

# Roads

## Master Specification

### RD-PV-S1 Supply of Pavement Materials

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## DEPARTMENT OF PLANNING, TRANSPORT AND INFRASTRUCTURE



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## Document Management

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## RD-PV-S1 Supply of Pavement Materials

### 1 General

1.1 This Part specifies the requirements for the supply and delivery of materials (including crushed quarry products, natural gravel, sand and recycled pavement materials) to be used in the construction of roadworks, bridgeworks, railways and other applications associated with construction.

1.2 The following definitions apply to this Contract.

Term	Definition
Pavement Materials	<p>Includes:</p> <ul style="list-style-type: none"> <li>• Spalls;</li> <li>• Road Ballast;</li> <li>• Rail Ballast;</li> <li>• Class 3 Recycled Pavement Material;</li> <li>• Class 3 Quarried Pavement Material;</li> <li>• Class 2 Recycled Pavement Material;</li> <li>• Class 2 Quarried Pavement Material;</li> <li>• Class 1 Recycled Pavement Material;</li> <li>• Class 1 Quarried Pavement Material;</li> <li>• Stabilised Pavement Material;</li> <li>• Sealing Aggregate;</li> <li>• Sand;</li> <li>• Asphalt Aggregate;</li> <li>• Mineral Filler for Asphalt, other than Hydrated Lime; and</li> <li>• Arrestor Bed Material.</li> </ul>
Process Control	A controlled documented system of practices and procedures used to monitor and control the product inputs, equipment and manufacturing processes to ensure the product replicates the product design.
Secondary Mineral	A mineral which has formed as a consequence of the alteration or replacement (other than by the conditions of normal weathering) of a pre-existing material and without alteration to the form of the rock.

1.3 The following documents apply to this Contract:

- a) AS 1141 Sampling and Testing Aggregates.
- b) AS 1289 Methods for Testing Soils for Engineering Purposes.
- c) AS 2758 Aggregates and Rock for Engineering Purposes.
- d) AS 2891 Methods of Sampling and Testing Asphalt.
- e) AS 1152 Specification for Test Sieves.
- f) NATA National Association of Testing Authorities, Australia.
- g) RMS Txxx Roads and Maritime Services NSW Test Procedure xxx.
- h) TP Department of Planning, Transport and Infrastructure (DPTI) Test Procedure (refer [https://www.dpti.sa.gov.au/materials\\_technology\\_documents/test\\_procedures2](https://www.dpti.sa.gov.au/materials_technology_documents/test_procedures2)).
- i) AS 5101 Methods for Preparation and Testing of Stabilized Materials.

1.4 The products shall comply with the requirements specified in Appendix 1: Pavement Material Specification – List of Products.

- 1.5 If recycled materials or blast furnace slag are to be used for any purpose other than construction of DPTI roadworks, additional environmental requirements may be necessary. This Part does not consider the suitability of recycled materials or blast furnace slag for any other purpose than for use in DPTI roadworks.

## 2 Quality Requirements

### Quality Plan, Procedures and Documentation

- 2.1 Further to the requirements of PC-QA1 "Quality Management Requirements", the Contractor shall develop and implement a Quality Plan that includes the following procedures at a minimum:

**Table RD-PV-S1 2-1 Quality Plan Procedure Requirements**

Material	Quality Plan
All materials:	Random selection of sample increments (Clause 5 under "Sampling").
	Representative splitting of bulk samples (Clause 5 under "Sampling").
	Handling and storage of the product including the avoidance of intermixing, contamination or deterioration which may affect the product properties.
	Inspection of bins, stockpile pads and trucks for contamination and operational efficiency
	Requirements for inspection and testing of processes and products (including the Inspection and Test Plan, Clause G20.7 "Inspection and Testing").
Material sourced from Quarries:	Plant calibration and maintenance, including weighing equipment, flow meters and proportioning systems where installed.
	Primary, Secondary and Tertiary Crusher inspection, wear adjustment and maintenance.
	Screen Deck inspection, wear adjustment and maintenance.
	Use and handling of explosives.
	Assessment of quarry face and shot rock.
	Moisture control of shot rock.
	Handling processes for shot rock.
	Requirements for labelling of storage bays and silos.
Sealing aggregate:	Stripping performance (vide Clause 4 under "Aggregate Stripping TP705").
Asphalt Aggregates:	Additional process control elements (Clauses 2 and 10).
Basic igneous source rock	Control of secondary mineralisation (Clause 4 under "Secondary Mineralisation").
Recycled materials and Blast Furnace Slag	Control of constituent materials (Clause 6 under "Construction and Demolition Materials" or "Blast Furnace Slag") as applicable.
	Quality Control and Compliance Testing (Clause 6 under "Alternative Sources of Recycled Materials").
Stabilised materials	Control of binder content (Clause 8 under "Additive Content Determination").
	Use of retarder (Clause 8 under "Addition of Retarder").
	Working time for other binders (Clause 8 under "Time Requirements").

- 2.2 Where the Principal does not hold a copy of the current procedures, these procedures shall be submitted at least 28 days prior to the commencement of production and shall generate objective evidence that the specified quality requirements have been achieved.

- 2.3 Provision of the documentation listed in this Clause shall constitute a **Hold Point**.

### Asphalt Aggregates

- 2.4 Where asphalt aggregates are to be produced, the Contractor shall develop and implement a Process Control System which includes:
- a description of the flow of materials and the processes carried out on them from input materials to the plant through to delivery of aggregates to the customer;
  - a flow diagram and identification of the key elements of the manufacturing process requiring monitoring, measurement or verification; and

- c) constant monitoring and statistical analysis of records to verify process capability and product characteristics.

## Identification

- 2.5 In addition to the requirements of PC-QA1 "Quality Management Requirements", Clause 5 "Product Identification and Traceability" under "Identification", the pavement materials shall be produced in identifiable Lots not greater than the following:
  - a) Sealing and Asphalt Aggregates, Arrestor Bed Material: 500 tonnes.
  - b) Other Pavement Materials: 1 000 tonnes.
- 2.6 A Lot of the material shall be produced under uniform conditions from the same source material and / or the same constituent components and be essentially homogeneous with respect to composition and general appearance. Notwithstanding PC-QA1 "Quality Management Requirements", Clause 5 "Product Identification and Traceability" under "Definition", a Lot may be prepared from more than one day's production.

## Dedicated Stockpiles

- 2.7 The Contractor shall establish dedicated stockpiles conforming to the following requirements:
  - a) The location of each Lot shall be accurately identified until conformance of the Lot with the Specification requirements has been verified.
  - b) Any non-conforming Lots placed into these stockpiles shall be removed.
  - c) Where the stockpile contains more than one Lot, the stockpile shall be constructed in horizontal layers with each successive layer fully contained within the area of the upper surface of the preceding layer. Levelling of each layer shall be carried out in a manner to minimise segregation and material breakdown.
  - d) Once a dedicated stockpile has been completed, further material shall not be added to the stockpile.

## 3 Acceptance of Material

- 3.1 Acceptance of materials will be undertaken on a Lot basis and the total quantity of material in the Lot will be subject to acceptance or rejection. The material in a Lot will be accepted if the material has been produced and stockpiled in accordance with the Specification and the NATA endorsed test results for the bulk sample comply with the requirements specified.

## 4 Quality of Materials

### General

- 4.1 All material shall be clean, sound, hard and durable.
- 4.2 Mica, shale and similar laminated materials, adherent coatings or any foreign material shall not be present in form or sufficient quantity to produce adverse effect upon the usage and performance of the material.
- 4.3 All products shall be produced from natural rock or sand deposits, as appropriate, except where otherwise permitted in this Part.
- 4.4 Recycled materials and blast furnace slag shall conform to the requirements detailed in Clause 6 "Recycled Materials and Blast Furnace Slag", which are specific to use in roadworks. All materials shall be free from undesirable seeds as described in the regulations under the Natural Resource Management Act (SA). The regulations are available from <https://www.legislation.sa.gov.au/index.aspx>.

## Properties

- 4.5 Additive contents shall be within the tolerances stated in Clause 8 under "Additive Content Determination" in the case of Plant Mixed materials.
- 4.6 For all materials specifications, square aperture sieves conforming to AS 1152 "Specification for Test Sieves" shall be used for the determination of grading for particle sizes 75 mm and finer. Coarser sizes shall be determined by linear measurement.

## Aggregate Stripping (TP 705)

- 4.7 The Contractor shall:
  - a) implement a design process to prevent the adverse stripping performance of sealing aggregates;
  - b) include a procedure for determining the stripping performance of the sealing aggregates in both wet and dry states in the Quality Plan;
  - c) include pre-coating agents and adhesion agents in the testing program; and
  - d) report the wet and dry test results.

## Secondary Mineralisation

- 4.8 This clause applies where basic igneous source rock (as defined in AS2758) is used for the production of a Pavement Material complying with this Part.
- 4.9 Secondary mineralisation shall not be present in the Pavement Material to the extent that it adversely affects the Pavement Material's durability and / or long term performance.
- 4.10 The Quality Plan shall:
  - a) indicate the level and nature of secondary mineralisation of the source rock, including a description of the potential of the secondary mineralisation to cause material degradation;
  - b) include procedures for monitoring the quality of the product and component materials during quarrying and production, addressing the control and monitoring of secondary mineralisation;
  - c) include rock type and durability classifications (i.e. Sound, Marginal or Unsound Rock) provided by VicRoads in accordance with VicRoads Specification 801 "Source Rock for the Production of Crushed Rock and Aggregates"; and
  - d) address any other information reasonably requested by the Principal.
- 4.11 VicRoads specifications are available from <http://webapps.vicroads.vic.gov.au/VRNE/csdspeci.nsf/>.

## 5 Sampling and Testing

### Sampling

- 5.1 Unless specified otherwise, the Contractor shall arrange for sampling of material to be carried out by an appropriately NATA certified laboratory in accordance with TP 226 "Sampling of Soils, Aggregates and Rock".
- 5.2 The Contractor shall include in the Quality Plan procedures for the random selection of sample increments appropriate to the sampling method used and the process of splitting and recombining to produce two samples equally representative of the bulk sample.
- 5.3 Preparation of samples for testing will be undertaken in accordance with AS 1289.1.
- 5.4 Unless otherwise approved, the NATA laboratory shall split each bulk sample to produce an audit sample to be held by the NATA certified laboratory for a period no less than 14 days after submission of test results.
- 5.5 Audit samples for Sealing Aggregates shall be held until the end of the Defects Liability Period and the sample supplied to the Principal if requested.

