

NZTA/NZRF T/8:2008

## SPECIFICATION FOR ROADMARKING APPLICATOR TESTING

### 1. SCOPE

This Specification describes technical, testing and certification requirements for mechanically controlled roadmarking paint applicators to be used for work in compliance with TNZ P/12 Specification for Pavement Marking and TNZ P/22 Specification for Reflectorised Pavement Marking.

### 2. PAVEMENT MARKING PERFORMANCE

The applicator is to be equipped such that it is capable of consistently achieving all of the requirements for both reflectorised and non-reflectorised painted pavement markings as specified by P/12 or P/22.

#### 2.1 Paint Application

The applicator shall be capable of producing clear definition and uniform spread of paint over every mark without the use of masking shields or their equivalent. The finished line shall be free from light spots, paint skin, stains and deleterious matter.

The line width and location tolerances are:

- (a) The applicator shall be capable of marking lines within a width tolerance as specified in P/12 or P/22, and
- (b) The applicator shall be capable of marking within the tolerances specified in P/12 or P/22 for location.

The applicator shall be capable of controlling paint application so that the finished dry film thickness of paint is as follows when demonstrating all paint line tests:

- (a) 180 nominal: No less than 150 microns, no greater than 210 microns
- (b) 220 nominal: No less than 190 microns, no greater than 250 microns
- (c) 300 nominal: No less than 270 microns, no greater than 330 microns.

#### 2.2 Glass Bead Application

The applicator shall be capable of producing uniform spread and embedment of glass beads over every mark without the use of masking shields or their equivalent. The finished line shall be free from variations in spread or embedment both across and along the length of the marking.

Intermittent markings are to be beaded for their entire length to within the tolerance specified by P/22.

The applicator shall be capable of controlling bead application so that the finished application rate is as follows when demonstrating all paint line tests with minimal waste at an application rate of:

- (a) 27.5 kg per km of continuous 100 mm wide paint marking
  - (b) 41.25 kg per km of continuous 150 mm wide paint marking
  - (c) 55 kg per km of continuous 200 mm wide paint marking,
- all within a tolerance of  $\pm 10\%$ .

### **2.3 Equipment Not Covered by This Specification**

Equipment used for hand spraying does not comply with this Specification. Any uncertified equipment e.g. handguns and/or paint trolleys attached or mounted on applicators at the time of testing will appear as an endorsement of the T/8 Certificate. The endorsement shall state that the respective equipment does not comply with this Specification.

## **3. REFERENCES**

AS/NZS 2009: Glass beads for roadmarking materials, Standards Australia

CoPTTM: The NZTA's New Zealand's Code of Practice for Temporary Traffic Management

TNZ M/7 : Specification for Roadmarking Paints, Transit New Zealand

TNZ P/12 : Specification for Pavement Marking, Transit New Zealand

TNZ P/22 : Specification for Reflectorised Pavement Marking, Transit New Zealand

## **4. DEFINITIONS**

*Applicator:* machine intended for the application of paint to a road surface

*Issuing Officer:* person with Registration Body authority as signatory for the issue of initial NZTA/NZRF T/8 Certificates (Initial T/8 Certificates)

*NZQA:* The New Zealand Qualifications Authority

*NZRF:* The New Zealand Roadmarkers Federation Inc.

*Registration Body:* Agency contracted by the NZTA to manage revision of the NZTA/NZRF T/8 Specification, approve Issuing Officers and maintain the T/8 Register for testing officers and applicators

*Roadmarker:* a trading organisation with responsibility for qualification of roadmarking paint applicators in compliance with this Specification

*Significant modification:* any modification that has a considerable and demonstrable effect, either positive or negative, on the performance of the applicator. Examples of such changes would include but not be limited to addition or removal of paint pumps, replacement of sources of power or pumps with equipment with a greater than 10% decrease in capacity.

*Testing Officer:* person with delegated authority to carry out inspections and testing of applicators

*NZTA:* The New Zealand Transport Agency

*NZTA/NZRF T/8 Audit:* (T/8 Audit) the examination and verification of a T/8 Testing Officers records by a person appointed by the T/8 Registrar

*NZTA/NZRF T/8 Certificate:* (T/8 Certificate) the "Roadmarking Paint Applicator Certificate of Compliance" issued in accordance with this Specification

*NZTA/NZRF T/8 Register:* (T/8 Register) the national listing of current T/8 certification status of registered roadmarking paint applicators

*Paint system types are defined as follows:*

<i>H.P. Airless</i>	Positive displacement paint pump with no atomising at spray gun
<i>L.P. Airless</i>	Pressurised paint tank with no atomising at the spray gun
<i>Conventional</i>	Pressurised paint tank with atomising air at the spray gun
<i>Extrusion</i>	Device that provides a ribbon of material directly onto road surface

## 5. PROCESS

When a new or previously uncertified roadmarking applicator is to be brought into service, an Issuing Officer first inspects the roadmarking applicator. If the specification and other requirements are met, an Initial T/8 Certificate shall be issued.

Thereafter, the Testing Officer, who may be an employee of the Roadmarker, shall regularly conduct paint applicator inspection and testing in accordance with this specification.

The Roadmarker is responsible for regularly submitting the paint applicator inspection and testing results for T/8 Certificate renewal.

Other responsibilities are outlined below.

## **6. RESPONSIBILITIES**

### **6.1 General**

While this NZTA specification describes the process of validation of the paint applicators it does not discharge the legal obligations of the owner / operator to maintain and operate it in compliance with New Zealand Law.

### **6.2 NZTA**

The NZTA is responsible for:

- Appointment of the agency to act on its behalf as the Registration Body
- Approval of this Specification
- Approval of Issuing Officers in consultation with the Registration Body.

### **6.3 Registration Body**

The Registration Body is responsible for:

- Development, implementation and review of this specification
- Approving Issuing Officers in consultation with the NZTA
- Maintaining the T/8 Register
- Registration of certificates
- Registration of T/8 Testing Officers
- Management of the T/8 Audit process, including the resolution of non-compliances.
- Providing for review of certification status where requested
- Provision of interpretations in consultation with the NZTA.

### **6.4 Roadmarker**

The Roadmarker is responsible for compliance of paint applicators with this Specification, including:

- Ensuring that the applicator complies with all of the requirements of the associated legislation
- Ensuring that the operation complies with the requirements of the NZTA requirements for temporary traffic control
- Provision of evidence of entry qualification for initial certification
- Engaging an Issuing Officer for initial certification of roadmarking applicators where required
- Selecting Testing Officers, whether in full time employ or on a contract basis, in compliance with this Specification

- Managing inspection and testing for annual certification in compliance with this Specification
- Managing associated activities for maintenance of compliance with this Specification
- Forwarding original certificate(s) to the T/8 Registration Body for registration
- Maintaining procedures and records relevant to this Specification, including records of T/8 Testing Officer qualifications, experience and approval, under a quality assurance system in compliance with NZTA requirements
- Advising the T/8 Registration Body of the disposal or decommissioning of a registered applicator.

