

### SLOVENSKI STANDARD SIST ENV 61111:2002

01-september-2002

Matting of insulating material for electrical purposes						
Matting of in	sulating material for electrical pu	rposes				
Matten aus i	isolierentem Material für elektrisc	he Anwendungen				
Tapis en ma	Tapis en matériau isolant pour travaux électriques PREVIEW					
(standards.iteh.ai) Ta slovenski standard je istoveten z: ENV 61111:2001						
<u>SISTENV 61111:2002</u> https://standards.iteb.ai/catalog/standards/sist/fa349e73-52a7-403a-9e26-						
5f94218b6047/sist-env-61111-2002						
ICS:						
13.260 Xæ•cç[Á¦^åÁ ^∖dã}ã Protection against electric čåæ{[{ĚÖ^ [Á][åAjæ]^q[∙d≬ shock. Live working						
SIST ENV 6	i 1111:2002	en				



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### EUROPEAN PRESTANDARD

### **ENV 61111**

### PRÉNORME EUROPÉENNE

### EUROPÄISCHE VORNORM

July 2001

ICS 13.260

English version

### Matting of insulating material for electrical purposes

(IEC 61111:1992 + corrigendum 2000, modified)

Tapis en matériau pour travaux électriques (CEI 61111:1992 + corrigendum 2000, modifiée)

Matten aus Isolierendem Material für elektrische Anwendungen (IEC 61111:1992 + Corrigendum 2000, modifiziert)

## **iTeh STANDARD PREVIEW**

This European prestandard was approved by CENELEC on 2001-03-24 as a prospective standard for provisional application. The period of validity of this ENV is limited initially to three years. After two years the members of CENELEC will be requested to submit their comments, particularly on the question whether the ENV/can be converted into a European Standard (EN)-403a-9e26-

5f94218b6047/sist-env-61111-2002 CENELEC members are required to announce the existence of this ENV in the same way as for an EN and to make the ENV available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the ENV) until the final decision about the possible conversion of the ENV into an EN is reached.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

# CENELEC

European Committee for Electrotechnical Standardization Comité Européen de Normalisation Electrotechnique Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

#### Foreword

The text of the International Standard IEC 61111:1992 + corrigendum May 2000, prepared by IEC TC 78, Tools for live working, together with the common modifications prepared by the Technical Committee CENELEC TC 78, Equipment and tools for live working, was submitted to the CENELEC questionnaire and vote procedure and was approved by CENELEC as ENV 61111 on 2001-03-24.

The following date was fixed:

 latest date by which the existence of the ENV has to be announced at national level
 (doa) 2001-07-01

Annexes designated "normative" are part of the body of the prestandard.

Annexes designated "informative" are given only for information.

In this prestandard, annexes A, B, C, D and ZA are normative and annexes E, F, and G are informative.

Annex ZA has been added by CENELEC.

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#### Endorsement notice

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The text of the International Standard IEC 61111:1992 + corrigendum May 2000 was approved by CENELEC as a European Prestandard with agreed common modifications as given below.

#### COMMON MODIFICATIONS

#### Contents

Add "and tolerances" to the title of 6.2.

Add "(normative)" after annex A, annex B, annex C and annex D.

Add "(informative)" after annex E, annex F and annex G.

Add a new annex ZA

Annex ZA (normative) - Normative references to international publications with their corresponding European publications

#### 1 Scope

# Add a second paragraph:

(standards.iteh.ai) Insulating mattings have increased mechanical characteristics with respect to insulating blankets covered by IEC 61112,01 particular, the puncture resistance of mattings is equal to that of category M blankets e73-52a7-403a-9e26-

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#### 2 Normative references

#### Replace by:

NOTE Normative references to International publications are listed in annex ZA (normative)

#### 3 Definitions

#### 3.6 **Replace** by:

3.6

proof test

a test during which a specified voltage is applied to a device for the time defined under specified conditions to assure that the electrical strength of the insulation is above the specified value

#### 3.7 Replace by:

#### 3.7

#### withstand test

a test during which the device must withstand without flashover, disruptive discharge, puncture or other electric failure a voltage applied under specified conditions

**3.11 Replace** "*nominal voltage*" by "*nominal voltage of a system*" and **replace** "to identify" by "to designate or identify".

