



Soils for landscaping and garden use



This Australian Standard® was prepared by Committee CS-037, Garden Soils and Potting Mixes. It was approved on behalf of the Council of Standards Australia on 31 October 2018. This Standard was published on 21 December 2018.

The following are represented on Committee CS-037:

- Australian Institute of Horticulture
 - Australian Institute of Landscape Architects
 - Australian Organics Recycling Association
 - Centre for Organic Research and Education
 - Department of Environment and Science, Qld
 - Horticulture Innovation Australia
 - NSW Department of Industry
 - NSW Environment Protection Authority
 - Nursery and Garden Industry Australia
 - Soil Science Australia
 - TAFE NSW
 - Waste Management Association of Australia
-

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Australian Standard®

Soils for landscaping and garden use

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PREFACE

This Standard was prepared by the Standards Australia Committee CS-037, Garden Soils and Potting Mixes, to supersede AS 4419—2003.

The objective of this Standard is to provide manufacturers with a set of requirements which will ensure that soils can support plant growth and to give users, such as growers, landscape architects and consumers, assurance of the suitability and quality of soils.

The principal differences between this and the previous edition are as follows:

- (a) Soil classifications have been revised and changed from classification by bulk density to classification by end use, fitness for purpose and specific application.
- (b) Specification parameters have been reviewed, and some have been removed for certain products, and others added, in order to produce a testing regime which will more closely determine a product's properties and potential performance in use.
- (c) The test methods were extensively reviewed and new or revised test methods added where necessary to cover changed specification parameters. An alternative test method to the root elongation test method set out in Appendix I has been nominated.
- (d) Compliance with national health standards has been expanded to include chemical contamination, biosecurity and physical contamination.

Statements expressed in mandatory terms in notes to tables are deemed to be requirements of this Standard.

The terms 'normative' and 'informative' are used in Standards to define the application of the appendices to which they apply. A 'normative' appendix is an integral part of a Standard, whereas an 'informative' appendix is only for information and guidance.

This Standard includes a commentary on some of the clauses. The commentary directly follows the relevant clause, is designated by 'C' preceding the clause number and is printed in italics in a box. The commentary is for information and guidance and does not form part of the Standard.

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FOREWORD

Due to the complexities of soil science, the large number of different soil types that occur in nature and the fact that many soils now sold for use in landscapes and gardens are blends of organic and mineral components, soils that meet the general requirements of this Standard have a wide range of properties.

Some plants have a distinct preference for soils with particular properties, therefore the appropriate soil should be carefully selected if optimum results are desired. Consequently, additional information on the suitability of soils with various properties for particular situations is provided. When in doubt, the consumer should seek specialist advice. In many cases the addition of fertilizer will also be necessary to achieve satisfactory results.

As there are various terms for soils of different types, this Standard defines the major types and gives information on soil selection and use in an Appendix.

Products conforming with AS 4454, *Compost, soil conditioners and mulches*, are required to meet chemical contaminant criteria for unrestricted use. Therefore, the use of composts conforming with AS 4454 as ingredients in landscaping soil blends will ensure that chemical contaminants levels are not undesirably high in soils.

STANDARDS AUSTRALIA

Australian Standard Soils for landscaping and garden use

1 SCOPE

This Standard sets out requirements and methods of test for general purpose soils, top dressing, topsoil and landscaping mixes, for domestic and commercial use, supplied in either bulk or bagged lots.

NOTES:

- 1 The requirements of this Standard specify soils suitable for the vast majority of plants but do not cover soils for plants with special requirements, cricket pitch soils, other specialist sporting turf soils or fertilizers.
- 2 All materials need to fully comply with the provisions of the current version of the State guidelines (or national guidelines in the absence of State guidelines) for use in application to land.
- 3 Requirements for potting mixes are specified in AS 3743.
- 4 It is often assumed that the darker the soil the better the quality. As this is not always the case, this specification does not specify colour requirements for soils.
- 5 Guidelines for taking soil samples are given in Appendix A.
- 6 Information on selection and use of soils is given in Appendix M.

2 OBJECTIVE

The objective of this Standard is to provide manufacturers with a set of requirements which will ensure that soils can support plant growth and to give users, such as growers, landscape architects and consumers, assurance of the suitability and quality of soils.

3 NORMATIVE REFERENCES

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document.

