

# TRANSPORT FOR NSW (TfNSW)

## QA SPECIFICATION 3253

### BITUMEN FOR PAVEMENTS

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#### REVISION REGISTER

| <b>Edition Number</b> | <b>Clause Number</b>  | <b>Description of Revision</b>  | <b>Authorised By</b>   | <b>Date</b> |
|-----------------------|---|---|------------------------|-------------|
| Ed 4                  | 5<br>A5   | 7 days increased to 21 days<br>New Clause   | GM, CMS                | 05.08.91    |
| Ed 5                  | 4, 5.2, 6.3,<br>7, A4,<br>Tables 1, 2<br>and A1<br>Notice<br>1<br>2<br>5.1<br>6.2<br>6.4<br>A4,<br>Table A2<br>Table A1<br>A5 | Requirements for multigrade bitumens added.<br>Guidance on selection added.<br>Acceptance of AR320 clarified.<br>References changed<br>New Clause<br>Rewritten to align with RTA 3252<br>Items (a), (h) and (i) changed.<br>Deductions for penetration added.<br>Deductions for Class 50 changed<br>Waiting time calculations changed | GM, PSP                | 10.05.96    |
| Ed 6                  | 6.2.3(a)  | Deleted "polymer modified".   | GM, PSP<br>J Woodward  | 25.09.96    |
| Ed 7                  |   | Converted to MS Word 6.0c.<br>Document reformatted.<br>References updated.  | GM, RNIC<br>J Woodward | 16.04.97    |
| Ed 8                  | Tables 3253<br>.1 & .2,<br>Table A1   | Min. viscosity of Class AR320 changed from 700 to 600.<br>Deductions changed accordingly.   | GM, RNIC<br>W Ho       | 22.05.97    |
| Ed 9                  | 1.2, 5.1  | Minor editorial changes.<br>Austroads Asphalt Guide added.  | GM, RNIC               | 23.04.03    |

| <b>Edition Number</b> | <b>Clause Number</b>   | <b>Description of Revision</b>  | <b>Authorised By</b> | <b>Date</b> |
|-----------------------|--|---|----------------------|-------------|
| Ed 9<br>(cont'd)      | Table 3253.1<br><br>2<br>Table 3253.2<br><br>Annexure 3253/1<br>Table A1   | Removed AR600/170 classification.<br>Changed viscosity for AR1000/320.<br><br>Added reference to MBT03.<br>Deleted: Viscosity at 135°C after RTFO, Segregation 72 hour 163°C, Matter Insoluble in toluene.<br>Added: Penetration at 25°C, Viscosity of RTFO residue as % of original, Sieve residue.<br>Changed acceptance criteria.<br><br>Schedule of Identified Records added.<br><br>Values for C600/170 and AR1000/320 changed.  |                      |             |
| Ed 10                 |  | Changed fonts.  | GM, RNIC             | 05.08.03    |
| Ed 11                 | Foreword<br>Notice<br>Table 3253.1<br>2<br>5.1<br>Table 3253.2<br>6.2<br>7<br>Annexures<br>Annex M<br>Annex L<br>Appen A -<br>Table A1 | Reformatted with new annexure.<br>Minor editorial changes.<br><br>New clause after the Table of Contents.<br><br>Inclusion of AR 450.<br><br>Expanded to describe structure. References transferred to Annexure 3253/M.<br><br>Protection requirements changed.<br>References updated.<br><br>Added new column for AR 450 properties.<br><br>Changed delivery procedures.<br><br>Transferred to Annexure 3253/L.<br>Test results must be submitted.<br><br>Annexures renumbered.<br><br>New annexure for references.<br><br>Sample containers specified.<br><br>Added new column for AR 450 viscosity deductions. | GM, RNIC             | 03.08.06    |
| Ed 12                 | Global   | Aligned multigrades properties with Austroads specifications.<br><br>Replaced “C600/170” with “M500/170”.<br><br>RTFO viscosity range (at 60°C) of AR1000/320 changed to 3500 – 6500.<br><br>Preference for a single referee test for every property is maintained, but additional alternatives of AS2008 in footnotes reintroduced.  | GM, IC               | 05.06.08    |

