



## SPECIFICATION FOR ROADMARKING RAISED PAVEMENT MARKER (RPM) ADHESIVE HEATER AND THERMOPLASTIC PRE-HEATER TESTING

## 1. SCOPE

This Specification describes technical, testing and certification requirements for temperature controlled raised pavement marker heaters to be used for work in compliance with NZTA P14 Specification for Raised Pavement Markers Installation (P14) and roadmarking thermoplastic pre-heaters for certification in compliance with NZTA T12 Specification for Long-life Pavement Marking Material Applicator Testing (T12).

Heater methods used may include but are not limited to:

- 1. Electricity
- 2. Gas
- 3. Diesel

## 2. HEATER PERFORMANCE

The heater shall be equipped such that it is compliant with the requirements of all relevant New Zealand legislation and be capable of consistently achieving all of the required heating requirements without adversely affecting the performance of the material being heated.

## 2.1 Heating Ability

The heater shall be capable of safely:

- 1. Melting and raising the raw material to the desired temperature
- 2. Maintaining the molten temperature at the desired temperature without adversely affecting the performance of the material.

## 2.2 Legislative Requirements

The Heater shall comply with all of the requirements of the appropriate legislation, regulations and associated Codes of Practice.

The relevant regulations and associate code of practice relating to the installation and maintenance of the heating medium, e.g. gas or electricity are to be complied with.

Where the device is mounted on a transport vehicle, the methods of mounting and the transport vehicle shall comply with all relevant transport legislation.

## 3. REFERENCES

NZTA M20: Specification for Long-life Roadmarking Materials, New Zealand Transport Agency (M20)

NZTA P14: Specification for Raised Pavement Markers Installation, New Zealand Transport Agency (P14)

NZTA T12: Specification for Long-life Pavement Marking Material Applicator Testing, New Zealand Transport Agency (T12)

#### 4. **DEFINITIONS**

*Melter:* Device intended for the heating of hot-melt roadmarking materials to their desired application/transfer temperature. Also known as Heater/Pre-Melter. Materials process by the melter include but may not be limited to bituminous raised pavement marker adhesive and thermoplastic roadmarking material.

NZRF: The New Zealand Roadmarkers Federation Inc.

*Registration Body:* Agency contracted by the New Zealand Transport Agency (NZTA) to manage revision of the NZTA/NZRF T18 Specification (T18), and maintain the NZTA/NZRF T18 Register (T18 Register) for testing officers and heaters

*Roadmarker:* a trading organisation with responsibility for qualification of melters in compliance with this Specification

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

*NZTA:* New Zealand Transport Agency

*NZTA/NZRF T18 Audit: (*T18 Audit*)* the examination and verification of a T18 Testing Officers records by a person appointed by the T18 Registrar

*NZTA/NZRF T18 Certificate:* (T18 Certificate) the "Roadmarking Material Heater Certificate of Compliance" issued in accordance with this Specification

*NZTA/NZRF T18 Register:* (T18 Register) the national listing of current T18 certification status of registered roadmarking material heaters

Heater types are defined as follows:

Gas	Heater fuelled by compressed gas
Electric	Heater with heating elements supplied with electricity
Diesel	Heater fuelled by diesel fuel
Oil Jacketed	Heater having a multiwall construction where the heat is
	transferred from heater to material via heat transfer oil

*Pedestrian controlled melter:* Roadmarking material heater (melter) which has wheels attached and is capable of being positioned on the pavement by a pedestrian operator. The melter may or may not be powered.

*Transportable melter:* Roadmarking material heater (melter) which is mounted on a sub-frame or chassis which enables the melter to be transported on a range of transport devices/vehicles.

*Vehicle mounted melter*: Roadmarking material heater (melter) which is permanently mounted to a dedicated transport vehicle. The vehicle may or may not be dual steer.

#### 5. PROCESS

When a new or previously uncertified roadmarking material heater is to be brought into service, a Testing Officer first inspects the melter. If the specification and other requirements are met, a T18 Certificate shall be issued.

The Roadmarker is responsible for annually submitting the melter inspection and testing results for T18 Certificate renewal.

