



Filtering Rainwater

By Dr. Larry Sunn and Dr. Steven Grainger

Rainwater harvesting is viewed by many as a partial solution to the problems posed by water scarcity. As we have cited in previous articles, there is a growing interest throughout the region in using rainwater for potable uses. A question frequently asked is, “Is rainwater safe to drink?” Yes, it can be as safe as your well or tap water by properly filtering and purifying it.

Start by taking measures to keep foreign matter out of the incoming rainwater. “First flush” devices, gutter screens, and other pre-tank screening mechanisms keep the rainwater as clean as possible before it enters your storage tank. Using screens and filters also greatly reduces maintenance and lengthens the life of your pump and filtration system.

But even the best screening systems allow some unwanted particulate into your tank. So, next is filtration. Sediment filters are both inexpensive, require quarterly replacement, and are measured in microns. Human hair is about 70 microns, a particle of dust is about 1 micron, and a virus can be smaller than .01 micron. The filters needed in your system, once the water leaves your storage tank, are sediment cartridge filters. They range widely in what they can remove and are used in a series (e.g., usually a 20-micron filter is followed immediately by a 5 micron filter).

However, filters will not eliminate all substances in the water. To create drinking quality water, filtration is always followed by disinfection. Although there are other disinfecting options (e.g., chlorine, ionization, membranes) we recommend using ultraviolet light. When using a UV light, the water must always pass through the sediment filters first—if no filter is used before the water circulates around the UV light, pathogens and bacteria will cast shadows in the flowing water, thereby allowing some live organisms to pass unharmed through your system in the shadows.

UV light works by penetrating an organism’s cell walls and disrupting that cell’s genetic makeup, making it impossible to reproduce and thereby rendering it harmless. Often it is claimed that UV “kills” the microorganism, but it doesn’t—it just makes them unable to reproduce and they are thus harmless.

Several issues with UV lights should be taken into consideration: first, you’ll need to replace the bulb at the manufacturer’s specified intervals—generally after 9,000 hours, or about every 12 months (cost is about \$100 once per year). Second, a UV light’s effectiveness is not visible to the human eye, so the bulb may appear to be lit when in fact, as the UV light ages and its intensity declines, it may not be disinfecting—ergo the need to replace UV lights per manufacturer’s recommendation. The intensity of the light is critical to protecting your water.

UV light manufacturers rate their systems at a given flow rate (e.g., 12 gallons per minute). When installing a UV light, make sure the flow rate of the UV unit is matched to meet or exceed your home’s peak water flow use rate. A home with three bathrooms or fewer would need an 8-gallon per minute UV filter and homes with 4 or more bathrooms should install a 12-gallon per minute UV filter. The UV light unit is always installed after your water has passed through all filters. The resulting water is clean, safe, and ready to use.

In sum, rainwater is free, but you do pay for filter changes—about \$120/year or \$10/month. Feel free to send rainwater capture questions to us by emailing Dr. Sunn at texsunn@gmail.com. Our rainwater and well water consulting services are offered to the public without charge.