Technical Specification

Transport and Main Roads Specifications MRTS22 Supply of Cover Aggregate

October 2010

Copyright

Feedback: Please send your feedback regarding this document to: mr.techdocs@tmr.qld.gov.au

Contents

1 Introduction

This Technical Specification applies to the supply and delivery of cover aggregate and prime cover material for use in sprayed bituminous surfacing treatments, and the construction of stockpile sites for storage of cover aggregate.

This Technical Specification shall be read in conjunction with MRTS01 *Introduction to Technical Specifications*, MRTS50 *Specific Quality System Requirements* and other Technical Specifications as appropriate.

This Technical Specification forms part of the Transport and Main Roads Specifications Manual.

2 Definition of terms

The terms used in this Technical Specification shall be as defined in Clause 2 of MRTS01 *Introduction to Technical Specifications*.

3 Referenced documents

Table 3 lists documents referenced in this Technical Specification.

Table 3 – Referenced documents

Reference	Title
Engineering Policy number EP108	Quarry Assessment and Certification - published by Transport and Main Roads

4 Standard test methods

The test methods given in Table 4 shall be used in this Technical Specification.

Further details of test numbers and test descriptions are given in Clause 4 of MRTS01 *Introduction to Technical Specifications*.

Table 4 – Standard test methods

Property to be Tested	Test No.
Sample preparation	Q101
Particle size distribution	Q103B
Relative dry density	Q142A, Q141B, Q140A
Flakiness index	Q201
Average least dimension (ALD)	Q202
Ten percent fines value (wet)	Q205B
Wet/dry strength variation	Q205C
Degradation factor	Q208B
Bitumen Stripping Value – Modified Plate	Q212B
Water absorption	Q214B
Crushed particles	Q215
Degree of aggregate precoating	Q216
Weak particles	Q217

5 Quality system requirements

5.1 Hold Points, Witness Points and Milestones

General requirements for Hold Points, Witness Points and Milestones are specified in Clause 5.2 of MRTS01 *Introduction to Technical Specifications*. The Hold Points, Witness Points and Milestones applicable to this technical specification are summarised in Table 5.1.

Table 5.1 – Hold Points, Witness Points and Milestones

Clause	Hold Point	Witness Point	Milestone
6	1. Use of quarry		Quarry assessment and current certification
7.1.4			Precoating of aggregate
8.1			Submit sample of cover aggregate
8.3.3			Submit aggregate test results and control charts
10	2. Use of stockpile site	Covering aggregate stockpiles	

5.2 Construction procedures

Construction procedures which are required to be submitted by the Contractor to the Administrator in accordance with Clause 6 of MRTS50 *Specific Quality System Requirements* are listed in Table 5.2.

Table 5.2 – Construction procedures

Clause	Procedure
7.1.4	Precoating of aggregate

5.3 Conformance requirements

The conformance requirements which apply to lots of work covered by this Technical Specification are summarised in Clauses 7 and 9.

5.4 Testing frequency

The minimum testing frequency for work covered by this Technical Specification is specified in Clauses 8.3 and 9.3.

6 Quarry assessment and certification

A quarry assessment shall be undertaken and the department's certification obtained (or current certification held) for any quarry from which cover aggregate is to be supplied.

The quarry assessment and certification shall be conducted in accordance with Engineering Policy No. EP108 'Quarry Assessment and Certification'.

A copy of the current certificate for the quarry from which the cover aggregate has been obtained shall be forwarded to the Administrator at least seven working days before material deliveries to the stockpile (or direct to the pavement if a stockpile is not required) are to commence. **Milestone**

Material from a quarry shall not be used until the quarry has been approved by the Administrator. **Hold Point 1**

7 Material

7.1 Cover aggregate

7.1.1 General

Aggregate quality categories A, B and C refer to cover aggregate that is crushed aggregate. Aggregate quality category D refers to primarily uncrushed aggregate.

Aggregate shall be free from dust, clay, vegetable matter and other deleterious material.

7.1.2 Particle size distribution (grading)

For each respective nominal size, the aggregate shall comply with the particle size distributions given in Table 7.1.2.

