DRAFT TANZANIA STANDARD

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First Edition

Textiles — Polyvinyl Chloride (PVC) floor covering —Specifications

TANZANIA BUREAU OF STANDARDS

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Foreword

This Draft Tanzania Standard is being developed by the Household Textile Technical Committee under supervision of the Textile and Leather Division Standards Committee and it is in accordance with the procedures of the Bureau.

This Draft Tanzania Standard has been prepared with assistance drawn from:

IS 3462 – Specification for unbacked flexible PVC flooring.

1. Scope

This Draft Tanzania Standard specifies requirements test methods and sampling plan for unbacked homogeneous flexible PVC flooring, including laminated PVC flooring in which the composition of each of the laminate is substantially the same.

2. Normative References

For the purpose of this Draft Tanzania Standard the following references shall apply:

a) TZS 40 Textiles - Tests for colour fastness – Colour fastness to light: Daylight.

b) TZS 44 Textiles - Tests Woven or knitted fabrics- Determination of length and width.

c) IS 3464 Method tests for plastic flooring and wall tiles.

d) TZS 532

e) ISO 105 E04:2013 Textiles — Tests for colour fastness — Part E04: Colour fastness to perspiration. TZS 280

3. Terms and Definitions

For the purpose of this Draft Tanzania Standard the following definitions shall apply:

3.1 elastic product
product of the tensile strength (expressed in MN/m^2) and the elongation at break (expressed by the increase in length as a fraction of the original length).

3.2 poly (vinyl chloride) floor coverings
floor covering with all layers produced using poly (vinyl chloride) as base resin.

4. Materials

The flexible PVC flooring shall consist of a thoroughly blended composition of thermoplastic binder, fillers and pigments. The thermoplastic binder shall consist substantially of one or both of the following:

a) Vinyl chloride polymer, and

b) Vinyl chloride copolymer.

4.1 The polymeric material shall be compounded with suitable plasticizers and stabilizers.

5. Requirements

The PVC floor covering when tested shall comply with requirements as specified in this Draft Tanzania Standard.

6. Conditioning of test sample

Unless otherwise stated, all samples shall be conditioned at a temperature of 25 ± 2°C in air for not less than 60 minutes and tested at a temperature of 25 ± 2°C.

7. Dimensions

7.1 Linear dimension.

7.1.1 Sheets and Rolls

Unless otherwise stated, the standard width of flooring' sheets or rolls in continuous lengths shall be 1,000 mm, 1,500 mm and 2,000 mm.

7.1.2 Tiles

Unless otherwise stated, the tiles shall be 250 mm, 300 mm, 600 mm and 900 mm square.

7.2 Thickness

Unless otherwise stated, the standard thickness of the floor covering shall be 1.5 mm, 2.0 mm, 2.5 mm and 3.0 mm.

8. Colour and surface characteristics

The flooring shall have a uniform wearing surface. The colour and also the pattern, marbling or mottling, if present, shall extend through the full thickness of the flooring, when the flooring is not laminated.

Table 1 – Requirements of flexible PVC flooring.

SN	Characteristics	Requirements	Test Methods
1	Thickness	The means thickness shall not differ by more than 0.13 mm from that specified. The variation between any two measurements shall not exceed 0.20 mm.	IS 3464
2	Width of sheet or roll	The mean width shall not differ by more than 0.13mm from that specified. The variation between any two measurements shall not exceed 0.20 mm	TZS 44
3	Tiles size	The dimension shall not vary from the specified dimensions by more than 0.13%or ±0.4 mm whichever is less.	TZS 44
4	Squareness (for tiles only)	Gap between the sides of the tiles and the arms of the metal jig shall not be greater than 0.15 mm towards the further end from the junction of the arms.	IS 3464
5	Dimensional stability	Change in any linear dimension shall not exceed 0.4% for sheet and 0.25% for tiles. After the test the sample shall show no signs of curling.	IS 3464
6	Curling for tiles	Shall not exceed 0.75 mm	IS 3464
7	Residential indentation	Shall not exceed 0.10mm	IS 3464

