

Draft QRs/SPECIFICATION FOR VEST THERMAL FOR ECC&E

1.0 SCOPE

1.1 The specification prescribes the requirement of “Vest Thermal for ECC&E” (Colour as per User/Buyer requirements).

1.2 This specification does not specify the general appearance, lustre, feel, type of finish of “Vest Thermal for ECC&E”.

2.0 MATERIAL AND MANUFACTURE

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

2.2 The “Vest Thermal for ECC&E” shall be manufactured using polyester filament yarn and elastane filament yarn. For guidance, Yarn to be used in Fabric shall be Hollow Polyester (Min- 50D).

2.3 The “Vest Thermal for ECC&E” shall be tailored out of well and evenly knitted tubular interlock fabric/Brush fabric made from circular knitting machine. The arrangement of needles in dial and cylinder of knitting machine are shown in the Table- 1. The finish of the “Vest Thermal for ECC&E” shall match the *specification of sample*.

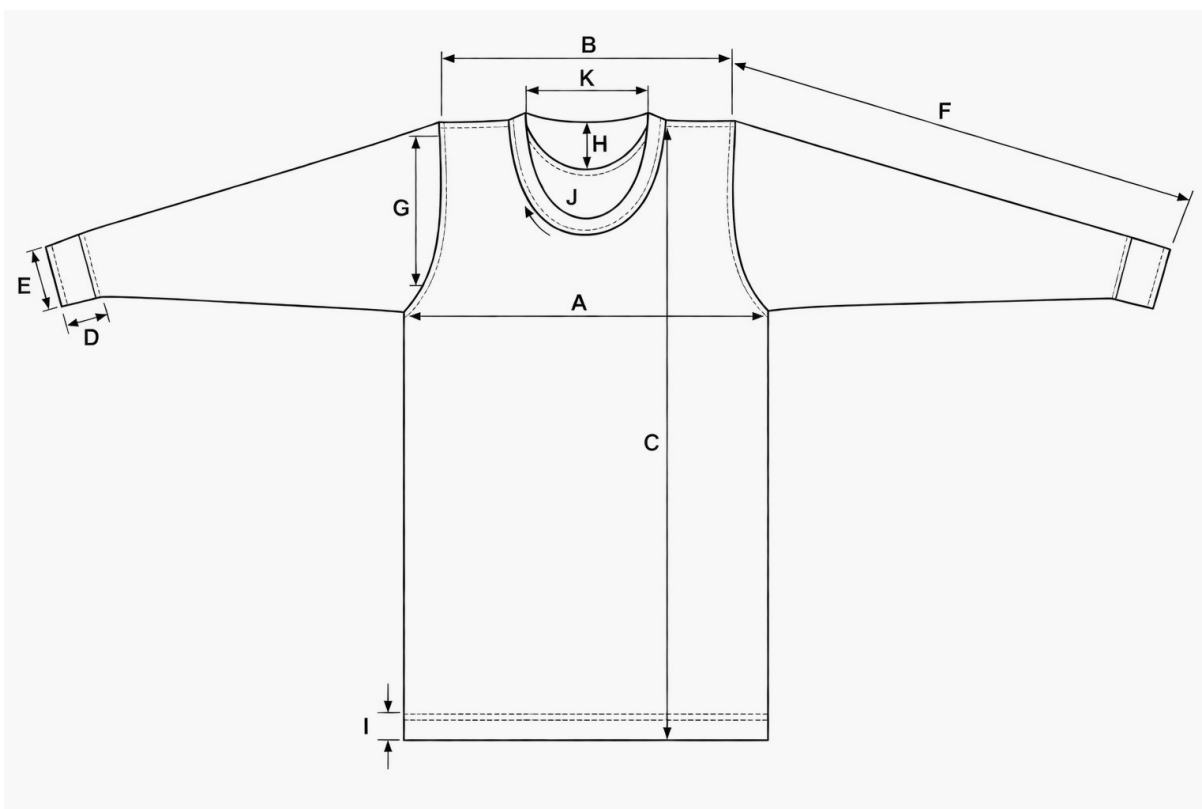


Fig. 1: Vest Thermal for ECC&E

2.4 The rib (1X1) attached to the sleeves opening of the “Vest Thermal for ECC&E” shall be manufactured using polyester yarn along with 3% elastane filament yarn.

