

**WEST BENGAL STATE ELECTRICITY  
DISTRIBUTION COMPANY LIMITED**  
**( A Govt. of West Bengal Enterprise )**

**Office of the Material Controller,  
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**TECHNICAL SPECIFICATIONS FOR**

**1.1KV COPPER CONTROL CABLE**

# WEST BENGAL STATE ELECTRICITY DISTRIBUTION COMPANY LIMITED

## TECHNICAL SPECIFICATION FOR 1.1 KV GRADE CONTROL CABLE

### **1.0** SCOPE :

The specification cover the design, manufacture, at manufacturer's works, supply and delivery of Copper Control Cables screened/armoured for use in different EHT/HT Sub-Stations in West Bengal

### **2.0** GENERAL INFORMATIONS :

The Control Cables are required for the control, protection, instrumentation, auxiliary Power Supply.

Each tender must be accompanied by full information required in the bidding schedule together with pertinent manufacturer's literatures, drawings, instruction manuals to enable the purchaser to make an appraisal of the quality and suitability of the materials offered. Failure to comply with the provision may be sufficient reasons to reject the bid.

### **3.0** STANDARDS AND REGULATIONS :

All materials shall comply with the applicable provisions of the latest edition of Indian Standards, Indian Electricity Rules, Indian Electricity Act and other applicable statutory provisions, rules and regulations.

The following standards would apply to the specification.

1. IS-1554 (Part-I) - PVC insulated heavy duty.
2. IS-8130-Conductors for PVC insulated Cables.
3. IS-3961 (Part-II)- Recommended current ratings for Cables.
4. IS-5831-PVC insulated and sheath of Electric Cable.
5. Other relevant standards for screening.

### **4.0** CLIMATIC AND ISOCERAUNIC CONDITIONS :

#### **4.1** The climatic conditions at site under which the material shall operate satisfactory are as follows ;

a) Maximum ambient temperature of the air-in shade (°C)	:	50
b) Minimum temperature of the air in shade (°C)	:	4
c) Maximum daily average ambient temperature (°C)	:	45
d) Maximum Yearly average ambient temperature (°C)	:	30
e) Maximum relative humidity (%)	:	100
f) Average number of thunderstorm days per annum.	:	100
g) Average annual rainfall (Cm)	:	200
h) Maximum wind pressure (Kg/M <sup>2</sup> )	:	150
i) Earthquake acceleration (g)	:	0.04 x 2 g
j) Height above Sea Level (m)	:	Not exceeding 1000

#### **4.2** The material offered shall be suitable for continuous operation at the full rated capacity under the above conditions.

### **5.0** DESIGN CRITERIA :

The Cables will be used for control protection and instrumentation, auxiliary Power Supply connections of the various equipment.

#### **5.1** The Cable will be laid in ground or on ladder type trays or drawn in conduit in a hot, humid and tropical atmosphere. The trays may be over head, suspended or run in concrete trenches with removable covers. The tenderer shall indicate clearly the de rating factor for the above conditions.

#### **5.2** The maximum conductor temperature for various classes and type of cables shall be limited to safe value as per applicable I.S. Cables shall be marked with ISI Certification Mark, if any.

- 6.0 SPECIFIC DESIGN REQUIREMENTS :**
- 6.1 1100 Volts Grade Heat Resisting (HR) Copper Cables** suitable for use where the combination of ambient temperature and temperature rise due to load results in conductor temperature not exceeding 85 deg.C under normal continuous operation and 160 deg.C under short-circuit condition with stranded annealed copper conductor, HR PVC insulated, HR extruded PVC inner sheathed, round galvanized steel wire armoured (for multicore cable only) and overall HR extruded PVC sheathed shall generally conform to latest revision of IS:1554 (Part-I). The cores shall be colour coded as per I.S. for easy identification. Each conductor shall consists of single Strand of 1.78/2.25 mm copper wire for 2.5/4 sq mm cross section. The PVC material for insulation and outer sheathing shall have smooth finish. Armouring shall be of single layer of 1.6/1.4 mm. dia. G.I. Steel Wires though enough to withstand mechanical stressed during handling and shall be resistant to action of oil, acid and alkali. The above cable shall be used for control, identification, inter-link and instrumentation etc.
- The insulation and sheath shall satisfy the test requirements stated in Tables-1 & 2 respectively, to the extent specified in the relevant cable standard.
- 6.2 CURRENT RATING :**  
The Cables will have current rating derating factors for an ambient temperature of 45 deg.C and ground cable is required to be taken into consideration. The current ratings shall be based on the maximum temperature 85 deg.C for continuous operation at the rated current.
- 6.3 OPERATION :**  
Cables shall be capable of satisfactory operation under Power Supply System frequency variation of  $\pm 5\%$  and voltage variation of  $\pm 10\%$ .
- 7.0 DRUM LENGTH OF CABLES :**
- 7.1** The Cables shall be packed in non-returnable wooden drums. The wooden drums should be bearing distinguishing number with following Information duly stenciled on the outer side of one flange.
1. Name of the Manufacturer.
  2. Normal sectional area of the Conductor of the Cable.
  3. Number of Cores.
  4. Type of Cable & Voltage for which it is suitable.
  5. Length of Cable in this drum.
  6. Direction of rotation of Drum (an arrow)
  7. Gross Weight.
  8. Purchase Order No. & Date.
  9. Year of Manufacture.
  10. Property of WBSEDCL.
  11. Date of Delivery.
- 7.2** Drums shall be proofed against attack by white ant and termite, Conforming to IS-10418-1982.
- 7.3** The Cables shall be supplied in Drum lengths of 250/500 Mtr. which shall be subject to tolerance of not more than  $\pm 5\%$  and the variation in the total quantity of Cables due to tolerance in individual drum length shall be limited to  $\pm 2.5\%$  for all types of Cable. Non-standard drum length shall not be acceptable. However, before packing the Cables on Drums, the successful bidders will be required to obtain purchaser's approval for the drum lengths.
- 7.4** Embossing on the outer sheath of the Cable with marking "WBSEDCL" and length of the Cable in meters at suitable intermittent distance, preferably 1Mtr. should be done.