Add:

3.12

usable area

the matting area that protects the worker against electric shock and that is verified by the proof test

#### 5 Classification

**Replace** the second paragraph by:

Guidance for the selection of class is given in annex E.

#### 6 Physical requirements

**Replace** 6.2, 6.3, including Table 2, and 6.4 by:

#### 6.2 Dimensions and tolerances

Recommended dimensions for matting are indicated in Table 1.

#### Table 1 - Recommended dimensions for matting

Specifi	2 Rolls of sheets	
https://Jengthus.iteh.ai	catalog/sWidthls/sist/fa3	49e73-5Width3a-9e26
mm 5f94	218b6047 <b>%%</b> env-6111	1-2002 mm
1 000	600	610
1 000	1 000	760
1 000	2 000	915
		1 220

Permissible variations in width shall be  $\pm$  15 mm for 600 mm, 610 mm and 760 mm widths and  $\pm$  25 mm for 915 mm, 1 000 mm, 1 220 mm and 2 000 mm widths.

For matting with dimensions different from those recommended in Table 1, tolerances of  $\pm 2$  % are required.

#### 6.3 Thickness

- 6.3.1 The maximum thickness of matting shall be limited in order to obtain appropriate flexibility and in order to pass the test defined in 7.6.2 (low temperature test).
- 6.3.2 The minimum thickness shall be determined only by the ability to pass the tests defined in clauses 7 and 8.

#### 6.4 Workmanship and finish

Matting shall be free on both surfaces from harmful physical irregularities that can be detected by the tests carried out according to this Prestandard. Harmful and non-harmful physical irregularities are described in annex G (In-service recommendations).

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#### 6.5 **Replace** 6.5.1 by:

- 6.5.1 Each matting which is claimed to comply with the requirements of this Prestandard shall be marked at least on one surface with the following:
- a) symbol (double triangle) (see annex A);
- b) name, trademark, or identification of the manufacturer;
- c) category, if applicable;
- d) size (length and width);
- e) class designation;
- f) month and year of manufacture;
- g) usable area (see Figure 1), except for class 0. (On rolls the usable area shall be marked along the two sides only).

In addition each matting shall have a group of rectangles or other suitable means to identify when the matting was put into service and the dates of periodic inspection and testing.

The usable area shall be visibly and permanently identified, for example by a line around the usable area which has a minimum thickness of 3 mm.

In the case of rolls, they shall bear on one border at least every metre all the above markings, except d).

# 6.5.2 Delete the second paragraph dards.iteh.ai)

- 6.5.4 Add "and of the limit of usable area" after "(double triangle)".
- 6.6 Add after the first paragraph 8b6047/sist-env-61111-2002

Instructions for use shall be included in the package.

#### 7 Tests on matting

#### 7.1 **Replace** the third paragraph by:

In order to carry out the type tests, it is necessary to have 13 mats. For mattings in rolls, the unit is a square of dimensions equal to the width.

**Replace** from the fifth paragraph to the end of the subclause by:

The test location conditions shall be in accordance with IEC 60160, clause 4 (temperature from 15 °C to 35 °C and relative humidity from 45 % to 75 %).

Unless otherwise specified, matting shall be conditioned for a period of  $2 h \pm 0.5 h$  at a temperature of 23 °C  $\pm 2$  °C and relative humidity of 50 %  $\pm 5$  % (see IEC 60212, standard atmosphere B).

Conditioning shall be performed on complete mattings or on test pieces.

Unless otherwise specified, the tolerances for any measured value shall be  $\pm$  5 %.

Samples, units and test pieces submitted to non destructive tests can be re-used for other tests. Samples, units and test pieces submitted to destructive tests shall be scrapped.

- 7.2.3 Replace by "Void".
- 7.2.5 **Replace** the text by:

*Type test and routine test (see 6.5)* 

The marking shall be verified by visual inspection and durability test for type test (« visual inspection » means by a person with normal or corrected vision and without additional magnification). No durability test is required for routine test.

