

Urban Forest Technical Manual

Appendix 4 – Material Specification Gap-graded Soil and GMB 20 Base

4.1 Gap-graded soil specification

Gap-graded soil shall be equivalent to the specification below. A sample of the filler soil and additives must be tested for compliance with the specification and results submitted to Council prior to installation.

Gap-graded Soil Transportation - Gap-graded soil shall be delivered to site pre-blended. The soil mix shall be transported in a moist condition to prevent segregation of components.

Gap-graded Soil Mix Components by Volume

- 80% 40mm Basalt aggregate. Narrowly graded uniform sized angular clean hard and durable gravel sized 25mm to 75mm.
- Filler Soil – 10% Screened Menangle Sandy Loam and 10% Screened Virgin Clay (remove any clay greater than 15mm)

Table 4.1.1 Required Filler Soil Properties

Property	Unit	Quantity/ Acceptable Range
Chemical		
pH in water (1:2)	mS/cm	5.5 - 7.0
pH in CaCl2	mS/cm	5.5 - 7.0
Electrical Conductivity	dS/m	< 2.5
Soluble Cations		
Sodium	% ECEC	< 5
Potassium	% ECEC	5 - 15
Calcium	% ECEC	60 -75
Magnesium	% ECEC	5 - 25
Calcium : Magnesium		2 - 6
Nutrient mg		
Phosphorous (Bray)	Mg/kg	< 30
Ammonium	Mg/kg	< 200
Nitrate	Mg/kg	< 100
Sulphate	Mg/kg	40 < 100
Physical		
Organic matter	% by mass	<1
Permeability - AS4419	cm/hr	2 - 100
Toxicity Index		> 50
Wet ability		> 5
Bulk Density (Standard)		> 0.7
Particle Size Distribution (Aggregate)AS1141.11	% Passing through sieve	
75 mm		100
53 mm		91
37.5 mm		64

Property	Unit	Quantity/ Acceptable Range
26.5 mm		34
19 mm		24
13.2 mm		22
9.5 mm		22
6.7 mm		21
4.75 mm		21
2.36 mm		21
1.18 mm		20
0.60 mm		18
0.30 mm		12

4.2 GMB 20 base specification

GMB 20

(Reference: RTA - Unbound and Modified Base and Sub-Base Materials for Surfaced Road Pavements)

Install 20mm GMB 20 to a minimum depth of 150mm over the finished surface of Gap-graded soil.

Table 4.2.1 GMB 20 Properties

Ref: Table 3051.1 - Unbound Material (Based on Particle Size Distribution) - Specification Requirements

Property	Defect Weighting Value	GMB 20 Base
RTA T106: (a) Coarse Particle Size Distribution ⁱ Passing AS Sieve (% by mass)		
75.0 mm	2	-
53.0 mm	2	-
37.5 mm	2	-
26.5 mm	2	100
19.0 mm	2	95-100
13.2 mm	2	50-70
6.70 mm	2	30-55
2.36 mm		20-30
RTA T106 & T107: (b) Maximum Permitted Deviation of Material Supplied from Nominated Particle size distribution ^{i, iv} Passing AS Sieve (% by mass)		
75.0 mm	1	-
53.0 mm		-
37.5 mm		-
26.5 mm		-
19.0 mm	2	-
13.2 mm	2	±8
6.70 mm	2	±5
2.36 mm	2	±4
425 µm ^{vii}	1	±3
75 µm ^{vii}	1	±2

Property	Defect Weighting Value	GMB 20 Base
RTA T107: (a) Fine Particle Size Distribution Ratios expressed as percentages		
A. <u>Pass 425 µm sieve %</u> Pass 2.36 mm sieve		30-50
B. <u>Pass 75 µm sieve %</u> Pass 425 µm sieve		30-50
C. <u>Pass 13.5 µm sieve %</u> Pass 75 µm sieve		-
RTA T108: Liquid Limit (if material non-plastic) ⁱ For natural or manufactured		max 20 ^V
For recycled building material		max 27
RTA T109: Plastic Limit (if plastic) ⁱ		max 20

4.3 Additives and fertilizer schedule

The following additives are to be thoroughly mixed with the filler soil prior to blending with crushed aggregate. Additives will be tested for compliance, and results submitted to the Principal's representative prior to blending with the crushed aggregate.

Table 4.3.1 Additives/Fertiliser Schedule for structural Soil Mix

Additives	Rate
Magrilime	600g/m ³ (to bring pH to 5.5 – 6.5)
Trace element mix	300g/m ³
Potassium nitrate	500g/m ³
Ammonium nitrate (Nitram)	500g/m ³
Superphosphate	500g/m ³
Iron sulphate	1500g/m ³
8-9 month control release fertiliser	500g/m ³
Magnesium sulphate	400g/m ³