



# SLOVENSKI STANDARD

## SIST EN 13256:2016

01-december-2016

Nadomešča:

SIST EN 13256:2014+A1:2015

---

### Geotekstilije in geotekstilijam sorodni izdelki - Značilnosti, ki se zahtevajo pri gradnji tunelov in podzemeljskih delov

Geotextiles and geotextile-related products - Characteristics required for use in the construction of tunnels and underground structures

Geotextilien und geotextilverwandte Produkte - Geforderte Eigenschaften für die Anwendung im Tunnelbau und in Tiefbauwerken

Géotextiles et produits apparentés - Caractéristiques requises pour l'utilisation dans la construction de tunnels et de structures souterraines

Ta slovenski standard je istoveten z: EN 13256:2016

---

#### ICS:

|           |  |   |
|-----------|--|---|
| 59.080.70 | Geotekstilije  | Geotextiles   |
| 93.020    | Zemeljska dela. Izkopavanja.<br>Gradnja temeljev. Dela pod<br>zemljo | Earthworks. Excavations.<br>Foundation construction.<br>Underground works |
| 93.060    | Gradnja predorov   | Tunnel construction   |

SIST EN 13256:2016

en,fr,de

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 13256:2016

<https://standards.iteh.ai/catalog/standards/sist/e2e7007b-e8cd-4e51-91f9-ab881765ead9/sist-en-13256-2016>

EUROPEAN STANDARD

EN 13256

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2016

ICS 59.080.70

Supersedes EN 13256:2014+A1:2015

English Version

## Geotextiles and geotextile-related products - Characteristics required for use in the construction of tunnels and underground structures

Géotextiles et produits apparentés - Caractéristiques  
requis pour l'utilisation dans la construction de  
tunnels et de structures souterraines

Geotextilien und geotextilverwandte Produkte -  
Geforderte Eigenschaften für die Anwendung im  
Tunnelbau und in Tiefbauwerken

This European Standard was approved by CEN on 4 June 2016.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

**iTeh STANDARD PREVIEW**

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

**Contents**

Page

|   |           |
|---|-----------|
| European foreword.....  | 4         |
| Introduction .....  | 5         |
| <b>1 Scope .....</b>  | <b>6</b>  |
| <b>2 Normative references.....</b>  | <b>6</b>  |
| <b>3 Terms, definitions and abbreviations .....</b>                                       | <b>7</b>  |
| 3.1 Terms and definitions .....   | 7         |
| 3.2 Abbreviations .....   | 8         |
| <b>4 Required characteristics and corresponding methods of test.....</b>                  | <b>8</b>  |
| 4.1 General.....  | 8         |
| 4.2 Selection of the appropriate standard in a specific application .....                 | 8         |
| 4.3 Characteristics relevant to specific conditions of use .....                          | 10        |
| 4.3.1 Tensile strength of seams and joints.....   | 10        |
| 4.3.2 Friction characteristics .....  | 10        |
| 4.3.3 Resistance to damage during installation.....                                       | 10        |
| 4.4 Release of dangerous substances.....  | 10        |
| <b>5 Assessment and verification of constancy of performance (AVCP) .....</b>             | <b>10</b> |
| 5.1 General.....  | 10        |
| 5.2 Presentation of characteristics.....  | 10        |
| 5.3 Product type determination (PTD).....   | 11        |
| 5.4 Factory production control (FPC).....   | 11        |
| 5.5 Verification of values .....  | 12        |
| 5.6 Initial inspection of factory and of FPC .....  | 12        |
| 5.7 Continuous surveillance of FPC.....   | 13        |
| <b>6 Marking.....</b>   | <b>13</b> |
| <b>Annex A (normative) Factory production control.....</b>                                | <b>14</b> |
| <b>A.1 Factory production control scheme .....</b>  | <b>14</b> |
| A.1.1 General.....  | 14        |
| A.1.2 Product design .....  | 14        |
| A.1.3 Production .....  | 14        |
| A.1.4 Finished products .....   | 14        |
| A.1.5 Provisions applicable to A.1.2, A.1.3 and A.1.4 (to be used where appropriate)..... | 15        |
| <b>A.2 Assessment of a factory production control (FPC) system.....</b>                   | <b>16</b> |
| A.2.1 General.....  | 16        |
| A.2.2 Checklist .....   | 16        |
| A.2.3 Test frequency.....   | 20        |
| <b>Annex B (normative) Durability aspects .....</b>                                       | <b>22</b> |
| <b>B.1 General.....</b>   | <b>22</b> |

