Corrigendum- 3

TPNODL/OT/2021-22/065

Rate Contract for Supply of Isolator & AB switch for 11KV & 33KV

Dated 08th October 2021

Following changes in Event Information & Calendar of Events in page no.-5, Annexure-I & II of tender document is made;

Page no 5

(a)	Last Date of receipt of Tender Fee	18.10.2021 ; 15:00 Hrs
(e)	Last date and time of receipt of Bids	22.10.2021 up to 15:00 Hrs
(f)	Date & Time of opening technical bids & EMD	22.10.2021 up to 15:30 Hrs

Annexure –I

S No	Material Description	Make	HSN Code	Qty	Unit Ex Work Price	GST	All-incl. (FOR) Unit Price (Rs.)	Total= (Qty x All inclusive unit price) (Rs.)	Lot
				(EA)	(Rs.)	(Rs)	C=A+B	(Q x C)	
				'Q'	'A'	'B'			
1	33kV Double Break Manual Isolator 1250A	Siemens/S & S/Switchgears and Structurs/C & S/ELPRO/Reputed		25					LOT-1
2	33kV Double Break Manual Isolator 1250A with Earth switch	Siemens/S & S/Switchgears and Structurs/C & S/ELPRO/Reputed		25					
3	33kV Double Break Motorised Isolator 1250A	Siemens/S & S/Switchgears and Structurs/C & S/ELPRO/Reputed		25					
4	33kV Double Break MotorisedIsolator 1250A	Siemens/S & S/Switchgears		25					

	with Earth switch	and Structurs/C & S/ELPRO/Reputed							
5	Supervision charges (Mandays)			10					
6	11kV Double Break Manual Isolator 1250A	Siemens/S & S/Switchgears and Structurs/C & S/ELPRO/Reputed		25					
7	11kV Double Break Manual Isolator 1250A with Earth switch	Siemens/S & S/Switchgears and Structurs/C & S/ELPRO/Reputed		25					
8	11kV Double Break Motorised Isolator 1250A	Siemens/S & S/Switchgears and Structurs/C & S/ELPRO/Reputed		25					Lot-2
9	11kV Double Break MotorisedIsolator 1250A with Earth switch	Siemens/S & S/Switchgears and Structurs/C & S/ELPRO/Reputed		25					
10	Supervision charges (Mandays 10)			10					
11	33kV AB Switch 1250A	Siemens/S & S/Switchgears and Structurs/C & S/ELPRO/Reputed		100					
12	33kV AB Switch 630 A	Siemens/S & S/Switchgears and Structurs/C & S/ELPRO/Reputed		100					Lot-3
13	33kV AB Switch 200 A	Siemens/S & S/Switchgears and Structurs/C & S/ELPRO/Reputed		150					
14	Supervision charges (Mandays)			5					
15	11kV Ab Switch 1250A	Siemens/S & S/Switchgears and Structurs/C & S/ELPRO/Reputed		100					
16	11kV AB Switch 630 A	Siemens/S & S/Switchgears and Structurs/C & S/ELPRO/Reputed		400					
17	11kV AB Switch 400 A	Siemens/S & S/Switchgears and Structurs/C & S/ELPRO/Reputed		500					Lot-4
18	11kV AB Switch 200 A	Siemens/S & S/Switchgears and Structurs/C & S/ELPRO/Reputed		1000					
19	Supervision charges (Mandays)	Siemens/S & S/Switchgears and Structurs/C & S/ELPRO/Reputed		5					
Total All Inclusive									

Annexure-II

Technical specification for line item number: 12, 13, 16,17 &18 are here by attached along with corrigendum-3.
Technical specification for other line items shall remain same as per the floated tender: TPNODL/OT/2021-22/065.

Note :- In the event of last date specified for submission of bids and date of opening of bids is declared as a closed holiday for TPNODL, the last date of submission of bids and date of opening of bids will be the following working day at appointed times.

All other terms and conditions of the above tender shall remain unaltered.

Yours faithfully,
-sd-

HoD - Contracts
TPNODL, Balasore

TP NORTHERN ODISHA DISTRIBUTION LIMITED
(A Tata Power & Odisha Government Joint Venture)
Registered & Corporate Office: Januganj, Remuna Golei, Balasore – 756 019, Odisha, India
Phone: +91 6782 244865, Email: contactus@tpnodl.com, Website: www.tpnodl.com
CIN: U40106OR2021SGC035951

CONTENTS

1. SCOPE

This specification covers the technical requirements of design, manufacturing, testing at manufacturer's works, inspection, packing, forwarding, supply and unloading of polymer 11kV , 3 – pole 200 Amps,400 Amps & 630 Amps Air Break Gang Operated Switch at site / stores complete with all the accessories.

The material shall be complete with all components and accessories, which are necessary or usual for their efficient performance and trouble free operation under the various operating and atmospheric conditions specified in clause no. 3

Such of the parts that may have not been specifically included, but otherwise form part of the AB Switch as per standard trade and/or professional practice and/or are necessary for proper operation, will be deemed to be also included in this specification. The successful bidder shall not be eligible for any extra charges for such accessories etc. notwithstanding the fact that at the time of an initial offer bidder had segregated such items and quoted for them separately.

2. APPLICABLE STANDARDS:

The equipment (and the materials used) covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian standards & other relevant standards for components, BEE & CEA guidelines with latest amendment from time to time, thereof, some of which are listed below:

• IS 9920 : High voltage switches for rated voltages above 11kV and up to and including 52kV
• IEC 61109 : Composite Insulators for A.C. overhead line with nominal voltages greater than 1000V
• IEC 62271 – 102: High Voltage switchgear and control gear - Part 102 : Alternating current disconnectors and earthing switches
• IS 2633: Method for testing uniformity of coating on zinc articles
• IS 2629: Recommended practice for hot dip galvanizing of iron and steel
• IS 4759 : Hot – dip zinc coatings on structural steel and other allied products
• IS: 2486/ IEC: 60120: Specification for Insulator fittings for Overhead Power Lineswith a nominal voltage greater than 1000V General Requirements and Tests, Dimensional Requirements Locking Devices.
• IEC: 61109: Definition, test methods and acceptance criteria for compositeinsulators for A.C. overhead lines above 1000V.
• IS: 2071/ IEC: 60060-1: Methods of High Voltage Testing.

• IS 9530 / 1980 : Recommended practice for silver plating
• IS 5925 / 1980 : Recommended practice for silver plating for general engineering purposes
• BS 2816 / 1964 : Testing of Silver plating thickness
• IS 6735 / 1994 : Spring Lock washers
• IS 2016: Plain Washers
• IS 1161 : Steel tubes for structural purposes
• IS 1239 : GI Pipe ('B class or medium class)

3. CLIMATIC CONDITIONS:

a)	Maximum Ambient Temperature	50 ^{o}C
b)	Maximum Daily Average Ambient Temperature	40 ^{o}C
c)	Minimum Ambient Temperature	2 ^{o}C
d)	Maximum Humidity	99.7 %
e)	Minimum Humidity	15 %
f)	Average Annual Rainfall	1800 mm
g)	Average Wind Speed prevailing in the area	200 km/hr.
h)	Average Thunderstorms prevailing in the area	70 days per annum
i)	Average dust storms prevailing in the area	20 days per annum
j)	Average number of rainy days per annum	160
k)	Maximum Altitude above sea level	1200 m
l)	Seismic Level	0.24g to 0.48g

Note: The atmosphere across coastal divisions of TPNODL is very saline, laden with salt, acid and dust suspended during dry months and subjected to fog in cold months.