Table 7.1.2 – Particle size distribution

AS Sieve Size (mm)	Percentage Passing by Mass for Each Nominal Size					
	20 mm	**16 mm**	**14 mm**	**10 mm**	**7 mm**	**5 mm**
26.5	100					
19.0	85 – 100	100	100			
16.0		85 – 100				
13.2	0 – 20	0 – 60	85 – 100	100		
9.50	0 – 5	0 – 15	0 – 30	85 – 100	100	
6.70			0 – 5	0 – 30	85 – 100	100
4.75				0 – 8	0 – 30	85 – 100
2.36	0 – 1	0 – 1	0 – 1	0 – 1	0 – 10	0 – 30
1.18					0 – 5	0 – 5

7.1.3 Particle quality

The aggregate quality category for the Works is given in Clause 1 of Annexure MRTS22.1.

The cover aggregate particles shall comply with the requirements of Table 7.1.3 where:

a) With reference to Table 7.1.3, for Greenstone source material only (Metamorphic Group), Greenstone that does not comply with the specified maximum Wet/Dry Strength Variation limits, it may be used, provided its Ten Percent Fines Value (Wet) is at least 60 kN greater than the specified maximum value for the relevant aggregate quality category.

b) The Ten Percent Fines Value (Wet) and the Wet/Dry Strength Variation tests shall be carried out on predominant size fraction represented within the sample. Where the predominant size is not in the 13.2 mm to 9.5 mm fraction, the following shall apply

   i. the requirements of Table 7.1.3 shall apply to the 13.2 mm to 9.5 mm fraction for samples from the source rock of the cover aggregate, and

   ii. test results for the predominant size shall not be for conformance testing and shall be reported to the Administrator.

Table 7.1.3 – Particle quality

Property	Limit	Aggregate Quality Category			
		A	B	C	D
Flakiness Index	Maximum	30	35	35	35
Ten Percent Fines Value (Wet) (kN)	Minimum	175	150	100	100
Wet/Dry Strength Variation (%)	Maximum	35	35	40	40
Weak Particles (%)	Maximum	1	2	3	3
Crushed Particles [1] (%)	Minimum	80	80	80	-
Degradation Factor [2, 3]	Minimum	45	40	40	35
Water Absorption [3, 4] (%)	Maximum	2	2	2	2

Notes for Table 7.1.3

1 Testing not required on material from a blasted face in a quarry.

2 Not applicable for sedimentary rock.

3 For non-surface layers (excluding the lower layers of any multiple coat seal on the final surface) which will not be subject to in-service traffic, the maximum water-absorption shall be 2.5 % and the minimum Degradation Factor shall be 40.

4 For aggregates with water absorption greater than the specified limit, project-specific approval may be granted by the Administrator provided that, in the opinion of the Administrator, the Contractor provides:

- written documentation of a history of satisfactory performance of the cover aggregate in similar application; and
- where the water absorption exceeds 2.5%, suitable adjustments to the precoating rate and precoating procedures are written for the cover aggregates for the Works.

7.1.4 Precoating

Where so stated in Clause 1 of Annexure MRTS22.1, cover aggregate shall be precoated with one of the nominated approved products listed in Clause 2 of Annexure MRTS22.1 prior to spreading.

Where precoated cover aggregate is specified, at least seven days prior to commencement of any precoating activity, the Contractor shall submit to the Administrator details of the procedure to be used for the application of the precoating agent. **Milestone**

The precoating agent shall be on the current Transport and Main Roads approved product listing for aggregate precoating agents; and shall also comply with the requirements stated in Clause 2 of Annexure MRTS22.1.

Precoating shall be carried out on surface dry aggregate unless the Administrator approves the precoating of non-dry aggregate subject to the precoated aggregate achieving, at the time of intended use, less than 10% stripping value when tested in accordance with Q212B.

The precoated condition of stockpiled aggregate shall provide a Degree of Aggregate Precoating of at least 70% when tested in accordance with Q216.

After precoating there shall be no flow or drip of precoating agent from individual stones.

The requirements for time periods between precoating and spreading of precoated aggregate are stated in Table 7.1.4. The Administrator may approve a change to a minimum or maximum time period subject to the precoated aggregate achieving, at the time of intended use, less than 10% stripping value when tested in accordance with Q212B.

Table 7.1.4 – Time period between precoating and spreading of precoated aggregate

Type of Precoating Agent	Minimum (days)	Maximum (days)
Solvent precoat (waste oil free)	7	56
Emulsion precoat	7	56
Solvent precoat (contains waste oil)	28	98

7.2 Prime cover material

Prime cover material shall consist of natural sand or crushed rock particles of size generally smaller than 4.75 mm but larger than 0.075 mm. The material shall be free from soluble salts, organic matter, clay and other deleterious matter.

