

DIN EN 13491:2006-10 (E)

Geosynthetic barriers - Characteristics required for use as a fluid barrier in the construction of tunnels and underground structures

Contents		Page
Introduction		5
1	Scope	6
2	Normative references	6
3	Definitions and abbreviations	8
3.1	Definitions	8
3.2	Abbreviations	9
4	Required characteristics and corresponding methods of test	9
4.1	General	9
4.2	Types of Application	9
4.2.1	Application 1: "Seepage water tunnel"	9
4.2.2	Application 2: "Pressurised water tunnel"	10
4.2.3	Application 3: "Cut and cover seepage water tunnel"	11
4.2.4	Application 4: "Cut and cover pressure water tunnel"	12
4.3	Relevant characteristics	12
4.4	Characteristics relevant to specific conditions of use	15
4.4.1	Tear strength	15
4.4.2	Bursting strength	15
4.4.3	Low temperature behaviour	15
4.4.4	Weathering	15
4.4.5	Resistance to wetting and drying	15
4.4.6	Freeze-thaw cycle resistance	15
4.4.7	Resistance to root penetration	15
4.4.8	Gas permeability	16
5	Evaluation of conformity	16
5.1	Presentation of characteristics	16
5.2	Verification of values	16
5.3	Initial type tests	16
5.4	Factory production control	17
5.5	Inspection	17
6	Marking	17
Annex A (normative) Scheme of factory production control		18
A.1	Product design	18
A.2	Production	18
A.3	Finished products	18
A.4	Equipment	18
A.5	Provisions applicable to A.1, A.2 and A.3 (to be used where appropriate)	19
Annex B (normative) Durability of geosynthetic barriers		20
B.1	Introduction	20
B.2	Evaluation of durability tests and acceptance criteria	21
B.3	Weathering	21
B.3.1	Direct tests	21

B.3.2	Period of exposure	22
B.4	Resistance to micro-organisms	23
B.5	Resistance to root penetration	23
B.6	Resistance to environmental stress cracking	23
B.7	Resistance to leaching	23
B.8	Resistance to oxidation	24
B.9	Chemical resistance for landfill applications	24
B.9.1	All applications	24
B.9.2	Liquid and solid waste storage (applicable to prEN 13492 and prEN 13493)	24
B.10	Geosynthetic clay barriers	24
Annex ZA (informative)	Clauses of this European Standard addressing the provisions of the EU Construction Products Directive	25
ZA.1	Scope and relevant characteristics	25
ZA.2	System of attestation of conformity for Geosynthetic Barriers used in the construction of tunnels and underground structures	26
ZA.3	CE marking and labelling	28
Bibliography	32
Figures	Figure 1 -- A geosynthetic barrier in a drilled seepage water tunnel	9
	Figure 2 -- A geosynthetic barrier in a drilled pressurised water tunnel	10
	Figure 3 -- A geosynthetic barrier in a cut and cover seepage water tunnel	11
	Figure 4 -- A geosynthetic barrier in a cut and cover pressurised water tunnel	12
	Figure ZA.1 -- Example of CE marking on the packaging of a Geosynthetic Barrier	29
	Figure ZA.2 -- Example of accompanying documents	30
Tables	Table 1 -- Geosynthetic Barriers used in the construction of tunnels and underground structures - Functions, function-related characteristics and test methods to be used	13
	Table 2 -- Characteristics required for initial type testing and evaluation of conformity	17
	Table B.1 -- Required weathering radiant exposure (> 75 % retained tensile properties)	22
	Table ZA.1 -- Scope and relevant clauses	26
	Table ZA. 2 -- System of attestation of conformity	27
	Table ZA.3 -- Assignment of evaluation of conformity tasks (for geosynthetic barriers under system 2+)	27