4. GENERAL TECHNICAL PARAMETERS:

Sl. No.	TECHNICAL PARTICULARS	DESIRED VALUE		
1.	Rating of AB Switch	630 Amps	400 Amps	200 Amps
2.	Installation	Outdoor	Outdoor	
3.	Suitable for Mounting	Horizontal Rotating Type	Horizontal Rotating Type	
4.	Type	3 Pole	3 Pole	
5.	Service Voltage	11kV	11kV	
6.	Rated Voltage	12kV	12kV	
7.	Rated Frequency	50Hz	50Hz	
8.	Current Carrying capacity	630 Amps	400 Amps	200 Amps

9.	Rated Short time current	16kA for 1 sec	16kA for 1 sec	
10.	Rated peak withstand current	40kA	40kA	
11.	Rated main active load breaking capacity	10kA	10kA	
13.	Rated line charging breaking capacity	2.5 A rms	2.5 A rms	
14.	Rated transformer off load breaking capacity	16.3 Amps	16.3 Amps	
15.	One – minute power frequency withstand voltage (Dry)	65kV	65kV rms	
16.	One – minute power frequency withstand voltage (Wet)	40kV	40kV rms	
17.	Power Frequency puncture withstand test	1.3 times of actual dry flashover voltage	1.3 times of actual dry flashover voltage	
A.	Visible Discharge voltage	9kV rms	9kV rms	
B.	Dry Flashover voltage	To be provided by bidder	To be provided by bidder	
18.	One minute Power frequency withstand voltage b/w pole and earth	28kV	28kV	
19.	One Minute Power frequency withstand voltage across the isolation distance	32kV	32kV	
20.	Impulse withstand voltage for positive and negative polarity (1.2/50) micro second wave			
A.	Across isolating distance	85kV peak	85kV peak	
B.	To earth and b/w poles	75kV peak	75kV peak	
21.	No. of post per phase (Polymeric, IEC 61109)	To be provided by the Bidder	To be provided by the bidder	
22.	Total no. of post	To be provided by bidder	To be provided by the bidder	
23.	Minimum Creepage distance	320 mm (minimum)	320 mm (minimum)	
24.	Phase to phase clearance	760 mm	760 mm	
25.	Isolation distance in switch open condition	380 mm	380 mm	
26.	Vertical clearance from top of insulator cap to mounting channel	254 mm (minimum)	254 mm (minimum)	
27.	Copper contacts temp in air should not exceed	65 degrees	65 degrees	
28.	Size of fixed contacts (Copper Type Electrolytic with silver plated)	Self-aligned, high pressure jaw type fixed contacts of electrolytic copper of size 75 mm x 8 mm x 80 mm duly silver plated. Each contact should be revetted with three nos. Copper rivets with a bunch (minimum 3 mm thick) consisting of copper foils, each may vary from 0.15 mm to 0.25 mm. These total thickness of copper foils per jaw should be 8 mm. Jaw assemblies are to be bolted through GI bolts and nuts	Self – Aligned Type 50 mm x 4 mm (2 piece set)	Self – Aligned Type 50mm x 3mm (2 piece set)

		with GI flat and spring washer.		
29.	Size of moving contacts (Copper Type Electrolytic with silver plated)	Solid rectangular blade type moving contact of electrolytic copper size 250 mm x 75 mm x 8 mm duly silver plated ensuring a minimum deposit of 10 micron of silver on copper contacts or as may be prescribed under relevant ISS / IEC.	Solid rectangular blade type moving contact of electrolytic copper size 250 mm x 50 mm x 8 mm duly silver plated ensuring a minimum deposit of 10 micron of silver on copper contacts or as may be prescribed under relevant ISS / IEC.	Solid rectangular blade type moving contact of electrolytic copper size 250 mm x 35 mm x 6 mm duly silver plated ensuring a minimum deposit of 10 micron of silver on copper contacts or as may be prescribed under relevant ISS / IEC.
30.	Moving contact support angles	Movable contact is to be supported by galvanized angle of 75 x 50 x 5 mm in each phase and the moving contact are to be bolted through 2 no GI bolts and nuts with suitable GI flat and spring washers.	Movable contact is to be supported by galvanized angle of 50 x 50 x 5 mm in each phase and the moving contact are to be bolted through 2 no GI bolts and nuts with suitable GI flat and spring washers.	Movable contact is to be supported by galvanized angle of 45 x 45 x 5 mm in each phase and the moving contact are to be bolted through 2 no GI bolts and nuts with suitable GI flat and spring washers.
31.	Pressure Springs	Pressure spring to be used in jaw contacts shall be Stainless Steel having 8 nos. of turn x 28 mm height x 14.4 mm diameter with 14 SWG wire (minimum six nos. springs shall be used)		
32	Insulation for tinned copper braid/rope	Polyolefin of woer make, (RSFR -H) type	Polyolefin of woer make, (RSFR -H) type	Polyolefin of woer make, (RSFR -H) type
33.	Copper Flexible Braided Tape – 320 mm long, tinned plated with brass nut, bolt & washers both ends shall be crimped with copper socket through brass bolts and nuts. Two nos. of suitable copper sockets shall be used at both ends. The minimum no. of flexible wires should be 1536 of 36 SWG for each flexible chord.	600 gm/mtr.	600 gm/mtr.	450 gm/mtr.
34.	Minimum Size – Length of the coupling rod (hot dip galvanized iron) for phase coupling pipe, Class B	25 mm dia & 1800mm long	25 mm dia & 1800mm long	
35.	Operating Down Pipe, B Class, (IS:1239-68)	25 mm nominal bore G.I. pipe medium gauge single length 6 mtr. The detailed dimension of the G. I. pipe as per IS-1239 (Pt. I)		
36.	Temperature Rise Limit (w.r.t. ambient temperature) - Tinned Copper contacts - Terminals - Metal Parts	 50°C 40°C 40°C	 50°C 40°C 40°C	
37.	Arcing Horns	10 mm dia GI Rod	10 mm dia GI Rod	
38.	Locking Arrangement	Provision for Pad locking for both 'ON' & 'OFF' position		

39.	Earth Terminals	M12 bolts with nuts and flat washer shall be provided at the base channel as earthing terminals
40.	'T' connection	The 'T' connection provided on the channel having moving contact shall be Four Bolted type G.I. nut & bolt at the bottom end to facilitate replacement of this unit only during requirements & avoid entire change of arm.
41.	'I' Bolt	The I bolt shall be longer with 75 mm thread
42.	Supporting Channel / Mounting Channel HDG 86 microns	75 x 40 x 5 mm hot dip galvanized channel (c/c slotted 18x36 hole 250mm) min. 480 mm length
43.	Connectors	Terminal connectors for both movable and fixed should be of copper flats of same size similar to that of moving contact blades (minimum 95% copper composition). The fixed connector shall of size 80 mm x 75 x 8 mm and the size of movable connector shall be size 80 x 75 x 8 mm with machine finishing duly silver plated with 2 nos. of 3/8" GI bolts, nuts, plain washers & spring washers should be provided along with Aluminum Alloy connector should be of 4 bolted type and suitable for 80 – 100 sq.mm AAAC conductor.
44.	Bearing	4 nos. of self-lubricating bearing to be provided with grease nipple including the 4th bearing being thrust bearing.
45.	Insulator Type	Polymer with FRP rod that must be dia minimum 24mm
46.	Spindle	Dia of spindle of long bearing rod shall be 25 mm
47.	Marking / Engraving	TPNODL, Serial No., Manufacturer's name or trade mark, Month & Year of manufacturing, Rated normal current in Amps, Rated one second short – time current in Amps

