



# PASCHIM GUJARAT VIJ COMPANY LIMITED

REGD. & CORPORATE OFFICE:- "PASCHIM GUJARAT VIJ SEVA SADAN"

OFF NANA MAVA MAIN ROAD, LAXMINAGAR, RAJKOT-360004

CIN U40102GJ2003SGC042908

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## TECHNICAL SPECIFICATION FOR ALL ALUMINIUM STRANDED ALLOY CONDUCTORS (AAAC)

### [1] SCOPE:

This specification covers details of All Aluminum Alloy Conductor (AAAC) for use on overhead lines. The sizes of the conductor cover under this specification are as under:

|   |                         |                    |                    |                     |
|---|-------------------------|--------------------|--------------------|---------------------|
| 1 | Code Name               | AAAC Weasel        | AAAC Rabbit        | AAAC Dog.           |
| 2 | Size                    | 7/2.5 mm           | 7/3.15mm           | 7/4.26 mm           |
| 3 | area in mm <sup>2</sup> | 34 mm <sup>2</sup> | 55 mm <sup>2</sup> | 100 mm <sup>2</sup> |

### [2] APPLICABLE STANDARDS:

Unless otherwise specified in the specification, the conductor shall comply with IS-398 (Part-IV)/1994 with latest amendment if any & REC Specification 33/1984 (Revised March-2000).

### [3] PROPERTIES OF WIRES:

The Properties of aluminum alloy wires to be used in the construction of the stranded conductors shall be as in the following table.

TABLE - I Aluminum Alloy wires used in the construction of stranded Aluminum alloy conductors.

| Diameter in mm |      |      | Cross Sectional area of wire (nominal dia.) | Mass Kg/Km | Minimum breaking load after stranding | Resistance (at 20°C) ohm /KM |
|----------------|------|------|---|------------|---------------------------------------|------------------------------|
| Nominal        | Min. | Max  |   |            |                                       | Max.                         |
| 2.5            | 2.47 | 2.53 | 4.909 mm <sup>2</sup>                       | 13.25      | 1.44 KN                               | 6.845                        |
| 3.15           | 3.12 | 3.18 | 7.793 mm <sup>2</sup>                       | 21.04      | 2.29 KN                               | 4.290                        |
| 4.26           | 4.22 | 4.30 | 14.253 mm <sup>2</sup>                      | 38.48      | 4.18 KN                               | 2.345                        |

### [4] PROPERTIES OF CONDUCTORS:

The properties of stranded all aluminum alloy conductors of various sizes shall be as in the following table.

TABLE- II ALL ALUMINIUM ALLOY CONDUCTORS (AAAC)

| Nominal Alloy area | Strands & wire dia. | Sectional Area | approx. overall dia. | approx. mass | Calculated resistance at 20°C (max) | Approx. breaking load. |
|--------------------|---------------------|----------------|----------------------|--------------|-------------------------------------|------------------------|
| sq. mm             | mm                  | sq. mm         | mm                   | Kg/KM        | Ohm/KM                              | KN                     |
| 34                 | 7/2.5               | 34.36          | 7.5                  | 94.00        | 0.990                               | 10.11                  |
| 55                 | 7/3.15              | 54.55          | 9.45                 | 149.2        | 0.621                               | 16.03                  |
| 100                | 7/4.26              | 99.77          | 12.78                | 272.86       | 0.339                               | 29.26                  |



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## [5] FREEDOM FROM DEFECTS:

The wire shall be smooth and free from all imperfections like, spills, splits & Scratches.

## [6] MATERIAL:

The conductor shall be constructed of heat treated Aluminum Magnesium silicon alloy wires having composition appropriate to the mechanical and electrical properties specified in IS-398 (Part IV)/1994 and this specification.

## [7] JOINTS IN WIRES:

There shall be no joint in any wire of a stranded conductor containing seven wires, except those made in the base rod or wire before final drawing.

## [8] STRANDING:

8.1 The wires used in the construction of a stranded conductor shall before stranding satisfy all the relevant requirements of this specification.

8.2 The lay ratio shall be minimum 10 and maximum 14.

8.3 The outer layer shall be right handed. The wires in layer shall be evenly and closely stranded.

## [9] STANDARD LENGTH:

9.1 The stranded All Aluminum Alloy Conductor shall be supplied in standard lengths of (a) 2000 meters for 34 mm<sup>2</sup> & 55 mm<sup>2</sup> and (b) 1100 meters for 100 mm<sup>2</sup> sizes.

9.2 The tolerance for standard length shall be +/- 5% (five percent).

9.3 Supply of short length shall not be less than 50% of the standard length. Also such random / short length shall not exceed 5% (five percent) of the ordered quantity. In any one drum, maximum three random lengths shall be permissible.

