



NOTICE INVITING TENDER (NIT)

TENDER REF NO: INS ENGG/ POWER ARC TESTING -01/2013-14

GENERAL TERMS AND CONDITIONS OF TENDER

BHEL EPD (A GOVT. OF INDIA ENTERPRISE) DESIRES TO CONDUCT POWER ARC TEST ON 400 kV STRINGS WITH 120 kN & 160 kN DISC INSULATORS AS PER THE DETAILS MENTIONED IN PAGES 1 to 15.

Sealed Bids are invited from eligible TESTING LABORATORIES for conducting POWER ARC Test on 400 kV Strings under TWO PART Bids:

- 1. Techno-Commercial Bid**
- 2. Price Bid**

The Tender Document may be obtained from Sr. Manager/ Insl. Engg BHEL EPD Bangalore-12 and also may be downloaded from BHEL website

<http://bhelceramics.com> or <http://www.bhel.com>

Interested and eligible TESTING LABORATORIES may study the Tender document carefully and offer their bids as Techno-Commercial bid and Price bid in two separate sealed covers duly subscribing the tender name, tender ref. no & due date. Please write 'Techno-Commercial bid' & 'Price Bid' on the respective covers or may be send by Mail.

If the offer is found in open condition, the same will be liable for rejection.

The PRICE BID of the parties who qualify TECHNO COMMERCIALY shall be opened and net cost will be computed. The exchange rate of SBI on the date of Techno Commercial bid opening shall be taken for currency conversion.

The salient features of the Tender Document are as follows:

- | | |
|--|-------------------|
| 1) Format of Techno Commercial Bid – Annexure 'A' | Page No. 2 |
| 2) General requirements, scope of work, Technical details | Page No. 3 to 6 |
| 3) Price Bid Format - Annexure 'B' | Page No. 7 |
| 4) Technical Specification , Scope of work of BHEL
& Testing Laboratory | Page No. 8 & 9 |
| 5) 120 kN and 160 kN Disc Insulators Drawings | Page No. 10 & 11 |
| 6) 400 kV String Drawings | Page No. 12 to 15 |

Sr. Manager/ Insl Engg

**TECHNO COMMERCIAL BID – ANNEXUIRE ‘A’****TENDER REF NO: INS ENGG/ POWER ARC TESTING -01/2013-14****TENDER NAME: POWER ARC TEST ON 400 KV STRINGS WITH 120 kN & 160 kN DISC INSULATORS****DATE OF ISSUE: 04.06.2013****LAST DATE FOR RECEIPT OF TENDER: 11.06.2013 BY 2: 00 PM (IST)****OPENING OF TECHNO COMMERCIAL BID: 11.06.2013 BY 2:30 PM****ESSENTIAL QUALIFICATIONS OF TECHNO - COMMERCIAL OFFER:****ADDRESS OF TEST LABORATORY:**

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Sl. No	PARAMETER	BHEL SPEC REQUIREMENT	LAB OFFER
1	Name of Contact Person	To be mentioned	
2	Email ID	To be mentioned	
3	Mobile No.	To be mentioned	
4	Land Line No.	To be mentioned	
5	Fax No.	To be mentioned	
6	Payment Terms	Through Letter of Credit as per Cl.10 of general terms & conditions	
7	Lead Time for testing	From order date	
8	Tentative Test dates	June/July - 2013	
9	Offer Validity	90 days from tender opening	
10	Tax & duty structure	Service Tax(VAT) , Duty %	
11	Any other charges		

NOTE: Filled forms to be submitted along with Techno Commercial Bid Sealed in a separate cover duly addressed to Sr. Manger/ Insl Engg along with tender name, tender Ref. No. and Date. Tender box available at BHEL-EPD Premises (Main Gate Reception) or Sent through E-Mail to powerarctender@bhelepd.com one for Techno-Commercial bid and other for Price Bid.

SIGNATURE OF TENDERER



GENERAL TERMS AND CONDITIONS OF TENDER

TENDER REF NO: INS ENGG/ POWER ARC TESTING -01/2013-14

TENDER NAME: POWER ARC TEST ON 400 KV STRINGS WITH 120 kN & 160 kN DISC INSULATORS

1. The Techno-Commercial Bid and the Price Bid offer shall be put in two separate sealed covers and the covers should have corresponding TECHNO - COMMERCIAL BID, or PRICE BID, TENDER NAME, TENDER REF NO. AND DUE DATE WRITTEN ON IT. The sealed covers should be addressed to :

**Sr. MANAGER / INSULATOR ENGINEERING DEPT.
BHARAT HEAVY ELECTRICALS LTD.,
ELECTROPORCELAINS DIVISION
P.B No. 1245 , SCIENCE INSTITUTE POST
Bangalore – 560012, INDIA.**

So as to reach within 2:00 pm on the due date and the tenders will be opened at 2:30 pm on the same date in presence of Vendors or their authorised representatives who wish to attend the opening of Techno Commercial bids.