## Testing

- 5.6 Notwithstanding TP 226 "Sampling of Soils, Aggregates and Rocks" and Clause 6.1.1 "General" therein, Quality Control testing for each product shall be undertaken on a sample representing each production Lot.
- 5.7 The Quality Control tests listed on each Product Specification Sheet (Appendix 1: Pavement Material Specification – List of Products) shall be performed on the sample representing each Lot in accordance with the testing frequency specified in Table RD-PV-S1 5-1.

**Table RD-PV-S1 5-1 Assurance Minimum Testing Frequencies**

Test Procedure	Property	Minimum Test Frequency
<b>SPALLS</b>		
AS 1141.11	Particle Size Distribution	One test per 5 Lots
<b>ROAD BALLASTS</b>		
AS 1141.11	Particle Size Distribution	One test per 5 Lots
AS 1141.23	Los Angeles Value	One test per 5 Lots
<b>RAIL BALLAST</b>		
AS 1141.4	Bulk Density	Two tests 1st per Lot, One test per Lot thereafter
AS 1141.6.1	Particle Density	Two tests 1st per Lot, One test per Lot thereafter
AS 1141.11 & 12	Particle Size Distribution	Two tests 1st per Lot, One test per Lot thereafter
AS 1141.22	Wet / Dry Strength	Two tests 1st per Lot, One test per Lot thereafter
AS 1141.23	Los Angeles Value	Two tests 1st per Lot, One test per Lot thereafter
AS 1141.14	Mis-shapen Particles	Two tests 1st per Lot, One test per Lot thereafter
<b>QUARRIED PAVEMENT MATERIALS</b>		
TP134	Particle Size Distribution	One test per Lot
AS 1289 3.1.2 ,3.2.1, 3.3.1 & 3.4.1	Atterberg Limits	One test per Lot
AS 1141.23	Los Angeles Value	One test per Lot <sup>(3)</sup>
TP183	Resilient Modulus / Deformation	One test per 100 Lots (Performance based only).
TP184	Triaxial Compression	One test per 100 Lots (Performance based only).
<b>RECYCLED PAVEMENT MATERIALS</b>		
TP134	Particle Size Distribution	One test per Lot
AS 1289 3.1.2, 3.2.1, 3.3.1 & 3.4.1	Atterberg Limits	One test per Lot
RMS T276	Foreign Materials Content	One test per Lot
AS 2891.3.3	Bitumen Content	One test per Lot <sup>(3)</sup>
AS 1141.23	Los Angeles Value	One test per Lot <sup>(3)</sup>
Contaminants	Metals, Organics	In accordance with Contractor's approved quality control and compliance testing procedures
TP183	Resilient Modulus / Deformation	One test per 100 Lots (Performance based only).
TP184	Triaxial Compression	One test per 100 Lots (Performance based only).
<b>STABILISED PAVEMENT MATERIALS</b>		
TP134	Particle Size Distribution	One test per Lot
AS 1289 3.1.2, 3.2.1, 3.3.1 & 3.4.1	Atterberg Limits	One test per Lot
AS 1141.23	Los Angeles Value	One test per Lot <sup>(3)</sup>



Test Procedure	Property	Minimum Test Frequency
Contractor Quality Plan	Binder Content	One test / 150 tons (refer Clause 8 "Additive Content Determination")
AS 5101.4	UCS (Strength Control)	Two tests / 150 tons (refer Clause 8 "Strength Determination Testing")
AS 5101.4	UCS (Binder Content Control)	One test per 10 000 tons
<b>SEALING AGGREGATES</b>		
AS 1141.11	Particle Size Distribution	One test per Lot
AS 1141.15	Flakiness Index	One test per Lot
TP244	% Flat Particles	One test per Lot
AS 1141.14	Mis-shapen Particles	One test per Lot
AS 1141.23	Los Angeles Value	One test per Lot <sup>(3)</sup>
AS 1141.42, AS 1141.40	Polished Aggregate Friction	One test annually <sup>(2)</sup>
TP705	Aggregate Stripping	One test annually <sup>(2)</sup>
AS 1141.20.1 or 20.2	Average Least Dimension – direct	Three tests per Lot
AS 1141.20.3	Average Least Dimension - calculated	One test per Lot
<b>ASPHALT AGGREGATES</b>		
AS 1141.11	Particle Size Distribution	One test per Lot
AS 1141.15	Flakiness Index	One test per Lot
TP240	Elongation Index	One test per Lot
AS 1141.23	Los Angeles Value	One test per Lot <sup>(3)</sup>
AS 1141.5, AS 1141.6.1 & AS 1141.6.2	Water absorption & densities	One test per 10 Lots
AS 1141.24	Sulphate Soundness	One test per 10 Lots <sup>(3)</sup>
AS 1141.30	Unsound & marginal stone contents	One test per Lot <sup>(1)(3)</sup>
AS 1141.42, AS 1141.40	Polished Aggregate Friction	One test annually <sup>(2)</sup> (refer Clause 10)
<b>SANDS</b>		
TP134	Particle Size Distribution	One test per Lot
AS 1289 3.1.2 , 3.2.1, 3.3.1 & 3.4.1	Atterberg Limits	One test per Lot <sup>(3)</sup>
AS 1141 34	Organic Impurities	One test per Lot <sup>(3)</sup>
<b>MINERAL FILLER FOR ASPHALT, OTHER THAN HYDRATED LIME</b>		
AS 1141.11	Particle Size Distribution	One per contract
AS 1141.17	Voids in Dry Compacted Filler	One per contract
AS 1289.B1.3	Moisture Content	One per week
AS 2350.8	Specific Surface	One per contract
AS 3583.3	Loss on Ignition	One per contract
AS 1141.8	Water Soluble Fraction	One per week
<b>ADDITIONAL REQUIREMENTS FOR BASIC IGNEOUS SOURCE ROCK</b>		
AS1142.6	Secondary Mineral Content	One test every two years
AS 1141.29	Accelerated Soundness Index	One test every two years
AS 1141.30	Unsound & marginal stone contents	Three tests per Lot
<b>ARRESTOR BED MATERIAL</b>		
TP134	Particle Size Distribution	One test per Lot
RMS T239	Fractured Faces	One test per Lot
AS 1141.14	Misshapen Particles	One test per Lot
WA 223.1	Crushing and Cracking	One test per contract
AS 1141.23	Los Angeles Value	One test per Lot
WA Specification 6706/02/1312 Attachment	Slump Angle	One test per Lot
AS 1141.4	Bulk Density	One test per contract

(1) Testing for Unsound & marginal stone contents under "Additional Requirements for Basic Igneous Source Rock", (if required) will include this test in the total number required per Lot.

(2) The Principal reserves the right to obtain material and undertake annual testing as necessary.

(3) Refer Clause 5 "Reduced Rate of Testing" for more information.

\* Refer to the Clause listed for further information about the testing frequency.

## Reduced Rate of Testing

- 5.8 The Contractor may adopt a reduced frequency of testing where approval has been granted under Part 4 of the Guidelines for the DPTI Prequalification Scheme for the Supply of Pavement Materials. Refer: [https://www.dpti.sa.gov.au/contractor\\_documents/prequalification](https://www.dpti.sa.gov.au/contractor_documents/prequalification).
- 5.9 Subject to Part 4 of the Guidelines for the DPTI Prequalification Scheme for the Supply of Pavement Materials, the Contractor may apply for a reduced frequency of testing for this Contract. Acceptance of a reduced rate of testing does not derogate from the Contractor's obligation to provide conforming Pavement Material.

## 6 Recycled Materials and Blast Furnace Slag

- 6.1 Where Quarried Material has been specified in Contract Documents, the Contractor may submit a proposal to use Recycled Material or Blast Furnace Slag in lieu of Quarried Material in accordance with this clause.
- 6.2 Blast furnace slag used in lieu of quarry materials referred to in this clause shall not be granulated or ground.
- 6.3 Submission of the proposal shall constitute a **Hold Point**.

### Construction and Demolition Materials

- 6.4 Recycled products comprising blends of quarried material and / or reclaimed concrete, with or without supplementary source materials (brick, tile and asphalt) shall comply with the designated quality requirements for each recycled product detailed in Appendix 1: Pavement Material Specification – List of Products.
- 6.5 No more than 20% by mass of supplementary materials may be incorporated and the constituent proportions shall remain unchanged during production.

### Blast Furnace Slag

- 6.6 Products comprising blast furnace slag or blends of quarried material and blast furnace slag shall comply with the designated quality requirements for quarried Class 1, 2 or 3 pavement materials detailed in Appendix 1: Pavement Material Specification – List of Products.
- 6.7 Blast furnace slag shall meet the requirements of the SA EPA Waste Derived Fill (Blast Furnace Slag) Specification 2015.
- 6.8 The Supplier shall provide the Principal with a written statement of compliance certifying that the Blast Furnace slag complies with the chemical criteria of the SA EPA Waste Derived Fill (Blast Furnace Slag) Specification 2015.

### Alternative Sources of Recycled Materials

- 6.9 If the Contractor proposes to supply reclaimed or industrial materials and by-products other than those described above in this Part, it shall undertake a comprehensive environmental assessment of the proposed material to determine contaminant levels.
- 6.10 The assessment shall be consistent with DPTI Environmental Instruction 21.6 "Recycled Fill Materials for Transport Infrastructure" (available from <https://www.dpti.sa.gov.au/standards/environment>) and in particular the requirements of Clause 11 "Use of Material or Soil from Non-DPTI Sources" of the Instruction. Products from alternative sources shall not be supplied without project specific written approval from DPTI.
- 6.11 The Products shall comply with the designated quality requirements for each recycled product detailed in Appendix 1: Pavement Material Specification – List of Products.

