

Foreword

This Bangladesh Standard was adopted by the Bangladesh Standards and Testing Institution on after the draft finalized by the Leather, Footwear and Leather Products Sectional Committee and approved by the Chemical Divisional Committee.

This Standard was first published in 2018 titled as 'Specification for Shoes (Physical)' and revised in 2021. In that revision title was changed to 'Specification for Leather Footwear (Physical)' by canceling BDS 486:1964.

The production of men's, women's, boy's, girl's and baby footwear both in the local market and the overseas markets has been increased. Keeping in view, the committee has decided to revise this standard. While revising the standard due consideration has been given to the views of the consumers, producers, importers and other interested stakeholders.

In this revision title of the standard has been changed again to 'Specification for Footwear (Physical)'.

Guidelines for the determination of compliance of a lot with the requirements of this specification based on statistical sampling and inspection are given in Annex A.

In the preparation of this standard considerable assistance has been derived from the following publication:

SLS 1290: 2009 Specification for men's shoe (First Revision); Sri Lanka Standards Institution.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value (observed or calculated) expressing the result of a test or analysis when applicable, shall be rounded off in accordance with BDS 103.

Bangladesh Standard
Specification for Footwear (Physical)
(Second Revision)

1. Scope

1.1 This specification prescribes the requirements, methods of sampling and test for men's, women's, boys, girls and baby footwear.

2. References

The following standards are necessary adjuncts for this standard. For undated BDS, ISO, ASTM, SATRA, EN and AATCC references the latest edition of the publication referred to applies. ISO or any other international standard whichever is considered suitable until the corresponding Bangladesh standard is formulated.

BDS 103	Rules for rounding off numerical values
BDS 590	Conditioning of leather for physical tests
BDS 487	Sizes and fitting of footwear
BDS ISO 105-E04	Textiles- Tests for colour fastness- Part E04:Colourfastness to perspiration
BDS ISO 811	Textiles Fabrics- Determination of Resistance to water penetration Hydrostatic Pressure Test
BDS ISO 1833	Textiles- Quantitative chemical analysis-Part 1: General principles of testing
BDS ISO 2589	Leather- Physical and mechanical tests-Determination of thickness
BDS ISO 3376	Leather - Physical and mechanical tests - Determination of tensile strength and percentage extension
BDS ISO 3377-2	Leather- Physical and mechanical tests - Determination of tear load Part 2:Double edge tear
BDS ISO 4649	Rubber, vulcanized or thermoplastic - Determination of abrasion resistance using a rotating cylindrical drum device
BDS ISO 4920	Textile fabrics- Determination of resistance to surface wetting (Spray test)
ISO 5402-1	Leather- Determination of flex resistance - Part 2: Vamp flex method
ISO 5423	Moulded plastics footwear - Lined or unlined polyurethane boots for general industrial use- Specification
BDS ISO 7619-1	Rubber, vulcanized or thermoplastic-Determination of indentation Hardness Part 1: Durometer method (Shore hardness)
ISO 10289	Methods for corrosion testing of metallic and other inorganic coatings on metallic substrates - Rating of test specimens and manufactured articles subjected to corrosion tests
ISO 11640	Leather – Test for colour fastness – Colour fastness to cycle of to and fro rubbing
BDS ISO 13937-2	Textiles-Tear properties of fabrics- Part 2: Determination of tear force of trouser-shaped test specimens (single tear method)
ISO 17704	Footwear – Test methods for uppers, linings and insocks –Abrasion resistance
ISO 18895	Footwear – Test methods for shanks – Fatigue resistance

ISO 18896	Footwear – Test methods for shanks – Longitudinal stiffness
BDS ISO 105-X12	Textiles -Tests for Colour Fastness - Part X12: Colour fastness to Rubbing
BDS ISO 9227	Corrosion tests in artificial atmospheres- Salt spray tests
BDS ISO 12947-1	Textiles- Determination of the abrasion resistance of fabrics by the Martindale method- Part 1: Martindale abrasion testing apparatus
EN ISO 17708	Footwear – Test methods for whole shoe – Upper sole adhesion
EN ISO 19956	Footwear – Test methods for heels – Fatigue resistance
EN ISO 22777	Footwear – Test methods for accessories: touch and close fasteners - Peel strength before and after repeated closing
EN 344	Safety, protective and occupational footwear for professional use – requirements and test methods
EN 12785	Footwear – Test methods for whole shoe – Heel attachment
EN 13520	Footwear – Test methods for uppers, lining and insoles - Abrasion resistance
EN 20811	Determination of resistance of Textile fabrics to water penetration; Hydrostatic pressure test
AATCC 8	Colorfastness to Crocking testing
AATCC 15	Colorfastness to perspiration and light testing
ASTM F609	Standard Test Method for Using a Horizontal Pull Slipmeter (HPS)
ASTM-D2061	Standard Test Method for Strength Test for Zippers
ASTM-D2209	Standard Test Method for Tensile Strength of leather
ASTM-D2212	Standard Test Method for Slit Tear Resistance of leather
ASTM-D2240	Standard Test Method for Rubber Property – Durometer Harness
ASTM F2412	Standard Test Methods for Foot Protection
ASTM F2413	Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear
ASTM F2913	Standard Test Method for Measuring the Coefficient of Friction for Evaluation of Slip Performance of Footwear and Test Surfaces/Flooring Using a Whole Shoe Tester
BS 3084	Slide fasteners (Zips) - Specification
BS 5131	Method of test for footwear and footwear materials
BS 7271	Specification for touch and close fasteners
SATRA TM 03	Flexing index
SATRA TM 20	Lateral impact test for shoe heels
SATRA TM 21	Fatigue test for shoe heels
SATRA TM 30	Tear strength - trouser leg method
SATRA TM 31A	Abrasion resistance - Martindale method
SATRA TM 34	Resistance to water penetration - Maeser test
SATRA TM 43	Tensile strength and extension at break of leather
SATRA TM 50	Resistance of slide fasteners to repeated opening and closing
SATRA TM 52	Strength of slide fastener pullers

