



FLEXIBLE COPPER BRAID – ANNEALED, FLAT

1.0 GENERAL:

This specification governs the quality requirements of flat flexible copper braid in annealed condition, manufactured from high conductivity copper wire, plaited in a tubular form.

2.0 APPLICATION:

Used in the manufacture of flexible connections of electrical apparatus.

3.0 CONDITION OF DELIVERY:

Copper braid shall be supplied in flat flexible annealed condition. The braid shall be of ordinary flexible quality or stretch wires refer Cl.6.3.

4.0 COMPLIANCE WITH NATIONAL STANDARDS:

There is no Indian Standard covering this material.

5.0 DIMENSIONS AND TOLERANCES:

5.1 Sizes:

The Copper braid shall be supplied with the width and thickness as specified in BHEL order. The stranding of the preferred sizes are given below:

Thickness mm	Width mm	No of strands	Wire dia mm	No of braids	Effective area, cm ²
1.60	19.05	648	0.122	1	0.1174
3.20	25.40	1908	0.152	3	0.4355

The stranding of other sizes shall be as described in BHEL order

5.2 Tolerances:

5.2.1 Width & Thickness:

The tolerance on width and thickness shall be ± 0.381 mm measured on the braid under no compression or tension.

Revisions :

Cl: 20.10.9 of MOM of MRC-NFCW+HE

APPROVED :

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**5.2.2 Wire:**

The tolerance on wire diameter shall be as follows:

Nominal Over	Diameter mm upto & incld.	Tolerance (±)
--	0.127	0.0025
0.127	0.190	0.0051

6.0 MANUFACTURE:

6.1 The wires for the braid shall be manufactured from copper of ETP grade conforming to IS:191.

6.2 **Braiding:** The stands shall be divided into groups of equal number and braided in tubular form. The braid shall then be flattened. The lay of the braid side shall, at the supplier's discretion, meet the flexibility and dimensional details specified.

For large number of strands the braids may be manufactured in two or more concentric tubular forms.

6.3 **Stretch wires:** Whenever specified in BHEL order, the braid shall be supplied with two parallel stretch wires of large diameter than the wire used in the braid running the whole length of the braid, to assist in controlling the width during manufacture and excessive stretching.

7.0 FREEDOM FROM DEFECTS:

The braid shall be clean, and free from harmful harmful defects.

8.0 CHEMICAL ANALYSIS:

The analysis of copper when analyzed in accordance with IS:440, shall as follows.

Element	Percent	
	Min.	Max
Copper and Silver	99.90	-----
Bismuth*	-----	0.001
Lead*	-----	0.005
Total of all impurities excl. silver and oxygen	-----	0.030
Silver present will be counted as copper.		



*These elements need not be determined when the material supplied conforms with mechanical and electrical properties specified in this specification. However, the supplier shall ensure that the composition of the material lies within the limits specified above.

9.0 TEST SAMPLES

One sample per size per melt per consignment of 3 tonnes or part thereof shall be taken for chemical and electrical tests.

The sample shall be cut off cold and shall receive no further treatment before being tested.

10.0 ELECTRICAL RESISTIVITY (AS RECEIVED)

When measured in accordance with IS: 3635, the electrical resistivity at 20⁰.C shall not be greater than 0.01739 ohm-mm²/metre, which is equivalent to an electrical conductivity of 99.14%, minimum of IACS standard. (Refer Appendix B of IS: 613 for temperature correction factor).

11.0 INSPECTION AT SUPPLIER ' WORKS:

When ever specified tests and inspection are to be conducted in the presence of BHEL's representative.

The supplier shall offer BHEL's representative all reasonable facilities, without charge to Satisfy the latter that the material is being furnished in accordance with this specification. The supplier shall prepare and provide necessary test specimens for testing to be carried out at his premises. If facilities are not available at his works, the supplier shall make Necessary arrangements for carrying out the prescribed test elsewhere. The supplier shall Notify BHEL in advance about the readiness of the material for inspection and testing.

BHEL reserves the right to test the material at BHEL's works and the final acceptance of the material shall be based on these test results.

12.0 TEST CERTIFICATES:

Unless other wise stated, three copies of certificates shall be supplied along with each consignment.

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



The test certificate shall bear the following information:

AA 12010 (Rev.03) : Flexible Copper Braid - Annealed, Flat

BHEL Order No.

Manufacturer 's/Supplier's Name:

Lot/Identification/Batch/Melt No.

Sizes and Quantity Supplied

The effective cross sectional area of the braid in square cm calculated from $W/o.887$ where W is the weight of finished braid in kg per metre length.

Results of dimensional inspection, chemical analysis, mechanical and electrical tests as per this specification.

13.0 PACKING AND MARKING:

The material shall be suitably packed to prevent damage during transit.

Each package shall be legibly marked or labeled with the following information:

AA 12010 : Flexible Copper braid – Annealed, Flat

BHEL Order No.

Manufacturer's/Supplier's Name :

Lot/Identification/Batch/Melt No.

Sizes and Quantity Supplied

14.0 REFERRED STANDARDS (Latest Publications Including Amendments):

1. IS:191

2. IS:440

3. IS:613

4. IS:3635