

TRANSPORT FOR NSW (TfNSW)

QA SPECIFICATION 3151

AGGREGATE FOR SPRAYED BITUMINOUS SURFACING

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REVISION REGISTER

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 2		First issue.	GM, CMS	16.04.91
Ed 3	Table 1 and Table 2	Aggregate Properties, 20 mm, column removed.	GM, CMS	27.02.92
Ed 4		Converted to MS Word 6.0c. Document reformatted. References updated.	GM, RNIC	14.04.97
Ed 5	9.4	Requirements to T230 and T238 aligned with RTA 3258 & 3268.	GM, RNIC	15.01.98
Ed 6	1 1 2, 4, 6.2, 7, 9.3, 9.4, 10, 2 & 3 2, 5.3, 5.4, 5.5, 5.6, 6.2, 10 2, 6.2, 9.4 5.1 5.2 Table 3151.1 5.4 Table 3151.2	Delete requirements for the Supplier to undertake all inspection and testing Include general requirements of aggregate used Update nomenclature and minor editorial changes Replaced ISO 9002 with ISO 9001 RTA Test Methods replaced by AS 1141 RTA specifications added. Purpose defined Update requirement for testing as in accordance with RTA T239 Include fracture face(s) requirement Include testing requirement for material passing the 75 µm Particle size distribution requirements has been changed	GM, RNIC	31.08.01

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 6 (cont'd)	5.6 8 9.2 9.3 Annexure 3151/1 Annexure 3151/2 Appendix A	Delete reference to RTA T102 and RTA T103 Aggregate stockpiled for more than 3 months, retesting is required Minimum acceptable QA sampling specified Minimum wet strength changed. Minimum PAFV must not be less than 44 New annexure - Schedule of Identified Records New		
Ed 7	2 & 3	Reference to ISO 9001 replaced by ISO 9002	GM, RNIC	23.10.01
Ed 8	Various 2, 3 2, global 2, 5.4 5.2 8 9.2	Minor editorial changes Reference to ISO 9002 replaced by ISO 9001 AS AS1141.11 replaced with RMS T201 AS AS1141.12 replaced with RMS T203 Fractured Faces requirement changed for 'drill and blasted' rocks Clarified that certified stockpiles do not exceed a lot size of 250m ³ Frequency of testing of stockpile sample	GM, RNIC	23.04.03
Ed 9		New fonts	GM, RNIC	05.08.03
Ed 10/ Rev 0	“Notice” Spec Ref No. Foreword Global 3 5.5 Annex A	RTA PO Box and Fax numbers updated. Revision No. added. Foreword, incorporating copyright clause, added. Text revised to direct imperative style. “shall” replaced by “must”. Clauses rearranged and renumbered. Reformatting and minor editing to clarify intent. Definitions of “you” and “your” added. Test methods updated. Previous “Supplementary Information” moved to Annex A “Project Specific Information”.	GM, IC	26.05.09
Ed 11/ Rev 0	2.3 3	Word “cover” deleted from spec title. Standard clause on frequency of testing added. Definition for terms “you” and “your” added.	DCS	27.09.19

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 11/ Rev 0 (cont'd)	5	Statement added that uncrushed aggregate acceptable if so stated in Annex A. Table 1: - Aggregate requirements previously under clauses 5.1 to 5.6 summarised and tabulated. - Water absorption requirement added. - Test methods updated. Fractured face requirements no longer set as a function of traffic volume. New column for 20 mm aggregate added in Table 3151.2 "Particle Size Distribution and ALD".		
	6.1	Headings added to form new sub-clauses 6.1.1 to 6.1.4.		
	6.1.1	Nominated target values for each aggregate property added to list of details to be submitted.		
	6.1.2	Acceptable age of test certificates changed.		
	6.1.3	Signed statement of conformity required to be submitted.		
	6.1.4	New clause on proprietary information added.		
	6.2	New Hold Point for supply of each nominated aggregate added.		
	6.3	Requirements on variation to nominated aggregate expanded. Previous clauses 7 and 8 on stockpiles deleted.		
	7	Previously clause 9 on conformity. Clause reworded.		
	7.2, Annex L	Frequency of testing to be in accordance with frequencies tabulated in Annex L, and based on volume supplied, rather than stockpile Lots.		
	8	Precoating requirements simplified. Previous clause 9.3 on use of "defect point" to determine conformity deleted. Conformity now based solely on conformity of each aggregate property. Previous clause 9.4 on adhesion capability deleted.		
	Annex A	Guidance notes added.		
	Annex C	Schedule of Hold Points added, and clause references updated.		

