

PROCUREMENT PROCEDURE OF CPRI (NON WORKS)

Revision No. : 04
 Dt of Revisio : 27.08.2020
 Page No. : 1 of 6
 Section : Formats
 Topic : Technical Specifications format

Issue No : 2
 Issue Dt : 30.06.2003
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 FORMAT NO.:CPRI/PUR/eTBID/GTP

Section IV T - Technical Specification

CENTRAL POWER RESEARCH INSTITUTE, BENGALURU/BHOPAL Web: www.cpri.in

Tender Enquiry No : CPRI/BLR22UHVRL73C979

Description of the Equipment/Goods/Services : +/- 1500 kV 50 mA HVDC Test System

Note : 1) The technical bid submitted in other than this format is liable to be rejected.

2) All blue fields are mandatorily to be filled in.

Name and address of the bidder

Quotation Number and Date

Sl.No.	Technical Specifications/Parameters	Qty	To be completed by the Bidder		
			Details of guaranteed technical parameters offered by the bidder	Guaranteed Technical Particulars (GTP)	Deviations from GTP
1.0. QUALIFYING REQUIREMENTS for BIDDER					
1	The bidder should have designed, supply, tested, installed and commissioned at least one number of 1000 kV,20 mA HVDC test system to any testing laboratory during last ten years. The system shall be supplied from Original Equipment manufacturer (OEM) and successfully in operation for more than five years. The bidder shall have to submit the documentary evidences such as performance certificate of test system by indicating the ratings, model, type and successful operation of system for more than five year. CPRI reserve the right to contact the organization, who has issued the performance certificate of the system				
1500 kV 50 mA HVDC Test System					
2	Equipment: 1500 kV 50 mA HVDC Test System	01 Number			
3	Scope: The scope of supply covers the design, development, manufacturing, testing, supply, transit insurance , installation, commissioning and training of 1500 kV, 50 mA to perform all types of DC dielectric tests, RIV, PD, Polarity Reversal test on Cables, Rectifier Transformers, Insulators, Bushings and Thyristor valves on electrical equipment rated up to ±800 kV level				
4	Application: The system shall be suitable to perform the DC dielectric tests, radio interference voltage test, DC partial discharge measurements, Polarity reversal test on all electrical equipment rated up to ±800 kV level as per IEC, IEEE/ANSI and BIS standards				
5	Detailed technical specifications of HVDC Test System:				
5.1	Rated output voltage : 10 to 1500 kV smooth variation of test voltage with regulation as specified in IEC 60060-1 standard.				
5.2	Polarity: Both Positive and Negative polarity				
5.3	Rated current : 50 mA @ 1500 kV				
5.4	Duty Cycle: 1 Hour ON / 2 Hour OFF at 50 mA Continuous at 20 mA @ 1500 kV level				
5.5	Installation: Mobile type				

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5.6	Suitability : The system shall be designed to perform the polarity reversal test on HVDC equipment. The time required for the polarity reversal of test voltage shall be less than 120 sec using suitable control system				
5.7	Voltage Ripple factor : $\leq 3\%$ at 50 mA with resistive load				
5.8	Installation type : Indoor				
5.9	Acoustic noise level at a distance of 4 m : less than 80 dB				
5.10	Partial discharge level : Very low partial discharge level from the system and pulse count shall be as specified in the relevant standards				
5.11	Operating Conditions at site: Ambient temperature: 10°C to 45 °C Relative humidity: 45 % to 85% RH Mean height of site above sea level: 542 meters Main Power supply: Three phase 11 kV or 415 V shall be provided depending on the requirement of supplier Control power supply: single phase 230 V, 50 Hz				
5.12	The HVDC test system shall be designed in stacked modular based arrangement.				
5.13	A separate suitable grounding and discharge device shall be provided for HVDC test system to discharge the stored energy for load capacitance up to 20 nF. The discharge of test system after completion test voltage application shall be as soon as possible to meet the polarity reversal duration less than 120 sec. The polarity of the test voltage shall be configurable with mechanism in the specified time.				
5.14	Voltage divider : A suitable resistive voltage divider shall be provided for measurement of test voltage with following major specifications:				
5.14.1	Voltage level: 1500 kV				
5.14.2	Type: Indoor and mobile type				
15.4.3	Duty cycle: continuous @ 1500 kV				
15.4.4	The resistive divider shall comply with requirements specified in IEC 60060-1 and IEC 60060-2 standards				
5.15	The coupling capacitor for measurement of radio interference voltage and partial discharges shall be provided. The coupling capacitor shall have following major parameters. Rated voltage : 1500 kV Rated capacitance : ≥ 1 nF PD/RIV Measuring Impedance : The quadropole measuring impedance shall be designed as per the requirements of IEC 60270, CISPR 18-2, NEMA 107 to perform for PD/RIV tests. The output of the PD/RIV measuring impedance shall be connected to measuring system through fiber optic/co-axial transmission with length at least 80 m .				

