



SLOVENSKI STANDARD
oSIST prEN 17534:2020
01-julij-2020

Tekstilije - Fiziološki učinki - Merjenje prenosa tekočega znoja in pufranja

Textiles – Physiological effects – Measurement of liquid sweat transport and buffering

Textilien - Physiologische Wirkungen - Messung des flüssigen Schweißtransports und der flüssigen Schweißpufferung

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: prEN 17534

[oSIST prEN 17534:2020](https://standards.iteh.ai/catalog/standards/sist/0f86f487-6852-4c38-aa4f-b994e0fd5b0e/osist-pren-17534-2020)

<https://standards.iteh.ai/catalog/standards/sist/0f86f487-6852-4c38-aa4f-b994e0fd5b0e/osist-pren-17534-2020>

ICS:

59.080.30 Tkanine Textile fabrics

oSIST prEN 17534:2020

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

oSIST prEN 17534:2020

<https://standards.iteh.ai/catalog/standards/sist/0f86f487-6852-4c38-aa4f-b994e0fd5b0e/osist-pren-17534-2020>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 17534

June 2020

ICS 59.080.30

English Version

Textiles - Physiological effects - Measurement of liquid sweat transport and buffering

Textilien - Physiologische Wirkungen - Messung des
flüssigen Schweißtransports und der flüssigen
Schweißpufferung

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 248.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents	Page
European foreword	3
Introduction	4
1 Scope.....	5
2 Normative references.....	5
3 Terms and definitions.....	5
4 Reagents.....	6
5 Test accessories.....	6
5.1 Thin foil	6
5.2 Polyester woven fabric	6
5.3 Frame (for method B).....	6
5.4 Specimen carrier.....	6
6 Measurement and test methods	7
6.1 General.....	7
6.2 Method A	8
6.2.1 Principle.....	8
6.2.2 Test specimens	9
6.2.3 Test procedure.....	9
6.2.4 Evaluation of test results.....	9
6.2.5 Physiological assessment of the textile material.....	11
6.2.6 Calibration of test apparatus.....	11
6.2.7 Precision of results.....	11
6.2.8 Test report.....	12
6.3 Method B (Modification of Method A)	12
6.3.1 Principle of test.....	12
6.3.2 Test procedure.....	13
6.3.3 Evaluation of test results.....	13
Annex A (informative) Specimen carrier	14

European foreword

This document (prEN 17534:2020) has been prepared by Technical Committee CEN/TC 248 “Textiles and Textile Products”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 17534:2020](https://standards.iteh.ai/catalog/standards/sist/0f86f487-6852-4c38-aa4f-b994e0fd5b0e/osist-pren-17534-2020)

<https://standards.iteh.ai/catalog/standards/sist/0f86f487-6852-4c38-aa4f-b994e0fd5b0e/osist-pren-17534-2020>

Introduction

For the assessment of the physiological properties of textiles worn next to the skin, not only their stationary thermophysiological properties (thermal and water vapour resistance) are important, which can be measured according to EN ISO 11092 with the sweating guarded-hotplate (Skin Model), but also their capacity to buffer in stationary sweat pulses and to transport liquid sweat, occurring in the practical use of textiles and clothing.

With liquid sweat appearing on the wearer's skin, the textiles takes it up and transport it into the next textile layers or into the environmental air. This so-called buffering capacity and transport of liquid water (sweat) of a textile is measured quantitatively with the sweating guarded-hotplate, slightly modified from the design and procedures described in the above standards. A textile is judged to perform better, the more complete the transport of sweat from the skin is effected, and the less liquid sweat remains on the skin.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 17534:2020](https://standards.iteh.ai/catalog/standards/sist/0f86f487-6852-4c38-aa4f-b994e0fd5b0e/osist-pren-17534-2020)

<https://standards.iteh.ai/catalog/standards/sist/0f86f487-6852-4c38-aa4f-b994e0fd5b0e/osist-pren-17534-2020>

1 Scope

This test method is intended for measuring liquid sweat management properties of knitted, woven and nonwoven textile fabrics, namely buffering index, sweat transport and sweat uptake.

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.

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

EN ISO 11092, *Textiles — Physiological effects — Measurement of thermal and water-vapour resistance under steady-state conditions (sweating guarded-hotplate test) (ISO 11092)*

ISO 17617:2014, *Textiles — Determination of moisture drying rate*

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:

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

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

3.1

uptake or buffering

liquid water remaining in the textile material in grams during and after a period of time in contact with water

3.2

sweat transport, F

amount of liquid water (sweat) in grams taken up by 1 m^2 of the textile material and within 1 h transported into ambient air with specific temperature and relative humidity

3.3

liquid sweat management

consists, on one hand, of the uptake or buffering of the sweat from the skin and, on the other hand, of the transport of the sweat from the skin to the ambience

Note 1 to entry: for sweat from the skin, see 3.1 and for sweat from the skin to the ambience, see 3.2.

