

**JAIPUR VIDYUT VITARAN NIGAM LIMITED
OFFICE OF THE SUPERINTENDING ENGINEER (PROC)
OLD POWER HOUSE PREMISES, NEAR RAM MANDIR, BANIPARK, JAIPUR-6
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SPECIFICATION FOR SUPPLY OF

**HARDWARE FITTINGS FOR 11KV ,45 KN DISC INSULATOR `T&C' TYPE,
HARDWARE FITTINGS FOR 11KV ,45 KN DISC INSULATOR `B&S' TYPE
& HARDWARE FITTINGS FOR 120 KN DISC INSULATOR `B&S' TYPE
AGAINST TENDER NO. TN-4310**

Last Date of receipt of tenders	18.03.2011 upto 2:30 PM
Date of opening of tenders	18.03.2011 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. 500,000.00 (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 Bid 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 bidders 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.

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Note:- The bidder, in their own interest, are requested to read very carefully Section-I (Instruction to bidders), Section-II (General Condition of Contract) & Section-III (Technical Specification) before filling the bid. The Bid documents be downloaded from JVVNL website www.jaipurdiscom.in . No hard copy of the bidding documents will be provided to the bidders through this office. In case of any discrepancy found in bidding documents downloaded from the website and appended with the bid (as a bid document) and original copy of such document available in the office of Superintending Engineer (Proc.), Jaipur Discom, Jaipur then the copy available with Superintending Engineer (Proc.), Jaipur Discom, Jaipur will be considered as final document for all purpose. The cost of Bid document as published in NIT shall be furnished along with downloaded bid document in the manner prescribed in bid document.

SECTION-III-A

**TECHNICAL SPECIFICATION AND OTHER REQUIREMENTS
FOR HARDWARE FITTINGS FOR 11 KV,45 KN DISC INSULATORS
TONGUE & CLEVIS TYPE & HARDWARE FITTINGS 11 KV,45 KN DISC
INSULATORS BALL & SOCKET TYPE**

3.01 SCOPE :

3.01.1 This specification covers the design, manufacture, testing supply and delivery of hardware fittings suitable for 11 KV disc insulators tongue & clevis type & Ball & Socket Type for use on various 11 KV /33KV sub transmission lines . These fittings are to be designed as per drawing attached at Appendix-I (A) & I(C) { for T&C type } and I (B) & I(C) {For B&S type}

3.01.2 The technical specifications, contained herein, are for the guidance of the bidders. 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 bidder in the form as per schedule-VI of the specification.

3.02 STANDARD :

Hardware fittings for 11 KV disc insulators T&C & B&S type should conform to ISS:2486 (Part.I/1993), 2486 (Part.II) 1989, ISS:2486 Part.III / 1974 and ISS:2486(Part. IV), 1981.

3.03 GENERAL REQUIREMENT :

i) All forgings and castings shall be of good finish and free from flaws and other defects. The edges on the outside of fittings, such as at the eye clevis and holes, shall be rounded.

ii) All parts of different fittings which provide for inter connection shall be made such that sufficient clearance is provided at connection point to ensure free movement. All eye and clevis connections shall be free in this manner but care shall be taken that too much clearance between eye and tongues of the clevis is avoided.

iii) All ferrous fittings and the parts other than those of stainless steel, shall be hot dipped galvanised. Small fittings like spring washers, nuts etc. may be electroplated with zinc conforming to IS:1573:1970 Grade-4.

(iv) **MATERIAL :** The material of the fittings shall be so selected that yield strength of the material shall not be less than maximum working load.

All fittings except strain clamp shall be made of drop forged or upset forged steel (IS-2004/1978) and shall be hot dipped galvanised.

The strain clamp for aluminium AAC and ACSR Conductor shall be high strength Aluminium alloy (IS 6051/1970). The composition of the alloy shall be declared by the manufacturer giving reference to the relevant Indian Standard.

The cotter pins shall be provided with mild steel flat washers in addition to split pins. The split pin to be used on the cotter pin shall be of phosphor-bronze conforming to IS-7814/1975, stainless steel conforming to IS-5522/1992, or brass conforming to IS-410/1977 with a minimum hardness of 160 HV.

