



BioPak

The BioCycle™ owner's manual - a complete guide to the operation of your wastewater treatment system



AS/NZS 1546.3:2008 Lic SMK20266
AS/NZS 1546.1:2008 Lic SMKB2010 for SA, VIC & WA
AS/NZS 1546.1:2008 Lic SMK01568 for NSW
SAI Global

www.biocycle.com.au

Contents

Welcome	1
Installing & Switching On	2
What is a BioCycle?	3
System Functions	4
Alarm Panel	6
Responsibilities & Legal Requirements	7
Quarterly Maintenance	8
General Care	9
Detergents & Cleaning Products	12
Fault Finding	15
Resetting the Circuit Breaker	17
Garden Irrigation	18
Suitable Plants	19
Warranty	20
Contact Details	21



The bioCycle™ System

Welcome

to the family of
bioCycle™ owners.

Dear Customer,

One of the problems faced by planning authorities throughout the world is the safe, reliable and economical disposal of the wastewater generated in urban, suburban and regional areas.

Individuals and communities cannot continue to ignore the growing problems of river, lake, ocean and groundwater pollution.

By purchasing a bioCycle™ Aerobic Wastewater Treatment System you have made an important contribution to environmental sustainability.

This handbook has been prepared to assist you in understanding how your bioCycle™ works, and how simple ongoing attention will ensure it continues to contribute efficiently to environmental health and safety.

I thank you for your support and look forward to your co-operation in creating a cleaner environment.

John Watkins

Chief Executive Officer

Installing and Switching On

Your bioCycle™ system is ready for use when:

- It has been installed in the correct location and filled with water (with each compartment, expect Pump-out Chamber, being added to progressively until almost full).
- Your household drainage system has been connected correctly to the system inlet
- Electricity has been connected and the alarm panel has been installed.
- The system has been fully commissioned – i.e. with the water pump, air blower, and irrigation system installed and connected (call your nearest bioCycle™ office is you are unsure about this).
- The irrigation area has been prepared and planted. Some form of landscaping is essential because you cannot irrigate on barren dirt. Your local council may also have stipulated requirements for this.

General Information

Once the system is running, the entire operation is automatic. Please do NOT make any adjustments to the air supply or pumping equipment. Should you require further information on the operation of the system, please contact your nearest bioCycle™ office.

Electricity Consumption

Our electrical consultants advise that the annual usage of electricity for the total system is similar to that of an average household refrigerator.

Septic Tank / Primary Chamber Pump-out

Depending on individual household usage, it will be necessary to periodically pump out the contents of the septic tank (2-tank models) or primary chamber. This is the homeowners' responsibility and is not included in our normal maintenance service. Your service technician will advise you if pumping out is required. This service may be carried out by any person or organisation approved by the relevant local Council or Government authority.

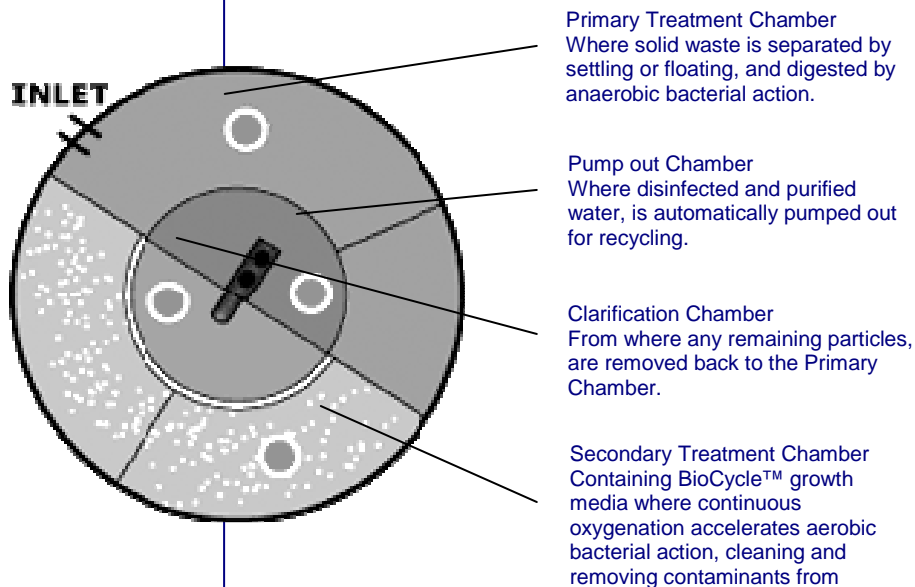
What is a bioCycle™

A bioCycle™ Aerobic Wastewater Treatment System is a packaged sewage and water treatment plant for locations where mainline sewerage is not available.

