STANDARDIZATION IN GEOTECH SECTOR

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What are Standards ?

- Standards are published documents that establish specifications and procedures designed to ensure the reliability of the materials, products, methods, and/or services people use every day.
- Standardization is the process of implementing and developing technical standards based on consensus of different parties that include firms, users, government organizations. Standardization can help to maximize compatibility, interoperability, support consumer safety and public health, repeatability or quality.
- **Why Are They Important?**
  Standards form the fundamental building blocks for product development by establishing consistent protocols that can be universally understood and adopted. Standards also make it easier to understand and compare competing products.

Why we need standards ?

- **Safety and reliability** – Adherence to standards helps ensure safety, reliability and environmental care.
- **Support of government policies and legislation** – Standards are frequently referenced by regulators and legislators for protecting user and business interests, and to support government policies.
- **Interoperability** the ability of devices to work together relies on products and services complying with standards.
- **Standards:**
  - Open up **market access**
  - Provide **economies of scale**
  - Encourage innovation
  - Increase **awareness** of technical developments and initiatives
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Specs and Standards formulated for Geosynthetics by BIS and COE-Geotech

Present Status

Specifications Formulated of Geosynthetics

- Woven jute geotextiles: IS 14715:2000
- Part 1 Strengthening of Sub Grade in Roads and Control of Bank Erosion in Rivers and Waterways
- Part 2 Control of Bank Erosion in Rivers and Waterways

- Jute geo-grid for rain water erosion control in road and railway embankments and hill slopes IS 14986:2001

- Open weave coir bhoovastra- IS 15869:2008
- Use of coir bhoovastra in unpaved roads IS 15871:2009

- PVC Geo membranes for lining IS 15909:2010
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Specifications Formulated of Geosynthetics

- Geotextiles used as Protection (or Cushioning) Material

- Geosynthetics - Specification for needle punched non woven geobags for coastal and waterways
- Geosynthetics - Specification for woven geobags for coastal and waterways

- Geosynthetics for Highways: *IS 15910:2010*

Specifications finalized

- Guidelines for installation of geotextile used in Subsurface drainage application
- Guidelines for installation of geotextile for permanent Erosion Control in Hard Armor Systems
- Guidelines for installation of geotextile used in subgrade separation in pavement structures
- Geo-textiles used in subgrade stabilization in pavement structures
- Guidelines for installation of geogrids used as reinforcement of base and sub-base layers in pavement structure
- Guidelines for installation of geogrids as soil reinforcement in mechanically stabilized earth (MSE) retaining structures

RECENT STANDARDS

- Geosynthetics - Part 1: Terms and definitions
- Natural fibre Geotextiles: Glossary of terms for Erosion Control Products.
- Geosynthetics - Test method for the determination of discharge capacity of prefabricated vertical drains
- Geosynthetics - Evaluation of mechanical damage caused by granular material (Installation Damage)

Geosynthetics Standard formulated

1. Filtration behavior of geotextiles under turbulence water flow condition
2. Seam / Joint Strength of geotextiles by wide width strip method
3. AOS by wet sieving method
4. Compressive creep properties of geosynthetics (part 1)
5. Short term compression behavior of geosynthetics (part 2)

Standards approved and Finalized

- Stress crack resistance of polyolefin geomembranes using notched constant tensile load test
- Pore size characteristics of geotextiles by capillary flow test
- Index puncture resistance of geomembranes
- Determination of weld strength of geocell
- Determination of 2 % secant modulus for polyethylene geomembranes
- Determination of pyramid puncture resistance of unprotected and protected geomembranes
- Tensile properties of geo-grids by the single or multi-rib tensile method
- Performance strength of geomembranes by wide strip method

Standards approved and Finalized

- Chemical resistance of geomembranes to liquids
- Dispersion of carbon black in polyolefin
- Standard practice for deterioration of geotextiles from outdoor exposure
- Method of test for determination of (in-plane) hydraulic transmissivity of a geo-synthetic by radial
- Standard test method for measuring geo-synthetic pullout resistance in soil
- Standard test method for permittivity of geotextiles under load

Standards approved and Finalized

- Biological clogging of textiles
- Grab braking strength & elongation
- Effect of temperature on stability of geotextile
- Chemical resistance of geosynthetics to liquids
- Tensile strength of Geosynthetic Clay Liner (GCL)
- Swell Index of Bentonite clay
- Method of test for determining connection strength between geosynthetic reinforcement and segmental concrete units.
- Test method to determine asphalt retention of paving fabrics used in asphalt paving applications
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STANDARDS TO BE FORMULATED

