the system in performance. A properly executed presentation not only demonstrates the product's capabilities and answers client questions -- it also demonstrates your professionalism as a salesperson. This means it is absolutely essential that every demonstration is properly conducted. So practice your presentations regularly -- and make sure you follow this checklist for every demonstration.

General Checklist for all demonstrations

- ✔ Only use cold water that has been treated by a municipal water supply. NEVER USE HOT WATER!
- ✔ Use only the “contaminants” listed in the following demonstration instructions. Other materials may damage the unit or pose a potential hazard and may not work as well over time.
- ✔ Filters used in demonstrations may have to be replaced more frequently than normal. This is because contaminant levels in demonstrations are much higher than those encountered in normal operation, which reduces filter life.
- ✔ Before each presentation, check the colour and flow rate of the water coming out of the filter. If either is unacceptable, replace the filter.
- ✔ Before using a new filter in a demonstration, flush the filter for 5-10 minutes, then let it soak inside the housing for several hours. This ensures the filter will function properly. If this is not done, excess carbon particles may appear in the treated water.
- ✔ Units used for demonstrations (except the turbidity demonstration) should not be used for drinking water until a new filter has been installed.
- ✔ Do not combine the additives used in demonstrations. This may lead to unsuccessful results and/or shortened filter life.



#1 Taste and Odour Demonstration

Purpose:

This simple demonstration effectively shows how the eSpring™ Water Purifier can dramatically improve water odour and taste. Although everyone's individual senses of taste and odour vary, almost everyone who participates in this test will observe a noticeable improvement in the eSpring treated water.

Equipment needed:

- 2 identical glasses for each participant in the presentation
- Grease pencil

Instructions:

1. Using the grease pencil, mark half the glasses. Fill these glasses with water directly from the tap. Give a glass to each participant.
2. Attach the eSpring Water Purifier to the tap.
3. Fill the remaining unmarked glasses with treated water. Hand out the glasses to the participants.
4. Have the participants smell, then taste the treated water in the marked glasses. Then, have them sample the untreated water. The improvement in taste and odour should be quite noticeable. If the untreated water is tasted first there may be some carryover flavour or taste.



#2 Turbidity (particles in water) Demonstration

Purpose:

The turbidity demonstration shows the eSpring™ unit's ability to remove small particles from drinking water. In order to present this demonstration effectively, your water must have some natural turbidity (particles in water). Although the drinking water may appear relatively clear, this demonstration will show dramatic improvements in clarity. Before the actual presentation, try this demonstration to be sure the improvements will be visible with water in your area.

Equipment needed:

- 2 identical tall (10 cm minimum) water glasses or pitchers
- 2 small coins (preferably copper which have been polished to a high luster)
- Newspaper or magazine

Instructions:

1. Attach the eSpring Water Purifier to the tap to be tested.
2. Using unfiltered water, fill one of the glasses. The higher the glass is filled, the better.
3. Turn the diverter valve to the treated water setting, and flush the system for 30 seconds.
4. Fill the second glass with filtered water to the same height as the glass with unfiltered water.
5. If the glasses have a clear bottom, place them on a newspaper or magazine.
6. Now look through the depth of the water and view the printed page. If your water has some turbidity, the print will be somewhat unclear. The higher the turbidity, the less distinct the printing will be. However, the printing will be clearly visible at the bottom of the glass with treated water. The taller the containers, the more noticeable this difference will be.
7. If the glasses have opaque bottoms, you can drop coins in the water and view them at the bottom of the glass. Again, the coin at the bottom of the glass with treated water will appear much more clearly than the coin at the bottom of the glass with turbid water. The greater the turbidity – and the higher the water level in the glasses – the greater the difference between the two will be.

#3 Chlorine Demonstration

Purpose:

Most people easily relate to the taste and odour of chlorine in their water. Therefore, chlorine provides a good demonstration of the eSpring™ Water Purifier's ability to effectively remove it from water. If your water contains notable amounts of chlorine, you may use it in the demonstration. If your water contains little or no chlorine, you must add chlorine for the demonstration.

Equipment needed:

- Liquid chlorine bleach unfragranced or SA8 Solutions™ dry chlorine bleach
- 6-8 large water glasses
- Small spoon
- Measuring cup
- 1 litre (1 quart) container
- 1 bottle of Ortho-tolidine (OTO) solution, available at swimming pool supply stores.

CAUTION: AVOID ACCIDENTAL INGESTION OF OTO – MAY BE HAZARDOUS TO HEALTH IF INGESTED. DISPOSE OF THESE TEST SOLUTIONS IMMEDIATELY AFTER USE AND RINSE THE CONTAINERS.

Instructions:

1. Attach the eSpring Water Purifier to the tap to be tested. Fill a glass with untreated water. Add about 3 drops of the OTO solution. If chlorine is present in the water, OTO will become yellow. If your water has chlorine in it, set the glass aside and go to Step 7. If no colour develops, you must proceed to Step 2 to add chlorine to the water.
2. Using a measuring cup, add about 300 ml (10 oz) of cold water into the 1/2 litre (16.9 oz) container. Add chlorine and mix.
3. Turn the diverter valve to the treated water setting and flush the system for about 30 seconds.
4. Pour about 25 ml (1 oz) of the chlorine solution into a glass and fill the glass with tap water and set aside.
This represents the untreated water.

5. Make sure the water is off and stand the eSpring™ Water Purifier on end. Remove the pressure vessel cap and cartridge. Tip the unit and pour the water from the unit.
6. Pour the container of remaining chlorine solution into the pressure vessel. Replace the pressure cap, cartridge, electronics and the housing cap.
7. Turn the diverter valve to the treated water setting to start water flowing through the system.
8. Fill the unused glasses with the treated water and place them in a row on the counter as they are filled.
9. Add OTO to the glasses of untreated water to test for chlorine. The untreated water will have colour, indicating chlorine. The treated water will be clear, demonstrating that the chlorine has been removed. This shows that the eSpring Water Purifier removes chlorine to improve the taste and smell of drinking water.

NOTE: It is best to pour the solution out of the glass after the demonstration because it is possible that a colour may develop after a few minutes, even though no chlorine is present. This is caused by compounds called chloramines that may occur in some water. The eSpring Water Purifier removes most of the chloramines, but traces may not be removed. Over time, these traces may cause the colour. So it is best to dispose of the solution to avoid any confusion about colour formation.



Approved eSpring Articles

The following articles are an excellent way to educate customers about the value of using the high-quality eSpring™ Water Purifier. Approved for use in publications or as reprints, they can be very cost-efficient, beneficial tools as you share the eSpring story.

The three articles included here are:

**Water and Wellness:
Why Water Is Good for You**

**NSF Certification:
The Best Verification of
eSpring Water Purifier
Performance**

**Home Water Treatment:
Why It Is Important,
How to Choose the Best
System for Your Family**



Water and Wellness: Why Water Is Good for You

We all know water is essential to live. But most of us are not aware of the crucial role water plays in virtually every organ and function of our bodies. Water does more than sustain life. Good water can actually improve our health, our fitness, and even our appearance.

What happens without water?

We can go for weeks at a time without food, but we will die in a matter of days without water – even faster in warm climates where perspiration causes us to lose water quickly. Going without water can have disastrous results:

- A 1% deficit in the body's water creates thirst.
- A 5% deficit causes a slight fever.
- A 10% deficit and the tongue swells, kidneys start to fail, and the muscles go into spasms. Walking becomes impossible.
- At or before 20% loss, skin cracks, organs grind to a halt, and death occurs.

What water does in the body

Water is the single most important nutrient the body takes in; every cell, tissue, and organ needs water to function properly:

- Water transports essential water-soluble vitamins and nutrients (such as protein, minerals, vitamins B & C) that cells, tissues, and organs need to function properly.
- Water moistens our eyes, mouth, and nasal passages, helping organs perform properly and keeping us physically comfortable.
- Water helps regulate body temperature, keeping the body cool when it is hot and insulating it when outside conditions are cold.
- Water allows the body's cells to retain their structure and carries oxygen to the cells.
- Water cushions the organs and acts as a shock absorber to minimize stress and damage to organs.
- Water provides optimum lubrication for joints.
- Water flushes kidneys to rid the body of toxic substances.

- Water carries solid waste from the body.
- Water balances electrolytes (minerals such as potassium, sodium, and chloride) that help regulate body temperature and control blood pressure.
- Water is a valuable source of trace minerals, such as manganese, magnesium, cobalt, and copper.

Drinking water can improve your health and well-being.

- Water helps maintain blood volume, which maintains your energy.
- Proper hydration improves your concentration and reaction time, especially during exercise.
- Water increases the number of calories you burn during regular daily activities.
- Water can help prevent the stomach distress concentrated medicines can cause.
- Water helps rid the body of excess sodium, which can cause fluid retention.
- Studies show links between high water consumption and reduced risk of minor ailments, such as colds, constipation, and urinary tract infections, to more serious conditions, including kidney stones and bladder cancer.
- Frequent water intake prevents dehydration among the very young and old. (Dehydration is one of the leading causes of hospital admissions for those over age 65.)
- Water may help you lose weight and improve your appearance.
- The body often mistakes thirst for hunger pangs, so people often eat snacks when their bodies are thirsty, not hungry. Studies show that people who drink large amounts of water usually feel less hungry.
- Water gives you more energy during exercise and increases the calories you burn during exercise.
- Studies indicate that water may also help reduce fat deposits.
- Water helps hydrate the skin, leaving it smoother, softer, more supple, and more wrinkle-free. (Water reaches the skin last; if the body doesn't get enough water, the skin will feel the effects sooner than any other organ.)

How much water you need?

Your body needs water even if you do not feel thirsty.

- While individual needs depend on many factors, as a general guideline, the average person should drink between 1.5 and 2.5 litres of water (about 51 oz – 85 oz) every day. (Check out our Water Intake Calculator at www.espring.com to find out more about how much water you should drink based on your exercise habits and your current weight.)
- Beverages with caffeine – coffee, tea, and colas – actually dehydrate the body, robbing the organs by using more water to process than they provide.
- Alcoholic beverages also cause dehydration.
- Juices and sports drinks quench the body's thirst, but they may also provide unwanted calories.

A variety of sources were used for this data including the Center for Disease Control and Prevention, the Water Quality Association, the American Cancer Society, the American Dietetic Association, and the American Heart Association. (USA)



NSF Certification: The Best Verification of eSpring™ Water Purifier Performance



Many claims are made by different water treatment systems. In our opinion, based on more than 20 years of water treatment experience, the standards set by NSF International are the most accurate, complete and impartial indicators of actual system performance. Here are the reasons behind our opinions.

There are dozens of water treatment systems on the marketplace. Almost all claim to do an excellent job of “water purification.” Amidst all these confusing claims, which can you believe?

