SLOVENSKI STANDARD
SIST EN 17117-2:2021

01-oktober-2021

Gumirane ali plastificirane tekstilije - Mehanske preskusne metode v dvoosnih napetostnih stanjih - 2. del: Določanje vrednosti kompenzacije vzorca

Rubber- or plastics-coated fabrics - Mechanical test methods under biaxial stress states - Part 2: Determination of the pattern compensation values

Mit Kautschuk oder Kunststoff beschichtete Textilien - Mechanische Prüfverfahren unter biaxialer Spannung - Teil 2: Bestimmung der Kompensationswerte

Supports textiles revêtus de caoutchouc - Méthodes d'essais mécaniques sous contraintes biaxiales - Partie 2 : Détermination des valeurs de compensation des modèles

Ta slovenski standard je istoveten z: **EN 17117-2:2021**

ICS:

59.080.40	Površinsko prevlečene tekstilije	Coated fabrics

SIST EN 17117-2:2021 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 17117-2

July 2021

ICS 59.080.40

English Version

Rubber- or plastics-coated fabrics - Mechanical test methods under biaxial stress states - Part 2: Determination of the pattern compensation values

Supports textiles revêtus de caoutchouc ou de plastique - Méthodes d'essais mécaniques sous contraintes biaxiales - Partie 2: Détermination des valeurs de compensation du patronnage

Mit Kautschuk oder Kunststoff beschichtete Textilien - Mechanische Prüfverfahren unter biaxialen Spannungszuständen - Teil 2: Bestimmung der Kompensationswerte

This European Standard was approved by CEN on 21 June 2021.

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.

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, 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.

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

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

Ref. No. EN 17117-2:2021 E

Contents

Page

European foreword

This document (EN 17117-2:2021) has been prepared by Technical Committee CEN/TC 248 “Textiles and textile products”, the secretariat of which is held by BSI.

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 January 2022, and conflicting national standards shall be withdrawn at the latest by January 2022.

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

EN 17117 consists of the following parts, under the general title *Rubber- or plastics-coated fabrics — Mechanical test methods under biaxial stress states*:

— *Part 1: Tensile stiffness properties*

— *Part 2: Determination of the pattern compensation values*

An additional part related to shear stiffness properties will be proposed after the publication of the previous parts.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

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, 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 the United Kingdom.

Introduction

Compensation is the process of reducing the size of cutting patterns with the objective to introduce and maintain the desired range of prestress specified in the structural design using coated fabrics such as architectural tensioned envelopes. Elastic strain correspondent to the prestress and irreversible strain of the coated fabrics induced by tensioning during installation and potential load incidents over the lifetime of an architectural tensioned envelope, should be compensated to achieve the objective. Different compensation values may be applied to different parts of the same architectural tensioned envelope. Decompensation may also be applied if required.

1 Scope

This document describes methods for the determination of compensation values for orthotropic coated fabrics (different properties along ideally perpendicular directions, such as the weft and warp yarns for woven based coated fabrics, or along the courses and wales of knitted based coated fabrics) for determining cutting patterns.

NOTE The final interpretation and the determination of the compensation values remains the responsibility of the project engineer.

Annex C describes a method to determine comparable measures of extensibility along ideally perpendicular directions of coated fabrics. The comparable measures of extensibility can be used by design engineers to assess the extensibility of a coated fabric by comparison with other coated fabrics. In this way, they can help to interpret results of compensation tests. Moreover, they can be used by material suppliers to measure the consistency of extensibility along perpendicular directions of a coated fabric from batch to batch.