### **6.5 Issuing Officer**

Issuing Officers are responsible for:

- Providing the inspection, testing and certification services under a quality assurance system certified to ISO 9001 or equivalent
- Inspection and testing of applicators in accordance with this Specification
- Issuing of Initial T/8 Certificates on satisfactory completion of testing
- Forwarding original certificate(s) to the T/8 Registration Body for registration

### **6.6 Testing Officer**

Testing Officers are responsible for:

- Conducting paint applicator inspection and testing in accordance with this Specification
- Recording results and renewing Certificates of Compliance in accordance with this Specification.

## **7. ISSUING AND TESTING OFFICER CRITERIA**

Applicators shall only be tested and certified by Issuing or Testing Officers who appear on the Register.

### **7.1 Competency Criteria**

The minimum competency criteria for Issuing and Testing Officers are:

- (a) Evidence, through appropriate technical and/or management expertise, of competency in the interpretation and application of technical specifications
- (b) Experience in plant and machinery operation
- (c) Understanding of inspection and testing principles
- (d) Familiarity with NZTA and Transit New Zealand roadmarking specifications
- (e) Training and competency in NZQA Unit Standards relating to NZTA and Transit New Zealand Paint Applicator Testing.

#### **7.1.1 Currency of Competency**

Issuing and Testing Officers who have carried out no T/8 testing over a period of five years, shall be removed from the register of Issuing or Testing Officers.

### **7.1.2 Contact Details**

Issuing and Testing officers shall keep the registration body advised of current contact details including postal and email address.

## **8. CERTIFICATION REQUIREMENTS**

### **8.1 General**

The T/8 Certificate provides evidence of compliance testing of roadmarking paint applicators against the requirements of this Specification.

### **8.2 Certificate requirements**

An electronic file version of the T/8 Certificate is available from the Registration Body Website and is to be used by all Issuing and Testing Officers.

The following information must be provided:

- (a) Confirmation of entry qualification in the case of an initial certificate, or the previous T/8 certificate number for the applicator in the case of a renewed certificate
- (b) Compliance details
- (c) Endorsements e.g.
  - a. additional equipment, or
  - b. dispensations
- (d) Date of expiry of certification as twelve months after the final on-site testing day, or twelve months after the day the current T/8 Certificate expires, if it expires within 30 days of the testing day
- (e) Photo which clearly identifies the applicator. A  $\frac{3}{4}$  view image taken from the front left hand side of the applicator in the case of a Type A applicator, or a photo showing application equipment in the case of a Type B applicator
- (f) Signature of Issuing or Testing Officer.

Note: The Certificate for all Type B Applicators which are incapable of marking turn arrows without the aid of a template shall be endorsed to show that arrows are to be painted using a template.

### **8.3 Certificate Validity**

T/8 Certification is valid only where:

- (a) Inspection, testing and certification procedures are conducted under a quality assurance system in compliance with NZTA requirements
- (b) Compliance with testing personnel criteria can be demonstrated
- (c) Certificates are completed and signed by an authorised person
- (d) Certificates have been registered with the T/8 Registration Body. This will be indicated by a stamp and the unique registration number issued by the Registration Body.
- (e) Appropriate records are maintained
- (f) Certificate is issued in the name of a legal entity.

- (g) The Testing Officer or Issuing Officer was not the operator of the applicator at the time of testing.

#### **8.4 Entry qualification**

A T/8 Certificate shall be issued only where the nominated roadmarking paint applicator meets specified criteria for entry qualification:

- (a) Initial T/8 Certification by an approved Issuing Officer.
- (b) New “Initial T/8 Certification” obtained after significant modifications to applicator.

#### **8.5 Initial T/8 certification**

Before an initial T/8 Certificate is issued the roadmarking paint applicator shall be demonstrated, inspected and tested at a suitable test site by, or under the direct control of, an Issuing Officer.

The Roadmarker shall arrange the engagement of a person currently authorised by the T/8 Registration Body as an Issuing Officer for the purposes of initial certification.

The operator shall be provided by the Roadmarker to produce the markings required for the tests.

The Issuing Officer may require additional tests be carried out to check compliance with this Specification. Under such circumstances the Registration Body requires a brief report covering the amended procedure and reasons for its adoption.

In the event of an applicator failing to comply with test criteria, the Issuing Officer shall arrange to inform the Roadmarker in writing and within one month supply copies of the test and inspection results. Where there is a significant delay in scheduling of continuation of testing, the Issuing Officer is to advise the T/8 Registration Body.

Where compliance with this Specification is confirmed, the Issuing Officer shall complete the T/8 Certificate in accordance with the requirements of this Specification.

#### **8.6 Maintenance of compliance**

The Roadmarker is responsible for the maintenance of compliance of roadmarking paint applicators.

Once entry qualification criteria have been met, the Roadmarker may maintain T/8 certification in compliance with this Specification on either an internal or external testing basis.

Testing for maintenance of compliance comprises:

### **8.6.1 Renewal of T/8 Certificates**

Renewal of certificates requires demonstration of applicator compliance with this Specification. The roadmarking paint applicator shall be demonstrated, inspected and tested at a suitable test site by an appropriately qualified Testing Officer. The inspection and test procedures shall be performed in accordance with appropriate checklists.

Where compliance with this Specification is confirmed, the Testing Officer shall complete the T/8 Certificate in accordance with the requirements of this Specification.

### **8.6.2 Confirmation of compliance**

Regular tests for compliance with the Specification are to be carried out under the Roadmarker's quality assurance programme.

As a minimum, one set of tests shall be carried out at approximately six months from the issue date of a Certificate. In addition, appropriate tests shall be carried out following significant applicator modifications which may affect compliance with this Specification.

The tests for confirmation of compliance shall be sufficient to demonstrate the range of applicator capabilities required by the Specification. Modifications may be made to the specified tests, provided that the modified tests and records are documented.

### **8.7 Currency of Certification**

Any applicator that has not been re-certified within a period of two (2) years from the expiry date of the last T/8 certificate shall require a T/8 Audit at time of recertification.

### **8.8 Transfer of plant to new cab and chassis**

Where application equipment has been transferred from one cab and chassis to another, T/8 certification is required and this will be subject to T/8 Audit.

### **8.9 Cancelled applicators**

Where an applicator has been written off or has been withdrawn from certification the Roadmarker shall advise the registration body within three (3) months.



## **9. REGISTRATION AND REVIEW OF T/8 CERTIFICATES**

### **9.1 Register**

A register of T/8 Certificates shall be maintained by the Registration Body.

The T/8 Register can be obtained from the Registration Body's Website.

Roadmarkers shall submit the original T/8 Certificate for entry into, or updating of, the Register. The Roadmarker is responsible for ensuring the validity of such Certificates.

The T/8 Registration Body is to register the valid certificates received. A stamp and unique form of numbering is to be used to indicate registration on the original before returning to the Roadmarker.

All applicators will remain on the T/8 Register, whether with current certification or expired, until advice of its disposal is received from the owner.

### **9.2 T/8 Audit**

The T/8 Registration Body is required to facilitate audits of T/8 Testing Officers at a frequency determined in consultation with the NZTA.

The Auditor will be selected on the basis of T/8 testing and auditing experience and independence.

