



**GUJARAT ENERGY TRANSMISSION
CORPORATION LTD.**

**SARADAR PATEL VIDYUT BHAVAN,
RACE COURSE, BARODA – 390 007.**

**TECHNICAL SPECIFICATIONS
FOR**

**400 KV, 220 KV, 132 KV & 66 KV
COMPOSITE SOLIDCORE STATION
POST INSULATORS**

GETCO/E/2,1,6 TS – 1-Composite BPI/R2 Oct22

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TECHNICAL SPECIFICATION FOR 400/ 220/132/66 kV
COMPOSITE SOLIDCORE STATION POST INSULATORS

1 SCOPE

This specification provides for the supply of 400, 220, 132, & 66 kV **composite** solid core station **post** insulators required for the 400, 220 kV, 132 kV or 66 kV sub-stations at various sites in State of Gujarat.

2 DESIGN

The composite solid core station post insulators required for sub-station bus support purpose shall consist of a load bearing cylindrical insulating solid core made of resin impregnated fibers, a housing (outside the insulating solid core) shall be made of silicone material and end fittings attached to insulating core and mold over end fitting process is to be adopted. If multi stack unit is proposed, then cantilever strength of complete stack shall be as per C15.0 Technical parameters Pt no.3.

Composite solid core station post insulators are intended to cater cantilever, torsion, tension and compression loads as mentioned in the applicable standard IEC 62231:2006 as amended up to date shall be applicable. It shall be outdoor type, suitable for operation under tropical conditions, with high temperature, humidity and rainfall. The insulation level should be as under:

Item	Power frequency <u>withstand value</u> 1 min (dry)/ (wet) in KV (rms)	Impulse withstand <u>strength</u> KV (Peak)
400 kV solid core post insulator	760/680 kV (w/o arcing horns)	1550 kVp
220 kV solid core post insulator	510/460 kV	1050 kVp
132 kV solid core post insulator	275 kV	650 kVp
66 kV solid core post insulator	165/140 kV	350 kVp

The **composite solid core station** post insulators shall be suitable for outdoor operation and shall be suitable for mounting on **lattice**. **The mounting bolts, nuts and washers shall be in the scope of supply.**

The successful bidder shall indicate all relevant dimensions and values necessary for identifying and testing the insulator in accordance with applicable standard. Each insulator shall be marked with the name or trademark of the manufacturer and the year of manufacture, Maximum Design Cantilever Load (MDCL). These markings shall be legible and indelible.

The transport, storage and installation shall be in line with IEC 62217.

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3 PROTECTION AGAINST CORROSION

All malleable iron steel work, steel bolts and nuts and flanges shall be hot dip galvanized in accordance with IS: 2629/1966 with the latest amendment thereof.

4 ELECTRICAL AND MECHANICAL CHARACTERISTICS OF INSULATORS

The design shall be defined by material of core, housing, end fittings with method of attachment, housing layer thickness over core, and diameter of core.

Electrically the insulator type shall be defined by its arcing distance, creepage and housing profile, while mechanically, by its length, core diameter, core material & design and method of attachment.

Imported insulator meeting electrical and mechanical characteristics will be accepted if only they are offered against suppliers import license and the transit breakages if any, are also covered by the supplier for replacement of material from their stock.

5 TECHNICAL PARTICULARS

Technical particulars of 400, 220, 132 & 66 KV composite solid core post insulator (Guaranteed details to be furnished by the bidder in Schedule-A attached with the specification).

Sr. No.	Description	Unit	Solid core post insulator			
			420 kV	220 kV	132 kV	66 kV
01	02	03	04	05	06	07
1	Highest system voltage	kV	420	245	145	72.5
2	Height of unit	mm	3910±6.0	2300±3.5	1500±2.5	770 ± 1
3	Bending strength (approximate failing load): a) Upright	Kgf	800	800	600	400
4	Tensile strength (Approximate)	Kgf	17000	8000	7000	3500
5	Compression strength (Approximate)	Kgf	33000	20000	14000	7000
6	Torsion strength (Approximate)	KgfM.	460	450	300	200
7	a) Power frequency flashover voltage (dry)	KV	890	625	275	180
	b) -do- (wet)	KV	820	570	275	155
8	a) Impulse flashover voltage (Positive)	KV	1850	1210	650	355

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	b) -do- (Negative)	KV	1850	1450	650	405
9	a) One-minute power frequency withstand voltage (dry)	KV	760 (with corona rings)	510	275	165
		KV	680 (with corona rings)	460	275	140
	b) -do- (wet)					
10	Impulse positive/negative withstand voltage	KV	1550	1050	650	350
11	RIV	KV	266		---	---
	a) Test V to Ground KV (rms)					
	b) at 1000 KHz with grading rings	mV	<1000mV	<500 mV		
12	(a) Visible discharge	KV	320 with grading ring	154	105	53
	(b) Switching surge withstand voltage	KVp	1050	--	--	--
13	Creepage distance (Approximate)	mm	31kV/mm			
14	Top metal fitting PCD	mm	4 holes of M16 PCD = 127	4 holes of M16 PCD = 127	4 holes of M16 PCD = 127	127 ± 0.2
15	Bottom metal fitting PCD	mm	8 holes of M18 and PCD = 300	8 holes of M18 and PCD = 254	4 holes of M18 and PCD = 225	127 ± 0.2
16	All ferrous part should be hot dip galvanized to IS:2629/1966		Yes	Yes	Yes	Yes
17	Suitable for Hot line washing		Yes	Yes	Yes	Yes
18	Corona Extinction device		Corona ring provided	--	--	--
19	Dry Arcing Distance	mm	3400	--	--	--
20	Silicone content	%age	Minimum 30% by weight			

1KN = 101.972 Kgs.