Our eSpring team of scientists has found that the NSF/ANSI Standards overseen by NSF International provide the most accurate and comprehensive evaluation of water treatment system performance. When a water treatment system has been certified by NSF International, it has been tested by an impartial, independent third party organization that is recognized worldwide as a leading expert in water treatment. As a result, you can have complete confidence that NSF-certified performance claims will accurately reflect a water treatment system's real world performance.

Who is NSF International?

NSF International was established more than 55 years ago to develop performance standards and testing programs for products used in food and beverage preparation. Since then, this independent, not-for-profit organization's certification programs have become the globally-accepted criteria of performance for a wide range of products.

- The first NSF International standards for water treatment systems were developed in 1968, and were based on input from experts in public health, industry, government agencies, and academia.
- NSF standards are ANSI accredited and are frequently updated and expanded to reflect both changes in water treatment technology and the growth in knowledge about water contamination and health effects.
- NSF International has established many different standards for drinking water products.
- Today, NSF International is seen as one of the world's foremost authorities on water treatment. This is why it has been designated by the World Health Organization (WHO) as a Collaborative Center for Drinking Water Safety and Treatment.

What does “NSF International Certification” mean?

To become an NSF-certified unit, a water treatment system is tested for more than its ability to trap contaminants. To earn NSF certification, a water treatment system must fully meet five sets of criteria:

1. All contaminant reduction claims must be valid.
2. The system cannot add anything harmful to the water.
3. The system must be structurally sound.
4. All advertising, literature and product labeling must be truthful.
5. Manufacturing processes and materials must be consistent – and subject to annual review.

Certification for each of these areas is performed by NSF International. All systems certified under a specific NSF standard are tested using the same procedures, under reproducible controlled laboratory conditions.

Which NSF standards does the eSpring Water Purifier meet?

Depending on the type of water treatment technologies used, and the level of performance delivered, a system may meet one or more NSF certification standards. The eSpring™ Water Purifier has been certified to meet these following standards.

Standard 42 certifies the system improves water taste, odour and clarity. It does not evaluate a system's ability to reduce harmful contaminants. Many systems meet this standard.

Standard 53 is much more difficult; a system must actually reduce health-related contaminants to qualify. Under Standard 53, NSF International has certified the eSpring Water Purifier to reduce more health effect contaminants than any other carbon/UV-based system NSF International has ever tested.

Standard 55 applies only to systems that use UV light to destroy waterborne bacteria. We were the first manufacturer to have a system certified under this standard.

So when it comes to evaluating water treatment performance, trust the world's most respected and accepted source for treatment system performance: NSF International. When you do, you'll discover that the eSpring Water Purifier delivers the best all-around certified performance.

The best gets even better

Thanks to our new, patented technologies, the new eSpring™ Water Purifier provides greater contaminant removal, more convenience and increased capacity – to provide the best performance of any system we've ever offered.

Our water treatment systems have always offered great value. That's why we have sold more than 3.5 million systems since 1984, more than any other direct merchandiser. However, when our engineers designed the latest eSpring Water Purifier, they raised the standard -- and developed a product with improved all-around performance. The following are some of the specific enhancements we have made to the new eSpring Water Purifier.

Reduces more contaminants from more water

The heart of any water treatment system is its filter. As with previous eSpring Water Purifiers, the new design uses a patented pressed carbon block/UV filter cartridge – which leading experts consider the best technology for home water treatment. Using this proven approach as a starting point, eSpring engineers redesigned the filter, increasing its capacity and its ability to trap more contaminants.

The result is a filter so innovative that it has seven patents. It reduces more than 140 different contaminants, trapping particulates that are 300 times smaller than the diameter of a human hair. NSF International, the world's leading independent authority on water treatment systems, has certified this new carbon cartridge for the reduction of more potential health effect contaminants than any other carbon-based system.

Now, an eSpring carbon filter can provide 5,000 litres (1,320 gallons) of clear, delicious water – 5% more water than the previous Water Treatment System. That's enough water to meet the needs of an average family of six for an entire year.

Effective protection against bacteria and viruses

The eSpring Water Purifier uses ultraviolet light to destroy waterborne organisms like bacteria and viruses. This technique is highly effective, destroying more than 99.99% of the organisms that may be present in your water. So, in the latest generation eSpring Water Purifier, we concentrated on improving other aspects of the UV system.

In the new UV system, solid state electronics allows the UV lamp to operate only when water is flowing, making the system even more reliable. This also assures that water coming out of the system will be cool even after a long period of nonuse. A watertight quartz enclosure protects the UV lamp, further improving reliability. This UV system design is patented – and it has been fully tested by an independent third party for microbiological performance.

Takes the guesswork out of ownership

In order to maintain the effectiveness of any water treatment system, filters must be changed at the proper intervals. If not, the system's contaminant reduction ability can quickly deteriorate. But it is difficult to remember exactly when filters need changing. So to eliminate the guesswork, we integrated a sophisticated electronic monitoring system into our latest eSpring™ Water Purifier.

The monitoring system carefully tracks time and usage to determine how much life remains in the filter and UV lamp. The eSpring system display has an indicator (much like a fuel gauge) showing remaining cartridge life. When the cartridge nears the end of its life, the display screen begins flashing an advisory message. This is followed by a continuous beep when replacement is finally necessary. With the electronic monitoring system, users never have to worry about changing filters too soon – or too late – and the system resets itself automatically by way of smart chip technology when a new cartridge is installed.

As the water treatment market continues to expand, your customers will be able to choose from an increasing number of competitive systems. And many of them may be quite good. But thanks to the innovations in the new eSpring Water Purifier, you can be fully confident that you are offering your customers the best we have in performance and value.



Value: The Key to eSpring Water Purifier Sales

In a field crowded with lower-cost competition, customers need to know the eSpring™ Water Purifier offers greater value than other systems – regardless of price. The eSpring Water Purifier was designed from the start to be a premium, no-compromises product that offers customers the highest level of household water treatment. As a result, it justifiably carries a premium price.

Many other water treatment products are priced lower than the eSpring product. Since, at first glance, these products seem to offer the same benefits – clear, better-tasting water – customers often wonder if the eSpring Water Purifier is their best buy.

It is. So in response, you must stress the value of the eSpring Water Purifier: the exclusive features, benefits, and long-term cost savings that make the eSpring Water Purifier the best investment customers can make for their families. Here are five crucial points you should make to convince customers of the eSpring Water Purifier's value.

1. Unmatched Performance

The primary reason to buy a water treatment system is to ensure your household is supplied with high quality water. In this respect, the eSpring Water Purifier leads the field. NSF International, the world's leading independent authority on water treatment, has tested and certified that the eSpring system removes more contaminants than any other carbon/UV-based system they have tested. Altogether, the eSpring system effectively removes more than 140 health-effect contaminants. Further, independent testing has documented the ability to eliminate more than 99.99% of waterborne bacteria and viruses. Few other systems at any price can offer your family similar levels of protection.

2. More Features

The eSpring Water Purifier has some of the most advanced features found on any treatment system, including an instant-on UV lamp, wire-free lamp connection, smart chip technology, and an electronic monitoring system that tells you exactly when to replace a cartridge.

3. Less Maintenance and Greater Convenience

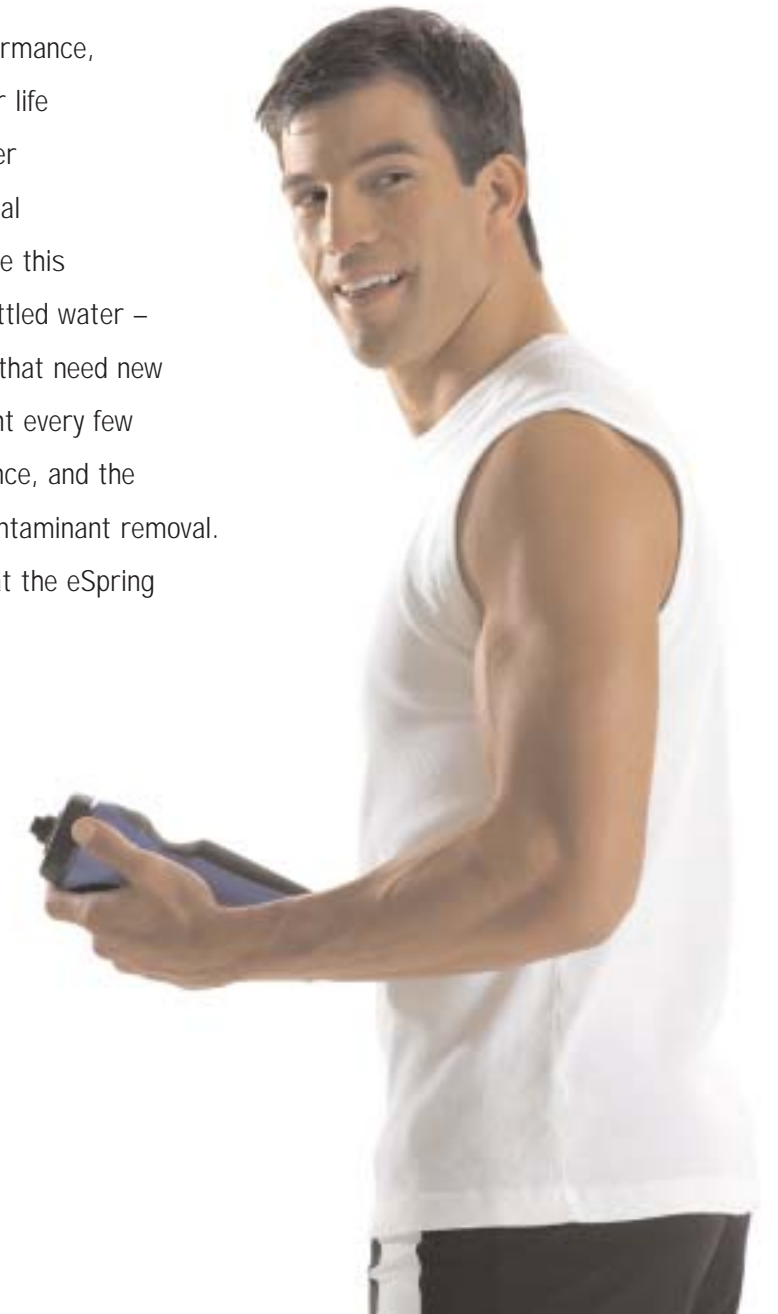
Unlike many other systems, many of which require filter changes on a monthly (or even more frequent) basis, the eSpring™ Water Purifier's carbon filter lasts up to 1 year before replacement. During that time, the system will treat up to 5,000 litres (1,320 gallons) of water – and this treated water is available in any quantity at any time, just by turning on the tap. There are no jugs to fill or bottles to replace. Only clear, great-tasting water whenever you want it at a great flow rate.

