INTERNATIONAL STANDARD

ISO 25619-1

First edition
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Geosynthetics — Determination of compression behaviour —

Part 1: Compressive creep properties

Géosynthétiques — Détermination du comportement en compression —

Partie 1: Propriétés de fluage en compression

Reference number
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Contents

Page

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 25619-1 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 189, *Geosynthetics*, in collaboration with ISO Technical Committee ISO/TC 221, *Geosynthetics*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This first edition of ISO 25619-1 cancels and replaces EN 1897:2001, which has been technically revised. The following technical changes have been introduced:

— normative references have been updated;

— definitions, in particular with regard to compressive creep strain (ε_{cc}), have been clarified;

— omission of conditioning of the test specimen has been allowed under specific circumstances, and the circumstances under which immersed specimens should be tested have been specified;

— a requirement has been included that the stress applied by the top plate on the specimen shall not exceed 2 kPa;

— calculation of compressive creep strain has been included in addition to total compressive strain; a requirement has been included that it be referred to in the test report and that a plot of compressive creep strain versus log (time) be provided (for both test methods).

ISO 25619 consists of the following parts, under the general title *Geosynthetics — Determination of compression behaviour*:

— *Part 1: Compressive creep properties*

— *Part 2: Determination of short-term compression behaviour.*

Geosynthetics — Determination of compression behaviour —

Part 1:
Compressive creep properties

1 Scope

This part of ISO 25619 specifies index test methods for determining the compressive creep properties of geosynthetic products. The test specimens are subjected either to normal compressive loading or to a combination of normal compressive loading and shear loading.

The test method with a normal load only (see Clause 5) is the standard method.

The test method in which both normal and shear loads are applied (see Clause 6) is intended for products that are sensitive to shear failure, i.e. which have a columnar or cuspated structure.

The tests are carried out on dry specimens or on specimens immersed in water. The test is intended to be carried out with the specimen immersed in water when any part of the geosynthetic product contains a hydrophilic polymer.

2 Normative references

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

ISO 554, *Standard atmospheres for conditioning and/or testing — Specifications*

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 9862, *Geosynthetics — Sampling and preparation of test specimens*

ISO 9863-1, *Geosynthetics — Determination of thickness at specified pressures — Part 1: Single layers*

ISO 10318, *Geosynthetics — Terms and definitions*

3 Terms and definitions

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

3.1
thickness
d
distance between the two rigid plates in contact with the specimen at any stage of the test

See Figures 1 and 2.

NOTE Thickness is measured in millimetres.

3.2
initial thickness
d_i
thickness of the specimen under an applied normal stress of 2 kPa

NOTE Initial thickness is measured in millimetres, in accordance with ISO 9863-1.

3.3
initial compressed thickness
d_0
thickness measured 1 min after loading (normal loading) or 4 min after loading (normal and shear loading)

3.4
total compressive strain
ε
time-dependent change in thickness

NOTE Total compressive strain is expressed as a percentage of the initial thickness (d_i).

3.5
compressive creep strain
ε_{cc}
time-dependant change in thickness of a material subjected to a constant compressive load (after reaching the initial compressed thickness, d_0, of the specimen)

NOTE Compressive creep strain is expressed as a percentage of the initial compressed thickness.

3.6
compressive creep collapse
occurrence of a sudden increase in the speed of change of thickness of a specimen subjected to a constant compressive load

4 Test specimens

4.1 Sampling

Specimens shall be taken in accordance with ISO 9862.

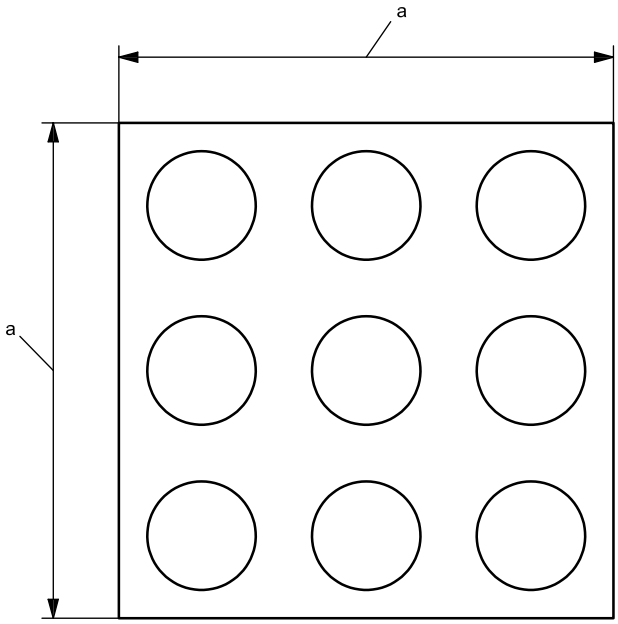
4.2 Number and dimensions of test specimens

Cut two specimens from the test sample for each test load; a new specimen is required for each test.

