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IC-QA-3151, IC-DC-3151

Specification

Supply of Aggregate for Sprayed Seals

(ATS 3120-21, Ed 1.0 MOD)

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Revision	Effective date	Summary of changes
1.0	04/12/2024	First issue as TS 00062

Preface

This specification is the first issue as TS 00062, which adopts and modifies ATS 3120-21. It sets out the requirements for the supply of aggregates used for sprayed bituminous surfacing work.

This document supersedes TS 03317.1 (IC-QA-3151) *Aggregate For Sprayed Bituminous Surfacing* and TS 03317.2 (IC-DC-3151) *Aggregate For Sprayed Bituminous Surfacing.*

For the purposes of this document, where TfNSW has identically adopted, or adopted and modified, an ATS document as a Transport Standard, the corresponding Transport Standard should be applied.

Table of contents

1. Scope

1.1 This document sets out the requirements for the supply of aggregates used for sprayed bituminous surfacing works.

2. Referenced documents

2.1 The following documents are referenced in this Specification:

Australian / New Zealand Standards

AS 1141	Methods for Sampling and Testing Aggregates
3.1	Sampling – Aggregates
6.1	Particle density and water absorption of coarse aggregate
14	Particle shape, by proportional caliper
15	Flakiness Index
30.1	Coarse aggregate quality by visual comparison
40	Polished aggregate friction value – Vertical road-wheel machine
41	Polished aggregate friction value – Horizontal bed machine
42	Pendulum friction test
AS 1726	Geotechnical site investigations.
AS/NZS/ISO 9001	Quality management systems – Requirements

Austroads

AP-C87-15	Austroads Glossary of Terms
AGPT04J-08	Guide to Pavement Technology Part 4J: Aggregate and Source Rock

ASTM International

ASTM C295	Petrographic analysis

Transport for NSW standards

TS 02799.02 (T201)	Particle distribution of aggregates (by washing)
TS 02799.04 (T203)	Particle distribution of aggregates finer than 75 μm (by washing)
TS 02799.13 (T215)	Wet/dry strength variation
TS 02799.27 (T230)	Resistance to stripping of aggregates and binders
TS 02799.32 (T235)	Average least dimension of aggregate (10 mm and greater)

TS 02799.36 (T239)	Fractured faces of coarse aggregate
TS 02799.50 (T275)	Average least dimension of aggregate (5 mm and 7 mm)

3. Definitions

3.1 In addition to the definitions set out in AP-C87-15 and AGPT04J-08, the definitions listed below apply to this Specification:

Aggregate Performance Classification:	The classification of aggregate into Class A, B or C, based on the mineralogical composition / texture, strength, hardness, toughness, soundness and shape of the aggregate.
Aggregate Size:	The nominal size of the aggregate, as determined in accordance with Clause 7.2.
Secondary Mineral:	A mineral which has formed as a consequence of the alteration or reconstruction of primary minerals by weathering, metamorphism, or exsolution.
Test Certificate:	All test certificates must be NATA endorsed.

4. Quality System Requirements

4.1 Subject to Clause 4.5, the Contractor must prepare and implement a Quality Plan that at a minimum includes the documents, procedures and/or instructions listed in this clause:

a. handling, storage and inspection of the products, including procedures for avoiding intermixing or contamination;

b. sampling and testing of processes and products (including Inspection and Test Plans);

c. calibration and maintenance of plant, including weighing equipment, screens, crushers and flow meters / proportioning systems (where installed);

d. application of precoat (where applicable);

In addition, for quarried rock:

e. use and handling of explosives;

f. assessment of quarry face and shot rock;

g. moisture control of shot rock;

h. handling processes for shot rock; and

i. for basic igneous source rock – control of secondary mineralization.

4.2 Aggregate must be produced under a Quality Management System which is third party certified to AS/NZS ISO 9001.

4.3 The Contractor must ensure that petrographic analysis in accordance with ASTM C295 is carried out on the source rock. The frequency of the analysis must be such that any variation in the petrography that may affect the aggregate quality is identified and as required by this Specification.

