

**JAIPUR VIDYUT VITRAN NIGAM LIMITED
OFFICE OF SUPERINTENDING ENGINEER(PROC.)
OLD POWER HOUSE PREMISES, NEAR RAM MANDIR
BANI PARK, JAIPUR**

TELEFAX: 2208098

**SPECIFICATION. JPD/SE/PROC/SPO-III/TN-4334
FOR SUPPLY OF 11 KV ROSTERING SWITCH(ISOLATOR) WITH 12 KV POST
INSULATORS (ASSEMBLED)**

Last Date of receipt of bids	25.04.2011 upto 2:30 PM
Date of opening of bids	25.04.2011 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 bid.
Earnest Money	Rs. 2,00,000.00 (Rs. Two Lac only) / Exemption Certificate / Vendor Registration Of Class "C" Category and above
Tendered Quantity	960 Sets.

NOTE : The bidders are advised to go through the complete specification carefully before filing the bid in their own interest

INDEX

Section-I	Instructions to bidders	
Section-II	General Conditions of Contract	
Section-III	Technical Specification	
Schedule-I	Schedule of Requirement	
Schedule-II (A)	P.V. Formula for Hardware Part of 11 KV Rostering Switch	
Schedule-II (B)	P.V. Formula for Post Insulators of 11 KV Rostering Switch	
Schedule-III	Details of Standards	
Schedule-III-A	Pre Qualification Requirement(PQR)	
Schedule-III-B	Performa of Bank Guarantee in lieu of type test certificates	
Schedule-IV	Price Schedule	To be submitted in Price Bid Envelop.
Schedule-IV-A	Details of bided quantity, quantity offered alongwith justification with reference to Qualifying Requirement.	The bidder is required to justify quantity offered as per Qualifying Requirement.
Schedule V	Guaranteed Technical Particulars	
Schedule V A	Bill of material	
Schedule V B	Departure from 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 VIII	Delivery schedule.	
Schedule IX	List of equipment & technical hands available with the biding firm.	
Schedule X	General Particulars about the bid in brief.	

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 can 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

TECHNICAL SPECIFICATION FOR 11 KV 400 AMPS OUTDOOR SINGLE BREAK 3 PHASE & NEUTRAL ROSTERING SWITCH (ISOLATOR) WITH POST INSULATOR & ALL ACCESSORIES AGAINST TN-4334

1.0 GENERAL DESCRIPTION:

To provide single phase domestic and non domestic supply to rural house holds round the clock, single phase distribution transformers are being installed in Jaipur Discom. For this purpose 11 KV Single break Roster group operating switch (RGOS) has been designed.

As indicated in the enclosed drawing the Roster Switch is required for the following function:

- i) Stage-1- For 3 phase supply (normal operation)
- ii) Stage-2- For single phase supply (Rostering)
- iii) Stage-3-All three phases and neutral open (For line clear and maintenance purpose)

The suitable interlocking is to be provided among above three operation to prevent any malfunctioning in the field.

2.0 SCOPE:

This specification covers the design, manufacture, testing at manufacturer's works before dispatch, supply and delivery of 11 KV, 400 Amp. Outdoor single break Rostering (three phase to single phase) switches (Isolators) without earth blade and with post insulator, base mounting channel & all accessories, required for installation at various 33/ 11 KV sub station in area of Jaipur Vidyut Vitran Nigam Limited. The Rostering Switch shall be suitable for installation on system maximum fault level of 16 KA with neutral effectively grounded.

It is not the intent to specify completely herein all details of the design and construction of equipments. However, the equipment shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous operation up to the supplier's guarantee acceptable to the purchaser, who will interpret in a manner the meaning of drawings and specifications and shall have the power to reject material which in his judgment is not in accordance herewith. The equipment offered shall be complete with all components necessary for its effective and trouble free operation along with associated equipments, interlocks, protection schemes etc. Such components shall be deemed to be within the scope of supply, irrespective of whether those are specifically brought out in this specification and/or the commercial order or not . All similar parts particularly movable ones shall be interchangeable.