The system uses accelerated natural biological processes to purify all wastewater passing through it, which is then pumped out through garden irrigation.

A home system is usually contained in a single tank, about 2.5 metres deep and wide. Internally the tank is divided into chambers of varying sizes.

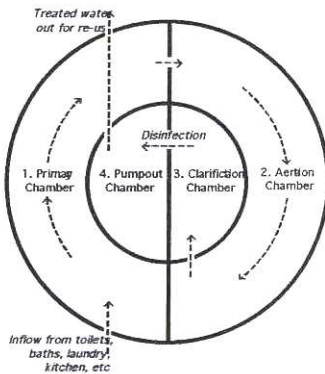
Wastewater and effluent from the home enters the bioCycle™ tank by gravity flow through a single inlet point, and in turn moves through the systems chambers by displacement – i.e. as untreated water flows into one chamber, treated water flows through an outlet into the next chamber, where the water level is slightly lower.



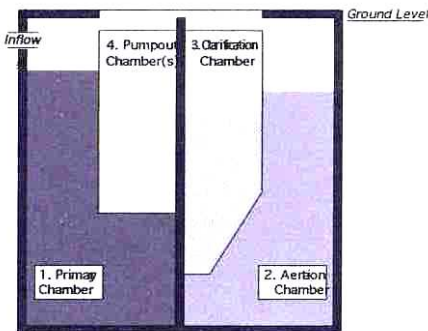
System Functions

bioCycle™ has a range of standard residential models for all sizes of household. We also design and manufacture larger systems for multiple dwellings, commercial or industrial projects,

Top View of Typical System showing Process Flow (Diagrammatic).



Cross Section of Typical System, showing Displacement Flow (diagrammatic).



A typical residential system has four or five chambers:

1. Primary Chamber

The effluent from the source enters the system via the Primary Chamber where digestion of solids occurs through anaerobic bacterial action. The Primary Chamber is, in effect, a septic tank – some two tank systems utilised a separate septic tank.

2. Aeration Chamber

From the Primary Chamber the partially treated effluent moves by displacement to the Aeration Chamber. This chamber is used for secondary treatment of the wastewater.

Air supplied by a small blower (compressor) is distributed through diffusers at the base of the chamber, dramatically increasing the level of dissolved oxygen in the water and stimulating aerobic bacterial growth.

The blower operates continuously at a very low noise level, and is located in a weather-proof housing on top of the tank.

The Aeration Chamber also contains the submerged biological growth media, consisting of different types and configurations of special plastic components, greatly enlarging the internal surface area in the chamber and assisting bacterial growth.

System Functions (cont.)

3. Clarification Chamber

After aeration the treated wastewater flows into the Clarification Chamber where it is allowed to settle under quiescent conditions.

In this chamber, the bioCycle™ system utilizes a venturi-syphon effect from the blower in an automatic and non-mechanical continuous sludge remover and skimmer.

This returns any excess sludge or floating material back to the primary chamber for further treatment by anaerobic digestion.

4. Pump-out Chamber

As the aerated and settled wastewater flows from the Clarification Chamber into the Pump-out Chamber, it passes through the bioCycle™ Chlorinator, and receives a final disinfection in the process.

The Pump-out Chamber contains an electric submersible pump which distributes the treated and disinfected water to an irrigation system in the garden or landscaped area of the property.

The pump is activated by a float switch. When the water level in the chamber rises to a certain level, the pump switches on, and when it drops below a certain level the pump switches off.

The water level in the Pump-out Chamber is kept deliberately low to provide a substantial reserve capacity in case of pump malfunction or irrigation blockage (some models have a separate reserve chamber to comply with regulations in different areas of Australia).