4. Longer Life

While many treatment systems are engineered to be as inexpensive as possible, the eSpring Water Purifier is made to be as durable as possible. High quality materials, such as high-tech engineering plastics and the latest solid state electronics, are used throughout the system. The result is a system that will last years longer than systems built to meet a low price.

5. Lower Overall Cost

The greater durability, higher performance, fewer cartridge changes and longer life combine to make the eSpring Water Purifier one of your most economical sources for treated water. Compare this cost to other alternatives – like bottled water – or to the overall costs of systems that need new filters every month and replacement every few years. Then compare the convenience, and the comprehensive level of effective contaminant removal. When you do, it becomes clear that the eSpring Water Purifier is the best value.



Home Water Treatment: Why It Is Important; How to Choose the Best System for Your Family

Few things are more crucial to the well-being of our families than the quality of the water that enters our homes. Here is how you can help ensure your family is protected by effective water treatment.

The importance of water in our lives is indisputable. We must drink it every day just to survive. But when the water we drink contains contaminants, there is a potential risk that this life-giver can turn into a health hazard. Although 80% of the earth's surface is covered with water, less than 1% is fit for human consumption. Even water that has been treated by a municipality can be contaminated by things like heavy metals from distribution pipes. Pesticides from the surrounding soil in private well applications can also enter the water supply. And when you drink water from the tap, these water-borne contaminants are ingested directly into your body.



In recent years, consumers have become increasingly aware of water quality issues. As a result, water treatment system sales are increasing at double digit rates. However, there is a great variation in performance and protection among different types and brands of water treatment systems. And some of the most important differences between systems are impossible to detect just by drinking a glass of treated water.

In fact, judging a system by taste, odour and clarity is the least effective and accurate way to compare systems. Taste alone cannot tell you what is truly important about treatment system performance.

Contaminant Reduction

Contaminants which pose the greatest potential health risks, such as organic chemicals, cannot be seen, smelled or tasted. Many systems that are engineered to improve water taste are not designed to remove these potential health effect contaminants. Therefore, choose eSpring™.

Bacteria/Virus Reduction

Even fewer systems have the capability to significantly reduce waterborne microorganisms. A special technology, UV light exposure, is extremely effective at destroying bacteria and viruses. Common pour-through type filters do not have this ability. Therefore, choose eSpring.

Long-Term Performance

How long will the treatment system perform at as-new levels? Many systems begin to lose effectiveness almost immediately and cannot maintain their original performance levels. Therefore, choose eSpring.

Filter Changes and Maintenance

Many systems require frequent filter changes in order to maintain proper contaminant removal. Few systems have filter life as long as eSpring before requiring replacement. Therefore, choose eSpring.

Value

We measure value as a combination of all the topics listed above. A low cost system that has limited contaminant reduction, requires constant filter changes, and quickly wears out and requires replacement is hardly a good investment for your family. Likewise, a system that offers excellent contaminant reduction for years to come with only minimal maintenance will more than pay back its purchase price with its superior protection, convenience, and longevity. We designed the eSpring™ Water Purifier to be precisely this kind of system.

We recognize that independent, third party testing is essential for water treatment devices. NSF International is a globally recognized testing and certification organization that has been designated by the World Health Organization as a Collaborative Center for Drinking Water Quality. The performance claims of the eSpring Water Purifier have been tested by NSF International under three NSF Standards: Standard 42 – Aesthetic Effects, Standard 5 – Health Effects, and Standard 55 – Ultraviolet Microbiological Water Treatment Systems.

The eSpring Water Purifier can maintain this level of performance for up to a full year (5000 L/1320 gal) before its cartridge needs to be replaced.

Protecting your family's water supply is important. And with the eSpring Water Purifier, you can provide your family with superior protection – at a superior value.

Timely Filter Replacement: Ensuring eSpring Water Purifier Performance - and Value

The eSpring Water Purifier provides world class-leading performance and convenience. But to maintain this performance, the cartridge must be replaced at the proper intervals. Here's why timely replacement is necessary – and how the new eSpring electronic filter monitor helps users protect their water quality, their families, and their investment.

Why even the best treatment technologies eventually become ineffective.

Our scientists and engineers have been studying water treatment technologies for more than 20 years. This experience has made it apparent that the combination of a solid carbon block with ultraviolet lamp treatment is the best approach to home water treatment.

By extensively developing these technologies – often with patented or proprietary designs and materials – they have created eSpring™, an exclusive system which effectively removes more than 140 different contaminants and destroys more than 99.99% of bacteria and viruses, and also other potentially hazardous waterborne microscopic organisms.

But, as with most water treatment technologies, the performance of both the carbon filter and the UV lamp decrease over time. There are several reasons for this. Made of densely packed carbon granules, the filter block contains pores that adsorb and trap contaminants as small as 1/300th the diameter of a human hair. However, as larger trapped contaminants build up inside the filter, they begin to plug many of the smaller pores available to trap these tiny contaminants. The filter's ability to trap smaller contaminants decreases. The carbon filter's life is shorter when treating water with high turbidity, or concentrations of large particles, due to plugging of the pores and decreasing water flow.



As with any other light-emitting lamp – such as a common light bulb – the ultraviolet lamp in the eSpring™ Water Purifier must be replaced over time. After 12 months, there is no guarantee that the UV light is strong enough to continue destroying the sufficiently high percentage of waterborne organisms required to meet performance standards. If the performance of the eSpring treatment technologies is less than optimum, the value built into the system is compromised. If customers do not replace the cartridge at the proper time, they simply will not get this extra level of performance – and the value of their investment is greatly reduced.

Customers pay a premium for the eSpring Water Purifier because it provides their families with water treatment that is far superior to lower-cost alternatives.

Taking the guesswork out of replacements - with the electronic monitoring system.

So, proper cartridge replacement is essential. But how can a customer know precisely when the cartridge should be replaced – especially when life is often determined by a combination of time and system use?

The electronic monitoring system keeps track of both time and system use to determine exactly how much effective life remains in the cartridge. The number of lighted bars decreases as cartridge life is used. When the cartridge requires immediate replacement, the flashing message is accompanied by an audible beep. As a result, users never have to guess when it is necessary to replace the cartridge.



Making replacement as easy as possible.

The new eSpring™ Water Purifier not only tells you exactly when to replace the cartridge – it also makes replacing this component easier than ever before. Due to the design of the eSpring Water Purifier, replacement is typically needed only once a year – as compared to the monthly or even more frequent changes required by some other treatment systems. And when replacement is required, the new system design allows fast, easy replacement.

Once you own an eSpring system it will be easy to order a replacement cartridge whenever you need one. Find the serial number by lifting the unit's cover. The number is located on the front. Order your replacement cartridges in either of these convenient ways:

1. Contact the IBO from whom you ordered the system.
2. Order electronically through eSpring.com.



When buying an eSpring™ Water Purifier, customers expect to get their money's worth in product quality and water quality. The new electronic monitoring system helps assure this is precisely what they will receive, for years to come. Therefore, always stress the importance of timely filter replacements to every customer who buys an eSpring Water Purifier. It is the best way to guarantee that customers will remain completely satisfied with their purchase.



NSF International

Established nearly 60 years ago, NSF International is an independent, objective, not-for-profit testing and certification agency that sets global performance standards for a wide variety of home and industrial products. Recently designated by the World Health Organization (WHO) as a Collaborative Center for Drinking Water Safety and Treatment around the world, NSF is also accredited by ANSI (American National Standards Institute) as an ISO 9000 and QS-9000 registrar. (Note: Please see Product Performance Claims Support section for further information on NSF standards.)

NSF International Listings for the eSpring Water Purifier

The eSpring™ Water Purifier has been tested and is listed by NSF for the reduction of the following potential drinking water contaminants (Note: "Influent" refers to water coming in; "Effluent" refers to water going out after processing):

	Mean Influent Challenge	Effluent Level (Product water)	Reduction at 1,584 gallons (%)	Reduction requirements/ Max. permissible concentration
Standard No. 42 Aesthetic Effects				
Particulates (Class I) (#/ml at <1 micron)	336667	226	99.9	>85%
Taste and Odour (mg/l as chlorine)	1.9	0.02	98.9	>75%

continued on page 71

NSF International Listings for the eSpring Water Purifier

	Mean Influent Challenge	Effluent Level (Product water)	Reduction at 1,584 gallons (%)	Reduction requirements/ Max. permissible concentration
Standard No. 53 Health Effects				
Alachlor (µg/l)	38	<0.2	>99.4	2.0
Asbestos (fibers/ml)	380,000	<1	799.99	>99%
Atrazine (µg/l)	9.0	1.0	88.8	3.0
Chlordane (µg/l)	41.0	0.20	99.5	2.0
2,4-D (µg/l)	320	0.40	99.8	70
Dibromochloropropane (µg/l)	4.0	0.02	99.5	0.20
Ethylene dibromide (µg/l)	1.1	0.01	99.0	0.05
Heptachlor epoxide (µg/l)	4.1	0.050	98.7	0.20
Lead pH 6.5 (mg/l)	0.15	<0.001	>99.3	0.01
Lead pH 8.5 (mg/l)	0.15	0.0013	99.1	0.01
Lindane (µg/l)	0.55	0.02	96.3	0.20
MTBE (µg/l)	14.8	<0.5	96.6	5.0
Mercury pH 6.5 (mg/l)	.006	0.0009	85	0.002
Mercury pH 8.5 (mg/l)	.0064	0.0012	81.2	0.002
Methoxychlor (µg/l)	295	1.0	99.6	40
PCB -1260 (µg/l)	12.0	0.3	97.5	0.5
Total trihalomethanes (TTHMs) (µg/l)	420	<0.5	>99.8	80.0
Toxaphene (µg/l)	15.2	<1	>93.3	3.0
2,4,5-TP (Silvex) (µg/l)	28	<0.2	>99	50
Turbidity (NTU)	10	0.15	98.5	0.5
VOCs (Volatile Organic (µg/l) compounds) as chloroform	320	1.8	99.4	95%
Standard No. 55 Ultraviolet Microbiological Water Treatment				
Reduction of Microorganisms - Class B				Requirement: >16,000 mw∅sec/cm ²

Standard 53 Surrogate Program

In addition to the above testing on individual contaminants, NSF Standard 53 uses chloroform as a surrogate compound for claiming the reduction of other VOCs (Volatile Organic Compounds). Research has shown that if a carbon filter reduces chloroform, it will also reduce a number of other VOCs that are retained by activated carbon as well as or better than chloroform. This has been proven by testing different designs of carbon filters with water that has been contaminated with a mixture of VOCs. The effluent water was analyzed and the order of breakthrough for the various VOCs was compared with the chloroform breakthrough. Different filter designs have different capacity ratings, but the order of breakthrough for the VOCs tested was similar.