AS

- | | |
|------------|--|
| 1289 | Methods of testing soils for engineering purposes |
| 1289.2.1.1 | Method 2.1.1: Soil moisture content tests—Determination of the moisture content of a soil—Oven drying method (standard method) |
| 1289.4.1.1 | Method 4.1.1: Soil chemical tests—Determination of the organic matter content of a soil—Normal method |
| 1141.11 | Methods for sampling and testing aggregates |
| 1141.11.1 | Method 11.1: Particle size distribution—Sieving method |
| 3743 | Potting mixes |
| 4454 | Composts, soil conditioners and mulches |

AS/NZS

- | | |
|--------|--|
| 1336 | Eye and face protection—Guidelines |
| 1715 | Selection, use and maintenance of respiratory protective equipment |
| 1716 | Respiratory protective devices |
| 2161 | Occupational protective gloves |
| 2161.2 | Part 2: General requirements |

MCINTYRE, KEITH and JAKOBSEN, BENT (1998), *Drainage for sportsturf and horticulture*, Kambah, ACT: Horticultural Engineering Consultancy

4 DEFINITIONS

For the purpose of this Standard, the definitions below apply.

4.1 Acid soils

Soils that have a pH of not less than 4.5 and not greater than 6.0.

4.2 Alkaline soils

Soils that have a pH of not less than 7.6 and not greater than 9.0.

4.3 Landscaping soils

Soils suitable for landscape and garden applications (on grade).

NOTE: 'On grade' refers to soils placed on and in connection with the earth, in a landscape zone such that the growing medium is in direct contact with the natural earth, top soil or subsoil.

4.4 Layers

Soil layers that change in texture, structure and colour with depth and change in soil chemistry conditions, categorized as follows:

- (a) Surface layer.
- (b) Sub-surface layer.

***C4.4** Common industry practice is to use terms 'A' Horizon and 'B' Horizon for these layers, but the term 'Horizon' has a specific technical meaning when applied to natural, undisturbed soil profiles and is not used in this Standard in order to avoid confusion.*

4.5 Low density soils

Soil for use on an artificial base (i.e. on a slab), for example, for a rooftop garden or in large landscape containers. Such soils will usually be blends of mineral and organic components, and will typically have a bulk density in the range 0.3 kg/L to 1.0 kg/L as determined in accordance with Appendix B.

4.6 Natural soil

4.6.1 General

A soil that has been excavated from the ground. Natural soil may be recovered site soil (RSS), excavated natural material (ENM) or virgin excavated natural material (VENM) as defined in Clauses 4.6.2 to 4.6.4.

NOTE: Natural soil could include topsoil and subsoil or quarried soil-like materials. Typically it will have a bulk density of greater than 1.0 kg/L as determined in accordance with Appendix B.

4.6.2 Excavated natural material (ENM)

Excavated natural material means naturally occurring rock and soil (including, but not limited to, materials such as sandstone, shale, clay and soil) that has:

- (a) been excavated from the ground; and
- (b) contains at least 98% (by weight) natural material; and
- (c) does not meet the definition of Virgin Excavated Natural Material in the Act.

Excavated natural material does not include material located in a hotspot; that has been processed; or that contains asbestos, Acid Sulfate Soils (ASS), Potential Acid Sulfate soils (PASS) or sulfidic ores.

NOTES:

- 1 Examples include soil excavated from a disturbed demolition site, an oval being reconstructed or a stockpile of soil stored on a site.
- 2 The terms VENM and ENM may have specific legislated definitions in different states. Users need to be aware of their legal responsibilities in this regard. Refer to <http://www.epa.nsw.gov.au/waste/virgin-material.htm> for use in NSW for example.

4.6.3 Recovered site soil (RSS)

Natural soil that has been stripped and recovered from the site being landscaped. It may be used to manufacture any of the soils described by this Standard. It may also be described as VENM or ENM.

4.6.4 Virgin excavated natural material (VENM)

The Protection of the Environment Operations Act 1997 (POEO Act) defines virgin excavated natural material (VENM) as—

natural material (such as clay, gravel, sand, soil or rock fines)—

- (a) that has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities; and
- (b) that does not contain any sulfidic ores or soils or any other waste; and
- (c) includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved for the time being pursuant to an EPA Gazettal notice.

