CERTIFICATE OF COMPLIANCE

SL NO.	PARTICULARS	REQUIREMENT	VENDOR TO NOTE/CONFIRM	VENDOR'S COMMENT (NOTED/ CONFIRMED)	DEVIATIONS (IF ANY)
1	**GENERAL REQUIRMENTS**				
1.1	PRE-QUALIFICATION REQUIREMENT	1. The bidder shall comply with the pre-qualification requirement (PQR) as per Annexure-1. Only PQR qualified bidders will be considered for further processing.	Vendor to note		
		2. Bidder to submit records as per the requirement of PQR (Annexure-1).	Vendor to confirm		
1.2	COMPLIANCE ASPECT	The offer shall contain confirmation for compliance to each and every clause of the specification. The certificate of compliance shall be as per Annexure-2. If there is any deviation, the same shall be clearly stated.	Vendor to note		
1.3	LANGUAGE REQUIREMENT	The offer and all documents enclosed with the offer should be in English language only.	Vendor to note		
2	**PURPOSE**	The automatic dissipation factor (tan-delta) and capacitance measurement system is required to measure dissipation factor (tan δ), capacitance (C) of stator winding, stator winding bars and connecting bus bars of turbo-generators rated upto 1000 MW.	Vendor to note		
3	**TEST OBJECT DETAILS**	The test objects which are to be tested are as follows:			
3.1	**GENERATOR STATOR BARS**	The rated voltage of generators varies from 15.75 KV to 27KV and capacitance of single generator bars varies from 4nF to 12nF. The dissipation factor (tan δ) of a stator bar is normally measured in steps of 20% of rated voltage and upto 140% of rated voltage. So, maximum test voltage will be approximately 50 KV.	Vendor to note		
3.2	**STATOR WINDING OF TURBO GENERATOR**	The rated voltage of generators varies from 15.75 KV to 27.0 KV and per phase capacitance of wound generators varies from 0.2μF to 0.6μF and maximum capacitance when all phases together is to be tested is approximately 1.8μF . The dissipation factor (tan δ) of a stator winding is normally measured in steps of 20% of rated voltage and upto 140% of rated voltage. So, maximum test voltage will be approximately 50 KV.	Vendor to note		
4	**SCOPE OF SUPPLY**				

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4.1		The scope of supply includes design, manufacturing, supply, commissioning and proving of automatic tan-delta and capacitance measurement system. The supply shall include basic equipment, standard capacitor and connecting cables with applicable accessories.	Vendor to note		
4.2		External shunt of 15 A or more to be provided in case in-built current capacity of the offered system is less than 15 A.	Vendor to confirm		
4.3		Test voltage source is not in the scope of supply.	Vendor to note		
5	**BASIC REQUIREMENTS**	A modern state of the art automatic dissipation factor (tan-delta) and capacitance measurement system along with essential accessories to measure the dissipation factor (tan δ), capacitance (C) of test object as mentioned in clause 3.1 and 3.2 shall have the following major features in it:	Vendor to note		
5.1		For measurement of tan-delta and capacitance of test objects in ungrounded (floating) as well as grounded test object condition with guard (to nullify the effect on tan-delta due to electrically graded portions while measurements are being conducted) and without guard test facility as per IS 13508:1992/IEC 60894.	Vendor to confirm		
5.2		Integrated laptop with operating software for instrument control, data storage, analysis, report generation and printing.	Vendor to confirm		
5.3		Advance software functions like graphical results for trend analysis along with other important features like digital display of measured value of capacitance, tan-delta, leakage current, applied voltage.	Vendor to confirm		
5.4		Built-in standard interface RS 232/Ethernet/USB.	Vendor to confirm		
5.5		Data storage and enabling easy transfer of data to external PC, conveniently print and storage.	Vendor to confirm		
5.6		Mains cable and other cable set of length minimum 10 meter suitable for interface of instrument and standard capacitor.	Vendor to confirm		
5.7		The measuring unit shall operate on an input supply of 240 ± 6% Volt at 50 ± 3% Hz. **Note: Use of any type of battery in the test system is not acceptable except in laptop.**	Vendor to confirm		
5.8		Test voltage source is not in the scope of supply. Test voltage to be applied from external source available with BHEL.	Vendor to confirm		
5.9		The measuring equipment and the standard capacitor shall be separate entities.	Vendor to confirm		
5.10		Measuring unit consisting of various modules shall be housed in one box.	Vendor to confirm		
5.11		3 nos. copies of original software used for measurement shall be provided	Vendor to confirm		