The durability of the marking is checked by rubbing the marking for 15 s with a piece of lint-free cloth soaked in soapy water and then rubbing it for further a 15 s with a piece of lint-free cloth soaked in ethyl alcohol. At the end of the test, the marking must remain legible.

**7.3.1** Add after the first paragraph:

The test pieces shall be cut from samples in two perpendicular directions.

- 7.3.2 Add in the second paragraph "(max. 25 mm)" after "6 mm". (standards.iteh.ai) Replace "Figure 1" by "Figure 2" (two times).
- **7.3.3 Replace** "Figure 2" by "Figure 3" (two times) 1349e73-52a7-403a-9e26-5/94218b6047/sist-env-61111-2002 Add a note at the end of the subclause:

NOTE This test procedure is given for information only, waiting for the results from the CEN/TC 134 ad hoc Group Slip.

#### 7.4.1 **Replace** the text by:

Dielectric testing shall be carried out either at a.c. or d.c. voltage. The choice of a.c. or d.c. shall be made between manufacturer and customer.

NOTE The equivalence of d.c. tests and a.c. tests is under consideration. The values of d.c. test voltages are under consideration.

For type tests three mats are used. For routine tests one mat is sufficient. For sampling tests the number is given in annex D (sample size).

The peak (crest) or r.m.s. value of the a.c. voltage shall be measured with an error of not more than 3 % (see IEC 60060-3).

For type and sampling tests the mats shall be conditioned for moisture absorption by total immersion in a bath of tap water at room temperature, as specified in 7.1, for a period of 16 h  $\pm$  0,5 h. Insulating compounds used in the finishing process (e.g. paraffin and talcum powder), should be removed before the test is commenced with suitable solvents. After the conditioning the matting shall be wiped and immediately submitted to the dielectric test.

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For routine tests such conditioning is not required.

Electrodes shall be of such design so as to apply the electrical stress uniformly over the test area without producing corona at any point or mechanical strain in the material.

#### Table 3 Delete.

#### 7.4.2.1 Replace by:

#### 7.4.2.1 For proof test

The ground electrode is a metal plate having dimensions exceeding at least by 20 mm on each side the dimensions of the matting under test.

In case of tests on rolls the ground electrode shall be able to contain at least a length of matting equal to its width.

The live electrode is a conductive plate, having smoothly rounded edges (3 mm radius) and corners (4,5 mm radius), of a size that covers and maximizes the usable area.

The matting under test is placed over the ground electrode, while the live electrode is placed over the usable area. The full usable area shall be tested.

In case of tests on class 0 mattings clearance around the live electrode not exceeding 10 mm is permitted.

 
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#### 7.4.2.3 Replace by:

#### 7.4.2.3 For withstand test

The electrode shall consist of two metal cylinders with the sharp edges removed to give a radius of 3 mm. One electrode shall be 25 mm in diameter and 25 mm high. The other electrode shall be 75 mm in diameter and 15 mm high. These electrodes shall be arranged coaxially as in Figure 4.

#### 7.4.4 Replace by "Void".

7.4.5 Replace by:

**7.4.5** *Electrical test procedures* 

#### 7.4.5.1 Test equipment

The test equipment shall comply with IEC 60060-1.

#### 7.4.5.2 Proof test procedure

#### Type test, routine test and sampling test

Each mat shall be given a voltage test as specified in Table 2 using electrodes as specified in 7.4.2.1. The a.c. voltage shall be initially applied at a low value and gradually increased at a constant rate-of-rise of approximately 1 000 V/s until the specified test voltage level is reached. The test period shall be considered to start at the instant the specified test voltage is reached.

The test is deemed successful if the specified test voltage is reached and maintained for 3 min for the type and sampling tests and 1 min for the routine test without the occurrence of flashover, disruptive discharge, electrical puncture or other electrical failure.

NOTE At the end of the test period the applied voltage should be reduced at the above mentioned constant rate to approximately half value before opening the test circuit unless an electrical failure has already occurred.

#### 7.4.5.3 Withstand test procedure

#### Type test and sampling test

Five test pieces having dimensions of 150 mm x 150 mm are cut from each matting.