Other responsibilities are outlined below.

## 6. **RESPONSIBILITIES**

#### 6.1 General

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

## 6.2 New Zealand Transport Agency

NZTA is responsible for:

- Appointment of the agency to act on its behalf as the Registration Body
- Approval of this Specification

#### 6.3 Registration Body

The Registration Body is responsible for:

- Development, implementation and review of this specification
- Maintaining the T18 Register
- Registration of certificates
- Registration of T18 Testing Officers
- Management of the T18 Audit process, including the resolution of noncompliances.
- 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 roadmarking material heaters with this Specification, including:

- Ensuring that the heater complies with all of the requirements of the associated legislation
- 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 T18 Registration Body for registration
- Maintaining procedures and records relevant to this Specification, including records of T18 Testing Officer qualifications, experience and approval, under a quality assurance system in compliance with NZTA requirements
- Advising the T18 Registration Body of the disposal or decommissioning of a registered applicator.

## 6.5 Testing Officer

Testing Officers are responsible for:

- Conducting roadmarking material heater inspection and testing in accordance with this Specification
- Recording results and renewing Certificates of Compliance in accordance with this Specification.

## 7. TESTING OFFICER CRITERIA

Roadmarking material heaters shall only be tested and certified by Testing Officers who appear on the NZTA T18 Register.

## 7.1 Competency Criteria

The minimum competency criteria for T18 Testing Officers are:

- (a) Current NZTA T8 Testing Officer status
- (b) Evidence, through appropriate technical and/or management expertise, of competency in the interpretation of this specification.

## 7.1.1 Currency of Competency

Testing Officers who have carried out no T18 testing over a period of five years, shall be removed from the register of T18 Testing Officers.

## 7.1.2 Contact Details

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

## 8. CERTIFICATION REQUIREMENTS

## 8.1 General

The T18 Certificate provides evidence of compliance testing of roadmarking material heaters against the requirements of this Specification.

## 8.2 Certificate requirements

An electronic file version of the T18 Certificate is available from the Registration Body Website and is to be used by all Testing Officers.

The following information must be provided:

- (a) Confirmation of entry qualification in the case of an initial certificate, or the previous T18 certificate number for the applicator in the case of a renewed certificate
- (b) Compliance details
- (c) Date of expiry of certification as twelve months after the final on-site testing day, or twelve months after the day the current T18 Certificate expires, if it expires within 30 days of the testing day
- (d) Photograph which clearly identifies the applicator.
- (e) Identification and Signature of Testing Officer.

## 8.3 Certificate Validity

T18 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 a T18 Testing Officer
- (d) Certificates have been registered with the T18 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.

## 8.4 T18 certification

Before a T18 Certificate is issued the roadmarking material heater shall be demonstrated, inspected and tested at a suitable test site by, or under the direct control of a NZTA T18 Testing Officer.

The Testing Officer may require documentary evidence to confirm compliance with relevant sections of this Specification. Under such circumstances the Testing Officer is required to hold a copy of such documents for a minimum of five years. The records shall be made available for review on formal request from the Registrar/NZTA.

Where compliance with this Specification is confirmed, the Testing Officer shall complete the T18 Certificate in accordance with the requirements of this Specification.

The Roadmarker is responsible for the maintenance of compliance of roadmarking material heaters.

T18 Certification requires annual demonstration of applicator compliance with this Specification. The roadmarking material heater 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 T18 Certificate in accordance with the requirements of this Specification.

#### 8.5 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 T18 certificate shall require a T18 Audit at time of recertification.

#### 8.6 Cancelled applicators

Where a roadmarking material heater has been sold, written off or has been withdrawn from certification the Roadmarker shall advise the registration body within three (3) months.

#### 9. REGISTRATION AND REVIEW OF T18 CERTIFICATES

## 9.1 Register

A register of T18 Certificates shall be maintained by the Registration Body.

The T18 Register can be obtained from the Registration Body's Website.

Roadmarkers shall submit the original T18 Certificate for entry into, or updating of, the Register. The Roadmarker is responsible for ensuring the validity of such Certificates.