8 Compliance testing

8.1 General

The Contractor is responsible for carrying out sufficient testing to ensure that the aggregate complies with the standards and requirements of this Technical Specification.

Compliance testing of cover aggregate shall be undertaken for each lot. Samples for compliance testing shall be randomly selected (random sampling) from the stockpile lot. A stockpile lot shall be an essentially homogeneous portion of aggregate from the same source and having the same nominal size and quality category. A new stockpile lot shall apply when there is a change in any of these characteristics.

If stated in Clause 3 of Annexure MRTS22.1, a preliminary sample of approximately 40 kg of each type of cover aggregate to be used in the Contract shall be supplied to the Administrator at least 15 working days before the material is to be used. **Milestone**

8.2 Stockpile Locations

Compliance testing for the following properties shall be completed on uncoated aggregates from stockpiles located at the quarry unless otherwise nominated in Clause 4.1 Annexure MRTS22.1:

a) Ten Percent Fines Value (Wet)

b) Wet/Dry Strength Variation

c) Degradation Factor

d) Water Absorption

e) Crushed Faces, and

f) Weak Particles.

Degree of Precoating testing shall be carried out at one point only and shall be completed on precoated aggregates from stockpiles located at the quarry unless otherwise nominated in Clause 4.2 of Annexure MRTS22.1.

Testing for the following properties shall be completed on precoated aggregates from stockpiles to be used in the Works:

a) Particle Size Distribution

b) Flakiness Index, and

c) Average Least Dimension.

8.3 Stockpile lot sizes and testing frequency

8.3.1 General

Each individual stockpile lot shall be clearly delineated by one of the methods below:

a) a separate stockpile shall be formed for each stockpile lot of the same material type, or

b) material of the same type shall be added to a single stockpile incrementally such that a portion representing a discreet stockpile lot is added, tested and found to be conforming before the next portion, representing the next stockpile lot, is added; nonconforming stockpile lots shall be removed from the stockpile prior to the addition of further portions.

Testing shall be undertaken for each aggregate source.

For each material property, a minimum of one test shall be completed for each lot.

8.3.2 Lot sizes

Lot sizes for compliance testing of the aggregate shall satisfy the requirements of Table 8.3.2-A and Table 8.3.2-B.

Table 8.3.2-A – Maximum lot sizes for aggregate strength and durability tests (minimum of one test per lot)

Property	Test Method	Maximum Lot Size[1] (tonnes of cover aggregate)		
		Normal	Reduced	Tightened
Ten percent fines value (wet)	Q205B	10,000	20,000	5,000
Wet/dry strength variation	Q205C	10,000	20,000	5,000
Crushed particles[2]	Q215	10,000	20,000	5,000
Weak particles	Q217	2,500	5,000	1,000
Water absorption	Q214B	10,000	20,000	5,000
Degradation factor	Q208B	10,000	20,000	5,000

1. Lot sizes are based on total throughput of cover aggregate from a particular quarry source to consecutive and/or concurrent Queensland Transport and Main Roads projects.
2. Testing is only required where aggregate is obtained from other than a crushing process.

Table 8.3.2-B – Maximum lot sizes for aggregate shape and degree of precoating tests

Property	Test Method	Maximum Lot Size (tonnes)	Minimum Number of Tests
Particle Size Distribution	Q103B	1000	1
Flakiness Index	Q201A	1000	1
Average Least Dimension	Q202	1000	1
Degree of Precoating	Q216	1000	1

8.3.3 Level of testing

The frequency for compliance testing shall initially be undertaken at the normal level, and shall change in accordance with the following criteria:

a) After no nonconformances have occurred in four consecutive lots, the reduced level may be applied.

b) When a nonconformance has occurred, the tightened level shall be applied.

c) When the tightened level is applied and no nonconformances have occurred in two consecutive lots, the normal level may be reapplied.

