GEOSYNTHETICS

Geosynthetics are polymeric materials used in combination with soil and rock as an integral component of a construction project, structure or system. Geotextiles and geogrids are two specific types of geosynthetic. Most are made from polypropylene, polyester and polyethylene.

GEOTEXTILES –NON-WOVEN/WOVEN

Geotextiles are fabrics manufactured either from individual fibers (monofilaments), or from yarns which comprise many fibers (multifilaments). The round filament may be long (a continuous monofilament) or short (a stable fiber). Some continuous monofilaments are produced as tape (a slit-film monofilament).

Nonwoven geotextiles consist of continuous monofilaments or staple fibers. Needle-punched nonwoven geotextiles are composed of random fibers that are physically entangled by punching with needles. Heat-bonded nonwovens comprise random fibers that are pressed and melted together at the contact points.

Woven geotextiles consist of continuous monofilaments, staple fibers, multifilament yarns, or slit films that are woven into a fabric.

GEOTEXTILE FOR MATERIAL SEPERATIONS (WOVEN)

Geotextile is used to prevent mixing of a subgrade soil and an aggregate cover material.

Any product that meets the requirements of Alberta Transportation Standard Specifications for Highway Construction, Section 5.31 Geotextile qualifies under this section.

GEOTEXTILE FOR STABILIZATION (WOVEN)

Any product that meets the requirements of Alberta Transportation Standard Specifications for Highway Construction, Section 5.31 Geotextile qualifies under this section.

FILTER FABRIC AND FILTER MATERIAL

Any product that meets the requirements of Alberta Transportation Standard Specification for Highway Construction, Specification 2.8 Perforated Pipe Subdrains qualifies under this section.

Filter Fabric (for Perforated Pipe Subdrains) – Non-Woven

The filter sock or filter fabric material for wrapping perforated pipe shall be in accordance with the following:

Properties	ASTM Test	Requirements
PHYSICAL		

Grab Tensile Strength	D4632	400 Newtons (N) minimum
Grab Tensile Elongation	D4632	50% minimum
Mullen Burst	D3786	1275 kPa minimum
Puncture	D4833	240 Newtons (N) minimum
Trapezoid Tear	D4533	180 Newtons (N) minimum
UV Resistance	D4355	70% @ 150 hr.
HYDRAULIC		
Apparent Opening Size	D4751	0.212 mm maximum
Permittivity	D4491	2.1 sec^{-1}
Flow Rate	D4491	102 $l/sec/m^2$

Filter Material (for Perforated Pipe Subdrains)

Filter material shall be composed of hard, durable mineral particles free from organic matter, clay balls, soft particles and other deleterious materials.

PROVEN PRODUCTS	TRIAL PRODUCTS	POTENTAIL PRODUCTS
Designation 8 Class 25		

Filter Fabric (Heavy Rock Riprap) – Non-Woven

Any product that meets Alberta Transportation Specifications for Bridge Construction, Section 10 Heavy Rock Riprap qualifies under this section.

Non-woven geotextile filter fabric shall be used under all riprap in accordance with the following table of minimum average roll value properties (MARV's) for each specific Class of riprap.

Non-Woven Geotextile Filter Fabric		
Specifications and Physical Properties		
	Class 1M, 1 and 2	**Class 3**
Grab Strength	650 N	875 N
Elongation (Failure)	50%	50%
Puncture Strength	275 N	550 N
Burst Strength	2.1 MPa	2.7 MPa
Trapezoidal Tear	250 N	350N
Minimum Fabric Lap to be 300 mm		

GEOGRIDS

Geogrids consist of a regular network of tensile elements (longitudinal and transverse ribs) and open apertures. Biaxial geogrids exhibit approximately square apertures. Uniaxial geogrids exhibit rectangular apertures. TriAx geogrids consist of 3 principal directions of elements as well as open aperatures. TriAx geogrids exhibit triangular apertures.

- **Extruded geogrids** are made from extrusion and drawing of perforated sheet, yielding a relatively inflexible grid with rigid junctions.