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6 TESTING

The bidder shall clearly state in their tender whether they have in their factory adequate facilities for carrying out type tests and routine tests as specified in related ISS & IEC and its latest amendments. Offers of those firms who have necessary equipment in their factory for carrying out type tests will be preferred. *Bidder shall submit all the reports of design tests and type tests in line with IEC 62231: 2006 amended up to date from the NABL laboratory. **The type test reports from NABL approved laboratory shall not be older than TEN years. Type Test shall be valid as on the last date of submission of bid.***

IMPORTANT NOTE: In case of non-submission/partial submission or type test reports of which validity is over, bidder shall submit pending type test report/s from NABL accredited laboratory, in the event of an order, before commencement of supply without affecting delivery schedule, free of cost to GETCO. Confirmation for above shall be invariably submitted along with technical bid.

a) List of design tests on specimen as per IEC 62231.

- 1) Tests on interfaces and connections of end fittings (cl. 9.1)
- 2) Load tests on assembled core
- 3) Tests on shed and housing material
- 4) Tests on core material

b) List of Type Tests on Complete insulator.

1. Visual Examination & Verification of dimensions (cl. 9.1)
2. Dry lightning impulse voltage test (cl. 9.2.1)
 - a) withstand voltage procedure with 15 impulses
 - b) 50% flashover voltage procedure
3. Wet Power frequency voltage withstand test (cl. 9.2.2)
4. Wet Power frequency flashover voltage test (cl. 9.2.2.3)
5. Mechanical test
 - a) Cantilever failing load test,
 - b) Specified tensile Test,
 - c) Compression and buckling withstand load test,

c) List of Acceptance Tests:

All the acceptance/routine tests shall be carried out as per IEC 62231: 2006 (latest amendments). The lot (N) shall be divided into two groups of samples E1 & E2. If $N \leq 10$ then 1 sample will be selected for E2 group only. If $10 < N \leq 100$ then $E1 = 2$ nos. & $E2 = 1$. Silicone content test shall be performed on weather shed cut from insulators from E1 group of samples only.

- 1) Verification of the dimensions (E1+E2)
- 2) Galvanizing test (E1+E2)
- 3) Verification of specified mechanical loads (E1+E2)
- 4) Power Frequency (dry) withstand test (one sample from E2)
- 5) *Silicone content test (Minimum content of silicone as guaranteed by supplier shall be verified through FT-IR spectroscopy & TGA analysis) (E1)*

d) List of routine tests:

- 1) Visual inspection
- 2) Tensile load test

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7 DEVIATION

The offer shall conform in all respects to the above specifications. If not, the deviations shall specifically be brought out in specified annexure – XII only, otherwise it will be presumed that the offer conform to above specifications in all respects.

8 SPECIAL CONDITIONS

The following information shall invariably be furnished by the tenderer along with the tender, if the same is not furnished along with the tender, the offer may be ignored without making correspondence.

- a. Name and full address of the manufacturer of *composite solid core station* post insulators offered.
- b. Make and Electrical and Mechanical characteristics of post insulators.
- c. Testing facilities available with the factory for carrying out type tests and routine tests.
- d. Dimensional drawings with full particulars.
- e. The list of orders executed for the offered items by the manufacturer of the *composite solid core station* post insulators giving full details such as voltage, type, quantity etc.
- f. The un-priced schedule of the offered item shall also be submitted in technical bid.

9 *Bidder shall furnish, MQP and FQP along with technical bid. Also drawings shall be submitted for approval in the event of an order.*

10 *Bidder shall give all the required guaranteed technical parameters as per attached Schedule – A.*

SCHEDULE - A
SCHEDULE OF GUARANTEED TECHNICAL PARTICULARS
FOR 245/145/72.5 kV composite solid core station POST INSULATORS

(To be filled in and signed by the Tenderer)

Sr. No.	Description	Unit	Guaranteed. Value
1	Highest system voltage	kV	
2	Name or trade mark of insulator		
3	Overall length of unit from flange face to face of end fitting	mm	
4	Applicable standard		
5	Material of core of insulator Diameter of core		
6	Material of housing Thickness of housing		
7	Housing profile a) Shed overhang b) Shed thickness c) Shed spacing d) Shed inclination e) Shed repetition		
8	Guaranteed maximum cantilever load	kN	
9	Bending strength (approx. failing load): i) Upright	kN	
10	Tensile strength (Approx.)	kN	
11	Compression strength (Approx.)	kN	
12	Torsional strength (Approx.)	kN	
13	Buckling load	kN	
14	a) Power frequency flashover voltage (Dry) b) Power frequency flashover voltage (Wet)	kV kV	
15	a) Impulse flashover voltage (Positive) b) Impulse flashover voltage (Negative)	kVp kVp	
16	a) 1 min. power frequency withstand voltage (Dry) b) 1 min. power frequency withstand voltage (Wet)	kV (rms)	
17	Lightning Impulse positive / negative withstand voltage.	kVp	
18	Power frequency punctures voltage.	kV	
19	Visible discharge voltage	kV	

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20	Radio Interference Voltage	Micro Volts	
21	Creepage distance (Minimum) : a) Total b) Protected	mm mm	
22	Dry Arcing distance (Minimum)	mm	
23	Type of end fitting material of end fitting		
24	Top end fitting PCD <i>with hole size</i>	mm	
25	Bottom end fitting PCD <i>with hole size</i>	mm	
26	All ferrous parts should be hot dip galvanized to IS:No.2629/1966.	--	YES
27	<i>Terminal connector details, if indicated in Schedule – A of respective tender.</i>		
28	% Silicone content		

Date:

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