

INTEGRATED HEADQUARTERS OF MINISTRY OF DEFENCE (NAVY)
DIRECTORATE OF CLOTHING & VICTUALLING

INDIAN NAVY SPECIFICATION

ON

SHOES BLACK DERBY
(SYNTHETIC PATENT)

CAT NO. CNCMT- PSF0031 to 0038

ISSUE DATE: 02 APR 14

DIRECTORATE OF CLOTHING AND VICTUALLING
D-II WING, SENA BHAWAN
INTEGRATED HEADQUARTERS
MINISTRY OF DEFENCE (NAVY)
NEW DELHI - 110 011

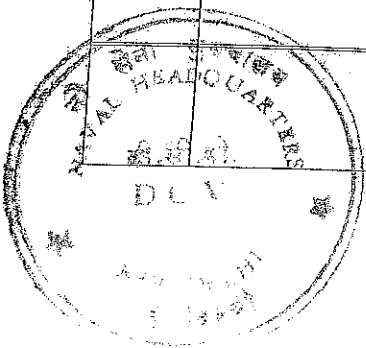
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डे.के.ओ. कार्यालय: कोशिका
Cmde Karumeshi Kaushik
प्रधान निदेशक/Principal Director
डी.सी.वी./डी.वी.ए. रक्षा मंत्रालय (नौसेना)
DCV, Integrated HQ-M.A. (Navy)
नई दिल्ली-110011

REPORT OF AMENDMENT

<u>SNO</u>	<u>DATE</u>	<u>AMENDMENT NO</u>	<u>DETAILS OF AMENDMENT</u>	<u>AMENDMENT CARRIED OUT BY AND DATE</u>



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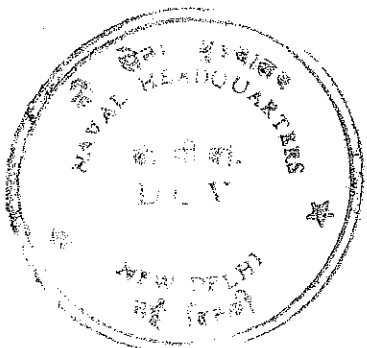
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(Handwritten Signature)
 श्रीमान् कार्मण्डल कांक्षिक
 Chief Karmanand Kaushik
 प्रमुख अधिकारी/Principal Director
 शिपिंग एवं नौकायान विभाग (नौसेना)
 नौसेना मुख्यालय (Navy)
 नई दिल्ली

FOREWORD

1. This specification is the property of Government of India and is a restricted document, not to be communicated to anyone who is not authorised to receive it. This specification or any drawings, pattern or other information issued in connection therewith may only be used for manufacture and quality assurance against specific procurement order placed by competent authority. It is not to be used for any other purpose whatsoever without the expressed written sanction of the Chief of Naval Staff or his representative.
2. This specification has been prepared on the basis of commercially available products and inputs obtained from reputed Indian manufacturers and exporters in addition to technology extracted from Indian Navy Specifications No. **DCV/PROV/SHOE PU COATED SPLIT LEATHER WHITE UNIFORM/12/2011** and **DCV/CG/NAVY/12/2013**. This specification has been prepared and vetted by **FDDI**, Noida. The Authority Holding Sealed Particulars (AHSP) for the item covered in this specification is Principal Director of Clothing & Victualling (PDCV), Sena Bhawan, New Delhi, for the Indian Navy. The AHSP would be the Quality Assurance Authority for all enquiries related to make and shape regarding this specification.
3. All clauses in this specification shall be complied with in every respect, irrespective of the source of supply or the material and/or components. Any deviation from this specification will not be resorted to without the express written sanction of Quality Assurance Authority. **Should any discrepancy be found between this fit/feel/finish as specified and any sample or pattern, submitted for any purpose, then decision of the AHSP in this regard would be final.**
4. Unauthorised departures from this specification may involve rejection of the store, which will be inspected during and after, manufacture and shall be subjected to testing for the final approval of the Quality Assurance Officer before dispatch to the consignee.
5. All the Specifications/drawings referred to in this specification for any tender or contract shall mean the edition current of the date of such tender or contract. The PDCV reserves the right to amend or modify this specification as and when necessary without any prior intimation to any parties associated/affected by the amendment/modification so being carried out.
6. While sending/informing procurement agencies about change in specifications, the AHSP shall ensure that such an action is not linked to any existing/under progress contract cases, unless it is inescapable, in terms of DPM-2009 Para 4.10.1. Notwithstanding the above, the procurement agencies would remain the best judge on whether to include the changes brought in the specification or otherwise for all such existing/under progress contract cases.

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श्रीमती कल्पना केशरी
Cmde Karanesh Keshari
प्रधान निदेशक/Principal Director
डीसीपी/एकीकृत एडवाइजरी रसा भवन (नौसेना)
DC V/Integrated Adv-Mat (Navy)
नई दिल्ली/New Delhi-110011

SCOPE

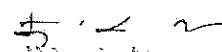
7. This specification covers the requirement of Shoes Black Derby with stuck-on Polyether PU (PU) Sole in sizes 5 – 12. These shoes are to be as per Classification I, Design 'A' of ISO:20345.
8. This specification covers the material requirements, construction particulars and overall shoe general requirements used in the manufacture of Shoes Black Derby.

