

	<u>BHARAT HEAVY ELECTRICAL LIMITED</u>			Enquiry No. :	
	<u>UNIT'S ADDRESS: BHOPAL</u>			Due Date :	
	<u>CONTACT PERSON'S NAME/DESIGN./PHONE NO./E-MAIL (FROM PURCHASE DEPTT.)</u>			Supplier Qtn. No.:	
				Date :	
<u>SPECIFICATION CUM COMPLIANCE CERTIFICATE OF HIGH VOLTAGE DC TEST SYSTEM FOR TESTING ON HVDC CONVERTER TRANSFORMER.</u>					
NOTE:-					
1. The "Offered" Column and where applicable, the "Deviations" & "Remarks" Column of this format shall be filled in by the Vendor and submitted along with the offer. Inadequate / incomplete, ambiguous, or unsustainable information against any of the clauses of the specifications/requirements shall be treated as non-compliance.					
2. The offer and all documents enclosed with offer should be in English language only.					
NAME & ADDRESS OF THE SUPPLIER :		NAME & ADDRESS OF THE INDIAN AGENT :			
TELEPHONE NOS.:		TELEPHONE NOS.:			
FAX NOS.:		FAX NOS.:			
E-MAIL ADDRESS :		E-MAIL ADDRESS :			
SCOPE: SUPPLY, ERECTION & COMMISSIONING OF HIGH VOLTAGE DC TEST SYSTEM FOR TESTING OF HVDC CONVERTER TRANSFORMER COMPLYING WITH SPECIFICATIONS AS BELOW					

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
1.0	PURPOSE & WORKPIECE MATERIAL				
1.1	Purpose: The High Voltage DC test sytem shall be used for DC separate source test and Polarity reversal testing alongwith partial discharge measurement on Converter transformers used in HVDC stations.	Vendor to note			
1.2	Job to be tested :Converter transformer.	Vendor to note			
1.3	Quantity : 01 No.	Vendor to note			
2.0	SPECIFICATIONS (Minimum Requirements)				
2.1	HVDC test system shall be suitable for testing in 400kV and 800kV class converter transformer. Min. test requirement includes: a) DC separate source level of 1275 kV for 2 hours with 15% overvoltage margin. b) Followed by 'a' above, Polarity reversal test at 912 kV for 4 hours. c)Increasing test voltage to max level shall be possible within 1 min.	Vendor to note & confirm			
2.2	Test object load is 0.5 nF to 8 nF with an insulation resistance >1 Gohm.	Vendor to note			
2.3	Load requirement shall be min 15 mA @1300 kV.	Vendor to confirm			
2.4	Polarity reversal shall be accomplished within 2 min preferable 1 min. at 7.5 nF load. Discharge circuit is needed as the insulation resistance can be higher than 1Gohm	Vendor to confirm			
2.5	PD levels shall be max 100pC including commutating pulses.	Vendor to confirm			
2.6	Stability of test voltage better than 1 %, for short duration 60 sec else 3%, both requirements as per IEC 60060-1 2010.	Vendor to confirm			
2.7	The system shall withstand an internal flashover to ground in an oil filled test object at full test voltage	Vendor to confirm			
2.8	The test voltage shall fulfill IEC 60060	Vendor to confirm			
2.9	The voltage measuring system shall fulfill IEC 60060	Vendor to confirm			
2.10	Mobility of the system on wheels/air cushion.	Vendor to confirm			
2.11	Ripple factor less than 3% in ouptut current.	Vendor to confirm			
2.12	HV electrode:Double toroidal/spherical Aluminium structure.	Vendor to confirm			
2.13	Suitable damping resistor /blocking imedance to limit the short circuit current & provides isolation from load during flashover.	Vendor to confirm			
2.14	High Voltage (HV) Divider/Coupling Capacitor suitable to read minimum 1300 kV	Vendor to confirm			
2.15	HV divider shall have separate secondary unit for dc volatge measurements.	Vendor to confirm			
2.16	HV divider shall have separate secondary unit for ac volatge measurements.	Vendor to confirm			
2.17	Have features to supress noise with a HV filter inductance.	Vendor to confirm			
2.18	Mobility of the HV divider on wheels/air cushion.	Vendor to confirm			

