TECHNICAL SPECIFICATION FOR ALL ALUMINIUM ALLOY STRANDED CONDUCTORS (AAAC)

(1) SCOPE :-

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

1	Code Name	AAAC Squirrel	AAAC Weasel	AAAC Rabbit
2	Size	7/2.0mm	7/2.5 mm	7/3.15mm
3	Actual area in mm2	22mm2 Alloy Area	34mm2 Alloy Area	55mm2 Alloy Area

(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 ALUMINIUM ALLOY WIRES USED IN THE CONSTRUCTION OF STRANDED ALUMINIUM ALLOY CONDUCTORS.

Diameter in mm			Cross Sectional area of nominal dia wire. in sq.mm.	Mass Kg/Km	Minimum breaking load after stranding in KN	Resistance at 20 C ohm per KM
Nominal	Min.	Max				Max.
2.0	1.98	2.02	3.142	8.48	0.92	10.653
2.5	2.47	2.53	4.909	13.25	1.44	6.845
3.15	3.12	3.18	7.793	21.04	2.29	4.290

(4) PROPERTIES OF CONDUCTORS :-

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

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Table-II. ALL ALUMINIUM ALLOY CONDUCTORS (AAAC)

Nominal Alloy Area	Stranding & Wire dia.	Sectional Area	Approx. overall dia.	Approx. Mass	Calculated resistance at 20 C (Max)	Approx. calculated breaking load.
sq. mm	mm	sq. mm	mm	Kg/KM	Ohm/KM	KN
22	7/2.0	21.99	6.0	60.16	1.541	6.45
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

(5) FREEDOM FROM DEFECTS:-

The wire shall be smooth and free from all imperfections not consistent with good commercial practice for example, spills, splits & scratches.

(6) MATERIAL:-

The conductor shall be constructed of heat treated aluminum Magnesium silicon alloy wires having composition appropriated 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 Aluminium Alloy Conductor shall be supplied in standard length of 2.0 KM

9.2 Tolerance +/- 5% of standard length.

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

(10) INSPECTION :-

The supplier shall offer the material for inspection in lots as and when ready with him. The UGVCL will 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 UGVCL's inspectors or waiver of inspection in writing from the UGVCL.

The acceptance tests for offered lot will be carried in presence of inspector at the works of the supplier at their cost. The testing instruments should be in working condition and duly calibrated either by the original manufacturer of the instruments or by any approved testing agency. Copies of the calibration certificates shall be made available to the inspector.

Only after sample passing the acceptance test, the lot will be acceptable. In case of failure of sample in any test, procedure as per clause no. 13 of IS 398 (part-IV) 1994 will be applicable.

(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 if demanded.

(12) SAMPLE CRITERIA:-

The sample 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.

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(14) MEASUREMENT OF LENGTH :-

14.1 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.

14.2 UGVCL will have the option of measuring conductor lengths at random at various destination. If, so desired the supplier will be allowed to remain present at the time of the consignee taking the measurement, otherwise the findings of the consignee will be entertained for the same. Adhoc deduction of the amount as deemed fit, to take care of the shortage will also be effected from invoices and it will be binding upon the supplier.

(15) EXPERIENCE:-

Tenders shall submit the list of orders executed for 7 strand AAAC Conductors such as squirrel, weasel, Rabbit, Recoon, Dog etc. at least for two years.

(16) ISI LICENCE :-

The tenderers should submit an attested zerox copy of ISI 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 licence, copy of receipt of fees and/or acknowledgement of application from ISI/BIS shall be furnished along with zerox copy of ISI Licence (Expired) with the offer.

(17) **ISI MARK**:-
Conductor drum 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 :-

18.1 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.

18.2 The gross mass of packing shall not exceed by more than 10% values of standard values given in the following table

CONDUCTOR SIZE	GROSS MASS
22 sq .mm &34 sq. mm.	1100kgs.
55 sq. mm.	1500kgs.

18.3 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.

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

18.5 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.

18.6 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.

18.7 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.

18.8 **MARKING** :-

Each drum shall have the following information stenciled on it in indeliable ink along with other essential details.

a) Size and name of conductor.
b) UGVCL order No. and date.
c) Name of manufacturer and address.
d) Number & length of conductor in meters.
e) Drum number.
f) Net weight of empty drum with lagging.
g) Gross weight of drum with conductor and lagging.
h) **Property of UGVCL**.
i) Name of consignee.
j) Reference IS Number & ISI Certification mark, if any.

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18.9 The following details shall also be marked on embossed plate of aluminium having minimum size of 10 Cm x 6 cm on one face of each drum in addition to the above marking by ink.

a) Name of Manufacturer.
b) Size and name of conductor.
c) UGVCL order No. & Date.
d) Drum Number.
e) Number & length of conductor in meters.