The Testing Officer selected for audit at the time of re-registration of their certificate(s) is to be advised in writing that they have five (5) working days to provide all records relating to the testing related to the certificate. Proof of the latest confirmation of compliance testing is also required.

The results are to be couriered to the T/8 Registration Body, or nominated Auditor. Courier costs are the Roadmarkers responsibility.

On receipt of the test records the Auditor is to conduct an audit and provide a report to the Registration Body which identifies any and all non-compliances.

The T/8 Registration Body is to advise the T/8 Testing Officer of the audit findings and to facilitate effective close-out of the identified non-compliances. The related T/8 Certificate(s) will not be registered until the non-compliances have been closed-out. Costs related to the close-out of the non-compliances are the Roadmarkers responsibility.

### **9.3 T/8 Review**

Interested parties may submit requests in writing to the T/8 Registration Body for review of the validity of nominated T/8 Certifications. Such requests are to be based on reasonable grounds.

In the event of a request for review, the Registration Body shall advise the relevant Roadmarker to provide copies of records related to initial certification and/or the current T/8 Certificate to the Registration Body.

#### **9.4 Audit and Review Non-Compliances**

The NZTA are to be advised by the T/8 Registration Body of any non-compliances identified by audits or review. The T/8 Registration Body will, in consultation with the NZTA, identify the appropriate corrective actions required. All costs resulting from the identified non-compliance are to be borne by the Roadmarker.

Where a Roadmarker fails to provide adequate records to substantiate compliance with T/8 certification requirements, the relevant certification record or records shall be removed from the T/8 Register and relevant authorities advised in writing.

Where a Certificate record is removed from the Register as a result of a review or audit, the removal shall be recorded on the T/8 Register until the expiry date of the relevant Certificate. Records of non-current certification shall be maintained by the T/8 Registration Body.

### **10. STATUTORY AND REGULATORY REQUIREMENTS**

The Roadmarker shall ensure that the applicator complies with all of the requirements of the appropriate legislation, regulations and associated Codes of Practice.

#### **10.1 Compliance with the Health and Safety in Employment Act and Regulations**

The Roadmarker shall ensure that the applicator complies with all of the requirements of the HSE Act 1992 and associated legislation, and relevant Transport Regulations including but not limited to the following:

- (a) All pressure equipment is compliant with the requirements of the Health and Safety in Employment (Pressure Equipment, Cranes, and Passenger Ropeways) Regulations 1999. The Hazard Rating carried out in accordance with AS4343 is to be current.
- (b) The exhausts of all motors on the applicator or pre-heater shall be directed such that fumes do not reach driver or operator. There shall be no danger of exhaust sparks or equipment above the auto ignition temperature coming into contact with thinners or other flammable vapours.
- (c) All operating positions, catwalks and ladders shall be of adequate size and design for the security of operators, shall as far as possible be of non-skid construction and provide safe, convenient access to ground level.
- (d) The fire control equipment meets the national and local authority requirements.

## **10.2 Compliance with the Hazardous Substances and New Organisms Act and Regulations**

The Roadmarker shall ensure that all vessels and systems associated with the storage, carriage and application of hazardous substances on the applicator complies with all of the requirements of the Hazardous Substances and New Organisms Act, Resource Management Act and associated legislation, including but not limited to:

- (a) Vehicle and storage vessels are to be appropriately signed and or placarded
- (b) Emergency Procedures are to be appropriate to the materials being handled and readily available
- (c) Spill Response and Containment Kits are to be appropriate to the materials being handled and readily available.

## **10.3 Compliance with Transport Regulations**

The Roadmarker shall ensure that the applicator complies with all of the requirements of the Land Transport Act 1998 and relevant Transport Regulations including but not limited to the following:

- (a) Possess current registration
- (b) Possess current and valid Warrant of Fitness or Certificate of Fitness as appropriate
- (c) Possess current and valid Transport Service Licence
- (d) Requirements for the carriage of Dangerous Goods is complied with regards to Dangerous Goods signage and availability of Dangerous Goods Information.

# **11. TECHNICAL REQUIREMENTS**

## **11.1 Applicator Type**

Applicators shall be either Type A or Type B.

### **11.1.1 Type A Applicators**

Type A applicators shall be suitable for the longer run markings normally applied to state highways such as edge lines, centre lines etc.

### **11.1.2 Type B Applicators**

Type B applicators shall be suitable for minor markings such as arrows, limit lines, alphabetic characters, diagonal hatching, 33 m centre line before limit lines etc.

There is a variety of styles of Type B applicators, including Operator Mounted and Pedestrian Controlled.

For the purpose of the T/8 methods of test, the subcategories of Type B applicators are:

- (a) "Umbilical Applicator": an umbilical applicator is a Pedestrian Controlled Type B applicator that draws its paint and/or power from a remote source, termed the mother vehicle. The mechanism containing the spray guns etc is called the applicator trolley.
- (b) "Type B1 Applicator": Type B1 applicators are operator mounted Type B applicators, that are suitable for applying all minor markings as required for Type B applicators, but also capable of applying longitudinal markings, such as edge lines, centre lines, etc.

## **11.2 Identification**

All applicators, associated paint application and safety related items are to be appropriately identifiable.

### **11.2.1 Chassis Numbers**

All applicators shall have a chassis number. For registered motor vehicles the chassis number shall be the chassis number recorded on the certificate of registration of the motor vehicle.

The chassis number shall be:

- (a) Permanently stamped or engraved into the chassis of the applicator;
- (b) Readily visible, clean and legible;
- (c) There shall be only one chassis number on the vehicle.

### **11.2.2 Equipment Serial Numbers**

Each paint pump and compressor shall have a serial number on it. The paint pump or compressor serial number shall be either the manufacturer's number where this uniquely identifies the paint pump or compressor or a number allocated by the Roadmarker or Testing Officer.

## **11.3 Requirements for All Applicators**

### **11.3.1 Power and Control**

The applicator shall have sufficient power and controls so that the uniform speeds required can be held on grades varying between + 12% and - 12% when fully laden. The speed shall not vary by more than  $\pm 10\%$  of each nominated marking speed when tested on varying grades and in varying directions.

### **11.3.2 Instruments and Controls**

All valves, controls and instruments shall be convenient to the driver and/or operator and clearly marked so that any predetermined application rate or line width can be accurately selected.

The applicator shall be fitted with a road speed indicator, marked with a serial number. The road speed indicator shall be positioned near the driver's line of sight to the guide arm so as to be read by the driver without parallax error.

The road speed indicator shall be accurate to within 10% over the normal operating speed range and be free of significant flutter at steady speeds. Analogue indicator scales shall be marked in increments with a minimum spacing of 3 mm representing a change in speed of not more than 5% of the slowest marking speed. Digital readout devices shall be readable to 5% of the slowest marking speed.

The instruments necessary for control of the system shall be readily removable for repair and calibration.

### **11.3.3 Paint and Bead Application Devices**

All applicators shall be fitted with a glass bead dispenser to ensure optimal embedment of the beads into the paint. If necessary, adjustable time delays shall be used to ensure that all markings are fully beaded without gaps or wastage.

All applicators shall have spray guns and bead dispensers mounted so that the distance to the road from the spray guns etc remains constant during painting and variations in load on the applicator.