REFERENCES

9. The succeeding paragraphs refer to the following specifications, which in turn sub-refer to the relevant specifications as applicable for the parameter being detailed:-

Table 1 : Applicable Documents

Sl.No.	Specifications	Description
(a)	IS: 2050	Glossary of terms relating to footwear. For the purpose of this specification the definitions and terminology given in IS:2050 are applicable.
(b)	IS: 5041-1978	Specification for Footwear and Stationery Eyelets/D-Rings
(c)	IS:4905-1968	Method of random sampling
(d)	IS:9543	Spun Polyester Sewing Thread
(e)	IS:11195	Blend Compositions of Textiles
(f)	ISO:20345-2011	Personal Protective Equipment – Safety Footwear
(g)	ISO 2062	Determination of single-end breaking force and break
(h)	ISO 5402	Flexing resistance of upper leather (Bally Flexing)
(j)	ISO 3376	Leather – Determination of tensile strength and elongation
(k)	ISO 11644	Finish Adhesion Test
(l)	ISO 426/1	Wrought copper-zinc alloys – Chemical composition and forms of wrought products – Part 1: Non-lead and special copper zinc alloys.
(m)	SATRA TM 36	Break/ Pipiness of Leather
(n)	SATRA TM 58	Stiffness of shanks
(p)	SATRA TM 92	Resistance to Whole Shoe Flexing
(q)	SATRA TM 94	Breaking force and extension at break of shoe laces
(r)	SATRA TM140	Scuff resistance - chisel method
(s)	SATRA TM149	Strength of eyelet facings and other laced fastenings
(t)	SATRA TM150	Attachment Strength of Eyelets
(u)	SATRA TM154	Shoe lace to shoe lace and shoe lace to lace carrier abrasion
(v)	SATRA TM195	Knot Slippage Test
(w)	SATRA TM310	Atmospheric Sulphide Tarnishing and Salt Water Corrosion
(x)	ASTM D5034	Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)


 Chief Executive Officer
 Indian Standards Institution
 1, Park Road, New Delhi (India)
 Tel: 011-26109600, 26109601

10. The standard pattern of the shoe shall be made to derby design on with stuck-on PU sole. A 'G' fitting last having "round pointed toe" is to be used. The standard pattern held in the custody of IHQ of MoD(N)/DCV shall constitute the standard as regards to any particulars or properties not noted/defined in this specification. An illustrative diagram for reference guidance purposes only is placed at Appendix "A".

STANDARD PATTERN

11. The standard pattern of shoe shall be made to derby design on with stuck-on PU sole. A 'G' fitting last having "round pointed toe" is to be used. The standard pattern held in the custody of IHQ of MoD(N)/DCV shall constitute the standard as regards to any particulars or properties not noted/defined in this specification. An illustrative diagram for reference guidance purposes only is placed at Appendix "A".

12. The standard pattern held by the AHSP would define the general appearances, workmanship, feel finish, shape, design and pattern and for other aspects not defined in this specification.

MATERIALS

13. The general description of materials to be used for manufacture of the shoe is as indicated at the following Table 2. **The physical and chemical properties for conformance to by relevant materials have been placed at Appendix 'B'.**

Table 2 : Material Description

Sl.No.	Component	Requirement
(a)	All Upper components including Tongue	Drill Cotton(Variety No.4 of IS:177) laminated over non-woven based Synthetic Patent Upper With High Gloss in Jet Black Colour and Scratch Resistant Upper Coating. Upon flexing the upper material, no wrinkles should form and only minor pleats may form.
(b)	Composite Lining with Foam Insert	100% Polyamide Black Colour Non-Woven material (Cambrelle type) with anti-microbial properties for Vamp, Quarters and Tongue . The lining has to be a three-layered composite material with 2 mm needle punch material on one side and the cambrelle type lining on the outer side(shoe inside) with 2 mm of PU Foam compressed firmly between them using pasting.
(c)	Toe Cap and Counter Stiffener	Stiffeners of Thermo plastic material shall be used for Toe Puff and Counter with minimum thickness 1.4-1.6 mm respectively.
(e)	Eyelets & Hook	5 nos. Brass Eyelets of size no. 7.5 + 0.5 mm collar diameter to be fitted on each face.
(f)	Laces	Each pair of boots shall be provided with a pair of Nylon Black Tubular Laces of min 100 cm long. They should have minimum breaking strength of 500 N when tested in accordance with BS 5131-Sec 3 .
(j)	Insock	Removable full insock with anatomically moulded arch support
(h)	Insole	Cellulosic Insole 2 ± 0.25 mm .
(g)	Sole	Single density Polyether PU sole with Cleated Design(Traction Pattern) as per IS:5676

	Stitching Thread	Thread No 40/60 2-Ply 100% Nylon. The thread should have a min. breaking strength of 100 N when tested in accordance with BS EN ISO 2062.
(m)	Shank	Fibre Glass of appropriate length as per Para 25 below having width 10 ± 1 mm and thickness of 1.25 ± 0.25 mm. The shank should have longitudinal stiffness of ≥ 400 kN/mm ² when tested in accordance with SATRA TM 58.

CONSTRUCTION

14. The Shoes Black Derby shall be manufactured as per standard manufacturing techniques, some aspects of which is described in the succeeding paragraphs. The illustrative diagram of the shoe has been placed at Appendix "A".

Upper Design

15. Care must be taken in cutting the upper components of the shoes to ensure that the tightness of the synthetic fabric is in heel to toe direction. All upper components shall be fitted and closed in the best commercial practice. All visible edges of the upper components will be properly skived and folded inside the seam stitching to ensure innocuous appearance. A binding of the Napa Leather/Synthetic Patent Leather in matt finish and black colour is to be used for the edges on the eyelet facing and the topline. The binding has to be folded as per the "English Binding" method.

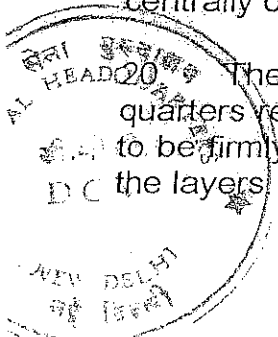
16. The tongue is to be stitched with the vamp using parallel rows of stitching (4-5 mm wide) and so fitted that wrinkles do not occur where it is joined to the vamp. The joining of quarter and vamp shall be done with two rows of stitches (4-5 mm wide). The distance between the two rows of stitching at the facing of the quarters shall not exceed 2 cm, the first row of stitches being 3-4 mm from the edge of the quarter.

17. The end tab of the quarter shall be reinforced with box stitch of 10 mm, placed 3-4 mm wide from the edges. The number of stitches shall be 30-40 per dm. Care shall be taken to maintain the space and uniform tension of the stitching at all places. All seams and stitches shall be properly hammered off and set. All seams/stitching would have to withstand tearing strength of 250 n when tested in accordance with ASTM D5034.

18. The toe and counter stiffeners are to be correctly positioned and aligned prior to moulding. Pre-moulding of the toe and counter shall be done before lasting. The depth of toe stiffeners shall be 55 ± 2 mm, while the counter stiffener is to be 11 mm at the feather line and 6 mm at the top line on either side of the quarters. The indicated sizes are for size 8 and an increase and decrease of upto 2 mm for lower and higher sizes respectively would be allowed.

19. The back joint has to be finished with a Backstrap of wide 25 ± 2 mm for size 8. The dimension of the strap has to increase or decrease by 2 mm per increase or decrease in size respectively. Attention is to be paid to correctly position the backstrap centrally over the back joint and with upright vertical alignment of both edges.

The upper shall be properly laced upto the fourth eyelet before lasting so that the quarters remain in proper alignment on the instep. All upper components and lining are to be firmly extended together to ensure that no air pockets are formed/remain between the layers.



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 श्रीमान् कार्यालय कोषीक
 श्रीमान् कार्यालय कोषीक / Principal Director
 श्रीमान् कार्यालय कोषीक का कार्यालय (दिल्ली)
 Integrated HQ-1601 (Noida) Page 7 of 17

During last stage process it has to be ensured that there are no wrinkles, piping creases or any other kind of deformities in the upper components. The shoe is to be constructed such that it is not possible to remove the insole without damaging the footwear.

22. The shoe shall remain on the last long enough, based on dry/wet atmospheric conditions, to ensure proper shape of the upper and adequate setting of the shoe. Good quality PU adhesive shall be applied on sole. The complete shoe shall be cooled for sufficient time before delasting.

Eyelets

23. The invisible eyelets should be affixed 10 mm (centred) from the edge of the eyelet face. The bottom eyelet has to be affixed 15 mm from the edge of the face and top eyelet should be fixed 10 mm from the top edge of the face/collar. The remaining eyelets should be fixed equidistant between the two. **The eyelets are to be riveted such that the riveted edges on the inside is smooth and has no rough edges when felt.**

TPR Sole

24. The sole has to have cleated sole design (Traction Pattern) as per IS:5676. Design of Sole bottom can be different from that provided in the illustration at Appendix A, however, the overall look, feel and finish has to be as per the sample held with AHSP. The decision of AHSP with regards to the finish of the PU Sole, including side walls, will be final and will override the functional performance as per applicable tests.

25. The non-metallic Shank shall be positioned and fixed centrally with the forward end levels with the ball line and rear end reaching to within approximately 40 mm of the end of the last.

26. The physical dimensions of the sole complex are to be maintained in accordance with clause 5.8.1.1 to 5.8.3 of ISO:20345-2011. For guidance, the following dimensions may be adopted:-

Table 3 : Dimensions PU Sole

S.No.	Description	Thickness (Min)
1.	Thickness of PU sole	1.5 mm
2.	Cleat height at Sole and Heel	1.5 mm
3.	Thickness of side wall of sole when measured from outside in accordance with applicable IS/ISO specs:-	Thickness (Approx)
	(a) At Forepart	10 mm
	(b) At Waist	9 mm
	(c) At Heel	20 mm

TESTS OF COMPLETE FOOTWEAR

27. The specific requirements to be met by the complete shoe would be as laid down at the following table when read in conjunction with the referred clauses of the ISO against each:-

Table 4: Complete Footwear Compliance

Sl.No.	Component	Requirement
(a)	Mass of Whole Footwear	One pair of finished boots of Size 8 should weigh 900 gms maximum, with an increase or decrease of 30 gms for each bigger/smaller size respectively.

(b)	Back Height	Back height of the foot shall be 66-68 mm, for Size 6 with an increase or decrease range of 1.0 mm for each bigger and smaller size, when measured as per Clause 5.2.2 of ISO:20345-2011. The height of upper of each pair shall be equal.	
(c)	Upper/ Outsole Bond Strengths	Clause 5.3.1.2 of ISO:20345-2011	
(d)	Water Penetration and Absorption	Clause 6.3 of ISO:20345-2011	
(g)	Antistatic Footwear	Clause 6.2.2.2 of ISO:20345-2011	
(h)	Energy Absorption of Seat Region	Clause 6.2.4 of ISO:20345-2011	
(j)	Full Shoe Flexing	(i) No Damage to any part of the Shoe upto 3 Lakh Cycles as per SATRA TM 92. (ii) Test is to be repeated for 1 Lakh Cycles after conditioning at 95% RH for 168 Hours) and no damage to any part is to be observed.	
(k)	Tests for Sole Complex		
	(i)	Slip Resistance	Clause 5.3.5.2 of ISO:20345-2011
	(ii)	Cleated Outsole	Clause 5.8.1 of ISO:20345-2011
	(iii)	Resistance to Harsh Environments – Heat and Cold Insulation	Clause 6.2.3.1 and 6.2.3.2 respectively of ISO:20345-2011
	(iv)	Water Resistance	Clause 6.2.5 of ISO:20345-2011
	(v)	Resistance to Hot Contact	Clause 6.4.1 of ISO:20345-2011(120±5° C)
	(vi)	Resistance to Fuel Oil	Clause 6.4.2 of ISO:20345-2011

Workmanship And Finish

28. The Shoes Black Derby shall be free from manufacturing defects/blemishes, any chemical damage and the workmanship and finish throughout shall be of the best quality. The store manufactured shall be delivered in dry and clean condition.

29. The patterns of the quarters, vamp, lining, toe cap and toe puff etc. shall be so designed and shall be correctly fitted in such a way that these do not form excessive pleats at toe and counter regions during lasting.

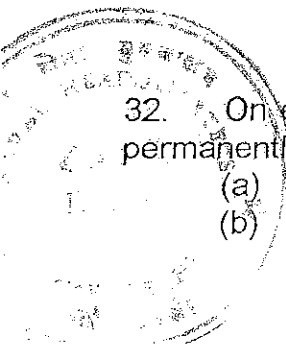
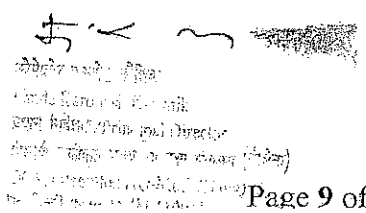
30. The stuck-on sole should be free from sole and heel flashes and shall be neatly trimmed smooth. There should be no blowholes or shrinkage or warpage in any part of the sole. The quality of the sole is indicated by the finishing/appearance/clarity mock-design of stitches/ridges on the flares of the sole and, hence, the quality of the dies used for the pre-moulded soles should be high with their usage life being of vintage which is within standard industry benchmarks.

31. In appearance, the general workmanship, feel, finish and shade of the Shoes Black Derby shall conform to the standard pattern held in the custody of AHSP.

MARKING

32. On each Shoe, at the waist of the outer sole, the following shall be clearly and permanently marked, e.g. by embossing or branding:-

- (a) Size
- (b) Name/Trade Mark of Manufacturer



- (c) Make & Year of Manufacture
- (d) Country of Manufacture
- (e) Number and Edition of Standards
- (f) Symbol Markings of 'A', 'HI', 'E', 'CI', 'WR', 'HR', 'OR' and 'NS'. The above markings could also be included through the use of applicable pictograms.

33. In addition a Taffeta Label with woven markings as at SI(a) to (d) is required to be stitched at the base of the tongue on the inner side on top of the lining material. Further, each pair of the footwear is to be supplied with a leaflet containing the following information as indicated at Clause 8.1 of ISO:20345-2011:-

- (a) Name and full address of the manufacturer and of his authorised representatives in India.
- (b) Explanation of the Symbol markings/pictograms marked on the sole.
- (c) Instructions for safe use, storage and maintenance, including maximum periods between maintenance check and procedures.
- (d) Instructions for cleaning and/or decontamination
- (e) Caution notice as follows:-

CAUTION NOTICE

"Antistatic footwear cannot guarantee an adequate protection against electric shock as it introduces only a resistance between foot and floor. The electrical resistance of this type of footwear can be changed significantly by flexing, contamination or moisture. The footwear will not perform its intended function if worn in wet conditions. Where the antistatic footwear is in use, the resistance of the flooring should be such that it does not invalidate the protection provided by the footwear.

In use, no insulating elements should be introduced between the inner sole of the footwear and the foot of the wearer. The footwear has been tested with the removable insock in place, therefore, the footwear is to be used only with the original insocks in place and the insock should be replaced by a comparable insock supplied only by OEM."

QUALITY ASSURANCE

34. The Shoes Black Derby shall be manufactured only by Manufacturers who have their manufacturing/production facilities certified under relevant Quality Management Systems (QMS). The QMS has to be as per certified by authorised agency and should be valid and in-date. The purchaser may seek supply chain certification of the raw materials used in the manufacture of the stores against any specific order referring to this specification.

35. The stores shall conform to the requirements when tested in accordance with the method mentioned against each in the specification. Pilot samples shall be forwarded to AHSP from bulk supplies to check/monitor the quality of store whenever required. If stipulated in the contract, the manufacturer shall submit prescribed numbers as advance sample at AHSP for clearance by the Inspection Authority before commencement of Bulk Production.

36. Manufacturers/ Contractors must satisfy themselves first by carrying out thorough pre-inspection of each lot/ batch that the stores manufactured are in accordance with the contract and fully conform to the specification, before tendering to QA officer nominated under the terms of contract. It is mandatory of the manufacturers to give Certificate of Conformity from respective OEM's of the raw materials, wherever desired by AHSP,

The A/SF reserves the right to check such items and also with the OLM to determine the validity of the certification

37. A declaration by the Contractor that necessary pre-inspection/ tests have been carried out on the stores tendered and the same are fit for inspection and test shall be rendered along with the challan. The declaration shall include the method followed in pre-inspection showing features checked / tested and the test reports be submitted along with challan.

SAMPLING AND CRITERIA FOR CONFORMITY

38. The safety boot pairs of the same description nomenclature and of the same batch belonging to one size and fitting or a set of sizes and fittings offered against one challan shall constitute a lot. **The lot size shall not exceed 10 (Ten) thousand pairs.**

39. In all cases samples shall be drawn using technique of random sampling as per **IS: 4905**. The sampling officer shall first draw the samples for visual, dimensional, and construction parameters and for compliance to approved sample as per Column 3 & 4 of the Table-6 appended below.

40. If found satisfactory on examination as above, the officer may draw (out of it) and send samples for lab testing as per Column 5 & 6 of Table-6. The samples so drawn shall be subject to testing. If found satisfactory, the lot shall be accepted and inspection report shall be prepared.

Table-5: Sampling Plan

S. No.	Lot Size in Pairs	For Visual, Dimensional, Constructional Parameters and compliance to approved sample		For Laboratory Testing for Physical and Chemical Parameters	
		Number of samples to be drawn	Permissible no. of non-conforming samples	Number of samples to be drawn	Permissible no. of non-conforming samples
(1)	(2)	(3)	(4)	(5)	(6)
(a)	Up to 2500	50	5	3	0
(b)	2501 to 5000	90	8	5	0
(c)	5001 to 8000	150	14	7	1
(d)	8001 to 10000	200	20	10	1

PACKING

41. Each pair of shoes shall be wrapped in tissue paper and shall be packed in a 3-Ply corrugated carton/LDPE box that will form a unit pack. A paper label with Nomenclature, Manufacturer's name/ Trade mark, Size and Month and Year of Manufacture shall be securely pasted on front of the unit box, which shall be clearly readable. Each individual pair of shoes to contain a Silica Gel or Other Moisture absorbing agent or Dessicant within the individual packing box to ensure added protection from Moisture related damage to the PU Components (Check the net for specifications).

5-1-2011
 Director
 State Project Director
 State Project Director
 State Project Director

Each e number of shoes is to be packed in one. The packages should be strong enough to withstand transit hazards and to the satisfaction of inspecting

43. The Carton, thereafter shall be sealed with adhesive tapes and tape bound with polypropylene tapes. Each package shall be legibly marked with:-

- (a) Nomenclature of the store and Quantity packed in the package.
- (b) Lot and serial No. of the package.
- (c) Month and year of manufacturer.
- (d) Gross mass of the package in kg.
- (e) Name and address of the consignee.
- (f) Name and recognized trade mark of the supplier.

WARRANTY

44. Except as otherwise provided in the invitation to the tender, contractor/supplier shall declare that the Shoes supplied to the purchaser against this specification is of best quality and workmanship and new in all respect and is strictly in accordance with the laid down specifications.

45. The contractor/supplier shall guarantee that the Shoes would continue to conform to the aforesaid description and quality, including all physical and chemical parameters for all parts of the shoes, for a period of **twelve months** from the date of delivery of the Shoes to the purchaser or **fifteen months** from the date of despatch from the supplier's premises, whichever is earlier and notwithstanding the fact that the purchaser (Inspector) may have inspected and /or approved the consignments.

46. If during the aforesaid period of 12/15 months the said consignment is discovered not conforming to the description and quality aforesaid or not giving satisfactory performance or have deteriorated and the decision of the purchaser in the behalf shall be final and binding on the contractor/supplier to rectify/replace by acceptable goods or such portion or portions thereof as is found to be defective by the purchaser within a reasonable period not exceeding three months or as decided by the purchaser.

47. In such an event the warranty period shall apply to the shoes replaced from the date of replacement or otherwise the contractor/supplier shall pay the purchaser, such compensation as determined by the purchaser as may arise by reason of breach of the warranty contained herein.

Shelf Life

48. All PU Components and the Synthetic Patent Upper material would have a shelf life of approximately 12 months. Therefore, precautions should be taken to ensure that the shoes are put in use as early as possible, **but not later** than 12 months after the manufacture of the soles.

Suggestion for Improvement

49. Any suggestion for improvement of this document may be forwarded to:-

The Principal Director of Clothing & Victualling,
Integrated Headquarters of Ministry of Defence (Navy)
Sena Bhawan, DHQ Post, New Delhi - 110 011



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Appendix - "A"

Diagram - 1: Outer Side Of Shoes, Derby, Synthetic Patent, Black

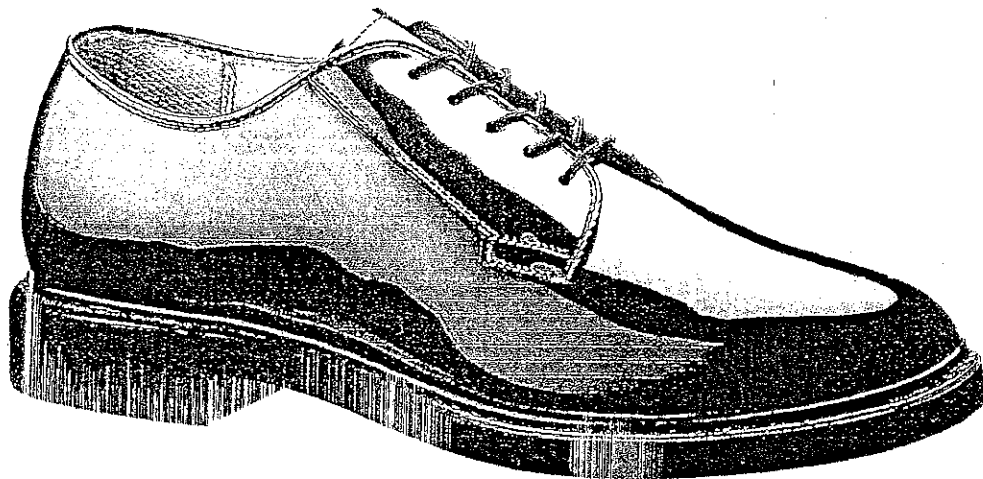
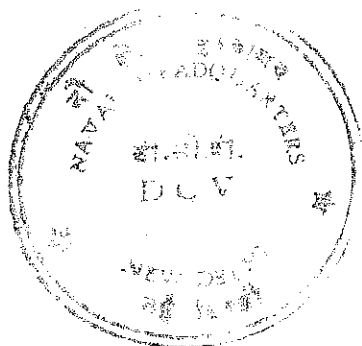
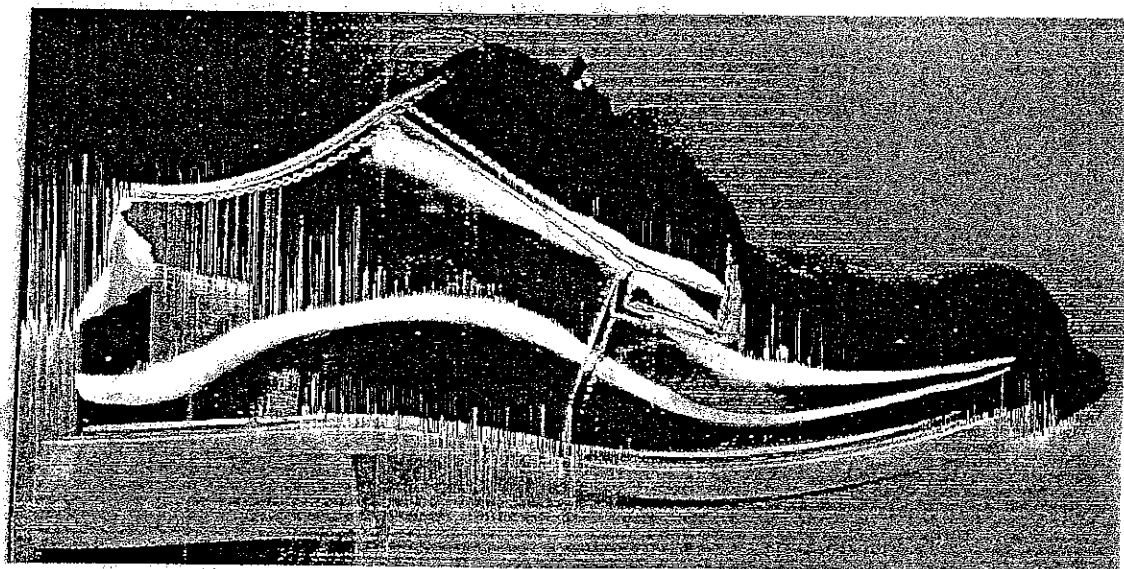


Diagram - 2: Inner Side Of Shoes, Derby, Synthetic Patent, Black



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சென்னை, தமிழ்நாடு சட்டமன்றப் பேரவை
தலைவர் அலுவலகம் / Principal Director
சட்டமன்றப் பேரவை அலுவலகம் (தலைவர்)
சட்டமன்றப் பேரவை அலுவலகம்
சட்டமன்றப் பேரவை அலுவலகம்

Appendix - "B"

CRITERIA FOR PHYSICAL AND CHEMICAL PROPERTIES

(Items marked * are to be strictly adhered to. All other properties values are for guidance.)

Table-1: Synthetic Patent Upper For Vamp, Quarters and Tongue

S.No.	Component	Requirement	Test Method
(a)	*Material Blend Composition	100 % PU Coated Non-Woven Synthetic Patent with Drill Cotton Lining as per SI(p)	Bielsten Method would be used to confirm absence of any PVC content
(b)	Colour	Jet Black Shade	Pantone TCX
(c)	*Gloss Levels	≥ 75 Sample : 70x15 mm from Vamp Angle of Reading: 60 Deg	Any COTS Glossmeter
(d)	*Thickness	1.4 ± 1	SATRA TM 1
(e)	*Mass (gm / m ²) (including Drill Cotton Lining)	$1600 \pm 5\%$	IS: 1964
(f)	*Tear Strength in N, Min. (a) Warp (b) Weft	100 80	IS:7016 Part-3
(g)	Elongation in % age	20 % (min)	IS: 1670
(h)	pH Value	≥ 3.5	Clause 5.4.7 of ISO:20345-2011
(i)	Flexing Endurance(Dry Test at 20° C)	No crack/delamination after 100,000 Cycles	SATRA TM 25
(j)	Wet Flex (After soaking in water 24 Hours and 85,000 cycles of flexing)	No cracks, delamination or bubbles of more that 5 mm in diameter	SATRA TM 25
(k)	Tensile Strength	17 N/mm ²	ISO 3376
(l)	Adhesion of Finish	No film delamination was observed in both condition (Dry & Wet)	SATRA TM 148
(m)	Break Pipiness Test	Min 3-4	SATRA
(n)	Resistance to Delamination after ageing at 95% RH for 168 Hours	No crack/film delamination till 7 days	SATRA TM 344
(o)	*Hydrolysis	Pass	Clause 5.4.8 of ISO:20345
(p)	*Drill Cotton Bleached Lining	Conforming to IS:177 Variety No.4 with Bond Strength of 0.8 Kg/cm as per SATRA TM 411	

Table-2 : Non-Woven Lining Material

Sl.No.	Parameter	Requirement	Test Method
(a)	*Blend Composition	Cambrelle Lining with PU Foam and Needle Punch	IS: 11195
(b)	*Weave	Non Woven	Visual
(c)	*Thickness	0.7 mm (min.)	SATRA TM 27
(d)	*Mass (gm / m ²)	$300 \pm 5\%$	IS: 1964
(e)	*Tear Strength in N, Min	15	Clause 5.5.1 of ISO:20345-2011

(g)	*Abrasion Martindale. Min	25,600 Cycles (dry) 12,800 Cycles(wet)	IS: 2454 IS: 984 / IS:764 IS: 971
(h)	Colour Fastness a. Light b. Washing c. Perspiration	4 or better 4 or better 4 or better	IS: 2454 IS: 984 / IS:764 IS: 971
(j)	*Anti-Microbial Properties for Staphylococcus Aureus (AATCC 6538) and Klebsiella Pneumonia (AATCC 4352)	90% Reduction of both bacteria.	AATCC 100-2004 (Using Nutrient Agar)
(k)	*Water Vapour Permeability	Min 30 mg/cm ² per hour	BS EN 344-1 - Sect 5.13
(l)	*Water Vapour Coefficient	Min 250 mg/cm ²	BS EN 344-1 - Sect 5.13

Table 3 : Brass Eyelets(Hidden)

Sl.No.	Parameter	Requirement	Test Method
1.	Breaking Strength	Min 250 N	SATRA TM 149
2.	Peeling Strength	Min 250 N	SATRA TM 150
3.	Atmospheric Sulphide Tamishing & Salt Water Corrosion	Min Grade 4	SATRA TM 310
4.	Raw Material	Brass (Cu:Zinc::63-67:37-33)	ISO 426/1

Table-4 :Laces

Sl.No.	Parameter	Requirement	Test Method
(a)	Material & Construction	100% Nylon	IS:11195
(b)	Breaking Strength	Min 500 N	SATRA TM 94 or BS 5131-Sec 3
(c)	Abrasion Resistance (Against Itself and Against D-Ring)	10,000 Cycles	SATRA TM 154
(d)	Ability To Retain Knots	Pass	SATRA TM 195

Table-5: Insock

S.No.	Parameter	Requirement/Norm	Test Method
(a)	*Composition	100% Virgin PU with density of 0.4 ± 0.05 gm/c	IS: 11195
(b)	*Thickness	Min 2 mm at forepart and min 8 mm at heelpart	Clause 5.7.1 of ISO:20345-2011
(c)	Top Wearing Surface	100 % non-woven Polyamide	IS: 11195
(d)	*Anti-Microbial Properties For Top Wearing Surface	As provided at Sl(j) of Table 2 above.	
(e)	Abrasion Resistance	Clause 5.7.4.2 of ISO:20345-2011	

Table-6: Insole

S.No.	Parameter	Requirement/Norm	Test Method
(a)	*Blend Composition	100% Polyester with HDPE Coating on one side	IS: 11195
(b)	*Wet Tensile Strength	7.0 Mpa	SATRA TM 2
(c)	Flexing Index	3.7	SATRA TM 3

	Marindale Abrasion	Loss in 60 mm ³ volume loss after 1024 revs)	SATRA TM 31
		No worse than Moderate Wear and Moderate Pilling (after 25600 cycles dry or 6400 cycles wet)	SATRA TM 31 Method A
(f)	Stitch Tear Strength	70N/mm	SATRA TM 5
(g)	Peel Strength	0.5N/mm	SATRA TM 101
(h)	Transverse Tensile Strength	Dry 500kPa Wet 350kPa	SATRA TM 80
(i)	Dimensional Change with Moisture Content	Maximum 1.5%	SATRA TM 98
(j)	Lasting Hot Melt Adhesion	0.4N/mm	SATRA TM 401
(k)	Microbial Deterioration after 14 days Burial	Maximum 100 (mm ³ volume loss after 1024 revs)	SATRA TM 14
	Followed by: Wet Scuff Resistance Or Martindale Abrasion	No worse than Moderate Wear and Moderate Pilling (after 25600 cycles dry or 6400 cycles wet)	SATRA TM 31 Method A
(l)	*Antistatic Value	Clause 4.3.4.2 of IS:15298 Pt I	
(m)	*Water Absorption/Desorption	Clause 4.7.3 of IS 15298 Pt I	
(n)	Abrasion Resistance	Clause 4.3.4.2 of IS:15298 Pt I	
(o)	pH Value	Clause 4.7.2 of IS:15298 Pt I	

Table-7 : Out Sole

Sl.No.	Parameter	Requirement	Test Method
(a)	*Material	Polyether PU Sole	1. Prepare 45% KOH solution. 2. Heat solution upto 70 Deg Centigrade and maintain temperature. 3. Stir the solution and put PU Specimen into the same. 4. After 1 Hr check for following:- (i) If Specimen disintegrates it is Polyester PU (ii) If Specimen does not disintegrate is is Polyether PU.
(b)	Hardness Original	50-55 Shore A	SATRA TM 205
(c)	Moulded Density	0.55 g/cc	SATRA TM 134
(d)	*Tear strength	>5 Kn/m	Clause 5.8.2 of ISO:20345
(e)	*Tensile Strength (Min)	30 kg/cm ²	SATRA TM 137
(f)	*Elongation At Break(Min)	250%	SATRA TM 137
(g)	*Abrasion Resistance(Max)	250 mm ³	Clause 5.8.3 of ISO:20345
(h)	*Upper/ Outsole and Sole Interlayer Bond Strengths(Min)	4 N/mm	SATRA TM 411
(i)	*Bennwart Flexing Test	Max 6 mm cut growth till 1 Lakh cycles	SATRA TM 161

	*Volume Set (Max)	200	SATRA TM 63
(k)	*Compression Set (Max)	20%	SATRA TM 64
(l)	*Hydrolysis	Pass	Clause 5.8.5 of ISO:20345-2011
(m)	*Resistance To Flexing	No adhesive bond opening/no crack of sole till 100000 cycles	SATRA TM 92

Table-8 : Tests For Thermoplastic Toe Puff and Counter Stiffner

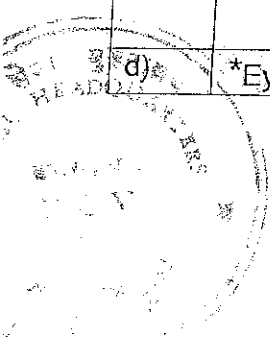
Sl.No.	Parameter	Requirement / Norm	Test Method
(a)	*Thickness (extracted from boot)	1.2 to 1.4 mm	SATRA TM 27
(b)	*Peel strength ¹ (N/mm)	Min 0.5	SATRA TM 401
(c)	*Shape retention of toe caps of finished footwear :- (a) After First Collapse (b) After V th Collapse (c) After 2 hrs recovery	(a)18% (b)21% (c)21%	SATRA TM 86/83

Note :

- Best Results are achieved after bonding to upper at 180 °C and 200 kPa.
- Resilience is percentage retention of initial collapsing load after ten collapses
- Moisture Resistance is percentage retention of initial dry collapsing loads after 1 hr immersion.

Table-9: Tests For Chemical Substances

S.No	Material	Test	Norm	Test Method
(a)	*All Leather & Lining Components including insole/ Insocks	Azo Free dyes	SG Criteria	ISO 17234, ISO 14362
		Chlorinated Phenols (PCP/TCP/TeCP/OPP)	SG Criteria	ISO 17070
		Cr-6	SG Criteria	ISO 17075
		Heavy Metals extractable	SG Criteria	ISO 105 E04/1CP
		Formaldehyde	SG Criteria	ISO 17226
(b)	*Polyester Laces	Azo Free Dyes	SG Criteria	ISO 17234 ISO 14362
		Chlorinated Phenols (PCP/TCP/TeCP/OPP)	SG Criteria	ISO 17070
		Dispersed dyes allergenic & carcinogenic	SG Criteria	DIN 54231
		Formaldehyde	SG Criteria	ISO 17226
		Phthalate	SG Criteria	Solvent Extraction/ GCMS
(c)	*Sole Complex	Organotins Compounds (TBT/DBT/MBT)	SG Criteria	ISO 17353
		Lead	SG Criteria	EN 1122
		Cadmium	SG Criteria	EN 1122
		Nickel free	SG Criteria	DIN EN 12471
(d)	*Eyelets	Nickel free	SG Criteria	DIN EN 12471



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