

## Greywater Systems

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In brief:

- ▶ Some greywater systems cost less than \$1000, some cost over \$10,000, and water quality varies accordingly.
- ▶ There are two main options: diversion devices and treatment systems. The best option for you will depend on how much greywater you produce, the size of your garden, and your budget.
- ▶ Greywater recycling is not for everyone — for some people the costs (and risks) will outweigh the benefits.

With water restrictions operating in many parts of Australia, people are looking at ways to save water or save their garden — or both. Rainwater tanks are one option (if you're getting any rainfall). Recycling greywater is another logical option: after all, you don't need drinking-quality water to water the garden or flush the toilet.

### What is greywater?

- ▶ It's the waste water from showers, baths, spas, handbasins, laundry tubs and washing machines. Water from dishwashers and kitchen sinks is often referred to as **dark greywater**, because it has a higher load of chemicals, fats and other organic matter. Water from toilets is called **black water**.
- ▶ It's estimated that just over half of total household water could be recycled as greywater, saving potentially hundreds of litres of water per day.
- ▶ Greywater 'systems' range from a simple hose diverting water from the washing machine to the garden, to treatment systems that treat greywater for use in your washing machine or toilet, as well as the garden.

### Risks to consider

- ▶ Using untreated greywater on the garden can be relatively cheap and easy, but can be risky for several reasons:
- ▶ Potential exposure to disease-causing pathogens.

- Damaging salts and chemicals could kill your plants and ruin the soil.
- Run-off could escape your boundaries and create problems for neighbours.

### **Choice Magazine Recommends**

Installing a greywater treatment system will give you safer water and more options to reuse it, but it's expensive and needs regular maintenance. Buying one probably won't save you much money on water costs over time, but it might save your garden — a valuable part of your house — if you can't use tap water in times of high-level water restrictions.

Not only your garden will benefit. Any sort of greywater recycling will reduce how much water you use and the amount of water going into the sewerage system. Combined with water conservation measures and a rainwater tank, you'll be doing your bit for the environment.

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### **Two types of system**

There are two basic types of system to recycle greywater: diversion devices and treatment systems.

#### **Greywater diversion devices**

Using this system, greywater is diverted from its source to the garden. The diversion device could be as simple as a flexible hose that you attach to your washing machine outlet, sending the rinse water into the garden (instead of the drain) whenever it needs watering.

A CHOICE test of the wash water showed it would be bad for most soils to put water containing so much detergent onto your garden.

Moving up a level, simple diverter valves can be plumbed into appropriate outlet pipes, and allow you to manually switch between diverting water through pipes onto the garden, or into the sewer.

Other diversion systems include shower to toilet diversion — an option if you have no garden. These are called closed-loop systems, though they're not approved in some states. More sophisticated diversion systems may include a surge tank, filters and a pump.

- ▶ A surge tank takes the brunt of greywater outflow and ensures the garden won't be suddenly inundated with hot water or, worse, allow greywater backflow into the house. You need to remove sludge from the tank every six months or so. It should also have an overflow device sending excess water into the sewer.
- ▶ Filters remove hair and other large particles from the water so they don't clog up your irrigation pipes (which can be an issue with diversion-only installations). They require routine maintenance to clear the filters, and need replacing every 6 to 12 months.
- ▶ A pump may be necessary to get water to all parts of your garden, especially if gravity's not on your side. You'll need a power source for it, which may mean getting an outdoor power point installed.

Untreated greywater should only be used for sub-surface garden irrigation — that is, through a network of pipes buried at least 100 mm below the ground – to reduce the risk of human or animal contact. Pipes carrying untreated greywater must display relevant warning labels. And you can't store untreated greywater, because the bacteria and other pathogens could multiply to dangerous levels. Use it immediately (or within 24 hours), and if it's raining, divert it to the sewer.

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## Greywater treatment systems

These systems collect and treat (and some disinfect) the water to various levels of purity and hygiene. Generally, the higher the treatment level, the higher the cost. Several stages are involved in the treatment of water, starting with the filtration of solids (lint and hair).

Pathogens and unwanted chemicals (such as salts and nutrients) can be removed from the filtered water in several ways, including micro-organisms and chemical treatment. Disinfection by chlorination or UV light is the last stage of the process, though not all systems do this.

Basic treatment systems produce cleaner water than greywater that's only been filtered, and some of the chemical and nutrient load has been reduced — so it's kinder on your plants. However, for health

reasons it should still be used only for sub-surface irrigation systems for ornamentals and fruit trees, say.

Systems that treat greywater to 'Class A' level (which is considered safe for watering plants intended for eating, but not for drinking or preparing food) cost from around \$10,000 up to well over \$20,000 including installation. Bear in mind you'll also need to pay maintenance costs — to cover regular service call-outs and filter replacements.

Installation costs depends on the extra plumbing required if your bathroom and laundry pipes are spread all around the house, or if pipes are in a concrete slab

The amount and location of water storage can also affect costs. Installing a system when building a new house (or doing major renovations) tends to be cheaper than retrofitting one.



If you consider that a garden makes up about 10% of the value of your home, you might think the cost of a treatment system to keep your garden (and home value) growing during water restrictions is worthwhile.

