

**PART R22****CONSTRUCTION OF PLANT MIXED STABILISED PAVEMENT****CONTENTS**

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**1. GENERAL**

- .1 This Part specifies the requirements for the construction of Plant Mixed Stabilised Pavement, using stabilising binders such as lime, polymers, cement or fly ash, but excluding bituminous binders.
- .2 The pavement must be placed in the configuration and binder content and any additional information regarding the mix design specified in Contract Specific Requirements "Pavement Work". Binder content is expressed as a percentage of the dry aggregate mass (i.e. excluding compaction water).
- .3 Documents referenced in this Part are listed below:  
AS 1289    Methods of Testing Soils for Engineering Purposes  
AS 3972    Portland and Blended Cements

**2. QUALITY REQUIREMENTS**

- .1 The Contractor must prepare and implement a Quality Plan that includes:
  - (a) Details of the type of mixing plant proposed, including type, proposed location, output capacity and method of controlling binder content and moisture content (including methods to ensure uniformity);
  - (b) Details of the retarder to be used with cement binder;
  - (c) Procedures for calibration of plant (including frequency);
  - (d) Procedure for verifying binder content, including evidence of reliability of the procedure;
  - (e) Procedures for material handling, including loading of mixer and control of segregation during loading and mixing; and
  - (f) Detailed procedures for pavement construction.
- .2 If not provided beforehand, the documentation must be submitted at least 28 days prior to the commencement of site work.
- .3 Provision of the documentation listed in this Clause shall constitute a **HOLD POINT**.

**3. MATERIALS**

- .1 Cement must be in accordance with AS 3972 and must be Type GB. A retarder must be used with cement binders.

#### 4. **MIXING**

##### **Plant**

- .1 The quarry material, binder, retarder and water must be mixed at a central mixing plant of the pugmill type. The mixing plant may be either a batch or continuous type. The mixing plant must be fitted with a measuring device to allow accurate measurement of the amount of retarder being added to the mix. The mass of charge in a batch mixer or the rate of feed to a continuous type mixer must not exceed that which will permit complete mixing of all material.
- .2 The mixing plant must be operated in accordance with the manufacturer's recommendations. Mixing of material must be continued until the quarry material, binder, retarder and water are evenly distributed through the mass and a uniform mixture of unchanging appearance is obtained.
- .3 Sufficient mixing capacity must be provided to produce enough mixture to permit placing up to 200 t of mixture on the road bed per hour and capable of providing measurements of the binder incorporated in the mix for each 200 t produced to within 0.3% of the dry mass of the material being stabilised.

##### **Process Control Requirements**

- .4 Production of each nominated mix must be such that the minimum proportion of stabilising binder incorporated is within the specified tolerances. The Contractor must implement a testing regime to demonstrate that the binder content complies with Clause 15 "Verification Requirements and Records".
- .5 At the end of each day's production, the average percentage of stabilising binder added to the plant mixed pavement material must be calculated (as a percentage of the dry mass of the material being bound, to 0.05%), from: the total amount of binder used that day (determined from delivery docketts, silo dippings, etc.), and
- .6 the total quantity of material mixed and placed in the works that day (determined by appropriate measurement).

#### 5. **TRANSPORTATION**

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

#### 6. **DELIVERY**

- .1 The rate of delivery must be sufficient to enable all spreading, shaping and compaction to be carried out within 2.75 hours of the material being stabilised. The rate of delivery and placing must also be sufficient to enable the first (or initial) compaction testing to be undertaken within 1.5 hours of the material being stabilised. This is to enable additional rolling of the material if the compaction standard has not been achieved.
- .2 Stabilised material must not be delivered when the shade air temperature exceeds 35°C and material must not be placed if the mix temperature at the site exceeds 27°C.

#### 7. **PLACING**

- .1 The spreading and shaping of the stabilised materials must be undertaken by either a paving machine or grader.
- .2 If a paving machine is used it must be:
  - (a) capable of laying and compacting pavement to a width of 12 m in a single pass;
  - (b) equipped with sensing devices for level control capable of working from a preset string line;
  - (c) fitted with a vibrating screed and tampers which impart an initial compactive effort to the pavement layer of up to 90% for the parent material; and
  - (d) capable of placing up to 200 t/h of material.
- .3 The minimum subbase layer thickness must be 100 mm. Where placed in 2 layers the upper layer of the stabilised course must not be less than one half of the specified thickness of the stabilised course. Individual layers must be of uniform thickness.

- .4 Each layer must be fully compacted and the surface kept damp prior to placing the next layer. Where placed in 2 layers, the upper layer must be placed as soon as practicable after the first layer and on the same day.
- .5 A lot must not exceed one days work.

## **8. JOINTS**

- .1 The works must be planned to minimise the number of joints. All joints, whether single or double layer, must be near vertical and must be continuous through the full depth of the stabilised material. At the end of each days work and where spreading operations have been halted for any reason for a period exceeding 3 hours, the Contractor must provide construction joints at each discontinuity in the operation. Joints must be cut within one hour of completion of compaction.
- .2 Joints must be made either transverse or parallel to the direction of the stabilising run. The joints must be formed by cutting back into the compacted stabilised material to the extent necessary to form a near vertical face. The loose trimmed material must not be incorporated into the pavement. Joints must be kept moist prior to commencement of the next stabilising run.

## **9. CURING**

- .1 The surface of compacted stabilised layers must be kept continuously moist by watering with suitable spraying equipment for a minimum period of 7 days.
- .2 For the purpose of this Clause and Clause 11 "Traffic Restrictions", the time period will commence at the completion of compaction of the section being stabilised.

