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English Version

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

Supports textiles revêtus de caoutchouc ou de plastique - Méthodes d'essais mécaniques sous contraintes biaxiales - Partie 1 : Propriétés de rigidité sous traction

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European foreword

This document (prEN 17117-1:2017) 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.

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* (in preparation)

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

Introduction

Conventional mechanical test methods (based on uniaxial method) are not always suitable within the purpose of the design of specific products using coated fabrics such as architectural tensioned covers.

1 Scope

This document describes methods of test using biaxial stress states for the determination of the tensile stiffness properties of biaxially oriented coated fabrics (properties along anisotropic directions, such as the weft and warp yarns for woven based coated fabrics, or along the courses and wales of knitted based coated fabrics).

Other mechanical properties (such as pattern compensation values, shear stiffness, and strength) will be described in other parts.

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 2231, *Rubber- or plastics-coated fabrics - Standard atmospheres for conditioning and testing (ISO 2231)*

EN ISO 7500-1, *Metallic materials - Calibration and verification of static uniaxial testing machines - Part 1: Tension/compression testing machines - Calibration and verification of the force-measuring system (ISO 7500-1)*

3 Terms and definitions

For the purposes of this document the following terms and definitions apply.

3.1
biaxial
related to measurement or application along two axes simultaneously

3.2
tensile stiffness
resistance to deformation along the directions of the yarns (e.g. weft and warp)

3.3
compensation
adjustment in size of a cutting pattern to achieve a prestress at specified installation

3.4
stress
force per unit width (expressed in kN/m)

3.5
gauge length
distance between two effective points of a testing device

3.6
initial length
length of the test specimen between two effective points, before testing

3.7
ultimate tensile strength (UTS)
mean tensile strength obtained by the application of EN ISO 1421, method 1 (expressed in kN/m)

Note 1 to entry: UTS is used as an input data.

3.8
extension
increase in length of a test specimen produced by a force as a result of testing, expressed in units of length (millimetres)

3.9
elongation
ratio of the extension of the test specimen to its initial length, expressed as a percentage

3.10
tensile modulus
ratio of stress to corresponding strain of a material when deformed under the action of a tensile force

Note 1 to entry: Example of methods for the determination of tensile stiffnesses (tensile moduli) and Poisson's ratios from biaxial load-strain test data are given in Annex D.

3.11
strain
deformation representing the extension relative to the initial length

3.12
Poisson's ratio (ν)
ratio of the contraction or transverse strain to the extension or axial strain (in the direction of the applied load)

3.13
cycle
process in which a coated fabric is taken from the gauge length or an initial fixed load, to a fixed load or fixed extension or elongation, and returned to the gauge length or initial fixed load

3.14
WF1
loads applied as a prestress in the warp and fill (respectively wale and course) directions with magnitudes that are the maximum of either 1kN/m or 1% of the ultimate tensile strength (UTS) in the warp and fill (respectively wale and course) directions

Note 1 to entry: the expression "fill direction" is used instead of "weft direction" in order to introduce the use of "F" and avoid confusion with "W" used for the warp direction.

3.15
W25
load applied in the warp (respectively wale) direction with a magnitude of 25% of the ultimate tensile strength (UTS) in the warp (respectively wale) direction

3.16
F25
load applied in the fill (respectively course) direction with a magnitude of 25% of the ultimate tensile strength (UTS) in the fill (respectively course) direction

3.17
MIN25
minimum of W25 and F25

3.18
W25/2
load applied in the warp (respectively wale) direction with a magnitude of W25 divided by 2

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