PART-A TECHNICAL SPECIFICATION FOR 11 KV, 400 Amp. OUTDOOR ROSTER SWITCH WITHOUT EARTH BLADE (ROSTER SWITCH & ACCESSORIES):

3.0 GENERAL TECHNICAL REQUIREMENT:

- a) The Rostering switch / Isolator (Hardware Part) shall be constructed out of the best quality of material suitable for weather conditions prevailing in Rajasthan. The workmanship shall be of the highest grade and the entire manufacture shall be in accordance with the modern Engineering practices. All ferrous parts shall be given an anticorrosive finish and shall be hot dip galvanized. The other parts shall be substantially non-corrosive. The bearings in the current part shall be shunted by flexible copper connectors of adequate cross section and the bearing housings shall be completely weather proof with arrangements to facilitate the lubrication of the bearings.
- b) Isolators shall be of triple pole and separate neutral gang operated, single break, two post with one post rotating, banging type suitable for outdoor horizontal mounting. The switch Isolators shall be manually operated. The operating handle shall have arrangements for locking isolators in 'ON' and 'OFF' positions. For reasons of safety, the isolator should be so designed that no dangerous leakage current can pass from the terminals of one side to any terminal of the other side of the isolator. Pad Lock shall not be included in the scope of supply.
- c) The frame of each isolator shall be provided with reliable earthing terminal for each phase for connections to an earthing conductor having a clamping bolt/ screw of not less than 12 mm diameter. The terminal shall be marked with 'Earth' symbol.
- d) The isolators shall be provided with arcing horns of liberally rated fixed type with make before and break after arrangement. The arcing horn shall be made of MS Rod (hot dip galvanized) of not less than 8mm dia.
- e) All similar materials and movable parts of similar equipment shall be interchangeable with each other.
- f) The vertical operating pipe and phase coupling pipe shall be of galvanized mild steel tube (medium class) as per IS-1161/1979.
- g) Suitable arrangement shall be provided to lock the operating handle(s) of isolator switch in 'ON' and 'OFF' positions. A galvanized plate indicating 'ON' and 'OFF' position should be fixed near the operating handle to indicate ON/OFF position of the Roster Switch.
- h) The guide cum locking plate near the operating handle shall have two holes (1/4" size) at a distance of 70 mm for fixing the plate.
- i) All ferrous parts shall be hot dip galvanized and uniformity of zinc coating shall satisfy requirement of IS:2633. The pipes /tubes shall be galvanized in accordance with IS: 4736/1968
- j) The contact surface shall be silver/Nickle plated and temperature rise (IS:9921 Part II Table-2) shall be according to surface condition on which it is measured. The

current density shall be less than 2.5 A per sq.mm. in copper and 1 Amp. per sq.mm aluminium.

4.0 OPERATING MECHANISM:

- a) The operating mechanism shall be suitable for normal operation by one man without strenuous efforts. The mechanism shall be so designed that all blades are in positive continuous control throughout the entire cycle of operation. It shall not be possible, after final adjustments have been made, for any part of the mechanism to be displaced at any point in the travel so as to allow improper functioning of switch, when the switch is in open or in close condition.
- b) All GI pipes used in operating mechanism of isolators shall be of medium class as per IS:1161/1979.
- c) The isolators complete with the operating mechanism should not come out of its own in open or closed position due to effect of gravity, wind pressure, vibrations, reasonable shocks or accidental touching of operating rods. The arrangement made and stoppers provided to prevent over travel shall be clearly shown in the bid drawings.
- d) The Isolators should also be capable of resisting in closed position, the dynamic and thermic effects of the maximum possible short circuit current at the installation point. Their construction should be such that they do not open under the influence of short circuit current.
- e) The earthing of operating handle shall be made through flexible copper strip of adequate cross section connected to the supporting metallic structure conforming to IS:9921 (Pt.III)-1982.
- f) Suitable inter locks shall be provided between operating mechanism so that operations are possible only in desired sequence and positions.

The salient features of the operational mechanisms are as under:

I. Normal Operation:

Under normal operation when three phase supply is given to feeder. In this situation all the three phase (R, Y, B) and neutral blades are in closed position as shown in figure at Stage-I.

II. Roster Operation:

Under Roster operation the feeder will get single phase supply and neutral only In this stage the blades of R&B phase disconnects from incoming R&B phase and connects with Y phase at outgoing side of isolator. At this stage Y phase supply connects to all three outgoing phases as shown in figure at Stage-II.

III. All three phases and neutral open:

Under this operation the feeder will not get supply at all. This is complete shut down position of the feeder. In this stage, all the three phases and neutral remains in disconnected (blades open) position as shown in figure at Stage-III. This is required for supply OFF period or for maintenance purpose.

IV. Interlocking:

The interlocking shall be provided in such a manner that operation can be made in a sequence only i.e. from stage-I to stage-II to stage-III to stage-II to stage-I only and no operation can be skipped. Interlocking be provided in such a way that locking in all clear position (state-iii), supply can not be restore by any other way without unlocking the Roster switch.

V. Locking:

To avoid any accident/ danger to human and other bodies the locking arrangement in Stage-III shall be provided such that supply (single phase or three phase or neutral) can't be restored without unlocking the system.