### **11.3.4 Segmented Line Equipment**

All applicators, with the exception of Umbilical Type B applicators shall be capable of automatically producing segmented lines. The maximum permitted dimensional tolerances shall be in accordance with P/12 or P/22.

### **11.3.5 Paint Tanks**

Applicators shall have a system that ensures that paint may be diluted or modified in accordance with the paint manufacturer's instructions.

Applicators equipped with paint supply tanks exceeding 20 litres paint capacity shall have an accurate method of gauging in litres the quantity of paint in each paint tank. This method shall be described in the Roadmarker's Quality Assurance procedures.

### **11.3.6 Traffic Management Equipment**

The applicator and all support vehicles working with the applicator shall have facilities for intercommunication, warning devices and signs that comply with NZTA requirements for temporary traffic management. Compliance is to be judged against a Temporary Management Plan produced and approved in accordance with current NZTA requirements.

## **11.4 Additional requirements for Type A paint applicators**

### **11.4.1 Direction of Travel**

The applicator shall be capable of producing all longitudinal markings along the road without travelling against the normal flow of traffic.

The applicator shall be equipped with dual control systems to enable the operator to steer and in all ways control the vehicle from the left and right sides of the cab during marking operations.

### **11.4.2 Guide Arms**

The applicator shall be equipped with a suitable guide to assist the driver in following the correct line. The guide arm shall be mounted or mountable on both sides of the vehicle, and in view of the driver from the normal driving position.

### **11.4.3 Cleaning Equipment**

The applicator shall have cleaning equipment which shall be capable of removing dust and fine detritus from the test area in advance of paint application.

The applicator shall be capable of having the pavement cleaning equipment in operation continuously during roadmarking operation.

## **11.5 Additional requirements for Type B paint applicators**

### **11.5.1 Applicator Length**

All Type B and Type B1 applicators shall have an overall length less than 2.5m.

For umbilical applicators this requirement shall apply to the applicator trolley only.

### **11.5.2 Applicator Power**

All Type B and Type B1 applicators, excluding Type B umbilical applicators, shall be motorised so that the operating speed is reached from a standing start in less than 0.7 m on level ground.

### **11.5.3 Transverse Line Ability**

All Type B and Type B1 applicators shall be capable of marking transverse lines (e.g. limit lines) to within 300 mm of the edge of a kerb or island. The standard kerb shall be assumed to be 150 mm high with the distance from the front face to the nearest obstruction 1.0 m.

### **11.5.4 Turn Arrow Ability**

All Type B and B1 applicators shall be capable of painting turn lane arrows.

## **11.6 Additional requirements for Type B1 paint applicators**

### **11.6.1 General**

Type B1 applicators are operator mounted and suitable for applying all minor markings as required for Type B applicators but also capable of applying longitudinal markings, such as edge lines, centre lines, etc.

### **11.6.2 Direction of Operation**

The applicator shall be capable of producing all longitudinal markings along the road without travelling against the normal flow of traffic.

### **11.6.3 Guide Arms**

The applicator shall be equipped with an appropriate guide to assist the driver in following the correct line. The guide shall be mounted or mountable on both sides of the vehicle, and in view of the driver from his normal driving position.

### **11.6.4 Cleaning Equipment**

The applicator shall have cleaning equipment which shall be capable of removing dust and fine detritus from the pavement in advance of paint application.

The applicator shall be capable of having the pavement cleaning equipment in operation continuously during roadmarking operation.

## **11.7 Additional requirements for Umbilical Type B paint applicators**

### **11.7.1 General**

For an umbilical type B applicator, as defined in clause 10.1.2 (b) the mother vehicle, the connecting hoses or lines, and the applicator trolley are all part of the applicator. Full details of the equipment are to be recorded and be included on the certificate as appropriate.

Where an applicator trolley is required to work from more than one mother vehicle, all mother vehicles must be presented for testing. Where the alternative mother vehicle is identical and has a valid certificate of compliance further testing may not be required.

If the mother vehicle is to serve more than one applicator trolley simultaneously then the applicator shall be tested with all the applicator trolleys working simultaneously.

**Notes:** An umbilical Type B applicator does not need to:

1. Be powered
2. Have the ability to automatically apply segmented lines.

### **11.7.2 Stability and Marking Ability**

The umbilical applicator shall have the ability to maintain a stable marking position.

### **11.7.3 Supply Hose Control**

The connecting hoses shall be controlled so that they run out freely without kinking or snagging and do not drag over the freshly painted surface.

## **12. METHODS OF TEST**

### **12.1 Inspection and test procedure**

The inspection and test procedure is divided into two phases, a visual inspection and demonstration of specified non-painting operations, followed by a demonstration of paint application and associated features.

Where either the Roadmarker or Testing Officer considers that additional inspection and test procedures are required to establish compliance of an applicator with the Specification, the special requirements and additional inspection and test procedures shall be recorded.

### **12.2 Visual inspection**

At the start of testing, the Testing Officer makes a visual inspection of the applicator, records relevant details and observes non-painting operation of the applicator.

The records of this inspection are to be made on the T/8 checklist available from the Registration Body Website.

### **12.3 Demonstration of line application**

The Testing Officer shall only proceed with the testing of the applicators ability to apply the specified materials at the specified application rates following satisfactory completion of the visual examination.

The Roadmarker is to specify the application rate chosen for the test. The application rate cannot be altered without restarting the application tests.



### 12.3.1 Application materials

The paint used shall have TNZ M/7 Specification approval.

Beads shall comply with AS/NZS 2009.

Thinners, when used, shall be in accordance with the paint manufacturer's instructions.

Paint to be used for the tests shall be made available for checking in unopened containers at the time of the initial test. The applicant shall cooperate with the Testing Officer to enable checking of brand, batch number, thinners added etc.

### 12.3.2 Test Site

The test site shall be provided by the Roadmarker, who shall provide proof of authority to mark the test site.

The test site shall have a surface of chip-seal, concrete, or similar pavement material. All materials shall be supplied by the Roadmarker.

The test site is marked with a test strip which is a straight line either 33 m or 50 m long with start and stop positions marked with transverse lines as shown in Figure 1.

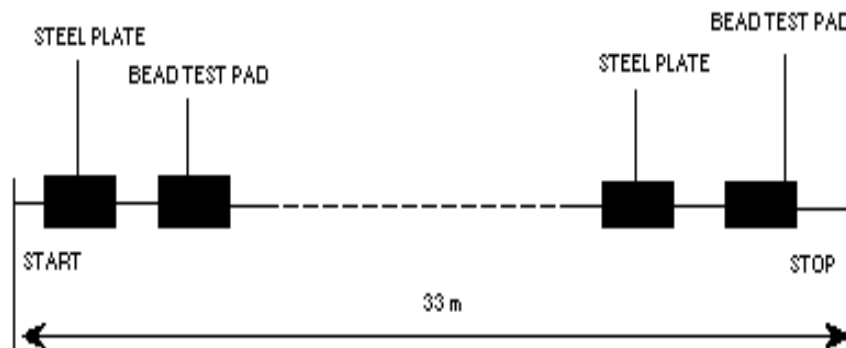


Figure 1: Test Site Layout

The plates and bead test pads shall be within 1.5 m of the relevant start and stop positions.

