WEST BENGAL STATE ELECTRICITY DIST. COM. LTD.
Office of the Chief Engineer , Procurement & Contracts Department
Vidyut Bhavan(4th Floor),Bidhannagar, Block-DJ : Sector-II, Kolkata-700 091

TECHNICAL SPECIFICATION FOR 11 KV & 33 KV POST INSULATORS, 11 KV & 33 KV PIN INSULATORS AND 11 KV, B&S TYPE 45 KN & 70 KN DISC INSULATORS.

1.0 SCOPE :

1.1 This specification covers Design, Manufacture, Testing of Manufacturer's Works, Supply & Delivery at WBSEDCL's stores/sites any where in WB incuding unloading of **Porcelain Make**, 11 KV Pin Insulators with minimum creepage distance 230 mm & 320 mm, 33 KV pin Insulators with minimum creepage distance 580 mm & 840 mm, 11 KV & 33 KV Post Insulators and 11 KV,B & S Type Disc Insulators(45 KN & 70KN) to be used for power lines. Deviation, if any, from this Specification shall be clearly mentioned with reasons for such deviation, otherwise no deviation from Specification will be permitted.

1.2 The materials offered shall be complete with all component and accessories which are necessary or usual for their efficient performance and satisfactory maintenance. Such parts shall be deemed to be within the scope of the contact, whether specifically indicated or not in the specification.

2.0 STANDARD :

2.1 The Insulators covered by this specification should conform to the latest editions of Indian Standard Specification IS:731, IS:2544 and IS:5350 or any other authoritative standard. Standard adopted should be clearly stated in the Tender in that case a copy of the standard should be submitted with the Tender without fail.

3.0 DEVIATION : -

Normally the offer should be as per Technical Specification without any deviations. But any deviation felt necessary to improve performance, efficiency and utility of the Pin, Post and Disc Insulators must be mentioned under Deviation Schedule. Such deviation suggested may or may not be accepted. Deviation not mentioned in Deviation Schedule will not be considered afterwards even if the same is mentioned elsewhere.

4.0 GENERAL REQUIREMENT :

4.1 The **Porcelain** shall be sound, free from defect, thoroughly vitrified and Smoothly glazed. The Insulators shall be brown in colour. The glaze shall Cover all the **Porcelain** parts of the Insulators except those areas which Serve as support during fixing or left un-glaze for the purpose of assembly.

4.2 Cement used in construction of insulators shall not cause fraction by expansion or loosening by construction and propose care must be taken in "Curing". The cement used shall not give rise to Chemical Reaction with the metal Fittings and its thickness shall be uniform as possible.

4.3 The design of Insulators shall be such that stores due to expansion or Contraction of any part of Insulators shall not lead to deterioration.

5.0 PIN INSULATORS :

5.1 The Pin Insulators shall be so designed that the porcelain part should not directly come in contact with any hard material.

5.2 For this purpose the pin insulators shall be fitted with a Zinc/Lead thimble designed to fit with the small / large steel head of the pin.

6.0 POST TYPE INSULATORS :

6.1 11KV POST INSULATORS:

i) The post type insulators shall be suitable for outdoor use and cap & base type. Caps & base shall have plain machined faces & zigs shall be used for drilling bolt holes on the cap & in the base for easy & perfect assembly. Regarding Test for Mechanical strength for post Insulators, all the necessary tests are as per 9.6.5.1, 9.6.5.2, & 9.6.5.3 of IS:2544-1973 with latest amendments are to be carried out at the manufacturer's premises. The Cap & Pedestal of Post Insulators shall be of Malleable Cast Iron.

ii) For each of the Post Insulators / Insulator sets Bolts, Nuts, Set Screws & Washers shall be supplied as follows :
a) Requisite numbers of set Screws & Spring Washers for assembling the Post Insulator unit.
b) Requisite numbers of set screws & spring washers for fixing bus-bar Support to the cap in the top Post Insulator.
c) One set of Bolts, Nuts & Washers or Lock nuts & plain washers for mounting the Insulators on the support steel structures of bus support.

iii) 5% spare Nuts & Bolts with washers shall have to be supplied of no extra cost by the purchaser with each consignment.