5.0 BEARINGS:

- a) The bearing assembly for each rotating post shall have taper thrust roller bearing at top and ball bearing at the bottom/ other end of bearing housing. The entire mechanical load shall be suspended on thrust bearings. Cross sectional drawings of the bearings shall be furnished with the bid.
- b) All the vertical operating shaft shall be supported with taper thrust roller bearing on the top and guides in between at uniform interval along its length in order to ensure smooth and easy operation.
- c) A galvanized 75x40 mm M.S. channel of suitable length shall be provided for fixing of forth bearing assembly. The holes shall be of movable type and at equal distance to that of base channel.

6.0 CONTACTS:

- a) The fixed contacts shall be spring loaded reverse loop type having minimum four fingers. The moving contacts shall be solid hard drawn electrolytic copper.
- b) The contacts and switches blades shall be of liberal cross section to withstand the rated continuous current. The cross sectional area of fixed contact shall not be less than the size specified herein under specific technical requirement clause 6.2. The copper contacts shall be sliver/nickel plated and female contacts finger(s) shall be provided with spring(s) of stainless steel. The spring shall be fixed in the finger contacts through taflon/ nylon insert at both ends so that no transfer of current is possible through spring and direct electric heating of springs is avoided.
- c) The contacts must be made of liberally rated electrolytic hard drawn copper suitably plated to withstand damage on account of weather conditions prevailing at site and accidental arcing. High Pressure contacts switch shall be designed with a contact pressure of $\frac{1}{2}$ (half) lb per ampere of capacity. The bidders shall specifically

confirm that the material components and cross sectional area of all current carrying parts shall be either exactly same or superior to that of isolator type tested for short circuit test, temperature rise test and milli-volt drop test as per relevant standards.

d) Full details of contacts and switchblades shall be given with cross sectional drawings to dimension. The temperature rise of the contacts shall not exceed the values specified in IS-9921 (Part-II/1982) at an ambient temperature 50 deg. C.

e) The successful bids while furnishing the drawings for purchaser's approval are required to furnish the details of material, size/diameter and calculation of cross section area, current density in respect of various switches, terminal pad and terminal connector etc. The comparison of sizes, area and current density in these parts of offered isolators with the required minimum sizes/ area and maximum current density as specified for respective parts shall also be required to be furnished by bidders.

The above calculation shall be furnished at various positions where holes are not provided as well as at positions where holes are provided as essentially required for joining of two different part made of same or different materials.

7.0 BASE CHANNELS:

The channels shall be of sizes mentioned in clause No. 6.2 of this specification and shall conform to IS-808.

8.0 TERMINAL PAD:

The terminal pad shall be made of electrolytic copper flat with movable feature and should be liberally sized so as to receive terminal connectors through 4 Nos. of nuts and bolts of suitable size. The terminal pad at one end shall be fitted with moving blade through flexible copper strip for movement.

9.0 ELECTRIC POWER CONNECTORS (TERMINAL CONNECTORS):

a) The isolators shall be provided with 6 nos. of bimetallic rigid type self grooved bolted type terminal clamps on incoming and outgoing sides to directly receive ACSR Rabbit/Raccoon Conductors without the use of lugs. The size of terminal connectors should match with terminal pad size specified under Clause 6.2 herein.

b) Thickness of bimetallic strip between terminal pad and aluminium terminal connectors shall be atleast one mm. The current density in terminal connectors shall be less than 1.0 Amp./sq.mm. The connectors shall conform to all the test requirement of IS-5561/1970 with latest amendments.

10.0 BOLTS & NUTS:

a) All bolts, nuts & washers required for assembling the equipment and for fixing them on to the structure shall be galvanized and supplied with the equipment at no extra cost.

- b) Bolts & Nuts shall also be provided with lock washers and lock nuts required for fixing post insulators on the base channel.

11.0 ACCESSORIES AND FITTINGS:

The following accessories and fittings shall be provided with Roster Switch:

- a) Handle suitable for locking in 'ON' & 'OFF' positions.
- b) Three earthing terminals having clamping bolt of atleast 12 mm diameter.
- c) Suitable interlocking arrangement should be provided so that one operation cannot be skipped without sequence.
- d) Name plate shall be provided on the equipment as per IS-9921 (Part-5/1985).
- e) Galvanized arcing horns of liberally rated fixed rod type with make before and break after arrangement.
- f) Terminal connectors (electric power connectors) of suitable size and capacity.
- g) Base channels.

