

# Engineering Construction Specification C17 Drainage blankets

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This document is a modified version of AUS-SPEC 1174  
Drainage blankets October 2018 version

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# 1 General

## 1.1 Responsibilities

### 1.1.1 General

Requirement: Provide geotextile and create drainage blankets, filter aggregates and filter slotted pipes, as documented.

## 1.2 Cross references

### 1.2.1 General

Requirement: This worksection is not a self-contained specification. In addition to the requirements of this worksection, conform to the following:

- *C01 General requirements (Construction)*
- *C02 Quality management (Construction)*
- *C03 Control of traffic*
- *C14 Subsurface drainage (Construction).*
- *C16 Pavement drainings (Construction)*

## 1.3 Interpretation

### 1.3.1 Definitions

General: For the purposes of this worksection the following definitions apply:

- Phreatic line or water table: The top flow line of a saturated soil mass below which seepage takes place, is called the Phreatic line. Hydrostatic pressure acts below the phreatic line whereas atmospheric pressure exists above the phreatic line. This line separates a saturated soil mass from an unsaturated soil mass. It is not an equipotential line, but a flow line.
- Type A blankets: Blankets constructed in fill road embankments where it is necessary to provide an open graded filter material to prevent upward flow of groundwater by capillary action into the road pavement material or a saturation weakening of the subgrade just below the pavement.
- Type B blankets: Blankets constructed to intercept water in road cuttings uplifting into pavements by capillary action from water charged aquifers underlying the road formation.

## 1.4 Submissions

### 1.4.1 Tests

Results: Submit results of testing to **ANNEXURE**

## 1.5 Inspections

### 1.5.1 Notice

General: Give notice so that inspection may be made of the following:

- Installation of geotextile in trenches.
- Survey of road subgrade minus 300 mm for thickness of filter layer.
- Installation of bottom layer of geotextile on road subgrade minus 300 mm and overlapping trenches
- Installation of filter material over the base filter geotextile.
- Survey of constructed subgrade after placing of filter material.

- Installation of top layer of geotextile over top of filter material prior to subbase gravel.

## 2 Materials

### 2.1 Blanket components

#### 2.1.1 General

Pressure pipes, geotextile, and filter material: To *C14 Subsurface drainage (Construction)* for grading requirements for granular filter materials.

#### 2.1.2 Filter material

Type A blankets: Provide Type A blankets in road cuttings or in transition fill embankment zones to the **Type A filter grading table** for single and first stage filters A1 to A6 gradings as documented in *C14 Subsurface drainage (Construction)*.

Type B blankets: Provide Type B blankets in both cuttings and transition embankment fill adjacent to geotextile surrounded pipework and separated from local soils or road pavement gravels by geotextile material to the **Type B filter grading table** for second stage filters, type B1 to B4 gradings, limited graded aggregates as documented in *C14 Subsurface drainage (Construction)*.

#### 2.1.3 Pipes

General: Thick walled PVC pressure pipe.

## 3 Execution

### 3.1 Order of construction

#### 3.1.1 General

Requirement: Conform to the following:

- Type A blankets: Place blankets after the site has been cleared and grubbed and before commencement of embankment construction.
- Type B blankets: Place blankets after completion of the subgrade construction minus 300 mm and before construction of the pavement.

### 3.2 Type A blankets (in fill) Geotextile

#### 3.2.1 Location

General: Provide Type A drainage blankets for transition from road cutting to low road fill embankment, as documented.

Extent: 2 m beyond the toes of embankments.

#### 3.2.2 Clearing and grubbing

General: Conform to the following:

- Clear and grub the road footprint plus 5 m extra either side of the base of proposed fill.
- Strip topsoil 200 mm to selected heaps for reuse later for revegetation.

#### 3.2.3 Compaction

Requirement: Trim and compact the parent local soil subgrade to a design level 300 mm below design subgrade of the road. Compact with a flat drum roller to allow an even surface for the geotextile.

