NOTICE INVITING TENDER

TENDER REF NO : INS ENGG/ HVDC TESTING - 01/*09-10*

TENDER NAME : TYPE TESTS ON 420 KN HVDC DISC INSULATOR STRINGS FOR +/- 800 KV HVDC TRANSMISSION LINE. & SF6 PUNCTURE TEST ON DISC INSULATOR UNITS.

GENERAL TERMS & CONDITIONS OF TENDER

BHEL/EPD (A Govt. of India Enterprises) DESIRES TO CONDUCT TYPE TESTS ON 420 KN HVDC DISC INSULATORS FOR +/- 800 KV HVDC TRANSMISSION LINE AS PER FOLLOWING DETAILS MENTIONED IN ANNEXURE – B (PAGE NO 5 , 6 & 7).

1. Sealed bids are invited From ELIGIBLE TESTING LABORATORIES for Type Testing of 420 KN HVDC Disc Insulators for +/- 800 KV HVDC Strings in their laboratories. under **TWO PART** bids :

1) **Techno commercial bid.**
2) **Price Bid.**

The Tender document may be obtained from **SDGM/Insulator Engg BHEL- EPD Bangalore-12**, & also may be downloaded from BHEL web site http://**bhelceramics.com**. or **http:// www.bhel.com**

Interested and eligible TESTING LABORATORIES may study the tender document carefully and offer their bids in the techno commercial bid and price bid in a two separate sealed cover duly subscribing the tender name, tender ref no & Due date, Please write either Techno commercial bid or price bid on the top of each cover.

The TECHNO-COMMERCIAL BID and PRICE BID offer shall be put in a two separate sealed cover and the cover should have the corresponding Techno commercial bid, price bid , tender name ,tender ref no. and due Date written on it. If the offer is found in opened condition, the same offer will be liable for rejection.

TECHNO COMMERCIALLY qualified party's price bids will be opened and net cost will be computed.

The salient features of tender documents are as follows.

SDGM/INS ENGG

TECHNO- COMMERCIAL BID - ANNEXURE –A

TENDER REFERENCE: INS ENGG/ HVDC TESTING - 01/*09-10*

TENDER NAME : TYPE TESTS ON 420 KN HVDC DISC INSULATOR STRINGS FOR +/- 800 KV HVDC TRANSMISSION LINE. & SF6 PUNCTURE TEST ON DISC INSULATOR UNITS.

DATE OF ISSUE : 20-11-2009
LAST DATE FOR RECEIPT OF TENDER : 05-12-2009 BY 2.00 P.M
OPENING OF TECHNO COMMERCIAL BID: 05-12-2009 BY 2.30 P.M

ESSENTIAL CRITERIA OF TECHNO COMMERCIAL OFFER

ADDRESS OF THE TEST LABORATORY :

SL.NO	PARAMETER	BHEL SPEC/REQUIREMENT	VENDOR OFFER
1	Name of Contact person	TO BE MENTIONED	
2	E-mail ID	TO BE MENTIONED	
3	Mobile number	TO BE MENTIONED	
4	Land line number	TO BE MENTIONED	
5	Fax number	TO BE MENTIONED	
6	Payment terms	THROUGH LETTER OF CREDIT AS PER CLAUSE 9 OF GENERAL TERMS AND CONDITIONS	
7	Lead time for Testing	FROM ORDER DATE	
8	Expected date of completion of tests	FEB –MARCH 2010	
9	Offer validity	180 DAYS FROM DATE OF TENDER OPENING	
10	Tax and duty structure	DUTY %	
11		SERVICE TAX %	
12	Any other charges	----	

Note: **FILLED FORMS TO BE SUBMITTED ALONG WITH TECHNCO- COMMERCIAL BID SEALED IN A SEPARATE COVER DULY ADDRESSED TO SDGM/INS ENGG ALONG WITH TENDER NAME,TENDER REFERENCE NO AND DATE.TENDER BOX IS AVAILABLE AT BHEL-EPD PREMISES (MAIN GATE RECEPTION) OR SENT THROUGH E – MAIL TO hvdc.tender@gmail.com**

SIGNATURE OF THE TENDERER

GENERAL TERMS & CONDITIONS OF TENDER

TENDER REF NO : INS ENGG/ HVDCTESTING-01 /*09-10*

TENDER NAME : TYPE TESTS ON 420 KN HVDC DISC INSULATOR STRINGS FOR +/- 800 KV HVDC TRANSMISSION LINE. & SF6 PUNCTURE TEST ON DISC INSULATOR UNITS.

I. GENERAL TERMS AND CONDITIONS OF THE TENDER

The TECHNO-COMMERCIAL BID and PRICE BID offer shall be put in two separate sealed cover and the cover should have the corresponding Techno commercial bid, price bid , tender name, tender Ref no . and due Date written on it. The offers should be submitted in a sealed cover super scribing tender name, tender number & due date and addressed to :

SDGM / INSULATOR ENGG
Bharat Heavy Electricals Ltd
Electro Porcelains Division
PB No: 1245, Science Institute Post
Bangalore – 560 012. INDIA.