|                               |   |           |
|-------------------------------|---|-----------|
| <b>B.1.1</b>                  | <b>Service life</b> .....   | <b>22</b> |
| <b>B.1.2</b>                  | <b>Initial and repeat testing of durability</b> .....   | <b>22</b> |
| <b>B.1.3</b>                  | <b>Use of rework material</b> .....   | <b>23</b> |
| <b>B.2</b>                    | <b>Weathering (all products)</b> .....  | <b>23</b> |
| <b>B.3</b>                    | <b>Products used in non-reinforcing applications and with service lives up to 5 years</b> .....   | <b>23</b> |
| <b>B.4</b>                    | <b>Other applications and service lives up to 25 years, 50 years and 100 years</b> .....  | <b>24</b> |
| <b>B.4.1</b>                  | <b>General</b> .....  | <b>24</b> |
| <b>B.4.2</b>                  | <b>Tests for specific materials</b> .....   | <b>24</b> |
| <b>Annex C</b> (informative)  | <b>Guidelines for the selection of the appropriate standard in a specific application</b> .....   | <b>28</b> |
| <b>Annex D</b> (informative)  | <b>Significant technical changes to superseded editions of this standard</b> .....  | <b>30</b> |
| <b>Annex ZA</b> (informative) | <b>Clauses of this European Standard addressing the provisions of the EU Construction Products Regulation</b> .....                                   | <b>31</b> |
| <b>ZA.1</b>                   | <b>Scope and relevant characteristics</b> .....   | <b>31</b> |
| <b>ZA.2</b>                   | <b>Procedure for AVCP of Geotextiles and geotextiles-related products for the use in the construction of tunnels and underground structures</b> ..... | <b>32</b> |
| <b>ZA.2.1</b>                 | <b>Systems of AVCP</b> .....  | <b>32</b> |
| <b>ZA.2.2</b>                 | <b>Declaration of performance (DoP)</b> .....   | <b>34</b> |
| <b>ZA.3</b>                   | <b>CE marking and labelling</b> .....   | <b>40</b> |
| <b>Bibliography</b>           | .....   | <b>41</b> |

<https://standards.iteh.ai/catalog/standards/sist/e2e7007b-e8cd-4e51-91f9-ab881765ead9/sist-en-13256-2016>

**EN 13256:2016 (E)****European foreword**

This document (EN 13256:2016) has been prepared by Technical Committee CEN/TC 189 “Geosynthetics”, the secretariat of which is held by NBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2017, and conflicting national standards shall be withdrawn at the latest by July 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13256:2014+A1:2015.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Regulation No 305/2011.

For relationship with Regulation (EU) Nr. 305/2011, see informative Annex ZA, which is an integral part of this document.

Annex D provides details of significant technical changes between this European Standard and the previous editions.

**iTeh STANDARD PREVIEW**

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## Introduction

This European Standard allows manufacturers to describe geotextiles and geotextile-related products on the basis of declared values for characteristics relevant to the intended use and if tested to the specified method. It also includes procedures for the assessment and verification of constancy of performance and factory production control.

This European Standard may also be used by designers, end-users and other interested parties to define which functions and conditions of use are relevant.

The term “product” used in this European Standard refers to a geotextile or geotextile-related product.

This European Standard is part of a series of standards, addressing the requirements for geotextiles and geotextile-related products when used in a specific application. Annex C provides guidance on how to select the appropriate standard.

