

SECTION 210 - GEOTEXTILES IN EARTHWORKS

##This section cross-references Sections 160 and 204.

If any of the above sections are relevant, they should be included in the specification.

If any of the above sections are not included in the specification, all references to those sections should be struck out, ensuring that the remaining text is still coherent:

210.01 GENERAL

This section covers the requirements for the supply, handling and placing of geotextiles as listed below or used as a separation layer, or as a separation and filtration layer, in earthworks at locations shown on the drawings or specified.

- (a) Woven Geotextile
- (b) Non-woven Geotextile.

210.02 SUPPLY OF MATERIALS

The Contractor shall supply the geotextiles as specified in Clause 210.07 and as shown on the drawings. The physical and mechanical properties of the geotextiles shall be provided in accordance with Clause 210.03.

After delivery of the geotextiles to site, the Contractor shall ensure that the geotextiles are kept clean and undamaged and stored away from direct sunlight until covered. Any damaged or improperly stored geotextiles shall be replaced by the Contractor.

210.03 PROPERTIES OF GEOTEXTILES

- (a) General

The geotextile shall consist of woven or non-woven fabric manufactured from synthetic fibres of a long chain polymer such as polypropylene, polyethylene, polyester or similar.

Woven geotextiles shall have filaments interlaced in two sets, mutually at right angles. One set shall be parallel to the longitudinal direction of the geotextile.

Non woven geotextiles shall have filaments bonded by needle punching, heat or chemical bonding processes.

- (b) Robustness

The geotextile shall have a robustness (Geotextile Strength Rating - G) complying with the requirements of Table 210.031.

Table 210.031

Classification	Robustness (G)
Moderately Robust	900 - 1350
Robust	1350 - 2000
Very Robust	2000 - 3000
Extremely Robust	Greater than 3000

Determination of robustness (G) shall be in accordance with VicRoads Test Method RC 381.01 *Calculation of Robustness of Geotextile Material*, as listed in Section 175.

(c) Equivalent Opening Size

Where specified in Clause 210.07 as a separation/filtration material, both woven and non-woven geotextiles shall have an equivalent opening size between 85 and 230 microns. The equivalent opening size determination shall be carried out in accordance with AS 3706.7 *Determination of pore size distribution - Dry sieving method*, as listed in Section 175.

(d) UV Radiation Stabilisation

The geotextile shall be stabilised against deterioration due to ultra-violet radiation such that when tested in accordance with AS 3706.11, the geotextile must have retained strength of at least 50% after 28 days of test exposure. After forming, the geotextile shall be processed so that the fibres retain their relative positions with respect to each other. The geotextile shall be free from defects or flaws which adversely affect its physical and mechanical properties.

(e) Testing

All testing shall be performed by laboratories with third party accreditation to ISO/IEC 17025 by a signatory to the International Laboratories Accreditation Cooperation (ILAC) scheme, e.g. by NATA (National Association of Testing Authorities, Australia), or by a laboratory accredited to ISO/IEC 17025 through NATA's Mutual Recognition Arrangement (MRA) Network process.

Test certificates shall be in the English language.

Sampling shall be in accordance with AS 2490, and testing shall be in accordance with the relevant part of AS 3706, including the determination of the material properties specified in Clause 210.03(b), (c) and (d).

Test certificates shall be submitted for each delivery of geotextile supplied to the works. Test certificates for the same material produced and tested within 12 months prior to the proposed use will be accepted, except for geotextile material used in structural applications, as detailed in Table 201.032, below.

Where no test certification is provided, test samples from each roll of geotextile shall be selected and the test results reported in accordance with the relevant part of AS 3706. Tests shall include the determination of the material properties specified in Clause 210.03(b), (c) and (d) of the geotextile for the consignment delivered.

Table 210.032 Frequency of Testing for Geotextile Material Properties

Geotextile Use	Test	Test frequency
General use	AS 3706.1 AS 3706.2 AS 3706.3 AS 3706.4 AS 3706.5 AS 3706.7 AS 3706.9 AS 3706.11 RC 381.01	Annual
Geotextile used in structural fill applications	AS 3706.1 AS 3706.2 AS 3706.3 AS 3706.4 AS 3706.5 AS 3706.7 AS 3706.9 RC 381.01	Test results on the test certificate shall include at least one set of results for each month of geotextile manufacture.
	AS 3706.11	Annual

210.04 PREPARATION

Prior to placing any geotextiles the Contractor shall excavate the surface material to the depth shown on the drawings or specified. The area shall then be trimmed to provide a uniform surface freely draining to points clear of the road formation.

Where the surface having been trimmed becomes unstable for whatever reason, the Contractor shall treat in situ or remove and replace the unstable material to the condition that the surface has the required strength to support the weight of construction traffic and plant and no additional payment shall be made for this work.

210.05 PLACING GEOTEXTILES AND BACKFILLING

HP *The placement of geotextile is not permitted without the written approval of the Superintendent.*

(a) General

The Contractor shall place the specified geotextile to the limits as shown on the drawings or specified. The geotextile shall be subject to a visual inspection by the Contractor's geotechnical consultant during placing. A certificate of compliance shall be provided by the Contractor's geotechnical consultant to verify that the coverage and ground preparation for placement of the geotextile have been executed in accordance with the drawings and this specification.

The geotextile shall be placed without punctures or tears and, if these occur, they shall be rectified or the entire roll of geotextile replaced prior to covering. Any rolls with imperfections shall not be used. Geotextiles used in subsurface drains shall be placed to conform approximately to the shape of the excavation. The geotextile shall fully envelop the drainage material in the excavation. All joints shall be overlapped or sewn in accordance with requirements specified in Clause 210.07. Geotextiles shall be covered by filling within 48 hours of placement.

(b) Type B Material

The Contractor shall supply and place over the geotextile Type B material of maximum particle size of not more than 150 mm and moisture ratio of not less than 85% as determined by test using the Standard compactive effort. The initial layer of Type B material shall be placed and compacted to the maximum density practicable without causing further instability in the underlying materials upon which the geotextile has been placed. Subsequent layers of Type B material shall also be placed to the maximum density practicable until stability is achieved and a layer satisfies the test rolling requirements specified in Section 204 as applicable. Any remaining layers of fill to be placed above the stable layer shall be placed and compacted in accordance with the requirements of Section 204 as applicable.

(c) Permeable Fill Material

Where shown on the drawings or specified, the Contractor shall supply and place permeable fill material of the depth specified in Clause 210.07 over the geotextile. The geotextile shall be of the type of filtration and separation classification. The permeable fill material shall comply with the requirements of Clause 210.06 and have a moisture content compatible with achieving maximum density practicable. The initial layer of permeable fill material shall be placed and compacted to the maximum density practicable without causing further instability or loss of shape to the trimmed surface upon which the geotextile has been placed. Any subsequent layers of permeable fill material shall also be placed to the maximum density practicable until the full depth of permeable fill material specified has been placed.

Following placement of the specified depth of permeable fill material, a second layer of geotextile (filtration and separation) shall be placed as specified to completely enclose the permeable fill material before placement of Type B material commences.

210.06 SUPPLY OF PERMEABLE FILL MATERIAL ~~##(a) or (b)~~:

For the purpose of this section, permeable fill material shall:

- (a) comply with the requirements of Section 204;
- (b) consist of hard, durable and clean sand or gravel, or crushed stone from a source rock with a Los Angeles Abrasion Loss of not more than 45;
- (c) have maximum particle size not exceeding 19 mm and a permeability not less than 10^{-4} m/sec when compacted to a density ratio value of 100% based on Standard compactive effort.

210.07 SCHEDULE OF DETAILS

*** (a) Supply of Geotextiles (Clause 210.02).

	Classification	Overlap Requirements	Type
(i) Separation Only	##:	##: mm	##:
(ii) Separation/Filtration	##:	##: mm	##:

*** (b) Permeable Fill Material (Clause 210.05(c))

Depth ##: m.