So as to reach here within 2 p.m. on the due date and the tenders will be opened at 2-30p.m. on the same date in the presence of those vendors or their authorized representatives who wish to be present can attend the opening of techno commercial bids..
The offer sent through e-mail is also acceptable. The email should be addressed to hvdc.tender@gmail.com
The TECHNO-COMMERCIAL BID and PRICE BID offer shall be put in two separate sealed cover and the cover should have the corresponding Techno commercial bid, price bid , tender name,subject of tender Ref no . and due Date written on it. If the offer is found in opened condition, the same offer will be liable for rejection. The techno-commercial offer will be opened on the due date. The tenders meeting our techno-commercial requirements will be considered for opening of price bid and eligible Testing laboratory will be intimated about date and place of price bid opening. BHEL will decide on placing order based on overall L1 (net testing cost).

1. **Validity**: The rates finalized for contract shall be valid for ONE YEAR from release of work order for Testing.

2. **Price Evaluation** : The rates quoted shall be on Ex-works of Testing Laboratory basis , it shall be inclusive of unloading charges but exclusive of freight and insurance. Duties and taxes applicable on date shall be explicitly mentioned. The taxes and duties will be paid extra as applicable on the date of dispatch of material from BHEL EPD Bangalore. Disc insulators will be supplied in crates and crates will be palletized suitable to air/ ship transport. Unloading of Insulators will be Testing Laboratory‘s scope. Testing dates indicated in work orders shall be adhered unless and otherwise changes are be communicated to BHEL by the Testing Laboratory at least 30 days in advance.

3. TESTING LABORATORY CAPABILITY & PROCESS REQUIREMENT: The Testing Laboratory shall have adequate facility for a Testing of 420 KN HVDC DISC INSULATORS for **+/- 800 KV SINGLE Y SUSPENSION STRING AND TRIPLE TENSION**. All the equipments used and measuring instruments shall be duly calibrated. The Vendor shall have personnel / process qualification where applicable and shall maintain valid record of the same. The Testing Laboratory shall have enough trained crew to ensure smooth flow of work in addition to requisite handling facilities.

4. Handling Capacity: Testing Laboratory should have minimum handling facilities for handling Disc Insulator strings. Handling equipment capacity should of minimum of 10 MT capacity. Those who are not meeting this requirement, their offers are likely to be rejected..

5. Lead time: Offers shall indicate minimum and maximum lead-time required to execute the orders for the tests indicated.

6.. The order will be placed on Testing Laboratory depending on their position in comparative statement of original offer and subjected to their acceptance.

7. Price Comparison: Prices shall be considered on **TOTAL COST BASIS** (COST TO BHEL). TOTAL cost shall be worked out on price quoted including freight, excise duty, sales tax after taking out CENVAT and VAT Benefit, as applicable. The comparative statement shall be worked out on TOTAL cost basis for ALL TESTS. The comparative statement of the prices prepared on the reference date shall remain firm throughout the execution period. **The Foreign exchange rate will taken on the date of Techno commercial bid opening**.

A) The lowest price received against BHEL tender need not be commercially lowest price (L1) and BHEL reserves the right to NEGOTIATE the same.

B) BHEL reserves the right/option to REFLOAT the tender if L1 price is not the lowest acceptable price to BHEL.

8. Ranking Price : For ranking the vendors as L-1, L-2, L-3….., the basis will be lowest tender value arrived at with quoted prices is the basis. As far as possible overall L1 will be considered for award of contract.

9. Payment Terms: BHEL shall open an Irrevocable Letter of Credit in the name of the concerned Lab. L/C will be opened before commencement of testing. After the completion of tests the representative of BHEL, witnessing the tests shall certify the same and 100% amount shall be payable after the submission of 3 sets of original reports in English language.

10. Selection Criterion : The lowest bidder meeting all the technical and commercial requirements shall be awarded the contract. The bidder shall also send the details of testing facilities including rating of the Test equipments, Test hall dimensions including the available Ground clearances, details of calculations of conductor surface gradient etc. Will be taken into account.

11. Risk Purchase Clause: If Testing laboratory is not able to carry out the tests as per terms of contract. BHEL has option to terminate the contract and get these tests done in different labs at the risk and cost of the awarded Testing laboratory.

12. Arbitration: Settlement of dispute, if any arises, at anytime between the BHEL and the Testing laboratory upon or in relation to or in connection with the Testing laboratory , the same shall be referred to the sole arbitration of the Head of BHEL unit or to person appointed by him. The award of the arbitrator shall be final and binding on both BHEL and the Testing laboratory.

13. Legal Jurisdiction: In case of any legal proceedings, area of jurisdiction will be Bangalore court only.

14. The tender not meeting any of the above conditions may not be entertained.

15.Clarification sought by BHEL during Technical & Commercial Evaluation:

In case BHEL asks for any clarification, the Testing Laboratory has to submit the same within specified date otherwise the offer will be evaluated considering the clarifications, if any received, as on the specified date. No grace period or late submission is allowed.

16 . Contact person for Information :

General Contract related Queries Name: Designation: Tel Nos. E-mail ID: Cell	**Y. BABAU RAO** **SDGM / INSUALTOR ENGG** **080-22182322/091-080-23568973** **baburao@bhelepd.com** **+919449003936 (Y.Baburao)**

- **ALL TESTING LABORATORIES SHOULD QUOTE FOR TOTAL COST ONLY AS PER ENCLOSED FORMAT IN PAGE NO 5 , 6 AND 7.**

TENDER REF NO : INS ENGG/ HVDC TESTING - 01 /*09-10*

TENDER NAME : TYPE TESTS ON 420 KN HVDC DISC INSULATOR STRINGS FOR +/- 800 KV HVDC TRANSMISSION LINE & SF6 PUNCTURE TEST ON DISC INSULATOR UNITS

PRICE BID FORMAT - **ANNEXURE - B**

GUIDELINES TO CALCULATE COST TO BHEL/EPD BANGALORE.