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2.19	Top electrode should have facility for two nos HV connection points.	Vendor to confirm			
3.0	Computer controls				
3.1	Settings for trips and overvoltage/overcurrent limits.	Vendor to confirm			
3.2	Provision for changing regulator voltage speed.	Vendor to confirm			
3.3	Provision to see applied voltage and output current.	Vendor to confirm			
3.4	Have fault message indication.	Vendor to confirm			
3.5	Licensed copy of all softwares (including OS), alongwith Ghost backup of PC in Hard Disk to be provided after final commissioning. Additional copy in CD/Pen drive of suitable size.	Vendor to confirm			
3.6	Data transfer ports: The instrument should have at least one ethernet port & two USB ports for easy data transfer to PC/Laptop in compatible operating system.	Vendor to confirm			
3.7	Industrial PC based system with Monitor size minimum 19 inch in LED.	Vendor to confirm			
3.8	If any HMI/PLC any other interface device is used in system, then a separate laptop with latest configuration shall be provided with back of HMI/other interface unit and original valid licensed compatible version of software.	Vendor to confirm			
3.9	Industrial PC with OS: Windows 10, Processor: Intel i7 Processor 5th generation 2x3.1 GHz, Hard Disk: 250 GB, RAM: 8GB, Switches: On/Off switch (back panel), Earthing: Wing nut earth connection M10.	Vendor to confirm			
4.0	ACCESSORIES:				
4.1	AC Power cord of suitable length.	Vendor to confirm			
4.2	Suitable electromagnetically shielded power/control cables and cable connectors of minimum 30 meters length each to be supplied along with the instrument.	Vendor to confirm			
4.3	1600 kV Flexible pipe for connection between HV divider and test object with features as : a) HV connection pipes of length 10 m approx & dia 0.3 m approx. Qty= 3 nos b) Have convenient feature for connection at both ends.	Vendor to confirm			
4.4	REFERENCE DIVIDER -Reference divider alongwith peak voltmeter and measuring cables -The reference divider shall be used for calibration of ac, dc & impulse test system with range as follows: -LI upto 800 kVp -SI upto 600kVp -AC upto 180kV rms -DC level upto 375 kV dc.	Vendor to confirm			
5.0	SPARES: (Optional - to be quoted seperately)				

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5.1	Itemised breakup of electrical and electronic spares are to be offered. Complete list of spares for equipment and accessories, along with specification / type / model, and name & address of the spare supplier shall be furnished along with documentation to be supplied with the equipment. (Unit Price of each item of spare should be offered). The spares will be ordered as per requirement. Note: The price of the spares will not be considered for the evaluation of the machine cost (L1 criteria).	Vendor to confirm			
5.2	All types of spares for equipment and accessories should be available for at least ten years after supply of the equipment. If equipment or control is likely to become obsolete in this period, the vendor should inform BHEL sufficiently in advance and provide drawings of parts / details of spares & suppliers to enable BHEL to procure these in advance, if required.	Vendor to confirm			
5.3	Recommended set of spares for all attachments are to be offered with details.	Vendor to confirm			
6.0	DOCUMENTATION : The following shall be supplied along with the system				
6.1	Instruction manual : 2 copies in hard form and one copy in soft form	Vendor to Confirm			
6.2	Maintenance manual along with circuit/ block diagrams and schematics with troubleshooting instructions: 2 copies in hard form and one copy in soft form	Vendor to Confirm			
6.3	Test & Guarantee Certificate : One set	Vendor to Confirm			
6.4	Calibration certificate to be submitted from laboratory having traceability with international calibration agency : One set	Vendor to Confirm			
6.5	List of customer where equipment has been supplied earlier : One set	Vendor to Confirm			
7.0	CRITERIA FOR DESPATCH CLEARANCE :				
7.1	Inspection at suppliers works before dispatch.	Vendor to Confirm			