The test pieces are placed between metallic electrodes as specified in 7.4.2.3 and the whole arrangement is dipped in a liquid insulant (for instance, insulating oil). The test pieces shall not touch the wall of the tank 2002

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Only one voltage rise is applied to each test piece. The voltage shall be applied to each test piece at a constant rate-of-rise of approximately 1 000 V/s until the withstand voltage value given in Table 2 is reached. The voltage is immediately reduced at the above mentioned constant rate to approximately half value and then the test circuit is opened. The test is deemed successful if no electrical puncture occurs.

#### 7.4.6 Replace by "Void".

Replace Table 4 by:

Class of matting	AC voltage r.m.s.				
	(kV)				
	Proof test Withstand test				
0	5	10			
1	10	20			
2	20	30			
3	30	40			
4	40	50			

#### Table 2 - Test voltage

- **7.5 Replace** the text starting with a dash by:
  - the puncture resistance shall be not less than 80 % of the minimum value obtained for unaged test pieces.

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#### **7.6.2 Replace** in the third paragraph "Figure 4" by "Figure 5".

**Replace** in the last paragraph "proof voltage test" by "a.c. voltage withstand test according to 7.4.5.3".

**7.7 Replace** the second paragraph by:

Four test pieces of 150 mm x 150 mm shall be cut from the matting and shall be conditioned by immersion in 32° Baumé sulphuric acid solution at a temperature of 23 °C  $\pm$  2 °C for 8 h  $\pm$  0,5 h. Following acid conditioning, the test pieces shall be rinsed in water and dried for 2 h  $\pm$  0,5 h at approximately 70 °C.

**Replace** the fourth paragraph by:

Tests shall then be carried out on three test pieces for withstand tests according to 7.4.5.3 but without conditioning for moisture absorption and on one test piece for mechanical puncture test (see 7.3.2).

**7.8 Replace** the second paragraph by :

Four test pieces of 150 mm x 150 mm shall be cut from the matting and shall be preconditioned in air for not less than  $3 h \pm 0.5 h$  at  $23 \degree C \pm 2 \degree C$ , and a relative humidity 50 % ± 5 %, then they shall be conditioned by immersing in oil N°1 (see annex C) at a temperature of 70 °C ± 2 °C for 24 h ± 0.5 h.

(standards.iteh.ai)

Replace the fifth paragraph by:

Tests shall then be carried out on three test pieces for withstand tests according to 7.4.5.3 but without conditioning for moisture absorption and on one test piece for mechanical puncture test (see 7.3.2).

#### 8 Tests on matting with special properties

8.2 **Replace** in the third paragraph "Figure 4" by "Figure 5".

**Replace** in the last paragraph "proof voltage test (see 7.4)" by "a.c. voltage withstand test according to 7.4.5.3".

#### 9 Quality assurance plan and acceptance test

**Replace** the text by:

#### 9.1 General

In order to assure the delivery of products that meet this Prestandard, the manufacturer shall employ an approved quality assurance plan that complies with the provisions of the ISO 9000 series.

The quality assurance plan shall ascertain that the products meet the requirements contained in this Prestandard.

In the absence of an accepted quality assurance plan as specified above the sampling procedure detailed in annex D shall be carried out.

#### 9.2 Acceptance tests

The manufacturer shall keep for inspection by the customer, all test results in accordance with the manufacturer's quality control procedures (see annex F).

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#### Annexe A / Annex A (normative)

Symbole de marquage double triangle

Marking symbol double triangle



#### NOTES

#### NOTES

1 - Toutes les dimensions sont en millimètres; Les tolérances sont $\pm$ 10 %.	1 -	All dimensions are in millimetres; tolerances are ± 10 %.
<ul> <li>2 - L'emplacement des données dans l'espace d'inscription est donné à titre indicatif.</li> <li>Un emplacement additionel est aussi prévu sous le symbole graphique.</li> </ul>	2 -	The position of information inside the space provided is for information only. Additional space is also provided below the graphical symbol.
3 - Au maximum 32 lettres.	3 -	Maximum is 32 letters.
4 - Dimensions: X peut valoir 16, 25 ou 40 Y = X/2 e = épaisseur minimale du trait = 1 mm.		4 - Dimensions: X may be 16, 25 or 40 Y = X/2 e = minimum thickness of the line = 1 mm.
5 - L'emplacement des symboles peut être à l'intérieur de la zone d'utilisation mais pas plus près que 2,5 mm du trait matérialisant la zone d'utilisation (ou du bord pour la classe 0).	5 -	Location of symbols should be inside the usable area and not closer than 2,5 mm from the line detecting the usable area (or from the border for class 0)