SL NO	DESCRIPTION	RATE /STRING TEST	
	TEST OBJECT : 420 KN HVDC DISC INSULATOR STRING FOR +/- 800 KV HVDC TRANSMISSION LINE	IN FIGURES	IN WORDS
A)	+/- 800 KV SINGLE 'Y' SUSPENSION STRING COMPRISING 2 X 67 UNITS (2 X 45 UNITS IN 'V'PORTION and 2 X 22 UNITS IN II PORTION) of 420 KN HVDC DISC INSULATORS WITH HARDWARE FITTINGS SUITABLE FOR SIX BUNDLE ACSR "LAPWING" CONDUCTOR IN ACCORDANCE WITH ASSEMBLY DRAWING NUMBER ITP/800 KV – SYS/00.		
	a) D.C. WITHSTAND VOLTAGE TEST (WET) (AS PER IEC : 60060-I) SPECIFIED TEST VOLTAGE : +900 KV		
	b) SWITCHING SURGE VOLTAGE WITHSTAND TEST (WET)(AS PER IEC: 60383 -2 & IEC : 60060-I) SPECIFIED TEST VOLTAGE : 1850 KV		
	c) LIGHTNING IMPULSE VOLTAGE WITHSTAND TEST(DRY) (AS PER IEC: 60383 -2 & IEC : 60060-I) SPECIFIED TEST VOLTAGE : 2250 KV		
	d) D.C.CORONA INCEPTION & EXTINCTION TEST (DRY) CORONA EXITINCTION VOLTAGE NOT LESS THAN 880 KV(POSITIVE POLARITY) UNDER CONDUCTOR SUFACE GRADIENT OF 22 KV/CM.		
	e) RADIO INTERFERENCE TEST (AS PER IEC:60437 UNDER DRY CONDITION)		
	f) ARTIFICIAL POLLUTION WITHSTAND TEST. (AS IEC : 61245)		
B)	TAXES IF ANY		
	SUB TOTAL - 1		

Note: FILLED FORMS TO BE SUBMITTED ALONG WITH TECHNCO- COMMERCIAL BID SEALED IN A SEPARATE COVER DULY ADDRESSED TO SDGM/INS ENGG ALONG WITH TENDER NAME,TENDER REFERENCE NO AND DATE.THE COVER MAY BE PUT INTO TENDER BOX, WHICH IS AVAILABLE AT BHEL-EPD PREMISES (MAIN GATE RECEPTION)

OR

SENT THROUGH E – MAIL TO hvdc.tender@gmail.com

TENDER REFNO : INS ENGG/ HVDC TESTING - 01 /*09-10*

TENDER NAME : TYPE TESTS ON 420 KN HVDC DISC INSULATOR STRINGS FOR +/- 800 KV HVDC TRANSMISSION LINE & SF6 PUNCTURE TEST ON DISC INSULATOR UNITS

PRICE BID FORMAT – ANNEXURE - B

GUIDELINES TO CALCULATE COST TO BHEL/EPD BANGALORE.

SL NO	DESCRIPTION	RATE /STRING TEST	
		IN FIGURES	IN WORDS
A)	+/- 800 KV TRIPLE TENSION STRING COMPRISING 3 X 64 UNITS (2 X 45 UNITS IN 'V'PORTION and 2 X 22 UNITS IN II PORTION) of 420 KN HVDC DISC INSULATORS WITH HARDWARE FITTINGS SUITABLE FOR SIX BUNDLE ACSR "LAPWING" CONDUCTOR IN ACCORDANCE WITH ASSEMBLY DRAWING NUMBER ITP/800 KV – SYS/00.		
	a) D.C. WITHSTAND VOLTAGE TEST (WET) (AS PER IEC : 60060-I) SPECIFIED TEST VOLTAGE : +900 KV		
	b) SWITCHING SURGE VOLTAGE WITHSTAND TEST (WET)(AS PER IEC: 60383 -2 & IEC : 60060-I) SPECIFIED TEST VOLTAGE : 1850 KV		
	c) LIGHTNING IMPULSE VOLTAGE WITHSTAND TEST(DRY) (AS PER IEC: 60383 - 2 & IEC : 60060-I) SPECIFIED TEST VOLTAGE : 2250 KV		
	d) D.C.CORONA INCEPTION & EXTINCTION TEST (DRY) CORONA EXITINCTION VOLTAGE NOT LESS THAN 880 KV(POSITIVE POLARITY) UNDER CONDUCTOR SUFACE GRADIENT OF 22 KV/CM.		
	e) RADIO INTERFERENCE TEST (AS PER IEC:60437 UNDER DRY CONDITION)		
	f) ARTIFICIAL POLLUTION WITHSTAND TEST. (AS IEC : 61245)		
B)	TAXES IF ANY		
	SUB TOTAL - 2		

