

# Green Star

## Credit Cover Sheet

### Round 2

---

#### Green Star - Office Interiors v1.1 Inn-3 Environmental Design Initiatives

---

Points available: up to 5    Points claimed: 1    CIR or TC Used: N

#### Round 1 Assessment Comments

None

#### Compliance with Credit Criteria

The Nutrient Cycle initiative explained in this credit provides environmental benefit not recognised by the Green Star - Office Interiors v1.1 rating tool. Specifically, it addresses the re-use of organic waste resources within the tenancy, providing both a resource to the tenancy as well as an educational demonstration of how office tenancies can improve their environmental performance, reduce their costs, and add a component of interactivity between employees and their workspace.

#### Documents Provided

- [3] Report on the Nutrient Cycle
- [10] Photos of compost bin and worm farms located in the office tenancy and balcony plants
- [12] Extract from Tenant Guide
- [13] As-built furniture plan showing worm farms
- [14] Aerobin brochure

#### Discussion

The Greenhouse tenancy takes advantage of the nutrient value contained in organic waste produced on site by composting and feeding two worm farms with this waste material. By diverting this waste from landfill, the office reduces its contribution to the creation of potent methane gas in landfills, which has 21x the global warming potential of CO<sub>2</sub>, and is created primarily by organic waste decomposing in landfills.

There is a financial savings associated with the on-site creation of this fertiliser as well in that no fertiliser or plant food is required to be purchased to maintain the health of the outdoor plants. There is also the associated carbon footprint savings with the transport of fertilisers and topsoil to the office as all this material is produced on site where it will be used.

Finally, office occupants have a firsthand interaction with the organic waste they produce and the herbs that are grown from their composted waste out on the balcony. Bridging the connection and closing the loop gives office occupants a stake in their own environmental performance within the

office and can encourage these beneficial behaviours to be taken back home and put to use in their personal lives.

The worm farms were installed at the very beginning of the tenancy and are reflected in the as-built furniture plan found on page 13 of this pdf. However, the Aerobin was brought in a few months after practical completion in order to compost scraps that the worms were not able to digest. Therefore, while the Tenant Guide explains the use of the compost bin, it is not reflected in the final set of drawings. We have attached photographic proof of its installation on page 10.

### Inn-3 Environmental Design Initiatives: 'Completing the nutrient cycle'



**Summary:** Food waste and plant waste is collected and placed into the two worm farms within the office space and the compost bin on the balcony of the office space (immediately accessible by all occupants). Signs in different places within the office space encourage food waste, tea bags, scraps, fruit peelings etc. to be placed into the containers for the worm farms, and other waste is collected for the 'Aerobin' compost bin. The 'Worm Tea' or worm juice collected from the worm farms, as well as the solid waste (worm castings), is used to fertilise the plants on the balcony. Additionally, the composted material is used to supplement and fertilise the containers for the plants on the balcony. The plants on the balcony have different culinary and medicinal benefits, and other plants act as bird / bee / butterfly attractants to ensure ongoing propagation. By consuming and using the plants on the balcony, the occupants of the space are directly benefiting from use of waste materials that would otherwise have gone to landfill. Raising awareness of this nutrient cycle highlights the reuse of materials and encourages such practices by using these plants as a learning resource.

**Environmental concern not addressed within this Green Star tool:** Reuse of food waste, compostable material and plant material, to divert 'resources' away from landfill by providing an avenue for their reuse and highlighting the outcomes of their reuse within the office space to encourage personal interest.

**Environmental benefit quantified:** An estimated 1.1kg of material is collected for the worm farms and compost bin each day, from the average of 50 people spread across the office space on any single working day. This material is made up of tea bags, food waste from people's lunches or snacks, fruit cores and peels, coffee grounds, egg shells, flowers, clippings from the plants and human hair. This waste is put into the worm farms and compost bin, for around 51 weeks of the year (assuming one week for public holidays and Christmas):

51 weeks x 5 working days each week x 1.1kg of waste = 280.5kg waste recycled.