MATERIAL FOR :

S. No.	Description	Particulars
a)	Dead end straps.	Galvanised M.S.Twisted
b)	Strain bolts & nuts with spring washer	Galvanised M.S.
c)	Cotter pin.	Phosphorbronze/Brass/ stainless steel.
d)	Special envelope for bolted type clamp	Al.Alloy.
e)	Socket eye	Forged steel
f)	Ball eye	Forged Steel.
g)	Clevis ended strain clamp.	Aluminium alloy

(v) Weight of T&C & B&S type hardware fittings set shall be indicated in GTP as per details below :-

S. No.	Description	"T&C"	"B&S"
i)	Net weight per set in kg	1.250	3.350
ii)	Net weight of steel parts in Kg.	1.050	2.675
iii)	Net weight of Aluminium part per set in Kg.	0.200	0.675

3.04 TOUNGE AND CLEVIS TYPE HARDWARE:

Each T&C type hardware fitting set shall be complete in every respect and shall comprise of the following :

S. No.	Description	Particulars
i)	Dead end straps.(As per drawing attached)	One set.
ii)	Strain bolt with hexgonal nuts.	One No.
iii)	Spring washer	One No
iv)	Flat washter	One No.
v)	Cotter pin.	One No.

S. No.	Description	Particulars
vi)	Split pin	One No
vii)	Clevis ended aluminium alloy clamps suitable for ACSR conductor 7/2.11 MM, 7/2.59 MM and 7/3.35 MM. The ultimate strength of clamps shall not be less than 3000 Kgs (As per drawing attached)	One No.

The T&C type fittings shall conform in all respect to drawing attached with the specification.(Appendix-I A&C)

3.05 CLEVIS AND TONGUE CONNECTION :

The dimension of the tongue and clevis type connection shall conform to Fig 25 of ISS 2486 (Part-2)/1989.

3.06 BALL AND SOCKET TYPE HARDWARES :

Each B&S type hardware fitting set shall be complete in every respect and shall comprise of the following :

S. No.	Description	Particulars
i)	Dead end straps.(As per drawing attached)	One set.
ii)	Strain bolt with hexagonal nuts.	One set.
iii)	Spring washer	One set.
iv)	Ball eye.	One set.
v)	Socket eye	One set.
vi)	Split pin	One set.
vii)	Flat washer	One set.
viii)	Cotter pin	One set.
ix)	Strain clamp of special envelops type made of aluminium alloy (Bolted type).	One set.
x)	Security clips (W.type) Split pin shall not be accepted.	One set.

The dead end straps or cross arms straps shall comprise of a pair of twisted straps, one strain bolt with one spring washer and hexagonal nut and split pin. The strap shall conformed to drawing attached.(Appendix-1C)

The material for the hardware fittings shall be such that it gives the required mechanical strength with specified dimensions. The aluminium alloy of the clamp shall conform to A-6 of IS:617 and shall be gravity die cast.

All nuts shall be made of material conforming to properly class 5 of IS:1367:1967 with regard to its mechanical properties. Cotter pins shall be

made of forged steel conforming to clause No. 2 of ISS:2004:1962,IS-2004:1978.

For galvanising, zinc conforming to grade Zn-98 of IS:209/1966,IS 209/1979 shall be used.

The B&S type fittings shall conform in all respect to drawing attached with the specification.(Appendix-I B&1C)

3.07 GALVANISING :

The uniformity of zinc coating of hot dipped galvanised parts shall conform to IS:2633:1972 with latest amendments thereof, if any.

3.08 MARKING :

The clamps (aluminum portion) of each H/W fittings shall be provided with the following marking:

- a) Name of manufacturer or trade mark.
- b) Year of manufacture.

The packages containing fittings may also be marked with the standard mark, if available.

3.09 PACKING :

For packing double bags, one HDP bag (inner) and one gunny bag (outer) or double gunny bag shall be employed. The packing shall be fit to withstand rough handling during transit and storage at destination. The heads and threaded portions of the fittings shall be properly protected against damage. The gross weight of the packing shall not normally exceed 50 Kg. Different fittings shall be packed in different bags and shall be completed with their minor accessories fitted in place. All nuts shall be hand tightened over the bolts and screwed upto the farthest point.

3.10 DRAWINGS :

The Hardware fitting shall conform in all respects to drawing at Appendix-I A & IC for T&C type and Appendix IB & IC for B&S type Disc Insulators.

The bidder shall submit detailed drawing showing design and dimensions. The type of material used for various parts shall be clearly specified on the drawing.

3.11 TYPE TESTS :

- a) The bidder shall furnish valid and authenticated type test certificate from a Govt. approved/ a Govt. recognized/ NABL accredited laboratory/ ILAC i.e.

International Laboratory Accredited laboratory / ILAC i.e International Laboratory Accrediation Cooperation (In case of foreign laboratory). Such type test certificates should not be older than three years as on the date of bid opening.

b) The type test certificates by in house laboratory of bidder firm even if it is a Govt approved/ Govt recognized/ NABL accredited/ ILAC accredited, shall not be accepted, in case of their own bid. This will not apply if bidder is Govt. Company/ Public Sector Undertaking.

c) The bid should furnish documentary evidence in support of the laboratory whose type test have been furnished, that the said laboratory is a Govt/ a Govt. approved/ a Govt. recognized/ NABL accredited laboratory/ ILAC accredited (in case of foreign laboratory)

d) The type test certificates shall be furnished either in original or duly attested by notary.

e) The bids of only those bids shall be considered to be meeting the type test criteria who furnishes complete type test certificates with the bid as per above provision.

f) However, in the following cases the bid of the bid may be considered meeting the type test criteria if the bid furnishes an undertaking stating that valid type test certificates from a Govt/ a Govt. approved/ a Govt. recognized/ NABL accredited laboratory/ ILAC accredited shall be furnished from first lot (without asking for any delivery extension) along with Bank Gurantee, with the technical bid from a Nationalized/ Scheduled Bank in prescribed proforma at Schedule-III C or DD/ Pay order amounting **Rs. 5.00 Lac**. The initial validity of BG shall be 9 months with claim period of 3 months in addition

i) Where a new Rajasthan based firm is participating & is technically competent.

ii) Where one or more type test(s) is/ are older than 3 years.

iii) Where Rajasthan/outside Rajasthan firm furnishes requisite type test reports of higher rating material.

3.12 ROUTINE AND ACCEPTANCE TESTS :

The material shall be subjected to all routine and acceptance tests specified in the latest edition of relevant IS, before despatch. Such tests shall be witnessed by the inspecting officer from the purchaser's side.

3.13 INSPECTION & TESTING :

The inspection & testing shall be governed by relevant clause of General Conditions of Contract (Schedule-II).

3.14 TESTING FACILITIES :

The bidder must indicate clearly about the various testing facilities for type tests as well as routine/sample tests as per relevant ISS in respect of hardwares are available at the bidders works. In case no testing facilities are available at the bidders works, particulars of the place where such testing is proposed to be conducted during the course of inspection must be indicated.

3.15 DEVIATION FROM SPECIFICATION :

The technical specification contained in this section are for the guidance for the bidder. Any deviation from the purchaser's specification will be considered on their relative merits in respect of performance efficiency durability and overall economy consistent of the purchaser's requirements here in after stipulated. Such deviations shall be clearly entered by the bidder in the form as per Schedule-VI –A & B of the specification.

3.16 VERIFICATION OF DIMENSIONS :

The following tolerances are allowed on all dimensions to which special tolerances do not apply :

Dimensions	Tolerance
Upto and including 35 mm	(+/-) 0.7 mm
Over 35 mm	(+/-) 2%

3.17 QUANTITY :

The quantities indicated above are provisional and the purchaser, reserves the right to increase/decrease the same at the time of placing the order.

3.18 PRICES & PRICE VARIATION:

The prices quoted shall be variable as per price variation formula given in the specification (**Schedule-II**).The IEEMA formula allowing price variation for transmission line accessories & hardware containing both aluminium & steel as under shall applicable for hardware fittings.

$$P = \frac{P_0}{100} (20 + 40 \frac{Al}{Al_0} + 5 \frac{Zn}{Zn_0} + 20 \frac{LA}{LA_0} + 15 \frac{W}{W_0})$$

The details of this PV Clause are available at Schedule-III-A.

b) 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 old indices are discontinued then the PV shall be admissible with the new indices.

c) The date of delivery (i.e. date of readiness of material) is to be considered as per clause No. 1.10 of Section-I(Instructions to bidder).

3.19 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 equal monthly installment** . In case ordered quantity is different than quoted quantity, then monthly delivery shall be adjusted proportionately. Bid in which monthly delivery schedule is not indicated shall be ignored.