Note: FILLED FORMS TO BE SUBMITTED ALONG WITH TECHNCO- COMMERCIAL BID SEALED IN A SEPARATE COVER DULY ADDRESSED TO SDGM/INS ENGG ALONG WITH TENDER NAME,TENDER REFERENCE NO AND DATE.THE COVER MAY BE PUT INTO TENDER BOX, WHICH IS AVAILABLE AT BHEL-EPD PREMISES (MAIN GATE RECEPTION)

OR

SENT THROUGH E – MAIL TO hvdc.tender@gmail.com

TENDER REFNO : INS ENGG/ HVDC TESTING - 01 /*09-10*

TENDER NAME : TYPE TESTS ON 420 KN HVDC DISC INSULATOR STRINGS FOR +/- 800 KV HVDC TRANSMISSION LINE & SF6 PUNCTURE TEST ON DISC INSULATOR UNITS

PRICE BID FORMAT – ANNEXURE - B

GUIDELINES TO CALCULATE COST TO BHEL/EPD BANGALORE.

SL NO	DESCRIPTION	RATE /STRING TEST	
		IN FIGURES	IN WORDS
A)	TEST OBJECT : 420 KN HVDC DISC INSULATOR		
	a) SF6 PUNCTURE WITHSTAND TEST		
B)	TAXES IF ANY		
	SUB TOTAL - 3		
	TOTAL COST = SUB TOATL 1 + SUB TOTAL 2 +SUB TOTAL 3		

Note: FILLED FORMS TO BE SUBMITTED ALONG WITH TECHNCO- COMMERCIAL BID SEALED IN A SEPARATE COVER DULY ADDRESSED TO SDGM/INS ENGG ALONG WITH TENDER NAME,TENDER REFERENCE NO AND DATE.THE COVER MAY BE PUT INTO TENDER BOX, WHICH IS AVAILABLE AT BHEL-EPD PREMISES (MAIN GATE RECEPTION)

OR

SENT THROUGH E – MAIL TO hvdc.tender@gmail.com

Signature with company seal :

Name –

Designation within Company / Organization –

Address of Company / Organization –

TENDER REFNO : INS ENGG/ HVDC TESTING - 01 /*09-10*.

TENDER NAME : TYPE TESTS ON 420 KN HVDC DISC INSULATOR STRINGS FOR +/- 800 KV HVDC TRANSMISSION LINE & SF6 PUNCTURE TEST ON DISC INSULATOR UNITS.

II. TECHNICAL SPECIFICATION

SPECIFICATION FOR CARRYING OUT HV& POLLUTION TESTS ON DISC INSULATOR STRINGS & SF6 PUNCTURE TEST DISC INSULATOR UNITS

A. TEST OBJECT:
DISC INSULATOR STRINGS FOR ± 800 KV HVDC TRANSMISSION LINE.

2. String Configuration:

2.1 ± 800 kV Single Y Suspension string comprising of 2 X 67 units (2 x 45 units in V portion & 2 X 22 units in II portion) of 420 kN disc insulators and hardware fittings suitable for six bundle ACSR 'LAPWING' conductor in accordance with assembly drawing number ITP/800KV- SYS/00.

Approximate weight of the string (Insulator +fittings) – 3000 kg

2.2 +/- 800 kV Triple Tension string consisting of 3 x 64 units of 420 kN disc insulators and hardware fittings suitable for six bundle ACSR 'LAPWING' conductor in accordance with assembly drawing number ITP/800KV-TT/HVDC/00.

Approximate weight of the string (Insulator +fittings) – 4500 kg

3. Tests:

3.1 D.C Voltage withstand Test (Wet)

The test shall be carried out in accordance with IEC 60060-1.
Specified Test Voltage : **+ 900 kV**

3.2 Switching Surge Voltage withstand Test (Wet)
The test shall be carried out in accordance with IEC 60383-2 & IEC 60060-1 under wet condition.
Specified Test Voltage : **1850 kV_{peak}.**

3.3 Lightning Impulse Voltage withstand Test (Dry)
The test shall be carried out in accordance with IEC 60383-2 & IEC 60060-1 under Dry condition.
Specified Test Voltage : **2250 kV_{peak}**

3.4 D.C Corona Inception & Extinction Test (Dry):
The complete insulator string with insulators, fittings & conductor bundle shall be assembled in the test hall in accordance with the relevant drawing. The string when subjected to a DC voltage under Dry condition shall have a corona extinction voltage of not less than 880 kV (positive polarity) under conductor surface gradient of 22 kV/cm. There shall be no evidence of visual

corona on any part of the test sample (insulators & fittings). For information, the Corona Inception voltage shall also be recorded. The test voltages shall be corrected to atmospheric conditions in accordance with IEC .

3.5 Radio Interference Test (Dry) :

The test shall be carried out in accordance with IEC 60437 under Dry condition. The arrangement of the test object shall be similar to Corona test described in serial number 3.4. The string shall be subjected to a DC voltage of 880 kV (positive polarity) under conductor surface gradient of 22 kV/cm & the Radio noise measured shall be lesser than 1000 micro Volts (60 dB) at 1 MHz.

3.6 Artificial Pollution Withstand Test:

The test shall be carried out in accordance with IEC 61245.