SATRA TM 55	Flexing resistance of upper materials – Bally flexometer
SATRA TM 58	Stiffness of steel shanks
SATRA TM 60	Ross flex test - resistance to cut growth on flexing
SATRA TM 77	Flexing machine - water penetration test
SATRA TM 92	Resistance of footwear to flexing
SATRA TM 94	Breaking force and extension at break of shoelaces
SATRA TM 103	Resistance of elastics to repeated extension
SATRA TM 108	Strength of top-piece attachment
SATRA TM 113	Measurement of the strength of attachment of heels to footwear and the back part rigidity of such footwear
SATRA TM 120	Strength of attachment of straps and nailed or stapled uppers
SATRA TM 123	Closure strength of touch and close fasteners
SATRA TM 133	Resistance to crack initiation and growth - belt flex method
SATRA TM 141	Breaking force of buckles - three point bending test
SATRA TM 144	Friction (slip resistance) of footwear and floorings
SATRA TM 151	Strength of fastened buckles
SATRA TM 154	Shoelace to shoelace and shoelace to lace carrier abrasion
SATRA TM 158	Washability of footwear
SATRA TM 162	Tear strength - Baumann method
SATRA TM 166	Slide fastener burst strength
SATRA TM 167	Colour fastness to rubbing – crockmeter test
SATRA TM 172	Water vapour permeability
SATRA TM 174	Abrasion resistance - rotating drum method
SATRA TM 180	Measurement of the strength of stitched seams in upper and lining material
SATRA TM 181	Strength of buckle and strap attachment
SATRA TM 194	Longitudinal stiffness of footwear
SATRA TM 205	Hardness of rubber and plastics - durometer method
SATRA TM 230	Dynamic footwear water penetration test
SATRA TM 310	Atmospheric sulphide tarnishing and salt water corrosion
SATRA TM 335	Colour fastness to water and perspiration
SATRA TM 401	Peel strength of adhesive bonds
SATRA TM 411	Peel strength of footwear sole bonds

3. Definitions

For the purpose of this specification the following definitions shall apply:

3.1 Apron: An inserted or overlaid part of the vamp (especially in moccasin).

3.2 Leather: Leather is a strong, flexible and durable material obtained from the tanning, or chemical treatment, of animal skins and hides to prevent decay. The most common leathers come from cattle, sheep, goats, equine animals, buffalo, and aquatic animals such as seals and alligators.

3.3 Backing: An extra under layer of materials that reinforces the upper layer i.e. lining, cloth, glass wool etc.

3.4 Cleats: Protruding part(s) of the outer surface of the sole.

3.5 Counter: A stiff piece of material at the heel of a footwear positioned between the lining and upper that helps maintain the shape of the footwear. The counter helps strengthen the rear of the footwear.

3.6 Elastomeric material: Polymeric material, flexible at room temperature.

3.7 Eyelet: An annular ring of metal or other material with a barrel for inserting in footwear upper to provide a durable ring for lacing.

3.8 Grain: The smooth side of the leather which gives colour and texture.

3.9 Insock: Removable or permanent footwear component used to cover part or the entire insole.

3.10 Insole: A layer of material that sits inside the footwear that creates a layer between the sole and the wearer's foot. The insole adds comfort for the wearer, while hiding the join between the upper.

3.11 Linings: Most footwear's include a lining on the inside of the footwear, around the vamp and quarter. These linings improve comfort, and can help increase the lifespan of the footwear.

3.12 Middle sole: Layer between the inner sole and the outer sole.

3.13 Outer sole: Outside bottom composed of the walking surface in the forepart and the walking surface on the base of the heel at the rear.

3.14 Polymeric material: Material composed of long chain molecules.

3.15 Poromeric material: A term coined to describe the microporosity, air permeability, and water and abrasion resistance of natural and synthetic leather.

3.16 Quarter: The back portion of the footwear's upper, covering the counter and sides and attached in front to the vamp.

3.17 Shank: A piece of metal inserted between the sole and the insole lying against the arch of the foot.

3.18 Stock: Starting manufacturing material and component.

3.19 Tongue: Shaped piece of the material to protect the foot from chaffing by the closure.

3.20 Vamp: The section of upper that covers the front of the foot as far as the back as the join to the quarter.

3.21 Upper: The entire part of the footwear that covers the foot.

3.22 Feather: The part of the footwear where the upper's edge meets the sole.

3.23 Toe puff: A reinforcing inside the upper which gives the toe its shape and support.

3.24 Outsole: The exposed part of the sole that is contact with the ground. As with all parts of the footwear, outsoles are made from a variety of materials. The properties the outsole need are: grip, durability, and water resistance.

3.25 Heel: The heel is the part of the sole that raises the rear of the footwear in relation to the front. The part of the heel that comes in contact with the ground is known as the top piece.

3.26 Seat: Where the heel of the fit sits in the footwear. It normally matches the shape of the heel for comfort and support.

3.27 Sole: The entire part of the footwear that sits below the wearers foot as opposed to the upper. The upper and sole make up the whole of the footwear.

3.28 Throat: The front of the vamp next to the toe cap. For footwear's where the vamp and quarter panels are one piece the throat is at the eye-stay.

3.29 Toe cap: Footwear's may have a toe cap in the front upper of the footwear. Toe caps can take various forms, but the distinct types are: complete replacements for the front upper of the footwear; stitched to the vamp that add an extra layer to the upper; solid toe caps for protection, such as steel toe caps. Stitch over toe caps may be decorative in nature. Toe caps help add strength to the upper front of the footwear, an area that receives a lot of stress and wear from use.

3.30 Top piece: The part of the heel that comes in contact with the ground. Made of a durable material that helps to protect and maintain friction with the ground.

3.31 Topline: The top edge of the upper.

3.32 Waist: The arch and in-step of the foot.

3.33 Welt: A strip of material that joins the upper to the sole.

3.34 Leather Footwear: When footwear is claimed as leather footwear, minimum 60% upper material should be made from genuine leather.

4. Requirements

4.1 Upper materials and components

Upper of footwear shall comply with the requirements given in Table 4.1.1 when tested by the methods given in Column 3 of the table.

4.1.1 Upper leather

The upper leather shall be well tanned and of acceptable quality. It shall be free from defects that affect its appearance or might affect its serviceability or both.