NSFI tests this by using chloroform at an influent concentration of 300 ppb. In order to pass the standard, the filter must reduce a minimum of 95% of the chloroform for twice the rated life of the filter if no monitor is used, or 120% if a monitor is included. The eSpring™ Water Purifier has passed this testing and is listed by NSFI for reduction of VOCs (including Trihalomethanes) via the surrogate test program. Therefore, the following claims can be made:

Organic Chemical Reduction Determined by Surrogate Testing

Chemical	Drinking water regulatory level ¹ (MCL/MAC) mg/l (ppb)	Influent Challenge Level ² mg/l (ppb)	Chemical Reduction Percent	Maximum Product Water Level mg/l (ppb)
alachlor	2.0	50	> 98	1.0 ³
atrazine	3.0	100	> 97	3.0 ³
benzene	5.0	81	>99	1.0 ³
carbofuran	40	190	>99	1.0 ³
carbon tetrachloride	5.0	78	98	1.8 ⁴
chlorobenzene	100	77	>99	1.0 ³
chloropicrin	---	15	99	0.0002 ³
2,4-D	70	110	98	1.7 ⁴
dibromochloropropane (DBCP)	0.2	52	>99	0.02 ³
o-dichlorobenzene	600	80	>99	1.0 ³
p-dichlorobenzene	75	40	>98	1.0 ³

Organic Chemical Reduction Determined by Surrogate Testing

Chemical	Drinking water regulatory level ¹ (MCL/MAC) mg/l (ppb)	Influent Challenge Level ² mg/l (ppb)	Chemical Reduction Percent	Maximum Product Water Level mg/l (ppb)
1,2-dichloroethane	5.0	88	954	4.8 ⁵
1,1-dichloroethylene	7.0	83	>99	1.0 ³
cis-1,2-dichloroethylene	70	170	>99	0.5 ³
trans-1,2-dichloroethylene	100	86	>99	1.0 ³
1,2-dichloropropane	5.0	80	>99	1.0 ³
cis-1,3-dichloropropylene	n/a	79	>99	1.0 ³
dinoseb	7.0	170	99	0.2 ⁴
endrin	2.0	53	99	0.59 ⁴
ethylbenzene	700	88	>99	1.0 ³
ethylene dibromide (EDB)	0.05	44	>99	0.02 ³
Haloacetonitriles (HAN):				
bromochloroacetonitrile	--	22	98	0.5 ³
dibromoacetonitrile		24	98	0.6 ³
dichloroacetonitrile		9.6	98	0.2 ³
trichloroacetonitrile		15	98	0.3 ³
Haloketones (HK):				
1,1-dichloro-2-propanone	--	7.2	99	0.1 ³
1,1,1-dichloro-2-propanone		8.2	96	.3 ³
heptachlor (H-34, Heptox)	0.4	80	>99	0.4
heptachlor epoxide	0.2	10.76	98	0.2 ⁶
hexachlorobutadiene	n/a	44	>98	1.0 ³
hexachlorocyclo-pentadiene	50	60	>99	0.002 ³
lindane	0.2	55	>99	0.01 ³
methoxychlor	40	50	>99	0.1 ³
pentachlorophenol	1.0	96	>99	1.0 ³
simazine	4.0	120	>97	4.0 ³
styrene	100	150	>99	0.5 ³
1,1,2,2-tetrachloroethane	n/a	81	>99	1.0 ³
tetrachloroethylene	5.0	81	>99	1.0 ³
toluene	1,000	78	>99	1.0 ³
2,4,5-TP (silvex)	50	270	99	1.6 ⁴
tribromoacetic acid	---	42	>98	1.0 ³

Chemical	Drinking water regulatory level ¹ (MCL/MAC) mg/l (ppb)	Influent Challenge Level ² mg/l (ppb)	Chemical Reduction Percent	Maximum Product Water Level mg/l (ppb)
1,2,4-trichlorobenzene	70	160	>99	0.5 ³
1,1,1-trichloroethane	200	84	95	4.6 ⁴
1,1,2-trichloroethane	5.0	150	>99	0.5 ³
trichloroethylene	5.0	180	>99	1.0 ³
trihalomethanes (includes):				
chloroform				
(surrogate chemical)	100	300	95	15
bromoform				
bromodichloromethane				
chlorodibromomethane				
Xylenes (total)	10,000	70	>99	1.0 ³

¹ These harmonized values were agreed upon by representatives of U.S. EPA and Health Canada for the purpose of evaluating products to the requirements of this Standard

² Influent challenge levels are average influent concentrations determined in surrogate qualification testing.

³ Maximum product water level was not observed but was set at the detection limit of the analysis.

⁴ Maximum product water level is set as a value determined in surrogate qualification testing.

⁵ Chemical reduction percent and maximum product water level calculated at chloroform 95% breakthrough point as determined in surrogate qualification testing.

⁶ The surrogate test results for heptachlor epoxide demonstrated a 98% reduction. These data were used to calculate an upper occurrence concentration which would produce a maximum product water level at the MCL.

Notes:

- 1) NSF listings are specific to the above claims and are not related to other claims made by Access Business Group LLC.
- 2) Production information can be accessed via the internet at www.espring.com
- 3) For additional information about NSF International, contact:
NSF International
Call 1-800-NSF-MARK
Information can also be accessed via the internet at www.nsf.org.

NOTE: The eSpring™ Water Purifier must be maintained according to manufacturer's instructions to ensure proper product performance. Note that the system's cartridge must be replaced as recommended in the Owner's Manual. NSF International's standards are also standards of the American National Standards Institute (ANSI).

Technical/Regulatory Information and Qualifications for Use

Owner's Manual

The following qualifications for use of the eSpring™ Water Purifier are provided to the user in the Owner's Manual. These guidelines must be followed in order to assure proper performance and to qualify for warranty protection.

1. The eSpring Water Purifier is designed for use only with cold, municipally treated (potable) water or private wells deemed potable by local public health officials.
2. DO NOT use with warm or hot water as this may damage the system.
3. During normal operation, if the system has not been used for a several hours (e.g., overnight), run water through the unit for 30 seconds prior to use.
4. The cartridge must be replaced at least once every 12 months, or 5000 litres (1,320 gallons), whichever comes first. In areas of very poor water quality, more frequent replacement may be needed.
5. Thread sealing compounds should NOT be used with the eSpring Water Purifier. The water connections are designed to produce water-tight seals without any such sealants, and the components could be damaged by solvents used in the sealants.
6. DO NOT allow vegetable oil, petroleum jelly or other lubricants, solvents, ammonia, alcohols, acids, or strong cleaning solutions to come in contact with the eSpring Water Purifier. They could cause permanent damage to the components. When cleaning inside or outside housing, use a mild liquid dishwashing detergent (such as DISH DROPS™) and water.
7. Do not use the eSpring Water Purifier unless it is plugged in to an appropriate electrical outlet.
8. Intended for use in residential applications, not under full line pressure.

eSpring Product Specifications

As you can see by the comparison chart on Page 21 and by the following specifications, the eSpring™ Water Purifier has more features and better performance than any other of our previous models.

Dimensions

Height: 327 mm (12 7/8")

Weight

Dry: 2.53 kg (without tubing or diverter)

Filled: 3.68 kg

Water Pressure Range

15 – 125 psi (103kPa – 860kPa)

System Flow Rate

3.4 lpm (0.9 gpm) at 60 psi water pressure with new filter element

Flow rate will vary directly with water pressure and length of time filter element has been in service

Unit Covering

Construction Material: durable, high impact, engineering grade plastic

Cartridge

Multi-stage, pressed activated carbon block with internal UV lamp cartridge (patented design)

Flow Monitor

Magnetic turbine sensor accurately monitors flow

System Display

Light Emitting Diode (LED) display showing:

1. Water flow
2. Remaining filter life
3. System status and error messages

Water Contact Surfaces

Surfaces made with FDA-approved materials; all contact surfaces have passed NSF1 extraction tests as specified in Standards 42, 53 and/or 55

System Tubing

EVA thermoplastic (above counter)
Polyethylene tubing colour coded (below counter)

Faucet Diverter

Dual line diverter, with pin to actuate treated water back to the faucet (above counter)
Auxiliary faucet with ceramic disk technology to deliver eSpring water (below counter)

Electrical

Requires appropriate electrical connection

Product Performance Claims Support

Performance Claims

1. Effectively removes chlorine.
2. Effectively removes chloramine.
3. Improves taste, odour, and clarity of water.
4. Improves taste of beverages made with filtered water.
5. Effectively removes more than 140 organic contaminants from water, such as volatile organic compounds (VOCs), pesticides, and trihalomethanes.
6. Effectively removes more than 13 disinfection by-products.
7. Effectively removes more than 30 pesticides and pesticide by-products.
8. Effectively removes vinyl chloride.
9. Effectively removes Microcystin LR, the most common algae toxin.
10. Effectively removes particulates down to 0.2 microns, including asbestos, sediment, dirt, and scale.
11. Effectively removes lead in drinking water.
12. Effectively removes mercury in drinking water.
13. Effectively removes radon and radon decay products in drinking water.
14. Effectively removes waterborne parasites larger than 3 to 4 microns.
15. Does not remove beneficial minerals, such as calcium, magnesium, and fluoride.
16. Effectively removes MTBE (Methyl Tertiary Butyl Ether).
17. Ultraviolet light destroys >99.99% of waterborne disease causing bacteria and viruses in drinking water.
18. Ultraviolet light destroys Cryptosporidium.
19. The carbon filter will treat drinking and cooking water for 5,000 litres (1,320 gallons) or one year, whichever comes first, enough to meet the needs of a family of 6.
20. Convenient, replaceable carbon/UV cartridge.
21. Attaches to most standard kitchen water faucets.
22. Uses exclusive patented technology. U.S. patents 4,753,728; 4,859,386; 5,017,318; 6,368,504; 5,573,666; 5,529,689; 6,436,299. Additional U.S. and International patents granted or pending.

Please note: Contaminants or other substances referenced in this section are not necessarily in your drinking water. When the filter indicator signals end of life, the cartridge must be changed to ensure optimal performance.

Claim 1: Effectively removes chlorine

Most municipal water supplies are treated with chlorine to kill pathogenic organisms, consequently preventing the spread of waterborne diseases. Many people object to the taste of the chlorine.