5. GENERAL CONSTRUCTION

1. The Air break switch shall be outdoor type, triple pole gang operated and shall be suitable for vertical installation.
2. The operating mechanism shall be suitable for manual operation from ground level and shall be designed in such way that all the three phases shall open and close simultaneously in smooth way.
3. The air break switch shall be with the arcing horns, the sizes of the rods used for the arcing horns would be 10 mm M.S. Hot dip galvanized, and arcing horn shall be bolted on double bolt.
4. The current carrying connectors should be two-bolt type having nuts and bolts, with spring washer and plane washer.
5. Each joint shall be provided with one plane and one spring of not less than 2mm thickness.
6. Connectors shall be of tinned copper.
7. Tinned Copper braid/rope shall be insulated by Polyolefin of woer make, (RSFR-H) type to prevent animal electrocution.
8. All ferrous parts shall be hot dip galvanized with heavy coating after proper surface treatment as per standards. Coating thickness shall not be less than 86micron at any point.
9. All Copper parts shall be heavily tinned plated as per relevant standards and coating thickness not less than 30micron at any point.
10. Equipment grounding shall be provided by bidder at two points with terminals.
11. All the nut bolt used must be Hot dip Galvanized and of size not less than M10.
12. A rigid base of galvanized steel channel of size approx. 100x50x6mm shall be provided with suitable holes, clamps and bolts for Horizontal mounting firmly on steel structure.
13. Each member of the switch shall be free from Rust, sharp edges, burr and any kind of deformation.

5.1 SILICONE RUBBER POST INSULATORS

1. All insulators provided to form a stack shall conform to the relevant standard specifications.
2. Composite insulator's shed and sheath shall be made of High Temperature Vulcanizing (HTV) type silicone rubber having silicone polymer content by weight 30% minimum.
3. The sheath and shed shall have excellent Hydrophobic and anti-tracking properties.
4. The composite polymer weather sheds made via injection molded and shall be free from imperfections, dust and air bubble etc. It should protect the FRP rod against environmental influences, external pollution and humidity.
5. The strength of the weather shed to sheath interface shall be greater than the tearing strength of the polymer.
6. The FRP rods used for insulator shall be of glass-fiber reinforced epoxy resin rod of high strength (FRP rod).
7. Glass fibers shall be Boron free electrically corrosion resistant (ECR) glass fiber (minimum 80%) and shall exhibit both high electrical integrity and high resistance to acid corrosion.
8. Glass fibers and resin shall be optimized in the FRP rod.
9. The end fitting transmit the mechanical load to the core. They shall be made of spheroidal graphite cast iron, malleable cast iron or forged steel or aluminum alloy.
10. Metal end fitting shall be suitable for hardware support of respective specified mechanical load and shall be hot dip galvanized with average minimum of 115micron and no value less than 90micron in accordance with IS 2629. They shall be connected to the rod by means of a controlled compression technique.
11. The OD of end fittings should be machined to make the surface uniform round to ensure effective sealing when housing is molded over it. The material used in fittings shall be corrosion resistant.
12. The Post insulator shall be homogenous and free from all the cavities and flaws.
13. Design of insulators shall ensure ample insulation, mechanical strength and rigidity for satisfactory operation under site conditions.
14. The design shall also ensure that the losses caused by capacitive current or conduction through dielectric are minimum and that the leakage due to moist and dirty insulators surfaces is least.
15. All metal caps and supports shall be crimped to the FRP rod.
16. There should be a closed ring of Stainless steel of 0.3x1mm at insulated bottom of the insulators.

5.2 FIXED AND MOVABLE CONTACT SYSTEM

1. The material of the fixed and moving contacts shall be electrolytic hard drawn copper (min. 95% copper) heavily tinned Coated.
2. The contact shall be of high pressure and self-aligning type with positive wiping action and minimum contact pressure shall be ¼ gram per amp of current carrying capacity.
3. The fixed contact shall have insulating bushes at spring ends and proper guide arrangement for preventing misalignment of springs
4. The minimum distance between the fixed and the nearest part on the moving contact in the completely open position shall not be less than the defined value in GTP.
5. The withstand level across the break, shall be as specified under Type test.

5.3 TERMINATIONS

1. The electrical terminations shall be made of tinned copper with minimum cross section and rating equivalent to fixed contact.
2. The terminations shall be suitable for connections for AL conductor with AL Lug.
3. Incoming terminal shall be of extended dimension for LILO connections, there should be provision for connecting two nos. of Al Lugs.
4. For outgoing side, there should be provision for connecting one nos. of connections.
5. All nut bolts, washer, spring washers required for connections shall be provided with equipment

5.4 OPERATING MECHANISM

1. There shall be provision to fix Eye hook with rod diameter of 18mm for pulling arrangement for both ON and OFF operations manually.
2. There shall not be any misalignment in post insulators/complete assembly and the touch time of main contacts of all poles shall be same i.e. at the time of closing, the moving main contacts of all poles shall come in touch with fix contact at the same instance.
3. There shall not be any discrepancy in contact touch timing while operations.
4. At the time of installation if any issue arises because of alignment, then the bidder shall extend the support in attaining the same or replacing the AB switch within 15days.
5. Suitable padlock/locking arrangement shall be provided for locking the operating cantilever in OFF position.

5.5 MECHANICAL STRENGTH

1. AB switches shall withstand rated mechanical terminal load and electromagnetic forces without impairing their operational reliability or current carrying properties.
2. AB switches inclusive of their operating mechanism shall not come out of their open or closed positions by gravity, wind pressure, vibrations or reasonable shocks.
3. AB switches shall be capable of resisting in closed position dynamic and thermal effects of the maximum possible short circuit current at the installation point and should not open under the influence of short circuit current.

5.6 GALVANIZATION

Zinc Coating thickness/ Mass of Zinc Coating to be as per mentioned in Tender /TPNODL requirements. Minimum Zinc Coating to be as detailed below:

Sl. No.	Product	Minimum Value for Average mass of coating (g/m²) / coating thickness (microns)
1.	Fabricated Steel articles : • 5 mm thick & over • Under 5 mm, but not less than 2 mm • Under 2 mm, but not less than 1.2 mm • All type Steel Poles	 705/100 610/86 340/48 850 / 120
2.	Threaded Items (nut, bolts, etc.) other than tubes & tube fittings : • 10 mm dia & over • Under 10 mm dia	 460/65 320/45
Note: The requirements for the minimum mass of coating shall be increased as agreed to between the galvanizer & the purchaser.		