The leather shall be bovine leather, goat or any other leather type as required, and the colour and the finish of the leather shall be an acceptable match to the colour and finish required. It shall comply with the requirements given in the table 4.1.1 (a) and 4.1.1 (b).

4.1.1 (a): Requirements for upper-Thickness

Sl. No.	Characteristic	Requirements	Method of test
i.	Thickness	Declared Range	ISO 2589

4.1.1(b): Leather uppers

Sl. No.	Characteristics	Methods of test	Products	Minimum Requirements
Color Fastness				Change in Color
i.	Color Fastness (Dry)	ISO 11640 SATRA TM 167 AATCC 8	Uppers Grain leather and pigmented/coated	After 50 rubs: 3
			Uppers Nubuck and Suede	After 20 rubs: 2
			Including the flesh or reverse side of unlined uppers	After 50 rubs: 3
ii.	Color Fastness (Wet)	ISO 11640 SATRA TM 335	Including the flesh or reverse side of unlined uppers	After 10 rubs: 2
iii.	CF to Perspiration	ISO 105-E04 SATRA TM 335 AATCC 15	Including the reverse side of unlined uppers	Colour staining: 3 Change in colour: 3
Durability & Strength				
iv.	Flexing Resistance of Uppers	ISO 5402-1 SATRA TM 55- "Bally flex"	Semi aniline & waxed leather	No damage to surface Room temp after 50,000 flexes Cold Flex after 20,000 flexes At -10°C for boot or closed up footwear
Sl. No.	Characteristics	Methods of test	Products	Minimum Requirements
v.	Abrasion Resistance	ISO 17704 (EN 13520)	Semi aniline	No damage after 3,200 cycles
			Pigmented/coated leather	No damage after 6,400 cycles
			Aniline & Laminated foil finish	No damage after 1,600 cycles
vi.	Tensile Strength and Percentage Elongation	ISO 3376 - Strength SATRA TM 43 ASTM-D2209	Upper	≥ 150 N Goat, sheep and leather thinner than 1.0 mm: ≥ 60N Aniline leather ≥ 125 N Goat, sheep and leather thinner than 1.0 mm: ≥ 55 N
		ISO 3376 - Elongation SATRA TM 43 ASTM-D2209		≥ 35% without cracking Laminated foil finish: ≥ 20%

vii.	Tear Strength (double edge tear)	ISO 3377-2 (SATRA TM 162) "Baumann method" ASTM-D 2212	Leather uppers	Goat skin 0.8-1.0 mm ≥ 4.0 kg 1.0 -1.2 mm ≥ 5.0 kg 1.2-1.4 mm ≥ 6.0 kg Kid skin 0.5-0.9 mm ≥ 3.0 kg Other leathers 0.6-0.8mm ≥ 5.0 kg; 0.8-1.0mm ≥ 6.0 kg; 1.0-1.2mm ≥ 7.0 kg; 1.2-1.4mm ≥ 8.0 kg; 1.4-1.6mm ≥ 9.0 kg; 1.6-1.8mm ≥ 11.0 kg; 1.8-2.0 mm ≥ 13.0 kg; 2.0-2.2 mm ≥ 15.0 kg; Minimum 10 kg with reinforcements
Performance - Material				
viii.	Water Penetration	SATRA TM 34 (ASTM-D2099)	Leather for footwear with "Water resistant" function	No leakage or wicking of moisture to the backside after 15000 flexes
ix.	Water-vapor Permeability	SATRA TM 172	Upper "Related to comfort function"	0.8 mg/cm ² -h

4.1.2 Non leather upper materials

Non leather upper materials shall be of a knitted, woven or non-woven fabric with or without a solid or an expanded polyvinyl chloride (PVC) or polyurethane (PU) coating or of a coagulated polyurethane material. The upper material may be a combination of these materials or of other elastomeric or poromeric materials. It shall comply with the requirements given in Table 4.1.2 (a), 4.1.2 (b).

4.1.2 (a): Synthetic Uppers (Including PU and PVC coated fabrics)

Sl. No.	Characteristics	Method of test	Minimum Requirements
i.	Tear strength, Min	ISO 13937-2 SATRA TM 30 For stretch PU use TM162	Normal PVC & PU: <ul style="list-style-type: none"> • Baby / Hikers / Work : 4.5 kg • Dress / Casual / Athletic : 3.6 kg; • Infant : 2.6 kg Stretch PU: weft: 5.0 kg, warp: 6.0 kg
ii.	Flexing Resistance, Min	ISO 5402-1 SATRA TM55	No damage to surface Room temp after 50,000 flexes Cold Flex after 20,000 flexes • At -10C for boot or closed up footwear • At – 20C for snow boot
iii.	Color fastness, Min	EN ISO 105-X12 SATRA TM 167 AATCC-8 ISO 11640	<u>After 50 rubs</u> Dry: 2-3 Grade <u>After 20 rubs</u> Wet: 2-3 Grade

4.1.2 (b): Textile Uppers

Sl. No.	Characteristics	Method of test	Minimum Requirements
i.	Tear strength	ISO 13937-2 SATRA TM 30	7.0 kg for sports/performance 4.5 kg for everyday men's and baby 3.5 kg for fashion/occasional men's, women's and baby 2.6 kg for infants footwear
ii.	Flexing Resistance	ISO 5402-1 SATRA TM55 – Bally Flex	No damage to surface/threads after 50,000 flexes
iii.	Color fastness	EN ISO 105-X12 SATRA TM 167 AATCC-8 ISO 11640	After 10 rubs Gray scale no worse than <ul style="list-style-type: none"> • Dry 3 • Wet 2

4.1.3 Lining materials

Lining material shall be of a leather, synthetic, fabric or blend of synthetic and cellulose fabric. Thickness of the lining material shall be not less than 0.5 mm. It shall be flexible and not have an unpleasant odour and not be injurious to the foot and health. It shall comply with the requirements given in Table 4.1.3 (a), 4.1.3 (b) and 4.1.3 (c).

