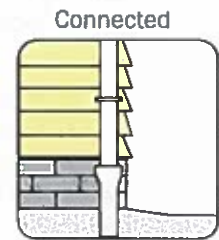


Installing a Rainwater Harvesting Cistern for Non-spray Irrigation

Rainwater harvesting is the age-old practice of collecting and using rainwater from your roof or other above-ground impervious surfaces. By installing a rainwater harvesting system, you can reduce the volume of potable drinking water used for irrigation. In addition, you help to maintain the health and beauty of the San Francisco Bay by reducing the amount of stormwater entering the sewer system. A rain barrel typically refers to a rainwater storage tank with a capacity between 50 and 200 gallons, while a cistern is a larger storage container that can store 200 to 10,000 gallons. Cisterns come in many shapes, sizes, and materials, and can be installed underground to save space.

Permit Requirements to Install a Cistern

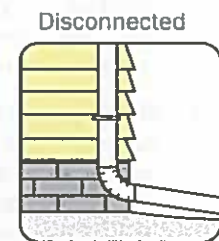
If your downspout is **connected** to the sewer system, you will need a permit from the Department of Building Inspection (DBI), Plumbing Division. Permit requirements include a basic site map identifying the location(s) of your cistern and intended destination for overflow (a drain or suitable garden area). There is a permit fee, which covers the permit and site visit by a DBI Plumbing Inspector. The SFPUC offers a rebate up to \$225 towards the cost of your permit.



For installations where a downspout disconnection is not optimum, consider using a diverter kit that attaches directly to your downspout and diverts water into your cistern. Once the cistern is full, water is diverted back into the downspout. A diverter kit allows you to connect to the existing downspout while maintaining the connection to the sewer system.

If your downspout is **disconnected** from the sewer system, you do not need a permit from DBI as long as your cistern meets the following requirements:

- Cistern capacity is less than 5,000 gallons
- Height to width ratio is less than 2-to-1
- Captured rainwater is only used for non-spray irrigation
- Cistern is supported directly on grade
- Rainwater system does not require power or a makeup water supply connection



If your cistern installation does not meet the above requirements, contact the DBI Plumbing Division for requirements regarding your site-specific rainwater harvesting system.

For further details on the design, installation, and maintenance of rainwater harvesting systems, please see the SFPUC **Rainwater Harvesting Manual**.

To learn more about rainwater harvesting and available incentives, please visit:

www.sfwater.org/rainwater

Questions? Contact us!

landscape@sfwater.org

(415) 551-4730



Guidelines For Your Rainwater Harvesting Cistern

Design and Installation

- Treated metal, clay, or concrete tile roofing generate the cleanest rainwater for capture and reuse. Rainwater should not be harvested from roofs with untreated metal (galvanized), copper, treated wood, lead flashing, or asbestos.
- As required by the California Plumbing Code, install a debris excluder or a first-flush diverter on your downspout.
- Create a firm and level foundation location near the downspout on which to place the cistern. For tanks over 500 gallons, a concrete pad or compacted gravel foundation is needed.
- Cisterns over 5,000 gallons in size require a licensed civil engineer to properly design the foundation and seismic support. Additional permits from DBI are required for cisterns of this size. When designing an overflow method, remember that in heavy storms cisterns could overflow. A 1,000 square foot roof will produce about 600 gallons of runoff during a storm that produces 1" of rain.
- **Overflow water should be directed to a drain or suitable rain garden that can absorb water onsite at an appropriate rate. Overflow must be directed away from your home, the cistern, or neighboring properties.**
- Ensure your cistern overflow pipe has a screen to prevent insects, birds, or rodents from entering the cistern.
- If you are using rainwater for drip irrigation, install a 100 micron filter downstream of the cistern to prevent clogging of the drip emitters.
- If irrigating edible landscapes, consider using irrigation piping that meet FDA food grade standards.
- For rainwater systems that are used indoors, have pumps, or require treatment please review the SFPUC Rainwater Harvesting Manual and consult with DBI.
- Adhere the required warning label to your cistern:



Maintenance

There are simple steps you can take to ensure your rainwater harvesting system functions at its best:

- Inspect catchment area every six months, before and after the rainy season, to remove debris, algae growth, or any other obstructions from the surface.
- Before and after the rainy season, ensure downspouts, gutters, screens, and filters are clean and clear to prevent debris from entering the system. Clean with warm water.
- Ensure first-flush diverters are functioning by checking to ensure they do not contain standing water after storm events.
- Once a year, flush out any debris or buildup that may have accumulated on the bottom of the cistern. For tough buildup, you may scrub the bottom using vinegar or another non-toxic cleaner.
- Maintain clear access to the cistern and outlets for regular maintenance.