The Pump-out Chamber also contains a high water alarm, activated if the water level rises further than it should.

5. The size of the system will determine the N°. of people it is designed for.

Bio 6000	up to 10 people
Bio 7000	up to 10 people

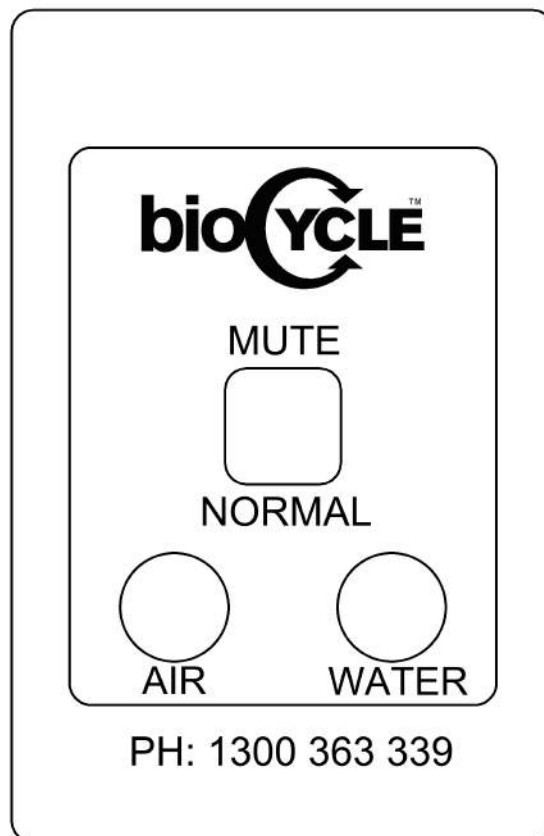


The Alarm Panel

The bioCycle™ Alarm Panel is normally located inside the house. If the system malfunctions, the alarm will sound and either the “Air” or “Water” light will illuminate.

If this occurs, consult the “Fault Finding” section on Pages 11-12 of this booklet. If you cannot solve the problem, contact your nearest bioCycle™ office or your authorised service contractor.

Note: The “Mute” switch will stop the alarm sounding. Always remember to return the switch to “Normal” after the problem has been rectified.



Responsibilities and Legal Requirements

Regulating bodies (State and Local Governments) throughout Australia impose certain requirements on sewage treatment system owners. The following basic list is provided as a guide only – please check with your local regulating body for further information.

- The system is to be constructed in the approximate position indicated in the plan.
- The system may not be used until the site has been inspected and the Council considers that effluent and sewerage can be completely disposed of on the site without nuisance or likely danger to health.
- Unless permitted by local authorities, irrigation water should not be used for food crops, vegetables, etc. Many authorities allow fruit or nut trees growing on the property to be irrigated with effluent from the system, but only on drip feed or flood irrigation.
- There shall be no irrigated water run-off from the allotment to the adjoining properties, public places or reserves.
- The owner shall enter into a service contract with the manufacturer, distributor or their agents considered to be competent by the relevant authority for servicing of the unit at quarterly intervals.
- The service contractor shall make adjustments to each unit, its ventilation and irrigation system, when directed to do so by the relevant authorities.
- The yard or garden areas of the allotment must be turfed and/or landscaped to the satisfaction of the relevant authorities before the system is used for irrigation purposes.

Detailed conditions of installation are stated on the Approval given to you by the Council or regulation authority. Please read these carefully and ask for advice should it be necessary.

The owner of the system is entirely responsible for its operation and maintenance. The existence of a service contractor does not transfer the responsibility from the owner to the supplier or its agent.

Quarterly Maintenance

To ensure that sewage treatment plants perform to the high standards set by the regulating bodies, a regular program of quarterly maintenance visits is mandatory. Failure to have the stipulated servicing carried out could result in a breach of public health legislation and subsequent legal proceedings by the relevant authority.

The first 12 months' servicing on your bioCycle™ system is included in the purchase price in some states. The local authorities insist that you have a current Maintenance Contract on your system at all times.

