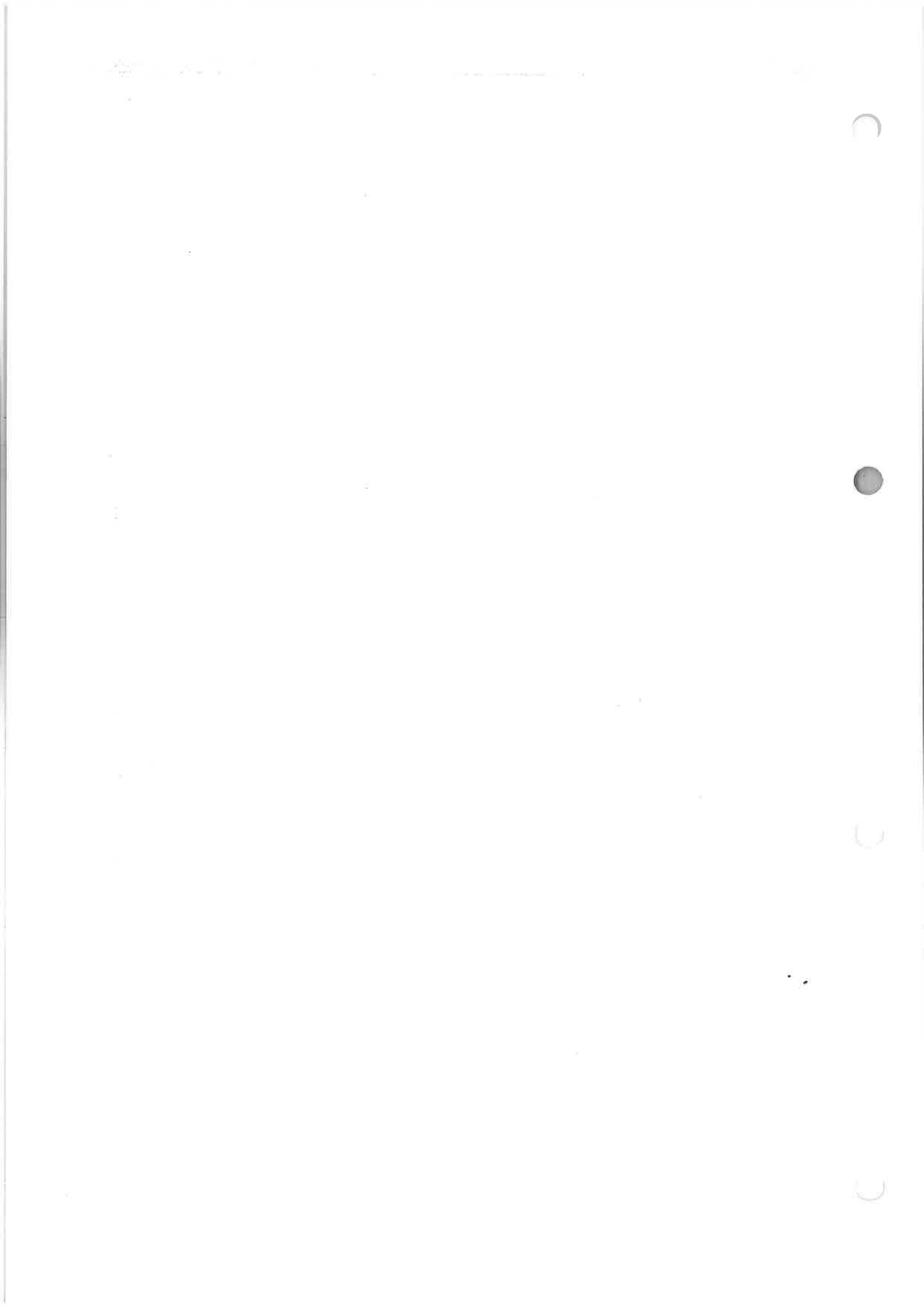


DEVELOPMENT
CONSTRUCTION
SPECIFICATION

C242

FLEXIBLE PAVEMENTS



SPECIFICATION C242 - FLEXIBLE PAVEMENTS

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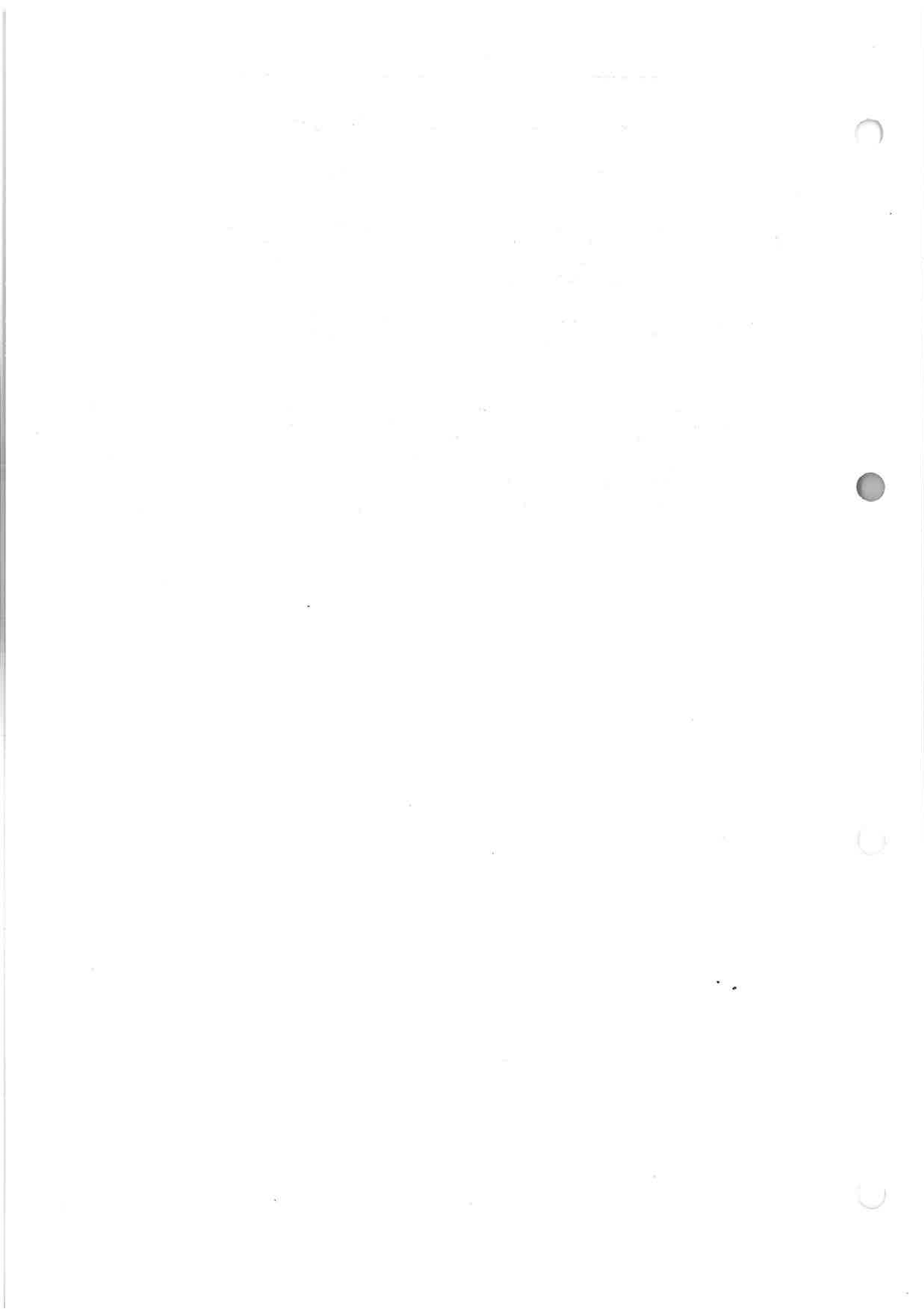
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SPECIFICATION 242 : FLEXIBLE PAVEMENTS