Much of the weight of this waste is liquid, and the liquid waste from the worm farm is siphoned off from the tap at the bottom and used to fertilise the plants (approx 180kg). The other volume of material is dug back into the plant containers to use as supplementary and fertilising material (approx 100kg). This equates to approximately four large (25kg) bags of potting mix each year which is recovered from the compost bin and worm farm, rather than being purchased new to refresh the plant containers.



Worm farm, showing front tap to siphon off liquid (known as 'Worm Tea')

Furthermore, the herbs and plants which are used by the occupants of the office space for culinary and medicinal purposes amount to around 1kg of nutrients which come back into the cycle of human consumption or use each year. Although this is only a small amount, the benefit of providing an example of how materials otherwise seen as 'waste', which would have been sent to landfill, can be used to good advantage, provides another way in which this fitout is a living example of using the building as a learning resource.

Awareness of the benefits of these plants, and their healthy nature as a result of the recycled and composted materials, is raised with staff to enable them to take advantage of these resources.

### **Plants used on the balcony of Level 15, 179 Elizabeth Street, Sydney, NSW 2000**

All of the plants used in the planters (all in pots / planter containers with a recycled content, or in reused containers) have culinary or medicinal qualities, or are bird / bee / butterfly attractants. The use of the attractants plants encourages propagation of the culinary and medicinal plants during different times of the year. Quantities of each plant are shown below.

Each of the plants is fed using the 'Worm Tea' produced by the worm farms, and the compost which is produced by the compost bin on the balcony is used to enrich the soil. Although in an exposed position, the plants have needed no external feeding, fertiliser or other chemicals since planting, as the worm tea and compost has provided sufficient material.

Each of the culinary and medicinal plants has been used, to different extents, by the occupants of the GreenHouse, ensuring that the 'nutrient loop' is completed. E-mails to all occupants letting them know the different qualities of the plants have been sent out, to raise awareness of their uses and also of the completion of the nutrient cycle.

**Rosemary** (*Rosmarinus officinalis*) – culinary and medicinal uses – 4 large plants



**Culinary:** The fresh and dried leaves are used frequently in traditional Mediterranean cuisine; they have a bitter, astringent taste, which complements a wide variety of foods. A tisane can also be made from them. When burned they give off a distinct mustard smell, as well as a smell similar to that of burning which can be used to flavor foods while barbecuing. Rosemary is extremely high in iron, calcium, and Vitamin B6.

**Medicinal:** the results of a study suggest that carnosic acid, found in rosemary, may shield the brain from free radicals, lowering the risk of strokes and neurodegenerative diseases like Alzheimer's and Lou Gehrig's. Rosemary contains a number of potentially biologically active compounds, including antioxidants such as carnosic acid and rosmarinic acid. Other bioactive compounds include caffeic acid, ursolic acid, betulinic acid, rosmaridiphenol, and rosmanol.

**Guinea flower** (*Hibbertia scandens*) – Bird / bee / butterfly attractant – 20 large plants



**Lemon Myrtle (*Backhousia citriodora*)** – culinary and medicinal uses – 3 small trees



Plant uses: Indigenous Australians have long used lemon myrtle, both in cuisine and as a healing plant. The oil has the highest citral purity; typically higher than lemongrass. It is also considered to have a "cleaner and sweeter" aroma than comparable sources of citral - lemongrass and *Litsea cubeba*.

Culinary: Lemon myrtle is one of the well known bushfood flavours and is sometimes referred to as the "Queen of the lemon herbs", with the new growth preferred for its sweetness. The leaf is often used as dried flakes, or in the form of an encapsulated flavour essence for enhanced shelf-life. It has a range of uses, such as lemon myrtle flakes in shortbread; flavouring in pasta; whole leaf with baked fish; infused in macadamia or vegetable oils; and made into tea, including tea blends. It can also be used as a lemon flavour replacement in milk-based foods, such as cheesecake, lemon flavoured ice-cream and sorbet without the curdling problem associated with lemon fruit acidity.