The offer sent through E - mail is also acceptable. The email should be addressed to powerarctender@bhelepd.com and send in two mails one for techno -commercial bid and price bid.

If the offer is found in open condition, the same 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 the price bid at a later stage and the eligible Testing laboratory will be intimated about the date and place of Price Bid opening. BHEL will decide on placing order based on overall L1 (Net Testing Cost).



1. **Scope of Work :** There can be some changes in the string configurations on which the test is required based on our Customer's approval. The same shall be intimated to all the test labs who qualify the technical requirements. Time shall be allotted for clarifications on the same before opening the price bid. Revised price bid shall be requested in such case.
2. **Validity:** The rates finalized for contract shall be valid for ONE YEAR from the release of work order for Testing.
3. **Price Evaluation:** The rates quoted shall be on basis of Ex-works of testing laboratory, it shall be inclusive of unloading charges but exclusive of freight and insurance. Duties and Taxes on the 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 packed in crates and the crates shall 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 made and communicated to BHEL by the Testing laboratory 30 days in advance.
4. **Testing laboratory Capability & Process Requirement:** The Testing Laboratory shall have adequate facility for testing. All equipments and measuring instruments used shall be duly calibrated. The laboratory shall have personnel / process qualification and shall maintain a valid record of the same. The Lab should have sufficient trained crew to ensure smooth flow of work in addition to requisite handling facilities.
5. **Handling Capacity:** The testing Laboratory should have minimum handling facilities for handling and mounting Suspension and Tension Disc Insulator strings.
6. **Lead Time:** Offers shall indicate minimum and maximum lead time required to execute the orders for the tests indicated.
7. **The order will be placed on the testing laboratory depending on their position in comparative statement of the original offer and subject to their acceptance.**
8. **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 benefits as applicable. The comparative statement prepared on the reference date shall remain firm throughout the execution period.



The Foreign Exchange rate taken for reference shall be of Reserve Bank of India on the date of Techno - Commercial Bid Opening.

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

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

9. Ranking Price: For ranking the vendor L1, L2, L3 etc the basis will be lowest tender value arrived at with quoted price as the basis. As far as possible overall L1 price will be considered for award of contract.

10. Payments Terms: BHEL shall open an irrevocable Letter of Credit in the name of the concerned Lab. The 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.

11. Selection Criteria: The lowest bidder meeting all the technical and commercial requirements shall be awarded the contracts. The bidder shall also send the details of the testing facilities including the rating of test equipments.

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

13. Arbitration: Settlement of disputes, if any arises, at any time between BHEL and testing laboratory upon or in relation to or in connection with the Testing laboratory, the same shall be referred to the HEAD of BHEL unit or to a person appointed by him. The award of the arbiter shall be final and binding on both BHEL and the testing Laboratory.

14. Legal Jurisdiction: In case of any proceedings, area of Jurisdiction shall be Bangalore Court only.

15. The Tender not meeting any of the above conditions may not be entertained.



16. 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 specified date. No grace period or late submission is allowed.

17. Contact Person for Information :

General Contract Related queries:	
Name:	B M HIREMANI
Designation:	Sr. MANAGER / INSULATOR ENGG
Tel. No.:	+91 080-22182204
Email ID:	hiremani@bhelepd.com
Mobile:	+91 9449837065

ALL TESTING LABORATORIES SHOULD QUOTE FOR TOTAL COST ONLY AS PER ENCLOSED FORMAT (PRICE BID FORMAT ANEEXURE - B) IN PAGE NO. 7.

**PRICE BID – ANNEXURE ‘B’****TENDER REF NO: INS ENGG/ POWER ARC TESTING -01/2013-14****TENDER NAME: POWER ARC TEST ON 400 kV STRINGS WITH 120 kN & 160 kN DISC INSULATORS AS PER IEC: 61467 :2008 AND CLIENTS****INSTRUCTION**

