

**SPECIFICATIONS FOR SPECIFICATION FOR VEST THERMAL  
CONTENTS**

<b>IT EM</b>	<b>SUBJECT</b>	<b>PA GE NO</b>
0	FORWARD	1
1	SCOPE	2
2	MATERIAL AND MANUFACTURE	2
3	STITCHING	4
4	WORKMANSHIP AND FINISH	5
5	SEALED SAMPLE	5
6	REQUIREMENTS	5
7	SAMPLING	9
8	MARKING	11
9	PACKAGING & PACKING	11
10	REFERENCES	13
	ANNEX -1	14

SPECIFICATION FOR SPECIFICATION FOR VEST THERMAL

RECORD OF AMENDMENTS

Amendment No. and Date	Amendment pertains to SI.No./Para No./Column No.	Authority	Amended by Name and Appoinment (in block letter)	Signature and Date

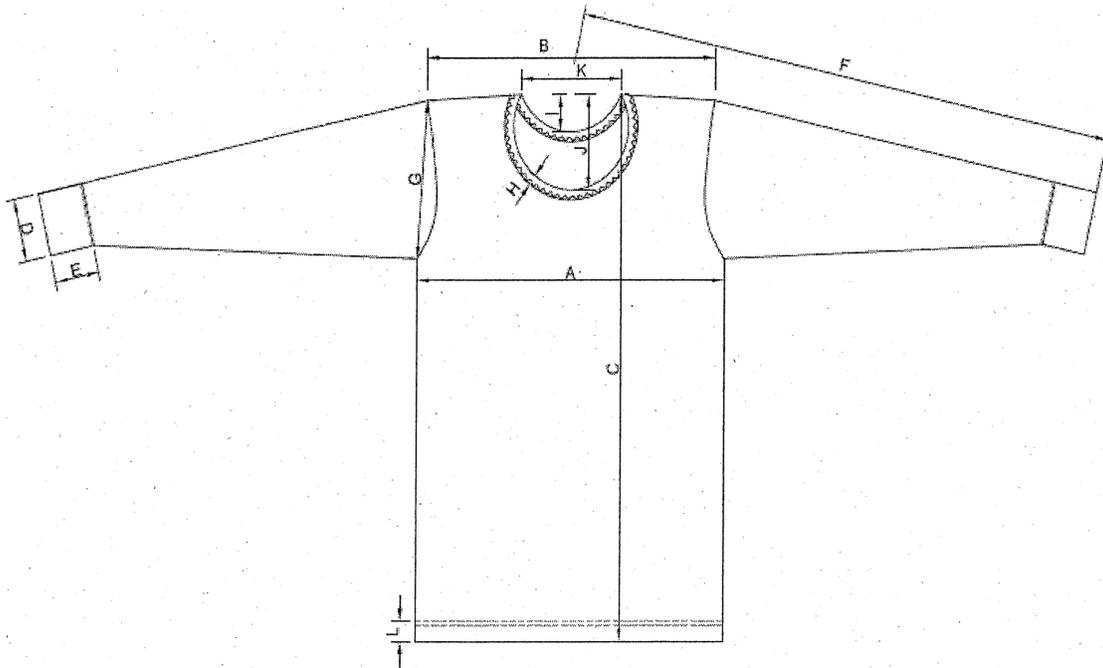
**0.0 FORWARD**

0.0 This specification has been prepared by Office of the Directorate General of Police, CRPF on the authority of The Director General of Police, CRPF.

- 0.1 This specification is for use by the CRPF.
- 0.2 This specification would be used for manufacture, quality assurance and procurement of the item.
- 0.3 Quality assurance authority for the item covered in this specification is Office of the Directorate General of Police, CRPF, New Delhi. All enquiries regarding this specification, including those relating to any contractual conditions contained therein shall be addressed to the Quality Assurance authority at the following address:  
Office of the Directorate General of Police,  
CRPF, Ministry of Home Block No-1, CGO Complex, Lodhi Road,  
New Delhi-03
- 0.4 Copies of the specification can be obtained from:  
Office of the Directorate General of Police,  
CRPF, Ministry of Home Block No-1, CGO Complex, Lodhi Road,  
New Delhi-03
- 0.5 This specification holds good only for the supply order for which it is issued.
- 0.6 The Quality Assurance Authority reserves the right to amend or modify this specification as and when required.
- 0.7 The Quality Assurance Authority is the competent authority to grant concessions, if any, in respect of any clause contained in this specification.
- 0.8 For the purpose of deciding whether a particular requirement of this specification is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS:2-1960 (Reaffirmed 2006). The number of significant places retained in the rounded off value should be the same as that of the specified value in this specification.

## 1.0 SCOPE

- 1.1 The specification prescribes the requirement of “Vest Thermal” off white in color.
- 1.2 This specification does not specify the general appearance, lusture, feel, type of finish of “Vest Thermal”.



## 2.0 MATERIAL AND MANUFACTURE

2.1 The style and shape with dimensions of the “Vest Thermal” are shown in the Fig. 1.

2.2 The “Vest Thermal” shall be manufactured using polyester filament yarn and elastane filament yarn. For guidance, 50 D or more polyester (micro) textured filament yarn may be used.

2.3 The “Vest Thermal” shall be tailored out of well and evenly knitted tubular interlock fabric made from circular knitting machine. The arrangement of needles in dial and cylinder of knitting machine are shown in the Fig. 2. The finish of the “Vest Thermal” shall match with the sample held in the custody of CRPF.

2.4 The rib (1X1) attached to the sleeves opening of the “Vest Thermal” shall be manufacture using 50 D or more textured filament yarn may be used along with 6% elastane filament yarn.

Fig. 1: Vest Thermal

### **3.0 STITCHING**

3.1 The type of stitch and seams (refer ISO 4915:1991 Textiles - Stitch types- classification and terminology and ISO 4916:1991 Textiles —Seam types- classification and terminology) and count of sewing thread (white colour) for seams and stitches at various portions of “Vest Thermal” shall be as given in Table 1. All the stitches shall be of even tension throughout with all loose ends fastened.

**Table-1 Seams and stitches**

SI. No	Portion to be stitched	Type of stitch	Number of stitches per cm, Min.	Type of seam	Recommended Thread in the Needle/Looper(s)
1	2	3	4	5	6
<b>Upper</b>					
1	Neck Binding	Cover Stitch (605)	4	EFa	i)100Tex Polyester sewing thread (two ply)- in needle ii)60 Tex Polyester (two ply)-in Looper
2	Shoulder Attach	Overlock (514)	4	SSa	
3	Sleeve Attach	Overlock (514)	4	SSa	
4	Underarm	Overlock (514)	4	SSa	
5	Hemming at the bottom	Multithread chainstitch (406)	5	EFa	
6	Rib making	Overlock (514)	4	SSa	
7	Rib attach	Overlock (514)	4	SSa	
8	Rib topstitch	Multithread chainstitch (406)	5	LSb	

EFa=Edge Finishing (Sub class-a), SSa=Super imposed Seam (Sub class-a),  
LSb=Lapped Seam (Sub class-b)

#### **4.0 WORKMANSHIP AND FINISH**

The “Vest Thermal” shall be free from workmanship defects i.e. texture, knitting flaws etc. The “Vest Thermal” shall not have missed stitches, hole, cut, oil stains or any other defect which may significantly affect the appearance or serviceability of “Vest Thermal”.

#### **5.0 SEALED SAMPLE**

In order to illustrate or specify the indeterminable characteristics such as general appearance luster and feel of the “Vest Thermal”, a sample has been agreed upon and sealed; the supply shall be conformity with the sample in such respects.

The custody of the sealed sample shall be a matter of prior agreement between the buyer and seller.

#### **6.0 REQUIREMENTS**

##### **6.1 Dimensions**

The dimensions of “Vest Thermal” when measured by, the method prescribed in Annex- A shall conform to the requirements given in Table 2.

##### **6.3 Other Requirements:**

- i) The “Vest Thermal” shall conform to the parameters as given in Table 3 A.
- ii) The rib attached with the sleeve opening of the “Vest Thermal” shall confirm to the parameters given in Table 3B.

Table 2: Dimension of “Vest Thermal”  
(All measurements are in centimeter)

Sizes	Chest Width (A)	Shoulder (B)	Length From H.P.S. (C)	Rib (Length) (D)	Rib (Width) (E)	Sleeve Length From C.B. (F)	Armhole Straight (G)	Neck binding (H)	Back Neck Depth (I)	Neck Drop (J)	Neck Width (K)	Bottom Hem Width (L)
80	38.1	35.6	63.5	5.7	7.6	66.0	17.8	1.25	3.8	10.2	11.4	2.5
85	40.6	38.1	66.0	5.7	7.6	69.9	19.1	1.25	4.4	11.4	13.3	2.5
90	43.2	40.6	68.6	5.7	7.6	73.7	20.3	1.25	4.4	11.4	13.3	2.5
95	45.7	43.2	71.1	6.4	8.3	76.2	21.6	1.25	5.1	12.7	14.6	2.5
100	48.3	45.7	73.7	6.4	8.3	78.7	22.9	1.25	5.1	12.7	14.6	2.5
105	50.8	48.3	76.2	6.4	8.3	81.3	24.1	1.25	5.1	12.7	14.6	2.5
Tolerance	+/- 1.5	+/-1.5	+/-1.5	+/-0.5	+/-0.5	+/-1.5	+/-0.5	+/-0.1	+/-0.5	+/-0.5	+/-0.5	+/-0.1