4.4 If requested, the Contractor must submit to the Principal for each nominal aggregate size:

a. NATA endorsed test results which demonstrate that the aggregate will comply with this Specification; and

b. the nominated target value of each specified property.

4.5 If the documents listed in Clause 4.1 have been provided to the Principal and assessed under a prequalification / registration scheme applicable to the jurisdiction where the work is carried out, Clause 4.1 does not apply and the Contractor must instead provide the following to the Principal:

a. details of the prequalification / registration applicable to the material source; and

b. where a quarry is used, details of the area of the quarry (for example, face number, bench number and reduced level) that will be used to source the material.

HOLD POINT 1	
Process Held	Commencement of aggregate supply
Submission Details	The documents listed in Clause 4.1 or 4.5 must be provided to the Principal at least 15 working days prior to the commencement the supply of the aggregate.

4.6 If, during the course of supply:

a. the Contractor proposes to make changes to the source of supply, plant or method of winning the aggregate, or

b. there is a change to the rock type or quality, even if sourced from the same quarry face,

the information listed in Clause 4.1 must be resubmitted to the Principal and Hold Point 1 will reapply.

5. Aggregate Strength and Durability

General

5.1 Subject to Clause 5.2, aggregate must be manufactured from rock which is hard, durable and produced from a single source.

5.2 The Contractor may submit a proposal to the Principal for the use of scoria, river gravel and synthetic materials or blended aggregates from different sources. Any such proposal must include evidence, including test results, that the aggregate will perform satisfactorily when used in a sprayed seal.

5.3 Unless the Contract documents specify that the Principal will undertake the assessment of the source rock properties under a quarry prequalification / registration scheme, the Contractor must undertake the sampling and testing necessary to demonstrate compliance with Clause 5.

5.4 This Specification sets out only one testing regime for aggregate strength and durability.

5.5 Where a rock type is specified, the rock type must be determined from a petrographic analysis in accordance with ASTM C295.

5.6 Subject to Clause 8.5, the minimum frequency of testing of the strength and durability is one test per 1000 tonnes, but the frequency of testing must not be less than one test for each 6 months of production. Test certificates must not be more than 6 months old when submitted to the Principal.

5.6A The minimum frequency of testing for water absorption is one test per 6 months of production.

5.7 The source rock properties must comply with Table 5.7.

Table 5.7: Strength properties

Property	Rock Type	Test Method	Aggregate Performance Classification Class A (3)	Aggregate Performance Classification Class B (3)	Aggregate Performance Classification Class C (3)
Minimum Wet Strength (kN)	All, except for Metamorphosed Basalt (Greenstone)	TS 02799.13	175	150	100
Maximum Wet / Dry Strength Variation (%)	All	TS 02799.13	35	35	40
Maximum Water Absorption (%)	All rock except for Glassy Basalt	AS 1141.6.1	2.5	2.5	2.5
	Silica Undersaturated Glassy Basalt (1)	AS 1141.6.1	3	3	3
	Silica Oversaturated Glassy Basalt (2)	AS 1141.6.1	4	4	4

Notes

1. Non-Silica Glass Content > 5%, Saturated Silica Glass Content < 1%

2. Non-Silica Glass Content > 5%, Saturated Silica Glass Content >1%

3. Class A is for road > 2,000 vehicle/lane/day, Class B is for road between 200 and 2,000 vehicle/lane/day and Class C is for road < 200 vehicle/lane/day.

5.8 The Wet Strength and the Wet / Dry Strength Variation tests may be carried out on a range of size fractions and on crushed spalls or crushed drill core.

5.9 The Contractor may submit a proposal to the Principal for the use of aggregate with water absorption values higher than that specified in Table 5.7, provided its Wet Strength is at least 60 kN greater than the specified minimum value for the relevant aggregate quality category. Any such proposal must include evidence, including test results, that the aggregate will perform satisfactorily when used in a sprayed seal, as well as any adjustments to the precoating rate and precoating procedures.

