

**HOMEDICS<sup>®</sup>**

**SHINING A LIGHT ON CLEAN WATER**



Americans' number one environmental concern is the pollution of drinking water, with 59 percent saying they worry “a great deal” about the issue, according to a 2009 Gallup Environment survey.<sup>1</sup> Given the essential nature of water to sustaining life, it is not surprising that the safety of drinking water is top of mind for Americans. From potential contaminants and disturbances in the water system, to untested well water, to less stringent requirements for bottled water vs. tap water, there are many potential worries.

While the United States has one of the safest water supplies in the world, the quality and safety of water varies from place to place, depending on the condition of the source water and the treatment it receives. The nation's public drinking water supply is regulated under The Safe Drinking Water Act (SDWA), originally passed by Congress in 1974. Under SDWA, the United States Environmental Protection Agency (EPA) sets standards for drinking water quality and oversees the governments and suppliers who implement those standards.<sup>2</sup> The EPA's primary standards are legally enforceable and limit the level of contaminants in drinking water to protect public health. Secondary standards regulate contaminants that may cause cosmetic or aesthetic effects in drinking water. While non-enforceable, the EPA recommends that water systems comply.<sup>3</sup>

The EPA mandates that all public water suppliers must provide an annual report, sometimes called a Consumer Confidence Report, to its customers. This report, due to customers by July 1 of each year, provides information on local drinking water quality,

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<sup>1</sup> <http://www.gallup.com/poll/117079/water-pollution-americans-top-green-concern.aspx>

<sup>2</sup> <http://www.epa.gov/OGWDW/sdwa/>

<sup>3</sup> <http://www.epa.gov/safewater/contaminants/index.html>



the source of the water, contaminants found in the water, and how customers can get involved in protecting drinking water.<sup>4</sup>

The EPA also protects the nation's drinking water by safeguarding watersheds and regulating the release of pollutants into the environment. In partnership with local authorities and community groups, the EPA encourages water conservation and works to develop contingency plans for source contamination and other water emergencies.<sup>5</sup> In the case of a water emergency where drinking water poses a risk to health, the EPA requires local water suppliers to provide notice to their customers.<sup>6</sup> For example, in August 2009 when The Milford Water Co. found water samples in Milford, Mass. were contaminated with E.coli bacteria, some strains of which can produce a powerful toxin that can cause severe illness,<sup>7</sup> the supplier was required to issue an immediate "boil water order".<sup>8</sup> Numerous incidences of contamination in local water supplies occur every year.

While EPA's standards apply to public water systems, private drinking water wells that serve fewer than 25 people are not regulated by the EPA and are only minimally regulated by states. The EPA encourages households with private drinking water supplies, approximately 15 percent of Americans, to have their water tested annually for total coliform bacteria, nitrates, total dissolved solids, and pH levels.<sup>9</sup> However, studies have found that many private wells are not tested regularly.<sup>10</sup>

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<sup>4</sup> [http://www.cdc.gov/healthywater/drinking/public/understanding\\_ccr.html](http://www.cdc.gov/healthywater/drinking/public/understanding_ccr.html)

<sup>5</sup> <http://www.epa.gov/ebtpages/waterdrinkingwater.html>

<sup>6</sup> <http://www.epa.gov/safewater/publicnotification/basicinformation.html>

<sup>7</sup> <http://www.epa.gov/safewater/contaminants/ecoli.html>

<sup>8</sup> [http://news.bostonherald.com/news/regional/view/20090810milford\\_residents\\_advised\\_to\\_boil\\_water/srv\\_c=home&position=recent](http://news.bostonherald.com/news/regional/view/20090810milford_residents_advised_to_boil_water/srv_c=home&position=recent)

<sup>9</sup> <http://www.epa.gov/privatewells/whatyoucando.html>

<sup>10</sup> [http://www.ruralpa.org/drinking\\_water\\_quality.pdf](http://www.ruralpa.org/drinking_water_quality.pdf), <http://www.madison.com/wsj/home/local/459580>

Private wells have been subject to dangerous contamination. For example, in March 2008, 116 people were sickened and one was killed from an E. coli outbreak in a private well in northeastern Oklahoma.<sup>11</sup> A recent UCLA study found that private wells in rural California have higher levels of some chemicals and pesticides than typical well water, including methomyl, chlorpyrifos and propargite, which have been linked to Parkinson's disease.<sup>12</sup>

In addition to contaminants, the nation's aging water infrastructure is a major concern in regards to safe drinking water. The American Water Works Association (AWWA), North America's largest association of water works professions, has called the next few decades the "Dawn of the Replacement Era" because a significant amount of the nation's buried water infrastructure needs to be replaced before it deteriorates and poses a threat to public health and safety. This will require a major investment; AWWA estimates that \$250 billion over the next 30 years may be required to replace worn-out drinking water pipes and associated structures nationwide.<sup>13</sup>

Surveys conducted by Gallup and the Water Quality Association indicate that consumers are concerned about drinking water.<sup>14</sup> These concerns may lead consumers to explore their options when it comes to safe drinking water. Filtration pitchers, such as Brita and PUR, are one affordable option. These pitchers use a single step process to filter water, but do not include a purification system to remove bacteria and viruses.