6.2 33KV POST INSULATORS:

i) The Post Insulator shall be sound, free from defects, thoroughly verified, smoothly glazed and type of Post Insulator shall be **stack type**. The glaze shall be brown in colour. The glaze shall cover the exposed **Porcelain** parts of the Insulator.

ii) The Post Insulator shall be designed and manufactured to avoid stresses due to expansion and contraction which may lead to deterioration, stress concentration due to direct engagement of Porcelain with metal fittings and shapes which do not facilitate cleaning by normal methods.

iii) Cement used in the construction of post insulator shall not cause fracture by expansion or loosening by contraction and shall not give rise to chemical reaction with the metal fittings and its thickness shall be uniform.

iv) All ferrous metal parts except those of stainless steel shall be hot dip galvanised and uniform zinc coating shall satisfy the requirement of IS:2633.The parts shall be galvanised after machining and the galvanised surface shall be smooth.

v) The tapped holes suitable for bolts with threads shall have anti-corrosion protection. The effective length of the thread shall not be less than the nominal diameter of the Bolt.

vi) The electrical and mechanical characteristics of Post Insulator shall conform to the specific technical parameters of this specification.

vii) Post Insulator shall be suitable for upright mounting on steel structures & the Cap & Pedestal of Post Insulators shall be of Malleable Cast Iron. Diameter of Cap & Base will be 108 mm.

7.0 DISC INSULATORS :

7.1 The Insulator discs shall be Cap and Ball Pin type with Ball and Socket coupling suitable for use in suspension or tension strings.

7.2 The porcelain shall be brown colour, non porous having high dielectric mechanical and thermal strength, free from internal stresses, blisters, laminations, voids, foreign matters, imperfections or other defects, which might in any way render it unsuitable as insulator shells. Porcelain shall be smoothly glazed to remain unaffected by climatic condition, ozone, acids, alkalis, zinc or dust.
The glaze shall have bright luster, smooth surface, a good performance under extreme weather condition of tropical climate and dust resistant. The glaze shall not crack or chip due to aging under normal service condition or while handling during transit or erection.

7.3 Cement used in the construction of Insulators shall not cause fracture by expansion or loosening by contraction and must have high compressive and shearing strength and be free from change in volume due to aging and temperature change. The cement shall not give rise to chemical reaction with metal fittings. Rapid hardening cement with special sand shall be used for assembly of metal parts.

7.4 The Caps and Ball Pins of Disc Insulator shall be hot dip galvanised and mechanically strong. The Ball Pins shall move freely in the Cap Socket, but shall be so designed that they do not disengage while in service. The Caps shall be made of heat treated malleable cast iron. These shall be free from cracks, shrinks, air holes, burrs and rough edges. All load bearing surfaces shall be smooth and uniform so as to distribute loading stress evenly

7.5 The Ball Pins shall be of forged steel and so designed that they will not yield or distract under loaded conditions. The ball and socket insulators shall be provided with 'R' /'W' clip to prevent uncoupling of insulator units from each other. The 'R' /'W' clip shall be made of phosphor bronze or stainless steel to safe guard against corrosion.

The electrical and mechanical characteristics of the Disc. Insulator shall conform to Specific Technical Parameters of this Specification.

Note :

i) The disc insulators shall be of Ball & Socket type.

ii) The cap of disc insulators shall be of Malleable Cast Iron whereas the ball pins shall be of Forged steel.

iii) All metal parts shall be of Hot dip galvanized as per IS: 2633.

8.0 WEATHER CONDITIONS :

The Insulators shall be suitable for use under the following climatic conditions :

i)	Max^{m} ambient temperature of the air : 50 ^{0}C .
ii)	Min^{m} ambient temperature of the air : (**-**) 4^{0}C.
iii)	Max^{m}. daily average ambient temperature : 40^{0}C.
iv)	Max^{m}. yearly weighted average ambient temperature : 32^{0}C
v)	Max^{m}. relative humidity : 100%.
vi)	Average number of thunder storm : 85 days / annum.
vii)	Max^{m} rain fall : 200 Cm / annum.
viii)	Max^{m}. Wind pressure : 200 Kg / M^{2}
ix)	Earthquake acceleration (g): As per IS: 1983 (1984) for Class III & IV Zone.
x)	No. of months of tropical monsoon condition per annum : 5 months (June -Oct.),

9.0 TEST AT MANUFACTURER`S WORKS AND TEST CERTIFICATES : -

Following acceptance tests shall be carried out at the works of the manufacturer and five (5) copies of test results shall be submitted to the Chief Engineer (P&C) for approval. An advance notice of thirty (30) days shall be given before the date when the test will be carried out:

i) Verification of dimensions.
ii) Temperature cycle test.
iii) Mechanical strength test.
iv) P.F. Puncture test.
v) Porosity test
vi) Galvanizing test
vii) Electromechanical failing load test. (for Disc. Insulator String only).