| Edition Number    | Clause Number                                   | Description of Revision  | Authorised By          | Date     |
|-------------------|---|--|------------------------|----------|
| Ed 12<br>(cont'd) | 4<br>Table 3253.2<br><br>Annex L<br><br>Annex M | Footnotes changed.<br><br>Deleted “Containers for distillates must be appropriate to their consistency and nature”.<br><br>Deleted “RTA T740 - Segregation Test for Bituminous Binders”.<br><br>Replaced “MBT 03” with “AG:PT/T103”.<br><br>Removed “MBT 24 - Toughness of PMBs (ARRB Extensiometer)”.<br><br>Added “AG:PT/T161 - Determination of dynamic viscosity by flow through a capillary tube – test tube schedule”.<br><br>Removed “Asphalt Guide” from the Austroads documents list.<br><br>Changes to deductions applied when the measured viscosity of class AR1000/320 at 60°C after RTFO is below the minimum specified limit.   |                        |          |
| Ed 12/<br>Rev 1   | Spec Ref No<br>Foreword<br>Global               | Revision No added.<br><br>Standard notes on revisions added.<br><br>Clauses renumbered, to be consistent with other Materials specifications.  | GM, IC                 | 22.04.09 |
| Ed 13/<br>Rev 0   | 1<br><br>3<br><br>5<br><br>5.1<br><br>5.2       | Spec title changed.<br><br>Scope extended to bitumen used in foamed bitumen stabilised material.<br><br>Statement that compliance with AR320 is considered compliance with C320 moved to footnote in Table 1.<br><br>Definition of “Contractor” clarified.<br><br>Definitions of “Supplier” and “terminal” added.<br><br>Previous clause on classification of bitumen on basis of viscosity at 60°C (including Table 1) deleted; details moved to footnote of new Table 1.<br><br>Subsequent clauses and tables renumbered.<br><br>Previously clause 6.1. References to Austroads publications for safe handling of bitumen deleted.<br><br>Previously clause 6.2. Reference to “refinery” replaced by “terminal”. | GM, CPS<br>Peter Letts | 26.05.14 |

| <b>Edition Number</b>       | <b>Clause Number</b>   | <b>Description of Revision</b>  | <b>Authorised By</b> | <b>Date</b> |
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| Ed 13/<br>Rev 0<br>(cont'd) | Table 1<br><br>6<br>7.2<br><br>7.4<br><br>8<br><br>Annex L<br><br>Annex M<br>Appen A | <p>Previously Table 2. C50 deleted, C240 added, AR1000 replaced by M1000, minimum frequency of testing moved to Annexure 3253/L, footnotes amended.</p> <p>Statement that material complying with AR320 is considered to comply with C320 added as footnote in Table 1.</p> <p>New clause titled "Production" added.</p> <p>Previous clause 7.2 on delivery procedures deleted. Subsequent clauses renumbered.</p> <p>Previously clause 7.3. Maximum temperature of 200°C replaced by Supplier recommended temperature.</p> <p>Previous clause 7.4 on details of consignment deleted.</p> <p>New clause on conformity sampling and testing at point of delivery, moved here from Annex L.</p> <p>Requirements on conformity sampling and testing at point of delivery moved to clause 8.</p> <p>New table on minimum frequency of testing table.</p> <p>Reference Documents updated.</p> <p>Previous Appendix A on requirements applicable when bitumen is ordered directly by RMS deleted.</p> |                      |             |
| Ed 13/<br>Rev 1             | 8<br><br>8.2.1<br><br>Annex M  | <p>Individual sub-clauses rearranged and rewritten with new sub-headings, to be consistent with spec 3252.</p> <p>Taking of samples to be in accordance with AGPT/T101.</p> <p>Reference Documents updated.</p>   | GM, CPS              | 27.06.14    |
| Ed 13/<br>Rev 2             | General<br><br>5<br><br>5.1<br><br>5.2   | <p>All references to "binder" replaced by "bitumen".</p> <p>New clause incorporating previous clauses 5 and 6; heading title changed. Subsequent clauses renumbered.</p> <p>Previous clause 5.1 titled "Safety" deleted. Previous clause 5.2 now becomes clause 5.1 with heading title changed.</p> <p>Age of test results demonstrating compliance for bitumen at terminal increased from 21 days to 42 days.</p> <p>Previous clause 6.1 with heading title changed.</p>   | GM, CB               | 30.08.16    |

| Edition Number                  | Clause Number   | Description of Revision   | Authorised By | Date     |
|---------------------------------|---|---|---------------|----------|
| Ed 13/<br>Rev 2<br><br>(cont'd) | 5.3<br><br>Table 3253.1<br><br><br><br><br><br><br>6.1<br><br>7.2.1<br><br><br><br>7.2.2<br><br><br><br>7.2.4<br><br>Annex L<br>Table L.1 | <p>Previous clause 6.2.</p> <p>Term “source” replaced by “terminal”.</p> <p>AR450 renamed to C450.</p> <p>AR320 deleted.</p> <p>Reporting requirement for C320 properties changed.</p> <p>Alternate test method for “Mass change” added.</p> <p>Material property “Sieve residue” replaced by “Matter insoluble in toluene”.</p> <p>Table footnote 7 clarified.</p> <p>Alternate method to test viscosity added as Table footnote 8.</p> <p>Requirement to maintain records showing conforming deliveries added.</p> <p>Previous clause 8.2.2 moved to become clause 7.2.1. Subsequent clauses renumbered.</p> <p>Requirement on period of retention for sample taken added.</p> <p>Heading added to form new sub-clause on frequency of testing.</p> <p>Requirements for implementing a reduced minimum frequency of testing added.</p> <p>Requirement to report nonconformities directly to RMS Pavement Unit added.</p> <p>Frequency of testing amended:<br/>- different frequencies specified for sampling and testing,<br/>- different frequencies specified for bitumen used in asphaltting, and in sprayed sealing/foam bitumen stabilisation.</p> |               |          |
| Ed 13/<br>Rev 3                 | Global<br><br>5<br><br>6.1<br><br>6.2<br><br>7.1  | <p>Minor changes to align spec 3253 with spec 3252.</p> <p>Previous clause 5 divided into clause 5 on material requirements, and clause 6 on production. Subsequent clauses renumbered accordingly.</p> <p>Previously clause 5.2. Headings added to form new sub-clauses 6.1.1 and 6.1.2.</p> <p>Previously clause 5.3.</p> <p>Previously clause 6.1. Headings added to form new sub-clauses 7.1.1 and 7.1.2.</p>   | DCS           | 17.08.18 |