4.1.3 (a): Leather Lining

Sl. No.	Characteristics	Method of test	Products	Minimum Requirements
Color Fastness				Change In Color
i.	Color Fastness (Dry)	EN ISO 105-X12 SATRA TM 167 ISO 11640 AATCC-8	Lining/Sock (including the reverse side of unlined uppers)	General: 3
ii.	Color Fastness (Wet)	EN ISO 105-X12 SATRA TM 167 ISO 11640 AATCC-8	Lining/Sock (including the reverse side of unlined uppers)	After 10 rubs: 2
iii.	CF to Perspiration	ISO 105-E04 SATRA TM 335 AATCC 15	Lining/Sock (including the reverse side of unlined uppers)	Color staining: 3 Change in color: 3
Durability & Strength				
iv.	Abrasion Resistance, Min	ISO 17704 (EN ISO 12947 SATRA TM 31A)	Lining	Not worse than moderate wear after: Everyday footwear's: Dry: 25,600 revs Wet: 6,400 revs Footwear's for occasional use (party footwear's, slippers): Dry: 12,800 revs Wet: 3,200 revs
v.	Tear Strength (Trouser Tear), Min	ISO 13937-2 (SATRA TM 30)	Lining	≥ 10 N

4.1.3 (b): Synthetic Lining

Sl. No.	Characteristics	Method of test	Products	Minimum Requirements
Color Fastness				Change In Color
i.	Color Fastness (Dry)	EN ISO 105-X12 (SATRA TM 167) ISO 11640	Lining/Sock (including the reverse side of unlined uppers)	General: 3
ii.	Color Fastness (Wet)	EN ISO 105-X12 (SATRA TM 167) ISO 11640	Lining/Sock (including the reverse side of unlined uppers)	After 10 rubs: 2
iii.	CF to Perspiration	ISO 105-E04 SATRA TM 335 AATCC 15	Lining/Sock (including the reverse side of unlined uppers)	Color staining: 3 Change in color: 3
Durability & Strength				
i.	Abrasion Resistance	ISO 17704 EN ISO 12947 SATRA TM 31A	Lining	Not worse than moderate wear after: Everyday footwear's: Dry: 25,600 revs Wet: 6,400 revs Footwear's for occasional use (party footwear's, slippers): Dry: 12,800 revs Wet: 3,200 revs
ii.	Tear Strength (Trousers Tear)	ISO 13937-2 (SATRA TM 30)	Lining	≥ 10 N

4.1.3 (c): Textile Lining

Sl. No.	Characteristics	Method of test	Products	Minimum Requirements	
i.	Deviation of Fibre Content	ISO 1833	All textile products	If 100% of the same fibre, no deviation is allowed If fibre blend:	
				Fibre content	Tolerance in percent units
				≤ 1%	± 0.3
				>1 to 2	± 0.6
				>2 to 3%	± 0.9
				>3 to 4%	± 1.2
				>4 to 9%	± 1.5
> 9	± 3.0				
Color Fastness				Minimum Gray scale rating	
ii.	Color Fastness (Dry)	EN ISO 105-X12 SATRA TM 167 ISO 11640	Lining/Sock (including the reverse side of unlined uppers)	General: 3	
iii.	Color Fastness (Wet)	EN ISO 105-X12 SATRA TM 167 ISO 11640	Lining/Sock (including the reverse side of unlined uppers)	After 10 rubs: 2	
iv.	CF to Perspiration	ISO 105-E04 SATRA TM 335 AATCC 15	Lining/Sock (including the reverse side of unlined uppers)	Color staining: 3 Change in color: 3	

Durability & Strength				
v.	Abrasion Resistance	ISO 17704 EN ISO 12947 SATRA TM 31A	Lining	Not worse than moderate wear after: Everyday footwear's: Dry: 25,600 revs Wet: 6,400 revs Footwear's for occasional use (party footwear's, slippers): Dry: 12,800 revs Wet: 3,200 revs
vi.	Tear Strength (Trousers Tear)	ISO 13937-2 SATRA TM 30	Lining	≥ 10 N
Performance - Material				
vii.	Surface Wetting of Fabric - Spray Test	ISO 4920 Temp. of water 20°C	"Waterproof", "Water resistant" & "Water repellent" fabric	Before wash: 4
viii.	Water Penetration	EN 20811 ISO 811	Fabric with "Water resistant" coating or membrane	Fabric: > 2000 mm H ₂ O
Safety				
ix.	Flammability Test	16 CFR 1610 (Ignition time: 3 seconds)	Uppers with raised surfaces	Time of flame spread: Self-extinguish

4.1.4 Closure fittings

4.1.4.1 Eyelets

Eyelets shall be of the visible - setting or the invisible - setting type and made of metal or polymeric material. Metal fitments shall have been so treated as to render them corrosion resistant or shall be of corrosion resistant metal. The internal diameter of the eyelets shall be not less than 3 mm. The length of the barrels shall be long enough to ensure proper clinking on the facing. Unless the number of eyelets per footwear is specified by the purchaser, it may vary (at the discretion of the manufacturer according to the design and size of footwear). Eyelet fitting shall be secured and not be injurious to the user.

Where eyelets are not fitted to the lace holes of lace-up footwear's, the facing shall be reinforced with reinforcing tape.

4.1.4.2 Fitments for fastening

Ski-hooks, D-rings, buckles or other acceptable fitments for fastening shall be as required by the design. All fasteners shall be strong enough and large enough for their intended function. Metal fitments shall have been so treated as to render them corrosion resistant or shall be of corrosion resistant metal. Plastic fitments shall be of a plastic material that is neither brittle nor likely to become brittle during the normal life of the footwear.

4.1.4.3 Buckles

Buckles shall be of corrosion resistant metal or polymeric material and the type and design shall be as agreed between the purchaser and the supplier. It shall comply with the requirements given in Table 4.1.4.3.

4.1.4.3: Metal components- Buckle

Sl. No.	Characteristics	Method of test	Products	Minimum Requirements
i.	Buckle strength	SATRA TM 141	Buckles with a centre bar	Men's: ≥ 25 kg Women's: ≥ 15 kg Baby: ≥ 12 kg
		SATRA TM 151	Buckles without a centre bar	Men's: ≥ 25 kg Women's: ≥ 20 kg Baby: ≥ 15 kg

4.1.4.4 Trims, ornaments and Metallic fittings

Trims, ornaments and Metallic fittings shall be of an acceptable type and design and shall be of an intrinsically corrosion resistant material. It shall comply with the requirements given in Table 4.1.4.4.

