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DOCUMENT TITLE	Technical Specification for SITC for installation of Remote operated motorized AB switch (400 A & 200 A) in 11KV lines	EFFECTIVE DATE 14/05/2026
DOCUMENT NO.	TPWODL/ENGG/SPEC/SITC/007/2026	REVISION NO: R0

Technical Specification for Remote operated 11 kV motorized AB switch (400 A & 200 A)

Prepared By	Reviewed By	Approved By
Amisha Pattnaik	J P Mohanty	Pramod Tupe

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1. SCOPE

This specification covers design, manufacturing, testing at manufacturer's works, inspection, packing, delivery and commissioning of Remote operated 11 kV motorized AB switch (400 & 200 A) having 3 poles, single center break type gang operated, outdoor, horizontal mounting (Insulators Vertical) type complete with motorized as well as manual operating mechanism and as per relevant IS and IEC standards. Aforesaid item(s) shall include loading and unloading at anywhere in TPWODL.

The AB Switches offered shall have the capability of being integrated with TPWODL SCADA system using intelligent electronic devices (IED). The equipment shall be self-powered through a voltage transformer, no external power source shall be required.

It is not intended to specify completely herein all the details of the design and construction of remote operated motorized Air Break Switches. However, AB Switches will conform in all respects to high standards of engineering design and workmanship and shall be capable of performing in continuous commercial operation up to the guarantee period, in accordance with the specifications/drawings.

The remote operated motorized AB Switches offered shall be complete with all components necessary for their effective and trouble-free operation along with associated equipment etc. such components shall be deemed to be within the scope of supplier's supply, irrespective of whether those are specifically brought out in the specification and/or in order or not. Also, similar parts, particularly removable ones shall be inter-changeable.

2. APPLICABLE STANDARDS

The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian, International Standards and shall conform to the regulations of the local authorities:

Motorized AB switch

Ref. IS	Description
IS 9920 (part-I to V)	Specification for helically formed fittings for Overhead lines up to 33 kV
IS 2633 (Part 1)	Method for testing uniformity of coating on zinc coated
IEC 62231	Composite station post insulators for substations with a.c. voltages greater than 1 000 V up to 245 kV – Definitions, test methods and acceptance criteria
IEC 60168:1994+AMD1:1997+AMD2:2000 CSV	Tests on indoor and outdoor post insulators of ceramic material or glass for systems with nominal voltages greater than 1000 V

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IS 9530	Recommended practice for silver plating
IS 5925	Recommended practice for silver plating for general engineering purposes
BS 2816	Testing of silver-plating thickness
IS 1239	GI pipe (B' class or Medium class)
IS: 5561	Electrical Power Connectors
IS 2062	Hot rolled medium and high tensile structural steel — specification

3. CLIMATIC CONDITIONS OF THE INSTALLATION

SL.NO.	CONDITONS	VALUES
1	Max. altitude above sea level	1200m
2	Max. Ambient Temperature	50 °C
3	Max. Daily average ambient temp	35 °C
4	Min Ambient Temp	0 °C
5	Maximum temperature attainable by an object exposed to sun	60 °C
6	Maximum Humidity	95%
7	Minimum Humidity	10%
8	Average No. of thunderstorm days per annum	70
9	Average Annual Rainfall	150 cm
10	Average No. of rainy days per annum	120
11	Thermal Resistivity of soil	150 Deg. Ccm/W
12	Wind Pressure	126 kg/sq. m up to an elevation of 10 meter.
14	Earthquakes of intensity in horizontal direction	equivalent to seismic acceleration of 0.3g
15	Earthquakes of intensity in vertical direction	equivalent to seismic acceleration of 0.15g
16	Wind velocity	300 km/hr.

Environmentally, some of the regions where the work will take place include coastal

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areas, river fronts are subject to high relative humidity, which can give rise to condensation. Onshore winds will frequently be salt laden. On occasions, the combination of salt and condensation may create pollution conditions for outdoor insulators. Some places are in heavily industrially polluted areas. Therefore, Outdoor material and equipment shall be designed and protected for use in exposed, heavily polluted, salty, corrosive and humid coastal atmosphere.

The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g.