GENERAL

C242.01 SCOPE

1. The work to be executed under this Specification consists of the supply, spreading, compaction and trimming of base and subbase courses of flexible pavements to the specified levels and thicknesses as shown on the Drawings. This includes pavements containing bound material layer(s).

C242.02 TERMINOLOGY

- (a) Materials designated as 'base' require the provision of a wearing surface comprising either a sprayed bituminous seal or asphalt up to 100mm thick.
- (b) Materials designated as 'subbase' require a covering course of 'base'. The subbase may consist of one or more layers.
- (c) A flexible pavement consists of a base and a subbase constructed of unbound, modified or bound materials.
- (d) Bound material incorporates a cementitious binder to produce structural stiffness.
- (e) Modified material incorporates small amounts of chemical modifying agent(s) to improve the properties of the material without significantly affecting structural stiffness.

Definitions

C242.03 REFERENCE DOCUMENTS

1. Documents referenced in this specification are listed in full below whilst being cited in the text in the abbreviated form or code indicated.

*Documents
Standards Test
Methods*

(a) Council Specifications

C241	-	Stabilisation
C244	-	Sprayed Bituminous Surfacing
C245		Asphaltic Concrete

(b) Australian Standards

AS 1141.14	-	Particle shape, by proportional calliper.
AS 1141.22	-	Wet/dry strength variation.
AS 1289.3.1.1	-	Determination of the liquid limit of a soil - Four point Casagrande method.
AS 1289.3.3.1	-	Calculation of the plasticity index of a soil.
AS 1289.5.2.1	-	Determination of the dry density/moisture content relation of a soil using modified compactive effort.
AS 1289.5.8.1	-	Determination of field density and field moisture content of a soil using a nuclear surface moisture - density gauge - Direct transmission mode.
AS 1289.6.1.1	-	Determination of the California bearing ratio of a soil - Standard laboratory method for a remoulded specimen.

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(c) RTA Test Methods

T106	-	Coarse Particle Size Distribution (Sieve Analysis)
T107	-	Fine Particle in Road Materials
T108	-	Liquid Limit of Road Materials
T114	-	Maximum Dry Compressive Strength of Road Materials
T116	-	Unconfined Compressive Strength - Remoulded Material
T119	-	Determination of Density of Road Materials In-Situ using Sand Replacement Method.
T130	-	Dry Density Moisture Relations for Mixtures of Road Materials and Cement.
T131	-	Unconfined Compressive Strength
T160	-	Benkelman Beam Deflection Test
T166	-	Determination of Relative Compaction
T171	-	Modified Texas Triaxial Compression Test

d) AUSTRROADS

APRG Special Report No 21 - A Guide to the design of new pavements for light traffic - 1998

A Guide to The Structural Design of Road Pavements – 1992

e) Other

Resource NSW Specification for Supply of Recycled Material for Pavements, Earthworks and Drainage June 2003.

C242.04 PAVEMENT STRUCTURES

1. Flexible pavement material types and layer thicknesses shall be as shown on the Drawings or as specified in the approved pavement design.

**Material Types
and Layer
Thickness**

C242.05 INSPECTION, SAMPLING AND TESTING

1. Inspection, sampling and testing of the pavement shall be undertaken by the Contractor in accordance with the requirements of this Specification before and during the construction of the pavement. Testing shall be carried out by a NATA registered laboratory with appropriate accreditation and suitably qualified personnel.

**Contractor's
Responsibility**

2. The Contractor shall provide the Council's Development Engineer with written notice when testing is being carried out and copies of all test reports for approval to proceed.

Written Notice

3. Field density tests shall be carried out using Test Method T119 or AS 1289.5.3.1, or, with the Council's Development Engineer's concurrence, with a Nuclear Density Meter in accordance with Clause 242.12.

Density Tests

MATERIALS

C242.06 GENERAL

1. The Contractor shall submit details of all constituents of the proposed base and subbase materials, including sources of supply and the proposed type and proportion of any stabilising agent. These details shall be submitted to Council's Development Engineer, supported with test results from a nominated NATA registered laboratory confirming that the constituents comply with the requirements of this Specification. If the proposed base or subbase is a bound material, the Contractor shall submit a completed Annexure C241A contained in Specification C241 - STABILISATION.

