

TRANSPORT FOR NSW (TfNSW)
QA SPECIFICATION 3154
GRANULATED GLASS AGGREGATE

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REVISION REGISTER

| Ed/Rev Number | Clause Number | Description of Revision | Authorised By | Date |
|----------------------|----------------------|---|----------------------|-------------|
| Ed 1/Rev 0 | | First issue. | GM, IC | 23.05.11 |
| Ed 2/Rev 0 | Global | Clauses rearranged and reworded to improve clarity. | DCS | 27.09.19 |
| | 2.3 | New standard clause on planning documents added. Subsequent clauses renumbered. | | |
| | 2.4 | Previously clause 2.3, incorporating previous clause 8.3.1 on frequency of testing. “PROJECT QUALITY PLAN” changed to “Inspection and Test Plan”. | | |
| | 3 | Definitions of “you” and “your” added. “Lot” definition reworded. “Exemption” and “order” relating to EPA resource recovery exemption and order for recovered glass sand defined. | | |
| | 5 | New clause on compliance with EPA resource recovery exemption and order, incorporating 2 nd and 3 rd paragraphs of previous clause 4. Subsequent clauses renumbered. | | |
| | 6.1 | Previously clause 5.1 on acceptable material source. Clause reworded. | | |
| | 6.2 | New clause on required material properties, incorporating previous clause 5.2, and other parts of previous clause 5. Requirement for granulated glass to be “clean” added. Definition of “report” added as footnote to Table 1. | | |

| Ed/Rev Number | Clause Number | Description of Revision | Authorised By | Date |
|------------------------|-------------------------------|--|----------------------|-------------|
| Ed 2/Rev 0 (cont'd) | 7.1 | Previously clause 6.1 on submission details, reworded. Previous items (a), (b) and (c) made into new sub-clauses 7.1.1, 7.1.2 and 7.1.3. | | |
| | 7.1.4 | Previously clause 6.2 on proprietary information, reworded. | | |
| | 7.2 | Previously clause 7, retitled "Production" and reworded. | | |
| | 8 | Previously clause 8 on conformity. | | |
| | 8.1 | New clause on sampling and testing, combining previous clauses 8.2 and 8.3 and reworded. | | |
| | 8.1.3 | Statement that maximum Lot size must be in accordance with RMS Q deleted. | | |
| | 8.2 | Previously clause 8.4, reworded and incorporating previous clause 8.1 as sub-clause 8.2.1 on homogeneity. | | |
| | Annex C | Schedules updated. | | |
| | Annex D | New Annexure. | | |
| Annex M | Referenced documents updated. | | | |
| Ed 2/Rev 1 | Global | References to "Roads and Maritime Services" or "RMS" changed to "Transport for NSW" or "TfNSW" respectively. | DCS | 22.06.20 |



GRANULATED GLASS AGGREGATE

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FOREWORD

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REVISIONS TO PREVIOUS VERSION

This document has been revised from Specification TfNSW 3154 Edition 2 Revision 0.

All revisions to the previous version (other than minor editorial and project specific changes) are indicated by a vertical line in the margin as shown here, except when it is a new edition and the text has been extensively rewritten.

PROJECT SPECIFIC CHANGES

Any project specific changes are indicated in the following manner:

- (a) Text which is additional to the base document and which is included in the Specification is shown in bold italics e.g. ***Additional Text***.
- (b) Text which has been deleted from the base document and which is not included in the Specification is shown struck out e.g. ~~Deleted Text~~.

TfNSW QA SPECIFICATION 3154

GRANULATED GLASS AGGREGATE

1 SCOPE

This Specification sets out the requirements for granulated glass for use as fine aggregate in road pavement materials.

2 STRUCTURE OF THE SPECIFICATION

This Specification includes a series of annexures that detail additional requirements.

2.1 (NOT USED)

2.2 SCHEDULES OF HOLD POINTS AND IDENTIFIED RECORDS

The schedules in Annexure 3154/C list the **HOLD POINTS** that must be observed. Refer to Specification TfNSW Q for the definition of **HOLD POINTS**.

The records listed in Annexure 3154/C are **Identified Records** for the purposes of TfNSW Q Annexure Q/E.

2.3 PLANNING DOCUMENTS

The PROJECT QUALITY PLAN must include each of the documents and requirements listed in Annexure 3154/D and must be implemented.

2.4 FREQUENCY OF TESTING

The minimum frequency of testing is shown in Annexure 3154/L.

The Inspection and Test Plan must nominate the frequency of testing which must not be less than the frequency specified in Annexure 3154/L. Where a minimum frequency of testing is not specified, nominate an appropriate frequency.

