

GENERAL PARTICULARS ABOUT THE TENDER IN BRIEF

**JAIPUR VIDYUT VITRAN NIGAM LIMITED
(PROCUREMENT CIRCLE)
NEAR RAM MANDIR , BANI-PARK, JAIPUR-302006**

TELEPHONE: - 0141 2208098

TELE FAX: - 0141-2208098

**SPECIFICATION FOR SUPPLY OF
(i) 11 KV 45 KN DISC INSULATORS "T&C" TYPE
(ii) 11 KV 45 KN DISC INSULATORS "B&S" TYPE
(iii) 120 KN DISC INSULATORS "B&S" TYPE
AGAINST TENDER NOTICE NO: TN-4309**

Last Date & time of receipt of tenders	21.03.2011 upto 2:30 PM
Date & time of opening of tenders	21.03.2011 at 3:00 PM
Cost of Specification	Rs. 2500.00 (Rs. Two Thousand Five Hundred only)
Validity	120 days from the next date of opening of techno commercial bid.
Earnest Money	Rs. 5,00,000.00 (Rs. Five Lac only) / Exemption Certificate / Vendor Registration Of Class " A " Category.

VERY VERY IMPORTANT :

i) The bidders in their own interest are advised to go through the complete specification carefully.

ii) The material to be purchased against above Tender is meant for three Discoms of Rajasthan i.e. JVVNL/ AVVNL/ JdVVNL.

The bidders are required to quote the price for delivery of material any Where in Rajasthan State in the stores of JVVNL/ AVVNL/ JdVVNL.

iii) In case of successful bidders, the purchaser reserves the right to distribute quantity awarded among JVVNL/ AVVNL/ JdVVNL in the ratio of their requirement & each Discom will issue separate purchase orders for which bidder will have to furnish separate BGs in JVVNL / AVVNL / JdVVNL (as the case may be) . However, for opening of tender the bidder should be registered vender in class "A" category in either of JVVNL/ AVVNL/ JdVVNL or furnish requisite EMD.

iv) Clause No. 1.17 (A) (c) & 1.17 (B) of Instructions to tenderers stands amended as under:

(a) Existing Qualification Requirement for minimum quantity to be quoted is Reduced to one third.

(b) Counter offer will be given to all responsive bidders.

INDEX

Section-I	Instructions to tenderers with addendum corrigendum	
Section-II	General Conditions of Contract with addendum / corrigendum.	
Section-III	Technical Specification for 11 KV 45 KN Disc Insulator “B&S” and “T&C” Type and 120 KN Disc Insulators “B&S” type	
Schedule-I	Schedule of requirement	
Schedule-II	P. V .Formula	
Schedule-III	Details of Standard	
Schedule-III(A)	Pre Qualification Requirement	
Schedule-III(B)	Bank Guarantee Form	
Schedule-IV	Price Schedule	To be submitted in Price Bid Envelope
Schedule IV(A)	Details of tendered quantity, quantity offered along with justification with reference to qualifying Requirement)	The Bidder is required to justify quantity offered as per qualifying Requirement.
Schedule V(A)	Guaranteed Technical Particulars of 11 KV 45 KN Disc Insulator “T&C” Type	
Schedule V(B)	Guaranteed Technical Particulars of 11 KV 45 KN Disc Insulator “B&S” Type	
Schedule V(C)	Guaranteed Technical Particulars of 120 KN Disc Insulator “B&S” Type	
Schedule V(D)	Departure from the Guaranteed Technical Particulars	
Schedule VI(A)	Departure from the requirement of Technical Specification.	
Schedule VI(B)	Departure from commercial terms & conditions of specification	
Schedule VII	List of Past supplies.	
Schedule VII(A)	Format of CA certificate	
Schedule VIII	Delivery schedule.	
Schedule IX	List of equipment & technical hands available with the tendering firm.	
Schedule X	General Particulars about the tender in brief.	