You will receive a Service Contract Renewal from bioCycle™ by our accredited Service Contractor after the third service in any 12-month period. Please follow the instruction to ensure your Contract does not lapse.

Each quarterly maintenance service includes a full inspection/check of the system, with special attention to the following points:

- Cleaning of the system components, if necessary.
- Water quality tests
- Adjustments to air system, if necessary
- Monitoring and maintaining the balance of the purifiers
- Replenishing supply of disinfecting agent
- Servicing and maintenance check of the blower, irrigation pump and electrical system
- Detailed Reports supplied to system owner and local Council/Authority.

General Care

Access

For all maintenance purposes, please ensure that clear access is available to ALL manholes on the tank(s) and to the Electrical Box. This is a requirement of the regulating bodies. Soil, plants, bark etc must be removed prior to a maintenance service.

Blower Damage (a very costly problem)

Do not create a water catchment area around the Electrical Box as this could cause fusion of the blower during periods of heavy rain. Avoid the problem by creating channels to take the rainwater away from the vicinity of the electrical box.

Insurance companies will NOT reimburse you for blower damage caused by your negligence.

Change of Ownership

To enable correct servicing records and procedures to be maintained could you please:

- Advise us if you sell your property.
- Leave this booklet for the new owner.

Difficult-to-Find Homes

Due to the complexities of street numbering in certain areas, our company provides an identification plate card. Please affix this to your letterbox or on the fence nearest to your property entrance – this will assist us in locating your home quicker during routine or emergency calls, thus keeping costs down.

General Care (cont.)

Tips for a Healthy System

- DO NOT flush newspaper, disposable or sanitary napkins down the toilet.
- DO NOT use “under-sink” style garbage disposal units.
- DO NOT allow strong caustic or alkaline substances, oils, acids, bleaches, disinfectants or chemical detergents to reach the system. These substances can harm or kill the beneficial bacteria within the bioCycle™ unit, causing unpleasant odours and adversely affecting the operation of the system.
- DO NOT exceed the maximum design load or subject the system to hydraulic shock loads (use of baths, washing machines, dishwashers etc. at the same time) as these can cause odours.
- DO NOT use too much detergent – always follow manufacturers’ directions regarding quantities.
- DO NOT switch the power off.

Holidays/Extended Absences

If you are absent from the property for any length of time, the system should be left switched on. Power use is similar to leaving a light switched on in the home.

Should you wish to switch the system off for any reason, please contact your local bioCycle™ office for advice.

For security reasons, we suggest that while you are away from the property you leave the alarm switched to MUTE. On your return please switch back to the NORMAL position.

General Care (cont.)

Irrigation System

Irrigation lines, spray heads, etc. can clog up over extended periods of use. Manufacturers of such equipment recommend that these items be flushed at least monthly. To avoid any inconvenience and to keep costs down, please comply with manufacturers' recommendations. You must have a minimum of five spray heads in your irrigation system.

Plumbing Problems

Blockages in the drainage pipes from the house to the system are plumbing problems. If your household fittings are not draining away, please check the inlet to the system (or septic tank with two-tank systems) for blockages. Usually the lines can be cleared at the inlet point by inserting a rod down the pipe. Should this not be possible please call your local plumber or drainer.

The loss of a water seal in fittings, allowing gasses to escape, should be initially referred to your local plumber for corrective measures. An incorrectly constructed E Duct bent could be the cause of this problem. E Duct Vents should be constructed to ensure the proper dispersal of gaseous by-products prevalent in all forms of sewerage treatment, The vent should be positioned at least 60mm above the highest point in the house so that prevailing winds will carry away such gasses.

In the House

Reduce foaming by adding a tablespoon of crushed bath soap (leftovers) to your washing power. After wiping down tiles and the like, rinse the cloth in a bucket, and then discard the contents in the yard, not in the system.

Don't Panic!

If the alarm sounds, PLEASE refer to the Fault Finding section on the following pages before calling us – this may help you keep your costs down!

