

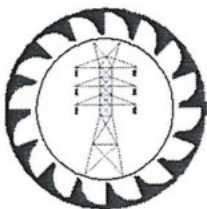
CEB  
SPECIFICATION

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**SPECIFICATIONS FOR PERSONAL PROTECTIVE  
EQUIPMENT**

**HAND PROTECTION**

**- ELECTRICAL INSULATING GLOVES FOR LIVE  
WORKING**



**CEYLON ELECTRICITY BOARD  
SRI LANKA**



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## 1. SCOPE

This specification specifies the requirements of Ceylon Electricity Board for electrical insulating gloves for live working.

## 2. SERVICE CONDITIONS

(i)	Annual average ambient temperature	30 °C
(ii)	Maximum ambient temperature	40 °C
(iii)	Maximum relative humidity	90%
(iv)	Environmental conditions	Humid tropical climate

## 3. APPLICABLE STANDARDS

The equipment and components supplied shall be in accordance with the latest edition of the standards specified below and amendments thereof.

(i)	IEC 60903	Live working - Electrical insulating gloves
(ii)	ASTM D120 - 14a	Standard specification for rubber insulating gloves
(iii)	IEC 60060-1	High voltage test techniques – Part 1: General definitions and test requirements
(iv)	IEC 60060-2	High voltage test techniques – Part 2: Measuring techniques
(v)	IEC 60212-2	Standard conditions for use prior to and during the testing of solid electrical insulating materials
(vi)	IEC 60417	Graphical symbols for use on equipment
(vii)	IEC 61318	Live working – Conformity assessment applicable to tools, devices and equipment
(viii)	IEC 61477	Live working – Minimum requirements for the utilization of tools, devices and equipment
(ix)	IEC 23529	Rubber – General procedures for preparing and conditioning test pieces for physical test methods

## 4. BASIC FEATURES AND TECHNICAL REQUIREMENTS

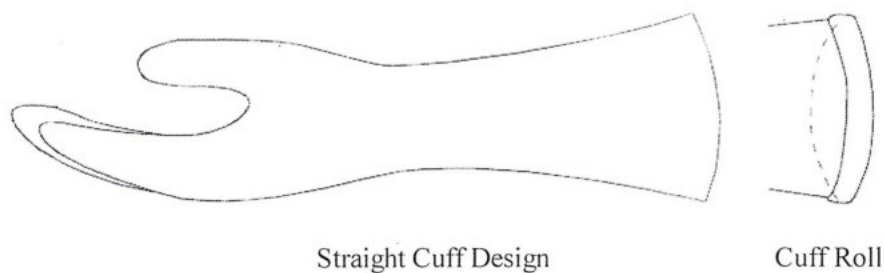
Glove design shall be such that the fingers are slightly bent in a position corresponding to the position the hand forms when while holding an object.

All electrical insulating gloves shall have the electrical, mechanical, chemical, thermal, ageing and flame retardancy characteristics conforming to the relevant standards specified.

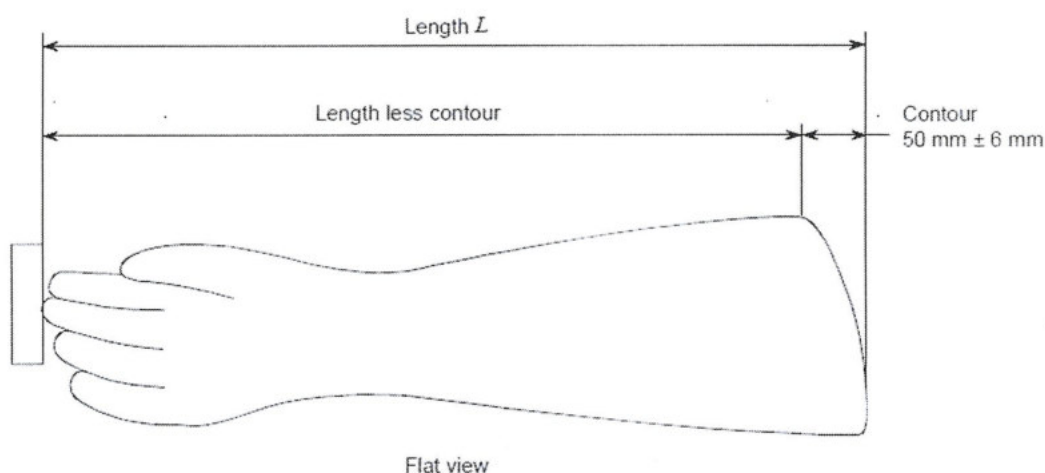
The gloves shall be manufactured with a cuff.

Cuff design shall be straight or contour for normal use as shown below.





