

## **TECHNICAL SPECIFICATION**

### **1. SCOPE :-**

This specification provides for the processing & Conversion of old damaged/burnt copper coils into ETP grade (Electrolytic-Tough-Pitch Grade, IS-191 part V<sup>th</sup> 1980/any latest amendment) DPC Copper winding wire & DPC Copper strips as per required sizes (with latest relevant IS with all amendments), testing and supply for making transformer coils. Following process shall be ensured:-

- (a) Lifting of old damaged/burnt copper coils from store/workshop of PVVNL after completing the necessary formalities.
- (b) Minimum quantity to be lifted in lots shall be **5,000 Kg.**
- (c) The lifted material after processing & conversion shall be returned back within maximum **25 days** from the date of allotment of old damaged/ burnt copper coils by PVVNL.
- (d) The finished material shall be offered for inspection within 15 days so that the scheduled delivery can be practically ensured within **25 days** from the date of allotment from store/workshop.
- (e) The actual weight of quantity to be ascertained after deduction of weight of oil soaked insulation @ 3% of the total quantity lifted. If the total Quantity of old damage/burnt copper coil lifted is **10,000 Kg.** then the quantity to be returned after processing & conversion will be in weight **10,000 – 3% of 10,000 Kg.**
- (f) Processing & Conversion of old damaged/ burnt copper coils into ETP grade copper wire/strips off sizes as per requirement of PVVNL rod conforming to IS 191 part Vth 1980/any latest amendment with following chemical composition-

#### **Chemical Composition**

<b>Element</b>	<b>Percent</b>
Copper + Silver,	99.90 Min
Bismuth,	0.001 Max
Lead,	0.005 Max
Total of all impurities excluding silver and oxygen	0.03 Max
<b>Note-</b> Oxygen should be limited to 0.06 percent subject to agreement between the supplier and the purchaser.	

- (g) **Paper covering of DPC Copper winding wire as per relevant IS.**
- (h) Covering of copper wire and strips with ITC/ABB/RAMAN make electrical grade insulated Craft paper as per relevant IS.
- (i) The samples from the first lot of the material offered for inspection shall have to be invariably tested for the chemical composition ETP grade copper & resistivity by **NABL accredited test laboratory** and one randomly selected sample from any other lots thereafter. The test for **electrical grade Insulating craft paper** shall also have to carried out from the **NABL accredited test laboratory** as per relevant IS with latest amendment. These tests shall be chargeable to the contractor and payment for the executed work shall be released after the successful test report.
- (j) Quantity manufactured to be offered for inspection before dispatch.
- (k) Pre dispatch inspection to be carried out as per relevant IS. (Without negative tolerance)
- (l) After successful inspection quantity to be dispatched as per the dispatch instruction given by S.E (MM-I).

2. **STANDARDS** :- The conductor shall conform to the following Indian Standard specifications which shall mean latest revisions with amendments / changes adopted and published unless specifically stated otherwise in the specification.

1	IS:13730 (Part-0/Sec1) with latest version	: Specifications for Particular types of Winding Wire Part 0: General Requirements Section 1: <u>Enamelled Round Copper Wire</u>
2	IS:13778 (Part-1 to 6) with latest version	: Specifications for Method of <u>tests for winding wire.</u>
3	IS: 7404 (Part-I)- 1974 and Amendment no. April 1974	: Specification for <u>Paper covered round copper conductors.</u>
4	IS: 13730 (Part 27) 1996 (with latest amendments)	: Specification for particular types of winding wires. (Part-27 <u>Paper covered rectangular copper conductor</u> )
5	IS: 1060 (Part I )-1966	: Specification for methods of sampling and <u>test for paper and allied products.</u>
6	IS 4800 ( Part 1 ): 1968	Enamelled round winding wires:
7	IS: 482:1981	: Specification for <u>Reels for covered round electrical wires</u>
8	IS 9335 (Part 3Sec 1) : 1984	Cellulosic papers for electrical purposes: Part 3 Specifications for individual materials, Section 1General purposes electrical paper.
9	IS-191 part V <sup>th</sup> 1980 (with latest amendments)	: For ETP grade copper CC Rod.

The various application IS referred in the specification shall be of the latest edition and amendments, if any.

3. **MATERIAL AND WORKMANSHIP** :- All the Copper conductors so made after processing & Conversion shall be reasonable smooth, uniform and shall be free from all defects such as die marks, scratches, abrasions and kinks etc. after drawing and also after enameling or paper covering the surface should be smooth.

The finished conductor shall have a smooth surface without any surface dents, abrasions, scuff marks and shall be free from dirt grit etc.

Particular care has therefore, to be taken during the Processing & Conversion, handling, packing and transportation of the conductor, to see that the surface is not dented, cut or damaged in any way.

#### 4. **JOINTS** :-

4.1 There shall be no joint of any kind in the conductor.

4.2 A certificate shall be recorded by the supplier on each and every invoice / bill and challan as follows.

“Certified that there is no joints of any kind in the conductor”.