You may propose to the Principal that a reduced minimum frequency of testing be accepted in accordance with TfNSW Q. Support your proposal by a statistical analysis verifying consistent process capability and product characteristics.

In the event of a nonconformity, a reduced frequency of testing must revert immediately to the specified minimum frequency of testing.

2.5 REFERENCED DOCUMENTS

Unless specified otherwise, the applicable issue of a referenced document, other than a TfNSW Specification, must be the issue current at the date one week before the closing date for tenders, or where no issue is current at that date, the most recent issue.

Standards, specifications and test methods are referred to in abbreviated form (e.g. AS 1234). For convenience, the full titles are given in Annexure 3154/M.

3 DEFINITIONS

The terms “you” and “your” mean “the Supplier” and “the Supplier’s” respectively. The term “the Supplier” means the supplier of the product covered by the scope of this Specification.

Granulated glass aggregate is also referred to as “granulated glass” in this Specification.

A Lot consist of all material in a stockpile, or multiple stockpiles, with the same source properties and manufactured under the same production parameters.

“The recovered glass sand exemption 2014” (“exemption”) refers to the exemption issued by the EPA under Part 9, Clauses 91 and 92, of the *Protection of the Environment Operations (Waste) Regulation 2014 (NSW)* to consumers of recovered glass sand.

“The recovered glass sand order 2014” (“order”) refers to the order issued by the EPA under Part 9, Clause 93 of the *Protection of the Environment Operations (Waste) Regulation 2014 (NSW)* that must be met by suppliers of recovered glass sand to which “the recovered glass sand exemption 2014” applies.

4 QUALITY MANAGEMENT SYSTEM

Implement a Quality Management System complying with AS/NZS ISO 9001 as a means of ensuring that the materials supplied conform to the requirements of this Specification.

The Principal may audit the system for compliance.

5 RESOURCE RECOVERY EXEMPTION AND ORDER

Comply, as applicable, with the conditions of exemption of “the recovered glass sand exemption 2014” and the processor requirements of “the recovered glass sand order 2014”.

Maintain records, including relevant test results, to demonstrate compliance with the “exemption” and “order”.

Provide evidence verifying compliance with this Clause.

6 MATERIALS

6.1 SOURCE

Granulated glass is primarily manufactured by crushing container glass. Do not use as your material source any of the following:

- (a) ceramics;
- (b) cathode ray tubes;
- (c) fluorescent light fittings;
- (d) laboratory glassware.

6.2 MATERIAL PROPERTIES

Granulated glass must comply with the chemical and other material requirements in Table 1 of the “order”, and be free of any putrid odour.

All granulated glass supplied must maintain conformity, have uniform appearance for the duration of the supply and be free of any material other than glass.

Granulated glass must be of granular form having a maximum nominal size of 5 mm and comply with the requirements in Table 3154.1.

Table 3154.1 – Material Requirements

| Property | Test Method | Acceptance Criteria |
|---|-------------|--|
| Particle size distribution | | |
| Nominated particle size distribution envelope | AS 1141.11 | Within nominated particle size distribution envelope |
| Material finer than 75 µm | AS 1141.12 | Report |
| Dry density | | |
| Percentage of oversize material | TfNSW T279 | Report for all properties |
| Flow time | | |
| Uncompacted void content | | |
| Dry particle density | | |
| SSD density | AS 1141.5 | Report for all properties |
| Water absorption | AS 1141.5 | ≤ 1.0% |

Legend: Report = no conformity criteria exist, but test results must be reported.

7 NOMINATED GRANULATED GLASS

7.1 SUBMISSION DETAILS

7.1.1 Material Details

For each nominated granulated glass, submit to the Principal the following details:

- (a) Source(s) of raw materials.
- (b) Production plant and method of production.
- (c) Evidence that the source and method proposed are suitable for the required quantity and quality of granulated glass.
- (d) Nominated target values for each property specified in Table 3154.1, including:
 - (i) Nominated particle size distribution.
 - (ii) Particle size distribution envelope, complying with the allowable tolerance specified in Table 1 of AS 2758.5.
 - (iii) Apparent, dry and SSD density.
 - (iv) Flow time.
 - (v) Uncompacted void content.
 - (vi) Water absorption.
- (e) Demonstrated compliance with the “order”.

7.1.2 Trial Production Test Results

Submit to the Principal test results for each material property specified in Table 3154.1, of a trial production by the plant from which the granulated glass will be supplied.

For each nominated granulated glass, all tests specified in Table 3154.1 must be from the same trial production.

7.1.3 Signed Statement

Provide a signed statement confirming that each nominated granulated glass meets the requirements of Clause 6. The statement must include NATA endorsed test results for all specified tests.

Attach to the statement a copy of the completed verification checklist.