Where applicator speeds are in excess of 10 km/hr the length of the test track may be increased to 50 m.

### 12.3.3 Test Requirements

For both Type A and Type B1 applicators at least one test line shall be painted on the other side of the applicator.

Where an applicator employs more than one paint system then at least one test type shall be run on each separate system.

In order for the applicator to meet the requirements the total number of test runs of all test types must not exceed 20 for a Type A or a Type B1 and 15 for a Type B applicator.

The operator shall nominate in which order they wish to complete Tests One to Four.

The operator is to nominate the speed at which the vehicle will do each test. It is a requirement for all tests that the speed of the applicator be uniform and at the speed nominated.

The applicator shall be charged with a minimum of 20 litres of paint.

### 12.3.4 Test One (All Applicators)

In test one the operator will demonstrate the applicator's ability to pass the cleaning test (if required) while marking a line of nominated thickness, and 150 mm wide.

Two bead test pads or alternative material as approved by the Issuing Officer and two steel plates are placed on the test strip as shown in Figure 1.

The stop end bead test pad is covered with 125 grams of sand spread evenly over an area of 500 mm x 150 mm (Type A and B1 only).

The applicator shall paint the full length of the test strip.

The criteria for passing the test are:

- (a) The applicator must pass the cleaning test (Type A and Type B1 only)
- (b) The marking on the steel plates must meet the requirements for width, film thickness, paint surface texture, edge definition and splatter.
- (c) The marking must not exhibit any signs of abnormal paint application pattern.

### 12.3.5 Test Two (All Applicators)

In test two the operator is required to demonstrate the applicator's ability to paint a straight continuous line of nominated thickness, and 100 mm wide.

An offset straight datum line is marked for the entire length of the test strip.

A steel plate is laid at each end of the test strip.

The applicator shall paint the full length of the test strip.

The criteria for passing the test are:

- (a) The average centre-line of the marked line must not deviate from the datum line by more than that allowed for in the tolerances for location and dimension as specified in P/12 or P/22.
- (b) The marking on the steel plates must meet the requirements for width, film thickness, paint surface texture, edge definition and splatter.
- (c) The marking must not exhibit any signs of abnormal paint application pattern.

### 12.3.6 Test Three – (All Applicators except Umbilical Type B)

In test three the operator is required to demonstrate the applicator's ability to automatically mark a beaded segmented line of nominated pattern (e.g. 3 m line, 7 m gap) of nominated thickness, and 100 mm wide.

A steel plate is laid at the start of the test strip. A section of heavy craft paper or similar is placed at approximately 3.5 m prior to the stop line.

The applicator is required to mark a segmented line for the full length of the test strip with the first stripe (unbeaded) commencing immediately after the start line and at least one stripe beaded.

The criteria for passing the test are:

- (a) The gap length between segments and the segment length shall be within the dimensional tolerances as specified in P/12 or P/22.
- (b) The marking on the steel plates must meet the requirements for width, film thickness, paint surface texture, edge definition and splatter.
- (c) The marking must not exhibit any signs of abnormal paint application pattern.
- (d) The beaded stripe shall exhibit a bead start point of no more than 150 mm after the commencement of the stripe, and if the beading finishes before the end of the stripe, a bead end point of no more than 150 mm from the end of the stripe. Evidence of compliance shall be retained.

### **12.3.7 Test Four (All Applicators)**

In test four the operator is required to demonstrate the applicator's ability to mark a reflectorised line of nominated thickness, and 200 mm wide.

Two bead test pads and two steel plates are placed on the test strip as shown in Figure 1.

The applicator shall paint the full length of the test strip applying drop-on beads to the second bead test pad and steel plate only.

The criteria for passing the test are:

- (a) The quantity, spread, wastage and depth of penetration of the beads conforms with section 14.1.2(b) of this specification.
- (b) The marking on the start end plate must meet the requirements for width, film thickness, paint surface texture, edge definition and splatter.
- (c) The marking must not exhibit any signs of abnormal paint application pattern.

### **12.4 Demonstration of power and control**

The applicator shall have sufficient power and controls so that the uniform speeds required can be held on grades varying between + 12% - 12% when fully laden.

The ability of the applicator to maintain marking speeds to within 10% of nominated marking speed shall be tested over a course or section of road that varies between +12% and -12% grade. The indicated speed shall lie between the upper and lower limits of the nominated speed over the full test distance. The highest and lowest nominated marking speeds shall be demonstrated.

### **12.5 Demonstration of ability to paint turn arrow (Type B applicators only)**

The applicator shall be capable of painting both right and left turn lane arrows in accordance with the requirements of the Traffic Control Devices Rule and P/12 or P/22 Specification. The direction of the arrow to be demonstrated is to be specified by the Testing Officer.

Specific criteria for passing the test are:

- (a) The arrow dimensions must be within the tolerances specified in P/12 or P/22 for location of the specified setting out dimensions;
- (b) The applicator must not track over any part of the painted surface during the application of paint;
- (c) The arrow must meet the Specification requirements for paint surface texture, edge definition and splatter.

Note: The Certificate for all Type B Applicators which are incapable of marking turn arrows without the aid of a template shall be endorsed to show that arrows are to be painted using a template.

### **12.6 Additional tests**

The Issuing Officer or Testing Officer may require additional tests to be carried out to check compliance with this Specification.

### **12.7 Verification of results**

The results of the testing determined by the Testing Officer shall be verified by a person, independent of the testing, who has sufficient knowledge and experience to enable adequate review of calculation and determination of findings.

Records of the verification are to be maintained.

## **13. RECORDS**

### **13.1 Test plate and bead test pad identification**

Test plates and bead test pads shall be permanently identified such that traceability to the following is maintained:

- Applicator
- Test date
- T/8 test number
- Run number for the particular test
- Start or End test plate
- Start or End test pad.

### **13.2 Test records**

Records of T/8 testing shall be uniquely identified in a manner such that they are readily traceable to the particular tests conducted, including:

- Applicator
- Date of testing
- Tests conducted
- Issuing or Testing Officer
- Location

T/8 Certification records shall include as a minimum:

- Completed T/8 checklists
- Test plates and bead test pads
- Records of materials used
- Records of test runs, including test runs producing non-complying test results

- Copy of T/8 Certificates
- Records of special applicator requirements and additional inspection and test procedures.

### **13.3 Retention and access**

The Issuing Officer shall retain records pertaining to initial certification testing.

The Roadmarker shall be responsible for all records conducted by Testing Officers.

Test plates and bead test pads for certification shall be retained for a minimum period of twelve months.

Other test plates and bead test pads related to maintaining compliance with T/8 Certificates shall be retained by the Roadmarker for at least two (2) years.

Records shall be readily accessible, so as to be available for client surveillance or auditing purposes.

T/8 records constitute part of Roadmarker quality records and as such shall be made available to third party auditors conducting quality system certification assessments.

## **14. TEST MEASUREMENT REQUIREMENTS**

### **14.1 Measurement methods**

The following measurement methods shall be applied in testing compliance of roadmarking paint applicators in accordance with this Specification.