The bidders are required to indicate the delivery schedule in the schedule attached with the Specification.

3.20 TEST CHECKING OF MATERIAL AT STORES

3.20.1 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 :

3.20.2 SAMPLING

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

11 KV 45 KN Disc Insulator B&S type- 1000 Sets
11 KV 45 KN Disc Insulator T&C type- 3000 Sets

The selection of sample from the material received at stores shall be done as soon as material is received in stores without the presence of the representative of the supplier. However, testing of sample(s) at CTL shall be carried out in the presence of representative of the supplier after identification / confirmation by him that sample so selected belongs to them. In case the supplier disputes that the selected samples does not pertain to them, then fresh sample shall be selected in the presence of the representative of the supplier and test(s) be carried out.

3.20.3 TESTS

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

- a) Visual Examination, Verification of Dimension, weight and marking Test
- b) Slip Strength Test.
- c) Ultimate Strength Test.
- d) Galvanisation (Uniformity) Test.

3.20.4 Testing of the material shall be got done at the test laboratory of the NIGAM i.e. at CTL in the presence of the representative of the supplier. For witnessing of testing, clear 7 days notice shall be given to the supplier by fax / speed post stating date, time & place where the test is to be conducted. In case the supplier do not attend for witnessing the testing, the testing shall be proceeded and completed and action be taken as per the contract.

3.20.5 The witnessing officers of the NIGAM or as designated by the purchaser shall send copies of test reports to the purchaser, consignees and the supplier.

3.20.6 Only those tests shall be conducted at CTL for which facility with CTL is available.

3.21. CRITERIA FOR ACCEPTANCE

3.21.1 Visual Examination, Verification of Dimension, weight and marking Test
As per specification/ ISS

3.21.2 Slip Strength test & Ultimate Strength Test :

In case of failure of sample in Slip Strength test or Ultimate Strength Test, the material contained in the lot / sub-lot to which the sample belongs, shall be rejected. The rejected material shall have to be replaced by the supplier free of cost.

3.21.3 Galvanisation (Uniformity) Test.

i) The sample(s) shall be first tested for (n-2) number of dips where (n) is specified number of dips in the contract. If the sample(s) does not pass the uniformity of Galvanisation Test for (n-2) dips, the material shall be rejected and the material relating to relevant lot / sub- lot to which sample(s) pertains shall have to be replaced by the supplier free of cost.

ii) If the sample has passed the uniformity of Galvanisation Test for (n-2) dips, then it shall be tested for (n-1) dips. If the sample has not passed the uniformity of Galvanisation Test with (n-1) dips, then material pertaining to relevant lot / sub-lot shall be accepted with a deduction @ 10% of cost of material.

iii) If the sample has passed the uniformity of Galvanisation Test with (n-1) dips, then sample shall be tested for last one dip of one minute to complete the test for `n' dips. If the sample does not pass the uniformity of Galvanisation Test with `n' dips, then the material pertaining to relevant lot/ sub-lot shall be accepted with a deduction @ 5% of cost of material.

iv) If the sample(s) have passed the Test with number of dips as specified in the contract (n), then material pertaining to relevant lot / sub-lot shall be accepted.

3.22 TEST CHARGES :

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

3.23 PAYMENT :

Payment shall be made only after receipt of successful test report from the CTL of JVVNL/AVVNL/JdVVNL on the samples selected from the material received at the stores. However, 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 Discom.

3.24 QUANTITY TOLERANCE :

Quantity tolerance of plus minus 2% of ordered quantity shall be allowed for supply .

SECTION –III-B

**TECHNICAL SPECIFICATION AND OTHER REQUIREMENTS
FOR HARDWARE FITTINGS FOR 11 KV,120 KN DISC INSULATORS `B&S'
TYPE (BOLTED TYPE SINGLE TENSION CLAMP SUITABLE FOR ACSR
`PANTHER' CONDUCTOR & LINKED WITH 120 KN DISC INSULATOR)**

3.1 SCOPE :

This specification covers the design, manufacture, testing at manufacturer's works before despatch, supply and delivery of hardware fittings and accessories suitable for 120 KN Disc Insulators `B&S' type (Bolted type single tension clamp suitable for ACSR `Panther' conductor & linked with 120 KN Disc Insulators) for use on various 33 KV & 132 KV lines and Grid Sub Station .