Antimicrobial: Lemon myrtle essential oil possesses antimicrobial properties; however the undiluted essential oil is toxic to human cells *in vitro*. When diluted to approximately 1%, absorption through the skin and subsequent damage is thought to be minimal. Use of lemon myrtle oil as a treatment for skin lesions caused by molluscum contagiosum virus (MCV), a disease affecting children and immuno-compromised patients, has been investigated. Nine of sixteen patients who were treated with 10% strength lemon myrtle oil showed a significant improvement, compared to none in the control group. The oil is a popular ingredient in health care and cleaning products, especially soaps, lotions and shampoos.

**Common Thyme (*Thymus vulgaris*)** – culinary and medicinal uses – 8 medium plants





Thyme is a good source of iron and is used widely in cooking. Thyme is a basic ingredient in French, Greek, Italian, Lebanese, Persian, Portuguese, Libyan, Spanish, Syrian, and Turkish cuisines, and in those derived from them. It is also widely used in Arab and Caribbean cuisines. Thyme is often used to flavour meats, soups and stews. It has a particular affinity to and is often used as a primary flavour with lamb, tomatoes and eggs.

Thyme, while flavourful, does not overpower and blends well with other herbs and spices. In French cuisine, along with bay and parsley it is a common component of the *bouquet garni*, and of *herbes de Provence*. In some Levantine countries, the condiment *za'atar* (Arabic for thyme) contains thyme as a vital ingredient. Thyme is sold both fresh and dried. The fresh form is more flavourful but also less convenient; storage life is rarely more than a week. While summer-seasonal, fresh thyme is often available year-round.

Fresh thyme is commonly sold in bunches of sprigs. A sprig is a single stem snipped from the plant. It is composed of a woody stem with paired leaf or flower clusters ("leaves") spaced  $\frac{1}{2}$  to 1" apart. A recipe may measure thyme by the bunch (or fraction thereof), or by the sprig, or by the tablespoon or teaspoon. If the recipe does not specify fresh or dried, assume that it means fresh. Depending on how it is used in a dish, the whole sprig may be used (e.g. in a *bouquet garni*), or the leaves removed and the stems discarded. Usually when a recipe specifies 'bunch' or 'sprig' it means the whole form; when it specifies spoons it means the leaves. It is perfectly acceptable to substitute dried for whole thyme. Leaves may be removed from stems either by scraping with the back of a knife, or by pulling through the fingers or tines of a fork. Leaves are often chopped.

Thyme retains its flavour on drying better than many other herbs. Dried, and especially powdered thyme occupies less space than fresh, so less of it is required when substituted in a recipe. As a rule of thumb, use one third as much dried as fresh thyme - a little less if it is ground. Substitution is often more complicated than that because recipes can specify sprigs and sprigs can vary in yield of leaves. Assuming a 4" sprig (they are often somewhat longer), estimate that 6 sprigs will yield one tablespoon of leaves. The dried equivalent is 1:3, so substitute 1 teaspoon of dried or  $\frac{3}{4}$  tsp of ground thyme for 6 small sprigs. As with bay, thyme is slow to release its flavours so it is usually added early in the cooking process.

Medicinal use: The essential oil of common thyme (*Thymus vulgaris*) is made up of 20-54% thymol. Thymol, an antiseptic, is the main active ingredient in Listerine mouthwash. Before the advent of modern antibiotics, it was used to medicate bandages. It has also been shown to be effective against the fungus that commonly infects toenails. A tea made by infusing the herb in water can be used for cough and bronchitis. Medicinally thyme is used for respiratory infections in the form of a tincture, tisane, salve, syrup or by steam inhalation<sup>1</sup>. Because it is antiseptic, thyme boiled in water and cooled is very effective against inflammation of the throat when gargled 3 times a day. The inflammation will normally disappear in 2 - 5 days. Other infections and wounds can be dripped with thyme that has been boiled in water and cooled.

## Oregano (*Oreganum vulgare*) – culinary and medicinal uses – 8 medium plants



### Plant uses:

Oregano has an aromatic, warm and slightly bitter taste. It varies in intensity; good quality is so strong that it almost numbs the tongue, but the cultivars adapted to colder climates have often unsatisfactory flavor. The influence of climate, season and soil on the composition of the essential oil is greater than the difference between the various species.