- 6.12 Suppliers of reclaimed or industrial materials and by-products shall maintain quality control procedures to ensure adequate detection and management of contaminants, including procedures relating to storage and handling, processing, sampling, analysis and reporting.
- 6.13 The assessment of the materials shall be appropriate to the physical and chemical nature of the material and its intended use. The quality control procedures shall be endorsed by an appropriately qualified professional with at least 7 years' experience in site contamination management.

## 7 Performance Based Pavement Materials

- 7.1 This Clause specifies the requirements for Performance Based Materials, which are designed and manufactured to meet particular levels of in-service pavement performance. Performance Based Materials may only be used where permitted in Contract Documents.
- 7.2 Where a Contractor proposes to design a pavement material to meet pavement performance criteria, the following applies:
- a) The Contractor shall determine the Mix Design properties for the product based on the full suite of tests identified in the Mix Design Limits of the product specification. With the exception of Resilient Modulus / Deformation testing and Triaxial Compression testing, results from testing a minimum of ten samples of product shall be used to determine the average test value. This value will be the nominated Mix Design value for that test property or sieve size. Each sample shall be representative of a minimum of 100 tonnes of product.
  - b) Mix Designs shall comply with the limits specified in "Mix Design Limits" of each product specification.
  - c) The Contractor shall submit a reference sample of the product.
  - d) Resilient Modulus / Deformation testing and Triaxial Compression testing shall be performed in duplicate on a sample representative of the submitted mix design and reference sample.
  - e) The Contractor may be requested to submit further evidence of conformance to Resilient Modulus and Triaxial Compression requirements on samples representative of the extremes of the permissible grading envelope for manufacturing, and / or field trial evidence of acceptable performance where the mix design is closer than one standard deviation from the Mix Design Limit for any specified sieve size.
  - f) The Contractor shall submit supporting mix design and / or specification conformance documentation including results for the full suite of tests identified in the Mix Design limits of the product specification. Subject to the product meeting all requirements of the Specification, DPTI will register the mix design and apply the Manufacturing Tolerance to the Mix Design for Product Quality Control purposes.
  - g) The Contractor shall not supply material under a Mix Design specification until written approval and the manufacturing tolerances have been received. Approval will remain current for a period not exceeding 2 years. The approval may be withdrawn in the event of unsatisfactory field performance of the material, or if the reference sample is no longer representative of delivered material.

## 8 Stabilised and Wet-Mixed Materials (Plant Mixed)

### General

- 8.1 Stabilised materials (which includes the addition of cement, fly ash, lime, bitumen, other binders or combinations of binders) and wet-mixed materials shall comply with this clause.
- 8.2 Stabilised materials are specified by class of pavement material, and by either binder content or strength. Materials specified by binder content basis shall be tested for binder content in accordance with Clause 8 under "Additive Content Determination".
- 8.3 Materials specified on a strength basis shall be tested for Unconfined Compressive Strength in accordance with Clause 8 under "Strength Determination Testing".

- 8.4 The addition of cement, fly ash, bitumen, lime, or slag and water shall be described by a suffix system as given in the following examples:
- a) SPM2/20QGC4      20 mm Class 2, 4% Cement Stabilised Quarried Pavement Material.
  - b) SPM1/30RMC4MPa      30 mm Class 1, 4 MPa Cement Stabilised Recycled Pavement Material.
  - c) SPM2/40QGB3      40 mm Class 2, 3% Bitumen Stabilised Quarried Pavement Material.
  - d) SPM2/20QGL1F2      20 mm Class 2 Stabilised Quarried Pavement Material with 1% Lime, and 2% Fly ash.
  - e) SPM2/30QGL1S4      30 mm Class 2 Stabilised Quarried Pavement Material with 1% Lime and 4% Slag.
- 8.5 Wet-mixed material is a mixture of Class 1, 2 or 3 Pavement Material and water, produced at a central mixing plant to a controlled moisture content that is based on the modified optimum moisture content of the material. Wet-mixed materials are identified by the suffix “W” as illustrated in the following examples:
- a) PM1/20QGW      20 mm Class 1 Quarried Pavement Material Wet-Mix (Grading Based).
  - b) PM1/20RMW      20 mm Class 1 Recycled Pavement Material Wet-Mix (Performance Based).

## Recycled Products

- 8.6 Cement, fly ash, lime, slag, bitumen or other binders shall not be added to recycled pavement material products without prior approval.
- 8.7 Where a Contractor proposes to produce a stabilised recycled product, the following applies:
- a) The Contractor shall submit evidence of compliance of the product to the full suite of tests detailed in the Product Specification Sheets (Appendix 1: Pavement Material Specification – List of Products) for Stabilised Pavement Material.
  - b) The Contractor shall submit a reference sample of the untreated recycled material, which shall be representative of a minimum of ten samples of product, and a sample of the proposed binder.
  - c) The Contractor shall undertake Unconfined Compressive Strength testing on three pairs of specimens at each binder content and curing age detailed in the Product Specification. Samples prepared for testing shall be representative of the reference sample.

## Strength Based Stabilised Material

- 8.8 Where the use of a stabilised material meeting strength based acceptance criteria is permitted under this Contract, the following applies prior to commencement of supply:
- a) The Contractor shall submit evidence of compliance of the product to the full suite of tests detailed in the Product Specification Sheets (Appendix 1: Pavement Material Specification – List of Products) for Stabilised Pavement Material (Strength Control).
  - b) The Contractor shall submit a reference sample of the unestablished material, which shall be representative of a minimum of 10 samples of product, and a sample of the proposed binder.
  - c) The Contractor shall undertake Unconfined Compressive Strength testing on 3 pairs of specimens at the binder contents and curing age required to meet the full range of strength targets detailed in the Product Specification. Samples prepared for testing shall be representative of the reference sample.
- 8.9 Strength based stabilised material shall not be supplied without the prior approval of the Principal.

## Binders

- 8.10 Binders and Additives shall comply with Table RD-PV-S1 8-1.

**Table RD-PV-S1 8-1 Binder Properties**

Material	Properties
Bitumen	Class 170 residual bitumen to RD-BP-S1 "Supply of Bituminous Materials" or other approved special foam binder.
Cement	Blended cement complying with AS 3972 "Portland and Blended Cements".
Lime	Hydrated lime or quick lime complying with AS 1672 "Building Limes". Quick lime shall be fully slaked.
Fly ash	Fine, medium or coarse fly ash meeting the requirements of AS 3582 "Supplementary Cementitious Materials for use with Portland Cement – Part 1 Fly Ash".
Slag	Ground granulated blast furnace slag shall meet the requirements of AS 3582 "Supplementary Cementitious Materials for use with Portland Cement – Part 2 Ground Granulated Blast Furnace Slag".
Chemicals	Proprietary chemical binders may be used provided documented evidence as to their suitability is submitted. Procedures for the use, dosage and handling of the binder shall be included in the Contractor's Quality Plan.
Water	Water shall be potable

## Additive Content Determination

### Bitumen

- 8.11 The bitumen content of the treated material shall be as ordered, expressed as a target percentage of dry mass. The bitumen content may vary up to +/- 0.25% from that ordered. The bitumen content shall be determined in accordance with AS 2891.3.3 "Binder Content and Aggregate Grading – Pressure Filter Method".

### Powder Form Binders

- 8.12 The binder content of the treated material shall be as ordered, expressed as a target percentage of dry mass. The binder content may vary up to +/- 0.5% from that ordered. The Contractor shall identify in the Quality Plan a methodology for control, measurement and quality assurance of the specified binder content. Proposed procedures shall be subject to approval prior to the supply of material.

### Liquid Binders

- 8.13 Liquid binders shall be ordered as a minimum percentage of the dry mass of untreated product or by loose volume of untreated product. The Contractor shall identify in the Quality Plan a methodology for control and quality assurance of the binder content.

### Combination Binders

- 8.14 Combination binders shall be ordered as a minimum percentage of the dry mass of untreated product or by loose volume of untreated product. The Contractor shall identify in the Quality Plan a methodology for control and quality assurance of the respective binder contents.

### Water

- 8.15 The moisture content of bitumen, cement, lime and / or fly ash treated material when combined with water and water by itself ordered as a wet mixed product shall be ordered expressed as a percentage of dry mass. The moisture content may vary up to +/- 1.0% from that ordered.

### Test Frequency

- 8.16 The Contractor shall include in the Quality Plan procedures for verifying the additive content for each 150 tonnes of treated material.

## Strength Determination Testing

### Powder Form Binders, Liquid Binders and Combination Binders

- 8.17 The strength of the treated material shall be as ordered, expressed as a target Unconfined Compressive Strength in MPa. The average strength of the test cylinders for each test may vary up

to - 0.5 MPa, + 1.0 MPa from that ordered. Strength shall be determined in accordance with AS 5101.4 "Unconfined Compressive Strength of Compacted Materials".

- 8.18 A contingency representative sample of the untreated material used in the production of plant treated material shall be taken from each day's production.

#### Test Frequency

- 8.19 Samples of stabilised materials shall be tested for strength at a rate not less than 2 tests (4 test cylinders) per 150 tonnes. Where Contractor developed procedures are proposed, the Contractor shall include in the Quality Plan procedures for verifying the additive content for each 150 tonnes of treated material.

#### **Addition of Retarder**

- 8.20 A retarder shall be used with blended cement binders. The proposed retarder and usage rate shall be nominated in the Contractor's Quality Plan. The Contractor's mixing plant shall be fitted with a measuring device to allow accurate measurement of the amount of retarder being added to the mix.

#### **Mixing**

- 8.21 The quarry material, selected additive (if specified) and / or water shall be mixed at a central mixing plant of the pugmill type. The mixing plant may be either a batch or continuous type. The mass of charge in a batch mixer or the rate of feed to a continuous type mixer shall not exceed that which will permit complete mixing of all material.
- 8.22 Mixing of material shall be continued until the quarry material, binder, retarder and / or water are evenly distributed through the mass and a uniform mixture of unchanging appearance is obtained. Sufficient mixing capacity shall be provided to produce enough mixture to permit placing up to 200 tonne of mixture on the road bed per hour.

#### **Transporting**

- 8.23 During transportation, the load shall be completely covered with a tarpaulin or similar heavy cover to protect the material against the effect of sun and rain. The cover shall not be removed until the load is about to be tipped.