6. NAME PLATE & MARKING

Below parameters should be embossed on SS sheet of thickness 1mm with black background. It should be riveted on MS channel of switch:

1. Rated Voltage
2. Manufacturer's Name
3. TPNODL "Name"
3. Month/Year of Manufacture
4. Serial Number
5. PO no.
6. Rated normal current in Amps
7. Rated one second short – time current in Amps

7. TESTS :

- All routine, acceptance & type tests shall be carried out in accordance with the relevant IS 9921 and relevant IEC.
- All routine/acceptance tests shall be witnessed by the TPNODL authorized representative.
- All the components and fittings shall also be type tested as per the relevant standards.
- Following tests for Air Break AB Switch should be done as per relevant IS/IEC standards:

7.1 Routine Test	• Power Frequency Voltage dry test • Dimensional Check • Satisfactory Operation Test • Measurement of resistance in main circuit • Voltage test for auxiliary circuit

7.2 Acceptance Test

Sl. No.	Test to be done	Reference BIS	Clause No.
1.	Power Frequency Voltage Dry test	IS 9920 – Part IV	4.1
2.	Satisfactory Operation Test	IS 9920 – Part IV	4.3
3.	Measurement of resistance in main circuit	IS 9920 – Part IV	4.2
4.	Visual & Dimensional checks		
5.	Verification of metallic or no metallic dust or air bubbles within polymeric housing & shed of insulator (destructive test)		
6.	Voltage test for auxiliary circuit	IS 9920 Part IV	4.01 & 3.1.11
7.	Galvanizing test for – i. GI pantograph ii. Operating rod, cantilever channel and base structure iii. Post Insulator parts iv. Nut Bolts	IS 4759	9

7.3 Type Test

1. Test for Temperature rise as per IS 9920 part4 cl.3.2.
2. Test to verify the insulation level including withstand test at power frequency voltages on auxiliary equipment test as per IS 9920 part4 cl. 3.1.
3. Test to prove satisfactory operation and mechanical endurance as per IS 9920 part4 cl.3.5.
4. Making and braking test as per IS 9920 part4 cl.3.3.
5. Test to prove the capability of the switch to carry the rated peak withstand current and rate short circuit current as per IS 9920 part4 cl.3.4.
6. Test to prove satisfactory operation under ice conditions as per IS 9920 part4 cl.3.6.

8. TYPE TEST CERTIFICATES:

The bidder shall furnish the type test certificates of the cable for the tests as mentioned as above as per the corresponding standards. All the tests shall be conducted by CPRI/ERDA as per the relevant standards. Type test should have been conducted in certified Test Laboratories during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports i.e., any test report not acceptable or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to TPNODL.

9. PRE-DISPATCH INSPECTION:

- The equipment shall be subject to inspection by a duly authorized representative of the TPNODL. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to TPNODL's representatives at all times when the work is in progress. Inspection by the TPNODL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPNODL.

Following documents shall be sent along with material

a) Test reports

b) MDCC issued by TPNODL

c) Invoice in duplicate

d) Packing list

e) Drawings & catalogue

f) Guarantee / Warrantee card

g) Delivery Challan

h) h) Other Documents (as applicable).

10. INSPECTION AFTER RECEIPT AT STORE:

The material received at TPNODL store will be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Engineering & Contracts department.

11. GUARANTEE:

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Purchaser up to a period of at least 18 months from the date of commissioning or 24 months from the date of last supplies made under the contract whichever is later, (the time scale of 18/24 months could be enhanced subject to mutual agreements). Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of the Purchaser, failing which the Purchaser will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the Purchaser's own charges (@ 20% of expenses incurred), from the Bidder or from the "Security cum Performance Deposit" as the case may be. Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Purchaser.

12. PACKING AND TRANSPORT:

Bidder shall ensure that all the equipment covered under this specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit.

Note: One use plastic not to be used for packing of the material.

13. TENDER SAMPLE:

One no. Sample of braided tinned Copper to be submitted during technical bid submission along with current density calculation.

14. TRAINING :

The bidder shall arrange to provide training of our staff if required for installation & commissioning or maintenance etc.

15. QUALITY CONTROL:

The bidder shall submit with the offer Quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.

The following information shall necessarily be submitted with the bid:

- List of important raw materials, names of sub-suppliers for raw materials, standards to which raw material is tested and the copies of test reports of the tests carried out on raw materials in presence of Bidder's representatives.
- List of manufacturing facilities available, level of automation achieved and the areas where manual process exists.
- List of areas in manufacturing process where stage inspections are normally carried out for quality control and details of these tests and inspections
- List of testing equipment for final testing with valid calibration reports. Manufacturer shall possess 0.1 class instruments for measurement of losses.
- QAP withhold points for TPNODL inspection

16. MINIMUM TESTING FACILITIES:

Bidder shall have adequate in-house testing facilities for carrying out all routine tests & acceptance tests as per relevant International / Indian standards.

17. MANUFACTURING ACTIVITIES

The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan submitted with the offer. This bar chart will have to be submitted within 15 days from the release of the order.

18. SPARES, ACCESSORIES & TOOLS:

The bidder shall provide a list of complete set of accessories and tools required for erection and maintenance of LT ABC along with the installation procedure.

1. Bidder shall provide a list of recommended spares with quantity and unit prices for 5 years of operation after commissioning. The Purchaser may order all or any of the spare part listed at the time of award of contract and these parts shall be supplied as a part of definite works. The Purchaser may order additional spares at any time during the contract period at the rates stated in the Contract document.
2. Bidder shall give an assurance that the reparability of AB Switch, spare parts and consumable items will continue to be available through the life of the equipment which shall be 15 years minimum. However, the Purchaser shall be given a minimum of 12 months' notice in the event that the Bidder or any sub-vendor plans to discontinue manufacture of any component used in this equipment.
3. Any spare apparatus, parts or tools shall be subject to the same specification, tests and conditions as similar material supplied under the Contract. They shall be strictly interchangeable and suitable for use in place of the corresponding parts supplied with the plant and must be suitably marked and numbered for identification

19. DRAWINGS AND DOCUMENTS:

Following drawings and documents shall be prepared based on TPNODL specifications and statutory requirements and shall be submitted with the bid:

- Completely filled in Technical Particulars and compliance to each clause of the specification General Technical Requirements to Additional Details.
- Description of the equipment and all components including brochures.
- General Drawing arrangement of AB Switch.
- Bill of material.
- Experience Certificate and list.
- Type test certificates.
- List of makes of major components.
- Current density calculation of tinned braided Copper.

Drawings / documents to be submitted after the award of the contract are as under:

List of Drawings/Parameters to be submitted:

- Technical Parameters as asked in Specification (General Technical Particulars, General Technical Requirements, Additional Details, Fittings, Type test Reports and Routine test certificates of bought out accessories).
- General Arrangement Drawing of the AB Switch (Front view, Top view and both sides view. Complete list of fittings to be displayed and quantities to be mentioned with the drawing).
- Terminal and connection drawings
- Manual catalogue
- Instructions for use
- Transport/shipping dimension drawing
- Type Test Certificates.
- Installation/ Mounting Instructions/Drawing.
- Quality Assurance plan.

List of Calculations to be submitted:

All the calculations shall be step by step showing the use of formulas and other practical considerations. Concise calculations in table or excel sheet shall not be accepted. Also, the reference (only standard sources as IS, IEC or any such standard is acceptable) of the formulas shall be mentioned.

- Short Circuit withstand.
- Temperature Rise Calculations.

Additional Documents to be submitted :

a. List of raw materials as well as bought out accessories and the names of sub-suppliers selected from those furnished along with offer.

b. Type test certificates of the raw materials and bought out accessories.

c. The successful Bidder shall submit the routine test certificates of bought out accessories and central excise passes for raw material at the time of routine testing.

All the documents & drawings shall be in English language. After the receipt of the order, the successful bidder will be required to furnish all relevant drawings/parameters/calculation to TPNODL for approval.

Instruction Manuals:

Bidder shall furnish softcopies of nicely bound manuals (In English language) covering erection and maintenance instructions and all relevant information and drawings pertaining to the main equipment as well as auxiliary devices.

20. GUARANTEED TECHNICAL PARTICULARS

Bidder shall submit & comply the guaranteed technical particulars in the attached format as mentioned in the GTR (Clause : 4)

21. SCHEDULE OF DEVIATIONS

(TO BE ENCLOSED WITH TECHNICAL BID)

All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the Purchaser's specifications:

Sl. No.	Clause No.	Details of deviation with justifications

We confirm that there are no deviations apart from those mentioned above.