Rainwater Frequently Asked Questions

Why use rainwater?

Rainwater harvesting systems can be as simple as using a barrel to capture water or as complex as installing a large underground cistern or storage tank. By capturing any amount of rainwater and reusing it, you can help reduce the need to use drinking water for landscape irrigation and toilet flushing.

Is it safe to use rainwater?

Yes, rainwater is safe to use for watering plants. However, it is not advised to drink rainwater since most rainwater harvesting systems do not filter and disinfect the water collected from roof tops, which may contain animal poop or tar from roof shingles.

How do I determine the size cistern or the number of barrels I need?

The size of your system depends on a number of factors: how big your roof is, how much space you have available for rainwater storage, and what you intend to use the water for. A rough rule of thumb is that you can collect 600 gallons of water for every 1,000 square feet of roof area for every inch of rain. San Francisco receives an average of 21 inches of rain per year, so for 1,000 square feet of roof that can add up to over 12,000 gallons of rainwater. See how much rainwater you can capture by using our [Rainwater Harvesting Calculator](#).

How much water can I save using rainwater?

Water savings vary depending on the size of your rainwater harvesting system and annual rainfall.

What happens when my rain barrel overflows?

Overflow water should be directed to a drain or suitable rain garden that can absorb water onsite at an appropriate rate. Overflow must be directed away from your home or neighboring properties.

Do I need a permit?

For rain barrels and cisterns, a permit is required if you need to disconnect a downspout that is currently connected to the sewer system. However, a permit is not required if you install a diverter kit that diverts rainwater into a rain barrel or cistern and, when full, flows back into the downspout and into the sewer system.

Additionally for cisterns, if your downspout is disconnected from the sewer system you do not need a permit from DBI as long as your cistern meets the following requirements:

- Cistern capacity is less than 5,000 gallons
- Height to width ratio is less than 2-to-1
- Captured rainwater is only used for non-spray irrigation
- Cistern is supported directly on grade
- Rainwater system does not require power or a makeup water supply connection

For rainwater harvesting projects that require a permit from DBI, the SFPUC offers a rebate up to \$225 toward the cost of your permit fee. Visit www.sfwater.org/rainwater for more information.

What extra steps do I need to take if I want to use rainwater for toilet flushing?

Indoor use of rainwater requires a permit from the DBI. For more information on indoor systems, please visit DBI's website at www.sfdbi.org or call 415.558.6570.

How long can I hold rainwater in my barrel or cistern?

As long as your rainwater harvesting system is opaque (of such color and thickness that sunlight cannot penetrate the barrel), shaded, and screened, and you use the water only for non-potable purposes, there is no strict limit on how long the water can sit in your system. Be sure to inspect your system often and clean it as needed. You can clean your system annually with a non-toxic cleaner such as vinegar. If you intend to water edibles with your rainwater, you must install a first flush diverter.

What is a first-flush diverter?

It's a device that diverts the first, most polluted flow of rainwater away from your rain barrel.

Will my rainwater system run out of water during the dry months?

It depends on the size of your system. If you have enough space to accommodate a large cistern and your water needs are low, your catchment system could hold rainwater for all your summer needs. If you are using a small rainwater harvesting system, the rainwater will run out quickly. Anecdotally, a local SF rain harvester has reported capturing 60 gallons of water from a summer's worth of fog and condensation from her roof.

How much maintenance is required for a rainwater harvesting system?