3.2 STANDARDS;

This hardware fittings and accessories should conform in all respect to the latest editions of IS-2486(PART.I/1993), (PART.II/1989) and (PART.IV/1981). All nuts shall be made of material conforming to property clause 4.8 of IS:1367/1967 (first revision) with regard to its mechanical properties, cotter pins should be made of forged steel conforming to clause 2 of IS:2004/1970 (first revision) with latest amendments. All ferrous parts shall be hot dip galvanised electro galvanised ferrous fittings shall be in accordance with IS:1573/1970 (first revision).

The hardware fittings are required to be used with Disc Insulators string units containing insulators of type-B as classified under clause-5 "Classification" of IS:731/1971 and ACSR Panther conductor specified in IS:398/pt.II/1976.

3.3 GENERAL REQUIREMENTS :

i) The insulator strings hardware fittings shall be supplied complete in all respect and shall include all fittings necessary for composing the insulator strings and should include shackles, U-clevis or ball-links for attaching it to the strain plate or hangers supplied with Sub-Station structures. Conductor strain clamps should be suitable for attaching the specified conductor to the string.

The supplier shall ensure that the insulator fittings offered are complete in all respect and are entirely suitable for the proposed attachment and for the sizes of conductors indicated in Appendix -I.

All Bolts , nuts & screw heads shall be of standard thread. Bolt heads and nuts shall be hexagonal. Where ever, required, nuts shall be

locked in an approved manner. The threads in nuts and tapped holes shall be cut after galvanising and shall be well-lubricated greased. All other threads shall be cut before galvanising.

The bolt thread shall be under cut to take care of increase in diameter due to galvanisation.

ii) All forgings and castings shall be of good finish and free from flaws and other defects. The edges on the outside of fittings, such as at the eye clevis and holes, shall be rounded.

iii) All parts of Hardware fittings which provide for interconnection shall be made such that sufficient clearance is provided at connection point to ensure free movement and tension of the insulators string assembly. All eye and clevis connections shall be free in this manner but care shall be taken that too much clearance between eye and tongues of the clevis is avoided.

3.4 MATERIAL DESIGN AND TYPE :

i) The material for string insulator fittings (except those specified otherwise) shall be either drop forged steel or heat treated malleable cast iron and shall be hot dip galvanised after all machining and fittings have been completed. The material used in fittings shall be corrosion resistant. All nuts shall be made of material conforming to property clause 4.8 of IS : 1367-1967 (first revision) with regard to its mechanical properties and cotter pins shall be made of forged steel conforming to clause 2 of IS-2004-1970 with latest amendments.

The security clips shall be of phosphor bronze conforming to IS: 1385/1968 or of brass of suitable temper with minimum hardness of 100 HV conforming to IS: 410-1967 (second revision) with latest amendments. For galvanising, zinc conforming to grade zn 98 of IS:209/1966 shall be used.

ii) 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 complying position atleast twenty times, at normal temperature. They should be effective at the lowest temperature likely to be encountered in service.

(iii) All fittings shall be designed so that the harmful bimetallic corrosion is avoided and effects of vibration, both on conductor and fitting itself are minimized.

iv) **TENSION CLAMP :**

The bolted type clamps shall be made out of high strength aluminum alloy suitable for Panther conductor indicated in Appendix-I. The mechanical efficiency of tension clamps shall not be effected by method of erection involving "Come-Along" or similar clamp during or after assembly and erection of tension clamp itself. The strain clamp shall have the same conductivity as the conductor, and shall be of a design that will ensure unrestricted flow of current.

3.5 ATMOSPHERIC CONDITIONS :

The material offered shall be suitable for operation in hot and humid tropical climate and will be subject to inclement weather and shall be able to withstand wide range of temperature variation. The humidity may be as high as 90% during rainy season and as low as 10% during the dry season.

3.6 TYPE TESTS : As per Clause 3.11 of Section III-A of this Technical specification .

3.7 ROUTINE AND ACCEPTANCE TESTS :

As per Clause 3.12 of Section III-A of this Technical specification .

3.8 INSPECTION & TESTING :

As per Clause 3.13 of Section III-A of this Technical specification .

3.9 MARKING :

As per Clause 3.07 of Section III-A of this Technical specification .

3.10 PACKING :

As per Clause 3.09 of Section III-A of this Technical specification .