3.6.1 Test Parameters:

3.6.1.1 Test Method – Solid Layer, Section 4
3.6.1.2 Test Procedure – Section 4.5
3.6.1.3 Specified SDD – 0.085 mg/sq.cm
3.6.1.4 Specified Test Voltage – 800 kV (-ve polarity)
3.6.1.5 Test Duration – 100 minutes

5. Arrangement of test object:

5.1 D.C Voltage withstand Test (Wet)
Switching Surge Voltage withstand Test (Wet)
Lightning Impulse Voltage withstand Test (Dry)

In accordance with the Assembly drawing enclosed. 'Lapwing' conductor of required length shall be used for testing Tension string. In case of Suspension string Aluminium tubes/rods of
required diameter may be used for conductor simulation.

5.2 RIV & Corona Test

In accordance with the Assembly drawing enclosed. 'Lapwing' conductor of necessary length
shall be used for testing Tension string. In case of Suspension string Aluminium tubes/rods of
required diameter may be used for conductor simulation. Required ground clearance for
achieving Conductor surface gradient of 22 kV/cm shall be maintained during testing.

5.3 Artificial Pollution Test

Y Suspension String shall be erected exactly in line with the drawing. In case of practical difficulties in the erection of Tension String in horizontal position, the same shall be tested in Vertical/ Inclined position using suitable support structure. The angle of inclination shall be indicated in the offer. Necessary ground clearance in accordance with IEC 61245 shall be ensured. Conductor simulation is not required during testing.

B. TEST OBJECT:

420 KN EMS HVDC DISC INSULATOR

Drawing number – EL DG 3 980 44 00200/A2

1. Tests: SF6 Puncture Withstand Test

1.1 Description of the Test:
10 samples of Disc insulators described above shall be subjected to SF 6 Puncture withstand test in accordance with Clause 16 of IEC 61325.

1.2 Specified Test withstand Voltage: + 240 kV

1.3. Arrangement of test object:
Shall be in accordance with IEC 61325.

C) TEST REPORT:

The report of test carried out shall include details of the test object, test procedure, test results including photographs etc. The report shall be in English language.

D) TEST SCHEDULE

It is required to commence the above tests during February-March 2010. The laboratory shall inform BHEL in advance regarding the following.

Latest date for delivery of Test objects at the test laboratory.
Date of Preparation of test samples.
Date of commencement of testing.
Date of completion of all the tests.
Date of submission of test report.

E) OTHER SCOPE OF WORK :

- The test lab shall arrange the following:
- Opening the packing and assembling insulators & hardware in accordance with the drawings submitted by BHEL
- Installation of strings in the test hall & carrying out tests in accordance with the specification
- Dismantling the tested objects & repacking them in case the samples are re imported
- Submission of test report
- Assistance for obtaining Visa for our engineers witnessing the tests.

F) DISPOSAL :

The samples may have to be re imported after the completion of testing. In case re importation is not required, the laboratory shall issue a certificate of destruction for closing the customs formalities in India.

G) PRICE :

The test laboratory shall quote LOWEST price for carrying out HV & Pollution Tests on strings & SF6 puncture test on single units. The test samples will be delivered at the test laboratory at our cost. The price shall also include local taxes if any.

H) PAYMENT TERMS:

BHEL shall open an Irrevocable Letter of Credit in the name of the concerned Lab. After the completion of tests the representative of BHEL, witnessing the tests shall certify the same and 100% amount shall be payable after the submission of 3 sets of original reports in English language.

I) BHEL's SCOPE:

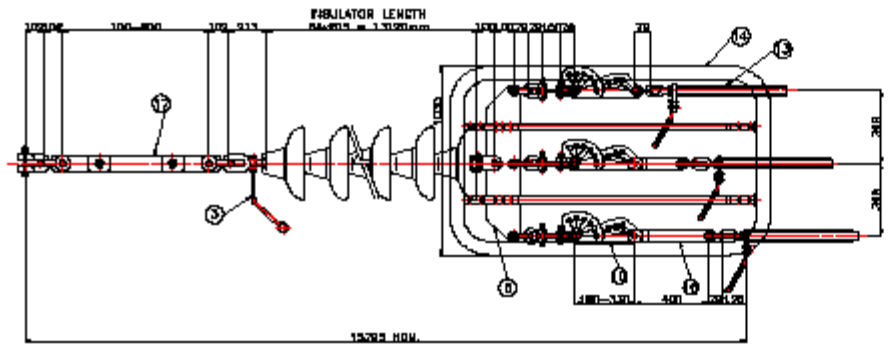
BHEL will arrange to dispatch the required number of test samples & deliver the same at the test laboratory before the commencement of testing at our cost. We will also arrange to Re Import the samples, if required, at our cost. L/C will be opened before the commencement of testing.

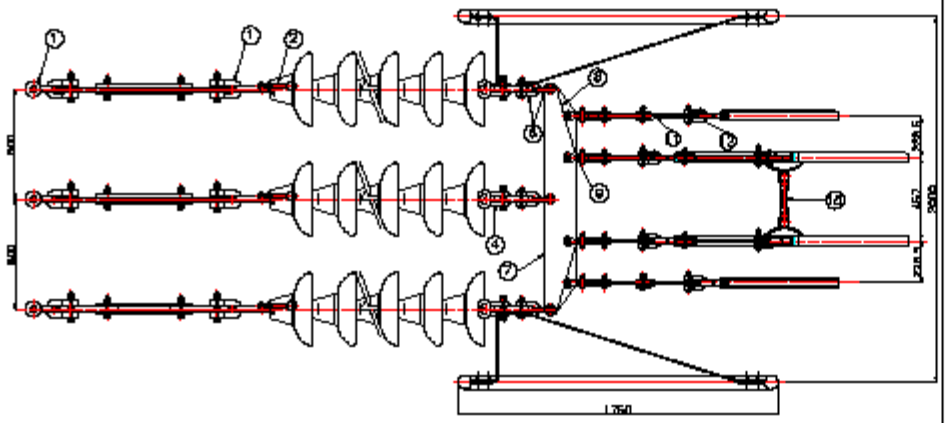
J) SELECTION CRITERION:

