

DRAFT UGANDA STANDARD

First Edition
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Footwear — Specification for ladies shoes — Part 1: Closed shoes

Reference number
DUS DEAS 943-1: 2019

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National foreword

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Draft Uganda Standards adopted by the Technical Committee are widely circulated to stakeholders and the general public for comments. The committee reviews the comments before recommending the draft standards for approval and declaration as Uganda Standards by the National Standards Council.

This Draft Uganda Standard, DUS DEAS 943-1: 2019, *Footwear — Specification for ladies shoes — Part 1: Closed shoes*, is identical with and has been reproduced from an International Standard, DEAS 943-1: 2019, *Footwear — Specification for ladies shoes — Part 1: Closed shoes*, and is being proposed for adoption as a Uganda Standard.

The committee responsible for this document is Technical Committee UNBS/TC 7, *Textiles, leather, paper and related products*, Subcommittee SC 2, *Leather and related products*.

Wherever the words, "East African Standard " appear, they should be replaced by "Uganda Standard."



DRAFT EAST AFRICAN STANDARD

Footwear — Specification for ladies shoes — Part 1: Closed shoes

EAST AFRICAN COMMUNITY

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Introduction

This draft East African Standard intends to give specifications for ladies' closed shoes. It will be useful for evaluating the quality footwear products traded across the East Africa Partner states and beyond. It will also assist footwear manufacturers and merchants in getting value for their products. In addition it will give the general consumers of the product bases to choose the products from an informed state.

The main purpose of this standard therefore is to provide a basis for evaluating the quality of ladies' closed shoes

PUBLIC REVIEW

Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the Principles and procedures for development of East African Standards.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

The committee responsible for this document is Technical Committee EASC/TC 064, *Footwear*.

Footwear — Specification for ladies shoes — Part 1: Closed shoes

1 Scope

This Draft East African Standard specifies the requirements, sampling and methods of test for ladies' closed shoes

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.

ISO 2585, *Leather — Test measurement of thickness*

ISO 3376, *Leather — Determination of tensile strength and elongation*

ISO 3377, *Leather — Determination of tearing load*

ISO 11640, *Leather — Fastness to rubbing*

ISO 11644, *Leather — Determination of adhesion to finish*

BS 2782, *Method of testing plastics*

ISO 105 B02, *Textiles — Colour fastness test Part B02: Xenon arc fading lamp*

ISO 12947-2, *Textiles — Determination of abrasion resistance by Martindale method Part 2: Determination of specimen breakdown*

ISO 4045, *Leather — Determination of pH*

ISO 11644, *Leather — Determination of adhesion to finish*

ISO 3380, *Leather — Shrinkage temperature*

ISO 2588, *Leather — Sampling — Number of items for a gross sample*

ISO 4044, *Leather — Chemical tests Preparation of chemical test samples*

ISO 17072-1, *Leather — Chemical determination of metal content -- Part 1: Extractable metals*

ISO 17075-1, *Leather — Chemical determination of chromium (VI) content in leather — Part 1: Colorimetric method*

ISO 17075-2, *Leather — Chemical determination of chromium (VI) content in leather — Part 2: Chromatographic method*

ISO 17233, *Leather -- Physical and mechanical tests -- Determination of cold crack temperature of surface coatings*

ISO 20344, *Personal protective equipment -- Test methods for footwear*

ISO 15702, Leather -- Tests for colour fastness -- Colour fastness to machine washing

ISO 16177, Footwear -- Resistance to crack initiation and growth -- Belt flex method

ISO 15703, Leather -- Tests for colour fastness -- Colour fastness to mild washing

ISO 4048 Leather -- Chemical tests -- Determination of matter soluble in dichloromethane and free fatty acid content

ISO 4047 Leather -- Determination of sulphated total ash and sulphated water-insoluble ash

ISO 17130 Leather - Physical and mechanical tests - Determination of dimensional change

ISO 2420 Leather -- Physical and mechanical tests -- Determination of apparent density and mass per unit area

ISO 48-4 Rubber, vulcanized or thermoplastic -- Determination of hardness -- Part 4: Indentation hardness by durometer method (Shore hardness)