Rain barrels and cisterns do not require much maintenance once they are installed. Here are simple steps to ensure your rainwater harvesting system functions as its best:

- Inspect catchment area every six months to remove debris, algae growth, or any other obstruction from the surface.
- Before and after the rain season (typically Oct-Apr), ensure downspouts are clear, and clean roof gutters, screens, overflow outlets, and filters on your barrel to prevent clogging.
- Once a year, flush out any debris or buildup that may have accumulated on the bottom of the cistern. For tough buildup, you may scrub the bottom using vinegar or another non-toxic cleaner.
- Maintain clear access to the cistern and outlets for regular maintenance.
- Repair leaks or holes immediately.

Where can I get more information on the code requirements for installing a rainwater harvesting system?

Full code requirements can be found in Chapter 17 of the 2013 California Plumbing Code.

Where can I take a course or learn more about rainwater capture and use?

The SFPUC sponsors free workshops which are held at the Garden for the Environment, a half-acre organic community garden located at the corner of [Lawton Street and 7th Avenue](#). For a list of upcoming workshops, please visit www.gardenfortheenvironment.com.

Other resources include:

- American Rainwater Catchment Systems Association: www.arcsa.org
- Greywater Action: www.greywateraction.org
- Rainwater Harvesting for Drylands and Beyond, Volumes 1 and 2. Brad Lancaster, 2008 edition. www.harvestingrainwater.com
- WhollyH2O: www.whollyh2o.org
- NSF-certified rainwater harvesting products: <http://www.nsf.org/consumer-resources/green-living/rainwater-collection/>



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(510) 524-1604

Corner 40th Ave in the Sunset

Next door to Sloat Garden Center

Exit Central Ave off I-80 & I-580

TYPE

50 gallon rain barrel

Price \$150

RECYCLABILITY

Ivy is made of 100% recycled plastic and is 100% recyclable

DESIGN

Easy to assemble, install and is stable when full

RAIN BARREL DIMENSIONS

Height: 42.5"
Top diameter: 22.5"
Bottom diameter: 18"

WEIGHT

Empty: 16 pounds
Full: 424 pounds

FUNCTION AND FEATURES

- Made in the USA!
- Locking lid with reusable zip ties
- All parts included, 3/4" valve, mosquito screen, and overflow hose
- Barrels nest for easy storage
- Linking capability
- 2 overflow ports
- Meets EPA safety standards
- Opaque HDPE material

**** Bonus - 3 Ivys will easily fit in the back seat of a mid size sedan**











Ivy, 50 gallon capacity rain barrel



You may optionally use a FlexiFit diverter to connect to one of the Ivy Barrel overflow ports (making it also the Ivy inlet) so when the barrel is full, the water will overflow back down the downspout.

Here's how:

Tools needed

1. Safety Glasses 
2. Safety Gloves 
3. Drill  + 2 1/8 inch hole saw
4. Measuring Tape or Ruler 
5. Pencil 
6. Scissors 
7. Phillips Screwdriver 
8. Level 

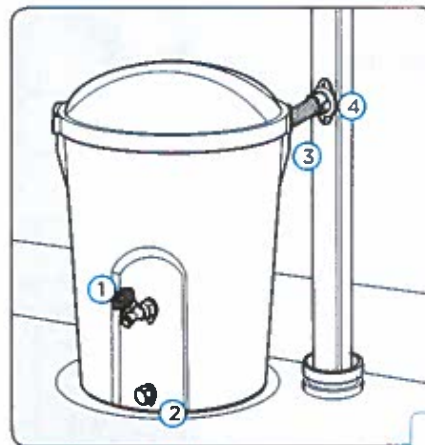
1 General description

Rain barrels have been used for hundreds of years to harvest and store rainwater for use with plants, gardens and other outdoor chores.

EarthMinded's DIY Rain Barrel Kit is a state-of-the-art sealed rainwater collection system when used with a barrel or container you supply. Our patented FlexiFit™ diverter installs easily by drilling a single hole into any standard 2" x 3" or 3" x 4" rectangular downspout. The diverter sends rainwater into the barrel. Once the barrel is full, the diverter will automatically pass excess water through the downspout.