Two eSpring™ units were tested for chlorine reduction by the NSF under Standard 42, “Drinking Water Treatment Units, Aesthetic Effects.” The units were tested to 100% of rated capacity, or 1,320 gallons of water. The water flow was cycled 10 minutes on and 10 minutes off at a line pressure of 60 psi. The chlorine reduction criteria established by NSF is an influent concentration of 2.0 ppm. Free chlorine must be reduced by a minimum of 75%. The eSpring Water Purifier removed more than 98% of the chlorine.

Claim 2: Effectively removes chloramine

While many municipalities add chlorine to the water supply to prevent the spread of waterborne disease organisms, an alternate disinfection material, chloramine, is becoming commonly used as well. As with chlorine, chloramine adds taste and odour components to the drinking water that are often considered undesirable. The eSpring system was tested in duplicate for chloramine reduction by NSF under standard 42, “Drinking Water Treatment Units, Aesthetic Effects.” The units were tested to 5,000 litres (1,320 gallons), the rated life of the filter as outlined in the protocol. The protocol requires water to be contaminated with chloramine as monochloramine at a concentration of 3 ppm and the system being tested must reduce these levels to less than 0.51 ppm. The eSpring system reduced 2.9 ppm influent concentrations of monochloramines with a maximum effluent concentration of 0.33 ppm.

Claim 3: Improves taste, odour, and clarity of water

In a consumer market test conducted in a U.S. city, the product was judged well for the reduction of taste and odour, and improvement of clarity. The following percentages of the panelists judged improvements in the various areas of water quality:

- Improved Clarity 79%
- Improved Taste 98%
- Improved Odour 86%

Claim 4: Improves taste of beverages made with filtered water

In the consumer market testing mentioned above, panelists were also asked whether the taste of beverages prepared with treated water was improved. The eSpring™ Water Purifier improved the taste of beverages made with treated water according to 82% of the panelists.

Two other additives – methyl isoborneol and geosmin, which are related to the presence of algae in the water source – are also considered significant sources of unacceptable taste. Consumers often complain about the taste and odour of such water, particularly in supplies that are subject to a seasonal algae problem. Activated carbon has been shown to be an effective method of reducing these compounds.

Claim 5: Effectively removes organic contaminants from water, including over 140 contaminants such as volatile organic compounds (VOCs), pesticides, and trihalomethanes

The eSpring Water Purifier has been documented to effectively remove an extensive list of organic compounds from water. The testing for these compounds has been conducted by several different laboratories.

Activated carbon can reduce concentrations of many organic compounds from water by a mechanism called adsorption. In the activation process, numerous pores are created in the carbon, greatly increasing the surface area. The carbon used in the eSpring Water Purifier has a particularly high adsorption capacity for organic contaminants found in drinking water.

The design of the carbon bed is also critical to filter performance. Factors such as carbon type, carbon particle size, amount of carbon, the physical structure of the filter, the water path and flow rate are all critical parameters. A well designed system can reduce common drinking water contaminants to extremely low levels for the rated life. NSF International and other third-party testing have documented the organic contaminant reduction performance test. These tests documented that eSpring effectively removes 140 organic compounds from water.

The U.S. Environmental Protection Agency (EPA) has compiled a list of contaminants which it has classified as priority pollutants. The eSpring™ Water Purifier effectively removes a broad range of these contaminants.

The range of compounds in the priority pollutant list and the methods used to analyze for them are too extensive to summarize in this document. Typically, the methods used were as follows:

The contaminants were dissolved in a minimum of an appropriate solvent mixture and injected into the moving feed water stream with a high pressure, liquid chromatography pump. This mixture then passed through a motionless mixer to assure uniform mixing. The influent, (challenge water), and effluent (water after the filter), were sampled at several points spaced throughout the rated life of the filter, which is 5,000 litres (1,320 gallons). As a safety factor, testing exceeded the rated life of the cartridge. The cartridges were tested in duplicate.

Where applicable, the samples were taken according to U.S. EPA protocols and analyzed by relevant U.S. EPA methods, or methods that were appropriate for the compounds present. The analytical methods used were acceptable technology for each of the contaminant classifications. The minimum detection limits shown were determined using U.S. EPA procedures. U.S. EPA Quality Assurance/Quality Control procedures were followed during analysis.

As the need arose for specific analytical techniques and/or confirmation of eSpring test results, certain compounds were evaluated by outside testing laboratories.

Listed below, arranged alphabetically, are the compounds tested, the detection limits for each compound, the measured average influent, the effluent averaged for the duplicate filters, percent reduction obtained in testing, and the calculated total loading on the filter. The measured average influent is an average of the influent concentrations throughout the study, and represents a minimum of seven points. The calculated loading is the summation of the influent concentration times the gallons of water passed at that concentration.

NOTE: If the effluent sample shows the designation <DL, this indicates that the level of contaminant in the effluent was below the ability of the analytical method to detect it. As an example, Acenaphthene could not be detected in the effluent samples. The detectable limit was 0.23 ppb. The level of Acenaphthene in the effluent samples would be at some level between zero and 0.23 ppb. If the effluent level of Acenaphthene (at 1,500 gallons) was at the detectable limit, the percent removal would be 99.7%. However, since the actual level of reduction (which would be somewhere between 99.7% and 100%) cannot be determined, the results are simply listed as >99.7%.

Compound	Detection Limit (ppb)	Average Influent 1,500 gal (ppb)	Average Effluent 1,500 gal (ppb)	Percent Reduction @ 1,500 gal	Total Loading (mg)
Acenaphthene	0.23	67.9	<DL	>99.7	386
Acenaphthylene	0.15	44.9	<DL	>99.7	255
Aldrin	0.12	14.4	0.38	97.4	81.7
Anthracene	0.00036	0.0106	<DL	>96.6	0.0602
Benzidine	0.010	2.54	<DL	>99.6	14.5
Benzo(a)anthracene	0.0016	0.224	<DL	>99.3	1.274
Benzo(a)pyrene	0.0023	0.0605	0.00456	92.5	0.344
Benzo(b)fluoranthene	0.0023	0.316	0.00416	98.7	1.800
Benzo(ghi)perylene	0.0090	0.434	0.0390	91.0	2.469
Benzo(k)fluoroanthene	0.0024	0.325	0.00611	98.1	1.849
alpha-BHC	0.30	80.6	<DL	>99.6	460
beta-BHC	0.30	81.4	<DL	>99.6	465
delta-BHC	0.30	77.8	<DL	>99.6	445
gamma-BHC	0.30	80.9	<DL	>99.6	463
Bis(2-chloroethoxy)methane	0.98	136	<DL	>99.3	775
Bis(2-chloroethyl)ether	2.2	213	<DL	>99.0	1,208
Bis(2-chloroisopropyl)ether	3.6	206	<DL	>98.3	1,170
Bis(2-ethylhexyl)phthalate	1.0	199	<DL	>99.5	1,122
4-Bromophenyl phenyl ether	2.0	225	<DL	>99.1	1,277
Butyl benzyl phthalate	1.4	226	<DL	>99.4	1,276
Chlordane	0.23	58.9	0.27	99.5	333
4-Chloro-3-methyl phenol	1.6	171	<DL	>99.1	973
2-Chloroethyl vinyl ether	0.21	298	<DL	>99.9	1,693
2-Chloronaphthalene	0.60	53.2	2.50	95.3	304
2-Chlorophenol	3.3	175	<DL	>98.1	993

Compound	Detection Limit (ppb)	Average Influent 1,500 gal (ppb)	Average Effluent 1,500 gal (ppb)	Percent Reduction @ 1,500 gal	Total Loading (mg)
4-Chlorophenyl phenyl ether	1.8	197	<DL	>99.1	1,119
Chrysene	0.0051	0.232	<DL	>97.8	1.322
4,4-DDD	0.40	59.4	1.05	98.2	339
Di-n-butyl phthalate	1.0	245	<DL	>99.6	1,380
Di-n-octyl phthalate	2.1	179	<DL	>98.8	1,009
Dibenzo(a,h)anthracene	0.0090	0.524	0.0345	93.4	2.983
1,3-Dichlorobenzene	0.19	99.7	<DL	>99.8	637
3,3-Dichlorobenzidine	0.020	4.89	<DL	>99.6	27.8
2,4-Dichlorophenol	2.1	161	<DL	>98.7	917
cis-1,3-Dichloropropene	1.0	554	<DL	>99.8	3,484
trans-1,3-Dichloropropene	0.22	163	<DL	>99.9	1,020
Dieldrin	0.16	132	0.43	99.7	752
Diethyl phthalate	0.70	202	<DL	>99.7	1,138
Dimethyl phthalate	0.40	197	<DL	>99.8	1,113
2,4-Dimethylphenol	2.2	167	<DL	>98.7	949
4,6-Dinitro-2-methyl phenol	0.43	57.4	<DL	>99.3	326
2,4-Dinitrophenol	0.18	57.6	<DL	>99.7	328
2,4-Dinitrotoluene	10	175	<DL	>94.3	993
2,6-Dinitrotoluene	10	204	<DL	>95.1	1,161
1,2-Diphenylhydrazine	1.6	161	<DL	>99.0	917
alpha-Endosulfan	0.30	75.6	2.20	97.1	432
beta-Endosulfan	0.30	79.4	1.95	97.5	454
Endosulfan Sulfate	0.70	85.2	3.95	95.4	487
Endrin	0.12	127	0.44	99.7	724
Endrin Aldehyde	0.21	20.3	<DL	>99.0	116
Fluoranthene	0.0054	0.303	<DL	>98.2	1.722
Fluorene	0.025	7.56	<DL	>99.7	42.9
Heptachlor	0.11	24.6	0.19	99.2	140
Heptachlor epoxide	0.15	123	0.50	99.6	700
Hexachlorobenzene	1.0	84.3	<DL	>98.8	479
Hexachlorocyclopentadiene	1.3	47.8	2.15	95.5	273

continued on page 83

Compound	Detection Limit (ppb)	Average Influent 1,500 gal (ppb)	Average Effluent 1,500 gal (ppb)	Percent Reduction @ 1,500 gal	Total Loading (mg)
Hexachloroethane	1.6	46.6	<DL	>96.6	266
Isophorone	2.9	177	<DL	>98.4	1,003
Naphthalene	0.075	23.4	<DL	>99.7	133
Nitrobenzene	2.4	156	<DL	>98.5	886
2-Nitrophenol	0.74	150	<DL	>99.5	851
4-Nitrophenol	0.099	57.6	<DL	>99.8	328
N-Nitrosodi-n-propylamine	1.3	157	<DL	>99.2	890
N-Nitrosodiphenylamine	1.3	147	<DL	>99.1	834
PCB-1016	0.70	57.9	<DL	>98.8	331
PCB-1221	0.20	49.7	<DL	>99.6	284
PCB-1232	0.50	30.9	<DL	>98.4	177
PCB-1242	0.30	35.5	<DL	>99.2	204
PCB-1248	0.20	35.6	<DL	>99.4	204
PCB-1254	0.10	40.3	1.00	97.5	231
Pentachlorophenol	2.4	245	<DL	>99.0	1,392
Phenanthrene	0.00072	0.0752	<DL	>99.0	0.428
Phenol	1.3	68.7	<DL	>98.1	391
Pyrene	0.0063	0.328	<DL	>98.1	0.1867
TCDD (2,3,7,8-Tetrachloro-dibenzo-para-dioxin)	0.000007	0.0131	<DL	>99.9	0.0718
Toxaphene	0.39	182	6.92	96.2	1,034
1,2,4-Trichlorobenzene	0.31	87.3	0.63	99.3	563
1,1,2-Trichloroethane	0.18	123	<DL	>99.9	779
2,4,6-Trichlorophenol	2.1	168	<DL	>98.7	955

ppb = parts per billion or micrograms per litre

Claim 6: Effectively removes over 13 disinfection by-products

During disinfection processes at municipal water treatment facilities, low levels of compounds can be formed when a disinfectant (typically chlorine or chloramine) reacts with residual organic matter. These compounds are referred to as disinfection by-products. Some of these compounds are suspected carcinogens, and are an increasing concern to

regulatory agencies. Different disinfectant by-products may be reduced with varying degrees of success by activated carbon.