4.1.4.4 Metallic components - All

Sl. No.	Characteristics	Method of test	Products	Minimum Requirements
Durability & Strength				
i.	Corrosion - Salt Spray Test	EN ISO 9227 ISO 10289	Metal accessory	$R_A \geq 6$
		SATRA TM 310 Method 2		No Corrosion On Surface

4.1.4.5 Hook and loop

Hook and loop (Velcro) fastening system shall be of acceptable quality as agreed between the purchaser and supplier. It shall comply with the requirements given in Table 4.1.4.5.

4.1.4.5: Hook and loop (Velcro)

Sl. No.	Characteristics	Method of test	Products	Minimum Requirements
Durability & Strength				
i.	Peel Strength	EN ISO 22777 SATRA TM 123 BS 7271 Appendix B	Touch and Close Fastener	Initial: ≥ 0.10 N/mm After 5000 opening and closing cycles: ≥ 0.08 N/mm As received 170 g/cm
ii.	Shear Strength	EN ISO 22776 SATRA TM 123, BS 7271 Appendix C	Touch and Close Fastener	Initial: ≥ 75 kPa After 5000 opening and closing cycles: ≥ 65 kPa As received 750 g/cm

4.1.4.6 Elastic

Elastic used for fastening shall be as required by the design. It shall be strong enough and large enough for its intended function. It shall comply with the requirements given in Table 4.1.4.6

4.1.4.6: Elastic

Sl. No.	Characteristics	Method of test	Products	Minimum Requirements
Durability & Strength				
i.	Resistance of Elastics to Repeated Extension	SATRA TM 103	Elastics	Not more than 10% broken rubber threads

4.1.4.7 Zippers

Zippers used for fastening (functional purpose) as well as decorative purpose as required by the design. In case of functional purpose, it shall comply with the requirements given in Table 4.1.4.7

4.1.4.7: Zippers

Sl. No.	Characteristics	Method of test	Products	Minimum Requirements
Durability & Strength				
i.	Fatigue resistance	BS 3084 SATRA TM 50, method 1	Normal & loose fitting styles	≥ 1000 cycles
			Close fitting styles	≥ 2000 cycles
ii.	Burst Strength	SATRA TM 166	Normal & loose fitting styles	≥ 160 N
			Close fitting styles	≥ 180 N
			Close fitting styles	≥ 300 N
iii.	Puller attachment strength	SATRA TM 52, Method 1 ASTM D2061 BS 3084		Adult & Boys ≥ 25.0 kg Misses/Youth ≥ 20.0 kg Infant/Toddler ≥ 15.0 kg
iv.	Lateral load (breaking strength of chain)	SATRA TM 51 ASTM D2061 BS 3084		≥ 38 kg

4.1.5 Threads

The threads used for attaching the various upper components shall be polyamide (nylon) or polyester. Threads shall not be finer than ticket number 60. The colour of threads shall match that of the surrounding material, unless a contrasting colour is part of the design.

4.1.6 Laces

Laces shall be of acceptable textile fibres or blends of fibres, and of braided construction. Lace end shall be fused. Lace shall be of uniform make, colour and finish. Lace tip shall be of cellulose, plastic or non corrosive metal and shall not be loosen when pulled. It shall comply with the requirements given in Table 4.1.6.

4.1.6: Laces

Sl. No.	Characteristics	Method of test	Products	Minimum Requirements
Durability & Strength				
i.	Breaking Load	SATRA TM 94 (BS 5131 Section 3.7)	Shoelaces	Dry: ≥ 200 N Wet: ≥ 150 N
ii.	Lace to Lace or Lace to Carrier Abrasion	SATRA TM 154	Shoelaces	≥ 3000 Cycles

4.1.7 Binding

Binding used on footwear's shall be of leather, fabric or fabric supported PVC of acceptable quality. When the binding is applied it shall not break while manufacture and PVC binding shall be cut at an angle of 45 ° along the axis.

4.2 Bottom materials and components

4.2.1 Insole

Insoles shall be made of leather, cellulose fibre board, or non-woven synthetic material, as required. Thickness of the insole shall be not less than 1.5 mm. It shall not have an unpleasant odour and not be injurious to the foot and health. It shall comply with the requirements given in Table 4.2.1.

4.2.1: Insole

Sl. No.	Characteristics	Method of test	Products	Minimum Requirements
Durability & Strength				
i.	Insole Board Flex Index	SATRA TM 03	Insole board	≥ 1.9

4.2.2 Middle sole

Middle sole shall be as agreed between the purchaser and supplier and it shall comply with the requirements given in Table 4.2.2.

4.2.2: Middle sole

Sl. No.	Characteristics	Method of test	Products	Minimum Requirements
Durability & Strength				
i.	Hardness (Asker C)	ASTM D2240 SATRA TM 205	EVA	35

4.2.3 Outer soles

Outer soles shall be of rubber or plastic material as agreed between the purchaser and supplier. It shall comply with the requirements given in Table 4.2.3 when tested by the methods given in column 2 of the table.