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<sup>11</sup> <http://www.cnn.com/2008/HEALTH/08/29/oklahoma.ecoli/index.html>

<sup>12</sup> <http://latimesblogs.latimes.com/greenspace/2009/08/pesticides-parkinsons-disease-well-water-contamination.html>

<sup>13</sup> <http://www.win-water.org/reports/infrastructure.pdf>

<sup>14</sup> <http://www.gallup.com/poll/104932/Polluted-Drinking-Water-No-Concern-Before-Report.aspx>,  
<http://www.bio-medicine.org/medicine-news-1/Half-of-Americans-Want-Stricter-Water-Quality-Laws--Survey-Finds-18777-1/>

Installed home systems may provide both filtration and purification (this varies by system); however, they require installation time and often are expensive.

Another option, bottled water, has skyrocketed in popularity in recent years, more than doubling in consumption between 1997 and 2005.<sup>15</sup> While bottled water provides convenience, especially when on the go, there are a number of drawbacks. First, the cost of bottled water is extremely high. According to the U.S. Conference of Mayors, single-serve bottled water costs between 1,000 and 4,000 times more than tap water, which costs about \$0.00002 per ounce.<sup>16</sup>

Second, while bottled water has been perceived as more pure than tap water, this is not necessarily the case. Bottled water is not regulated by the EPA, but rather by the Food and Drug Administration (FDA) as a packaged food product.<sup>17</sup> Research, including an October 2008 study conducted by the Environmental Working Group (EWG), revealed that 10 popular brands of bottled water, purchased from retailers in nine states and the District of Columbia, contained 38 chemical pollutants with an average of eight contaminants per brand. Some of the chemical levels exceeded legal limits in California and an industry-sponsored voluntary safety standard. Four bottled water brands tested also were contaminated with bacteria.<sup>18</sup>

In addition to not necessarily being purer than tap water, bottled water is also not subject to some of the more stringent requirements that apply to tap water. For example, bottled water providers are not required to notify their customers of the source of the

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<sup>15</sup> <http://www.worldwatch.org/node/5475>

<sup>16</sup> [http://www.usatoday.com/news/nation/environment/2008-06-07-bottled-water\\_N.htm](http://www.usatoday.com/news/nation/environment/2008-06-07-bottled-water_N.htm)

<sup>17</sup> <http://www.fda.gov/Food/ResourcesForYou/Consumers/ucm046894.htm>

<sup>18</sup> <http://www.ewg.org/reports/bottledwater>

water, occurrence of contaminants in the water, if it is purified, and even, if it is simply bottled tap water. The Government Accountability Office and the Environmental Working Group recently released reports urging that bottled water makers be mandated to provide the same level of information municipal water providers must disclose.<sup>19</sup>

In addition to these concerns, bottled water presents significant environmental concerns. In 2007, 8.8 billion gallons of bottled water were sold worldwide. Of those bottles consumed in the United States, nearly 77 percent ended up in landfills.<sup>20</sup> According to *USA Today*, “Plastic water bottles produced for U.S. consumption take 1.5 million barrels of oil per year... That much energy could power 250,000 homes or fuel 100,000 cars for a year.”<sup>21</sup> Importantly, this number does not take into account transportation costs and associated environmental effects, as more than 5 trillion gallons of bottled water is shipped internationally each year.<sup>22</sup>

What is a consumer to do then, if they are interested in preserving the environment, yet want to ensure that the water they are drinking is as pure as possible? In an age when 61 percent of Americans look for health information online, they also should be researching their choices for safer drinking water.<sup>23</sup> One option worth exploring is the use of ultraviolet (UV) light for water purification.

The light spectrum is made up of energy in varying wavelengths. A wavelength is the distance between the crest of two waves and is measured in units called nanometers (nm), one billionth of a meter. Visible light wavelengths range from about 400 to 700

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<sup>19</sup> <http://www.cnn.com/id/31799838>

<sup>20</sup> <http://greeninc.blogs.nytimes.com/2009/07/17/bottled-water-makers-in-the-hot-seat/>

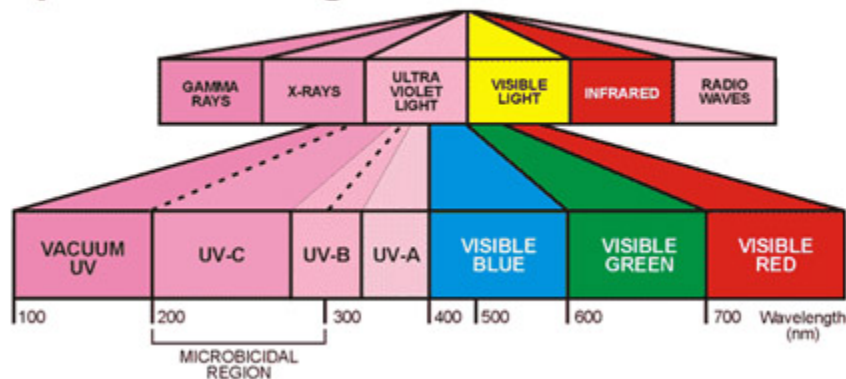
<sup>21</sup> [http://www.usatoday.com/news/nation/environment/2008-06-07-bottled-water\\_N.htm](http://www.usatoday.com/news/nation/environment/2008-06-07-bottled-water_N.htm)

