

भारतीय मानक ब्यूरो

BUREAU OF INDIAN STANDARDS

भारतीय मानक मसौदा

भूकृत्रिम — घर्षण विशेषताओं का निर्धारण

भाग 1: प्रत्यक्ष अपरूपण परीक्षण

Draft Indian Standard

GEOSYNTHETICS — DETERMINATION OF FRICTION CHARACTERISTICS

PART 1: DIRECT SHEAR TEST

ICS 59.080.70

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Last date for receipt of comment is
30 May 2024

NATIONAL FOREWORD

(Formal clauses will be added later)

This Indian Standard intended to be adopted is identical with ISO 12957-1 : 2018 'Geosynthetics — Determination of friction characteristics Part 1: Direct shear test' issued by the International Organization for Standardization (ISO).

The text of ISO Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

- Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.
- Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In the standard intended to be adopted, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards which are to be substituted in their respective places are listed below along with their degree of equivalence for the editions indicated:

<i>International Standard</i>	<i>Corresponding Indian Standard</i>	<i>Degree of Equivalence</i>
ISO 9862, Geosynthetics — Sampling and preparation of test specimens	IS 14706 : 1999 Geotextiles — Sampling and preparation of test specimens	Identical

In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2: 2022 ‘Rules for rounding off numerical values (*first revision*)’.

Extract of ISO 12957-1:2005 ‘Geosynthetics — Determination of Friction Characteristics Part 1: Direct Shear Test’

Foreword

This second edition cancels and replaces the first edition ([ISO 12957-1:2005](#)), which has been technically revised. The main changes compared to the previous edition are as follows:

- introduction of the possibility to test the shear between two geosynthetics;
- introduction of the possibility to test soil different from the standard sand.

A list of all parts in the ISO 12957 series can be found on the ISO website.

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.

1 Scope

This document specifies an index test method to determine the friction characteristics of geosynthetics in contact with a standard sand as described in EN 196-1, i.e. with a specified density and moisture content, under a normal stress and at a constant rate of displacement, using a direct shear apparatus.

The same testing procedure can be used with any type of soil with the density and moisture content that are required to evaluate the performance under specific conditions or with another geosynthetic under a normal stress and at a constant rate of displacement, using a direct shear apparatus.

The procedure can also be used for testing geosynthetic barriers.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 9862](#), *Geosynthetics — Sampling and preparation of test specimens*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply. ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <http://www.electropedia.org/>

3.1 relative displacement

S

displacement of the sand, soil or other geosynthetic relative to the specimen during shearing
Note 1 to entry: Relative displacement is expressed in millimetres (mm).

3.2 normal force

N

constant vertical force applied to the specimen
Note 1 to entry: Normal force is expressed in kilonewtons (kN).

3.3 shear force

S

horizontal force measured during shearing at a constant rate of displacement
Note 1 to entry: Shear force is expressed in kilonewtons (kN).

3.4 normal stress

σ

normal force (3.2) divided by the contact area of the specimen
Note 1 to entry: Normal stress is expressed in kilopascals (kPa).

3.5 shear stress

τ

shear force (3.3) along the sand, soil or other geosynthetic /geosynthetic interface, divided by the contact area of the specimen

Note 1 to entry: Shear stress is expressed in kilopascals (kPa).

3.6 maximum shear stress

τ_{\max}

maximum value of shear stress (3.5) developed in a shear test

Note 1 to entry: Maximum shear stress is expressed in kilopascals (kPa).

3.7 angle of friction

ϕ

slope of the "best fit regression straight line", through the plot of maximum shear stress (3.6)

Note 1 to entry: The angle of friction is expressed in degrees (°).

Note 2 to entry: In this document, ϕ_{sg} is used to refer to the angle of friction between geosynthetic and sand, or geosynthetics and specific soil, and ϕ_{gg} is used for the angle of friction between geosynthetic and geosynthetic.

3.8 apparent cohesion

c_{sg}

calculated value of the shear stress (3.5) on the "best fit regression straight line" corresponding to zero normal stress (3.4)

Note 1 to entry: Apparent cohesion is expressed in kilopascals (kPa).

Note 2 to entry: This term is used between geosynthetic and sand, or geosynthetics and specific soil.

3.9 maximum shear stress in sand or soil alone

$\tau_{\max,s}$

maximum shear stress (3.6) developed during a shear test on sand or soil alone

Note 1 to entry: Maximum shear stress in sand or soil alone is expressed in kilopascals (kPa).

3.10 maximum shear stress sand or soil/support

$\tau_{\max,sup}$

maximum shear stress (3.6) developed during the shearing along the sand or soil/support interface without geosynthetic

Note 1 to entry: Maximum shear stress sand or soil/support is expressed in kilopascals (kPa).

3.11 friction ratio

$f_g(\sigma)$

ratio of the *maximum shear stress*, τ_{\max} (3.6) to the *maximum shear stress in sand or soil alone*, $\tau_{\max,s}$ (3.9) for the same *normal stress* (3.4) σ

3.12

apparent adhesion

a_{gg}

calculated value of the *shear stress* (3.5) on the "best fit regression straight line" corresponding to zero *normal stress* (3.4)

Note 1 to entry: Apparent adhesion is expressed in kilopascals (kPa).

Note 2 to entry: This term is used between geosynthetic and geosynthetic.

FORMAT FOR SENDING COMMENTS ON BIS DOCUMENTS

(Please use A4 size sheet of paper only and type within fields indicated. Comments on each clause/sub clause/table/fig etc. be started on a fresh box. Information in column 3 should include reasons for the comments and suggestions for modified working of the clauses when the existing text is found not acceptable. Adherence to this format facilitates Secretariat's work)

Please e-mail your comments to txd@bis.gov.in.

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(1)	(2)	(3)	(4)	(5)

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