#### Figure A.1 - Symboles et emplacement des symboles Symbols and symbols location

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### Annex B Replace the annex by:

#### Annex B

#### (normative)

### General test procedure

Description of work	Subclause	Subclause Type tests						Routine
		Lot 1	Lot 2	Lot 3	Lot 4	Lot 5	Lot 6	tests
Visual (7.2)								
Shape	7.2.1	1						
Dimensions	7.2.2	2						
Workmanship and finish	7.2.4	3	1	1	1	1	1	1
Marking	7.2.5	4						
Packaging	7.2.6	5						
Mechanical (7.3)								
Puncture resistance	7.3.2	6 a)						
Slippage test	7.3.3		2 a)					
Dielectric (7.4)								
Proof 11e	7.4.5.2	DA	KD ]	2 b)	VIE	<b>W</b>		2 b)
Withstand	7453	lard	ls ite	2 b)				2 b)
Ageing (7.5)	7.5		3 a)		<b>)</b>			
Thermal (7.6)	SIS	T ENV (	51111:20	02				
Flame retardance testps://stand	ards.it <b>e</b> l <b>6</b> a <b>1</b> /catalo	og/st <b>a</b> nda	rds/sist/fa		52a7-40	3a-9e26-		
Low temperature	<b>75.6.2</b> 218b	6047/sist	-env-611	11-2002	2 c)			
Acid resistance	7.7					2 a)		
Oil resistance	7.8						2	
Special properties (8)								
Category C - Extreme low temperature	8.2				2 c)			
Size of each lot (unit is the matting)		1	1	3	3	1	4	
The numbers given in the table indicate the order in which the tests are to be made.								
a) Tests carried on on test pieces.								
b) By agreement between the manufacturer and the customer, either the a.c. tests or the d.c. tests shall be used.								
c) Either test 7.6.2 or test 8.2 shall be used, according to the special porperties of the matting.								
NOTE 1 The rules governing the ac	ceptance tests a	re given i	n annex F	Ξ.				
NOTE 2 The sampling tests are the same as those for type tests.								

NOTE 3 The size of each lot for sampling tests is given in annex D.

NOTE 4 Matting which has been subjected to destructive type tests or sampling tests shall not be re-used.

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#### Annex D

#### **D.1** Replace by:

The quality assurance system shall integrate the requirements of the sampling plan as given in annex F. The sampling procedure does not follow the guidance provided in IEC 60410, because the nature of the product, the safety of the personnel involved and the quantity produced do not lend themselves to the application of this Prestandard in its entirety. Since these important distinctions exist, special individual quality assurance measures are herein incorporated.

Every lot consists of matting of the same class and category.

#### **D.2 Replace** the first paragraph by:

Defects are classified as to whether they are critical, major or minor.

a) Defects of critical nature - For this condition, each unit shall be tested (routine test).

b) Defects of major and minor nature - In this case, tests (whether they are destructive or not) shall be carried out on samples only (sampling test). The acceptable quality level is selected depending on whether the defects are major or minor.

# Table D.1 - Classification of defects NDARD PREVIEW

Add a column under "Type of defect": "Critical".

## Replace the lines of "Visual" by: standards/sist/fa349e73-52a7-403a-9e26-

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Type of test	Subclause	Minor	Major	Critical			
Visual (7.2)							
Shape	7.2.1	Х					
Dimensions	7.2.2	Х					
Workmanship and finish	7.2.4	Х					
Marking	7.2.5	Х					
Packaging	7.2.6	Х					

Move for all tests under "Mechanical" the "X" mark from "Major" to "Minor".

**Replace** the lines of "Dielectric" by:

Type of test	Subclause	Minor	Major	Critical
Dielectric (7.4)				
proof (1 min)	7.4.5.2			Х
proof (3 min)	7.4.5.2		Х	
withstand	7.4.5.3		Х	