### 3.2.4 Placement of geotextile

Requirement: Conform to the following:

- Place the lower geotextile layer of the proposed drainage blanket across the road and clear of the toe of embankment.
- Place the alternative Type A1 to A6 filter gravel material selected based on the parent soil to Type A filter grading table in *C14 Subsurface drainage (Construction)*.
- Trim and compact the top of the selected filter gravel layer to the design road subgrade level.
- Survey top of compacted filter layer to ensure level of subgrade is within tolerances for road design.
- Place the upper geotextile layer of the proposed drainage blanket on the subgrade across the road and 2 metres clear of the base of the embankment. Cover the overlapped geotextile with parent soil.

### 3.2.5 Additional requirements of geotextile

Special advice: Conform to the following:

- At rock embankments: Place an additional layer of geotextile at the base of any rock facing. Extend the additional layer of geotextile beyond the outside and inside faces of the bottom layer of rock.
- Intersections: Minimum 200 mm overlap.
- Timing: Less than 14 days between initial laying out and final cover of the geotextile with filter layer.
- Protection: Secure the geotextile to prevent movement by wind or by construction activities. Protect and avoid damage during construction of the drainage blanket.
- Removal to spoil and replacement: Remove and replace damaged geotextile and remove if geotextile is exposed for longer than 14 days. The cost of repairing or replacing such damaged geotextile shall be borne by the contractor

Thickness of filter gravels: Conform to the following:

- Known expected consolidation of embankment: 300 mm minimum plus allowance for the expected total consolidation of the embankment.
- Check by survey that the top of compacted filter material is at design subgrade level for the road pavement.

Protective layer: After the approval of the subgrade survey information and the placement of the top geotextile layer of the blanket. Cover the extension of the top geotextile beyond the toe of the embankment with 300 mm filter material or parent soil.

### 3.2.6 Discharge

Outlets: Install as follows:

- Surface outlets: At the toes of embankments.
- Piped outlets: Connect to other drainage systems.

## 3.3 Type B blankets in cuttings

### 3.3.1 Location

General: Provide Type B drainage blankets in cuttings to be integrated with side trench drains.

### 3.3.2 Clearing and grubbing

General: Conform to the following:

- Clear and grub the road footprint to about 5 m clear of the proposed top of road cutting.
- Strip topsoil 200 mm depth to selected heaps for later reuse.
- Trim and compact the parent local soil subgrade to a design level between 250 mm and 300 mm below design subgrade of the road. Compact with a flat drum roller.
- Trim the cutting embankment with extra width both sides for the proposed subsoil side drains plus some extra width as selected.
- Excavate subsoil drainage trenches to a selected design depth depending on assessed water table levels from the cuttings and surrounding land grades.

### 3.3.3 Placement of geotextile

Location: In cuttings, as documented.

Width: The full width of cuttings and overlapping the side drains and, for the road pavement width.

- Place the lower level geotextile across the road and lining trenches plus provision for overlap of geotextile for the top layer of geotextile.
- Compact the 50 mm pipe bedding of filter gravel then place subsoil drainage pipework with or without filter sock as determined by type of filter material selected either B1, B2, B3 or B4.
- Cover the subsoil drain with gravel filter material compacting in maximum 300 mm layers.
- When the side drains are filled to the bottom of the road filter level place and compact the filter material across the roadway and over the side drains and to the design level of the road subgrade.
- Survey top of compacted filter layer to ensure level of subgrade is within tolerances for road design.
- Place the upper level geotextile with overlapping of at least 200 mm for material from the sidedrains.
- Place and compact a maximum 300 mm width layer of parent soil or clayey subbase gravel over both side drains 150 mm thick then place the subbase and base gravel layers over the central roadway.