The lowest bidder meeting all the technical and commercial requirements shall be awarded the contract. The bidder shall also send the details of testing facilities including rating of the Test equipments, Test hall dimensions including the available Ground clearances, details of calculations of conductor surface gradient etc.

K) CLARIFICATIONS:

Any Clarifications required may please be sent to the following person.
baburao@bhelepd.com +919449003936 (Mr. Y. Babu Rao)





NO.	DESCRIPTION	MATERIAL	QTY.	UTS KN
17	EXTENSION PLATE(A)variable from 100 mm to 800 mm)	MILD STEEL IS:2062 Fe 410	3	440
16	Y-TYPE EXTENSION LINK	MILD STEEL IS:2062 Fe 410	2	220
15	MID ROD SPACER (250mm)	AL ALLOY 65032 IS:739	2	----
14	CORONA CONTROL RING	AL ALLOY 6063/63400 IS:733	2	---
13	COMPN. DEAD END	ALUM. & STEEL IS:2004 CL II	6	175.6
12	ANCHOR SHACKLE	FORGED STEEL IS:2004 CL M	8	180
11	Y-TYPE EXTENSION LINK	MILD STEEL IS:2062 Fe 410	2	220
10	SAG ADJUSTING PLATE	MILD STEEL IS:2062 Fe 410	6	220
9	CLEVIS EYE	FORGED STEEL IS:2004 CL M	6	220
8	TRAPEZOIDAL YOKE PLATE	MILD STEEL IS:2062 Fe 410	1	440
7	TRAPEZOIDAL YOKE PLATE	MILD STEEL IS:2062 Fe 410	2	440
6	ANCHOR SHACKLE	FORGED STEEL IS:2004 CL M	18	220
5	TRAPEZOIDAL YOKE PLATE	MILD STEEL IS:2062 Fe 410	3	440
4	SOCKET CLEVIS	FORGED STEEL EN-19	3	440
3	ARCING HORN	MILD STEEL IS:2062 Fe 410	3	1.5
2	H.H. BALL LINK	FORGED STEEL EN-19	3	440
1	ANCHOR SHACKLE	FORGED STEEL IS:2004 CL M	9	440

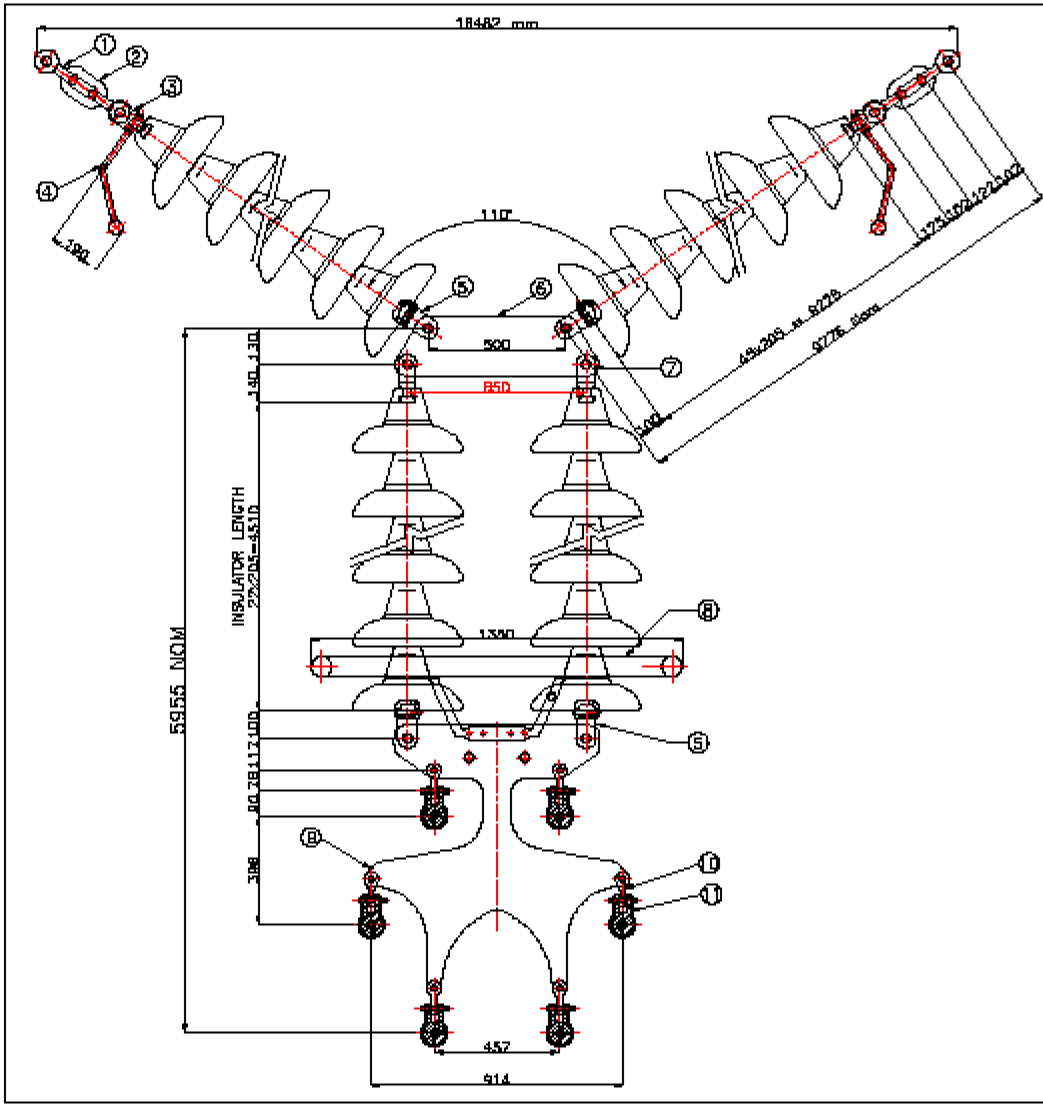
NOTE:-
1. ALL DIMENSION IN mm.
2. TOTAL WEIGHT OF HARDWARE- 453Kg.(Approx.).
3. SLIP STRENGTH OF CLAMP - 178.80KN. MIN.
4. BALL & SOCKET SIZE 28 mm. AS PER IEC-120
5. ALL FERROUS PARTS HOT DIP GALVANISED AS PER POWERGRID SPECIFICATION.
6. SECURITY CLIP: STAINLESS STEEL.
7. GENERAL TOLERANCE ±3% FOR INDIVIDUAL COMPONENTS.
8. TOLERANCE ON TOTAL LENGTH OF H/W FITTING ±2%.
9. ALL BOLTS,NUTS & WASHER H.D.G.
10. WEIGHT IS INDICATIVE AND MANDATORY.
11. UTS OF THE STRING - 1320 KN.
12. MIN. CORONA EXTINCTION VOLTAGE (DRY)-880KV (rms).
13. RIV AT 22KV/cm(POSITIVE) (DRY) - BELOW 1000 microvolts.

