

# Main Roads Technical Standard

## **MRTS42**

### **Supply of Wax Emulsion Curing Compound for Concrete**

**June 09**

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# Supply of Wax Emulsion Curing Compound for Concrete

## 1 INTRODUCTION

This Technical Standard details the requirements for the supply of wax emulsion for use as a curing compound for concrete road pavements, and as a debonding layer between a concrete sub-base and concrete base.

This Standard shall be read in conjunction with MRTS01 *Introduction to Technical Standards*, MRTS50 *Specific Quality System Requirements* and other Technical Standards as appropriate.

This Standard forms part of the Main Roads Specifications and Technical Standards Manual.

## 2 REFERENCED DOCUMENTS

Table 2 lists documents referenced in this Technical Standard.

**Table 2 – Referenced Documents**

Reference	Title
AS 1160	Bituminous Emulsions for the Construction and Maintenance of Pavements
AS 1580.202.1	Paints and Related Materials - Methods of Test - Density
AS 1580.301.1	Paints and Related Materials - Methods of Test - Non-volatile Content by Mass
AS 1580.214.5	Paints and Related Materials - Methods of Test - Consistency - Rotational Viscometer
AS 2341.18	Methods of Testing Bitumen and Related Roadmaking Products-Determination of Softening Point (Ring and Ball)
AS 3799	Liquid Membrane-Forming Curing Compounds for Concrete
AS/NZS ISO 9002	Quality Systems - Model for Quality Assurance in Production, Installation and Servicing
T862	Stability of Wax Emulsion Curing Compound
T866	Residue on Ignition of Wax Emulsion Curing Compounds
T1005	Qualitative Analysis Using the Infrared Spectrophotometer

## 3 MATERIAL REQUIREMENTS

### 3.1 General

The compound shall be suitable for spray application to freshly laid concrete at the 'low sheen' stage of drying, which shall be defined as when the surface is still soft to touch but without free water.

The compound shall be suitable for application to surfaces which have been previously coated with wax emulsion or hydrocarbon resin curing compound or with bitumen emulsion. When applied to such surfaces, the compound shall dry to provide a smooth, continuous waxy film.

### 3.2 Material Composition

Wax emulsion curing compound shall consist of a stable emulsion of paraffin wax. Unless otherwise specified, it shall be coloured white by the addition of titanium dioxide pigment which has been thoroughly dispersed. The product shall be a free-flowing stable emulsion, uniformly white and free from contamination. The emulsifying agent shall be an unsaturated long-chain fatty acid capable of combining with lime to produce a calcium soap release agent to prevent bonding between layers of concrete.

### 3.3 Density at 25°C

The density of the curing compound when determined in accordance with AS 1580, Method 202.1, shall not differ from that of the certified sample by more than  $\pm 0.01$  kilograms per litre.

### **3.4 Non-Volatile Content**

When determined in accordance with AS 1580, Method 301.1, the non-volatile content of the compound shall be not less than 30% by mass.

When tested in accordance with AS 2341.18, the softening point of the non-volatile material shall be not less than 45°C.

### **3.5 Viscosity at 25°C**

When tested in accordance with AS 1580, Method 214.5, Consistency Rotational Viscometer (at a speed of 60 r/min., using the No. 1 spindle) the viscosity shall be  $0.18 \pm 0.13$  Pa.s and the rate of separation in seven days shall not exceed 4%.

### **3.6 Infra-Red Spectrum**

The infra-red spectrum of the residue remaining in the dish after carrying out Test Method AS 1580, Method 301.1, Clause 2.4 shall be recorded in accordance with Test Method T1005.

### **3.7 Residue on Ignition**

When tested in accordance with Test Method T866, the mass of the residue on ignition at 600°C shall be within the range of 2.8 to 4.0%. The mass of titanium dioxide in the residue on ignition shall not be less than 2.7% of the total mass tested.

### **3.8 Residue on 150 Micron Sieve**

When tested in accordance with AS 1160, Appendix G, the residue of material retained on the sieve shall not exceed 0.2% of mass.