8	Resistance to various substances	The average scratch width obtained after immersion shall not exceed 2.0 mm. the colour of the treated pieces shall show no significant change when compared with untreated material.	IS 3464
9	Ply adhesion	Adhesion between plies in any test piece shall not be less than 1.05 Kn/m	IS 3464
10	Flexibility	Shall not break, crack or show any other sign of failure.	Annex A
11	Moisture movement	Change in any linear dimension shall not exceed 0.4%	Annex B
12	Heat ageing and exudation	No exudation of Plasticizer shall be apparent nor shall there be any change in appearance. The mandred tests shall not produce surface cracking.	Annex C
13	Elastic Product	The mean product of tensile strength and elongation shall be not less than 2 Mj/m^2	Annex D
14	Colour fastness to light	4	TZS 40
15	Colour fastness to perspiration, min	4	TZS 280

Note:

i. Parameter 3 in Table 1 is related to the situation of the use and the purchaser shall specify the substances to which the PVC flooring materials shall have resistance as tested by the method given in IS 3464.

ii. The dimensions and thickness of PVC flooring may also be upon agreement between supplier and purchaser but shall meet the same requirements on tolerance as given in Table 1.

9. TESTS

9.1 The tests shall be of three categories as given in 9.1.1 to 9.1.3

9.1.1 Type test

Tests carried out to prove conformity to the requirements of this Draft Tanzania Standard. These tests are intended to check the general qualities and design of the flooring.

9.1.2 Acceptance tests

Tests carried out on samples of flooring selected from a lot for purposes of acceptance of the lot.

9.1.3 Routine tests

Tests carried out on each and every tile/roll/sheet to check the requirements which are likely to vary during production.

10. Sampling and Criterion for Conformity for Acceptance Tests.

10.1 Tiles

10.1.1 Lot

All the tiles of the same type, size and manufactured from the same batch in one consignment shall constitute a lot.

10.1.2 Selection

10.1.2.1 The number of tiles to be selected at random from the lot shall depend upon the size of the lot and shall be in accordance with column 1 to 4 of Table 2.

10.1.2.2 The tile shall be selected at random from the lot, and in order to ensure the randomness of selection, random number tables as specified in TZS 532. In case random number tables are not available, the following procedure may be adopted for the selection of tiles.

a) Starting from any tile in the lot, count them as 1,2,3 …. (r, and 10 on in one Oder;

b) Every r^{th} tile thus counted may be selected till the requisite number of tiles for the sample is obtained;

c) r being the integral part of N/n where; N is the number of tiles in the lot and n is the number of tiles to be selected in the samples.

10.1.3 Criteria for Conformity

10.1.3.1 The number of tiles in the first sample (see column 2 and 3 of table 2) shall be subjected to the acceptance tests see clause 9.1.2

10.1.3.2 If in the first sample the number of defective tiles, that is those failing to satisfy anyone or more of the acceptance test is less than or equal to the corresponding acceptance number a (column 5 of table 2) then the lot shall be considered as conforming to the requirements of the acceptance tests.

10.1.3.3 If the number of defective tiles in the first sample is more than or equal to the corresponding rejection number r (column 6 of table 2), then the lot shall be considered as not conforming.

10.1.3.4 If the number of defective tiles in the first sample lies between the corresponding value of a and r, a second sample (see column 2 and 3 of table 2) shall be selected and subjected to the acceptance tests;

10.1.3.5 If in the combined sample, the number of defective tiles is less than or equal to the corresponding acceptance number a, the lot shall be considered as conforming;

10.1.3.6 If the number of defective tiles is more than or equal to the corresponding rejection number r, the lot shall be considered as not conforming.

Table 2 – Sample size and criteria for conformity for tiles

No. of tiles in the lot	Sample	Sample size	Cumulative Sample Size	Acceptance number (a)	Rejection number (r)
1	2	3	4	5	6
Up to 300	First second	13 13	13 26	0 1	2 2
301 to 500	First	20	20 40	0 1	2 2

	second	20			
501 to 1000	First second	32 32	32 64	0 3	3 4
1001 to 3000	First second	50 50	50 100	1 4	4 5
3001 and above	First second	80 80	80 160	2 6	5 7

10.2 Rolls and sheets

10.2.1 Lot

All the rolls or sheets of the same type, size and manufactured from the same batch, in one consignment, shall constitute a lot.