**Details of
Proposed Base
and Subbase
to be
Submitted**

2. No material shall be delivered until the Council's Development Engineer has approved the source of supply.

Source of Supply

3. If, after the Contractor's proposals have been approved, the Contractor wishes to make changes in any of the material constituents the Contractor shall inform Council's Development Engineer in writing of the proposed changes. No delivery of material produced under the altered proposal shall take place without the approval of Council's Development Engineer.

Variations by Contractor

4. At least two days before placement of the material on site, the Contractor shall submit a Certificate from a laboratory with appropriate NATA registration demonstrating and stating that the unbound material or the mix and its constituents comply with the requirements of this Specification.

5. Ongoing testing of materials during delivery and construction shall be undertaken on samples taken from the site and at the discretion of the Council.

Sampling on-site

C242.07 TRAFFIC CATEGORY

1. Pavement materials are specified in terms of the Traffic Categories given in Table C242.1 for the calculated design traffic of the pavement.

Pavement Material Traffic Category Drawings

2. The Traffic Category (or Design Traffic) for the pavement materials shall be as shown on the Drawings or as specified in the approved pavement design.

Pavement Material Traffic Category	Description
1	Roads with design traffic equal to or exceeding 10^7 equivalent standard axle (ESA) repetitions.
2a	Roads with design traffic exceeding 4×10^6 ESAs but less than 10^7 ESAs.
2b	Roads with design traffic exceeding 10^6 ESAs but less than or equal to 4×10^6 ESAs.
2c	Roads with design traffic exceeding 10^5 ESAs but less than or equal to 10^6 ESAs.
2d	Roads with design traffic less than or equal to 10^5 ESAs.

Table C242.1 - Pavement Material Traffic Categories

C242.08 UNBOUND BASE AND SUBBASE

1. Unbound materials, including blends of two or more different materials, shall consist of granular material, which does not develop structural stiffness when compacted. Material produced by blending shall be uniform in grading and physical characteristics.

Granular Material

2. Unbound crushed rock materials are designated as follows:

Crushed Rock

- DGB20 20mm nominal sized densely graded base
- DGS20 20mm nominal sized densely graded subbase
- DGS40 40mm nominal sized densely graded subbase
- FCR20 20mm nominal sized fine crushed rock base
- CSS20 20mm nominal sized crushed sandstone base
- FCR40 40mm nominal sized fine crushed rock subbase
- CSS40 40mm nominal sized crushed sandstone subbase
- R1 20mm nominal sized recycled densely graded base

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R2 20mm nominal sized recycled densely graded subbase

3. Unbound natural gravel materials are designated as follows:

Natural Gravel

- NGB20-2c 20mm nominal sized natural gravel base for Traffic Category 2c
- NGB20-2d 20mm nominal sized natural gravel base for Traffic Category 2d
- NGS20 20mm nominal sized natural gravel subbase
- NGS40 40mm nominal sized natural gravel subbase

4. The acceptable material types for each Traffic Category are given in Table C242.2.

Material Types

Traffic Category	Acceptable Base Material	Acceptable Subbase Material
1	DGB20-1	DGS20, DGS40, R1
2a	DGB20-2a, R1	DGS20, DGS40, R1
2b	DGB20-2b, R1	ANY CONFORMING SUBBASE
2c	DGB20-2c,, NGB20-2c, CCS20-2c, R2	ANY CONFORMING SUBBASE
2d	DGB20-2d, NGB20-2d, FCR20-2d, CCS20-2d, R2	ANY CONFORMING SUBBASE

Table C242.2 - Acceptable Pavement Material Types

5. Base materials shall comply with the requirements of Table C242.3.

Base

Test Method	Description	Base Material Requirements			
		DGB20	R1	NGB20-2c	NGB20-2d
T106	Coarse Particle Size Distribution % passing 75.0mm sieve % passing 53.0mm sieve % passing 37.5mm sieve % passing 26.5mm sieve % passing 19.0mm sieve % passing 13.2mm sieve % passing 9.5mm sieve % passing 6.7mm sieve % passing 4.75mm sieve % passing 2.36mm sieve % passing 0.425mm sieve % passing 0.075mm sieve	- - - 100 95-100 - - 50-70 - 35-55 - -	- - - 100 95-100 70-90 - 50-70 - 35-55 10-30 5-15	- - - 100 93-100 - 71-87 - 47-70 35-56 14-32 6-20	- - - 100 93-100 - 71-87 - 47-70 35-56 14-32 6-20
T107	Fine Particle Size Distribution Ratios expressed as percentages (for that portion of the material passing 2.36mm sieve) A. Pass 425µm sieve % B. Pass 75µm sieve % Pass 425µm sieve C. Pass 13.5µm sieve % Pass 75µm sieve	35-55 35-55 35-60	- - -	- - -	- - -
T108	Liquid Limit (if non plastic) √	max 20	-	max 20	max 20
AS 1289.3.1.1	Plastic Limit (if plastic)	max 20	max 27	max 20	max 20

Test Method	Description	Base Material Requirements			
		DGB20	R1	NGB20-2c	NGB20-2d
AS 1289.3.2.1	Plasticity Index ■	max 6	Max 5	max 6	max 8
T114	Maximum Dry Compressive Strength on fraction passing 19mm sieve (only applies if Plasticity Index is less than 1)	min 1.7 MPa	min 1.7 MPa	min 1.7 MPa	min 1.7 MPa
AS 1141.14	Particle Shape by Proportional Calliper % mis-shapen (2 : 1)	max 35	max 35	-	-
AS 1141.22	Aggregate Wet Strength ◇ For category 1 or 2a For category 2b or 2c For category 2d	min 80 min 70 min 60	min 70 min 70 min 70	- - -	- - -
AS 1141.22	Wet/Dry Strength Variation ◇ Dry - Wet % Dry For category 1 or 2a For category 2b or 2c For category 2d	max 35 max 40 max 45	max 35 max 35 max 35	- - -	- - -
AS 1289.F1.1	4 day Soaked CBR (98% Modified Compaction)	-	-	80	60

Table C242.3 - Unbound Base Material Properties

NOTES ON TABLE C242.3:

Material consisting of rounded river stone shall have a minimum of two fractured faces on at least 75 per cent of the particles larger than 6.70mm.