Virgin excavated natural material (VENM) is a waste that has been pre-classified as general solid waste (non-putrescible). For more information see Classifying waste (NSW EPA) or your local regulator.

4.7 Neutral soils

Soils that have a pH of 6.1–7.5.

4.8 Organic matter

The organic matter component of soil, composed of organic compounds that have come from the remains of organisms such as plants and animals and their waste products in the environment. In this Standard organic matter is calculated by applying a multiplier to the total organic carbon of the material determined by loss on ignition of the material.

4.9 Shall

Indicates that a statement is mandatory.

4.10 Should

Indicates a recommendation.

4.11 Soils for turf and lawns

A soil which is suitable for turf underlay and/or top dressing for turf and lawn.

4.12 Specialist soils**4.12.1 Structural support soil**

A media for tree planting in urbanized environments, designed to allow for root development under engineered structures (i.e. roads, pavements, etc.).

4.12.2 *Wetland soils*

A media that has good water-holding capacity, reasonable wet strength and suitable drainage capacity for wetland purposes.

4.13 **Substitute material**

A soil or sand substitute that contributes to the physical, chemical and size requirements for landscaping soils, low density soils, soils for turf and lawns and specialist soils.

NOTE: Examples of substitute materials include materials derived from construction and demolition waste, manufactured materials, mined rock materials, etc.

5 **GENERAL REQUIREMENTS**

5.1 **Soil classification**

Soils shall be classified into the following categories:

- (a) Landscape soils (on grade).
- (b) Low density media (on slab).
- (c) Soils for turf and lawns.
- (d) Specialist soils.

NOTE: Natural soils (VENM, ENM and RSS) may be components in the above categories.

5.2 **Soil pH**

Soils may be further classified as acid, neutral or alkaline.

Acid soil shall have a pH of not less than 4.5 and not greater than 6.0.

Neutral soils shall have a pH of 6.1–7.5.

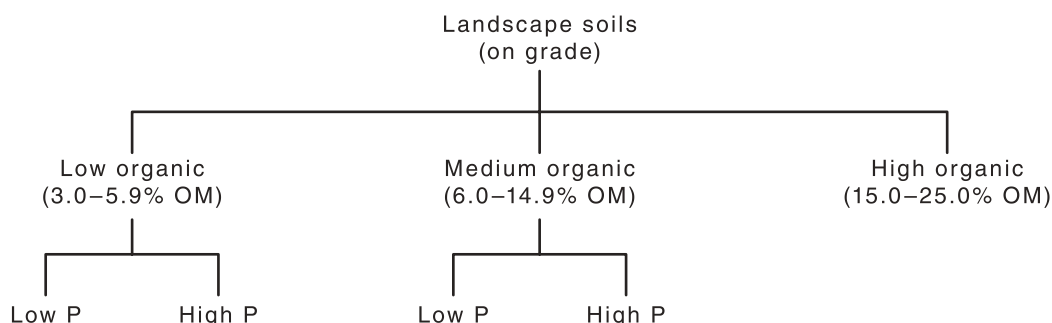
Alkaline soil shall have a pH of not less than 7.6 and not greater than 9.0.

The pH values specified in this clause shall be determined by the appropriate method in Appendix D.

NOTE: Soil pH may change over time as plants grow and the soil is fertilized.

5.3 **Scheme of soil classification**

Figures 1 to 4 show the classification of soils for landscape soils (on grade), low density soils (on slab), soils for turf and lawns and specialist soils respectively.



NOTE: Low organic, medium organic and high organic may also be referred to as: low fertility, medium fertility and high fertility, respectively.

FIGURE 1 SOIL CLASSIFICATION—LANDSCAPE SOILS (ON GRADE)