#### **Time Requirements**

- 8.24 Cement treated material shall be delivered to the road bed or construction site within a time sufficient to enable all spreading, shaping and compaction to be carried out within 2.75 hours of the introduction of cement to the untreated material.
- 8.25 Blends of lime and fly ash or lime treated material shall be delivered to the road bed or construction site on the same day as the introduction of lime and / or fly ash to the moist material. Bitumen treated material may be stockpiled for a period not exceeding 4 weeks.
- 8.26 Wet mix material shall be delivered to the road bed or construction site and placed / compacted in a time that ensures that the moisture content of the material remains within the specified tolerance of that at which it was ordered. Other binders shall be delivered to the site within time periods detailed in the Contractor's Quality Plan.
- 8.27 The time of binder addition shall be recorded on the cart-note for each load of stabilised material.

### **9 Rail Ballast**

- 9.1 The production of rail ballast shall comply with this clause.
- 9.2 The Contractor shall undertake petrographic analyses of the source rock to the extent that all mineralogical variations of the rock are examined.
- 9.3 Where basic igneous source rock is used for the production of ballast, the Contractor shall indicate in the Quality Plan the maximum acceptable level of secondary mineralisation of the source rock and procedures for monitoring the product during quarrying and production.

- 9.4 Notwithstanding that the rock may comply with other requirements of this Specification, ballast shall not contain minerals in a concentration that may be detrimental to the overall performance of the ballast in service.
- 9.5 The ballast shall be managed at all stages to prevent material contamination, segregation and degradation. Unnecessary handling shall be avoided at all times, such as repeated mechanical handling and dropping of material.
- 9.6 Where the ballast is to be used under steel sleepers, the ballast shall comply with Classification RAIL60S.

## 10 Asphalt Aggregates and Sand

- 10.1 The production of asphalt aggregates and sand shall comply with this clause 10.
- 10.2 The production process shall provide material to meet the grading requirements for the appropriate aggregate size to produce a particular asphalt type.
- 10.3 Once the design has been completed, the grading of the aggregate to be supplied shall be known as the "Nominated Grading". Production tolerances for the assessment of conformity to the design shall comply with Appendix 1: Pavement Material Specification – List of Products.
- 10.4 The associated properties of each aggregate type complying with the property limits as shown in Appendix 1: Pavement Material Specification – List of Products shall be determined and thereafter be referred to as the Nominated Property; for example, "LA Nominated Property".
- 10.5 PAFV assessment of any size product from a particular source shall be undertaken on aggregates within the -9.5 mm to +6.7 mm size fraction of the same product source in accordance with AS 1141.40 Section 7.1.

## 11 Hold Points

- 11.1 The following is a summary of Hold Points referenced in this Part:

Document Ref.	Hold Point	Response Time
2	Submission of Procedures (where the Principal does not hold a copy of the current procedures)	7 working days
6	Proposal to use Recycled Material or Blast Furnace Slag in lieu of Quarried Material.	14 working days

## 12 Verification Requirements and Records

- 12.1 The Contractor shall supply written verification that the testing undertaken demonstrates compliance with the requirements of this Part and supply the verification with the lot package.

## 13 Appendix 1: Pavement Material Specification – List of Products

Table RD-PV-S1 13-1 Pavement Material Specification – List of Products

Identification No.	Source	Mix Design	Product
<b>SPALLS</b>			
SP300	Quarry	No	300 mm Spalls
<b>ROAD BALLAST</b>			
RB100	Quarry	No	100 mm Road Ballast
RB65	Quarry	No	65 mm Road Ballast
<b>RAIL BALLAST</b>			
RAIL50	Quarry	No	50 mm Rail Ballast
RAIL60	Quarry	No	60 mm Rail Ballast
RAIL60S	Quarry	No	60 mm Rail Ballast (steel sleepers)
<b>CLASS 3 RECYCLED PAVEMENT MATERIALS</b>			
PM3/20RG	Recycled	No	20 mm Class 3 Recycled Pavement Material [Grading Based]
PM3/40RG	Recycled	No	40 mm Class 3 Recycled Pavement Material [Grading Based]
PM3/55RG	Recycled	No	55 mm Class 3 Recycled Pavement Material [Grading Based]
PM3/75RG	Recycled	No	75 mm Class 3 Recycled Pavement Material [Grading Based]
<b>CLASS 3 QUARRIED PAVEMENT MATERIALS</b>			
PM3/20QG	Quarry	No	20 mm Class 3 Quarried Pavement Material [Grading Based]
PM3/40QG	Quarry	No	40 mm Class 3 Quarried Pavement Material [Grading Based]
PM3/55QG	Quarry	No	55 mm Class 3 Quarried Pavement Material [Grading Based]
PM3/75QG	Quarry	No	75 mm Class 3 Quarried Pavement Material [Grading Based]
<b>CLASS 2 RECYCLED PAVEMENT MATERIALS</b>			
PM2/20RG	Recycled	No	20 mm Class 2 Recycled Pavement Material [Grading Based]
PM2/30RG	Recycled	No	30 mm Class 2 Recycled Pavement Material [Grading Based]
PM2/40RG	Recycled	No	40 mm Class 2 Recycled Pavement Material [Grading Based]
PM2/20RM	Recycled	Yes	20 mm Class 2 Recycled Pavement Material [Performance Based]
PM2/30RM	Recycled	Yes	30 mm Class 2 Recycled Pavement Material [Performance Based]
<b>CLASS 2 QUARRIED PAVEMENT MATERIALS</b>			
PM2/20QG	Quarry	No	20 mm Class 2 Quarried Pavement Material [Grading Based]
PM2/30QG	Quarry	No	30 mm Class 2 Quarried Pavement Material [Grading Based]
PM2/40QG	Quarry	No	40 mm Class 2 Quarried Pavement Material [Grading Based]
PM2/20QM	Quarry	Yes	20 mm Class 2 Quarried Pavement Material [Performance Based]
PM2/30QM	Quarry	Yes	30 mm Class 2 Quarried Pavement Material [Performance Based]
<b>CLASS 1 RECYCLED PAVEMENT MATERIALS</b>			
PM1/20RG	Recycled	No	20 mm Class 1 Recycled Pavement Material [Grading Based]



Identification No.	Source	Mix Design	Product
PM1/30RG	Recycled	No	30 mm Class 1 Recycled Pavement Material [Grading Based]
PM1/40RG	Recycled	No	40 mm Class 1 Recycled Pavement Material [Grading Based]
PM1/20RM	Recycled	Yes	20 mm Class 1 Recycled Pavement Material [Performance Based]
PM1/30RM	Recycled	Yes	30 mm Class 1 Recycled Pavement Material [Performance Based]
<b>CLASS 1 QUARRIED PAVEMENT MATERIALS</b>			
PM1/20QG	Quarry	No	20 mm Class 1 Quarried Pavement Material [Grading Based]
PM1A/20QG	Quarry	No	20 mm Class 1 Heavy Duty Quarried Pavement Material
PM1B/20QG	Quarry	No	20 mm Class 1 Heavy Duty Quarried Pavement Material
PM1/30QG	Quarry	No	30 mm Class 1 Quarried Pavement Material [Grading Based]
PM1/40QG	Quarry	No	40 mm Class 1 Quarried Pavement Material [Grading Based]
PM1/20QM	Quarry	Yes	20 mm Class 1 Quarried Pavement Material [Performance Based]
PM1/30QM	Quarry	Yes	30 mm Class 1 Quarried Pavement Material [Performance Based]
<b>STABILISED PAVEMENT MATERIAL</b>			
Refer Clause 8 "General" for examples of nomenclature for this class of pavement material.			
<b>SEALING AGGREGATE</b>			
SA20-14	Quarry	No	20/14 mm Sealing Aggregate
SA16-10	Quarry	No	16/10 mm Sealing Aggregate
SA14-10	Quarry	No	14/10 mm Sealing Aggregate
SA10-7	Quarry	No	10/7 mm Sealing Aggregate
SA7-5	Quarry	No	7/5 mm Sealing Aggregate
SA5-2	Quarry	No	5/2 mm Sealing Aggregate
<b>SAND</b>			
Sa – A	Quarry/ Pit	No	Type A Sand
Sa – B	Quarry/ Pit	No	Type B Sand
Sa – C	Quarry/ Pit	No	Type C Sand
Sa – D	Quarry/ Pit	No	Type D Sand
<b>ASPHALT AGGREGATE</b>			
Refer to the relevant Product Information Sheet for requirements of Source Materials and Product Quality Control.			
<b>MINERAL FILLER FOR ASPHALT, OTHER THAN HYDRATED LIME</b>			
Refer to the relevant Product Information Sheet for requirements of Product Quality Control.			
<b>ADDITIONAL REQUIREMENTS FOR BASIC IGNEOUS SOURCE ROCK</b>			
<b>ARRESTOR BED MATERIAL</b>			

## Spalls

### Source Materials

- 13.1 Source materials must be natural quarried material and must be free from laminations or weak cleavages and of such character that they will not disintegrate from the action of the sea, sand or weather. No recycled material is permitted to be included.

### Product Quality Control

**Table RD-PV-S1 13-2 Spalls Quality Control Tests**

Test Procedure		Manufacturing Tolerance
Quality Control Tests		
Particle Size Distribution AS 1141.11	Product	300 mm Spalls SP300
	Sieve Size (mm)	Percent Passing
	300	100
	125	0 – 30
	75	0 – 2

Notes: For all materials specifications, square aperture sieves conforming to AS 1152 "Specification for Test Sieves" shall be used for the determination of grading for particle sizes 75 mm and finer. Coarser sizes shall be determined by linear measurement.

## Road Ballast

### Source materials

13.2 Source materials must be natural quarried material. No recycled material is permitted to be included.

### Product Quality Control

**Table RD-PV-S1 13-3 Road Ballast Quality Control Tests**

Test Procedure		Manufacturing Tolerance	
Quality Control Tests			
Particle Size Distribution AS 1141.11	Product	100 mm Ballast RB-100	65 mm Ballast RB-65
	Sieve Size (mm)	Percent Passing	
	125	100	
	106	90 – 100	
	75	100	
	63	95 – 100	
	53	40 – 70	
	37.5	0 - 5	0 – 15
	19	0 – 2	
AS1141.23	LA Abrasion Grading 'A'	Maximum 45%	

Notes: For all materials specifications, square aperture sieves conforming to AS 1152 "Specification for Test Sieves" shall be used for the determination of grading for particle sizes 75 mm and finer. Coarser sizes shall be determined by linear measurement.