10.2.2 Selection

The number of rolls or sheets to be selected at random from the lot shall depend upon the size of the lot and shall be in accordance with column 1 and 2 of table 3.

10.2.2.1 The rolls or sheets shall be selected at random from the lot, and in order to ensure the randomness of selection, random number tables as specified in IS 4905 – 1968.

10.2.2.2 In case random number tables are not available, the following procedure may be adopted for the selection of rolls or sheets;

a) starting from any roll or sheet in the lot, count them as 1,2, 3, r and so on in one oder.

b) every r^{th} roll or sheets for the sample is obtained, r being the integral part of N/n, where N is the number of rolls or sheets in the lot and n is the number of rolls or sheets to be selected in the sample.

Table 3 – Sample size and criteria for conformity for rolls and sheets

No. of rolls or sheets in the lot	No. of rolls or sheets to be selected in the sample.	Permissible No. or defective rolls or sheets.
1	3	0
Up to 50	5	0
51 to 150	8	0
151 to 300	13	0
501 to 1000	20	0
1001 and above	3	1

10.2.3 Criteria for conformity

10.2.3.1 The number of rolls or sheets selected in accordance with 10.2.2 shall be subjected to acceptance tests see clause 9.1.2.

10.2.3.2 If the number of defective rolls or sheets, that is, those failing to satisfy any one or more of the acceptance tests is less than or equal to the corresponding permissible number of defective rolls or sheets (column 3 of table 3).

10.2.3.3 The lots shall be considered as conforming to the requirements of acceptance tests.

10.2.3.4 If the number of defective rolls or sheets is more than the corresponding permissible number of defectives, the lot shall be considered as not conforming.

ANNEX A

(Normative)

Determination of flexibility of PVC material

A1 APPARATUS

A 40 mm diameter mandrel and a low tempereture equipment capable of maintaining a tempereture of 0 ± 0.5˚C

A 2 PROCEDURE

a) The test piece shall be a strip of the flooring 50 mm wide and 225 mm long;
b) Six test pieces shall be tested cut at random from the sample;
c) In the case of tiles, test pieces from separate tiles shall be tested;
d) Three test pieces shall be cut with their long dimensions' parallel to the grain of the flooring and three with these dimensions at right angles to the grain;
e) Each test piece shall be conditioned at a tempereture of 0 ± 0.5˚C for at least 60 minutes in air;
f) Immediately prior to testing the mandrel shall be cooled to the test tempereture;
g) The test piece shall be bent by hand over the mandrel with the wearing surface outwards, through an arc of 180˚C in approximately three seconds.

A 3 REPORT

The bent portion of the test piece shall be examined in good lighting and under magnification of x4, and shall be reported for crack, breaks or other signs of failure.

ANNEX B

(Normative)

Determination of moisture movement

B1 APPARATUS

B 1.1 Shallow Tray

Approximately 300 x 300 mm, 50 mm depth with a layer of glass balls, approximately 5mm diameter, in the bottom and filled to a depth of 40 mm with distilled water.

B 1.2 Steel plate

180mm squatter and 13 mm thick, for keeping the test specimen flat during measurement.

B 1.3 Travelling Microscope

B 1.4 Desiccator

B 2 PROCEDURE

a) The test piece shall consist of a piece of the flooring not less than 225mm^2, two test pieces shall be tested;

b) The test pieces shall be conditioned at specified in clause 5;

c) The test pieces shall be marked for the dimensional stability test in accordance with clause 5 of IS 3464;

d) After maintaining a tempereture of 27 ± 2˚C in the desiccator for not less than 24 hours, the test piece shall be placed on a perfectly flat surface with the steel plate on top of it and the distance between each pair of marks to the nearest 0.01 mm shall be measured;

e) The steel plate shall then be removed and the test piece shall then be placed on the layer of glass balls in the tray containing water (see figure 1) for 72 hours at 27±2˚C;

f) It shall be removed from the water and the distance between each pair of reference marks as previously described shall be re - measured.