SECTION-III**TECHNICAL SPECIFICATION FOR**

- (1) 11 KV 45 KN DISC INSULATORS T & C TYPE.**
- (2) 11 KV 45 KN DISC INSULATORS B & S TYPE**
- (3) 120 KN DISC INSULATORS B&S TYPE**

3.01 SCOPE :

3.01.1 This section covers for the design, manufacture, testing at manufacturer's works before despatch, supply and delivery of Disc Insulators Tongue & Clevis type and Ball & Socket type for various overhead 33 KV an 11 KV Power Lines and overhead 132/33 KV Power Lines. The description of insulators & string arrangements have been given in Appendix- I, Appendix-II and Appendix-III

3.01.2 The technical specifications, contained herein ,are for the guidance of the tenderers. Any deviation from the Purchaser's specification will be considered on their relative merits in respect of performance, efficiency, durability and overall economy consistent with the requirements stipulated herein after. Such deviations shall be clearly entered by the tenderer in the form as per schedule-VI (A&B) of the specification.

3.02 STANDARDS :

The Disc Insulator shall comply in all respects with the Indian Standard Specifications IS:731-1971 (Second Revision), IS:3188-1980, IS:2486 (Part-I)-1993 (Second Revision),IS:2486 (Part-II) 1989 (Second Revision) and IS:2486 (Part-III)1974, IS:2486(Part.IV)1981 with latest amendments. The galvanisation of metallic parts shall conform to IS:2633/1972(Latest amendments). The Insulator String shall consist of discs (B&S Type) of dimensions specified in Appendix-I, for use on 3 phase, 50 cycle power system . All applicable standards shall be clearly mentioned in schedule-III

3.03 MATERIALS, DESIGN & TYPE :

3.03.1 All the materials used in the manufacture of the insulators shall be of the first class quality. The porcelain shall be sound, free from defects thoroughly vitrified and smoothly glazed.

3.03.2 The glaze shall be brown in colour . The glaze shall cover all the porcelain parts of the insulators except those areas which serve as supports during firing or are left unglazed for the purpose of assembly . The glaze shall be uniform, smooth, hard, dense, continuous and brilliant.

3.03.3 The design of the insulator shall be such that stresses due to expansion and contraction in any part of the insulator shall not lead to deterioration. The porcelain shall not engage directly with hard metal.

3.03.4 Cement used in the construction of the insulator shall not cause fracture by expansion or loosening by contraction and proper care shall be taken to locate the individual parts, correctly during cementing . The cement shall not give rise to chemical reaction with metal fittings and its thickness shall be as uniform as possible.

3.03.5 All parts of different fittings which provide for interconnection shall be made such that sufficient clearance is provided at the connection point to ensure free movement and suspension of the insulator string assembly.

3.03.6 All hardware fittings (except those specified otherwise) shall be made of drop forged steel or heat treated malleable cast iron, and shall be hot dip galvanized after all machining and fittings have been completed. The material used in fittings shall be corrosion resistant.

3.03.7 The locking devices shall be resilient, corrosion resistant and of suitable mechanical strength. The hardness and temper of the material are important for their satisfactory operation.

The locking devices shall retain their locking ability after being operated from the locking to the coupling position at least twenty times , at normal temperature. They should be effective at the lowest temperature likely to be encountered in service.

3.03.8 For Ball & Socket type disc insulators the cap and the pin shall be heavily galvanised and mechanically strong. The ball shall move freely in the cap sockets, but shall be so designed that they do not give way while in service. The dimensions of the pin ball & socket shall be conforming to ISS 2486/part -II. The cap shall be made of malleable cast iron conforming to IS:2108-1977. These shall be free from cracks, shrinks, air holes, burs and rough edges. The caps shall be circular, with inner and outer surfaces concentric and of such design that they will not yield or distort under the stress to the porcelain shells. The pin shall be single piece made of drop forged steel and shall be free from laps, field's burs and rough edges. All bearing surfaces shall be smooth and uniform so as to distribute the loading stresses uniformly. The pins shall be of such a design that they will not yield or distort under loaded condition. They shall not be made by joining, welding, shrink fitting or any other process from more than one piece of material. The locking devices 'W/R' type for Ball & Socket lockers shall be either of Phosphor bronze conforming to IS:7814-1975 or stainless steel conforming to IS:6603-1972 with minimum hardness of 160 HV. The dimensions shall confirm to IS:2486(Part-3)-1974.