3.4

moisture permeability, F_1

amount of liquid water in grams taken up by 1 m^2 of the textile material and within 1 h transported into ambient air with a water vapour pressure gradient of 1 hPa between the two sides of the textile material

3.5

sweat uptake, G_2

portion of liquid water remaining in the textile material in grams after 15 min of contact with water

prEN 17534:2020 (E)**3.6****buffering index, K_f**

portion of the sum of liquid water transported through the textile material (G_1) and remaining in the textile material (G_2) in grams after 15 min of contact with water related to the total amount of water offered to the textile material (G_0) in grams

4 Reagents

Grade 3 water compliant with EN ISO 3696.

5 Test accessories**5.1 Thin foil**

A thin foil sized 25 cm x 25 cm which is water and water vapour impermeable. A suggested material for the foil is PET (Polyethylene terephthalate) with a thickness of 0,1 mm. The thin foil shall present a good thermal stability and a good planarity to enable close contact with the plate of the skin-model.

Note: the foil prevents the water from being wicked into the measuring unit for the duration of the test.

5.2 Polyester woven fabric

A polyester woven fabric with hydrophobic surface characteristics, a mass of (100 ± 3) g/m² and a size of 20 cm x 20 cm¹⁾.

Note: this fabric simulates distribution of sweat on skin.

Water absorbency of this fabric can be checked using the method described in Annex A of ISO 17617:2014 (drop test).

When soiling is visible, this polyester woven fabric shall be cleaned. The cleaning procedure is as follows: the polyester woven-fabric is rinsed in distilled water at room temperature until the soiling has been removed. Then the fabric is air-dried at room temperature.

5.3 Frame (for method B)

A frame made of material with a low thermal conductance, for example synthetic resin.

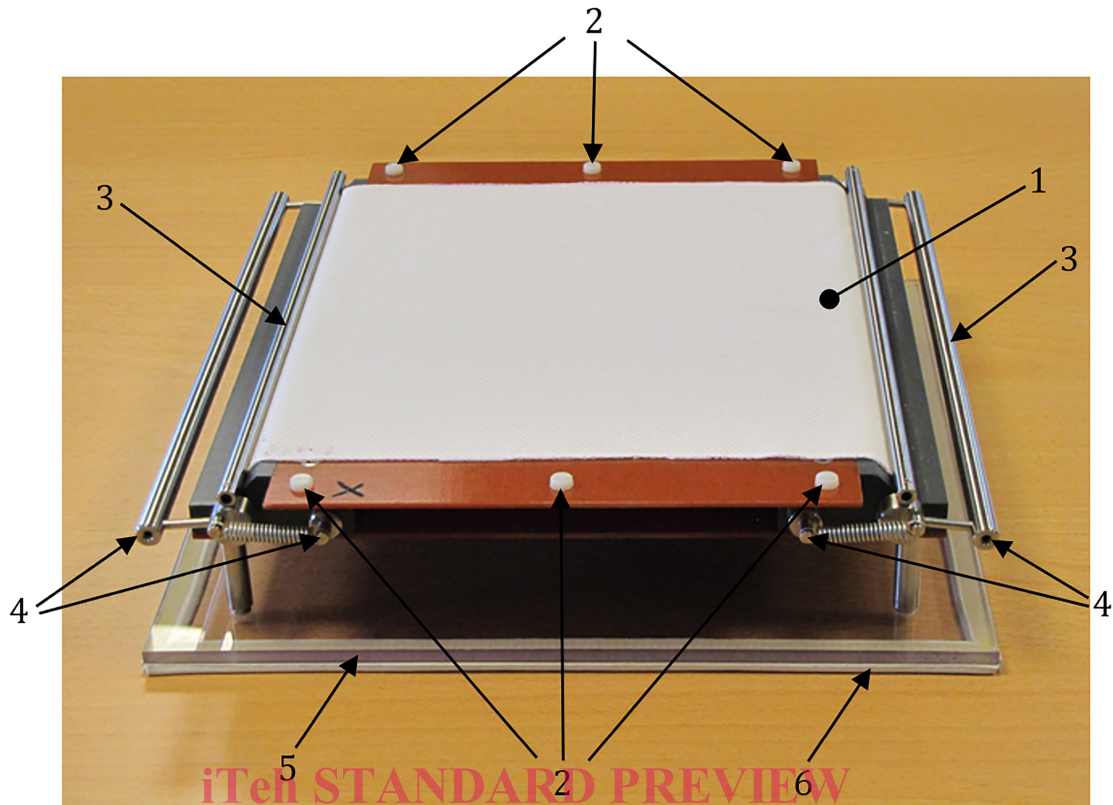
Dimensions of the frame are:

- outer size: 300 × 300 mm²;
- inner size: 230 × 230 mm²;
- thickness: $(2 \pm 0,1)$ mm.

5.4 Specimen carrier

A specimen carrier, see Figure 1.