12.0 CONSTRUCTIONAL FEATURES OF ROSTERING SWITCH:

12.01 RATINGS:

Sr.No.	Particulars	11 KV Isolator
A)	PARTICULARS OF SYSTEM	
i)	Nominal system voltage	11 KV (rms)
ii)	Highest system voltage	12 KV (rms)
iii)	Frequency	50 Hz
iv)	Number of phases	3 Nos.
v)	Rated Current	400 Amps.
B)	SERVICE CONDITIONS	Suitable to work at ambient temperature of 50 deg. C.
C)	Lightning impulse withstand voltage	
i)	To earth & between poles	75 KV (Peak)
ii)	Across the isolating distance	85 KV (Peak)
D)	One minute P.F. withstand voltage	
i)	To earth & between poles	28 KV (r.m.s.)
ii)	Across the isolating distance	32 KV (r.m.s.)
iii)	Rated short time withstand current for one second	16 KA (rms)
iv)	Rated peak withstand current	40 KA (Peak)

The values of the item mentioned above shall not be less than the specified against each.

12.02 SPECIFIC TECHNICAL REQUIREMENT:

1.	Phase separation (minimum)	As per drawing
2.	Minimum centre to centre distance between two	425 mm

	adjacent poles of same phase.	
3.	Size of base channel on which insulators are to be mounted.	75x40x2500 mm
4.	Size of vertical operating pipe (Down pipe) i) Length ii)Nominal bore	3.5 Metre 25 mm
5.	Minimum length of operating handle.	500 mm
6.	Nominal bore of phase coupling pipe.	20 mm
7.	Minimum size of terminal pad (Projected portion)	50x4.5x90 mm
8.	No. of fingers in a fixed contact.	Four
9.	Min. cross sectional area of each finger.	55 sq.mm with minm. Length of 105 mm
10.	Diameter of arcing horn (Rod).	8 mm dia.
11.	No. and size of bolts to be provided for fixing terminal connectors with terminal pad.	4x1/4 inch dia.
12.	Size of stainless steel spring to be provided with fixed contacts. i) Gauge ii)Outer diameter iii)Min. No. of turns per coil. iv)Min. total length.	16 SWG 15 mm 6 Nos. 28 mm.
13.	Size of flexible earthing connector: i) Minimum cross sectional area. ii)Minimum Length.	50 sq.mm. 150 mm
14.	Minimum No. of guides to be provided for down pipe.	Three
15.	Size of ACSR conductor for which electric power connectors shall be suitable.	10.2 mm dia (Rabbit/Raccoon)
16.	Top and bottom pitch circle diameter of the post insulator (technical specification as per clause No. 7.3 for which isolator hardware shall be suitable.	57 mm.

12.03 CLEARANCES:

The isolators shall have clearance conforming to relevant IS and should meet the requirements of the impulse voltage tests as specified therein.

PART B: TECHNICAL SPECIFICATION FOR 12 KV POST INSULATORS SUITABLE FOR 11 KV, 400 AMP. OUTDOOR ROSTER SWITCH.

13.0 CONSTRUCTIONAL DETAILS:

- a) The post insulator units shall be constructed out of the best quality of material suitable for weather conditions prevailing in Rajasthan. The workmanship shall be of the highest grade and the entire manufacture shall be in accordance with the modern Engineering practices. All ferrous parts shall be given an anticorrosive finish and shall be hot dip galvanized.
- b) The 12 KV post insulator with creepage distance as per relevant IS shall be used for 11 KV 400 Amps. Roster Switch. The rating of individual post insulator shall not be less than 12 KV for 11 KV Roster Switch.
- c) The porcelain used for post insulators shall be sound, free from defects, thoroughly vitrified smoothly glazed. The glaze shall be brown in colour. The glaze shall cover all the exposed porcelain parts of the insulator except those areas which serve as supports during fixing are required to be left unglazed.
- d) The porcelain and metal parts shall be assembled in such a manner that any thermal expansion between the metal parts and porcelain shall not get loose or create under strength of the unit as a whole.
- e) Cement used in the construction of post insulators shall not cause fracture by expansion or loosening by construction and proper care shall be taken to locate correctly the individual parts during cementing. The cement used shall not give rise to chemical reaction with metal fittings and its thickness shall be uniform.
- f) The porcelain and hardware surface coming in contact with cement shall be coated with bituminous paint for cushioning to relieve mechanical stress caused by temperature variation and cement expansion.
- g) All ferrous metal parts except those of stainless steel shall be hot dip galvanized and the uniformity of the zinc coating shall satisfy the requirement of IS: 2633/1972 with latest edition. The finished galvanized surface shall be smooth.
- h) The threads of the tapped holes in the post insulator metal fittings shall be cut after giving anti corrosion protection and shall be protected against rust by greasing or other similar means all other threads shall be cut before giving anti-corrosion protection. The tapped holes shall be suitable for bolts with thread having anti-corrosion protection and shall conform to IS:4218 (Part I to IV)/1967 or latest version thereof. The effective length of thread shall not be less than the nominal diameter of the bolt.
- i) The post insulator unit shall be assembled in a suitable jig to ensure the correct positioning of the top and bottom metal fittings relative to one another. The faces of the metal fittings shall be parallel and at right angles to the top and the bottom metal fittings shall be in a vertical plane containing the axis of the insulator.
- j) The post insulator shall conform the IS: 2544/1973 & IS:5350 (Part III/1971) with latest amendment if any. The total creepage distance for post insulators for 11 KV isolators shall be as per clause No. 7.3 of this specification.