- **Woven and knitted geogrids** are made from interweaving the junctions of oriented fibres or yarns, which are then coated, yielding a relatively flexible grid with deformable junctions.

- All geogrid applications must be properly designed by a Professional Engineer (registration with APEGGA). The use of extensible reinforcement in MSE Bridge abutments and wingwall applications shall conform to requirements of Alberta Transportation *Standard Specifications for Bridge Construction*, Section 25, Mechanically Stabilized Earth Wall.

PAVEMENT APPLICATION

Unpaved design – the design must be based on the Giroud-Han Method. Proper calibration and in-situ validation testing must be performed for the geogrid reinforcement utilized in the mechanically Stabilized Layer.

Paved Design – The design must be based on the AASHTO 1993 Pavement Design Guide and utilizes modified layer coefficients that have been properly calibrated, tested in-situ and validated for the geogrid reinforcement utilized in the Mechanically Stabilized Layer.

UNI-AXIAL GEOGRIDS

PROVEN PRODUCTS	TRIAL PRODUCTS	POTENTIAL PRODUCTS
Tensar Uni-axial Series UX1100, UX1400, UX1500, UX1600, UX1700		Layfield E'grid Uni-Axial HDPE Series (50R, 65R, 90R, 110R, 130R) (Expiry Date: April 2016)
Layfield Geogrid Uni-Axial (Pet) T-Series (LP 120T)		FlexGrid UX150 (Expiry Date: Aug. 2017)
Layfield E'grid Uni-Axial HDPE Series (170R)		Titan TE-UXPET (Expiry Date: May 2019)
		Synteen SF Series Uniaxial Geogrid (Expiry Date: Sept 2019)

BI-AXIAL GEOGRIDS

PROVEN PRODUCTS	TRIAL PRODUCTS	POTENTIAL PRODUCTS
Tensar Biaxial Series (Type 1, Type 2)		
Naue Combigrid 30/30		
Maccaferri; WG Series (WG06 & WG09)		MacGrid GeoGrid EG Series (Expiry Date: May. 2017)
		Terrafix Biaxial TBX Series TBX 1500, 2000, 2500, 3000, 11, and 12

		(Expiry Date: Oct. 2017)
		Titan TE-BXPP (Expiry Date: May 2019)
		Layfield E'Grid 2020 and 2030 (Expiry Date: May 2019)
		Layfield RX Services (Expiry Date: May 2019)

TRI-AXIAL GEOGRIDS

PROVEN PRODUCTS	TRIAL PRODUCTS	POTENTIAL PRODUCTS
		Tensar TriAx Geogrids TX5, TX7, TX160 (Expiry Date: May 2019)

COMPOSITE GEOSYNTHETICS

PROVEN PRODUCTS	TRIAL PRODUCTS	POTENTIAL PRODUCTS
		Titan TE-BXC GeoGrid Composite CTX-BXC 18 & TE-BXC 30 (Expiry Date: July 2019)
		Tencate Mirafi H2Ri (Expiry Date: July 2019)

GEONET / GEOCOMPOSITE / WICK DRAIN

Geocomposite — A manufactured material using geotextiles, geogrids, geonets, and/or geomembranes in laminated or composite form.

Geonet — A geosynthetic consisting of integrally connected parallel sets of ribs overlying similar sets at various angles for planar drainage of liquids or gases.

Wick Drain — Consists of a central plastic core, which functions as a free-draining water channel, surrounded by a thin geosynthetic filter jacket. It is used to create an artificial drainage path. It is also called prefabricated vertical drain or band drain.

PROVEN PRODUCTS	TRIAL PRODUCTS	POTENTIAL PRODUCTS
Multi-Flow Report	Draintube (Expiry Date: Nov. 2018)	
Wick Drain		

GEOMEMBRANE

A continuous sheet of material, whether prefabricated as a flexible polymeric sheeting or sprayed or coated in the field, such as a sprayed on asphalt.

CANAL LINER

PROVEN PRODUCTS	TRIAL PRODUCTS	POTENTIAL PRODUCTS
Coletanche ES		
Reinforced Polyethylene Liner RPE11BB		
Siplast Teranap Geomembrane **REPORT**		