4. GENERAL TECHNICAL REQUIREMENTS

SL. NO.	TECHNICAL PARTICULARS	DESIRED VALUE	
1	Rating of AB Switch	400 Amps AB Switch	200 Amps AB Switch
1.a	Reference standards (latest amend.)	IS 9920, IEC 129, IEC 62231, IS 1239	
2	Installation	Outdoor	Outdoor
3	Suitable for Mounting	Horizontal Rotating Type	
4	Type	3 Pole	3 Pole
5	Service Voltage	11 kV	11 kV
6	Rated Voltage	12 kV	12 kV
7	Rated Frequency	50 Hz	50 Hz
8	Continuous current rating at design ambient temp of 50 Deg C	400 Amps	200 Amps
9	Rated short time current	16 kA for 1sec	16 kA for 1sec
10	Rated peak withstand current	40 kA	40 kA
11	Rated main active load breaking capacity	10 Amp	10 Amp
12	Rated line charging breaking capacity	2.5A	2.5A
12.a	Rated Cable charging breaking capacity	10A	10A
13	Rated Transformer off load breaking Capacity	6.3A	6.3A
14	One minute power frequency with stand voltage Dry	35kV RMS	35kV RMS
15	One minute power frequency withstand voltage Wet	35kV RMS	35kV RMS
16	Dry flashover Voltage	55kV	55kV
17	Power Frequency puncture withstand voltage	1.3 times of actual dry flashover Voltage	
18	Visible Discharge Voltage	9kV RMS	
19	1 Minute Power Frequency withstand voltage between pole and earth	28kV RMS	28kV RMS

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20	1 Minute Power frequency withstand voltage across the isolation distance	32kV RMS	32kV RMS
21	Impulse with stand voltage for positive and negative polarity (1.2 / 50) micro second wave)		
a	Across Isolating distance	85kV Peak	85kV Peak
b	To earth and between poles	75kV Peak	75kV Peak
22	No. of Post Per Pole (Polymeric, IEC 62231)	2	2
23	Total No. of post for 3 phases	6	6
24	Minimum Creepage Distance	31 mm/kV	31 mm/kV
25	System Neutral Earthing	Effectively Earthed	Effectively Earthed
27	Operating mechanism	Motorized and Manual	Motorized and Manual
28	Operating Time	<=12 sec	<=12 sec
SL. NO.	TECHNICAL PARTICULARS	DESIRED VALUE	
29.a	FRP Dia. of the Post Insulator (min.)	24mm	24mm
29.b	Dai of Weather sheds	>100mm	>100mm
29.c	Thickness of Housing (min)	3mm	3mm
29.d	Type of Sheds	Aerodynamic	Aerodynamic
30	Phase to Phase Clearance	760mm	760mm
31	Isolation Distance in switch open condition	380mm	380 mm
32	Vertical clearance from Top of Insulator cap to mounting channel	254mm (min)	254mm (min)
33	Copper contacts Temp in Air should not exceed	65Degree	65 Degree
34	Size of fixed contacts (Copper Type Electrolytic with silver plated) (coating thickness not less than 10 microns)	80mmx50mmx8mm (50x8x2 Fingers)	70mmx35mmx6mm (35x6x2 Finger)
35	Size of Moving contacts (Copper Type Electrolytic with silver plated) (coating thickness not less than 10 microns)	220mmx50mmx8mm	220mmx35mmx6mm
36	Moving Contact supporting Angle	50mmx50mmx5mm	45mmx45mmx5mm
37	Size of rods used for arcing horns	10 mm	8 mm
38	Insulation for tinned Copper braid/rope	Polyolefin, (RSFR-H) type	Polyolefin, (RSFR-H) type
39	Copper Flexible BRAIDED Tape - 320mm Long, Tined plated with Brass Nut, bolt & Washers	450gm /Mtr	450gm /Mtr

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40	Minimum size*Length of Coupling Hot Dip GI Solid Pipe for Phase coupling pipe, B Class (Nominal Bore)	25mm Dia &1800 mm long	25mm Dia &1800mm long
41	Operating Down Pipe, B class (IS 1239) (Nominal bore)	32mm Dia & 7Mtr Long (one piece)	32mm Dia & 7Mtr Long (one piece)
42	Temperature Rise Limit (w.r.t ambient temp) - Tinned Copper contacts - Terminals - Metal Parts	65°C 65°C 40°C	65°C 65°C 40°C
43	Bearings	4 nos. self-lubricating bearing to be provided with grease nipple including 4 th bearing being a thrust bearing.	
44	Locking arrangement	Provision for pad locking at both 'ON' & 'OFF' Position	
45	Earth Terminal	M12 Bolts with nuts and flat washer shall be provided at base channel as earthing Terminal.	
46	'T' Connection	The T connection provided on the channel having 'moving contact' shall be G.I Nut & bolt at the bottom end to facilitate replacement of this unit only during	
SL. NO.	TECHNICAL PARTICULARS	DESIRED VALUE	
		requirements & avoid entire change of arm.	
47	'I' bolt	The I bolt shall be longer with 75 mm thread.	
48	Mounting Channel HDG 100 microns	75x40x4.8 mm hot dip galvanized channel length 480 mm min. (C/C slotted hole 18x 36 mm-250mm)	
49	Connectors	Connectors shall be of hard drawn electrolytic copper or brass. The connector should be of 4 bolted type and suitable for 55- 148 sqmm AAAC conductor. Or SOCKET: Two no. of bimetallic copper sockets shall be used at both ends suitable for 55-148 sqmm AAAC conductor.	
	Marking/Engraving (Parameters should be embossed on SS sheet of thickness 1mm with black background.	1. Rated Voltage 2. Manufacturer Name 3. Month/Year of Manufacture 4. Serial No. 5. PO No.	