k) It shall be the sole responsibility of the supplier to carry out through inspection and quality checks on the insulators at the insulator supplier's works before offering the insulators for purchaser's inspection.

l) **Makes of the Post Insulators for the supply of 11 KV Rostering Switch**

The Post Insulators manufactured by the following manufacturers shall be acceptable for the supply of 11 KV Rostering Switch :

- M/s.Jaipur Glass & Potteries, Jaipur.
- M/s.India Potteries, Kolkata.
- M/s.Bikaner Ceramices, Bikaner.
- M/s.CJI Porcelain, Khurja.
- M/s.Vishal Melleable, Ankeleshwar.
- M/s.Allied Ceramices Pvt. Ltd., Kolkata.
- M/s.WSI, Chennai.
- M/s.IEC, Bhopal.
- M/s.MIL, Allahabad.
- M/s.Jay Shree Insulators, Vadodara.
- M/s.Birla NGK Insulators Pvt. Ltd., Halol.
- M/s.MIL, Abu Road.
- M/s.Sarvana Insulators Ltd., Kurinji Padi, Dist Cuddalore, (Tamilnadu).
- M/s BHEL

Besides above, the Post Insulators manufactured by the vendors approved by the Power Grid Corporation of India Ltd (PGCIL) and National Thermal Power Corporation (NTPC) shall also be acceptable.

14.0 TECHNICAL REQUIREMENT OF POST INSULATORS:

The standard insulation level of the post insulator unit shall be in accordance with the following:

Sr.No.	Particulars	For 12 KV Insulator
1.	Highest system voltage	12 KV (rms)
2.	Visible discharge test	9 KV (rms)
3.	Dry one minute power frequency test voltage	35 KV (rms)
4.	Wet one minute power frequency test voltage	35 KV (rms)
5.	Power frequency puncture withstand	35 KV (rms)
6.	Impulse voltage withstand test	35 KV (rms)

15.0 DIMENSIONAL CHARACTERISTICS OF POST INSULATOR:

Sr.No.	Particulars	12 KV Post Insulator for 11 KV Isolator

1.	Nominal system voltage	11 KV
2.	No. of units per stack	One
3.	Total height of	254 mm
4.	Diameter of insulating parts (max)	152 mm
5.	Minimum creepage distance of each unit	300 mm
6.	Top and bottom fitting pitch circle diameter	57 mm
7.	Centilever strength	9 KN

16.0 CALIBRATION CERTIFICATES:

The supplier shall present the latest calibration certificate(s) of testing instruments/ equipments to be used for the testing of the materials covered in the purchase order to the authorized inspecting officer/ inspecting agency of the purchaser. The testing instruments/ meters/ apparatus etc. should be got calibrated by the supplier from time to time from independent laboratory accredited from NABL or the manufacturer of the testing instruments having traceability to NPL or NABL accredited laboratory. The calibration certificates should not in any case be older than one year at the time of presenting the same to the inspecting officer/ inspecting agency of the purchaser. The testing instruments/ equipments should be duly sealed by the calibrating agency and mention thereof shall be indicated in the calibration certificates(s).

17.0 TOLERANCE:

Tolerance shall be allowed as per respective/ relevant Indian Standards unless otherwise specified. However, in case of current carrying parts only following negative tolerances shall be permissible :

- i) Width and thickness of strip & bimetallic strip:
 - a) Positive Tolerance : (+) No limit
 - b) Negative Tolerance: Only upto (-) 2.5% but subject to meeting the requirement of specified / approved cross sectional area.

