Technical Specification

Transport and Main Roads Specifications MRTS103 Fillers for Asphalt

July 2017

Queensland Government

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1 Introduction

This Technical Specification applies to the material requirements for added filler for use in asphalt.

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

This Technical Specification forms part of the Transport and Main Roads Specifications Manual.

2 Definition of terms

The terms used in this Technical Specification are as defined in Clause 2 of MRTS01 *Introduction to Technical Specifications.* Additional terms used in this Specification shall be as defined in Table 2.

Table 2 - Definition of terms

Term	Definition
Added filler	A material which is introduced from an external source, the majority of which passes a 0.075 mm AS sieve
Available lime	Alkaline constituents which are readily soluble in a sucrose solution as determined by AS 4489.6.1, using the calculation for calcium hydroxide
Cement works flue dust	A mineral material derived from the cement manufacturing process, also known as “cement kiln dust”
Fly ash	The solid material extracted from the flue gases of a boiler fired with pulverized coal
Ground limestone	A calcium carbonate-rich rock dust derived from the grinding of sound unfired limestone and complying with this Technical Specification
Hydrated lime	Essentially calcium hydroxide in the form of a white powder produced by the addition of sufficient water to slake quicklime

3 Referenced documents

Table 3 lists the documents referenced in this Technical Specification.

Table 3 - Referenced documents

Reference	Title
Australian Standards	
AS 1141.8	*Methods for sampling and testing aggregates - Water-soluble fraction of filler*
AS 1141.11.1	*Methods for sampling and testing aggregates - Particle size distribution - Sieving method*
AS 1141.17	*Methods for sampling and testing aggregates - Voids in dry compacted filler*
AS 1672.1	*Limes and limestones - Limes for building*
AS 2150	*Hot mix asphalt - A guide to good practice*
AS 3582.1	*Supplementary cementitious materials for use with portland and blended cement - Fly ash*

Reference	Title
AS 3583.1	*Methods of test for supplementary cementitious materials for use with portland and blended cement - Determination of fineness by the 45 micrometre sieve*
AS 4489.2.1	*Test methods for limes and limestones - Fineness - Wet sieving*
AS 4489.6.1	*Test methods for limes and limestones - Lime index - Available lime*
AS 4489.8.1	*Test methods for limes and limestones - Free moisture - Convection oven*
European Standards	
EN 13639	Determination of total organic carbon in limestone

4 Standard test methods

The standard test methods listed in Table 4 shall be used in this Technical Specification.

Further details of test numbers and test descriptions are given in Clause 4 of MRTS01 *Introduction to Technical Specifications.*

Table 4 - Standard test methods

Property to be Tested	Test Method Number
Water-soluble fraction	AS 1141.8
Particle size distribution	AS 1141.11.1
Fineness	AS 3583.1
Sieve residue	AS 4489.2.1
Available lime content	AS 4489.6.1
Moisture content	AS 4489.8.1
Total organic carbon	EN 13639

5 Quality system requirements

5.1 Conformance requirements

Materials supplied to this Technical Specification shall be sampled and tested in accordance with Clause 7.7.

The conformance requirements that apply to this Technical Specification are summarised in Clause 7.

6 Storage

Filler materials shall be stored in silos, bins or sheds that keep the contents dry and free from contamination.

Materials are to be used in the order they were delivered with the earliest delivered batches to be used first. Materials are to be rejected if they contain lumps or signs of moisture absorption.

7 Added fillers for asphalt

7.1 General

The following types of added fillers may be used in asphalt:

a) cement works flue dust

b) ground limestone

c) fly ash

d) hydrated lime

e) rock dust, and

f) other mineral fillers.

Each type of added filler from each source shall be mineral material, dry and free from lumps, organic material or other deleterious matter, and conform to AS 2150.

7.2 Cement works flue dust

Cement works flue dust shall be obtained from a cement manufacturing plant. Its particle size distribution determined in accordance with AS 1141.11.1 shall conform to Table 2 of AS 2150.

7.3 Ground limestone

Ground limestone shall contain more than 75% by mass of $CaCO_3$. If the $CaCO_3$ content is less than 80%, the total organic carbon content, determined in accordance with EN 13639, shall be less than 0.50% by mass.

The particle size distribution determined in accordance with AS 1141.11.1 shall conform to Table 2 of AS 2150.

7.4 Fly ash

Fly ash shall be fine or medium grade conforming to AS 3582.1.

7.5 Hydrated lime

Hydrated lime shall conform to AS 1672.1 and the additional requirements in Table 7.5.

Table 7.5 - Hydrated lime requirements

Property	Test Method	Requirement
Available lime content, calculated as calcium hydroxide	AS 4489.6.1	≥ 80.0%
Sieve residue: % retained 300 µm sieve	AS 4489.2.1	≤ 2.0%
Moisture content before use	AS 4489.8.1	≤ 1.0%

7.6 Rock dust

Rock dust is filler derived from rock conforming to the requirements of MRTS101 *Aggregates for Asphalt*.

7.7 Testing

Fillers for asphalt materials shall be sampled and tested in accordance with Table 7.7.

Table 7.7 - Minimum testing frequencies for asphalt fillers

Material Property	Test Method	Minimum Frequency of Testing
Particle size distribution (flue dust and ground limestone)	AS 1141.11.1	One per 500 tonnes of production of each added filler type
Fineness (fly ash)	AS 3583.1	One per 500 tonnes per source of supply
Available lime (hydrated lime)	AS 4489.6.1	One per 500 tonnes per source of supply
Sieve residue (hydrated lime)	AS 4489.2.1	One per 500 tonnes per source of supply
Moisture content (hydrated lime)	AS 4489.8.1	One per 500 tonnes per source of supply