- ▼ The maximum value of the Liquid Limit may be increased to 23 for non-plastic material, provided that the value determined is not influenced by the presence of adverse constituents.
- For category 2d base materials the maximum Plasticity Index shall be 8.
- ◇ All fractions of the sample specified by AS 1141.22 must be within specification. The fraction with the highest wet/dry strength variation is the value for determining conformance with the specification. The fractions 19.0mm to 13.2mm and 6.7mm to 4.75mm must be tested.

6. Subbase materials shall comply with the requirements of Table C242.4

Subbase

Test Method	Description	Subbase Material Requirements				
		DGS20	DGS40	R2	NGS20	NGS40
T106	Coarse Particle Size Distribution % passing 75.0mm sieve % passing 53.0mm sieve % passing 37.5mm sieve % passing 26.5mm sieve % passing 19.0mm sieve % passing 13.2mm sieve % passing 9.5mm sieve % passing 6.7mm sieve % passing 4.75mm sieve % passing 2.36mm sieve % passing 0.425mm sieve % passing 0.075mm sieve	- - - 100 95-100 - - 50-70 - 35-55 - -	- 100 - - 50-85 - - 30-55 - 25-50 - -	- - - 100 85-100 70-90 - 45-70 - - 30-55 10-30 5-15	- - - 100 96-100 - - 65-89 - 47-80 32-67 14-42 6-26	- 100 95-100 80-97 - - 48-85 - 35-73 25-58 10-33 3-21
T107	Fine Particle Size Distribution Ratios expressed as percentages (for that portion of the material passing 2.36mm sieve) A. Pass 425µm sieve % B. Pass 75µm sieve % Pass 425µm sieve C. Pass 13.5µm sieve % Pass 75µm sieve	35-55 35-55 35-60	35-60 35-60 35-65	- - -	- - -	- - -
T108	Liquid Limit (if non plastic)	max 23	max 23	-	max 23	max 23
AS 1289.3.1.1	Plastic Limit (if plastic)	max 20	max 20	max 27	max 23	max 23
AS 1289.3.2.1	Plasticity Index	max 12	max 12	max 5	max 12	max 12
T114	Maximum Dry Compressive Strength on fraction passing 19mm sieve (only applies if Plasticity Index is less than 1)	min 1.0 MPa	min 1.0 MPa	min 1.0 MPa	1.0 MPa	1.0 MPa
AS 1141.14	Particle Shape by Proportional Calliper % mis-shapen (2 : 1)	max 35	max 35	max 35	-	-
AS 1141.22	Aggregate Wet Strength ♦	min 50kN	min 50kN	min 130kN	-	-
AS 1141.22	Wet/Dry Strength Variation ♦ Dry - Wet % Dry	max 60	max 60	max 40	-	-
AS 1289.F1.1	4 day Soaked CBR (98% Modified Compaction)	-	-	-	30	30

Table C242.4 - Unbound Subbase Material Properties

NOTES ON TABLE C242.4:

Material consisting of rounded river stone shall have a minimum of two fractured faces on at least 75 per cent of the particles larger than 6.70mm.

♦ All fractions of the sample specified by AS 1141.22 must be within specification. The fraction with the highest wet/dry strength variation is the value for determining

conformance with the specification. The fractions 19.0mm to 13.2mm and 6.7mm to 4.75mm must be tested.

7. Where the proposed unbound base material complies with all of the requirements of Table C242.3 except gradings (T106, T107), the Contractor may propose the use of the material, subject to approval of Council's Development Engineer, if the material complies with the Modified Texas Triaxial Classification Number (T171) requirements specified in Table C242.5, (T171 tested at not less than 85 per cent of Optimum Moisture Content and 98 per cent of Maximum Dry Density as determined by Test Method T112 or AS 1289.5.2.1).

Modified Texas Triaxial Classification

Traffic Category	Modified Texas Triaxial Classification Number (Test Method T171)
1	max 2.0
2a	max 2.2
2b	max 2.5
2c	max 3.0
2d	max 3.0

Table C242.5 - Modified Texas Triaxial Classification Number Requirements

8. In addition to the forgoing, materials designated as R1 or R2 shall in all respects comply with the Resource NSW Recycled Materials specification.

Recycled Materials

C242.09 MODIFIED BASE AND SUBBASE MATERIALS

1. Modification of unbound base and subbase materials to meet the requirements of Clause C242.08 by the addition of a chemical modifying agent(s) shall be subject to approval by Council's Development Engineer and to the additional requirements of this clause. After modification, the material shall meet the requirements of Clause C242.08.

Modification Of Materials

2. Modification of materials for Traffic Categories 1, 2a and 2b shall only be by use of a chemical modifying agent(s) mixed in a stationary mixing plant at the supplier's quarry.

Traffic Categories 1, 2a, 2b

3. Modification of materials for Traffic Categories 2c and 2d may be by the use of a chemical modifying agent(s) through a stationary mixing plant or utilising in-situ operations.

Traffic Categories 2c, 2d

4. Material requirements of hydrated lime and quicklime shall be in accordance with Specification C241 - STABILISATION.

Lime

5. The method of incorporating chemical modifying agent(s) through the stationary mixing plant shall ensure that the agent is mixed uniformly through the material.

Incorporation

6. In-situ operations shall be in accordance with Specification C241 - STABILISATION.

In-situ Operations

7. The proportion of modifying agent shall be at the approval of Council. The material prior to treatment shall not contain any added pozzolanic material.

Proportion

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8. The modified material shall yield an unconfined compressive strength not exceeding 1.0 MPa, when tested in accordance with Test Method T116 commencing within 24 hours of modification. **Unconfined Compressive Strength**
9. For DGB20 material, prior to being modified, the material shall comply with the requirements of DGB20 in Table C242.3, except that the aggregate wet strength shall not be less than 80kN and the wet/dry strength variation shall not exceed 60 per cent. **DGB20**
10. For DGB20, the modified material shall yield a CBR value of not less than 100 when tested in accordance with AS 1289.F1.1, commencing within 24 hours of modification. **CBR Value**

C242.10 BOUND BASE AND SUBBASE MATERIALS

1. Bound materials utilised in pavements for Traffic Categories 1, 2a and 2b shall be supplied as a crushed rock product with the cementitious binder incorporated in a stationary mixing plant (pugmill) at the supplier's quarry. **Traffic Categories 1, 2a, 2b**
2. Bound material for Traffic Categories 2c and 2d may be supplied as a crushed rock product with the cementitious binder incorporated in a pugmill or may be produced by the in-situ stabilisation of natural or blended gravel where stabilisation is undertaken by mobile plant at the site. **Traffic Categories 2c, 2d**
3. Prior to stabilisation, the pavement material shall meet the requirements of Table C242.4 for subbase material for the appropriate Traffic Category. **Material Requirements Prior to Stabilisation**
4. Material requirements for the cementitious binder shall be in accordance with Specification C241 - STABILISATION. **Stabilising Agent**
5. When produced by in-situ stabilisation, the stabilisation process shall meet the requirements of Specification C241 - STABILISATION. **In-situ Stabilisation**
6. The unconfined compressive strength (UCS) of the material after seven days accelerated curing as determined by Test Method T131 shall be not less than 4MPa nor more than 10MPa. Sampling and test specimen compaction of the material shall be undertaken within one hour of the incorporation of the cementitious binder. **Unconfined Compressive Strength**

C242.11 UNSEALED PAVEMENT MATERIALS

1. Pavement materials for all unsealed roads shall comply with the requirements of Table C242.6

Unsealed Pavements

2. Pavement materials for maintenance and rejuvenation of existing unsealed shoulders shall comply with the requirements of Table C242.6 and shall be subject to the approval of Council

Unsealed Shoulders

**Test
Method**

Description

Unsealed Pavement Material Requirements

AS 1289.3.6.1

Coarse Particle Size Distribution

- % passing 75.0mm sieve
- % passing 53.0mm sieve
- % passing 37.5mm sieve
- % passing 26.5mm sieve
- % passing 19.0mm sieve
- % passing 13.2mm sieve
- % passing 9.5mm sieve
- % passing 6.7mm sieve
- % passing 4.75mm sieve
- % passing 2.36mm sieve
- % passing 0.425mm sieve
- % passing 0.075mm sieve

-
- 100
-
- 65-95
-
- 50-80
-
-
- 25-60
- 15-40
-

AS 1289.3.6.3

Fine Particle Size Distribution Ratios expressed as percentages (for that portion of the material passing 2.36mm sieve)

A. Pass 425µm sieve %

NA

B. Pass 75µm sieve %
Pass 425µm sieve

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	NA
C. Pass 13.5µm sieve % Pass 75µm sieve	
	NA
	AS 1289.3.1.1
Liquid Limit (if non plastic)	max 35
	AS 1289.3.3.1
Plastic Limit (if plastic)	max 25
	AS 1289.3.3.1
Plasticity Index	4-9
	T114
Maximum Dry Compressive Strength on fraction passing 19mm sieve (only applies if Plasticity Index is less than 1)	NA
	AS 1141.14
Particle Shape by Proportional Calliper % mis-shapen (2 : 1)	NA
	AS 1141.22
Aggregate Wet Strength ♦	min 50kN
	AS 1141.22
Wet/Dry Strength Variation ♦ $\frac{\text{Dry} - \text{Wet}}{\text{Dry}} \%$	max 60kN
	T216
Sandstone Crushing Value (in lieu of wet strength and wet/dry strength variation for sandstone materials.)	max 40
	AS 1289.F1.1
4 day Soaked CBR (min) (98% Modified Compaction)	60

Table C242.6- Unsealed Pavement Material Properties

DELIVERY, STOCKPILING AND PROCESSING OF PAVEMENT MATERIAL**C242.12 DELIVERY TO SITE**

1. Materials shall be supplied sufficiently damp to avoid segregation and loss of fines during transit. *Damp Condition*

C242.13 STOCKPILING OF UNBOUND MATERIALS

1. Stockpile sites shall be located as shown on the Drawings or as approved by the Council's Development Engineer. *Stockpile Sites*
2. Stockpile sites, which shall be cleared of all vegetation and extraneous matter, shall be shaped to form a crown so as to be free draining and compacted over the whole area to provide a relative compaction, determined by Test Method T166 for standard compactive effort, of not less than 95 per cent. *Compacted and Free Draining*
3. Stockpiles and stockpile sites shall be maintained so as to prevent the stockpiled materials from becoming intermixed or contaminated with foreign material. *Stockpile Requirements*
4. The total height of any stockpile shall not exceed 3m. *Height*
5. Stockpiles shall be of uniform shape with side slopes neither steeper than 1.5 to 1 nor flatter than 3 to 1. *Shape*
6. The worked face of any stockpile shall be the full face of the stockpile. The stockpiled material shall be maintained at a moisture content sufficiently damp to avoid loss of fines. *Maintained Damp*
7. At the completion of the works, stockpile sites shall be cleared of all surplus material and left in a clean and tidy condition. *Completion of Work*

C242.14 DELIVERY OF BOUND MATERIALS

1. Bound materials shall be delivered in vehicles fitted with covers of canvas or other suitable material to prevent loss of moisture during transport, unless otherwise approved by the Council's Development Engineer. *Vehicle Deliveries*
2. For bound materials, the time between mixing and conveyance by delivery trucks to the site, shall be such as to allow incorporation into the works including trimming and compaction within the nominated field working period. *Time Limit*
3. Each truck load of crushed rock bound material shall be identified by delivery dockets, indicating the time and date of mixing and registration or fleet number of the delivery truck, and such dockets shall be made available to the Council's Development Engineer at the point of delivery. *Delivery Dockets*

SPREADING OF PAVEMENT MATERIAL**C242.15 SPREADING PAVEMENT MATERIALS**

1. Unbound materials shall not be spread upon an underlying pavement layer which *Underlying*

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has a moisture content exceeding the laboratory optimum moisture content as determined by AS 1289.5.2.1 or which has become rutted or mixed with foreign matter. The underlying layer shall be corrected to comply with this Specification before spreading of the next layer of pavement.