3.03.9 The dimension of the clevis and tongue connection shall be as shown in fig.25 and the dimension of cross arm strap shall be as shown in fig.26 of IS:2486/Pt.II/1989 (latest amendments)

The tongue and clevis type porcelain insulators shall be as per fig.2 and its dimension shall conform to table-2 of IS:3188/1980 (latest amendments)

The dimensions of pin ball socket shall be according to fig.8 and 9 respectively of IS:2486 (Part.II/1989) IInd revision.

3.04 CLASSIFICATION SIZE & NO. OF DISCS :

3.04.1 The insulators shall be of type B as specified under clause 5 "Classification" of IS:731-1971(second revision).

3.04.2 The long rod Insulator falling under type A shall conform to IEC:433-1980(with latest amendments)& IEC-575/1977.

3.05 ATMOSPHERIC CONDITIONS :

3.05.1 Climatic condition : All parts and fittings shall be suitable for atmospheric condition and shall be inherently resistant to atmospheric corrosion or be suitably protected against corrosion both storage & in service :

1. Min. temperature	(-) 2.5 deg.C
2. Max. temperature of air in shade	50.0 deg.c.
3. Average everyday temperature	32.2 deg.c.
4. Max. temperature of conductor carrying current and exposed to sun	67 .0 deg.c.
5. Max relative humidity	90 %
6. Min relative humidity	10 %
7. Isoceraunic level	25
8. Number of rainy days per year	70
9. Annual rain fall	10 to 100 cm
10. Wind pressure(acting on full projected area	195 kg/sq.cm
11. Altitude	200M to 1000M

3.05.2 Reference atmospheric conditions at which insulator characteristics shall be expressed for the purpose of comparison shall be as given below :

Ambient Temperature	: 20 degree C
Barometric pressure.	: 1013 millibars.
Absolute humidity.	: 11 g water per cubic metre corresponding to 63 percent relative humidity at 20 deg.C.

3.05.3 Tests for the purpose of this specification may be carried out under conditions naturally obtaining at the time of test. The barometric pressure, air temperature and humidity shall be recorded for the purpose of corrections. Corrections of test voltages for atmospheric conditions shall be taken as per Appendix. "A" of IS:731/1971 (second revision) "Correction Of Test Voltages For Atmospheric Conditions".

3.06 TESTING :

3.06.1 Sampling inspection, testing and acceptance of insulators shall be in accordance with the latest revision of IS:731/1971 while that of hardware associated with these discs shall be as per IS:2486(Pt.I)/1993 (second revision) IS:2486(Pt. II)/1989 (second revision) and IS:2486(Pt.III)/1974 & IS:3188-1980 with

latest amendments. Sampling inspection, testing and acceptance of long rod insulators shall be in accordance with the latest edition of IEC :433/1980 & IEC:575/1977.

3.06.2 TEST VOLTAGE : The test voltage of the insulators shall be as given in Appendix. II (values given are without applying correction factors).

3.07 MECHANICAL LOADS :

The insulator strings shall be suitable for the minimum failing loads specified in Table-2, clause 7 of IS:731/1971 (IInd Revision). The load shall be supplied axially to the insulator strings.

3.08 MARKINGS :

Each insulator shall be legibly and indelibly marked to show the following :

- a) Name or trade mark of the manufacturer.
- b) Month and year of manufacture.
- c) Minimum failing load in KNewton.

Marking on porcelain shall be originated and shall be applied before firing.

3.09 CREEPAGE DISTANCE :

The tenderer shall specify in his tender the creepage distances of the insulator. These values should not be less than those specified in IS:731-1971 & IS:3188-1980 (Latest amendment).