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 13256:2016](https://standards.iteh.ai/catalog/standards/sist/e2e7007b-e8cd-4e51-91f9-ab881765ead9/sist-en-13256-2016)

<https://standards.iteh.ai/catalog/standards/sist/e2e7007b-e8cd-4e51-91f9-ab881765ead9/sist-en-13256-2016>

## EN 13256:2016 (E)

## 1 Scope

This European Standard specifies the relevant characteristics of geotextiles and geotextile-related products used in the construction of tunnels and underground structures, and the appropriate test methods to determine these characteristics.

The intended use of these geotextiles or geotextile-related products is to protect geosynthetic barriers used in tunnels and underground structures.

This European Standard is not applicable to geosynthetic barriers, as defined in EN ISO 10318-1.

This European Standard provides for the assessment and verification of constancy of performance of the product to this European Standard and for factory production control procedures.

Particular application cases may contain requirements regarding additional properties and – preferably standardized – test methods, if they are technically relevant.

This European Standard may be used to derive design values by taking into account factors within the context of the definitions given in EN 1997-1 (Eurocode 7), e.g. factors of safety. The design life of the product should be determined, since its function may be temporary, as a construction expediency, or permanent, for the lifetime of the structure.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12224, *Geotextiles and geotextile-related products - Determination of the resistance to weathering*

EN 12226, *Geosynthetics - General tests for evaluation following durability testing*

EN 12447, *Geotextiles and geotextile-related products - Screening test method for determining the resistance to hydrolysis in water*

EN 14574, *Geosynthetics - Determination of the pyramid puncture resistance of supported geosynthetics*

EN ISO 1043-1, *Plastics - Symbols and abbreviated terms - Part 1: Basic polymers and their special characteristics (ISO 1043-1)*

EN ISO 3696, *Water for analytical laboratory use - Specification and test methods (ISO 3696)*

EN ISO 9862, *Geosynthetics - Sampling and preparation of test specimens (ISO 9862)*

EN ISO 10318-1, *Geosynthetics - Part 1: Terms and definitions (ISO 10318-1)*

EN ISO 10319, *Geosynthetics - Wide-width tensile test (ISO 10319)*

EN ISO 10320, *Geotextiles and geotextile-related products - Identification on site (ISO 10320)*

EN ISO 10321, *Geosynthetics - Tensile test for joints/seams by wide-width strip method (ISO 10321)*

EN ISO 10722, *Geosynthetics - Index test procedure for the evaluation of mechanical damage under repeated loading - Damage caused by granular material (ISO 10722)*

EN ISO 12236, *Geosynthetics - Static puncture test (CBR test) (ISO 12236)*



EN ISO 12957-1, *Geosynthetics - Determination of friction characteristics - Part 1: Direct shear test (ISO 12957-1)*

EN ISO 12957-2, *Geosynthetics - Determination of friction characteristics - Part 2: Inclined plane test (ISO 12957-2)*

EN ISO 13426-1, *Geotextiles and geotextile-related products - Strength of internal structural junctions - Part 1: Geocells (ISO 13426-1)*

EN ISO 13426-2, *Geotextiles and geotextile-related products - Strength of internal structural junctions - Part 2: Geocomposites (ISO 13426-2)*

EN ISO 13433, *Geosynthetics - Dynamic perforation test (cone drop test) (ISO 13433)*

EN ISO 13438, *Geotextiles and geotextile-related products - Screening test method for determining the resistance to oxidation (ISO 13438)*

ISO 10390, *Soil quality — Determination of pH*

ASTM D7409 — 15, *Standard Test Method for Carboxyl End Group Content of Polyethylene Terephthalate (PET) Yarns*

ASTM D4603 — 03(2011) e1, *Standard Test Method for Determining Inherent Viscosity of Poly(Ethylene Terephthalate) (PET) by Glass Capillary Viscometer*

PDF STANDARD PREVIEW  
(standards.iteh.ai)

### 3 Terms, definitions and abbreviations

[SIST EN 13256:2016](#)

#### 3.1 Terms and definitions [standards.iteh.ai/catalog/standards/sist/e2e7007b-e8cd-4e51-91f9-ab881765ead9/sist-en-13256-2016](#)

For the purposes of this document, the terms and definitions given in EN ISO 10318-1 and the following apply.

