

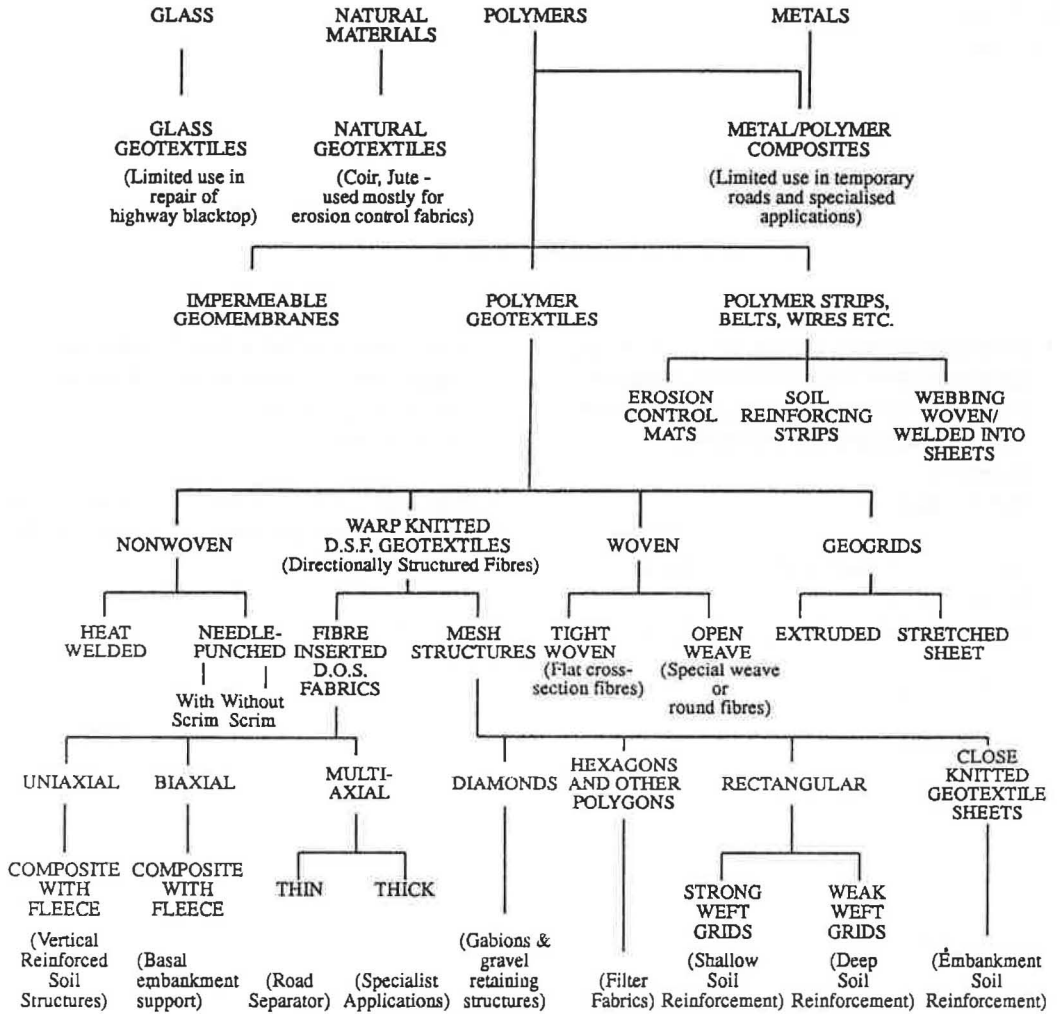
Educational workshop on 'how to select geotextiles/geosynthetics'

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1. General descriptions of geotextiles/geosynthetics, constituent fibres, yarns and fibrous structures. General relationship between a particular textile structure and its physical and mechanical properties.
IFP, R. Shishoo
2. Nonwovens Production of Geotextiles and typical nonwovens structure based functions of a geotextile.
IFP, R. Shishoo
3. Woven and knitted fabric based production of geotextiles and typical woven and knitted function of a geotextile.
IFP, R. Shishoo
4. DOS-Production of geotextiles/geosynthetics and typical functional properties of DOS based grids.
Engtex, T. Eng
5. Conventional and accelerated test methods for geotextiles.
BTTG, D. Cook

SUB-DIVISION OF GEOTEXTILES, GEOGRIDS, GEOMEMBRANES AND RELATED PRODUCTS.