INTERNATIONAL TRANSMISSION PRODUCTS PVT. LTD; MUMBAI-78.

DRAWN	NAMRATA	DATE 08.08.08
CHECKED		SCALE 1:30
APPROVED		REV.

TITLE:-
800KV HVDC TRIPPLE TENSION INSULATOR STRING FOR HEXA BUNDLE LAPWING ACSR COND.

DRG. NO. :-
ITP/800KV-TT/HVDC



SL.	DESCRIPTION	MATERIAL	SURF. TREAT.	QTY	U.T.S. KN
11	A. A. SUSPENSION CLAMP	ALUMINIUM ALLOY BR 4600 BS17	——	8	130
10	CLEVIS EYE	FORGED STEEL IS:2004 CL. IV	H.D.G.	8	130
9	SPACING YOKE PLATE	MILD STEEL IS :2062, Fe 410	H.D.G.	1	505
8	GRADING RING	ALUMINIUM ALLOY 6063/63400 IS:733	——	1	–
7	BALL CLEVIS	FORGED STEEL EN-19	H.D.G.	2	440
6	TRAPEZOIDAL YOKE PLATE	MILD STEEL IS :2062, Fe 410	H.D.G.	1	440
5	SOCKET CLEVIS	FORGED STEEL EN-19	H.D.G.	4	440
4	ARCING HORN	MILD STEEL IS :2062, Fe 410	H.D.G.	2	–
3	H.H.BALL EYE	FORGED STEEL EN-19	H.D.G.	3	440
2	CHAIN LINK	FORGED STEEL IS:2004 CL. IV	H.D.G.	2	440
1	ANCHOR SHACKLE	FORGED STEEL IS:2004 CL. IV	H.D.G.	4	440

NOTE:-

1. ALL DIMENSION IN mm.
2. GENERAL TOLERANCE ±3% FOR INDIVIDUAL COMPONENTS.
3. BALL & SOCKET SIZE 28 mm. IS:2486 PART-II.
4. ALL FERROUS PARTS HOT DIP GALVANISED AS PER POWERGRID SPECIFICATION.
5. SECURITY CLIP: STAINLESS STEEL.
6. SLIP STRENGTH OF SUSPENSION CLAMP BETWEEN 20 TO 28KN.
7. TOLERANCE ON TOTAL LENGTH OF H/W FITTING ±2%.
8. ALL BOLTS,NUTS & WASHER H.D.G.
9. UTS OF H/W FITTING – 505KN.
10. SPRING WASHERS ARE ELECTRO GALVANISED.
11. APPROX WEIGHT – 232 KG OF H/W FITTING

INTERNATIONAL TRANSMISSION PRODUCTS PVT. LTD; MUMBAI-78.