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50	It should be riveted on MS channel of AB switch)	6. Rated Normal Current in Amps 7. Rated One Second Short-Time Current
51	Pressure Spring	Stainless steel

5. GENERAL CONSTRUCTIONS/REQUIREMENTS

- The Air break switch shall be outdoor type, rotating type gang operated and shall be suitable for horizontal installation having 2 no. of polymeric post insulators per phase.
- The Rotating type 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.
- The air break switch shall be with the arcing horns, the sizes of the rods used for the arcing horns would be 10mm for 400 A and 8mm for 200 A AB switch of M.S. Hot dip galvanized.
- The current carrying connectors should be two-bolt type having nuts and bolts, with spring washer and plane washer.
- Each joint shall be provided with one plane and one spring of not less than 2mm thickness.
- Connectors shall be of H D electrolytic copper.
- The minimum cross section for fixed contact shall be 400 sq.mm for 400 Amp AB Switch and 200 sq.mm for 200 Amp AB Switch.
- Tinned Copper braid/rope shall be insulated by Polyolefin (RSFR-H) type to prevent animal electrocution. It shall be 320 mm long minimum and shall weigh 450 G/M. It shall be punched at both ends.
- 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 100 micron at any point.
- All Copper parts shall be silver plated as per relevant standards and coating thickness not less than 10 microns at any point.
- Equipment grounding shall be provided by bidder at two points with terminals.
- All the nut bolt used must be Hot dip Galvanized and of size not less than M10.
- A rigid base of galvanized steel channel of size approx.75x40x4.8 mm Length 480 mm min. (C/C slotted hole 18x 36 mm- 250mm shall be provided with clamps and bolts for Horizontal mounting firmly on steel structure.

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14. Each member of the switch shall be free from Rust, sharp edges, burr and any kind of deformation.
15. The phase coupling rod, operation rod with intermediate guide braided with flexible electrolytic copper, tail piece of required current carrying capacity and operation mechanism with 'ON' & 'OFF' positions shall be provided.
16. The operation rod shall be medium gage of 32mm diameter nominal bore G.I. pipe single length 7 meters. The phase coupling rod for gang operation shall be of medium gauge 25mm dia. & 1800 mm length nominal bore G.I. pipe.
17. Non-threaded type spindle shall be provided for connection with down pipe.
18. Provision for operating handle earth with flexible copper wire shall be provided.

Technical particulars	400 Amps AB Switch	200 Amps AB Switch
Switching Blades	It shall be made out of electrolytic copper with silver plated. The approximate size shall be 220mm x50 x 8mm for 11 KV. The switch shall have such a spring mechanism so as to ensure that the speed of the opening of contact is independent of speed of manual operation.	It shall be made out of electrolytic copper with silver plated. The approximate size shall be 220mmX35X 6mm. The Switch shall have such a spring mechanism so as to ensure that the speed of the opening of contact is independent of speed of manual operation.
Fixed Contacts	The fixed jaw type female contacts (80x50x8)mm for 11 KV shall be made of electrolytic copper (minimum 95 % copper composition) duly electroplated controlled by phosphorus bronze/Stainless Steel high pressure spring housed in robust G.I. Cover. It is essential that provision shall be made in fixed female contacts to take the shock arising from the closing of moving contact blade without the same being transmitted to the post insulator.	The Fixed Jaw type female contacts of size (70x35x6) mm shall be made of electrolytic copper (minimum 95% copper composition) duly silver coated controlled by phosphorous bronze/Stainless steel high pressure spring housed in robust G.I. Cover. It is essential that provision shall be made in fixed female contracts to take the shock arising from the closing of move contract blade without the same being transmitted to the post insulator.

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Terminal pads	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 50 x 8 mm and the size of movable connector shall be size 80 x 50 x 8 mm with machine finishing duly silver plated with 2 nos. of 12mm dia. brass bolts, double nuts, plain washers & spring washers should be provided along with 2 nos. solder less bimetallic sockets for each connector suitable sockets for each connector suitable up to 55- 100 mm ² AAA conductor.	Terminal connectors shall be robust in design. The size of fixed connector shall be (70 X 35 X 6 mm) and size of movable connector shall be of (70 X 35) X (70 X 35) X 6mm of copper casting with uniform machine finishing duly silver plated made out of minimum 95% copper composition with 2 nos. of 12mm dia. holes provided with suitable brass bolts and double nuts, flat washers, spring washers & 2nos.bimetallic solder less sockets suitable up to 55-100 mm ² AAA conductor.
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19. Adding SCADA compatibility: The AB switch should be capable of being integrated with SCADA functions using an IED (Intelligent Electronic Devices). The load break switch should be capable of reporting switch ON/OFF status and should be capable of being operated (OPEN/CLOSE) by GPRS/3G/4G function within built modem.
20. Communication protocol shall be IEC 60870-5-104. MODBUS, DNP 3.0, MQTT any other proprietary protocol shall not be acceptable. Communication Port shall be USB for local communication and programming. Logs storage shall minimum to 10,000. The LBS should maintain the logs in its buffer in case of connection loss. Once the connection is retrieved all logs shall be transferred to SCADA.

Sr. No.	Signal Name	Data Type	104 Address
1	SWITCH OPEN STATUS	DPI	2001
2	SWITCH CLOSE STATUS		
3	AC HEALTHY	SPI	1001
4	BATTERY CHARGER HEALTHY	SPI	1002
5	BATTERY LOW	SPI	1003
6	MANUAL ENGAGE ON	SPI	1004
7	SWITCH FPI-1 OPERATED	SPI	1005
8	SWITCH OPEN COMMAND	DCO	5001

6. MARKING

Below parameters should be embossed on SS sheet of thickness 1mm with

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black background. It should be riveted on MS channel of AB switch:

1. Rated Voltage
2. Manufacturer's 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 CERTIFICATE

The A.B. switches shall be subjected to the following type tests in accordance with clause No. 6 of IS-9920 (Part-1)/2002.

- (i) Tests prove that the temperature rise of any parts does not exceed the values specified in part-2 of this standard.
- (ii) Tests to prove the capability of the switch to carry the rated peak withstand current and the rated short time current.
- (iii) Measurement of the resistance of the main circuit.
- (iv) Tests to prove the ability of the switch to make and break the specified currents.
- (v) Tests to verify the insulation level including withstand tests at power frequency voltages on auxiliary equipment if any. Di-electric tests include impulse withstand tests, power frequency voltage withstand tests, and power frequency voltage withstand tests.
- (vi) Tests to prove satisfactory operation and Mechanical Endurance.
- (vii) Tests to prove the integrity of the external insulation under conditions of the air pollution.

Note 1: The type test certificate should not be more than 5 years old as on due date of opening of tender.

Note 2: Type test certificate of polymeric post Insulator shall be submitted and shall be issued from CPRI/ERDA or Government lab only.

7.2 Acceptance Tests

The following acceptance test should be carried out as per IS: 9920

(P4/1985) on number of samples selected from the offered lot.

- (i) Visual Inspection.
- (ii) Checking of Dimensions (of all parts as per the approved drawing).
- (iii) Power frequency voltage dry test.
- (iv) Measurement of the resistance of the main circuit.
- (v) Test to prove satisfactory operation
- (vi) Galvanizing test as per IS: 2633.

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(vii) Temperature rise test.

7.3 Routine Tests:

The supplier shall provide a control plan, which will be implemented on AB switches. Routine test reports should be submitted by the manufacturer with inspection call.

The following routine tests as outlined in clause No.4 of IS: 9920 (Part4/1985) shall be carried out by the manufacturer on each unit to check certain essential requirements.

- i) Power frequency voltage dry tests.
- ii) Measurement of the resistance of the main circuit.
- iii) Test to prove satisfactory operation.

The bidder shall clearly indicate what testing facilities are available in the works of manufacturer & whether facilities are adequate to carry out all Acceptance & Routine Tests. These facilities should be available to TPWODL's representative if deputed or carried out or witness the tests in the manufacturer's work.