Layer Quality

2. Each layer of material shall be deposited and spread in one operation and, after compaction, the finished surface levels on the base and subbase courses shall be within the permitted tolerances stated in Clause C242.22 (c) without subsequent addition of material. The thickness of each compacted layer shall be neither less than 100mm nor more than 200mm for all pavement layer types, unless otherwise approved by the Council's Development Engineer.

Tolerances

3. At all work boundaries in bound materials the Contractor shall provide vertical faces to provide for transverse and longitudinal joints.

Joints

TRIMMING AND COMPACTION

C242.16 GENERAL REQUIREMENTS

1. Each layer of the base and subbase courses shall be uniformly compacted over its entire area and depth to satisfy the requirements of relative compaction set out in Clauses C242.19 and C242.20.

*Uniform
Compaction*

2. On sections of pavement with one-way crossfall, compaction shall begin at the low side of the pavement and progress to the high side. On crowned sections, compaction shall begin at the sides of the pavement and progress towards the crown. Each pass of the rollers shall be parallel with the centreline of the roadway and uniformly overlap each preceding pass. The outer metre of both sides of the pavement shall receive at least two more passes by the compaction plant than the remainder of the pavement.

*Compaction
Procedure*

3. At locations where it would be impracticable to use self-propelled compaction plant, the pavement material shall be compacted by alternative hand-operated plant approved by the Council's Development Engineer.

*Hand Operated
Plant*

4. Watering and compaction plant shall not be allowed to stand on the pavement being compacted.

*Plant
Movement
Restrictions*

5. If any unstable areas develop during rolling, the unstable material shall be rejected. The rejected material shall be removed for the full depth of the layer, disposed of and replaced with fresh material in accordance with Clause C242.24.

Unstable Areas

6. The placement of subsequent layers shall not be allowed until the requisite testing has been completed and the Council's Development Engineer has accepted the test results for each layer.

*Placing
Subsequent
Layers*

7. Any unbound material in a layer that has attained the specified relative compaction but subsequently becomes wetted up shall be dried out and, if necessary, uniformly recompacted and trimmed to meet the specified density requirements and level tolerances.

*Excessive
Moisture
Content*

8. Each successive layer of the pavement will be tested by proof loading after completion of trimming and compaction of the layer. Council's Development Engineer shall be present during the testing. The testing will involve a visual inspection of the pavement layer as either a fully laden 8-tonne capacity truck or a roller of static weight exceeding 10 tonnes passes over the layer. This inspection will be a **HOLD POINT**. Any unstable areas, including areas showing excessive deflection, shall be rejected. Approval by Council's Development Engineer is required for release of the **HOLD POINT**.

Proof Loading

HP

C242.17 CURING OF BOUND MATERIALS

1. The curing of the surface layer of a lot shall commence after compaction is completed.
2. The stabilised work shall be protected against rapid drying out by keeping it continuously wet or damp during the period prior to the provision of a subsequent layer or the application of a prime or primer-seal.
3. Water curing shall consist of frequent light uniform spraying that will not produce significant run off or flooding on sections of the area. Slurrying of the surface or leaching of the stabilising agent shall be avoided.

**Commence-
ment Time**

Water Curing

Caution

ACCEPTANCE OF COMPACTED LAYERS

C242.18 LOTS FOR ACCEPTANCE

1. Acceptance of work shall be based on density testing of the work in lots. A lot shall be nominated by the Contractor, but shall conform to the following:
 - (a) for bound materials, only a single layer of work which has been constructed under uniform conditions in a continuous operation and not crossing any transverse construction joints;
 - (b) for unbound materials, it may comprise the entire layer.

**Lot
Requirements**

C242.19 COMPACTION ASSESSMENT

1. For residential, commercial and industrial roads, the Contractor shall arrange for testing to assess compaction on the basis of either one test per 50 lin m or 250 m² (which ever is the greater) with a minimum of two tests in any one length. The results shall be presented to the Council's Development Engineer for approval.
2. For rural roads, the Contractor shall arrange for testing to assess compaction on the basis of either one test per 100 lin m or 500 m² (which ever is the greater) with a minimum of two tests in any one length. The results shall be presented to the Council's Development Engineer for approval.
3. Acceptance of the final pavement layer shall be determined according to the elastic rebound deflection. The elastic rebound deflection shall be taken as the maximum deflection in accordance with Test Method T160 utilising the Benkelman Beam or equivalent. The average maximum deflection for any lot shall not exceed the limits stated in AUSTROADS. The co-efficient of variation (CV) in recorded deflections shall not exceed 30 per cent. Measurements shall be taken at maximum spacings of 20 metres in alternating wheel paths in each lane, with not less than 4 measurements per any one length of road.
4. The presentation of compaction testing results shall be a **HOLD POINT**. Approval by Council's Development Engineer is required for release of the **HOLD POINT**
5. Proof rolling shall be performed.

Sampling

**Benkelman
Beam Testing**

Approval

HP

**Proof Roll
Test**

C242.20 RELATIVE COMPACTION

1. The relative compaction of pavement material at each location tested for in-situ dry density shall be calculated in accordance with Test Method T166 as follows:

Calculation

FLEXIBLE PAVEMENTS

$$\text{Relative Compaction (per cent)} = \frac{\text{In-situ dry density}}{\text{Comparative dry density}} \times 100$$

2. In-situ dry density testing shall be carried out by the Contractor using Test Method T119 or, alternatively, the Council's Development Engineer may approve some or all of the in-situ dry density testing to be carried out with a single probe Nuclear Density Meter in the direct transmission mode in accordance with AS 1289.5.8.1. ***In-Situ Dry Density Testing***
3. Each day that material is produced for placement in a layer or layers, a sample of the material shall be taken by the Contractor for maximum dry density testing to represent that day's production. ***Daily Samples***
4. For unbound layers, the sample shall be tested in accordance with AS 1289.5.2.1 to determine the maximum dry density (modified compactive effort) for the material. ***Maximum Dry Density***
5. For bound layers the sample shall be tested within two hours after the addition of stabilising agent to the mix in accordance with Test Method T130 to determine the maximum dry density (modified compactive effort) for the material. This test method shall also be used to determine the optimum moisture content. ***Time for Testing***
6. The maximum dry density so determined shall be used as the comparative dry density in relative compaction calculations for all material from that day's production placed in a single layer of work. ***Comparative Dry Density***