## **10. FINISH**

- .1 The surface of the pavement layers must be uniformly tight and free of loose uncompacted material, segregated or 'bony' material or soft, over wet areas and free of roller indentations. The surface of the subbase layer must have a well graded aggregate texture.

## **11. TRAFFIC RESTRICTIONS**

- .1 No vehicular traffic or construction equipment (with the exception of vehicles and plant required for curing purposes provided vehicles utilised are only single axle units not exceeding 8 t per axle) will be permitted on stabilised areas for a period of 7 days from the completion of the compaction of the section being stabilised. After the 7 day period the only traffic permitted on stabilised areas must be construction equipment used for construction of subsequent pavement layers and backfilling of kerb and gutter.
- .2 The Contractor must not use any section of stabilised pavement as a construction/haul track.
- .3 Where heavy commercial vehicle access over the stabilised area is required, the Contractor must place a 200 mm thick layer of PM2/20Q Class 2 Pavement Material over the area to be trafficked.
- .4 Equipment and vehicles required for kerb laying purposes will be permitted on stabilised areas after a period of 3 days from the completion of compaction of the stabilised section.

## **12. SAMPLING AND TESTING**

### **Determination of Initial MDD**

- .1 During production of the raw feed material, bulk samples must be taken for the determination of the initial assigned value of maximum dry density in accordance with TP 166 and AS 1289.5.4.1.

### **Determination of Subsequent MDD Values**

- .2 Additional bulk samples must be taken from subsequent lots and the value of MDD updated in accordance with TP 166. The updated value must be the assigned value for that lot. Traceability must be applied to each lot and the assigned value of MDD for the lot must be used when determining the Dry Density Ratio in accordance with TP 320.
- .3 Alternatively, conforming lots of raw feed may be combined on site to form a composite stockpile. For each day of production, 5 sample increments of raw feed must be obtained at approximately equal intervals during the days production. These increments must be combined to form a bulk sample and an MDD determined which must be used to update the assigned value. This MDD must be used to determine the final compaction results for acceptance/verification.

- .4 For control testing during the placement of each layer, the assigned MDD for the material placed on the previous day must be used.

#### **Moisture Content Control**

- .5 Samples must be taken in conjunction with each binder content determination. If AS 1289.2.1.4 is utilised then calibration must be conducted in accordance with AS 1289.B3.1 and calibration checks must be carried out at the frequencies recommended in this Test Procedure.

#### **Compaction**

- .6 Unless otherwise stated in **Contract Specific Requirements** "Pavement Work" or on the Drawings, stabilised granular pavement layers must be compacted uniformly to the full depth over the full width to not less than 96% and the minimum frequency of testing must be as follows:

<b>LOT AREA (SQUARE METRE)</b>	<b>NUMBER OF TESTS PER LAYER</b>
< 300	2
301 – 600	3
601 – 900	4
901 – 1 200	5
1 201 – 1 500	6
>1 500	6 plus 1 test for each additional 300 m <sup>2</sup> lot area or part thereof.

- .7 The location of the test must be on a stratified random basis in accordance with AS 1289.1.4.2. Acceptance must be based on discrete results. Where a result fails, the stratum represented by that result must be the subject of a Non-conformance Report.

#### **Levels and Position**

- .8 Tolerances on the specified lateral position of stabilised pavement materials must be  $\pm 50$  mm. The finished level of stabilised pavement layers must be in accordance with **Contract Specific Requirements** or the Drawings.

### **13. TEST PROCEDURES**

- .1 The Contractor must use the following test procedures (refer [http://www.dpti.sa.gov.au/contractor\\_documents](http://www.dpti.sa.gov.au/contractor_documents)) to verify conformance with the Specification:

<b>TEST</b>	<b>TEST PROCEDURE</b>
SITE SELECTION BY STRATIFIED RANDOM TECHNIQUE	AS 1289.1.4.2
SAMPLING OF SOIL, AGGREGATES AND ROCKS	TP 226
PREPARATION OF SAMPLES	AS 1289.1
FIELD DENSITY: Nuclear Method	AS 1289.5.8.1
MOISTURE CONTENT: Oven Drying Method	AS 1289.2.1.1
Microwave Method	AS 1289.2.1.4
MAXIMUM DRY DENSITY: Modified Compaction	AS 1289.5.2.1
Three Point Method	TP 164 <sup>(1)</sup>
DRY DENSITY RATIO	TP 320

<sup>(1)</sup> The three point method may be used to provide MDD value in stabilised material.

<sup>(2)</sup> For granular pavement materials only.

### **14. HOLD POINTS**

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

CLAUSE REF.	HOLD POINT	RESPONSE TIME
2	Submission of Procedures (if not in Post Tender Submission) and Plant Details	7 days

## 15. VERIFICATION REQUIREMENTS AND RECORDS

### Test Records

- .1 The Contractor must undertake the testing specified in this Clause and supply written evidence of compliance with the lot package.

CLAUSE REF.	SUBJECT	PROPERTY	TEST PROCEDURE	TEST FREQUENCY	ACCEPTANCE LIMITS
4.2	Mixed Material Properties	Binder Content	Refer Quality Plan	One test per 150 t or part thereof	Within $\pm 0.5\%$ of that specified
		Moisture Content	AS 1289.2.1.1 or AS 1289.2.1.4.	One test per calibration curve	Report Only
12.4	Pavement Compaction	Dry Density Ratio	TP 320	Refer Table 12.4	Not less than 96%
12.5	Surface of Pavement Course	Levels	As specified in Part CH30	As specified in Part CH30	Refer Part R20

### Other Records

- .2 The Contractor must supply the following records:

CLAUSE REF.	SUBJECT	RECORD TO BE PROVIDED
4.5	Process Control	Daily production records of binder consumed, material mixed and placed
4.5	Process Control	Daily calculation of average binder content