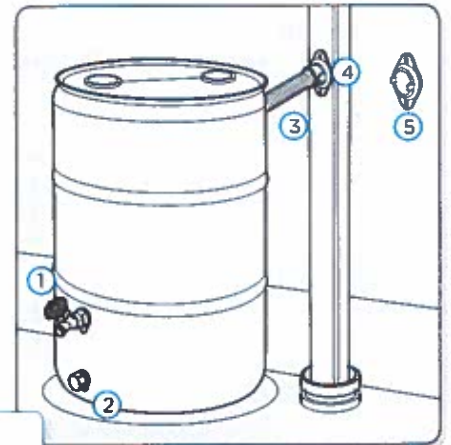
The FlexiFit™ diverter helps prevent mosquitoes, pests and algae-causing sunlight from entering the barrel. The diverter is easy to remove from the downspout and the kit includes a winterizing hole cover.

The FlexiFit™ diverter offers many advantages over conventional top fill rain barrels that commonly flood with heavy rain, require permanent modifications to your downspout, and use unsightly overflow hoses.



Open Top Container

1. Spigot
2. Drain or hose attachment
3. Fill hose
4. FlexiFit™ Diverter
5. Winter hole cover



Sealed Barrel

Some areas prohibit the use of rain barrels. Please check local regulations before installing.

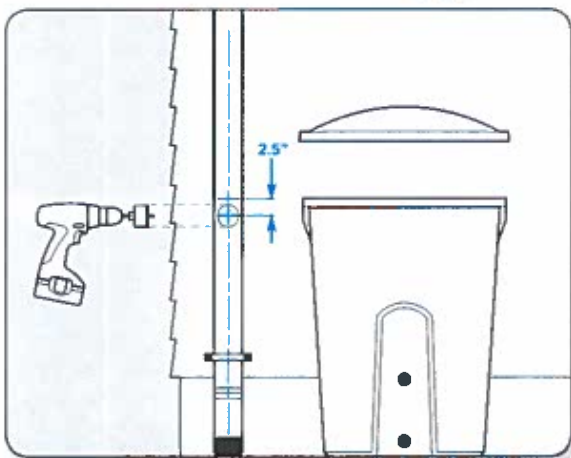
WARNING

Stored rainwater not for human or animal consumption

2 Drilling the FlexiFit™ diverter hole

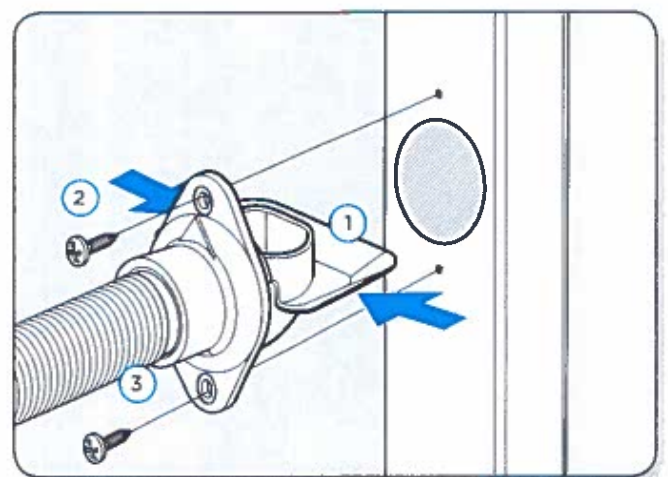
Drill a hole in the downspout using the (LARGE) 2 1/8" hole saw. The center bit of the hole saw should align with the center mark on the downspout.

- a. Do not force the hole saw. Cut slow and steady keeping a firm hold on the drill.
- b. Always use safety glasses and gloves when cutting or drilling
- c. The cut edges of the downspout can be sharp. Wear protective safety glasses and gloves when handling.
- d. For 3" x 4" downspouts make sure you drill the hole on the narrow 3" side.



3 Installing the FlexiFit™ diverter

1. Insert the diverter into the hole in the downspout by squeezing the sides and pushing the diverter into the downspout until the flange sits flat against the downspout. Do not twist the diverter when installing - push it straight in - with the cup facing up at all times to insure a proper seal. Make sure that the arrow on the front of the diverter is installed pointing straight up.
2. Use (2) of the self-tapping screws to attach the diverter to the downspout.
3. Connect the fill hose to the cuff end of the FlexiFit diverter. Press the hose into the diverter until the corrugated section is flush against the diverter. Use soapy water or hand lotion on the hose cuff and seal to reduce friction and improve fit.



