



TSD6206A

PLANT PURCHASING SPECIFICATION BHOPAL

BP 12075

REV NO. 05

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SILVER BEARING HARD DRAWN COPPER COMMUTATOR SEGMENTS (Ag 0.15 to 0.25%)

SUPERSEDES
BP12075 Rev 04

1. GENERAL :

This specification governs the quality of silver bearing hard drawn copper commutator segments, over 6 mm in height and upto 15 mm thick in which the inclination of the two surfaces is constant throughout the height.

2. APPLICATION :

Used as commutator segment in electrical machines.

3. CONDITION OF DELIVERY :

Supplied in hard drawn condition.

4. COMPLIANCE WITH NATIONAL STANDARDS:

This specification is generally based on the following :

For Material : IS:5885-1977 (Reaffirmed 2016)

Gr : Copper Silver Alloy (Except Silver)

For Dimensions: BS: 1434-1985 (Reaffirmed 2017).

5. DIMENSIONS AND TOLERANCES:

5.1 Sizes :

All sizes shall be according to the drawing accompanying our order.

Revision :

Reviewed & IS, BS Reaffirmed

Issued by :

**STANDARDS AND MATERIALS GROUP
TECHNICAL SERVICES DEPARTMENT**

Rev. 05

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5.2 Tolerance :

The tolerances on dimensions and shapes shall comply with clause 6 of BS:1434-1985 (Reaffirmed 2017) as detailed below and in addition shall comply to the following.

The measurement shall be made by a suitable programme co-ordinate measuring machine and readings shall be recorded in Test Certificate.

5.2.1 End Squareness : to Clause 6.2

5.2.2 Height : to Clause 6.3

5.2.3 Thickness : to Clause 6.4
(Close Grade)

5.2.4 Angle : to Clause 6.5
(Close Grade)

5.2.5 Shape of side faces : to Clause 6.6*
(Convexity or Concavity) (Close Grade)

*May also be checked by computer
aided profile projector

5.2.6 Straightness : to Clause 6.7

5.2.7 Twist : to Clause 6.8

of BS 1434-1985
(Reaffirmed 2017)

5.2.8 Segment Length :

For bars ordered as segments for assembly, the length when measured at any position across the width of the bar shall not deviate from the specified length by more than ± 0.8 mm.

5.2.9 Sharpness of Corners :

Any loss of sharpness of corners shall not exceed 10% of bar thickness at thick edge. The minimum and maximum values being 0.25 and 0.76 mm.



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6. FREEDOM FROM DEFECTS :

The segments shall be clean, smooth, and free from harmful defects.

7. CHEMICAL COMPOSITION :

The copper used for the manufacture of this alloy shall be of ETP grade (except silver content), as mentioned in IS: 5885/BS: 1434.

The material when analysed in accordance with IS:440 shall have following chemical composition:

<u>Element</u>	<u>Percent</u>
Silver	0.15 to 0.25
Copper + Silver	99.9 Min.

8. TEST SAMPLES :

One sample per consignment/size shall be tested at normal temperature and after heating. The results must satisfy the values mentioned below. The sample shall be heated at 300°C for one hour and after restoring to normal temperature, the mechanical properties shall be measured.

9. MECHANICAL PROPERTIES :

9.1 Tensile :

Test sample when tested in accordance with IS:1608 / BS EN 10002, Part I, shall show the following :

Size	Normal Temperature		After Heating (Refer Cl.8)	
Thickness mm	T.S. N/mm ² Min	% Elongation on 250 mm GL. Min.	T.S. N/mm ² Min	% Elongation on 250 mm GL. Min.
Below 5	335	5	315	7
5 to 10 Excl.	315	6	295	8
10 to 15 Excl.	295	7	275	9



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9. Hardness :

The hardness shall be determined by the Vickers hardness test in accordance with IS : 1501/BSEN ISO : 6507 (Part -1,2&3). Routine measurements shall be made on the side face of the bar segment or blank.

Dimension	Vickers Hardness Normal Temperature HV. Minimum	Vickers Hardness After Heating (Refer Cl.8) HV. Min.
Height mm		
Upto 60	110	108
Over 60	108	105
Upto 60	108	105
Over 60	105	103
Upto 60	105	103
Over 60	103	100

10. ELECTRICAL RESISTIVITY (AS RECEIVED) :

When measured in accordance with IS :3636, the electrical resistivity at 20°C shall not be 0.01777 Ohm-mm² / metre, which is equivalent to an electrical conductivity of 97% minimum of IACS Standard.

Alternatively, the method of measurement employing Eddy Current Probes as per ASTM E 1004 is also acceptable.

Refer IS : 613 Appendix 'B' for temperature correction factor.

11. TEST CERTIFICATE :

Unless otherwise specified, three copies of test certificates shall be supplied.

In addition, the supplier shall ensure to enclose one copy the test certificate Along with the dispatch document and shipping list to facilitate quick clearance of the material.



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The test certificate shall bear the following information :

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BHEL Order No.

Manufacturer's / Supplier's Name

Lot Identification/Batch/Melt No.

Sizes and Quantity Supplied.

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

12. PACKING AND MARKING :

The material shall be suitably packed to prevent damage during transit. Each package / bundle shall be legibly marked or labelled with the following information.

BP 12075 : Silver Bearing Hard Drawn
Copper Commentator Segments.

BHEL Order No.

Manufacturer's/Supplier's Name.

Lot / Identification/Batch/Melt No.

Size and Quantity Supplied.

Weight.