6. Friction Rating

6.1 Unless specified otherwise in the Contract documents, the friction rating of Class A and Class B Aggregate must comply with the Polished Aggregate Friction Value (PAFV) as specified in Table 6.1.

Table 6.1: Friction Rating

Property	Acceptance Criteria	Minimum Test Frequency (1)	Test Method
PAFV	≥ 44 (2)	1 per 6 months of production	AS 1141.41 and AS 1141.42

Notes:

1. Subject to Clause 8.5.

2. Unless specified in Annexure B.

6.2 Test certificates must not be more than 6 months old when submitted to the Principal.

7. Production Properties

General

7.1 Aggregate must be clean and free of impurities, such as clay, organic matter or foreign materials.

Particle dimensions

7.2 Unless specified otherwise in the Contract documents, the aggregate must comply with the particle size distributions (tested in accordance with TS 02799.02 and TS 02799.04) and average least dimension (tested in accordance with TS 02799.32 or TS 02799.50) given in Table 7.2 for each respective nominal size.

Table 7.2: Particle size distribution (Percentage Passing by Mass for each Nominal Size) and ALD

AS Sieve Size (mm)	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		
9.5	0 – 5	0 – 15	0 – 30	85 – 100	100	
6.7			0 – 5	0 – 30	85 – 100	100
4.75				0 – 5	0 – 35	85 – 100
2.36	0 – 1	0 – 1	0 – 1	0 – 1	0 –5	0 –10
1.18					0 –2	0 –2
75 µm	0 – 1.0	0 – 1.0	0 – 1.0	0 – 1.0	0 – 1.0	0 – 1.0
Minimum Average Least Dimension (1) (mm)	11.0	9.0	7.5	5.5	3.5	2.5

Note 1. Determined in accordance with TS 02799.32 for 10 mm and greater and TS 02799.50 for 5 mm and 7 mm.

7.3 Subject to Clause 8.5, the minimum frequency of testing for the properties listed in Table 7.2 is one test per 500 tonnes. Test certificates must not be more than 3 months old when submitted to the Principal.

Other production properties

7.4 Aggregate must comply with Table 7.4.

Table 7.4: Aggregate properties

Property	Test Method	Test Frequency (1)	Aggregate Performance Classification Class A	Aggregate Performance Classification Class B	Aggregate Performance Classification Class C
Minimum Flakiness Index (2) For aggregates used in the bottom layer of double/double seals (e.g. I-D/D, D/D, HSS2-M, HSS2-H, XSS, and GRS-D/D)	AS 1141.15	1 per 500 tonnes	10	10	10

Property	Test Method	Test Frequency (1)	Aggregate Performance Classification Class A	Aggregate Performance Classification Class B	Aggregate Performance Classification Class C
Minimum Flakiness Index (2) For aggregates used in all applications other than the bottom layer of double/double seals	AS 1141.15	1 per 500 tonnes	0	0	0
Maximum Flakiness Index (2)	AS 1141.15	1 per 500 tonnes	25	30	35
Maximum Particle Shape (using 2:1 caliper ratio)	AS 1141.14	1 per 500 tonnes	30	35	40
Maximum Particle Shape (using 3:1 caliper ratio)	AS 1141.14	1 per 500 tonnes	8	10	12
Minimum Fractured face(s) (3) (%)	TS 02799.36	1 per 1,000 tonnes	98	80	80

Notes

1. Subject to Clause 8.5.
2. Not required for aggregate sizes less than 10 mm.
3. Not required for material from a blasted quarry face.

7.5 Test certificates for the properties listed in Table 7.4 must not be more than 3 months old when submitted to the Principal.