Contour gloves shall be designed in such a way as to facilitate the bending of the arm and shall be intended for gloves that extend to or above the elbow



Contour Cuff Design

The gloves shall be produced by a seamless process and shall be free on both inner and outer surfaces from harmful physical irregularities such as pinholes, cracks, blisters, cuts, conductive embedded foreign matter, creases, pinch marks, voids (entrapped air), prominent ripples and prominent mould marks that can be detected by thorough test and inspection.

Palm and finger surfaces designed to improve the grip shall not be considered as irregularities.

#### 4.1 Class of Insulating Gloves

Class of the insulating glove shall be designated according to the below table.

The maximum use voltage is the a.c. voltage (r.m.s) rating of the insulating glove that designates the maximum nominal voltage of the energized system that may be safely worked. The nominal voltage is equal to the phase-to-phase voltage on 3-phase circuits or phase to ground voltage on single phase circuits.



Class	AC V(rms)	DC V
00	500	750
0	1000	1500
1	7500	11250
2	17000	25500
3	26500	39750
4	36000	54000

## 4.2 Category of Insulating Gloves

### 4.2.1 Recommended Category for Gloves Conforming to IEC 60903 standard

Insulating gloves shall be marked according to their resistance to acid, oil, ozone and extreme low temperatures as mentioned in the below table.

Category	Resistant to
A	Acid
H	Oil
Z	Ozone
R	Acid, Oil, Ozone
C	Extreme low temperatures

As per CEB's requirement gloves shall be acid, oil and ozone resistant. Therefore, according to IEC 60903 standard, the gloves shall carry the marking 'R' (Acid + Oil + Ozone resistant).

### 4.2.2 Recommended Type for Gloves Conforming to ASTM D120 standards

Gloves conforming to ASTM D120 standard are usually categorized for ozone resistance only. Hence, those shall be Type I (non-resistant to ozone) or Type II (ozone-resistant). However, the manufacturer's comments on their resistance to industrial oils and acids will be preferred.

## 4.3 Standard Lengths of Insulating Gloves

Length of the insulating glove shall be manufactured according the below table.

Class	Standard Length (mm)
0	360
2	360
4	410

The permissible variation in length shall be  $\pm 15$  mm for any class.



#### 4.4 Standard Sizes of the Gloves

Glove Size	Palm Circumference (mm)
7	178
7.5	191
8	203
8.5	216
9	229
9.5	241
10	254
10.5	267
11	279
11.5	292
12	305

#### 4.5 Maximum Thickness of Gloves

The maximum thickness on the flat surface of a glove (no ribbed area if present) shall be as given in below table in order to obtain the appropriate flexibility.

Class	Maximum Thickness (mm)	
	IEC Standard	ASTM Standard
00	0.50	0.75
0	1.00	1.02
1	1.50	1.52
2	2.3	2.29
3	2.9	2.92
4	3.6	3.56

#### 4.6 Marking on the Glove

The marking or label shall not impair the quality of the glove; it shall be indelible and shall remain visible after being subjected to a durability test as specified in the standard. All such marking shall be confined to the cuff portion of the glove and shall be non-conducting

When a colour code for markings/symbols is used, it shall correspond to the following: Class 0 - red, Class 2 - yellow and Class 4 - orange.

Markings shall be clearly visible and legible without additional magnification.

##### 4.6.1 Gloves Conforming to IEC 60903 Standard

Each glove which is claimed to comply with the requirements of IEC 60903 standard shall bear a label and/or marking giving the following information:

- i. Symbol IEC 60417-5216 – Suitable for live working; double triangle (Figure 1 below)
- ii. Number of the relevant IEC standard with year of publication (four digits) (IEC 60903:2014)



- iii. Name, trademark or identification of the manufacturer
- iv. Category
- v. Size
- vi. Class
- vii. Month and year of manufacture

In addition, each glove shall provide an area permitting the marking of the date of the current inspection or date of next required inspection and test, or any other suitable means to identify the date the glove is put into service and the dates of periodic inspection and test.



Figure 1 - Symbol IEC 60417-5216

#### 4.6.2 Gloves Conforming to ASTM D 120 Standard

Each glove shall be marked clearly and permanently with a label that gives the information specified below.

- I. The name of the manufacturer or supplier
- II. ASTM D 120 (number of the standard)
- III. Type
- IV. Class
- V. Size
- VI. Month and year of manufacture

#### 4.7 Leather Protector Gloves (Leather Over Gloves)

Leather Protector Gloves are used to protect the Insulating Glove from mechanical punctures, tears, abrasions etc.

If leather protector gloves are requested, then the distances between the cuff of the protector glove and the top of the cuff of the insulating glove should be as follows:

Class	Minimum Distance (mm)
0	13
2	51
4	102



### 5. TESTING

The gloves shall be subjected to the following tests according to the relevant standard. Test reports or a summary sheet of tests carried out shall be submitted as specified in 5.3.