#### **14.1.1 Paint application tests**

##### **(a) required performance capability**

The applicator shall be capable of controlling paint application so that the finished dry film thickness of paint is as follows when demonstrating all paint line tests:

- 180 nominal: No less than 150 microns, no greater than 210 microns
- 220 nominal: No less than 190 microns, no greater than 250 microns
- 300 nominal: No less than 270 microns, no greater than 330 microns.

The application rate must be nominated by the road marker prior to the commencement of the test.

##### **(b) acceptance criteria**

The finished dry film thickness of paint shall be within the parameters specified above when demonstrating all paint line application work.

The finished lines shall be free from thin areas, paint skin, stains and deleterious matter.

Paint film surface texture, edge definition and splatter will be judged acceptable or otherwise by reference to the Specification requirements.

**(c) apparatus required**

The paint film thickness shall be measured with a non-destructive thickness gauge. Suitable gauges are Elcometer 256, Elcometer 300 or similar. The thickness gauge shall meet the following minimum requirements:

- (i) Accuracy of  $\pm 3\%$  in the range of thicknesses being tested when calibrated at zero and either end of the range
- (ii) The probe tip shall be hemispherical and have a maximum diameter of 2 mm  $\pm 0.2$  mm.

Paint film instruments shall be calibrated with standard shims having calibration traceable to National Standards and with a range of values relevant to the expected film thickness being measured.

**(d) test materials**

Test Plates: flat electro-galvanised steel plates, at least 0.6 mm thick, 150 mm long and at least 50 mm wider than the nominal width to be tested.

The surface of the plates shall be clean and in as new condition, i.e. free from dents scratches, rust and significant variations in coating thickness.

**(e) procedure**

Test plates shall be placed on the pavement surface centrally over the line of the proposed marking and sprayed with paint as part of a paint application run.

Prior to drying the paint film shall not be disturbed by the use of wet film gauges or similar devices.

To reduce time between spraying and measurement of the paint film thickness, the Roadmarker may heat the plates. The plates shall not be heated above 50°C.

When the paint surface is sufficiently hard, the Testing Officer shall measure and record the average dry film thickness along each zone on the test plate. Paint thickness criteria must be met by each zone average for the plate to pass the test.

The paint film thickness instrument shall be used in accordance with the manufacturer's recommendations.

**(f) calculation and reporting**

The average dry film thickness shall be determined from at least 20 readings taken along each zone on the test plate. The average value for each zone shall be recorded.

A measurement zone is the area of the plate within 5 mm of a straight line, drawn lightly with a soft pencil on the painted surface of the test plate, in the direction of applicator travel. The centre zone shall be established by bisecting the paint line. The outer zones are established by drawing parallel lines to the centre zone at the following mandatory positions:

<u>Line width</u>	<u>Zone separation</u>
100 mm	35 mm
150 mm	60 mm
200 mm	80 mm

Where there is visual evidence of uneven paint distribution across the paint line profile, the Testing Officer shall select additional zones between the inner and outer zones to be tested. Where the average dry film thickness in such additional zones does not meet the acceptance criteria, the test plate shall be rejected.

#### **14.1.2 Bead application tests**

##### **(a) required performance capability**

The bead application equipment shall be capable of producing a uniform coverage of painted marks with minimal waste at an application rate of:

- (i) 27.5 kg per km of continuous 100 mm wide paint marking
- (ii) 41.25 kg per km of continuous 150 mm wide paint marking
- (iii) 55 kg per km of continuous 200 mm wide paint marking

all within a tolerance of  $\pm 10\%$ .

##### **(b) acceptance criteria**

Test pads shall not exhibit disturbed paint or bead application.

The beaded test pad and test plate shall exhibit a uniform spread of beads both across the line width and in the longitudinal direction.

The beads are embedded in such a manner as to provide optimum retroreflectivity. As a visual guide, at least 50% of the beads are to be embedded in the paint to approximately 60% of their diameter. Comparative retroreflectivity tests are required in cases where embedment is considered to be such that optimum retroreflectivity is achieved.

The calculated bead application rate for a 200 mm nominal line width shall be with the range of 49.5 to 60.5 kg per km.



**(c) apparatus required**

The bead application rate shall be determined with a balance with an accuracy of  $\pm 0.1$  gram in the range of 10 to 70 grams.

**(d) test materials**

Bead Test Pads: 6 mm thick low density ( $33 \text{ kg/m}^3$ ) expanded cross-linked polyethylene foam pads measuring 300 mm by 500 mm. Pads to be cut to the 500 mm length to within 2 mm.

Note: Material may be sourced from Dunlop Flexible Foams as "6 mm LD33" in a variety of colours.

The pads shall be clean and free of paint, holes or surface imperfections.

Test Plates: Flat electro-galvanised steel plates, at least 0.6 mm thick, 150 mm long and at least 50 mm wider than the nominal width to be tested.

The surface of the plates shall be sufficiently clean to facilitate paint and bead adhesion.

**(e) procedure**

The application rate of beads shall be calculated by spraying paint only and paint plus beads on to separate weighed sheets of Bead Test Pad in one paint application run with speed and paint application maintained at a constant rate.

The weights of two bead test pads are determined prior to positioning on test site in accordance with Figure 1.

The balance must be set up level, in an area which is free from draughts and/or vibration.

Note: Even small draughts have a significant effect on the bead test pads due to their size and density.

The bead test pads shall be securely attached such that the entire length of the pad remains uncovered and available for paint and bead application. If nails or similar are used, they shall be positioned where they will not be covered with paint.

Bead test pads exhibiting disturbed paint and/or bead surfaces shall be rejected.

Following paint and bead application the test plates and bead test pads are retrieved without disturbing either paint or beads.

The weights of the two bead test pads shall not be determined until the paint is completely dry.

The bead application rate shall be obtained from the weight of beads adhering to the Bead Test Pad after inverting and tapping lightly several times.

The test plates and bead test pads shall be examined for uniformity of bead distribution.

**(f) calculation and reporting**

The weight of 500 mm of paint line is determined by subtracting the unpainted weight of the unbeaded test pad from the dry painted weight of the test pad.

The weight of 500 mm of beaded paint line is determined by subtracting the unpainted weight of the beaded test pad from the dry painted weight of the test pad.

The bead application rate for 500 mm is determined by subtracting the weight of 500 mm of paint line from 500 mm of beaded paint line.

The application rate per kilometre of marking is determined by multiplying the application rate for 500 mm by 2000.

The resultant value is compared with the acceptance criteria. Complying value is to be recorded.

The conformance of uniformity of spread and embedment is to be recorded.

**14.1.3 Intermittent bead application tests**

**(a) required performance capability**

The bead application equipment shall be capable of producing a uniform coverage of painted intermittent markings for their entire length with minimal waste.

**(b) acceptance criteria**

Test samples or photographs shall not exhibit disturbed paint or bead application.

The beaded stripe shall exhibit a bead start point of no more than 150 mm after the commencement of the stripe, and if the beading finishes before the end of the stripe, a bead end point of no more than 150 mm from the end of the stripe.

**(c) apparatus required**

Steel rule having the required accuracy.

Note: Steel rules manufactured in accordance with British Standards and Japanese Industrial Standards (JIS) meet these requirements.

**(d) test materials**

A variety of materials may be used to record the bead delay i.e.:

1. Test Pads: 6 mm thick low density ( $33 \text{ kg/m}^3$ ) expanded cross-linked polyethylene foam pads measuring 300 mm by 500 mm.
2. Heavy construction paper

3. Test Plates: Flat electro-galvanised steel plates, at least 0.6 mm thick, 150 mm long and at least 50 mm wider than the nominal width to be tested.

The surface of the material shall be sufficiently clean to facilitate paint and bead adhesion.

**(e) procedure**

The delay of application of beads onto intermittent lines shall be determined by spraying paint plus beads on to a clean surface in one paint application run with speed and paint application maintained at a constant rate.

The test surface shall be securely attached such that the entire length of the material remains uncovered and available for paint and bead application. If nails or similar are used, they shall be positioned where they will not be covered with paint.

Test surfaces exhibiting disturbed paint and/or bead surfaces shall be rejected.

Following paint and bead application the test surface is retrieved without disturbing either paint or beads.

The bead delay shall be obtained by measuring the distance from the commencement of the painted marking and the point at which the beads are consistently and uniformly embedded into the paint.

**(f) calculation and reporting**

The resultant value is compared with the acceptance criteria. Complying value is to be recorded.

The conformance of uniformity of spread and embedment is to be recorded.

Evidence of compliance shall be retained. This could either be photographic evidence or a retained sample of marking on test pad, construction paper or test plate or similar.

**14.1.4 Cleaning tests - Type A and B1 applicators only**

**(a) required performance capability**

The applicator shall be capable of removing 125 grams of silica sand from an area of 500 mm by 150 mm of pavement while marking. To pass the test the applicator shall remove the sand while painting the required marking such that no sand remains beneath or within the paint film.

**(b) acceptance criteria**

The dried pad shall not exhibit:

- sand remaining trapped in the paint

- indication of discontinuities in painted surface due to loose sand being removed after paint application

**(c) apparatus required**

The weight of sand shall be determined with a balance with an accuracy of  $\pm 1$  gram in the range of 100 to 150 grams.

**(d) test materials**

Silica sand weighed into 125 gram lots.

Bead test pad (see following measurement method) or alternative material having similar surface texture characteristics.

Note: The reverse side of rejected test pads from the bead application test may be used for the sand clean test.

**(e) procedure**

The bead test pad or alternative is securely fastened to the test track surface at the location indicated by Figure 1, with at least 480 mm exposed.

The 125 grams of sand is spread uniformly over the length of the exposed pad to a width of 150 mm.

The sand must not be disturbed prior to the applicator passing over the pad during the cleaning test.

The applicator cleaning apparatus must be operated continuously in conjunction with painting operation for the full length of the test track.

The test pad is examined for sand retention.

**(f) calculation and reporting**

No calculation necessary. Rejected test pads may be disposed of. Test pads from successful test runs to be retained.

#### **14.1.5 Width determination**

**(a) required performance capability**

The applicator shall be capable of controlling the width of the paint application work so that completed test lines are within + 10% - 5% of the nominal line width.

**(b) acceptance criteria**

The width of the dry painted line on the test plates shall be between:

- 95 mm and 110 mm for 100 mm line
- 142.5 mm and 165 mm for 150 mm line
- 190 mm and 220 mm for 200 mm line.

Width variation of the painted line within 15 mm of the leading and trailing edges of the plates is excluded.

**(c) apparatus required**

Steel rule having the required accuracy.

Note: Steel rules manufactured in accordance with British Standards and Japanese Industrial Standards (JIS) meet these requirements.

**(d) test materials**

None required

**(e) procedure**

The minimum and maximum widths of each of the dry painted and beaded test plates are to be determined.

Where the edge definition of the painted line is either very poorly defined or obscured by excessive splatter, the test plate shall be rejected.

**(f) calculation and reporting**

The minimum and maximum line widths on each complying plate are to be recorded.

**14.1.6 Speed determination****(a) required performance capability**

The applicator shall be capable of being maintained to within 10% of the nominated speed over the normal operating speed range and be free of significant flutter at steady speeds.

**(b) acceptance criteria**

Test plates shall be accepted only where the observed speed is within 10% of the nominated speed.

**(c) apparatus required**

Stop watch having an accuracy of better than 0.6%

30 m or 50 m measuring tape having an accuracy of better than 0.06%, i.e. 20 mm over 33 metres.

**(d) test materials**

None required

**(e) procedure**

The distance between the start and stop positions of the test track shall be 33 metres  $\pm$  200 mm.

The start and stop positions shall be clearly identified such that the traverse time can be readily determined by Testing Officer.

The time taken by the applicator to traverse the test strip is determined by starting and stopping the stop watch as the applicator sprayed line traverses the respective start and stop positions.

**(f) calculation and reporting**

The speed for the run is calculated by dividing 118.8 by the elapsed time in seconds.

The speed determined for each paint line application test run shall be recorded.

**14.1.7 Intermittent line spacing****(a) required performance capability**

The applicator shall be capable of automatically producing intermittent lines. The maximum permitted dimensional tolerances shall be in accordance with P/12 or P/22.

**(b) acceptance criteria**

All painted segments and intervening gaps on the test strip shall be within the values specified in P/12 or P/22.

**(c) apparatus required**

30 m or 50 m measuring tape having an accuracy of better than 0.06%, i.e. 20 mm over 33 metres.

**(d) test materials**

None required

**(e) procedure**

The Testing Officer shall nominate the specified values for the segmented line.

The test strip shall be prepared in such a manner that the Testing Officer can readily determine the positions of the start and stop of each painted segment down the length of the test strip.

The Testing Officer shall measure each segment and gap for the whole test line.

**(f) calculation and reporting**

The position of start and stop of each segment is to be recorded.

The lengths of each segment and gap are to be determined using the position of the respective segment start and stop positions.

**14.1.8 Straightness****(a) required performance capability**

The applicator shall be capable of marking within the tolerances specified in P/12 or P/22 for location.

**(b) acceptance criteria**

The painted line shall be within 15 mm of the pilot line.

**(c) apparatus required**

String line.

Steel rule.

**(d) test materials**

None required

**(e) procedure**

A string line is strung from one end of the strip to the other in the longitudinal direction in such a manner that it provides guidance to the operator without impinging on the paint surface. The string line is to be tensioned and secured such that it provides a nominally straight line.

The operator uses the string line for guiding the applicator for paint application.

The deviations of the average centre line of the painted marking from the string line are measured using a steel rule. The line is not to be altered or interfered with between painting and measuring the location of the painted line.

**(f) calculation and reporting**

The maximum deviation in both directions is to be determined and recorded.

**14.2 Reliability of measurement methods**

**14.2.1 General**

The Roadmarker shall identify and control the characteristics having significant influence on test results. The Testing Officer shall take responsibility for reliability of measurement in carrying out test procedures.

The reliability of test methods is dependent on the steps taken to minimise the influence of relevant characteristics on the parameter being determined. To provide reliable results, the Testing Officer needs to understand those influences and control them appropriately.