3.0 STITCHING

3.1 The type of stitch and seams (refer ISO 4915:1991 (Latest) Textiles - Stitch types-classification and terminology and ISO 4916:1991(Latest) Textiles — Seam types-classification and terminology) and count of sewing thread (colour as per user) for seams and stitches at various portions of “Vest Thermal for ECC&E” 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

Sl. No	Portion to be stitched	Type of stitch	Nos. of stitches per cm, Min.	Type of Seam	Recommended Thread in the Needle/Looper(s)
1	Neck Binding	Cover stitch (605)	4	EFa	i) 80 Tex Polyester sewing thread (two ply)- in needle ii) 80 Tex Polyester (two ply)- in Looper
2	Shoulder Attached	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 topstitches	Multithread chainstitch (406)	5	LSb	

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



Fig. 2: Vest Thermal for ECC&E

4.0 WORKMANSHIP AND FINISH

The “Vest Thermal for ECC&E” shall be free from workmanship defects i.e. texture, knitting flaws etc. The “Heavy 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 for ECC&E”.

5.0 REQUIREMENTS

5.1 Dimensions

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

5.2 Other Requirements:

- i) The “Vest Thermal for ECC&E” shall conform to the parameters as given in Table 3A.
- ii) The rib attached with the sleeve opening of the “Vest Thermal for ECC&E” shall confirm to the parameters given in Table 3B.
- iii) Neck Rib- the size of neck rib shall as per Table 2 (i.e. 2 cm) and the shape of neck shall be Round or V-shape or as per user requirement.

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

Size	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 Rib (H)	Back Neck Depth (I)	Neck Drop (J)	Neck Width (K)	Bottom Hem Width (L)
80	38.1	35.6	63.5	5.7	8	66.0	17.8	2	3.8	10.2	11.4	2.5
85	40.6	38.1	66.0	5.7	8	69.9	19.1	2	4.4	11.4	13.3	2.5
90	43.2	40.6	68.6	5.7	8	73.7	20.3	2	4.4	11.4	13.3	2.5
95	45.7	43.2	71.1	6.4	8	76.2	21.6	2	5.1	12.7	14.6	2.5
100	48.3	45.7	73.7	6.4	8	78.7	22.9	2	5.1	12.7	14.6	2.5
105	50.8	48.3	76.2	6.4	8	81.3	24.1	2	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 “Vest Thermal for ECC&E”

S/No	Parameters	Requirements	Method of Testing
01	Type of Knitting	Box fleece with anti-pilling treatment. (Both Layers)	Visual
02	Composition (excluding of Rib), Percentage	(Individual Layers) Hollow Polyester 97% +/- 5% Elastane Min 3%	IS 667:1981 and IS 3416 (Part-I): 1988 (Based on dry mass) AATCC 201A:2020 ISO 17751
03	Wales/inch, Minimum	32 (Individual Layers)	B-3, IS:14759-2000
04	Courses/inch, Minimum	48 (Individual Layers)	B-3, IS:14759-2000
05	Fabric Weight, gsm	200 ± 5% gsm (Individual Layers)	IS 1964-2001 RA 2022 (Method A)
06	Dimensional Change, (Machine wash at room temperature) percentage, Maximum - Wales direction - Courses direction	4.0 4.0	Washing after 3 wash & ISO 6330: 2021
07	pH Value of aqueous extract	6.0 to 8.0	IS:1390(Latest)
08	Colour fastness to Light	4 or better	IS/ISO 105-B02
09	Colour	As per user	Visual

Additional Parameters

10	Anti-fungal (Penicillium species, Fusarium Species, Aspergillus Niger, Candida Albicans, Trichoderma species)	No fungal growth; Effectiveness to be shown against at least 5 fungal strains (effective upto 20 washes at 40° C)	AATCC 30 (Part III) – Latest ISO 6330:2021-4N
11	Anti-bacterial (Escherichia coli, Klebsiella pneumoniae, Staphylococcus aureus)	Effectiveness to be shown against at least 2 bacteria (effective upto 20 washes at 40°C)	AATCC 100
12	Breathability / RET factor	4 m ² Pa/W or less (Individual Layers)	ISO 11092 - 2014
13	Fabric absorbency rate	10 sec (Max) (Individual Layers)	AATCC-79
14	Wicking (time taken to reach 22mm)	10 sec (Max) (Individual Layers)	AATCC-197
15	Fabric drying rate	1.0 ml/hr or more (Individual Layers)	AATCC 201
16	Banned Azo Colorants	None	IS 15570: 2005(Latest)
17	Pilling resistance	3.5 or better	IS 10971 (Part I) 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
22	Thermal Resistance in Clo	Minimum – 1.0	ISO 11092
23	Formaldehyde	Maximum 20 mg/kg	IS14563 Part-I

