

## Information Sheet No. 3-9

### Manufacturing Quality Products from Compost

### Introduction to Australian Standard AS 3743–2002 for potting mixes

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#### What is the Australian Standard AS 3743–2002?

The Australian Standard AS 3743–2002 contains guidelines to assist the recycled organics industry to produce quality *potting mixes*.

The overall objective of the standard is to provide manufacturers, educational institutions, consumers and growers with a set of minimum requirements which will ensure that potting mixes can germinate seeds, grow seedlings, strike cuttings and maintain plant growth.

The standard specifies physical, chemical, biological and labelling requirements for potting mixes packaged for resale.

Potting mixes of both regular and premium quality are covered.

Requirements are also included for specialist potting mixes labelled as suitable for African violets, bulbs, hanging baskets, seedlings, orchids,

acid-loving plants and plants that are sensitive to phosphorus.

Given the beneficial effect that composts impart to potting mixes, formulation of composts into potting mixes can be a potentially profitable method of value adding to composted organics.

#### Benefits from using compost in potting mixes

The increasing price of peat in many countries in the late 1980's resulted in the widespread use of recycled organic materials as a substitute for peat in potting mixes.

Composts are an effective substitute for peat because the organic fraction:

- absorbs and releases water;
- slowly releases nutrients;
- assists in nutrient retention; and
- suppresses the growth of plant pathogens (Hoitink and Fahy,

**Plate 1.** A regular potting mix certified under AS 3743 (2002) for potting mixes. The mix contains composted garden organics, peat, sand and a wetting agent.



1986; Handreck and Black, 1999).

Potting mixes formulated with compost are often combined with inert material(s) to improve structural stability and *air-filled porosity*.

These may include: coarse sand; gravel; perlite; vermiculite; plastic foams; clay pellets; rockwool; scoria; pumice; diatomite and lignite (Handreck and Black, 1999).

Composts added to potting mixes usually have a specific particle size range to ensure that the mix has an adequate level of air-filled porosity.

Composts used in potting mixes also tend to be mature, thus minimising nitrogen drawdown and subsidence (or compression) in the pot.

Use of mature compost in potting mixes in many cases is important as immature composts can be toxic to plants.

AS 3743–2002 provides a quality guideline for potting mixes, whether they are formulated with compost, peat or any other suitable type of material.

### Two potting mix quality categories

One way a manufacturer can guarantee the quality of a potting mix is to have it certified according to criteria set out in AS 3743–2002. Australian Standard Certification then allows the manufacturer of a potting mix to label their product with the widely recognised Australian Standard ‘five ticks’ logo.

Australian Standard Certification ‘ticks’ allows the differentiation of products in the market place. Consumers will buy a certified product with confidence, knowing that it is of a certain minimum quality.

To produce a potting mix that meets the Australian Standard, a manufacturer must use a quality management system based on best practice principles.

AS 3743–2002 contains two product quality categories: *regular potting mix* and *premium potting mix*.

Premium potting mixes differ from regular potting mixes based on some chemical and physical properties.

Premium potting mixes have a higher soluble nitrogen content and thus a lower ability to deprive plants of soluble nitrogen. Such mixes can sustain plant growth for at least a month without added fertilisers if the use of the mix is commenced with 2 months of manufacture. Regular potting mixes require the addition of a balanced fertiliser from the time of potting.

In addition, the water holding capacity and wettability of premium potting mixes is superior to that of regular grade potting mixes.

### What range of potting mixes are included in AS 3743–2002?

The standard provides quality guidelines for general and specialist potting mixes.

Some of the products within these categories can be divided into regular and/or premium grades.

The entire range of potting mix products covered in AS 3743 (2002) is shown in Figure 1.

Please note that specific differences between the products are not reviewed in this Information Sheet. Readers should consult AS 3743–2002 for specific chemical, biological and physical differences between these products.

## Definitions

### Potting Mix

A growing medium suitable for the establishment and development of a wide range of plants in containers.

### Air-filled Porosity

The percentage of air, by volume, in a potting mix after it has been watered and drained under standard conditions.

### Regular Potting Mix

A potting mix with properties as outlined in AS 3743–2002 and requiring the use of a balanced fertiliser from the time of potting.