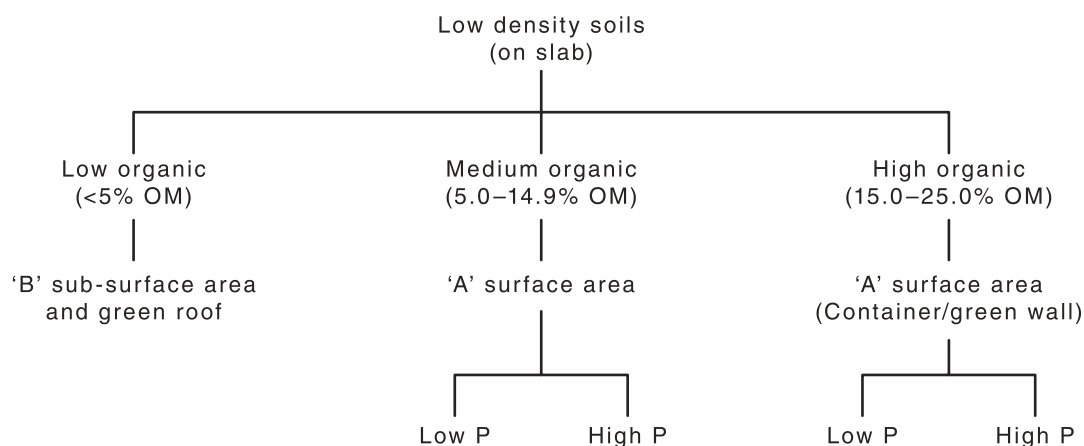


FIGURE 2 SOIL CLASSIFICATION—LOW DENSITY SOILS (ON SLAB)

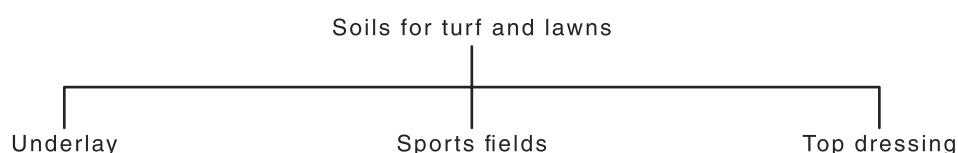


FIGURE 3 SOIL CLASSIFICATION—SOILS FOR TURF AND LAWNS

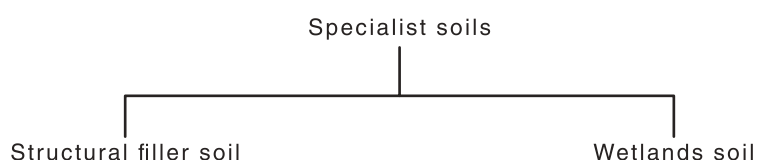


FIGURE 4 SOIL CLASSIFICATION—SPECIALIST SOILS

5.4 Specifications

5.4.1 General

Soils shall be tested to the specifications in Clauses 5.4.2, 5.4.3, 5.5 and 5.6 within 28 days of manufacture.

NOTES:

- 1 The composition and properties of soil may change over time due to environmental, storage or usage factors. Testing to show conformity with this Standard should be done as soon as possible after manufacture and within 28 days of manufacture. Users of soils may require additional testing at time of purchase, delivery or application in order to ascertain that the product is fit for purpose.
- 2 Any sampling undertaken to determine conformance with this Standard should be representative of the material, including spatially and temporally (see Appendix A).
- 3 See Appendix K for determination of soil texture.
- 4 See Appendix M for guidance on the selection and use of soils.

5.4.2 *Testing for all soil types*

All soils shall pass the following tests:

- (a) Physical and chemical contaminants (all products).
- (b) Plant propagules (all products).

NOTES:

- 1 All soils should be free from any living parts (seeds, bulbs, corms, vegetative propagules and the like) of plants. (See Clause 8.2.)
- 2 Products should be tested for plant propagules when type testing or as part of product characterization, and whenever the source or nature of the raw materials used in production changes.
- 3 Appendix L contains a test method which may be used to assess the presence of propagules.

Bulk density shall be tested and reported for all soil types. Specific applications may require soils to have a bulk density within a specified range.

ECEC (Effective Cation Exchange Capacity) shall be tested and reported for landscape soils (on grade), structural filler soils and wetlands soils. For test methods see BIBLIOGRAPHY: 1. RAYMENT, G.E. and LYONS, D.J., 2011. *Soil chemical methods—Australasia*. CSIRO Publishing, Collingwood, VIC.

5.4.3 *Specifications for each soil type*

Each soil type shall be in accordance with the requirements and test methods specified in Tables 1 to 4. Sieve analysis for the aggregate component of Structural Filler Soils and for Wetland Soils shall meet the requirements specified in Tables 5 and 6.

