



## Transverse Distribution by Fixed Pit Facility

### 1. Preface

This test method was prepared by the Bituminous Surfacing Working Group (BSWG) on behalf of the Austroads Pavements Task Force (PTF).

Representatives of Austroads, the Australian Road Research Board (ARRB), the National Association of Testing Authorities (NATA) and the Australian Asphalt Pavement Association (AAPA) have been involved in the development, review and update of this test method.

### 2. Scope

This test method is for bitumen sprayers as specified in AGPT/T530 *Calibration of bitumen sprayers: general introduction and list of methods*.

It sets out the procedures for determining the transverse distribution of bitumen sprayers, and is based on the approach of using a fixed pit facility capture system and a suitable calibration fluid.

### 3. Safety Disclaimer

**Warning:** The use of this Austroads test method may involve hazardous materials, operations and equipment. This Austroads test method does not purport to address the safety requirements associated with its use. It is the responsibility of the user of this Austroads test method to establish appropriate work health and safety practices and determine the applicability of regulatory limitations prior to use.

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## 4. References

The following documents are referred to in this method:

### **Austrroads**

AGPT/T530:            *Calibration of bitumen sprayers: general introduction and list of methods.*

AGPT/T536:            *Calibration of bitumen sprayers: viscosity of test fluid.*

## 5. Equipment

The following equipment is required:

### 5.1 Collection Device

Use a trough as specified in AGPT/T530.

### 5.2 Calibration Fluid

Use a calibration fluid as specified in AGPT/T536.

### 5.3 Timing Device

Use a timing device as specified in AGPT/T530.

## 6. Procedure

The following steps are to be followed to ensure a consistent approach to testing transverse distribution:

- (a) The spray nozzles should be mounted at the appropriate rotational angle and at the respective height above the trough for the duration of the test. Guidance may be sought from bitumen sprayer and/or nozzle manufacturers.
- (b) The spraybar should be positioned so that the full lateral width of spray is collected by the trough.
- (c) Timing of each test shall be of duration long enough to fill most trough segments to a minimum of 75% of their capacity, excepting those near the ends of the spraybar where reduced nozzle overlap reduces the sprayed volume.
- (d) During testing the volume of calibration fluid in the sprayer tank must not fall below 10% of its nominal capacity.
- (e) Variability in transverse distribution must conform to the specified limits given in Section 7.

### 6.1 Testing Procedure by Sprayer Type

#### 6.1.1 *Single Bar Sprayer*

The sprayer is tested at the full intended width of the spraybar for which certification is required, and at the specified output for the nozzles fitted.

### 6.1.2 Multiple Bar and/or Multiple Pump Sprayer

When a sprayer has multiple spraybars and/or multiple pumps, each spraybar and pump combination to be used in practice must be tested individually and independently.

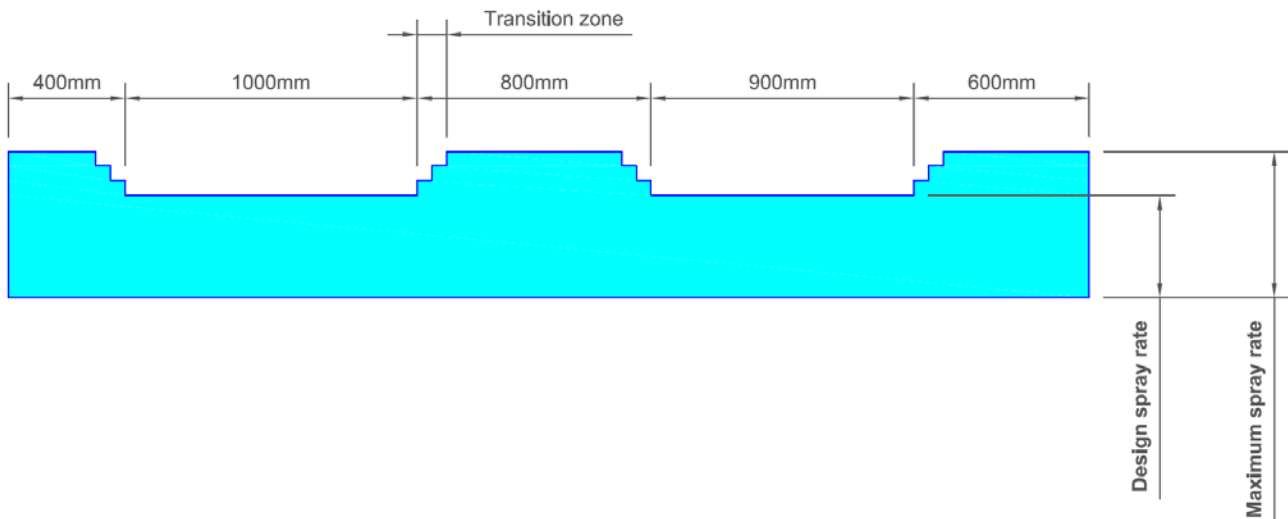
Each spraybar is to be tested at its full intended width for which certification is required and at the specified output for the nozzles fitted.

If the sprayer is required to provide both uniform transverse distribution and variable transverse distribution, the uniform distribution must be tested as specified in Section 6.1.1.

When seeking certification as a variable sprayer, the owner shall nominate the maximum and minimum spraybar widths for a typical variable spray pattern.

When spraying a variable pattern as shown in Figure 6.1, the sprayer owner shall nominate the ratio of maximum spray rate to the design spray rate (e.g. 120:100). This ratio is governed by the size of the nozzles fitted in the respective bars. If more than one ratio is required, a full suite of testing is required for each ratio.