4.2.3: Requirements for outer sole

Sl. No.	Characteristics	Method of test	Products	Minimum Requirements
Durability & Strength				
i.	Hardness	Shore A ISO 7619-1 ASTM D2240 SATRA TM 205	Resin Rubber	- Men's 65±5 - Women / Boys 60±5 - Baby / Infant 55±5
			TPR soles	- Men's 65±5 - Women / Boys 60±5 -Baby / Infant 55±5
			Vulcanized Rubber	60-65
			Polyurethane	Adult: 60 (±5) Baby - from size 34: 55 (±5) - up to size 33: 50 (±5)
		PVC	- Solid 42 – 77 - Expanded 35 minimum	
		Shore C (ISO 7619-1) ASTM D2240 SATRA TM 205	EVA	- Men & Women & Boys : 65±5, - Baby& Infant: 55±5

Sl. No.	Characteristics	Method of test	Products	Minimum Requirements
ii.	Abrasion Resistance	ISO 4649 (SATRA TM 174)	Sole material	mm³ volume loss
			Resin Rubber	≤ 350
			TPR soles	50-70 IRHD: ≤ 300 71-95 IRHD: ≤ 400
			Vulcanized Rubber	≤ 350
			Polyurethane	Polyester: ≤ 300 Polyether: ≤ 500
			PVC	• Expanded PCU: 300mm ³ max Others: 270mm ³ max
			EVA	High density: ≤ 160 Low density: ≤ 700
iii.	Abrasion Resistance – Leather Outsole	SATRA TM 193	Outsoles	≤ 25 mm/1000 rev
		SATRA TM 174	Leather	≤ 450 mm ³
iv.	Ross Flex Test - Resistance to Cut Growth	SATRA TM 60 @ 25°C (BS 5131 section 2.1)	Sole material	mm cut growth/kilocycle
			Resin Rubber	6 mm max. cut growth after 50,000 flexes
			TPR	
		Vulcanized Rubber	6 mm max. cut growth after 20,000 flexes	
		Polyurethane		
		EVA		
v.	Sole Flex Resistance “Bata Belt”	SATRA TM 133	Patterned Soles and all PU Soles	No spontaneous cracking at 50,000 cycles.
			Leather	
vi.	Hydrolysis resistance	EN 344 Conditioning = 7 days ageing at 70°C / 95% relative humidity	PU (Special)	Critical properties continue to meet minimum requirement. Test Abrasion & Flexing with < 10% change
		ISO 5423:1992		Changes in elongation at break shall not exceed 20%

4.2.4 Shanks

Shanks shall be made of plastic, non corrosive metal or wood of width not less than 9.5 mm. Shanks shall not permanently distort or break during use. Thickness of shank shall comply with the requirements given in Table 4.2.4.

4.2.4: Shanks

Sl. No.	Characteristics	Method of test	Products	Minimum Requirements
Durability & Strength				
i.	Shank Stiffness	ISO 18896 SATRA TM 58	Heel height <50mm: Heel height 50-74mm: Heel height 74-99mm: Heel height >99mm:	≥ 400 kN mm ² ≥ 800 kN mm ² ≥ 1200 kN mm ² ≥ 1600 kN mm ²
ii.	Shank Fatigue Resistance	ISO 18895	Heel height <50mm: Heel height 50-74mm: Heel height 74-99mm: Heel height >99mm:	≥ 3,000 cycles ≥ 8,000 cycles ≥ 20,000 cycles ≥ 60,000 cycles

4.2.5 Heel

Heels other than heels of pre-moulded outer sole and heel unit shall be of leather, leather board, wood, rubber, plastics or other acceptable material as required. Heels shall be stacked heels, covered or uncovered heels as required. It shall comply with the requirements given in Table 4.2.5.

4.2.5: Heel

Sl. No.	Characteristics	Method of test	Products	Minimum Requirements
i.	Heel Fatigue Resistance	EN ISO 19956 SATRA TM 21 BS 5131: Section 4.9	High heeled footwear's (heel ≥ 50 mm)	No cracking after 14,000 blows
ii.	Impact Resistance	SATRA TM 20 BS 5131: 4.8	High heeled footwear's (heel ≥ 50 mm)	≥ 5.5 Joules without damage

4.2.6 Top piece

Top-pieces shall be of acceptable leather or of an acceptable rubber or plastics material, as required. Heel top piece shall be according to the design and appropriate thickness and properly fastened to the heel. It shall comply with the requirements given in Table 4.2.6.

4.2.6: Top piece

Sl. No.	Characteristics	Method of test	Products	Minimum Requirements
Durability & Strength				
i.	Abrasion Resistance	ISO 4649 SATRA TM 174	Top Piece	Autoloc types: ≤ 100 mm ³ volume loss Spigotted types: ≤ 40 mm ³ volume loss
ii.	Hardness	Shore A ISO 7619-1	Top Piece, Vulcanized rubber	Vulcanized rubber: ≥ 70
		SATRA TM 205	Top Piece, PU/TPU	1. Soft step top lift of TPU without Steel Pin: 85-95 2. Soft step top lift of TPU with Steel Pin Street side 92+/-2 Inner side 95+/-2 3. Normal top lift of TPU with Steel Pin (width less than 11mm): 95+/-2

Safety				
iii.	Slip Resistance	SATRA TM 144 ASTM F2913-11 ASTM F609 (Modified)	Top Piece	≥ 0.3 Coefficient of Friction

4.3 Work boot

A work or safety boot is a boot that has steel to protect the person's toes. It shall comply with the requirements given in Table 4.3.

4.3 Work boot

Sl. No.	Characteristics	Method of test	Class/compression force	Minimum Clearance height
i.	Safety toe compression	ASTM F2412	Class 75 ≥ 2,500 lb Class 50 ≥ 1,750 lb	Men's ≥ 0.50 inch (12.7mm) Women's ≥ 0.468 inch (11.9mm)
ii.	Safety toe impact	ASTM F2413	Class 75 ≥ 101.7 J (75ft-lb) Class 50 ≥ 67.8 J (50ft-lb)	Men's ≥ 0.50 inch (12.7mm) Women's ≥ 0.468 inch (11.9mm)

4.4 Washable

Sl. No.	Characteristic	Method of test	Minimum Requirements
i.	Washing	SATRA-TM 158	No Obvious Dyeing Transfer & < 5% Shrinkage In Length/Width