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5.16	HV Blacking Impedance: The blocking impedance shall be provided to high impedance path to high frequency signals generated from the test system. Rated voltage: 1500 kV Duty cycle: continuous				
5.17	AC/DC Peak Voltmeter: The peak voltmeter shall be supplied for measurement of test voltage. The Peak voltmeter shall meet the requirements of IEC 61083-3:2020 and IEC 60060-2 (latest version) standard. The Peak voltmeter shall have capability to measure the positive, negative peak, form factor, RMS value, Ripple factor				
5.17.1	Input voltage :≥ 1000 V (max.)				
5.17.2	Input Impedance : ≥1 MΩ < 50 pF capacitor				
5.17.3	Frequency range : DC to 200 Hz				
5.17.4	Input connector: Coaxial type/BNC type				
5.18	Compliance with respect to Standards:				
5.18.1	Test System : The requirements of test system shall be fulfil the requirements of the following standards: IEC 60060-1 .				
5.18.2	The Measuring system shall be fulfil the requirements of following standards : IEC 60060-1, IEC 60060-2, IEC 61083-3.				
5.18.3	The expanded uncertainty value for the complete measuring system shall be less than 3% with coverage factor of 2 and confidence level of 95%.				
5.19	Safety and Protection System: The system shall be equipped with necessary safety arrangement with door interlock system, entrance to main test area, warning lamps, Emergency stop, lock based HV switch ON control panel. The system shall be equipped with necessary protection systems such as breakdown detector, primary side fuse protection, circuit breaker, earthing rod arrangement. The system shall be capable of switching off the main power supply in the event of object failures with necessary indication and test current is exceeding the rated current of test system, The necessary indication in the PC based system for respective faults in the system (example: primary current high/ primary voltage low, test current is high). The surge and transient protection for all measuring equipment and relays.				

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 Page No. 4 of 6
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5.20	PC based Measuring and Control System: The test voltage shall be regulated from the PC based Human Machine Interface (HMI) system. This system shall interface all components in the test circuit system to control, regulate and measure the parameters related to test system. The HMI system shall have EMERGENY STOP button accessible to operator, key based control on/off provision, measuring modules. The HMI shall be designed to provide the controls and indications for controlling the test system in line with requirements specified by relevant standards IEC 60060-1, IEC 60060-2 and IEEE std 4. All parameters such as test voltage, test current, input voltage, input current, test time, positive peak, negative peak etc shall be recorded in the PC based measuring system. The recorded data shall be able to export in spreadsheet format for further processing.				
5.21	Interconnection power and Control cable: Suitable length of power and control cables for interconnecting the components of the test system based on the schematic layout of the test laboratory. A length of 30 meters shall be considered for the bid evaluation.				
5.23	Calibration reports for Test System: All type test, routine and performance tests specified in Table 1 of IEC 60060-2 standards shall be carried out at any ILAC/NABL approved laboratory. The calibration reports of measuring equipment shall be calibrated according to IEC 60060-1, IEC 60060-2 and IEC 61083-3 standards at any ILAC/NABL approved laboratories. The reports shall be submitted prior to pre despatch inspection (PDI).				
Additional Accessories and Spare Parts					