Detergents and Cleaning Products

Detergent and Cleaning Products: DO's and DON'T's

- Products which state on the packing “**Antibacterial**” or “**Kills Germs**” should be **avoided** because your system relies mainly on bacteria for treatment.
- Use bio-degradable detergents and softeners which are **sodium** and **phosphorous free**.
- Use small amounts of detergent, to prevent excessive foaming.
- Use **Washing Soda** to unblock drains
- Odours from the sink or basin plug holes can be eliminated by mixing a handful of **Washing Soda** into a capful of hot water. Pour down the drain last thing at night.
- If hasher cleaning needs to be done, wipe over area needing to be cleaned then rinse cloths in a bucket and discard the contents in the garden, **DO NOT** pour down the drain.
- Avoid pouring ½ a litre or more of beer, wine, milk or juice into the system.
- Best products to use are **Bicarbonate of Soda** and **Vinegar**, they can unblock drains, and clean ovens (if left to soak on hard grease) it also cleans bathrooms and toilets and kills mould.
- To kill mould in bathroom/shower, spray from a bottle a small amount of mould killer. Let sit for awhile then rub off with a damp cloth (rinse cloth out in garden)

Detergents & Cleaning Products (cont.)

Detergent and Cleaning Products: To be Avoided

The use of the following types of products should be avoided for a healthy system.

ANTIBACTERIAL SOLUTIONS

Bio-Ad	Napisan	Preen Soaker
Bio Joy	Nursil	Tri-zyme
Nappy Plus	Nappy Fresh	Toilet Duck
Milton tablets etc.		

Antibacterial Hand wash – soaps

BLEACHES

Domestos	Lemon Budget	White King
Fiesta	Marvolinn	Zixo
Lemon Bleach		

OTHER CLEANERS

Ajax	Handy Andy
Down to Earth	Aussa
Pet, Flea/Tick Washes	Draino
Blu Loo {or other toilet cleaners}	Exit Mould
Spirits/Alcohol	Caustic Oven Cleaners
Floor Cleaners	Swipol
Green Choice	Metho or Kero
Finish	

N.B. These products are only examples to help you make a choice. We can not keep track on what products are available on supermarket shelves, they are continually being changed/modified. The ultimate responsibility of what goes down your household drains lies solely on the user.

If in doubt, or you require any further information ask your bioCycle technician at your next Quarterly Maintenance Service.

Fault Finding – A Quick Reference

In the unlikely event of a malfunction, please refer to the Guide below. Many minor problems can be rectified by the owner taking simple corrective action.

If, after taking the recommended actions, the system is still malfunctioning, contact your nearest bioCycle™ office or your authorised service contractor.

Don't panic – the system has been designed with sufficient reserve capacity to allow normal household use until a technician arrives.

Possible Causes:

- Tripping of a circuit breaker
- Power Failure
- Blower Failure

Possible Causes:

- Tripping of a circuit breaker
- Power Failure
- Blocked irrigation filter
- Blockage in the irrigation line
- Kink in the irrigation line
- Pump failure

FAULT – THE ALARM SOUNDS AND THE 'AIR' LIGHT ILLUMINATES

Action:

Turn alarm to MUTE. Listen at the system to hear if the blower is running. If not, follow instructions for resetting the Circuit Breaker on Page 13.

Check power supply and/or other home appliances/fittings. If necessary, contact your electricity supplier or a local electrician.

If power supply is OK but blower is still not running, a service call is necessary.

FAULT – THE ALARM SOUNDS AND THE 'WATER' LIGHT ILLUMINATES

Action:

Check as above.

Check as above

Clean out irrigation filter.

Flush irrigation lines.

Un-kink lines – if necessary cut out damaged section and rejoin.

If all above have been checked but pump still does not operate a service call is necessary.

Fault Finding – A Quick Reference (cont.)

Possible Causes:

- Tripping of a circuit breaker
- Power Failure
- Blocked irrigation filter
- Blockage in the irrigation line
- Kink in the irrigation line
- Pump Failure

Possible Causes:

- Too much detergent being used in laundry
- Too many washes

Possible Causes:

- The first tank in the system has not matured yet
- Too much water being discharged through your household fittings at the same time
- Excessive chemicals and/or disinfectants are being used
- E-duct vent or S-bends are not suitably constructed
- Exposed areas in tanks, seal degradation
- The system is required to do more than its designed for
- The venting system on the house is too low and/or is over a window

FAULT – IRRIGATION DOES NOT WORK

Action:

Check as above.