ISO 48-3 Rubber, vulcanized or thermoplastic -- Determination of hardness -- Part 3: Dead-load hardness using the very low rubber hardness (VLRH) scale

ISO 48-2 Rubber, vulcanized or thermoplastic -- Determination of hardness -- Part 2: Hardness between 10 IRHD and 100 IRHD

ISO 868 Plastics and ebonite -- Determination of indentation hardness by means of a durometer (Shore hardness)

ISO 4684 Leather -- Chemical tests -- Determination of volatile matter

ISO 17489 Leather -- Chemical tests -- Determination of tan content in synthetic tanning agents

ISO 3378 Leather -- Physical and mechanical tests -- Determination of resistance to grain cracking and grain crack index

ISO 3379 Leather -- Determination of distension and strength of surface (Ball burst method)

ISO 17694 Footwear -- Test methods for uppers and lining -- Flex resistance

ISO 17708 Footwear -- Test methods for whole shoe -- Upper sole adhesion

ISO/TR 20572 Footwear -- Performance requirements for components for footwear -- Accessories

3 Terms and definitions

For the purposes of this document, the terms and definitions given in 19952 and the following apply.

3.1**pu coated leather**

leather with a coating of polyurethane

3.2**pvc coated textiles**

textiles with a coating of polyvinylchloride.

3.3**synthetic materials**

materials made of PU, PVC and other synthetic materials which are used as natural leather substitute

3.4 Lot

All footwear pairs in a consignment belonging to the same pattern/design and batch of manufactured shoes delivered or imported.

3.5 Defect

A fault or failure of a footwear pair to meet the requirements of this standard.

3.6 Defective footwear

A footwear pair with one or more defects as mentioned in this standard.

4 Requirements**4.1 General requirements**

The method of construction shall follow the principle applicable for that type. The sizing and fitting shall be in accordance with KS 1632.

4.2 Workmanship and finish**4.2.1 Workmanship**

The footwear shall be manufactured in accordance with sound manufacturing practice.

4.2.2 Trimming

Unless the heel seats are of the extended type, heels shall be trimmed smooth to the heel seats.

4.2.3 Edge trimming

The sole edges (other than pre-moulded outer sole and heel units) shall be trimmed smooth, stitched down construction shall be so trimmed that the distance beyond the outside of the stitching on the flanged portion of the upper is not less than 1.5 mm.

4.3 Burnishing

In leather footwear, the leather exposed at the sides of the heels and at the edges of the bottom shall be stained, well waxed, set and polished.

4.4 Defects

Inner soles, runners and linings shall be free from protruding grinders, roughness and pleats inside the shoe.

4.5 Laces

Each pair of lace-up shoes shall be provided with one pair of laces complying with KS 08-599.

4.6 Material requirements

The material characteristics, including the whole shoe assembly characteristics shall comply with the requirements given in the Tables 1 to 7.

4.6.1 Uppers

The upper characteristics shall comply with the requirements given in Table 1.

Table 1 — Upper material characteristics and requirements

Characteristics	Materials and requirements										Test method
	Leather	PU coated leather	Textiles	PU coated textiles	PVC coated textiles	EVA/MC R	PU	PVC	Blown PVC	Other materials (Include composite)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)		(10)	(11)
Thickness (mm), min.	1.0	0.7	—	0.7	0.7	0.7	0.7	0.7	0.5	0.5	ISO 2589
Tensile strength (MPa), min.	10	10	-	6	7.5	2	6	6	5	6	ISO 3376
Elongation at break, (%), Min	30 - 80	30 - 80	15	10	10	80	100	120	100	40	ISO 3376
Tear strength (N), min.	50	50	—	28	25	10	20	20	20	20	3377
Rub fastness (Grey scale), min. i) dry ii) wet	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	ISO 11640
Adhesion to finish, N, min.	1	0.8	—	—	—	—	—	—	-	—	ISO 11644
Break pipeness (BP scale), max.	3	4		-	-	—	-	-	-	-	ISO 17233
Breaking load (N/mm), min.	—	—	15	10	10	—	—	—	-	—	ISO 3377
Chrome content, %, max.	3.5 Hide	3.5 Hide 3.0 - 3.5 skins	—	—	—	—	—	—	-	—	ISO 17075