## Rail Ballast

### Source Materials

- 13.3 Source materials must be natural quarried material and must not include recycled material or metallurgical slag. River gravel or crushed river gravel shall not be used as railway ballast because of the poor interlock between the rounded faces of the water worn rock. All testing be undertaken on representative ballast samples and not the source rock within the quarry. The sampling procedure must ensure that the samples are representative of the materials supplied and have not been affected by segregation during handling and transport.

### Product Quality Control

**Table RD-PV-S1 13-4 Rail Ballast Quality Control Tests**

Test Procedure		Manufacturing Tolerance		
Quality Control Tests				
Particle Size Distribution AS 1141.11	Product	RAIL50	RAIL60	RAIL60S (Used under steel sleepers)
	Sieve Size (mm)	Percent Passing		
	63		100	100
	53	100	85 – 100	95 – 100
	37.5	70 – 100	20 – 65	35 – 70
	26.5	-	0 – 20	15 – 30
	19	40 – 60	0 – 5	5 – 15
	13.2	-	0 – 2	0 – 10
	9.5	10 - 30	-	0 - 1
	4.75	0 - 20	0 - 1	-
	1.18	0 - 10	-	-
	0.075	0 - 1	0 - 1	0 - 1
AS 1141.4	Bulk Density	Minimum 1200 kg/m <sup>3</sup>		
AS 1141.6.1	Particle Density	Minimum 2500 kg/m <sup>3</sup>		
AS 1141.22	Wet / Dry Strength <sup>(2)</sup>	Minimum 150 kN Wet Strength, Maximum 30 % Wet / Dry Strength Variation		
AS 1141.23	LA Abrasion Grading B <sup>(3)(4)</sup>	Track carrying < 6 Mt (gross) per annum: Max 30% Track carrying >6 Mt (gross) per annum: Max 25%		
AS 1141.14 <sup>(3)</sup>	Mis-shapen Particles % <sup>(5)</sup>	Max 30 %		

**Notes:**

(1) Refer to Clause 9 “Rail Ballast” for further details.

(2) Samples must be prepared from an appropriately sized fraction of ballast from delivered lots. Wet / Dry Strength testing must be carried out on the fraction of material passing 26.5 mm sieve and retained on 19 mm sieve.

(3) Los Angeles testing must be carried out on the fraction of ballast passing 19 mm sieve and retained on 9.5 mm sieve.

(4) In accordance with AS 2758.7, the ballast itself may be crushed to provide an appropriately graded test within the size range for Los Angeles Testing only.

(5) Misshapen particles must be determined on the fraction of ballast retained on the 9.5 mm test sieve using a 2:1 Calliper Ratio. The report must indicate each of % flat, elongated, and flat and elongated particles.

## Class 3 Recycled Pavement Material [Grading Based]

### Source Materials

- 13.4 Source materials may be quarried material, reclaimed concrete or any combination of them. Supplementary source materials may comprise brick, tile and asphalt. Asbestos or asbestos fibre must not be incorporated into the product under any circumstances. No more than 20% by mass of supplementary materials may be incorporated and the constituent proportions must remain unchanged during production.

### Product Quality Control

**Table RD-PV-S1 13-5 Class 3 Recycled Pavement Material [Grading Based] Quality Control Tests**

Test Procedure	Manufacturing Tolerance				
Quality Control Tests					
Particle Size Distribution TP134	Product	20 mm Class 3 PM 3/20RG	40 mm Class 3 PM 3/40RG	55 mm Class 3 PM 3/55RG	75 mm Class 3 PM 3/75RG
	Sieve Size (mm)	Percent Passing			
	75	100			
	53		100	100	75 – 95
	37.5		90 – 100	75 – 95	
	26.5	100			50 – 75
	19	90 – 100	60 – 85	50 – 75	
	13.2				
	4.75	40 – 65	25 - 50	20 – 45	20 – 40
0.075	5 – 15	3 - 11	3 - 11	3 - 11	
AS 1289.3.1.2	Liquid Limit	Maximum 35%			
AS 1289.3.3.1	Plasticity Index	Maximum 15%			
AS 1289.3.4.1	Linear Shrinkage	Maximum 8%			
RMS T276	Type II Foreign Materials	Maximum 1%			
RMS T276	Type III Foreign materials excluding bitumen	Maximum 0.5%			
AS/NZS 2891.3.3	Bitumen Content	Maximum 1%			
AS 1141.23	LA Abrasion Grading ‘A’	N/A	Maximum 45%		
AS 1141.23	LA Abrasion Grading ‘B’	Max 45%	N/A		

## Class 3 Quarried Pavement Material [Grading Based]

### Source Materials

13.5 Source materials must be natural quarried material. No recycled material is permitted to be included.

### Product Quality Control

**Table RD-PV-S1 13-6 Class 3 Quarried Pavement Material [Grading Based] Quality Control Tests**

Test Procedure	Manufacturing Tolerance				
Quality Control Tests					
Particle Size Distribution TP134	Product	20 mm Class 3 PM 3/20RG	40 mm Class 3 PM 3/40RG	55 mm Class 3 PM 3/55RG	75 mm Class 3 PM 3/75RG
	Sieve Size (mm)	Percent Passing			
	75	100			
	53		100	100	75 – 95
	37.5		90 – 100	75 – 95	
	26.5	100			50 – 75
	19	90 – 100	60 – 85	50 – 75	
	13.2				
	4.75	40 – 65	25 - 50	20 – 45	20 – 40
	0.075	5 – 15	3 - 11	3 - 11	3 - 11
AS 1289.3.1.2	Liquid Limit	Maximum 35%			
AS 1289.3.3.1	Plasticity Index	Maximum 15%			
AS 1289.3.4.1	Linear Shrinkage	Maximum 8%			
AS 1141.23	LA Abrasion Grading ‘A’	N/A	Maximum 45%		
AS 1141.23	LA Abrasion Grading ‘B’	Max 45%	N/A		

Note: Blast furnace slag can be substituted for quarried material subject to Clause 6.

## Class 2 Recycled Pavement Material [Grading Based]

### Source Materials

- 13.6 Source materials may be quarried material, reclaimed concrete or any combination of them. Supplementary source materials may comprise brick, tile and asphalt. Asbestos or asbestos fibre must not be incorporated into the product under any circumstances. No more than 20% by mass of supplementary materials may be incorporated and the constituent proportions must remain unchanged during production.

### Product Quality Control

**Table RD-PV-S1 13-7 Class 2 Recycled Pavement Material [Grading Based] Quality Control Tests**

Test Procedure	Manufacturing Tolerance			
Quality Control Tests				
Particle Size Distribution TP134	Product	20 mm Class 2 PM 2/20RG	30 mm Class 2 PM 2/30RG	40 mm Class 2 PM 2/40RG
	Sieve Size (mm)	Percent Passing		
	53			100
	37.5		100	90 – 100
	26.5	100	90 – 100	74 – 96
	19	90 – 100	77 – 95	62 – 86
	13.2	74 – 96		
	9.5	61 – 85	51 – 75	42 – 66
	4.75	42 – 66	35 – 57	28 – 50
	2.36	28 – 50	24 – 44	20 – 39
	0.425	11 – 27	9 – 22	8 – 21
	0.075	4 – 14	4 – 12	3 - 11
AS 1289.3.1.2	Liquid Limit	Maximum 28%		
AS 1289.3.3.1	Plasticity Index	Minimum 1% - Maximum 8%		
AS 1289.3.4.1	Linear Shrinkage	Maximum 4%		
RMS T276	Type II Foreign Materials	Maximum 1%		
RMS T276	Type III Foreign materials excluding bitumen	Maximum 0.5%		
AS/NZS 2891.3.3	Bitumen Content	Maximum 1%		
AS 1141.23	LA Abrasion Grading ‘A’	N/A	N/A	Maximum 45%
AS 1141.23	LA Abrasion Grading ‘B’	Maximum 45%	Maximum 45%	N/A

## Class 2 Recycled Pavement Material [Performance Based]

### Source Materials

- 13.7 Source materials may be quarried material, reclaimed concrete or any combination of them. Supplementary source materials may comprise brick, tile and asphalt. Asbestos or asbestos fibre must not be incorporated into the product under any circumstances. No more than 20% by mass of supplementary materials may be incorporated and the constituent proportions must remain unchanged during production.

### Nominated Mix Design Parameters

**Table RD-PV-S1 13-8 Class 2 Recycled Pavement Material [Performance Based] Quality Control Tests – Mix Design Limits**

Test Procedure	Mix Design Limits		
Quality Control Tests			
Particle Size Distribution TP134	Product	20 mm Class 2 PM 2/20RM	30 mm Class 2 PM 2/30RM
	Sieve Size (mm)	Percent Passing	
	37.5	100	
	26.5	100	
	19	90 – 100	
	2.36	30 – 60	
	0.075	5 – 20	
AS 1289.3.1.2	Liquid Limit	Maximum 30%	
AS 1289.3.3.1	Plasticity Index	Minimum 1% - Maximum 10%	
AS 1289.3.4.1	Linear Shrinkage	Maximum 5%	
TP183	Resilient Modulus	Minimum 250 MPa	
TP183	Deformation	Maximum 10-7	
AS 1141.23	LA Abrasion Grading ‘B’	Contractor Nominated Value	
TP184	Triaxial Compression	Cohesion Max 250 kPa, Friction Angle Min 400	
RMS T276	Type II Foreign Materials	Maximum 1%	
RMS T276	Type III Foreign Materials excluding bitumen	Maximum 0.5%	
AS/NZS 2891.3.3	Bitumen Content	Maximum 1%	

### Product Quality Control

**Table RD-PV-S1 13-9 Class 2 Recycled Pavement Material [Performance Based] Quality Control Tests**

Test Procedure	Manufacturing Tolerance	
Particle Size Distribution TP134	Sieve Size (mm)	Percent Passing
	37.5	0
	26.5	0 (PM2/20), +/-6 (PM2/30)
	19	+/-6
	9.5	+/-9
	2.36	+/-8
	0.075	+/-3
AS 1289.3.1.2	Liquid Limit	+3
AS 1289.3.3.1	Plasticity Index	+2
AS 1289.3.4.1	Linear Shrinkage	+1
AS 1141.23	LA Abrasion Grading 'B'	+3