C242.21 COMPACTION REQUIREMENTS AND ACCEPTANCE

1. A lot shall be accepted for compaction if:
 - a) **For sub-base:**
 - i. The minimum value of all calculated relative compaction for modified compactive effort is not less than 95 per cent within the lot or the area of pavement being assessed.
 - ii. Pass proof roll test
 - iii. Thickness within tolerance as determined from test pits at locations nominated by the Principal Certifying Authority.
 - b) **For base:**
 - i. The minimum value of all calculated relative compaction for modified compactive effort is not less than 98 per cent within the lot or the area of pavement being assessed.
 - ii. Pass proof roll test
 - iii. Thickness within tolerance as determined from test pits at locations nominated by the Principal Certifying Authority.
 - iv. Comply with deflection criteria of Benkelman Beam Testing.
 - c) **For bound layers:**

An area of pavement presented for compaction assessment having within that area a zone or zones with relative compaction less than 98 per cent but equal to or greater than 96 per cent, may be accepted by Council's Development Engineer provided such zone or zones shall not comprise more than 5 per cent of the area presented.

2. Lots or areas of pavement not achieving these specified values shall be rejected. Unbound layers may be reworked as provided by Clause C242.22, but the bound materials ***Rejection of Lots***

in rejected layers/courses shall be removed and replaced with fresh materials in accordance with Clause C242.24.

C242.22 REWORKING OF REJECTED UNBOUND LAYERS

- | | |
|---|----------------------------------|
| <p>1. Lots or areas of pavement that have been rejected in regard to compaction shall be reworked before resubmission for compaction assessment.</p> | <p><i>Reworking</i></p> |
| <p>2. Material that has become degraded, segregated or otherwise reduced in quality by reworking shall be rejected. The rejected material shall be removed, disposed of and replaced with fresh material complying with this Specification in accordance with Clause C242.24. When a lot or area of pavement is resubmitted for compaction assessment, testing shall be carried out in accordance with Clauses C242.18 and C242.19.</p> | <p><i>Rejected Material</i></p> |
| <p>3. All costs associated with corrective work carried out before the resubmission of a lot, including rewatering, re-rolling, removal and replacement of material as well as reworking shall be carried out at no cost to the Council.</p> | <p><i>Contractor's Costs</i></p> |

C242.23 TOLERANCES

a) General

- | | |
|---|---|
| <p>1. The tolerances stated are the acceptable limits of departure from the dimensions shown on the Drawings.</p> | <p><i>Tolerances</i></p> |
| <p>2. Areas for assessment of conformity with tolerance requirements shall be divided into lots and presented to the Council's Development Engineer together with survey reports covering line and level.</p> | <p><i>Lots for Assessment of Conformity</i></p> |

b) Width

- | | |
|---|-------------------------------------|
| <p>1. At any cross section without kerb and/or guttering, and for pavement layers extending under the kerb and/or guttering, the horizontal dimension measured from the design centre line to the edge of the constructed pavement surface shall be neither less than 50mm less than the dimension nor more than 300 mm greater than the dimension shown on the Drawings.</p> | <p><i>Horizontal Dimensions</i></p> |
| <p>2. The average width of the layer determined from measurements at three sites selected at random by the Council's Development Engineer over any 200 metre road length, or part thereof, shall be not less than the specified width.</p> | <p><i>Average Width</i></p> |

c) Levels and Surface Trim

- | | |
|---|---------------------------------------|
| <p>1. The levels of the finished surface of the top of the subbase course shall not vary from the design levels by more than ± 10mm.</p> | <p><i>Subbase Surface Level</i></p> |
| <p>2. Level tolerances at the top of the base course shall not vary from the design levels by more than 10mm. In addition, where kerb and gutter exists or is being constructed, the level of the top of the base course adjacent to the kerb and gutter shall not vary by more than ± 5mm from the lip level of the gutter minus the design thickness of the wearing surface.</p> | <p><i>Base Surface Level</i></p> |
| <p>3. The design level of the top of the subbase course shall be determined from the design level of the finished road surface less the thickness of the base course and the wearing course.</p> | <p><i>Subbase Design Level</i></p> |
| <p>4. The pavement surface after trimming and immediately prior to sealing shall be of a quality such that the deviation under a 3 metre straight edge placed in any direction does not exceed 12mm. Measurements with the 3 metre straight edge shall be taken at a minimum of 10 randomly selected stations so as to represent a 200-metre lane length or part thereof.</p> | <p><i>Straight Edge Deviation</i></p> |

C242.24 ACTION ON REJECTION

(a) Unbound Materials

1. A lot that has not complied with the requirements for width or level tolerance as set out in Clauses C242.22 (b) and C242.22 (c) respectively shall be rejected except as otherwise provided in this Clause. Rejected lots shall be removed, disposed of and replaced with fresh material in accordance with Clause C242.24.

**Rejection
Criteria**

2. Notwithstanding the above, where the rejected lot can be corrected by further trimming, Council's Development Engineer may allow the surface to be corrected without complete removal and replacement with fresh material. Such trimming shall be undertaken in a manner that produces a uniform, hard surface and shall be achieved by cutting only without filling. After any such cutting, the level tolerances in Clause C242.22(c) shall apply.

**Corrective
Action**

(b) Bound Materials

1. An area that has not complied with the requirements for width or level tolerance as set out in Clauses C242.22 (b) and C242.22 (c) respectively shall be rejected except as otherwise provided for in this Clause. Rejected areas shall be removed, disposed of and replaced with fresh material in accordance with Clause C242.24.