Table 3B: Requirements of “Vest Thermal for ECC&E” – Rib/Cuff

S	Parameters	Requirements	Method of Testing
1.	Composition, Percentage - Elastane (Polyurethane), Minimum - Hollow Polyester	5% min 95% Remaining	IS 3421
2.	Wales/inch, Minimum	32	B-3, IS:14759-2000
3.	Courses/inch, Minimum (Including elastane yarn)	48	B-3, IS:14759-2000
4.	Colour	Match with the Vest Thermal for ECC&E fabric	Visual

Note – 01. All relevant Test methods and standards should be latest.

6.0 SAMPLING

6.1 The sampling procedure detailed in 6.2 and 6.3 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 for ECC&E” tendering by him for inspection to comply with the requirements of this standard in all respects.

6.2 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 for ECC&E” to be selected from a lot and permissible number of non-conforming “Vest Thermal for ECC&E”

Lots Size in No's	Visual Inspection (As per GIL-1 AQL-4)		Physical Parameters (As per SIL-4 AQL-4)		Chemical Parameters (As per SIL-2 AQL-4)	
(1)	Sample Size (2)	Acceptance No (Permissible Number of Non-Conforming) (3)	Sample Size (4)	Acceptance No. (5)	Sample Size (6)	Acceptance No. (7)
Up to 280	13	1	13	1	5	0
281-500	20	2	13	1	5	0
501-1200	32	3	20	2	5	0
1201-3200	50	5	32	3	8	1
3201-10000	80	7	32	3	8	1
10001-35000	125	10	50	5	8	1

Sample Size, Permissible Number of Non-Conforming and Sample drawn for Testing

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

6.3 Lot: For the purpose of conformance inspection and test sampling, a lot is defined as all the completed “Vest Thermal for ECC&E” 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.

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

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

Characteristics	Sample size	Criteria for conformity
Freedom from defects, manufacture and dimensions	All the “Vest Thermal for ECC&E” shall be inspected according to the column 2 of table 4	Non-conforming “Vest Thermal for ECC&E” not to exceed the corresponding number given in col. 3 of table 4

Characteristics	Sample size	Criteria for conformity
Nature of fibre, Construction, Dimensional change, Scouring loss, pH value, colour	All the “Vest Thermal for ECC&E” shall be inspected according to the column 4 of table 4	All the “Vest Thermal for ECC&E” to satisfy the relevant requirements.
Colour fastness to light	One each for lot size up to 500 “Vest Thermal for ECC&E” and two if lot size is 501 and above	All the “Vest Thermal for ECC&E” to satisfy the relevant requirements.

7.0 MARKING

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

- Name of Force
- Size in cm
- Blend composition
- Year of manufacture
- Name of manufacturer or trade mark, if any
- Washing instructions (Bilingual)
- Any other information required by the buyer.

8.0 PACKAGING & PACKING

8.1 Each “Vest Thermal for ECC&E” shall be placed in polyethylene bag. The vendor shall supply a sticker for each “Vest Thermal for ECC&E” for inspection and signature. 50 such “Vest Thermal for ECC&E” 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:

- Name of material;
- “Vest Thermal for ECC&E” style and size in cm;
- Quantity per box.
- Any other information as required by the buyer

9.0 REFERENCES

Sl. 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, rib-knitted- specification
(f)	IS: 9543: 1980	Spun polyester sewing threads
(g)	IS3421	Fibre analysis: Quantitative

10.0 ANNEX A

A-1 Conditioning of test specimens and atmospheric conditions for testing: The test specimen shall be tested in Standard atmospheric conditions i.e. 65% RH (Relative Humidity), Temp. 25°C (± 5). 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 for ECC&E” 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.