TABLE 1
LANDSCAPE SOILS (ON GRADE)

Property		Low organic		Medium organic		High organic	Test method
		Low phosphorus	High phosphorus	Low phosphorus	High phosphorus		
EC (dS/m)		<0.75	<1.2	<1.75	<1.75	<2.5	Appendix D
Na (% of ECEC)	No pre-treatment for soluble salts	<20	<20	<20	<20	<20	See Bibliography Item 1, Methods 15A1 and 15D2
	Pre-treatment for soluble salts	<10	<10	<10	<10	<10	See Bibliography Item 1, Methods 15A2 and 15D1
K (% of ECEC)		3–15	3–15	5–15	5–15	5–18	See Bibliography Item 1
Ca (% of ECEC)	Acid and neutral soils	50–80	50–80	50–80	50–80	50–80	See Bibliography Item 1
	Alkaline soils	50–90	50–90	50–90	50–90	50–90	See Bibliography Item 1
Mg (% of ECEC)		10–30	10–30	10–30	10–30	10–30	See Bibliography Item 1
Available P (mg/kg)		<30	30–200	<30	30–200	<300	Appendix F
OM (%dw)		3–6	3–6	6–15	15–25	15–25	See Clause 5.6
Total available N (NO ₃ + NH ₄) mg/kg		>20	>20	>30	>50	>50	Appendix E
Large particles >20 mm (%w/w)		<2	<2	<2	<2	<2	Dry sieving
Bioassay		>60 mm or ≤20% worm avoidance (see Note 3)	>60 mm or ≤20% worm avoidance (see Note 3)	>60 mm or ≤20% worm avoidance (see Note 3)	>60 mm or ≤20% worm avoidance (see Note 3)	>60 mm or ≤20% worm avoidance (see Note 3)	Appendix I
Water repellence		≤60 s (water) or rating of ≤5 (ethanol)	≤60 s (water) or rating of ≤5 (ethanol)	≤60 s (water) or rating of ≤5 (ethanol)	≤60 s (water) or rating of ≤5 (ethanol)	≤60 s (water) or rating of ≤5 (ethanol)	Appendix C

NOTES:

- 1 Use of low or high phosphorus soils is dependent on the species to be planted in the soil. Specifiers of soils should be aware that phosphorus sensitivity is species and environment specific, and no general rules can be applied.
- 2 Landscape soils should be able to hold enough plant-available water to sustain plant growth. No suitable test method for measuring this was available at the time of publication.
- 3 If variation in the number of worms between the test sample and the control is ≤20%, this constitutes ≤20% worm avoidance.

C5.4.3 %ECEC ranges for the various ions quoted in this Standard were determined by the committee on the best available information on the composition of soils for landscape and garden use that perform satisfactorily. Not a great deal of information is available on the limiting values of these trace elements in manufactured soils for landscape and garden use. The committee would appreciate any relevant technical information on the effects of %ECEC on soil performance in order to review these specifications at the next revision of the Standard.

TABLE 2
LOW DENSITY MEDIA (ON SLAB)

Property	Low organic 'A' or 'B' horizon	Medium organic 'A' horizon		High organic 'A' horizon/container		Test method
		Low phosphorus	High phosphorus	Low phosphorus	High phosphorus	
Bulk density (kg/L)	0.3–0.8	0.3–0.8	0.3–0.8	0.3–0.8	0.3–0.8	Appendix B
EC (dS/m)	<2.2	<2.2	<2.2	<2.2	<2.2	Appendix D
AFP (%)	≥10	≥10	≥10	≥10	≥10	AS 3743—2003 Appendix B
Water holding capacity (%)	≥30	≥30	≥30	≥30	≥30	AS 3743—2003 Appendix B
P (mg/L)	8–40	<3	8–40	<8	8–40	Appendix G
OM (%dwb)	<5	<15	<15	<25	<25	See Clause 5.6
Ammonium-N (mg/L)	≤100	≤100	≤100	≤100	≤100	Appendix E
Ammonium-N + Nitrate-N (mg/L)	≥50	≥50	≥50	≥50	≥50	Appendix E
NDI	≥0.7	≥0.7	≥0.7	≥0.7	≥0.7	Appendix H