##### 3.1.1

##### **product**

geotextile or geotextile-related product

##### 3.1.2

##### **specification**

document in which the work, functions and specific conditions of use of the product are described

##### 3.1.3

##### **rework material**

##### **RWM**

material that is generated in a process and capable of being reclaimed within the same process that generated it

##### 3.1.4

##### **post-consumer material**

##### **PCM**

material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product which can no longer be used for its intended purpose

Note 1 to entry: This includes returns of material from the distribution chain.

## EN 13256:2016 (E)

## 3.1.5

**post-industrial material****PIM**

material diverted from the waste stream during a manufacturing process

## 3.2 Abbreviations

For the purposes of this document, the abbreviations given in EN ISO 1043-1 and EN ISO 10318-1 apply.

- AR: aramid
- GCO-D: geocomposite drainage

## 4 Required characteristics and corresponding methods of test

## 4.1 General

The main function of geotextiles and geotextile-related products used in the construction of tunnels and underground structures is protection. If a drainage or erosion control system is integrated in the construction, the requirements of the appropriate standards shall also be fulfilled.

The specification shall define which conditions of use are relevant (see Table 1). The producer shall provide the necessary data based on the requirements and test methods specified in this European Standard, as described in 5.1.

The characteristics, their relevance to the conditions of use, and the test methods to be used, are specified in Table 1. The list of characteristics in Table 1 includes those relevant to all conditions of use (A), and those relevant to specific conditions of use (S). The indication “-” means that the characteristic is not relevant for that function.

Where, for the same property, data for more than one function shall be provided, the following ranking order shall be observed: A overrides S, and S overrides “-”.

The functions and conditions of use, corresponding with the S-coded characteristics in Table 1, are specified in 4.3.

Durability shall be assessed in accordance with the requirements of Annex B.

## 4.2 Selection of the appropriate standard in a specific application

Guidelines for the selection of the appropriate standard in a specific application are given in Annex C.

**Table 1 — Geotextiles and geotextile-related products used in the construction of tunnels and underground structures – Functions, function-related characteristics and test methods to be used**

| Characteristic  | Test method                       | Functions  |
|---|-----------------------------------|------------|
|   |                                   | Protection |
| (1) Tensile strength <sup>b</sup>   | EN ISO 10319                      | A          |
| (2) Elongation at maximum load  | EN ISO 10319                      | A          |
| (3) Tensile strength of seams and joints <sup>c d</sup>   | EN ISO 10321                      | S          |
| (4) Static puncture resistance (CBR test) <sup>a b</sup>  | EN ISO 12236                      | see (8)    |
| (5) Dynamic perforation resistance (cone drop test) <sup>a</sup>  | EN ISO 13433                      | A          |
| (6) Friction  | EN ISO 12957-1;<br>EN ISO 12957-2 | S          |
| (7) Resistance to damage during installation under repeated loading   | EN ISO 10722                      | S          |
| (8) Protection characteristics  | EN 14574                          | A          |
| (9) Durability  | According to Annex B              | A          |
| <p><u>Relevance of codes:</u></p> <p>A: relevant to all conditions of use</p> <p>S: relevant to specific conditions of use</p> <p>“-”: indicates that the characteristic is not relevant for that function.</p> <p><sup>a</sup> Static puncture resistance may not be relevant for some types of products, e.g. GGR, GCO-D or GST.</p> <p><sup>b</sup> If the mechanical properties (tensile strength and static puncture) are coded “A” in this Table, the use of only one, either tensile strength or static puncture, is usually sufficient in a project specification.</p> <p><sup>c</sup> The strength of internal structural junctions of geocells shall be tested in accordance with EN ISO 13426-1.</p> <p><sup>d</sup> The strength of internal structural junctions of geocomposites shall be tested in accordance with EN ISO 13426-2.</p> |                                   |            |

### 4.3 Characteristics relevant to specific conditions of use

#### 4.3.1 Tensile strength of seams and joints

Data on tensile strength of seams and joints are necessary for all functions if the product is to be mechanically jointed and if load is transferred across the seams and joints.