Unblock filter

Flush out irrigation line

Unkink line – if necessary cut out damaged section and rejoin

If all above have been checked but pump still does not operate a service call is necessary.

FAULT – EXCESSIVE FOAMING

Action:

Use recommended quantities of detergents

Adjust loads – only do one or two washes per day.

FAULT – PERSISTENT ODOURS

Action:

Contact your local bioCycle™ office for advice

Modify your water use patterns to avoid heavy loads on the system – e.g. avoid using the bath and washing machine at the same time

Please avoid and the system will recover

Refer to your plumber or contact your local bioCycle™ office for advice

Apply a light mix of sand/cement or similar mix

Refrain from overloading

Extend the vent pipe higher

Resetting the Circuit Breaker

The electrical circuitry in your bioCycle™ allows for some variations in power supply, but problems can still occur. Blackouts, supply fluctuations, power surges or voltage drops – all more common in rural areas – may trip the circuit breaker, shutting down the system and triggering the alarm.

If the overload circuit breaker in your switchboard has tripped to the “off” (down) position, this does not necessarily indicate a fault in the system – it is the electrical system working correctly to protect the equipment within the system.

If, after a power cut or voltage fluctuation, the system alarm does not clear itself within 30 minutes it may be necessary for you to reset the tripped circuit breaker.

To do this, open your switchboard and look for the circuit marked “Aerobic” (or whatever your electrician may have named it). There will be two circuit breakers. If one of them is in the down position it is off. To reset, lift the circuit breaker toggle to the up position.

Upon doing this, the blower should immediately re-start and the system should function normally. The alarm may take 30 minutes to clear. Don't forget to reset the alarm to NORMAL if previously switched to MUTE.

If the circuit breaker switch will not stay up, contact your nearest bioCycle™ office for advice. You may need to call an electrician.

Garden Irrigation

The treated wastewater from your system is rich in nutrients and therefore a bonus to your garden. Please do not waste this water.

You should be aware that most authorities require: "There shall be no irrigated water run-off from the allotment to adjoining properties, public places or reserves."

Generally speaking, you are not permitted to water the councils footpath and are should be taken not to allow any run-off onto your neighbours land.

Chlorine – Will it harm my garden?

Within the system the only chemical used is Chlorine. This acts as a final disinfecting process.

Research has been carried out on the use of Chlorinated swimming pool water (which usually contains a greater amount of Chlorine than the bioCycle™ system's irrigation water) by the Department of Agriculture Biological and Chemical Research Institute.

They found that Chlorine concentrations up to 15 ppm – 7 times greater than the amounts found in a bioCycle™ system – had no long term effects on grasses or native species of plants and there was no Chlorine accumulation in plants or soil.

Many town water supplied are Chlorinated with residual concentrations of up to 6 ppm. bioCycle™ irrigation water generally ranges from 0.5 to 2 ppm.

Our company has tested the effect of the systems treated water on three individual installations where it has been sprayed directly onto native plants over a period of two years. The results are thriving and healthy plants with a measured faster growth rate than areas of the gardens not irrigated by the systems water.

Care should be taken when spraying onto very young plants.

Plants

Suitable plants for the surface irrigation area

This list is only intended to provide a selection of trees, shrubs and other plants which may be considered suitable for the surface irrigation disposal area. However, as we live in a land of wide climate and soil variations, it is essential that further investigation be made with your local plant nurseries before finalising plant choices to suit your particular locality and site conditions.