	3.0 - 3.5 skins										
Water vapour permeability, mg/cm ² h, min.	1	1	2	2	1	2	2	1	0.6	0.8	ISO 20344
Water vapour coefficient (mg/cm ²), min.	30	30	30	30	30	—	30	30	20	30	ISO 20344
Abrasion resistance (Cycles) min. i) dry ii) wet	— —	— —	25 600 6 400	25 600 6 400	25 600 6 400	—	25 600 6 400	25 600 6 400	25 600 6 400	25 600 6 400	ISO 20871
pH value, min.	3.8 - 4.0	3.8 - 4.0	—	—	—	—	—	—	—	—	ISO 4045
pH difference, max.	0.7	0.7	—	—	—	—	—	—	—	—	ISO 4045
Fat content, (% m/m), min.	3	3	—	—	—	—	—	—	—	—	ISO 4048
Total ash, (%), max.	5	5	—	—	—	—	—	—	—	—	ISO 4047
Total water soluble, (%), max.	6	6	2	2	4 1	—	1	1	—	4	ISO 20344
Shrinkage, (%), max.	5	5	4	5	5	—	5	5	—	5	ISO 17130
Light fastness, (blue wool standards), min.	4	4	4	4	4	—	4	4	4	4	ISO 11640
Wash fastness, (grey scale), min.	—	—	4	4	4	4	4	4	4	4	ISO 15702, ISO 15703
Flex endurance, Number of cycles	10 000	100 000	—	—	—	—	—	—	30 000	—	ISO 20344

4.6.2 Upper lining

The upper lining characteristics shall comply with the requirements given in Table 2.

Table 2 — Upper lining material characteristics and requirements

Characteristic	Materials and requirements				Test method
	Leather	PVC	Textile	PU	
(1)	(2)	(3)	(4)	(5)	(6)
Thickness (mm), min.	0.6	0.5	—	0.5	ISO 2589

Characteristic	Materials and requirements				Test method
	Leather	PVC	Textile	PU	
(1)	(2)	(3)	(4)	(5)	(6)
Tensile strength (MPa), min.	6	5	8	5	ISO 3376
Elongation at break (%), min.	30	120	7	100	ISO 3376
Tear strength (N), min.	20	8	10	5	3377
Rub fastness (gray scale), min.					ISO 11640
a) dry	4	4	4	4	
b) wet	4	4	4	4	
Break pipiness (Bp scale), max.	3	—	—	—	ISO 17233
Breaking load (N), min.	—	—	130	—	ISO 3377
Chrome content (%), max.	3.5 - 4.0 Hides 3.0 - 3.5 Skins	—	—	—	ISO 17075
Water vapour permeability (mg/cm ² , h), min.	1	2	2	1	ISO 20344
Water vapour coefficient (mg/cm ²), min.	30	30	30	30	ISO 20344
abrasion Resistance.	—	—	dry 4 000 wet 2 000	—	ISO 20871
PH value, min.	3.8 - 4.0	—	—	—	ISO 4045
Fat content (% m/m), min.	3	—	—	—	ISO 4045
Total ash (%), max.	5	—	—	—	ISO 4047
Total water soluble (%), max.	6	1	2	1	ISO 20344
Shrinkage %, max.	5	—	5	—	ISO 17130
Light fastness (Blue wool standards), min.	4	4	4	4	ISO 11640

4.6.3 Bottom/sole

The bottom/sole characteristics shall comply with the requirements given in Table 3.