3.10. TYPE TEST ON SAMPLES SELECTED FROM MATERIAL RECEIVED IN STORES FROM 1st OFFERED LOT :

3.10.1 The first lot offered shall not be less than 10% of the ordered qty or of following quantity , whichever is less.

11 KV 45 KN Disc Insulator "T&C" Type - 5000 Nos
 11 KV 45 KN Disc Insulator "B&S" Type - 1000 Nos
 120 KN Disc Insulators "B&S" type - 500 Nos.

3.10.2 If the bidder has already got conducted the requisite type test from the first lot of material received in Nigam's store against any previous / earlier tender of JVVNL and such Type Test reports are valid i.e not older than 3 years on the date of opening of Techno-Commercial Bids, then the requirement of conducting Mandatory Type Test on the sample selected from 1st Lot of supply received in Nigam's store is **RELAXED**. For this purpose date of conducting type test will be considered.

ALTERNATIVELY

In case the bidder do not meet above requirement than two sample of each type of Disc Insulators from the 1st lot received in purchaser's store shall be selected and

sealed in the presence of representative of supplier for getting it Type Tested at Govt. / Govt. approved / Govt. recognized / NABL accredited Laboratory / ILAC Accredited.

However, suppliers own lab shall not be considered for the purpose of type test reports. The selected and sealed sample for type test shall be identified by providing **Polycarbonate seals**. The transportation charges of sample from store to test house shall be borne by NIGAM, Whereas the charges incurred towards type test of the material at test house shall be borne by the supplier. The testing charges should be remitted through D.D. in favour of Test House. The name of the test house shall be intimated separately..

3.10.3 In case sample(s) from first lot fails in type tests then:

a) Supplier shall have to replace the full quantity of the respective inspected lot supplied to various stores which is lying unused.

b) For the quantity already utilized against the order in field a deduction of 30% (thirty percent) of F.O.R. destination price of the material supplied shall be made

c) Sample(s) from next lot shall be selected again for type test . All test charges incurred towards type test of the material for second time shall be borne by the Supplier for which the testing charges should be remitted through D.D. in favour of the Test House by the supplier with the 2nd inspection offer.

3.10.4 In case sample again fails in the type test then:

a) The quantity supplied/received in stores and lying unused in stores shall stand rejected and shall be lifted back by the supplier.

b) For the quantity already utilized against the order in field a deduction of 30% (thirty percent) of F.O.R. destination price of the material supplied shall be made

c) Further supplies shall not be accepted and order shall stand cancelled .

3.10.5 In case the bidder receives order from more than one Discom, then the Type test form 1st lot shall be conducted by the Discom where material have been received first .

3.11 TYPE TEST :

a) The following tests shall constitute the type tests and shall be carried as per the relevant clauses of IS:731/1971 (second revision). The clause references have been given in brackets against each test.

- a) Visible discharge test (10.2).
- b) Impulse voltage withstand test (10.3).
- c) Wet power frequency voltage withstand test(10.4).
- d) Temperature cycle test (10.6).
- e) Electro mechanical failing load test 10.7).

- f) Twenty four hours mechanical strength test (10.9).
- g) Puncture test (10.10).
- h) Porosity test (10.11).
- i) Galvanizing test (10.12).

b) In addition to above, the following type tests shall be got conducted at CPRI , Bangalore / any other NABL accredited Government lab / Govt. approved Lab where facility for the same is available as per the relevant clauses of IEC standard.

- a) Residual Strength Test as per IEC :60797**
- b) Steep Wave Front test as per IEC: 61211/2004**

In case , if it is not possible to conduct the aforesaid additional type test in above manner then the said additional type test may be allowed to arrange by the supplier at their own works or any other manufacturers works where the requisite testing facilities for conducting the above test are available.

3.12 ACCEPTANCE TESTS :

3.12.1 These tests shall be for the purpose of acceptance of the lot. For carrying out acceptance test sampling procedure given in Appendix "C" of IS:731/1971 (second revision) shall be followed.

