

Directorate General CRPF

Block No. 1 CGO Complex, Lodhi Road, New Delhi-110003

(Govt. of India/Ministry of Home Affairs)

(Phone/Fax- 011-24360155)

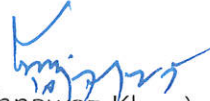
(e-mail: digprov@crpf.gov.in)

EXPRESSION OF INTEREST'

CRPF is in the process of revising the QR (Qualitative Requirements) specifications for the Thermal Pant and Thermal Vest for all CAPF. The draft revised QRs/Specification of these items are attached herewith.

The interested firms/parties dealing in subject matter are invited to submit their views/opinions on the draft revised QRs/ Specification of the item by 20/07/2025.

Contact Person:



(Shahnawaz Khan)

DIG (Provision)

Directorate General CRPF

Lodhi Road, New Delhi

PH/FAX: 011- 24360155

EMAIL: digprov@crpf.gov.in

SPECIFICATION FOR UNDER PANT THERMAL

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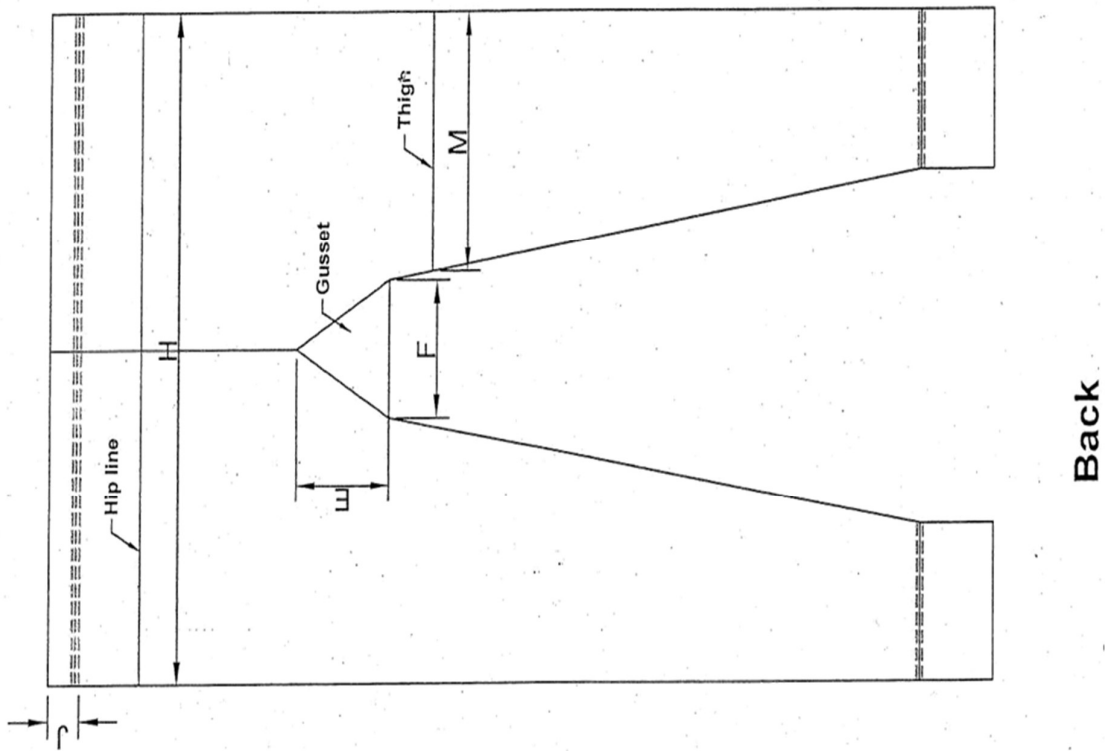
1.0 SCOPE

- 1.1 The specification prescribes the requirement of “Under Pant Thermal” (color- as per user requirement).
- 1.2 This specification does not specify the general appearance, luster, feel, type of finish of “Under Pant Thermal”.

2.0 MATERIAL AND MANUFACTURE

- 2.1 The style and shape with dimensions of the “Under Pant Thermal” are shown in the Fig. 1.
- 2.2 The “Under Pant Thermal” shall be manufactured using polyester filament yarn. For guidance, yarn to be used in fabric shall be Hollow Polyester (Min-50D).
- 2.3 The “Under Pant Thermal” 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 Fig. 1. The finish of the “Under Pant Thermal” shall match the specification of sample.
- 2.4 At waist of the “Under Pant Thermal”, the raw edge of the fabric shall be turned into of 2.5cm throughout and finished with elastic tape (2.0± 0.1) cm through the waist band.

2.5 The rib (1X1) attached to the sleeves opening of the “Under Pant Thermal” shall be manufacture using polyester yarn along with 3% elastane filament yarn.