The T18 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 roadmarking material heaters will remain on the T18 Register, whether with current certification or expired, until advice of its disposal is received from the owner.

## 9.2 T18 Audit

The T18 Registration Body is required to facilitate audits of T18 Testing Officers at a frequency determined in consultation with NZTA.

The Auditor will be selected on the basis of T18 testing and auditing experience and independence.

The Testing Officer selected for audit 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 T18 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 T18 Registration Body is to advise the T18 Testing Officer of the audit findings and to facilitate effective close-out of the identified non-compliances. The related T18 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 T18 Review

Interested parties may submit requests in writing to the T18 Registration Body for review of the validity of nominated T18 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 T18 Certificate to the Registration Body.

#### 9.4 Audit and Review Non-Compliances

NZTA are to be advised by the T18 Registration Body of any major noncompliances identified by audits or review. The T18 Registration Body will, in consultation with 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 T18 certification requirements, the relevant certification record or records shall be removed from the T18 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 T18 Register until the expiry date of the relevant Certificate. Records of non-current certification shall be maintained by the T188 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 heating equipment complies with all legislation relevant to the heating medium. Electrically heated equipment shall comply with the Electrical (Safety) Regulations 2010. Heating devices using compressed gas such as LPG shall comply with the Gas (Safety & Measurement) Regulations 2010.
- (b) All items which may present a contact burn hazard shall be adequately shielded or if this impractical shall be clearly identified as presenting a contact burn hazard.
- (c) The exhausts of all motors on the heater shall be directed such that fumes do not reach operator. There shall be no danger of exhaust sparks or equipment above the auto ignition temperature coming into contact with heated material or other flammable vapours.
- (d) 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.
- (e) The fire control equipment shall meet the national and local authority requirements.
- (f) The first aid equipment shall meet industry best practice.

## 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, Hazardous Substances (Classification) Regulations 2001 and associated legislation, including but not limited to:

- (a) Transport 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:

- (d) Possess current registration
- (e) Possess current and valid Warrant of Fitness or Certificate of Fitness as appropriate
- (f) Possess current and valid Transport Service Licence

(g) Requirements for the carriage of Dangerous Goods is complied with regards to segregation of appropriate materials, Dangerous Goods signage and availability of Dangerous Goods Information.

## 11. TECHNICAL REQUIREMENTS

#### 11.1 Melter Type

Melters shall be either;

- 1. Pedestrian Controlled, or
- 2. Transportable, or
- 3. Vehicle Mounted

#### **11.1.1 Pedestrian Controlled Melters**

Pedestrian controlled melters are those which have wheels attached and are capable of being positioned on the pavement by a pedestrian operator. The melter may or may not be powered.

#### 11.1.2 Transportable Melters

Transportable melters are those which are mounted on a sub-frame or chassis which enables the melter to be mounted on a range of transport devices/vehicles.

## **11.1.3 Vehicle Mounted Melters**

Vehicle mounted melters are those melters which are permanently mounted to a specific transport vehicle.

The vehicle mounted RPM melter usually has facilities for the operator to be seated such that they can apply the molten material to the pavement without the need to stand on the pavement.

## 11.2 Identification

All melters, associated power and control equipment, transport means and safety related items are to be appropriately identifiable.

#### 11.2.1 Melter Numbers

All melters shall have a unique identification number.

The melter identification number shall be:

- (a) Permanently stamped or engraved into the melter vessel. Where the melter is pedestrian controlled or transportable the number shall also be stamped onto the chassis of the melter; where the melter is vehicle mounted, the chassis number of the vehicle shall be the chassis number recorded on the certificate of registration of the motor vehicle.
- (b) Readily visible, clean and legible;
- (c) The only identification number on the melter.

## **11.2.2 Equipment Serial Numbers**

Each temperature control and monitoring device shall have a serial number on it. The number shall be either the manufacturer's number where this uniquely identifies the device or a number allocated by the Roadmarker or Testing Officer.

## 11.3 Requirements for All Melters

## 11.3.1 Melter Tanks

The melter tank shall be designed and constructed in accordance with industry best practice.