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|---------------------------------|--|--|----------------------|-------------|
| Ed 13/<br>Rev 3<br><br>(cont'd) | 7.2<br><br>8.2<br><br>8.3<br><br>8.4<br><br>8.5<br><br>Annex C | Requirement reworded to accord with spec 3252.<br><br>Previous clause 8.2 now divided into clauses 8.2 to 8.5.<br><br>Previously clause 7.2.3. Headings added to form new sub-clauses 8.3.1 and 8.3.2.<br><br>Previously clause 7.2.4. Headings added to form new sub-clauses 8.4.1 and 8.4.2.<br><br>Previously clause 7.2.5.<br><br>Schedules updated. |                      |             |
| Ed 13/<br>Rev 4                 | Global   | References to “Roads and Maritime Services” or “RMS” changed to “Transport for NSW” or “TfNSW” respectively.   | DCS                  | 22.06.20    |

## **GUIDE NOTES**

(Not Part of Contract Document)

### **End Product Considerations**

This Specification is essentially based on viscosity with a view to optimising temperature performance and assumes a proper design of end product asphalt and sprayed seal. This Specification does not address the chemical nature of the binder. Compatibility of particular binder and aggregate combinations must be separately addressed in each asphalt and sprayed seal design, and application.







Transport  
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QA SPECIFICATION 3253

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# BITUMEN FOR PAVEMENTS

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## FOREWORD

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### REVISIONS TO PREVIOUS VERSION

This document has been revised from Specification TfNSW 3253 Edition 13 Revision 3.

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 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 Q 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**

Unless otherwise specified, 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 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 <sup>(6)</sup>                           | C240 <sup>(6)</sup> | C320 <sup>(6)</sup> | C450 <sup>(5,7)</sup> | C600 <sup>(6)</sup> | M500 <sup>(6)</sup> | M1000 <sup>(5)</sup> |             |
| Viscosity at 60°C                           | Pa.s              | AS/NZS 2341.2 <sup>(1)</sup>                  | 140 – 200           | 190 – 280           | 260 – 380             | Report              | 500 – 700           | 400 – 600            | Report      |
| Viscosity at 135°C                          | Pa.s              | AS 2341.3 <sup>(2)</sup>                      | 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 <sup>(3)</sup>                     | 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 <sup>(8)</sup> | Pa.s              | AS/NZS 2341.10 & AS/NZS 2341.2 <sup>(1)</sup> | –                   | –                   | 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 <sup>(3)</sup>    | –                   | –                   | 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 <sup>3</sup> | AS 2341.7                                     | Report              | Report              | Report                | Report              | Report              | Report               | Report      |
| Matter insoluble in toluene                 | % by mass         | AS/NZS 2341.20 <sup>(4)</sup>                 | 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 the Principal, or a minimum of 12 months after 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 Q. 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](mailto:pavements@rms.nsw.gov.au).

## 8.4 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 Q Annexure Q/E.

| <b>Clause</b> | <b>Description of Identified Record</b>              |
|---------------|--|
| 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 <sup>(1)</sup> |                     | Sampling Frequency   | Testing Frequency  |
|--|--|---------------------|--|--|
|  | C450                                   | Other Classes       |  |  |
| <b>For bitumen used in sprayed sealing or foam bitumen stabilisation</b> |  |                     |  |  |
| 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 <sup>(2, 3)</sup> | 1 per 200,000 litres (or part thereof)   |
| Penetration at 25°C 0.1 mm   |  |                     |  |  |
| <b>For bitumen used in asphaltting</b>                                   |  |                     |  |  |
| 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 <sup>(2)</sup> | The greater of:<br>1 per 500,000 litres (or part thereof);<br>or<br>1 per 3 months |
| Penetration at 25°C 0.1 mm   | 35 min                                 | As per Table 3253.1 |  |  |

**Legend:** min = minimum

**Notes:**

- <sup>(1)</sup> Conformity values shown are applicable only for testing of sample taken at point of delivery.  
<sup>(2)</sup> Samples are to be taken at the point of delivery.  
<sup>(3)</sup> 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 Q            Quality Management System

**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