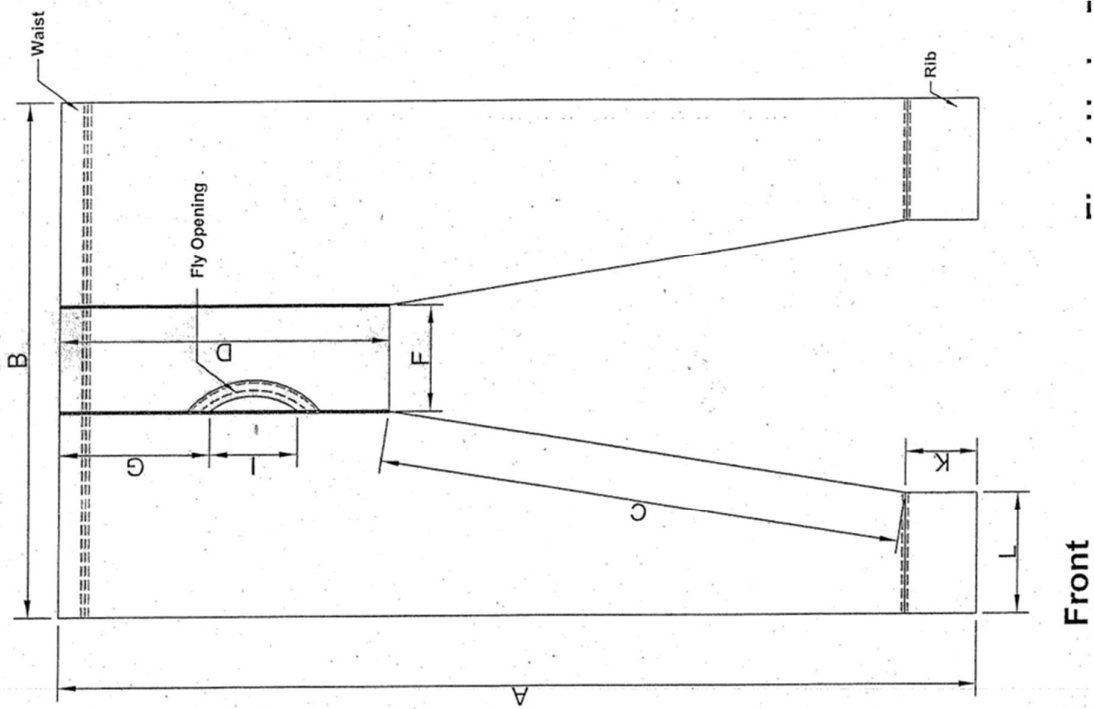


Fig 1: Under Pant Thermal

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 (color as per user) for seams and stitches at various portions of “Under Pant 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

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	2	3	4	5	6
1	Waistband elastic	Multithread Chain stitch (407)	8	Efa	i) 80 Tex Polyester sewing thread (two ply)- in needle ii) 80 Tex Polyester (two ply)- in Looper
2	Center panel	Cover stitch(605)	4	SSa	
3	Binding at upper opening	Multithread chain stitch(406)	4	BSb	
4	Binding at under opening	Multithread chain stitch(406)	4	BSb	
5	Inseam leg joining	3 thread overlock(504)	3	SSa	
6	Gusset end joining	3-thread overlock (504)	3	SSa	
7	Rib attach	3-thread overlock(504)	3	SSa	
8	Rib cover stitch	Multithread chain stitch(406)	8	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)

4.0 WORKMANSHIP AND FINISH

The “Under Pant Thermal” shall be free from workmanship defects i.e. texture, knitting flaws etc. The “Under Pant Thermal”

shall not have missed stitches, hole, cut, oil stains or any other defect which may significantly affect the appearance or serviceability of “Under Pant Thermal”.

6.0 REQUIREMENTS

6.1 Dimensions

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

6.2 The width of the elastic tape (used in waist band) shall be (2.5 ± 0.1) cm (measured in accordance with IS 1954: 1990, (RA 2007)-Latest). The other properties of the elastic tape, when tested shall meet the requirement laid down in specification IS 9686: 1980, (RA 2002)(Latest). For this purpose, the seller has to submit at least 5 meters of elastic tape along with the “Under Pant Thermal”.