Treated water can be used in washing machines and toilets, as well as on the garden. If you don't have much garden to water, or if you don't need to water it in all seasons, this sort of system may be a more useful option, as you can use the water elsewhere.

### Which option suits you?

If you have access to mains water, it's unlikely you'll want to bother with greywater recycling unless you wish to maintain a large, thirsty garden. You'd probably be better to install a rainwater tank and pump.

But if you produce a lot of greywater, thanks to a large household, regular use of a top-loading washing machine and/or a passion for long showers, it could be worth investing in some sort of greywater recycling.

The system that best suits will depend on your situation:

▶ **Big garden (fruit or ornamentals)**

The cheapest and simplest solution is to get a diverter and send that water to the lawn or garden through sub-surface irrigation pipes. However, a higher level of treatment will be safer and give you more options (such as also using it indoors).

▶ **Vegetable gardening**

If you want the water for growing herbs and vegetables you'll need to get a higher level of water treatment to use it on the garden — and you can also use it indoors. Untreated greywater should definitely not be used on food plants that will be eaten raw

▶ **Small or no garden**

If you produce a lot of greywater but don't have much garden, you could get a treatment system that allows the water to be used in your toilet and/or washing machine.

▶ **Drought-affected supply**

If you live in a drought-affected part of the country and/or have to rely on rainwater for your household water supply, a greywater treatment system could help a lot — especially when water is worth any price. If plumbed into your toilet and washing machine, you'll save precious drinking water. It will also reduce the load on septic tanks or drought-stressed



waterways. (You might also consider a waste water treatment system that handles black as well as greywater, though this is beyond the scope of this article.

▶ You want the whole green shebang

Installing a greywater treatment system will reduce how much water you use (especially if teamed up with a decent-sized rainwater tank), reduce the amount of water going into the sewerage system, and avoid some of the cost to the community of infrastructure for providing water and dealing with waste. While it won't necessarily save you much money, for many it's simply buying peace of mind. And let's face it: there's kudos in green status symbols.

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## Check before you buy

Authorities are often lukewarm about the use of untreated greywater on gardens, especially in areas of high population density where potential contamination of neighbouring properties, soils and groundwater is a concern, not to mention contamination of food plants. There are certainly situations where the risks outweigh the benefits.

Check with Artesian Plumbing for what's required, and will be able to tell you whether you're eligible for any green rebates. You may also need approval from your council and/or water authority.

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## Greywater gardening

Various estimates show that the average Australian produces almost 100L of greywater per day. You may be able to come up with a more accurate figure by checking the water meter before and after showers, and before and after doing the laundry. Monitor these figures over a week.

By far the easiest way to use your greywater is on the garden. However, it very much depends on the size of your garden: if you produce more greywater than your garden can use, you'll need to consider other uses of greywater — or only use your 'cleaner' greywater.

When you're calculating how much greywater you can put on your garden, reckon on about 20L per square metre per watering event. The frequency of watering events required depends on the local climate, rainfall and the season, while the amount of water required per square metre depends on soil type (20L is for loam soils).

Using these average figures, though, the average person produces enough greywater to water 35 square metres of lawn or garden once a week.

So — to work out how many square metres of garden you can supply with greywater:

- ▶ EITHER calculate the amount of greywater produced by your household each week, and divide it by 20
- ▶ OR take the number of people in your household, and multiply by 35.

### **Other factors to consider**

If your garden is smaller than the calculated figure or you have no garden, consider a treatment system that allows your treated greywater to be used in the toilet (150L per person per week on average) and/or washing machine (190L per person per week).

If your garden is as big as or bigger than the calculated figure, you could get away with a greywater diverter system. However, there are several caveats:

- ▶ You shouldn't store water for more than 24 hours, so you may have to water different parts of your garden each day, and divert greywater to the sewer when it's raining.
- ▶ Keep an eye on the health of your plants: greywater tends to be high in chemicals that alter the structure of the soil, and it also tends to be overused — sick-looking plants could be suffering from overwatering, rather than the greywater per se.

- ▶ Give your plants a break by using rainwater (if you have a rainwater tank) or tap water every six weeks.
- ▶ Increase the organic content of your soil (with compost, say) to improve its structure and help it survive the chemical onslaught.
- ▶ Your greywater shouldn't escape from your property into a neighbouring one, into stormwater systems or aquifers used for drinking water — in fact it's illegal.
- ▶ Water from front-loading washing machines tends to have a high concentration of detergent, so unless you're willing to use less than the recommended amount and compromise on the 'cleanliness' of your clothes, we wouldn't recommend you use the wash water on your garden. The amount of rinse water may not be enough to make it worthwhile (about 30 to 50L per cycle — enough to water about two square metres of garden).
- ▶ Don't use untreated greywater if someone in your household is sick, if you wash nappies and when you use certain chemicals, including bleach and dyes. You might also have to change some of the cleaning agents you use.

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## Case study

### Happy Customer Exert

In terms of maintenance, the system needs two professional services a year, and the UV lamp (used for disinfecting the treated water) is replaced annually. Electricity costs are low, using about the same energy as a light bulb for a couple of hours a day. Drinking-quality water usage has dropped from over 1000L per day to less than 500L.