4.5 Whole footwear test

Sl. No.	Characteristics	Method of test	Products	Minimum Requirements
Durability & Strength				
i.	Heel Attachment	SATRA TM 113 EN 12785	High heeled footwear's (heel ≥ 50 mm)	≥ 500N Permanent movement of heel tip should not exceed 15% of heel height
ii.	Sole Bond Peel Strength	SATRA TM 411 EN ISO 17708	Footwear	≥ 3.0 N/mm
iii.	Whole footwear Flexing	SATRA TM 92	Footwear	No damage / cracking after - Room temp for 50,000 flexes - Cold for 20,000 flexes
iv.	Top Piece Attachment	SATRA TM 108	Nailed Top Piece	≥ 140 N/mm
		SATRA TM 401	Glued Top Piece	≥ 1.0 N/mm
v.	Seam strength	SATRA TM 180 BS 5131 Section 5.13	Functional seams	Work Boot / Hiker / Men's: ≥ 25.0 kg/cm Women's / Baby / Functional ≥ 13.0 kg/cm Decorative ≥ 4.0 kg/cm
vi.	Strap to Sole Attachment Strength	SATRA TM 120 BS 5131 Section 5.14	Footwear with straps	Men's: ≥ 250 N Women's: ≥ 200 N Baby footwear: Age 0-1.5 (size 12-23): ≥ 150 N Age 2-14 (from size 24): ≥ 250 N

vii.	Strength of Straps, Buckles and Related Attachments, Min	SATRA TM 181 (EN 5131:5:11)	Footwear with straps, buckles and attachments	Men's: ≥ 250 N Women's: ≥ 200 N Baby footwear Age 0-1.5 (size 12-23): ≥ 150 N Age 2-14 (from size 24): ≥ 250 N
Performance				
viii.	Water Penetration	SATRA TM 77 SATRA TM 230	• "Water resistant" • "Waterproof"	No water penetration after 15,000 flexes

4.5 Adhesives

The adhesive used (in all cases) in the manufacture of footwear's shall be such as to be acceptable, and compatible with the materials with which they are used and capable of producing an adequate bond between the component concerned. Requirement of bonding sole to upper material shall comply with the requirements given in Table 4.5.

4.6 Sizing and size marking

Sizing and size marking of the footwear shall confirm to BDS 487.

5. Packaging and Marking

5.1 Packaging

Each pair of footwear's shall be packed individually in boxes made by suitable packing material that will protect it from damage during normal, storage, handling and transportation.

5.2 Marking

5.2.1 Footwear's

The footwear's shall be legibly and indelibly marked with the following information:

- a) Size of the footwear;
- b) Brand name or trade mark; and
- c) Material of the upper; the lining and sock; and the outersole either of written indications for specific materials (Leather/ Coated Leather/ Textile/ Other material) or of the pictograms given in figure 1.
- d) Any further information required by the purchaser.

NOTE - 1. The labelling shall provide information on the material, which constitutes at least 60 % of the surface area of the upper; and the lining and sock of the footwear, and at least 80% of the volume of the outersole.

2. No account being taken of accessories or reinforcements such as ankle patches, edging, ornamentation, buckles, tabs, eyelet stays or similar attachments.
3. Where multiple materials are used, the two main materials in the composition of the footwear must be stated with the percentage.
4. **For Example:** A footwear constitutes leather more than 60 % of the surface area of the upper; and textile material more than 60 % of the lining and sock of the footwear, and Synthetic material at least 80% of the volume of the outersole shall used pictograms given in figure 2 on the footwear.

Part of the Footwear	Description	Pictogram
Upper	The upper is the outer face of the structural element which is attached to the outer sole. The accessories (buckles, eyelets etc.) and reinforcements (edges, tabs etc.) are excluded.	
Lining and Sock	It refers to the lining and the insole and constituting the inside of the footwear.	
Outersole	It is the bottom part of the footwear, which is subjected to abrasive wear and attached to the upper.	
Leather	A general term for hide or skin with its original fibrous structure more or less intact, tanned to be rot-proof. The hair or wool may or may not have been removed.	
Coated Leather	Coated Leather is defined as a product that has a finish thickness of less than 30 percent but greater than 0.15 mm.	
Textile	Natural textile materials, synthetic textile materials or non-woven fabrics.	
Other material	Symbol for artificial, synthetical and other material of shoe top, lining, sole that are not mentioned in above.	

Fig. 1 Pictogram

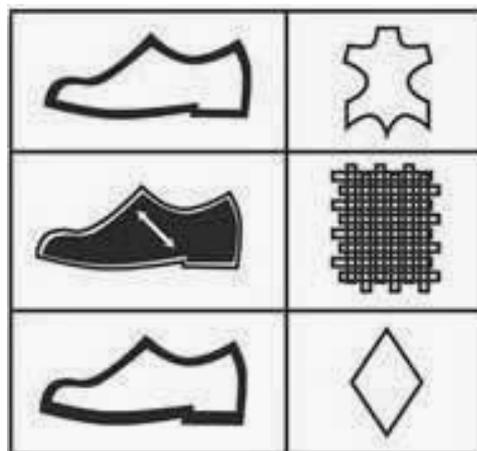


Fig. 2 Pictogram of a footwear

5.2.2 Boxes

Each box shall be legibly and indelibly marked with the following information:

- a) Name of the product as "Men's footwear's", "Women's footwear's", "Boy's footwear's", "Girls footwear's" and "Baby footwear's".
- b) The size of the footwear's;
- c) Brand name and/or trade mark, if any;
- d) Batch number;
- e) Colour;
- f) Code of manufacture; and
- g) Any other information required by the purchaser.

6. Methods of test

6.1 Tests shall be carried out as prescribed in 2 (References) and Annex B- guide.

6.2 The conditioning and testing atmosphere shall be the standard atmosphere for conditioning and testing as defined in BDS 590, i.e relative humidity of 65 ± 5 per cent and temperature of 27 ± 2 °C.

Annex A Sampling of a Lot

The sampling scheme given in this Annex should be applied where compliance of a lot to the requirements of this standard is to be assessed based on statistical sampling and inspection. Where compliance with this standard is to be assessed based on manufacturer's control systems coupled with type testing and check tests or any other procedure, an appropriate scheme of sampling and inspection should be adopted.

A-1 Lot

In any consignment all pairs of footwear's of the same style belonging to one batch of manufacture or supply shall constitute a lot.

A-2 Scale of sampling

A-2.1 Samples shall be tested from each lot for ascertaining the conformity of the product to the requirements of this specification.

A-2.2 Number of pairs of footwear's (boxes) to be selected shall be as given in Column 2 of Table 5. From the Pairs of footwear's so selected (as far as possible), equal number of pairs of footwear's shall be selected to form a sub sample as given in Column 3.