Several tests have been conducted to document the reduction of several different compounds. Testing for trihalomethanes (THM) reduction was conducted by NSF International under NSF/ANSI Standard 53. Results showed a 99.8% reduction at the end of the test period. Therefore, the eSpring™ Water Purifier is certified by NSF International, under NSF/ANSI Standard 53 for the reduction of trihalomethanes, including chloroform, bromoform, bromodichloromethane, and chlorodibromomethane.

Testing for Mutagen X (MX) reduction was performed at an independent laboratory with methods specially designed to document the reduction of this material. The tests showed the eSpring filter is effective in reducing Mutagen X from water throughout the rated life of the filter.

An additional group of disinfection by-products has been identified as significant contaminants of concern. Two eSpring Water Purifiers were each tested to 5,900 litres to determine their ability to reduce these compounds.

The charts below sum up the results:

Contaminant	Influent Concentration ppb	Effluent Concentration ppb	Chemical Reduction Percent
Tribromoacetic Acid	18	<1.0	>94.4
Bromochloroacetonitrile	5.5	<0.1	>98.2
Dibromoacetonitrile	12	<0.1	>99.2
Dichloroacetonitrile	6.2	<0.1	>98.4
Trichloroacetonitrile	7.3	<0.1	>98.6
1,1-Dichloropropanone	4.9	<0.1	>98.0
1,1,1-Trichloropropanone	5.8	<0.1	>98.3
Chloropicrin	13	<0.1	>99.2

The table below summarizes the results of MX testing.

Sample Litres	Percent of Filter Life	Influent MX (mg/L)	Effluent A MX (mg/L)	Effluent B MX (mg/L)	Percent Reduction A	Percent Reduction B
1226	26%	1.37	<0.035	<0.035	>97.9%	>97.9%
2483	52%	0.90	<0.035	<0.035	>97.9%	>97.9%
3721	79%	1.65	<0.035	<0.035	>97.9%	>97.9%
4928	104%	1.93	<0.035	<0.035	>97.9%	>97.9%
5886	124%	2.61	0.051	0.062	96.9%	96.2%

Claim 7: Effectively removes over 30 pesticides and pesticide by-products

Pesticide contamination of groundwater and surface water is of increasing concern in the last few years, particularly in agricultural areas. Although pesticide contamination of drinking water does not appear to be widespread, surveys have shown contamination does occur. Tests monitored by NSF International indicate that the eSpring™ Water Purifier effectively removes the following pesticides and by-products:

Alachlor	4,4-DDD	Guthion
Aldicarb (Temik)	2,4-D	Heptachlor
Aldrin	Dibromochloropropane	Heptachlor epoxide (1)
Atrazine	(DBCP)	Hexachlorobenzene
alpha-BHC	1,2-Dibromomethane (EDB)	Malathion
beta-BHC	Dieldrin	Methoxychlor
delta-BHC	alpha-Endosulfan	Parathion
gamma-BHC (Lindane)	beta-Endosulfan	Pentachlorophenol
Carbaryl	Endosulfan sulfate (1)	Strychnine
Chlordane (technical mix.)	Endrin	2,4,5-TP (Silvex)
Chlorpyrifos	Endrin Aldehyde	Toxaphene

(1) Pesticide by-products

Claim 8: Effectively removes vinyl chloride

Vinyl chloride is a colourless organic gas that is used in the plastics industry to make polyvinyl chloride (PVC). PVC pipe is often used as a material for drinking water pipes. In the mid-1970s it was discovered that vinyl chloride was causing cancer in workers through exposure in the factories. Prior to that, much of the PVC pipe contained high levels of residual vinyl chloride, which could contaminate drinking water. Since that time, manufacturing methods for the pipe have changed to significantly reduce any vinyl chloride that may be in the plastic, and this is not considered a problem with the newer pipe. However, much of the earlier pipe is still in use and vinyl chloride contamination of drinking water is still occurring. Vinyl chloride is also a common by-product formed by the biodegradation of some industrial solvents. This can result in the contamination of ground water. The US EPA has established a maximum contaminant level (MCL) of 2 ppb for vinyl chloride in drinking water.

Prior models* were tested for the reduction of vinyl chloride from water. The test was conducted according to NSF/ANSI Standard 53-1998 Drinking Water Treatment Units Health Effects. The testing was conducted internally under the review of NSF International. NSF generated the protocol and audited the testing operation to assure compliance with the protocol.

The systems were run in a cycle of 10 minutes on and 10 minutes off, for 16 hours per day. Vinyl chloride was added to a municipal water source at an average concentration of 8 ppb. The water had an average background total trihalomethane (TTHM) concentration of 28.3 ppb during the test period. Duplicate water treatment systems were tested for a total of 1500 gallons each.

The systems reduced the vinyl chloride concentration to less than the instrument detection limit of 0.5 ppb, throughout the test period of 1500 gallons. This is greater than a 93% reduction of the vinyl chloride.

A mathematical model was used for the prediction of vinyl chloride reduction capacity for the systems. This model predicted the capacity for the filter to be greater than 95 percent at its rated capacity for the reduction of vinyl chloride. When comparing the modeling performance using the same influent and background TTHM concentrations, the model

compares very close to the actual data. The model predicted that the filter would reach the EPA 2.0 ppb MCL before the actual duplicate filter performance did showing the model to be a conservative prediction.

The eSpring™ and other model filters are manufactured with the same raw materials and process. This same mathematical model was used to predict the performance of the eSpring filter to reduce organic compounds, like chloroform, before the filters were submitted to NSF for certification. Based on the numerous performance evaluations and NSF certification of the eSpring filter, it has continued to demonstrate that it performs as well as the other filters. The mathematical model was once again used to determine the reduction performance of vinyl chloride. The model predicted that the eSpring filter can reduce vinyl chloride below the U.S. EPA maximum contaminant level of 2 ppb for greater than 6,908 litres (1,825 gallons). The rated life of the eSpring filter is 5,000 litres (1,320 gallons) and the modeling prediction demonstrates the performance well beyond the rated life with a 1,893 litre (500 gallon) margin of safety.

The eSpring system's ability to reduce vinyl chloride is predicted to be greater than 95% at its rated life.

*Prior models used for testing: E84, E8301, E3411

Claim 9: Effectively removes Microcystin LR, a common algae toxin

Algae are microorganisms that grow in water, particularly if the water is stagnant and contains high levels of nutrients. Algae cells can form long filaments that form into floating mats on the surface of water. Algae can cause taste and odour problems in drinking water. Certain species of algae also produce toxins, which can be released into the water. Recently, researchers have found these toxins in drinking water used for human consumption. Some of these toxins can have immediate effects if ingested, and some are suspected carcinogens. The most common algae toxin found in drinking water is Microcystin LR.

We contracted to have prior models* tested for the reduction of Microcystin LR from drinking water. In addition to Microcystin LR chloroform was added to act as a surrogate. In an NSF International audited study conducted at a major university by a professor who is considered a leading expert on algae toxins, the systems reduced the concentration of the

Microcystin LR toxin to a level less than the instruments were capable of detecting. This is greater than a 99.8% reduction. The surrogate, chloroform, did not break through at the end of the 6,132 litre (1,620 gallon) test. Therefore, it can represent Microcystin LR. The eSpring™ and prior models' filters are manufactured with the same raw materials and process. Based on this surrogate program, the eSpring Water Purifier will also reduce Microcystin LR to greater than 99.8 percent.

*Prior models used for testing: E84, E8301, E3411

Claim 10: Effectively removes particulates down to 0.2 microns including asbestos, sediment, dirt, and scale

The eSpring unit uses a compressed carbon block filter. The spaces between the carbon particles in the filter are extremely small and are able to filter out small particles. The claim for particulate reduction down to 0.2 microns has been documented by the following:

1. A test of the ability of the filter to reduce particles of a test dust down to 0.5 microns. Conducted by NSF International, this test qualified the eSpring system for certification under NSF Standard 42 reducing particles by greater than 85% to achieve Class I reduction.
2. Other lab testing has shown the eSpring Water Purifier's ability to reduce even smaller contaminants. The data showed that eSpring system effectively removes particles in water down to 0.2 microns. This testing was performed in our laboratory and samples were sent out for CCSEM (Computer Controlled Scanning Electron Microscope) equipped with an energy dispersive X-ray spectrophotometer. This provided an analysis of the size of particles as well as elemental composition of the particles. Testing was performed on two systems using ISO fine test dust (0 – 80 micron). The lowest particle removal efficiency was 96.6 % at 25% reduction in flow for one of the filters in the 0.2 – 0.4 micron range. Particle removal improved as particle size increased.
3. Two eSpring Water Purifier units were tested for asbestos reduction by NSF International under NSF Standard 53. The tests yielded a reduction of asbestos fibers of 99.99%. This certifies the eSpring unit for asbestos reduction under standards set by NSF International.

Claim 11: Effectively removes lead in drinking water

Lead is rarely found naturally in water but can enter into drinking water through lead pipes or from solder which contains lead. Lead can exist in different forms in water, depending on the pH. A water treatment device may be effective at one pH but not another. Therefore, it is important to test a water treatment system at two different pHs more to accurately determine lead reduction.

The eSpring™ Water Purifiers were tested for lead reduction by NSF International under Standard 53 specifications. The test units achieved greater than 99% reduction, which qualified them for NSF International certification for drinking water lead reduction.