10.0 TENDER DRAWING / LEAFLETS AND TYPE TEST CERTIFICATES FOR PIN, POST & DISC INSULATORS :-

The following Drawings, Leaflets and Type Test Certificates shall have to be submitted alongwith each Tender.

i) Dimensional General Arrangement Drawing showing all fittings and accessories, sectional Drawing etc. of individual Pin, Post & Disc insulators.
ii) Leaflets of individual Pin, Post & Disc Insulators.

11.0 TYPE TESTS & TEST REPORTS :

The Bidder should submit the complete Type Test Reports as stipulated in latest relevant IS/IEC including Mechanical Performance Test & Thermal- Mechanical Performance test(for Disc Insulators) with complete Identification, Date & Sl.No., carried out within 5 (Five) years from Due Date of Tender in any NABL accredited/Govt. recognized Test House or Laboratory on the Tendered Items (Pin, Post & Disc Insulators) of identical drawing, design of same CD as per Tender Specification with the Bid failing which their offer may not be technically accepted.

The Certificates of the NABL accredited/Govt. recognized Test House or Laboratory should, however, bear the Logo of NABL accreditation.

12.0 TYPE TESTS AFTER ISSUANCE OF ORDER :

Besides submission of Type Test Report, carried out within five years as per Tender Specification, Type Test at the discretion of Ordering authority, shall have to be arranged by the successful contractor or WBSEDCL on his own may conduct the same from any lot delivered to site, as per the relevant ISS from any NABL accredited/Government recognized Test House or Laboratory in presence of WBSEDCL'S representative. In case of failure of the materials after type test the WBSEDCL will have the right to reject the total supplied lot of the said materials and the party have to replace the complete lot of materials at his own cost including transportation of materials at site.

However the necessary cost of the Type Test charges, if arranged by the party, only be reimbursed to the party on production of necessary supporting documents.

13.0 DOCUMENTS TO BE SUBMITTED AT THE TIME OF PHYSICAL DELIVERY AT CONSIGNEE STORES

The following documents to be submitted by the vendors to the consignee Stores at the time of despatch to stores by the vendors:-

a) Copy of Purchase Order.
b) Copy of Despatch Instruction.
c) Inspection Test Certificate.
d) Guarantee Certificate.
e) Proforma Invoice.
f) Calculation Sheet for price Variation on the basis of IEEMA or CACMAI as applicable with base date of order.
g) Seal list and packing list.
h) Challan, in triplicate.
i) Way bill, if applicable.

14.0 SPECIFIC TECHNICAL PARAMETERS

14.1 11 KV PIN INSULATORS :

Sl.No.	Description		Rating	
	Environment		Moderately Polluted atmospheres	heavily polluted atmospheres
1.	Nominal system Voltage		11 KV	11 KV
2.	Highest system Voltage	:	12 KV	12 KV
3.	**Minimum Specific Creepage Distance**	:	**230 mm**	**320 mm**
4.	Minimum failing load	:	5 KN	5 KN
5.	P.F Visible Discharge Voltage	:	09 KVrms	09 KVrms
6.	P.F Minimum flash over voltage			
	a) Dry	:	75KVrms	75KVrms
	b) Wet	:	45KVrms	45KVrms
7.	Impulse flashover voltage **1.2/50 micro second wave :**			
	a)Positive	:	95KVp	95KVp
	b)Negative	:	100KVp	100KVp
8.	P.F. Withstand Voltage :			
	a)Dry	:	60KVrms	60KVrms
	b)Wet	:	35KVrms	35KVrms
9.	Impulse withstand voltage **1.2/50 micro second wave :**			
	a) Positive	:	75KVp	75KVp
	b) Negative	:	80 KVp	80 KVp
10.	Power Frequency puncture withstand voltage	:	105KVrms	105KVrms