HPS= Highest point shoulder, C.B.=Centre back

**Table 3A: Requirements of “Under Pant Thermal”**

<b>Sl. No.</b>	<b>Parameters</b>	<b>Requirements</b>	<b>Method of Testing</b>
	Type of Knitting	Single Jersey Box fleece with anti peeling treatment.	
1	Composition (excluding of Rib), Percentage	--Polyester 97% +/- 5% --Elastane Min 3%	IS 667:1981 and IS 3416 (Part-1): 1988 (Based on dry mass) AATCC 201A:2020
2	Wales/inch, Minimum	32-36	B-3, IS:14759-2000
3	Courses/inch, Minimum	48	B-3, IS:14759-2000
4	Weight, g/m <sup>2</sup>	200 +/- 5%	IS 1964-2001 RA 2022 (Method A)
5	Dimensional Change, (Machine wash at room temperature percentage, Maximum - Wales direction - Courses direction	5.0 5.0	Washing wash after 3 wash & ISO 6330 : 2021
6	pH Value of aqueous extract	6.0 to 8.0	IS:1390(Latest)
7	Colour fastness to Light	4 or better	IS/ISO 105302 B2 Method
8	Colour	As per user	Visual
<b>Additional Parameters</b>			
9	Anti fungal	No fungal growth; Effectiveness to be shown against at least 5 fungal strains	AATCC 30 (Part III) - 2017

10	Anti bacterial	Effectiveness to be shown against at least 5 bacteria	AATCC 100
11	Breathability / RET factor	4 m <sup>2</sup> Pa/W or less	ISO 11092 - 2014
12	Fabric absorbency rate	10 sec (Max)	AATCC-79
13	Wicking (time taken to reach 22mm)	10 sec (Max)	AATCC-197
14	Fabric drying rate	1.0 ml/hr or more	AATCC 201
15	Anti UV / UV Protection	UPF 50 plus or more	AATCC 183
16	Banned Azo Colorants	None	IS 15570: 2005(Latest)
17	Pilling resistance	4 or better	IS 10971 (Part 1) 2011 RA 2017
18	Colour fastness to Water	4 or better	IS / ISO 105 E01 2010 RA 2017
19	Colour fastness to Rubbing	Dry & Wet: 4 or better	IS/ISO 105-X12: 2001 RA 2016
20	Colour fastness to Laundering at 40C	Change in colour: 4 or better	IS/ISO 105 C 10: 2006 RA 2017 Test A (1)
21	Colour fastness to Perspiration	4 or better	IS/ISO 105 E04: 2008 RA 2019

**Table 3B:** Requirements of “Under Pant Thermal” – Rib/Cuff

SI. No.	Parameters	Requirements	Method of Testing
1.	Composition, Percentage -Elastane, Minimum -Polyester	5% min Remainder	AATCC 20A (Dry mass basis)
2.	Wales/inch, Minimum	32-36	B-3, IS:14759-2000
3.	Courses /inch, Minimum (Including elastane yarn)	48	B-3, IS:14759-2000
4.	Colour	Match with the Under Pant	Visual

		thermal fabric	
--	--	-------------------	--

## 7.0 SAMPLING

- 7.1 The sampling procedure detailed in 7.2 and 7.3 shall give desired protection to the buyer and the seller, provided that the lot submitted for inspection is homogeneous. To achieve this, the manufacturer shall maintain a system of process control at all stages of manufacturing ensuring the “Vest Thermal” tendering by him for inspection to comply with the requirements of this standard in all respects.
- 7.2 The manufacturer should offer the stores serially numbered and arranged in such a way that the entire lot is accessible to the inspecting officer. The conforming of a lot to the requirement of this specification shall be determined on the basis of the tests carried out on the samples selected from it. The number of samples shall be selected at random in accordance with Table-4

Table-4: Number of “Vest Thermal” to be selected from a lot and permissible number of non-conforming “Vest Thermal”

Number of “Vest Thermal” in the Lot  (1)	Physical Characteristics		Other Requirements - Number of “Vest Thermal” to be tested  (4)
	No. of “Vest Thermal” to be Inspected  (2)	Permissible number of non-conforming “Vest Thermal”  (3)	
Up to 300	13	1	3
301 — 500	20	2	5
501-1000	32	3	5
1001 and above	50	5	8

Note: Sampling officer will select sampling unit randomly and select ultimate items from each sampling unit as per the above table.