TABLE 3
SOIL FOR TURF AND LAWNS

Property	Underlay	Sports fields	Top dressing	Test method
EC (dS/m)	<1.2	<1.2	<2.5	Appendix D
Exchangeable Na (% of ECEC)	<6	<6	<6	See Bibliography Item 1
Exchangeable Ca: Mg ratio	3–9	3–9	3–9	See Bibliography Item 1
Available P (mg/kg)	20–100	20–100	—	Appendix F
Available N (mg/kg)	20–60	20–60	0–60	Appendix E
OM (%w/w)	2–10	<10	0–25 (See Note 1)	Clause 5.6
Large particles >5 mm		<2%	(See Note 2)	

(continued)

TABLE 3 (continued)

Property	Underlay	Sports fields	Top dressing	Test method
Large particles 2–20 mm (% by mass)	<10		(See Note 2)	
Large particles >20 mm (% by mass)	0	1 or 2	(See Note 2)	
Dispersibility (category)	1 or 2	1 or 2	1 or 2	Appendix J
Permeability (mm/h @ 32 drops)	>20	>30–200		McIntyre & Jakobsen (1998) method and Note 3
Water repellence	≤60 s (water) or rating of ≤5 (ethanol)	≤60 s (water) or rating of ≤5 (ethanol)	≤60 s (water) or rating of ≤5 (ethanol)	Appendix C

NOTES:

- 1 The range 0–25% OM allows for both low organic and high organic products within this category.
- 2 *Large particles*: Top dressing should not contain—
 - (a) any mineral particles which do not pass a 2 mm sieve;
 - (b) more than 15% by weight of organic particles which pass a 5 mm sieve but not a 2 mm sieve;
 - (c) more than 5% by weight of organic particles which do not pass a 5 mm sieve; and
 - (d) any organic particles which do not pass an 8 mm sieve.
- 3 *McIntyre & Jakobsen method*: The test report for the McIntyre & Jakobsen permeability test should contain the following:
 - (a) Sample identification, including sufficient details to show the time period between the manufacture and testing of the product.
 - (b) The hydraulic conductivity as the mean of the three readings.
 - (c) Reference to this test method and Standard, i.e. McIntyre & Jakosen (1998) and AS 4419.

TABLE 4**STRUCTURAL SUPPORT SOIL AND WETLANDS**

Property	Structural filler soil	Wetlands	Test method
EC (dS/m)	<0.5	<1.2	Appendix D
Bulk density (kg/L)		1.3–1.6	Appendix B
Na (% of ECEC)	<7	<7	See Bibliography Item 1
K (% of ECEC)	3–10		See Bibliography Item 1
Ca (% of ECEC)	60–80	60–80	See Bibliography Item 1
Mg (% of ECEC)	15–25		See Bibliography Item 1
Al (% of ECEC)	<5		See Bibliography Item 1
Ca: Mg ratio	3–9	3–9	See Bibliography Item 1
P (mg/kg)	30–100	<60	Appendix F
OM (% dwb)	3–8	2–5	See Clause 5.6
Available N (as Nitrate) (mg/kg)	>20	20–50	Appendix E

(continued)

TABLE 4 (continued)

Property	Structural filler soil	Wetlands	Test method
Water repellence	≤60 s (water) or rating of ≤5 (ethanol)	≤60 s (water) or rating of ≤5 (ethanol)	Appendix C
Permeability (mm/h @ 16 drops)		>30	McIntyre & Jakobsen (1998) method

NOTES:

- 1 The following are typical components used to meet the physical requirements of structural support soil specifications:
 - (a) Nominal 63 mm hard rock aggregate—1000 parts by volume.
 - (b) Filler soil (loam to clay loam)—200 parts by volume.
- 2 McIntyre & Jakobsen method: The test report for the McIntyre & Jakobsen permeability test should contain the following:
 - (a) Sample identification, including sufficient details to show the time period between the manufacture and testing of the product.
 - (b) The hydraulic conductivity as the mean of the three readings.

Reference to this test method and Standard, i.e. McIntyre & Jakobsen (1998) and AS 4419.

TABLE 5
SIEVE ANALYSIS [AS 1141.11.1 (2009)]
FOR STRUCTURAL SUPPORT SOIL
FOR AGGREGATE COMPONENT

AS sieve mm	% passing
63.0	100
53.0	85–100
37.5	230–65
26.5	0–20
19.0	0–5
13.2	0–2
4.75	0–1

NOTES:

- 1 Other aggregate sizes may be acceptable in many installations. Other considerations in specifying support soils are: tree root diameter, effective rooting space and stem diameter, which can determine the optimum physical properties for a particular application.
- 2 An associated planting soil with good drainage in the root zone should be used with a structural support soil to provide street trees and other plants with a suitable growing environment.