Remarks : Each Insulator shall be legibly and indelibly marked to show the following :

(a) Name/Trade Mark of the Manufacturer
(b) Month & Year of the Manufacture
(c) Country of Manufacture
(d) Minimum failing load in newtons , Minimum Creepage Distance

14.2 <u>33 KV PIN INSULATORS</u> :

<u>Sl.No.</u>	**<u>Description</u>**		Rating	
	<u>Environment</u>		Moderately Polluted atmospheres	heavily polluted atmospheres
1.	Nominal system Voltage		33 KV	33 KV
2	Highest system Voltage	:	36 KV	36 KV
3.	**Minimum Specific Creepage Distance**	:	**580 mm**	**840 mm**
4.	Minimum failing load	:	10 KN	10 KN
5.	P.F Visible Discharge Voltage	:	27 KVrms	27 KVrms
6.	P.F Minimum flash over voltage			
	a) Dry	:	130KVrms	130KVrms
	b) Wet	:	90KVrms	90KVrms
7.	Impulse flashover voltage **1.2/50 micro second wave :**			
	a)Positive	:	210KVp	210KVp
	b)Negative	:	230KVp	230KVp
8.	P.F. Withstand Voltage :			
	a)Dry	:	95KVrms	95KVrms
	b)Wet	:	75KVrms	75KVrms
9.	Impulse withstand voltage **1.2/50 micro second wave :**			
	a) Positive	:	170KVp	170KVp
	b) Negative	:	180 KVp	180 KVp
10.	Power Frequency puncture withstand voltage	:	180KVrms	180KVrms

Remarks : Each Insulator shall be legibly and indelibly marked to show the following :

(a) Name/Trade Mark of the Manufacturer
(b) Month & Year of the Manufacture
(c) Country of Manufacture
(d) Minimum failing load in newtons , Minimum Creepage Distance

14.3 11 KV & 33 KV POST INSULATORS :

Sl No.	Description		Rating	
			11 KV	33 KV(2x22KV)
1	Nominal system voltage/Working voltage	:	11 KV	33 KV
2	Highest system voltage	:	12 KV	36 KV
3	No. of units per Stack	:	1	2
4	Minimum specific Creepage distance	:	25 mm per KV	25 mm per KV
5	P.F Visible Discharge Voltage	:	9 KV rms	27 KV rms
6	P.F. Withstand Voltage			
	a) Dry	:	60 KV rms	95 KV rms
	b) Wet	:	35 KV rms	75 KV rms
7	Impulse withstand voltage **1.2/50 micro second wave :**			
	a) Positive	:	75 KVp	170 KVp
	b) Negative	:	80 KVp	180 KVp
8	P.F. Minimum flash over voltage			
	a) Dry	:	70 KV rms	130 KV rms
	b) Wet	:	45 KV rms	90 KV rms
9	Impulse flashover voltage **1.2/50 micro second wave :**			
	a) Positive	:	95 KVp	210 KVp
	b) Negative	:	120 KVp	230 KVp
10	Power Frequency puncture withstand voltage on single unit	:	105 KV rms	150 KV rms
11	Cantilever strength on stack			
	a) Upright	:	5 KN	4.5 KN
	b) Inverted	:	3 KN	6.8 KN
12	Tensile Strength	:	15 KN	30 KN
13	Torsional Strength	:	200 Nm	680 Nm
14	Compression Strength	:	30 KN	40 KN
15	Height	:	254 mm	508 mm
16	Insulation Part Diameter	:	152 mm	210 mm
17	Pitch Circle Diameter			
	a) Top	:	57 mm	76 mm
	b) Bottom	:	57 mm	76 mm
18	Conforming standard	:	As per IS	As per IS

Remarks : Each Insulator shall be legibly and indelibly marked to show the following :

(a) Name/Trade Mark of the Manufacturer
(b) Month & Year of the Manufacture
(c) Country of Manufacture
(d) Minimum failing load in newtons

14.4 11 KV DISC. INSULATOR :

