

This is a preview of "ISO/TS 13434:2020". Click here to purchase the full version from the ANSI store.

Second edition  
2020-10

---

---

## Geosynthetics — Guidelines for the assessment of durability

*Géosynthétiques — Lignes directrices concernant la durabilité*



Reference number  
ISO/TS 13434:2020(E)

© ISO 2020

This is a preview of "ISO/TS 13434:2020". Click here to purchase the full version from the ANSI store.



## **COPYRIGHT PROTECTED DOCUMENT**

© ISO 2020

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

This is a preview of "ISO/TS 13434:2020". Click here to purchase the full version from the ANSI store.

## Contents

	Page
<b>Foreword</b>	<b>vi</b>
<b>1 Scope</b>	<b>1</b>
<b>2 Normative references</b>	<b>1</b>
<b>3 Terms, definitions, symbols and abbreviated terms</b>	<b>1</b>
3.1 Terms and definitions	1
3.2 Symbols	1
3.3 Abbreviated items	2
<b>4 Generalized procedure</b>	<b>3</b>
4.1 General	3
4.2 Available and required properties	4
4.2.1 Condition of acceptability	4
4.2.2 Development of the required and available properties with time	4
4.3 Design life	6
4.4 Margin of safety	6
4.5 End of life (function)	6
4.6 Durability study	7
<b>5 Constituents of geosynthetics</b>	<b>7</b>
5.1 Types of geosynthetic	7
5.1.1 Polymeric durability considerations	7
5.1.2 Geotextiles	8
5.1.3 Geosynthetic barriers or polymeric and bituminous geosynthetic barriers	8
5.1.4 GBR-C	8
5.1.5 Geoblasts (GBL)	8
5.1.6 Geogrids	9
5.1.7 Geonets	9
5.1.8 Geocells	9
5.1.9 Geomats	9
5.1.10 Geocomposites	9
5.1.11 Geofoam	9
5.1.12 Geospacers	9
5.2 Individual polymer types	9
5.2.1 General	9
5.2.2 Polypropylene (PP)	10
5.2.3 Flexible polypropylene (fPP)	10
5.2.4 Polyethylene (PE)	10
5.2.5 Polyesters (i.e. PET, PEN)	10
5.2.6 Flexible polyvinyl chloride (PVC-P)	10
5.2.7 Polyamides (PA)	11
5.2.8 Ethylene propylene diene monomer (EPDM)	11
5.2.9 Ethylene interpolymer alloy (EIA)	11
5.2.10 Chlorinated polyethylene (CPE)	11
5.2.11 Chlorosulfonated polyethylene (CSPE)	11
5.2.12 Bitumen	11
5.2.13 Aramid	12
5.2.14 Polyvinyl alcohol (PVAL)	12
5.2.15 Polystyrene (PS)	12
5.2.16 Typical physical properties of polymeric geosynthetics	12
5.3 Manufacturing process	13
5.3.1 General	13
5.3.2 Geotextiles	13
5.3.3 Geosynthetic barriers	14
5.3.4 Geogrids	15
5.3.5 Geonets	15

This is a preview of "ISO/TS 13434:2020". Click [here](#) to purchase the full version from the ANSI store.

5.3.6	Geocomposites.....	15
5.3.7	Geocells .....	15
5.3.8	GBR-C.....	15
5.4	Recycled and reworked materials .....	15
5.5	Additives, stabilizers, fillers and reinforcement scrims .....	16
5.5.1	General.....	16
5.5.2	Antioxidants.....	16
5.5.3	Acid scavengers.....	16
5.5.4	Metal ion deactivators.....	16
5.5.5	UV stabilizers.....	17
5.5.6	Plasticizers.....	17
5.5.7	Lubricants.....	17
5.5.8	Mineral fillers.....	17
5.5.9	Scrims.....	17
<b>6</b>	<b>Environmental factors that may lead to degradation .....</b>	<b>17</b>
6.1	The environment above ground.....	17
6.2	The environment below ground.....	18
6.3	Chemical and biological effects on a geosynthetic .....	19
6.3.1	General.....	19
6.3.2	Hydrolysis of PET and PA .....	20
6.3.3	Oxidation of PE and PP .....	20
6.3.4	Biochemical attack .....	20
6.3.5	Chemical effects on other geosynthetic barriers .....	20
6.4	Effects of load and mechanical damage .....	22
6.4.1	Tensile load: Creep and creep-rupture .....	22
6.4.2	Synergy of tensile load with environmental effects (environmental stress cracking) .....	22
6.4.3	Effect of mechanical load on weathering and oxidation .....	23
6.4.4	Loading during installation: Mechanical damage .....	23
6.4.5	Normal pressure: Compressive creep and penetration .....	23
6.4.6	Abrasion and dynamic loading .....	23
<b>7</b>	<b>Evidence of the durability of geosynthetics .....</b>	<b>24</b>
7.1	Historical development .....	24
7.2	Empirical evidence of durability from geosynthetics extracted from the soil .....	24
7.2.1	Geotextiles .....	24
7.2.2	Geosynthetic barriers .....	25
7.2.3	Geogrids .....	27
7.3	Summary .....	28
<b>8</b>	<b>Procedure for assessment of durability .....</b>	<b>28</b>
8.1	General .....	28
8.1.1	Need for testing .....	28
8.1.2	Testing concepts for lifetime index tests .....	28
8.1.3	Scope of durability assessment .....	29
8.2	Procedure .....	29
8.2.1	Material .....	29
8.2.2	Function and application .....	29
8.2.3	Environment .....	29
8.2.4	Mechanism of degradation .....	30
8.2.5	Design life .....	30
8.2.6	The “end-of-life” criterion .....	30
8.3	Degradation during storage and installation .....	30
8.3.1	Weathering .....	30
8.3.2	Mechanical damage .....	31
8.4	Short-, medium-, and long-term applications .....	31
8.5	Assessment of long-term durability .....	32
8.5.1	General .....	32
8.5.2	Evidence from service .....	32

This is a preview of "ISO/TS 13434:2020". Click [here](#) to purchase the full version from the ANSI store.

8.6	8.5.3 Accelerated testing.....	33
	Prediction of durability.....	37
	8.6.1 Statement of the durability .....	37
	8.6.2 Level of confidence .....	37
8.7	Planning for future inspection.....	37
	<b>Bibliography.....</b>	<b>39</b>

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

ISO/TS 13434 was prepared by Technical Committee ISO/TC 221, *Geosynthetics*.

This first edition cancels and replaces ISO/TS 13434:2008, which has been technically revised. The main changes compared to the previous edition are as follows:

- standards and wording actualized;
- added product types in 5.1;
- updated subclauses 5.4, 8.4, 8.5 and Table 3.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).