All tests relating to the submission must be within a three month period prior to the date of submission. All phases of any particular test must be performed at the same laboratory.

7.1.4 Proprietary Information

Identify in your submission any detail(s) which are not provided because you consider it to be proprietary information.

HOLD POINT

| | |
|------------------------|---|
| Process Held: | Supply of nominated granulated glass. |
| Submission Details: | Documents as specified in Clause 7.1, at least 7 working days before the proposed date of delivery. |
| Release of Hold Point: | The Principal will consider the submitted documents prior to authorising the release of the Hold Point. |

7.2 PRODUCTION OF GRANULATED GLASS

Use a process that is capable of producing granulated glass conforming to this Specification. Implement process control to achieve the nominated target values.

The Principal may audit the method of process control.

8 CONFORMITY

8.1 SAMPLING AND TESTING

8.1.1 Sampling

Nominate all sampling locations, frequencies and methods in the PROJECT QUALITY PLAN. Samples taken must be representative of the granulated glass supplied to the Principal.

Upon request, provide samples to the Principal. Riffle and/or quarter the samples taken before delivering the samples in sealed and labelled containers.

8.1.2 Testing

Test each type and source of granulated glass separately.

8.1.3 Maximum Lot Size

The maximum Lot size must not exceed 500 tonnes.

8.2 NONCONFORMITY

8.2.1 Homogeneity

Granulated glass exhibiting segregation and/or contamination is considered to be nonconforming.

8.2.2 Nonconforming Lots

Lots represented by samples that do not comply with the nominated target values (refer Clause 7.1.1) is nonconforming.

Remove and replace all nonconforming granulated glass supplied, at your cost.

Where the nonconforming granulated glass supplied has resulted in the need for rectification of other works, the cost of this rectification will be borne by you.

ANNEXURES 3154/A AND 3154/B – (NOT USED)**ANNEXURE 3154/C – SCHEDULES OF HOLD POINTS AND IDENTIFIED RECORDS**

Refer to Clause 2.2.

C1 SCHEDULE OF HOLD POINTS

| Clause | Description |
|---------------|--|
| 7.1.4 | Submission of nominated granulated glass details |

C2 SCHEDULE OF IDENTIFIED RECORDS

The records listed below are Identified Records for the purposes of TfNSW Q Annexure Q/E.

| Clause | Description of Identified Record |
|---------------|---|
| 5 | All records verifying compliance with the “exemption” and “order” |
| 7.1 | Nominated granulated glass submission details, including any proprietary information which are identified but not submitted |
| 8.1.2 | Test reports for all specified properties and characteristics at the minimum frequency of testing |

ANNEXURE 3154/D – PLANNING DOCUMENTS

Refer to Clause 2.3.

The following documents are a summary of documents that must be included in the PROJECT QUALITY PLAN. The requirements of this Specification and others included in the Contract must be reviewed to determine additional documentation requirements.

| Clause | Description |
|---------------|---|
| 8.1.1 | Nominated sampling locations, frequencies and methods |

ANNEXURES 3154/E TO 3154/K – (NOT USED)

ANNEXURE 3154/L – MINIMUM FREQUENCY OF TESTING

Refer to Clause 2.4.

| Property | Test Method | Minimum Frequency of Testing |
|--------------------------------------|--------------------|-------------------------------------|
| Particle size distribution | | |
| Nominated particle size distribution | AS 1141.11 | 2 per Lot |
| Material finer than 75 µm | AS1141.12 | 2 per Lot |
| Dry density | TfNSW T279 | 1 per Lot |
| Percentage of oversize material | | |
| Flow time | | |
| Uncompacted void content | | |
| Dry particle density | AS 1141.5 | One test every 3 months |
| SSD density | | |
| Water absorption | AS 1141.5 | One test every 3 months |

ANNEXURE 3154/M – REFERENCED DOCUMENTS

Refer to Clause 2.5.

TfNSW Specifications

TfNSW Q Quality Management System

TfNSW Test Methods

TfNSW T279 Flow Time and Voids Content of Fine Aggregate by Flow Cone

Australian Standards

AS 1141 Methods for sampling and testing aggregates
 AS 1141.5 Particle density and water absorption of fine aggregate
 AS 1141.11 Particle size distribution – Sieving method
 AS 1141.12 Materials finer than 75 micrometre in aggregates (by washing)
AS 2758.5 Aggregates and rock for engineering purposes – Coarse asphalt aggregate

NSW Government Regulations

Protection of the Environmental Operations (Waste) Regulation 2014
 Resource Recovery Exemption under Part 9, Clauses 91 and 92 - The recovered glass sand exemption 2014
 Resource Recovery Order under Part 9, Clause 93 - The recovered glass sand order 2014