3.11 DRAWING :

The bidder should submit detailed drawing showing design and dimensions of the complete hardware set alongwith design and dimension of various parts. Full particulars of the conductor clamps shall be given and the type of material used of various parts should be clearly specified either on the drawing or in a separate statement.

THE BID DRAWINGS SHOULD CONSIST OF :

i) Dimensioned assembly drawings of the complete hardware set with all fittings.

ii) Seperate detailed dimensioned drawing for all hardware fittings such as conductor, tension clamps, hook ball clevis socket clevis, yokes etc.

iii) Weight of Alluminium and steel portion separately.

3.12 GUARANTEED TECHNICAL PARTICULARS :

The number of discs used on tension strings and the EMS ratings, technical particulars of matching insulators and that of conductor are given in Appendix -I. The technical particulars of hardware fittings shall be given by the bidder in Schedule-V –A(ii).

3.13 TESTING FACILITIES ;

As per Clause 3.14 of Section III-A of this Technical specification .

3.14 DEVIATIONS FROM SPECIFICATIONS :

As per Clause 3.15 of Section III-A of this Technical specification .

3.15 PRICES & PRICE VARIATION:

As per Clause 3.18 of Section III-A of this Technical specification .

3.16. DELIVERY SCHEDULE

As per Clause 3.19 of Section III-A of this Technical specification .

3.17 TEST CHECKING OF MATERIAL AT STORES

3.17.1 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 :

3.17.2 SAMPLING

One sample out of each sub-lot / lot consisting of **500 sets** or part thereof of hardware fittings for disc insulators from each inspected lot received in stores shall be selected for test checking of material and shall be got tested.

The selection of sample from the material received at stores shall be done as soon as material is received in stores without the presence of the representative of the supplier. However, testing of sample(s) at CTL shall be carried out in the presence of representative of the supplier after identification / confirmation by him that sample so selected belongs to them. In case the supplier disputes that the selected samples does not pertain to them, then fresh sample shall be

selected in the presence of the representative of the supplier and test(s) be carried out.

3.17.3 TESTS

As per Clause 3.20.3 of Section III-A of this Technical specification.

3.18 CRITERIA FOR ACCEPTANCE

As per Clause 3.21 of Section III-A of this Technical specification .

3.19 TEST CHARGES :

As per Clause 3.22 of Section III-A of this Technical specification .

3.20 PAYMENT :

As per Clause 3.23 of Section III-A of this Technical specification .

3.21 QUANTITY TOLERANCE :

As per Clause 3.24 of Section III-A of this Technical specification .

**TECHNICAL REQUIREMENT FOR BOLTED TYPE HARDWARE FITTINGS
132 KV STRING INSULATOR HARDWARE**

1	Power system	132 KV 3 Phase 50 Cycles Effectively earthed.
2	Insulators :	
	Type	Conventional ball & socket type
	Diameter	255 mm
	Spacking	145 mm
	Colour	Brown
	Surface	Glazed
	i) Highest system voltage	145 KV(rms)
	ii) Visible discharge test (power frequency voltage)	105 KV(rms)
	iii) Wet power frequency with stand test.	230 KV(rms)
	iv) Impulse voltage Withstand test.	550 KV(Peak)
	v) power freqiemcu puncture withstand voltage.	1.3 times the actual dry flashover voltage.
	vi) Minimum creepage distance of the insulator for moderately polluted atmospheres (total).	2250 mm.

APPENDIX-II**MECHANICAL REQUIREMENT FOR BOLTED TYPE HARDWARE FITTINGS**

1 Strings arrangements	Nos. of Disc -----	Electro Mechanical strength -----
a) Tension strings for normal tension locations	10	120 KN
b) Minimum Failing load.	As above.	
2 Accessories & Hardwares :-		
(A) 132 KV Power Conductor Hardwares :		
a) Clamps -----	Tension -----	
Slip strength (Max.)	8230 Kgs.	
Ultimate strength.	9144 Kgs.	
Minimum failing load	9144 Kgs.	
b) Other Hardware -----		
Minimum failing load	9144 Kgs.	
c) Conductor	ACSR Panther	
d) Stranding & wire diameter	Al 30/3.04 + St 7/3.0 mm	
e) Approx. overall dia	21.0 mm	
f) Normal area	207 mm sq.	
g) Maximum temp.of conductor carrying current & expose to sun.	67 degree C	