4 Connect tubing from diverter to one of the Ivy Barrel overflow ports. Link the other overflow port to another Ivy Barrel. Important: If you are not linking the second Ivy overflow to another barrel, the other overflow port must be plugged.

Popular sizes we stock—see larger size details at bushmanusa.com

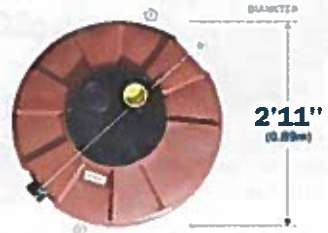
Above Ground Rainwater Tanks

Round tanks can also be quoted in 1110, 1320 & 2825 gallon sizes

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Made In California By Bushman USA

FOOD GRADE HDPE



205 gallon \$439



420 gallon \$685



660 gallon \$899



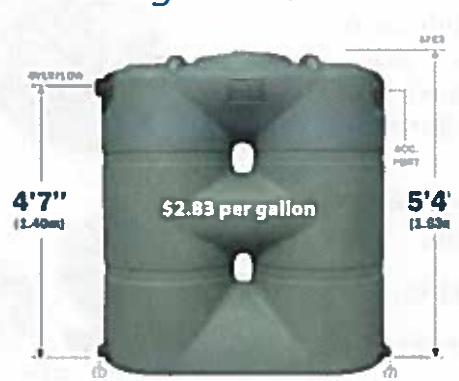
865 gallon \$1015



Slimline tanks will fit through most doors



265 gallon \$750



530 gallon \$1190



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Rainwater Harvesting System

Quality solutions designed to collect and preserve one of our most valuable resources

Rainwater Harvesting Tanks are ideal for:

- Landscape irrigation
- Storm water reduction
- Emergency water supply
- Fire protection



• 7 year manufacturer warranty on all water tanks



200 Gallon Storage Tank

- White interior for easy inspection of liquid contents.
- Strong, durable construction.
- Will not leak, rust, chip or corrode.
- Roto-molded high density polyethylene.
- Suitable for potable water storage.

\$485

\$2.43 per gallon

Top View

Lid
Material: Polypropylene
Color: Black
Dimension: 22"
Vent: 4"



Side View

Tank
Material: HDPE
Manhole: Octagonal
Diameter: 40"
High: 42"
Graduation: Gallons
Fitting area: 1 of 8"x10"
Two Banjo 2" threaded, bulkhead fittings (with caps).



400 Gallon Storage Tank

- White interior for easy inspection of liquid contents.
- Strong, durable construction.
- Will not leak, rust, chip or corrode.
- Roto-molded high density polyethylene.
- Suitable for potable water storage.

\$728

\$1.82 per gallon

Top View

Lid
Material: Polypropylene
Color: Black
Dimension: 22"
Vent: 4"



Side View

Tank
Material: HDPE
Manhole: Octagonal
Diameter: 40"
High: 80"
Graduation: Gallons
Fitting area: 1 of 8"x10"
Two Banjo 2" threaded, bulkhead fittings (with caps)



500 Gallon Storage Tank

- White interior for easy inspection of liquid contents.
- Strong, durable construction.
- Will not leak, rust, chip or corrode.
- Roto-molded high density polyethylene.
- Suitable for potable water storage.

\$797

\$1.59 per gallon

Top View

Lid
Material: Polypropylene
Color: Black
Dimension: 22"
Vent: 4"



Side View

Tank
Material: HDPE
Manhole: Octagonal
Diameter: 48"
High: 73"
Graduation: Gallons
Fitting area: 1 of 8"x10"
Two Banjo 2" threaded, bulkhead fittings (with caps)



Complete System Includes:

- 22" easy access lid
- 16" stainless steel mesh basket – mosquito proof
- Overflow kit – 3" or 4" depending on tank size
- 3/4" ball valve for 200 and 500 gallon tanks
- 2" ball valve on 1200, 2500 and 5100 gallon tanks
- Polypropylene Bulkhead fitting 3/4"



Basket with 22" Lid



Ball Valve



Overflow Kit



Poly Bulkhead

Sales tax and delivery not included.

Prices subject to change without notice.

Please note that these tanks will not fit through doorways.

We stock green color only

Larger sizes available rotoplasusa.com