**Figure 6.1: Example of a variable application rate spray pattern**



### 6.1.3 Telescoping Bar Sprayer

This section is applicable only to sprayers:

- that are fitted with telescoping spraybars
- where the telescoping spraybar position is infinitely adjustable between the nominated maximum and minimum spraybar widths
- that will continuously operate over the infinitely adjustable range of positions.

It is not applicable to telescoping bars that are adjustable in width increments equal to the nozzle spacing distance (e.g. 100 mm increments).

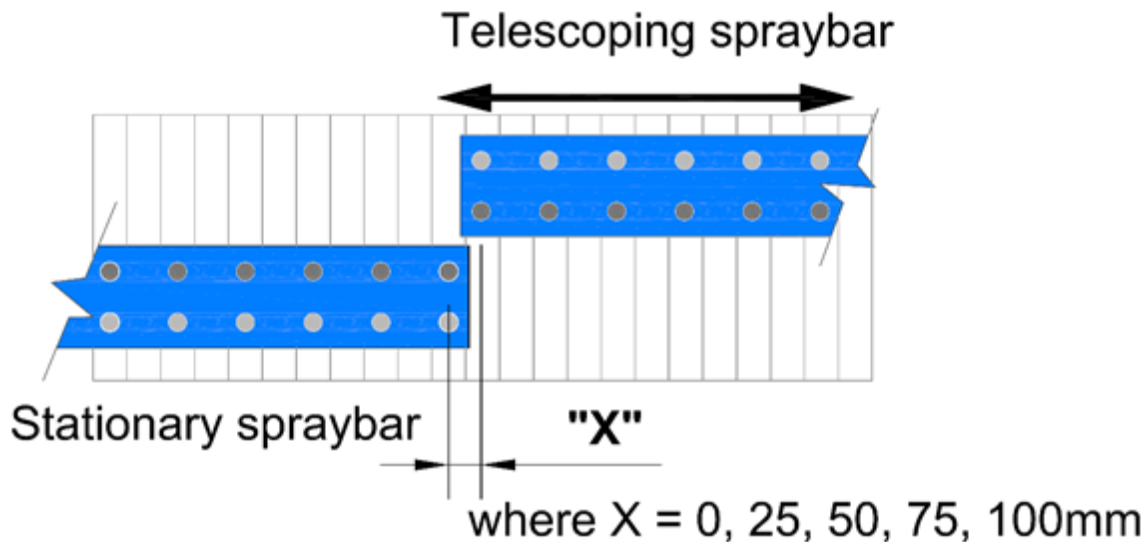
This test is to verify that the application rate remains within the prescribed limits in the vicinity of the emerging nozzles at the point of overlap of the two spraybar spray patterns. The test is to ensure that the spray rate in this transition zone is within the tolerance of  $\pm 10\%$  between the design and maximum application rates specified.

Where the overlap occurs within the area of the design spray rate then a test shall be performed using nozzles spraying at the design spray rate. Similarly, if the overlap occurs within the area of the maximum spray rate then a test shall be performed using nozzles spraying at the maximum spray rate. Hence two sets of tests may be required.

The test procedure for a telescoping bar sprayer is as follows:

- (a) Extend the spraybar to the full nominated maximum width.
- (b) Nominate one of the bars to be stationary for the purpose of the test.
- (c) Align the nozzle at the end of the stationary bar to overlap with the first nozzle on the telescoping bar, as shown in Figure 6.2 (for  $X = 0$  mm).
- (d) Perform the transverse distribution test.
- (e) Retract the telescopic spraybar by 25 mm ( $X = 25$  mm in Figure 6.2), and repeat the transverse distribution test.
- (f) Further retract the telescoping spraybar, repeating the transverse distribution test over the range of positions  $X = 50$  mm,  $X = 75$  mm and  $X = 100$  mm.
- (g) Repeat the tests when extending the spraybar in the reverse direction, at the range of positions  $X = 100$  mm,  $X = 75$  mm,  $X = 50$  mm and  $X = 25$  mm. This will give a second set of results.
- (h) For all test results, apply the test limits specified in Section 7.

**Figure 6.2: Telescoping test**



## 7. Acceptance Criteria

Any segment on the ends of the test trough that measures less than 80% of the average should not be included in the results. The effective spray width can be determined from the remaining width of the segments.

The following criteria must be met for all measurements of uniform and variable transverse distributions:

- (a) Any segment shall not exceed  $\pm 20\%$  of the average of all segments.
- (b) A maximum of two in any consecutive ten segments may exceed  $\pm 15\%$  of the average of all segments.
- (c) A maximum of four in any consecutive seven segments may exceed  $\pm 10\%$  of the average of all segments.

Up to three segments along each end of the effective width can be excluded when calculating the acceptance criteria.

## **8. Reporting**

It shall be reported whether the bitumen sprayer passes or fails the acceptance criteria.

The information recorded from the testing will be used by the testing facility in preparing a Sprayer Calibration Certificate, as per the requirements of AGPT/T530.

## Amendment Record

Amendment no.	Clauses amended	Action <sup>1</sup>	Date
1	Commentary page Footer and header Applied revised test method number Applied new styles	New Format Format Format	June 2005
2	Replace superseded Austrroads test method number	Substitution	June 2006
3	Footer and header Preface Scope Clauses 1–5	Substitution Substitution Substitution Substitution	February 2012
4	Preface Clauses 3–4	Substitution Substitution	September 2012
5	All	Substitution	October 2016
6	Safety Disclaimer	New	June 2018

### <sup>1</sup>Key

Format	Change in format
Substitution	Old clause removed and replaced with new clause
New	Insertion of new clause
Removed	Old clauses removed