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1.0 SCOPE:

This specification covers technical requirements of design, manufacture, performance, testing at manufacturer's works, packing, forwarding, supply and unloading at stores/site, performance of 33KV Porcelain Pin Insulator with all accessories tor trouble free and efficient performance.

2.0 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 731-1971	Specification tor porcelain insulator tor over head power lines with a nominal voltage greater than 1OOOV.
IS 3188-1980	Characteristics of string insulator units.
IS 2486(Part-1)1993	Metal fitting of insulator tor overhead power lines with nominal voltages greater than 1OOOV- Specification, Part 1- General requirement and tests
IS 2486(Part-2)1993	Insulator fitting tor overhead power lines with nominal voltages greater than 1OOOV- Specification, Part 2- Dimensional requirement
IS 2486(Part-3)1993	Insulator fitting for overhead power lines with nominal voltages greater than 1OOOV-Specification, Part 3- Locking device
IS 2486(Part-4)1993	Insulator fitting tor overhead power lines with nominal voltages greater than 1OOOV- Specification, Part 4- Test tor locking device.
IS 2629-1985	Recommended practice tor hot dip galvanizing of iron and steel
IS 7814-2005	Phosphor bronze sheet, strip and toil.
IS 6603-2001	Stainless steel bars and flats- specification
IS 2004-1978	Forged steel for ball pin
IS 14329-1995	Malleable Iron Castings
IS 2071-1978 (Part-1,2,3)	HV test technique

3.0 CLIMATIC CONDITIONS OF THE INSTALLATION:

The material shall be suitable for following climatic conditions,

1. Maximum altitude above sea level 1,000m
2. Maximum ambient air temperature 50°C
3. Maximum daily average ambient air temperature 35°C
4. Minimum ambient air temperature 0°C
5. Maximum relative humidity 95%
6. Average number of thunderstorm days per annum (isokeraunic level) 70
7. Average number of rainy days per annum 120
8. Average annual rainfall 150cm
9. Earthquakes of an intensity in horizontal direction - equivalent to seismic acceleration of 0.3g
10. Earthquakes of an intensity in vertical direction - equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)
11 .Wind velocity: 300 km/hr, 200 km/hr and 160 km/hr.

Environmentally, some of the regions, where the work will take place includes coastal areas, 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 industrial 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 design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g.

4.0 GENERAL TECHNICAL REQUIREMENTS:

SL No.	Descriptions	Particulars	
1	Type of insulator	33KV CD-720 Porcelain Pin Insulator	33KV CD-900 Porcelain Pin Insulator
2	Over all Dimensions (mm)		
	a) Height	As per relevant IS	As per relevant IS
	b) Outer Diameter	As per relevant IS	As per relevant IS
3	Min. Creepage Distance (mm)	720 min.	900 min.
4	Nominal System Voltage (kV)	33	33
5	Highest System Voltage (kV)	36	36
6	Visible Discharge Test Voltage	27 KV	27 KV
7	Minimum Failing Load (kN)	10	10
8	Dry Power Frequency 1 Min. Withstand Voltage (kV)	100	100
9	Wet Power Frequency 1 Min. Withstand Voltage (kV)	75	75
10	Dry Power Frequency Flashover Voltage (kV)	110	110
11	Wet Power Frequency Flashover Voltage (kV)	85	85
12	Impulse Withstand Voltage: (kV_p)	170	170
13	Impulse Flashover Voltage: (kV_p)		
	a) Positive Polarity	200	200
	b) Negative Polarity	210	210

5.0 GENERAL CONSTRUCTIONS:

5.1 Porcelain insulator shell:

a. The porcelain shall be sound, free from defects, thoroughly vitrified and smoothly glazed.
b. Unless otherwise specified, the glaze shall be brown in colour. The glaze shall cover all the porcelain parts of the insulator expect those areas which serve as supports during firing or are left unglazed for the purpose of assembly.

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

d. Cement used in the construction of the insulator shall not cause fracture by expansion or loosening by contraction, and proper care shall be taken to locate the individual parts correctly

during cementing. The cement shall not give rise to chemical reaction with metal fittings, and its thickness shall be as uniform as possible.

e. The insulator should preferably be manufactured in automatic temperature controlled kilns to obtain uniform baking and better electrical and mechanical properties.

f. All ferrous parts shall be hot dip galvanized in accordance with the latest edition of IS 2629-1985. The Zinc to be used for galvanizing shall conform to grade Zn 99.99 as per IS 209-1992. The Zinc coating shall be uniform, smoothly adherent, reasonably bright, continuous and free from impurities such as flux, ash, rust stains, bulky white deposits and blisters.

5.2 The dimensions of the disc insulator shall be within limits specified in relevant IS/IEC.

6.0 NAME PLATE AND MARKING:

Marking showing all technical parameters shall be provided on all equipments. Marking shall be embossed with "PO no. with date", "PROPERTY OF TPSODL BERHAMPUR", "CODE NUMBER", along with other technical parameters including.

i) Manufacturer's Name
ii) Type designation or serial no.
iii) Applicable rated values
iv) No. of the relevant standard.
v) Month and year of manufacture
vi) Country of manufacture
vii) Minimum failing load in kN.