## Class 2 Quarried Pavement Material [Grading Based]

### Source Material

13.8 Source materials must be natural quarried material. No recycled material is permitted to be included.

### Product Quality Control

**Table RD-PV-S1 13-10 Class 2 Quarried Pavement Material [Grading Based] Quality Control Tests**

Test Procedure	Manufacturing Tolerance			
Quality Control Tests				
Particle Size Distribution TP134	Product	20 mm Class 2 PM 2/20QG	30 mm Class 2 PM 2/30QG	40 mm Class 2 PM 2/40QG
	Sieve Size (mm)	Percent Passing		
	53			100
	37.5		100	90 – 100
	26.5	100	90 – 100	74 – 96
	19	90 – 100	77 – 95	62 – 86
	13.2	74 – 96		
	9.5	61 – 85	51 – 75	42 – 66
	4.75	42 – 66	35 – 57	28 – 50
	2.36	28 – 50	24 – 44	20 – 39
	0.425	11 – 27	9 – 22	8 – 21
	0.075	4 – 14	4 - 12	3 – 11
AS 1289.3.1.2	Liquid Limit	Maximum 28%		
AS 1289.3.3.1	Plasticity Index	Minimum 1% - Maximum 8%		
AS 1289.3.4.1	Linear Shrinkage	Maximum 4%		
AS 1141.23	LA Abrasion Grading ‘A’	N/A	N/A	Maximum 45%
AS 1141.23	LA Abrasion Grading ‘B’	Maximum 45%	Maximum 45%	N/A

Note: Blast furnace slag can be substituted for quarried material subject to Clause 6.

## Class 2 Quarried Pavement Material [Performance Based]

### Source Materials

13.9 Source materials must be natural quarried material. No recycled material is permitted to be included.

### Nominated Mix Design Parameters

**Table RD-PV-S1 13-11 Class 2 Quarried Pavement Material [Performance Based] Quality Control Tests – Mix Design Limits**

Test Procedure	Mix Design Limits
Quality Control Tests	
	Product
	20 mm Class 2 PM 2/20QM
	30 mm Class 2 PM 2/30QM
	Sieve Size (mm)
	Percent Passing
Particle Size Distribution TP134	37.5
	100
	26.5
	90 – 100
	19
	80 – 95
	9.5
	2.36
	30 – 60
	25 – 55
	0.075
	5 – 20
	5 – 20
AS 1289.3.1.2	Liquid Limit
	Maximum 30%
AS 1289.3.3.1	Plasticity Index
	Minimum 1% - Maximum 10%
AS 1289.3.4.1	Linear Shrinkage
	Maximum 5%
TP183	Resilient Modulus
	Minimum 250 MPa
TP183	Deformation
	Maximum 10-7
AS 1141.23	LA Abrasion Grading 'B'
	Contractor Nominated Value
TP184	Triaxial Compression
	Cohesion Max 250 kPa, Friction Angle Min 400

### Product Quality Control

**Table RD-PV-S1 13-12 Class 2 Quarried Pavement Material [Performance Based] Quality Control Tests**

Test Procedure	Manufacturing Tolerance
	Sieve Size (mm)
	Percent Passing
Particle Size Distribution TP134	37.5
	0
	26.5
	0 (PM2/20), +/-6 (PM2/30)
	19
	+/-6
	9.5
	+/-8
	2.36
	+/-6
	0.075
	+/-2
AS 1289.3.1.2	Liquid Limit
	+3
AS 1289.3.3.1	Plasticity Index
	+2
AS 1289.3.4.1	Linear Shrinkage
	+1
AS 1141.23	LA Abrasion Grading 'B'
	+3

#### Notes:

- Blast furnace slag can be substituted for quarried material subject to Clause 6.
- Refer to the Contractor's current Mix Design certificate to assess compliance.

## Class 1 Recycled Pavement Material [Grading based]

### Source Materials

13.10 Source materials may be quarried material, reclaimed concrete or any combination of them. Supplementary source materials may comprise brick, tile and asphalt. Asbestos or asbestos fibre must not be incorporated into the product under any circumstances. No more than 20% by mass of supplementary materials may be incorporated and the constituent proportions must remain unchanged during production.

### Product Quality Control

**Table RD-PV-S1 13-13 Class 1 Recycled Pavement Material [Grading based] Quality Control Tests**

Test Procedure	Manufacturing Tolerance			
Quality Control Tests				
Particle Size Distribution TP134	Product	20 mm Class 1 PM 1/20RG	30 mm Class 1 PM 1/30RG	40 mm Class 1 PM 1/40RG
	Sieve Size (mm)	Percent Passing		
	53			100
	37.5		100	95 – 100
	26.5	100	95 – 100	79 – 91
	19	95 – 100	79 – 93	65 – 83
	13.2	77 – 93		
	9.5	63 – 83	53 – 73	44 – 64
	4.75	44 – 64	36 – 56	29 – 49
	2.36	29 – 49	25 – 43	20 – 38
	0.425	13 – 23	10 – 21	8 – 18
	0.075	5 – 11	4 - 10	3 – 9
AS 1289.3.1.2	Liquid Limit	Maximum 25%		
AS 1289.3.3.1	Plasticity Index	Minimum 1% - Maximum 6%		
AS 1289.3.4.1	Linear Shrinkage	Maximum 3%		
AS 1141.23	LA Abrasion Grading ‘A’	N/A.	N/A	Maximum 30%
AS 1141.23	LA Abrasion Grading ‘B’	Maximum 30%	Maximum 30%	N/A
RMS T276	Type II Foreign Materials	Maximum 1%		
RMS T276	Type III Foreign Materials excluding bitumen	Maximum 0.5%		
AS/NZS 2891.3.3	Bitumen Content	Maximum 1%		

Note: The recycled pavement material must have a uniform grading and must not be graded from the coarse limit of the grading envelope to the fine limit of the grading envelope, or vice versa.

## Class 1 Recycled Pavement Material [Performance Based]

### Source Materials

13.11 Source materials may be quarried material, reclaimed concrete or any combination of them. Supplementary source materials may comprise brick, tile and asphalt. Asbestos or asbestos fibre must not be incorporated into the product under any circumstances. No more than 20% by mass of supplementary materials may be incorporated and the constituent proportions must remain unchanged during production.

### Nominated Mix Design Parameters

**Table RD-PV-S1 13-14 Class 1 Recycled Pavement Material [Performance Based] Quality Control Tests – Mix Design Limits**

Test Procedure	Mix Design Limits		
Quality Control Tests			
Particle Size Distribution TP134	Product	20 mm Class 1 PM 1/20RM	30 mm Class 1 PM 1/30RM
	Sieve Size (mm)	Percent Passing	
	37.5	100	
	26.5	100	
	19	95 – 100	80 – 95
	9.5	65 – 85	50 – 75
	2.36	30 – 50	25 – 45
	0.075	5 – 15	5 – 15
AS 1289.3.1.2	Liquid Limit	Maximum 25%	
AS 1289.3.3.1	Plasticity Index	Minimum 1% - Maximum 6%	
AS 1289.3.4.1	Linear Shrinkage	Maximum 3%	
TP183	Resilient Modulus	Minimum 300 MPa	
TP183	Deformation	Maximum 10-8	
AS 1141.23	LA Abrasion Grading 'B'	Contractor Nominated Value	
TP184	Triaxial Compression	Cohesion Max 150 kPa, Friction Angle Min 450	
RMS T276	Type II Foreign Materials	Maximum 1%	
RMS T276	Type III Foreign Materials excluding bitumen	Maximum 0.5%	
AS/NZS 2891.3.3	Bitumen Content	Maximum 1%	

### Product Quality Control

**Table RD-PV-S1 13-15 Class 1 Recycled Pavement Material [Performance Based] Quality Control Tests**

Test Procedure	Manufacturing Tolerance	
	Sieve Size (mm)	Percent Passing
Particle Size Distribution TP134	37.5	0
	26.5	0 (PM1/20), +/-6 (PM1/30)
	19	+/-6
	9.5	+/-9
	2.36	+/-8
	0.075	+/-3
AS 1289.3.1.2	Liquid Limit	+3
AS 1289.3.3.1	Plasticity Index	+2
AS 1289.3.4.1	Linear Shrinkage	+1
AS 1141.23	LA Abrasion Grading 'B'	+3

Note: Refer to the Contractor's current Mix Design certificate to assess compliance.

## Class 1 Quarried Pavement Material [Grading Based]

### Source Materials

13.12 Source materials must be natural quarried material. No recycled material is permitted to be included.

### Product Quality Control

**Table RD-PV-S1 13-16 Class 1 Quarried Pavement Material [Grading Based] Quality Control Tests**

Test Procedure	Manufacturing Tolerance			
Quality Control Tests				
Particle Size Distribution TP134	Product	20 mm Class 1 PM 1/20QG	30 mm Class 1 PM 1/30QG	40 mm Class 1 PM 1/40QG
	Sieve Size (mm)	Percent Passing		
	53			100
	37.5		100	95 – 100
	26.5	100	95 – 100	79 – 91
	19	95 – 100	79 – 93	65 – 83
	13.2	77 – 93		
	9.5	63 – 83	53 – 73	44 – 64
	4.75	44 – 64	36 – 56	29 – 49
	2.36	29 – 49	25 – 43	20 – 38
	0.425	13 – 23	10 – 21	8 – 18
	0.075	5 – 11	4 – 10	3 – 9
AS 1289.3.1.2	Liquid Limit	Maximum 25%		
AS 1289.3.3.1	Plasticity Index	Minimum 1% - Maximum 6%		
AS 1289.3.4.1	Linear Shrinkage	Maximum 3%		
AS 1141.23	LA Abrasion Grading 'A'	N/A	N/A	Maximum 30%
AS 1141.23	LA Abrasion Grading 'B'	Maximum 30%	Maximum 30%	N/A

#### Notes:

- Blast furnace slag can be substituted for quarried material subject to Clause 6.
- The quarried pavement material must have a uniform grading and must not be graded from the coarse limit of the grading envelope to the fine limit of the grading envelope, or vice versa.