#### 4.8 Tests for Gloves that are Conforming to IEC 60903 Standard

##### 4.8.1 Mechanical Tests (Type Tests)

- i. Tensile Strength and elongation at break
- ii. Resistance to mechanical puncture
- iii. Tension set

##### 4.8.2 Dielectric Tests (Type Tests)

- i. AC proof Test
- ii. AC withstand test

##### 4.8.3 Ageing Test

##### 4.8.4 Tests on Gloves with Special Properties

- i. Category A – Acid resistance
- ii. Category H – Oil resistance
- iii. Category O – Ozone resistance

#### 4.9 Tests for Gloves that are Conforming to ASTM D 120 Standard

##### 4.9.1 AC Tests

- i. AC Proof Test
- ii. AC Breakdown Test
- iii. AC Moisture Absorption/Proof Test

##### 4.9.2 Ozone Resistance Test

##### 4.9.3 Chemical and Physical Tests

##### 4.10 Test Reports

A *summary sheet* of the tests carried out shall be submitted where the summary sheet clearly shows the equipment concerned, the manufacturer's identity, the tests carried out, test results and the standard's requirements against the test results to determine passing or failing of the test.

The summary sheet shall be from the accredited independent testing laboratory where the testing was carried out and this testing laboratory shall be acceptable to the purchaser. Proof of accreditation of the testing laboratory by a national/international authority shall be forwarded if requested by the purchaser.

Submission of individual test reports is not necessary if duly authenticated summary sheet is submitted as described above.

## 6. QUALITY ASSURANCE

The manufacturer shall possess valid ISO 9001 : 2008 or latest Quality Assurance certifications for the plant where the manufacture of equipment is done.





Bidders shall furnish a copy of the ISO certificate certified as true copy of the original by the manufacturer, along with the offer.

## 7. ADDITIONAL REQUIREMENTS

### Packaging and Delivery

Each pair of gloves shall be packaged in an individual container or package of sufficient strength to properly protect the product from damage. The outside of the container or package shall be marked with the name of the manufacturer or supplier, the classification, category, size, length and cuff design.

The type of packaging suitable for transport shall be defined by the manufacturer.

At the request of the customer, or according to government specifications any additional or amended instructions shall be included in the package.

## 8. INFORMATION TO BE SUPPLIED WITH THE OFFER

The selected bidder shall supply all relevant drawings, technical literature, hand books etc. in English.

The bid shall be accompanied with the following also;

- a) English version of catalogues describing the equipment and indicating the type/model number.
- b) Technical literature in English describing the constructional and operational features, relevant drawings etc. of the equipment.
- c) Information on the following:  
Instructions for use, information on storage, fitting and adjustment, handling, cleaning, disposal, periodic inspection, periodic testing and useful service life
- d) Packing details.
- e) Completed schedule of technical particulars as per Annex A.
- f) Test reports or summary sheet conforming to clause 5.

## 9. Sample Study

One sample of the offered equipment including accessories if any, shall accompany the bid to facilitate analysis and evaluation. Any additional sample may be requested by the purchaser if such deemed necessary.

## 10. ANNEX

Annex A - Schedule of Guaranteed Technical Particulars



**SCHEDULE OF GURANTEED TECHHNICAL PARTICULARS**

(CEB Requirements shall be filled by the procurement entity and information of the offer shall be filled by the manufacturer/supplier)

Electrical Insulating Gloves for Live Working			
Specific Requirements			
Sr No	Item	Requirement	Offered
1	Class	<input type="checkbox"/> Class 0 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 4	
2	Glove Size		
3	Glove Length (mm)	<input type="checkbox"/> Class 0 - 360 mm <input type="checkbox"/> Class 2 - 360 mm <input type="checkbox"/> Class 4 - 410 mm	
4	Leather Protector Glove (Over Glove)	<input type="checkbox"/> Required <input type="checkbox"/> Not Required	
5	Year and Month/Quarter of Manufacture	manufactured within two years before the bid closing date.	
General Requirements			
Sr No	Item	Requirement	Offered
6	Brand	specify	
7	Model	specify	
8	Country of Manufacture	specify	
9	Applicable Standard	IEC 60903 or ASTM D120	
10	Category*	R (acid, oil and ozone resistant)	
11	Type**	Type I or Type II	
12	Material	specify	
13	Marking on the equipment	Please refer clause 4.6	
14	Test Reports/ Summary Sheet submitted	Please refer clause 5	
15	Quality Assurance for Manufacturer	Please refer clause 6	
16	Samples	Please refer clause 9	
17	Warranty	specify	



18	Packing details submitted	Please refer clause 8	
19	Product catalogues, technical literature submitted	Please refer clause 8	
20	Information on the following should be submitted Instructions for use, information on storage, shelf life, fitting and adjustment, handling, cleaning, disposal, periodic inspection, periodic testing	Please refer clause 8	

\* category is only applicable to IEC 60903 standard

\*\* type is only applicable to ASTM D 120 standard

I/We certify that the above data are true and correct

.....  
Signature of the Bidder/Manufacture and Seal

.....  
Date