The related species *Origanum onites* (Greece, Asia Minor) and *O. heracleoticum* (Italy, Balkan peninsula, West Asia) have similar flavors. A closely related plant is marjoram from Asia Minor, which, however, differs significantly in taste, because phenolic compounds are missing in its essential oil. Some breeds show a flavor intermediate between oregano and marjoram.

The dish most commonly associated with oregano is pizza. Its variations have probably been eaten in Southern Italy for centuries. Oregano became popular in the US when returning WWII soldiers brought back with them a taste for the “pizza herb”.

Health benefits: Oregano is high in antioxidant activity, due to a high content of phenolic acids and flavonoids. Additionally, oregano has demonstrated antimicrobial activity against food-borne pathogens such as *Listeria monocytogenes*. Both of these characteristics may be useful in both health and food preservation. In the Philippines, oregano (*Coleus aromaticus*) is not commonly used for cooking but is rather considered as a primarily medicinal plant, useful for relieving children's coughs.

Main constituents include carvacrol, thymol, limonene, pinene, ocimene, and caryophyllene. The leaves and flowering stems are strongly antiseptic, antispasmodic, carminative, cholagogue, diaphoretic, emmenagogue, expectorant, stimulant, stomachic and mildly tonic. Aqueous extracts, capsules, or oil extracts of oregano are taken by mouth for the treatment of colds, influenza, mild fevers, fungal infections, indigestion, stomach upsets, enteric parasites, and painful menstruation. It is strongly sedative and should not be taken in large doses, though mild teas have a soothing effect and aid restful sleep. Used topically, oregano is one of the best antiseptics because of its high thymol content.

Hippocrates, the father of medicine, used oregano as an antiseptic as well as a cure for stomach and respiratory ailments. A Cretan oregano (*O. dictamnus*) is still used today in Greece to soothe a sore throat. Oregano has recently been found to have extremely effective properties against Methicillin-resistant *Staphylococcus aureus* (MRSA), showing a higher effectiveness than 18 currently used drugs.



New Zealand Christmas Bush (*Metrosideros excelsa*) – Bird / bee / butterfly attractant – 3 bushes





Aerobin compost bin on the balcony at Level 15, 179 Elizabeth Street.



Worm farms located under caterer's bench in Level 15, 179 Elizabeth Street.





Plants on balcony

- Telephone directories
- Newspapers and magazines
- Envelopes and office paper
- Cartons
  - Empty milk & juice cartons
- Glass
  - All empty glass bottles & jars

In the recycling bins provided at the caterer’s bench outside the board room, the following can be recycled:

- Plastics
  - Codes 1 – 3
  - Milk bottles
  - Take-away containers
- Aluminium and Steel
  - All clean empty steel cans
  - Aluminium soft drink cans
  - Empty aerosol cans
- Glass
  - All empty glass bottles & jars

**Worm Farm**

The worm farm can be used for the disposal of all organic kitchen scraps according to the table below:

Place these items in worm farm	Do not place these items in worm farm:
Tea bags	Citrus peels
Coffee grounds	Garlic and onions
Dust	Meat
Tissues	Dairy
Paper napkins	Bread
	Pasta and rice

tea bags, coffee grounds, dust, tissues and paper napkins.

The following cannot be disposed of in the worm farm: orange and lemon peels, garlic and onions, meat, dairy, bread, pasta, and rice.

**Compost**

A mix of dry and wet materials must be added to the Aerobin compost bin. Acceptable materials listed in the table below:

Green (wet) Materials	Brown (dry) Materials	Do not place these items:
Food scraps	Leaves and small twigs	Oils
Citrus and onions (cut up)	Shredded or crumpled newspaper or office paper	Meat
Vegetable peelings	Roots or branches that are mulched	Fish
Lawn clippings and weeds	Long yellow grass	Wood
Green garden cuttings	Pea Straw	Glossy magazines
Coffee grounds		Ash
Tea-leaves and tea bags		