TABLE 6
SIEVE ANALYSIS [AS 1141.11.1 (2009)]
FOR WETLAND SOILS

Particle size distribution	% retained by mass
2.0 mm (fine gravel)	<10
1.0 mm (very coarse sand)	<10
0.5 mm (coarse sand)	10–30
0.25 mm (medium sand)	20–40
0.1 mm (fine sand)	10–30
0.05 mm (very fine sand)	5–15*
0.002 mm (silt)	<12**
<0.002 mm (clay)	3–8

* = max 25% combined very fine sand, Si + Clay.

** = Si + clay combined 5–10.

NOTE: A wide range of soils can be used in wetland plantings including naturally occurring silts and clays albeit these can be difficult to install and plant into. The specification given is intended for the supply of commercial grade of soils for wetland purposes, designed to provide minimum consolidation and reduce planting difficulties.

5.5 Bulk density

The bulk density of all soils shall be determined by the method of Appendix B. Bulk density shall be reported for all soil types.

NOTES:

- 1 Documentation requirements can be found in Clause 7.
- 2 The supplier is responsible for providing evidence of the bulk density, if required by the purchaser.

5.6 Organic matter

The organic matter content of all soils shall be determined in accordance with AS 1289.4.1.1, or by any other laboratory procedure (such as a Leco furnace) that has been correlated with the methodology of AS 1289.4.1.1. All soils shall contain no less than 3% by mass of organic matter (except top dressing—see Clause 5.4.3). The organic matter content is calculated from total organic carbon content using either of the following equations:

$$\text{OM} = 1.7 \times \% \text{C (Leco furnace)} \quad \dots 1$$

$$\text{OM} = 2.2 \times \% \text{C (Walkley and Black)} \quad \dots 2$$

where

C = carbon content

OM = organic matter

6 DELIVERIES OF SOILS

6.1 Bagged soils

6.1.1 General

NOTE: Attention is drawn to any relevant State and Federal legislation related to size, packing volume or weight, which may apply in addition to the requirements of this clause, and may require additional marking or documentation.

6.1.2 Volume

Soil volume shall be measured in accordance with Appendix B. The soil contents of the package shall not be less than the volume stated on the package. The package shall be marked with the following:

- (a) The volume of the soil contents in litres to the nearest litre.
- (b) The volume as per Item (a) being the only volume stated on the package.
- (c) The volume printed in letters a minimum of 4.8 mm high.

NOTE: It is not acceptable to mark packages with 'No. 1 Pack' or other similar terms as a substitute for stating the actual volume in litres.

6.1.3 Protection

Soils should be packaged so that, under normal conditions of handling, storage and transport, the contents are protected from contamination by extraneous matter and the contents are not released unintentionally.

6.2 Bulk deliveries

Soils shall be supplied either by mass (tonnes) or by volume (cubic metres) and accompanied by a docket showing either or both. If sold by mass, this shall be determined using calibrated weighing equipment.

When soils are supplied by volume, the determination of volume of bulk product is subject to agreement between the supplier and the purchaser, for example, loose or settled volume, or weight at a specified moisture content.

Appendix B describes the methods for determining volume and bulk density of materials delivered packaged or in bulk. Using the bulk density determined as in Appendix B, the mass of a load of product, and the volume of product despatched can be determined.

NOTES:

- 1 Parties need to be aware that settling will occur during transport.
- 2 The purchaser and the supplier should agree prior to delivery whether soil is to be supplied by mass or volume.
- 3 Appendix M gives information on the selection and use of soils.

7 DOCUMENTATION

NOTE: Attention is drawn to any relevant State and Federal laws, which may require additional or different marking or documentation to that specified in this clause.

Soil shall be accompanied by documentation (e.g. an information sheet, online product information or invoice) stating the following:

- (a) The soil type, as defined and described in Clauses 4 and 5, or its suitability.
- (b) Mass or volume.
- (c) pH range of the product.
- (d) Electrical conductivity (EC).