Each specimen shall satisfy the following criteria with regard to dimensions:

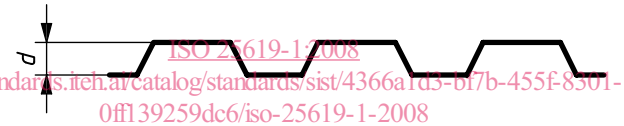
— the specimen shall be square and have a minimum size of 100 mm × 100 mm (see Figures 1 and 2); if the specimen has a structure in which loading is resisted at defined points or areas, then the loading plate shall cover at least three complete points or areas in both directions (see Figure 3);

— specimens shall be cut with the sides parallel to the length and width of the sample.



a) Plan area

a 100 mm minimum, or at least three contact points in each direction.

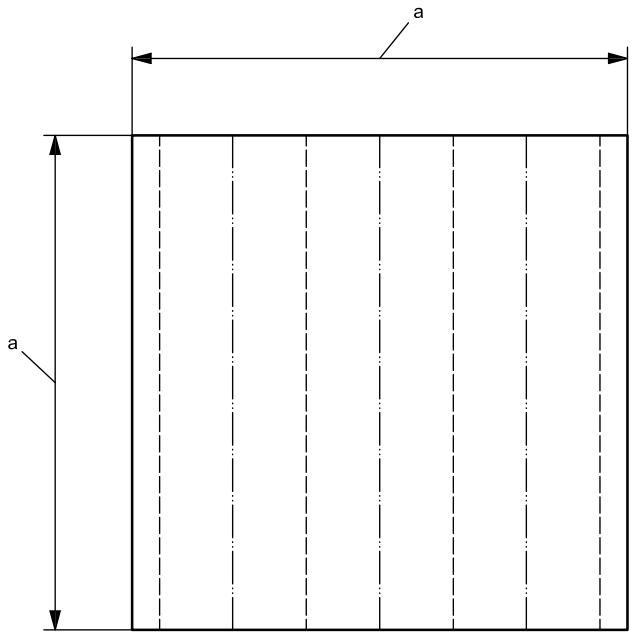


b) Cross-sectional area

Key

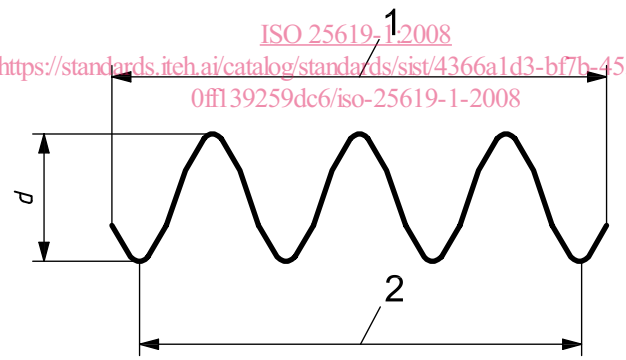
d thickness of the specimen, in millimetres

Figure 1 — Dimensions of general test specimen



a) Plan area

[a] 100 mm minimum, or a minimum of three contact lines on the top plate and a minimum of four contact lines on the base plate.

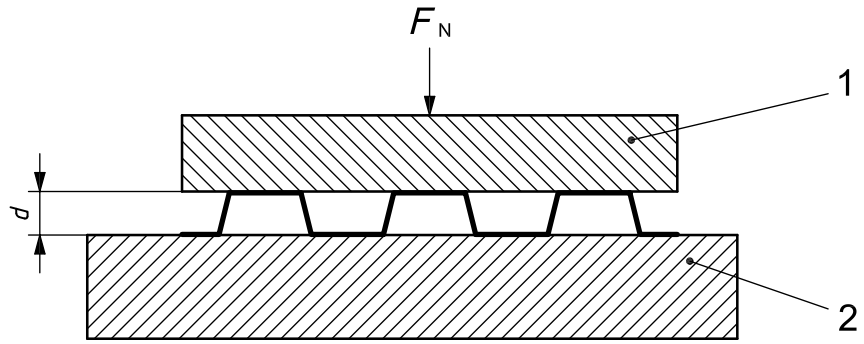


b) Cross-sectional area

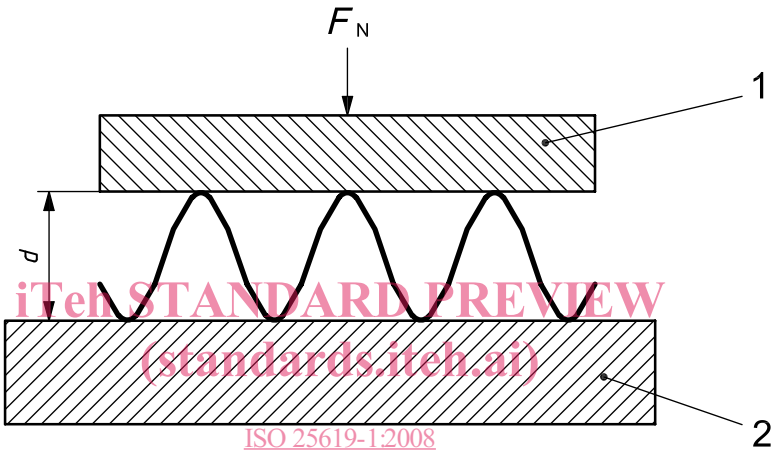
Key

1 specimen width
2 representative width of the specimen
d thickness of specimen, in millimetres