BOTANIC NAME	COMMON NAME	APPROX. HT.
Trees		
Agonis flexuosa	Willow myrtle	5-6m
Acacia Baileyana	Cootamundra Wattle	3-5m
Banksia spp		
Casuarinastrica	Drooping She Oak	3-5m
Casuarina cunninghamiana	River She Oak	6-10m
Callistemon viminalis	Red Bottlebrush	3-6m
Callistemon salignus	White Bottlebrush	3-6m
Eucalyptus robusta	Swamp Mahogany	6-9m
Eucalyptus saligna	Sydney Blue Gum	15-30m
Eucalyptus grandis	Flooded Gum	5-6m
Eucalyptus camaldulensis	River Red Gum	15-20m
Eucalyptus cosmophylla	Cup Gum	5-6m
Hymenosporum flavum	Native Frangipani	3-5m
Leptospermum flavum	Coast Tea Tree	5-6m
Melaleuca Quinquenervia	Broad Paperback	5-7m
Melaleuca nesophila	Western Tea Myrtle	2-4m
Pittosporum spp		
Syzygium paniculatum	Bush Cherry	8-10m
Tristania laurina	Kanuka	3-5m
Shurbs		
Abelia x grandiflora	Abelia	2-3m
Acacia floribunda	Gossamer Wattle	2-4m
Acacia longifolia	Sallow Wattle	2-4m
Acacia iteaphylla	Flinder Range Wattle	2-3m
Cotoneaster spp.	Pampas Grass	
Cortaderia seloana	Umbralla Grass	2-3m
Cyperus alternifolius	Papyrus	0.5-1m
Cyperus papyrus		0.5-1m
Cassia spp.	Geraldton wax	
Chamelaucium uncinatum		
Dryandra formosa		1-3m
Eremophila spp.		
Grevillia spp.		1-3m
Hebe spp.	Veronica	0.5-1m
Climbers		
Bougainvillea spp.		
Clematis spp.		
Hardenbergia violacea	Purple Coral Pea	
Hibbertia scandens	Snake Vine	
Jasminum grandiflorum		
Jasminum polyanthum		
Jasminum officinate	Common Jasmine	
Kennedia rubicunda	Dusky Coral Pea	
Lonicera japonica	Japansese Honeysuckle	
Passiflora spp.	Passion Plover	
Vitis coignetiae	Glory Vine	
Perennials		
Aster novi-belgii	Perennial Aster	
Canna		
Chrysanthemum frutescens	Margeuertie Dasiy	
Chrysanthemum maximum	Shasta Daisy	
Gazania ringens	Black eyed Sussan	
Impatiens spp.		
Salvia ulignosa	Bog Salvia	
Viola spp.		

Warranties

bioCycle™ warrants that if the pumps, blowers, fittings, pipe work and/or plumbing components supplied require repair or replacement due to defective manufacturing during a period of two (2) years (3 years for Blowers) from the date of supply, it will carry out such repairs or replacements at no charge to the Customer.

These warranties shall not apply to any failure of the System caused by:

- The customer or owners' non-compliance with any conditions of the contract, operating instructions or recommendations by bioCycle™.
- Actual interference with the System or any of its components by any person other than an authorised service technician.
- The System being required to bear a work load greater than that for which it was designed for, due to incorrect information being supplied by the customer at the time of purchase, or a subsequent change in the volume of use, or the load being unusually large for the size of the dwelling on the site.
- Actual or consequent damage caused by earthquake, fire, flood, storm, lightning, land slip, soil subsidence, electrical supply fault or plumbing fault.

The customer agrees to pay any charges incurred for labour, repairs, and/or replacement parts due to System failure resulting from any of the above causes.



bioCycle® systems prevent damage to the environment

The system which services this settlement (above) of 13 holiday homes is located in one of the most ecologically sensitive zones in Australia—the banks of the River Murray—and ensures there is no pollution of this critical waterway by effluent from the homes.

contacts

Head Office:

South Australia

48 Patpa Drive
Sheidow Park, SA 5158

Ph 08 8381 9100
Fax 08 8381 9116

New South Wales

37 Bosworth Road
Woolgoolga, NSW 2456

Ph 1300 363 399

Branch Offices:

Western Australia

Bicycle Yard
Bibra Lake, WA 6163

Ph 1300 363 399
Mob 0429 824 300

Victoria

PO Box 192
Melton, Victoria 3337

Ph 03 9747 0487

South East Queensland

Unit 1/59 Township Drive
West Burleigh, Queensland 4220

Ph 07 5520 7620
Fax 07 5520 7932

Far North Queensland

PO Box 695
Tolga, Queensland 4882

Ph 07 4095 5088
Fax 07 4095 5077

Web: www.biocycle.com.au

Email: sales@biocycle.com.au