## [10] INSPECTION OF CONDUCTORS.

The supplier shall offer the material for inspection in lots as and when ready with him. The Purchaser shall arrange for inspection of each lot of material as early as possible within **15 days** from the date of receipt of intimation. The lot offered shall not be dispatched by the supplier without having it inspected and tested by the Purchaser's inspector or issue of waiver of inspection by the Purchaser.

The acceptance tests on samples drawn from the offered lot for each size by the Purchaser's Inspector, as per sampling plan specified in the relevant Indian Standards, shall be carried out at the works of the supplier at their cost. The testing instruments should be in working condition and duly calibrated either by the original



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manufacturer of the instruments or by any NABL approved testing agency. Copies of calibration certificates shall be made available to the inspector.

The offered lot will be accepted only after samples selected for tests are found to pass all the acceptance test, In case of failure of sample in any test, procedure as per clause no. 13 of IS 398 (part-IV) 1994 will be applicable.

One Conductor drum for any one size shall be taken up for verification of actual length measurements. This shall form part of inspection for each and every lot offered for inspection by the manufacturer.

## [11] ROUTINE TESTS:

Routine tests on samples of individual wires shall be taken before stranding by supplier. A record of such tests shall be maintained and made available to the inspector on demand.

## [12] SAMPLING CRITERIA:

The sampling criteria for acceptance test shall be 10% of the number of reels or drum of the lot size in accordance with clause No. 12.1 of IS-398 (Part-IV)/1994.

## [13] ACCEPTANCE TESTS:

Following acceptance tests as per IS-398 (Part-IV)/1994 with latest amendment if any shall be carried out on all samples.

- (i) Measurement of lay ratio.
- (ii) Measurement of diameters of individual wire.
- (iii) Measurement of resistance of individual wire.
- (iv) Breaking load test of individual wire.
- (v) Elongation test of individual wire.

## [14] MEASUREMENT OF LENGTH:

(A) The supplier shall provide at his works the necessary facilities for measurement of conductor length of the drum. The conductor length of minimum one drum shall be measured in presence of the inspector. The length measurement results shall be recorded in the test report.

In case the actual conductor length is found short than the declared length, then length of further 2 (Two) drums are to be verified. The results shall be recorded in the test report.

(B) The Purchaser will have the option of measuring conductor lengths at on receipt of material at destination. If, so desired the supplier representative will be allowed to remain present at the time of the consignee taking the measurement, otherwise the findings of the consignee will be final and binding on the supplier.



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In case of any shortage in length from declared value , the cost of short length shall be deducted from the relevant invoices / bills raised by the vendor, to take care of the shortage and penalty to the extent of 30% of the value of such short length shall also be levied.

## [15] EXPERIENCE:

Bidders should have supplied seven strand AAAC Conductors such as Weasel, Rabbit & Dog or higher (like ACSR Conductors) in the last two years.

## [16] BIS LICENCE:

**The tenderers should submit a notarized copy of BIS License of IS-398 (Part-IV)/1994 valid at least up to the date of opening of the tender. If applied for renewal of the license, copy of receipt of fees and/or acknowledgement of application from ISI/BIS shall be furnished along with zerox copy of expired BIS License with the bid.**

**Bids received without above document shall be rejected.**

## [17] ISI MARK:

Conductor drums bearing ISI Mark will only be acceptable.

## [18] PACKING AND MARKING:

The conductor shall be packed in wooden drums confirming to IS-1778/1980 with latest amendments if any and detailed specifications as under:

(a)The conductor shall be supplied in non-returnable strong wooden drums provided with lagging of adequate strength, constructed to protect the conductor against all damages and displacement during transit, loading, unloading during transport and subsequent handling and stringing operation in the field.

The Wooden drums shall be generally confirming to IS-1778/1980 with amendment No.1 of June-1989.

(b) All wooden components shall be manufactured out of seasoned soft wood which shall be sound and free from defects that may materially weaken the components parts of the drums. Preservative treatment shall be applied to the entire drum with preservatives of good quality which is not harmful to the conductor.

(c) The drum sizes and dimensions shall be in accordance with the IS-1778/1980 with amendment No. 1 June-1989.

(d) Before reeling of conductor, the barrel of the drum as well as inside and outside surface of flanges of drum shall be painted with Aluminum/bitumen based paint. One layer of water proof and abrasion resistant paper shall be used over barrel. After reeling the conductor the exposed surface of the outer layer of all conductors shall be wrapped with water proof and abrasion resistant paper.