18.0 TEMPERATURE RISE:

a) The equipments covered by this specification shall be used outdoor and maximum temperature attained by any part of the equipment in service at site conditions and full load current shall not exceed 25 deg.C the permissible limits mentioned in the IS:9921 (Part-II)/1982 at ambient temperature of 50 deg. C. Bidders are required to mention specific degree of maximum temperature rise in GTP.

b) The temperature rise test after fitting terminal connector shall also be carried out as routine test on one switch Isolator out of each lot offered for inspection. The limit shall not exceed those specified under this specification.

19.0 DRAWINGS:

The following drawings/ technical literature of equipment covered by this specification shall be furnished by the bidders along with their bid.

- i) Outline dimensional drawings of Isolators (Hardwares) and all other accessories and list mentioning bill of material.
- ii) Outline dimensional drawings of post insulator
- iii) Assembly drawings showing complete details of all current carrying parts and operating mechanism and mass of main components.
- iv) Longitudinal and cross sectional views for the Roster Isolator Switch (Blades, contacts, terminal clamps, interlocking, auxiliary switch ec.).
- v) Dimensional drawing of terminal connector.

20.0 INSTRUCTIONS MANUALS:

The successful bidders shall have to supply twenty sets of operating and maintenance instructions manual alongwith the erection manuals and requisite detailed drawings of the equipment covered by this specification.

21.0 NAME/ RATING PLATE:

All items of the equipments included in this specifications shall be provided with a weather and corrosion proof plate of name/trade mark of manufacturer, rating and TN in according with the provision of the IS:9921. **The name & rating plate should be riveted on base channel.**

22.0 PACKING AND FORWARDING:

i) The complete (fitted with insulator) equipment shall be packed suitably for vertical/ horizontal transport and withstand handling during transport and outdoor storage during transit. The Supplier shall be responsible for any damage to the equipment during transit due to improper and inadequate packing. Wherever necessary, proper arrangement for lifting, such as lifting hooks etc. shall be provided. Any material found short inside the packing cases shall be supplied by supplier without any extra cost.

ii) Each consignment shall be accompanied by a detailed packing list containing the following information:

- a) Name of the consignee.
- b) Details of consignment.
- c) Destination.
- d) Total weight of consignment.
- e) Handling and unpacking instructions.
- f) Bill of material indicating contents of each package.

23.0 TEST ON BOUGHT OUT ITEMS:

Tests are not required to be performed on small bought out equipments like terminal connectors etc. at the works of manufacturer except operational tests. Inspection of the tests at Sub-contractors works will be arranged by the supplier whenever required. However the purchaser reserve the right to insist for witnessing the acceptance/routine test of the bought out items.

24.0 TYPE TEST

A) TEST ON HARDWARE:-The following type tests is to be conducted on the dis-connector along with insulators and terminal connectors.

1. **Short time withstand current test-** The test is to be carried out as per provisions of IS:9921 (Part.IV). As per clause No. 3.0.2 of IS:9921 (Part.IV). The test carried out on one type of disconnector will be applicable for different current and voltage ratings but with similar components i.e. reverse loop type fixed contacts, tubular moving contact, double break mechanism with similar post insulator. However, as per clause No. 3.3.1.1. of IS:9921 (Part,IV) the isolator subjected to type tests shall be at least favorable conditions of electro magnetic forces than offered isolator for which necessary calculations may be submitted along with offer.

2. **High voltage test-** The type tested isolator shall have lower or equal clearances than offered isolator i.e. for phase to phase clearance, phase to earth clearance and clearance for isolating distance.

- a) Lightning impulse voltage test.
- b) Power frequency voltage withstand test.

3. **Temperature rise test.**

4. **D.C. voltage drop test or measurement of resistance of main circuit.**

5. **Short time withstand current test on terminal connectors either as per provisions of IS:5561 or tested along with isolator.**

6. **Mechanical endurance test.**

B) TEST ON POST INSULATORS :-

1. **Visible discharge test.**

2. **Impulse voltage withstand test**

3. **Dry and wet power frequency voltage withstand test.**

4. **Temperature cycle test.**

5. **Test for mechanical strength.**

6. **Puncture test.**

7. **Porosity test.**

8. **Galvanizing test.**

However, the purchaser reserves the right to demand repetition of some or all the type tests in presence of purchaser's representative. For this purpose , the tenderer should indicate unit rate for carrying out such type tests. These test charges shall not be taken into consideration for bid evaluation.

During type tests the disconnector shall be mounted on its own support structure or equivalent support structure and installed with its own operating mechanism to make the type tests representative.

24.1 The manufacturer is required to conduct following routine tests as per relevant IS on the Isolators complete with required Post Insulators at manufacturer's works .