5. **PAPER** : The paper shall be free from metallic & other injurious inclusions and shall conform to **IS: 7404 (Part-I)-1974**. It should be of ITC/ABB/Raman make Paper electrical grade. The thickness of the paper used shall be between the limits 0.025 and .075 mm. The paper shall be applied in two layers; both of them shall be overlap wound in the opposite directions.

**6. PACKING & MARKING**

- 6.1 The conductor shall be supplied on strong non-returnable plastic reels/ wooden drum so that it is not damaged during transit and can withstand all the transit and weather hazards. The supplier/manufacturer shall be responsible for any damage to the material during transit due to improper/inadequate packing.

All reels shall have layer of a waterproof paper over inner barrel. The filled reels shall also be covered with a water proof paper to protect the conductor wrapped on it from moisture and other rough surfaces. Each reel shall have the Name of manufacturer/supplier and details of Purchaser engraved/embossed necessarily on it and the remaining information from the following shall be marked on reel with indelible ink or on paper sticker pasted on reel along with other essential data. The sticker shall be of good quality paper, well fixed on reel and not easily removable. The plastic reel shall conform to the relevant IS.

The drums shall be painted on the inside and outside with Copper paints and fitted with strong cast iron bushings. All drums shall have layer of a waterproof paper under the lagging. The conductor drums shall conform to IS: 1778/1980. The drums shall be strapped with steel wire. Each drum shall have the following information marked on it with indelible ink along with other essential data without which the offered material is liable to be rejected. The conductor should remain half inch below the outer periphery of drum/reel.

1. Paschimanchal Vidyut Vitran Nigam Ltd.
2. Name of supplier
3. Drum No.
4. Contract/Specification number.
5. DI no
6. Size and type of conductor.
7. Gross weight of the drum.
8. Weight of the empty drum.
9. Net weight of conductor.

- 6.2 The Drums shall be constructed in such a way to ensure delivery of conductor in the store free from displacement and damage and should be able to withstand all stresses due to handling and the stringing operation so that conductor surface is not dented, scratched or damaged in any way during transport and erection.
- 6.3 All wooden components shall be transform worthily and free from defects that may materially weaken the component parts of the drum. Wood preservative of treatment shall be supplied to the entire drum with preservative of such quality, which is not harmful to the conductor.
- 6.4 The gross weight of each packing shall not exceed 80-100 Kg. Net weight 75-95 Kg.

- 7. TOLERANCE OF QUANTITIES:** The total permissible variation for the entire quantity ordered shall be subject to limit of  $\pm 2\%$  for overall quantity. However, the permissible variation in case of individual consignment may be  $\pm 5\%$ .

8. **TESTING:** The conductor shall be subjected to the following tests in accordance with relevant IS and latest amendment thereof without negative tolerance whatsoever. :-

- 8.1 Overall dimension of bare copper conductor.
- 8.2 Overall dimension of copper conductor with insulation.
- 8.3 Check for cross sectional area of copper conductor.
- 8.4 Breaking load tests on copper.
- 8.5 Elongation on copper conductor.
- 8.6 Wrapping test on copper wire.
- 8.7 Electrical resistance test on copper conductor.
- 8.8 Checking of conductor's surface & declared weight.
- 8.9 Visual Examination test on conductor drums as per IS: 1778/1980.
- 8.10 Checking for double paper covering as per IS: 7404 (Part-I)-1974
- 8.11 The rejection & retest procedure shall be followed as stipulated in IS.

9. **TESTING AND TEST CERTIFICATE:** The conductor shall be subject to all tests laid down in the relevant IS at contractor's work or at approved test laboratory at contractor's cost. Certified copies of test certificate in respect of tensile test of Copper, quality of Copper and paper used for covering and all other tests as prescribed in the relevant IS shall be furnished by contractor in triplicate, one copy to respective consignee officer second copy to SE (MM-I), PVVNL Victoria Park, Meerut. The inspection of the conductor offered will be arranged by the SE (DQC), PVVNL Victoria Park, Meerut.

10. **CALIBRATION OF TESTING EQUIPMENTS:** All the testing machine and equipments shall be got checked from the NABL accredited lab for calibration once in a year. Calibration certificates, when demanded by the Inspecting Officer, shall be produced for verification purposes. In case of dispute regarding calibration, the instruments shall be jointly sealed and sent to institutions, lab or deputed for calibration at the cost of supplier. The result of such checking shall be binding on the supplier.

11. **CHECKING OF CONDUCTOR SURFACE/DECLARED WEIGHT:** The supplier/manufacturer shall arrange for the inspection of conductors by the representative of the purchaser specially authorized for this purpose. At least 5% of the total number of drum of conductor taken at random shall be checked to ascertain the surface, declared weight of conductor.

12. **GUARANTEE PERIOD:** The material will be guaranteed for the period of at least 12 calendar months from the date of installation at site or 18 months from the date of receipt of material at store/site.