**8.0 DRAWING DATA & MANUAL :**

The following information shall be furnished in triplicate along with the tenders :

- a) Manufacturer's leaflets giving construction details, dimensions and characteristics of different Cables.
- b) Current rating of cables including derating factor due to grouping, ambient temperature and Type of various installations.
- c) Write up sketch illustrating the manufacturer's recommendation for splitting, jointing and termination of different type of cables.
- d) List of customers to whom the cable for similar rating have been supplied.

**9.0 TESTS :**

**9.1** Routine tests in accordance with the provision of relevant standard specification shall be carried out for each drum of finished cable lengths.

Type Tests and acceptance tests on the samples taken on random basis from the lot of cables offered for inspection shall have to be carried out as per relevant Indian Standard Specification to prove the general qualities and design of a given type of cable and for the purpose of acceptance of the lot.

**TYPE TEST REPORTS** for the type tests conducted in accordance with IS:1554 (Part-I for similar type of Cables (as per Tender Specification) *Type Test Report conducted on similar type of Cable from NABL/ Central Govt./ Jadavpur University approved Accredited Testing Laboratory within 5 years from the due date of opening of Tender is to be submitted along with Tender Papers.*

**9.2 WITNESSING OF TESTS :**

The tabulation for each test result shall contain corresponding I.S. specified limiting figures to facilitate checking of test Results. Six (6) copies of type tests certificate lot-wise for each type of cables should be sent to the purchaser for acceptance. Type Test Certificate for each lot and routine test certificate for each drum of cables shall be submitted to the Purchaser for approval before despatch of cables from the Works. The test certificates shall be completed with all results.

**10.0 TECHNICAL GUARANTEED PARTICULARS :**

**10.1** Technical guaranteed particulars shall be furnished in triplicate as per format annexed herewith along with other relevant particulars.

**11.0** List of testing equipment/instruments made available at the manufacturer's premises is to be submitted along with tender paper.

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**TO BE FILLED IN AND SIGNED BY BIDDER**  
**SCHEDULES OF GUARANTEED TECHNICAL PARTICULARS FOR CONTROL CABLE**

1. **Name of the Manufacturer and Trade Name** :
2. **Rated Voltage** :
3. **Standard referred** :
4. **Conductor** :
  - i) **Material** :
  - ii) **Nominal area of cross-section(Sq.mm.)** :
  - iii) **No./Nom. Dia wires.** :
  - iv) **Shape of Conductor.** :
5. **Insulation :**
  - i) **Material** :
  - ii) **Nom. thickness** :
  - iii) **Approx. dielectric strength.** :
  - iv) **Suitable by with regard to temp. moisture, acid, oil and alkaline surroundings.** :
6. **Inner Sheath :**
  - i) **Material** :
  - ii) **Min. thickness of sheath (mm.)** :
7. **Armouring :**
  - i) **Material & Type.** :
  - ii) **Nom. Dia. of armour wires.** :
8. **Outer Sheath :**
  - i) **Material.** :
  - ii) **Nom. Thickness of sheath** :
9. **Approx. overall dia of Cable.** :
10. **Method of Core identification.** :
11. **Electrical properties :**
  - i) **Max. d.c. resistance of cond. At 20 deg.C (Ohm./KM)** :
  - ii) **Max. permissible cond.temp (deg.C)under full load.** :
  - iii) **Rated Voltage.** :
  - iv) **Maxm. Operating Voltage.** :
  - v) **Permissible Voltage variation.** :
  - vi) **Rated frequency.** :
  - vii) **Permitted frequency variation.** :
  - viii) **Min. specific insulation resistance at 80 deg.C (Ohm./Cm.)** :
  - ix) **Continuous current carrying capacities as per IS-3961 Part-II/67** :
  - x) **Noise Level** :
12. **Details of Type Test Report with Type and Size of Cable submitted or not ?:**