Seal of the Company

Designation

Signature

ANNEXURE – 1

INSPECTION TEST PLAN FOR PRE – DELIVERY OF AB SWITCH

1	Name of the Firm / BA	
2	Date of Inspection	
3	Details of Offer made	
	i. Order No. & Date	
	ii. Rating	
	iii. Quantity	
	iv. Sl. No. of material offered	
4.	Sample Quantity	Sr. No……

ACCEPTANCE TESTS TO BE CARRIED OUT:

Sl.no.	Particulars	Specified Value	Reference Docs.	Test Results	Pass / Fail
1	Power Frequency Voltage Dry Withstand Test		IS 9920 Part IV Cl: 4.1		
2	Satisfactory Operation Test		IS 9920 Part IV Cl: 4.3		
3	Measurement of Resistance in main circuit	GTP	IS 9920 Part IV Cl: 4.2		
4	Voltage Test for auxiliary circuit		IS 9920 Part IV Cl: 4.01 & 3.1.11		
5	Visual & Dimensional Checks	GTP / TS			
6	Verification of metallic or non – metallic dust and air bubbles within polymeric housing of post insulators (destructive test)	Free from metallic or non – metallic dust, air, bubbles, etc.			
7	Mechanical Strength Test	GTP			
8	Galvanizing test for – i. GI pantograph ii. Operating rod, cantilever, channel & base structure iii. Post Insulators parts iv. Nut Bolts	GI coating min. >86 micron Uniform GI Coating Free from rust, burr deformation			
9	Verification of Raw material TC, invoice and its consumption record	Record must be maintained for each raw material			

ANNEXURE – II

SOURCE OF MATERIALS / PLACES OF MANUFACTURE, TESTING & INSPECTION

Sl. No.	Item	Source of Material	Place of Manufacture	Place of testing & inspection
1.	Steel (channel, angle, etc.)			
2.	Galvanizer			
3.	Zinc			
4.	Silicon Rubber			
5.	FRP Rod			
6.	Insulation			
7.	Tinned Copper braid / rope			
8.	Copper for terminal & contacts			

CONTENTS

1. SCOPE

This specification covers the technical requirements of design, manufacturing, testing at manufacturer's works, inspection, packing, forwarding, supply and unloading of polymer 33kV , 3 – pole 200 Amps,400 Amps & 630 Amps Air Break Gang Operated Switch at site / stores complete with all the accessories.

The material shall be complete with all components and accessories, which are necessary or usual for their efficient performance and trouble free operation under the various operating and atmospheric conditions specified in clause no. 3

Such of the parts that may have not been specifically included, but otherwise form part of the AB Switch as per standard trade and/or professional practice and/or are necessary for proper operation, will be deemed to be also included in this specification. The successful bidder shall not be eligible for any extra charges for such accessories etc. notwithstanding the fact that at the time of an initial offer bidder had segregated such items and quoted for them separately.

2. APPLICABLE STANDARDS:

The equipment (and the materials used) covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian standards & other relevant standards for components, BEE & CEA guidelines with latest amendment from time to time, thereof, some of which are listed below:

• IS 9920 : High voltage switches for rated voltages above 11kV and up to and including 52kV
• IEC 61109 : Composite Insulators for A.C. overhead line with nominal voltages greater than 1000V
• IEC 62271 – 102: High Voltage switchgear and control gear - Part 102 : Alternating current disconnectors and earthing switches
• IS 2633: Method for testing uniformity of coating on zinc articles
• IS 2629: Recommended practice for hot dip galvanizing of iron and steel
• IS 4759 : Hot – dip zinc coatings on structural steel and other allied products
• IS: 2486/ IEC: 60120: Specification for Insulator fittings for Overhead Power Lineswith a nominal voltage greater than 1000V General Requirements and Tests, Dimensional Requirements Locking Devices.
• IEC: 61109: Definition, test methods and acceptance criteria for compositeinsulators for A.C. overhead lines above 1000V.
• IS: 2071/ IEC: 60060-1: Methods of High Voltage Testing.

• IS 9530 / 1980 : Recommended practice for silver plating
• IS 5925 / 1980 : Recommended practice for silver plating for general engineering purposes
• BS 2816 / 1964 : Testing of Silver plating thickness
• IS 6735 / 1994 : Spring Lock washers
• IS 2016: Plain Washers
• IS 1161 : Steel tubes for structural purposes
• IS 1239 : GI Pipe ('B class or medium class)

3. CLIMATIC CONDITIONS:

a)	Maximum Ambient Temperature	50 ^{o}C
b)	Maximum Daily Average Ambient Temperature	40 ^{o}C
c)	Minimum Ambient Temperature	2 ^{o}C
d)	Maximum Humidity	99.7 %
e)	Minimum Humidity	15 %
f)	Average Annual Rainfall	1800 mm
g)	Average Wind Speed prevailing in the area	200 km/hr.
h)	Average Thunderstorms prevailing in the area	70 days per annum
i)	Average dust storms prevailing in the area	20 days per annum
j)	Average number of rainy days per annum	160
k)	Maximum Altitude above sea level	1200 m
l)	Seismic Level	0.24g to 0.48g

Note: The atmosphere across coastal divisions of TPNODL is very saline, laden with salt, acid and dust suspended during dry months and subjected to fog in cold months.

4. GENERAL TECHNICAL PARAMETERS:

Sl. No.	TECHNICAL PARTICULARS	DESIRED VALUE		
1.	Rating of AB Switch	630 Amps	400 Amps	200 Amps
2.	Installation	Outdoor	Outdoor	
3.	Suitable for Mounting	Horizontal Rotating Type	Horizontal Rotating Type	
4.	Type	3 Pole	3 Pole	
5.	Service Voltage	33kV	33kV	
6.	Rated Voltage	36kV	36kV	
7.	Rated Frequency	50Hz	50Hz	
8.	Current Carrying capacity	630 Amps	400 Amps	200 Amps

9.	Rated Short time current	16kA for 1 sec	16kA for 1 sec	
10.	Rated peak withstand current	40kA	40kA	
11.	Rated cable charging breaking capacity	40kA rms	40kA rms	
12.	Rated Short circuit making capacity	25 kA	25 kA	
13.	Rated line charging breaking capacity	5.3 A (rms)	5.3 A rms	
14.	Rated transformer off load breaking capacity	16.3 A (rms)	16.3 Amps	
15.	One – minute power frequency withstand voltage (Dry)	95 kV	95kV rms	
16.	One – minute power frequency withstand voltage (Wet)	75 kV	75kV rms	
17.	Power Frequency puncture withstand test	1.3 times of actual dry flashover voltage	1.3 times of actual dry flashover voltage	
A.	Visible Discharge voltage	27kV rms	27kV rms	
B.	Dry Flashover voltage	To be specified by bidder	To be specified by bidder	
18.	One minute Power frequency withstand voltage b/w pole and earth	70 kV	70kV	
19.	One Minute Power frequency withstand voltage across the isolation distance	80 kV	80kV	
20.	Impulse withstand voltage for positive and negative polarity (1.2/50) micro second wave			
A.	Across isolating distance	195 kV peak	195 kV peak	
B.	To earth and b/w poles	170 kV peak	170 kV peak	
21.	No. of post per phase (Polymeric, IEC 61109)	To be provided by bidder	To be provided by bidder	
22.	Total no. of post	To be provided by bidder	To be provided by bidder	
23.	Minimum Creepage distance	900 mm (minimum)	900 mm (minimum)	
24.	Phase to phase clearance	1200 mm	1200 mm	
25.	Isolation distance in switch open condition	640 mm	640 mm	
26.	Vertical clearance from top of insulator cap to mounting channel	508 mm (minimum)	508 mm (minimum)	
27.	Copper contacts temp in air should not exceed	65 degrees	65 degrees	
28.	Size of fixed contacts (Copper Type Electrolytic with silver plated)	Self-aligned, high pressure jaw type fixed contacts of electrolytic copper of size 75 mm x 8 mm x 80 mm duly silver plated. Each contact should be revetted with three nos. Copper rivets with a bunch (minimum 4 mm thick) consisting of copper foils, each may vary from 0.15 mm to 0.25 mm. These total thickness of copper foils per jaw should be 8 mm. Jaw assemblies are to be bolted through GI bolts	Self – Aligned Type 50 mm x 4 mm (2 piece set)	Self – Aligned Type 50 mm x 3 mm (2 piece set)