8. Sampling and Testing

General

8.1 Sampling must be undertaken in accordance with AS 1141.3.1.

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

a. a separate stockpile is formed for each stockpile lot of the same material type, or

b. material of the same type is 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. Any non-conforming stockpile lots must be removed from the stockpile prior to the addition of further portions.

8.3 The maximum lot size is 1000 tonnes.

8.4 If requested by the Principal, the Contractor must riffle and/or quarter the samples taken for testing, and deliver a sample in a sealed and labelled container to the Principal.

Frequency of testing

8.5 The frequency of testing set out in this Specification applies, unless:

a. a reduced rate of testing applies under a prequalification / registration scheme applicable to the jurisdiction where the work is carried out; or

b. the Contractor has submitted a proposal (supported by statistical analysis verifying consistent process capability and product characteristics) for a reduced rate of testing and the Principal has approved that proposal.

8.6 For a reduced rate of testing to apply, the aggregate must be manufactured under uniform conditions from a single homogeneous source. The Principal may rescind approval of a reduced rate of testing at any time.

8.7 The sampling and testing for each property required under this Specification must also be carried out whenever there is a change of quarry face, source rock type or change of source.

Delivery

8.8 Aggregate must not be removed from the quarry or manufacturing site until the aggregate has been tested and NATA endorsed test certificates issued and submitted to the Principal, demonstrating compliance with the requirements of this Specification.

HOLD POINT 2	
Process Held	Acceptance of aggregate and/or commencement of aggregate delivery.
Submission Details	All test results demonstrating that the aggregate complies with this Specification must be submitted prior to the commencement of supply of aggregate to the worksite.

9. Precoating

9.1 Clause 9 applies where it is specified in the Contract documents that precoating is required.

9.2 Where an approval / registration scheme for precoating agent is applicable in the jurisdiction where the sprayed seal will be applied, the precoating agent must be registered / approved under that scheme. Aggregate must be precoated with the type of precoating material as specified in Annexure B.

9.3 Precoating must be carried out on surface dry aggregate.

9.4 The precoating agent must be applied to the aggregate in a manner and at a rate and time that provides a completed, light, uniform, effective cover of all aggregate particles at the time of spreading.

9.5 The quantity of precoating agent applied must be just sufficient to coat each aggregate particle uniformly.

9.6 Precoating must not be carried out when rain is imminent. If aggregate has been precoated and rain appears imminent, the aggregate must be adequately covered to prevent the precoating material being washed from the aggregates.

9.7 Precautions, such as covering stockpiles, must be taken to prevent settlement of dust, penetration of moisture or drying out of the precoating material in the stockpiled aggregate.

9.8 If testing for stripping resistance of the precoated aggregate is specified in the Contract documents, the Maximum Stripping Test Value (%) for all classes of aggregate is 10, when assessed by TS 02799.27 test method.

Annexure A Summary of Hold Points, Witness Points and Records

The following is a summary of the Witness Points / Hold Points that apply to the Specification and Records that the Contractor must submit to the Principal, to demonstrate compliance with this Specification.

Clause	Hold point	Witness point	Record
4.5	Commencement of aggregate supply		Quality Plan
8.8	Commencement of aggregate delivery		Test results

Annexure B Project Specific Requirements

NOTES TO TENDER DOCUMENTER: (Delete this boxed text after customising Annexure B)

Complete the table below by filling in the required details. For aggregate performance, the Class should be based on the traffic volume (that is, vehicles/lane/day). The minimum PAFV value specified must not be less than 44 (refer Table 6.1). To determine the shape of the aggregate, select either the Flakiness Index or Particle Shape test method.

Where “Yes/No” options are shown below, delete whichever is not applicable.

Clause	Description	Requirement
5.7, 7.4	Aggregate Performance Classification	Class =
6.1	Minimum Polished Aggregate Friction Value (PAFV)	
7.4	Determine the shape of the aggregate (Flakiness Index or Particle Shape)	
9	Aggregate to be supplied precoated	Yes/No
9	Type of precoating material to be used	