### 3.3.4 Special treatment of geotextile

General: Install geotextile as follows:

- Geotextile under rock facing: Place an additional layer of geotextile at the base of any rock facing. Extend the additional layer of geotextile beyond the outside and inside faces of the bottom layer of rock.
- Intersections: Minimum 200 mm overlaps.
- Geotextile deterioration by ultraviolet light: Ensure that all geotextile is covered at least 14 days maximum after first sunlight exposure to prevent sunlight damage to the geotextile. Where possible, place geotextiles just ahead of construction works and cover with materials within 48 hours.
- Protection: Secure the geotextile to prevent movement by wind or by construction activities. Protect and avoid damage during construction by using only flat drum roller to provide a flat surface for placement of filter material over geotextile.
- Removal and geotextile replacement: If geotextile is exposed to sunlight for longer than 14 days or damaged by activity then remove and replace geotextile where affected. The cost of repairing or replacing such damaged geotextile shall be borne by the contractor

### **3.3.5 Filter material**

Compaction: Compact cohesionless material to a Density Index of 70%.

Thickness: As documented.

Layers: Install filter material in layers so that the thickness of each compacted layer is no greater than 250 mm maximum.

### **3.3.6 Discharge**

Outlets: To *C14 Subsurface drainage (Construction)*.

### **3.3.7 Tolerance**

Surface level to top of drainage blankets: + 0 and - 40 mm from designed finished level.

## 4 Annexures

### 4.1 Annexure - Summary of hold and witness points

Reference No:	Clause and description	Type*	Submission/Inspection details	Submission/Notice times	Process held
C17-HP01	INSPECTION Notice  Install geotextile in trenches.	H	Inspection of pipes, bedding and trench geotextile prior to filling trench with trench filter aggregates.	1 day before filling trenches	Compaction. For development inspections book through "MyInspect".
C17-WP02	INSPECTION Notice  Survey of road subgrade	W	Survey of parent soil under road filter 300mm below road design subgrade.	1 day before placement of bottom geotextile layer.	Placement of filter material.
C17-WP03	INSPECTION Notice  Installation of bottom layer of geotextile.	W	Inspection of bottom geotextile layer and trench geotextile prior to placement of Type A or Type B filter material	1 day prior to placement of aggregate filter materials	Placement of filter material
C17-HP04	INSPECTIONS, Notice  Installation of filter material over the base filter geotextile.	H	Filter gravel material Type A or Type B placement. Compaction with vibrating flat drum roller.	2 days before placing of top geotextile layer	Filter material placement and compaction of each layer. For development inspections book through "MyInspect".
C17-WP05	INSPECTION Notice  Survey of constructed subgrade after placing of filter material	W	Survey of top of Type A or Type B of compacted filter material. Levels to road subgrade design.	1 day before placement of top geotextile filter layer	Placement of geotextile top layer.
C17-WP06	INSPECTIONS Notice  Installation of top layer of geotextile over top of filter material prior to subbase gravel.	W	Geotextile for top layer properly overlaps side trench geotextile	1 day before placement of filter material	Placement of filter material at road subgrade level for top of drainage blanket completion



Reference No:	Clause and description	Type*	Submission/Inspection details	Submission/Notice times	Process held
C17-HP07	SUBMISSIONS, Work as Executed details and asset attribute information.	H	Submit details showing locations of any new subsoil drainage blankets	2 weeks following completion of works.	Completion
*H = Hold Point, W = Witness Point					

## 4.2 Annexure - Maximum lot sizes and minimum test frequencies

Activity	Key quality verification requirements	Test method
Parent soil below lower geotextile filter	Compaction density test soil below Filter material A or B	AS 1289.5.1.1
Compaction	Density Index for cohesionless material filter A and B	AS 1289.5.6.1

## 4.3 Annexure - Referenced documents

The following documents are incorporated into this worksection by reference:

AS 1289		Methods of testing soils for engineering purposes
AS 1289.5.1.1	2017	Soil compaction and density tests- Determination of dry density/moisture content relation of a soil using standard compactive effort
AS 1289.5.6.1	1998	Soil compaction and density tests - Compaction control test - Density index method for a cohesionless material