Lot sizes are based on total throughput of cover aggregate from a particular quarry source to consecutive and/or concurrent Queensland Transport and Main Roads projects. To demonstrate compliance with the testing requirements in Tables 8.3.2-A and 8.3.2-B, the Contractor shall provide aggregate test results and historical control charts for each aggregate property to the Administrator:

a) at least seven days prior to commencement of sprayed sealing operation, and

b) as evidence of compliance throughout the project **Milestone**

9 Stockpile sites

9.1 Site details

9.1.1 General

If a position is stated in Clause 5.1 of Annexure MRTS22.1, the stockpile site shall be so located. If a position is not so stated, the stockpile site shall be located to suit the construction program and to comply with the requirements specified in Clauses 9.1.2 and 9.1.3.

9.1.2 Location

The stockpile site shall be located within the road reserve on firm, well-drained, even ground and shall be located:

a) at least 1 metre from any property boundary

b) at least 3 metres from any road, railway, structure or watercourse, and

c) clear of any proposed works or accommodation works.

Additional restrictions to the location of the stockpile site shall apply as stated in Clause 5.2 of the Annexure MRTS22.1.

9.1.3 Size

The size of the stockpile site shall depend on the quantity and nominal size of cover aggregate to be stored and shall comply with the requirements in Table 9.1.3.

Table 9.1.3 – Stockpile size restrictions

Requirements	Limits (metres)
Height of stockpile (maximum)	2
Distance between the edge of a stockpile and the edge of the stockpile site (minimum)	1
Distance between stockpile sites (minimum)	2

9.2 Construction standard

9.2.1 General

Stockpiles shall be constructed to the standard stated in Clause 5.3 of Annexure MRTS22.1 and shall either be one of the standards listed in Clauses 9.2.2 or 9.2.3 or that described in Clause 5.3 of Annexure MRTS22.1.

9.2.2 Stockpile site Standard A

Stockpile site Standard A shall consist of the following works:

a) clearing, grubbing, compacting and trimming of the natural ground over the full area of the stockpile site in accordance with MRTS04 *General Earthworks*

b) installation of any necessary drains, and

c) construction of access tracks.

9.2.3 Stockpile site Standard B

Stockpile site Standard B shall consist of those works specified for Standard A in Clause 9.2.2 plus the following additional works:

a) A pavement over the full area of the site in accordance with MRTS05 *Unbound Pavements* and which shall:

   i. have a minimum compacted thickness of 100 mm

   ii. be constructed from at least material of Subtypes 2.5 and 3.5, as appropriate, and

   iii. be compacted to a minimum relative dry density of 97%

b) The pavement shall be surfaced with a bitumen seal with at least a sand cover material in accordance with either MRTS11 *Sprayed Bituminous Surfacing (Excluding Emulsion)* or MRTS12 *Sprayed Bituminous Emulsion Surfacing*, and with binder as specified in Table 9.2.3.

Table 9.2.3 – Stockpile site seal binder requirements

Technical Specification	Treatment	Binder	Rate (L/m^2)
MRTS11	Primerseal	AMC1 cutback bitumen	0.8
MRTS12	Seal	CRS bitumen emulsion	1.0

9.3 Compliance Testing of Pavement in Stockpile Sites

Compaction testing of the pavement in stockpile sites constructed in accordance with Standard B shall be undertaken in accordance with the relative dry density test methods stated in Table 4. One test shall be undertaken for each 500 m^2 of stockpile area, with a minimum of two tests for each stockpile site.

10 Delivery of aggregate to stockpiles

Prior to commencement of delivery of aggregate to any stockpile site, the Contractor shall obtain the Administrator's authorisation to place aggregates on the stockpile site. **Hold Point 2**

Placement of aggregate on stockpile sites shall be carried out in a manner which ensures that segregation of particles and other deleterious effects are avoided, and shall proceed in an orderly

sequence which ensures that trimming and/or shaping of stockpiles for measurement purposes are minimised.

Cover aggregate stockpiles shall not be exposed to contaminating agents, particularly dust, and shall be handled so as to avoid contamination and any other deleterious effects.

Except for prime cover materials, all cover aggregate stockpiles shall be protected with a light plastic or similar material to prevent the ingress of moisture and other contaminants unless otherwise stated in Clause 4.3 of Annexure MRTS11.1, The protective material shall be sufficiently anchored to ensure the optimal fixture that can be achieved consistent with the protective material properties.
Witness Point

11 Supplementary requirements

The requirements of MRTS22 are varied by the supplementary requirements given in Clause 6 of Annexure MRTS22.1.