Sl. No.	Description		Rating	
			11 KV (BALL & SOCKET TYPE – 70 KN)	11 KV (BALL & SOCEKT TYPE –45 KN)
1	Nominal system voltage	:	11 KV	11 KV
2	Highest system voltage	:	12 KV	12 KV
3	Total Creepage distance	:	320 mm	320 mm
4	Spacing	:	145mm	145mm
5	Minimum Failing Load	:	70KN	45 KN
6	P.F. visible discharge voltage	:	9KV rms	9KV rms
7	P.F. Minimum flash over voltage			
	a) Dry	:	75 KV rms	75 KV rms
	b) Wet	:	45 KV rms	45 KV rms
8	Impulse flashover voaltage **1.2/50 micro second wave :**			
	a) Positive	:	115 KVp	115 KVp
	b) Negative	:	120 KVp	120 KVp
9	P.F. withstand voltage			
	a) Dry	:	60 KV rms	60 KV rms
	b) Wet	:	35 KV rms	35 KV rms
10	Impulse withstand voltage **1.2/50 micro second wave :**	:		
	a) Positive	:	75 KVp	75 KVp
	b) Negative	:	80 KVp	80 KVp
11	P.F. puncture withstand voltage	:	1.3 times the actual dry flashover voltage of the unit	1.3 times the actual dry flashover voltage of the unit
12	Nominal Dia of Ball, Ball pin, Socket & Security Cap	:	As per IS	As per IS
13	Porcelain Diameter	:	255 mm	255 mm

Remarks : Each Insulator shall be legibly and indelibly marked to show the following :

(a) Name/Trade Mark of the Manufacturer
(b) Month & Year of the Manufacture
(c) Country of Manufacture
(d) Minimum failing load in newtons

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GUARANTED TECHNICAL PARTICULARS FOR 11 KV PIN NSULATOR with 230 mm minimum Creepage Distance

(To be filled in & submitted by the Tenderer with the Techno-Commercial Bid)

Sl.No.	**Description**		
1.	Name of the Manufacturer	:	
2.	Nominal system Voltage (KV rms)	:	
3	Highest system Voltage (KV rms)	:	
4.	Height of the Insulator (mm)		
5.	Dia. of Largest shed (mm)	:	
6.	Weight per unit (Kg)		
7.	Conductor Groove (mm)		
8.	Creepage Distance (mm)		
9.	Minimum failing load (KN)	:	
10.	Power Frequency Visible Discharge Voltage (KV rms)	:	
11.	Minimum Withstand Test Voltage		
	i) Power Frequency One Minute Dry (KV rms)	:	
	ii) Power Frequency One Minute Wet (KV rms)	:	
	iii) **1.2/50 micro-second wave Impulse Withstand Voltage**		
	a)Positive Wave (KV peak)		
	b) Negative Wave (KV peak)		
12.	Power Frequency Puncture Withstand Voltage (KV rms)	:	
13.	Minimum flash over voltage	:	
	i) Power Frequency One Minute Dry (KV rms)		
	ii) Power Frequency One Minute Wet (KV rms)	:	
	iii) **1.2/50 micro-second wave Impulse Flashover Voltage** (KV peak)	:	
	a)Positive Wave (KV peak)	:	
	b) Negative Wave (KV peak)	:	
14.	Colour of Glaze	:	
15.	Marking on Insulator(To specify as per I.S. & Tender Specification)	:	

Signature ……

Name ……

Company Seal

Designation …….

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GUARANTED TECHNICAL PARTICULARS FOR 11 KV PIN NSULATOR with 320 mm minimum Creepage Distance

(To be filled in & submitted by the Tenderer with the Techno-Commercial Bid)

Sl.No.	**Description**		
1.	Name of the Manufacturer	:	
2.	Nominal system Voltage (KV rms)	:	
3	Highest system Voltage (KV rms)	:	
4.	Height of the Insulator (mm)		
5.	Dia. of Largest shed (mm)	:	
6.	Weight per unit (Kg)		
7.	Conductor Groove (mm)		
8.	Creepage Distance (mm)		
9.	Minimum failing load (KN)	:	
10.	Power Frequency Visible Discharge Voltage (KV rms)	:	
11.	Minimum Withstand Test Voltage		
	i) Power Frequency One Minute Dry (KV rms)	:	
	ii) Power Frequency One Minute Wet (KV rms)	:	
	iii) **1.2/50 micro-second wave Impulse Withstand Voltage**		
	a)Positive Wave (KV peak)		
	b) Negative Wave (KV peak)		
12.	Power Frequency Puncture Withstand Voltage (KV rms)	:	
13.	Minimum flash over voltage	:	
	i) Power Frequency One Minute Dry (KV rms)		
	ii) Power Frequency One Minute Wet (KV rms)	:	
	iii) **1.2/50 micro-second wave Impulse Flashover Voltage** (KV peak)	:	
	a)Positive Wave (KV peak)	:	
	b) Negative Wave (KV peak)	:	
14.	Colour of Glaze	:	
15.	Marking on Insulator(To specify as per I.S. & Tender Specification)	:	

