GLOVES



MEASURMENT & DIAGRAM





Revised Technical Specifications for Gloves

1. General Description

The ECC (Extreme Cold Climate) Inner Gloves are high-performance under-gloves engineered to offer **insulation**, **dexterity**, and **durability** in sub-zero environments, particularly for tactical operations involving **weapon handling**. Constructed using **bonded fleece fabric** and **premium goat leather**, these gloves ensure thermal protection up to -10°C, while maintaining a **snug fit**, superior **grip**, and **flexibility** for precise hand movements.

2. Material Composition

A. Bonded Fleece Fabric (Primary	REMARKS
Insulating Layer)	
Composition:	• 3 layer bonded polar fleece fabric
	keeps the glove warm and protects
	the wearer from strong winds.
	• VISIBLE LAYER: polyester 100%
	bonded fabric with
	membrane/scrim inside.
	• Goat leather at the palm area
	• Test method IS: 667 (Latest)
Fabric Weight (GSM):	• $320 \text{ g/m}^2 \pm 5\%$
	Test method IS: 1964- Part-I (Latest)
Bursting Strength:	Minimum 400 KPa
	• Should be in IS standard
	Test method IS- 1966:2022- Part-I or II
	(Latest amendment)
Antimicrobial Efficacy	• (Test Standard: IS: 20743-2021):
0	◦ Staphylococcus aureus: $≥95\%$
	Reduction
	Klebsiella pneumoniae: \geq 95%
	Reduction

B. Goat Leather (Grip & Durability Layer)

- **Type**: Full-Grain Goat Leather (*Visual Testing – Visual Grain and Texture Check*)
- Thickness: Maximum 2 mm (Test Standard: ASTM D1777:1996)
- Chromium (VI) Content: Maximum 10 mg/kg (Test Standard: EN 420:2003 – Annex C)
- pH : 5-7.5 (IS-1390:2022 standard)
- Ash content : 13 max
- Flexing endurance (upto50,000 cycles) : no cracking

Special feature: Conductive fabric on the thumb and index finger allows easy operation of touch screens without removing gloves. This feature enhances convenience, especially in cold environments or while working on smartphones, tablets, and other touchscreen devices.

3. Performance Parameters

Glove (Fleece)

• Dimensional Stability of fabric (Post Washing)

(3 cycles @ 40°C, Standard Conditions – ISO 5077 / ISO 6330: 4N):

- > Lengthwise Shrinkage: $\leq 5\%$
- > Widthwise Shrinkage: $\leq 5\%$

C. Final Product Evaluation

Performance Parameter	Requirement	Test Standard
Contact Cold Resistance	Minimum Level 4	EN 511:2006
Convective Cold Resistance	Minimum Level 3	IS 15758-Part-I
Air Permeability (Palm/Back @100 Pa)	Maximum 10 l/m ² /sec (both zones)	ISO 11056
Dexterity	Minimum Level 4	EN 420:2003
Abrasion Resistance	Minimum Level 2 (≥10000 rubs)	EN 388:2016 & EN 511:2006

4. Garniture Items & Constructional Features

A. Stitching & Assembly

- Thread Material:
 - > Standard 100 Certified, non-allergenic, rot-resistant thread
 - > Polyester thread 3 Ply- Density -?

B. Supporting Accessories

- Webbing Tape:
 - 100% High Tenacity Polyester
 (ISO 1833-1 / AATCC 20/20A:2018)
 - > Tensile Strength: $\geq 1500 \text{ N}$

(Test Standard: ISO 13934-1:2013)

- Construction Quality:
 - > Ergonomic design with minimal seam interference
 - > All seams shall be lock stitches single needle and reinforced properly secured

5. Suitability & Operational Application

- Designed for use in **extreme cold weather** operations (up to -10° C).
- Engineered to provide **maximum hand mobility** and **high grip accuracy**, particularly useful in **firearm operation** and **technical tasks**.
- Durable structure ensures extended field usability without degradation.
- Optimal balance of **thermal insulation**, **air permeability**, and **hand protection**.
- Lightweight and breathable fabric enhances **comfort** during extended wear.