<u>GUIDELINES TO CALCULATE COST TO BHEL EPD BANGALORE</u>			
SL NO	DESCRIPTION	RATE/STRING	
		IN FIGURES	IN WORDS
A)	Power Arc Test on 400 kV Single ‘I’ Suspension String with 1 X 23 Units of 120 kN Disc Insulators and Hardware Fittings suitable for Twin Moose ACSR Conductor. (Refer Drg No: I_HK12H0004/01/A3)		
B)	Power Arc Test on 400 kV Double ‘I’ Suspension String with 2 X 23 Units of 120 kN Disc Insulators and Hardware Fittings suitable for Quad Moose ACSR Conductor. (Refer Drg No: I_HK24X0006/01/A3)		
C)	Power Arc Test on 400 kV Double Tension String with 2 X 23 Units of 160 kN Disc Insulators and Hardware Fittings suitable for Twin Moose ACSR Conductor. (Refer Drg No: I_AK22H0002/01/A3)		
D)	Power Arc Test on 400 kV Quad Tension String with 4 X 23 Units of 160 kN Disc Insulators and Hardware Fittings suitable for Quad Moose ACSR Conductor. (Refer Drg No: I_AK44X0007/01/A3)		
G)	TAXES IF ANY(%age VAT)		
	TOTAL COST		

NOTE: Filled Forms to be submitted along with Techno-Commercial Bid Sealed in a separate cover Duly Addressed to Sr. Manager / Insl Engg. The Cover May Be Put in Tender Box available at BHEL or Sent through E-Mail To powerarctender@bhelepd.com

SIGNATURE WITH COMPANY SEAL:

NAME:

DESIGNATION WITHIN COMPANY / ORGANISATION:

ADDRESS OF COMPANY / ORGANIZATION:

**TENDER REF NO: INS ENGG/ POWER ARC TESTING -01/ 2013-14****TENDER NAME: POWER ARC TEST ON 400 kV STRINGS WITH 120 kN & 160 kN DISC INSULATORS****TECHNICAL SPECIFICATION****SPECIFICATION FOR CARRYING OUT POWER ARC TEST ON 400 kV DISC INSULATOR STRINGS AS PER IEC:61467:2008**

1. **TEST OBJECT:** 120 kN and 160 kN Disc Insulator Strings for 400 kV Transmission Line.

2. **400 kV STRING CONFIGURATION:**

2.1 400 kV Single 'I' Suspension String with 1 X 23 Units of 120 kN Disc Insulators and Hardware Fittings suitable for **Twin** Moose ACSR Conductor. (Ø 31.77 mm)

Insulator Drawing Number: EL DG 3 980 09 00400 / A1

Assembly Drawing Number: I_HK12H0004/01/A3

Approximate Weight of the String (Insulator + Fittings) – **300 kgs**

2.2 400 kV Double 'I' Suspension String with 2 X 23 Units of 120 kN Disc Insulators and Hardware Fittings suitable for **Quad** Moose ACSR Conductor. (Ø 31.77 mm)

Insulator Drawing Number: EL DG 3 980 09 00400 / A1

Assembly Drawing Number: I_HK24X0006 / Rev 01/A3

Approximate Weight of the String (Insulator +Fittings) – **450 kgs**

2.3 400 kV Double Tension String with 2 X 23 Units of 160 kN Disc Insulators and Hardware Fittings suitable for Twin Moose ACSR Conductor (Ø 31.77 mm)

Insulator Drawing Number: EL DG 3 980 07 03100 / A1

Assembly Drawing Number: I_AK22H0002 /Rev 01/A3

Approximate Weight of the String (Insulator +Fittings) – **500 kgs**

2.4 400 kV Quad Tension String with 4 x 23 Units of 160 kN Disc Insulators and Hardware Fittings suitable for **Quad** Moose ACSR Conductor.

Insulator Drawing Number: EL DG 3 980 03100 / A1

Assembly Drawing Number: I_AK44X0007 /Rev 01/A3

Approximate Weight of the String (Insulator +Fittings) – **1000 kgs**

3. **TESTS:**

3.1 **POWER ARC TEST:** The test shall be performed on the complete string in accordance with IEC 61467 / 2008.

Test Circuit – Type B

Short Circuit Current: 40 k Amps

Test Sequence: 0.2 s, 0.2 s and 0.5 s - One sequence of 3 shots on the sample.



4. 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.

5. TEST SCHEDULE: It is required to commence the above tests during June end July 2013. 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.

6. OTHER SCOPE OF WORK: The test lab shall arrange the following:

- Transportation of insulators & hardware from nearest airport to test laboratory and returning back if necessary.
- 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.