Table 5 - Scale of sampling

Number of pairs of footwear's (boxes) in the lot (1)	Number of pairs of footwear's (boxes) to be selected (2)	Number of pairs of footwear's (boxes) in sub sample (3)
Up to 500	05	02
501 to 35 000	06	02
35 001 and above	08	03

A-2.3 Pairs of footwear's shall be drawn at random. In order to ensure randomness of selection random number tables as given in BDS 993 shall be used.

A-3 Number of tests

A-3.1 Each box selected as in A-2.2 shall be inspected for packaging and marking requirements specified in 5.

A-3.2 Each pair of footwear's selected as in A-2.2 shall be inspected for packaging and marking requirements specified in 5.

A-3.3 Each pair of footwear's selected as in A-2.2 shall be examined and tested for the requirements given in 4.1.1(b) to 4.1.3, 4.1.7, 4.2.4 and 4.7.

A-3.4 A sub-sample of size as given in column 3 of Table 5 shall be drawn from the sample selected as in A-2.2 and each footwear in the sub-sample shall be tested for upper thickness as given in 4.1.1(a).

A-3.5 Each footwear in the sub-sample tested as in A-3.4 shall be tested for the requirements given in 4.2.1 and 4.2.2.

A-3.6 Each footwear in the sub-sample tested as in A-3.5 shall be tested for the requirements given in 4.2.3, 4.2.5 and 4.2.6.

A-3.7 Each pair of footwear's selected as in A-2.2 shall be examined and tested for the requirements given in 4.5.

A-3.8 Each pair of footwear's selected as in A-2.2 shall be examined and tested for the requirements given in 4.1.4.3 to 4.1.4.7 and 4.1.6.

A-4 Criteria for conformity

A lot shall be declared as conforming to the requirements of this specification if the following conditions are satisfied:

A-4.1 Each box inspected as in A-3.1 satisfies the packaging and marking requirements.

A-4.2 Each pair of footwear's inspected as in A-3.2 satisfies the packaging and marking requirements.

A-4.3 Each pair of footwear's examined as in A-3.3 satisfies the relevant requirements.

A-4.4 Each footwear tested as in A-3.4, A-3.5, A-3.6, A-3.7 and A-3.8 satisfies the relevant requirements.

Annex B- Guide: Examples of which requirements relate to what type of footwear

Test Name	Applicable material	Ladies high heel -Pump -Sandalette	Ladies wedge heel	Boots	Men's shoe (Flat)	Sandal	-Ballerina -Spa drill	Sneakers -Vulcanization -Injection -Cementing	-Flip flop -Slippers	Water resistance footwear	Sports
		 	 	 	 	 	 	 	 	 	 
Heel attachment	Whole footwear test	x		x							
Sole bond peel strength		x	x	x	x	x	x	x	x		x
Whole footwear flexing					x	x		x		x	x
Top piece attachment		x		x							
Seam strength		x	x	x	x	x	x	x	x		x
Strap to sole attachment		x	x				x			x	
attachment of straps, buckles etc		x	x	x	x	x		x	x	x	
Water penetration											x
Colour fastness (Dry)	LR, Syn, Tex (Upper+ lining)	x	x	x	x	x	x	x	x	x	x
Colour fastness (Wet)	LR, Syn, Tex (Upper+ lining)	x	x	x	x	x	x	x	x	x	x
CF to Perspiration	LR, Syn, Tex (Lining)	x	x	x	x	x	x	x	x	x	x
Flexing Resistance of Uppers	LR, Syn, Tex	x		x	x						
Abrasion Resistance	LR, Syn, Tex (Upper+ lining)	x	x	x	x	x	x	x			
Tensile Strength and Percentage Elongation	LR (Upper)	x	x	x	x	x	x	x			

Tear Strength (double edge tear)	LR, Syn, Tex (Upper+ lining)	x	x	x	x	x	x		x	x	
Water penetration	LR (Upper)									x	
Water-vapor Permeability	LR (Upper)			x	x		x			x	
Deviation of Fibre Content	Tex	Applicable for all types when containing blends textile									
Surface Wetting of Fabric-Spray Test	Tex	Applicable for all types when containing blends textile									
Water Penetration	Tex									x	
Flammability Test	Tex	Applicable for all types when containing blends textile									
Corrosion –Salt Spray Test	Metal	Applicable for all types when containing metal components									
Peel Strength	Hoop & Loop (Velcro)	Applicable for all types when containing functional Velcro									
Shear Strength											
Resistance of elastics to Repeated Extension	Elastic	Applicable for all types when containing functional elastics									
Fatigue resistance	Zipper	Applicable for all types when containing functional zippers									
Burst strength											
Puller attachment strength											
Lateral load (breaking strength of chain)											
Breaking Load	Laces	Applicable for all types with shoelaces									
Lace to Lace or Lace to Carrier Abrasion											
Insole Board Flex Index	Insole	Applicable for all types with insole									
Buckle strength	Buckle	Applicable for all types with buckle									
Hardness	Mid sole, sole, toe piece	Applicable for all types with Mid sole, sole, toe piece									

Abrasion Resistance	Sole, toe piece	x	x	x	x	x	x	x	x	x	x
Abrasion Resistance – Leather outsole	LR	Applicable for all types with leather outsole									
Ross Flex Test – Resistance to Cut Growth	Sole	Applicable for all types with outsole (Sheet type)									
Sole Flex Resistance “Bata Belt”	Sole	Applicable for all types with outsole (Unit type)									
Hydrolysis Resistance	Sole (PU)	Applicable for all types with PU outsole									
Shank Stiffness	Shank	Applicable for all types with shank									
Shank Fatigue Resistance											
Heel Fatigue Resistance	Heel	x		x							x
Impact Resistance		x		x							x
Slip Resistance	Toe piece	x		x							
Safety toe compression	Toe puff	Applicable for all work boot or safety footwear									
Safety toe impact											
Washing		Applicable for all types of washable footwear									

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BANGLADESH STANDARDS AND TESTING INSTITUTION
MINISTRY OF INDUSTRIES
MAAN BHABAN, 116-A, TEJGAON INDUSTRIAL AREA
DHAKA-1208, BANGLADESH