Figure 2 — Size of specimen of a geomat (with wave structure or double-sided structured core of a drainage composite)



a) Example for single-sided structured cores



b) Example for double-sided structured cores

Key

1 metal top plate, smooth surface (same size as specimen or larger)
2 metal base plate, smooth surface (larger than top plate)
d thickness of specimen, in millimetres
F_N applied normal force, in kilonewtons

Figure 3 — Loading arrangements for structured cores

4.3 Conditioning

The test specimens shall be conditioned and tested in the standard atmosphere for testing at (20 ± 2) °C and (65 ± 5) % relative humidity, as defined in ISO 554.

The specimens can be considered to have been conditioned when the change in mass in successive weighings made at intervals of not less than 2 h does not exceed 0,25 % of the mass of the test specimen.

Conditioning and/or testing in the standard atmosphere may only be omitted when it can be shown that results obtained for the same specific type of product (both structure and polymer type) are not affected by changes in temperature and humidity exceeding the limits. This information shall be included in the test report.

The test shall be carried out with the specimen immersed in water when any part of the geosynthetic product contains a hydrophilic polymer. Where the test is to be carried out with the specimen immersed in water, the specimen shall be soaked in water for 24 h prior to the test. Deionized water in accordance with ISO 3696 shall be used. The water shall be maintained at a temperature of (20 ± 2) °C.

5 Normal compressive load method

5.1 Principle

The geosynthetic specimen is placed on the fixed base of the compression testing equipment. With an upper loading plate, the vertical compressive load is applied and the change in thickness is recorded with time.

The vertical compressive load is applied to the specimen for a period of 1 000 h, or for a longer or shorter period by agreement.

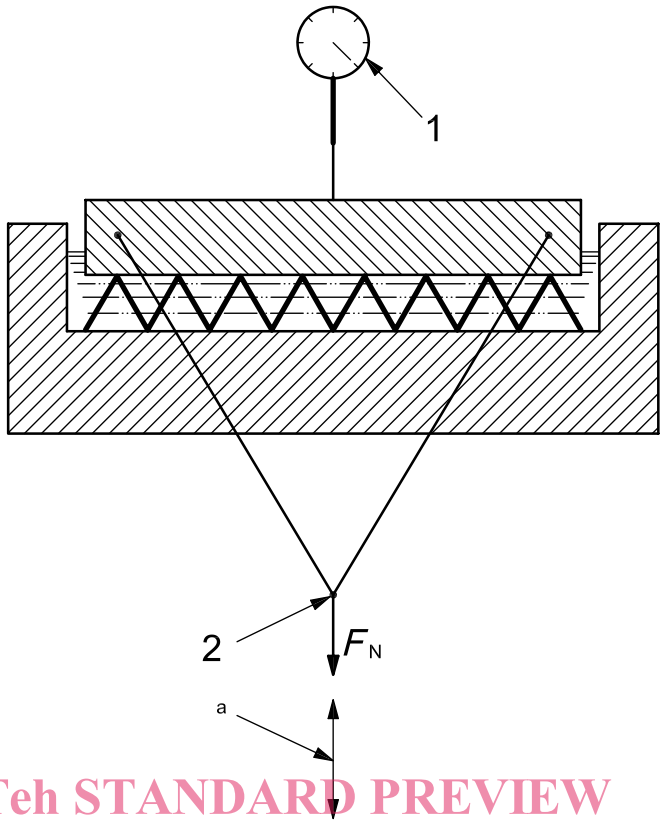
5.2 Apparatus

5.2.1 **Compression testing equipment**.

Compression testing equipment with a vertical travel greater than the initial thickness of the specimen shall be used. It shall be capable of sustaining the applied stress to within 1 % accuracy for the duration of the test.

The compressive stress may be applied mechanically, pneumatically or hydraulically. Where hydraulic or pneumatic loading systems are used, the stress applied shall be constant for the duration of the test. The loading device, however, shall be capable of applying the full stress in one controlled step, i.e. without significant impact, within a period of 60 s.

Most systems use dead weights to apply the stress. In systems using dead weights, the loading system shall be fully supported while being assembled so that no forces are applied to the specimen until the support is smoothly released [see Figure 4 a)].



a) Normal load test

Key

1 measuring device
2 weights on hanger
F_N applied normal force, in kilonewtons
[a] Load supported prior to starting.

Figure 4 (*continued*)