

DIN EN 13491:2013-11 (E)

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

Contents		Page
Foreword		4
Introduction		5
1	Scope	6
2	Normative references	6
3	Terms, definitions and abbreviations	8
3.1	Terms and definitions	8
3.2	Abbreviations	9
4	Required characteristics and corresponding methods of test	9
4.1	General	9
4.2	Types of application	10
4.2.1	Application 1: "seepage water tunnel"	10
4.2.2	Application 2: "pressurised water tunnel"	11
4.2.3	Application 3: "Cut and cover seepage water tunnel"	12
4.2.4	Application 4: "Cut and cover pressure water tunnel"	13
4.3	Relevant characteristics	13
4.4	Characteristics relevant to specific conditions of use	17
4.4.1	General	17
4.4.2	Tear strength	17
4.4.3	Bursting strength	17
4.4.4	Low temperature behaviour	17
4.4.5	Weathering	17
4.4.6	Resistance to wetting and drying	17
4.4.7	Freeze-thaw cycle resistance	17
4.4.8	Resistance to root penetration	17
4.4.9	Gas permeability	18
4.5	Release of dangerous substances	18
5	Evaluation of conformity	18
5.1	Presentation of characteristics	18
5.2	Verification of values	18
5.3	Initial type tests	19
5.4	Factory production control	19
5.5	Inspection	20
6	Marking	20
Annex A (normative) Factory production control Factory production control scheme		21
A.1	General	21
A.2	Product design	21
A.3	Production	21
A.3.1	Raw or incoming materials	21
A.3.2	Production process	21
A.4	Finished products	21
A.4.1	Raw or incoming materials	21
A.4.2	Alternative tests	24

A.4.3	Equipment	24
A.5	Provisions applicable to A.2, A.3 and A.4 (to be used where appropriate)	25
A.5.1	Records	25
A.5.2	Assessment of results	25
A.5.3	Traceability	25
A.5.4	Corrective action for non-conforming materials and products	25
A.5.5	Personnel	25
A.5.6	Quality management	25
Annex B (normative) Durability of geosynthetic barriers		26
B.1	Introduction	26
B.1.1	Standards to which this annex is common	26
B.1.2	Mechanisms of degradation	26
B.1.3	Service life	27
B.1.4	Use of rework materials	27
B.2	Test requirements	27
B.2.1	General requirement	27
B.2.2	Requirements for repeat testing	27
B.2.3	Requirements for individual materials	28
B.3	Durability tests	29
B.3.1	Introduction	29
B.3.2	Weathering	29
B.3.3	Resistance to micro-organisms	31
B.3.4	Resistance to environmental stress cracking	31
B.3.5	Resistance to leaching	31
B.3.6	Resistance to oxidation	32
B.3.7	Chemical resistance	32
B.4	Evaluation tests and acceptance criteria	32
B.4.1	General	32
B.4.2	Evaluation by comparison of tensile properties	32
B.4.3	Evaluation by comparison of Oxidative Induction Time (OIT) values	33
B.4.4	Evaluation by change in mass	33
B.4.5	Evaluation by change in water permeability	33
Annex ZA (informative) Clauses of this European Standard addressing the provisions of the EU Construction Products Directive		34
ZA.1	Scope and relevant characteristics	34
ZA.2	Procedure for attestation of conformity of geosynthetic barriers	35
ZA.2.1	System of attestation of conformity	35
ZA.2.2	EC Certificate and Declaration of Conformity	36
ZA.3	CE marking and labelling	37
Bibliography		40