Signature ……

Name ……

Company Seal

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GUARANTED TECHNICAL PARTICULARS FOR 33 KV PIN NSULATOR with 580 mm minimum Creepage Distance

(To be filled in & submitted by the Tenderer with the Techno-Commercial Bid)

Sl.No.	**Description**		
1.	Name of the Manufacturer	:	
2.	Nominal system Voltage (KV rms)	:	
3	Highest system Voltage (KV rms)	:	
4.	Height of the Insulator (mm)		
5.	Dia. of Largest shed (mm)	:	
6.	Weight per unit (Kg)		
7.	Conductor Groove (mm)		
8.	Creepage Distance (mm)		
9.	Minimum failing load (KN)	:	
10.	Power Frequency Visible Discharge Voltage (KV rms)	:	
11.	Minimum Withstand Test Voltage		
	i) Power Frequency One Minute Dry (KV rms)	:	
	ii) Power Frequency One Minute Wet (KV rms)	:	
	iii) **1.2/50 micro-second wave Impulse Withstand Voltage**		
	a)Positive Wave (KV peak)		
	b) Negative Wave (KV peak)		
12.	Power Frequency Puncture Withstand Voltage (KV rms)	:	
13.	Minimum flash over voltage	:	
	i) Power Frequency One Minute Dry (KV rms)		
	ii) Power Frequency One Minute Wet (KV rms)	:	
	iii) **1.2/50 micro-second wave Impulse Flashover Voltage** (KV peak)	:	
	a)Positive Wave (KV peak)	:	
	b) Negative Wave (KV peak)	:	
14.	Colour of Glaze	:	
15.	Marking on Insulator(To specify as per I.S. & Tender Specification)	:	

Signature ……

Name ……

Company Seal

Designation …….

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GUARANTED TECHNICAL PARTICULARS FOR 33 KV PIN NSULATOR with 840 mm minimum Creepage Distance

(To be filled in & submitted by the Tenderer with the Techno-Commercial Bid)

Sl.No.	**Description**		
1.	Name of the Manufacturer	:	
2.	Nominal system Voltage (KV rms)	:	
3	Highest system Voltage (KV rms)	:	
4.	Height of the Insulator (mm)		
5.	Dia. of Largest shed (mm)	:	
6.	Weight per unit (Kg)		
7.	Conductor Groove (mm)		
8.	Creepage Distance (mm)		
9.	Minimum failing load (KN)	:	
10.	Power Frequency Visible Discharge Voltage (KV rms)	:	
11.	Minimum Withstand Test Voltage		
	i) Power Frequency One Minute Dry (KV rms)	:	
	ii) Power Frequency One Minute Wet (KV rms)	:	
	iii) **1.2/50 micro-second wave Impulse Withstand Voltage**		
	a)Positive Wave (KV peak)		
	b) Negative Wave (KV peak)		
12.	Power Frequency Puncture Withstand Voltage (KV rms)	:	
13.	Minimum flash over voltage	:	
	i) Power Frequency One Minute Dry (KV rms)		
	ii) Power Frequency One Minute Wet (KV rms)	:	
	iii) **1.2/50 micro-second wave Impulse Flashover Voltage** (KV peak)	:	
	a)Positive Wave (KV peak)	:	
	b) Negative Wave (KV peak)	:	
14.	Colour of Glaze	:	
15.	Marking on Insulator(To specify as per I.S. & Tender Specification)	:	

Signature ……

Name ……

Company Seal

Designation …….