Table 3 — Bottom/sole material characteristics and requirements

Characteristic	Materials and requirements										Test method
	Vulcanized rubber	PVC	PU	TPR	EVA/MC R	Leather	Resin rubber	Blown PU	Blown PVC	Other materials (including composite)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Hardness (IRHD)	60 - 85	50 - 85	45 - 90	45 - 80	30 - 55	—	85 - 98	30 - 55	50 - 60	40 - 90	ISO 868, ISO 48, ISO 18517

Specific gravity, max.	1.35	1.4	0.45 - 0.65	1.15	0.65	0.9	1.55	0.25 - 0.55	0.6 - 0.9	1.7	ISO 2420
Tensile strength (MPa)	7	6	6	5	2	-	5.5	2	6	1.5	ISO 3376
Elongation at break (%), min. a) Before ageing b) After ageing	300 110	120	100	400	80	-	120 110	80	100	60	ISO 3376
Flex resistance a) Initial crack (cycle s), max. b) Cut growth at 150 000 cycles (%), max.	50 000 600	30 000 600	50 000 600	30 000 600	25 000 800	50 000	5 000 500	25 000 800	25 000 800	25 000 800	ISO 16177
Compression set %, max.	25	25	25	25	50	25	25	35	35	25	ISO 20344
Split tear strength (N), min.	10	7.5	7.0	10	6.0	-	7.5	6.0	6.0	6.0	ISO 3377
Stitch tear strength (N/mm), min.	70	40	35	25	55	100	50	25	25	25	ISO 3377
Slip resistance (coefficient of friction), min.	0.5	0.5	0.5	0.5	0.5	-	0.5	0.5	0.5	0.5	ISO 20344
Abrasion loss (mm ³), max.	350	300	400	250	900	300	300	600	450	600	ISO 20871
Volatility (%), max.	-	2	-	-	-	-	-	-	2	-	ISO 4684
Lead Pb (ppm), max.	-	1	-	-	-	-	-	-	-	-	ISO 17072-1
Total ash (%), max.	-	-	-	-	-	5	-	-	-	-	ISO 4047
Total water soluble (%), max.	-	-	-	-	-	21	-	-	-	-	ISO 20344
pH value, min.	-	-	-	-	-	3.8 - 4.0	-	-	-	-	ISO 4045
pH difference, max.	-	-	-	-	-	0.7	-	-	-	-	ISO 4045
Heat shrinkage (%), max.	4	4	4	4	4	4	4	4	4	4	ISO 3380
Degree of tannage, min.	-	-	-	-	-	60	-	-	-	-	ISO 17489
Grain cracking on mandrel 3	-	-	-	-	-	No crack	-	-	-	-	ISO 3379
KEY EVA-Ethyl Vinyl Acetate, MCR-Micro Cellular Rubber, TPR-Thermoplastic Rubber, PU-Polyurethane PVC-Polyvinyl Chloride											

4.6.4 Heel and top piece

The heel and top piece characteristics shall comply with the requirements given in Table 4.

Table 4 — Heel and top piece material characteristics and requirements

Characteristic	Materials and requirements						Test method
	Top piece			Heel			
	Vulcanized Rubber	Leather	PVC	Resin Rubber	PVC	TPR	
Hardness (IRHD)	88 – 98	–	88 – 98	65 – 75	70 – 80	60 min	ISO 868, ISO 48, ISO 18517
Specific gravity, max.	1.55	0.9	1.45	1.4	1.3	1.1	ISO 2420
Tensile strength (MPa)	6.0	-	17	15	10	7.0	ISO 3376
Elongation at break (%), min. a) Before ageing b) After ageing	120 70 – 110	– –	200 –	120 70 – 110	200	120 70 – 110	ISO 3376
Flex resistance Initial crack (cycles), max.	50 000	10 000	10 000	15 000	10 000	15 000	17694
Compression set %, max.	20	20	20	20	20	30	ISO 20344
Slip resistance (coefficient of friction), min.	0.5	0.5	0.5	0.5	0.5	0.5	ISO 20344
Abrasion loss (mm ³), max.	300	300	250	300	250	300	ISO 20871
Volatility (%), max.	–	–	1	–	1	–	ISO 4684
Grain cracking on mandrel 3	–	No crack	–	–	–	–	ISO 3379
Total ash (%), max.	–	5	5	–	5	–	ISO 4047
Total water soluble (%), max.	–	21	–	–	–	–	ISO 20344
Degree of tannage (%), min.	–	60	–	–	–	–	ISO 17489
Top piece-heel attachment (N), min	150	150	150	150	150	150	19958

4.6.5 Stiffener and toe puff

The stiffener and toe puff characteristics shall comply with the requirements given in Table 5.