## Class 1 Quarried Pavement Material [Performance Based]

### Source Materials

13.13 Source materials must be natural quarried material. No recycled material is permitted to be included.

### Nominated Mix Design Parameters

**Table RD-PV-S1 13-17 Class 1 Quarried Pavement Material [Performance Based] Quality Control Tests - Mix Design Limits**

Test Procedure	Mix Design Limits		
Quality Control Tests			
Particle Size Distribution TP134	Product	20 mm Class 1 PM 1/20QM	30 mm Class 1 PM 1/30QM
	Sieve Size (mm)	Percent Passing	
	37.5	100	
	26.5	100	
	19	95 – 100	80 – 95
	9.5	65 – 85	50 – 75
	2.36	30 – 50	25 – 45
	0.075	5 – 15	5 – 15
AS 1289.3.1.2	Liquid Limit	Maximum 25%	
AS 1289.3.3.1	Plasticity Index	Minimum 1% - Maximum 6%	
AS 1289.3.4.1	Linear Shrinkage	Maximum 3%	
TP183	Resilient Modulus	Minimum 300 MPa	
TP183	Deformation	Maximum 10-8	
AS 1141.23	LA Abrasion Grading ‘B’	Contractor Nominated Value	
TP184	Triaxial Compression	Cohesion Max 150 kPa, Friction Angle Min 450	

### Product Quality Control

**Table RD-PV-S1 13-18 Class 1 Quarried Pavement Material [Performance Based] Quality Control Tests**

Test Procedure	Manufacturing Tolerance	
Particle Size Distribution TP134	Sieve Size (mm)	Percent Passing
	37.5	0
	26.5	0 (PM1/20), +/-6 (PM1/30)
	19	+/-6
	9.5	+/-8
	2.36	+/-6
	0.075	+/-2
AS 1289.3.1.2	Liquid Limit	+3
AS 1289.3.3.1	Plasticity Index	+2
AS 1289.3.4.1	Linear Shrinkage	+1
AS 1141.23	LA Abrasion Grading 'B'	+3

Note: Refer to the Contractor's current Mix Design certificate to assess compliance.

## Class 1 Heavy Duty Quarried Pavement Material [Grading Based]

### Source Materials

13.14 Source materials must be natural quarried material. No recycled material is permitted to be included.

### Product Quality Control

#### Class 1 Heavy Duty Quarried Pavement Material [Grading Based] Quality Control Tests (20 mm Class 1A PM1A/20QG)

Test Procedure	Manufacturing Tolerance [Grading Based]			
Quality Control Tests				
Particle Size Distribution TP134	Product	20 mm Class 1A PM1A/20QG		
	Percent Passing	Percent Retained		
	Sieve Size (mm)	%	Size Range (mm)	%
	37.5			
	26.5	100	26.5 – 19.0	0 - 5
	19.0	95 – 100	19.0 – 13.2	7 - 18
	13.2	78 – 92	13.2 – 9.5	10 - 16
	9.5	63 – 83	9.5 – 4.75	14 - 24
	4.75	44 – 64	4.75 – 2.36	10 - 20
	2.36	30 – 48	2.36 – 0.425	14 - 28
	0.425	14 – 22	0.425 – 0.075	6 - 13
	0.075	7 – 11		
AS 1289.3.1.2	Liquid Limit	Maximum 25%		
AS 1289.3.3.1	Plasticity Index	Minimum 2% - Maximum 6%		
AS 1289.3.4.1	Linear Shrinkage	Maximum 3%		
AS 1141.23	LA Abrasion Grading 'B'	Maximum 25%		

OR

#### Class 1 Heavy Duty Quarried Pavement Material [Grading Based] Quality Control Tests (20 mm Class 1B PM1B/20QG)

Test Procedure	Manufacturing Tolerance [Grading Based]			
Quality Control Tests				
Particle Size Distribution TP134	Product	20 mm Class 1B PM1B/20QG		
	Percent Passing	Percent Retained		
	Sieve Size (mm)	%	Size Range (mm)	%
	37.5			
	26.5	100	26.5 – 19.0	0 - 5
	19.0	95 – 100	19.0 – 13.2	7 - 18
	13.2	78 – 92	13.2 – 9.5	10 - 16
	9.5	63 – 83	9.5 – 4.75	14 - 24
	4.75	44 – 64	4.75 – 2.36	10 - 20
	2.36	29 – 48	2.36 – 0.425	15 – 29
AS 1289.3.1.2	0.425	13 – 21	0.425 – 0.075	7 – 14
	0.075	5 – 9		
AS 1289.3.1.2	Liquid Limit	Maximum 25%		
AS 1289.3.3.1	Plasticity Index	Minimum 2% Maximum 6%		
AS 1289.3.4.1	Linear Shrinkage	Maximum 3%		
AS 1141.23	LA Abrasion Grading 'B'	Minimum 25% - Maximum 30%		

## Stabilised Pavement Material [Binder Control]

### Source Materials

13.15 Source materials must be natural quarried material or, where approved, recycled materials.

### Raw Feed Product Quality Control

**Table RD-PV-S1 13-19 Stabilised Pavement Material [Binder Control] Quality Control Tests**

Test Procedure	Manufacturing Tolerance [Grading Based]			
Quality Control Tests				
Particle Size Distribution TP134	Product	20 mm Class 2 PM 2/20*	30 mm Class 2 PM 2/30*	40 mm Class 2 PM 2/40*
	Percent Passing		Percent Retained	
	Sieve Size (mm)	%	Size Range (mm)	%
	53			100
	37.5		100	90 – 100
	26.5	100	90 – 100	74 – 96
	19	90 – 100	77 – 95	62 – 86
	13.2	74 – 96		
	9.5	61 – 85	51 – 75	42 – 66
	4.75	42 – 66	35 – 57	28 – 50
	2.36	28 – 50	24 – 44	20 – 39
	0.425	11 – 27	9 – 22	8 – 21
	0.075	4 – 14	4 – 12	3 – 11
AS 1289.3.1.2	Liquid Limit	Maximum 28%		
AS 1289.3.3.1	Plasticity Index	Minimum 1% - Maximum 8%		
AS 1289.3.4.1	Linear Shrinkage	Maximum 4%		
AS 1141.23	LA Abrasion Grading ‘A’	N/A	N/A	Maximum 45%
AS 1141.23	LA Abrasion Grading ‘B’	Maximum 45%	Maximum 45%	N/A

### Stabilised Product Quality Control

**Table RD-PV-S1 13-20 Stabilised Pavement Material [Binder Control] – Product Quality Control**

Test	Product	Refer Clause 8 for nomenclature
Contractor Quality Plan	Target Binder Content (% dry mass)	Within the tolerance specified in Clause 8 "Additive Content Determination" of the binder content specified in the material description in accordance with Clause 8 "General".
AS 1141.51	Unconfined Compressive Strength (96% MDD - 7 days curing)	Reported Value
AS 1141.51	Unconfined Compressive Strength (96% MDD - 28 days curing)	Strength must not be less than the value specified in the material description in accordance with Clause 8 under "General".

Note:

- \*Raw feed material must be: PM2/20QG, PM2/30QG, PM2/40QG, OR, with prior approval, PM2/20RG, PM2/30RG or PM2/40RG.
- The Principal may specify Class 1 Quarried, Recycled or Performance Based materials as an alternative to Class 2 Pavement Material (Grading Based). When Class 1 materials are specified, Product Quality Control criteria for the appropriate Class 1 Pavement Material must apply.



## Stabilised Pavement Material [Strength Control]

### Source Materials

13.16 Source materials must be natural quarried material or, where approved, recycled materials.

### Raw Feed Product Quality Control

**Table RD-PV-S1 13-21 Stabilised Pavement Material [Strength Control] Quality Control Tests**

Test Procedure	Manufacturing Tolerance [Grading Based]			
Quality Control Tests				
Particle Size Distribution TP134	Product	20 mm Class 2 PM 2/20*	30 mm Class 2 PM 2/30*	40 mm Class 2 PM 2/40*
	Percent Passing		Percent Retained	
	Sieve Size (mm)	%	Size Range (mm)	%
	53			100
	37.5		100	90 – 100
	26.5	100	90 – 100	74 – 96
	19	90 – 100	77 – 95	62 – 86
	13.2	74 – 96		
	9.5	61 – 85	51 – 75	42 – 66
	4.75	42 – 66	35 – 57	28 – 50
	2.36	28 – 50	24 – 44	20 – 39
	0.425	11 – 27	9 – 22	8 – 21
	0.075	4 – 14	4 – 12	3 – 11
AS 1289.3.1.2	Liquid Limit	Maximum 28%		
AS 1289.3.3.1	Plasticity Index	Minimum 1% - Maximum 8%		
AS 1289.3.4.1	Linear Shrinkage	Maximum 4%		
AS 1141.23	LA Abrasion Grading ‘A’	N/A	N/A	Maximum 45%
AS 1141.23	LA Abrasion Grading ‘B’	Maximum 45%	Maximum 45%	N/A

### Stabilised Product Quality Control

**Table RD-PV-S1 13-22 Stabilised Pavement Material [Strength Control] Product Quality Control**

Test	Product	Refer Clause 8 for nomenclature
Contractor Quality Plan	Target Binder Content (% dry mass)	Within the tolerance specified in Clause 8 "Additive Content Determination" of the binder content specified in the material description in accordance with Clause 8 "General".
AS 1141.51	Unconfined Compressive Strength (96% MDD - 7 days curing)	Reported Value
AS 1141.51	Unconfined Compressive Strength (96% MDD - 28 days curing)	Strength must not be less than the value specified in the material description in accordance with Clause 8 "General".

#### NOTE:

- \*Raw feed material must be: PM2/20QG, PM2/30QG, PM2/40QG, OR, with prior approval, PM2/20RG, PM2/30RG or PM2/40RG.
- The Principal may specify Class 1 Quarried, Recycled or Performance Based materials as an alternative to Class 2 Pavement Material (Grading Based). When Class 1 materials are specified, Product Quality Control criteria for the appropriate Class 1 Pavement Material must apply.