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GUARANTED TECHNICAL PARTICULARS FOR 11 KV & 33 KV POST INSULATOR

(To be filled in & submitted by the Tenderer with the Techno- Commercial Bid)

SL.No.	Description		Rating	
			11 KV	33 KV
1.	Name of the Manufacturer	:		
2.	Particulars for Insulator	:		
	a) Type of Insulator	:		
	b) Nominal System Voltage (KVrms)	:		
	c) Highest System Voltage (KV rms)	:		
	d) Height of the Insulator (in mm)	:		
	e) Diameter of the Largest Shed (in mm)	:		
	f) Creepage Distance (in mm)	:		
	g) Weight of complete Unit (Kg)	:		
	h) Weight of Insulator only (Kg)	:		
	i) No. of Units per Stack	:		
3.0	Electrical Characteristics (for one Insulator)	:		
3.1	Visible Discharge Voltage (KV rms)			
3.2	Withstand Voltage	:		
	(i) Dry Power Frequency (KV rms)	:		
	(ii) Wet Power Frequency (KV rms)			
	(iii) **1.2/50 micro-second wave Impulse Withstand Voltage**	:		
	a)Positive Wave (KV peak)	:		
	b) Negative Wave (KV peak)			
3.3	Flash Over Voltage	:		
	(i) Power Frequency Flash Over Voltage (KV rms)	:		
	a) One Minute Dry	:		
	b) One Minute Wet			
	(ii) **1.2/50 micro-second Wave Impulse Flashover Voltage**	:		
	a)Positive Wave (KV peak)	:		
	b)Negative Wave (KV peak)	:		
3.4	Power Frequency puncture withstand voltage One Minute (KV rms) on single unit	:		
3.5	Mechanical Characteristics	:		
	(i) Cantilever strength			
	a) Upright	:		
	b) Inverted	:		
	(ii) Torsional Strength	:		
	(iii) Tensile Strength	:		
	(iv) Compression Strength	:		
	(v) Failing Load	:		
3.6	Pitch Circle Diameter			
	Top	:		
	Bottom	:		
3.7	Standard to which the Insulator conforms	:		
3.8	Marking on Insulator (To specify as per I.S. & Tender Specification)	:		
Note : Values for Insulators should be given in Metric Units.				

Signature ……

Name ……

Company Seal

Designation …….

WEST BENGAL STATE ELECTRICITY DIST. COM. LTD.
Office of the Chief Engineer , Procurement & Contracts Department
Vidyut Bhavan(4th Floor),Bidhannagar, Block-DJ : Sector-II, Kolkata-700 091

GUARANTED TECHNICAL PARTICULARS FOR 11 KV DISC INSULATORS (B&S TYPE)
(To be filled in & submitted by the Tenderer with the Techno- Commercial Bid)

Sl.No.	Description		Rating	
			11 KV (BALL & SOCKET TYPE – 70 KN)	11 KV (BALL & SOCEKT TYPE – 45 KN)
1	Nominal system voltage (KVrms)	:		
2	Highest system voltage (KVrms)	:		
3	Minimum Creepage distance	:		
4	a) Height of complete Unit (mm)	:		
	b) Weight of complete Unit (Kg)			
	c) Weight of Insulator Portion (Kg)			
5	Tension strength	:		
6	P.F. visible discharge voltage (KVrms)	:		
7	P.F. Minimum flash over voltage			
	a) One Min Dry (KVrms)	:		
	b) One Min Wet (KVrms)	:		
8	Impulse flashover voltage **1.2/50 micro second wave :**	:		
	a) Positive (KVpeak)	:		
	b) Negative (KVpeak)	:		
9	P.F. withstand voltage			
	a) One Min. Dry	:		
	b) One Min Wet	:		
10	Impulse withstand voltage **1.2/50 micro second wave :** (KVpeak)	:		
11	P.F. puncture withstand voltage (KVrms)	:		
12	Nominal dia of Ball, Ball Pin, Socket & Security Clip	:		
13	Min. Failing Load (KN)	:		
14	Size of the Disc – a) Diameter (mm) b) Unit Spacing (mm)	: :		
15	Other Dimension of the Ball & Socket(mm)	:		
16	Colour of Glaze	:		
17	Marking on Insulator(To specify as per I.S. & Tender Specification)	:		
18	Grade of Material used and Ref. to relevant Std. i.r.o. Cap, Ball Pin & Security Clip	:		

Signature ……

Name ……

Company Seal

Designation …….