#### 4.3.2 Friction characteristics

Data on friction characteristics are necessary for the functions separation and filtration when the product is used in a situation where a differential movement can take place between the product and adjacent material that may endanger the stability of the works. The friction characteristics can be measured, using site specific materials, by a direct shear test according to EN ISO 12957-1 or, in the case of loads up to 5 kPa, by an inclined plane test according to EN ISO 12957-2.

Friction behaviour with the adjacent construction materials, e.g. the soil or the geosynthetic barrier, should also be considered.

#### 4.3.3 Resistance to damage during installation

EN ISO 10722 can be used as an index test giving the relative performance of the product. Testing with site specific soil and conditions may give more relevant results for specific design.

### 4.4 Release of dangerous substances

National regulations on dangerous substances may require verification and declaration on release, and sometimes content, when construction products covered by this European Standard are placed on those markets.

In the absence of European harmonized test methods, verification and declaration on release/content should be done taking into account national provisions in the place of use.

NOTE An informative database covering European and national provisions on dangerous substances is available at [http://ec.europa.eu/growth/tools-databases/cp-ds/index\\_en.htm](http://ec.europa.eu/growth/tools-databases/cp-ds/index_en.htm).

## 5 Assessment and verification of constancy of performance (AVCP)

### 5.1 General

The compliance of geotextiles and geotextile-related products with the requirements of this European Standard and with the declared values shall be demonstrated by:

- Product type determination (PTD);
- Factory production control (FPC) by the manufacturer, including product assessment.

The manufacturer shall always retain the overall control and shall have the necessary means to take responsibility for the product.

### 5.2 Presentation of characteristics

The characteristics specified in Table 2, except for durability, shall be expressed as mean values and tolerance value(s) corresponding to the 95 % confidence level. The values expressed may be verified using the procedure referred to in 5.5.

NOTE The 95 % confidence level corresponds to the mean value minus (and/or plus) a tolerance value (see Annex ZA, table ZA1.X column Notes). Both the mean value and the tolerance value are defined by the

manufacturer to be representative of the performance of the product for the corresponding characteristic (these two values are not necessarily based on a statistical calculation).

Information on durability shall be expressed in accordance with Annex B.

### 5.3 Product type determination (PTD)

PTD tests shall be carried out by the manufacturer to define the values of the properties to be declared for the product to satisfy the requirements of this European Standard.

PTD tests shall also be carried out on existing products when a change in the basic materials or manufacturing procedures affects the declared properties or the use of a product. In these cases, the PTD tests are those for the properties which are affected or shall be confirmed and new properties introduced by a change of use.

The tests to be conducted shall be reference tests as specified in this European Standard and shall be selected from the characteristics specified in Table 2, consistent with the product's intended use:

**Table 2 — Characteristics required for PTD and AVCP**

| Characteristic  | Functions  |
|---|------------|
| Tensile strength  | Protection |
| Elongation at maximum load  | Protection |
| Static puncture resistance (CBR test)                             | Protection |
| Dynamic perforation resistance (cone drop test)                   | Protection |
| Protection characteristics  | Protection |
| Durability <sup>a</sup>   | Protection |
| <sup>a</sup> For the durability aspects, see Table 1 and Annex B. |            |

The results of PTD tests shall be recorded and be available for inspection.

The sample for the PTD tests shall be drawn according to EN ISO 9862 from a normal production run using the same materials and forming processes as used for the full production process. The size of the sample shall be big enough to allow the determination of the characteristics specified in Table 2. Handmade samples, short trial batches and other development prototypes may be tested by the same methods, but shall not be used for establishing characteristic values in PTD tests.

### 5.4 Factory production control (FPC)

A FPC scheme shall be established and documented in a manual prior to a product type being placed on the market. Subsequently, any fundamental changes in raw materials and additives, manufacturing procedures or the control scheme that affect the properties or use of a product shall be recorded in the manual.

The manual shall include the FPC procedures relevant to the declared properties, as confirmed by the product type determination.

The FPC procedures shall consist of a permanent internal production control system to ensure that such products comply with this European Standard and that the measured values conform to the declared values.