

## **Technical Specification for Lineman Electrical Rubber Insulating Hand Gloves-Electrical Purposes**

### **1.0 SCOPE**

This specification covers design, manufacture, method of sampling and testing & supply of for lineman Electrical Rubber Insulating Hand Gloves for Electrical Purposes.

### **2.0 Applicable Standards**

#### **2.1 Standards**

Following Indian/International Standards, which shall mean latest revision, with amendments/changes adopted and published, unless specifically stated otherwise in the Specification, shall be referred while accessing conformity of Lineman Electrical Rubber Insulating Hand Gloves.

**2.1.1** In the event of supply of Electrical Rubber Insulating Hand Gloves confirming to Standards other than specified, the bidder shall confirm in his bid that these standards are equivalent or better to those specified. In case of award, salient features of comparison between the standards proposed by the bidder and those specified in this document will be provided by the supplier to establish equivalence.

<b>Sl. No.</b>	<b>Indian Standard</b>	<b>Title</b>	<b>International Standard</b>
1.	IS: 4770	Definition, test methods and acceptance criteria for Electrical Rubber Insulating Hand Gloves for Electrical Purposes.	IEC: 60903
2.	IS: 1876: 1961	Method for voltage measurement by means of sphere-gaps (one sphere earthed).	
3.	IS: 1885 (Parts 1-66)	Electro technical vocabulary	
4.	IS: 3400	Methods of test for vulcanized rubbers:	
	IS: (Part-1): 1987	Tensile stress-strain properties (second revision)	
	IS: (Part-4): 1987	Accelerated ageing (second revision)	
	IS: (Part-13): 1983	Tension set (first revision)	
	IS: (Part-17): 1974	Tear strength-angular test pieces	
	IS: (Part-20):	Resistance to ozone	

	1977		
5.	IS: 3708	Methods of test for natural rubber latex:	
	IS: (Part-8): 1986	Determination of total nitrogen (NRL:12) (first revision)	
	IS: (Part-9): 1986	Determination of total ash (NRL:16) (first revision)	
6.	IS: 7503 (Parts 1-6)	Glossary of terms used in rubber industry	

### **3.0 REQUIREMENTS**

#### **3.1 Composition**

**3.1.1** Type-3, for use at voltage not exceeding 7500 ac rms shall be gauntlet type. Gloves shall be made from good quality Natural or Synthetic Rubber or from a mixture thereof conforming to IS: 4770: 1991, with latest revision/amendments/changes adopted and published.

#### **3.1.2 Construction**

Gloves shall be made out of latex by dipping. The Natural Rubber Construction of gloves should offer the required dielectrical properties combined with flexibility strength, 100% shock proof and durability applications. The gloves shall be seamless construction and should have smooth finish (inside & outside). The cuff edges shall be finished with a roll or reinforcing strip of rubber.

#### **3.1.3 Shape & Size**

The type-3, gloves shall be of loose fitting contoured shape has given in figure-2, and the recommended size has in Annexure-A of IS: 4770: 1991 with latest amendments if any.

#### **3.1.4 Length**

The minimum internal length from the tip of the second finger to the edge of the cuff shall be 400 mm (gauntlet type).

#### **3.1.5 Thickness**

The thickness of the gloves when determined as in Annexure-C shall meet the requirements specified in table-1 of IS: 4770: 1991.

**3.1.6** The gloves shall have smooth surface and shall be free on both are inner & outer surfaces from visual defects like patches, blisters, porosity, embedded foreign matters or other physical defects.

**3.1.7** The rubber forming gloves shall comply with requirements given in table-2 of IS: 4770: 1991.

**3.1.8 Proof (Test) voltage and leakage current**

Each glove shall withstand the 50 Hz ac proof (test) voltage (rms value) according to the method prescribed in Annexure-F. The test voltage shall be applied continuously for 1 minute and the glove shall withstand it without breakdown and the leakage current shall not be more than as prescribed in col 6 of table-3 of IS: 4770: 1991.

**3.1.9 Breakdown Voltage**

Gloves when tested according to the method prescribed in Annexure-G, shall not breakdown at voltage below the value shown against each type in table-4 of IS: 4770: 1991.

**4.0 WORKMANSHIP**

**4.1** The material shall be latest design and confirm to the best engineering practices adopted in the field. Bidder shall offer only such Electrical Rubber Insulating Hand Gloves as are guaranteed by them to the satisfactory and suitable for continued good services in lineman electrical gloves.

**4.2** The design, manufacturing process and material control at various stages shall be such as to give maximum working voltage, highest mobility, good finish and elimination of sharp edges and corners.

**4.3** The design of Electrical Rubber Insulating Hand Gloves shall be such that stresses due to electrical contact should not expand or contract in any part of the gloves.

**5.0 PACKING AND MARKING**

**5.1** The gloves shall be packed in polyethylene bags, and marked indelibly at the back with the following information.

- a. Size and type of glove;
- b. Maximum working potential in volts, followed by the word 'working' in brackets;
- c. Identification of the source of manufacture;
- d. Month and year of manufacture and
- e. Property of "BESCOM".

**5.2** The gloves shall be colour coated as per IS: 4770: 1991.

**5.3** Time lapse between receipt of material, testing & test piece shall be as per IS: 4770; 1991.

## **6.0 TESTS & STANDARDS**

Lineman Electrical Rubber Insulating Hand Gloves offered shall be manufactured with the same configuration and raw materials as used in the Lineman Electrical Rubber Insulating Hand Gloves for which design and type test reports are submitted. The manufacturer shall submit a certificate for the same. The design and type tests reports submitted shall not be more than 3 years old.