**WHAT CANNOT BE RECYCLED**

- Plastic bags
- Polystyrene

CASTLEREAGH STREET

Worm Farms



BlighVollerNieldArchitecture

Telephone +61 3 9639 9199  
Facsimile +61 3 9639 9188  
www.bvn.com.au

INTELLECTUAL PROPERTY  
© COPYRIGHT BLIGH VOLLER NIELD PTY LTD. THIS DOCUMENT IS THE PROPERTY OF BLIGH VOLLER NIELD PTY LTD. AND IS SUBJECT TO THE TERMS AND CONDITIONS OF THE LICENSING AGREEMENT. THIS DOCUMENT MAY ONLY BE USED FOR THE PURPOSES SPECIFIED IN THE LICENSING AGREEMENT. ANY UNAUTHORIZED REPRODUCTION OR DISTRIBUTION OF THIS DOCUMENT IS STRICTLY PROHIBITED. ANY UNAUTHORIZED REPRODUCTION OR DISTRIBUTION OF THIS DOCUMENT IS STRICTLY PROHIBITED. ANY UNAUTHORIZED REPRODUCTION OR DISTRIBUTION OF THIS DOCUMENT IS STRICTLY PROHIBITED.

ISSUE	DATE	FOR
01	03.10.07	INFORMATION
02	09.10.07	INFORMATION
03	11.10.07	INFORMATION
04	17.10.07	APPROVAL
05	22.10.07	APPROVAL
06	22.10.07	CURTAIN RAILS DELETED
A	09.11.07	FOR CONSTRUCTION

CONSULTANT  
DAVIS LANGDON  
tel 02 9956 8822 fax 02 9956 8848

CONSULTANT  
LINCOLNE SCOTT  
tel 02 8907 0900 fax 02 9957 4127  
CLIENT

GBCA  
L15, 179 ELIZABETH STREET  
SYDNEY NSW 2000  
CLIENT PROJECT No.