1. Types of Geotextiles

1.1 Raw materials

Mainly synthetic polymers
(polyester, polyamid, polypropylene,
polyethylene)

Biodegradable materials: e.g. jute

1.2 Sheet materials

- Woven geotextiles
- Nonwoven geotextiles
- Knitted geotextiles
- Polymer nets and grids
- Mats
- Composites

1.3 Structure/properties relationships

- Intrinsic properties, such as physical and mechanical properties, that are called properties of a geotextile in isolation
- Geotextile properties that influence soil-geotextile interaction
- Endurance properties

1.4 Designing with geotextiles

- Design by specification
- Design by function

Important Criteria and Principal Properties required for Geotextile Evaluation

Criteria and Parameter	Property	Application			
		Filtration	Drainage	Separation	Reinforcement
Design requirements					
Mechanical strength					
Tensile strength	Wide-width strength				X
Tensile modulus	Wide-width modulus				X
Seam strength	Wide width				X
Tension creep	Creep		*		X
Soil-fabric friction	Friction angle				X
Hydraulic					
Flow capacity	Permeability	X	X	X	X
	Transmissivity		X		
Piping resistance	Apparent opening size (AOS)	X		X	X
Clogging resistance	Porimetry	X			
	Gradient ratio	X			
Constructability requirements					
Tensile strength	Grab strength	X	X	X	X
Seam strength	Grab strength	X	X	X	
Puncture resistance	Rod puncture	X	X	X	X
Tear resistance	Trapezoidal tear	X	X	X	X
Longevity (durability)					
Abrasion resistance**	Reciprocating block abrasion	X			
UV stability†	UV resistance	X			X
Soil compatibility††	Chemical	X	X	?	X
	Biological	X	X	?	X
	Wet-dry	X	X		
	Freeze-thaw	X	X		

2. Nonwoven production of Geotextiles

2.1 Nonwoven processes

- Dry laid
- Spunlaid
- Needlepunched
- Wet-laid
- Bonding - mechanical, chemical, thermal

2.2 Typical nonwoven structure based functions of a geotextile:

Hydraulic functions, mechanical functions

3. Woven and knitted fabric based production of geotextiles

3.1 Woven and knitted structures

- Monofilament based
- Multifilament based
- Split-film based

3.2 Typical woven and knitted structure based function of a geotextile

4. DOS-production of geotextiles/geosynthetics

4.1 DOS production

Raw materials

- Fibre materials
- Fibre orientation
- Testing of fibres

Textile process

- WIWK process
- Structural orientation of thread systems
- Additional processes

Quality assurance

- Development stage testing
- Testing in production
- External testing
- Statistical levels - nominal values
- CEN standards

4.2 Functional properties

Mechanical properties

- Tensile properties
- Long term creep properties
- Interlock effects
- Resistance to pullout
- Resistance to site damages
- Engtex range of DOS grids

Chemical properties

- Resistance to hydrolyse
- Resistance to oxidation
- Weathering properties

Handling properties

- Handling on site
- Marking of products
- Distributors

5. Conventional and accelerated test methods for geotextiles

This paper describes the most important test methods for geotextile in current use.

The categories referred to are:

- Characterisation; (weight, thickness, etc.)
- Hydraulic; (water flow, pore size)
- Mechanical; (tensile strength, elongation, modulus, creep)
- Durability (chemical, biological, weathering etc.)

The following topics are addressed:

- The purpose of testing; index and performance tests
- The strengths and weaknesses of the test methods
- Differences between National Standards
- Progress of European and International harmonisation of test methods
- The potential of accelerated durability tests to predict changes in material properties