18.10 If, the 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. GUARANTEED TECHNICAL PARTICULARS (GTP) :-

The Guaranteed Technical Particulars (GTP) given in the Appendix-A are generally in confirmity 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.
Bidder shall submit the details in guaranteed technical particulars (GTP) in Appendix-A along with the offer.

20. Bidders are requested to submit the following documents along with the offer.

i) Valid ISI Licence attested copy.
ii) Guaranteed Technical Particulars (GTP) given in App-A.
iii) List of testing equipment.
iv) List of Plant and Machinery and Production capacity.
v) List of orders executed with GUVNL (earstwhile GEB) or its DISCOM/Other State Electricity Board.

In absence of above details, the offer is liable to be rejected without any further correspondence.

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APPENDIX –A

Manufacturer's Name :
and address.

GUARANTEED TECHNICAL PARTICULARS (GTP)
Technical information and Guaranteed Technical information for supply of All Alloy Conductor.
Size : 22 ,34 &55 sq.mm.

PART-A

BIDDERHAS TO CONFIRM FOLLOWING IMPORTANT REQUIREMENTS.

Sr.No.	Particulars	Confirmation
1.	**Conductor shall be manufactured as per IS-398 Part-IV/1994 or latest amendment of it.**	**Yes**
2.	**Wooden drums shall be as per IS-1778/1980 with latest amendment, if any and shall be painted as per specification.**	**Yes**
3.	**Spacing between outer layer of conductor and inner surface of lagging shall be 75mm min.**	**Yes**
4.	**Standard length 2000 Meters +/- 5%.**	**Yes.**
5.	**Random length 50% of the standard length shall not exceed 5% (five) of order quantity.**	**Yes**
6.	**Maximum three numbers of random length shall be wound on any one drum.**	**Yes**
7.	**Conductor shall have 7 Nos. of wires.**	**Yes**
8	**Outer layes shall be right handed**	**Yes**
9.	**Drum Size. As per IS-1778/80 with Amendment No. I of 1989**	**Yes**
10.	**Conductor drum shall carry ISI Mark.**	**Yes**
11.	**Marking on drum as per Clause 18.8 & 18.9**	**Yes**
12.	**The properties of individual wires shall be as under :-**	

i) Diameter of wire in mm	**Squirrel**	**Weasel**	**Rabbit**	
Nominal	**2.0**	**2.5**	**3.15**	**YES**
minimum	**1.98.**	**2.47**	**3.12**	**YES**
maximum	**2.02**	**2.53**	**3.18**	**YES**
ii) mass kg/km	**8.48**	**13.25**	**21.04**	**YES**
iii)minimum breaking load after stranding	**0.92**	**1.44**	**2.29**	**YES**
iv)max. resistance at 20deg. C in ohm/km	**10.653**	**6.845**	**4.290**	**YES**

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GEB/RE/SPECIFICATION/13/JULY 2000/(R-0)

The properties of stranded complete conductor shall be as under.

	Squirrel	Weasel	Rabbit	
i)App. overall dia. of complete stranded conductor in mm.	6.0	7.50	9.45	YES
ii) App. mass in kg /km.	60.16	94.00	149.20	YES
iii) App. calculated breaking load in KN.	6.45	10.11	16.03	YES
iv) calculated max. resistance at 20deg.C in ohms/km.	1.451	0.990	0.621	YES
v) lay ratio. min.	10	10	10	YES
max.	14	14	14	YES

PART-'B'

BIDDER HAS TO FURNISH BELOW DETAILS ABOUT MATERIALS.

(1) ISI License No.

(2) –do- date of expiry. (Valid up to)

PART-'C'

BIDDER HAS TO ENCLOSE FOLLOWING DOCUMENTS & HAS TO CONFIRM FOR THE SAME.

Sr. No.	Particulars.	Confirmation
1.	ISI License.	Yes, copy attached
2.	Proof, if applied for renewal of ISI License.	Yes, copy attached
3.	List of Plant & Machinery.	Yes, copy attached
4.	List of testing equipments.	Yes, copy attached
5.	List of orders pending/executed atleast for past two years for the item offered.	
	a) With G.E.B./UGVCL/MGVCL/PGVCL/DGVCL.	Yes, copy attached
	b) With the firms other than former GEB.	Yes, copy attached

PART-'D'

Bidder has to mention deviation if any, quoting relevant clauses of specification.

Signature & seal of Tenderer

Date : **Place :** **Company's Round Seal**

Signature & Seal of Tenderer