Marking on porcelain shall be printed and shall be applied before firing. Insulators may also be marked with the ISI certification mark. Marking on each functional unit shall be legible during normal service. The removable parts, if any shall have a separate marking with the data relating to the functional units they belong to, but this marking need only be legible when the removable parts is in removed position.

7.0 TESTS:

All the Routine and acceptance tests shall be carried out in accordance with the relevant IS. All routine/acceptance tests shall be witnessed by the Purchaser/his authorized representative. All the components should have been type tested as well as per the relevant IS. All the Type Tests as per latest IS should have been carried out on the disc insulators. Following Tests shall be necessarily conducted on the disc insulators further to those mentioned in the IS:

Routine Test
i) Visual examination
ii) Mechanical routine test
iii) Electrical routine test

Acceptance Test:
i) Verification of dimensions
ii) Temperature cycle test
iii) Puncture test
iv) Porosity test
v) Galvanizing test.
vi) Electro-mechanical failing load test.
vii) Twenty four hours mechanical strength test.

Type Test:
i) Visual examination
ii) Verification of dimensions
iii) Visible discharge test
iv) Impulse voltage withstand test

v) Wet power frequency voltage with stand test.
vi) Temperature cycle test.
vii) Puncture test.
viii) Porosity test.
ix) Galvanizing test.
x) Electro-mechanical failing load test.
xi) Twenty four hours mechanical strength test.

However, Purchaser reserves the right to get the insulator tested for all the tests as a string, if required. The hardware assembly shall be supplied by the purchaser, as per the requirement.

8.0 TYPE TEST CERTIFICATES:

The bidder shall furnish the type test certificates for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at 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, same shall be carried out without any cost implication to TPSODL.

9.0 PRE-DESPATCH INSPECTION:

Equipment shall be subject to inspection by a duly authorized representative of the Purchaser. Inspection may be made at any stage of manufacture at the option of the purchaser and the equipment if found unsatisfactory as to workmanship or material is liable to rejection. Bidder shall grant free access to the places of manufacture to Purchaser's representatives at all times when the work is in progress. Inspection by the Purchaser 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 the Purchaser.

Following documents shall be sent along with material"

a) Test reports
b) MDCC issued by Purchaser
c) Invoice in duplicate
d) Packing list
e) Drawings & catalogue
f) Guarantee / Warrantee card
g) Delivery Challan
h) Other Documents (as applicable)

10.0 INSPECTION AFTER RECEIPT AT STORES:

The material received at Purchaser's store shall 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 Project Engineering department.

11.0 GUARANTEE:

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under the 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 Company up to a period of 12 months from the date of commissioning or 18 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 his own costs, within mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company will be at liberty to get it replaced/rectified at bidder's risks and costs and recover all such expenses plus the Company's own charges(@ 20% of expenses incurred), from the supplier 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 Company.

12.0 PACKING:

Supplier shall 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

13.0 TENDER SAMPLE:

The bidder shall submit a sample of material along with bid at TPSODL's Engineering Dept.

14.0 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, 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 Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.

15.0 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.

16.0 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.

17.0 SPARES, ACCESSORIES & TOOLS:

Not Applicable.

18.0 DRAWINGS & DOCUMENTS:

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

a) Completely filled-in Technical Schedules.
b) General description of the equipment and all components including brochures.
c) General arrangement drawings.
d) Type Test Certificates.
e) Experience List.
f) Fixing drawings.
g) Detail bill of material for individual project.

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

S.No.	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√
2	GA Drawing	√		√
3	Mounting and Fixing Drawing		√	√
4	Instruction for Use		√	√
5	QA & QC Plan	√	√	√
6	Test Certificates	√	√	√

All the documents & drawings shall be 1n English language.

After receipt of the order, the successful bidder will be required to furnish five copies of all relevant drawings for TPSODL approval.
Instruction Manuals: Bidder shall furnish two softcopies (CD) and four (4) hard copies 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.

19.0 GURANTEED TECHNICAL PARTICULARS:

SL No.	Descriptions	Particulars(Furnished By Bidder)
1.	Manufacturer's Name & Address	
2.	Type of insulator	
3.	Over all Dimensions (mm)	
	a) Height	
	b) Outer Diameter	
4.	Min. Creepage Distance (mm)	
5.	Nominal System Voltage (kV)	
6.	Highest System Voltage (kV)	
7.	Visible Discharge Test Voltage	
8.	Minimum Failing Load (kN)	
9.	Dry Power Frequency 1 Min. Withstand Voltage (kV)	
10.	Wet Power Frequency 1 Min. Withstand Voltage (kV)	
11.	Dry Power Frequency Flashover Voltage	
12.	Wet Power Frequency Flashover Voltage (kV)	
13.	Impulse Withstand Voltage: (kV_p)	
14.	Impulse Flashover Voltage: (kV_p)	
	a) Positive Polarity	
	b) Negative Polarity	
15.	Puncture Withstand Voltage (Power	
16.	Weight (Approx.) Kgs.	
17.	Type of Packing	
18.	Number of Insulators in each Pack	
19.	Gross Weight of Packing	

20.0 SCHEDULE OF DEVITAIONS:

The bidders shall set out all deviations from this specification, Clause by Clause in this schedule. Unless **specifically** mentioned in this schedule, the tender shall be deemed to confirm the purchaser's specifications.

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:

S. No	Clause No.	Details of deviation with justifications

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

Seal of the Company

Designation:
Signature: