

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

INDIAN NAVY SPECIFICATION

ON

BOOT, ANKLE, TEXTILE, JUNGLE  
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(NOTE: THIS SPECIFICATIONS CONTAINS 14 PAGES INCLUDING THIS PAGE)

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## 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 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 similar products available with reputed Indian manufacturers and exporters and has been vetted by FDDI, Noida. This specification has been prepared by the Directorate of Clothing and Victualling on the authority of Controller of Logistics, Indian Navy. 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 specifications and any sample or pattern, loaned 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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## SCOPE

7. This specification covers the requirement of Boot, Ankle, Textile, Jungle with Direct Moulded PU-TPU Sole in sizes 5 – 12. These boots are to be made with bucket type sole having Polyether Polyurethane(PU) midsole & Thermo Plastic Urethane(TPU) outer sole by Direct Moulded Process.

8. This specification covers the material requirements, construction particulars and overall shoe general requirements used in the manufacture of Boot, Ankle, Textile, Jungle with PU-TPU Sole.

## REFERENCES

9. Reference is made in this specification to the following

**Table 1 : Applicable Documents**

<u>Sl.No.</u>	<u>Specifications</u>	<u>Description</u>
(a)	IS: 2050-1991	Glossary of terms relating to footwear. For the purpose of this specification the definitions and terminology given in IS:2050-1991 are applicable.
(b)	IND/TC/0304	Laces Nylon Black
(c)	IS: 5041-1978	Specification for Footwear and Stationery Eyelets
(d)	IS:4905-1968	Method of random sampling
(e)	IS: 15298 Part-IV or ISO:20347.	Requirements and test methods for Safety, Protective and occupational footwear for professional use. That document would be applicable whose edition is most latest wrt the date of such tender or contract referring to this Specification
(f)	IS:3442	Method for determination of count of yarn of woven fabrics
(g)	IS:1963	Method of determination of threads per unit length in woven fabrics
(h)	IS:1969	Method of determination of breaking load and elongation at break of woven fabric

10. The Standards mentioned above or anywhere in this specification contain provisions which through reference in this text, constitute provisions of this standard. In case of any discrepancy/contra-indication the interpretation of the buyer will be considered to be final. For the purpose of this specification, the terminology, definitions and symbols given in the relevant applicable standards shall apply.

## STANDARD PATTERN

11. The standard pattern of Boot shall be made to derby design on broad toe and padded collar, on broad-toe 'H' fitting last with stroble construction and directly moulded PU-TPU sole. 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 boot is as indicated at the following Table 2. The physical and chemical properties of the same have been placed at Appendix 'B'.

**Table 2 : Material Description**

<u>Sl.No.</u>	<u>Component</u>	<u>Requirement</u>
(a)	Upper	The upper shall consist of 100% Polyester Fabric in Rip-stop Weave. The colour/shade of outer layer fabric shall be of Digital Camouflage Print with Green, Brown and Black pixels on a Khaki base. Illustrative diagram for Camouflage Print has been placed at Appendix 'A'
(b)	Lining	100% Polyamide Non-Woven material (Cambrelle type) with anti-microbial in nature as defined at Appendix 'B'.
(c)	Foam Insert	Polyurethane Foam with 30 Density and Min 5 mm Thickness
(d)	Binding Materials	All Upper components are to bound with 100% Polyester of 200 GSM $\pm$ 5% in Black Colour of best trade quality, with colour fastness to washing and light of Grade 4 or better.
(e)	Toe Puff and Counter	Stiffeners of Thermo plastic material of minimum thickness 1.2-1.4 mm & 1.6-1.8 mm respectively shall be used.
(f)	Eyelets	8 nos. Black Anodised Aluminium Eyelets as per IS: 5041-1978 of size no. 7.5 + 0.5 mm collar diameter to be fitted on each face. Eyelets of same material and suitable size are to be fitted on the inner side of the shoe upper near the arch as vent holes for improved breathability.
(g)	Insole	Insole will be non-woven polyester fabric in Gray/Black or Two-Toned with thickness of 2 to 2.5 mm.
(h)	Insock	The boots have to be supplied with anatomically moulded full insock with arch support made from virgin PU material with density of 0.4 $\pm$ 0.05 gm/cc and having thickness Min 2 mm forepart and Min 5 mm at heel. The top of the insock will be adhered with 100 % Polyamide material with anti-microbial properties as defined at Appendix 'B'.
(i)	Laces	Each pair of boots shall be provided with a pair of Nylon Black Laces of 130 cm long.
(k)	Midsole	The directly moulded midsole will be of Polyether based PU with properties as defined at Appendix 'B'.
(l)	Outsole	The directly moulded outsole is to be with distinct heel design and flat sole design will not be accepted. Diagram of tread design at Appendix 'A' is for illustrative purposes only.
(m)	Stitching Thread	TKT No.40/60 2-Ply 100 % Polyester/Nylon.

### CONSTRUCTION

14. The Boot, Ankle, Textile, Jungle PU-TPU Sole shall be manufactured as per standard manufacturing techniques, some aspects of which is described in the succeeding paragraphs.
15. The Vamp, Quarter and Tongue is to be made from the upper material. The tongue shall be full bellows with cushion & lining and stitched with the vamp. The joining of quarter and vamp shall be done with two rows of stitches. The tab shall be reinforced with two parallel rows of stitches at a distance of 4 to 5 mm away from the face stitching and in the manner illustrated in the drawing. The length of tab stitches shall be between 10 to 12 mm.
16. The toe cap and arch piece shall be of Black colour Chrome-Tanned CG Leather of thickness of  $1\text{mm} \pm 0.1\text{ mm}$ . The toe cap and arch piece is to be adhered to the upper and their edges have to be fixed with one row of stitches after proper skiving of the edges for a flush fitting. Toe puff and stiffener components are to be correctly positioned and aligned prior to moulding.
17. The length of Toe Cap shall be  $55 \pm 2\text{ mm}$  for size 8 with increase or decrease of 2 mm per size shall be reinforced with two rows of stitches to the vamp to cover the entire toe portion. The length of Arch piece, measured as the radius of the visible portion above the sole, shall be  $30 \pm 2\text{ mm}$  for size 8 with increase or decrease of 2 mm per size. Two number eyelets of Black Anodised Aluminium Metal of suitable size are to be fitted at the centre of the visible portion of the Arch Piece as vent holes for improved breathability.
18. Inside counter lining shall be of upper material. All upper components and lining are to be firmly adhered together using flexible adhesive with the foam insert between them.
19. The back seams shall be reinforced with 25 mm wide upper fabric and the edges shall be folded inside having inside turning of 12 mm on each side. The reinforcement shall also form a loop as shown in the drawing at Page 10.
20. 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.
21. The TPU outer sole has to be of translucent finish. The sole and heel flashes shall be neatly trimmed smooth. There should be no blowholes or shrinkage or warpage in any part of the sole. The physical dimensions of the sole complex are to be maintained as follows:-

**Table 3 : Dimensions of PU-TPU Sole**

S.No.	Description	Thickness
1.	Minimum Thickness of TPU sole	1.5 mm
3.	Thickness of composite sole when measured from outside with side wall in accordance with applicable IS/ISO as per Para 7(e):-	
	(a) At Forepart	20 mm (Min)
	(b) At Waist	16 mm (Min)
	(c) At Heel	35 mm (Min)

## TESTS OF OCCUPATIONAL FOOTWEAR

22. The specific occupational requirements to be met by the complete shoe would be as laid down at the following table when read in conjunction with the applicable IS/ISO referred to in accordance with Para 7(e) above.

**Table 4 : Occupational Requirements**

Sl. No.	<u>Component</u>	<u>Requirement</u>
(a)	Mass of Whole Footwear	The Mass of one pair of finished boots of Size 8 shall be 850 gms $\pm$ 50 gms with an increase or decrease of 50 gms for each bigger or smaller size respectively.
(b)	Height of Upper	The Height of Upper(Back Height) of the boot shall be 150 $\pm$ 2.5 mm, for Size 8 with an increase or decrease by 2.0 mm for each bigger and smaller size, when measured from the inside of the back of the boot insole to the top line. The leg height of each pair shall be, however, be equal.
(c)	Upper/Outsole Bond Strength	The bond strength between upper & midsole and midsole & outer sole shall be not less than 4.0 N/mm.
(d)	Water Resistance, Penetration and Water Absorption	Requirements to be as per the relevant reference in the applicable standards document in accordance with Para 7(e) of this specification.
(e)	Water Vapour Permeability and Co-Efficient of Upper and Lining	
(f)	Leak-proofness	
(g)	Tests for Sole Complex	
(i)	Anti-Staticity	Requirements to be as per the relevant reference in the applicable standards document in accordance with Para 7(e) of this specification.
(ii)	Energy Absorption of Seat Region	
(iii)	Resistance to Harsh Environments – Heat and Cold Insulation	
(iv)	Anti-Slip	
(v)	Hydrolysis Test	The Boots shall be placed in RH of 100% at a temperature of 70° C for 5 days and then tested for whole shoe flexing for 100000 cycles. No Crack or damage to the sole or bonding with upper is acceptable.



23. The requirement for tests for presence of harmful chemicals are as follows:-

**Table 5 : Tests For Chemical Substances**

<u>Sl.No.</u>	<u>Material</u>	<u>Test</u>	<u>Quality Norm</u>	<u>Test Method</u>
(a)	Upper And Lining Material	Azo dyes	IS 14898	LC : 4 of IS 14816/ ISO 17234/ ISO 14362
		Pentachlorophenol (PCP)	IS 14898	IS 14575/ ISO 17070
(b)	Sole and all Polymeric materials	Phthalates	SG Criteria	Solvent extraction/ GCMS
		Lead	IS 12254	IS 12240 (Part 5)/ EN 1122
(c)	Metal parts eg eyelets, buckles , zip etc	Nickel free	SG Criteria	DIN EN 12471

**Workmanship And Finish**

24. The Boot, Ankle, Textile, Jungle PU-TPU Sole shall be free from manufacturing defects, such as pleats, piping, sole flashes, etc. and shall also be free from any chemical damage. The store manufactured shall be delivered in dry and clean condition.

25. In appearance, the general workmanship, feel, finish and shade of the Boot, Ankle, Textile, Jungle PU-TPU Sole shall conform to the standard pattern held in the custody of AHSP.

**MARKING**

26. Each boot shall have the "Name/Trade Mark of Manufacturer", "Size of Boot", "Month & Year of manufacture" and all other applicable markings as per applicable IS /ISO document on the waist of outer sole, during moulding.

27. In addition a Taffeta Label with woven markings as in above and necessary caution information on maintenance and usage care is required to be stitched at the base of the tongue on the inner side on top of the lining material.

**QUALITY ASSURANCE**

28. The Boot, Ankle, Textile, Jungle 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.

29. 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.

30. 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.

31. 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

32. The jungle 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.**

33. 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.

34. 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-6: 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 6000	90	8	5	0
(c)	6001 to 10000	150	14	7	1

## PACKING

35. Each pair of boots shall be wrapped in tissue paper and shall be packed in a 3-Ply corrugated 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.
36. Suitable number of unit packs shall further be packed in one 7-Ply corrugated carton strong enough to withstand transit hazards and to the satisfaction of inspecting officer.
37. 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.
  - (b) Quantity packed in the package.
  - (c) Lot and serial No. of the package.
  - (d) Month and year of manufacturer.
  - (e) Gross mass of the package in kg.
  - (f) Name and address of the consignee.
  - (g) Name and recognized trade mark of the supplier.

## WARRANTY

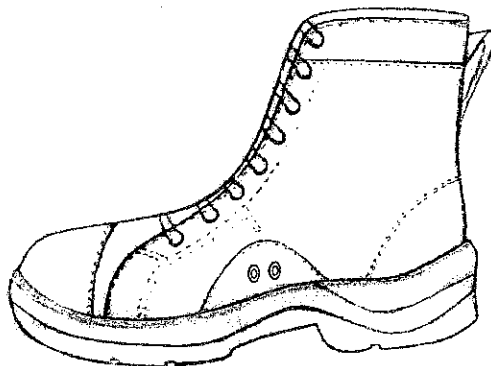
38. Except as otherwise provided in the invitation to the tender, contractor/supplier shall declare that the Shoes supplied to the purchaser against this specification is of best quality and workmanship and new in all respect and is strictly in accordance with the laid down specifications.
39. The contractor/supplier 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.
40. 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.
41. 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.

## Suggestion for Improvement

42. 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

**Appendix – “A”**

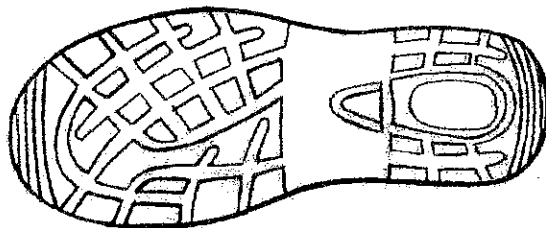
**Diagram - 1: Inner Side Of Boot, Ankle, Textile, Jungle**



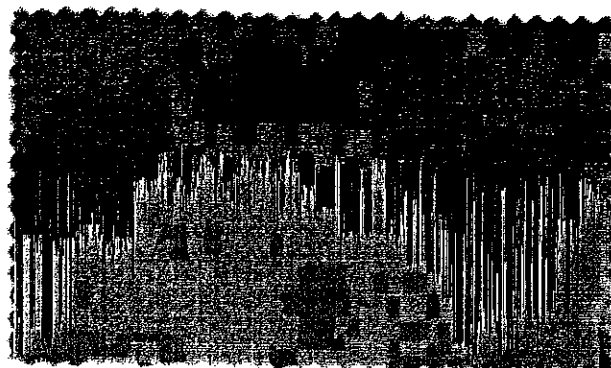
**Diagram - 2: Outer Side Of Boot, Ankle, Textile, Jungle**



**Diagram - 3: Illustrative Tread Design For Outsole**



**Diagram - 4: Illustrative Design For Outer Fabric**



**Appendix – “B”****PHYSICAL AND CHEMICAL PROPERTIES****Table-1: Upper Material**

S.No.	Parameter	Requirement/Norm	Test Method
(a)	Blend Composition	100% Polyester	IS: 11195
(b)	Weave and Print	Rip-stop with Digital Camouflage Print with Green, Brown and Black pixels on a Khaki base.	Visual(Dimensions of the Rip-stop Cell)
(c)	Yarn Linear Density and Ends/Picks For guidance	300 Denier Ends: 80 Picks :60	IS:3442 and IS:1963(1981)
(d)	Mass (gm / m <sup>2</sup> )	225 ± 5%	IS: 1964
(e)	Breaking Load in N, Min. (5x20 cm strip) a. Warp b. Weft	1000 800	IS: 1969
(f)	Elongation in % age	20 % (min)	IS: 1670
(g)	Tear Strength in N, Min. a. Warp b. Weft	100 80	IS:7016 Part-3
(h)	pH Value	6.0 – 8.5	IS:1390 (Cold method)
(j)	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

**Table-2: Insole**

S.No.	Parameter	Requirement/Norm	Test Method
(a)	Blend Composition	100% Polyester with HDPE Coating on one side	IS: 11195
(b)	Antistatic Value	0.1 MΩ to 1000 MΩ	Applicable ISO/IS Specification as per Para 7(e)
(c)	Water Absorption And Desorption	Absorption not less than 70 mg/cm <sup>2</sup> and Desorption not less than 80% of water absorbed.	Applicable ISO/IS Specification as per Para 7(e)
(d)	Abrasion Resistance	Insole should not be damaged before 400 Cycles	Applicable ISO/IS Specification as per Para 7(e)

**Table-3 : Non-Woven Lining Material**

Sl. No.	Parameter	Requirement / Norm	Test Method
(a)	Blend Composition	Nylon: 100%	IS: 11195
(b)	Weave	Non Woven	Visual
(c)	Thickness	0.7mm (min.)	-
(d)	Mass (gm / m <sup>2</sup> )	150 ± 25	IS: 1964
(e)	Tear Strength in N, Min	15	IS: 7016 Part 3
(f)	Mullen Burst in Kg / cm <sup>2</sup>	4(min)	IS:7016 Part-6/ IS:1966 Part-1
(g)	Abrasion Martindale, Min	25,600 Cycles (dry) 12,800 Cycles (wet)	Applicable ISO/IS Specification as per Para 7(e)
(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)	Overall Moisture Management Capability Value	≥0.75	AATCC 195

**Table 4 : TPU Sole**

Sl.No.	Parameter	Requirement / Norm	Test Method
1.	Hardness	60 to 70 Shore 'A'	SATRA TM 205
2.	Moulded Density in Kg / m <sup>3</sup>	1200	SATRA TM 134
3.	Tear strength in kN/m, Min	8	Applicable ISO/IS Specification as per Para 7(e)
4.	Abrasion Resistance Relative Volume Loss, Max.	150 mm <sup>3</sup>	
5.	Flexing Resistance	Cut growth shall not be greater than 4 mm before 30,000 flexes	Ross Flex Test
6	Flexing Resistance	Cut growth in mm/1000 cycles At -5°C and At -18° shall not be more than 0.03 mm	
7	Colour	Translucent White	

**Table 5 : Polyether Based PU Mid Sole**

Sl.No.	Parameter	Requirement / Norm	Test Method
1.	Hardness	40 to 50 Shore 'A'	SATRA TM 205
2.	Moulded Density in Kg / m <sup>3</sup>	430 to 500	SATRA TM 134
<b>Note:</b> Only Basic test for Midsole since it is not the functional sole exposed to the outside. However, vendor has to certify that all relevant requirements of applicable IS/ISO as per Para 7(e) is to be met.			