7.2 Lot: For the purpose of conformance inspection and test sampling, a lot is defined as all the completed “Vest Thermal” of the same size and type, with same assemblies, produced in one facility, using the same production processes and materials, and being offered for delivery at one time to buyer against a dispatch note.

7.3 The CRPF reserves the right to carry out inspection of bigger lot sizes, even to the extent of 100% inspection, if considered necessary.

7.4 The sample size and the criterion for conformity for various characteristics shall be as follows:

<b>Characteristics</b>	<b>Sample size</b>	<b>Criteria for conformity</b>
Freedom from defects, manufacture and dimensions	All the “Vest Thermal” shall be inspected according to the column 2 of table 4	Non-conforming “Vest Thermal” not to exceed the corresponding number given in col. 3 of table 4
Nature of fibre, Construction, Dimensional change, Scouring loss, pH value, colour	All the “Vest Thermal” shall be inspected according to the column 4 of table 4	All the “Vest Thermal” to satisfy the relevant requirements.
Colour fastness to light	One each for lot size up to 500 “Vest Thermal” and two if lot size is 501 and above	All the “Vest Thermal” to satisfy the relevant requirements.

## 8.0 MARKING

A woven cloth label marked with the following information (Colour from the label shall not bleed on to the “Vest Thermal” during storage or use) shall be fastened to each “Vest Therma” at the inside of the neck portion (backside)

- a) Size in cm
- b) Name of manufacturer or trade mark, if any
- c) Any other information required by the buyer.

## 9.0 PACKAGING & PACKING

9.1 Each “Vest Thermal” shall be placed in polyethylene bag. The vendor shall supply a sticker for each “Vest Thermal” for inspection and signature.

50 such “Vest Thermal” shall be placed in mill Grey board (3 ply corrugated fibre board telescopic Box) to form a unit pack and such four unit shall be packed in 7 ply corrugated fibre board slotted Box and further wrapped into water proof hessian/HDPE sheet (as per buyer requirement) and stitched with not less than 6 stitches/ 6 cm. and strip bound. However, on each box the following shall be indicated:

- a) Name of material;
- b) Count of yarn and type;
- c) Designation of fabric;
- d) “Vest Thermal” style and size in cm;
- e) Blend composition, if required by buyer;
- f) Quantity per box;
- g) Indication of the source of manufacturer;
- h) Any other information as required by the buyer

Dial	Needle no.	Structure		
	2	K	M	T
	1	K	M	M

Cylinder	Needle no.	Structure		
	1	M	K	M
	2	M	K	K

K=Knit, M=Miss, T=Tuck

Fig. 2 : Arrangement of needles in dial and cylinder of knitting machin

## 10.0 REFERENCES

SI. No.	SPEC./TEST METHOD No.	DESCRIPTION
(a)	IS 667: 1981	Method for identification of textile fibres
(b)	IS 1390: 1983, RA 2004	Methods of testing of pH value of aqueous extract
(c)	IS 2454: 1985, RA 2006	Methods for determining of colour fastness of textile materials to artificial light (xenon lamp)
(d)	IS 6359:1971, RA 2004	Method for Conditioning of Textiles
(e)	IS 14759 : 2000,	Textiles-Fabric, polyester, rib-knitted-specification
(f)	IS: 9543: 1980	Spun polyester sewing threads
(g)	IS: 834: 1993	Textiles-Ring spun grey cotton yarn for hosiery-Specification
(h)	AATCC 20A	Fibre analysis: Quantitative

### ANNEX A

**A-1 Conditioning of test specimens and atmospheric conditions for testing:** The test specimen shall be tested in prevailing atmospheric conditions. In case of dispute, the sample shall be conditioned and tested in the standard atmosphere as given in IS 6359.

’•

#### **A-2 Dimensions:**

Take each “Vest Thermal” constituting the test specimen. Lay it flat on a table. Removed by hand all crease and wrinkles without

distorting the specimen.

Measure nearest to 0.1 cm, the dimensions given in Table-2.