3.12.2 The insulators selected in accordance with clause 3.11.1 above shall be divided approximately into three parts and subjected to the tests in the order as specified in clause No. 10.1.2.2 of IS:731/1971.

3.12.3 The insulators after having withstood the routine tests shall be subjected to the acceptance tests.

3.12.4 **Additional acceptance test-** Insulation resistance test In addition to acceptance test as per clause no.3.11.2, insulation resistance test shall also be conducted on the samples as per clause No.3.11.1. The procedure for carrying out this test shall be as under:

- (a)** Clean insulator & dry properly, then meggar the insulator with 2.5 KV/ 5 KV meggar
- (b)** IR value so measured should not be less than 1000 (one thousand) mega ohms

The testing and criteria for conformity shall be as applicable to galvanizing and puncture test.

3.13. CRITERION OF CONFORMITY :

3.13.1 The criterion of conformity to the requirements of the tests given in 3.11.2 shall be as per clause No.C-2, of Appendix 'C' of IS:731/1971 (second revision).

3.13.2 No part of the lot withdrawn as described in 3.12.1 above shall constitute part of any other test submitted for the first time.

3.14 ROUTINE TESTS :

3.14.1 Routine tests shall be carried out on each insulator & to check requirements which are likely to vary during production as per relevant IS:731/1971 (with latest amendments).

3.15 PACKING :

3.15.1 All insulators shall be packed in suitable crates or boxes with suitable steel bands so as to withstand rough handling and storage at destination. The gross weight of packing shall not exceed 50 Kgs.

3.16 DRAWINGS :

3.16.1 The tenderer shall submit detailed drawings showing design and dimensions of insulator , ball pin, socket cap & security pin . The type of the material used for various parts shall be clearly specified on the drawing.

3.17 GUARANTEED TECHNICAL PARTICULARS :

Full guaranteed particulars including dry and wet flashovers, puncture and impulse voltages, corona formation voltages, creepage distances, etc. should be given in the tender as called for in Schedule-V(A) for 11 KV 45 KN T&C Disc Insulators , Schedule-V(B) for 11 KV 45 KN B&S Disc Insulators and Schedule-V(C) for 120 KN B&S Disc Insulators. Tenders not accompanied by Schedule-V(A), V(B) & V(C) duly filled in are likely to be ignored.

3.18 QUANTITY :

Quantity indicated above is provisional. The purchaser reserves the right to increase/ decrease the same at the time of placing the order.

3.19 PRICES & PRICE VARIATION :

a) The prices shall be quoted in Rs. per unit on F.O.R. destination basis in the manner detailed in schedule of Prices(Schedule-IV) indicating details of ex-works price, Excise Duty, Sales tax / VAT, freight & Insurance charges and Entry Tax, etc. for delivery at our stores.

b) The quoted price shall be variable as per Price Variation formula given in this specification at Schedule-II without any ceiling. The base date of price variation shall be **1.02.2011** and shall be governed as per clause No.1.10. of Instructions to bidders. The offers in which prices have not been quoted in prescribed manner are liable to rejection.

c) If the price variation formula is changed, the same shall be applicable for the price variation. During the transit period when both old and new indices are being circulated, then the admissible Price Variation shall be applicable, which is advantageous to Nigam, and the period from which the old indices are discontinued then the P.V. shall be admissible with the new indices.

3.20. DELIVERY SCHEDULE

The bidder is required to quote monthly delivery. The delivery of quoted quantity should be completed in **Ten months** period including commencement period of **maximum 30 days**. In case ordered quantity is different than quoted quantity, then monthly delivery shall be adjusted proportionately. Tenders in which monthly delivery schedule is not indicated shall be ignored.

The tenderers are required to indicate the delivery schedule in the schedule-VIII of specification.