### **3.9 Moisture Retention Performance**

When tested in accordance with AS 3799, Appendix B, the Water Retention Efficiency Index after 72 hours at 38°C and 32% relative humidity shall not be less than 90 per cent.

The following information shall be recorded on a certificate which shall be delivered with the material. The certificate shall include the identification criteria listed below for the drums or bulk container –

- a) Manufacturer's name;
- b) Product name;
- c) Date of manufacture or batch number;
- d) Quantity represented;
- e) Date of sampling;
- f) Place of sampling; and
- g) Sampling Officer.

## **4 SAMPLING**

### **4.1 Sampling of Drums**

In the case of delivery in drums, the Administrator shall select a drum at random, and the contents of this drum shall be mixed thoroughly by turning end-over-end and stirring to achieve a homogeneous compound immediately prior to sampling. A field sample shall be taken from the centre of the drum using a thief sampler. This sample shall be taken as representative of its batch.

### **4.2 Sampling of Bulk Container**

A field sample shall be taken by the Administrator from any level in the bulk container by means of a thief sampler. This sample shall be taken as representative of the delivery.

## 5 TESTING

### 5.1 General

Conformance testing shall involve the testing of a sample for all the properties in Clause 3 from a sample taken from the first delivery of each particular agent (a separate complete set of tests for each source, brand and type) and for each project. If the product conforms, a certificate shall be provided for that product. For the balance of the project, uniformity testing shall be carried out for each delivery.

### 5.2 Certificate of Conformance

A sample shall be taken from the first delivery and tested for all the properties in Clause 3. If the product conforms, a certificate shall be issued for that product for the particular project.

The certificate shall relate only to the formulation of which the tests were made and shall be valid only for the particular project. Any changes in product formulation shall necessitate the retesting and the issue of new certification.

For the balance of the project, uniformity testing shall be carried out for each delivery.

### 5.3 Uniformity Testing

The product is to be uniform when applied and testing is to be carried out to ensure this uniformity. Uniformity testing shall be carried out as close as possible to the use of the product. This clause contains the minimum uniformity testing requirements.

When the product is delivered in drums, a sample(s) is to be taken from a drum(s) which is representative of the drums from the same batch and the same delivery from the supplier.

Where the product is delivered in bulk, a sample shall be taken at intervals of not more than 5000 litres.

The supplier shall provide a certificate with each delivery stating that the same formulation has been used for the batch as is represented by the Certificate of Conformance.

Each sample shall be tested for uniformity with the results shown in the Certificate of Conformance as follows –

- a) Non-Volatile content: The value of non-volatile content shall be not less than 30% nor shall it vary from the conformance certificate by more than + 2%, - 1%;
- b) Density: The value of the density shall be  $\pm 0.01$  kg/.L of the density of the product in the conformance certificate;
- c) Viscosity: The value of viscosity shall be as per Clause 3.5; and
- d) Infrared Spectrum: The infrared spectrum shall match that established in the conformance certificate. It shall be carried out on every tenth sample of uniformity testing.

## 6 DELIVERY

Deliveries shall be made in either airtight drums or bulk carriers.

All drums and containers shall be in good condition, clean and free from any deleterious material. Any material delivered in punctured, leaky, broken or otherwise defective drums and containers shall be tested and, if nonconforming, shall be removed and replaced.

Drums shall be labelled with the following –

- a) Manufacturer's name;
- b) Product name;
- c) Date of manufacture and batch number; and
- d) Capacity.

A certificate of loading shall be supplied with each bulk container detailing –

- a) Manufacturer's name;
- b) Product name;

- c) Date of manufacture and batch number; and
- d) Capacity.

## **7 STABILITY DURING TRANSPORT AND STORAGE**

The compound shall retain all the properties of the certified sample during transport and storage and when tested at any time up to six months after manufacture.

## **8 NONCONFORMING MATERIAL**

Where the sample fails to meet all of the properties of the approved sample, the material is nonconforming and shall be removed and replaced.