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- (e) Minimum spacing between outer layer of conductor and inner surface of lagging shall be 75 mm. The external lagging shall be closely fitted and shall be thickness of not less than 38 mm. There shall be minimum 2 Nos. binders consisting of hoop iron/galvanized steel wire outside of the protective lagging.
- (f) Arrangement for sealing (seal wire with lead seal) the outer end of conductor may be provided by supplier. The inspector may provide his seal after inspection.
- (g) Each drum shall have the following information stenciled on it in indelible ink along with other essential details.
- (I) Size and nomenclature of conductor.
  - (II) Purchaser's order No. and date.
  - (III) Name of manufacturer and address.
  - (IV) Number & length of conductor in meters.
  - (V) Drum number.
  - (VI) Net weight of empty drum with lagging.
  - (VII) Gross weight of drum with conductor and lagging.
  - (VIII) Property of (write name of relevant DISCOM).
  - (IX) Name of consignee.
  - (X) Reference IS Number & ISI Certification mark, if any.
- (h) The following details shall also be etched on Aluminum /steel plate of minimum size of 10 cm x 6 cm on one face of each drum in addition to the above marking by ink.
- (i) Name of manufacturer. (ii) Size and nomenclature of conductor.
  - (iii)Purchase Order No. & Date. (iv) Drum Number & length in meters.
- (i) If, the Conductor drum carries more than one length, measurement of each length of conductor and total of all of them shall be marked on drum. The outermost length on drum shall be numbered as first and the inner most shall be numbered as last.

[19] Bidders are required to submit the following documents with the offer without which the bid shall be liable for rejection.

1. Notarized copy valid BIS License.
2. Guaranteed Technical Particulars (GTP) given in App-A.
3. List of testing equipment.
4. List of Plant and Machinery and Production capacity.
5. List of orders executed with GUVNL/DISCOM/Other SEB/Utility.

[20] GUARANTEED TECHNICAL PARTICULARS (GTP):

The Guaranteed Technical Particulars (GTP) given in the Appendix-A are generally in conformity with IS-398 (Part-IV) of 1994.

The manufacturer offering ISI certificate mark, shall be deemed to be manufacturing conductor meeting the guaranteed technical particulars given in Appendix-A.



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## APPENDIX -A GUARANTEED TECHNICAL PARTICULARS (GTP)

|  |  |  |
|--|--|--|
| Size of Conductor:<br>34 mm <sup>2</sup> AAAC Weasel | Size of Conductor:<br>55 mm <sup>2</sup> AAAC Rabbit | Size of Conductor:<br>100mm <sup>2</sup> AAACDog |
|--|--|--|

Bidder has to confirm following important requirements.

| SI.No.            | PARTICULARS  | CONFIRMATION |        |        |
|-------------------|--|--------------|--------|--------|
| A1                | Conductor shall be manufactured as per IS-398 Part-IV/1994 or latest amendment of it.  |              |        |        |
| A2                | Wooden drums shall be as per IS-1778/1980 with latest amendment, if any and shall be painted as per specification  |              |        |        |
| A3                | Spacing between outer layer of conductor and inner surface of lagging shall be 75mm min.   |              |        |        |
| A4                | Standard length shall be (a) 2000 meters for 34 mm <sup>2</sup> & 55 mm <sup>2</sup> and (b) 1100 meters for 100 mm <sup>2</sup> sizes with 5% (five percent) tolerance. |              |        |        |
| A5                | Short length shall not be less than 50% of the standard length. Also such random / short length shall not exceed 5% (five percent) of the ordered quantity.              |              |        |        |
| A6                | Maximum three numbers of random length shall be wound on any one drum.   |              |        |        |
| A7                | Conductor shall have 7 Nos. of wires. And outer lay shall be right handed.   |              |        |        |
| A8                | Drum Size shall be as per IS-1778/80 with Amendment No. I of 1989  |              |        |        |
| 9                 | Properties of individual wires shall be as under:  |              |        |        |
|                   | Dia of wire  | Weasel       | Rabbit | Dog    |
|                   | Nominal  | 2.5          | 3.15   | 4.26   |
|                   | Minimum  | 2.47         | 3.12   | 4.22   |
|                   | Maximum  | 2.53         | 3.18   | 4.30   |
|                   | Mass in kg/km  | 13.25        | 21.04  | 38.48  |
|                   | Min.BL after stranding   | 1.44         | 2.29   | 4.18   |
|                   | Res.at 20°C (max)  | 6.845        | 4.290  | 2.345  |
|                   | App. overall diam. of complete stranded conductor in mm  | 7.50         | 9.45   | 12.78  |
|                   | App. mass in kg /km  | 94.00        | 149.20 | 272.86 |
|                   | Approx. calculated breaking load in KN   | 10.11        | 16.03  | 29.26  |
|                   | Calculated max. res. at 20°C in ohms/km  | 0.990        | 0.621  | 0.339  |
|                   | Minimum lay ratio  | 10           | 10     | 10     |
| Maximum lay ratio | 14   | 14           | 14     |        |



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|    |   |  |
|----|---|--|
| B1 | BIS License number(Copy Enclosed)                               |  |
| B2 | Validity Up to  |  |
| B3 | List of Plant & Machinery.                                      |  |
| B4 | List of NABL approved test house calibrated Testing equipments. |  |

PLACE:

Signature & Seal of Tenderer

DATE: