

TRANSPORT FOR NSW (TfNSW)
SPECIFICATION D&C 3253
BITUMEN FOR PAVEMENTS

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Transport
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FOREWORD

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BASE SPECIFICATION

This document is based on Specification TfNSW 3253 Edition 13 Revision 4.

TfNSW SPECIFICATION D&C 3253

BITUMEN FOR PAVEMENTS

1 SCOPE

This Specification sets out the requirements for bitumen for use as binder in asphalt, sprayed bituminous surfacings and foamed bitumen stabilisation.

2 STRUCTURE OF THE SPECIFICATION

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

2.1 (NOT USED)

2.2 SCHEDULE OF IDENTIFIED RECORDS

The records listed in Annexure 3253/C are **Identified Records** for the purposes of Specification TfNSW D&C Q6 Annexure Q/E.

2.3 FREQUENCY OF SAMPLING AND TESTING

Frequency of sampling and testing must be in accordance with Clause 8.2 and Annexure 3253/L.

2.4 REFERENCED DOCUMENTS

Standards, specifications and test methods are referred to in abbreviated form (e.g. AS 1234). For convenience, the full titles are given in Annexure 3253/M.

3 DEFINITIONS

The term “you” means either “the Contractor” or “the Supplier”.

“The Contractor” refers to the Contractor carrying out the asphaltting or sprayed sealing or foamed bitumen pavement stabilisation. “The Supplier” means the manufacturer of the binder.

“Terminal” refers to the bitumen distribution facility and includes bitumen refinery.

4 QUALITY MANAGEMENT SYSTEM

Obtain materials only from suppliers who have implemented a Quality Management System conforming to AS/NZS ISO 9001 as a means of ensuring that the materials supplied conform to the requirements of this Specification.

5 MATERIAL REQUIREMENTS

5.1 BITUMEN PROPERTIES

Bitumen at a terminal for delivery must comply with all the requirements for its class as specified in Table 3253.1, and evidenced by tests carried out at a date not more than 42 days prior to the date of delivery to the work.

Table 3253.1 - Properties of Bitumen for Sprayed Sealing and Asphalt Applications

Property	Test Method	Class							
		C170 ⁽⁶⁾	C240 ⁽⁶⁾	C320 ⁽⁶⁾	C450 ^(5,7)	C600 ⁽⁶⁾	M500 ⁽⁶⁾	M1000 ⁽⁵⁾	
Viscosity at 60°C	Pa.s	AS/NZS 2341.2 ⁽¹⁾	140 – 200	190 – 280	260 – 380	Report	500 – 700	400 – 600	Report
Viscosity at 135°C	Pa.s	AS 2341.3 ⁽²⁾	0.25 – 0.45	0.32 – 0.55	0.4 – 0.65	0.70 max	0.6 – 0.85	1.0 max	1.5 max
Penetration at 25°C	0.1 mm	AS 2341.12 ⁽³⁾	62 min	53 min	40 min	Report	20 min	65 min	Report
Viscosity of RTFO residue as % of original	%	AS/NZS 2341.10 & AS/NZS 2341.2	300 max	300 max	300 max	Report	300 max	Report	Report
		ASTM D2872	340 max	340 max	340 max	340 max	340 max	340 max	340 max
Viscosity at 60°C after RTFO ⁽⁸⁾	Pa.s	AS/NZS 2341.10 & AS/NZS 2341.2 ⁽¹⁾	–	–	Report	750 – 1150	–	Report	3500 – 6500
		ASTM D2872	–	–	Report	850 – 1300	–	Report	4000 – 7400
Penetration at 25°C after RTFO	0.1 mm	AS/NZS 2341.10 & AS 2341.12 ⁽³⁾	–	–	Report	26 min	–	Report	26 min
Mass change	%	AS/NZS 2341.10 or ASTM D2872	–	–	Report	0.6 max	–	0.6 max	0.6 max
Flash Point (open cup)	°C	AS 2341.14	250 min	250 min	250 min	250 min	250 min	250 min	250 min
Density at 15°C	kg/m ³	AS 2341.7	Report	Report	Report	Report	Report	Report	Report
Matter insoluble in toluene	% by mass	AS/NZS 2341.20 ⁽⁴⁾	1.0 max	1.0 max	1.0 max	1.0 max	1.0 max	1.0 max	1.0 max