Note:

1) **The Mechanical Strength Test on string and Dry Power Frequency Flashover Test on each Disc Insulators after the Power Arc Test are not under the scope of the Test Laboratory and shall be done by BHEL EPD themselves.**

2) **Required conductors have to be arranged by testing laboratory.**

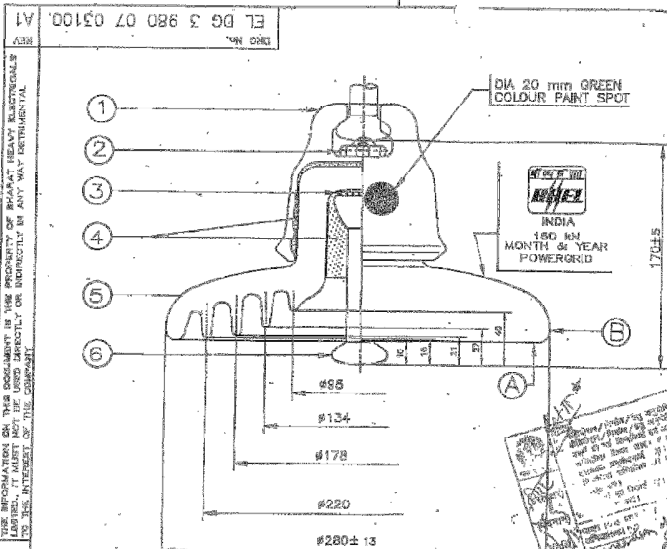
7. DISPOSAL: The samples may have to be re imported after the completion of testing. In case re-importation is not required, the laboratory shall issue a certificate of destruction for closing the customs formalities in India.

8. 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.



FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN mm.



TECHNICAL PARTICULARS

1. BALL & SOCKET COUPLING DESIGNATION IS:2498 (Part-I)-1989 20 mm
2. TOTAL CREEPAGE DISTANCE (mm) 370
3. ELECTROMECHANICAL FAILING LOAD kN 180
4. DRY POWER FREQUENCY FLASHOVER VOLTAGE (rms) kV (rms) 78
5. DRY POWER FREQUENCY WITHSTAND VOLTAGE (rms) kV (rms) 72
6. WET POWER FREQUENCY FLASHOVER VOLTAGE (rms) kV (rms) 48
7. WET POWER FREQUENCY WITHSTAND VOLTAGE (rms) kV (rms) 42
8. IMPULSE FLASHOVER VOLTAGE (+ve & -ve) (peak) kV (peak) 120/125
9. IMPULSE WITHSTAND VOLTAGE (+ve & -ve) (peak) kV (peak) 115
10. POWER FREQUENCY PUNCTURE VOLTAGE (rms) kV (rms) 125
11. MINIMUM VISIBLE DISCHARGE VOLTAGE UNDER DRY CONDITION kV (rms) 18
12. MAXIMUM RIV AT 10 kV (rms), 1 MHz V 50
13. HOT DIP GALVANIZING (ON COMPONENTS ONLY):
 - a) No. of DIPS IN PREEZE TEST 8
 - b) WEIGHT OF ZINC COATING gm/m² 800
 - c) MIN. PURITY OF ZINC USED FOR GALVANIZING % 99.95
14. AXIAL RUNOUT AT POINTER 'A' mm 11.2
15. RADIAL RUNOUT AT POINTER 'B' mm 8.4
16. STANDARD TESTING SPEC. No. IS:731/EC:383 (LATEST REVISION)
17. STEEPNESS OF IMPULSE VOLTAGE WHICH THE DISC INSULATOR CAN WITHSTAND IN STEEP FRONT WAVE TEST kV/μ SEC 2500

CONTROLLED COPY

REVISIONS: 1. 18/01/13
2. 19/01/13
3. 19/01/13

NOTES :

1. PERMISSIBLE LIMITS OF VISUAL DEFECTS ON PORCELAIN AS PER QA PLAN
2. *CONFORMING TO GRADE 450/10 OF IS:1885-1991
3. UNTOLERANCED DIMENSIONS ARE INDICATED FOR REFERENCE PURPOSE ONLY AND NOT FOR INSPECTION

ITEM No.	DESCRIPTION	MATERIAL	QTY
6	BALL PIN	FORGED STEEL	1
5	SHELL	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 : 400KV D/C (QUAD) NELLORE (PG)-THIRUVALAM TRANSMISSION LINE
 PROJECT NAME : 400KV D/C THIRUVALAM-SHOLINGANALLUR TRANSMISSION LINE
 LOA No. & DATE : 400KV SRSS Pkg IS02-CC-CS/278-SR1/INS-1948/3/01/WCA/4563 DT 08.01.2013

GHARAT HEAVY ELECTRICALS LTD.
 ELECTROPORCELAINS DIVISION
 BANGALORE - 560 012

DRN	DRN	NAME	DATE
END	END	BALU	18.01.2013
APPO	APPO	B M H	19.01.13
APPO	APPO	B M H	19.01.13

REV	DATE	ALTERED	REV	DATE	ALTERED	REV	DATE	ALTERED
		CHECKED			CHECKED			CHECKED

TITLE: **DISC INSULATOR FOR 160 kW EMS**

DEPT: GRADE OF YOL DIM: O/W/P

SCALE: NTS

WEIGHT (kg): 8.5 (Approx)

REF TO ASSEMBLING

CARD CODE

DRAWING No. EL DG 3 980 07 03100 A1

REV. 1

SUB No. 00

MADE SHEETS

SUPERSEDES DRG. No.