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6.0	<p>Pre Dispatch Inspection:</p> <p>The supplier shall submit the routine, type, special and calibration test reports of the individual components as well as overall system as detailed in Sl. No. 8 above for review before Pre Dispatch Inspection (PDI) to be carried out at the works of the supplier. Further, PDI shall be carried out subject to the satisfactory compliance of all the test and calibration reports in accordance with the relevant standards. The supplier shall conduct the following tests in the presence of CPRI representatives (two officials) at the manufacturer's works as a part of PDI for duration of five days:</p>				
6.0.1	Functional tests of all protection devices				
6.0.2	Operational tests of all devices				
6.0.3	Functionality of all control circuits, overloads and safety interlocks				
6.0.4	Three repeated flashover tests at rated voltage through an external gap to ground with base load connected for each polarity.				
6.0.5	Polarity reversal test at rated voltage				
6.0.6	PD measurement at 100% of rated voltage measurement at rated output voltage				
6.0.7	The determination of scale factor of DC voltage divider shall be demonstrate				
6.0.8	The duty cycle of HVDC test system to be demonstrated with load cycle mentioned with continuous current rating				
6.1	The pre dispatch inspection shall be performed at manufacturing unit or any other facility other than CPRI testing laboratories				
6.2	The expenditure towards the pre despatch inspection of CPRI representatives (two officials) shall be borne by the CPRI for duration of five days to complete the pre despatch inspection programme.				
7	<p>Installation, Commissioning and Functional tests: The total system shall be successfully supplied, installed commissioned and functionally tested for following tests at site:</p> <ol style="list-style-type: none"> 1. Partial discharge measurement test shall be performed with basic capacitive load (voltage divider / coupling capacitor) 2. The ripple factor shall be measured at rated voltage of HVDC test system and it shall be ensured less than 3% with resistive load 3. Polarity reversal test on HVDC test equipment. 				
8	<p>Training: The supplier shall provide two days training programme to CPRI officials during the commissioning time for following aspects.</p> <ol style="list-style-type: none"> 1. Hands on training programme on the operation and safety aspects of the system 2. Tips for the troubleshooting and maintenance service requirements of the system 				

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9	Additional accessories and spare parts: The supplier shall be provided the following list of mandetory spare for successful operation of the system 1. complete set of fuses - 01 set 2. Set of fiber optic cable / Coaxial cables - 01 set 3. Discharge /grounding rods - 01 set 4. Current and voltage metering modules - 01 set				
10	Technical documents to be provided: The following information shall be provided during the bid: 1. schematic diagram of the test system 2. Mass of the major equipment 3. Dimensions of major components 4. Any other information for installation and commissioning of the test system The following documents shall be provided during the supply: 1. Type, Routine, performance test and acceptance test reports of the complete test system 2. Calibration reports of measuring equipment. 3. Operation and maintenance manual of the test system in triplicate 4. Pre dispatch and commissioning test reports Calibration reports, operation & maintenance manuals, schematic layout of the system shall be provided in triplicate copies in hard and soft formats. All the documents shall be provided in English Language only.				
11	Warranty: The complete system shall be guaranteed for duration of minimum 12 months from the date of successful commissioning at site				

PN: 1) Mere statement of "Complied" do not suffice the requirement. The details of technical parameters in proof of CPRI requirements shall be furnished along with technical write-up, catalogues, brochures, literatures, phamplates, or any other documents shall be submitted in hard copy along with technical bid.
 2) Calibration reports/certificates, factory test reports/certificates from an laboratory accredited as per ISO/IEC 17025:2017 /facilites shall be submitted wherever applicable.
 3) CPRI reserves the rights to conduct "predispatch inspection" prior to dispatch at the works of the supplier and the expenditure towards PDI shall be borne by CPRI. However information regarding the rediness of the equipment/machinery for the PDI shall be communicated in writing at least 60 days in advance.
 4) The standards quouted in the tender document are to be considered only latest editions/versions.