3.21 DELAY IN DELIVERY :-

The “**Delay in Delivery**” shall be governed as per **clause 1.24 of General Condition of Contract**

3.22 TEST CHECKING OF MATERIAL AT STORES

The material received in the stores of the NIGAM shall be subjected to the test checking at stores before final acceptance of the material, the procedure for the same shall be as under :

i) SAMPLING

One sample out of each sub-lot / lot consisting of following quantities or part thereof in case of each type of insulators from each inspected lot received in stores shall be selected from each store for test checking of material and shall be got tested.

11 KV 45 KN Disc insulator “T&C” Type –	1000 Nos.
11 KV 45 KN Disc insulator “B&S” Type –	1000 Nos
120 KN Disc Insulators “B&S” type -	500 Nos

The sample selection shall be done as soon as the material is received in stores, without calling the representative of supplier. However, testing at CTL or else where as arranged by NIGAM shall be done in the presence of representative of supplier after identification/ confirmation by the supplier’s representative that sample(s) so selected belong to them.

ii) TESTS

The following tests shall be carried out on the above items :

- a) Visual examination, verification of dimensions, creepage distance etc.
- b) Mechanical failing Load Test
- c) Porosity test
- d) Puncture Test

However, only those tests shall be conducted at CTL for which facility with CTL is available.

In case if the facility for conducting any of the above test(s) is not available at the NIGAM's CTL, the purchaser reserve the right to get such test (s) conducted at any independent NABL Test House.

1. For witnessing of the testing, clear 7 days notice shall be given to the supplier stating date, time & place where the test is to be conducted. The testing shall be started after identification / confirmation of sample by the representative of the supplier that sample selected for testing pertain from the lot supplied by them. In case the supplier does not attend for witnessing the testing, the testing shall be proceeded and completed and action be taken as per the contract.

2. The CTL shall send copies of test reports to the purchaser, consignees and the supplier.

iii) CRITERIA FOR ACCEPTANCE

In case of failure of any of sample (s) in any of the tests at CTL, the material contained in the lot / sub-lot received in store to which the samples belong, shall be rejected. The rejected material shall have to be replaced by the supplier free of cost.

The material duly inspected/ cleared for dispatch received in stores against replacement of rejected material shall be tested in CTL of NIGAM.

In case material received against replacement fails in CTL testing, then the following action shall be taken :

i) Material contained in the lot / sub-lot received in stores to which the sample belong shall be rejected and shall be lifted by the supplier from Stores and order equal to the quantity of lot/ sub-lot shall stand cancelled with a recovery of 5% of value of the lot / sub-lot considering it as non-supply of material. Apart from this any lot tested for 2nd time in CTL will attract a recovery of Rs.5000/- at each occasion.

(ii) If there is more than 50% failure of samples tested in CTL, then the firm shall be debarred from participating in future tenders for two years.

iv) TEST CHARGES :

All test charges incurred towards test checking of the material received in our stores shall be borne by the NIGAM.

v) PAYMENT :

A) If bidder have submitted valid type test reports with bid:

The 100% payment shall be released after receipt of successful test reports from CTL for the mandatory test checking on the samples selected from the material received at stores against first lot and subsequent lot(s) in anticipation of successful type test reports.

B) If bidder have not submitted valid type test reports with bid:

i) The 70% payment shall be released after receipt of successful test reports from CTL for the mandatory test checking on the samples selected from the material received at stores against first lot and subsequent lot(s) in anticipation of successful type test reports.

ii) The balance 30% payment shall be released after receipt of successful type test reports on the samples selected from the material received in the stores.

C) The due dates for payment shall be considered from the date of submission of the bills along with receipted challans to Sr. Accounts Officer (CPC) of respective Discoms.

3.23 PLANT, MACHINERY & TESTING EQUIPMENTS;

3.23.1 The bidder should have required plant, machinery and testing equipment for manufacturing & testing of disc insulators.

3.23.2 The bidders should furnish details of plant, machinery and testing equipment with the bids failing which bids may be ignored.

The bidder should have conveyor belt system at their works for conducting continuous and hundred percent routine test on Disc Insulators. The bids of bidder not having such arrangement (infrastructure) may be ignored.