6.3 Other Requirements:

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

Table 2: Dimension of “Under Pant Thermal”(All dimensions are in centimeter)

Sizes	Length (A)	Waist Elastic (B)	Leg Inside Length (C)	Crotch (D)	Gusset length (E)	Gusset Width (F)	Waist to Fly Opening (G)	Hip (H)	Front Opening (I)	Elastic Width (J)	Rib (Length) (K)	Rib (Width) (L)	Thigh (M)
80	81.3	52.1	55.5	27.9	7.5	8.8	11.9	45.7	8.9	2.5	7.0	8.9	21.6
85	86.4	57.2	58.0	29.2	7.5	8.8	12.5	47.0	10.2	2.5	7.0	9.5	22.2
90	91.4	61.0	60.8	30.5	7.5	8.8	13.1	49.5	10.2	2.5	7.0	9.5	22.9
95	96.5	63.5	63.6	31.8	7.5	8.8	13.7	52.1	10.2	2.5	7.0	10.2	24.1
100	99.1	68.6	66.6	33.0	7.5	8.8	14.3	54.6	10.2	2.5	7.0	10.2	25.4
105	101.6	73.7	69.8	34.3	7.5	8.8	15	57.2	10.2	2.5	7.0	10.2	26.7
Tolerance	±1.5	±1.0	±1.0	±1.0	±0.5	±0.5	±0.5	±0.5	±0.5	±0.1	±0.5	±0.5	±0.5

Table 3A: Requirements of “Under Pant Thermal”

Sl. No.	Parameters	Requirements	Method of Testing
	Type of Knitting	Box fleece with anti-pilling treatment.	Visual
1	Composition (excluding of Rib), Percentage	-- Hollow Polyester 97% +/- 5% --Elastane Min 3%	IS 667:1981 and IS 3416 (Part-1): 1988 (Based on dry mass) AATCC 201A:2020 ISO 17751
2	Wales/inch, Minimum	32	B-3, IS:14759-2000
3	Courses/inch, Minimum	48	B-3, IS:14759-2000
4	Weight, g/m ²	200 + 5%	IS 1964-2001 RA 2022 (Method A)
5	Dimensional Change, (Machine wash at room temperature) percentage, Maximum - Wales direction - Courses direction	4.0 4.0	Washing 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 105-B02 Method
8	Colour	As per user	Visual
Additional Parameters			
9	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) – 2017 ISO 6330:2021-4N

10	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
11	Breathability / RET factor	4 m ² 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	Banned Azo Colorants	None	IS 15570: 2005(Latest)
16	Pilling resistance	4 or better	IS 10971 (Part 1) 2011 RA 2017
17	Colour fastness to Water	4 or better	IS / ISO 105 E01 2010 RA 2017
18	Colour fastness to Rubbing	Dry & Wet: 4 or better	IS/ISO 105-X12: 2001 RA 2016
19	Colour fastness to Laundering at 40C	Change in colour: 4 or better	IS/ISO 105 C 10: 2006 RA 2017 Test A (1)
20	Colour fastness to Perspiration	4 or better	IS/ISO 105 E04: 2008 RA 2019
21	Thermal Resistance in Clo	Minimum - 0.5	ISO11092

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

Sl. No.	Parameters	Requirements	Method of Testing
1.	Composition, Percentage -Elastane (Polyurethane), -Hollow Polyester	5% min 95% Remaining	IS3421
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 Under Pant thermal fabric	Visual
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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 “Under Pant Thermal” to be selected from a lot and permissible number of non-conforming “Under Pant Thermal”

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

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)	
	Sample Size	Acceptance No (Permissible Number of Non-Conforming)	Sample Size	Acceptance No.	Sample Size	Acceptance No.
(1)	(2)	(3)	(4)	(5)	(6)	(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

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

7.3 Lot: For the purpose of conformance inspection and test sampling, a lot is defined as all the completed “Under Pant 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.

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

7.5 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 “Under Pant Thermal” shall be inspected according to the column 2 of table 4	Non-conforming “Under Pant 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 “Under Pant Thermal” shall be inspected according to the column 4 of table 4	All the “Under Pant Thermal” to satisfy the relevant requirements.
Colour fastness to light	One each for lot size upto 500 “Under Pant Thermal” and two if lot size is 501 and above	All the “Under Pant 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 “Under Pant Thermal” during storage or use) shall be fastened to each “Under Pant Thermal” at the inside of the hip portion (inner side of the waist band).

- a) Name of Force
- b) Size in cm
- c) Blend composition
- d) Year of manufacture
- e) Name of manufacturer or trade mark, if any
- f) Washing instructions (bi-lingual)
- g) Any other information required by the buyer.

9.0 PACKAGING & PACKING

9.1 Each “Under Pant Thermal” shall be placed in polyethylene bag. The vendor shall supply a sticker for each “Under Pant Thermal” for inspection and signature. 50 such “Under Pant 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) “Under Pant Thermal” style and size in cm;
- c) Quantity per box.
- d) Any other information as required by the buyer.

10.0 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, knitted- specification
(f)	IS: 9543: 1980	Spun polyester sewing threads
(h)	IS 3421	Fibre analysis: Quantitative

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. 65°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 “Under Pant 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.