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6	**TECHNICAL SPECIFICATIONS**				
6.1	FOR DISSIPATION FACTOR (TAN δ) MEASUREMENT	1. Measuring range of dissipation factor (tan δ) = 0...100	Vendor to confirm		
		2. Resolution ≤ $1X10^{-5}$	Vendor to confirm		
		3. Accuracy = ± 1% reading ± 10^{-4} or better	Vendor to confirm		
6.2	FOR CAPACITANCE MEASUREMENT	1. Capacitance measuring range = 0.1nF.....5μF	Vendor to confirm		
		2. Resolution ≤ 0.01 pf	Vendor to confirm		
		3. Accuracy = ± 0.25% reading ± 0.1pF or better	Vendor to confirm		
6.3	STANDARD CAPACITOR	1. The standard capacitor should be portable.	Vendor to confirm		
		2. SF_6 gas filled standard capacitor.	Vendor to confirm		
		3. Rated voltage: Minimum 50KV	Vendor to confirm		
		4. Capacitance and PD of standard capacitor should be such that the overall system meets the requirements as per CL 6.1 and 6.2.	Vendor to confirm		
7	**WORKING ENVIRONMENT CONDITIONS**	The automatic dissipation factor (tan-delta) and capacitance measurement system shall operate under the following environment conditions:	Vendor to confirm		
		1. Operating temperature: 0-45°C			
		2. Humidity: upto 90% RH			
8	**SOURCE OF POWER SUPPLY AND INTER CONNECTING CABLES**	All interconnecting control and power cables shall be supplied by the supplier along with the measuring system. Supplier has to ensure operation of the measurement system under above power supply condition.	Vendor to confirm		
9	**MANDATORY SPARES**	The following items are required to be supplied along with the main equipment: a) Fuses: 2 nos. of each type b) All inter connecting cables as supplied with equipment: 01 no. of each type Price of each spare item to be quoted separately.	Vendor to confirm		
10	**O&M MANUAL**	Operation and maintenance manuals in English shall be supplied with the main test system. The following details shall be included in the manual:	Vendor to confirm		
10.1		Block schematic illustrating the principle of operation of the system.	Vendor to confirm		
10.2		Detailed assembly drawings with clear marking of each assembly/sub-assembly.	Vendor to confirm		
10.3		Installation and commissioning manuals for various components separately and combined.	Vendor to confirm		

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10.4		General maintenance manual of the equipment.	Vendor to confirm		
10.5		Programming manual of controls.	Vendor to confirm		
10.6		Specifications for all type of connecting cables, standard capacitors for measurement test set up.	Vendor to confirm		
10.7		2 nos. original copies of O&M manual (no photocopies) to be supplied along with 3 CD ROMs.	Vendor to confirm		
11	**TEST AND CALIBRATION CERTIFICATES**	1. Calibration certificate for overall measurement system accuracy and measurement accuracy of all the instruments traceable to National/International standards shall be supplied along with the measurement system. 2. Test certificates for the overall measurement system shall be supplied.	Vendor to confirm		
12	**PACKING**	The automatic dissipation factor (tan-delta) and capacitance measurement system/accessories shall be packed in a suitable water proof/vibration proof packing boxes capable of bearing transit hazards. The measurement system shall have proper casing/ covers for its instruments and assemblies for safe handling,storage and transportation.	Vendor to confirm		
13	**COMMISSIONING AND PROVING**	The automatic dissipation factor (tan-delta) and capacitance measurement system shall be commissioned by the supplier at BHEL Haridwar works. Any special instrument/equipment required for commissioning shall be brought by the supplier. The equipment shall be proved at BHEL Haridwar works. It shall be considered commissioned only after successful proving. The job/test object along with HV source required at the time of commissioning shall be provided by BHEL for proving.	Vendor to confirm		
14	**WARRANTY**	The equipment/test system shall have a warranty for a period of at least 12 months after successful completion of installation and commissioning at BHEL Haridwar works.	Vendor to confirm		
15	**TRAINING**	Training of BHEL personnel at BHEL Haridwar works shall be imparted by the supplier regarding its operation, calibration, maintenance and testing. Supplier shall demonstrate its operation under different test modes (floating/grounded) of objects with different test objects having different capacitance value.	Vendor to confirm		
16	**PRE DISPATCH INSPECTION (PDI)**	BHEL reserves the right to conduct PDI at vendor's works prior to dispatch. Accordingly vendor shall raise inspection call for PDI. During PDI the vendor should demonstrate all technical requirements of the specification. Travel, boarding and lodging expenditure of BHEL personnel deputed for PDI will be borne by BHEL.	Vendor to confirm		

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