		and nuts with GI flat and spring washer.		
29.	Size of moving contacts (Copper Type Electrolytic with silver plated)	Solid rectangular blade type moving contact of electrolytic copper size 250 mm x 75 mm x 8 mm duly silver plated ensuring a minimum deposit of 10 micron of silver on copper contacts or as may be prescribed under relevant ISS / IEC.	Solid rectangular blade type moving contact of electrolytic copper size 250 mm x 50 mm x 8 mm duly silver plated ensuring a minimum deposit of 10 micron of silver on copper contacts or as may be prescribed under relevant ISS / IEC.	Solid rectangular blade type moving contact of electrolytic copper size 250 mm x 35 mm x 6 mm duly silver plated ensuring a minimum deposit of 10 micron of silver on copper contacts or as may be prescribed under relevant ISS / IEC.
30.	Moving contact support angles	Movable contact is to be supported by galvanized angle of 75 x 50 x 5 mm in each phase and the moving contact are to be bolted through 2 no GI bolts and nuts with suitable GI flat and spring washers.	Movable contact is to be supported by galvanized angle of 50 x 50 x 6 mm in each phase and the moving contact are to be bolted through 2 no GI bolts and nuts with suitable GI flat and spring washers.	Movable contact is to be supported by galvanized angle of 45 x 45 x 5 mm in each phase and the moving contact are to be bolted through 2 no GI bolts and nuts with suitable GI flat and spring washers.
31.	Pressure Springs	Pressure spring to be used in jaw contacts shall be Stainless Steel having 8 nos. of turn x 28 mm height x 14.4 mm diameter with 14 SWG wire (minimum six nos. springs shall be used)		
32	Insulation for tinned copper braid/rope	Polyolefin of woer make, (RSFR -H) type	Polyolefin of woer make, (RSFR -H) type	Polyolefin of woer make, (RSFR -H) type
33.	Copper Flexible Braided Tape – 450 mm long, 28mm width, 1 no. of flexible electrolytic copper tape or braided chord (with tin coated), bolt & washers both ends shall be crimped with copper socket through brass bolts and nuts. Two nos. of suitable copper sockets shall be used at both ends. The minimum no. of flexible wires should be 1536 of 36 SWG for each flexible chord.	600 gm/mtr.	600 gm/mtr.	600 gm/mtr.
34.	Minimum Size – Length of the coupling rod (hot dip galvanized iron) for phase coupling pipe, Class B	25 mm dia & 3000 mm long	25 mm dia & 3000 mm long	
35.	Operating Down Pipe, B Class, (IS:1239-68)	32 mm nominal bore G.I. pipe medium gauge single length 6 mtr. The detailed dimension of the G. I. pipe as per IS-1239 (Pt. I)		
36.	Temperature Rise Limit (w.r.t. ambient temperature) - Tinned Copper contacts - Terminals - Metal Parts	 50°C 40°C 40°C	 50°C 40°C 40°C	
37.	Arcing Horns	10 mm dia GI Rod	10 mm dia GI Rod	
38.	Locking Arrangement	Provision for Pad locking for both 'ON' & 'OFF' position		

39.	Earth Terminals	M12 bolts with nuts and flat washer shall be provided at the base channel as earthing terminals
40.	'T' connection	The 'T' connection provided on the channel having moving contact shall be Four Bolted type G.I. nut & bolt at the bottom end to facilitate replacement of this unit only during requirements & avoid entire change of arm.
41.	'I' Bolt	The I bolt shall be longer with 75 mm thread
42.	Supporting Channel / Mounting Channel HDG 86 microns	100 x 50 x 6 mm M.S. Channel hot dip galvanized (c/c slotted 18x36 hole 250mm) min. 760 mm length)
43.	Connectors	Terminal connectors for both movable and fixed should be of copper flats of same size similar to that of moving contact blades (minimum 95% copper composition). The fixed connector shall of size 80 mm x 75 x 8 mm and the size of movable connector shall be size 80 x 75 x 8 mm with machine finishing duly silver plated with 2 nos. of 3/8" GI bolts, nuts, plain washers & spring washers should be provided along with Aluminum Alloy connector should be of 4 bolted type and suitable for 80 – 100 sq.mm AAAC conductor.
44.	Bearing	4 nos. of self-lubricating bearing to be provided with grease nipple including the 4^{th} bearing being thrust bearing.
45.	Insulator Type	Polymer insulators with FRP rod to be minimum 24mm dia
46.	Spindle	Dia of spindle of long bearing rod shall be 30 mm
47.	Marking / Engraving	TPNODL, Serial No., Manufacturer's name or trade mark, Month & Year of manufacturing, Rated normal current in Amps, Rated one second short – time current in Amps

5. GENERAL CONSTRUCTION

1. The Air break switch shall be outdoor type, triple pole gang operated and shall be suitable for vertical installation.
2. The operating mechanism shall be suitable for manual operation from ground level and shall be designed in such way that all the three phases shall open and close simultaneously in smooth way.
3. The air break switch shall be with the arcing horns, the sizes of the rods used for the arcing horns would be 10 mm M.S. Hot dip galvanized, and arcing horn shall be bolted on double bolt.
4. The current carrying connectors should be two-bolt type having nuts and bolts, with spring washer and plane washer.
5. Each joint shall be provided with one plane and one spring of not less than 2mm thickness.
6. Connectors shall be of tinned copper.
7. Tinned Copper braid/rope shall be insulated by Polyolefin of woer make, (RSFR-H) type to prevent animal electrocution.
8. All ferrous parts shall be hot dip galvanized with heavy coating after proper surface treatment as per standards. Coating thickness shall not be less than 86micron at any point.
9. All Copper parts shall be heavily tinned plated as per relevant standards and coating thickness not less than 30micron at any point.
10. Equipment grounding shall be provided by bidder at two points with terminals.
11. All the nut bolt used must be Hot dip Galvanized and of size not less than M10.
12. A rigid base of galvanized steel channel of size approx. 100 x 50 x 6mm shall be provided with suitable holes, clamps and bolts for Horizontal mounting firmly on steel structure.
13. Each member of the switch shall be free from Rust, sharp edges, burr and any kind of deformation.