¹⁾ A suitable reference for the PES-woven fabric is 'Vektron 4003' produced by Klopman International, Berliner Strasse 101, D-40880 Ratingen, Germany. This information is given for the convenience of users of this document and does not constitute an endorsement by CEN/TC248 of the product named. Equivalent products may be used if they can be shown to lead to the same results.



(standards.itech.ai)

Key

- 1 specimen
- 2 spacers
- 3 clips (closed position)
- 4 mechanism to open and close the clips
- 5 lid
- 6 gasket

[oSIST prEN 17534:2020](https://standards.itech.ai/catalog/standards/sist/0f86f487-6852-4c38-aa4f-b994e0fd5b0e/osist-pren-17534-2020)

<https://standards.itech.ai/catalog/standards/sist/0f86f487-6852-4c38-aa4f-b994e0fd5b0e/osist-pren-17534-2020>

Figure 1 — Specimen carrier in reverse position

The lid shall be large enough to lay on the frame and cover the sample without touching it. Spacer height shall be 3 mm.

The use of the specimen carrier is illustrated in Annex A.

6 Measurement and test methods

6.1 General

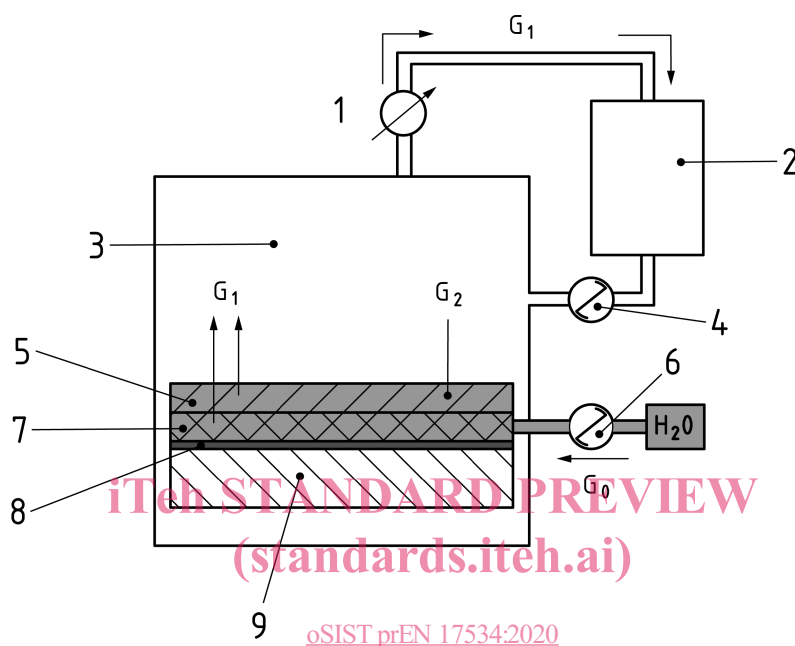
Two methods are described. Method A implies a technical modification by adding a gas meter to the sweating guarded hotplate. If it is not possible to modify the equipment, method B can be used on any sweating guarded hotplate compliant with EN ISO 11092

It has been shown that both methods provide similar results.

6.2 Method A

6.2.1 Principle

The buffering capacity and transport of liquid sweat of a textile material is measured with the sweating guarded-hotplate, specified in EN ISO 11092, with as additional components a gas meter and two temperature sensors at the inlet and outlet of the gas meter (Figure 2).



Key

- | | | | |
|---|-------------------------------------|----------------|---|
| 1 | gas meter | 7 | hydrophobic polyester fabric |
| 2 | drying column | 8 | water and water vapour impermeable foil |
| 3 | climatic cabinet (35 °C, 30 % r.h.) | 9 | measuring unit |
| 4 | air pump | G ₀ | water injected in the polyester fabric |
| 5 | specimen | G ₁ | water transported through the specimen |
| 6 | syringe | G ₂ | sweat uptake |

Figure 2 — Principle of apparatus

To perform the test the sweating guarded-hotplate's measuring unit kept at 35 °C is covered with the thin foil. On top of the foil the polyester woven fabric is placed.

During the test, the air stream (velocity $(1 \pm 0,05)$ m/s) in the climatic cabinet of the sweating guarded-hotplate is maintained at a constant temperature of $(35 \pm 0,5)$ °C with a relative humidity of (30 ± 3) % r.h. This is affected by the climatic cabinet's air pump set to a pumping power of 3 000 l/h. With this pump the air of the climatic cabinet is circulated through a drying column filled with silica gel as drying agent. The total volume of the air circulated during the test period of 15 min is determined by a gas meter.

During the test, water vapour diffusion is taking place through the specimen due to the difference in water vapour pressure between the surface of the PES-woven fabric placed on the measuring unit and the air within the climatic cabinet. In addition the specimen is absorbing water out of the underlying PES-woven fabric, which is simulating the sweating human skin. This water absorbed by the specimen is also at least partly evaporated into the air of the climatic cabinet. The total amount of moisture in the