Rainwater Rules

Standards & treatment considerations for rainwater harvesting systems

By Jason Carlson

Almost all of the water that has ever existed on our planet is the same water we see today, 97% of which is non-potable seawater. The remaining 3% is freshwater, mostly locked in ice caps, glaciers and the ground. Only a fraction of a percentage is the surface water we typically depend on. To put it in perspective, if all of the Earth's water were condensed down to fit into a single gallon jug, the freshwater readily available for our use would only equal about one tablespoon. As world population continues to increase, so does the demand for this finite resource.

One ancient and low-impact technique for obtaining freshwater is rainwater harvesting. This collection method is making a resurgence, aided by increased sustainability awareness and new green building practices.

Methods for collecting rainwater have been successfully employed by our ancestors for thousands of years. To summarize the process, a large impermeable surface, such as a roof, initially "catches" the rainwater. It is then diverted away from the catchment surface by gravity and a network of gutters, pipe or tubing, eventually ending up in a protected tank or cistern. This stored freshwater may be used over time as needed for either potable or non-potable needs. With as little as 1 in. of rainfall on a 2,000-sq-ft roof, 1,250 gal of water can be harvested. For most locations in the U.S. and Canada, tens of thousands of gallons of freshwater can be harvested by a typical family-sized residence annually.

Benefits of harvesting rainwater include the following:

- Rainwater is free. The only costs are in the construction of a catchment system.
- The rainwater is used at its source, eliminating the need for a large-scale and costly distribution system.
- It provides freshwater when other sources, including groundwater, are unavailable.
- Rainwater starts pure, with little or no dissolved minerals or harmful chemical contaminants.
- Rainwater harvesting helps reduce storm water runoff and demand on existing water utilities, and can help lower consumer utility bills.

Table 1. Rainwater Standard Certification Requirements

	NSF P151 Required	NSF P151/61 Optional	NSF 61 Required
ARCSA/ASPE 63	Flat roof products	Painted surfaces required to P151 or 61	Cisterns, plastic storage systems
		Other wetted conveyance system components	
CSA/ICC 805-201X Draft	Flat roof products		Other wetted conveyance system components
	Liners and coatings used within storage tanks		Storage tanks

Rainwater Standards

Two key questions must be asked before beginning any rainwater catchment system project:

1. Are there regulations in place for the construction of rainwater catchment systems and the usage of the water they collect?
2. How is the quality of the collected water ensured, especially if it is intended for potable use?

It is always best to first check with local and state governments to see if any restrictions are in place. Many cities and states now have guidance on the construction of rainwater catchment systems available online. Other helpful resources are available through the American Rainwater Catchment Systems Assn. (ARCSA) at www.arcsa.org.

In late 2013, ARCSA and the American Society of Plumbing Engineers (ASPE) published the first Plumbing Engineering and Design Standard for Rainwater Catchment Systems, titled ARCSA/ASPE 63-2013. The objective of the standard is to provide guidance on creating and maintaining a safe alternative to municipal or well water sources by reducing consumer risk from poor design, installation and maintenance of rainwater catchment systems.

In addition to the published ARCSA/ASPE 63-2013 standard, the Canadian Standards Assn. (CSA) and the International Code Council (ICC) have partnered to form the Rainwater Collection System Design and Installation Standard Development Committee. Currently in draft format, CSA/ICC 805-201x would become a similar standard for the design, installation and maintenance of rainwater collection systems intended to collect, store, treat, distribute and utilize rainwater for potable and non-potable applications. It will be up to local authorities which standard they will adopt for rainwater collection systems built in their jurisdictions. Local water collection regulations and codes would still take precedence.

Rainwater Treatment

When it comes to using rainwater for potable applications, there are additional precautions to keep in mind. Although rainwater is quite pure, organic debris such as branches, leaves, pine needles, insects and even bird waste can end up on a rooftop. Stored water that is intended for human consumption requires additional processing in order to ensure that the water is safe to drink. Proper water filtration and purification are still required.

In addition to contamination from outside the system, all components and materials in contact with rainwater intended for potable end use should comply with NSF Standards P151 and/or 61. Compliance ensures that harmful levels of chemical contaminants are not extracting from a catchment system into the water supply.

Both the ARCSA/ASPE 63-2013 and CSA/ICC 805-201x design standards stress the importance of components evaluated to NSF standards when harvesting potable water. Table 1 shows each design standard's requirements regarding NSF P151 and 61. Certification to NSF standards would be granted by an accredited third-party testing laboratory such as UL if a product, component or material meets the applicable standard requirements. **WQP**

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