5.1 SILICONE RUBBER POST INSULATORS

1. All insulators provided to form a stack shall conform to the relevant standard specifications.
2. Composite insulator's shed and sheath shall be made of High Temperature Vulcanizing (HTV) type silicone rubber having silicone polymer content by weight 30% minimum.
3. The sheath and shed shall have excellent Hydrophobic and anti-tracking properties.
4. The composite polymer weather sheds made via injection molded and shall be free from imperfections, dust and air bubble etc. It should protect the FRP rod against environmental influences, external pollution and humidity.
5. The strength of the weather shed to sheath interface shall be greater than the tearing strength of the polymer.
6. The FRP rods used for insulator shall be of glass-fiber reinforced epoxy resin rod of high strength (FRP rod).
7. Glass fibers shall be Boron free electrically corrosion resistant (ECR) glass fiber (minimum 80%) and shall exhibit both high electrical integrity and high resistance to acid corrosion.
8. Glass fibers and resin shall be optimized in the FRP rod.
9. The end fitting transmit the mechanical load to the core. They shall be made of spheroidal graphite cast iron, malleable cast iron or forged steel or aluminum alloy.
10. Metal end fitting shall be suitable for hardware support of respective specified mechanical load and shall be hot dip galvanized with average minimum of 115micron and no value less than 90micron in accordance with IS 2629. They shall be connected to the rod by means of a controlled compression technique.
11. The OD of end fittings should be machined to make the surface uniform round to ensure effective sealing when housing is molded over it. The material used in fittings shall be corrosion resistant.
12. The Post insulator shall be homogenous and free from all the cavities and flaws.
13. Design of insulators shall ensure ample insulation, mechanical strength and rigidity for satisfactory operation under site conditions.
14. The design shall also ensure that the losses caused by capacitive current or conduction through dielectric are minimum and that the leakage due to moist and dirty insulators surfaces is least.
15. All metal caps and supports shall be crimped to the FRP rod.
16. There should be a closed ring of Stainless steel of 0.3x1mm at insulated bottom of the insulators.

5.2 FIXED AND MOVABLE CONTACT SYSTEM

1. The material of the fixed and moving contacts shall be electrolytic hard drawn copper (min. 95% copper) heavily tinned Coated.
2. The contact shall be of high pressure and self-aligning type with positive wiping action and minimum contact pressure shall be ¼ gram per amp of current carrying capacity.
3. The fixed contact shall have insulating bushes at spring ends and proper guide arrangement for preventing misalignment of springs
4. The minimum distance between the fixed and the nearest part on the moving contact in the completely open position shall not be less than the defined value in GTP.
5. The withstand level across the break, shall be as specified under Type test.

5.3 TERMINATIONS

1. The electrical terminations shall be made of tinned copper with minimum cross section and rating equivalent to fixed contact.
2. The terminations shall be suitable for connections for AL conductor with AL Lug.
3. Incoming terminal shall be of extended dimension for LILO connections, there should be provision for connecting two nos. of Al Lugs.
4. For outgoing side, there should be provision for connecting one nos. of connections.
5. All nut bolts, washer, spring washers required for connections shall be provided with equipment

5.4 OPERATING MECHANISM

1. There shall be provision to fix Eye hook with rod diameter of 18mm for pulling arrangement for both ON and OFF operations manually.
2. There shall not be any misalignment in post insulators/complete assembly and the touch time of main contacts of all poles shall be same i.e. at the time of closing, the moving main contacts of all poles shall come in touch with fix contact at the same instance.
3. There shall not be any discrepancy in contact touch timing while operations.
4. At the time of installation if any issue arises because of alignment, then the bidder shall extend the support in attaining the same or replacing the AB switch within 15days.
5. Suitable padlock/locking arrangement shall be provided for locking the operating cantilever in OFF position.

5.5 MECHANICAL STRENGTH

1. AB switches shall withstand rated mechanical terminal load and electromagnetic forces without impairing their operational reliability or current carrying properties.
2. AB switches inclusive of their operating mechanism shall not come out of their open or closed positions by gravity, wind pressure, vibrations or reasonable shocks.
3. AB switches shall be capable of resisting in closed position dynamic and thermal effects of the maximum possible short circuit current at the installation point and should not open under the influence of short circuit current.

5.6 GALVANIZATION

Zinc Coating thickness/ Mass of Zinc Coating to be as per mentioned in Tender /TPNODL requirements. Minimum Zinc Coating to be as detailed below:

Sl. No.	Product	Minimum Value for Average mass of coating (g/m²) / coating thickness (microns)
	Fabricated Steel articles :	

1.	• 5 mm thick & over • Under 5 mm, but not less than 2 mm • Under 2 mm, but not less than 1.2 mm • All type Steel Poles	705/100 610/86 340/48 850 / 120
2.	Threaded Items (nut, bolts, etc.) other than tubes & tube fittings : • 10 mm dia & over • Under 10 mm dia	 460/65 320/45
Note: The requirements for the minimum mass of coating shall be increased as agreed to between the galvanizer & the purchaser.		

6. NAME PLATE & MARKING

Below parameters should be embossed on SS sheet of thickness 1mm with black background. It should be riveted on MS channel of switch:

1. Rated Voltage
2. Manufacturer's Name
3. Month/Year of Manufacture
4. "TPNODL" Name
5. Serial Number
6. PO no.
7. Rated normal current in Amps
8. Rated one second short – time current in Amps

7. TESTS :

- All routine, acceptance & type tests shall be carried out in accordance with the relevant IS 9921 and relevant IEC.
- All routine/acceptance tests shall be witnessed by the TPNODL authorized representative.
- All the components and fittings shall also be type tested as per the relevant standards.
- Following tests for Air Break AB Switch should be done as per relevant IS/IEC standards:

7.1 Routine Test	• Power Frequency Voltage dry test • Dimensional Check • Satisfactory Operation Test • Measurement of resistance in main circuit • Voltage test for auxiliary circuit

7.2 Acceptance Test

Sl. No.	Test to be done	Reference BIS	Clause No.
1.	Power Frequency Voltage Dry test	IS 9920 – Part IV	4.1
2.	Satisfactory Operation Test	IS 9920 – Part IV	4.3
3.	Measurement of resistance in main circuit	IS 9920 – Part IV	4.2
4.	Visual & Dimensional checks		
5.	Verification of metallic or no metallic dust or air bubbles within polymeric housing & shed of insulator (destructive test)		
6.	Voltage test for auxiliary circuit	IS 9920 Part IV	4.01 & 3.1.11
7.	Galvanizing test for – i. GI pantograph ii. Operating rod, cantilever channel and base structure iii. Post Insulator parts iv. Nut Bolts	IS 4759	9

7.3 Type Test

1. Test for Temperature rise as per IS 9920 part4 cl.3.2.
2. Test to verify the insulation level including withstand test at power frequency voltages on auxiliary equipment test as per IS 9920 part4 cl. 3.1.
3. Test to prove satisfactory operation and mechanical endurance as per IS 9920 part4 cl.3.5.
4. Making and braking test as per IS 9920 part4 cl.3.3.
5. Test to prove the capability of the switch to carry the rated peak withstand current and rate short circuit current as per IS 9920 part4 cl.3.4.
6. Test to prove satisfactory operation under ice conditions as per IS 9920 part4 cl.3.6.

8. TYPE TEST CERTIFICATES:

The bidder shall furnish the type test certificates of the cable for the tests as mentioned as above as per the corresponding standards. All the tests shall be conducted by CPRI/ERDA as per the relevant standards. Type test should have been conducted in certified Test Laboratories during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports i.e., any test report not acceptable or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to TPNODL.

9. PRE-DISPATCH INSPECTION:

- The equipment shall be subject to inspection by a duly authorized representative of the TPNODL. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to TPNODL's representatives at all times when the work is in progress. Inspection by the TPNODL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPNODL.

Following documents shall be sent along with material

a) Test reports

b) MDCC issued by TPNODL

c) Invoice in duplicate

d) Packing list

e) Drawings & catalogue

f) Guarantee / Warrantee card

g) Delivery Challan

h) h) Other Documents (as applicable).

