Technical Specification

Transport and Main Roads Specifications MRTS36 Recycled Glass Aggregate

November 2020

Queensland Government

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1 Introduction

This Technical Specification sets out the requirements for recycled glass aggregate used in asphalt and unbound granular road pavements as well as general earthworks. Recycled glass aggregate used in other applications is not covered by the Technical Specification unless referenced elsewhere.

Recycled glass aggregate may be considered as an alternative to a quarry or natural sand material for the applications listed in Table 1.

The requirements of the parent Technical Specification shall apply to recycled glass aggregate unless those requirements are specifically excluded or amended by this Technical Specification.

Table 1 – Parent technical specifications

Parent Technical Specification	Application
MRTS04	*General Earthworks*
MRTS05	*Unbound Pavements*
MRTS101	*Aggregates for Asphalt*

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 are as defined in Clause 2 of MRTS01 *Introduction to Technical Specifications*, and Table 2 of this Technical Specification.

Table 2 – Definition of terms

Term	Definition
Composite sample	A sample that combines five discrete sub-samples of equal size into a single sample for the purpose of analysis.
Recycled glass	Glass sourced from the collection of domestic or commercial waste. This includes glass collected from domestic commingled recycling collections.

3 Referenced documents

Table 3 lists the documents referenced in this Technical Specification.

Table 3 – Referenced documents

Reference	Title
MRTS01	*Introduction to Technical Specifications*
MRTS04	*General Earthworks*
MRTS05	*Unbound Pavements*
MRTS50	*Specific Quality System Requirements*
MRTS101	*Aggregates for Asphalt*

4 Standard test methods

The standard test methods listed 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	Method No.
Sampling of aggregates	AS 1141.3.1
Particle size distribution	AS 1141.11.1
Material finer than 75 µm	AS 1141.12
Chemicals – sample preparation	USEPA SW 846 Method 3051A Microwave assisted acid digestion of sediments, sludges, soils, and oils.
Chemicals – analysis	USEPA SW 846 Method 6010C Inductively coupled plasma - atomic emission spectrometry, or an equivalent analytical method with a detection limit < 10% of the stated absolute maximum concentration in Table 6.2, Column 3.
Mercury concentration	USEPA SW 846 Method 7471B Mercury in solid or semisolid waste (manual cold vapour technique), or an equivalent analytical method with a detection limit < 20% of the stated absolute maximum concentration in Table 6.2, Column 3.
Total organic carbon content	Method 105 (Organic Carbon) and using a 2 gram sample in Schedule B (3): Guideline on Laboratory Analysis of Potentially Contaminated Soils, National Environment Protection (other published or validated classical chemistry technique or instrumentation technique).[1]
Electrical conductivity	Method 104 (Electrical Conductivity) in Schedule B (3): Guideline on Laboratory Analysis of Potentially Contaminated Soils, National Environment Protection (Assessment of Site Contamination) Measure 1999 or APHA 2510 B. (other published or validated classical chemistry technique or instrumentation technique)[1]

Notes

[1] Where an equivalent analytical method is used, the detection limit must be equal to or less than that nominated for the methods in Table 4. Instrumentation techniques may include Ion Chromatography / Inductively Coupled Plasma / Discrete Analyser and so on. NATA endorsed test results are evidence of a validated technique.

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

There are no Witness Points defined.

Table 5.1 – Hold Points, Witness Points and Milestones

Clause	Hold Point	Witness Point	Milestone
5.2	1. Acceptance of production procedure		Submit recycled glass aggregate production procedure

5.2 Recycled glass aggregate production procedure

For each source of recycled glass aggregate to be used in the Works, the Contractor shall prepare a procedure for aggregate production in accordance with Clause 6 of MRTS50 *Specific Quality System Requirements* and detail the following for the nominated material:

a) target particle size distribution

b) source(s) of recycled glass

c) production plant and methods of controlling the quality of the final product

d) procedures for stockpile management and traceability as part of the lot control and as applicable, sub lot control, and

e) quality control procedures.

The recycled glass aggregate production procedure shall be submitted to the Administrator at least seven days prior to the commencement of aggregate production for the Works. **Milestone**

The use of recycled glass aggregate shall not commence until all relevant production procedures have been accepted by the Administrator. **Hold Point 1**

6 Material requirements

6.1 General

Recycled glass aggregate shall be:

a) of nominal size of 5 mm or less

b) produced from food and beverage container glass

c) processed to a consistent gradation

d) cubical in shape, not sharp edged or elongated

e) essentially free of contaminants such as ceramics, glass from other sources (such as cathode ray tubes, fluorescent light fittings and laboratory glassware), paper, cork, metals (including heavy metals), brick, plaster, plastic, rubber, wood, clay, paint, and other deleterious materials, and

f) free from any putrid odour.

6.2 Chemical and other attributes

Recycled glass aggregate shall comply with the maximum concentration limits for chemicals and other attributes given in Table 6.2.

Table 6.2 – Maximum concentration limits for chemicals and other attributes

Column 1	Column 2	Column 3
Chemicals and other attributes	**Maximum average concentration[1] (mg/kg 'dry weight' unless otherwise specified)**	**Absolute maximum concentration (mg/kg 'dry weight' unless otherwise specified)**
Mercury	0.5	1
Cadmium	0.5	1.5
Lead	50	100
Arsenic	10	20
Chromium (total)	20	40
Copper	40	120
Molybdenum	5	10
Nickel	10	20
Zinc	100	300
Total Organic Carbon	1.0%	2.0%
Electrical Conductivity	1 dS/m or 1000 µS/cm	2 dS/m or 2000 µS/cm

Notes

[1] The average shall be based on the five most recent test results.

7 Compliance testing

7.1 General

The Contractor shall, as a minimum, undertake testing for the following properties to demonstrate the recycled glass aggregate conforms with the requirements of Clause 6:

a) particle size distribution

b) material finer than 75 µm, and

c) chemicals and attributes listed in Table 6.2.

A composite sample consisting of five discrete sub-samples of equal size shall be used to represent a lot of material.

Recycled glass aggregate shall be sampled and tested in accordance with the minimum frequencies listed in Table 7.1.

Table 7.1 – Minimum sampling and testing frequencies

Number of Historical Test Results for Each Test Property	Minimum Frequency
< 5	1 per 500 tonnes
≥ 5	1 per 1000 tonnes

Transport and Main Roads has adopted a risk based approach to sampling and testing recycled glass aggregate.

For new production facility / glass sources that have limited historical test data available, more frequent testing is required (i.e. 1 per 500 tonnes). Once a production facility has established a history of compliance with specification requirements, a reduced testing frequency can be adopted (i.e. 1 per 1000 tonnes).

7.2 Samples for the Administrator

When the Administrator requests a sample of the recycled glass aggregate, the Contractor shall riffle and/or quarter the sample taken for compliance testing and deliver the sub-sample to the Administrator in a sealed and labelled container identifying the following:

a) lot number

b) sample description

c) sampler

d) date produced and/or supplied

e) date sampled, and

f) any other quality system references, as appropriate.

7.3 Nonconformances

Unless otherwise approved by the Administrator, nonconforming recycled glass aggregate shall not be incorporated into the Works.