Legend: RTFO = Rolling Thin Film Oven; min = minimum; max = maximum; Report = no conformity criteria exist, but test results must be reported

Notes:

- (1) For "Viscosity at 60°C", the reference test is AS/NZS 2341.2, using the schedule of tubes and bulbs specified in AGPT/T161.
- (2) For "Viscosity at 135°C", AS/NZS 2341.4 or AS/NZS 2341.2 may also be used. Brookfield (or mechanical equivalent) with Thermosel may be used under AS/NZS 2341.4 for "viscosity at 135°C" only.
- (3) The conditions of AS 2341.12 are 5 seconds, 100g at 25°C.
- (4) AS/NZS 2341.8 may be used instead of AS/NZS 2341.20.
- (5) This bitumen is classified on the basis of "Viscosity at 60°C" after RTFO conditioning.
- (6) This bitumen is classified on the basis of "Viscosity at 60°C" not after RTFO conditioning.
- (7) For the purposes of this Specification, C450 is equivalent to AR450.
- (8) "Viscosity at 60°C" after RTFO conditioning can be tested using either method (i.e. AS/NZS 2341.10 or ASTM D2872).

6 PRODUCTION

6.1 PROCESS CONTROL

6.1.1 Process Control System

The Supplier must implement a documented process control system to produce bitumen of a consistent quality conforming to the requirements of this Specification.

As a minimum, the process controls must include a method for determining blend ratios, keeping records of blend ratios for each load and recording sampling frequency.

6.1.2 Other Tests

The Supplier may nominate other tests or different values from those specified in Table 3253.1 in its Quality Management System, which, if agreed to by the Principal, will form the basis for the production quality testing.

The Supplier must state in its Quality Management System the control limits or target value of these tests.

6.2 PRODUCT CERTIFICATION

The Supplier must provide a NATA endorsed certificate of conformity verifying that the bitumen at the terminal complies with all the properties for its class as specified in Table 3253.1.

The certificate is specific only to the bitumen at the terminal, produced to a particular formulation, on which the tests were made.

7 DELIVERY

7.1 CONTAINERS

7.1.1 General

Use only delivery containers which are in good condition and do not contain contaminants which would cause the bitumen at the point of delivery to be non-complying with any of the requirements for its class as specified in Table 3253.1.

7.1.2 Records of Deliveries

The Supplier must, as part of its Quality Management System, maintain records of the deliveries made. These records include but are not limited to delivery dockets showing the history of the individual container's use over the last 5 deliveries, including the type of product that was transported in the container.

7.2 HANDLING TEMPERATURE

Transport the bitumen by road tanker or sprayer at a temperature within the manufacturer's recommended temperature range.

8 SAMPLING AND TESTING AT POINT OF DELIVERY

8.1 FREQUENCY OF SAMPLING AND TESTING

8.1.1 Frequency of Sampling

Carry out sampling of the bitumen at the point of delivery, at the frequencies stated in Annexure 3253/L.

Samples not used for testing must be retained for a minimum of 6 months after delivery in the case where the bitumen is supplied directly to TfNSW, or a minimum of 12 months after Construction Completion where the bitumen is supplied to the Contractor for use in road works.

8.1.2 Frequency of Testing

Carry out testing of the bitumen samples taken under Clause 8.2.1, at the frequencies stated in Annexure 3253/L.

You may propose in writing to the Principal that a reduced minimum frequency of testing be accepted in accordance with TfNSW D&C Q6. Support your proposal with 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. You can request a reduction in the minimum frequency of testing when you can demonstrate again by statistical analysis that you have gained a consistent process capability and product characteristics.

8.2 METHOD OF SAMPLING AND TESTING

8.2.1 Sampling Personnel

Sampling must be conducted by a nominee considered to be competent for that sampling procedure, supported by documented training records of your nominee.

8.2.2 Test Methods

Take samples of the bitumen for testing in accordance with Test Method AGPT/T101. For the purpose of this Specification, the scope of AGPT/T101 is deemed to include all of the bitumen classes covered under this Specification.

Test the samples in accordance with the Test Methods stated in Table 3253.1.