Claim 12: Effectively removes mercury in drinking water

Mercury can enter the water supply through environmental contamination from industrial and waste sources. It can exist in different forms in water, depending on the pH. Therefore a water treatment device may be effective at one pH, but not another. This is why it is important to test a water treatment system at two different pHs to accurately determine mercury reduction.

The eSpring Water Purifier cartridges were tested for mercury reduction by NSF International under Standard 53. The units achieved greater than 81.1% reduction, earning NSF International certification for mercury reduction in drinking water.

Claim 13: Effectively removes radon and radon decay products in drinking water

Radon is a naturally occurring radioactive gas that has no taste, odour, or colour. It is produced by the natural breakdown of uranium and is found in soils and rocks containing uranium, granite, shale, phosphate, and pitchblende. Most radon rises out of soil and rock and is harmlessly released into the atmosphere. Hazardous exposure to high concentrations of radon can occur under two circumstances:

1. Waterborne radon released into the air from showers, washing machines, and dishwashers can be inhaled and increase the risk of lung cancer; and
2. Ingestion of radon in drinking water may increase the risk of stomach cancer.

Prior model pressed carbon block smaller in weight than the eSpring Water Purifier was tested for radon reduction by a leading U.S. radon researcher. This smaller carbon block removed 99.8% of the radon. The eSpring system has more carbon and therefore will reduce an equal or greater amount of radon. The testing also showed that the radon decay products were retained by the filter. This shows that the eSpring system can be an effective method of reducing the risk of ingestion of radon. At high levels of radon (above 3,500 pCi/L) all of the water in the home should be treated, because the risk from inhalation becomes more significant.

Claim 14: Effectively removes waterborne parasites larger than 3 to 4 microns

The eSpring™ Water Purifier has been shown to effectively remove particles as small as 0.2 microns per claim 10. Cryptosporidium oocysts are in the 3 to 4 microns size range. Since these represent the smallest protozoan parasitic organisms likely to be found in drinking water, eSpring will also effectively reduce any other larger waterborne parasites by 99.95%.

The following table lists the relative sizes of most of the known waterborne protozoan parasites. Some of these are only found in subtropical or tropical regions. Giardia and Cryptosporidium are the most likely to be found in the United States.

Protozoan Parasite	Size (micrometer)
Cryptosporidium parvum	3 to 4
Endolimax	5 to 14
Iodamoeba	5 to 14
Naegleria	7 to 21
Cyclospora cayetanesis	8 to 10
Giardia lamblia	8 to 12 x 6 to 8
Entamoeba histolytica	10 to 20
Toxoplasma gondii	10 to 13 x 9 to 11
Acanthamoeba	12 to 23
Eggs of Taenia solium	35 to 40
Eggs of Ascaris lumbricoides	40 to 75 x 35 to 50

Most other waterborne protozoan parasites of potential concern occur in subtropical or tropical regions, and are infective to humans in the larval stage. These larval worms are very large compared to the above organisms. Since the eSpring system can effectively reduce the smallest of these protozoan parasites (Cryptosporidium), it will also effectively remove any other larger waterborne parasites.

Claim 15: Does not remove beneficial minerals, such as calcium, magnesium, and fluoride

In most municipal water systems, fluoride is added at low levels to improve dental health. It is also generally considered beneficial to ingest low levels of certain other minerals, such as calcium and magnesium, which are present in most water supplies at various levels. Tests conducted with municipal water supplies have shown that the eSpring™ Water Purifier does not remove calcium, magnesium or fluoride from drinking water.

Claim 16: Effectively removes MTBE (Methyl Tertiary Butyl Ether)

In the U.S., MTBE is a gasoline additive that is used to make it burn more efficiently. Unfortunately, this is also a contaminant that has made its way into groundwater due to leaking underground storage tanks and other sources. Although there are federal programs, in the U.S., underway to replace old underground storage tanks, MTBE is still being leached into drinking water supplies.

NSF/ANSI Standard 53 has a protocol to test drinking water systems to reduce MTBE. Two eSpring filters were tested at NSF for MTBE reduction. The mean influent challenge was 14.8 ppb. The effluent concentration was below detection limit throughout the test at 0.5 ppb. This means the actual reduction was greater than 96.6% for MTBE.

Claim 17: Ultraviolet light destroys more than 99.99% of waterborne disease causing bacteria and viruses in drinking water

Claim 18: Ultraviolet light destroys Cryptosporidium
Introduction

The US Environmental Protection Agency, through a multidisciplinary task force, developed a test protocol for water treatment devices for their ability to produce microbiologically safe water. The intent of the protocol is to test these devices with bacteria, viruses and cysts, for their designed operational life. The guide standard establishes that any microbiological water purifier is to be capable of removing or inactivating enteric bacteria, viruses and protozoan parasites. The devices must also be capable of achieving these results under realistic “worst case” water quality conditions.

The test requires a device to reduce specified bacteria, viruses and cysts from drinking water in a series of flowing and stagnant conditions. The test protocol applies only to microorganisms, and does not measure the ability of a system to reduce chemical or particulate contamination. The microorganisms and the reduction requirements are listed below.

US EPA Guide Standard

Organism	Influent Challenge	Minimum Organism Reduction
Bacteria Klebsiella terrigena	10 ⁵ /ml	99.9999%
Virus Poliovirus	10 ⁴ /ml	99.99%
Rotavirus	10 ⁴ /ml	99.99%
Cyst Giardia lamblia or Cryptosporidium	10 ³ /ml 10 ³ /ml	99.9% 99.9%

Test Methods

Three separate tests were used to prove the performance of the UV/reactor of the eSpring™ Water Purifier:

- 1) A modified U.S. EPA Guide Standard
- 2) UV Dose measurement with MS-2 coliphage
- 3) Cyst Infectivity with live Cryptosporidium parvum oocysts

Test Method 1

The EPA standard as an established guide for testing microorganisms, which included bacteria, viruses and cysts, and as a basis for evaluating other organisms not directly identified in the protocol.

The protocol for the studies was based on the U.S. EPA Guide Standard and Protocol for Testing Microbiological Water Purifiers, Task Force Report April 1987. Testing was performed at an independent, third-party facility. Three filters were challenged under simulated worst case conditions over a 13-day period. The water was supplied to the products for 150% of the rated life of the system, for a total of 7,500 litres (1,980 gallons), in an “On/Off” cycle (one minute on/two minute off cycle). The initial flow rate of the water was set at 3.4 lpm (0.9 gpm) the maximum recommended for the system.

Four challenges of water, containing the microorganisms at the appropriate level, were supplied to each unit at water treatment volumes of 250, 3,748, 5,000, and 7,500 litres (66, 990, 1,320, and 1,980 gallons). At these times influent and effluent samples were taken and assayed by standard methods for the organism under study. After two 48-hour stagnation periods, initial effluent water samples were also sampled and assayed to determine the possible presence of organisms after prolonged stagnation. The physical and chemical parameters of the dechlorinated water and test system were monitored daily.

Coliphage MS-2, a non-pathogenic virus, was included in this testing because it is the test organism in NSF/ANSI Standard 55, Ultraviolet Microbiological Water Treatment Systems, to assess the effectiveness of drinking water treatment systems, due to its high resistance to ultraviolet light.

Results:

The table below shows the results of the bacterial and virus challenge of the eSpring™ Water Purifier.

Microorganism Reduction Data

Microorganism	Influent	Effluent	Percent Reduction
Bacteria			
Klebsiella terrigena	1.82 x 10 ⁷ /100 ml	<1/100 ml	>99.9999
Viruses			
Poliovirus	4.97 x 10 ⁸ /1000 ml	<1000/1000 ml	>99.99
Rotavirus	3.03 x 10 ⁷ /1000 ml	<100/1000 ml	>99.99
Coliphage MS-2	1.6 x 10 ⁵ /ml	0.457 x 10 ² /ml	99.97

Test Method 2

The UV dosage of the ultraviolet lamp in the eSpring Water Purifier was determined using MS-2 coliphage. This organism was calibrated against known UV doses to determine the level of reduction per unit of intensity. This test was performed on two units at a third-party laboratory. The flow rate of the test unit was adjusted to a maximum of 0.9 gallons/minute. The lamp used in the test was conditioned for 150% of capacity of the system to simulate worst case aging. There were two different challenge waters used in this test to cover extreme conditions of Total Organic Carbon (TOC), nitrates, nitrites, and turbidity. The TOC was added as potassium hydrogen phthalate. The turbidity was tested at two levels 0.3

and 3.0 NTU using 0 – 5 micron test dust. During this test the actual filter had holes drilled in it to demonstrate the UV dose of the lamp/reactor itself. The test organism was injected into the challenge water entering the eSpring™ Water Purifier, and the effluent stream was sampled to determine the reduction rate on this organism. The UV reduction rate was then compared to the calibration information to determine the UV dose.

In order to support the reduction of other bacteria with the eSpring Water Purifier, studies were done to show that if a system provided adequate control of an organism with a certain sensitivity to UV energy, then organisms that were controlled at lower levels of UV energy would also be adequately reduced by the eSpring Water Purifier. For this surrogate bacteria reduction method, Klebsiella terrigena was used as the primary testing organism. The amount of UV energy needed to reduce Klebsiella terrigena by at least 99.9% was compared to the UV energy needed to reduce several other bacteria by at least 99.9%. The table below shows these relative intensities.

Bacteria	UV Intensity for 99.9% Reduction	Expected Reduction at 42.2 mJ/cm ²
Shigella dysenteriae	2.080 mJ/cm ²	>99.9999%
Vibrio cholerae	2.236 mJ/cm ²	>99.9999%
Yesinia enterocolitica	3.652 mJ/cm ²	>99.9999%
Aeromonas hydrophila	3.697 mJ/cm ²	>99.9999%
Campylobacter jejuni	3.786 mJ/cm ²	>99.9999%
Enterohemorrhagic Escherichia coli	4.185 mJ/cm ²	>99.9999%
Salmonella typhi	6.639 mJ/cm ²	>99.9999%
Legionella pneumophila	7.441 mJ/cm ²	>99.9999%
Klebsiella terrigena	9.115 mJ/cm ²	>99.9999%

Results

By this method, the UV dosage of the eSpring Water Purifier was determined to be 42.2 mJ/cm². This intensity is well above the 9.1 mJ/cm² necessary to reduce Klebsiella terrigena by 99.9%, as well as the other organisms in the table that require less than 9.1mJ/cm². In fact, this evaluation determined that 42.2mJ/cm² will reduce Klebsiella terrigena by more than 99.9999%. Therefore, it is appropriate to conclude that the eSpring Water Purifier will control all of the organisms listed by more than 99.9999%.