<sup>22</sup> <http://www.sfgate.com/cgi-bin/article.cgi?file=/chronicle/archive/2007/02/18/EDG56N6OA41.DTL>

<sup>23</sup> <http://www.pewinternet.org/Press-Releases/2009/The-Social-Life-of-Health-Information.aspx>

nm, while ultraviolet (UV) wavelengths are between 100 and 400 nm and lie beyond the edge of the visible spectrum. UV light is broken up into three bands called UVA, UVB and UVC.

## Spectrum of Light

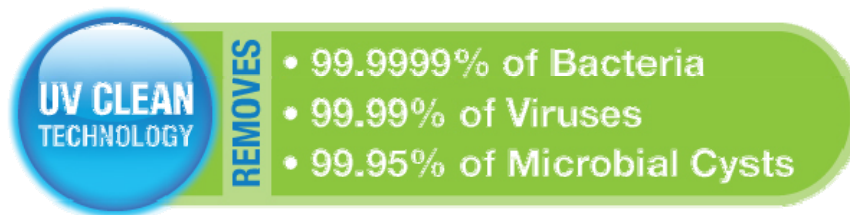


UVC light, with wavelengths between 100 and 280 nm, is commonly referred to as “germicidal light” due to its effectiveness in destroying microorganisms. UVC light acts as a natural outdoor air purification system by deactivating the DNA of microorganisms and destroying their ability to multiply.

UVC light has been used to effectively disinfect and sanitize in water treatment plants, hospitals and laboratories, and food and drug facilities for years. In addition, this technology has been used in a number of consumer products.

Utilizing the germ-killing benefits of UVC light, HoMedics, the leader in health and wellness products, developed Restore®, a complete water purification system in an easy to use pitcher. Restore combines UV Clean technology to remove bacteria, viruses and microbial cysts with a filtration system to reduce heavy metals, chlorine (taste and odor), and some industrial and agricultural pollutants.

Restore includes an internal filtration system with an activated carbon and ion exchange resin. Once water has passed through the filter, the water is purified by the built-in UV lamp by activating a 60-second germ-killing cycle. This process removes:



To test the efficacy of Restore, a third party laboratory conducted a series of tests on the pitcher. Pitchers were tested with and without the filter cartridge installed. To provide a rigorous test approach, extended lamp conditioning and turbidity of 5 NTU was used. According to EPA standards, 5 NTU represents the highest level of turbidity that is allowed for tap water in municipal drinking water systems after treatment is complete. Based on these testing conditions, samples sent through the Restore process demonstrated a 99 percent reduction of the bacteriophage MS-2, a common microorganism that was used to test the efficacy of Restore.

In addition, tests were conducted on chlorine (taste and odor), zinc, benzene, cadmium, copper, lindane, mercury, tetrachloroethylene, toluene and lead according to NSF/ANSI Standard 42/53.<sup>24</sup> All showed more than a 90 percent reduction. Restore also underwent stringent testing procedures to demonstrate the bacterial efficacy against E. coli.

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<sup>24</sup> All testing was conducted to the most current NSF/ANSI 53 standards, except lead, which was tested in accordance with NSF/ANSI 53 (1988), the standard currently adopted by the state of California.



HoMedics worked with the State of California to create a new protocol to test Restore, which enabled a water purifier class for household products that previously only applied to installed systems and large systems for water treatment plants. California's water is regulated by the California Department of Public Health along with the EPA, and has some of the strictest standards in the nation. For example, California has a safety standard of 50 parts per billion (ppb) for total chromium, while the national standard is 100 ppb.<sup>25</sup>

Restore is California certified for microbiological water purification, a first for a water pitcher utilizing UV technology. Additionally, Restore is Gold Seal Certified to National Sanitation Foundation standards by the Water Quality Association. Restore is also BPA-free, a common agent used to make plastics and suspected of causing negative health effects.

Today the nation's water infrastructure is beginning to show signs of age. Harmful contaminants, including dangerous bacteria like E. coli, continue to be a recurring challenge in water systems and cause for concern. These concerns are compounded by other health threats in the media, such as the H1N1 virus, posing even greater unknown health and safety risks and concerns to consumers. While municipal water systems are doing an excellent job, many consumers seek that extra layer of protection.

Leveraging proven technology, such as UV, to help ensure clean water can help ease consumer concerns by knowing that they are taking steps to ensure cleaner, safer

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<sup>25</sup> <http://www.environmentalhealthnews.org/ehs/news/chromium-in-drinking-water>



drinking water for themselves and their families. Restore, backed by science and proven to clean water to a different level, meets consumers' needs by delivering a cost-effective and easy solution for producing cleaner, great tasting water.