3.24. CHALLENGE TESTING :

The other manufacturer can also request challenge testing for any test based on specification. The challenger would request for testing with testing fee. The challenge test fees are proposed at least three times the cost of testing. This is likely to deter unnecessary challenges. The challenger would have the opportunity to select the sample from the store of Nigam and any such challenge should be made within the guaranty period. The party challenged, challenger and the utility could witness the challenged testing. The challenged testing would cover all the type tests as per relevant IS.

The challenge test could be conducted at NABL accredited laboratory, like ERDA/ CPRI . If the values are within limit, the product gets confirmed, else not confirmed. If the product is not confirmed, the manufacturer would pay the challenge fee and challenger would get the fee refunded. However, as a redressal system the challenger would be allowed to ask for fresh selection of two more samples from the store of Nigam and same be tested in a NABL laboratory (which shall be other than previously selected NABL accredited lab) at the cost of supplier, in presence of party challenged, challenger and the utility. If any one or both sample does not confirm the tests, then the product is said to have failed the tests. In such cases the manufacturer will be declared as unsuccessful manufacturer for the said product and balance supply shall not be availed and the order shall be cancelled with levy of maximum penalty.

APPENDIX-I**TECHNICAL PARTICULARS**

S. NO	PARTICULARS	45 KN DISC INSULATOR T&C TYPE	45 KN DISC INSULATOR B&S TYPE	120 KN DISC INSULATOR B&S TYPE
1	INSULATORS			
	a) Diameter	225 mm	255 mm	255 mm
	b) Height	145 mm	145 mm	145 mm
	c) Spacing	----	145 mm	145 mm
	d) Colour	Brown	Brown	Brown
	e) Surface	Glazed	Glazed	Glazed
	f) Creepage Distance	280 mm	280 mm	290 mm
	g) Ball Dia	16 mm	16 mm	20 mm
	h) Tolerance	As per relevant ISS	As per relevant ISS	As per relevant ISS
2	STRING ARRANGEMENT			
	a) Single Tension String for normal tension location			
	i) No of E&M	3	3	10
	ii) Disc strength	45	45	120 KN
	b) Double Tension String for normal tension location			
	i) No of E&M	3x2	3x2	N.A.
	ii) Disc strength	3x45 KN	3x45 KN	N.A.
	c) Minimum Failing Load	As per relevant ISS		
	All Electrical & Mechanical values Conforming to Highest sytem voltage 36 KV / 132 KV in table -1A of string of IS:731/1971			
3	Power System	33KV 3 Phase 50 Cycle effectively Non earthed	132 KV 3 Phase 50 Cycle effectively earthed	
4	Hiehest System	36 KV(RMS) Vol.	36 KV(RMS) Vol.	145 KV(RMS) Vol.
5	Visible Discharge	27 KV (RMS)	27 KV (RMS)	105 KV (RMS)
6	Wet Power Frequency	75 KV (RMS) withstand test	230 KV (RMS)	
7	Impulse Voltage	170 KV (Peak)	170 KV (Peak)	550 KV (Peak)
8	Power Frequency	1.3 Times the actual dry Flash over voltage of the unit		
9	Minimum creepage distance of the insulator string for moderately polluted admoshere	580 MM	580 MM	2250 MM
10	Conductor	Weasel & Rabbit	Racoon & Dog	Panther
11	Stranding and wire diameter	Al.30/3.0 + ST 7/3 mm		
12	Approx.overall diameter	21 mm	21 mm	21 mm

S. NO	PARTICULARS	45 KN DISC INSULATOR T&C TYPE	45 KN DISC INSULATOR B&S TYPE	120 KN DISC INSULATOR B&S TYPE
13	Appox. Calculated breaking load	9143.47 Kg	9143.47 Kg	9143.47 Kg
14	Normal Aluminium area	207 sq mm	207 sq mm	207 sq mm
15	Max. temperature of conductor carrying current and exposed to sun	67 Deg. C	67 Deg. C	67 Deg. C

*