The characteristics which influence the reliability of measurement commonly relate to the:

- i) Article being measured, e.g. hardness of paint
- ii) Instrument being used, e.g. readability of scale
- iii) Standard against which an instrument is calibrated, e.g. quality of test shims
- iv) Person making the measurement e.g. test consistency, transcription accuracy
- v) Environment in which the measurement is made e.g. air movement.

Minimum requirements for measurement reliability are specified within the measurement methods.

The Testing Officer shall take particular account of the characteristics which may influence Paint Dry Film Thickness and Bead Application Rate.

**14.2.2 Dry film thickness measurement**

The control aspects required to maintain reliability of measurements include:

Paint hardness:

- (a) plates to be at normal ambient temperature
- (b) paint surface to be sufficiently hard, such that elcometer probe does not leave any visible impression on surface
- (c) confirming measurements to be taken at least 12 hours after initial measurements.



Variation in film thickness:

- (a) A minimum of twenty (20) readings uniformly spaced down the length of zone shall be taken
- (b) Where the readings vary by more than 50 microns on a zone, a minimum of thirty (30) readings uniformly spaced down the length of the zone shall be taken.

### **14.2.3 Bead application rate measurement**

The control aspects required to maintain reliability of measurements include:

Bead application pressure:

With high bead application pressures, beads may be inadequately trapped in the paint line.

The application of beads shall be observed by the Testing Officer to detect beads being deflected by the bead test pad. If this occurs, an alternative means of securing bead test pads and/or application equipment re-orientation shall be trialled with the aim of improving reliability.

Bead adhesion:

- (a) The pads shall be allowed to dry for at least one hour prior to final determination.
- (b) The pads shall be inverted and tapped lightly on the reverse side to dislodge loose beads.
- (c) The pads shall not to be subjected to beating, scraping or other handling which may displace beads from the painted surface.

**INDEX**

NZTA/NZRF T/8:2008..... 1

**SPECIFICATION FOR ROADMARKING APPLICATOR TESTING ..... 1**

1. SCOPE..... 1

2. PAVEMENT MARKING PERFORMANCE..... 1

    2.1 Paint Application ..... 1

    2.2 Glass Bead Application ..... 1

    2.3 Equipment Not Covered by This Specification ..... 2

3. REFERENCES ..... 2

4. DEFINITIONS..... 2

5. PROCESS..... 3

6. RESPONSIBILITIES ..... 4

    6.1 General..... 4

    6.2 NZTA..... 4

    6.3 Registration Body ..... 4

    6.4 Roadmarker ..... 4

    6.5 Issuing Officer ..... 5

    6.6 Testing Officer..... 5

7. ISSUING AND TESTING OFFICER CRITERIA..... 5

    7.1 Competency Criteria..... 5

        7.1.1 Currency of Competency ..... 5

        7.1.2 Contact Details ..... 6

8. CERTIFICATION REQUIREMENTS ..... 6

    8.1 General..... 6

    8.2 Certificate requirements ..... 6

    8.3 Certificate Validity ..... 6

    8.4 Entry qualification ..... 7

    8.5 Initial T/8 certification..... 7

    8.6 Maintenance of compliance..... 7

        8.6.1 Renewal of T/8 Certificates ..... 8

        8.6.2 Confirmation of compliance..... 8

    8.7 Currency of Certification ..... 8

    8.8 Transfer of plant to new cab and chassis ..... 8

    8.9 Cancelled applicators..... 8

9. REGISTRATION AND REVIEW OF T/8 CERTIFICATES ..... 9

    9.1 Register..... 9

    9.2 T/8 Audit ..... 9

    9.3 T/8 Review ..... 9

    9.4 Audit and Review Non-Compliances ..... 10

10. STATUTORY AND REGULATORY REQUIREMENTS ..... 10

    10.1 Compliance with the Health and Safety in Employment Act and Regulations ... 10

    10.2 Compliance with the Hazardous Substances and New Organisms Act and Regulations ..... 11

    10.3 Compliance with Transport Regulations ..... 11

11. TECHNICAL REQUIREMENTS ..... 11

    11.1 Applicator Type ..... 11

        11.1.1 Type A Applicators..... 11

        11.1.2 Type B Applicators..... 11

    11.2 Identification..... 12

11.2.1	Chassis Numbers .....	12
11.2.2	Equipment Serial Numbers.....	12
11.3	Requirements for All Applicators.....	12
11.3.1	Power and Control .....	12
11.3.2	Instruments and Controls.....	13
11.3.3	Paint and Bead Application Devices .....	13
11.3.4	Segmented Line Equipment.....	13
11.3.5	Paint Tanks .....	13
11.3.6	Traffic Management Equipment.....	14
11.4	Additional requirements for Type A paint applicators .....	14
11.4.1	Direction of Travel .....	14
11.4.2	Guide Arms.....	14
11.4.3	Cleaning Equipment .....	14
11.5	Additional requirements for Type B paint applicators .....	14
11.5.1	Applicator Length.....	14
11.5.2	Applicator Power.....	14
11.5.3	Transverse Line Ability .....	15
11.5.4	Turn Arrow Ability.....	15
11.6	Additional requirements for Type B1 paint applicators .....	15
11.6.1	General.....	15
11.6.2	Direction of Operation.....	15
11.6.3	Guide Arms.....	15
11.6.4	Cleaning Equipment .....	15
11.7	Additional requirements for Umbilical Type B paint applicators .....	15
11.7.1	General.....	15
11.7.2	Stability and Marking Ability .....	16
11.7.3	Supply Hose Control .....	16
12.	<b>METHODS OF TEST .....</b>	<b>16</b>
12.1	Inspection and test procedure .....	16
12.2	Visual inspection .....	16
12.3	Demonstration of line application .....	16
12.3.1	Application materials.....	17
12.3.2	Test Site.....	17
12.3.3	Test Requirements .....	18
12.3.4	Test One (All Applicators) .....	18
12.3.5	Test Two (All Applicators).....	19
12.3.6	Test Three – (All Applicators except Umbilical Type B) .....	19
12.3.7	Test Four (All Applicators) .....	20
12.4	Demonstration of power and control.....	20
12.5	Demonstration of ability to paint turn arrow (Type B applicators only) .....	20
12.6	Additional tests.....	21
12.7	Verification of results .....	21
13.	<b>RECORDS.....</b>	<b>21</b>
13.1	Test plate and bead test pad identification.....	21
13.2	Test records.....	21
13.3	Retention and access.....	22
14.	<b>TEST MEASUREMENT REQUIREMENTS .....</b>	<b>22</b>
14.1	Measurement methods.....	22
14.1.1	Paint application tests .....	22
14.1.2	Bead application tests .....	24

14.1.3	Intermittent bead application tests .....	26
14.1.4	Cleaning tests - Type A and B1 applicators only .....	27
14.1.5	Width determination .....	28
14.1.6	Speed determination .....	29
14.1.7	Intermittent line spacing .....	30
14.1.8	Straightness.....	31
14.2	Reliability of measurement methods .....	32
14.2.1	General.....	32
14.2.2	Dry film thickness measurement .....	32
14.2.3	Bead application rate measurement .....	33