24.2 ACCEPTANCE TESTS:

The following tests shall be got conducted in presence of purchaser's representative as per relevant standards at the place of manufacturer before dispatch without any extra charges. The tests at Sr. No. 1 to 7 are to be carried out on completely assembled isolators as per IS:9921 (Part.IV). The sampling for the inspection of completely assembled isolators, offered for final inspection shall be on 10% of offered quantity (unless otherwise specified). The tests at Sr. No. 7 to 12 are to be carried out on Post Insulators as per IS:2544 and sampling will also be as per same IS, at original manufacturer's works.

1. Measurement of resistance of main circuit of isolators as per IS:9921 (Part.IV).
2. Mechanical operating test on atleast one sample selected at random.
3. Mechanical endurance test shall be done as acceptance test on one isolator of each type and rating from every lot. Mechanical endurance test shall be conducted on the main switch as well as earth switch of one disconnector of each type and rating. Bare contacts shall not be acceptable in any case.
4. Verifications of dimensions as per approved drawing on one isolator set of each type and rating.
5. Temperature rise test on one set of isolator of each rating from the offered lot.
6. Preece Test on one isolator of each type and voltage rating as per relevant IS.
7. Verification of dimensions of post insulators.
8. Temperature cycle test on post insulators.
9. Mechanical strength test on post insulators.
10. Puncture test on 1x12KV post insulators.
11. Porosity test on post insulators.
12. Galvanizing test on post insulators.

25.00 TYPE TEST CERTIFICATE:

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) of similar rating and design. Such type test certificates should not be older than three years as on the date of bid opening. For this purpose date of conducting type tests will be considered.

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

c) The bidder 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 bidders 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 bidder may be considered meeting the type test criteria if the bidder furnishes an undertaking stating that valid type test certificates from 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 Guarantee, with the technical bid from a Nationalized/ Scheduled Bank in prescribed proforma at Schedule-III C or DD/ Pay order amounting **Rs. 1,50,000** (Rs. One lac Fifty Thousand Only). 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 & 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

However, the purchaser reserves the right to demand repetition of some or all the type tests in presence of purchaser's representative. For this purpose , the tenderer should indicate unit rate for carrying out such type tests. These test charges shall not be taken into consideration for bid evaluation.

During type tests the disconnecter shall be mounted on its own support structure or equivalent support structure and installed with its own operating mechanism to make the type tests representative.

26.0 TYPE TEST ON SAMPLES SELECTED FROM MATERIAL RECEIVED IN STORES FROM 1st OFFERED LOT (Applicable to Successful bidders who have not furnished valid type test certificate but furnished BG in lieu of Type Test)

The first lot offered shall not be less than 10 % of the ordered qty.

One sample of 11 KV Roastering Switch (Isolator) with 12 KV Post Insulators from the 1st Lot received in purchaser's store shall be selected and sealed for getting it type tested at any Govt. approved/ Govt. recognized/ NABL accredited laboratory/ ILAC i.e. International Laboratory Accredited laboratory / ILAC i.e International Laboratory Accrediation Cooperation (In case of foreign laboratory).

The transportation charges of sample(s) 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 the Test House by the supplier with the 1st inspection offer. The name of test house shall be intimated to successful bidder after issue of Purchase order.

At the option of the purchaser, the material received in the stores may be utilized in the field after receipt of successful test reports from CTL, Jaipur 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 report(s).

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

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

ii) 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.

iii) 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.

B) In case sample again fails in the type test then:

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

ii) 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.

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

The various type tests as per relevant standards shall be conducted on each type of Isolator.

27.0 TOLERANCE :

Tolerance shall be allowed as per respective/ relevant standards unless otherwise specified. However, in case of current carrying parts only following negative tolerances shall be permissible :

Width & thickness of strip & bi-metallic strip : Positive Tolerance: (+) No Limit
Negative Tolerance: only upto (-) 2.5% but subject to meeting the requirement of specified/ approved cross- sectional area.

28.0 INSPECTION AND TESTING:

The successful bidder shall offer the required No. of 12 KV Post Insulators for purchasers inspection and after clearance of the above material, the complete assembled Roster Isolator Switch may be offered for inspection.

During type tests the dis-connector shall be mounted on its own support structure or equivalent support structure and installed with its own operating mechanism to make the type tests representative. The type tests are to be conducted on the disconnector along with insulators and terminal connectors.

29.0 TESTS AT SITE:

The purchasers reserves the right to carry out any site tests as may be decided at his own cost and will claim reimbursement from the supplier, in case the material as a result of such test/ tests is not found conforming to the prescribed specification.