8.3 SUBMISSION OF TEST RESULTS

8.3.1 Point of Delivery

Within 14 days after delivery, submit all test results demonstrating conformity of the bitumen with the requirements for its class as specified in Table 3253.1. Report the test results on NATA endorsed test documents.

8.3.2 Report of Nonconformities

In the event of nonconformities occurring, submit a report of the nonconformities directly to TfNSW Pavements Unit within 14 days of the testing date. The report may be forwarded by email to pavements@rms.nsw.gov.au.

8.4 THE PRINCIPAL REQUESTED SAMPLING

When the Principal makes a request for additional samples to be taken at the point of delivery, take three samples. Retain two of the samples and deliver the third sample to a location nominated by the Principal.

Test one of the two samples retained by you to verify conformity of the batch delivered with Table 3253.1. Keep the other sample as a reference sample. The Principal may test the third sample to verify conformity with this Specification.

If the results of the samples tested by you or the Principal do not meet the acceptance criteria, the bitumen represented by the sample is deemed to be nonconforming.

If the results of the samples tested by you or the Principal do not meet the acceptance criteria, you may request the Principal to test the third sample in your presence to verify conformity.

ANNEXURES 3253/A TO 3253/B – (NOT USED)

ANNEXURE 3253/C – SCHEDULE OF IDENTIFIED RECORDS

Refer to Clause 2.2.

The records listed below are Identified Records for the purposes of TfNSW D&C Q6 Annexure Q/E.

Clause	Description of Identified Record
6.2	Certificate of conformity of the bitumen at terminal
8.3.1	Test results of samples taken at point of delivery

ANNEXURES 3253/D TO 3253/K – (NOT USED)

ANNEXURE 3253/L – MINIMUM FREQUENCY OF TESTING

Minimum frequency of testing must be in accordance with Table 3253/L.1.

Table 3253/L.1 – Minimum Frequency of Testing

Property	Conformity Requirements ⁽¹⁾		Sampling Frequency	Testing Frequency
	C450	Other Classes		
For bitumen used in sprayed sealing or foam bitumen stabilisation				
Viscosity at 60°C Pa.s	As per Table 3253.1		One sample per shift whenever there is at least one delivery during the period ^(2, 3)	1 per 200,000 litres (or part thereof)
Penetration at 25°C 0.1 mm				
For bitumen used in asphaltting				
Viscosity at 60°C Pa.s	360 – 520	As per Table 3253.1	One sample per 24 hours whenever there is at least one delivery during the period ⁽²⁾	The greater of: 1 per 500,000 litres (or part thereof); or 1 per 3 months
Penetration at 25°C 0.1 mm	35 min	As per Table 3253.1		

Legend: min = minimum

Notes:

- ⁽¹⁾ Conformity values shown are applicable only for testing of sample taken at point of delivery.
- ⁽²⁾ Samples are to be taken at the point of delivery.
- ⁽³⁾ A "shift" is a period of continuous work not exceeding 12 hours.

ANNEXURE 3253/M – REFERENCED DOCUMENTS

Refer to Clause 2.4.

TfNSW Specification

TfNSW D&C Q6 Quality Management System (Type 6)

ASTM Test Method

D2872 Standard Test Method for Effect of Heat and Air on a Moving Film of Asphalt
(Rolling Thin-Film Oven Test)

Austrroads Test Method

AGPT/T101 Method of sampling polymer modified binders, polymers and crumb rubber

AGPT/T161 Determination of dynamic viscosity by flow through a capillary tube – Test tube
schedule

Australian Standards

AS 2341 Methods of testing bitumen and related roadmaking products

AS/NZS 2341.2 Determination of dynamic viscosity by vacuum capillary viscometer

AS 2341.3 Determination of kinematic viscosity by flow through a capillary tube

AS/NZS 2341.4 Determination of dynamic viscosity by rotational viscometer

AS 2341.7 Determination of density using a density bottle

AS/NZS 2341.8 Determination of matter insoluble in toluene

AS/NZS 2341.10 Determination of the effect of heat and air on a moving film of bitumen
(rolling thin film oven (RTFO) test)

AS 2341.12 Determination of penetration

AS 2341.14 Determination of flashpoint of bitumen

AS/NZS 2341.20 Determination of sieve residue for bituminous materials

AS/NZS ISO 9001 Quality management systems – Requirements