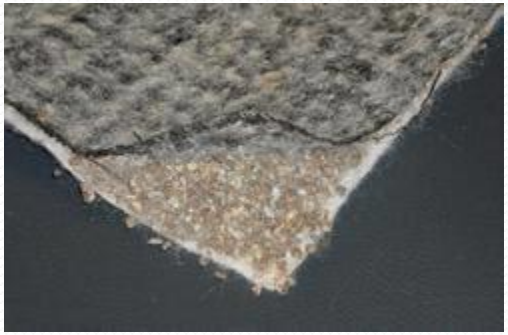
- **For the Products :** Geosynthetic Clay Liner (GCL)
- Prefabricated Vertical Drain (PVD)
- Geomattress
- Bi-Axial Geogrid (Extruded /Moulded)
- Geostrap
- Geocmposites

STANDARDS TO BE FORMULATED

- Chemical Resistance of Geogrids & Geotextiles to Liquids
- Accelerated Tensile Creep and Creep –Rupture of Geosynthetic
- Ply Adhesion Strength of Reinforced Geomembranes
- Bursting of entire geobag by drop method
- Properties of metal and rope gabions
- Anchoring strength of anchors for hill slopes

STANDARDS TO BE FORMULATED

- **For Geosynthetic Clay Liner (GCL)**



- Mass of Geosynthetic Clay Liners
- Peel Bond Strength of Geosynthetic Clay Liners
- Index Flux
- Fluid loss
- Swell index of Bentonite Clay

STANDARDS TO BE FORMULATED

- **For Prefabricated Vertical Drain (PVD)**
- **Composite (entire PVD)**

- Mass of PVD (Composite) per unit length (g/m)
- Full width Tensile strength of PVD (Composite), kN
- Elongation at 0.5 or 1 kN strength, %

STANDARDS TO BE FORMULATED

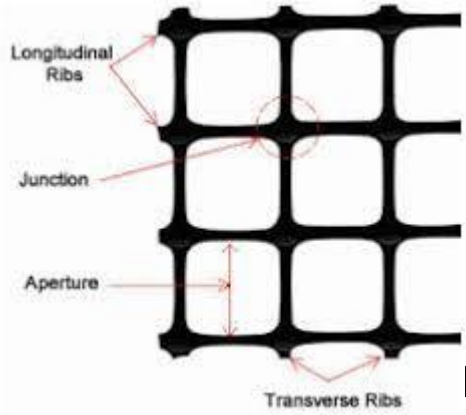
- **For Prefabricated Vertical Drain (PVD)**
- **Composite (entire PVD)**
- Discharge capacity (In plane permeability)
- Discharge capacity (In plane permeability) in buckled condition
- Chemical resistance
- Width, mm
- Thickness, mm

STANDARDS TO BE FORMULATED

- **For Prefabricated Vertical Drain (PVD)**
- **Filter component (Nonwoven)**
- Mass per unit area (g/m2)
- Grab strength (filter as it is i.e. entire Tube)
- Water permeability
- Apparent Opening Size (AOS) or Pore size
- **Core Component**
- Mass of Core per unit length (g/m)
- Compressive strength, load per unit area or load required for 50 % compression, N/mm2

STANDARDS TO BE FORMULATED

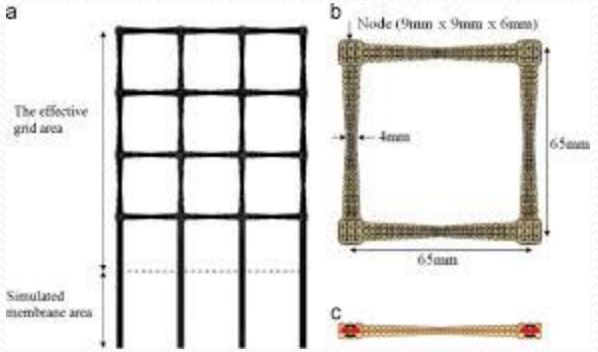
- **For Bi-axial Geogrid**



- ırea, g/m2
- Thickness of Rib, mm
- Thickness of Junction, mm
- Rib width,mm
- Rib thickness, mm
- Aperture Size, mm x mm

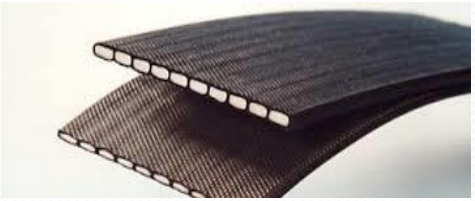
STANDARDS TO BE FORMULATED

- **For Bi-axial Geogrid**
- Aperture stability
- Single rib tensile strength & elongation
- Junction strength / efficiency
- Radial Stiffness
- Carbon Black content