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 17117-1, *Rubber or plastics-coated fabrics - Mechanical test methods under biaxial stress states - Part 1: Tensile stiffness properties*

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
biaxial
measurement or application along two axes simultaneously

[SOURCE: EN 17117-1:2018, 3.1]

3.2
compensation
reduction in size of a cutting pattern, so that during installation the panel elongates to achieve an initial nominal prestress

3.3
compensation value
amount by which the dimensions of the pattern geometry is reduced by compensation

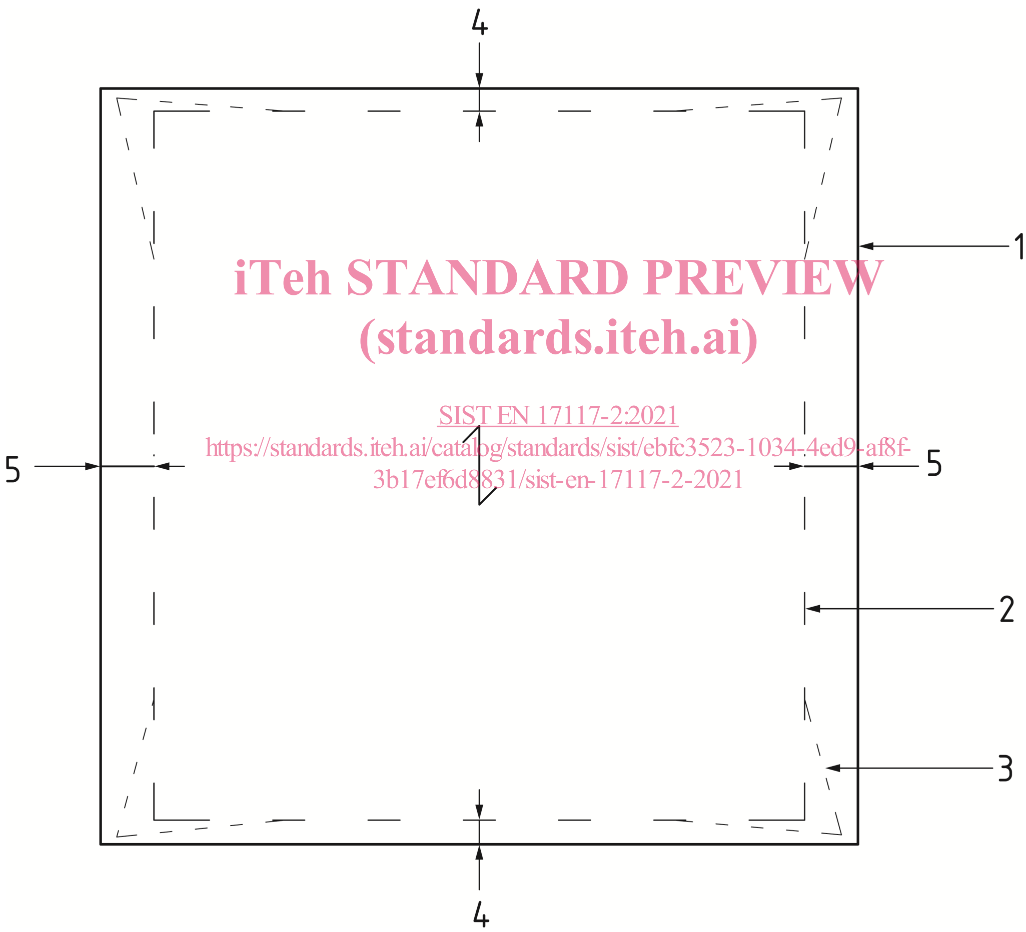
Note 1 to entry: The compensation value is expressed as a percentage of length in the direction to be compensated.

3.4
cutting pattern
two-dimensional geometry developed from a pattern to be cut out of the individual piece of a coated fabric

3.5
decompensation
partial or complete reduction of compensation

Note 1 to entry: Decompensation may be applied to ease the installation process, typically in the vicinity of boundaries.

Note 2 to entry: Typical application of compensation and decompensation to a piece of a coated fabric is depicted in Figure 1.