PROJECT

GREEN BUILDING COUNCIL  
OF AUSTRALIA  
BVN PROJECT NUMBER

M0709010  
TRUE NORTH PROJECT NORTH

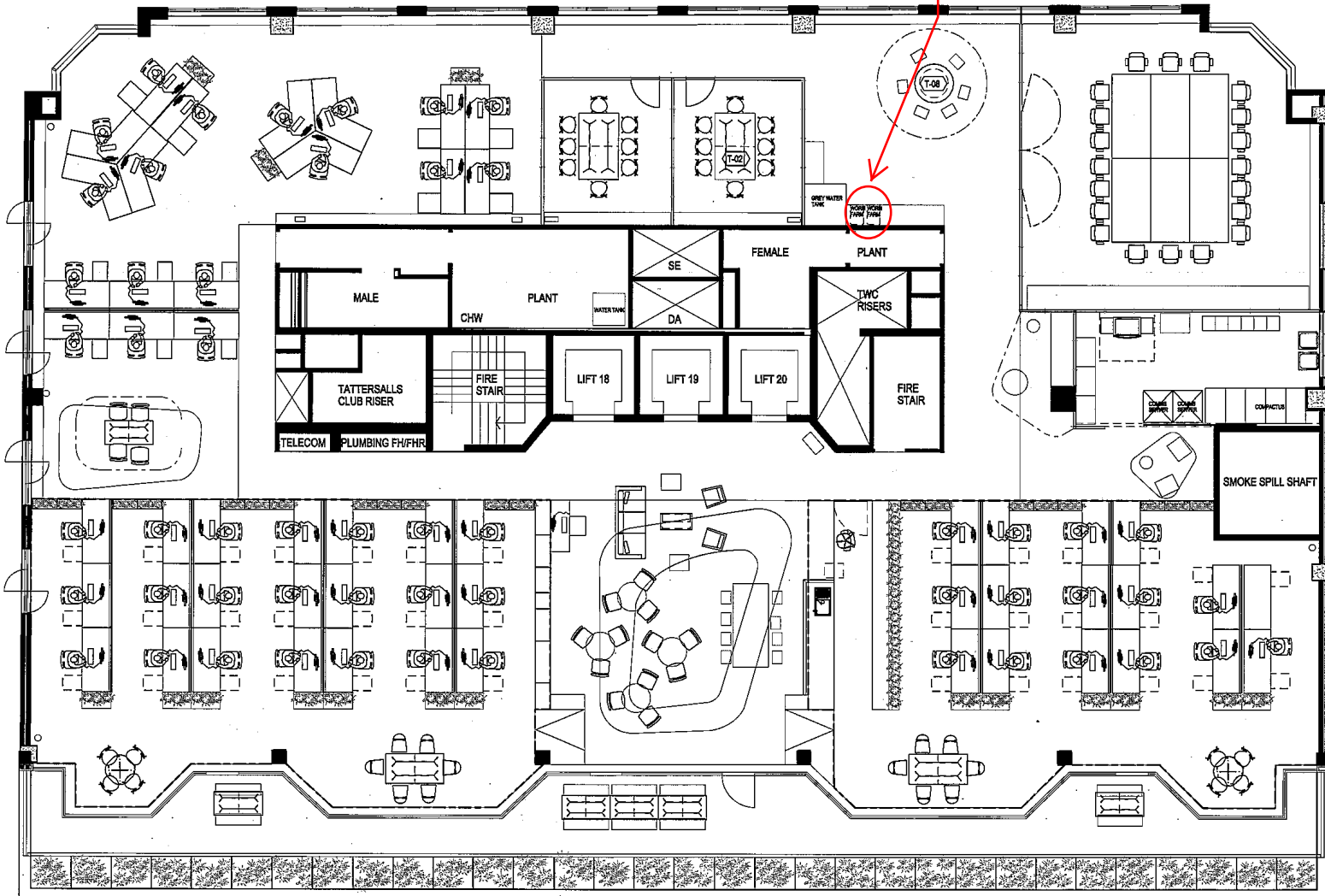
GRAPHIC SCALE  
0 2000 5000

SCALE  
1:100 at A2 DO NOT SCALE  
STATUS

FOR CONSTRUCTION  
DRAWING

GENERAL ARRANGEMENT  
FLOOR PLAN

DRAWING NUMBER ISSUE  
A-D-01 A



ELIZABETH STREET

AS BUILT

01 FLOOR PLAN  
1:100



# AEROBIN

## The Next Step In Recycling



**THE AEROBIN® IS A FINELY TUNED ENGINEERED PRODUCT WHICH, WHEN TREATED WITH RESPECT, SHOULD GIVE YOU YEARS OF SUSTAINABLE GARDENING.**

### POSITIONING YOUR AEROBIN®

Best placed in a shady or partially shady area and must be on a level, firm and even surface - large pavers or concrete are best, ensure the whole underneath surface is supported as the **Aerobin®** can weigh up to 400kg. Choose your spot carefully as it is not recommended that you move the **Aerobin®** once you start using it. If you need to move the **Aerobin®**, you will need to remove the matter inside first.

### GETTING STARTED

Using your **Aerobin®** couldn't be simpler. Open the lid, drop in a mix of brown (dry) and green (wet) organic materials. Close the lid and that's it! Keep adding a similar mix of organic material regularly. You can add more material as you take out compost. It's an ongoing process. Try to keep the amount of wet and dry material even, layering about 4 to 12cm (1 to 5 Inches) of each or for every bucket of kitchen scraps add a bucket of scrunched paper or dry garden material. Wet material shouldn't be dripping wet, just moist. (See "What Can Go In The Bin").

### MOISTURE LEVEL

The moisture level of your green materials should be that of a damp sponge. If you wring the material you should get a few drops of moisture. If there are no drops or it appears too dry, add a little water to the materials **BEFORE** you add to the **Aerobin®**. If it's dripping wet, add more dry material to even the moisture out. Dropping food scraps into the bin daily helps keep it moist.

### WEEDS AND SEEDS

When used correctly the **Aerobin®** kills weeds and seeds by heat generated through micro-organic activity in the bin. This activity raises the temperature within the bin. Even in cooler weather the process in the thermally insulated bin generates heat and breaks down compost, which is why you don't need to place the **Aerobin®** in the sun.

### WHAT CAN GO IN THE BIN?

Most organic waste, keeping an even mix of Green (wet) and Brown (dry). See chart below.

### COMPOSTING: HOW IT WORKS

Composting is a natural biological process that releases nutrients from organic matter, and produces fertile humus. The process requires air, moisture, warmth, organic matter and micro-organisms (fungi, bacteria and very small animals, which digest organic matter).