STANDARDS TO BE FORMULATED

- **For Geostrap**



- Mass of Geostrap per unit length (g/m)
- Thickness, mm
- Full width Tensile strength, kN
- Elongation, %
- Chemical Resistance
- Flexibility / stiffness
- Width, mm

STANDARDS TO BE FORMULATED

- **For Geomattress**
- **Inner Layer (Nonwoven)**
- Mass per unit area (g/m2)
- Thickness, mm
- Wide width Tensile strength, kN/m & Elongation, %
- Chemical Resistance
- Water Permeability, l/m2/sec
- UV resistance
- Abrasion resistance
- **Mattress :** Seam strength

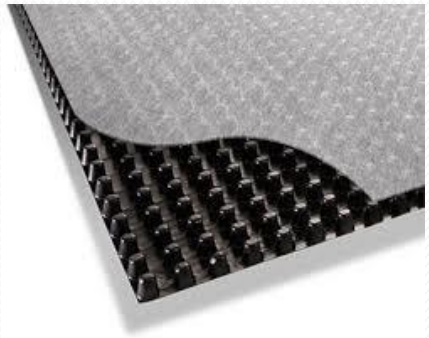
STANDARDS TO BE FORMULATED

- **For Geomattress**

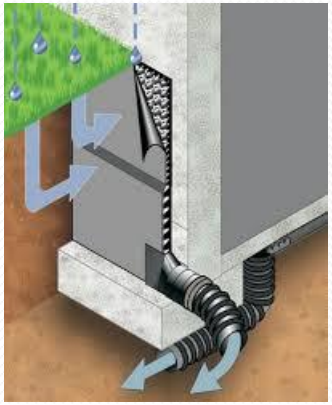
- **Outer Layer (Woven)**
- Mass per unit area (g/m2)
- Thickness, mm
- Wide width Tensile strength, kN/m & Elongation, %
- UV resistance
- Abrasion resistance
- Chemical resistance
- **Stitching thread :** Tensile strength, kN

STANDARDS TO BE FORMULATED

- **For Geocomposite Drains**

- Mass of Geocomposite & nonwoven
- Thickness of Geocomposite & nonwoven
- Wide width Tensile strength & Elongation
- Hydraulic Transmissivity
- Compressive strength
- Chemical Resistance
- Flexibility / stiffness



Required Standards for Composites

	Test parameters	Available std.
1	Short-Beam Strength of Polymer Matrix Composites	ASTM D 2344M
2	Tensile Properties of Polymer Matrix Composites	ASTM D 3039M
3	Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials	ASTM D 790
4	Tensile Properties of Plastics	ASTM D 638
5	Izod Pendulum Impact Resistance	ASTM D256 (IS 1598 for metal)
6	Lap Shear Adhesion for Fiber Reinforced Plastics Bonding	ASTM D5868
7	Compressive Properties of Rigid Plastics	ASTM D 695
8	Tensile Properties of Thin Plastic Sheeting	ASTM D 882
9	Compressive Properties of Polymer Matrix Composites with Unsupported Gage Section by Shear Loading	ASTM D3410
10	Ignition Los of Cured Reinforced Resins	ASTM D 2584

Required Standards for Composites

	Test parameters	Available std.
11	Temperature of deflection Under Load	(ISO 75)
12	Void Content of Reinforced composites	(ASTM D 2734)
13	Apparent Density of regid composite	(ASTM D 1622)
14	Tension fatigue	ASTM D 3479
15	Cure behaviour	ASTM D 4473
16	Glass transition	ASTM D 7028
17	Impact drop test	ASTM D 7136
18	Compressive residual strength properties	ASTM D7137
19	Creep rupture	ASTM D 7337
20	Flexure fatigue	ASTM D 671
21	Chemical resistance	ASTM D 581

Required Standards for Composites

	Test parameters	Available std.
22	Thermal stability	ASTM D 696
23	Thermal resistance	EN 12667
24	Breakdown voltage	ASTM D 149
25	Gloss retention	ASTM D 523
26	Corrosion resistance	ASTM B 244
27	Abrasion resistance	
28	Hardness	ASTM D 2583
29	Fibre content and void content	EN 2564
30	Thermal expansion	ASTM E 831
31	Water Absorption	EN ISO 175
32	Bending strength and stiffness	ASTM D 7249

- Thanks !