DRAWN	NAMRATA	DATE 08.08.09
CHECKED		SCALE 1:20
APPROVED		

TITLE:- 800KV SINGLE 'Y' SUSPENSION STRING FOR HEXA. BUNDLE ACSR LAPWING

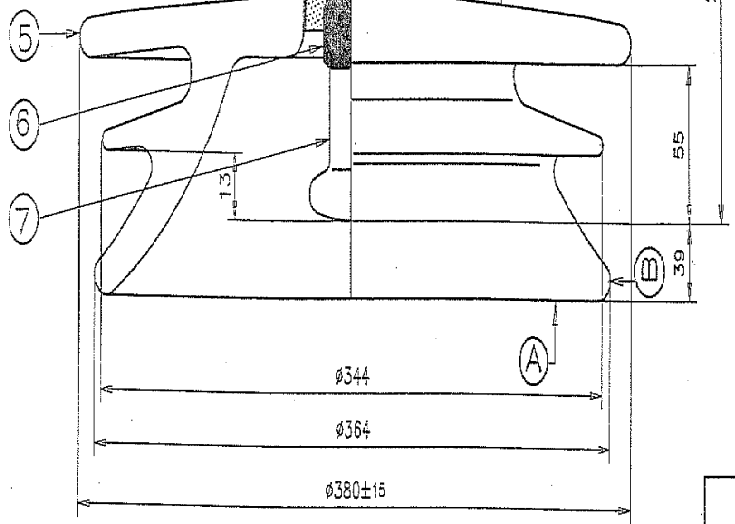
DRG. NO. :- ITP/800KV-SYS

REV. 00

REF. DRG. No.

SIGN AND DATE

INVENTORY No.



10	DC PUNCTURE VOLTAGE (IN SF_6 GAS)	kV (DC)	+240
11	STEEP FRONT WAVE TEST :		
	a) Positive	kV/microsec	2500
	b) Negative	kV/microsec	2500
12	PURITY OF ZINC USED FOR GALVANISING	%	99.95
13	STANDARD TESTING SPEC:	IEC:1325/IEC383/IS:731 ANS C-29.2	
14	ZINC SLEEVE (MIN) :		
	a) Dimensional thickness	mm	3.5
	b) Length of exposed surface	mm	5
	c) Total length	mm	25
	d) Adhereence total/base area (min)	%	80
	e) Purity of zinc (min)	%	99.8

15 No. OF DIPS IN STANDARD PREECE TEST :

a) Socket cap	Nos.	6
b) Ball pin	Nos.	6

16 PERMISSIBLE LIMITS & VISUAL DEFECTS ON PORCELAIN WILL BE AS PER QA PLAN

17 AXIAL AND RADIAL RUNOUT AS PER IEC:1325

a) Variation A 4% of nominal dia

b) Variation B 3% of nominal dia

18 MINIMUM ALUMINA CONTENT BY WEIGHT % 38

19 PF PUNCTURE WITHSTAND VOLTAGE (UNDER OIL) kV 150

20 DRY PF FLASHOVER VOLTAGE kV (rms) 110

21 DRY PF WITHSTAND VOLTAGE kV (rms) 100

22 *MATERIAL CONFORMING TO GRADE 709M40 OF BS: 970 Part 1 :1996
**MATERIAL CONFORMING TO GRADE SG 500/7 OF IS:1865:1991

NOTE : UNTOLERANCED DIMENSIONS INDICATED ARE FOR REFERENCE PURPOSE ONLY AND NOT FOR INSPECTION

FERROUS PARTS ARE HOT-DIP GALVANIZED AS PER IS:2629 AND TESTS CONFORM TO IS:2633/IEC 383/BS 729 (LATEST REVISION)

PORCELAIN BROWN GLAZED

ITEM No.	DESCRIPTION	MATERIAL	QTY
7	BALL PIN	*FORGED STEEL	1
6	SLEEVE	ZINC	1
5	SHELL	ALUMINA PORCELAIN	1
4	BINDING MATERIAL	PORTLAND CEMENT	–
3	CUSHION	CORK/SYN FOAM	1
2	STANDARD SPLIT PIN	STAINLESS STEEL	1
1	SOCKET CAP	**S G IRON	1

CUSTOMER NAME : M/s POWERGRID CORPORATION OF INDIA LIMITED., GURGAON

PROJECT NAME : ±800 kV HVDC BISWANATH CHARIYALI-AGRA TRANSMISSION LINE ASSOCIATED WITH NORTH EAST NORTHERN/WESTERN INTERCONNECTOR-I

SPECN. NUMBER : PKG-11 C-619C2-L079-7

LOA AND DATE :

BHARAT HEAVY ELECTRICALS LTD.
ELECTROPORCELAINS DIVISION
BANGALORE - 560 012

	NAME	SIGN	DATE
DRN	N K DDALAGI		13 01 2009
CHD	–	–	–
APPD	Y B R		15-01-2009

REV	DATE	ALTERED	CHECKED
A2	13 01 09	ALTERED N K DDALAGI	CHECKED

1 SPECIFICATION No. ALTERED

REFER PH No. 5272

DEPT	GRADE OF TOL DIM	SCALE	WEIGHT (kg)	REF TO ASSY.DRG	ITEM No.	No.OF ITEMS
CODE	C/M/F	NTS	20.0 (Approx)			

TITLE
ANTIFOG DISC INSULATOR
FOR 420 kN EMS (HVDC)

ICARD CODE

DRAWING No. EL DG 3 980 44 00200 REV. A2

SJ3 No. 02 No.OF SHEETS

SUPERSEDES DRG. No.

SHT.24 SIZE A3 420 x 297