Decomposition starts at quite low temperatures. The insulation in the **Aerobin®** speeds up this process and the materials breathe through its patented aeration Lung® to provide a more sustainable composting process.

Any soil type will become richer, easier to work and more friable by adding compost, which will also make the soil water retentive, so you won't need to water the garden as much. The nutrients will feed the plants. You will see visible improvement in plant growth and condition in your soil if you regularly apply compost.

### COMPOST: WHEN IS IT READY?

Within three to six months. Allow more time in cold weather or if only adding smaller amounts of material every so often. Inspect material via either side access door. It is ready when the material is evenly textured, slightly moist and dark. Use a small spade or garden trowel to remove mature compost, taking care not to damage the central aeration core or lung®.

### ORGANIC LIQUID FERTILISER

The base of your **Aerobin®** contains a chamber to retain excess moisture from composting material. This organic liquid fertiliser is a mixture of moisture and minerals from the decomposing organic materials, and the naturally occurring micro-organisms that help composting occur.

This valuable organic liquid fertiliser can be used on your garden and pot plants to feed the plants, diluted 1:20 with water. You will see visible improvement in plant growth and condition in your soil.

The outlet pipe at the base of the **Aerobin** has an integrated valve which, when in the open position (facing downwards) allows the fertiliser to flow and, when in the closed position (facing upwards) stops the flow. Some people prefer to attach a length of 13mm diameter poly pipe to the outlet at the bottom of the unit, with a tap fixed on the end of the pipe to access the organic liquid fertiliser.

#### GREEN (WET) MATERIALS

- > Food scraps
- > Citrus and onions (Cut up)
- > Vegetable peelings
- > Lawn clippings\* and weeds
- > Green garden cuttings
- > Coffee grounds
- > Tea-leaves and tea bags

#### BROWN (DRY) MATERIALS

- > Leaves and small twigs
- > Shredded or crumpled newspaper or office paper
- > Roots or branches, finely chipped or mulched
- > Long yellow grass
- > Pea Straw

#### DO NOT USE...

- > Oils
- > Meat
- > Fish
- > Wood
- > Glossy magazines
- > Ash
- > Faeces from meat eating animals

\* (note: "Sir Walter Buffalo" grass is very moist, so mix it with more dry materials)



# Frequently Asked Questions

## HOW LONG IS THE UNIT GUARANTEED?

3 years against manufacturing or material defects.

## IS IT GUARANTEED TO MAKE GOOD COMPOST?

University tests have proved compost from the **Aerobin®** is superior to compost from other leading international compost units, when contents are mixed evenly and at the right moisture level. The tests achieved Rottegrad 4 standard (one step down from the top level) after just 13 weeks. The test indicated Rottegrad 5 standard would be achieved given a little more time.

## CAN I KEEP IT INSIDE?

Plenty of airflow is required, and if kept indoors a composting odour may be evident, so it should be kept outdoors.

## CAN I GET SPARE PARTS FOR THE AEROBIN®?

The **Aerobin®** is exceptionally resilient and should not break, however, replacement parts are available at a charge. You may freecall the hotline on 1800 615 445 or email [info@aerobin.com.au](mailto:info@aerobin.com.au) to order spare parts.

## WORMS

### HOW DO WORMS GET IN?

**Aerobin®** doesn't actually need worms to operate, however garden worms greatly enhance the composting process and may get in through small holes in the bottom of the **Aerobin®**.

### WILL IT KILL WORMS?

Worms may die if placed in the top of the unit due to the high temperatures generated by the composting procedure. They should survive and thrive at the bottom of the unit.

## ADDITIONAL HELP

**E-mail:** [info@aerobin.com.au](mailto:info@aerobin.com.au)

**Phone:** **Aerobin®** Hotline Australia-wide  
1800 615 445  
09:00 – 17:00 AEST,  
Monday - Friday except Victorian public holidays.

**Website:** [www.aerobin.com.au](http://www.aerobin.com.au) or [www.aerobin400.com](http://www.aerobin400.com)



**Aerobin®**  
The waste revolution for modern living