



# AP4 – Transportation Materials

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## AP4 Transportation Materials

### 4.1 General

The following specifications apply to materials to be incorporated in the Works.

### 4.2 Sand

Imported sand for use in the formations of lower sub-base of pavement, imported subgrade, footpaths and paved areas and as foundations to concrete works shall be "run of pit" sand which is free of organic matter and well graded within the limits given below. It shall be made up of clean particles of silica or hard stone containing minimal silts, clays and pumice. The sand shall obtain a smooth grading curve within the grading limits given below:

Test Sieve	% of weight passing
9.5mm	95 - 100
4.75mm	80 - 100
2.36mm	45 - 80
1.18mm	25 - 65
600micron	18 - 45
300micron	12 - 30
150micron	5 - 15
75micron	10 max

Bedding sand for use with concrete block paving shall comply with NZS3116:2002 Grading Curve for Bedding Sand. Single sized, gap graded or other sands containing an excessive amount of fines shall not be used. The sand shall be free of deleterious materials, soluble salts and other contaminants. The particles shall preferably be sharp. The sand shall have a moisture content in the range 4% – 8%.

Joint filling sand shall be such that 90% passes a 1.18mm BS410 sieve and no more than 10% passes a 75micron sieve and shall be free of deleterious materials, soluble salts and other contaminants. It shall be dry enough to be free running and shall be non-plastic.

Trench sand shall comprise "run of pit" sand as above and 4% to 6% by weight of clean loam.



### 4.3 Brown Rock

This material is a non-specific rock aggregate with a maximum particle size of 200mm.

The suitability of the material will be assessed on its grading, crushing and weathering resistance and clay content relative to its use.

Evidence of these properties will be required for approval by the Engineer prior to its use.

### 4.4 GAP Aggregate – Pavement Courses

Gap20 shall be used as Pavement Course where the compacted depth is less than 80mm and GAP40 where the compacted depth is greater than 80mm.

The GAP aggregate shall comprise crushed aggregate and must be free of all non-mineral matter.

The crushing resistance shall be not less than 100kN when the aggregate is tested according to NZS4407:1991 Test 3.10 “The Crushing Resistance Test”.

An aggregate shall be considered to have met the requirement if the sample produces less than 10 percent fines when loaded so that the specified peak load is reached in 10 minutes. In this case the test shall follow the standard method in all other respects. If the aggregate passes the test it shall be reported as having a crushing resistance “greater than (the load specified)”.

Weathering Resistance – The aggregate shall have a quality index of AA, AB, AC, BA, BB, CA or CB when tested according to NZS4407:1991 Test 3.11 “Weathering Quality Index Test”.

Sand Equivalent – The sand equivalent shall not be less than 30 for carriageway pavement metal when the aggregate is tested according to NZS4407:1991 Test 3.6 “Sand Equivalent Test”.

Where GAP20 is to be used on the footpath the sand equivalent shall not be less than 25 when tested according to NZS4407:1991 Test 3.6 “Sand Equivalent Test”.

Grading Limits – When tested according to NZS4402 Part 2:1986 Test 2.8.2 “Subsidiary Method by Dry Sieving”, or test 2.8.1 “Standard Method for Wet Sieving” where aggregates contain clay or other fine material causing aggregating of the particles, the grading of the aggregate shall fall within the respective envelope defined below.



Test Sieve Aperture	Percent Passing	
	GAP40	GAP20
37.5mm	100	-
19.0mm	63 – 81	100
9.5mm	40 – 60	52 – 76
4.75mm	25 – 45	33 – 57
2.36mm	16 – 35	20 – 44
1.18mm	9 – 27	12 – 35
600micron	5 – 20	7 – 25
300micron	1 – 15	4 – 20
150micron	10 max	12 max
75micron	7 max	8 max

Grading Shape Control – The weight in each fraction shall lie within the limits defined in the following table:

Fractions	Percentage of Material Within the Given Fraction	
	GAP40	GAP20
19.0 – 4.75mm	25 – 49	-
9.5 – 2.36mm	14 – 36	19 – 45
4.75 – 1.18mm	7 – 27	11 – 35
2.36mm – 600micron	5 – 22	6 – 26
1.18mm – 300micron	3 – 18	3 – 21
600 – 150micron	1 - 13	2 – 18

#### 4.5 TNZ M/4 Aggregate – Pavement Course

Only TNZ M/4 aggregate shall be used for the basecourse layer and shall with the TNZ specification.

#### 4.6 Bitumen Bound Basecourse

The emulsion shall conform to TNZ Specification M/1 and the basecourse shall conform to GAP40 or M/4 AP40 specifications.



#### **4.7 Cement for Stabilisation**

Cement shall comply with NZS3122:1995

#### **4.8 Sealing Chips**

Sealing chips shall conform to TNZ Specification M/6 for all applications in the works.

#### **4.9 Asphaltic Bitumens**

Bitumens for use in pavement and footpath tack coats and sealing shall conform to TNZ Specification M/1 and shall generally be 130.150 penetration grade.

#### **4.10 Asphaltic Concrete**

Asphaltic concrete shall conform to TNZ Specification M/10 – Specification for Asphaltic Concrete.

#### **4.11 Concrete**

Cement, aggregates and water shall be of the qualities specified in NZS3109:1997 – Concrete Construction.

If requested, samples shall be supplied to the Engineer for testing.

The following specifications shall apply for the production of the concrete.

- NZS3104 Ready Mixed Concrete Production.
- NZS3108 Site Mixed Concrete Production.

Curing compounds shall conform to ASTM C309 “Specifications for Liquid Membrane Forming compounds for Curing Concrete”.

#### **4.12 Topsoil**

Refer to Section 6 Streetscape Works.



#### 4.13 Grass Seed

Refer to Section 6 Streetscape Works.

#### 4.14 Timber

Timber for edging and pegs shall be H4 treated timber. Timber for fencing shall be H4 Treated timber for posts or other members in contact with the ground, and H3 treated for all other components.

#### 4.15 Concrete Block Paving

Concrete blocks shall comply with NZS3116:2002, Interlocking Concrete Block Paving.

#### 4.16 Reinforcement

Reinforcing bars shall conform to NZS4671:2001 – Steel Reinforcing Materials.

#### 4.17 Sumps

Sump components are shown in the approved material list.

	Manufacturer
675 x 450 x 1650 Sump Flat Top	Hynds/Humes
675 x 450 x 1650 Sump Top (Back Entry)	Hynds/Humes
600 dia x 1800mm Circular Sump Barrel	Humes
750 dia x 1800mm Circular Sump Barrel	Humes
225 dia x 1200mm Socketed Culvert Pipe Class X	Hynds/Humes
675 x 450 x 1650mm Rectangular Sump Barrel	Humes
675 x 450 Cast Iron Grate and Frame	Humes/Surecast
300 dia Cast Iron Grate to suit socket of 225 dia culvert pipe	
610 x 310 Galvanised Web Grate and Frame	Hygrade/Humes

The construction specification as described in Part 4 - Stormwater and Wastewater Sewers, Section B shall apply.