Test Method 3

The Cyst Infectivity test was performed at an independent, third-party lab. Two units were tested in duplicate using *Cryptosporidium parvum* oocysts. The flow rate of the test unit was adjusted to a maximum of 3.4 lpm (0.9 gpm). The lamp used in the test was conditioned for 150% of capacity of the system to simulate worst case aging. The challenge water used in this test covered extreme conditions of TOC, nitrates, nitrites, and turbidity. The TOC was added as potassium hydrogen phthalate. The turbidity was set at 3.0 NTU using 0 – 5 micron test dust. During this test the actual filter had holes drilled in it to demonstrate the UV dose of the lamp/reactor itself. The test organism was injected into the challenge water entering the eSpring™ Water Purifier, and the effluent stream was sampled to determine the reduction rate on this organism.

Results

The table below shows the 99.95% reduction performance for *Cryptosporidium* oocysts of the eSpring Water Purifier. This completes the three classes of organisms under the U.S. EPA Guide Standard and Protocol for Testing Microbiological Water Purifiers.

Microorganism Reduction Data

Microorganism	Influent	Effluent	Percent Reduction
Cysts <i>Cryptosporidium parvum</i> oocysts	7.9 x 10 ³ /ml	1.4/ml	> 3.7 log

Claim 19: The carbon filter will treat drinking and cooking water for 5,000 litres (1,320 gallons) or one year, whichever comes first, well in excess of the need of a family of 6

Introduction

In order to assure that the eSpring Water Purifier provides an adequate supply of drinking and cooking water, an analysis of water usage per family was reviewed and incorporated into the product platform.

Results

The eSpring™ Water Purifier is listed by NSF International for a capacity of 5,000 litres (1,320 gallons). (1,2,3) indicate that an average family uses about 1,893 litres (500 gallons) of water per year for cooking and drinking. All testing was conducted to 5,000 litres (1,320 gallons) in order to ensure the recommended one year life.

The U.S. EPA estimates that the average person consumes 1.63 litres of “liquids” per day, based on nine different surveys taken from literature (4). This would equal 3,570 litres (943 gallons) per year for a family of six. This value has been rounded up to 2 litres per day by the U.S. EPA and used to calculate health risks of exposure to water contaminants. A family of six, drinking two litres per day, would use 4,380 litres (1,157 gallons) of water per year.

The claim that the eSpring Water Purifier will provide a sufficient quantity of adequately treated drinking and cooking water for the average family of six for one year is based on the following:

- a) the consumption of “liquids,” as determined in the referenced studies;
- b) most individuals consume a portion of their “liquids” from sources other than drinking water; and
- c) the 5,000 litre (1,320 gallon) endpoint for the contaminant removal testing.

Therefore, it has been determined that eSpring Water Purifier will treat well in excess of the drinking and cooking water needs for a family of six for one year.

¹ National Water Summary 1983 - Hydrologic Events and Issues. U.S. Geologic Survey Water Supply, Paper 2250.

² Water Quality Association - Point of Use Treatment for Compliance with Drinking Water Standards. May 6, 1983.

³ Statistical Abstract of the United States 1984, U.S. Department of Commerce, Bureau of the Census.

⁴ Drinking Water and Health, Vol. 1, National Academy of Sciences, 1977.

Claim 20: Convenient, replaceable carbon/UV filter

Consumer market testing of the eSpring Water Purifier was conducted in a U.S. city. During the testing, new cartridges were supplied to the panelists, and they were asked to install the cartridge. Afterwards, they were asked to rate the ease of replacing the cartridge. The rating scale ranged from “Extremely Difficult” to “Extremely Easy.” More than 84% of the panelists indicated the cartridge was easy to replace.

Claim 21: Attaches to most standard kitchen water faucets

The eSpring™ Water Purifier contains adapters that allow the attachment of the diverter valve to various styles of kitchen faucets. The eSpring Water Purifier was panel tested with consumers. The consumers installed the systems in their homes. Questionnaires were used to determine the success rate for attaching the diverter valves to the faucets. Of the panelists, who responded to the question, more than 73% were able to attach the system to their kitchen faucet.

Claim 22: Uses exclusive patented technology

The eSpring Water Purifier is covered by the following U.S. patents: 4,753,728; 4,859,386; 5,017,318; 6,368,504; 5,573,666; 5,529,689; 6,436,299, with additional U.S. and International patents granted or pending.



Glossary of Terms

Absorb: To take in and make part of an existent whole.

Adsorb: The act of an extremely thin layer of molecules adhering to the surface of solid bodies or liquids with which they are in contact.

American National Standards Institute (ANSI): This is a private, nonprofit organization that administers and coordinates the U.S. voluntary standardization and conformity assessment system (www.ansi.org).

Aquifers: A water-saturated geologic zone that yields a sufficiently high volume of water to supply wells and springs at a rate so that they can serve as practical sources of drinking water.

Bacteria: Class of plants having round, rod-like, spiral, or filamentous single-celled or non-cellular bodies, often aggregated into colonies living in soil, water, or organic matter.

Carbon block: A solid piece of carbon, to distinguish it from the granulated carbon used in some water treatment systems.

Carcinogen: Substance or agent with the potential to produce or incite cancer.

Channeling: An event that occurs when untreated water passes through a treatment device without contacting the filter material or resin.

Contaminant: In water, any substance other than hydrogen and oxygen. The U.S. Environmental Protection Agency has established guidelines for three different classes of contaminants.

- Aesthetic-effect contaminants (substances) are harmless particles that add colour or smell to water, or make it cloudy.
- Cosmetic-effect contaminants (substances) may cause skin or tooth discolouration.
- Health-effect contaminants may cause health problems in humans, either acute (short-term) effects such as cramps or diarrhea, or chronic (long-term) effects such as cancer. Microbiological contaminants tend to cause affects.

Cryptosporidium: A protozoan (one-celled animal) associated with the disease cryptosporidiosis in humans. The disease can be transmitted through drinking water. Cryptosporidiosis may cause acute diarrhea, abdominal pain, vomiting, and fever that last up to two weeks in healthy adults, but may be chronic or fatal in immuno-compromised people.

Cyst: See protozoan.

Diverter: A valve that connects to the end of a faucet with a mode to direct the tap water through the eSpring™ Water Purifier to be treated and then back to the valve through a separate port.

Dual-technology cartridge: Refers to the fact that the eSpring Water Purifier combines carbon-block filtering with ultraviolet (UV) light to destroy microorganisms.

E. Coli: Escherichia Coli is a bacterial species that is the major constituent of the normal intestinal flora of humans and warm-blooded animals. The predominant species of a group of bacteria known as fecal coliforms, e. coli is used as an indicator organism of fecal contamination of water from sewage.

Effluent: Water flowing out of the system.

Flow Rate: The rate that a certain volume of water flows through the system usually measured in liters per minute (lpm) or gallons per minute (gpm).

Giardia lamblia: A protozoan that can survive in water for up to three months, associated with the disease giardiasis. The symptoms of this gastrointestinal disease may persist for weeks or months and include diarrhea, fatigue, and cramps.

Ground water: The water that systems pump and treat from aquifers (see above).

Health-risk contaminant: See Contaminant, health-effect.

Inductive electronic coupling: When an electrical conductor becomes electrified through coming near (but not touching) a charged or magnetized body. An electric toothbrush uses an inductive electronic coupling with its base to allow it to recharge.

Influent: Water flowing into the system.

Inorganic contaminants: Mineral-based compounds such as metals, nitrates, and asbestos.

LED: Light-emitting diode that emits light when a current passes through it.

Microbiological: Having to do with microscopic forms of life.

Microorganism: Simply, an extremely tiny (microscopic or ultramicroscopic) living being, such as bacteria, viruses, or cysts.

Monochloromines: A disinfectant used for microorganism control in municipal water by combining chlorine and ammonia.

MTBE (Methyl-tert-butyl ether): An oxygenate added to gasoline to make it burn more efficiently. It can leak into drinking water from underground storage tanks, boats, and jet skis, and has been tentatively classified by the EPA as a possible human carcinogen.

NSF International: An impartial, independent third party organization that is recognized worldwide as a leading expert in water treatment.

Oocysts: One stage in the life cycle of a large class of parasites.

Organic contaminants: Chemical molecules that contain carbon and other elements such as hydrogen. Organic contaminants of possible concern include chlorohydrocarbons, pesticides, and others.

PPB: Parts per billion or micrograms per liter ($\mu\text{g}/\text{L}$), a measurement of a concentration on a weight or volume basis,

PPM: Parts per million or milligrams per liter (mg/L), a measurement of a concentration on a weight or volume basis.

PSI: Pounds per square inch which is a unit of measuring force per unit area of water.

Particulates: Very tiny particles, pieces of dirt or minerals or organic matter so small they can be suspended in water. They may affect water's taste, smell, or clarity, but not human health.

Pathogenic: Organisms, including bacteria, virus or protozoa, capable of causing diseases in a host or person.

Potable: Water that has been tested and deemed suitable for drinking by health authorities or a municipal supplier.

Protozoan: Any one of a phylum or subkingdom of microscopic acellular (no-celled) or unicellular (one-celled) animals. A protozoan cyst is a protozoan in a resting stage, when it has produced a resistant cover around itself. Some protozoans are serious parasites and are classified as health-effect contaminants.

Radially: Water flowing from the outside towards the center of the carbon filter.

Radiation: The process of emitting energy, usually in the form of light (e.g., the UV light).

Radioactivity: Materials that emit nuclear radiation, such as uranium.

Reservoir: A pond, lake, or basin, either natural or artificial, for the storage, regulation, and control of water.

Sediment: Material in suspension in water or recently deposited from suspension; in the plural, the word is applied to all kinds of deposits from the waters of streams, lakes, or seas.

Surface water: The water that systems pump and treat from sources open to the atmosphere, such as rivers, lakes, and reservoirs.

Surrogate compound: A compound that can represent others for the purpose of performance testing.

TOC: Total organic carbon, a measure of the organic content of the water.

Trihalomethanes (THMs): These are formed as a by-product of the process of disinfecting drinking water with chlorine or chloramine. THMs are suspected carcinogens. (TTHMs: total trihalomethanes.)

UV: Ultraviolet, the kind of light the eSpring Water Purifier bulb emits. UV light has a wavelength shorter than visible light (such as daylight); it is destructive to the RNA and DNA of microorganisms.

Virus: The causative agent of an infectious disease.

Volatile Organic Compounds (VOCs): A group of organic chemicals that may leach into ground water or be discharged into lakes and streams in wastewater from chemical, plastic, or petroleum plants, landfills, dry cleaners, or gasoline storage tanks. They may cause liver problems, anemia, kidney or spleen damage, or an increased risk of cancer.

Waterborne: Carried by water.