8. TESTS

Along with the bid, the bidder must submit Type Test Reports on AB switches as per this technical specification, carried out within last five years from the date of opening of techno-commercial bid of the tender from CPRI/ERDA labs only. Otherwise, the tender may be rejected.

9. PRE-DISPATCH INSPECTION

Equipment shall be subject to inspection by a duly authorized representative of TPWODL. An inspection may be made at any stage of manufacture at the option of TPWODL and the equipment, if found unsatisfactory as to workmanship or material is liable to rejection. Suppliers shall grant free access to the places of manufacture to TPWODL's representatives at all times when the work is in progress. Inspection by the TPWODL authorized representatives shall not relieve the supplier of his obligation to furnish equipment in accordance with the specifications.

Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPWODL. The following documents shall be sent along with material

- a) Routine Test reports
- b) MDCC issued by TPWODL
- c) Invoice in duplicate
- d) Packing list
- e) Drawings
- f) Delivery Challan

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- g) Installation and maintenance Manual soft copy for all components
- h) Other Documents (as applicable)

10. INSPECTION AFTER RECEIPT AT STORES/SITE

The material received at TPWODL Store/Site will be inspected for acceptance and shall be liable for rejection if found different from the reports of the pre-dispatch inspection. If any deviation or anomaly observed at this stage, the same need to be rectified by bidder at bidders' own cost at earliest.

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 12 months from the date of commissioning or 24 months from the date of last supplies made under the contract whichever is earlier. 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

12. PACKING

The bidder should ensure that all equipment covered by this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit. The packing should be in such a manner that during storage and its components should not be damaged. No single-use plastic to be used in packing material. Packing should be done with environmentally friendly recyclable materials.

13. TENDER SAMPLE

Bidder shall submit the sample material with the offer (in case of first supply to TPWODL).

14. QUALITY CONTROL

The bidder shall submit with the offer, 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 after finishing, bought out items and fully assembled component and equipment including drives. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The TPWODL's or its nominated representative engineer shall have free access to the manufacturer/sub-supplier's work to carry out inspections. To ensure proper operation of the Product the bidder shall provide onsite training for TPWODL teams as and when required. To ensure quality of installations, the bidder shall provide supervision support during importation.

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15. 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.

16. MANUFACTURING ACTIVITIES

The bidder shall get the approved drawing and GTP before starting of manufacturing activity. The successful bidder will have to submit details of the design & components offered for approval as per specification. CAT-A/CAT-B is mandatory to start manufacturing.

17. SPARES, ACCESSORIES AND TOOLS

Not applicable.

18. DRAWINGS AND DOCUMENTS

The following documents to be submitted along with the bid for evaluation:

- Filled-in clause wise compliance of this specification.
- Signed and stamped copy of drawing
- Complete Type test reports
- Filled signed and stamped copy of tender document.
- Any other requisite document
- Experience List.

The following documents shall be submitted after award of RC/PO before manufacturing:

- Filled-in clause wise compliance of the specification.
- Signed and stamped copy of GA drawing
- Signed and stamped copy of installation drawing
- Compliance of all undertaking submitted during technical evaluation, if any
- Type test Certificates for each specified test if not submit during technical evaluation

Following Drawings/Documents shall be submitted after the award of the contract.

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Amisha Pattnaik	J P Mohanty	Pramod Tupe

TPWODL	TP WESTERN ODISHA DISTRIBUTION LTD		Page 15 of 15	
DOCUMENT TITLE	Technical Specification for SITC for installation of Remote operated motorized AB switch (400 A & 200 A) in 11KV lines		EFFECTIVE DATE 14/05/2026	
DOCUMENT NO.	TPWODL/ENGG/SPEC/SITC/007/2026		REVISION NO: R0	
S. No	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√
2	Manual/Catalogues/drawings for all components.		√	
3	Technical details and test certificates.		√	√
4	Installation Instructions		√	√
5	Transport/shipping dimension drawing		√	√
6	QA & QC Plan	√	√	√
7	Routine, Acceptance and Type test Certificates	√	√	√

All the Documents and Drawings shall be in English Language.

19. GUARANTEED TECHNICAL PARTICULARS

Filled-in clause wise compliance of this specification along with bid.

20. 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 detailed above.

Seal of the Company:

Signature

Designation

Prepared By	Reviewed By	Approved By
Amisha Pattnaik	J P Mohanty	Pramod Tupe