**6.1** The following constitute type test.

- a. Thickness Test
- b. Tensile strength Test
- c. Elongation at break Test
- d. Tension set test
- e. Tensile stress at 200% elongation test
- f. Tear strength
- g. Tensile strength and elongation at break after heat ageing test
- h. Puncture resistance test
- i. Moisture absorption test
- j. Nitrogen content (for natural rubber only) test
- k. Ash content (for natural rubber only) test
- l. Proof voltage and leakage current test
- m. Breakdown voltage; and
- n. Ozone resistance (for type 4 only)

**6.2** It shall be the option of the owner to accept the Lineman Electrical Rubber Insulating Hand Gloves based on test reports submitted by the manufacturer. The owner shall be free to repeat the type tests and may be witness same.

### **6.3 Sample batch for type testing**

The bidder shall offer material for sample selection for type testing only after getting Quality Assurance Programme approved by the owner. The bidder shall offer at least three times the quality of materials required for conducting all the type tests for sample selection. The sample for type testing will be manufactured strictly in accordance with Quality Assurance Programme approved by the owner.

**6.4** Following shall constitute acceptance test

- a. Thickness Test
- b. Tensile strength and ultimate elongation test
- c. Puncture resistance test
- d. Moisture absorption test
- e. Proof voltage and leakage current test
- f. Breakdown voltage test

**6.2.1** The number of samples for acceptance test shall be as given in Annexure-J of IS: 4770: 1991.

**6.3 Routine Tests**

- a. Thickness test
- b. Proof voltage and leakage current test

**7.0 ADDITIONAL TEST**

**7.1.1** The owner reserves the right at bidder's expenses, for carrying out any other test (s) of reasonable nature carried out at suppliers premises, at site, or in any other place in addition to the aforesaid type, acceptance and routine tests to satisfy himself that the material comply with the specifications.

**7.1.2** The owner also reserves the right to conduct all the tests mentioned in this specification at his own expense on the samples drawn from the site at suppliers premises or at any other test center. In case of evidence of non compliance, it shall be binding on the part of the supplier to prove the compliance of the items to the technical specifications by repeat tests or correction of deficiencies or replacement of defective items, all without any extra cost to the owner.

**8.0 QUALITY ASSURANCE PLAN**

**8.1.1** The successful bidder shall submit following information to the owner;

**8.1.2** Test certificates of the raw materials and bought out accessories.

**8.1.3** Statement giving list of important raw materials, their grades along with names of sub-suppliers for raw materials, list of standards according to which the raw materials are tested. List of tests normally carried out on raw materials in presence of bidder's representative.

**8.1.4** List of manufacturing facilities available

**8.1.5** Level of automation achieved and lists of areas where manual processing exists.

**8.1.6** List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspection.

**8.1.7** List of testing equipments available with the bidder for final testing of equipment along with valid calibration reports.

**8.1.8** The manufacture shall submit manufacturing quality plan (MPQ) for approval & the same shall be followed during manufacture and testing.

**8.1.9** The successful bidder shall submit the routine test certificates of bought out raw material/accessories and central excise passes for raw material at the time of inspection.

## **9.0 GUARANTEE**

The supplier of lineman Electrical Rubber Insulating Hand Gloves shall guarantee overall satisfactory performance of the Lineman Electrical Rubber Insulating Hand Gloves.

**9.1** At least three copies of type test reports shall be furnished. One copy shall be returned duly certified by the owner, only after which the commercial production of the concerned material shall start.

**9.2** Copies of acceptance test reports shall be furnished in at least three copies. One copy shall be returned duly certified by the owner, only after which the materials shall be dispatched.

**9.3** Record of routine test reports shall be maintained by the supplier at his works for periodic inspection by the owner's representative.

**9.4** Test certificates of test during manufacture shall be maintained by the supplier. These shall be produced for verification as and when desired by the owner.

## **10.0 INSPECTION**

**10.1** The owner's representative shall at all times be entitled to have access to the works and all places of manufacture, where Lineman Electrical Rubber Insulating Hand Gloves, and its component parts shall be manufactured and the representatives shall have full facilities for unrestricted inspection of the supplier's and sub-supplier's works, raw materials, manufacture of the material and for conducting necessary test as detailed herein.

**10.2** The material for final inspection shall be offered by the supplier only under packed condition. The owner shall select samples at random from the packed lot for carrying out acceptance tests. The lot offered for inspection shall be homogenous and shall contain Lineman Electrical Rubber Insulating Hand Gloves manufactured in 3-4 consecutive weeks.

- 10.3** The supplier shall keep the owner informed in advance of the time of starting and the progress of manufacture of material in their various stages so that arrangements could be made for inspection.
- 10.4** No material shall be dispatched from its point of manufacture before it has been satisfactory inspected and tested unless the inspection is waived off by the owner in writing. In the later case also the material shall be dispatched only after satisfactory testing specified here in has been completed.
- 10.5** The acceptance of any quantity of material shall in no way relieve the supplier of his responsibility for meeting all the requirements of the specifications and shall not prevent subsequent rejection, if such materials are later found to be defective.

**General Manager (Ele)  
Q,S&S, BESCO**