Specifications for Gloves

1. General Description

The ECC (Extreme Cold Climate) Inner Gloves are high-performance under-gloves engineered to offer insulation, dexterity, and durability in sub-zero environments, particularly for tactical operations involving weapon handling. Constructed using 3-layer bonded fleece fabric and premium goat leather, these gloves ensure thermal protection up to -10°C, while maintaining a snug fit, superior grip, and flexibility for precise hand movements.

- **Color:** Black or Olive Green (as approved)
- Available Sizes: S, M, L, XL (to be specified in tender)
- **Design:** Ambidextrous (right and left specific), ergonomic finger design
- Shelf Life: Minimum 2 years under standard storage conditions

2. Material Composition

A. Bonded Fleece Fabric (Primary Insulating Layer)

Parameter	Specification	Test Method
Construction	3-layer bonded polar fleece fabric with membrane/scrim	Visual + ISO confirmation
Visible Layer	100% Polyester with internal membrane layer	Declaration + lab report
Fabric Weight	$320 \pm 5\%$ GSM	IS 1964-Part I
Bursting Strength	≥ 400 KPa	IS 1966:2022-Part I
Dimensional Stability (Post 3 Washes @ 40°C)	≤ 5% shrinkage (lengthwise & widthwise)	ISO 5077 / ISO 6330
Antimicrobial Efficacy	\geq 95% reduction for S. aureus & K. pneumoniae	IS 20743:2021

B. Goat Leather (Grip & Durability Layer)

Parameter	Specification	Test Method
Туре	Full-Grain Goat Leather	Visual inspection
Thickness	≤ 2.0 mm	ASTM D1777:1996
Chromium (VI) Content	$\leq 10 \text{ mg/kg}$	EN 420:2003 – Annex C

Parameter	Specification	Test Method
pН	Between 5.0 and 7.5	IS 1390:2022
Ash Content	≤13%	Lab test
Flex Endurance	No cracking up to 50,000 cycles	EN ISO 5402-1
Special Feature	Conductive fabric on thumb & index finger for touchscreen use as shown in drawing.	Practical verification

3. Performance Parameters – Final Product

Parameter	Requirement	Test Standard
Contact Cold Resistance	Minimum Level 4	EN 511:2006
Convective Cold Resistance	Minimum Level 3	IS 15758-Part I
Air Permeability (Palm/Back @ 100 Pa)	\leq 10 l/m ² /sec (both zones)	ISO 11056
Dexterity	Minimum Level 4	EN 420:2003
Abrasion Resistance	Minimum Level 2 (≥10,000 rubs)	EN 388:2016 & EN 511:2006
Wash Durability	Should retain cold resistance & fit after 10 standard washes	In-house / certified lab test

4. Garniture Items & Constructional Features

A. Stitching & Assembly

Component	Specification
Thread	3-ply, rot-resistant, Standard 100 OEKO-TEX Certified polyester
Stitch Density	Minimum 6 stitches per inch
Stitch Type	Lock stitches, single needle, double stitched at stress points
Seam Strength	Should withstand minimum 30 N force without failure

B. Supporting Accessories

Component	Specification	Test Method
Webbing Tape	100% High Tenacity Polyester	ISO 1833-1 / AATCC 20/20A:2018
Tensile Strength of Webbing	≥ 1500 N	ISO 13934-1:2013

- Cuff: Elasticated hem or adjustable Velcro closure for secure fit
- **Design**: Ergonomically contoured, minimal seam interference for comforts

5. Suitability & Operational Application

- Designed for sub-zero operations (down to -10°C)
- High grip accuracy and dexterity for weapon handling and fine tasks
- Antibacterial, breathable, and lightweight for extended use
- Washable and durable under field conditions
- Foldable and compact for pocket storage