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 11/ Rev 0 (cont'd)	Annex L Annex M	Frequency of testing added. Referenced documents updated. Previous Appendix A on measurement and payment for direct supply to Principal deleted.		
Ed 11/ Rev 1	Global	References to “Roads and Maritime Services” or “RMS” changed to “Transport for NSW” or “TfNSW” respectively.	DCS	22.06.20



AGGREGATE FOR SPRAYED BITUMINOUS SURFACING

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VERSION FOR: DATE:

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FOREWORD

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REVISIONS TO PREVIOUS VERSION

This document has been revised from Specification TfNSW 3151 Edition 11 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 3151

AGGREGATE FOR SPRAYED BITUMINOUS SURFACING

1 SCOPE

This Specification sets out the requirements for aggregate used in sprayed bituminous surfacing work.

2 STRUCTURE OF THE SPECIFICATION

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

2.1 PROJECT SPECIFIC REQUIREMENTS

Project specific details of work are shown in Annexure 3151/A.

2.2 SCHEDULES OF HOLD POINTS AND IDENTIFIED RECORDS

The schedules in Annexure 3151/C list the **HOLD POINTS** that must be observed. Refer to Specification TfNSW Q for the definition of **HOLD POINT**.

The records listed in Annexure 3151/C are **Identified Records** for the purposes of TfNSW Q Annexure Q/E.

2.3 FREQUENCY OF TESTING

The Inspection and Test Plan must nominate the proposed frequency of testing to verify conformity of the item, which must not be less than the frequency specified in Annexure 3151/L. Where a minimum frequency is not specified, nominate an appropriate frequency. Frequency of testing must conform to the requirements of TfNSW Q.

You may propose to the Principal a reduced minimum frequency of testing. The proposal must be supported by a statistical analysis verifying consistent process capability and product characteristics. The Principal may vary or restore the specified minimum frequency of testing, either provisionally or permanently, at any time.

2.4 REFERENCED DOCUMENTS

Unless specified otherwise, the applicable issue of a referenced document, other than a TfNSW Specification, is 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 3151/M.

3 DEFINITIONS

The terms “you” and “your” mean respectively “the Contractor” and “the Contractor’s”, or “the Supplier” and “the Supplier’s”, as appropriate.

The term “the Supplier” means the supplier of the product covered by the scope of this Specification.

The following definitions apply to this Specification:

Aggregate A material composed of discrete mineral particles of specified size or size distribution, produced from sand, gravel, rock or metallurgical slag, using one or more of the following processes: selective extraction, screening, blasting or crushing.

Nominal size A size designation of an aggregate which gives an indication of the largest particle size present. It is expressed as the next whole number above the largest sieve size on which aggregate may be retained.

4 SUPPLIER’S QUALITY MANAGEMENT SYSTEM

The Supplier must have in place a quality management system complying with AS/NZS ISO 9001 as a means of ensuring that the product conforms to this Specification.

Provide evidence verifying compliance with this Clause.

5 AGGREGATE REQUIREMENTS

Aggregates must be well shaped, clean, hard, tough, sound and free from dust, clay, dirt or other deleterious matter.

The aggregate must not fracture under traffic or deteriorate rapidly in stockpiles or at the quarry face.

Aggregate must conform to the requirements of Table 3151.1.

Where so stated in Annexure 3151/A, you may supply aggregates which are uncrushed.

Table 3151.1 – Aggregate Properties

Property	Test Method	Requirement
Particle size distribution	TfNSW T201	As specified in Table 3151.2
Material finer than 75 µm	TfNSW T203	≤ 1.0%
Average Least Dimension (ALD)	TfNSW T235 or TfNSW T275 as appropriate	As specified in Table 3151.2
Particle shape:	TfNSW T213	
Using 2:1 calliper ratio		≤ 35%
Using 3:1 calliper ratio		≤ 10%
Fractured face(s) ^(1, 2) for aggregate derived from gravels and meta-sediments:	TfNSW T239	
At least one fracture face		≥ 98%
At least two fractured faces		≥ 80%
Strength and durability:	TfNSW T215	
Wet strength		≥ 150 kN
Wet/dry strength variation		≤ 35%
Frictional characteristics - Polished Aggregate Friction Value (PAFV)	TfNSW T231 and TfNSW T233	≥ 44 ⁽³⁾
Water absorption	AS 1141.6.1	≤ 3%

Notes:

- (1) Requirement not applicable for uncrushed aggregate.
- (2) Test not required for aggregate sourced from drilled and blasted rocks.
- (3) Unless specified otherwise in Annexure 3151/A.

Table 3151.2 - Particle Size Distribution ⁽¹⁾ and ALD ⁽²⁾

Sieve Size (mm)	Percentage Passing AS Sieve (by mass) Nominal Size of Aggregate				
	20 mm	14 mm	10 mm	7 mm	5 mm
26.5	100	–	–	–	–
19.0	90 – 100	100	–	–	–
13.2	0 – 30	90 – 100	100	–	–
9.50	0 – 5	0 – 30	90 – 100	100	–
6.70	–	0 – 5	0 – 40	90 – 100	100
4.75	–	–	0 – 5	0 – 35	90 – 100
2.36	–	–	–	0 – 10	0 – 35
1.18	0 – 1	0 – 1	0 – 1	0 – 2	0 – 5
ALD	≥ 10.0	≥ 7.0	≥ 5.0	≥ 3.5	≥ 2.5

Notes:

⁽¹⁾ In accordance with Test Method TfNSW T201.

⁽²⁾ In accordance with Test Methods TfNSW T235 or TfNSW T275 as appropriate.

6 NOMINATED AGGREGATE

6.1 SUBMISSION OF NOMINATED AGGREGATE

Prior to supply of the aggregate, submit to the Principal details of the properties of each proposed nominal size aggregate (“nominated aggregate”), with accompanying test results and a signed statement, in accordance with Clauses 6.1.1 to 6.1.4.

6.1.1 Aggregate Characteristics

For each nominated aggregate, submit to the Principal the following details:

- (a) Source and geological type.
- (b) Production plant and methods of winning materials.
- (c) Evidence that the source and methods proposed are adequate for the required quantity and quality of aggregate.
- (d) Nominated target values for each property specified in Table 3151.1 and Table 3151.2.

6.1.2 Test Certificates

For each nominated aggregate, submit test certificates for all the properties specified in Table 3151.1 and Table 3151.2.

All test certificates relating to the submission must be NATA endorsed and no older than the following periods prior to the date of submission to the Principal:

- (a) Three months for properties related to the manufacturing process, i.e. particle size distribution, ALD and particle shape.
- (b) Six months for source properties, i.e. wet/dry strength variation, water absorption and PAFV.

Notwithstanding the above, PAFV test results not older than 12 months may be accepted.

All phases of any particular test must be performed at the same laboratory.

6.1.3 Signed Statement

Provide a signed statement confirming that each nominated aggregate conforms to the requirements of Clause 5. The statement must provide cross references to the submitted test certificates for all specified properties. Attach a copy of your completed verification checklist.

6.1.4 Proprietary Information

Where applicable, clearly identify in your submission any details that are not provided because you consider them to be proprietary information, together with a proposal by you outlining each point of such details and an alternative method of risk management on behalf of the Principal.

6.2 SUPPLY OF NOMINATED AGGREGATE

The production and delivery of nominated aggregate must:

- (a) satisfy the requirements of this Specification;
- (b) target the nominated values of each property.

HOLD POINT

Process Held: Supply of each nominated aggregate.

Submission Details: Documents as detailed in Clause 6, at least five working days prior to the proposed date of delivery of the nominated aggregate.

Release of Hold Point: The Principal will consider the submitted documents prior to authorising the release of the Hold Point.

6.3 VARIATION TO NOMINATED AGGREGATE

If you propose to make changes to the source of supply, plant or method of winning the aggregate, resubmit the documents required under Clause 6.3 from the plant which will supply the new nominated aggregate. In such cases, the Hold Point of Clause 6.2 will apply.

The test results resubmitted must cover each aggregate property specified in Clause 5.

Aggregate from the same face or quarry as the nominated aggregate but of a different geological type or quality will be regarded as aggregate from a different source and will be treated as such.

7 CONFORMITY OF DELIVERED AGGREGATES

7.1 GENERAL

Verify conformity of the delivered aggregate with the Specification before its use in the Works by sampling and testing, and providing records of process control.

7.2 SAMPLING

Carry out sampling from stockpiles of the aggregate at the quarry or at the Site. Each stockpile will comprise a Lot. The maximum Lot size must not exceed 250 m³.

Arrange sampling in accordance with the requirements of TfNSW T100, on a Lot-by-Lot basis.

When the Principal requests samples, riffle and/or quarter the samples taken for testing, and deliver the samples in sealed and labelled containers.

7.3 TESTING

Unless otherwise approved by the Principal, frequency of testing must be in accordance with Annexure 3151/L.

Carry out testing by a laboratory with current NATA registration for the relevant tests in accordance with Clause 5.

Provide the Principal with a summary of test results for all properties specified in Table 3151.1 and Table 3151.2 for each Lot within seven working days of sampling that Lot.

7.4 NONCONFORMITY

A Lot will be considered as nonconforming if any single test result of a sample taken from that Lot in accordance with Clause 8.2 fails to meet the specified criteria in Table 3151.1 and Table 3151.2.

If a Lot fails to conform to this Specification and it is deemed by the Principal that such nonconformity in the aggregate supply will adversely affect the sprayed bituminous surfacing performance, the aggregate must not be used. Where such nonconforming aggregate has been delivered to the Site, remove the nonconforming aggregate at your cost.

The cost of rectification or replacement, including any restoration to the work and to the Principal's premises or property that becomes necessary as a result of such rectification or replacement, will be borne by you.

Rectified and replacement aggregates must conform to this Specification.

8 PRECOATING

Where so specified in Annexure 3151/A, supply aggregate precoated with the type of precoating material specified.

Apply the precoating material to the aggregate at the rate as determined by Test Method TfNSW T237 to within $\pm 10\%$ to produce a uniform cover of all aggregate particles.

ANNEXURE 3151/A – PROJECT SPECIFIC REQUIREMENTS

Refer to Clause 2.1.

*NOTES TO TENDER DOCUMENTER: (Delete this boxed text after customising Annexure 3151/A)**Complete the table below by filling in the required details. Where “Yes / No” options are shown, delete whichever is not applicable. The minimum PAFV value (2nd row item in the table) specified must not be less than 44 (refer Table 3151.1).*

Clause	Description	Requirement
5	Uncrushed aggregate acceptable	Yes / No
5	Minimum Polished Aggregate Friction Value (PAFV)	
8	Aggregate to be supplied precoated	Yes / No
8	Type of precoating material to be used	

ANNEXURE 3151/B – (NOT USED)**ANNEXURE 3151/C – SCHEDULES OF HOLD POINTS AND IDENTIFIED RECORDS**

Refer to Clause 2.2.

C1 SCHEDULE OF HOLD POINTS

Clause	Description
6.2	Supply of nominated aggregate

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
7.1	Records verifying conformity of aggregate delivered
7.3	Summary of test results for each Lot

ANNEXURES 3151/D TO 3151/K – (NOT USED)

ANNEXURE 3151/L – FREQUENCY OF TESTING

Refer to Clause 2.3.

Characteristic Analysed	Test Method	Minimum Frequency of Testing
Particle size distribution	TfNSW T201	1 per 250 m ³ of aggregate
Material finer than 75 µm by washing	TfNSW T203	1 per 250 m ³ of aggregate
Particle shape	TfNSW T213	1 per 250 m ³ of aggregate
Average Least Dimension (ALD)	TfNSW T235 or TfNSW T275	1 per 250 m ³ of aggregate
Fractured faces	TfNSW T239	1 per 250 m ³ of aggregate
Wet strength	TfNSW T215	1 per 500 m ³ of aggregate ⁽¹⁾
Wet/Dry strength variation	TfNSW T215	1 per 500 m ³ of aggregate ⁽¹⁾
Polished Aggregate Friction Value (PAFV)	TfNSW T231 and TfNSW T233	1 per 6 months and at change of quarry face
Water absorption	AS 1141.6.1	1 per 6 months and at change of quarry face

Notes:

- ⁽¹⁾ Provided that all of the six previous tests have met the requirements of this Specification for both Wet strength and Wet/Dry strength variation, then the following reduced frequencies apply:

Wet/Dry strength variation	Frequency of testing
< 25%	1 per 6,500 m ³
< 30%	1 per 2,500 m ³
< 35%	1 per 1,250 m ³

ANNEXURE 3151/M – REFERENCED DOCUMENTS

Refer to Clause 2.4.

TfNSW Specifications

TfNSW Q Quality Management System

TfNSW Test Methods

TfNSW T100 Sampling Road Construction Materials
TfNSW T201 Particle Size Distribution of Aggregates (by Washing)
TfNSW T203 Particle Size Distribution of Aggregates Finer than 75 µm (by Washing)
TfNSW T213 Particle Shape by Proportional Calliper
TfNSW T215 Wet/Dry Strength Variation
TfNSW T231 Frictional Resistance by Pendulum Tester
TfNSW T233 Polished Value of Aggregate
TfNSW T235 Average Least Dimension of Aggregate (10 mm and Greater)
TfNSW T237 Rate of Application of Precoat to Aggregate
TfNSW T239 Fractured Faces of Coarse Aggregate
TfNSW T275 Average Least Dimension of Aggregate (5 mm and 7 mm)

Australian Standards

AS 1141.6.1 Particle density and water absorption of coarse aggregate – Weighing-in-water method
AS/NZS ISO 9001 Quality management systems – Requirements