SHT.24 SIZE A3 420 x 297

Item	
Part	
Section	
Number	
Revision	
Date	
Drawn	
Checked	
Approved	

TECHNICAL DETAILS :

- 1) ALL DIMENSIONS ARE IN MM.
- 2) GENERAL TOLERANCE ±0.3%
- 3) BALL AND SOCKET SIZE-20mm AS PER IS-2486 (Part - II) / IEC/60120.
- 4) SLIP STRENGTH OF CLAMP : 20 TO 28 KN.
- 5) MIN. UTS OF STRING WITHOUT SUSPENSION CLAMP-240 KN.
- 6) ALL FERROUS PARTS ARE HOT DIP GALVANIZED AS PER IS-2629 / POWERGRID SPECIFICATION.
- 7) SPRING WASHER ELECTRO GALVANIZED.
- 8) MIN CORONA EXTINCTION VOLTAGE (DRY)-320 KV (RMS).
- 9) RIV AT 15MHz & 305 KV RMS (DRY)-BELOW 1000 MICROVOLTS.
- 10) HARDWARE TOLERANCES ON LENGTH ±2%.
- 11) INSULATOR DISC TOLERANCES : ±4 mm PER DISC.
- 12) MAX. MAGNETIC POWER LOSS AT 600 AMP - 1W / CLAMP ASSEMBLY.
- 13) TOTAL WEIGHT OF ASSEMBLY : 82.00 KG (APPROX)

Part-II For Type Testing only

25/12/2012

25/12/2012

Sl. No.	Qty	Description	Part No	Material / Grade	UTS	Remarks
10	4	Anchor Pin	L 1607600	T.T. Aluminum Hot Dipped Galv. 62/35	220 KN	
4	4	HSU Clamp (HSU)		Aluminum Alloy 6061, IS: 677	70 KN	
9	4	Clamp Eye (HSU)	PHS118040	Forged Steel C.L.-W, IS: 2004	hot dip galvanized	70 KN
5	4	Clamp Central Plug (HSU)	PHS118024	Aluminum Alloy 6061/6063, IS: 2191	hot dip galvanized	12 KN
7	1	Yoke Plate	PHS262124	Mild Steel Fe-410, IS: 2062	hot dip galvanized	250 KN
6	2	Socket Clamp	PHS262100	Forged Steel C.L.-W, IS: 2004	hot dip galvanized	180 KN
5	2	Ball Clutch	PHS262074	Forged Steel C.L.-W, IS: 2004	hot dip galvanized	120 KN
4	1	Anchor Beam (HSU)	PHS262076	Mild Steel Fe-410, IS: 2062	hot dip galvanized	12 KN
3	1	Insulator Yoke Plate	PHS262104	Mild Steel Fe-410, IS: 2062	hot dip galvanized	250 KN
2	1	Clamp Eye (HSU)	PHS118040	Forged Steel C.L.-W, IS: 2004	hot dip galvanized	200 KN
1	1	Anchor Shank	PHS262077	Forged Steel C.L.-W, IS: 2004	hot dip galvanized	250 KN
1	1	Anchor		Steel / Grade	250 KN	

Customer :-	POWER GRID CORPORATION LIMITED
Contractor :-	MOHAN - OBC DISCOMBON 27
Manufacturer :-	M/S MOSDORFER INDX PVT. LMT.
Project :-	SUPPLY OF HARDWARE FITTINGS, CONDUCTOR ACCESSORIES AND EARTHING ACCESSORIES TOWER PACKAGES (TWO) FOR 400 KV (AC) EHV/DC DEPENDENT ASSEMBLY TRANSMISSION LINE ASSOCIATED WITH NORTH-ERN REGION
Contract Agreement :-	GD/CA/12-184/PW-1279/USPCN-1886 DL 12/2/2012

MOSDORFER

MOHAN - OBC DISCOMBON 27

Scale: NTS

400KV Double Y Suspension Insulator String
Quadruple Moose ACSRI(231.77mm) Cond.

Doc. No. LHK24XG006

Rev. 05 A3