10. INSPECTION AFTER RECEIPT AT STORE:

The material received at TPNODL store will be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Engineering & Contracts department.

11. GUARANTEE:

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Purchaser up to a period of at least 18 months from the date of commissioning or 24 months from the date of last supplies made under the contract whichever is later, (the time scale of 18/24 months could be enhanced subject to mutual agreements). Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of the Purchaser, failing which the Purchaser will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the Purchaser's own charges (@ 20% of expenses incurred), from the Bidder or from the "Security cum Performance Deposit" as the case may be. Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Purchaser.

12. PACKING AND TRANSPORT:

Bidder shall ensure that all the equipment covered under this specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit.

Note: One use plastic not to be used for packing of the material.

13. TENDER SAMPLE:

One no. Sample of braided tinned Copper to be submitted during technical bid submission along with current density calculation.

14. TRAINING :

The bidder shall arrange to provide training of our staff if required for installation & commissioning or maintenance etc.

15. QUALITY CONTROL:

The bidder shall submit with the offer Quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.

The following information shall necessarily be submitted with the bid:

- List of important raw materials, names of sub-suppliers for raw materials, standards to which raw material is tested and the copies of test reports of the tests carried out on raw materials in presence of Bidder's representatives.
- List of manufacturing facilities available, level of automation achieved and the areas where manual process exists.
- List of areas in manufacturing process where stage inspections are normally carried out for quality control and details of these tests and inspections
- List of testing equipment for final testing with valid calibration reports. Manufacturer shall possess 0.1 class instruments for measurement of losses.
- QAP withhold points for TPNODL inspection

16. **MINIMUM TESTING FACILITIES:**

Bidder shall have adequate in-house testing facilities for carrying out all routine tests & acceptance tests as per relevant International / Indian standards.

17. **MANUFACTURING ACTIVITIES**

The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan submitted with the offer. This bar chart will have to be submitted within 15 days from the release of the order.

18. SPARES, ACCESSORIES & TOOLS:

The bidder shall provide a list of complete set of accessories and tools required for erection and maintenance of LT ABC along with the installation procedure.

1. Bidder shall provide a list of recommended spares with quantity and unit prices for 5 years of operation after commissioning. The Purchaser may order all or any of the spare part listed at the time of award of contract and these parts shall be supplied as a part of definite works. The Purchaser may order additional spares at any time during the contract period at the rates stated in the Contract document.
2. Bidder shall give an assurance that the reparability of AB Switch, spare parts and consumable items will continue to be available through the life of the equipment which shall be 15 years minimum. However, the Purchaser shall be given a minimum of 12 months' notice in the event that the Bidder or any sub-vendor plans to discontinue manufacture of any component used in this equipment.
3. Any spare apparatus, parts or tools shall be subject to the same specification, tests and conditions as similar material supplied under the Contract. They shall be strictly interchangeable and suitable for use in place of the corresponding parts supplied with the plant and must be suitably marked and numbered for identification

19. DRAWINGS AND DOCUMENTS:

Following drawings and documents shall be prepared based on TPNODL specifications and statutory requirements and shall be submitted with the bid:

- Completely filled in Technical Particulars and compliance to each clause of the specification General Technical Requirements to Additional Details.
- Description of the equipment and all components including brochures.
- General Drawing arrangement of AB Switch.
- Bill of material.
- Experience Certificate and list.
- Type test certificates.
- List of makes of major components.
- Current density calculation of tinned braided Copper.

Drawings / documents to be submitted after the award of the contract are as under:

List of Drawings/Parameters to be submitted:

- Technical Parameters as asked in Specification (General Technical Particulars, General Technical Requirements, Additional Details, Fittings, Type test Reports and Routine test certificates of bought out accessories).
- General Arrangement Drawing of the AB Switch (Front view, Top view and both sides view. Complete list of fittings to be displayed and quantities to be mentioned with the drawing).
- Terminal and connection drawings
- Manual catalogue
- Instructions for use
- Transport/shipping dimension drawing
- Type Test Certificates.
- Installation/ Mounting Instructions/Drawing.
- Quality Assurance plan.

List of Calculations to be submitted:

All the calculations shall be step by step showing the use of formulas and other practical considerations. Concise calculations in table or excel sheet shall not be accepted. Also, the reference (only standard sources as IS, IEC or any such standard is acceptable) of the formulas shall be mentioned.

- Short Circuit withstand.
- Temperature Rise Calculations.

Additional Documents to be submitted :

a. List of raw materials as well as bought out accessories and the names of sub-suppliers selected from those furnished along with offer.

b. Type test certificates of the raw materials and bought out accessories.

c. The successful Bidder shall submit the routine test certificates of bought out accessories and central excise passes for raw material at the time of routine testing.

All the documents & drawings shall be in English language. After the receipt of the order, the successful bidder will be required to furnish all relevant drawings/parameters/calculation to TPNODL for approval.

Instruction Manuals:

Bidder shall furnish softcopies of nicely bound manuals (In English language) covering erection and maintenance instructions and all relevant information and drawings pertaining to the main equipment as well as auxiliary devices.

20. GUARANTEED TECHNICAL PARTICULARS

Bidder shall submit & comply the guaranteed technical particulars in the attached format as mentioned in the GTR (Clause : 4)

21. SCHEDULE OF DEVIATIONS

(TO BE ENCLOSED WITH TECHNICAL BID)

All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the Purchaser's specifications:

Sl. No.	Clause No.	Details of deviation with justifications

We confirm that there are no deviations apart from those mentioned above.

Seal of the Company

Designation

Signature

ANNEXURE – 1

INSPECTION TEST PLAN FOR PRE – DELIVERY OF AB SWITCH

1	Name of the Firm / BA	
2	Date of Inspection	
3	Details of Offer made	
	i. Order No. & Date	
	ii. Rating	
	iii. Quantity	
	iv. Sl. No. of material offered	
4.	Sample Quantity	Sr. No……

ACCEPTANCE TESTS TO BE CARRIED OUT:

Sl.no.	Particulars	Specified Value	Reference Docs.	Test Results	Pass / Fail
1	Power Frequency Voltage Dry Withstand Test		IS 9920 Part IV Cl: 4.1		
2	Satisfactory Operation Test		IS 9920 Part IV Cl: 4.3		
3	Measurement of Resistance in main circuit	GTP	IS 9920 Part IV Cl: 4.2		
4	Voltage Test for auxiliary circuit		IS 9920 Part IV Cl: 4.01 & 3.1.11		
5	Visual & Dimensional Checks	GTP / TS			
6	Verification of metallic or non – metallic dust and air bubbles within polymeric housing of post insulators (destructive test)	Free from metallic or non – metallic dust, air, bubbles, etc.			
7	Mechanical Strength Test	GTP			
8	Galvanizing test for – i. GI pantograph ii. Operating rod, cantilever, channel & base structure iii. Post Insulators parts iv. Nut Bolts	GI coating min. >86 micron Uniform GI Coating Free from rust, burr deformation			
9	Verification of Raw material TC, invoice and its consumption record	Record must be maintained for each raw material			

ANNEXURE – II

SOURCE OF MATERIALS / PLACES OF MANUFACTURE, TESTING & INSPECTION

Sl. No.	Item	Source of Material	Place of Manufacture	Place of testing & inspection
1.	Steel (channel, angle, etc.)			
2.	Galvanizer			
3.	Zinc			
4.	Silicon Rubber			
5.	FRP Rod			
6.	Insulation			
7.	Tinned Copper braid / rope			
8.	Copper for terminal & contacts			