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7.2	<p>Following forms the part of acceptance test:</p> <ol style="list-style-type: none"> 1. Checking the scope of delivery for completeness and explanation of test reports of main components. 2. Explanation of main components & assembly of the test system . 3. Checking of the safety features (earthing devices, Emergency Stop, Safety loop, overcurrent & overvoltage protection etc). 4. Demonstration of the specified voltage measuring systems (and, current measuring systems) and all other measuring devices, including explanation of calibration of high voltage measuring system. 5. Demonstration of control functions in manual and automatic modes, as well as explanation of operator device and computerised control system. 6. Voltage test with both polarities each at rated voltage for 90 min; followed by 45 min of first polarity with PD measurement. 7. Breakdown test with external spark gap in air for both polarities each comprising of 3 breakdowns at approx. rated voltage, with subsequent voltage test at rated voltage for 15 min. 8. Check of the ripple factor by calculation. 	Vendor to Confirm			
7.3	Calibration certificate (in complete range as specified in cl 2.1) from laboratory having traceability with international calibration agency : One set	Vendor to Confirm			
7.4	Transportation, boarding & lodging upto supplier's works for inspection activities shall be in scope of BHEL.	Vendor to note			
8.0	INSTALLATION & COMMISSIONING				
8.1	Supplier to take full responsibility for carrying out entire installation and commissioning of the equipment. Commissioning to be done in presence of technical expert from OEM.	Vendor to Confirm			
8.2	Successful proving of all routine and operational tests on BHEL equipments by the supplier shall be considered as part of commissioning. All operational tests deemed necessary for system acceptance and demonstration of all features shall form part of the commissioning activity.	Vendor to Confirm			
8.3	Demonstration by actual use of all supplied components and accessories to their full capacity.	Vendor to confirm			
8.4	Commissioning tools, required for commissioning of the system within stipulated time, shall be brought by the supplier on returnable basis.	Vendor to confirm			
8.5	Schedule for delivery, installation and Commissioning shall be submitted with the offer.	Vendor to furnish			
9.0	TRAINING:				
9.1	<p>Training to BHEL testing engineer and maintenance person should be provided at BHEL, Bhopal in the area of</p> <ol style="list-style-type: none"> (a) Use of all system Features, programming for Measuring Systems & supplied accessories etc. (b) Electrical, Electronic & maintenance for system & other supplied equipments 	Vendor to specify & confirm			
10.0	ACCEPTANCE CRITERIA AT BHEL WORKS:				
10.1	Successful conduction of tests as per clause 2.1 to 2.9	Vendor to note			

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11.0	AMBIENT CONDITIONS:				
11.1	Total System and all supplied items should work trouble free and efficiently under following operating conditions and should give specified accuracies. Power Supply: Voltage: 230V \pm 10%, 1Ø Or 415V \pm 10%, 3Ø, Frequency: 50 Hz \pm 1.5 Hz, Operating Humidity: 10% to 80%, Operating Temperature : 5°C to 45°C (Vendor to confirm that system is suitable for above and details of provisions on the system for the same are to be furnished by Vendor)	Vendor to confirm			
12.0	PACKING:				
12.1	Air worthy/Sea worthy & rigid packing for all items of complete system, all Accessories and other supplied items to avoid any damage/loss in transit. When system is despatched in containers, all small loose items shall be suitably packed in boxes	Vendor to confirm			
13.0	GUARANTEE :				
13.1	12 months from the date of commissioning of the system.	Vendor to confirm			
14.0	GENERAL : The vendor should submit the following information along with offer:				
14.1	Equipment Model & make	Vendor to furnish			
14.2	Vendor to submit, along with offer, the reference list of customers where similar systems have been supplied mentioning the customer, Machine Model, major specifications of the supplied system, Year of Supply etc.	Vendor to submit			
14.3	Detailed catalogues , sketch/ photographs of the m/c and accessories/ attachments should be submitted with the offer.	Vendor to submit			
15.0	QUALIFYING CONDITIONS :				
15.1	The supplier should either be an Original Equipment Manufacturer(OEM) of High Voltage DC Generator or an authorised dealer of the OEM. Dealers have to submit along with the offer, a valid Certificate of Authorisation from OEM for quoting the equipment, along with declaration for support from OEM for erection & commissioning, after sales service & necessary spares.	Vendor to specify & submit			
15.2	The vendor (OEM or Principal of authorised representative) must have supplied and commissioned (directly or through any of its dealers) at least one equipment of OEM make(meeting specifications as per Clause no. 2.1 to 2.9) in the seven years (on the date of opening of Tender) and the equipment is working satisfactorily for more than one year after commissioning.	Vendor to confirm			
15.3	Following documents/information should be submitted by the vendor in reference to supplied equipment, this is required from all the vendors for qualification of their offer.	Vendor to confirm			
15.3.1	One copy of Purchase Order in name of OEM or any Dealer/Vendor for High Voltage DC Generator supplied in line with Clause 15.2	Vendor to submit			
15.3.2	Complete postal address and contact details of customer where above system is installed/supplied.	Vendor to Specify			

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15.3.3	Month & Year of commissioning of equipment.	Vendor to Specify			
15.3.4	The PO copy to clearly mention name of item, type, make and model no. including other details.	Vendor to submit			
15.3.5	Performance certificate (issued within 3 years of tender opening date) from the customers regarding satisfactory performance of the equipment supplied to them vide the Purchase Order as per clause 15.3.1. showing minimum one year satisfactory performance	Vendor to submit			
15.3.6	BHEL reserves the right to verify information submitted by vendor. In case the information is found to be false/incorrect, the offer shall be rejected.	Vendor to note			
16.0	POINTWISE CONFIRMATION:				
16.1	Vendor should confirm/clarify pointwise (all the points) as per specification and provide original technical leaflet, technical details, photographs, scope of supply etc. at the first instance.	Vendor to confirm			