The melter tank shall be sufficiently robust to remain intact, and continue to contain the intended contents safely and without leaking for normal conditions of loading, transport and unloading, allowing for reasonably foreseeable changes in environment.

## 11.3.2 Load/Access Hatch(s)

The melter tank shall have a hatch of a sufficient size to enable:

- 1. Safe and efficient loading of material
- 2. Ready checking for and removal of water or detritus prior to heating
- 3. Effective cleaning of the tank.

The access hatch shall be self-closing.

Where the access hatch acts as the sole vent to the tank, it shall be able to vent the tank sufficiently to prevent unsafe pressures occurring during normal operation.

## 11.3.2 Agitator

A material agitator is required.

The agitator paddle(s) shall operate in close proximity to the base and walls of the tank. To be adequate, the agitation equipment must be capable of:

- 1. Shifting material in all areas of the tank
- 2. Shifting material from and to all areas of the tank; and
- 3. Moving the material surface, with the material at any level of the tank.

The agitator requirements shall be met with the material at any level within the tank and without inducing air entrapment.

## 11.3.4 Tank Vent

Where the access hatch is close fitting, the tank shall be fitted with open vents to ensure that unsafe pressures do not occur during normal operation.

## 11.3.5 Heating Gas Flue

Where the heating system is diesel or gas, an appropriately sized exhaust flue shall be fitted.

The flue shall be positioned as far as practical from any hatch, vent or other vapour path.

## 11.3.6 Lagging and Corrosion Prevention

The melter tank shall be protected from corrosion using protective coatings that withstand temperatures of at least 250°C.

Insulation material shall be clad such that spillage and rainwater cannot enter.

Where an electric heater or flame tube passes through the insulation material, a positive 10mm air gap shall be provided between the insulation and the heater/flame tube.

## 11.3.7 Level Indication

Each tank shall have a means of determining the contents level relative to:

- 1. The minimum safe heating level
- 2. The maximum hot working level (at which at least 5% headspace is provided).

## 11.3.8 Discharge Valve/Hose

Each tank shall have a suitably sized discharge valve. The valve is to be of an appropriate design and construction for the discharge of molten bitumen/thermoplastic.

Electrically heated connecting hoses (where fitted) shall be controlled so that they run out freely without kinking or snagging and are protected against inadvertent damage.

Guns connected to discharge hoses are to:

- 1. Have a positive action and self closing on release of trigger
- 2. Be heated to temperatures corresponding to melter temperatures
- 3. Be insulated sufficiently to minimise contact burn hazard

## 11.3.9 Temperature Indicator

Each tank shall have with a temperature device which indicates the temperature of the material above the heating elements and below the minimum safe heating level referred to in 11.3.7.

The temperature indicating device shall:

1. Be marked with a unique identification number

- 2. Function correctly, refer 12.2.2
- 3. Be of a robust design which protects against inadvertent damage and / or material spills
- 4. Be accurate to within  $\pm$  5°C over the working range

## 11.3.10 Temperature Controller

The heating system shall be controlled by an automatic system which is:

- 1. Marked with a unique identification number
- 2. Accurate to within  $\pm$  5°C over the working range
- 3. Fail-safe, i.e. will lock the heating off in the event of either the temperature sensor or the controller failing.

The fail-safe device shall require positive action by the operator to reset the heating system following initiation.

#### 11.3.11 Instruments and Controls

All valves, controls and instruments shall be convenient to the operator and clearly marked so that the operation of the melter can be safely and accurately controlled.

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

#### 11.3.12 Heat Shielding and Guarding

All surfaces which may present a contact burn hazard are to be appropriately shielded or clearly labelled.

## 11.3.13 Heating Equipment

The heating equipment shall:

- 1. Comply with the appropriate legislation
- 2. Match the requirements of tank construction and volume
- 3. Be fail-safe

Electrically heated equipment shall comply with the Electrical (Safety) Regulations 2010.

Heating devices using compressed gas such as LPG shall comply with the Gas (Safety & Measurement) Regulations 2010.

#### 11.3.14 Component Attachment

Any attachment to the melter tank should be to the subframe of the tank wherever practicable. Where attachment to the tank subframe is impracticable and attachments are made to the tank, the fitting or method of attachment shall be designed to fail before the tank is ruptured.

## 11.3.15 Tank Signage

The tank shall carry the appropriate signs and placarding in accordance with Hazardous Substances and New Organisms Act and the NZTA Land Transport Rule 45001.

## 11.3.16 Emergency Procedures

Each melter shall have a set of Emergency Procedures. The Emergency Procedures shall comply with the requirements of Section 6 of the Health and Safety in Employment Act 1992.

## 11.3.17 First Aid Equipment

Each melter shall have a First Aid Kit. The kit shall comply with the recommendations of the Roading New Zealand publication, The Bitumen Safety Book, ISBN 978-0-9582827-0-3.

## 11.3.18 Fire Fighting Equipment

Each melter shall have appropriate fire fighting equipment which meets the national and local authority requirements.

## 11.3.19 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 NZTA Code of Practice for Temporary Traffic Management (CoPTTM).

## 11.4 Additional requirements for Vehicle Mounted Melters

Note: A vehicle may transport more than one melter.

The transport vehicle shall comply with all relevant Transport Regulations.

## 11.4.1 Tank Mounting

The tank mounting design and construction shall be to engineering best practice and comply with the relevant NZTA Road Transport Rule.

## 11.4.2 Roll-over Protection

Any component that is positioned in such a manner that it is vulnerable to damage in a roll-over, and where its removal would result in a hole in the tank greater in diameter than 20mm, shall be provided with roll over protection.

## 11.4.3 Placarding

The tank and vehicle shall carry the appropriate signs and placarding in accordance with Hazardous Substances and New Organisms Act and the NZTA Land Transport Rule 45001.

## 11.5 Additional requirements for Pedestrian Controlled Melters

An effective and secure park brake shall be provided.

## 12. METHODS OF EXAMINATION

#### 12.1 Visual inspection

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

The records of this inspection are to be made on the T18 checklist available from the Registration Body Website.

## 12.2 Demonstration of Operation and Operational Safety

The Testing Officer shall only proceed with the observation of the demonstration of operation and operational safety following satisfactory completion of the visual examination.

The Roadmarker is to provide appropriate materials, work instructions and operational personnel to establish that the melter is capable of operating as intended in a safe manner.

#### 12.2.1 Demonstration Site

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

#### **12.2.2 Demonstration Requirements**

The melter is to be charged with sufficient material to demonstrate that it is capable of operating as intended.

The heating system is to be operated in accordance with manufacturer's instructions and / or company procedures.

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

The Testing Officer is to observe the operation and note any deficiencies in function of equipment or hazards that are inadequately managed.

The Testing Officer is to monitor the temperature measuring device for function and accuracy throughout the entire heating range.

The Testing Officer is to use an appropriate temperature measuring device to check the accuracy of the temperature indicating device.

The heater shall be capable of safely:

1. Melting and raising the raw material to the desired temperature

2. Maintaining the molten temperature at the desired temperature without adversely affecting the performance of the material.

The heater shall be run through at least three (3) full operational cycles including start up and shut down. The material shall be held at the nominated operational temperature for a minimum of thirty (30) minutes. The material is to be allowed to cool down to below 100°C between each test cycle.

The function of the temperature over-heating cut-out device is to be demonstrated. The device shall lock-out the heating system positively and reliably at the set temperature. The fail-safe device shall require positive action by the operator to reset the heating system following initiation.

#### 13. RECORDS

#### 13.1 Test records

Records of T18 testing shall be uniquely identified in a manner such that they are readily traceable to the particular tests conducted, including:

- Melter
- Date of testing
- Tests conducted
- Testing Officer
- Location.

T18 Certification records shall include as a minimum:

- Completed T18 checklists
- Copy of relevant Compliance Certificates
- Photograph of Melter.

## 13.2 Retention and access

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

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

T18 records constitute part of Roadmarker quality records and as such shall be made available to third party auditors conducting quality system certification assessments.

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