Key

1	final geometry when stressed with nominal prestress
2	geometry compensated, unstressed
3	geometry decompensated, unstressed
4	half of the pattern compensation measure in warp (wale, respectively)
5	half of the pattern compensation measure in fill (course, respectively)

Figure 1 — Typical application of compensation and decompensation to a piece of a coated fabric

3.7
overstressing
stressing beyond the nominal prestress level during the installation of a panel

3.8
panel
final three-dimensional assembly of pieces of a coated fabric, cut according to the cutting pattern, ready to be installed on site

Note 1 to entry: An architectural tensioned envelope may be made of more than one panel.

3.9
piece of a coated fabric
two-dimensional piece cut from a roll of coated fabric

3.10
nominal prestress
input data of prestress, prescribed during the form finding and structural analysis, and part of the structural design

3.11
pattern
seam layout based subdivision of a three-dimensional surface into a piece of a coated fabric

3.12
seam layout
definition of location and direction of seams over the surface of an architectural tensioned envelope

3.13
W1,5
load applied in the warp (respectively wale) direction with a magnitude of 1,5 % of the ultimate tensile strength (UTS) in the warp (respectively wale) direction

3.14
F1,5
load applied in the fill (respectively course) direction with a magnitude of 1,5 % of the ultimate tensile strength (UTS) in the fill (respectively course) direction

3.15
W10
load applied in the warp (respectively wale) direction with a magnitude of 10 % of the ultimate tensile strength (UTS) in the warp (respectively wale) direction

3.16
F10
load applied in the fill (respectively course) direction with a magnitude of 10 % of the ultimate tensile strength (UTS) in the fill (respectively course) direction

3.17
MIN1,5
minimum of W1,5 and F1,5

3.18
MIN10
minimum of W10 and F10

4 Principle

Strains measured during the biaxial loading in warp and fill (respectively wale and course) directions of the coated fabric are used to derive the compensation values.

5 Apparatus

5.1 Biaxial test equipment

Shall be according to EN 17117-1:2018, 5.1.

5.2 Measurement of load

Shall be according to EN 17117-1:2018, 5.2.

5.3 Measurement of strain

Shall be according to EN 17117-1:2018, 5.3.

6 Sampling and preparation of test specimens

6.1 Bulk sample (number of pieces from a shipment or lot)

Shall be according to EN 17117-1:2018, 6.1.

6.2 Number of laboratory samples

Shall be according to EN 17117-1:2018, 6.2.

6.3 Specimen geometry and preparation

6.3.1 General

Shall be according to EN 17117-1:2018, 6.3.1.

6.3.2 Contact strain measurement

Shall be according to EN 17117-1:2018, 6.3.2.

6.3.3 Non-contact strain measurement

Shall be according to EN 17117-1:2018, 6.3.3.

7 Atmosphere for conditioning and testing

Shall be according to EN 17117-1:2018, Clause 7.

8 Test procedure

8.1 Mounting of the specimen

Shall be according to EN 17117-1:2018, 8.1.

8.2 Loading and selection of strain values

In order to derive project specific compensation values from selected strain values, project specific load profiles should be individually specified. The specimen is loaded by forces in the warp and fill (respectively wale and course) directions with prescribed magnitudes and ratios.

Example of project specific load profiles are illustrated in Annex B.

Load ratios are used to define a load cycle with start, middle and end values.

The specification of the load profile should include consideration of:

— design nominal prestress;

— design biaxial stresses arising from characteristic external loads, for example wind, snow. Design biaxial stresses should be representative (for example an average value) for the area over which the compensation value is to be applied;

— type of external loads, for example wind, snow;

— design biaxial stress ratios;

— duration of design biaxial stresses;

— probability of design biaxial stresses;

— spatial representation of design biaxial stresses;

— area over which the compensation value is to be applied;

— overstressing anticipated during installation;

— installation process, for example order of prestressing of the yarn directions during installation.

Typically, two dominant load cases can be derived from the structural analysis: one with predominant warp stress and one with predominant fill stress. The respective stresses in warp and fill direction together with the corresponding stresses in the perpendicular direction should be used to specify the load profile. The load profile should consist of the steps given in Table 1. In some cases, for example pneumatic structures or plane frames, only one load case may exist. In these cases, steps 4 and 5 can be neglected.