**Rejection
Criteria**

2. Notwithstanding the above, Council's Development Engineer may allow the Contractor to rectify the area in the following cases:

**Corrective
Action
Circumstances**

(i) Where the cause for rejection is under Clause C242.22 (c), the course is a subbase course and rejection is due to departures from design level being too far below the design level, the Contractor may increase the thickness of the base course to make up such deficiency in thickness.

(ii) Where the cause for rejection is under Clause C242.22(c), the course is a subbase course and rejection is due to departures from design level being too far above the design level, the Contractor may propose a regrading of the design level of the base course, to allow for its design thickness to be laid, up to a maximum of 20mm above the original design level. Approval by the Council's Development Engineer shall be subject to the following requirements:

- The rate of change of grade from the original finished design surface level shall be less than 3 mm per metre.
- The regrading shall not interfere with the proper design functioning of the drainage system.
- The regrading shall not interfere with levels at the property boundary, or increase or decrease footpath or footpath crossover levels or grades beyond Council's allowable design limits.
- The regrading shall not interfere with clearances.

(iii) Where the cause for rejection is under Clause C242.22(c), the course is a base course and rejection is due to departures from design level being too far above the design level, the Contractor may propose a regrading of the design level of the base course. Approval by Council's Development Engineer shall be subject to the requirements of this Clause in (ii) above.

C242.25 REMOVAL AND REPLACEMENT OF REJECTED COURSES

1. Sections of the work that have been rejected shall be removed from the work and replaced with fresh material. Rejected material shall be removed from site.

**Rejected
Material**

2. In rejected sections the material shall be removed over the full length of the rejected lot, except that a minimum length of 50 m of pavement layer shall be removed and replaced. Any damage to underlying or abutting layers or structures shall be made good by the Contractor using methods approved by the Council's Development Engineer.

Length to be Removed

3. The Council's Development Engineer may approve removal for less than the full width as constructed if the cause of the rejection of the work can be isolated transversely to the Council's Development Engineer's satisfaction. In this case, the new longitudinal cold joint shall be formed and located along the centreline of the road pavement.

Superintendent's Discretion

4. After removal of rejected base or subbase course material, the section shall be presented for inspection by the Council's Development Engineer before replacement work is commenced.

Inspection Before Replacement

5. Materials used as replacement materials, and the subsequent spreading, compaction, trimming, curing and testing of the replacement materials, shall comply with the requirements of this Specification.

Replacement Material

C242.26 MAINTENANCE BEFORE COMPLETION OF WEARING SURFACE

1. Following the Council Engineer's acceptance of any section of the work, the Contractor shall maintain the prepared surface of the base in the condition specified for acceptance until the wearing surface is completed. The base course of sections of the accepted work shall be covered with a primer seal over the full width of pavement in accordance with the Specification for SPRAYED BITUMINOUS SURFACING within seven days of the date of the acceptance of such sections, unless otherwise approved by the Council's Development Engineer.

Primerseal

2. Should the pavement condition deteriorate before the application of the primer seal and consent to proceed with the bitumen surfacing work is withdrawn by Council's Development Engineer, the Contractor shall re-prepare the pavement and re-present the pavement for acceptance by Council's Development Engineer.

Contractor's Responsibility

OPENING PAVEMENT TO TRAFFIC

C242.27 GENERAL REQUIREMENTS

1. For unbound pavements, construction plant and vehicles not involved in the current construction or testing of the work shall not be permitted to use the pavement until the primer seal has been applied, unless otherwise approved by the Council's Development Engineer.

Restrictions on Movement

2. For bound pavements, construction plant and vehicles not involved in the current construction or testing of the work shall not be permitted to use the pavement until the primer seal has been applied and seven days have elapsed since placement of the base.

Restrictions on Movement of Construction Traffic

3. For bound pavements, traffic shall not be allowed to use the constructed pavement until a minimum of seven days after completion of the full pavement depth and the primer seal.

Open to Traffic Bound Pavement

LIMITS AND TOLERANCES

C242.28 SUMMARY OF LIMITS AND TOLERANCES

1. The tolerances applicable to the various clauses in this Specification are summarised in the Table below

Item	Activity	Tolerances	Spec Clause
1.	Stockpile Sites	(i) Relative Compaction > 95% (ii) Stockpile height < 3m (iii) Stockpile batter < 1.5:1 and > 3:1	C242.12 C242.12
2.	Spreading Pavement Materials		
	(i) Compacted Layer Thickness	≥ 100mm, ≤ 200mm	C242.14
3.	Compaction Acceptance		
	Minimum value of all calculated relative compaction results	≥ 98 per cent (modified compactive effort)	C242.20
4.	Width of Pavement		
	(i) Design centre-line to edge of constructed pavement	-50mm to +300mm of dimensions on Drawings	C242.22(b)
	(ii) Average Width	The average width determined from 3 random sites over any 200m road length, or part thereof, shall be not less than the specified width.	C242.22(b)
5.	Surface Level		
	(i) Subbase levels	<± 10mm from design level	C242.22(c)
	(ii) Base levels	<± 10mm from design level	C242.22(c)
	(iii) Base levels adjacent to Kerb and Gutter	<±5mm from the lip levels of adjacent gutter minus design thickness of wearing surface.	C242.22(c)
	(iv) Shape	Deviation from a 3m long straightedge on base surface immediately prior to sealing shall be less than 12mm	C242.22(c)

Table C242.3 - Summary of Limits and Tolerances

C242.29 SUMMARY OF APPROVALS & SUBMISSIONS TO COUNCIL'S DEVELOPMENT ENGINEER

Activity	Notice Required	Spec Clause
Details of Proposed Base and Subbase to be Submitted		C242.06 1.
Variations by Contractor of Proposed Base and Subbase		C242.06 3.
Modified Texas Triaxial Classification		C242.08 7.
Modification of unbound base and subbase materials		C242.09 1.
Thickness of each compacted layer		C242.15 2.
Proof Loading of each successive layer of the pavement	HOLD POINT	C242.16 8.
The presentation of compaction and deflection testing results	HOLD POINT	C242.19 4.
Correction of rejected lot by further trimming		C242.24 (a) 2.
Correction of rejected lot – bound layer		C242.24 (b) 3.

Table C242.4