## Sealing Aggregate

### Source Materials

13.17 Source materials must be natural quarried material. No recycled material is permitted to be included.

### Product Quality Control

**Table RD-PV-S1 13-23 Sealing Aggregate Quality Control Tests**

Test Procedure	Manufacturing Tolerance						
Quality Control Tests							
	Product	SA 20-14	SA 16-10	SA 14-10	SA 10-7	SA 7-5	SA 5-2
	Sieve Size (mm)	Percent Passing					
	26.5	100					
	19	95 – 100	100				
	16	35 – 65	65 – 90	100			
	13.2	0 – 10	15 – 40	90 – 100	100		
	9.5	0 – 2	0 – 8	0 – 15	85 – 100	100	
	6.7		0 – 2	0 – 2	0 – 15	80 – 100	100
	4.75				0 – 3	0 - 20	80 – 100
	2.36					0 - 5	0 – 10
	1.18	0 – 1	0 – 1	0 – 1	0 – 1	0 - 1	0 – 1
AS 1141.15	Flakiness Index	Maximum 25%				Reported Value	N/A
TP244	% Flat Particles	N/A				Maximum 35%	N/A
AS 1141.14 <sup>(3)</sup>	Misshapen Particles %	Reported Value			N/A		
AS 1141.23	LA Abrasion Grading H	Max 25%		N/A			
AS 1141.23	LA Abrasion Grading J	N/A		Max 25%	N/A		
AS 1141.23	LA Abrasion Grading K	N/A			Maximum 25%	Maximum 30%	Maximum 30% <sup>(1)</sup>
AS 1141 42/40 <sup>(1)</sup>	PAFV	Min 48 <sup>(2)</sup>	Minimum 45 <sup>(2)</sup>				
TP705 <sup>(1)</sup>	Aggregate Stripping	Maximum 15% Wet and Maximum 5% Dry					
AS 1141.20.1	ALD – Direct	Reported Value				N/A	
AS 1141.20.2	ALD - Direct	N/A				Reported Value	
AS 1141.20.3	ALD – Calculated	Reported Value				N/A	

Note:

(1) Sample must be prepared from an appropriately sized fraction of identical source rock.

(2) A minimum value of 55 must apply to sites requiring high skid resistance.

(3) Calliper Ratio = 2:1; report each of % flat, elongated, and flat and elongated particles.

## Sand

### Source Materials

- 13.18 Type A and B      Must be washed or unwashed natural pit, river or crushed quarry material.
- 13.19 Type C              Must be a crushed quarry product only.
- 13.20 Type D              Must be a natural pit material, dune sand or crushed quarry product.

### Product Quality Control

**Table RD-PV-S1 13-24 Sand Quality Control Tests**

Test Procedure	Manufacturing Tolerance				
Quality Control Tests					
Particle Size Distribution TP134	Product	Sa-A	Sa-B	Sa-C	Sa-D
	Sieve Size (mm)	Percent Passing			
	9.5	100	100		
	6.7			100	95 – 100
	4.75	95 – 100	95 – 100	70 – 100	
	2.36	75 – 100	75 – 100	35 – 100	
	1.18	55 – 90	45 – 90		
	0.600	35 – 70	30 – 70		
	0.425			25 – 70	
	0.300	20 – 40	20 – 42		
	0.150	5 – 20	15 – 30		
	0.075	0 - 10	5 – 20	8 – 23	0 – 10
AS 1289.3.1.2	Liquid Limit	Non-Plastic	Max 25%	Non-Plastic	
AS 1289.3.3.1	Plasticity Index		Max 6%		
AS 1289.3.4.1	Linear Shrinkage		Max 3%		
AS 1141.34	Organic Impurities	Satisfactory			

## Asphalt Aggregate

### Source Materials

- 13.21 Source materials must be natural quarried material. No recycled material is permitted to be included. Highly micaceous materials such as granite and gneiss should not be used for Asphalt Aggregates unless the Contractor can provide evidence that the aggregate particles will maintain long term strength and not exfoliate when subject to processing through an asphalt plant (or equivalent). Materials of the same size from two or more sources must not be mixed.

### Product Quality Control

- 13.22 Table RD-PV-S1 13-25 provides percentage tolerances for the assessment of conformity of aggregate and sand production.

**Table RD-PV-S1 13-25 Asphalt Aggregate Percentage Tolerances**

Percentage Passing	Tolerance about target composition of aggregate size D-d*			
	Small aggregate (D ≤ 20)	Large aggregate (D > 20)	Natural Sand	Quarry Sand
One sieve less than D	±8	±10		
Closest sieve to d	±2.5	±5		
2.36 mm sieve	-	-	±5	±5
1.18 mm sieve	±0.5	±0.5	±4	±4
0.075 mm sieve			±3	±3

\*Aggregate size D-d, e.g. 10-7

**Table RD-PV-S1 13-26 Asphalt Aggregate Quality Control Tests**

Test Procedure	Manufacturing Tolerance					
Quality Control Tests						
	Product <sup>(5)</sup>	Coarse Fraction (-37.5 mm+ 19.0 mm)	Medium Fraction (-19.0 mm + 6.7 mm)	Fine Fraction (-6.7 mm + 2.36 mm)	Natural Sand	Quarry Sand
AS 1141.24	Sulphate Soundness	Maximum 12			Maximum 15	
AS 1141.30	Unsound & Marginal Stone Content	Maximum 5% (unsound stone) <sup>(6)</sup> Maximum 10% (marginal& unsound stone)				
AS 1141.15	Flakiness Index	Maximum 30	Maximum 30		N/A	
TP 240	Elongation Index	Maximum 35	Maximum 35			
AS 1141.23	LA Abrasion Max %	Maximum 35	Maximum 25	Maximum 30		
AS 1289.3.1.2	Liquid Limit					Max 25
AS 1289.3.3.1	Plasticity index				NP	Max 61
AS 1289.3.4.1	Linear shrinkage					Max 3
AS1141.34	Organic impurities				Satisfactory	
AS 1141 42/402	PAFV <sup>(4)</sup>	-	Minimum 483	-	N/A	
AS1141.5, AS1141.6.1 & AS1141.6.2	Water absorption & densities	Report Only				

- (1) Sand may be non-plastic.
- (2) Sample must be prepared from an appropriately sized fraction of identical source rock.
- (3) A minimum value of 55 must apply to all OG and SMA Asphalt mixes. A minimum value of 55 must also apply to specified sites requiring high skid resistance.
- (4) Aggregates within -9.5 mm to +6.7 mm fraction, prepared in accordance with AS 1141.40 Section 7.1.
- (5) 'Product' for asphalt aggregates refers to the fractions of individual asphalt aggregate products used in the asphalt mix; common asphalt aggregate products include 35/20 mm, 20/14 mm, 10/7 mm and 7/2 mm.
- (6) Refer to "Additional Requirements for Basic Igneous Source Rock" for criteria which takes precedence where basic igneous source rock is used.

## Mineral Filler for Asphalt, Other Than Hydrated Lime

### Product Quality Control

**Table RD-PV-S1 13-27 Mineral Filler for Asphalt, Other Than Hydrated Lime Quality Control Tests**

Test Procedure	Manufacturing Tolerance	
AS 1141.11	Gradings (0.60, 0.3 & 0.075 mm sieves) (%)	Report Only
AS 1141.17	Voids in Dry Compacted Filler (%)	Report Only
AS 1289.B1.3	Moisture Content (%)	3% maximum
AS 2350.8	Specific Surface (square metres per kilogram)	Report Only
AS 3583.3	Loss on Ignition (% by mass)	4% maximum
AS 1141.8	Water Soluble Fraction (% by mass)	20% maximum

## Additional Requirements for Basic Igneous Source Rock

13.23 This clause applies where basic igneous source rock (as defined in AS 2758) is used for the production of a Pavement Material complying with this Part. The presence of Secondary Minerals must not have a deleterious effect of the Pavement Material's intended performance.

13.24 The Source Rock must be classified in accordance with the following:

**Table RD-PV-S1 13-28 Basic Igneous Source Rock Classifications**

<b>Rock Classification</b>	<b>Secondary Mineral Content (%) AS1142.6</b>	<b>Accelerated Soundness Index AS 1141.29</b>
Sound Rock	< 25	> 94
Marginal Rock	26-30	90-93
Unsound Rock	> 30	< 90

13.25 Unsound and marginal rock in that fraction of the product retained on a 4.75 mm AS sieve must not exceed the percentages specified below:

**Table RD-PV-S1 13-29 Basic Igneous Source Rock Marginal and Unsound Rock Percentages**

<b>Material Class</b>	<b>Total of Marginal and Unsound Rock % (max)</b>	<b>Unsound Rock % (max)</b>
PM 1	10	5
PM 2	10	7
PM 3	20	10
Sealing and Asphalt Aggregate	10	3

## Arrestor Bed Material

### Source Materials

13.26 Arrestor bed material shall have a smooth surface and be relatively spherical, well-rounded, hard and durable. Source materials shall be from a natural source such as river gravel, and be uncrushed, unblended and from a single quarry.

13.27 No recycled material is permitted to be included. Arrestor bed material shall be free of deleterious inclusions such as concrete, bitumen, bricks, and organic matter.

### Product Quality Control

**Table RD-PV-S1 13-30 Arrestor Bed Material Quality Control Tests**

Test Procedure	Manufacturing Tolerance	
Particle Size Distribution TP134	Sieve Size (mm)	Percent Passing
	19	100
	9.5	0 – 5
	0.075	Maximum 2
RMS T239	Fractured Faces	Maximum 10%
AS 1141.14 <sup>(1)</sup>	Misshapen Particles %	Maximum 10%
WA 223.1	Crushing	Maximum 5%
AS 1141.23	Los Angeles Value Grading B	Report Only
WA 223.1	Cracking	Maximum 5%
WA Specification 6706/02/1312 Attachment <sup>(2)</sup>	Slump Angle	Maximum 30°
AS 1141.4	Bulk Density	Maximum 3.4 tonnes/m <sup>3</sup>

(1) Calliper Ratio = 2:1; report each of % flat, elongated, and flat and elongated particles.

(2) Also report measured radius points and height of slump; repeat the test for a non-inverted cone.