



TSD6206A

PLANT PURCHASING SPECIFICATION BHOPAL

BP 12083

REV NO. 08

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RECTANGULAR COPPER CONDUCTORS - ANNEALED-CONTROLLED OXYGEN (400PPM MAX.)

**SUPERSEDES
BP12083 Rev 07**

1. GENERAL :

This specification governs the requirements of bare rectangular, high conductivity copper conductors, in annealed condition with controlled Oxygen (400PPM Max.) up to a thickness or width of 16mm, with rounded corners.

2. APPLICATION :

For use in Traction / Electrical machines .

3. CONDITION OF DELIVERY :

The material shall be supplied in annealed condition, with rounded Corners.

4. COMPLIANCE WITH NATIONAL STANDARDS :

There is no National standard covering this type of material.

5. DIMENSIONS AND TOLERANCES :

5.1 Sizes

The conductors shall be supplied to the sizes stated on our order.

5.2 Tolerances -

Tolerances on thickness or width shall be as given in Table1 below :

5.2.1 Thickness / width : Table - 1

Thickness/ Width : Table -1

Specified Width or Thickness		Tolerance (±) mm
Over mm	Up to & incl. mm	
--	03.15	0.030
03.15	06.30	0.050
0630	12.50	0.070
1250	16.00	0.100

Revision :

Reviewed & No Tech. Change

Issued by :

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5.2.2 Radius on Corners :

The conductor shall have round corners, the radius of curvature being within the range given below in Table 2.

The arc shall merge smoothly into the flat and the conductors shall be free from sharp, rough ' and projecting edges.

Table - 2

Nominal Thickness		Corner Radius mm
Over mm	Up to & in cld. mm	
-	1.00	Semicircular
1.00	1.60	0.50-0.65
1.60	2.24	0.65-0.80
2.24	3.55	0.80-1.00
3.55	-	1.00-1.25

6. FREEDOM FROM DEFECTS :

The material shall be clean, smooth and free from harmful defects such as slivers, Cracks and other defects.

7. MANUFACTURE :

7.1 Conductor Material

The conductor shall be manufactured from ETP grade copper conforming to CPS AA I2024 "Electrolytic Tough pitch copper wire bars / Ingots/Continuously Cast Wire Rods"

Note :- It is preferable to manufacture conductor from continuous cast copper rods provided all other acceptance parameters & conditions remain same.

8 TEST SAMPLES

One sample per size per batch per consignment of 500 kg or part there - off shall be taken for test.



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9. MECHANICAL PROPERTIES :

9.1 Tensile Strength & Elongation :

A sample of conductor 250 mm gauge length when tested by the methods prescribed in IS: 1608 shall have the tensile strength and elongation at fracture as follows

Tensile strength : 205-245 N/ mm²

Elongation : 36 Percent Minimum (up to 5 mm²)

: 38 Percent Minimum (5 mm² - 30 mm²)

: 40 Percent Minimum (above 30 mm²)

9.2 Edgewise Bend Test (For all thickness)

The material shall withstand, without showing any sign of fracture, when bent edgewise through 180° over a former of diameter equal to half the width of the material.

9.3 Low Stress Elongation :

The conductor shall have a minimum LSE value of 1 percent, when determined in accordance with ASTM Method B 279.

9.4 Hardness – Vickers (with 5kg load) :

When tested in accordance with IS:1501:Part, material shall have Vicker Hardness of 53 to 58 HV

10 ELECTRICAL RESISTIVITY:

When measured in accordance with IS:3635 directly on a sample in the "As Received" condition, the Electrical Resistivity at 20°C shall be not greater than 0.01724 ohm mm² /meter, which is equivalent to 100% Conductivity of IACS Standard. Alternatively, the method of measurement employing Eddy Current Probe as per ASTM E1004 shall also be acceptable.

Refer IS 613, Appendix B for temperature correction factor.

11. JOINTS :

No joint shall be made in the copper conductor after it is drawn. Any joint made during drawing shall be only resistance welded.



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12. TEST CERTIFICATE ;

Three copies of test certificates shall be supplied unless otherwise stated in the order.

In addition, the supplier shall ensure to enclose one copy of the test certificate along with their dispatch documents to facilitate quick clearance of the material.

The test certificate shall bear the following information :

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BHEL Order No.

Supplier's Reference/Name.

Size

Identification /Batch/Melt No.

Test results obtained for Electrical and Mechanical properties, Chemical Composition and dimensional Tolerances as per the specification.

13. PACKING AND MARKING

The material shall be supplied on drums, wound tightly and evenly spread, free from dropped turns and shall be layer wound. The conductors shall be secured firmly to the drums and they shall further be protected from physical damage by closely spaced wooden strips held securely in position. Each drum shall be legibly marked with the following information.

BP 12083- Rectangular Copper Conductors,

Annealed –Controlled Oxygen (400 PPM max.)

BHEL Order NO.

Supplier's Name

Size and Net weight of conductor.