30.0 GUARANTEED TECHNICAL PARTICULARS:

Guaranteed technical particulars as per Schedule-V for isolators and for post insulator shall be furnished alongwith the bid. Bid not accompanied with guaranteed technical particulars, type test reports and detailed drawings etc. are liable to be ignored.

31.0 COMPLETENESS OF EQUIPMENT:

All fittings, accessories or material which may have not been specifically mentioned in this specification, but which are usual or necessary for the equipment

shall be deemed to have been included in this specification. All equipments shall be complete in all respects. The tentative bill of material is mentioned with the drawing/ sketch.

32.0 PRICE & 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 **1.03.2011** 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.

33.0 SPARES:

List of spare parts recommended for five years operation shall be furnished by the bidder. The bidder shall also quote unit price F.O.R. destination of the spares.

34.0 DELIVERY SCHEDULE :

The delivery of quoted quantity should be completed in **8 months** period including commencement period of maximum **60 days**. In case ordered quantity is different than quoted quantity, then monthly delivery shall be adjusted proportionately. Bids in which monthly delivery is not indicated shall be ignored.

35.0 DELAY IN DELIVERY :-

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

36.0 TEST CHECKING OF MATERIAL AT TESTING LABORATORY:

The material received in stores of Nigam shall be subjected to the test checking at testing laboratory before final acceptance of material. The procedure for testing shall be as under:

i) SAMPLING

One sample out of each sub lot/ lot of (100 sets) Hundred sets or part thereof from each inspected lot received in stores shall be selected from each store 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 or else where as arranged by the JVVNL shall be carried out in the presence of representative of the supplier after identification / confirmation by him that samples so selected belong to them.

ii) TESTS

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

- a) Visual examination , verification of dimensions, weight and marking.
- b) Post Insulators : - i) Mechanical strength test. ii) Porosity test
 iii) Puncture test.
- c) All galvanized parts. - Uniformity of galvanization test.
- d) Checking of current carrying parts as per approved drawing

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.

For witnessing of the testing, clear 7 (seven) 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.

The Officer Incharge of Central Testing Lab (CTL) Jaipur shall send copies of test reports to the purchaser, consignees and the supplier.

iii) CRITERIA FOR ACCEPTANCE

a) Visual Examination, verification of dimensions, weight and marking.

As per Specification/ GTP/ approved drawing.

b) Post Insulators : i) Mechanical strength test. ii) Porosity test
iii) Puncture test.

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

c) For Uniformity of galvanization test:

i) The sample(s) shall be first tested for (n-2) number of dips where n is specified No. of dips in the contract. If the sample does not pass the uniformity of galvanization test for (n-2) dips, the material shall be rejected and the material relating to relevant sub-lot/ lot to which the sample(s) pertains shall have to be replaced by the supplier free of cost.

ii) If the sample has passed the uniformity of galvanization test for (n-2) dips, then it shall be tested for (n-1) dips. If the sample has not passed the uniformity of galvanization test with (n-1) dips, the material pertaining to relevant lot/sub-lot shall be accepted with a deduction @ 4% of cost of galvanized material parts.

iii) If the sample passed the uniformity of galvanization 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 unifoprmy of galvanization test with `n' dips, then the material pertaining to relevant lot/sub-lot shall be accepted with a deduction @ 2% of cost of galvanized material parts.

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.

d) Checking of current carrying parts as per approved drawing :

If the dimensions of the current carrying metal parts are in conformity with approved drawings, the material shall be accepted. When the dimensions of above parts are less than those minimum specified in the approved drawings within 5%, the material contained in the lot / sub-lot to which the sample belongs shall be accepted subject to the condition that the current density in above part is in conformity with the contract and deduction at the rate of 2% cost of above parts for every 1% or part thereof reduction in weight due to less dimensions. The deduction shall be made for the weight of above parts calculated on the basis of dimensions observed and found less. The weight shall be compared with one calculated on the basis of the minimum dimensions for the part(s) approved in the drawings.

The rates for deductions shall be taken from the relevant IEEMA Circulars applicable on the date two months prior to the date of supply. When the dimensions are less by more than 5% as compared to the dimensions as per approved drawings, the material contained in the lot / sub-lot to which the sample belongs shall be rejected and shall have to be replaced by the supplier.

iv) TEST CHARGES :

All test charges incurred towards test checking of the material received in our stores shall be borne by the NIGAM except that of personal expenses of the representative of the supplier for witnessing the tests.

37.00 PAYMENT :

The Payment shall be governed in accordance with the clause No. 1.42 of GCC with the following modifications :-

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.

38.0 QUANTITY TOLERANCE :

Quantity tolerance of plus minus 2% of ordered quantity shall be allowed in respect of each item for completion of supply.