### Premium Potting Mix

A potting mix complying with the requirements as outlined in AS 3743–2002. Most particularly, its soluble nitrogen content and low ability to deprive plants of soluble nitrogen enable it to sustain good plant growth for at least a month without added fertilisers if the use of the mix is commenced within 2 months of manufacture. Its nutrient levels, water holding capacity and wettability are superior to those of a regular grade mix.

## Overview of potting mix quality guidelines

The standard states that potting mixes must meet a minimum level of quality.

Tests for product quality assess different physical, chemical and biological properties of a mix.

More specifically, the standard assesses the following quality parameters (Table 1).

**Figure 1.** Potting mixes covered by AS 3743 (2002). Please note that specific differences between the products are not reviewed in this Information Sheet. Readers should consult the standard for specific chemical, biological and physical differences between these products.

<b>General Potting Mix</b>		<b>Specialist Potting Mix</b>						
		Seedling	Orchid	Low Phosphorus	Acid	African Violet	Bulb	Hanging Basket
Regular	✓	✓	✓	✓	✓	✓	✓	
Premium	✓			✓	✓	✓	✓	✓

**Testing to meet requirements of AS 3743–2002**

To demonstrate compliance with the Standard, samples of product need to be periodically tested by an independent off-site laboratory.

Further details regarding off-site laboratory testing can be found in Information Sheet No. 3-5.

Further details regarding product certification systems can be found in Information Sheet No. 3-2.

**Table 1.** Explanations of the physical, chemical and biological quality criteria for potting mixes as specified in AS 3743 – 2002.

Soil property	Explanation
<b>Physical properties</b>	
Air-filled porosity	This is the percentage of air (by volume) in a potting mix after it has been watered and drained. Air filled porosity is important as this affects the ability of gases to diffuse in and out of a potting mix, which is required for good plant growth. Composts need to be combined with an inert substrate to maintain air-filled porosity over the life of the mix.
Total water holding capacity	This is the total amount of water (by weight) that a potting mix can hold after it has been watered and drained. Adequate water holding capacity is needed to provide water for plant consumption over time between waterings.
Wettability	This is the ease with which a potting mix may be re-wet once it has dried out. Some materials in potting mixes repel water when dry, and are difficult to rewet. This can seriously affect the ability of a mix to support plant growth. Wettability is measured as the time (minutes) taken for water to fully soak into a mix in the dry state.
<b>Chemical properties</b>	
pH	This is a measure of the acidity or alkalinity of a potting mix. pH can affect the availability of nutrients in potting mixes, and plants vary in their tolerance to pH.
Electrical conductivity	This is a measure of how salty a potting mix is. Potting mixes that have a high electrical conductivity can slow the growth or kill plants by causing water stress.
Ammonium, nitrate and chloride	Ammonium and nitrate ions, referred to as soluble nitrogen, are required for plant growth. Potting mixes low in these nutrients require the addition of fertiliser to ensure that good plant growth is achieved. High ammonium concentrations, however, can be toxic to some plants. The concentration of chloride is important as this ion contributes to the salinity of a mix. Young plants are particularly sensitive to water stress caused by high concentrations of chloride.
Nitrogen drawdown index	Potting mixes composed of organic materials that are not fully mature immobilise soluble nitrogen and can result in nitrogen deficiencies in plants. The nitrogen drawdown index measures nitrogen immobilisation in potting mixes.
P, K, S, Ca, Mg, Ca/Mg, K/Mg, Na, Fe, Cu, Zn, Mg & B	A range of macro- and micro-elements are required for sustained plant growth in potting mixes. The standard provides nutrient concentration ranges that are needed to produce potting mixes that are nutrient balanced.
<b>Biological properties</b>	
Toxicity index	Organic and inorganic toxins in potting mixes can reduce or even prevent plant growth. Toxicity index determines the toxicity of a mix relative to a reference mix that is non-toxic.

### *Important references*

- Handreck, K.A. and N.D. Black (1999). *Growing Media for Ornamental Plants and Turf*. University of New South Wales Press, Sydney, Australia.
- Hoitink, H. A. J. and P.C. Fahy (1986). Basis for the control of soilborne plant pathogens with composts. *Annual Review of Phytopathology*, 24: 93-114.
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