Table 5 — Stiffener and toe puff characteristics and requirements

Characteristic	Requirements		Test method
	Stiffener	Toe puff	
Hardness (IRHD), min.	70	50	ISO 868, ISO 48, ISO 18517
Flexibility resistance (cycles), min.	50 000	50 000	17694
Water absorption (%), min.	25	25	ISO 20344
Resilience (%), min.	35	35	ISO 20344
Thickness (mm)	1.0	0.6	ISO 2589

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4.6.6 Insole and sock

The insole and sock characteristics shall comply with the requirements given in Table 6.

Table 6 — Insoles and sock characteristics and requirements

Characteristic	Requirements				Test method
	Insole		Sock		
	Leather board	Paper board	Leather	PVC/PU	
Thickness (mm), min.	1.5	1.5	1.0	0.8	ISO 2589
Water absorption (%), max.	35	35	—	—	ISO 20344
Desorption	40	40	—	—	
Warp flexibility resistance (cycles), min.	15 000	15 000	—	—	ISO 17694
Shrinkage (%), max.	4	4	4	4	ISO 17130
Split tear strength (N/mm), min.	10	10	—	—	ISO 3377
Insole/sock adhesion (N/mm), min.	1.5	1.5	1.5	1.5	ISO 20344
Rub fastness (Grey scale), min.					ISO 11640
a) Wet	4	4	4	4	
b) Dry	4	4	4	4	
pH value, min	3.8 - 4.0	4	3.8 - 4.04	—	ISO 4045
pH difference, min.	0.7	0.7	0.7	—	ISO 4045
Water vapour permeability (mg/cm ² h), min.	0.8	0.8	1	—	ISO 20344
Coefficient of water vapour permeability g/cm ² , min.	30	30	30	30	ISO 20344

4.6.7 Whole shoe assembly

The whole shoe assembly characteristics shall comply with the requirements given in Table 7.

Table 7 — Physical requirements for the whole shoe assembly

Characteristic	Requirement	Test method
Sole Adhesion Strength, (N),minimum	Sole Heel	ISO 17708
a) Leather	140 250	
b) PVC/PU	270 360	
c) Rubber	140 230	
d) EVA/MCR	110 200	
Seam strength (N/mm), min.	20	23910
a) Water penetration after 5 h, max.	None	ISO 20344
b) Mass change (%), max.	5	
Sole bond strength (N/mm), min.	4	ISO 20344

Finishes a) Buttons and trims attachment strength (N), min. b) Buckle fastening strength (N), min. c) Velcro attachment i) Peel strength (N/cm), min. – Initial – At 10 000 cycles ii) Shear strength (N/cm ²), min. – Initial – At 10 000 cycles	 10 110 2 1 10 5	ISO 20572
Shank a) Accumulated impact strength (J), min. b) Bending modulus (N), min. c) Resilience (%), min.	 40 700 80	ISO 20344

5 Marking

5.1 Footwear

- a) At the waist of the sole, the size fitting number of footwear shall be legibly and indelibly marked.
- b) The following information shall be legibly and indelibly marked on the sock or any other suitable visible place,
- i) Manufacturer's name and/or registered trade mark.
 - ii) Size fitting number of footwear.
 - iii) Country of manufacture/origin.
 - iv) Batch number.
 - v) Type of material (upper and bottom).

5.2 Carton

The following information shall be legibly and indelibly marked on each box;

- i) Size of footwear;
- ii) Colour of footwear and/or batch number;
- iii) Manufacturer's name or registered trade mark; and
- iv) Country of manufacture/ origin.

5.3 Bale

The following information shall be legibly and indelibly marked on each bale:

- i) Name of product;
- ii) Quantity;
- iii) Name of manufacturer or local supplier's name and/or registered trade mark; and
- iv) Country of manufacture/origin.

6 Packing

6.1 Individual packing

Each pair of footwear shall be packed in a bag or any other suitable material that will protect the product from damage during normal transportation and storage.

PUBLIC REVIEW

Annex A (normative)

Sampling and criteria for conformity

A.1 Scale of sampling

A.1.1 Samples shall be selected and examined for each lot separately for ascertaining the conformity of the footwear to the requirements of this standard.