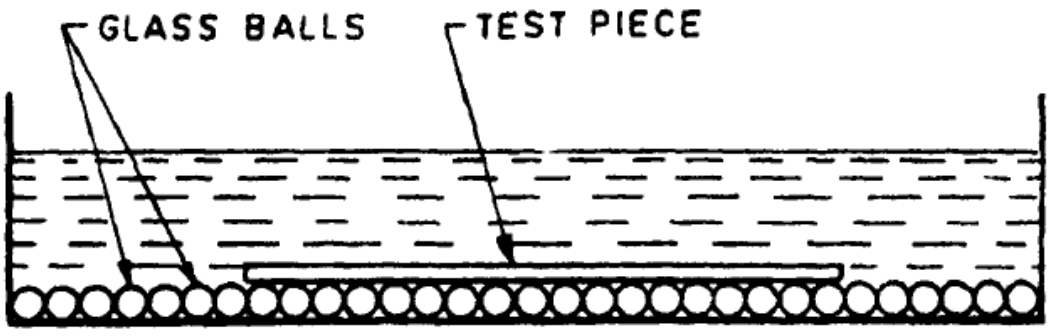

Figure 1 Apparatus for measuring moisture movement.

B 3 EXPRESSION OF RESULTS

The change in the distance between the corresponding marks of a pair shall be expressed as a percentage of the original distance. The average value for the three pairs of marks in a direction shall be taken as the moisture movement in that direction.

B 4 REPORT

The maximum value shall be reported.

ANNEX C

(Normative)

MEASURING HEAT AGEING AND EXUDATION

C 1 OBJECTIVE

To determine the quality of PVC flexible flooring after ageing and to assess the flexibility.

C 2 APPARATUS

A circulating air oven capable of maintaining a tempereture of 70±1˚C and 25 mm diameter mandrel.

C 3 PROCEDURE

a) The test specimen shall be a strip of the flooring 50 mm wide and 225 mm long;

b) Three specimen cut from widely separated parts of the flooring shall be taken and shall be maintained at a tempereture of 70±1˚C in the circulating air oven for 15days;

c) After 15 days, the specimen shall be removed from the oven, and then allowed to cool;

d) After a further period of 60 minutes at 25 ± 2˚C, the specimen shall be examined for exudation by lightly rubbing the wearing surface with a clean white filter paper;

e) A greasy stain on the paper shows that exudation has occurred and constitutes a failure of the test.

f) Having conditioning the samples as specified in clause 5, they shall be bent around the mandrel, with the wearing surface outwards, through an arc of 180˚C in approximately three seconds;

C 4 REPORT

The bent portion of the test piece shall be examined in good lighting and under magnification of x4, and shall be reported for crack, breaks or other signs of failure.

ANNEX D

(Normative)

METHOD OF TEST FOR ELASTIC PRODUCT

D 1 OBJECTIVE

To evaluate the product of tensile strength and elongation at break of PVC flexible flooring.

D 2 APPARATUS

A constant rate of extension machine provided with a means of obtaining the force applied to the specimen at the breaking point. Under conditions of use, the force at break shall be within one percent of true value.

D 3 PROCEDURE

a) Each test specimen shall be rectangular, 25 mm wide and at least 75 mm long;

b) Six pieces shall be cut from the sample, three with their long sides as nearly as possible parallel to the calendaring axis and three with their long sides at right angles to this direction;

c) The sample shall be conditioned as given in clause 5;

d) The specimen shall then be mounted in the tensile testing machine in axial alignment with the direction of pull in such a way that the unclamped part of the specimen between the grips shall be 50 mm in length;

e) The specimen shall be loaded by separating the grips at such a speed that the rate of extension of the specimen is 100% per minute.

D 4 CALCULATION OF RESULTS

a) The tensile strength of the specimen shall be calculated from the force to break and the original area of cross section and expressed in MN/m^2;

b) The elongation of the specimen at break shall be the increase in distance between the grips;

c) The product of tensile strength and elongation for each piece shall be obtained and the mean of six determinations as the elastic product of the sample shall be reported.