A.1.2 Footwear shall be considered to be of different lots if they differ in shape and design.

A.1.3 The number of footwear pairs to be selected from any lot shall depend on the size of the lot and shall be in accordance with Columns 1 and 2 of Table A1.

A.2 Method of selection

A.2.1 Footwear to be selected from the lot shall be chosen at random. To ensure randomness the procedure in A3.2 shall be used.

A.2.2 When the footwear pairs in a lot are not packed in a number of cases (boxes), the sampling shall be as follows:

Starting from any footwear pair in the lot, count the pairs as 1,2, etc---up to r and so on in one order. Every r^{th} pair thus counted shall be withdrawn to constitute a sample (r is the integral part of N/n where N is the lot size and n is the sample size). This procedure shall be stopped as soon as the required number of pairs is obtained.

For example if a sample of 125 pairs is to be selected from a lot of 3,000 pairs, compute r as equal to integral part of $3,000/125=24$. Starting from any pair, the footwear shall be counted in one order and every 24th pair shall be withdrawn.

A.2.3 When the footwear pairs in a lot are packed in different cases (boxes), a suitable number of boxes (not less than 30 per cent of the total boxes in the lot) shall be first chosen at random. For each of the boxes so chosen, an approximately equal number of pairs shall be picked up from its different parts so as to obtain the required number of pairs.

For example, if a lot consists of 1,000 pairs of footwear packed in 50 boxes, each containing 20 pairs, choose more than 15 boxes at random. If it is decided to open 20 boxes, then 4 pairs shall be picked up from different parts of each of the 20 boxes to give a total of 80 pairs as specified in Table A.1.

Table A1 — Scale of sampling and permissible number of defects

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No. of footwear pairs in a lot	Samples for visually observed defects (Pairs)	Permissible no. of defectives (Pairs)	Sample size for laboratory testing (Pairs)	Permissible no. of defectives (Pairs)
(1)	(2)	(3)	(4)	(5)
Up to 50	13	0	2	0
51 to 100	20	1	3	0
101 to 300	32	1	3	0
301 to 500	50	2	5	1
501 to 1 000	80	3	6	1
1 001 to 3 000	125	5	7	2
3 001 and above	200	7	8	3

ICS 61.060

A.3 All randomly selected footwear pairs (Table A.1, Column 2) shall be inspected for visually observed defects, i.e.

- (i) Difference in shape, design and colour.
- (ii) Odd pairing and incorrect size.
- (iii) Distorted shapes.
- (iv) Faulty jointing and adhesion of sole, heel, toe guard, toe cap and insole.
- (v) Insole cut short.
- (vi) Broken stitches and incorrect stitching.
- (vii) Missing or defective eyelets/speed hooks or eyeleting/hooksing.
- (viii) Variations in positioning of eyelets/speed hooks.
- (ix) Stiffener not centrally placed.
- (x) Unfit lace.
- (xi) Finish not even and unpolished.
- (xii) Missing or defective buckles/buckling assembly.

A.4 The number of defective footwear pairs shall not exceed the permissible number given in Table A.1, Column 3. If, however, the number of defective pairs exceeds the permissible number of defectives, the lot shall be rejected.

A.5 In case the lot has been found satisfactory for visually observed defects, sample pairs for laboratory testing (Table A.1, Column 4) shall be taken from among those drawn (Table A.1, Column 2). The pairs shall be chosen at random and tested for dimensional, physical and chemical characteristics. If the number of defective footwear is less than or equal to the corresponding permissible number of defectives given in Table A.1, Column 5, the lot shall be declared to have met the requirements of this standard. Otherwise if the defective footwear pairs are more than the corresponding permissible numbers of defectives the lot shall be rejected.

Bibliography

ISO 2585, Leather — Test measurement of thickness

BS 2782, Method of testing plastics

ISO 105 B02, Textiles — Colour fastness test Part B02: Xenon arc fading lamp

ISO 12947-2, Textiles — Determination of abrasion resistance by Martindale method Part 2: Determination of specimen breakdown

ISO 2588, Leather— Sampling — Number of items for a gross sample

ISO 4044, Leather — Chemical tests Preparation of chemical test samples

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